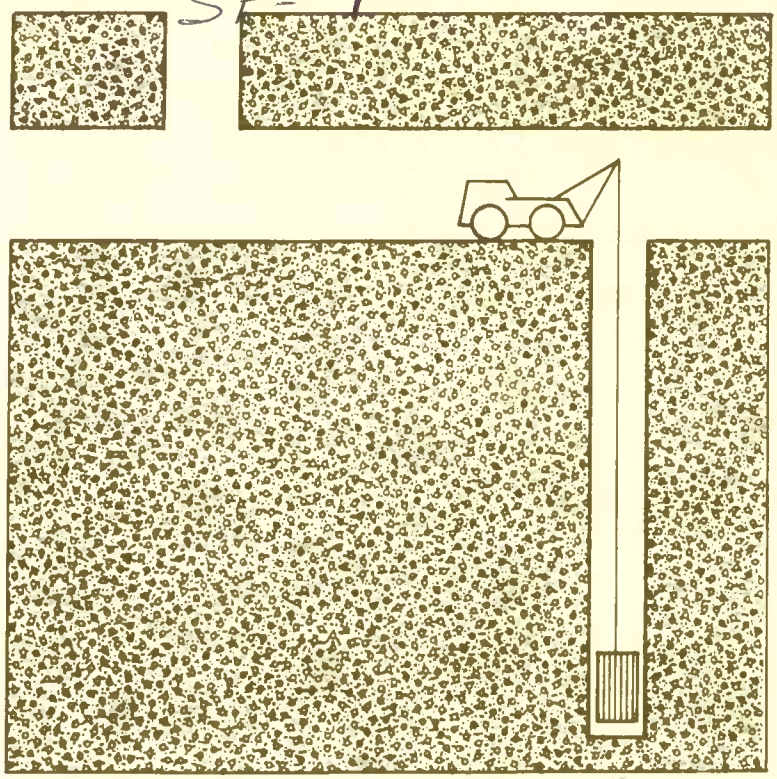
Radioactive Waste Processing and Disposal

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Controlled Fusion and Plasma Research. A Literature Search. June 1977. 4723 refs. covering July 1976 through June 1977. TID-3557-S12. Price Code A99.

Cooling Towers: A Bibliography. Feb. 1981. 300 refs. DOE/TIC-3360(Suppl. 5). Price Code A05.

Electric Batteries: A Bibliography. April 1978. 5422 refs. TID-3361. Price Code A99.

Energy: Social and Economic Aspects. A Bibliography. July 1980. DOE/TIC-3383. Price Code A99.

Environmental Studies at the Savannah River Plant and Immediate Environs: A Bibliography. July 1975. 702 refs. TID-3353. Price Code A05.

Fuel Cells: A Bibliography. July 1980. 1067 refs. covering 1977 through June 1980. DOE/TIC-3359(Suppl. 1). Price Code A11.

Gas Cooled Reactor Technology: A Bibliography. May 1978. 1768 refs. covering July 1976 through Dec. 1977. TID-3339-S2. Price Code A17.

Geothermal Resources: Exploration and Exploitation. July 1976. 5476 refs. TID-3354-R1. Price Code A99.

Hydrogen Fuels: A Bibliography. Feb. 1981. 3298 refs. DOE/TIC-3358(Suppl. 1). Price Code A99.

Liquid Metal Fast Breeder Reactors: A Bibliography. Nov. 1980. 5465 refs. covering Jan. 1978 through Aug. 1980. DOE/TIC-3333(Suppl. 6), Vols. 1 and 2. Price Code A99.

Low-Level Radiation: Biological Interactions, Risks, and Benefits: A Bibliography. Sept. 1978. 3294 refs. covering July 1976 through Sept. 1978. TID-3373. Price Code A99.

Magnetohydrodynamics: Power Generation and Theory. A Bibliography. Nov. 1975. 8539 refs. covering 1957 through Oct. 1975. TID-3356. Price Code A99.

Nuclear Medicine, Bibliography on. Dec. 1976. 4362 refs. covering Jan. 1975 through June 1976. TID-3319-S7. Price Code A22.

Nuclear Quality Assurance: A Bibliography. Sept. 1978. 375 refs. covering Jan. 1976 through June 1978. TID-3337. Price Code A06.

Nuclear Raw Materials: A Selected Bibliography. Jan. 1976. 273 refs. TID-3357. Price Code A03.

Occupational Health Aspects of Uranium: A Selected Bibliography. 716 refs. covering 1948 through 1976. TID-3352. Price Code A07.

Oil Shales: Selected Bibliography of DOE Sponsored Research. Jan. 1980. 436 refs. DOE/TIC-3378. Price Code A07.

Oil Shales and Tar Sands: A Bibliography. April 1981. 5142 refs. DOE/TIC-3367(Suppl. 1). Price Code A99.

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Sodium Technology. August 1977. 1129 refs. covering Jan. 1975 through June 1976. TID-3334-S3. Price Code A10.

Solar Energy: A Bibliography. Mar. 1976. 9732 refs. TID-3351-R1P1, Citations. Price Code A-25. TID-3351-R1P2, Indexes. Price Code A17.

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TID-3311-S5 containing 345 citations, issued 1974
TID-3311-S6 containing 2140 citations, issued 1975
TID-3311-S7 containing 1841 citations, issued 1976
TID-3311-S8 containing 4144 citations, issued 1978, (NUREG-0643)
TID-3311-S9 containing 3598 citations, issued 1980, (NUREG-0644)

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ABSTRACTS

NUCLEAR FUELS

1 (AAEC/PR--44U) NUCLEAR SCIENCE AND TECHNOLOGY BRANCH REPORT 1977. URANIUM FUEL CYCLE PROGRAM. Hardy, C.J. (Australian Atomic Energy Commission Research Establishment, Lucas Heights). Dec 1977. 15p. Dep. NTIS (US Sales Only), PC A02/MF A01.

A report of research programs continuing in the following areas is presented: mining and treatment of uranium ores, manufacture of uranium hexafluoride, uranium enrichment, waste treatment, reprocessing and the uranium fuel cycle. Staff responsible for each project are indicated.

2 (CONF-790949--2) NUCLEAR FUEL CYCLE. Leuze, R.E. (Oak Ridge National Lab., TN (USA)). 1979. Contract W-7405-ENG-26. 64p. Dep. NTIS, PC A04/MF A01.

From Energy resources workshop; Oak Ridge, TN, USA (24 Sep 1979).

The visual aids used in a talk on the nuclear fuel cycle are presented.

3 (K-BD--904) SEISMIC DESIGN OF NONREACTOR NUCLEAR FACILITIES. Beavers, J.E. (Oak Ridge Gaseous Diffusion Plant, TN (USA)). 1980. Contract W-7405-ENG-26. 8p. (CONF-800919--5). NTIS, PC A02/MF A01.

From 7. world conference on earthquake engineering; Istanbul, Turkey (8 Sep 1980).

The state-of-the-art for seismic design of nonreactor nuclear facilities is discussed. Both safety and economic aspects and trends of uranium enrichment plants are emphasized.

4 (KFK--2833) FUEL HANDLING, REPROCESSING, AND WASTE AND RELATED NUCLEAR DATA ASPECTS. Kuesters, H.; Lalovic, M.; Wiese, H.W. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik; Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Wiederaufarbeitung und Abfallbehandlung). Jun 1979. 31p. (CONF-780921--14; PWA--81/78). Dep. NTIS (US Sales Only), PC A03/MF A01.

From Conference on neutron physics and other applied purposes; Harwell, UK (25 Sep 1978).

The essential processes in the out-of-pile nuclear fuel cycle are described, i.e. mining and milling of uranium ores, enrichment, fuel fabrication, storage, transportation, reprocessing of irradiated fuel, waste treatment and waste disposal. The aspects of radiation (mainly gammas and neutrons) and of heat production, as well as special safety considerations are outlined with respect to their potential operational impacts and long-term hazards. In this context the importance of nuclear data for the out-of-pile fuel cycle is discussed. Special weight is given to the LWR fuel cycle including recycling; the differences of LMFBR high burn-up fuel with large PuO_2 content are described. The HTR fuel cycle is discussed briefly as well as some alternative fuel cycle concepts.

5 NUCLEAR FUEL CYCLE. Bulletin de l'Association Suisse des Electricians ; 70: No. 22, 1194-2000(17 Nov 1979). (In French).

From 18. Congress of the international union of producers and distributers of electrical energy (UNIPEDE); Warsaw, Poland (11 - 15 Jun 1979).

All the operations covering extraction, preparation, use and disposal of nuclear fuel are economically interdependent, and in the case of enriched uranium were covered in detail in the UNIPEDE report presented in Vienna in 1976. The present article briefly summarises the operations in diagram form, discusses the major developments which have occurred since 1976 and examines present prospects in the three most sensitive areas: supply of natural uranium, uranium enrichment and the reprocessing of irradiated fuels.

6 CHEMICAL PROCESSES AND PROBLEMS ASSOCIATED WITH THE NUCLEAR FUEL CYCLE. Wethington, J.A. Jr. (Univ. of Florida, Gainesville). Transactions of the American Nuclear Society ; 33: 123-124(1979). (CONF-791103--).

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

FUEL CYCLE;SOLVENT EXTRACTION;ION EXCHANGE; URANIUM;RECOVERY;URANIUM ORES;ORE PROCESSING; PHOSPHATE ROCKS;MILL TAILINGS;RADIATION HAZARDS; CHEMISTRY;EDUCATIONAL TOOLS

7 INORGANIC CHEMISTRY OF NUCLEAR FUEL CYCLES. Findlay, J.R.; Jenkins, I.L. (UKAEA, Harwell. Atomic Energy Research Establishment. Chemical Technology Division); Glover, K.M.; Large, N.R.; Marples, J.A.C.; Potter, P.E.; Sutcliffe, P.W. (UKAEA, Harwell. Atomic Energy Research Establishment. Chemistry Division). pp 419-466 of Modern inorganic chemicals industry. Thompson, R. (ed.). London, England; The Chemical Society (1977).

From Modern inorganic chemicals industry symposium; London, UK (31 Mar 1977).

The aim of this article is to introduce the reader to the many aspects of the inorganic chemistry of the nuclear energy industry. The resources of thorium and uranium are discussed together with the various thermal and fast breeder nuclear reactor systems in which these materials are being exploited. Among the

topics reviewed are the extraction of thorium and uranium from their ores, the enrichment of uranium, the chemistry relating to the heat transfer media for gas-, water- and liquid metal-cooled nuclear reactor systems, and the preparation and fabrication of the various nuclear fuels. The complex chemical changes which occur during irradiation of nuclear fuels within a reactor due to the formation of over 30 elements from the fission of the actinide nuclei, the subsequent reprocessing of the fuel for the separation of uranium and plutonium from the fission product elements, and the inorganic chemical aspects of waste management are considered. Finally some aspects of the actinide elements other than thorium, uranium and plutonium, with particular emphasis on their industrial application, are discussed.

Reserves

8 RELEVANCE OF THE STUDIES OF THE OKLO NATURAL NUCLEAR REACTORS TO THE STORAGE OF RADIOACTIVE WASTES. Hagemann, R.; Roth, E. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Recherche et Analyse). Radiochimica Acta ; 25: No. 3-4, 241-247(1978).

The geological environment of the OKLO natural nuclear reactors is described along with the operating caracteristics of the reactors. Data relevant to the stability of most of the fission products and to the transuranium elements in the reaction zones are reviewed.

9 MIGRATION PATHS FOR OKLO REACTOR PRODUCTS AND APPLICATIONS TO THE PROBLEM OF GEOLOGICAL STORAGE OF NUCLEAR WASTES. Cowan, G.A. (Los Alamos Scientific Lab., NM (USA)). pp 693-699 of Les reacteurs de fission naturels. Vienna: IAEA (1978).

From IAEA symposium on natural fission reactors; Paris, France (19 Dec 1977).

Escape of the products from the Oklo reactor proceeds, first, by escape from the uraninite (UO_2) grains and, second, by transport out of the gangue. Escape from the grain by fission recoil accounts for prompt deposition in the gangue of 5-10% of the products. Escape by volume diffusion is very slow. The rate of loss by diffusion was highest during the operating period of the reactor and may have been of the order of 10^{-6} fraction/a for the most volatile elements. The least volatile elements have been retained in the grains. Their diffusion rates are less than $5x10^{-10}$/a. If similar loss rates can be achieved in synthetic uraninite (or thorianite), the overall rate of transport of most reactor products would be sufficiently limited by diffusion to ensure that essentially all the radioactive species would decay in situ. The principal geochemical requirements for a suitable storage site are those that ensure the survival of the UO_2 matrix, particularly that the pH and Eh are similar to the values at Oklo.

Exploration

10 (AECB--1116) RADIOACTIVE WASTE MANAGEMENT: YESTERDAY, TODAY AND TOMORROW. Prince, A.T. (Atomic Energy Control Board, Ottawa, Ontario (Canada)). Oct 1977. 26p. NTIS (US Sales Only), PC A03/MF A01.

The public believes that there is a radioactive waste problem, but knowledge in the field is so well advanced that the only problem left is how to choose the most economically effective method among many available. Tailings from uranium ore processing could be made harmless by removing the majority of the radium and storing the remaining waste in well-designed retention areas. Non-fuel reactor wastes may be handled by incineraton, reverse osmosis, and evaporation in a central waste management centre. The dry storage of spent fuel in concrete cannisters is being investigated. Ultimate disposal of high-level wastes will be in deep, stable geologic formations.

11 EQUIPMENT FOR COLLECTING SLUDGE SAMPLES FROM SAVANNAH RIVER PLANT WASTE TANKS. Allen, B.M. Jr. (E.I. du Pont de Nemours and Co., Inc., Aiken, SC). pp 386-390 of Proceedings of the 27th conference on remote systems technology. Wallin, D.R. (ed.). La Grange Park, IL: American Nuclear Society, Inc. (1980).

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

A sampler was developed to take 25-l samples of sludge from Savannah River Plant waste tanks. The cylindrical sample vessel has a retractable nose section. Sludge enters an annular space at the nose section as the sampler is forced through the sludge layer with rigid drive pipes. Two samples have been taken and transported in a special cask to a waste processing research facility at the Savannah River Laboratory.

12 RADIOACTIVE LIQUID WASTE MANAGEMENT OF TYPICAL PWR'S. Kang, C.S. (Daewoo Engineering Co. Ltd., Seoul (Republic of Korea)). Journal of the Korean Nuclear Society ; 11: No. 3, 213-217(Sep 1979).

The generation of radioactive waste is systematically reviewed and the characteristics of each waste stream is evaluated for logical processing. Three process schemes such as evaporators, reverse osmosis units, and dimineralizers are proposed to treat the radioactive liquid wastes, and reverse osmosis units are proposed for miscellaneous and detergent wastes. And the small amount of hot lab wastes are proposed to be directly solidified. A redundancy process was also proposed.

13 PROPOSAL OF THRESHOLD LEVELS FOR THE DEFINITION OF NON-RADIOACTIVE WASTES. Yoshida, Y. (Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Kogai To Taisaku (Journal of Environmental Pollution Control) ; 15: No. 5, 677-681(May 1979). (In Japanese).

With increasing amounts of radioactive wastes along with the advances of nuclear power generation and radioactive material utilizations, the needs for management cost reduction and resource saving have arisen. Under the situation, the threshold levels for the definition of non-radioactive solid wastes are required. The problem has been studied by an ad hoc committee in Nuclear Safety Research Association, by the request of the Science and Technology Agency. The matters described are the procedures of deriving the threshold levels, the feasibility studies of the management of waste threshold-level with several enterprises, and future subjects of study. The threshold levels are grouped in two, i.e. the unconditional level and the conditional level. According to the unconditional threshold level, solid wastes are separated definitely into radioactive and non-radioactive ones. According to the conditional threshold level, under certain conditions, some

radioactive solid wastes according to the unconditional level are regarded as non-radioactive ones.

Mining

14 (AAEC/PR--45U) RESEARCH ESTABLISHMENT PROGRESS REPORT 1978 - URANIUM FUEL CYCLE. (Australian Atomic Energy Commission Research Establishment, Lucas Heights). Dec 1978. 14p. NTIS (US Sales Only), PC A02/MF A01.

A report of research programs continuing in the following areas is presented: mining and treatment of uranium ores, uranium enrichment, waste treatment, reprocessing and the uranium fuel cycle. Staff responsible for each project are indicated.

15 SLUDGE DEWATERING BY BELT PRESS. Soderberg, R.L.; Dorman, K.R. (US Bur of Mines, Spokane, Wash). Mining Congress Journal ; 65: No. 8, 29-32(Aug 1979).

The Tait-Andritz mobile double belt filter sludge dewatering machine 20 S3 applies gradually-increasing pressure to dewater material. Four types of tailings were tested to examine possible applications of this system to waste disposal: general mill tailings from a lead, zinc, silver mine in the Coeur d' Alene mining district, cyclone overflow from the same mine, uranium mill tailings consisting of fine sand of sedimentary origin and unthickened coal wash plant waste.

16 LOW-LEVEL RADIOACTIVE WASTE DISPOSAL TECHNIQUES. (Camp Dresser and McKee, Inc, Austin, Tex). pp 69-73 of South Texas uranium seminar, 1978. Sethness, E.D. Jr.; Holmes, C.W. New York, NY; American Inst. of Mechanical Engineers (1979).

This brief review outlines several methods by which the U.S. uranium mining industry has sought to increase the sophistication of disposal and restoration techniques, while keeping pace with the continually changing Federal and state regulations. Considerable progress has been made in the short span of 15 years and the industry has not only maintained environmental quality, but managed to increase production rates as well. Two key methods of waste disposal are highlighted: tailings ponds and deep well injection. 13 refs.

17 FELDER URANIUM PROJECT--RENEWED OPERATIONS. (Exxon Miner Co). pp 101-105 of South Texas uranium seminar, 1978. Barrett, K.E. New York, NY; American Inst. of Mechanical Engineers (1979).

From South Texas uranium seminar; Corpus Christi, TX, USA (10 Sep 1978).

Exxon owns a uranium mill and holds two mining leases in Live Oak County, Texas, about halfway between San Antonio and Corpus Christi. The properties made up the Felder Uranium Operations which was reopened earlier this year. The feasibility study for reopening the Felder Project began in late 1975 and was not completed until late 1976. This paper discusses several areas of the feasibility study that required additional work prior to making the decision to renew operations. Mine planning evaluation and the actual mine planning are described briefly.

Feed Processing

18 (ORNL/TM--6488) GRAPHICAL DETERMINATION OF THE RADIONUCLIDE INVENTORY IN THE CONCENTRATE AND TAILINGS FROM PROCESSING FACILITIES. Crawford, D.J. (Oak Ridge National Lab., TN (USA)). Oct 1979. Contract W-7405-ENG-26. 42p. Dep. NTIS, PC A03/MF A01.

During radiological surveys of radionuclide processing facilities, one must make a determination of the expected inventory of all members of the three naturally occurring radionuclide decay chains. A set of graphs has been developed that display the decay and ingrowth of all members of the ^{232}Th, ^{238}U, and ^{235}U decay series. These graphs may be used in the field to predict present inventories from a knowledge of previous inventories. Equations used to generate several of the graphs are given in tables. 20 figures, 4 tables.

19 DRY CLEANING METHOD FOR COLD TRAP. Kawamura, F.; Komori, I. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 1954-53,799/A/ . 27 Apr 1979. 3p. (In Japanese).

A method is described to remove solid contaminants deposited in a cold trap by only dry process, without use of chemicals. Solid products (such as UO_2F_2 and UF_4) deposited at the bottom or the like part of a cold trap are subjected to a jet of inert gases, such as nitrogen and argon. Pulverized and scrapped contaminants are then converted into aerosol form before removed by suction.

20 REMOVAL OF RADIONUCLIDES FROM PROCESS STREAMS--A REVIEW. Itzkovitch, I.J.; Ritcey, G.M. (Ont Res Found). CANMET (Canada Centre for Mineral and Energy Technology) Report ; No. 79-21, 1-85(Apr 1979).

This report details the origin and control of radium 226, thorium 230 and lead 210 contamination of mill effluent streams from conventional and non-conventional milling of uranium ores, reviews the basic chemistry of the radionuclides as it relates to potential alternatives for control and presents these alternatives along with a summary of published cost data. The conclusions from the study indicate that the current technology, using sulfuric acid processing, solubilizes only a comparatively small quantity of the radionuclides, with the solid tailings containing approximately the same concentration as the original ore. Present technology does not provide for complete removal and isolation of the radionuclides. 122 refs.

21 WET HIGH-INTENSITY MAGNETIC SEPARATION FOR THE CONCENTRATION OF WITWATERSRAND GOLD-URANIUM ORES AND RESIDUES. Corrans, I.J.; Levin, J. (Natl Inst for Metall, Randburg, Transvaal, S Afr). Journal of the South African Institute of Mining and Metallurgy ; 79: No. 8, 210-228(Mar 1979).

Wet high-intensity magnetic separation (WHIMS) for the concentration of gold and uranium was tested on many cyanidation residues, and on some ores and flotation tailings. The results varied, but many indicated recoveries of over 60 per cent of the gold and uranium. The main source of loss is the inefficiency of WHIMS for material of smaller particle size than 20;mu;m. The recoveries in the continuous tests were lower than those in the batch tests. The continuous tests indicated an operational difficulty that could be experienced in practice, namely the tendency for wood chips and ferromagnetic particles to block the matrix of the separator. It was decided that a solution to the problem lies in the modification of the separator to allow continuous removal of the matrix for

cleaning. A system has been developed for this purpose and is being demonstrated on a pilot-plant scale. A simple model describing the operation of the WHIMS machine in terms of the operating parameters is described. This should reduce the amount of empirical testwork required for the optimization of operating conditions and should provide a basis for scale-up calculations.

22 ENGINEERING EVALUATION OF THE DECOMMISSIONING OF FORMER URANIUM ORE PROCESSING FACILITIES. Rogers, V.C.; Overmyer, R.F.; Varley, C.R. (Ford, Bacon and Davis Utah, Inc., Salt Lake City (USA)). pp 411-430 of Decommissioning of nuclear facilities. Vienna, Austria; IAEA (1979).

From International symposium on the decommissioning of nuclear facilities; Vienna, Austria (13 Nov 1978).

The United States Department of Energy has sponsored engineering services relating to the decommissioning and reclamation of former uranium ore milling and processing facilities. The engineering services are divided into two stages: Title I and Title II. The Title I services include: an engineering assessment of existing conditions, estimations of types, areas and volumes of radioactive materials, assessment of building decontamination or demolition efforts, the estimation of potential environmental impacts and the determination of various decommissioning and reclamation alternatives, including cost. The Title II services include the preparation of detailed plans and specifications for implementing the selected reclamation alternatives. Reports have been issued for the Title I effort on 22 inactive uranium milling sites in eight western states. The amount of tailings and contaminated material estimated at the sites ranges from 40,000 to 2,470,000 tons. In some cases, the environmental and health impacts dictate that the tailings and contaminated materials be removed from their current location to alternative long-term storage sites. Alternate sites were located based upon remoteness from populated areas, satisfactory hydrological conditions, availability of cover material, and present and future use of the land. Where on-site storage is considered practical and at alternate storagelocations, the tailings and contaminated materials will be covered with physical stabilization materials such as clay, soil, and gravel or riprap to reduce gamma radiation to background rates, to reduce radon exhalation, and to eliminate the further spread of contaminated materials.

23 PROCESS FOR ENRICHING NUCLEAR FUEL FROM BREEDER AND FISSION WASTE MATERIAL. Puchala, H. (to Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,700,334/A/. 13 Jul 1978. 7p. (In German).

It is proposed to obtain material suitable for nuclear fuel from ores and from burnt up fuel in nuclear power stations, by having smelting furnaces arranged in stages which make separation of material containing calcium-carbide and material containing ferrosilicon possible. The former is processed, and nuclear fuel is contained in the latter, which is enriched by continuous smelting and solidification processes and is later released by a well known process.

24 CHEMISTRY OF PROTACTINIUM, NEPTUNIUM, AMERICIUM, AND CURIUM IN THE NUCLEAR FUEL CYCLE. Keller, O.L. Jr. (Oak Ridge National Lab., TN (USA)). Radiochimica Acta ; 25: No. 3-4, 211-223(1978).

A review of the chemistry of the actinide elements protactinium, neptunium, americium, and curium is given with a focus on their most important roles in the nuclear fuel cycle. The chemistry of Pa in molten salts and molten bismuth as it relates to a conceptual Molten Salt Breeder Reactor is given, followed by a discussion of its behavior in aqueous systems. The principal reactions of neptunium, particularly as they relate to control of oxidation states, are presented for the Purex process. And finally a discussion is given of the new reagents and processes being developed for partitioning of Am(III) and CU(III) from fission products in high level wastes.

25 NUCLEAR FUEL SUPPLY FOR COUNTRIES EMBARKING ON A NUCLEAR POWER PROGRAMME, AND ASPECTS OF DEVELOPING A DOMESTIC NUCLEAR FUEL INDUSTRY. Schmiedel, P.; Pekarek, H. (Kraftwerk Union A.G., Erlangen (Germany, F.R.)). pp 333-342 of Problems associated with the export of nuclear power plants. Proceedings of a symposium held by the IAEA in Vienna, 6-10 March 1978. Vienna; IAEA (1978).

In connection with the implementation of a nuclear power programme, the long-term availability of nuclear fuel-cycle services and the eventual development of a domestic nuclear fuel industry need to be carefully evaluated in any country. The various aspects and possibilities for secure supplies and services for the individual nuclear fuel-cycle steps for light-water reactors - uranium concentrate; uranium enrichment; the manufacture of fuel assemblies; and the disposal of spent fuel - are discussed in detail. The present situation and future tendencies are reviewed on a worldwide basis in order to draw conclusions concerning the supply situation of countries which do not have local fuel supplies. It is shown that foreign supplies of natural uranium, enrichment and fuel manufacturing services need not lead to non-acceptable dependence, because of the increasing international diversification of supply sources as a result of the worldwide implementation of nuclear power programmes. Concerning the disposal of spent fuel assemblies several possibilities of avoiding undue difficulties are discussed. Reference is made to the status of fuel-cycle activities in the Federal Republic of Germany, and the available technology and experience are described for each step of the fuel cycle.

26 METHOD OF WASTE WATER RECYCLING IN URANIUM ORE CHEMICAL TREATMENT PLANTS. Klicka, V.; Mitas, J.; Vacek, J. Czech Patent 167,412/B/. 15 Feb 1977. 5p. (In Czech).

Waste water is thickened by evaporation to a saturated solution from which sodium sulfate as the least soluble component is obtained by further evaporation or cooling. After further purification the obtained sodium sulfate may be used in another industry. The supernatant is returned to the sorption-elution process where the remaining uranium is extracted using common methods. The remaining solution replaces part of the acids for eluant preparation. The waste water evaporation condensate is used in a chemical water treatment plant in place of water from external sources.

27 ATMOSPHERIC Kr^{85} POLLUTION BY NUCLEAR ENERGY. Eggermont, G.; Jacobs, R.; Janssens, A. (Ghent Rijksuniversiteit (Belgium). Instituut voor Kernwetenschappen). Annales de l'Association Belge de Radioprotection ; 1: No. 3, 275-294(1976). (In Dutch).

The nuclear energy development will cause in

2000 a global atmospheric ^{85}Kr pollution of 1 to 1.8 10^{-9} Ci/m^3. Higher maxima can occur in the northern troposphere and in the neighborhood of reprocessing centers. The resulting doses are lower than M P D for population at risk and for genetic risk for the total population. The somatic risk for the total population considering essentially the skin as the most exposed organ results in 4000 to 8000 victums especially in the densely populated world regions. Control techniques such as cryogenic distillation are cost-effective. The application in reprocessing centers influences the cost of the kWh by about 1%. The combined climatological effects of nuclear and chemical pollution demand further research. An optimal time schedule for application of retention is calculated and can be postponed if further reprocessing delays occur; 90% in 1980 and 99% in 1985 can stabilize the pollution. Risks of gaseous waste management are quantified for Belgain nuclear programmes.

Fuels Production and Properties

28 DIRECT DETERMINATION OF THE TOTAL FISSILE CONTENT IN IRRADIATED FUEL ELEMENTS, WASTE CONTAINERS AND OTHER SAMPLES OF THE NUCLEAR FUEL CYCLE. Filss, H.P. (Kernforschungsanlage Juelich, Ger). Nuclear Materials Management ; 8: No. 2, 74-79(1979).

A non-destructive assay system for the direct determination of fissile material is presented which is not influenced by the presence of high level fission product radioactivity (;similar;100 Ci). In order to explain the basic principles of this system, some neutron transport properties in hydrogeneous materials are discussed which lead to the specific attenuation of the source neutrons. Some typical aspects from the measurement of medium-size waste boxes are reported. The system was originally developed for the assay of irradiated HTR pebble bed fuel materials. 10 refs.

29 NONDESTRUCTIVE ASSAY SYSTEM FOR USE IN DECOMMISSIONING A PLUTONIUM-HANDLING FACILITY. Roche, C.T.; Vronich, J.J.; Bellinger, F.O.; Perry, R.B. (Argonne Natl Lab, Ill). Nuclear Materials Management ; 8: 162-173(1979).

Argonne National Laboratory is decommissioning a facility used to fabricate reactor fuel elements. The equipment is contaminated with alpha emitters at levels up to 10^{12} dpm/100 cm^2. The objective of decontamination is to reduce the TRU concentrations below 10 nCi/g of waste. A portable NDA procedure using NaI(Tl) gamma-spectrometric techniques was selected to measure the residual Pu and ^{241}Am in the glove boxes. 13 refs.

30 ALTERATION OF PROCESSING OF NUCLEAR FUEL MATERIALS IN KUMATORI WORKS OF NUCLEAR FUEL INDUSTRIES, LTD. Genshiryoku Iinkai Geppo (Journal of Atomic Energy Commission) ; 23: No. 6, 46-50(Aug 1978). (In Japanese).

A report of the Committee on Examination of Nuclear Fuel Safety to the Atomic Energy Commission of Japan Concerning alteration of processing nuclear fuel materials is presented. Its safety was confirmed. The alteration of processing nuclear fuel materials in Kumatori Works of Nuclear Fuel Industries, Ltd. is as follows. Concerning buildings: the main building is expanded to construct a transport vessel storage; the storage No. 3 for UO_2 powder and others is installed; and a storage for fuel assembly parts is installed. Concerning equipments: for forming, a press, a sintering furnace and three pellet transport equipments are installed along with other improvements; for cladding, improvements are made to raise the capacity; for assemblying, improvement is made to raise the capacity of fuel assembly production for storing UO_2 powder, etc.

Spent Fuels Reprocessing

31 (AED-Conf--78-274-000, pp vp) BEHAVIOUR OF NP AND PU IN THE REPROCESSING OF THORIUM-CONTAINING NUCLEAR FUELS. Wenzel, U.; da Silveira Branquinho, C.L. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Chemische Technologie). 1978. (In German).

From Lecture meeting on principles and applications of nuclear-, radio-, and radiation chemistry; Lindau, F.R. Germany (16 Oct 1978).

HTGR TYPE REACTORS;NEPTUNIUM;PLUTONIUM; CHEMISTRY;PLUTONIUM RECYCLE;RADIOACTIVE WASTES; SEPARATION PROCESSES;SPENT FUELS;STABILITY; THOREX PROCESS

32 (ANL--78-76) CHEMICAL ENGINEERING DIVISION FUEL CYCLE PROGRAMS. QUARTERLY PROGRESS REPORT, APRIL-JUNE 1978. Steindler, M.J.; Ader, M.; Barletta, R.E. (Argonne National Lab., IL (USA)). Dec 1979. Contract W-31-109-ENG-38. 301p. Dep. NTIS, PC A14/MF A01.

Fuel cycle studies reported include development of centrifugal contactors for Purex processes. Tricaprylmethyl-ammonium nitrate and di-n-amyl-n-amylphosphonate are being evaluated as Thorex extractants. Dispersion of uranium and plutonium by fires, and mechanisms for subdividing and dispersing liquids and solids were reviewed. In the pyrochemical and dry processing program, a facility for testing containment materials is under construction; a flowsheet for carbide fuel processing has been designed and studies of carbide reactions in bismuth are underway; salt transport processes are being studied; process-size refractory metal vessels are being fabricated; the feasibility of AIROX reprocessing is being determined; the solubility of UO_2, UO_2 + fission products, and PuO_2 in molten alkali metal nitrates, has been investigated; a flowsheet was developed for reprocessing actinide oxides in molten salts; preparation of Th-U carbide from the oxide is being studied; new flowsheets based on the Dow Aluminum Pyrometallurgical process for reprocessing of spent uranium metal fuel have been prepared; the chloride volitility processing of thorium-based fuels is being studied; the reprocessing of $(Th,U)O_2$ solid solution in KCl-LiCl-$ThCl_4$-Th is being studied; and a flowsheet for processing spent nuclear fuel in molten tin has been constructed. Leach rates of simulated encapsulated waste forms in a metal matrix were studied. Nine criteria for handling waste cladding hulls were established. Strontium and tin migration in glauconite columns was measured. Radioactive Sr in a stream of water moved through oolitic limestone as rapidly as water, but in a stream of water equilibrated with the limestone, Sr moved through the limestone one-tenth as fast. Migration of trace quantities of Cs and I through kaolinite was studied. 88 figures, 53 tables.

33 (ANL--79-6) CHEMICAL ENGINEERING DIVISION FUEL CYCLE PROGRAMS. QUARTERLY PROGRESS REPORT, JULY-SEPTEMBER 1978.

Steindler, M.J.; Ader, M.; Barletta, R.E. (Argonne National Lab., IL (USA)). Jan 1980. Contract W-31-109-ENG-38. 280p. Dep. NTIS, PC A13/MF A01.

Fuel cycle work included hydraulic performance and extraction efficiency of eight-stage centrifugal contactors, flowsheet for the Aralex process, Ru and Zr extraction in a miniature centrifugal contactor, study of Zr aging in the organic phase and its effect on Zr extraction and hydraulic testing of the 9-cm-ID contactor. Work for predicting accident consequences in LWR fuel processing covered the relation between energy input (to subdivide a solid) and the modes of particle size frequency distribution. In the pyrochemical and dry processing program corrosion-testing materials for containment vessels and equipment for studying carbide reactions in bismuth is under way. Analytical studies have been made of salt-transport processes; efforts to spin tungsten crucibles 13 cm dia continue, and other information on tungsten fabrication is being assembled; the process steps of the chloride volatility process have been demonstrated and the thoria powder product used to produce oxide pellets; solubility of UO_2, PuO_2, and fission products in molten alkali nitrates is being investigated; work was continued on reprocessing actinide oxides by extracting the actinides into ammonium chloroaluminate from bismuth; the preparation of thorium-uranium carbide from the oxide is being studied as a means of improving the oxide reactivity; studies are in progress on producing uranium metal and decontaminated ThO_2 by the reaction of $(Th,U)O_2$ solid solution in molten salts containing $ThCl_4$ and thorium metal chips. In the molten tin process, no basic thermodynamic or kinetic factors have been found that may limit process development.

34 (CEA-CONF--4241) TREATMENT OF LIQUID EFFLUENTS OF REPROCESSING PLANTS BY A CHEMICAL PROCESS: FRENCH EXPERIENCE. Fernandez, N.; Taillard, D.; Pottier, P. (CEA Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-les-Durance (France). Dept. de Chimie Appliquee). 1977. 26p. (In French). (CONF-771139--34). Dep. NTIS (US Sales Only), PC A03/MF A01.

From Radioactive effluents from nuclear fuel reprocessing plants seminar; Karlsruhe, F.R. Germany (22 Nov 1977).

The goal of radioactive effluent processing is to obtain a liquid with a residual activity level allowing disposal and a minimum amount of slurries. Insolubilization methods used in France are described to eliminate fission products in reprocessing plants effluents i.e. strontium, cesium, ruthenium and antimony; others radioelements are generally carried away with others precipitates. Evolution of the process is expressed in terms of reprocessing needs and improvements. Decontamination factors better than 100 are now possible with concentration factors between 30 and 50.

35 (CONF-791184--1) SEPARATION OF URANIUM FROM PROCESS WASTEWATERS USING MICROBIAL CELLS AS SORBENTS. Shumate, S.E. II; Strandberg, G.W.; Parrott, J.R. Jr.; Locke, B.R. (Oak Ridge National Lab., TN (USA)). 1979. Contract W-7405-ENG-26. 17p. (CONF-791072--4). NTIS, PC A02/MF A01.

From 9. annual hydrometallurgical meeting; Toronto, Canada (11 Nov 1979).

A mixed culture of denitrifying bacteria was evaluated for separating U from process wastewaters. The mixed culture was obtained as films on coal particles in an operating fluidized-bed bioreactor system. Biosorption of U by the mixed culture was rapid, reaching a saturation of approx. 0.14 g U per gram of dry cells. Two contacting devices were also evaluated. 4 figures. (DLC)

36 (CONF-800334--7) DEVELOPMENTS IN EFFLUENT CONTROL FOR BREEDER REPROCESSING FACILITIES. Yarbro, O.O.; Sears, M.B. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 8p. Dep. NTIS, PC A02/MF A01.

From 2. DOE environmental control symposium; Reston, VA, USA (17 Mar 1980).

10 CFR 20 and 40 CFR 190 impose tight restrictions on the releases of radioactive materials from the fuel cycle. Retention factors needed in the LMFBR and LWR fuel cycles to meet the 40 CFR 190 release limits of ^{85}Kr, ^{129}I, and ^{239}Pu are listed. Technologies for the control of I, ^{85}Kr, and tritium are discussed. Advanced effluent control systems will be demonstrated in the Hot Experimental Facility. (DLC)

37 (CONF-800610--2) REMOVAL OF ACTINIDES FROM NUCLEAR FUEL REPROCESSING WASTES USING AN ORGANOPHOSPHOROUS EXTRACTANT. Chamberlain, D.B.; Maxey, H.R.; McIsaac, L.D.; McManus, G.J. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Jan 1980. Contract EY-76-C-07-1570. 29p. Dep. NTIS, PC A03/MF A01.

From American Institute of Chemical Engineering conference; Philadelphia, PA, USA (6 Jun 1980).

By removing actinides from nuclear fuel reprocessing wastes, long term waste storage hazards are reduced. A solvent extraction process to remove actinides has been demonstrated in miniature mixer-settlers and in simulated columns using actinide feeds. Nonradioactive pilot plant results have established the feasibility of using pulse columns for the process.

38 (CONF-800743--1) RECOVERY OF PLUTONIUM FROM HEPA FILTERS BY CE(IV)-PROMOTED DISSOLUTION OF PuO_2 AND RECYCLE OF THE CERIUM PROMOTER. Leuze, R.E.; Bond, W.D.; Scheitlin, F.M. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 33p. NTIS, PC A03/MF A01.

From International conference on Nuclear waste transmutation; Austin, TX, USA (22 Jul 1980).

The experimental studies carried out included (1) the electrolytic production of Ce(IV) from Ce(III), (2) the leaching of refractory PuO_2 from HEPA filter materials with maintenance of Ce(IV) concentrations by anodic oxidation during leaching, and (3) evaluation of methods for contecting the HEPA solids with the leaching solution and for separating the solid residue from the leaching liquor. Anodic oxidation of Ce(III) was accomplished with an electric current efficiency of about 85% at current densities of 0.04 to 0.4 A/dm^2 at a platinum anode. Refractory PuO_2 was dissolved by a 4.0 M HNO_3 - 0.1 M Ce(IV) solution in 1.5 h at 100°C using stirred-contact leaching of the solids or by recirculating the leachant through a packed column of the solids. Cerium (IV) concentrations were maintained continuously by anodic oxidation throughout leaching. Dissolution times up to 10 h were required unless the HEPA media were oxidized initially in air at 300°C to destroy carbonaceous species which consumed Ce(IV) more rapidly than it could be regenerated by anodic oxidation. Leaching solids in packed columns avoided the relatively difficult liquid-solids separation by centrifugation which was required

after stirred-contact leaching; however, the solids handling difficulties associated with charging and discharging of the packed columns in a remote environment remain a significant design obstacle. A chemical flowsheet is proposed for the recovery of actinides from HEPA filters. A 4 M HNO_3 - 0.1 M Ce(IV) nitrate solution is used as the leachant and the Ce(III) is recycled to the leaching operation using bidentate solvent extraction.

39 (CONF-800802--18(Draft)) IODINE EVOLUTION FROM NUCLEAR FUEL DISSOLVER SOLUTIONS BY AIR SPARGING. Morgan, J.G.; Holland, W.D. (Oak Ridge National Lab., TN (USA); Tennessee Technological Univ., Cookeville (USA)). 1980. Contract W-7405-ENG-26. 32p. NTIS, PC A03/MF A01.

From 89. annual meeting of the American Institute of Chemical Engineers; Portland, OR, USA (17 Aug 1980).

Iodine removal rates were measured from air-sparged nitric acid solutions in experiments designed to simulate part of the iodine recovery system in an advanced fuel reprocessing flowsheet. Variables studied were temperature, sparge rate, and iodine and acid concentrations. Experimental mass transfer coefficients were determined and compared to results based on correlations available in the literature.

40 (CONF-800943--(Summ.)) FUEL CYCLES FOR THE 80'S. (American Nuclear Society, Oak Ridge, TN). 1980. 170p. NTIS, PC A08/MF A01.

From National topical meeting of fuel cycles for the 80's; Gatlinburg, TN, USA (29 Sep 1980).

Papers presented at the American Nuclear Society's topical meeting on the fuel cycle are summarized. Present progress and goals in the areas of fuel fabrication, fuel reprocessing, spent fuel storage, accountability, and safeguards are reported. Present governmental policies which affect the fuel cycle are also discussed. Individual presentations are processed for inclusion in the Energy Data Base.(DMC)

41 (CONF-800943--(Summ.), pp 86-87) PROSPECTS FOR THE BACK-END OF THE FUEL CYCLE IN BELGIUM. Detilleux, E.J. 1980.

From National topical meeting of fuel cycles for the 80's; Gatlinburg, TN, USA (29 Sep 1980).

REPROCESSING;FABRICATION;FUEL ELEMENTS;MIXED OXIDE FUELS;RADIOACTIVE WASTE MANAGEMENT; BELGIUM;GOVERNMENT POLICIES;EUROCHEMIC

42 (DOE/ET/34036--T1) STUDY OF THE POTENTIAL USES OF THE BARNWELL NUCLEAR FUEL PLANT (BNFP). FINAL REPORT. (International Energy Associates Ltd., Washington, DC (USA)). 25 Mar 1980. Contract AC05-80ET34036. 302p. NTIS, PC A14/MF A01.

The purpose of this study is to provide an evaluation of possible international and domestic uses for the Barnwell Nuclear Fuel Plant, located in South Carolina, at the conclusion of the International Nuclear Fuel Cycle Evaluation. Four generic categories of use options for the Barnwell plant have been considered: storage of spent LWR fuel; reprocessing of LWR spent fuel; safeguards development and training; and non-use. Chapters are devoted to institutional options and integrated institutional-use options.

43 (DP--1527) TRACE ELEMENTS RETAINED IN WASHED NUCLEAR FUEL REPROCESSING SOLVENTS. Gray, L.W.; MacMurdo, K.W. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Sep 1979. Contract EY-76-C-09-0001. 21p. Dep. NTIS, PC A02/MF A01.

Analysis of purified TBP extractant from solvent extraction processes at Savannah River Plant showed several stable elements and several long-lived radioisotopes. Stable elements Al, Na, Br, Ce, Hg, and Sm are found in trace quantities in the solvent. The only stable metallic element consistently found in the solvent was Al, with a concentration which varies from about 30 ppM to about 10 ppM. The halogens Br and Cl appear to be found in the solvent systems as organo halides. Radionuclides found were principally ^{106}Ru, ^{129}I, ^{3}H, ^{235}U, and ^{239}Pu. The ^{129}I concentration was about 1 ppM in the first solvent extraction cycle of each facility. In the other cycles, ^{129}I concentration varied from about 0.1 to 0.5 ppM. Both ^{129}I and ^{3}H appear to be in the organic solvent as a result of exchange with hydrogen.

44 (DPSTD-AFCT--77-7) SPENT FUEL HANDLING AND STORAGE FACILITY FOR AN LWR FUEL REPROCESSING PLANT. Baker, W.H.; King, F.D. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Jan 1979. Contract EY-76-C-09-0001. 196p. Dep. NTIS, PC A09/MF A01.

The facility will have the capability to handle spent fuel assemblies containing 10 MTHM/day, with 30% if the fuel received in legal weight truck (LWT) casks and the remaining fuel received in rail casks. The storage capacity will be about 30% of the annual throughput of the reprocessing plant. This size will provide space for a working inventory of about 50 days plant throughput and empty storage space to receive any fuel that might be in transit of the reprocessing plant should have an outage. Spent LWR fuel assemblies outside the confines of the shipping cask will be handled and stored underwater. To permit drainage, each water pool will be designed so that it can be isolated from the remaining pools. Pool water quality will be controlled by a filter-deionizer system. Radioactivity in the water will be maintained at less than or equal to 2×10^{-4} Ci/m^3; conductivity will be maintained at 1 to 2 μmho/cm. The temperature of the pool water will be maintained at less than or equal to 40°C to retard algae growth and reduce evaporation. Decay heat will be transferred to the environment via a heat exchanger-cooling tower system.

45 (ENICO--1003) EVALUATION OF SUBMICRON PARTICLE SIZE CLASSIFICATION AND COLLECTION TECHNIQUES FOR NUCLEAR FACILITY OFF-GAS STREAMS. Fernandez, S.J.; Pierce, G.D.; Murphy, L.P.; Motes, B.G. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Aug 1979. Contract AC07-79ID01675. 33p. Dep. NTIS, PC A03/MF A01.

The present state-of-the-art in submicron aerosol size classification and collection is evaluated. Electrostatic precipitation, cryogenic collection, cascade impaction, and granular bed filtration are examined as collection methods. Methods of aerosol size classification reviewed are: electrical aerosol size analysis and the diffusion battery. An integrated sampler that includes the methods of collection and classification selected, the electrofluidized bed and the diffusion battery, is proposed and development plan presented.

46 (ENICO--1034) TECHNICAL QUARTERLY PROGRESS REPORT, OCTOBER 1-DECEMBER 31, 1979. Plung, D.L. (ed.). (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Jul 1980. Contract AC07-79ID01675. 116p. NTIS, PC A06/MF A01.

Special Materials Production: results of work on the long-term management of ICPP high-level wastes, ICPP plant process improvement, advanced graphite fuels reprocessing, ICPP waste management development, technical support to the New Waste Calcining Facility, effluent monitoring methods evaluation and development, and technical program improvement are reported. Results of work on pelleted waste form development, a Rover mass balance model, pneumatic transport studies, calciner autoignition studies, and development of a continuous alpha monitor are presented. Fuel Cycle Research and Development: results of krypton-85 storage development work are presented. This quarter's work focused on: (1) krypton zeolite encapsulation - including krypton loading and leakage tests and zeolite materials development, and (2) krypton storage development - including conceptual design alternatives, materials and pilot-plant testing, and long-term tests. Other Energy Projects: results of work are presented on nuclear materials security, reactor source term program, burnup methods for fast breeder reactor fuels, specialized fuel research - analytical support, negative thermal ionization mass spectrometry, iodine adsorber evaluation program, and Oklo studies. In addition, results of work on radiological consequences of containment purge, iodine pathway studies, and offsite emergency instrumentation for accidents involving light-water nuclear power plants are reported.

47 (ENICO--1055) PRELIMINARY SAFETY EVALUATION OF A COMMERCIAL-SCALE KRYPTON-85 ENCAPSULATION FACILITY. Christensen, A.B.; Tanner, J.E.; Knecht, D.A. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Sep 1980. Contract AC07-79ID01675. 54p. NTIS, PC A04/MF A01.

This report demonstrates that a commercial-scale facility for encapsulating krypton-85 in zeolite-5A or glass at a 2000 MTHM per year nuclear fuel reprocessing plant can be designed to contain fragments and the 340 to 850 kCi krypton-85 inventory from an assumed catastrophic failure of the high pressure vessel. The vessel failure was assumed as a worst case and was not based on a detailed design evaluation or operating experience. The process design is based on existing commercial hot isostatic pressing technology operated at up to 40 times the scale required for krypton encapsulation. From the calculated process gas inventory in the pressure vessel and vessel design, the explosive energy of 8.4 kg TNT and vessel plug and fragment velocities were calculated. The facility Containment Cell housing the high pressure vessel was designed to contain the gases, fragments, and the shock wave energy calculated for vessel failure. The Access Cell located directly above the Containment Cell was designed to be a tertiary confinement of krypton-85, should the access hatch be breached.

48 (ETR--299) ACTIVITY REPORT 1978. Delande, E.; Drent, W. (eds.). (European Company for the Chemical Processing of Irradiated Fuels, Mol (Belgium)). Jul 1979. 73p. Dep. NTIS (US Sales Only), PC A05/MF A01.

The principal activities of Eurochemic plant in the fields of reprocessing and the solidification and conditioning of liquid and solid wastes are presented in this report that covers the period 1 January to 31 December 1978. Works in the plant are closely related to the decontamination in cooperation with specialized firms. Active operation of bituminization facility was started in June, and a total of 66 m^3 of medium level waste was incorporated into bitumen by the end of 1978. The associated storage facility was in active operation since June and preliminary studies for its extension were completed. A facility was completed for the conditioning of solid wastes arising from the decontamination operation of solid wastes whch were stored under water during plant operation.

49 (IAEA-R--1841-F) REMOVAL OF RADIOIODINE SPECIES FROM GASEOUS STREAM ON INORGANIC ABSORBENTS. FINAL REPORT FOR THE PERIOD 1 NOVEMBER 1976 - 31 OCTOBER 1977. Vujisic, L. (International Atomic Energy Agency, Vienna (Austria)). Nov 1978. 15p. Dep. NTIS (US Sales Only), PC A02/MF A01.

As a contribution to the development of an impregnated absorbent for the removal of airborne iodine species in the off-gas streams of nuclear facilities the adsorption of ^{131}I-labelled methyl iodide on impregnated alumina was investigated. Alcoa alumina H-151 was impregnated with metal nitrates (Ag, Ag+Cd, Ag+Pb) and with triethylenediamine (TEDA). The removal efficiency of CH_3I was experimentally evaluated, as functions of relative humidity of air-stream, its temperature and flow rate and of the amount of impregnated materials. Under constant temperature, relative humidity and face velocity, the retention of CH_3I increases as the total amount of Ag impregnation increases. In a wet air-stream the only efficient impregnation was found to be with silver nitrate. At constant temperature the CH_3I retention decreases with increasing relative humidity or face velocity of the stream. An increase of temperature favours the CH_3I retention. Very low retention of CH_3I was found on TEDA impregnated alumina.

50 (INIS-mf--4782, pp 171-185) REPROCESSING AND WASTE MANAGEMENT. Merz, E. 1977. (In German).

From Energy policies forum of the Landesregierung; Stuttgart, F.R. Germany (9 May 1977).

After a historical survey of problems and failures in existing reprocessing plants, the Purex process and the treatment and storage of different types of waste are described. The risk in reprocessing (radiation exposure) and possible accidents are treated in some more detail.

51 (INIS-mf--5372, pp 52-54) SAFETY CONSIDERATIONS IN A FUEL REPROCESSING PLANT. Siddiqui, H.R.; Kumar, S.V. (Bhabha Atomic Research Centre, Bombay (India). Fuel Reprocessing Div.); Krishnamony, S. (Bhabha Atomic Research Centre, Bombay (India). Health Physics Div.). 1979.

From 6. Indian Association for Radiation Protection conference; Bombay, India (7 Mar 1979).

CRITICALITY;FUEL REPROCESSING PLANTS;LIQUID WASTES;RADIATION ACCIDENTS;RADIATION PROTECTION; RADIOACTIVE WASTE STORAGE;RADIOACTIVE WASTES; SAFETY;SPENT FUEL ELEMENTS;SPENT FUEL STORAGE

52 (INIS-mf--5564, pp 46-58) STUDY OF SOME SALTLESS REDUCERS OF PLUTONIUM AND NEPTUNIUM.

Koltunov, V.S.; Tikhonov, M.F.; Zhuravleva, G.I.; Vashman, A.A. 1977. (In Russian).
From 4. symposium on study into irradiated fuel reprocessing; Karlovy Vary, Czechoslovakia (28 Mar 1977).
The problem of applying some saltless Pu and Np reducers in the radioactive liquid wastes is discussed. The problem is of interest for nuclear fuel reprocessing technology. Namely, peculiarities of Pu(6), Pu(4), Np(6) and Np(5) reduction by hydroxylamine, hydrazine and ascorbic acid are considered. The chemical reaction kinetics in nitric acid and oxychloride media are studied. Depending on different conditions of concentration and the type of reducer, temperature, solution acidity and presence of catalyst, rates and duration of individual reactions can differ significantly, which allows to solve different technical tasks. Orders of constant rate and thermodynamical activation parameters for all the above reactions of Pu and Np are determined. Mechanisms of the reactions are discussed. On the basis of the obtained data, a number of methods is suggested for stabilization of different ion pairs Np and Pu(Np(5)-Pu(3), Np(5)-Pu(4), Np(4)-Pu(3) and others) aimed at their separation, or joint recovering at extraction, reextraction and sorption.

53 (INIS-mf--5564, pp 72-82) VANADIUM(5) AS OXIDANT OF NEPTUNIUM AND PLUTONIUM. Koltunov, V.S.; Marchenko, V.I.; Solovkin, A.S.; Tverdovskii, A.N.; Frolov, K.M.; Pushkov, A.A. 1977. (In Russian).
From 4. symposium on study into irradiated fuel reprocessing; Karlovy Vary, Czechoslovakia (28 Mar 1977).
Kinetics and equilibrium of reactions of Np(4), Np(5), Np(6), Pu(3), and Pu(4) ions with vanadium(5) in aqueous solutions and in two-phase systems of TBP-nitric acid are investigated. The investigation was carried out by spectrophotometric method in the $HClO_4$ solutions. Vanadium(5) is a selective oxidant for neptunium and plutonium ions; it oxidizes lower valent Np and Pu forms up to Np(6) and Pu(4). In vanadium(4) presence Pu(6) and Pu(5) reduce to Pu(4). Thus, vanadium is a reagent for neptunium and plutonium stabilization in the most extractible valent forms- Np(6) and Pu(4), which results in the high level of their extraction by TBP from the NH_3 solutions. The full neptunium and plutonium separation may be practically obtained by selective reduction of Np(6) with hydrazine up to Np(5) in the two-phase system. Shown is the possibility of obtaining some reactions mentioned above not only in mixers-settlers but in apparatus with short time of phase contact as well, for instance, in centrifugal extractors.

54 (INIS-mf--5564, pp 304-311) STUDYING THERMOPHYSICAL PROPERTIES OF HIGH-ACTIVE SECONDARY PRODUCTS OF REPROCESSING OF THE BOR-60 REACTOR SPENT FUEL ELEMENTS BY FLUORIDE GASEOUS METHOD. Vorobei, M.P.; Kirillovich, A.P.; Lavrinovich, Yu.G. 1977. (In Russian).
From 4. symposium on study into irradiated fuel reprocessing; Karlovy Vary, Czechoslovakia (28 Mar 1977).
The investigation results are presented of temperature dependence of thermal conduction, specific heat and thermal stability of high-active powdered secondary products of irradiated fuel reprocessing of the BOR-60 reactor by fluoride-gaseous method. The study of thermal and physical properties of sorbents (NaF), calcareous chemical absorbent (95%Ca $(OH)_2$+5%NaOH), and fluoration residues as well was based on differential thermography characterized by satisfactory accuracy (+-15%) and fit for remote maintenance. Thermal conduction of processed high-active sorbents is 20-25% higher than thermal conductivity of initial nonactive material. The general regularity for all sorbents studied is thermal conduction decrease, which passes through the minimum in the range of 500-550 deg C, at temperature increase. Specific heat of all samples grows monotonously with temperature increase. Fluorating residue thermal conduction is 3-5 times as high as sorbent and chemical absorbent thermal conduction. It decreases with temperature increase. It is noted that for dry powdered and granulated materials the character of thermal conduction temperature dependence is mainly defined by relation of such properties as porosity, granula size, bulk density, solid and gaseous phase volume.

55 (INIS-mf--5565, pp 270-275) INVESTIGATION INTO PLUTONIUM SEPARATION FROM SORBENTS AND HIGH-ACTIVE WASTES OF GAS-FLUORIDE TECHNOLOGY. Gorbunov, V.F.; Novoselov, G.P.; Ulanov, S.A. 1977. (In Russian).
From 4. symposium on study into irradiated fuel reprocessing; Karlovy Vary, Czechoslovakia (28 Mar 1977).
The results of investigation into the interaction of plutonium fluorides and some fission products with metal oxides in the molten alkali metal fluorides are presented. Plutonium tetrafluoride reacts with calcium and aluminium oxides forming plutonium dioxide. The plutonium dioxide is slightly soluble in molten salts and it may be quantitatively separated from them. The effect of an oxide precipitant nature on the complete plutonium separation from the molten salts and on its purification from fission products is studied. It is shown that an aluminium oxide precipitates plutonium from the melt, but it does not react with the rare earth fluorides, thus permitting the plutonium separation from the rare earth compounds which form the bulk of fuel fluorating residues.

56 (INIS-mf--5565, pp 210-221) STOP AND REGULATING VALVES FOR RADIOCHEMICAL PLANTS. Cheika, I.; Goudek, A.; Moizhish, K.; Shraer, V. 1977. (In Russian).
From 4. symposium on study into irradiated fuel reprocessing; Karlovy Vary, Czechoslovakia (28 Mar 1977).
The papers on developing stop and regulating valves and selecting material for these valves are reviewed. The main technical requirements of the radiochemical production to the valves are: the fluid stream velocity of 0.2-10000 l/s, remote exchange, one year lifetime or 15000 cycles, the pressure and temperature of the fluid up to 0.6 MPa and up to 120 deg C. It is presupposed to use 03Cr18Ni12 and 03Cr18Ni12Mo2-3 type steels for these valves. The CrWCO type lining materials for the working medium of nitrogen acid are acknowledged unfit. Significantly better anticorrosion properties are found for the electrodes with the 1Cr18Ni Mo2-5 Mn2-4 type lining. The bellow valve design meets the suggested technical requirements most fully. Two perspective projects of the valve of this type are presented.

57 (INIS-mf--5567, pp 260-267) SYNTHESIS AND USE OF STABILIZED INORGANIC IONITES FOR CAPTURING FISSION PRODUCTS. Dolezhal, J.; Kourzhim, V.; Santarova, M.; Steiskal, J. 1975. (In Russian).
From 3. CNEA symposium on investigations in

the field of spent fuel reprocessing; Marianske Lazne, Czechoslovakia (24 Apr 1974).

The advantage of inorganic ionites is high heat and radiation resistance as well as high selectivity towards a certain ion. However, difficulties arise when attempts are made to prepare these materials as particles which, when used for packing ion-exchange columns, reveal suitable hydrodynamic properties: their dimensions should remain constant during ion exchange to avoid plugging of the column. The paper describes a sol-gel technique for preparing stable ball-like particles. Possible application of ion exchange for extracting nuclides from fluorination wastes is also discussed.

58 (INIS-mf--5567, pp 144-151) EXTRACTION OF AMERICIUM, CURIUM, STRONTIUM AND RARE EARTHS FROM AQUA-TAIL SOLUTIONS OF WWER SPENT FUEL ELEMENT REPROCESSING. Shevchenko, V.B.; Smelov, V.S.; Kozlov, A.G.; Chubukov, V.V.; Lanin, V.P.; Smetanin, E.Ya. 1975. (In Russian).

From 3. CMEA symposium on investigations in the field of spent fuel reprocessing; Marianske Lazne, Czechoslovakia (24 Apr 1974).

Theoretical grounds are discussed of conditions ensuring quantitative extraction of strontium, americium, curium, rare earths from the aqueous solution and regimes of element fraction separation during reextraction operations. Technological scheme is described of element extraction from water-tail solutions of WWER spent fuel element reprocessing. This scheme includes: operations of joint extraction of americium, curium, strontium, 0.6M rare earths by di-2-ethylhexylphosphoric acid solution (HDEHP) in the hydrocarbon diluent; strontium reextraction by dilute nitric acid; reextraction of solution containing 0.8M lactic acid and 0.05M sodium dtpa; rare earth reextraction by 3M nitric acid. The technological scheme proposed ensures high degree of element extraction, allows strontium, americium, curium and rare earth successive and selective reextraction with 92-95% output from initial quantity.

59 (INIS-mf--5568, pp 230-239) ECONOMIC STUDY OF SPENT FUEL REPROCESSING USING THE SYWA COMPUTER PROGRAM. Til'e, D.; Fisher, V. 1975. (In Russian).

From 3. CMEA symposium on investigations in the field of spent fuel reprocessing; Marianske Lazne, Czechoslovakia (24 Apr 1974).

Studies were made aimed at verification of the computer model validity and obtaining reprocessing-related economic solutions for any scheme of nuclear power development. The base variant assumes PWR and FBR type electricity generating capacities and aqueous reprocessing of spent oxide fuels. Several other variants considered include fluoride reprocessing, different unit capacities of spent fuel reprocessing plants and timing of their introduction different durations of spent fuel storage. The total costs as well as specific capital, operation and maintenance costs have been calculated. The validity of the SYWA program has been demonstrated, the final results being very sensitive to the input parameters.

60 (INIS-mf--5569, pp 174-189) INTERCONNECTION BETWEEN FUEL REPROCESSING AND RADIOACTIVE WASTE TREATMENT. Dlougi, Z. 1975. (In Russian).

From 3. CMEA symposium on investigations in the field of spent fuel reprocessing; Marianske Lazne, Czechoslovakia (24 Apr 1974).

Problems of LWR and LMFBR type reactors spent fuel reprocessing and associated radioactive waste processing and disposal are discussed in terms of radiation safety and environmental impact. The discussion is based on the experience accumulated in the USA and Western Europe. Data are provided on typical isotopic compositions of the spent fuels and radioactivity of major fission products, actinides and corrosion products formed as a result of fuel cans activation. The experience in radioactive liquid waste storage and processing is summarized. The current practice in radioactive gaseous waste stock disposal in the atmosphere is discussed at greater length. Geological, hydrological and meteorological implications of site selection for spent nuclear fuel reprocessing plants are also considered. The current practice in the field of spent fuel processing is shown to ensure the radiation safety and minimal environmental impact.

61 (INIS-mf--5571, pp 141-144) TYPES AND PROPERTIES OF SOLID AND GASEOUS WASTES PRODUCED DURING EXPERIMENTAL FLUORIDE-GASEOUS REGENERATION OF THE BOR-60 REACTOR FUEL. Kirillovich, A.P.; Lavrinovich, T.G.; Dem'yanovich, M.A.; Skiba, O.V.; Ivanov, P.M.; Serov, A.V.; Vasil'ev, G.I. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Experimental data are given concerning types and characteristics of radioactive wastes obtained during melting of fuel cans and reprocessing of the uranium oxide fuel from the BOR-60 reactor by means of the gaseous fluoride method. Characteristics of irradiated fuel elements and fuel regeneration processes are given. Fuel reprocessing includes fuel elements declading and uranium dioxide purufication by removal of fission products by gaseous-fluoride method. As a result of processing of fuel cans, solid wastes in form of fuel can material ingots and ceramics have been obtained. Characteristics of the wastes obtained as a result of processing, including gaseous ones are given. Characteristics of solid wastes, produsd on fluorination of spent fuels and isotope composition of aerosols from fuel reprocessing are stated.

62 (LA--8272-PR) FISSION PRODUCT RELEASE. PROGRESS REPORT, OCTOBER 1-DECEMBER 31, 1979. Norris, A.E. (comp.). (Los Alamos Scientific Lab., NM (USA)). Mar 1980. Contract W-7405-ENG-36. 9p. Dep. NTIS, PC A02/MF A01.

The set of experiments, undertaken to compare the effects of leaching spent fuel wafers in deionized water at pH 4 under oxidizing and under reducing conditions, was concluded this quarter. Analyses of the leachant solutions still are in progress. A new set of leaching experiments under oxidizing and reducing conditions was begun at pH 8, a pH value likely to be encountered in the ground waters near a nuclear waste repository. Additional experiments were performed to determine whether reducing conditions could be obtained that resulted in less dissolution of UO_2 than has been observed in previous measurements. Addition of a palladium-black catalyst to an ongoing UO_2 dissolution experiment in which hydrogen gas is the reducing agent dramatically lowered the uranium concentration in solution. Work is continuing to determine whether the uranium decrease is caused by a change in the solution or by provision of additional uranium sorption sites.

Use of Fe^{2+} (o-phenanthroline)$_3$ as a reductant in an experiment with sintered UO_2 yielded uranium concentrations in deionized water that were about one-tenth the values obtained in the similar spent-fuel leaching experiments.

63 (ORNL--5566) ACTINIDE PARTITIONING-TRANSMUTATION PROGRAM FINAL REPORT. I. OVERALL ASSESSMENT. Croff, A.G.; Blomeke, J.O.; Finney, B.C. (Oak Ridge National Lab., TN (USA)). Jun 1980. Contract W-7405-ENG-26. 151p. NTIS, PC A08/MF A01.

This report is concerned with an overall assessment of the feasibility of and incentives for partitioning (recovering) long-lived nuclides from fuel reprocessing and fuel refabrication plant radioactive wastes and transmuting them to shorter-lived or stable nuclides by neutron irradiation. The principal class of nuclides considered is the actinides, although a brief analysis is given of the partitioning and transmutation (P-T) of ^{99}Tc and ^{129}I. The results obtained in this program permit us to make a comparison of the impacts of waste management with and without actinide recovery and transmutation. Three major conclusions concerning technical feasibility can be drawn from the assessment: (1) actinide P-T is feasible, subject to the acceptability of fuels containing recycle actinides; (2) technetium P-T is feasible if satisfactory partitioning processes can be developed and satisfactory fuels identified (no studies have been made in this area); and (3) iodine P-T is marginally feasible at best because of the low transmutation rates, the high volatility, and the corrosiveness of iodine and iodine compounds. It was concluded on the basis of a very conservative repository risk analysis that there are no safety or cost incentives for actinide P-T. In fact, if nonradiological risks are included, the short-term risks of P-T exceed the long-term benefits integrated over a period of 1 million years. Incentives for technetium and iodine P-T exist only if extremely conservative long-term risk analyses are used. Further RD and D in support of P-T is not warranted.

64 (ORNL/Sub--79/31056/1/A3) ACTINIDE PARTITIONING-TRANSMUTATION PROGRAM FINAL REPORT. V. PRECONCEPTUAL DESIGNS AND COSTS OF PARTITIONING FACILITIES AND SHIPPING CASKS (APPENDIX 3). (Parsons (Ralph M.) Co., Pasadena, CA (USA)). Jun 1980. Contract W-7405-ENG-26. 405p. NTIS, PC A18/MF A01.

This Appendix contains cost estimate documents for the Fuels Reprocessing Plant Waste Treatment Facility. Plant costs are summarized by Code of Accounts and by Process Function. Costs contribution to each account are detailed. Process equipment costs are detailed for each Waste Treatment Process. Service utility costs are also summarized and detailed.

65 (ORNL/Sub--79/31056/1/A4) ACTINIDE PARTITIONING-TRANSMUTATION PROGRAM. V. PRECONCEPTUAL DESIGNS AND COSTS OF PARTITIONING FACILITIES AND SHIPPING CASKS, APPENDIX 4. FINAL REPORT. (Parsons (Ralph M.) Co., Pasadena, CA (USA)). Jun 1980. Contract W-7405-ENG-26. 254p. NTIS, PC A12/MF A01.

This Appendix contains cost estimate documents for the Fuels Fabrication Plant Waste Treatment Facility. Plant costs are summarized by Code of Accounts and by Process Function. Costs contributing to each account are detailed. Process equipment costs are detailed for each Waste Treatment Process. Service utility costs are also summarized and detailed. Shipping cask costs are provided.

66 (ORNL/TM--6984) ACTINIDE PARTITIONING-TRANSMUTATION PROGRAM FINAL REPORT. IV. MISCELLANEOUS ASPECTS. Alexander, C.W.; Croff, A.G. (Oak Ridge National Lab., TN (USA)). Sep 1980. Contract W-7405-ENG-26. 81p. NTIS, PC A05/MF A01.

This report discusses seven aspects of actinide partitioning-transmutation (P-T) which are important in any complete evaluation of this waste treatment option but which do not fall within other major topical areas concerning P-T. The so-called miscellaneous aspects considered are (1) the conceptual design of a shipping cask for highly neutron-active fresh and spent P-T fuels, (2) the possible impacts of P-T on mixed-oxide fuel fabrication, (3) alternatives for handling the existing and to-be-produced spent fuel and/or wastes until implementation of P-T, (4) the decay and dose characteristics of P-T and standard reactor fuels, (5) the implications of P-T on currently existing nuclear policy in the United States, (6) the summary costs of P-T, and (7) methods for comparing the risks, costs, and benefits of P-T.

67 (PNCT--841-78-60) OPERATION TESTING LABORATORY IN PNC REPROCESSING PLANT, (1). TRANSFER EQUIPMENTS FOR CHOPPED FUEL, DISSOLVER SOLUTION, DEGRADED SOLVENT AND HIGH ACTIVE WASTE. Gonda, K.; Nemoto, T.; Yasu, S.; Miyachi, S. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). Nov 1978. 29p. (In Japanese). NTIS (US Sales Only), PC A03/MF A01.

The transfer equipment for chopped fuel, dissolver solution, degraded solvent and high active waste were installed in the Operation Testing Laboratory of PNC Reprocessing Plant. This paper describes the transfer mechanism and the transfer method of each equipment.

68 (PNL--2985) CLADDING HULL DECONTAMINATION PROCESS: PRELIMINARY DEVELOPMENT STUDIES. Griggs, B.; Bryan, G.H. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Dec 1979. Contract EY-76-C-06-1830. 63p. Dep. NTIS, PC A04/MF A01.

An investigation of the chemical and radioactive properties of fuel hulls was conducted to assist in a decontamination process development effort. The removal of zirconium oxide layers from zirconium was accomplished by a treatment in 600°C HF followed by a dilute aqueous reagent. Similar treatment in fused alkali-zirconium fluoride salt baths was examined. A remotely operated small batch facility was developed and process parameters determined. 16 figures, 9 tables.

69 (PNL--3153) COMPARATIVE TECHNIQUES FOR NUCLEAR FUEL CYCLE WASTE MANAGEMENT SYSTEMS. Pelto, P.J.; Voss, J.W. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Sep 1979. Contract EY-76-C-06-1830. 177p. Dep. NTIS, PC A09/MF A01.

A safety assessment approach for the evaluation of predisposal waste management systems is described and applied to selected facilities in the light water reactor (LWR) once-through fuel cycle and a potential coprocessed UO_2-PuO_2 fuel cycle. This approach includes a scoping analysis on pretreatment waste streams and a more detailed analysis on proposed waste management processes. The primary evaluation parameters used in this study include radiation exposures to the public from radionuclide releases from normal

operations and potential accidents, occupational radiation exposure from normal operations, and capital and operating costs. On an overall basis, the waste management aspects of the two fuel cycles examined are quite similar. On an individual facility basis, the fuel coprocessing plant has the largest waste management impact.

70 (PNL--3166(Pt.1)) CLADDING HULL DECONTAMINATION AND DENSIFICATION PROCESS. PART 1. THE PROTOTYPE CLADDING HULL DECONTAMINATION SYSTEM. Lambright, T.M.; Montgomery, D.R. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Apr 1980. Contract EY-76-C-06-1830. 56p. NTIS, PC A04/MF A01.

A prototype system for decontaminating Zircaloy-4 cladding hulls has been assembled and tested at Pacific Northwest Laboratory. The decontamination process consists of treatment with a gaseous mixture of hydrogen fluoride (HF) and argon (Ar) followed by a dilute aqueous etch of ammonium oxalate, ammonium citrate, ammonium fluoride, and hydrogen peroxide. The continuous cleaning process described in this report successfully descaled small portions of most charges, but was unable to handle the original design capacity of 4 kg/hr because of problems in the following areas: control of HF reactor temperatures, regulation of HF and argon mixtures and flows, isolation of the HF reactor atmosphere from the aqueous washer/rinser atmosphere, regulation of undesirable side reactions, and control over hull transport through the system. Due to the limited time available to solve these problems, the system did not attain fully operational status. The work was performed with unirradiated hulls that simulated irradiated hulls. The system was not built to be remotely operable. The process chemistry and system equipment are described in this report with particular emphasis on critical operating areas. Recommendations for improved system operation are included.

71 (PNL-SA--7752) KRYPTON-85 STORAGE IN SOLID MATRICES. Tingey, G.L.; McClanahan, E.D.; Bayne, M.A.; Gray, W.J.; Hinman, C.A. (Battelle Pacific Northwest Labs., Richland, WA (USA); Hanford Engineering Development Lab., Richland, WA (USA)). 1979. Contract AC06-76RL01830. 9p. (CONF-791112--67). NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

Storage of Kr-85 will be required in support of nuclear power reactors beginning in 1983. Both approaches described here appear to meet the requirements for such a storage medium. Entrapment of the Kr during sputtering has several rather obvious safety advantages. The operation of the process at low rho and at or below room temperature should reduce markedly the potential for significant Kr-85 release to the environment during processing of the waste stream. It also appears that adaptation of this process for handling radioactive materials would also be simpler than the large high pressure, high temperature apparatus required for loading the glass sample. Furthermore, a significantly higher Kr loading is possible in the sputtered metals thus reducing the volume required for storage by as much as a factor of 50 to 100. On the other hand, the low density loaded glass process takes advantage of a very inexpensive starting material and existing commercial technology for high temperature, high pressure processes. The volume of the Kr-loaded glass matrix could be reduced by going to still higher pressures.

72 (PNL-SA--7844) KILOGRAM-SCALE PURIFICATION OF AMERICIUM BY ION EXCHANGE. Wheelwright, E.J. (Battelle Pacific Northwest Labs., Richland, WA (USA)). 1979. Contract EY-76-C-06-1830. 20p. (CONF-7910108--4). NTIS, PC A02/MF A01.

From Symposium on separation science and technology for energy applications; Gatlinburg, TN, USA (30 Oct 1979).

Sequential anion and cation exchange processes have been used for the final purification of ^{241}Am recovered during the reprocessing of aged plutonium metallurgical scrap. Plutonium was removed by absorption of Dowex 1, X-3.5 (30 to 50 mesh) anion exchange resin from 6.5 to 7.5 M HNO_3 feed solution. Following a water dilution to 0.75 to 1.0 M HNO_3, americium was absorbed on Dowex 50W, X-8 (50 to 100 mesh) cation exchange resion. Final purification was accomplished by elution of the absorbed band down 3 to 4 successive beds of the same resin, preloaded with Zn^{2+}, with an NH_4OH buffered chelating agent. The recovery of mixed ^{241}Am-^{243}Am from power reactor reprocessing waste has been demonstrated. Solvent extraction was used to recover a HNO_3 solution of mixed lanthanides and actinides from waste generated by the reprocessng of 13.5 tons of Shippingport Power Reactor blanket fuel. Sequential cation exchange band-displacement processes were then used to separate americium and curium from the lanthanides and then to separate approx. 60 g of ^{244}Cm from 1000 g of mixed ^{241}Am-^{243}Am.

73 (RHO-LD--79-3A) PROCESS TECHNOLOGY AND PROCESS DEVELOPMENT. ROCKWELL HANFORD OPERATIONS SEMIANNUAL REPORT, OCTOBER 1978-MARCH 1979. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Aug 1979. Contract EY-77-C-06-1030. 144p. Dep. NTIS, PC A07/MF A01.

This semiannual report provides information on the technical progress of process technology and process development activities being performed by Research and Engineering, Rockwell Hanford Operations to improve the processing of irradiated reactor fuels, the production of plutonium, and the management of resultant chemical wastes. The work reported herein was performed during the period October 1978 through March 1979.

74 (RHO-LD--79-3B) ROCKWELL HANFORD OPERATIONS PROCESS TECHNOLOGY AND PROCESS DEVELOPMENT. SEMIANNUAL REPORT, APRIL-SEPTEMBER 1979. (Atomics International Div., Richland, WA (USA). Rockwell Hanford Operations). Jun 1980. Contract AC06-77RL01030. 145p. NTIS, PC A07/MF A01.

This semiannual report provides information on the technical progress of process technology and process development activities being performed by Research and Engineering, Rockwell Hanford Operations, to improve the processing of irradiated reactor fuels, the production of plutonium, and the management of resultant radioactive wastes. The work reported herein was performed during the period April 1979 through September 1979.

75 (RHO-SA--122) CONTINUOUS-FLOW APPARATUS FOR DETERMINATION OF ^{90}SR IN MIXTURES OF FISSION PRODUCTS. Jewett, J.R. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Jul 1979. Contract EY-77-C-06-1030. 19p. (CONF-7909110--1). Dep. NTIS, PC A02/MF A01.

From Federation of Analytical Chemistry and

Spectroscopy Societies conference; Philadelphia, PA, USA (17 Sep 1979).

Strontium-90 is determined at Rockwell Hanford Operations in nuclear waste processing plant solutions, and liquid and gaseous effluents. The ^{90}Sr is separated from these samples by liquid/liquid extraction, evaporated to dryness on a stainless steel counting dish, then determined by gross beta counting with a gas proportional counter. This solvent extraction method is based on the selective extraction of various radionuclides by TBP and TTA in 4-methyl-2-pentanone. 15 figures.

76 (SAI--00979-1) IDENTIFICATION OF IODINE-129 SOURCES, CONCENTRATIONS, CONTAMINANT LEVELS AND RADIOIODINE MONITORING TECHNIQUES IN LWR REPROCESSING OPERATIONS. Hower, R.B.; Pence, D.T. (Science Applications, Inc., San Diego, CA (USA)). Oct 1978. Contract EY-77-C-09-0979. 41p. Dep. NTIS, PC A03/MF A01.

Six proposed reprocessing facility designs are described. The potential sources and concentrations of I-129 in each facility are determined and the effects of voloxidation are discussed. The sources and concentrations of NO, NO_2, water vapor, and organic contaminants are also disccussed. Iodine-129 monitoring requirements for process and stack gas streams are determined based on averages of expected I-129 concentrations at the six proposed facilities. Various monitoring techniques are summarized, including LEPS (Low Energy Photon Spectrometry), mass spectrometry, and laser-based methods. The mass spectrometric methods which are potentially sensitive enough are medium pressure photoionization, molecular beam photoionization, surface ionization, and API (Atmospheric Pressure Ionization). The laser-based methods which have the appropriate sensitivities are the laser-induced fluorescence monitor and the intracavity dye laser.

77 (UJV--4620-D,CH,E) PROCESSING OF SPENT NUCLEAR FUEL FROM LIGHT WATER REACTORS. Sraier, V. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Nov 1978. 53p. (In Czech). Dep. NTIS (US Sales Only), PC A04/MF A01.

A comprehensive review is given of the reprocessing of spent nuclear fuel from LWR's (covering references up to No. 18 (1977) of INIS inclusively). Particular attention is devoted to waste processing, safety, and reprocessing plants. In the addendum, the present status is shown on the example of KEWA, the projected large German fuel reprocessing plant.

78 (WINDSCALE-TRANS--813) STATE OF DEVELOPMENT AND PROBLEMS OF CHEMISTRY AND PROCESS TECHNOLOGY IN NUCLEAR FUEL PROCESSING. Baumgaertner, F. (UKAEA Windscale Nuclear Power Development Labs.). 1979. 24p. Available from British Library Lending Division, Boston Spa.

Fuel processing is based on the well-known technology of multi-stage back extraction. Adaptation of conventional apparatus to nuclear technology limitations is not generally necessary. There are no unknown steps, from a technical aspect, for which new ways must be first sought. There is sufficient knowledge and practical experience in the Federal Republic after 10 years preliminary work to be able to plan and to build a technical processing plant. Present development work is concerned with minimisation of gaseous emission and reduction of liquid radioactive waste volumes, process optimisation and increasing the scale of the operation. Long term research aims to develop a still better understanding of the molecular reactions in the Purex Process. These projects are carried out externally to the Nuclear Research Centres, in the nuclear chemistry technical school groups, which are in contact with Industrial and the centre laboratories. A fuel element lasts for about 3 years full power operation in a nuclear power station. If the residual nuclear fuel is to be separated from the nuclear waste, the fuel element must be chemically processed. The chemical and technological problems that have to be solved are dealt with here under 3 headings. 1. Which chemical and technological problems are to be solved. 2. How have they been dealt with previously. 3. What can be achieved by further technical developments and research work.

79 (PNL-TR--409) INVESTIGATIONS OF THE SOLIDIFICATION OF FEED CLARIFICATION SLUDGE IN AN INORGANIC MATRIX RESISTANT TO RADIATION AND HEAT (VITRIFICATION), SUBPROJECT B. Stammler, M.; Eggersdorfer, R.; Gaar, H.; Harr, K.; Schwaemmlein, W.; Sherriff, R. (Battelle-Institut e.V., Frankfurt am Main (Germany, F.R.)). 13 Oct 1980. Translation of BMFT-FB (KWA 1688 A), April 1980 105p. NTIS, PC A06/MF A01.

After concentration, dissolver sludge can be embedded into a glass matrix. The resulting product shows high radiation and recrystallization stability. The process to make the product is simple and causes practically no secondary waste. Mixtures of simulated FKS and frit can be processed into spherical pellets on a pelletizing disc. Another possibility is to pour the mixture into hemispherical cavities in a suitable substrate material. Sintering at about 700°C results in pellets with a vitrified surface. Some of the equipment necessary for the process has been tested.

80 POSITIVE TECHNICAL BALANCE OF BACK-END FUEL CYCLE ACTIVITIES. COMMENTS ON THE 1979 STATUS REPORT OF THE REPROCESSING AND WASTE TREATMENT PROJECT AT KARLSRUHE. Schmieder, H. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Heisse Chemie); Specht, S. (Gesellschaft zur Wiederaufarbeitung von Kernbrennstoffen m.b.H., Eggenstein-Leopoldshafen (Germany, F.R.)). Atomwirtschaft, Atomtechnik ; 25: No. 3, 155-156(Mar 1980). (In German).

The reprocessing and waste treatment project (PWA) with about 240 people employed is one of the largest projects within the Karlsruhe Nuclear Research Centre. According to an agreement concluded with the Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen (DWR) in mid-1979, the activities of the PWA are strictly coordinated with the work carried out by other research facilities and by industry so as to serve the main purpose of establishing a national German reprocessing centre. The Status Report of the PWA presents among others recent results of work on criticality safety, suitability of high-level radioactive vitrified waste for safe ultimate storage, and further development of vitrification techniques for reducing high-level radioactive to solid waste. In addition to results of research and development activities, the report also informs about first findings of a comparative study recently taken up on behalf of the Federal Ministry for Science and Technology for the evaluation of various alternatives to current back-end fuel cycle activities.

81 SCHEMATIC FLOW SHEET COMPARISON OF REPROCESSING PLANTS. Baumgaertner, F. (Technische Univ. Muenchen, Garching (Germany, F.R.). Inst. fuer Radiochemie). Atomkernenergie/Kerntechnik ; 35: No. 2, 81-94(1980). (In German).

Schematic flow sheets of representative Purex-type reprocessing plants namely Purex plant Hanford, Magnoxplant Windscale, NFS, Eurochemic, WAK, BNFP and NFRRC are presented. The process schemes allow direct comparison of different plants by superposition. The following characteristics of the plants are compared: 1. The arrangement of extraction cycles with position of extractors; 2 the combination of solvent washing cycles as sources of the alkaline medium active waste; 3. the rafinate- and condensate-streams as well as the product purification in front of evaporators as the sources of acid and organic medium active waste.

82 ACTINIDE SEPARATIONS. Navratil, J.D.; Schulz, W.W. (eds.). Washington, DC; American Chemical Society (1980). 609p. (CONF-790415--P5).

From 177. national meeting of the American Chemical Society; Honolulu, HI, USA (1 Apr 1979).

Actinide recovery, partition, and purification are explored. The 39 chapters are grouped into six sections: ion exchange and precipitation, solvent extraction, pyrochemical and photochemical methods, power reactor fuel reprocessing, recovery from waste solution, and general methods/review papers. Separate abstracts were prepared for 29 of these chapters; the remaining ten chapters have been previously abstracted. (DLC)

83 STUDIES ON ACTINIDES SEPARATION IN JAERI. Ishimori, T. (Japan Atomic Energy Research Inst., Tokyo). pp 333-350 of Actinide separations. Navratil, J.D.; Schulz, W.W. (eds.). Washington, DC; American Chemical Society (1980).

From 177. national meeting of the American Chemical Society; Honolulu, HI, USA (1 Apr 1979).

The separation of actinides has been studied for various purposes in Japan Atomic Energy Research Institute (JAERI). Studies carried out so far, are classified into four categories: preparation of actinide nuclides, separation chemistry for chemical analysis, separation of actinides from radioactive waste, and reprocessing of spent nuclear fuels. The present work is to review studies of actinide separation performed in JAERI, emphasizing the need of the separation for the main purpose of individual. Concern is focussed on the separation of transuranium elements and studies on thorium and uranium are put aside. 9 figures.

84 HEAD-END PROCESS FOR WASTE DISPOSAL WITHIN THE FUEL CYCLE. Tischer, H.; Merz, E. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Chemische Technologie). pp 433-436 of Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht. Sektion 4: Brennstoffkreislauf und Spaltstoff-Flusskontrolle. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980). (In German)

From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).

COATED FUEL PARTICLES;DISSOLUTION;FLUIDIZED-BED COMBUSTION;GASEOUS WASTES;HEAD END PROCESSES;HTGR TYPE REACTORS;NITRIC ACID; RADIOACTIVE WASTES;SPENT FUEL ELEMENTS

85 PLUTONIUM PROCESSING FOR THE FAST REACTOR FUEL CYCLE. Allardice, R.H. (UKAEA Culham Lab., Abington); Taylor, H.A. Nuclear Engineering International ; 24: No. 292, 52-55(Nov 1979).

Current Dounreay and Windscale experience in reprocessing, fabrication and plutonium waste operations together with the continuing UK development programme to establish process and plant design for larger scale operations is described. The necessity for considering these fuel cycle operations an an entity and avoiding the independent optimization of individual areas, in order to obtain the preferred balance for safe and reliable Pu processing operations is emphasized.

86 PLUTONIUM RECOVERY GOES ON-STEAM. Barrett, T.R.; Mills, A.L. Processing ; 25: No. 11, 42-43(Nov 1979).

The Dounreay fast reactors DFR and PFR are very briefly described, with particular reference to their fuel elements. The spent fuel reprocessing plant is described in more detail under the headings: fuel subassemblies (dimensions, composition, preparation for reprocessing); dissolution and recovery (U-Pu separation from fission products, etc., and from each other); waste products.

87 CLOSING THE FAST FUEL CYCLE AT DOUNREAY. Moss, J. Electrical Review (London) ; 205: No. 11, 16-17(21 Sep 1979).

The opening of the new fast reactor fuel reprocessing plant at Dounreay enables plutonium based fuel used in the PFR to be reprocessed and the plutonium to be sent to Windscale for fabricating into new fuel rods. An outline is given of the fuel cycle including plans for waste disposal.

88 PROCESS FOR THE DECONTAMINATION OF WASTE GASES OF A REPROCESSING PLANT FOR SPENT FUEL AND/OR FERTILE MATERIAL AND INSTALLATION FOR ITS REALISATION. Henrich, E.; Leuchtmann, D.; Weinlaender, W. (to Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,759,185/A/. 5 Jul 1979. 14p. (In German).

The recombination bottom column consists of a lower parallel-flow column and an upper counterflow column in which tritiated water vapour, aerosols, nitric oxides, iodine, ruthenium tetroxide, and $^{14}CO_2$ are removed from the waste gas. By means of a nitric oxide washing, a waste gas practically free of iodine and ruthenium tetroxide is produced, and the iodine is led to the counterflow column for futher treatment. (DG) 891 HP/DG 892 MBE.

89 PROJECTIONS OF COMMERCIAL NUCLEAR CAPACITY AND SPENT-FUEL ACCUMULATION IN THE UNITED STATES. Park, U.Y.; Yates, K.R. (Battelle Columbus Lab., OH). Transactions of the American Nuclear Society ; 32: 349-352(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

USA;SPENT FUELS;FORECASTING;RADIOACTIVE WASTES;NUCLEAR POWER PLANTS;CAPACITY

90 FINANCIAL ACCOUNTING FOR BACK END OF THE FUEL CYCLE. Heubner, F.C. (Public Service Commission of Wisconsin, Madison). Transactions of the American Nuclear Society

32: 375-376(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
SPENT FUELS;REPROCESSING;COST;FUEL CYCLE; SPENT FUEL STORAGE;RADIOACTIVE WASTE DISPOSAL

91 UTILITY VIEWPOINT OF ACCOUNTING FOR FUEL CYCLE BACK END COSTS. Grube, R.M.; Soucy, A.R. (Yankee Atomic Electric Co., Westboro, MA). Transactions of the American Nuclear Society ; 32: 376-377(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
SPENT FUELS;REPROCESSING;FUEL CYCLE;COST; ACCOUNTING;RADIOACTIVE WASTE DISPOSAL

92 BRED FUEL VALUE: EFFECT OF TAX ACCOUNTING TREATMENT ON UTILITY FUEL CYCLE COSTS. Macnabb, W.V. (NUS Corp., Rockville, MD). Transactions of the American Nuclear Society ; 32: 377-378(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
NUCLEAR POWER PLANTS;FUEL CYCLE;COST; ACCOUNTING;TAXES;BREEDER REACTORS;NUCLEAR FUELS; SPENT FUELS;REPROCESSING

93 HEAD-END OF A REPROCESSING PLANT FOR HTR FUEL ELEMENTS. Tischer, H.; Hartmann, K. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Chemische Technologie). Atomwritschaft, Atomtechnik ; 24: No. 6, 331-333(Jun 1979). (In German).
One of the main goals pursued by the HTR fuel cycle project carried out by KFA Juelich and by industry is to solve the problem of closing the uranium/thorium fuel cycle for HTRs by suitable reprocessing and final storage of waste material. Methods and techniques for reprocessing spent fuel elements and recycling fissionable fuel as well as treating radioactive waste are being developed. The effects towards developing a head-end of a HTR reprocessing plant have now yielded results allowing a comprehensive technical concept to the presented also for the dual-particle fuel system which involves particularly difficult problems in the head-end process.

94 EXTRACTION OF TECHNETIUM FROM FISSION PRODUCT MIXTURES. Koch, H.; Kupsch, H.; Fabian, B. (Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung). Zeitschrift fuer Chemie ; 19: No. 4, 136-137(Apr 1979). (In German).
ARSENIC CHLORIDES;ARSENIC COMPLEXES; CHLOROFORM;ORGANOMETALLIC COMPOUNDS; PERTECHNETATES;PH VALUE;QUANTITY RATIO; RADIOACTIVE WASTE PROCESSING;SOLVENT EXTRACTION; TECHNETIUM 99;FISSION PRODUCTS;SEPARATION PROCESSES

95 EXXON NUCLEAR FUEL RECOVERY AND RECYCLING CENTER: PROCESS DESCRIPTION. Ritter, G.L. (Exxon Nuclear Co., Inc., Richland, WA). Nuclear Technology ; 43: No. 2, 194-202(Apr 1979).
The Purex solvent extraction process will be used in the nuclear fuel recovery and recycling center to reprocess up to 2100 MT/yr of spent light water reactor fuels. Modifications to the process will be made to improve fission product decontamination and to treat gaseous and liquid radioactive waste streams. These modifications will allow overall decontamination factors for most fission products from recovered uranium and plutonium of > 10^{10}. No liquid process wastes will be released, and releases of radioactive materials in gaseous effluents will be as low as reasonably achievable. 7 figures, 2 tables.

96 EXXON NUCLEAR FUEL RECOVERY AND RECYCLING CENTER FACILITY DESCRIPTION. Birchler, J.E.; Caudill, H.L. (Exxon Nuclear Co., Inc., San Francisco, CA). Nuclear Technology ; 43: No. 2, 203-212(Apr 1979).
Exxon Nuclear Company, Inc. has submitted an application to the US Nuclear Regulatory Commission for a construction permit to build a 1500 MT/yr (expandable to 2100 MT/yr) reprocessing plant on the Oak Ridge Reservation in Tennessee. The proposed plant utilizes the basic Purex solvent extraction process for recovering uranium and plutonium from spent nuclear fuel. A basic design objective of the nuclear fuel recovery and recycling center (NFRRC) is to ensure that the plant personnel and the general public are not exposed to excessive radiation. This is accomplished through the application of engineered confinement systems and the incorpation of confinement features in the various facilities and support systems. The design featues include those employed (a) to withstand environmental and accident forces and (b) to ensure radiological protection. The NFRRC is comprised of two interconnected principal facilities with their related support facilities. These are the fuel receiving and storage facility and the fuel reprocessing facility. 2 figures.

97 REPROCESSING OF IRRADIATED FUELS. Piatier, H. (Compagnie Generale des Matieres Nucleaires (COGEMA), La Boursidiere, 92 - Le Plessis-Robinson ;France)). Revue Generale Nucleaire ; No. 2, 159-167(Mar-Apr 1979). (In French).
Having first itroduced the dry and wet (Purex) reprocessing procedures, the reprocessing situation in France and the coordination and cooperation policies applied in this at the European level are described. The problem of wastes issued from the reprocessing operations, both as concerns reliability and the economics of the fuel cycle is considered.

98 METHOD OF LOCATING RADIATION DETECTORS. Shirai, Takamori; Inami, Ichiro; Suzuki, Takeo. (to Nippon Atomic Industry Group Co. Ltd., Tokyo). Japanese Patent 54-1799/A/. 8 Jan 1979. 3p. (In Japanese).
Purpose: To avoid direct contact between a detector and radioactive liquid wastes upon on-line measurement of radio activity for radioactive liquid wastes. Method: A by-pass is provided to a pipe through which liquid wastes flow thus making laminar flow of the liquid wastes. A detection portion is provided to the laminar flow portion. In the detection portion, are formed an upper chamber and a lower chamber in contaction to the laminar flow. The upper chamber is filled with a fluid having a specific gravity lower than that of the liquid wastes and insoluble to the liquid wastes, for example, benzene or cyclohexane, which is contacted to the laminar flow. A radiation detector is provided in the above fluid of a low specific gravity. This can prevent the direct contaction between the detector and the liquid wastes and avoid the deposition of oils and scales contained in the liquid wastes to the detector. The above liquid of the lower specific gravity is circulated and cleaned by a pump. In the lower chamber of the pipe, a fluid

having a specific gravity higher than that of the liquid wastes and insoluble to the liquid wastes is filled for removing the precipitating substances.

99 PROCESS FOR TAKING SAMPLES, IN PARTICULAR FROM HOT CONCENTRATES FLOWING IN PIPES, WHICH CONTAIN RADIOACTIVE OR CORROSIVE SUBSTANCES. Stiefel, M. (to Babcock - Brown Boveri Reaktor G.m.b.H., Mannheim (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,729,326/A/. 4 Jan 1979. 8p. (In German).

The sample is taken from a bypass line. A block of valves with four outlets is used for this purpose, where there is always part of the concentrate in one valve chamber. The valve chamber can be shut off from the bypass line using two valves in the outlets. The contents of the chamber are then flushed with a solvent (e.g. water) into a mixing container, via two of the other valves in the other two outlets, and is diluted in the ratio 1:99. The actual sample extraction is via a sample vessel, which can be connected to the mixing vessel. The process requires no direct cooling, and the dilution reduces the danger from the substance.

100 SAFETY IN ALTERATION OF THE FUEL REPROCESSING PLANT IN POWER REACTOR AND NUCLEAR FUEL DEVELOPMENT CORPORATION. Genshiryoku Iinkai Geppo (Journal of Atomic Energy Commission) ; 23: No. 9, 126-130(Jan 1979). (In Japanese).

A report of the Committee on Examination of Nuclear Fuel Safety to the Atomic Energy Commission of Japan, concerning the safety in the alteration of the fuel reprocessing plant in Power Reactor and Nuclear Fuel Development Corporation, was presented, and its safety was confirmed. The alteration is as follows. On the site of the fuel reprocessing plant, in order to carry out the technology development of the asphalt solidification for radioactive liquid wastes, a facility for developing asphalt solidification technology is installed. The technology development facility consists of an asphalt solidification treatment facility, an asphalt solid storage, and an exhaust stack. The radioactive liquid wastes subjected to asphalt solidification are the liquid concentrated from the evaporation treatment of low-level radioactive waste water in the waste disposal area, the sludge from chemical sedimentation treatment in the same area, and the liquid concentrated from the evaporation treatment in the development facility for the evaporation treatment of ultra-low level radioactive waste water.

101 INVESTIGATION OF THE REPROCESSING AND WASTE MANAGEMENT REQUIREMENTS OF PRESENT AND ALTERNATIVE NUCLEAR FUEL CYCLES. Rochlin, G.I. Sacramento, CA; California Energy Commission (1979). 158p. (NP--24158(Vol.1)). California Energy Commission, 1111 Howe Ave., Sacramento, CA, 95825.

This study examines various nuclear fuel cycles with regard to economics, health and safety, and proliferation implications. Emphasis is placed on the question of whether reprocessing of nuclear fuel is required in particular fuel cycles. This emphasis is prompted by California state law, which prohibits (under certain conditions) the licensing of nuclear fission thermal power plants requiring the reprocessing of fuel rods. The report concludes that there are several fuel cycles, including the light water reactor cycle, which do not require reprocessing on technical or resource/economic grounds. The final decision to reprocess in many cases depends upon the resolution of environmental, health, and safety issues.

102 INVESTIGATION OF THE REPROCESSING AND WASTE MANAGEMENT REQUIREMENTS OF PRESENT AND ALTERNATIVE NUCLEAR FUEL CYCLES. VOLUME II. APPENDICES. Rochlin, G.I. Sacramento, CA; California Energy Commission (1979). 197p. (NP--24158(Vol.2)). California Energy Commission, 1111 Howe Ave., Sacramento, CA, 95825.

The following appendices are included: spread of nuclear power, data from Nuclear Proliferation Factbook, LWR fuel cycle descriptions and flowsheets, thorium fuel cycles in LWRs, LWR-thorium and advanced LWR cycles, thorium fuel cycle in HWRs, CANDU and advanced HWR cycles, thorium fuel cycles in HTGRs, HTGR cycles, fast breeder fuel cycles, and technical safeguard features of advanced fuel cycles. (DLC)

103 MONTE CARLO CALCULATIONAL DESIGN OF AN NDA INSTRUMENT FOR THE ASSAY OF WASTE PRODUCTS FROM HIGHLY ENRICHED SPENT FUELS. Eccleston, G.W.; Schrandt, R.G.; MacDonald, J.L. (Los Alamos Scientific Lab., NM). Transactions of the American Nuclear Society, Supplement ; 33: No. 1, 36-37(1979).

DELAYED NEUTRON ANALYSIS;DESIGN;SPENT FUELS; REPROCESSING;RADIOACTIVE WASTES;CONTAINERS; PACKAGING;MONTE CARLO METHOD;COMPUTER CODES;M CODES;NUCLEAR REACTION ANALYZERS;NONDESTRUCTIVE ANALYSIS

104 SURVEY OF NUCLEAR FUEL REPROCESSING TECHNOLOGIES. Selvaduray, G.; Goldstein, M.K.; Anderson, R.N. (Sci Serv, Inc, Redwood City, Calif). Conservation and Recycling ; 3: No. 2, 93-134(1979).

A comprehensive review of 32 separation technologies applicable to nuclear fuel reprocessing has been conducted. These techniques have been classified and subdivided according to their principles of separation. The input fuels, principles of separation, history, stage of development, ability to extract plutonium and other pertinent information are summarized and tabulated for reference and comparison. For the most part the flow sheets and technologies involved in each separation process are described and the primary advantages and disadvantages are discussed. Engineering parameters such as decontamination factors, operating temperature, number of stages, chemistry and construction materials needed are examined. 99 refs.

105 ANALYTICAL PROCEDURE AND TRAINING MATERIAL DEVELOPMENT AT ICPP. German, F.O. (Exxon Nuclear Idaho, Idaho Falls). Transactions of the American Nuclear Society ; 33: 469-470(1979). (CONF-791103--).

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

IDAHO CHEMICAL PROCESSING PLANT;MANUALS; SPENT FUEL STORAGE;DISSOLUTION;RADIOACTIVE WASTE PROCESSING

106 REMOTE HANDLING SYSTEMS AT THE BARNWELL NUCLEAR FUEL PLANT: AN OVERVIEW. Atchinson, G.; Cottrell, J.E.; Sears, L.F. (Allied General Nuclear Services, Barnwell, SC). Transactions of the American Nuclear Society ; 33: 893-894(1979). (CONF-791103--).

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

BARNWELL FUEL PROCESSING PLANT;REMOTE

HANDLING EQUIPMENT;HOT CELLS;SPENT FUELS; REPROCESSING;SPENT FUEL STORAGE

107 SYSTEM FOR RECEIVING AND SHEARING LWR SPENT FUEL. Siemens, D.H.; Berger, D.N.; Carter, J.G. (Battelle Columbus Labs., Columbus, OH). Transactions of the American Nuclear Society ; 33: 915-916(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
PWR TYPE REACTORS;BWR TYPE REACTORS;SPENT FUEL ELEMENTS;DECLADDING;LIQUID WASTES;REMOTE HANDLING EQUIPMENT

108 NUCLEAR DEBATE. REPROCESSING: LA HAGUE. THE WEAKER LINK. Sciences et Avenir ; No. 27, 25, 27, 29, 31(1979). (In French).
Working conditions of the reprocessing plant are examined. The actual capacity of the plant is estimated. Tables and graphs give radiation doses of workers and comparisons are made with other reprocessing plants. Ageing of the plant, waste disposal into the sea and limits of the Purex process are also discussed.

109 NUCLEAR DEBATE. REPROCESSING: LA HAGUE. A TECHNIQUE UNDER CONTROL. Aycoberry, Claude (Compagnie Generale des Matieres Nucleaires (COGEMA), La Boursidiere, 92 - Le Plessis-Robinson (France)). Sciences et Avenir ; No. 27, 24, 26, 28, 30(1979). (In French).
After giving advantages of reprocessing, safety is examined for population, workers and operations. Storage of spent fuels, cooling, high activity fission products, containment during reprocessing, criticality are briefly described. Irradiation of personnel is very low at La Hague plant. It is possible to treat the different fuels on an industrial scale.

110 CHAPTER 4. WASTE DISPOSAL. PAPER 6. REPROCESSING AND WASTE MANAGEMENT. Abrahamson, D. (Minnesota Univ., Minneapolis (USA)). pp 105-111 of Nuclear energy and nuclear weapon proliferation. London, England; Taylor and Francis (1979).
From Stockholm International Peace Research Institute symposium; Stockholm, Sweden (12 Oct 1978).
The existence of the special nuclear materials, particularly plutonium-239, produced in reactors which were either ostensibly or actually operated for electricity production is one factor contributing to the increased risk of nuclear weapon proliferation. Were there no reprocessing of spent fuel from these reactors, plutonium-239 would be unavailable for at least the several hundred years during which the radioactivity of the fission products effectively prevents access to the spent fuel. There seem to be no compelling reasons why reprocessing is necessary for responsible management of the radioactive wastes. In several respects reprocessing complicates waste management or makes it less safe. However, neither waste management nor safeguards considerations have weighed heavily in the decisions whether or not to reprocess spent fuel. Of energy sources known to be viable options to replace the fossil fuels, only breeder reactors could, even theoretically, supply sufficient commercial energy to satisfy projections based on historical trends. The logic of the industrialized economies demands reprocessing and the breeder reactor, and rejects non-nuclear alternatives because these alternatives would not permit energy consumption rates tens of times greater than the present rate. Impediments such as possibly hazardous conditions associated with waste or plutonium management have been brushed aside by the 'experts' as hobgoblins of small minds.

111 DECOMMISSIONING ASPECTS OF A NUCLEAR CHEMICAL PLANT. Rao, M.K. (Bhabha Atomic Research Centre, Bombay (India)). pp 597-600 of Decommissioning of nuclear facilities. Vienna, Austria; IAEA (1979).
From International symposium on the decommissioning of nuclear facilities; Vienna, Austria (13 Nov 1978).
The need for decommissioning of nuclear installations at the end of their useful lives is beginning to be felt. A brief discussion on the various considerations relevant for the decommissioning effort is included in the paper. Decommissioning work could be minimized if suitable provisions were incorporated at the design stage. Experience with the partial decommissioning of the Trombay Fuel Reprocessing Plant prior to reconstruction to extend its life is touched upon.

112 PROCESS FOR SEPARATING FISSION GASES FROM IRRADIATED NUCLEAR FUEL. Bray, L.A.; Boldt, A.L. (to Exxon Nuclear Co., Inc., Bellevue, WA (USA); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,801,744/A/. 10 Aug 1978. 18p. (In German).
Transient fission products (xenon, iodine, krypton, tritium) can be removed from irradiated nuclear fuel particles by treating them with NO_2, or a mixture of NO_2 with O_2 and NO at temperatures between 325 and 650°C. 4 examples explain the process.

113 SAFETY CONCERNING THE PARTIAL ALTERATION OF THE FUEL REPROCESSING FACILITY IN POWER REACTOR AND NUCLEAR FUEL DEVELOPMENT CORPORATION. Genshiryoku Iinkai Geppo (Journal of Atomic Energy Commission) ; 23: No. 3, 13-15(Jul 1978). (In Japanese).
A report of the Committee on Examination of Nuclear Fuel Safety was presented to the Atomic Energy Commission of Japan, which is concerned with the safety in the partial alteration of the fuel reprocessing facility in the Power Reactor and Nuclear Fuel Development Corporation. Its safety was confirmed. The alteration is as follows. In order to raise the storage capacity of low-level radioactive solid wastes, the second storage is installed. The building for low-level solid waste storage is a ferro-concrete structure, total floor space is 1,260 m^2, two-storied with one basement floor. The basement floor is for storage, the first floor for receiving, storage, etc., and the second floor for storage and machinery room. The capacity of the second storage is for about 9,500 200 l drums (equivalent to about four years waste discharge). The contents of the safety examination are safety of facilities such as aseismatic property and radiation protection, and effects on the surrounding environment. (Mori, K.

114 SAFETY CONCERNING THE PARTIAL ALTERATION OF THE FUEL REPROCESSING FACILITY IN POWER REACTOR AND NUCLEAR FUEL DEVELOPMENT CORPORATION. Genshiryoku Iinkai Geppo (Journal of Atomic Energy Commission) ; 23: No. 3, 15-16(Jul 1978). (In Japanese).
A report of the Committee on Examination of Nuclear Fuel Safety was presented to the Atomic Energy Commission of Japan, which is concerned with the safety in the partial alteration of the fuel reprocessing facility in the Power Reactor and Nuclear Fuel Development

Corporation. Its safety was confirmed. The alteration is as follows. Ultra-low level liquid waste from the high-level radioactive material research facility in Tokai Works is received in liquid-waste storage tanks of the facility removing oil from liquid wastes. Receiving standards are: up to 600 m^3 yearly; and total α + total β is not more than 1×10^{-7} Ci/m^3, and tritium is not more than 1×10^{-3} Ci/m^3. The contents of the examination are safety of the facilities and effects on the surrounding environment. (Mori, K.

115 FRENCH COMMERCIAL PLANT FOR REPROCESSING AND VITRIFICATION OF SPENT REACTOR FUEL. Koksvik, R.M. Ingenioer-nytt ; 14: No. 44, 16-17(2 Jun 1978). (In Norwegian).

The basic principles of the system for the reprocessing of spent reactor fuel on a commercial basis at the plant at Marcoule in France are described. After four months cooling the canning is stripped mechanically and the fuel dissolved in boiling nitric acid. Using TBP the uranium and plutonium are separated from the fission products. The plutonium is then separated by valency change and aqueous extraction. The uranium is transferred to a refinery and stored as hexahydrate. The plutonium is concentrated and precipitated as oxalate, dried and converted via oxide to fluoride, thence to metal. The fission products are concentrated and converted to glass form in a process dependent on the reactor type, the burnup and their chemical processing. The two processes developed, the 'pot' process and the continuous process, are described in some detail. The final disposal of the radioactive wastes is not yet decided, and temporary storage facilities have therefore been built, with a capacity for 30 years of reprocessing.

116 DEVELOPMENT OF ENRICHMENT AND REPROCESSING TECHNOLOGIES IN JAPAN. Amanuma, T. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). Gensan Nenji Taikai Gijiroku (Proceedings of Japan Atomic Industrial Forum, Incorporated) ; No. 11, 191-197, 225-231(1978).

The present status of the development of fuel cycle technologies for LWR systems in Japan is reviewed. As for the uranium enrichment technology, recent development of the centrifuge method is briefly explained. The construction schedule of the pilot plant at Ningyo-Toge is also shown. The completion of the plant is expected in 1980, and 7000 machines will be in full operation. Other methods such as gaseous diffusion, chemical separation, and laser method are briefly described. Comparisons among these different methods are also made in various economical aspects. As for the reprocessing technologies, those concerned with environmental problems, nuclear non-proliferation, and safeguard measures are explained. Recovery of krypton and xenon, method of co-processing, and co-operative research and development with IAEA are the main topics here. Finally, the technological development in the field of high-level radioactive waste disposal is explained. The construction schedule of an experimental facility (CPF), development of solidification techniques, and the methods of final disposal are the main topics treated here.

117 STATUS OF NUCLEAR FUEL REPROCESSING, SPENT FUEL STORAGE, AND HIGH-LEVEL WASTE DISPOSAL. NUCLEAR FUEL CYCLE COMMITTEE, CALIFORNIA ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION. DRAFT REPORT. Sacramento, CA: California Energy Commission (1978). 290p. (NP--24060). California Energy Commission, Sacramento, CA.

An analysis of the current status of technologies and issues in the major portions of the back-end of the nuclear fuel cycle is presented. The discussion on nuclear fuel reprocessing covers the reprocessing requirement, reprocessing technology assessment, technology for operation of reprocessing plants, and approval of reprocessing plants. The chapter devoted to spent fuel storage covers the spent fuel storge problem, the legislative response, options for maintaining full core discharge capacity, prospective availability of alterntive storage options, and the outlook for California. The existence of a demonstrated, developed high-level waste disposal technology is reviewed. Recommendations for Federal programs on high-level waste disposal are made.

118 QUALITY ASSURANCE PROGRAM REQUIREMENTS FOR POST REACTOR NUCLEAR FUEL CYCLE FACILITIES. Hinsdale, IL: American Nuclear Society (1978). vp.

This standard sets forth requirements for the establishment and execution of quality assurance programs for the design, procurement, construction, operation, and decommissioning of post reactor nuclear fuel cycle facilities. This standard shall apply specifically to spent fuel and waste storage installations, fuel reprocessing plants, plutonium processing and plutonium fuel fabrication plants, and other post reactor related facilities.

119 EXTRACTION PROCESS OF FISSION PRODUCTS FROM SPENT NUCLEAR FUEL ELEMENTS. Anav, M.; Chesne, A.; Leseur, A.; Miquel, P.; Pascard, R. (to CEA, 75 - Paris (France)). French Patent 2,405,541/E/. 10 Oct 1977. 8p. (In French).

Process for extracting fission products contained in irradiated nuclear fuel elements consisting in bringing these elements into contact with water after having treated them mechanically to remove their cladding and/or cut them up, then separate these treated elements from the aqueous solution and recuperating at least one of the fission products concerned from this by concentrating it by distillation so as to obtain a concentrate containing these fission products and then processing this concentrate in order to ensure a long term storage of these fission products.

120 METHOD FOR MEASURING TRITIUM ACTIVITY FROM RADIOACTIVE SOLUTION. Ali, S.A.H.; Leifeld, W. (to Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,612,893/A/. 6 Oct 1977. 12p. (In German).

It is proposed to dilute the solution to be measured with a strongly alkaline solution and then to let it come into an equilibrium state with a substance absorbing moisture (e.g. to keep it in a small flash that has got on the inner side of the screw cap a pre-ground molded body from a molecular sieve). Afterwards the substance absorbing moisture is removed and, in another room, finely dispersed in clear water, so that the liquid being formed and containing titrated water can be measured in conventional manner.

121 IODINE 129 TRAPPING IN IRRADIATED FUEL REPROCESSING PLANTS. Jacquemin, M. ;CEA

Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 ;France). Dept. de Protection);
Schuettelkopf, H. ;Kernforschungszentrum Karlsruhe G.m.b.H. ;Germany, F.R.)). pp 84-87 of Iode-129. Compte rendu d'une reunion de specialistes de l'AEN. Paris, 13-16 juin 1977. Paris, France; OECD (1977). (In French)
From NEA specialist meeting on Iodine-129; Paris, France (13 Jun 1977).
Production of iodine 129 is briefly described. Decontamination factors (D.F.) required in the USA, Federal Republic of Germany and France are given. Trapping of iodine 129 is examined. In a first method it is realized by scrubbing with a solution of soda or potash, or diluted nitric acid plus mercuric nitrate or hyperazeotropic nitric acid (DF 10 to 100), in a second method iodine is adsorbed on solids: silver exchanged zeolites or silicates impregnated with silver nitrate (DF 1000 to 10 000). For a high D.F. and to save silver the best is to use the first method and then the second one. Storage and disposal are also examined and costs are given for the different trapping processes.

122 IODINE RETENTION IN LA HAGUE REPROCESSING PLANT. Jacquemin, M. ;CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 ;France). Dept. de Protection). pp 88-89 of Iode-129. Compte rendu d'une reunion de specialistes de l'AEN. Paris, 13-16 juin 1977. Paris, France; OECD (1977). (In French)
From NEA specialist meeting on Iodine-129; Paris, France (13 Jun 1977).
Iodine is trapped by scrubbing with a soda solution, decontamination factor (D.F.) is 15, modifications are in progress to get a DF of 50. Each year 800t of spent fuel are reprocessed and 800 m^3 of soda solution are needed, iodine is extracted as copper iodide and stored in concrete. To avoid treatment of great volumes another process is studied in a pilot plant: iodine is concentrated by distillation and precipitated as metallic iodide.

Transport and Storage

123 (AECL--6331) TRANSPORTATION OF NUCLEAR FUEL. Prowse, D.R. (Atomic Energy of Canada Ltd., Pinawa, Manitoba. Whiteshell Nuclear Research Establishment). Jan 1979. 10p. Dep. NTIS (US Sales Only), PC A02/MF A01.
Shipment of used fuel from nuclear reactors to a central fuel management facility is discussed with particular emphasis on the assessment of the risk to the public due to these shipments. The methods of transporting used fuel in large shipping containers is reviewed. In terms of an accident scenario, it is demonstrated that the primary risk of transport of used fuel is due to injury and death in common road accidents. The radiological nature of the used fuel cargo is, for all practical purposes, an insignificant factor in the total risk to the public.

124 (AECL--6356) PROPOSAL TO STUDY THE STABILITY OF ZIRCALOY-CLAD UO_2 FUEL ELEMENTS DURING LONG-TERM STORAGE. Bain, A.S.; Hardy, D.G.; Tayal, M. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Sep 1978. 13p. Dep. NTIS (US Sales Only), PC A02/MF A01.
Irradiated CANDU fuel bundles have been successfully stored under water for up to 16 years. Laboratory corrosion data give confidence that such storage for much longer times will pose no problem. This report outlines a proposed experimental program to study the stability of irradiated Zircaloy-clad UO_2 fuel elements during long-term storage in water. We intend to perform, at five-year intervals during the next twenty to thirty years, non-destructuve (e.g. neutron radiography) and destructive (e.g. metallographic examination) tests on irradiated fuel elements currently stored in the bays of the NRX and NRU reactors, in dry storage in Building 375 at Chalk River Nuclear Laboratories and in the storage bays at Pickering Nuclear Generating Station in order to monitor the continued ability of the clad to contain radioactive fission products. These tests are designed to study the effects of the severity of a fuel element's internal environment (controlled primarily by element power and burnup) and the rate of the element's external corrosion (both aqueous and galvanic) on clad stability. The results obtained from such periodic checks on the Zircaloy sheaths are expected to confirm that discharged CANDU fuel can be safely stored in an interim storage facility for at least 50 years before it is transferred to an underground repository, or to a reprocessing plant.

125 (AECL--6577) LONG-TERM STORAGE OF FUEL IN WATER. Hunt, C.E.L.; Wood, J.C.; Bain, A.S. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Jun 1979. 18p. (CONF-7906142--2). NTIS (US Sales Only), PC A02/MF A01.
From 19. Canadian Nuclear Association annual international conference; Toronto, Canada (10 Jun 1979).
Two intact and two defective elements stored for 11 years and two intact elements stored for 16 years were metallographically examined in 1978. The experimental bundle stored for 11 years showed no differences between the original examination and the present one. The NPD bundle, which had been stored for 16 years, showed no differences from other NPD bundles which had been examined shortly after discharge from the reactor. In parallel, fission product induced stress corrosion cracking of Zircaloy-4 below 373 K is being studied. Although cracks can grow by iodine stress corrosion, the depth of starter crack and amount of applied stress required are so large that stress corrosion cracking of stored fuel is very unlikely.

126 (AGNS--35900-1-1-49) STUDIES AND RESEARCH CONCERNING BNFP: ADVANCED CASK HANDLING STUDIES. McCreery, P.N. (Allied-General Nuclear Services, Barnwell, SC (USA)). Oct 1979. Contract ET-78-C-09-1040. 75p. Dep. NTIS, PC A04/MF A01.
Cask turnaround times at loading and unloading sites can be improved by providing better working conditions, improved safety, reduced decontamination time, training, and where practical to do so, improved facility design. This report consists of treatments of several of these topics with the common goal of improving operational efficiency.

127 (AGNS--35900-1.2-45) STUDIES AND RESEARCH CONCERNING BNFP: SPENT FUEL DISASSEMBLY AND CANNING PROGRAMS AT THE BARNWELL NUCLEAR FUEL PLANT (BNFP). Townes, G.A.; Rogell, M.L.; Anderson, R.T. (Allied-General Nuclear Services, Barnwell, SC (USA)). Oct 1979. Contract ET-78-C-09-1040. 82p. Dep. NTIS, PC A05/MF A01.
Methods of disassembling and canning spent fuel to allow more efficient storage are being investigated at the BNFP. Studies and development programs are aimed at dry

disassembly of fuel to allow storage and shipment of fuel pins rather than complete fuel assemblies. Results indicate that doubling existing storage capacity or tripling the carrying capacity of existing transportation equipment is achievable. Disassembly could be performed in the BNFP hot cells at rates of about 12 to 15 assemblies per day.

128 (AGNS--35900-1.3-47) STUDIES AND RESEARCH CONCERNING BNFP. SPENT FUEL DISASSEMBLY: INCREASING HOT-CELL STORAGE CAPACITY AT THE BARNWELL NUCLEAR FUEL PLANT. Anderson, R.T. (Allied-General Nuclear Services, Barnwell, SC (USA)). Oct 1979. Contract ET-78-C-09-1040. 82p. Dep. NTIS, PC A05/MF A01.

This report presents the results of work performed at AGNS in 1979 related to production-rate fuel disassembly in the existing hot cell spaces of the BNFP. The primary advantage of the developed technique is realized at a reprocessing plant facility where suitable hot cells and connecting storage pools are available. The existing spent fuel pools are also candidates for away-from-reactor (AFR) storage space. Storage estimates based on utilization of the BNFP indicate that a major expansion from 1600 MTU up to 3000 MTU is possible. The report presents data on the results of initial process development and prototype equipment testing. Assessments were made of operational safety, licensing, and economic factors. These studies indicate that the techniques are performable and have economic merit when there is a requirement for a large increment of new storage capacity. A development program plan is presented. This plan delineates the future work required to bring the process to a point where implementation is possible.

129 (AGNS--35900-1.4-59) STUDIES AND RESEARCH CONCERNING BNFP. NUCLEAR SPENT FUEL TRANSPORTATION STUDIES. Anderson, R.T.; Maier, J.B. (Allied-General Nuclear Services, Barnwell, SC (USA)). Nov 1979. Contract ET-78-C-09-1040. 63p. Dep. NTIS, PC A04/MF A01.

Currently, there are a number of institutional problems associated with the shipment of spent fuel assemblies from commercial nuclear power plants: new and conflicting regulations, embargoing of certain routes, imposition of transport safeguards, physical security in-transit, and a lack of definition of when and where the fuel will be moved. This report presents a summary of these types and kinds of problems. It represents the results of evaluations performed relative to fuel receipt at the Barnwell Nuclear Fuel Plant. Case studies were made which address existing reactor sites with near-term spent fuel transportation needs. Shipment by either highway, rail, water, or intermodal water-rail was considered. The report identifies the impact of new regulations and uncertainty caused by indeterminate regulatory policy and lack of action on spent fuel acceptance and storage. This stagnant situation has made it impossible for industry to determine realistic transportation scenarios for business planning and financial risk analysis. A current lack of private investment in nuclear transportation equipment is expected to further prolong the problems associated with nuclear spent fuel and waste disposition. These problems are expected to intensify in the 1980's and in certain cases will make continuing reactor plant operation difficult or impossible.

130 (AGNS--35900-1.5-37) STUDIES AND RESEARCH CONCERNING BNFP: ASSISTANCE TO DEPARTMENT OF ENERGY. FINAL REPORT. Darr, D.G.; Highberger, P.F. (Allied-General Nuclear Services, Barnwell, SC (USA)). Sep 1979. Contract EY-76-C-09-0001. 21p. Dep. NTIS, PC A02/MF A01.

During FY 1979, the Savannah River Operations Office of the Department of Energy requested Allied-General Nuclear Services undertake the following special studies: (1) early receipt and storage of foreign spent fuel; (2) safety and environmental impact of interim AFR storage in the BNFP-FRSS; and (3) status of BNFP licensing. Each of the above studies was completed and a report issued during FY 1979.

131 (AGNS--35900-CONF-7) COOLDOWN TESTING OF NUCLEAR FUEL CASKS. Anderson, R.T. (Allied-General Nuclear Services, Barnwell, SC (USA)). Aug 1979. Contract ET-78-C-09-1040. 27p. (CONF-790822--12). Dep. NTIS, PC A03/MF A01.

From 87. AICHE national meeting; Boston, MA, USA (19 Aug 1979).

The results of development related to the thermal interaction between dry spent fuel casks and nuclear fuel under operating situations are presented. The tests were performed at the Barnwell Nuclear Fuel Plant using full-sized truck and rail casks and electrically heated dummy fuel assemblies.

132 (AGNS--35900-CONF-41) SPENT FUEL DISASSEMBLY AND CANNING PROGRAMS AT THE BARNWELL NUCLEAR FUEL PLANT (BNFP). Townes, G.A. (Allied-General Nuclear Services, Barnwell, SC (USA)). Oct 1979. Contract ET-78-C-09-1040. 16p. (CONF-791103--40). Dep. NTIS, PC A02/MF A01.

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

Methods of disassembling and canning spent fuel to allow more efficient storage are being investigated at the BNFP. Studies and development programs are aimed at dry disassembly of fuel to allow storage and shipment of fuel pins rather than full fuel assemblies. Results indicate that doubling existing storage capacity or tripling the carrying capacity of existing transportation equipment is achievable. Disassembly could be performed in the BNFP hot cells at rates of about 12 to 15 assemblies per day.

133 (AGNS--35900-CONF-63) SPENT-FUEL DISASSEMBLY AND CANNING PROGRAMS AT THE BARNWELL NUCLEAR FUEL PLANT (BNFP). Townes, G.A. (Allied-General Nuclear Services, Barnwell, SC (USA)). Feb 1980. Contract AC09-78ET35900. 6p. (CONF-800901--2). NTIS, PC A02/MF A01.

From Symposium on intermediate range atmospheric transport processes and technology assessment; Gatlinburg, TN, USA (29 Sep 1980).

Doubling pool storage and tripling truck cask shipping capability appear feasible based on preliminary development work performed at the BNFP. This would be accomplished by disassembly of the fuel assembly and canning of the fuel pins. The dry, remote disassembly and canning in the headend cells offer adequate rates, easily controlled operator exposure, and visual inspection of the fuel pins and operations through shielded windows.

134 (AGNS--47921-3026-TPR-1) DEMONSTRATE FUEL DISASSEMBLY/ENCAPSULATION. TECHNICAL PROGRESS REPORT, APRIL 1980-JUNE 1980.

(Allied-General Nuclear Services, Barnwell, SC (USA)). 25 Jul 1980. Contract AC09-79ET47921. 9p. NTIS, PC A02/MF A01.

Work on this project is focused on demonstrating disassembly and encapsulation of nuclear fuels as a means to increase spent fuel storage. The effort commenced on April 17, 1980, and is progressing satisfactorily. The Equipment/Procedure Preparation and Process Assessment Studies sub-tasks are currently underway with the Equipment Demonstration sub-task scheduled to commence February 1, 1981. The equipment design effort associated with the former sub-task and the technical studies and investigations associated with the latter sub-task continue to verify the feasibility of this concept to enhance the use of fuel storage resources.

135 (AGNS--47921-TPR-5) AFR SPENT FUEL STORAGE PROGRAM. TECHNICAL PROGRESS REPORT, JULY 1980-SEPTEMBER 1980. (Allied-General Nuclear Services, Barnwell, SC (USA)). 24 Oct 1980. Contract AC09-79ET47921. 17p. NTIS, PC A02/MF A01.

Work on this project is focused on developing design and licensing information for the model facility. The subcontracts for soils and structural design and the security system design have been completed. The rack design subcontract is progressng satisfactorily. Design of facility modifications have been completed and draft reports are underway. Licensing documentation is approximately 65% complete and progressing at a satisfactory pace to meet scheduled projections.

136 (BAW--1484-1) CRITICAL EXPERIMENTS SUPPORTING CLOSE PROXIMITY WATER STORAGE OF POWER REACTOR FUEL. TECHNICAL PROGRESS REPORT, OCTOBER 1, 1977-DECEMBER 31, 1977. Baldwin, M.N.; Hoovler, G.S. (Babcock and Wilcox Co., Lynchburg, VA (USA)). Mar 1978. Contract EY-77-C-09-1001. 17p. Dep. NTIS, PC A02/MF A01.

Experiments are being conducted on critical configurations of clusters of fuel rods, mocking up LWR-type fuel elements in close proximity water storage. Spacings between fuel clusters and the intervening material are being varied to provide a variety of benchmark loadings. (DLC)

137 (BAW--1484-1) CRITICAL EXPERIMENTS SUPPORTING CLOSE PROXIMITY WATER STORAGE OF POWER REACTOR FUEL. TECHNICAL PROGRESS REPORT, OCTOBER 1-DECEMBER 31, 1978. Baldwin, M.N.; Hoovler, G.S. (Babcock and Wilcox Co., Lynchburg, VA (USA)). Mar 1978. Contract EY-77-C-09-1001. 20p. Dep. NTIS, PC A02/MF A01.

Experimental measurements are being conducted on critical configurations of clusters of fuel rods mocking up LWR-type fuel elements in close proximity water storage. The square clusters with 14 rods on each side are arranged in 3 x 3 arrays. Both the spacing between the fuel clusters and the intervening material are being varied to provide a variety of benchmark loadings. The KENO IV code and the PDQ07 code (in selected cases) will be used to analyze each benchmark loading to determine the calculated k/sub eff/ of each configuration. Experimental results obtained during the fourth calendar quarter of 1977 are presented.

138 (BAW--1484-3) CRITICAL EXPERIMENTS SUPPORTING CLOSE PROXIMITY WATER STORAGE OF POWER REACTOR FUEL. TECHNICAL PROGRESS REPORT, APRIL 1, 1978-JUNE 30, 1978. Baldwin, M.N.; Hoovler, G.S.; Eng, R.L.; Welfare, F.G. (Babcock and Wilcox Co., Lynchburg, VA (USA)). Sep 1978. Contract EY-77-C-09-1001. 15p. Dep. NTIS, PC A02/MF A01.

Experimental measurements are being taken on critical configurations of clusters of fuel rods mocking up LWR-type fuel elements in close proximity water storage. The results will serve to benchmark the computer codes used in designing nuclear power reactor fuel storage racks.

139 (BAW--1484-3) CRITICAL EXPERIMENTS SUPPORTING CLOSE PROXIMITY WATER STORAGE OF POWER REACTOR FUEL. Baldwin, M.N.; Hoovler, G.S.; Eng, R.L.; Welfare, F.G. (Babcock and Wilcox Co., Lynchburg, VA (USA)). Sep 1978. Contract EY-77-C-09-1001. 14p. Dep. NTIS, PC A02/MF A01.

Experimental measurements are being taken on critical configurations of clusters of fuel rods mocking up LWR-type fuel elements in close proximity water storage. The results will serve to benchmark the computer codes used in designing nuclear power reactor fuel storage racks.

140 (BAW--1484-4) CRITICAL EXPERIMENTS SUPPORTING CLOSE PROXIMITY WATER STORAGE OF POWER REACTOR FUEL. TECHNICAL PROGRESS REPORT, JULY 1, 1978-SEPTEMBER 30, 1978. Baldwin, M.N.; Hoovler, G.S.; Eng, R.L.; Welfare, F.G. (Babcock and Wilcox Co., Lynchburg, VA (USA)). Nov 1978. Contract EY-77-C-09-1001. 89p. Dep. NTIS, PC A05/MF A01.

Experimental measurements are being taken on critical configurations of clusters of fuel rods mocking up LWR-type fuel elements in close proximity water storage. The results will serve to benchmark the computer codes used in designing nuclear power reactor fuel storage racks. KENO calculations of Cores I to VI are within two standard deviations of the measured k/sub eff/ values.

141 (BAW--1484-5) CRITICAL EXPERIMENTS SUPPORTING CLOSE PROXIMITY WATER STORAGE OF POWER REACTOR FUEL. TECHNICAL PROGRESS REPORT, OCTOBER 1, 1978-DECEMBER 31, 1978. Baldwin, M.N.; Hoovler, G.S.; Eng, R.L.; Welfare, F.G. (Babcock and Wilcox Co., Lynchburg, VA (USA)). Mar 1979. Contract EY-77-C-09-1001. 39p. Dep. NTIS, PC A03/MF A01.

Experimental measurements are being taken on critical configurations of clusters of fuel rods mocking up LWR-type fuel elements in close proximity water storage. The results will serve to benchmark the computer codes used in designing nuclear power reactor fuel storage racks. KENO calculations of k/sub eff/ are in close agreement with experimental values for nine cores, with differences being 0.0059 or about one standard deviation.

142 (BAW--1484-5) CRITICAL EXPERIMENTS SUPPORTING CLOSE PROXIMITY WATER STORAGE OF POWER REACTOR FUEL. TECHNICAL PROGRESS REPORT, OCTOBER 1-DECEMBER 31, 1978. Baldwin, M.N.; Hoovler, G.S.; Eng, R.L.; Welfare, F.G. (Babcock and Wilcox Co., Lynchburg, VA (USA)). Mar 1979. Contract EY-77-C-09-1001. 40p. Dep. NTIS, PC A03/MF A01.

Experimental measurements are being taken on critical configurations of clusters of fuel rods mocking up LWR-type fuel elements in close proximity water storage. The results will serve to benchmark the computer codes used in designing nuclear power reactor fuel storage

racks.

143 (BAW--1484-6) CRITICAL EXPERIMENTS SUPPORTING CLOSE PROXIMITY WATER STORAGE OF POWER REACTOR FUEL. TECHNICAL PROGRESS REPORT, JANUARY 1-MARCH 31, 1979. Baldwin, M.N.; Hoovler, G.S. (Babcock and Wilcox Co., Lynchburg, VA (USA)). May 1979. Contract EY-77-C-09-1001. 14p. Dep. NTIS, PC A02/MF A01.

Experimental measurements are being taken on critical configurations of fuel rod clusters mocking up LWR-type fuel elements in close proximity water storage. The results will serve to benchmark the computer codes used in designing nuclear power reactor fuel storage racks. Measurements on Cores XIII through XXI are reported in this document.

144 (BAW--1484-7) CRITICAL EXPERIMENTS SUPPORTING CLOSE PROXIMITY WATER STORAGE OF POWER REACTOR FUEL. TECHNICAL PROGRESS REPORT. Baldwin, M.N.; Hoovler, G.S.; Eng, R.L.; Welfare, F.G. (Babcock and Wilcox Co., Lynchburg, VA (USA)). Jul 1979. Contract EY-77-C-09-1001. 103p. Dep. NTIS, PC A05/MF A01.

Close-packed storage of LWR fuel assemblies is needed in order to expand the capacity of existing underwater storage pools. This increased capacity is required to accommodate the large volume of spent fuel produced by prolonged onsite storage. To provide benchmark criticality data in support of this effort, 20 critical assemblies were constructed that simulated a variety of close-packed LWR fuel storage configurations. Criticality calculations using the Monte Carlo KENO-IV code were performed to provide an analytical basis for comparison with the experimental data. Each critical configuration is documented in sufficient detail to permit the use of these data in validating calculational methods according to ANSI Standard N16.9-1975.

145 (CAEC--012) ASSESSMENT OF THE LONG-TERM STORAGE OF ZIRCALOY FUEL RODS IN WATER. Munir, Z.A. (California Univ., Davis (USA). Dept. of Mechanical Engineering). 15 Oct 1977. 28p. NTIS, PC A02/MF A01.

This report is a preliminary assessment of corrosion mechanisms which might affect the integrity of zircaloy-clad fuel rods during long periods of underwater storage. Potential corrosion mechanisms are discussed, and those which merit further investigation are identified. These are the principal recommendations. Current methods of degradation assessment of spent fuel are inadequate; other methods must also be used. The general corrosion of zircaloy under water storage is believed to be too low to justify concern over periods of 10 to 20 years. Additional experimental work is needed to establish the roles of the following variables on zircaloy corrosion: degree of residual stress; fission product uptake and the degree of prior embrittlement; galvanic coupling with other metals of the fuel rod storage assembly; and the nature and concentrations of surface layer contaminants accumulated during reactor residence.

146 (CONF-780506--(Vol.1), pp 36-42) HZ-75T SPENT FUEL SHIPPING CASK. Onodera, A.; Yamashita, M.; Yamada, T. (Hitachi Shipbuilding and Engineering Co., Ltd., Osaka, Japan). 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

The HZ-75T is the first large scale spent fuel shipping cask licensed and fabricated in Japan to transport the spent fuel of 2nd generation nuclear power reactors. It was originally designed by NL Industries, Inc. and Battelle Columbus Laboratories in 1973 to the IAEA Regulations for the Safe Transport of Radioactive Materials 1967 and 10 CFR Part 71 Packaging of Radioactive Material for Transport and Transportation of Radfoactive Material. The design was partially modified in the course of design and licensing to meet the revised 1973 Edition of the IAEA Regulations and the Japanese Safety Criteria for the Transport of Radioactive Materials, 1975. The design capacity of the HZ-75T is 7 PWR or 17 PWR fuel assemblies, of which average burn up is 33,000 MWD/MTU or 27,500 MWD/MTU. Special consideration was made for the sea transport, as all nuclear power plants in Japan are located on the coast and spent fuels are most economically transported by sea going vessel. For this purpose the HZ-75T was designed to be cooled by air for land transport and water or air for sea transport. Total weight of the loaded cask, 80 tons, was primarily restricted by the crane capacity in the spent fuel storage building. Other features associated with the HZ-75T designs are (1) stainless steel clad copper fin for the dissipaton of decay heat of 84 kW, (2) impact limiters of multilayer circular metal tubes, and (3) use of stainless steel for overall surface of the cask for easy decontamination and maintenance.

147 (CONF-780506--(Vol.1), pp 59-64) SPENT FUEL TRANSPORTATION: A REQUISITE FOR ANY ALTERNATIVE IN THE BACK-END OF THE NUCLEAR FUEL CYCLE. Nordahl, J.H.; O'Malley, L.C. (Exxon Nuclear Company, Inc., Bellevue, WA). 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

All of the technologies which are currently being examined for the back-end of the nuclear fuel cycles have at least one thing in common - spent fuel transportation. The characteristics of the spent fuel and the transportation requirements can vary significantly between fuel cycle alternatives. The choice of packaging designs for spent fuel transportation may also be highly dependent on the fuel management alternative which is generally adopted. Where reprocessing is deferred and the spent fuel is placed in interim storage, the incentive is to allow the spent fuel to cool in basin storage for several years. Two of the spent fuel parameters which most directly impact packaging designs, the gamma and thermal source strengths, are significantly different depending on the fuel management scenario adopted. In the design of an efficient spent fuel packaging system, these parameters will affect design tradeoffs in the areas of payload, weight, shielding material and heat dissipation systems. Exxon Nuclear has pursued the design of spent fuel transporters to be optimized for serving a maturing LWR industry, with a major objective being to transport short-cooled spent fuel from reactors to a reprocessing plant. Design work conducted with the Boeing Engineering and Construction Company has produced truck and rail transporter design concepts which meet Exxon Nuclear's design objectives. However, in the evaluation of reprocessing alternatives and delays, these transporter design concepts developed to serve a large reprocessing plant may not prove to be optimum for near-term use for transport of longer aged fuel. The discharge of spent fuel requiring transportation has exceeded the capacity of existing transportation equipment.

148 (CONF-780506--(Vol.1), pp 127-134)
LICENSING EXPERIENCES, RISK ASSESSMENT, DEMONSTRATION TEST ON NUCLEAR FUEL PACKAGES AND DESIGN CRITERIA FOR SEA GOING VESSEL CARRYING SPENT FUEL IN JAPAN. Aoki, S. (Tokyo Inst. of Tech., Japan); Ikeda, K. 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

In Japan spent fuels from nuclear power plants shall be shipped to reprocessing plants by sea-going vessels. Atomic Energy Committee has initiated a board of experts to implement the assessment of environmental safety for sea transport. As a part of the assessment a study has been conducted by Central Research Institute of Electric Power Industry under sponsorship of Nuclear Safety Bureau, which is intended to guarantee the safety of sea transport. Nuclear Safety Bureau also has a program to carry out a long term demonstration test on spent fuel package using full scale package models. The test consists of drop, heat transfer, fire, collapse under high external pressure, immersion, shielding and subcritical test. The purpose of this test is to obtain the public acceptance and also to verify the adequacy of the safety analysis for nuclear fuel packages. In order to secure the safety of sea transport, the Ministry of Transportation has provided for the design criteria for sea-going vessel in the case of full load shipping, which aims to make minimum the probability of sinking at collision, grounding and other unforeseen accidents on the sea and also to retain the radiation exposure to crews as low as possible. The design criteria consists of the following items: (1) structural strength of vessel, (2) collision protective structure, (3) arrangement of holds, (4) stability after damage, (5) grounding protective structure, (6) cooling system, (7) tie-down equipment, (8) radiation inspection apparatus, (9) decontamination facilities, (10) emergency water flooding equipment for ship fire, (11) emergency electric sources, etc. Based on the design criteria a sea-going vessel names HINOURA-MARU has been reconstructed to transport spent fuel packages from nuclear power stations to the reprocessing plant.

149 (CONF-780506--(Vol.1), pp 143-149)
SAFETY EVALUATION ON TRANSPORT OF FUEL AT SEA AND TEST PROGRAM ON FULL SCALE CASK IN JAPAN. Nagukara, T.; Maki, Y.; Tanaka, N. (Central Research Inst. of Electric Power Industry, Chiba, Japan). 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

With the operation of the reprocessing factory in Japan, the spent fuel will be transported by a ship on the domestic sea area of Japan. This paper discusses the probability of the sinking of the ship with the cask, the release of radionuclides from the sunken cask and the resultant radiological impact on individuals and populations at risk as follows: 1. Based on recent statistics about the number of ships in service and shipping casualties around Japan, the probability of the sinking of a ship navigated along the scheduled routes is estimated; 2. The radioactive material released into the sea water is determined by survey of types of radionuclides and quantities of radioactive material transported, and by analyses of the effects of hydrostatic pressure induced deformative and corrosive behavior of sunken casks as well as fuel rods; 3. Ocean models of diffusion of radioactive material are considered for the selected area on scheduled shipping routes and the concentration of radioactivity in sea is determined. Then, the population and individual doses are estimated from consumption of sea foods and effect of the exterior radiation from contaminated sea shore is also considered.

150 (CONF-780506--(Vol.1), pp 163-169) US PERSPECTIVE OF TRANSPORTING RADIOACTIVE MATERIALS BY SEA. Chitwood, R.B. (Dept. of Energy, Washington, DC). 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

The reason for the US interest in transportation of radioactive materials by sea is discussed. The national and international institutional considerations related to this subject are covered. Some economic aspects in transporting these materials, particularly spent fuels, by sea are also presented. (DC)

151 (CONF-780506--(Vol.1), pp 173-179)
RAILROAD PERSPECTIVE ON TRANSPORTATION OF SPENT FUEL AND HIGH LEVEL WASTE AND RECENT ICC DECISIONS. Paschall, J.R. (Chessie System Railroads, Cleveland, OH). 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

This paper attempts to summarize some railroad viewpoints on issues concerning transportation of spent fuel and high-level waste and to outline Interstate Commerce Commission decisions arising over differing opinions about the manner of such transportation. Although the railroad position includes a number of legal arguments, it also involves operating expertise and a number of well-based questions concerning the safety of casks under actual operating conditions in regular trains. The commonly-used estimates of accident frequency and severity in regular trains are severe underestimates based on a mistake in the annual number of railroad car-miles, inadequacies in and misunderstanding of accident reporting, and invalid assumptions, especially concerning fires, which some actual data suggest are far more frequent than assumed. Thus, railroads estimate casks could be involved in at least 12 accidents involving severe fires by 1990. A number of unanswered questions about casks and perceived inadequacies in testing lead to a conservative railroad position. These include the possibility of escape routes of materials other than by breach such as weld and pressure relief valve failures and direct radiation hazards through loss of shielding. These doubts are fostered through experience with accidents more severe than those used in testing or certification as well as these questions. Also, there is doubt concerning the integrity of fuel rod cladding (used as a second level of containment) in credible accident situations. Moreover, the damage estimates of $1,000 per man rem have been shown to have no relationship to damages in a transportation accident.Added safety is expected in special trains for at least 17 reasons involving speed, transit time, routing, train consist, crew alertness, reduced slack and other reduced hazards and accident opportunities.

152 (CONF-780506--(Vol.1), pp 180-185)
GOVERNMENT'S DUTY, AS SHIPPER AND REGULATOR, TO KEEP SPENT FUEL AND WASTE ON TRACK: THE ICC CASES. DiStefano, J. (Dept. of Energy, Washington, DC). 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las

Vegas, NV, USA (7 May 1978).

The transportation of radioactive materials, particularly spent nuclear fuel and radioactive waste, is at once the most studied and the most misunderstood category of hazardous materials transportation. During recent years, agencies of the United States Government have expended substantial effort and money not only studying many aspects of nuclear materials transportation but also litigating the safety and economics of such transportation. The movement of such materials has been attacked, not only by some state and local organizations, but also, by senior members of the transportation industry - the nation's railroads. This paper will discuss the government's role in the litigation which has developed between the railroad industry on one side and the government and the nuclear industry on the other. For more than two years, the Department of Energy has joined with representatives of other government agencies and the nuclear industry in an effort to preserve the viability of rail transportation of radioactive materials under reasonable common carrier tariffs. The southern and western railroads had restricted such transportation by requiring spent fuel and radioactive waste to move only in special trains. The eastern railroads and some midwestern roads had refused any common carriage for these commodities. Because tariff rates or the absence of such rates sparked this controversy, the United States Interstate Commerce Commission became the tribunal to hear these cases in the first instance.The issues heard included the adequacy of current safety requirements including packaging, testing and insurance. By the end of 1977, the ICC had issued initial decisions striking down the restrictive tariffs and ordering publication of tariffs where none existed. The litigation, however, will not be finally concluded for some time.

153 (CONF-780506--(Vol.1), pp 186-192)
PRIVATE SHIPPERS' EFFORTS TO TRANSPORT SPENT NUCLEAR FUEL AND WASTE BY RAIL: THE INTERSTATE COMMERCE COMMISSION CASES. Brown, O.F. II. (LeBoeuf, Lamb, Leiby and MacRae, Washington, DC). 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

While the nuclear industry is beset on many sides by opposition and uncertainty, notable success has been achieved to date by fighting railroads that would impose onerous restrictions on the transportation of nuclear materials on their own battleground. Regardless of how commercial spent nuclear fuel is ultimately handled, it must eventually be shipped from reactor sites. The most efficient method for doing this is generally by railroad. The railroads of the Nation have contended either that they are not common carriers for the transportation of radioactive materials, or if common carriers, that the carriage must be by the use of special trains and special operating procedures at great additional expense. The rationale for this railroad position has been principally one of concern with regard to the hazards presented and the adequacy of safety regulations and insurance-indemnity coverage. The nuclear industry, realizing that, if the railroads prevailed, the added cost per year by the mid-1980s could be about $600 million and that extensive safety precautions had been provided, challenged the railroads' positions before the Interstate Commerce Commission. This paper will describe the position of the nuclear industry in opposing unnecessary restrictions sought to be imposed by the railroads, including the uncertainties presented by the lack of published tariffs, the risks of carriage with and without added requirements, the insurance-indemnity coverage available, and the need for railroad transportation. As of this time, the Interstate Commerce Commission has concurred with the position of the nuclear shippers and has found the railroads' positions unreasonable and in violation of applicable laws. This legal battle, however, will continue until finally concluded by the ICC or by the courts if appeals are taken.

154 (CONF-780506--(Vol.1), pp 193-198)
PLACING THE SPECIAL TRAINS ISSUE IN PERSPECTIVE. Rhoads, R.E. (Battelle Pacific Northwest Labs., Richland, WA); DeSteese, J.G.; Loscutoff, W.V.; Chais, M. 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

The Association of American Railroads has proposed changes in the way railroads handle shipments of radioactive materials. These changes are embodied in a set of recommended operating practices that would require shipments of spent fuel and radioactive waste to be moved only in special train service. The proposed operating practices include a 35 mph maximum speed restriction, a passing restriction and a no-other freight restriction. Shippers of radioactive materials oppose the imposition of these operating practices. The special train issue is currently being argued in hearings before the Interstate Commerce Commission. The history and current status of these hearings are reviewed. Pacific Northwest Laboratories has undertaken a study to provide perspective on the safety and economic factors related to the use of special trains for shipping spent fuel. The results of this study for the amount of spent fuel anticipated to be shipped in 1986 are reviewed. The safety analysis determines the frequencies and severities of accidents for conventional freight trains and compares these to extrapolated frequencies and severities of accidents for conventional freight trains subject to the special train operating restrictions. Results of the study show that the adoption of special trains and attendant operating restrictions has limited potential for improving safety during shipment. The economic analysis compares the cost of spent fuel shipments made by special train and by conventional freight train service.Results of the economics phase of the study show that the use of special trains will most likely increase the cost of shipments by about 50%, although under certain circumstances shipping costs for spent fuel by special trains may be up to 20% lower than by conventional train service. Possible methods to resolve the special train issue are explored.

155 (CONF-780506--(Vol.1), pp 206-213)
COMPATIBILITY OF RADIOACTIVE MATERIALS TRANSPORTATION WITH RAILROAD OPERATIONS: TWO VIEWS. Eldridge, C.C.; Van Gorp, P.H. (Bechtel Power Corp., San Francisco, CA). 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

The nuclear industry has a growing need for safe, economical and efficient transport of nuclear spent fuel and similar radioactive materials. In most cases railroads are the clearly economic mode of transport. Many US rail carriers have shown an increasing reluctance - in some instances an outright

refusal - to handle these commodities. This is in spite of very stringent packaging and safety regulations, and a virtually perfect accident record to date. Following several years of fruitless discussions with the railroads on this issue, the nuclear industry filed several complaints with the Interstate Commerce Commission seeking to force the railroads to handle this traffic in normal operations. The history and results of the investigations stemming from these complaints are covered in other papers. The testimony, exhibits and briefs submitted in these cases illustrate the reasons for the railroads' safety concerns and why they believe certain train operating restrictions will produce a safer transport environment. Despite the acknowledged sturdiness of spent fuel casks, the rail industry has not been convinced that the tests and model simulations used by the nuclear industry to design and certify casks adequately portrayed the forces actually generated in a railroad accident. The most significant of the operating changes proposed by the carriers in response to this concern was the requirement that spent fuel be moved only in special trains.According to the railroads, this would permit closer monitoring; reduce both the probability and consequences of accidents; permit better control of speeds; and minimize switching and terminal handling. A review of the material submitted by both the protestants and respondents in these proceedings provides a clearer understanding of the litigants' respective positions, as well as some insights into practical railroading as it pertains to the transportation of nuclear materials.

156 (CONF-780506--(Vol.1), pp 297-303)
EUROPEAN EXPERIENCE WITH ASPHALT PACKAGING OF RADIOACTIVE WASTES. Stewart, J.E. (Werner and Pfleiderer Corp., Waldwick, NJ). 1978.
From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).
In Europe, the use of asphalt is synonymous with volume reduction of low and medium level radioactive waste. It started at Marcoule, France in the early 1960's and soon was adopted by Karlsruhe in West Germany, Eurochemic in Belgium, and in other countries. The use of an asphalt (or bitumen) binder, or immobilizing agent, in the VRS (Volume Reduction and Solidification) process proved to be beneficial in many ways. At Karlsruhe, for example, the VRS asphalt system replaced a cement system (non-volume reducing) and resulted in two drums of solidified waste versus ten with cement. This process reduced the transportation problem considerably. Asphalt is an inert, waterproof material and provides significantly improved package integrity under all conditions of on-site storage, transportation, and burial. The asphalt VRS system provides considerable cost savings, particularly for the recurring items such as binder, containers, transportation, and burial. These annual savings may approach $500,000 annually for a 1000 MWe nuclear plant. End product advantages include higher resistance to leaching and other environmental impacts, as well as less internal corrosion of the drums.

157 (CONF-780506--(Vol.1), pp 331-338)
SPENT FUEL SHIPPING AND STORAGE SYSTEM FOR ATUCHA NUCLEAR POWER STATION. Marticorena, J.O. (Consorzio NUCLITAL, Genoa, Italy); Quilici, O. 1978.
From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).
Argentina's Atucha Nuclear Power Station is on the HWR type with pressure vessel. Its natural UO_2-zircaloy fuel assemblies are bundles of 36 fuel rods, 620 cm in length and 11 cm in diameter. The fuel elements are irradiated up to 7000 MWD/MTU and stored in a conventional decaying pool adjacent to the reactor building. A project was developed to design and build a shipping cask and a dry storage place for interim storage of spent Atucha's fuel. This paper describes the cask and storage design, as well as the special container (basket) for the fuel elements. The operation of the whole system is described, with emphasis on safety aspects, and a brief reference is made to heat transfer, corrosion and costs. Safety analysis shows that even in accident conditions the radiation dose on workers in the area will be under the maximum allowed levels. Cask and storage design allows for refrigeration by air convection without surpassing a temperature of 250°C in the hottest fuel rod. Estimate unit costs for the storage system are under 0.1 mills/kWh.

158 (CONF-780506--(Vol.1), pp 341-350)
EMPIRICAL EQUATIONS FOR PUNCTURE ANALYSIS OF LEAD-SHIELDED SPENT FUEL SHIPPING CASKS. Shieh, R.C. (Nuclear Regulatory Commission, Washington, DC). 1978.
From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).
In-depth review and analysis of the existing experimental puncture data of unlaminated steel plates and lead-shielded prismatic and cylindrical steel casks are made. Based on these test data, empirical equations applicable to puncture analysis and designs of steel plate and shell components of spent fuel casks are developed in terms of nondimensional incipient puncture energy, shell thickness and curvature parameters. In addition, the present study also examines the static puncture force behavior and puncture failure mechanism of unlaminated mild steel plates. This results in shedding some additional light on the puncture failure mechanism and better understanding of the puncture force behavior. Certain possible distortions in model-predicted prototype cask puncture responses (through use of the exact replica scale model testing techniques) are also discussed and a correctional measure presented.

159 (CONF-780506--(Vol.1), pp 351-358)
PUNCTURE PHENOMENA IN LOW VELOCITY IMPACT OF RADIOACTIVE WASTE SHIPPING CONTAINERS. Little, R.W. (Michigan State Univ., East Lansing); Larder, R.A. 1978.
From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).
Punch penetration phenomena of a radioactive waste shipping container when subjected to low velocity impact are studied both analytically and experimentally. Model cask materials in the form of circular test samples of stainless steel, backed with high density material (lead or uranium) are dropped on a steel punch with impact velocities of 220 in/sec or less. The experimental program involves 25 static tests and 67 dynamic tests in which plate thicknesses, backing material and punch diameters are varied. A detailed finite element analysis including the effects of plastic-work hardening in the materials and plate laminate separation was made on two geometries; ballasted with an impact velocity of 66.7 in/sec and unballasted with an impact velocity of 200 in/sec. An alternate analytical program was developed based upon a system frequency spectra analysis. A Rayleigh-Ritz approach was

selected, including the laminated plates, deformable punch and elastic ballast in the potential energy, and distributed mass in the kinetic energy. A model analysis using the first five frequencies was performed and stress calculations included the effects of plastic deformation. Excellent agreement was obtained between the Rayleigh-Ritz and the finite element analyses. In most cases, it was observed that initial impact was not sufficient to cause onset of punch yield or plate puncture but the plate vibration effects would initiate failure at a later time. The Rayleigh-Ritz program was used to analyze the different experimental configurations and then compared to experimental data. This research indicates that low velocity impact studies of radioactive waste shipping containers must consider the phenomena of structural vibrations. The analytical approach developed offers an accurate, quick and inexpensive method of examining low velocity impact.

160 (CONF-780506--(Vol.1), pp 375-383)
CORRELATION OF EXPERIMENTAL SHIPPING CASK MODEL STRUCTURAL BEHAVIOR BY COMPUTER ANALYSIS. Balmert, M.; Groom, J. (Battelle Columbus Labs., OH). 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

As an aid in the planning and investigation of an experimental research program on the effects of environmental accidents upon spent fuel shipping containers, a study is being made to correlate the results of tests of scale model shipping casks with those of complex structural computer models. After surveying the available codes, a general purpose, dynamic, nonlinear computer program (ADINA) was chosen to model several experiments. Among these are: stainless steel cylindrical containers dropped on end from a height of 12 inches; lead and uranium filled cask models dropped 12 inches and 30 feet, in both end and side orientations. The results will be used for selection of the test parameters by the prediction and planning of failure test conditions, as well as confirmation of previous test results. Together, the experimental and theoretical analyses will provide a realistic assessment of the effects of accident loadings on spent fuel shipping containers.

161 (CONF-780506--(Vol.1), pp 447-453)
DETERMINATION OF ALLOWABLE MAXIMUM ACCELERATION LOADS FOR THE TRANSPORT OF IRRADIATED FUEL. Hill, R.G.; Waymire, G.R. (Exxon Nuclear Co., Inc., Bellevue, WA). 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

In developing design criteria for the transport of irradiated fuel assemblies, the maximum mechanical loads which may be applied without cladding breach must be specified. A breach in the fuel rod cladding will result in releasing gaseous and perhaps particulate radioactivity to the transporter cavity. While this failure will not result in a safety hazard during the transport of the fuel assemblies, it could result in delays in unloading and preparing the transporter for additional shipments. Two finite element models of a PWR fuel assembly were developed to provide a relationship between transport input accelerations and fuel rod stress and strain. The models were set up for loading in the axial or transverse direction to the fuel assembly. Non-linear effects such as the fuel rods impacting the tie plates for axial loads and impact with adjacent fuel rods for transverse loads were included in the analyses. Test and Finite Element Model (FEM) analysis has demonstrated that both the impact and sliding phenomenon are linear with respect to strain and stress. Based on the irradiated cladding material properties and derived strain limits, these models can then be used to determine the acceleration limits for the design of the transporter suspension system. This paper describes the analytical models used, typical results obtained from the analyses, and considerations involved in formulating the resultant criteria. It is proposed that criteria developed from these analyses may be used in monitoring the operation of spent fuel transport equipment.

162 (CONF-780506--(Vol.1), pp 150-153)
MOTOR VESSEL HONOURA MARU: A SPECIALIZED CARRIER FOR SPENT FUEL. Mori, Y. (Nuclear Transport Service Co., Ltd., Tokyo, Japan). 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

In Japan, the volume of nuclear spent fuel is increasing and reprocessing has been become an urgent matter. Means of transporting spent fuels were studied and the criteria for a vessel resulted. The construction of the ship HINOURA MARU was completed on July 1, 1977. Several trial voyages were performed last year and the first vogage was undertaken in January of this year. Spent fuel will be transported from electric power companies to the reprocessing plant for ten years. The HINOURA MARU is a vessel of 1290 tons gross and includes the following special structures and special equipment: 1. double hull structure against collision; 2. double bottom structure against grounding; 3. structure of radiation shield; and 4. cargo cooling equipment, etc.

163 (CONF-780506--(Vol.1), pp 154-162)
STRENGTH AND WATER-TIGHTNESS OF THE CLOSURE HEAD AND VALVES OF A MODEL CASK UNDER HIGH EXTERNAL PRESSURE. Terada, O.; Kumada, M.; Hayakawa, T.; Mochizuki, S.; Ohrui, K. (Mitsui Engineering and Shipbuilding Co., Ldd., Tokyo, Japan). 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

This paper describes experimental research on the strength and water-tightness of the closure head and attached valves of a model cask under high external pressure, in simulation of its having been accidentally lost in the deep sea. Both the external pressure tests and the corrosion tests were carried out using scale models of the closure head of an 80-ton spent-fuel shipping cask, and the full size pressure relief valves and drain valves which were to be attached to the actual cask. Based on the results of the above tests, evaluations were made, and new information was obtained on the pressure-proof strength and water-tightness of the closure head of the cask and the valves. Lastly, research which is being carried on in Japan on the pressure equalizer is also introduced.

164 (CONF-780506--(Vol.1), pp 17-27)
STANDARDIZE OR NOT TO STANDARDIZE: THE PROS AND CONS OF STANDARDIZED DESIGNS FOR CASKS AND CASK TRANSPORT SYSTEMS. Brobst, W.A.; Chais, M. (Dept. of Energy, Washington, DC). 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

There are many different cask designs that

have been approved, built, and used over the years. Some special-use vehicles have been built. In the US, there are now over a dozen current use casks. With a sharp increase in the number of spent fuel shipments coming up in the next decade, and the beginning of high-level waste shipments in the late 1980's, there could be a proliferation of cask and transport vehicle designs. But is this a good idea. Should there be more casks of fewer designs, or are custom-designed casks and vehicles a better way to go. This paper examines the advantages and disadvantages of standardized designs for casks and cask transport systems. Factors of safety, economics, efficiency, and public acceptance are considered. Examples of other transport hardware standardization are given and evaluated. The effects of cask standardization on reactor and processing plant design and operations are examined, as well as the effects of plant standardization on the transport system. This is a chicken and egg situation, and will require close cooperation between designers of transport system hardware and plant hardware.

165 (CONF-780506--(Vol.1), pp 52-58)
CONCEPTUAL DESIGN OF A SHIPPING CASK FOR RAIL TRANSPORT OF SOLIDIFIED HIGH LEVEL WASTE. Rhoads, R.E.; Peterson, P.L. (Battelle Pacific Northwest Labs., Richland, WA). 1978.
From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).
No commercial facilities to reprocess spent fuel from light water reactors are currently in operation in the US. Whether or not such facilities will be operated during the remainder of this century is currently a topic of national debate. If it is decided to proceed with the reprocessing option, much work remains to be done to develop commercial facilities to solidify the liquid high level waste generated from the process, transport it to a federal repository and isolate it from the environment. The Department of Energy is currently conducting a variety of research activities in these areas so that reprocessing facilities could be developed and operated in a timely fashion if the decision to use this technology is made. This paper reports the results of a study to develop a conceptual design for a shipping cask to transport solidified high level waste from a reprocessing plant to a federal repository by rail. Scale models of the cask design and accompanying graphics displays have also been developed. The design of a shipping container for radioactive materials is dependent on a variety of design constraints. The design constraints important to development of a cask for shipping solidified high level waste are reviewed. Since commercial facilities to solidify high level waste have not been operated, assumptions based on current technology were made concerning the properties of the solidified high level waste that would be shipped.The conceptual cask would transport nine canisters of waste. The canisters are assumed to be 0.3 m in diameter and 3 m long. Possible cask configurations for other canister sizes are described.

166 (CONF-780506--(Vol.1), pp 69-74)
URANIUM-LEAD SHIELDING FOR NUCLEAR MATERIAL TRANSPORTATION SYSTEMS. Lusk, E.C.; Miller, N.E.; Basham, S.J. Jr. (Battelle Columbus Labs., OH). 1978.
From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).
The basis for the selection of shielding materials for spent fuel shipping containers is described with comments concerning the favorable and unfavorable aspects of steel, lead, and depleted uranium. A concept for a new type of material made of depleted uranium and lead is described which capitalizes on the best cask shielding characteristics of both materials. This cask shielding is made by filling the shielding cavity with pieces of depleted uranium and then backfilling the interstitial voids with lead. The lead would be bonded to the uranium and also to the cask shells if desired. Shielding density approaching 80 percent of that of solid uranium could be achieved, while a density of 65 percent is readily obtainable. This material should overcome the problems of the effect of lead melting in the fire accident, high thermal gradients at uranium-stainless steel interfaces and at a major reduction in cost over that of a solid uranium shielded cask. A development program is described to obtain information on the properties of the composite material to aid in design analysis and licensing and to define the fabrication techniques.

167 (CONF-780506--(Vol.1), pp 102-109)
DESIGN, LICENSING AND FABRICATION OF A 64,000 POUND, TOP AND BOTTOM LOADING, TYPE B SHIELDED OVERPACK. Hansen, L.J. (Nuclear Packaging, Inc., Tacoma, WA). 1978.
From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).
The NUPAC OH-142 shielded overpack has been designed to provide a flexible package capable of transporting 142 cubic feet (4m^3) of medium-to-high level wastes. It was primarily designed for the transport of spent ion exchange resins from Canadian reactors to the Quadricell retrievable storage facility. During the design phase it was determined that with minor modifications its function could be expanded from a pure top loading transportation shield to one of a top and bottom loading transfer cask. As it is used to transport liners of ion exchange resins to the Quadricell where, through the use of its bottom unloading feature, the shield can be placed atop the Quadricell, thus allowing a liner to be lowered directly into the storage cell. The resultant transfer provides minimum operator exposure.

168 (CONF-780506--(Vol.1), pp 424-436)
MODEL TESTING OF HEAVY SPENT FUEL CASKS AND WASTE PACKAGINGS. Schulz-Forberg, B.; Huebner, H.W.; Wieser, K.E. (Bundesanstalt fuer Materialpruefung, Berlin, Germany). 1978.
From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).
Testing of models of appropriate scale is allowed by the 1973 IAEA regulations, Section VII, No. 701c. So and due to cost-benefit-analysis and limited capacity of test facilities, model testing of spent fuel casks and waste packagings has become more and more effective in the procedure of approving a packaging design. To verify model laws and scaling, two test series were performed by BAM. The first one with lead cylinders to verify the right scaling of deformation, the second one with rigid steel cylinders to verify the right scaling of forces. Besides this, investigations were made concerning the vibration behavior of lid constructions and the modeling of tightness. In the latter case, considerations were especially made for the tightness due to the geometry and the flow of the respective medium, including the use of different types of gaskets, looking also to the activity leakage rate. Based on these considerations, three test

series were carried out by BAM with models of the 100t Biblis packaging (scales: 1/12 and 1/3), the 1/5 scale model of the 32t TN28 waste packaging and the 1/2 scale model of the 32t TN8/9 spent fuel cask (200 m drop test). Besides model considerations, the latter super drop test is intended to lead to a better public acceptance while simulating the most severe impact conditions coming from a truck/train-traffic.

169 (CONF-780506--(Vol.1), pp 479-486)
ASSESSMENT OF THE HEAT TRANSFER PROPERTIES OF SPENT FUEL SHIPPING CASKS. Aoki, S.; Shimada, H.; Tamura, K. (Tokyo Inst. of Tech., Japan). 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

The purpose of this study is to assess the fire safety of spent fuel shipping casks through the analysis of fire test results. On the basis of results of open fire tests conducted in 1973-1974, of 1/2, 1/2.5 and 1/4 scale models of 80 ton cylindrical casks, heat transfer properties of the cask models in open fire were evaluated by computer analysis and the method for evaluation was confirmed to be feasible. A comparison was made between the temperature-time curves from the tests and those from the computer analyses. Observations are summarized as follows. 1) The temperatures in the upper part of the cask models were generally higher than the computer temperatures, while in the lower part, they both agreed with each other. 2) The average flame temperature can be used as the outer boundary temperature for the analysis, unless the flame temperature fluctuates very much. 3) When the heat transfer by convection to casks in an open fire is computed, equations of forced convection by wind, not those of natural convection, should be used. 4) It is believed that when the flame temperature distribution is not even, the heat flux by radiation should be computed with different flame temperatures taken into consideration.

170 (CONF-780506--(Vol.2), pp 683-692)
WORLDWIDE SPENT FUEL TRANSPORTATION LOGISTICS. Best, R.E. (Nuclear Assurance Corp., Atlanta, GA); Garrison, R.F. 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

This paper presents an overview of the worldwide transportation requirements for spent fuel. Included are estimates of numbers and types of shipments by mode and cask type for 1985 and the year 2000. In addition, projected capital and transportation costs are presented. For the year 1977 and prior years inclusive, there is a cumulative worldwide requirement for approximately 300 MTU of spent fuel storage at away-from-reactor (AFR) facilities. The cumulative requirements for years through 1985 are projected to be nearly 10,000 MTU, and for the years through 2000 the requirements are conservatively expected to exceed 60,000 MTU. These AFR requirements may be related directly to spent fuel transportation requirements. In total nearly 77,000 total cask shipments of spent fuel will be required between 1977 and 2000. These shipments will include truck, rail, and intermodal moves with many ocean and coastal water shipments. A limited number of shipments by air may also occur. The US fraction of these is expected to include 39,000 truck shipments and 14,000 rail shipments. European shipments to regional facilities are expected to be primarily by rail or water mode and are projected to account for 16,000 moves. Pacific basin shipments will account for 4500 moves. The remaining are from other regions. Over 400 casks will be needed to meet the transportation demands. Capital investment is expected to reach $800,000,000 in 1977 dollars. Cumulative transport costs will be a staggering $4.4 billion dollars.

171 (CONF-780506--(Vol.2), pp 693-699)
TRANSPORT OF IRRADIATED FUEL IN THE EUROPEAN COMMUNITY, 1975-1985. Rocco, P. (Commission of the European Communities, Ispra, Italy). 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

This report is a study on the development of the transport of irradiated fuel in the Community for a ten year period (1975 to 1985). Forecasts made in the 1975 to 1976 period evaluated the installed nuclear power in the Community for 1981 to 1982 as 86 GW with a doubling of this power for 1985. On this basis, the yearly transports of spent oxide fuel were raising to more than 1000 in 1985, whereas the corresponding values for spent magnox fuel were 750. More recent forecasts show strong reduction of the former values. In fact, a reflective tendency and the economic situation have reduced the orders of new power plants and delayed the building times. In the same way, reprocessing difficulties have led to long waiting periods in the pools. This report considers the new situation. The installed nuclear power for the next years is given following the latest information and the yearly output of irradiated fuel is computed. The reprocessing possibility of the Community and the construction in some countries of high capacity storage ponds are briefly reviewed. The foreseen shipments of out of Community fuel (especially Japanese) are taken in account. Typical LWR fuel elements, which will constitute the bulk of the Community transports for the next years are described, so as the actual and future shipping flasks. The tendency to the dimensional increase of the flasks will lead to a progressive reduction of the road transports in favor of rail transports. In the United Kingdom the rail transports are already predominant. A prospect is given of the technical and administrative procedures of these transports and of the discrepancies existing among the different Community countries. Finally, starting from the national fuel outputs, the number of annual transports is evaluated for the next years in each country and in the Community as a whole, making some alternative hypotheses for flasks of different capacity.

172 (CONF-780506--(Vol.2), pp 700-709)
TRANSPORT OF IRRADIATED FUELS WITHIN THE ITALIAN ELECTRONUCLEAR POWER PROGRAM. Faloci, C. (Comitato Nazionale per l'Energia Nucleare, Rome, Italy); Piermattei, S.; Cane, G.; Zaffiro, B.; Forasassi, G.; Tomassetti, G. 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

The problem of spent fuel transport in Italy has been under consideration since 1966. In this paper the authors analyze the experience gained during a ten year period in the transport field from the view point of the designers' sustomers and control authorities. Since the recent approval by the Italian government of the electronuclear power program the transport of irradiated fuels will assume in the future a role so prominent that it will strongly influence the national activities in

the nineties. Therefore, a forecast is made of the future nuclear movements according to the development of the nuclear program. The conditions are examined for the optimum organization to coordinate the future movements to coordinate. The main concern is to achieve the maximum safety and the minimum risk for the population. The technical problems connected with the above mentioned transport organization are pointed out on the basis of past experiences and future projections due to the new features and performances of the fuels to be used in the new plants. According to experience, a series of questions concerning the casks must be still answered. They concern the design criteria to be adopted for heat exchange, shielding, criticality and the practical solutions for the handling of the casks. Analysis indicates that advice and ideas from international organizations would be helpful, mainly concerning the criteria to interpretate the tests, their meaning on scale model and the holding down arrangements for different transport modes. Some suggestions are then presented to find the answer to some of the problems and they could also be used as a starting point in the selection of some important topics to be studied in depth by the experts.

173 (CONF-780506--(Vol.2), pp 719-726)
TRUCK VS RAIL SHIPMENT OF SPENT NUCLEAR FUEL. Dufrane, K.H. (Chem-Nuclear Systems, Inc., Orchard Park, NY). 1978.
From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).
In the evaluation of truck and rail transportation for spent nuclear fuel, three basic factors generally play a key role. These may be summarized as (1) economic, (2) operational, and (3) political. Any one of these three items may mandate the selection of truck or rail due to the singular importance of a particularly critical or sensitive item. However, in most instances, the final selection is the result of all three factors taken in combination. Both the operational and political factors are mainly site and/or location dependent, while economic additionally depends on off-site factors such as transportation distances, available services, cask use charges, and destination requirements. Operational limitations would be established by site factors such as the availability of qualified personnel to handle the cask turnaround, available time slots, suitable cask handling facilities, and access to the desired transportation mode. Political considerations would include any local restrictions, special agreements, and the relative visibility of the contemplated truck or rail shipments. Economic factors for the evaluation of truck and rail shipments include the man power and equipment turnaround costs at both the source and destination, travel distances and associated transport time, cask cost of daily use charges, direct transportation cost plus associated support activities, and specialized restrictions, tariffs, embargos, etc. that may be applied (i.e. special train charges, overweight permits, weekend or night travel restrictions, schedule restrictions, etc.). The economic, operational and political factors mentioned are expanded and discussed in greater detail.

174 (CONF-780506--(Vol.2), pp 727-729)
PUBLIC ACCEPTANCE OF RADIOACTIVE WASTE TRANSPORTATION SYSTEMS. Gablin, K.A. (Protective Packaging, Inc., Louisville, KY). 1978.
From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).
As the thoughts of the country concentrate on the problems of transportation of waste through high traffic urban areas, the problem of how to deal directly and honestly with the public takes on greater significance in the nuclear industry. Non-technical aspects of the methods of transportation, especially by railroad and highway, enter into the total scheme of moving radioactive waste from both weapon and nuclear power plant sources to final processing and disposal. Factors such as shape, color, size, familiarity, and industrial designing are necessary ingredients that take on equal or more significance that the designing of containers to survive the hypothetical accident conditions of the present, or even of the future. Protective Packaging, Inc. has been a leader in the presentation of containers to the private and public sector of the nuclear industry. The products have undergone very open testing, in public, with both invited and uninvited witnesses. In those experiences, dating back to 1969, the problems of public acceptance will be related between the technical problems and the associated social and political problems that relate to container acceptance by the public in today's world. Proven experience data, relative to the safety of the present day systems will be discussed, as well as methods of improving the image in the future. Review will also be given to the effort by industry to discuss the proven record with parties outside the nuclear industry, i.e., individuals and pressure groups that are diametrically opposed to review the facts relative to safety as opposed to other, but more traditional industries.

175 (CONF-780506--(Vol.2), pp 741-747)
OPERATIONS EXPERIENCE WITH THE NAC-1 LEGAL WEIGHT TRUCK CASK. Viebrock, J.M.; Hoffman, C.C. (Nuclear Assurance Corp., Atlanta, GA). 1978.
From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).
The first three years of operation of Nuclear Assurance Corporation's (NAC) four (4) NAC-1 Casks have demonstrated that shipments of spent fuel, fuel rods and other highly irradiated reactor components can be moved routinely by legal weight truck transport. Shipments of these materials have involved some 800,000 miles of highway travel and cask handling at some fifteen different nuclear facilities. This paper presents details on NAC's operations experience with these casks including cask description, cask handling (loading and unloading), pre-shipment testing, facility turnaround and transit times, operator exposure, transport vehicles and shipper/carrier/cask owner responsibilities, actual experience with regard to facility interfacing requirements and operational procedures. Cask and equipment utilization is discussed together with the methods used to control operation costs and to improve the economics of truck transport.

176 (CONF-780506--(Vol.2), pp 748-753)
INTERSTATION TRANSFER OF SPENT NUCLEAR FUEL. Kunita, R.K.; Wallace, A.R. (Carolina Power and Light Co., Raleigh, NC). 1978.
From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).
During the period from October 1977 through January 1978 Carolina Power and Light Company (CP and L) transferred a substantial number of

spent nuclear fuel assemblies from storage at one nuclear station to another station for interim storage there. The spent fuel assemblies were removed from the fuel storage pool at the H. B. Robinson Plant, Unit No. 2, located near Hartsville, South Carolina, and transferred to a newly modified fuel storage pool at Brunswick Plant, Unit No. 1, located near Southport, North Carolina. After a careful engineering study, CP and L chose the General Electric IF-300 Irradiated Fuel Shipping Cask System as the most practicable cask for use in our particular situation. This system consists of a spent fuel cask licensed under 10CFR71 as a Type B package, the skid on which it is mounted along with a diesel engine cooling system and personnel enclosure, and the railcar on which it is transported. When the cask arrived at our Brunswick Plant in May 1977, CP and L became the first utility to purchase and take delivery of its own spent fuel shipping cask. Actual transfer of fuel marked the culmination of an intensive effort on the part of several departments within CP and L. The difficulties encountered in registering as a user of the cask and in taking possession of the cask and railcar were many and varied. Due to the limited shipping window, the decision was made to use special train service for the shipments. Dry run operations at both sites utilizing an empty cask revealed problems which required prompt attention. Modifications to equipment and procedures were made as required. When actual shipments were begun, equipment problems were quick to arise and cause minor delays. Once the campaign was in full swing, however, the personnel involved became more experienced in handling the cask and operations went more smoothly.

177 (CONF-780506--(Vol.2), pp 804-806)
SPENT FUEL TRANSPORTATION ACCIDENT: A STATE'S INVOLVEMENT. Neuweg, M. (Illinois Dept. of Public Health, Springfield). 1978.
From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

On February 9, 1978 at 8:20 p.m., the duty officer for the Illinois Radiological Assistance Team was notified that a shipment containing uranium and plutonium was involved in an accident near Gibson City, Illinois on Route 54. It was reported that a pig containing an unknown amount of uranium and plutonium was involved. The Illinois District 6A State Police were called to the scene and secured the area. The duty officer in the meantime learned after numerous telephone calls, approximately 1 hour after the first notice was received, that the pig actually was a 48,000 pound cask containing 6 spent fuel rods and the tractor-trailer had split apart and was blocking one lane of the highway. The shipment had departed from Dresden Nuclear Power Station, Morris, Illinois, enroute to Babcox and Wilcox in Lynchburg, Virginia. Initial reports indicated the vehicle had split apart. Actually, the semi-trailer bed had buckled beneath the cask due to apparent excess stress. The cask remained entirely intact and was not damaged, but the state highway was closed to traffic. The State Radiological Assistance Team was dispatched and arrived on the scene at 12:45 a.m. Immediate radiation monitoring revealed a reading of 4 milliroentgen per hour at 10 feet from the cask. No contamination existed nor was anyone exposed to radiation unnecessarily. The cask was transferred to a Tri-State semi-trailer vehicle the following morning at approximately 6:30 a.m. At 9:30 a.m., February 10, the new vehicle was again enroute to its destination. This incident demonstrated typical occurrences involving transportation radiation accident: misinformation and/or lack of information on the initial response notification, inaccuracies of radiation monitorings at the scene of the accident, inconsistencies concerning the occurrences of the accident and unfamiliar terminology utilized by personnel first on the scene, i.e., pig, cask, vehicle split apart, etc.

178 (CONF-780506--(Vol.2), pp 887-889)
EXPERIENCE IN COMPLYING WITH QUALITY ASSURANCE REQUIREMENTS FOR CASK LIFTING DEVICES. Hoffman, C.C.; Best, R.E. (Nuclear Assurance Corp., Atlanta, GA). 1978.
From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

The Nuclear Assurance Corporation (NAC) owns and operates four NAC-1 truck casks. These casks are used to ship spent reactor fuel assemblies and radioactive reactor-core components. The casks have been loaded or unloaded at a total of fifteen nuclear facilities in the United States. In addition, NAC has used another large, overweight-truck cask to ship radioactive reactor core components from a reactor to a waste burial site. There are many individual differences in the cask handling facilities at each of the reactor stations, nuclear research facilities and the storage and burial sites serviced. Various types of auxiliary lifting and handling devices for on-site cask operations have been required. The quality assurance requirements for the equipment used in interfacing casks with nuclear power plant facilities have become more stringent. This paper presents details on the type of special equipment being employed, the quality assurance requirements that are imposed, and the quality assurance audits that are being performed. The paper presents NAC's experiences in the development and procurement of a variety of cask-facility equipment and the implementation of quality assurance procedures for the design, manufacture, acceptance and in-service inspection and test of the equipment. Also, experiences in working with customers' engineering and quality assurance organizations are discussed with specific attention given to the establishment of interface equipment requirements and the documentation that must be developed. The paper discusses a number of factors that must be considered in the development of design criteria for cask lifting devices. In addition to the criteria that are important to the functional safety of the equipment, other considerations important to the equipment utilization and effectiveness are presented.

179 (CONF-780506--(Vol.2), pp 933-936)
RADIOLOGICAL RISK ANALYSIS OF TRUCK AND RAIL TRANSPORTATION OF NUCLEAR WASTES. Fullwood, R.R.; Mendoza, Z.; Ritzman, R.L.; Aron, W.; Straker, E.A. (Science Applications, Inc., Palo Alto, CA). 1978.
From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

A radiological accident risk analysis of the transportation of nuclear waste has been performed for the following waste transportation modes: spent fuel (NLI 10/24, rail; NFS-4, truck), plutonium dioxide (6M, truck), vitrified high level waste (conceptual cask, rail), cladding hulls (conceptual cask, truck, and rail) and non-high level waste (Super-Tiger, truck). In order to simplify the problem, accident categories were defined corresponding to failure and degree of failure of various barriers. Fault trees, for each category, were prepared and quantified using

various sources of failure probabilities, the transportation accident probabilities were taken from SLA 74-0001. All accidents of public concern involve penetration of the protection barriers. Based on recent full scale testing and analysis, the only mechanisms for this penetration is impalement on accident debris such as a rail or axile. This probability is taken to be the probability of a missile (conservatively assuming all missiles are impalement stubs) times the probability of penetration obtained from two missile penetration formulae. The source terms for the accidents were obtained from several physiochemical models. Cesium release source terms were calculated using the WASH-1238 supplement 2 model. The population dose was calculated using the WASH-1400 draft computer program which uses mean demographics and meteorologies appropriate to a nuclear power plant. No cancer effects are estimated. The relative mix of transportation modes was adapted from recent projections for the US in 1990. The findings are that transportation of plutonium either as a powder or as a TRU containment of non-high-level waste represents the two highest risk modes. Eliminating PuO_2 transport, this work finds total non-occupational risks to be less than presented in GESMO except for lung risks which are slightly higher.

180 (CONF-780506--(Vol.2), pp 939-945) TRANSPORTATION OF POSTFISSION RADIOACTIVE WASTES FROM THE COMMERCIAL LWR FUEL CYCLE. Murphy, E.S.; Clark, L.L.; Napier, B.A. (Battelle Pacific Northwest Labs., Richland, WA). 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

Requirements for transportation of postfission radioactive wastes from the commercial LWR fuel cycle were studied. Only radioactive wastes that would require transport to federal facilities for interim storage or final disposal were considered. These wastes included spent fuel, solidified high-level waste, fuel residues and non-high-level TRU waste. Transportation requirements were determined and transport facilities described; packaging and shipping costs were estimated; and the potential environmental impacts of transportation and of postulated accidents were evaluated. Projections are given for the number one cost of waste shipments for the once-through fuel cycle and for a uranium plus plutonium recycle option. The projections are based on an assumed nuclear generating capacity of 400 GWe in the year 2000. On a cost per kg of heavy metal basis, truck cask shipments appear to cost about the same as rail cask shipments. However, shipping cost estimates do not take into account the large increase in cask handling capacity required if all shipments were by truck. It is therefore assumed that cask shipments will be by rail. Under normal transport conditions, no radioactive materials will be released from shipping containers to the atmosphere, ground or water. Direct radiation doses calculated for members of the general population from passing rail or truck shipments of radioactive wastes are insignificant when compared to doses from natural background radiation. In the absence of accident data involving material releases, a series of minor, moderate and severe accident scenarios for radioactive shipments were postulated. Expected frequencies for these accidents were calculated on the basis of accident statistics and assumed total shipment miles; material releases were postulated for each accident scenario; and radiation doses from these postulated releases were calculated.

181 (CONF-800943--(Summ.), pp 42-44) DOE'S SPENT FUEL PROGRAM TALK. Lawrence, M.J. 1980.

From National topical meeting of fuel cycles for the 80's; Gatlinburg, TN, USA (29 Sep 1980).

GOVERNMENT POLICIES;AWAY-FROM-REACTOR STORAGE;RADIOACTIVE WASTE FACILITIES;BARNWELL FUEL PROCESSING PLANT;MIDWEST FUEL RECOVERY PLANT;WEST VALLEY PROCESSING PLANT

182 (CONF-800943--(Summ.), pp 45-48) ECONOMICS OF SPENT LWR FUEL STORAGE. Clark, H.J.; O'Neill, G.F. (Savannah River Lab., Aiken, SC). 1980.

From National topical meeting of fuel cycles for the 80's; Gatlinburg, TN, USA (29 Sep 1980).

BWR TYPE REACTORS;PWR TYPE REACTORS;SPENT FUEL STORAGE;AWAY-FROM-REACTOR STORAGE; ECONOMICS;COMPARATIVE EVALUATIONS;FUEL RACKS; COST

183 (CONF-800943--(Summ.), pp 49-52) DETERMINATION OF AWAY-FROM-REACTOR STORAGE REQUIREMENTS. Thomas, A.B. (Savannah River Plant, Aiken, SC). 1980.

From National topical meeting of fuel cycles for the 80's; Gatlinburg, TN, USA (29 Sep 1980).

AWAY-FROM-REACTOR STORAGE;SPENT FUELS; INVENTORIES;GOVERNMENT POLICIES;CAPACITY;D CODES;DATA BASE MANAGEMENT;DATA COMPILATION; PLANNING

184 (CONF-800943--(Summ.), pp 53-55) LICENSING OF AWAY-FROM-REACTOR (AFR) INSTALLATIONS. Gray, P.L. (Savannah River Lab., Aiken, SC). 1980.

From National topical meeting of fuel cycles for the 80's; Gatlinburg, TN, USA (29 Sep 1980).

LICENSING;AWAY-FROM-REACTOR STORAGE;SPENT FUELS;US NRC;RADIOACTIVE WASTE FACILITIES

185 (CONF-800943--(Summ.), pp 56-59) SPENT FUEL DRY STORAGE CONCEPTS. Anderson, K.J. (Allied-General Nuclear Services, Barnwell, SC). 1980.

From National topical meeting of fuel cycles for the 80's; Gatlinburg, TN, USA (29 Sep 1980).

Vault storage, caisson storage; and repository storage. SPENT FUEL STORAGE;BARNWELL FUEL PROCESSING PLANT;RADIOACTIVE WASTE FACILITIES;RADIOACTIVE WASTE STORAGE; VENTILATION SYSTEMS;UNDERGROUND STORAGE;HOT CELLS

186 (CONF-800943--(Summ.), pp 60-64) HIGH-DENSITY RACK CONCEPTS FOR AFR FUEL STORAGE POOLS. Anderson, R.T. (Allied-General Nuclear Services, Barnwell, SC). 1980.

From National topical meeting of fuel cycles for the 80's; Gatlinburg, TN, USA (29 Sep 1980).

AWAY-FROM-REACTOR STORAGE;SPENT FUELS; COOLING PONDS;FUEL RACKS;CAPACITY;BARNWELL FUEL PROCESSING PLANT;NEUTRON ABSORBERS;DESIGN

187 (CONF-801115--5(Draft)) PREDICTING ROUTES OF RADIOACTIVE WASTES MOVED ON THE U.S. RAILROAD SYSTEM. Hillsman, E.L.; Johnson, P.E.; Peterson, B.E. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-

26. 7p. NTIS, PC A02/MF A01.
From 6. international symposium on packaging and transporting radioactive material; Berlin, F.R. Germany (10 Nov 1980).
Relative to the use of public roads, railroads offer several advantages for the movement of radioactive wastes. These include the ability to accommodate large, heavy containers, the ability to transfer large volumes in a single movement, and the safety of a dedicated, centrally controlled right-of-way. The principal disadvantage of railroads is that the shipper has considerably less freedom to specify the route a shipment will take. The lower density of the railroad network, the need to coordinate waste shipments with other traffic in the system, and the private ownership of the US network all reduce the shippers routing power. Although the shipper can dictate an exact route, this could require the use of a special train at an increased cost. Before considering the general use of special trains to move radioactive wastes, it is first desirable to determine how these materials would move as general rail traffic. This paper describes the development of a system to predict routes of general rail traffic at Oak Ridge National Laboratory (ORNL).

188 (DOE/ET/47906--2) FUEL-CLAD FAILURE DETECTION. FINAL REPORT, TASK 1. Reier, M.; Keneshea, F.; Younger, J. (Nuclear Services Corp., Campbell, CA (USA)). 16 Nov 1979. Contract AC09-79ET47906. 63p. Dep. NTIS, PC A04/MF A01.
A study has been made of the means of identifying spent nuclear fuel assemblies which have suffered clad rupture. Various probe techniques, such as the use of an ultrasonic probe or boroscope for visual inspection of individual rods, are not feasible because of the inaccessibility of interior rods and the inordinate time consumed in checking a single assembly. The PIXE (Proton Induced X-Ray Emission) method has also been investigated. Although it should produce satisfactory results, it would be far more expensive, without any obvious advantages, than a sipping system for fission products. In-situ sipping of an assembly in a large rack would be extremely desirable; however, unambiguous results cannot be predicted without trying it and comparing with a technique which isolates the assembly from the neighboring ones. Finally, the conceptual design of a sipping system is proposed which is about 2-1/2 times faster than current ones in operation without any loss in accuracy or increased complexity. 5 figures, 7 tables.

189 (DOE/NE--0002) SPENT FUEL STORAGE REQUIREMENTS: THE NEED FOR AWAY-FROM-REACTOR STORAGE. (Department of Energy, Washington, DC (USA). Div. of Spent Fuel Storage and Transfer). Jan 1980. 12p. Dep. NTIS, PC A02/MF A01.
The analyses of on-site storage capabilities of domestic utilities and estimates of timing and magnitude of away-from-reactor (AFR) storage requirements were presented in the report DOE/ET-0075 entitled Spent Fuel Storage Requirements: The Need For Away-From-Reactor Storage published in February 1979 by the US Department of Energy. Since utility plans and requirements continue to change with time, a need exists to update the AFR requirements estimates as appropriate. This short report updates the results presented in DOE/ET-0075 to reflect recent data on reactor operations and spent fuel storage. In addition to the updates of cases representing the range of AFR requirements in DOE/ET-0075, new cases of interest reflecting utility and regulatory trends are presented.

190 (DOE/NE--0010) SPENT NUCLEAR FUEL: A COMPARISON OF AT-REACTOR BASIN STORAGE AND AWAY-FROM-REACTOR STORAGE. (Department of Energy, Washington, DC (USA). Assistant Secretary for Nuclear Energy). Jul 1980. 25p. NTIS, PC A02/MF A01.
A nuclear power reactor operator, confronted with rising spent fuel inventories that would soon exceed storage capacity, has several options to remedy this situation: transshipment, reracking of existing at-reactor storage basins (ARB), new ARB's, and away-from-reactor (AFR) basins. This report examines the latter two cases where a macro-economic comparison of each storage system is developed. The AFR storage system proved to be significantly more economical. This analysis indicates that 46 ARB's would be needed to meet storage requirements compared to only three AFR's. The total discounted costs associated with building new ARB's and AFR's are $4.7 billion and $1.2 billion respectively.

191 (DOE/NV/10061--1) SPENT FUEL HANDLING AND PACKAGING PROGRAM. QUARTERLY REPORT, OCTOBER-DECEMBER 1979. Durrill, D.C. (Westinghouse Electric Corp., Mercury, NV (USA). Advanced Energy Systems Div.). Jan 1980. Contract AC08-80NV10061. 13p. NTIS, PC A02/MF A01.
Balance of 13 fuel assemblies for the Climax programs were received; 9 were completely encapsulated, 4 were canistered without welding; all were placed in Hot Bay lag storage. Six Climax electrically heated mockup assemblies (EHMA) were pre-assembled at E-MAD, delivered to the Climax site and assembly was completed. The BWR fuel handling tool was fabricated and proof tested. The new constant air monitor (CAM) equipment was received. Fuel Temperature Test controller modifications were completed and testing was resumed. Calorimeter equipment installation was resumed; modification of lower vertical supports was completed; and the first review draft of the operating procedure was issued. The Lag Storage Pit ventilation test was completed.

192 (DOE/NV/10061--2) SPENT FUEL HANDLING AND PACKAGING PROGRAM. QUARTERLY REPORT, JANUARY-MARCH 1980. Durrill, D.C. (Westinghouse Electric Corp., Mercury, NV (USA). Advanced Energy Systems Div.). Apr 1980. Contract AC08-80NV10061. 17p. NTIS, PC A02/MF A01.
The following was completed: calorimeter equipment modification, installation, calibration and checkout, climax canister thermocouple channel/Climax shield plug alignment checks, Climax canister/shield plug/dummy fuel lifting force measurement, 1 KW PWR Fuel Temperature Test, and lag Storage Pit radiation background measurement study.

193 (DOE/NV/10061--3) SPENT FUEL HANDLING AND PACKAGING PROGRAM. QUARTERLY REPORT, APRIL-JUNE 1980. Durrill, D.C. (Westinghouse Electric Corp., Mercury, NV (USA). Advanced Energy Systems Div.). Jul 1980. Contract AC08-80NV10061. 19p. NTIS, PC A02/MF A01.
This document is a report of activities performed by Westinghouse Advanced Energy Systems Division-Nevada Operations at the E-MAD Facility, Area 25, Nevada Test Site, in meeting subtask objectives during the third quarter of

FY 1980. Activities during this period included completion of encapsulation and preparation for shipment of 11 spent fuel assemblies to be tested at the Climax test site by Lawrence Livermore Laboratories; calorimetry of two fuel assemblies; repeat of three 1 kW Fuel Temperature Test runs; acquisition of gas samples from fueled canisters; removal of ten R-MAD shielding windows; and assembly and checkout of the canister cutter, which was received from AESD-Large.

194 (DOE/NV/10061--4) COMMERCIAL WASTE AND SPENT FUEL PACKAGING PROGRAM. QUARTERLY REPORT, JULY THROUGH SEPTEMBER 1980. Hakl, A.R. (Westinghouse Electric Corp., Mercury, NV (USA). Advanced Energy Systems Div.). Oct 1980. Contract AC08-80NV10061. 20p. NTIS, PC A02/MF A01.

This document is a report of activities performed by Westinghouse Advanced Energy Systems Division-Nevada Operations at the E-MAD Facility, Area 25, Nevada Test Site, in meeting subtask objectives during the fourth quarter of Fiscal Year 1980. These activities include removal of the one kilowatt (kw) spent fuel assembly and installation of a two kw assembly into the Fuel Temperature Test in the West Process Cell; transfer of fueled canisters to Drywells 1, 2 and 3, and initiation of the Drywell Interaction Test; initiation of the two kw Drywell Test in Drywell 5; calorimetry; gas sampling; neutron spectra measurement; installation and qualification of the Canister Cutter; and continuation of the three kw Soil Temperature Test.

195 (DOE/SR--0004(Vol.1)) DEPARTMENT OF ENERGY STUDY ON SPENT NUCLEAR FUEL STORAGE. (Department of Energy, Washington, DC (USA)). Mar 1980. 47p. NTIS, PC A03/MF A01.

This report defines the needs for storage facilities and identifies possible sites in three regions of the US where such facilities could be located. The three sites are: Barnwell, South Carolina; Morris, Illinois; and West Valley, New York. This report includes consideration of the technical, economic, and regulatory factors associated with providing spent fuel storage in existing or potential at-reactor storage pools, and in AFR storage pools. This determination was based on specific data regarding the storage capacity needed to accommodate spent fuel from reactor pools by January 1, 1985, that the utilities would be unable to provide for themselves.

196 (DOE/SR--0004(Vol.2)) APPENDICES FOR DEPARTMENT OF ENERGY STUDY ON SPENT NUCLEAR FUEL STORAGE. (Department of Energy, Washington, DC (USA)). Mar 1980. 92p. NTIS, PC A05/MF A01.

Eight appendices comprise this report: predicted away-from-reactor storage requirements; detailed cost information for at-reactor and away-from-reactor storage pools; spent fuel storage studies by federal agencies or interagencies; detailed site information; reactors with near term considerations; state legislation affecting siting of away-from-reactor storage; Department of Energy Act of 1978; and legislation affecting transportation to AFR facilities.

197 (DOE/SR-SF--2002(Rev.1)) SPENT LWR FUEL STORAGE COSTS: RERACKING, AR BASINS, AND AFR BASINS. (Department of Energy, Aiken, SC (USA). Savannah River Operations Office). Jan 1980. 11p. Dep. NTIS, PC A02/MF A01.

Whenever possible, fuel storage requirements will be met by reracking existing reactor basins and/or transfer of fuel to available space in other reactor basins. These alternatives represent not only the lowest cost storage options but also the most timely. They are recognized to face environmental and regulatory obstacles. However, such obstacles should be less severe than those that would be encountered with AR or AFR basin storage. When storage requirements cannot be met by the first two options, the least costly alternative for most utilities will be use of a Federal AFR. Storage costs of $100,000 to $150,000 MTU at a AFR are less costly than charges of up to $320,000/MTU that could be incurred by the use of AR basins. AFR storage costs do not include transportation from the reactor to the AFR. This cost would be paid by the utility separately. Only when a utility requires annual storage capacity for 100 MTU of spent fuel can self-storage begin to compete with AFR costs. The large reactor complexes discharging these fuel quantities are not currently those that require relief from fuel storage problems.

198 (DOE/SR-SF--2003) SPENT FUEL STORAGE CAPACITY IN NEW REACTORS. (Department of Energy, Aiken, SC (USA). Savannah River Operations Office). Dec 1979. 13p. Dep. NTIS, PC A02/MF A01.

The standard spent fuel storage pools of the US power reactors currently under construction are sized at about 1000 ft^2 and 1225 ft^2 for BWR and PWR respectively. These basins, when equipped with SS racks, will contain 11 and 13 years fuel discharge respectively, each with full core reserve. With densification by fuel pin disassembly and reassembly into light SS cans, their capacity can be increased to 19 and 27 years respctively. With moderately expanded basin size, estimated to cost $3.0 and $1.6 million, and with boron SS basin racks, estimated to cost $2.5 and $1.0 million for BWR and PWR respectively, the basin capacities could be expanded to handle 20 years of reactor discharge. With fuel rod reassembly, the capacity of these basins would increase to 40 years or full reactor lifetime discharge. Utilities will move toward these moderately expanded size basins.

199 (DOE/SR-SF--2005-9) MONTHLY AWAY-FROM-REACTOR SPENT FUEL STORAGE REPORT: AFR PROGRAM. (Department of Energy, Aiken, SC (USA). Savannah River Operations Office). Sep 1980. 124p. NTIS, PC A06/MF A01.

This monthly away-from-reactor (AFR) report on spent fuel storage covers the following areas: planning and management; facility acquisition; legislative requirements; technical support; transportation, and international activity. The planning and management section provides a general statement of monthly activities which are itemized under that applicable program area. Specific program objectives, associated project activity and cost and milestone charts are provided. Some of the highlights of this report are: under facility acquisition, a reinforced concrete buttress outside of the basin wall has been selected as the best method for supporting the south wall in the event of add-on pool construction at the Morris operation; under legislative requirements, a formal draft of the fee report for Congress, Department of Energy Fee and Cost Studies of Spent Nuclear Fuel Storage and Disposal has been issued and is being reviewed internally; under technical support, the Technical Data Summary for AFR safeguards and non-proliferation concerns has been issued, and John Hopkins University is continuing work on streamlining computer

programs and developing and testing methods to address timing and capacity considerations in the AFR site selection; under transportation, Sandia Laboratories conducted high-velocity impact tests on spent fuel to determine released product dispersion, and has developed a computer model to evaluate the thermal transient inside a spent fuel cask during and after an accident; and under international activity, a US proposal for a work plan and allocation of tasks for the Pacific Basin feasibility study has been transmitted to the Japanese team to prepare for the initial joint working level meeting in October.

200 (DOE/SR-SF--20005-5) MONTHLY AWAY-FROM REACTOR SPENT FUEL STORAGE REORT AFR PROGRAM. (Department of Energy, Aiken, SC (USA). Savannah River Operations Office). May 1980. 66p. NTIS, PC A04/MF A01.

The program covered planning and management, facility acquisition, legislative requirements, technical support, transportation, and international activities. (DLC)

201 (DP-MS--79-71) FEDERAL FEES AND CONTRACTS FOR STORAGE AND DISPOSAL OF SPENT LWR FUEL. Clark, H.J. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1979. Contract EY-76-C-09-0001. 18p. (CONF-791108--3). Dep. NTIS, PC A02/MF A01.

From 72. AICHE meeting; San Francisco, CA, USA (25 Nov 1979).

The methodology for establishing a fee for federal spent fuel storage and disposal services is explained along with a presentation of the cost centers and cost data used to calculate the fee. Results of the initial fee calculation and the attendant sensitivity studies are also reviewed. The current status of the fee update is presented. The content of the proposed contract for federal services is briefly reviewed.

202 (DP-MS--80-31) LICENSING OF AWAY-FROM-REACTOR (AFR) INSTALLATIONS. Gray, P.L. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract AC09-76SR00001. 18p. (CONF-800943--9). NTIS, PC A02/MF A01.

From National topical meeting of fuel cycles for the 80's; Gatlinburg, TN, USA (29 Sep 1980).

Storage of spent fuel at Away-From-Reactor (AFR) installations will allow reactors to continue to operate until reprocessing or other fuel disposal means are available. AFR installations must be licensed by the Nuclear Regulatory Commission (NRC). Although wide experience in licensing reactors exists, the licensing of an AFR installation is a relatively new activity. Only one has been licensed to date. This paper delineates the requirements for licensing an AFR installation and projects a licensing schedule. Because the NRC is developing specific AFR requirements, this schedule is based primarily on draft NRC documents. The major documents needed for an AFR license application are similar to those for a reactor. They include: a Safety Analysis Report (SAR), and Environmental Report (ER), safeguards and security plans, decommissioning plans, proposed technical specifications, and others. However, the licensing effort has one major difference in that for AFR installations it will be a one-step effort, with follow-up, rather than the two-step process used for reactors. The projected licensing schedule shows that the elapsed time between filing an application and issuance of a license will be about 32 months, assuming intervention. The legal procedural steps will determine the time schedule and will override considerations of technical complexity. A license could be issued in about 14 months in the absence of intervention.

203 (DPSP-AFR--79-6-3) STATUS OF AWAY FROM REACTOR SPENT FUEL STORAGE PROGRAM. King, F.D. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant). Jul 1979. Contract EY-76-C-09-0001. 6p. (CONF-791108--9). Dep. NTIS, PC A02/MF A01.

From 72. AICHE meeting; San Francisco, CA, USA (25 Nov 1979).

The Away From Reactor (AFR) Spent Fuel Program that the US Department of Energy established in 1977 is intended to preclude the shutting down of commercial nuclear power reactors because of lack of storage space for spent fuel. Legislation now being considered by Congress includes plans to provide storage space for commercial spent fuel beginning in 1983. Utilities are being encouraged to provide as much storage space as possible in their existing storage facilities, but projections indicate that a significant amount of AFR storage will be required. The government is evaluating the use of both existing and new storage facilities to solve this forecasted storage problem for commercial spent fuel.

204 (DPST--77-458) COMPUTER MODEL FOR LWR FUEL STORAGE. Brotherton, J. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 30 Sep 1977. Contract EY-76-C-09-0001. 75p. Dep. NTIS, PC A04/MF A01.

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WATER COOLED REACTORS;FUEL POOLS;SPENT FUEL STORAGE;FUEL CYCLE;FORECASTING;INVENTORIES; TRANSPORT

205 (GA-A--15828) EVALUATION OF FSV-1 CASK FOR THE TRANSPORT OF LWR IRRADIATED FUEL ASSEMBLIES. (General Atomic Co., San Diego, CA (USA)). May 1980. Contract AT03-80SF10791. 180p. (TTC--0119). NTIS, PC A09/MF A01.

The Model FSV-1 spent fuel shipping cask was designed by General Atomic Company (GA) to service the Fort St. Vrain (FSV) nuclear generating station, a High Temperature Gas Reactor (HTGR) owned and operated by Public Service Company of Colorado (PSC). This report presents an evaluation of the suitability of the FSV-1 cask for the transport of irradiated Light Water Reactor (LWR) fuel assemblies from both Pressurized Water Reactors (PWR) and Boiling Water Reactors (BWR). The FSV-1 cask evaluation parameters covered a wide spectrum of LWR fuel assemblies, based on burnup in Megawatt Days/Metric Ton of Heavy Metal (MWD/MTHM) and years of decay since irradiation. The criteria for suitability included allowable radiation dose rates, cask surface and interior temperatures and the Gross Vehicle Weight (GVW) of the complete shipping system.

206 (HEDL-SA--1890-FP) ROLE OF SPENT FUEL CHARACTERIZATION IN THE DEVELOPMENT OF SAFE REPOSITORIES. Fish, R.L.; Davis, R.B.; Cantley, D.A. (Hanford Engineering Development Lab., Richland, WA (USA)). Aug 1979. Contract EY-76-C-14-2170. 25p. (CONF-791033--8). Dep. NTIS, PC A02/MF A01.

From 1. annual ONWI information meeting; Columbus, OH, USA (30 Oct 1979).

Portions of document are illegible.

Objective is to understand the spent fuel

performance. In order to do this, we must quantify the spent fuel characteristics at various time intervals during specific field and laboratory tests. This spent fuel characterization is used to identify and describe mathematically the degradation modes experienced during the tests. Incorporation of these descriptions into the more comprehensive spent fuel performance prediction model will aid in the overall licensing of repositories for permanent disposal of the spent fuel waste form.

207 (HEDL-SA--1891-FP) SPENT FUEL: PREDICTION MODEL DEVELOPMENT. Almassy, M.Y.; Bosi, D.M.; Cantley, D.A. (Hanford Engineering Development Lab., Richland, WA (USA)). Jul 1979. Contract EY-76-C-14-2170. 29p. (CONF-791033--6). Dep. NTIS, PC A03/MF A01.

From 1. annual ONWI information meeting; Columbus, OH, USA (30 Oct 1979).

Portions of document are illegible.

The need for spent fuel disposal performance modeling stems from a requirement to assess the risks involved with deep geologic disposal of spent fuel, and to support licensing and public acceptance of spent fuel repositories. Through the balanced program of analysis, diagnostic testing, and disposal demonstration tests, highlighted in this presentation, the goal of defining risks and of quantifying fuel performance during long-term disposal can be attained.

208 (HEDL-SA--2054-FP) ELEVATED TEMPERATURE TESTING OF SPENT NUCLEAR FUEL RODS. Stellrecht, D.E.; Pasupathi, V.; Krogness, J.C. (Battelle Columbus Labs., OH (USA); Hanford Engineering Development Lab., Richland, WA (USA)). Apr 1980. Contract AC14-76FF02170. 20p. (CONF-800607--64). NTIS, PC A02/MF A01.

From American Nuclear Society annual meeting; Las Vegas, NV, USA (8 Jun 1980).

The results of the first three tests have indicated that the experimental equipment designed for this program has functioned well and that the equipment and techniques constitute a viable test method for determining the stability of spent nuclear fuel rods at elevated temperatures. Test capsules are reusable and additional testing is feasible.

209 (HEDL-SA--2138) SPENT FUEL RESISTANCE TO INTERNALLY PRODUCED CLADDING DEGRADATION. Einziger, R.E.; Cantley, D.A.; Krogness, J.C.; Stellrecht, D.E.; Pasupathi, V. (Westinghouse Hanford Co., Richland, WA (USA); Battelle Columbus Labs., OH (USA)). May 1980. Contract AC14-76FF02170. 15p. (CONF-8005107--1). NTIS, PC A02/MF A01.

From Alternate waste form information workshop; Gatlinburg, TN, USA (13 May 1980).

These tests were conducted over a narrow temperature range considerably above anticipated disposal conditions and utilized only one set of rods from a single reactor. The following conclusions are made: The measured cladding strain was sufficiently large so that failure mechanism verification by inducing breaches in unmodified rods heated to elevated temperatures for short periods of time does not appear to be practical based on a stress rupture mechanism. At the elevated test temperatures, though, Blackburn's formulization based on stress rupture gives very conservative estimates of breach times. In addition to the high cladding strain, the fuel exhibited no additional gas release or axial fission product migration at 482°C. The nondestructive examination gave no additional indication of internal deterioration of the fuel rod.

210 (HEDL-TC--1331) MATERIALS INTERACTION TEST SUMMARY DESCRIPTION. Krogness, J.C. (Hanford Engineering Development Lab., Richland, WA (USA)). Jan 1980. Contract EY-76-C-14-2170. 14p. Dep. NTIS, PC A02/MF A01.

The Materials Interaction Test is designed to provide early scoping data on host rock performance and interaction between nuclear waste canister materials and host repository media under conditions representative of expected disposal environments. Capsules containing these materials were put in a spent fuel assembly and subsequently placed in a disposal test to study behavior in a low-level radiation environment at temperatures expected to range between 300 and 400°F. Thermal control capsules are being exposed in laboratory furnaces to allow a determination and separation of thermal and radiation effects. Post-test specimen examinations are planned to determine material property changes and interaction effects and provide data for understanding the effectiveness of host rock, canister, and cladding materials in long-term waste isolation.

211 (HEDL-TC--1334(Rev.1)) SPENT FUEL CHARACTERIZATION PLAN FOR DRY SURFACE STORAGE DEMONSTRATION TESTS. Krogness, J.C. (Hanford Engineering Development Lab., Richland, WA (USA)). Feb 1980. Contract EY-76-C-14-2170. 13p. Dep. NTIS, PC A02/MF A01.

Pre- and post-test examinations are planned for spent fuel assemblies to be placed in Dry Surface Storage Demonstration (DSSD) tests at the Nevada Test Site (NTS). Selected spent fuel assemblies are being characterized to determine the condition of the assemblies and fuel rods prior to packaging for disposal. At the end of the two to five year DSSD program, the spent fuel assemblies will undergo a post-test characterization for analysis and comparison with pre-test examination data. Data obtained from these as well as from other demonstration tests and laboratory spent fuel tests will be used to develop a performance prediction model for spent fuel disposal.

212 (HEDL-TME--78-58) SPENT FUEL INTEGRITY DURING TRANSPORTATION. Funk, C.W.; Jacobson, L.D. (Hanford Engineering Development Lab., Richland, WA (USA)). Jan 1980. Contract EY-76-C-14-2170. 54p. Dep. NTIS, PC A04/MF A01.

The conditions of recent shipments of light water reactor spent fuel were surveyed. The radioactivity level of cask coolant was examined in an attempt to find the effects of transportation on LWR fuel assemblies. Discussion included potential cladding integrity loss mechanisms, canning requirements, changes of radioactivity levels, and comparison of transportation in wet or dry media. Although integrity loss or degradation has not been identified, radioactivity levels usually increase during transportation, especially for leaking assemblies.

213 (HEDL-TME--79-20) SPENT FUEL DATA FOR WASTE STORAGE PROGRAMS. Greene, E.M. (Hanford Engineering Development Lab., Richland, WA (USA)). Sep 1980. Contract AC14-76FF02170. 102p. NTIS, PC A06/MF A01.

Data on LWR spent fuel were compiled for dissemination to participants in DOE-sponsored

waste storage programs. Included are mechanical descriptions of the existing major types of LWR fuel assemblies, spent LWR fuel fission product inventories and decay heat data, and inventories of LWR spent fuel currently in storage, with projections of future quantities.

214 (INFCE/DEP/WG--7/5) PACKAGING OF LWR SPENT FUEL FOR GEOLOGIC REPOSITORIES. (INFCE (USA)). Sep 1979. 17p. NTIS (US Sales Only), PC A02/MF A01.

One of the waste forms considered for geologic disposal by the INFCE Working Group 7 is spent, unreprocessed fuel from the Light Water Reactor (LWR) fuel cycle. This report describes a concept for a facility designed to package spent fuels from both Boiling-Water Reactors (BWR) and Pressurized-Water Reactors (PWR) in sealed, steel canisters, filled with helium, as assumed by the INFCE Working Group 7. Many features of the conceptual facility would be applicable for more complex, alternative packaging methods that are also briefly discussed. These methods include alternatives varying from simple, single-wall canisters to complex, multi-wall containers. Filler or stabilizer materials in the containers may involve solid metals (e.g., lead); solid nonmetallic materials or particulate materials. The use and selection of these filler or stabilizer materials, as well as the materials used for the canister, need to be evaluated from a systems viewpoint. The choices are dependent upon the role these materials might play in the multiple barrier system designed to isolate the radionuclides in the spent fuel and the degree of redundant safety desired by a particular country for a particular geologic situation.

215 (INIS-mf--4765) HANDLING FINAL STORAGE OF UNREPROCESSED SPENT NUCLEAR FUEL. I. GENERAL. (Kaernbraenslesaekerhet, Stockholm (Sweden)). 1978. 111p. Dep. NTIS (US Sales Only), PC A06/MF A01.

The present second report from KBS describes how the safe final storage of spent unreprocessed nuclear fuel can be implemented. According to the Swedish Stipulation Law, the owner must specify in which form the waste is to be stored, how final storage is to be effected, how the waste is to be transported and all other aspects of fuel handling and storage which must be taken into consideration in judging whether the proposed final storage method can be considered to be absolutely safe and feasible. Thus, the description must go beyond general plans and sketches. The description is therefore relatively detailed, even concerning those parts which are less essential for evaluating the safety of the waste storage method. For those parts of the handling chain which are the same for both alternatives of the Stipulation Law, the reader is referred in some cases to the first report. Both of the alternatives of the Stipulation Law may be used in the future. Handling equipment and facilities for the two storage methods are so designed that a combination in the desired proportions is practically feasible. In this first part of the report are presented: premises and data, a description of the various steps of the handling procedure, a summary of dispersal processes and a safety analysis.

216 (INIS-mf--5010) HANDLING OF FINAL STORAGE OF UNREPROCESSED SPENT NUCLEAR FUEL. 2. TECHNICAL. (Kaernbraenslesaekerhet, Stockholm (Sweden)). 1978. 325p. Dep. NTIS (US Sales Only), PC A15/MF A01.

In this report the various facilities incorporated in the proposed handling chain for spent fuel from the power stations to the final repository are cescribed. Thus the geological conditions which are essential for a final repository are discussed as well as the buffer and canister materials and how they contribute towards a long-term isolation of the spent fuel. Furthermore one chapter deals with leaching of the deposited fuel in the event that the canister is penetrated as well as the transport mechanisms which determine the migration of the radioactive substances through the buffer material. The dispersal processes in the geosphere and the biosphere are also described together with the transfer mechanisms to the ecological systems as well as radiation doses. Finally a summary is given of the safety analysis of the proposed method for the handling and final storage of the spent fuel.

217 (INIS-mf--5013, pp 29-58) HANDLING AND FINAL STORAGE OF UNREPROCESSED SPENT NUCLEAR FUEL. [nd].

Safe handling and storage of high level radioactive waste. A condensed version of the proposals of the Swedish KBS-Project regarding reprocessing waste, spent fuel.

The following stages in the handling of the fuel on its way to final storage are proposed in this report. 1) The spent fuel is stored at the nuclear power plant for at least six months. 2) The fuel is then transported to a central storage facility for spent nuclear fuel, where it is stored for 40 years. 3) The fuel is transported to an encapsulation station located above ground in connection with the final repository. Here the fuel rods are separated from the other parts of the fuel assemblies. The fuel rods are enclosed in copper canisters and the cavities are filled up with lead. Other radioactive material is embedded in concrete cubes. 4) The copper canisters are taken to a final repository which is built at a depth of approximately 500 metres in the bedrock. The copper canisters are surrounded by blocks of highly compacted bentonite - a clay which possesses very low permeability and which swells considerably upon absorbing water. 5) The facility can be kept open as long as surveillance is deemed desirable. It is then sealed by filling all tunnels and shafts with a mixture of quartz sand and bentonite. 6) The concrete cubes containing the metal components of the fuel assemblies are deposited in a separate repository at a depth of 300 metres in the bedrock. This repository is sealed with concrete, sand and bentonite.

218 (INIS-mf--5565, pp 54-61) PROBLEMS OF SPENT NUCLEAR FUEL TRANSPORT. Kondrat'ev, A.N.; Kalinin, B.V.; Mikhajlov, G.V.; Popov, V.A.; Yulikov, E.I. 1977. (In Russian).

From 4. symposium on study into irradiated fuel reprocessing; Karlovy Vary, Czechoslovakia (28 Mar 1977).

The experience in the field of spent nuclear fuel transportation in the CMEA member-states and also in France, West Germany and the USA is reviewed. Represented are some characteristics of transportation casks, railway wagons and spent assemblies with the storage time ranging from 0.5 to 3 years.

219 (INIS-mf--5569, pp 164-173) SPENT NUCLEAR FUEL SHIPMENT. Arkhipovskii, Yu.I.; Burlakov, V.A.; Kondrat'ev, A.N.; Lyubimov, E.D.; Markovin, A.P. 1975. (In Russian).

From 3. CMEA symposium on investigations in the field of spent fuel reprocessing; Marianske Lazne, Czechoslovakia (24 Apr 1974).

The world experience in spent nuclear fuel shipments is summarized. Major attention is paid to the development of safe, reliable and economical casks, to the choice of the most efficient spent fuel transport (motorway, railway and maritime) and to some international legal and organizational aspects of the problem. Among those considered are both ''dry'' and ''wet'' designs of casks with different biological shields from gamma radiation (steel, lead, depleted uranium) and neutrons (boron, cadmium, water) and different cooling systems. Limits on cask weight and optimum time of spent fuel storage before shipment influence heavily the choice of a particular material, design and dimensions of casks.

220 (K/OP--268) UTILIZATION OF PROBABILISTIC NETWORK ANALYSES IN PLANNING LONG-RANGE ENGINEERING PROJECTS. Swindle, D.W. Jr.; Gift, E.M.; Bustamante, F.M. (Oak Ridge Gaseous Diffusion Plant, TN (USA)). 6 Sep 1979. Contract W-7405-ENG-26. 10p. (CONF-791207--1). Dep. NTIS, PC A02/MF A01.

From Winter simulation conference; San Diego, CA, USA (3 Dec 1979).

The application of the GERT (Graphical Evaluation and Review Technique) probabilistic network analysis technique and the results obtained from a program analysis using GERT is discussed. A historical summary of decision analysis techniques leading to the development and application of GERT is included. Discussion is provided on the GERT methodology, study rationale, and results of an analysis examining the Receiving and Storage Task at the Oak Ridge National Laboratory. Long-range program planning advantages using GERT are identified and discussed as relates to the methodology's decision analysis capability.

221 (KBS-TR--108) CRITICALITY IN A SPENT FUEL REPOSITORY IN WET CRYSTALLINE ROCK. Behrenz, P.; Hannerz, K. (Kaernbraenslesaekerhet, Stockholm (Sweden)). May 1978. 65p. Dep. NTIS (US Sales Only), PC A05/MF A01.

The KBS project proposes a method for final disposal of spent fuel as waste in a repository in deep mined cavities in wet crystalline rock. Such a repository would contain large amounts of fissile nuclides. This report considers the risks associated with assembly of these nuclides into critical configurations. Any criticality incident must be preceded by penetration of the long lived copper canisters surrounding the spent fuel waste, the life of which has been estimated to hundreds of thousands of years. Hence canister failure at a time where sufficient amounts of plutonium 239 still remain is already an unlikely event. It turns out that in order to create a situation where criticality with this nuclide could take place subsequent to canister failure several other unlikely conditions have to be simultaneously assumed. Thus the overall probability of the occurence of criticality is vanishingly small. Criticality with uranium 235 involves time perspectives far longer than are otherwise considered in connection with nuclear waste disposal. For geometric and other reasons it has to take place within the mined cavities of the repository, i.e. the deposition holes for the canisters or the tunnels above them. In fact, the senarios leading to criticality incidents in the repository are based on so unlikely assumptions that they border on physical impossibilities and would hardly merit consideration in an ordinary safety analysis. The sole reason for discussing them at length in this report is the fact that statements are frequently appearing in the literature and public debate claiming that criticality represents a major hazard in geologic disposal of spent fuel. The conclusion of this report is that, at least as far as the KBS proposal is concerned, such claims can be dismissed and that the total risk potential associated with criticality incidents in the repository can be considered negligible.

222 (LA--7969-PR) FISSION PRODUCT RELEASE. PROGRESS REPORT, APRIL 1-JUNE 30, 1979. Norris, A.E. (comp.). (Los Alamos Scientific Lab., NM (USA)). Aug 1979. Contract W-7405-ENG-36. 15p. (ONWI/Sub--79/E511-01200-12). Dep. NTIS, PC A02/MF A01.

Experiments continued this quarter to measure the rates of leaching reactor products from spent UO_2 fuel under oxidizing and reducing conditions. One pair of spent fuel wafers was leached in deionized water for 65 days at 25°C. Then the temperature was raised to 70°C. Lanthanide and actinide elements were observed to be leached at one-tenth the rate under reducing conditions at 25°C than under oxidizing conditions. At 70°C, the rates of leaching these elements decreased. After 30 days at the higher temperature, the differences between oxidizing and reducing conditions no longer were apparent in the leach rate data. A second pair of spent fuel wafers was leached at 25°C under the same conditions as the first pair. Duplicate results were obtained. In experiments to measure the rate of dissolution of finely divided UO_2 in deionized water, values of 9×10^{-7} and 6×10^{-7} g $cm^{-2}day^{-1}$ were obtained at a pH of 4.1 and an Eh of +0.5 V. Similar measurements were made at an Eh of -0.15 V, but the data could not be interpreted in terms of a UO_2 dissolution rate.

223 (LA--8237-PR) SPENT-FUEL STORAGE FACILITY PROJECT. PROGRESS REPORT, JUNE 1-SEPTEMBER 30, 1979. Cobb, D.D. (comp.). (Los Alamos Scientific Lab., NM (USA)). Jun 1980. Contract W-7405-ENG-36. 37p. NTIS, PC A03/MF A01.

The Los Alamos Scientific Laboratory (LASL) safeguards groups (Q-1, Q-2, Q-3, Q-4, and Q-5) and the nuclear data group (T-2) are participating in the US Department of Energy Away-From-Reactor Spent-Fuel Storage Program. This report presents the status of the LASL Spent-Fuel Storage Facility Project being performed under the direction of Savannah River Laboratory. Four task areas are: concept development, spent-fuel assay, spent-fuel verification, and automated data-base management.

224 (LA--8463-MS) IRRADIATED FUEL INSPECTION IN A STORAGE POND WITH NO FUEL MOVEMENT AND AN UNCOLLIMATED DETECTOR. Rinard, P.M. (Los Alamos Scientific Lab., NM (USA)). Jul 1980. Contract W-7405-ENG-36. 25p. NTIS, PC A02/MF A01.

It is assumed that the assemblies are not to be moved during the inspection in order to reduce the time required. The task is simplified further when the detector is well collimated. If the collimation is insufficient to respond to only one assembly from among an array of fuel assemblies, then an unfolding process is needed. A formulation of the detector's behavior is given followed by an unfolding process to yield the detector's response to each assembly as if it were isolated. Some simulated arrays are used to illustrate the sensitivity of the procedure to normal fluctuations in the measured quantities. Measurements with an ionization chamber on

actual arrays of up to fourteen PWR assemblies are treated to provide a realistic application of the unfolding process. An unfolding technique is essential with a poorly collimated detector, but the examples warn that weak source strengths surrounded by much stronger sources will not be accurately recovered and even the detection of voids is thus uncertain. Some simulated arrays of up to 100 assemblies indicate that unacceptably inaccurate results may be caused by even the small normal fluctuations in measured values. Any use of an unfolding process is thus quite limited.

225 (NEDG--21889) SPENT FUEL RECEIPT AND STORAGE AT THE MORRIS OPERATION. Astrom, K.A.; Eger, K.J. (General Electric Co., San Jose, CA (USA). Nuclear Energy Div.). Jun 1978. Contract EY-76-C-04-0789. 95p. Dep. NTIS, PC A05/MF A01.

Operating and maintenance activities in an independent spent fuel storage facility are described, and current regulations governing such activities are summarized. This report is based on activities at General Electric's licensed storage facility located near Morris, Illinois, and includes photographs of cask and fuel handling equipment used during routine operations.

226 (NTIS/PS--79/0704) HAZARDOUS MATERIALS TRANSPORTATION. PART 2. RADIOACTIVE MATERIALS AND WASTES (CITATIONS FROM THE NTIS DATA BASE). REPORT FOR 1964-APR 1979. Carrigan, B. (National Technical Information Service, Springfield, VA (USA)). Jul 1979. 174p. NTIS PCN01/MF N01.

The bibliography cites studies on the hazards, risks, and uncertainty of transporting radioactive wastes and materials. The design of shipping containers and special labels for identification purposes for transporting fuels and wastes are also cited. Studies are included on legislation dealing with the safety and health of the population and the environmental problems associated with transporting radioactive materials. (This updated bibliography contains 167 abstracts, 27 of which are new entries to the previous edition.)

227 (NUREG/CR--0956) COMMENTARY ON SPENT FUEL STORAGE AT MORRIS OPERATION. Eger, K.J.; Zima, G.E. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Oct 1979. Contract EY-76-C-06-1830. 122p. (PNL--3065). Dep. NTIS, PC A06/MF A01.

The General Electric Company is providing technical support to Battelle Pacific Northwest Laboratories in the analysis of the design, operation, and maintenance experience in the handling of nuclear fuel at the Independent Spent Fuel Storage Facility. The purpose of this report is to provide a description of spent fuel handling activities and systems, and an analysis of the storage performance as developed over the seven year operational history of the Morris Operation. Design considerations and performance are analyzed for both the basin and key supporting systems. The bases for this analysis are the provisions for containing radioactive by-product materials, for shielding from the radiation they emit, and for preventing the formation of a critical array. These provisions have been met effectively over the history of storage at Morris. The release of radioactive materials is minimized by the protection of the cladding integrity, the containment of the basin water, the removal of radioactive and other contaminants from the water, and by filtering and then dispersing the basin air. Four auxiliary systems are provided to accomplish this, the basin leak detection system, the filter, the coolers, and the building ventilation system. This successful history notwithstanding, action to reduce personnel exposure, to improve fuel handling reliability and to lessen the potential for accidents continues to be taken.

228 (NUREG/CR--1312) METHODS FOR EVALUATING THE LEAK TIGHTNESS OF SPENT FUEL CONTAINER CLOSURES. Benda, B.J.; Langland, R.T. (California Univ., Livermore (USA). Lawrence Livermore Lab.). Feb 1980. Contract W-7405-ENG-48. 137p. (UCRL--52738). Dep. NTIS, PC A07/MF A01.

Quarter- and half-scale configurations of five different seal-flange hardware configurations were built, including: polymer O-rings, silver-coated hollow-metal O-rings, Conoseals, Grayloc seals, and Batzer seals. Using helium as a tracer gas, leak-rate tests were conducted under conditions simulating normal use of spent fuel containers. Leak rates were then correlated with such measured and calculated parameters as temperature, bolt load, seal-flange interface stress, and the differential pressure across the seal. Computer codes were developed, and analyses of the seal-flange configuration related bolt closure force to both seal-flange interface contact stress and surface area.

229 (NVO--210) SAFETY ASSESSMENT DOCUMENT FOR THE SPENT REACTOR FUEL GEOLOGIC STORAGE TEST IN THE CLIMAX GRANITE STOCK AT THE NEVADA TEST SITE. (Department of Energy, Las Vegas, NV (USA). Nevada Operations Office). Jan 1980. 250p. Dep. NTIS, PC A11/MF A01.

The objective of the Spent Fuel Geologic Storage Test in the Climax Granite Stock is to evaluate the response of a granitic rock mass to the underground storage of encapsulated spent reactor fuel in a geometry that simulates a module of a large-scale geologic repository. This document reports an assessment of the safety of conducting this test. Descriptions are provided of the geography, meteorology, hydrology, geology, and seismology of the Climax Site; the effects of postulated natural phenomena and other activities at the nevada Test Site on the safety of the test; and the design and operation of the test facility and associated equipment. Evaluations are made of both the radiological and nonradiological impacts of normal operations, abnormal operations, and postulated accidents. It is concluded that conduct of the spent fuel test at the Climax Site will not result in any undue risk to the public, property, environment, or site employees.

230 (ONWI--39(Vol.1)) ASSESSMENT OF LWR SPENT FUEL DISPOSAL OPTIONS. VOLUME 1. SUMMARY AND CONCLUSIONS. (Bechtel National, Inc., San Francisco, CA (USA)). Jul 1979. Contract EY-76-C-06-1830. 36p. Dep. NTIS, PC A03/MF A01.

The study identifies several spent fuel waste forms as well as the high level waste (HLW) and other waste forms from fuel reprocessing, defines facility and system design features to handle, transport, process, encapsulate, and dispose of these spent fuel and waste forms, and provides a comparative assessment of each of the spent fuel/waste alternatives with respect to technical feasibility, safeguards, criticality, radiological impact, retrievability, and economics. This volume provides the reader with a general overview of the study, coupled with

the specific conclusions developed from the comparative assessments of the study cases and study variations.

231 (ORNL/SUB--79/13866/1) FLEET SERVICING FACILITIES FOR SERVICING, MAINTAINING, AND TESTING RAIL AND TRUCK RADIOACTIVE WASTE TRANSPORT SYSTEMS: FUNCTIONAL REQUIREMENTS, TECHNICAL DESIGN CONCEPTS AND OPTIONS COST ESTIMATES AND COMPARISONS. Watson, C.D.; Hudson, B.J.; Keith, D.A.; Preston, M.K. Jr.; McCreery, P.N.; Knox, W.; Easterling, E.M.; Lamprey, A.S.; Wiedemann, G. (Allied-General Nuclear Services, Barnwell, SC (USA)). May 1980. Contract AC04-76DP00789; W-7405-ENG-26. 150p. NTIS, PC A07/MF A01.

This is a resource document which examines feasibility design concepts and feasibility studies of a Fleet Servicing Facility (FSF). Such a facility is intended to be used for routine servicing, preventive maintenance, and for performing requalification license compliance tests and inspections, minor repairs, and decontamination of both the transportation casks and their associated rail cars or tractor-trailers. None of the United States' waste handling plants presently receiving radioactive wastes have an on-site FSF, nor is there an existing third party facility providing these services. This situation has caused the General Accounting Office to express concern regarding the quality of waste transport system maintenance once the system is placed into service. Thus, a need is indicated for FSF's, or their equivalent, at various radioactive materials receiving sites. In this report, three forms of FSF's solely for spent fuel transport systems were examined: independent, integrated, and colocated. The independent concept was already the subject of a detailed report and is extensively referenced in this document so that capital cost comparisons of the three concepts could be made. These facilities probably could service high-level, intermediate-level, low-level, or other waste transportation systems with minor modification, but this study did not include any system other than spent fuel. Both the Integrated and Colocated concepts were assumed to be associated with some radioactive materials handling facility such as an AFR repository.

232 (ORNL/TM--7024) POSSIBILITY OF MULTIPLE TEMPERATURE MAXIMA IN GEOLOGIC REPOSITORIES FOR SPENT FUEL FROM NUCLEAR REACTORS. Beyerlein, S.W.; Claiborne, H.C. (Oak Ridge National Lab., TN (USA)). Jan 1980. Contract W-7405-ENG-26. 42p. Dep. NTIS, PC A03/MF A01.

Heat transfer studies show that two temperature maxima at the disposal horizon could be experienced in CANDU spent fuel repositories - one at about 60 years and another slightly higher one at 13,000 years. Because CANDU spent fuels display a monotonically decreasing heat generation rate, it is not immediately obvious why this behavior should occur. This report investigates this behavior, confirms the Canadian results, demonstrates that the double peak phenomenon is due to the presence of the right mixture of short- and long-lived nuclides in the fuel, and concludes that the 13,000-year maximum is largely an artifact of the infinite or very large plane source model. When more realistic repository geometries are used, the second peak disappears for repository sizes less than about 1 km^2. Over the long term, radial and surface heat transfer causes the thermal history of the disposal region to deviate from that predicted by infinite plane (or large finite) source models by reducing the magnitude of the second peak. Beyond a 1000-year time horizon, care should be exercised in modeling spent fuel repositories to include the proper boundary conditions. For the first few centuries after emplacement, however, the infinite source model is consistent with the finite disk source model as well as with arrays of spherical and point sources. The second temperature peak can be avoided by restricting the size of the repository and/or partitioning out the long-lived components of the fuel. When spent fuel from PWRs was examined for multiple temperature maxima, only one peak was found, even for the infinite plane source model.

233 (ORNL/TM--7170) TRANSPORTATION ANALYSIS FOR THE CONCEPT OF REGIONAL REPOSITORIES. Joy, D.S.; Hudson, B.J. (Oak Ridge National Lab., TN (USA)). Jun 1980. Contract W-7405-ENG-26. 84p. NTIS, PC A05/MF A01.

Over the past several years, planning associated with the National Waste Terminal Storage (NWTS) program assumed the use of one or two large, centrally located repository facilities. Recently, an alternative approach has been proposed which consists of the use of multiple, smaller regional repositories. In this report, several regional concepts were studied and the transportation requirements for the shipment of spent fuel to the regional repositories were estimated. In general, the transportation requirements decrease as the number of repositories increase. However, as far as transportation is concerned, the point of diminishing returns is reached at approximately one repository in each of three to four regions. Additional savings beyond this point are small. A series of sensitivity studies is also included to demonstrate the impact on the total transportation requirements of varying cask capacity, rail speed, or truck speed. Since most of the projected fuel shipments are to be made by rail, varying the capacity of the rail cask or varying average rail transport speed will have a major effect on overall transportation requirements.

234 (ORNL/TM--7179) OAK RIDGE NATIONAL LABORATORY SHIPPING CONTAINERS FOR RADIOACTIVE MATERIALS. Schaich, R.W. (Oak Ridge National Lab., TN (USA)). May 1980. Contract W-7405-ENG-26. 202p. NTIS, PC A10/MF A01.

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The types of containers used at ORNL for the transport of radioactive materials are described. Both returnable and non-returnable types are included. Containers for solids, liquids and gases are discussed. Casks for the shipment of uranium, irradiated fuel elements, and non-irradiated fuel elements are also described. Specifications are provided. (DC)

235 (PB--292599) A GENERIC ASSESSMENT OF BARGE TRANSPORTATION OF SPENT NUCLEAR FUEL. Unione, A.J.; Garcia, A.A.; Stuart, R. (Science Applications, Inc., Palo Alto, CA (USA)). Sep 1978. 280p. NTIS, PC A13/MF A01.

This generic study provides data and methodologies to evaluate the transportation of spent reactor fuel to reprocessing plants by barge or barge-rail intermodal/water methods. The probabilities of barge accidents are examined under different conditions and severities to evaluate the radiological consequences including radio-nuclide source term data. The study addresses operational methods, equipment requirements and availability, manpower regulations, radiological impacts, and the economics

associated with several different barge routes and barge-rail intermodal mixes. Also included are the estimated radiation doses to public personnel under normal operating conditions. Although the study specifically treats the shipment of fuel from reactors to reprocessing plants, the results are linked to intermodal/water transportation of spent fuel to interim or permanent storage facilities as well.

236 (PNL--2982) SPENT LWR FUEL LEACH TESTS: WASTE ISOLATION SAFETY ASSESSMENT PROGRAM. Katayama, Y.B. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Apr 1979. Contract EY-76-C-06-1830. 50p. Dep. NTIS, PC A03/MF A01.

Spent light-water-reactor (LWR) fuels with burnups of 54.5, 28 and 9 MWd/kgU were leach-tested in deionized water at 25°C. Fuel burnup has no apparent effect on the calculated leach rates based upon the behavior of ^{137}Cs and $^{239+240}Pu$. A leach test of 54.5 MWd/kgU spent fuel in synthetic sea brine showed that the cesium-based leach rate is lower in sea brine than in deionized water. A rise in the leach rate was observed after approximately 600 d of cumulative leaching. During the rise, the leach rate for all the measured radionuclides become nearly equal. Evidence suggests that exposure of new surfaces to the leachant may cause the increase. As a result, experimental work to study leaching mechanisms of spent fuel has been initiated. 22 figures.

237 (PNL--3017) OPPORTUNITIES TO INCREASE THE PRODUCTIVITY OF SPENT FUEL SHIPPING CASKS IN THE UNITED STATES. Winsor, G.H.; Faletti, D.W.; DeSteese, J.G. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Mar 1980. Contract AC06-76RL01830. 89p. (TTC--0078). NTIS, PC A05/MF A01.

Trends indicate that future transportation requirements for spent fuel will be different from those anticipated when the current generation of casks and vehicles was designed. Increased storage capacity at most reactors will increase the average post irradiation age of the spent fuel to be transported. A scenario is presented which shows the 18 casks currently available should be sufficient until approximately 1983. Beyond this time, it appears that an adequate transportation system can be maintained by acquiring, as needed, casks of current designs and new casks currently under development. Spent fuel transportation requirements in the post-1990 period can be met by a new generation of casks specifically designed to transport long-cooled fuel. In terms of the number of casks needed, productivity may be increased by 19% if rail cask turnaround time is reduced to 4 days from the current range of 6.5 to 8.5 days. Productivity defined as payloads per cask year could be increased 62% if the turnaround time for legal weight truck casks were reduced from 12 hours to 4 hours. On a similar basis, overweight truck casks show a 28% increase in productivity.

238 (PNL--3105) PACIFIC NORTHWEST LABORATORY (PNL) SPENT FUEL TRANSPORTATION AND HANDLING FACILITY MODELS. Andrews, W.B.; Bower, J.C.; Burnett, R.A.; Engel, R.L.; Rolland, C.W. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Sep 1979. Contract EY-76-C-06-1830. 80p. Dep. NTIS, PC A05/MF A01.

A spent fuel logistics study was conducted in support of the US DOE program to develop facilities for preparing spent unreprocessed fuel from commercial LWRs for geological storage. Two computerized logistics models were developed. The first one was the site evaluation model. Two studies of spent fuel handling facility and spent fuel disposal facility siting were completed; the first postulates a single spent fuel handling facility located at any of six DOE laboratory sites, while the second study examined siting strategies with the spent fuel repository relative to the spent fuel handling facility. A second model to conduct storage/handling facility simulations was developed. (DLC)

239 (PNL--3171) SPENT FUEL AND FUEL POOL COMPONENT INTEGRITY. ANNUAL REPORT, FY 1979. Johnson, A.B. Jr.; Bailey, W.J.; Schreiber, R.E.; Kustas, F.M. (Battelle Pacific Northwest Labs., Richland, WA (USA)). May 1980. Contract EY-76-C-06-1830. 86p. Dep. NTIS, PC A05/MF A01.

International meetings under the BEFAST program and under INFCE Working Group No. 6 during 1978 and 1979 continue to indicate that no cases of fuel cladding degradation have developed on pool-stored fuel from water reactors. A section from a spent fuel rack stand, exposed for 1.5 y in the Yankee Rowe (PWR) pool had 0.001- to 0.003-in.-deep (25- to 75-μm) intergranular corrosion in weld heat-affected zones but no evidence of stress corrosion cracking. A section of a 304 stainless steel spent fuel storage rack exposed 6.67 y in the Point Beach reactor (PWR) spent fuel pool showed no significant corrosion. A section of 304 stainless steel 8-in.-dia pipe from the Three Mile Island No. 1 (PWR) spent fuel pool heat exchanger plumbing developed a through-wall crack. The crack was intergranular, initiating from the inside surface in a weld heat-affected zone. The zone where the crack occurred was severely sensitized during field welding. The Kraftwerk Union (Erlangen, GFR) disassembled a stainless-steel fuel-handling machine that operated for 12 y in a PWR (boric acid) spent fuel pool. There was no evidence of deterioration, and the fuel-handling machine was reassembled for further use. A spent fuel pool at a Swedish PWR was decontaminated. The procedure is outlined in this report.

240 (PNL--3261) APPLICATION OF ALARA PRINCIPLES TO SHIPMENT OF SPENT NUCLEAR FUEL. Greenborg, J.; Brackenbush, L.W.; Murphy, D.W. Burnett, R.A.; Lewis, J.R. (Battelle Pacific Northwest Labs., Richland, WA (USA)). May 1980. Contract AC06-76RL01830. 99p. (TTC--0073). NTIS, PC A05/MF A01.

The public exposure from spent fuel shipment is very low. In view of this low exposure and the perfect safety record for spent fuel shipment, existing systems can be considered satisfactory. On the other hand, occupational exposure reduction merits consideration and technology improvement to decrease dose should concentrate on this exposure. Practices that affect the age of spent fuel in shipment and the number of times the fuel must be shipped prior to disposal have the largest impact. A policy to encourage a 5-year spent fuel cooling period prior to shipment coupled with appropriate cask redesign to accommodate larger loads would be consistent with ALARA and economic principles. And finally, bypassing high population density areas will not in general reduce shipment dose.

241 (PNL--3268) CRITICALITY SAFETY CONSIDERATIONS IN THE GEOLOGIC DISPOSAL OF SPENT NUCLEAR FUEL ASSEMBLIES. Gore, B.F.; McNair, G.W.; Heaberlin, S.W. (Battelle

Pacific Northwest Labs., Richland, WA (USA)). May 1980. Contract AC06-76RL01830. 53p. NTIS, PC A04/MF A01.

Features of geologic disposal which hamper the demonstration that criticality cannot occur therein include possible changes of shape and form, intrusion of water as a neutron moderator, and selective leaching of spent fuel constituents. If the criticality safety of spent fuel disposal depends on burnup, independent measurements verifying the burnup should be performed prior to disposal. The status of nondestructive analysis method which might provide such verification is discussed. Calculations were performed to assess the potential for increasing the allowed size of a spent fuel disposal canister if potential water intrusion were limited by close-packing the enclosed rods. Several factors were identified which severely limited the potential of this application. The theoretical limit of hexagonal close-packing cannot be achieved due to fuel rod bowing. It is concluded that disposal canisters should be sized on the basis of assumed optimum moderation. Several topics for additional research were identified during this limited study.

242 (PNL-SA--6519) PLACING THE SPECIAL TRAINS ISSUE IN PERSPECTIVE. Rhoads, R.E.; Chais, M.; DeSteese, J.G.; Loscutoff, W.V. (Battelle Pacific Northwest Labs., Richland, WA (USA)). May 1978. Contract EY-76-C-06-1830. 7p. Dep. NTIS, PC A02/MF A01.

The contention of the Association of American Railroads (AAR) that special trains are necessary for handling spent fuel is discussed. These special trains would not move faster than 35 mph nor carry any nonradioactive freight. When a special train meets, passes, or is passed by another train, one train would stand still while the other moves past at a speed of less than 35 mph. The shippers feel these special trains are not necessary and that they would increase the cost of transporting spent fuel possible alternatives to the current standoff between railroads and shippers of radioactive material are mentioned.

243 (PNL-SA--6520) RISK OF TRANSPORTING SPENT NUCLEAR FUEL BY TRUCK. Elder, H.K.; Andrews, W.B.; Rhoads, R.E. (Battelle Pacific Northwest Labs., Richland, WA (USA)). May 1978. Contract EY-76-C-06-1830. 10p. (CONF-780506--44). Dep. NTIS, PC A02/MF A01.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

Portions of document are illegible.

The risk methodology used to evaluate the risk in shipping spent fuel includes: 1) a description of the spent fuel transport system, 2) identification of potential release sequences, 3) evaluation of the probabilities and consequences of the releases, and 4) calculation and assessment of the risk. The system description includes projected industry characteristics, amounts to be shipped, shipping package descriptions, material characteristics, transport mode, transport routes used and weather and population distribution information. Release sequences are identified by fault tree analysis tehniques. Releases are evaluated using package failure data, normal transport and transport accident environment data and mathematical models for material dispersion and resultant health effects. This information is combined to calculate the shipping system risk which is compared to other known risks. The data may be further analyzed to determine the primary contributors to the risk and identify possible methods for reducing the risk, if the current risk level is judged by society to be unacceptable.

244 (PNL-SA--6521) ANALYSIS OF FREIGHT TRAIN ACCIDENT STATISTICS FOR 1972-1974. Murphy, E.S. (Battelle Pacific Northwest Labs., Richland, WA (USA)). May 1978. Contract EY-76-C-06-1830. 8p. (CONF-780506--42). Dep. NTIS, PC A02/MF A01.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

Both train speed and dollar damage have been used in transportation studies as measures of accident severity. Analysis of freight train accident data for the three year period, 1972-74 showed that, in general, as speed increases dollar damage to railroad property also increases. A greater percentage of high speed than low speed accidents result in high dollar damage. Factors, in addition to speed, that can have an important effect on accident severity include the type of accident, the kinds of railcars and other equipment involved, and the geographical environmental of the accident. Threshold levels of accident stresses (e.g., impact and puncture forces and fire temperature and duration) are required to compromise the integrity of shipping containers used for the transport of radioactive materials. Analyses of accident severity using either speed or dollar damage as a basis can provide some insights into the possible risks involved in transport of radioactive materials. however, care must be taken in the strict use of results since there is no direct correlation between either speed or dollar damage and cask failure threshold levels.

245 (PNL-SA--6526) CONCEPTUAL DESIGN OF A SHIPPING CASK FOR RAIL TRANSPORT OF SOLIDIFIED HIGH LEVEL WASTE. Rhoads, R.E.; Peterson, P.L. (Battelle Pacific Northwest Labs., Richland, WA (USA)). May 1978. Contract EY-76-C-06-1830. 7p. Dep. NTIS, PC A02/MF A01.

A shipping cask uniquely designed to transport solidified high level waste (SHLW) from reprocessing spent LWR fuel has not yet been developed. Battelle, Pacific Northwest Laboratory (PNL) has conducted a program for the Department of Energy to develop a conceptual design for a rail cask for transporting SHLW, and to produce models and graphical displays based on the conceptual design for use at technical meetings and in public information displays. The results of this work are summarized in this paper.

246 (PNL-SA--7344) NEAR SURFACE SPENT FUEL STORAGE: ENVIRONMENTAL ISSUES. Nelson, I.C.; Shipler, D.B.; McKee, R.W.; Glenn, R.D. (Battelle Pacific Northwest Labs., Richland, WA (USA)). 1979. Contract EY-76-C-06-1830. 20p. (CONF-791004--2). Dep. NTIS, PC A02/MF A01.

From ASCE national meeting; Atlanta, GA, USA (Oct 1979).

Interim storage of spent fuel appears inevitable because of the lack of reprocessing plants and spent fuel repositories. This paper examines the environmental issues potentially associated with management of spent fuel before disposal or reprocessing in a reference scenario. The radiological impacts of spent fuel storage are limited to low-level releases of noble gases and iodine. Water needed for water basin storage of spent fuel and transportation accidents are considered; the need to minimize the distance travelled is pointed out. Resource commitments for

construction of the storage facilities are analyzed.

247 (PNL-SA--7734) LONG-TERM LEACHING OF IRRADIATED SPENT FUEL. Katayama, Y.B.; Bradley, D.J. (Battelle Pacific Northwest Labs., Richland, WA (USA)). 1979. Contract AC06-76RL01830. 29p. (CONF-791112--68). NTIS, PC A03/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

Spent Light Water Reactor (LWR) fuel with burnups of 9, 28 and 54 MWd/kg U were leach tested at 25°C in deionized water in a Paige apparatus. No discernible differences in leach rates were observed due to burnup. Additionally, the 28 MWd/kg U fuel was IAEA leach tested in five different leachants using the IAEA method. Deionized water gave the highest leach rates and a calcium chloride solution gave the lowest leach rates. An accelerated leaching period was observed during the Paige leach test of the 54 MWd/kg U spent fuel. Comparison between spent fuel and borosilicate waste glass leach rates was made. In sodium bicarbonate solution the leach rates are near equal and the glass becomes increasingly more durable with $CaCl_2$ solution, followed by sodium chloride solution, WIPP B brine and deionized water where the glass is two to three orders of magnitude more leach resistant than spent fuel. 16 figures.

248 (RFP--2862) NATIONAL WASTE TERMINAL STORAGE PROGRAM: CONTAINMENT SYSTEM CONCEPTS FOR TRANSPORTING TYPE B QUANTITIES OF TRANSURANIC WASTE. Rushton, R.J.; Merlini, R.J. (Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). 14 Sep 1979. Contract EY-76-C-04-3533. 94p. Dep. NTIS, PC A05/MF A01.

A series of shipping containment system preliminary concepts for Type B quantities of transuranic waste have been formulated. The concepts were based on hypothetical accident protection requirements, potential waste forms, and selected hardware design/considerations. The concepts consist of suggested waste system containment configurations and construction material suggestions. Analysis of the concepts, based on such features as fabrication ease and cost, utility, and payload efficiency, revealed that concepts utilizing processed waste forms and/or disposable waste packages to provide a major portion of the required accident protection are most favorable.

249 (RFP--2982) CHEMISTRY RESEARCH AND DEVELOPMENT. PROGRESS REPORT, DECEMBER 1978-MAY 1979. Miner, F.J. (Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). 30 Jun 1980. Contract AC04-76DP03533. 60p. NTIS, PC A04/MF A01.

Progress and activities are reported on component development, pilot plant development, and instrumentation and statistical systems. Specific items studied include processing of pond sludge, transport of radioactive materials and wastes, corrosion, decontamination and cleaning, fluidized-bed incineration, Pu contamination of soils, chemical analysis, radiometric analysis, security. (DLC)

250 (RHO-C--25(Vol.2)(Draft)) DRY WELL STORAGE FACILITY CONCEPTUAL DESIGN STUDY: ENVIRONMENTAL ASSESSMENT. REPORT NO. 79-8-R. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations; Kaiser Engineers, Oakland, CA (USA)). Feb 1979. Contract EY-77-C-06-1030; EY-76-C-06-2195. 37p. Dep. NTIS, PC A03/MF A01.

The Dry Well Storage Facility will receive canisters (packages) containing spent fuel assemblies from a Spent Fuel Receiving and Packaging Facility or a Packaged Fuel Transfer Facility and store them in dry wells. The reference site for this study will be adjacent to the 200-W Area at the Hanford Reservation on a plateau approximately six miles from the Columbia River. This report discusses the potential nonradiological and radiological impacts on the environment due to construction, operation, and decommissioning of the facility.

251 (RHO-LD--79-83-3Q) COMMERCIAL WASTE AND SPENT FUEL PACKAGING PROGRAM. QUARTERLY TECHNICAL PROGRESS REPORT, APRIL-JUNE 1979. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). 1979. Contract EY-77C-06-1030. 33p. Dep. NTIS, PC A03/MF A01.

Objectives are to develop waste package criteria for all commerical waste types, develop a standardized demonstration package for spent fuel for dry well storage, study the performance of spent fuel assemblies under geologic storage conditions, and continue dry surface storage demonstration activities. This document reports activities during this time period. (DLC)

252 (RHO-LD--95) CLOSURE WELD DEVELOPMENT FOR SPENT FUEL CANISTERS. INTERIM REPORT. Tignac, L.L. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Jun 1979. Contract EY-77-C-06-1030. 27p. Dep. NTIS, PC A03/MF A01.

In the spent fuel receiving and packaging facility, spent fuel assemblies would be enclosed within heavy-walled carbon steel canisters, and caps would be welded onto the canisters such that the sealed canisters would meet the intent of requirements for coded pressure vessels. The entire canister sealing operation, including welding and weld inspection, would normally be conducted remotely in a shielded hot-cell. A weld development activity was initiated to investigate canister sealing operations and to provide design criteria and bases for the spent fuel receiving and packaging facility and the canister. The activity plan included laboratory evaluation of welding processes and weld inspection techniques. Full-scale demonstrations were planned to evaluate, develop, and demonstrate the remote handling aspects of the operation. In February 1979, direction was received to suspend the weld development activity and to store its associated records and materials.

253 (RHO-SA--136) SPENT FUEL RECEIVING AND PACKAGING FACILITY CONCEPTUAL DESIGN. Henry, K.H.; Kurzeka, W.J. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Oct 1979. Contract EY-77-C-06-1030. 8p. (CONF-791033--5). Dep. NTIS, PC A02/MF A01.

From 1. annual ONWI information meeting; Columbus, OH, USA (30 Oct 1979).

The Spent Unreprocessed Fuel (SURF) Program was initiated to provide facilities to receive and package the spent fuel, and to provide interim storage in surface structures with a passive cooling mode. This paper describes the conceptual design of the Receiving and Packaging Facility (RPF) module for that program. The design is also applicable to packaging spent fuel for geologic disposal.

254 (RHO-SA--141) STANDARDIZED EXPERIMENTAL PACKAGE FOR SPENT FUEL. Davis, J.M.; Smith, R.E. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Oct 1979. Contract EY-77-C-06-1030. 7p. (CONF-791033--4). Dep. NTIS, PC A02/MF A01.
From 1. annual ONWI information meeting; Columbus, OH, USA (30 Oct 1979).
Design requirements are set forth for a package for geologic disposal of spent fuel. Conceptual design has been completed and preliminary drop tests conducted. (DLC)

255 (SAND--79-1402) PROGRAM STRATEGY DOCUMENT FOR THE NUCLEAR MATERIALS TRANSPORTATION TECHNOLOGY CENTER. Jefferson, R.M. (ed.). (Sandia Labs., Albuquerque, NM (USA)). Jul 1979. Contract EY-76-C-04-0789. 122p. Dep. NTIS, PC A06/MF A01.
A multiyear program plan is presented which describes the program of the Nuclear Materials Transportation Technology Center (TTC) at Sandia Laboratories. The work element plans, along with their corresponding work breakdown structures, are presented for TTC activities in the areas of Technology and Information Center, Systems Development, Technology, and Institutional Issues for the years from 1979 to 1985.

256 (SAND--79-1424) POSTMORTEM METALLURGICAL EXAMINATION OF A FIRE-EXPOSED SPENT FUEL SHIPPING CASK. Rack, H.J.; Yoshimura, H.R. (Sandia Labs., Albuquerque, NM (USA)). Apr 1980. Contract EY-76-C-04-0789. 35p. NTIS, PC A03/MF A01.
A potmortem examination of a large fire-exposed rail-transported spent fuel shipping container has revealed the presence of two macrofissures in the outer cask shell. The first, a part-thru crack located within the seam weld fusion zone of the outer cask shell, was typical of hot cracks that may be found in stainless steel weldments. The second, located within the stainless steel base metal, apparently originated at microcracks formed during the welding of a copper-stainless steel dissimilar metal joint. The latter microcrack then propagated during the fire-test, ultimately penetrating the outer shall of the cask. 18 figures, 2 tables.

257 (SAND--79-1841) ALARA STUDIES ON SPENT FUEL AND WASTE CASKS. Sutherland, S.H. (Sandia Labs., Albuquerque, NM (USA)). Apr 1980. Contract EY-76-C-04-0789. 35p. (TTC--0050). Dep. NTIS, PC A03/MF A01.
In this report, some implications of applying the ALARA concept to cask designs for transporting spent fuel, high-level commercial and defense waste, and remote-handled transuranic waste are investigated. The XSDRNPM, one-dimensional radiation transport code, was used to obtain potential shield designs that would yield total dose rates at 1.8 m from the cask surface of 10, 5, and 2 mrem/h. Gamma shields of depleted uranium, lead, and steel were studied. The capacity of the casks was assumed to be 1, 4, or 7 elements or canisters, and the wastes were 1, 3, 5, and 10 years old. Depending on the dose rate, the cask empty weights and lifetime transportation costs were estimated.

258 (SAND--79-1929C) ENVIRONMENTAL EFFECTS ASSOCIATED WITH THE TRANSPORTATION OF RADIOACTIVE MATERIAL. McClure, J.D.; Pope, R.B.; Yoshimura, H.R. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 8p. (CONF-791112--20). Dep. NTIS, PC A02/MF A01.
From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).
The primary aim of this paper has been to describe some of the background information concerning nuclear materials transportation systems, accident statistics, accident severities, and test information - all of which when combined yield an environmental statement of the risks associated with the transportation of radioactive materials. The results of the ultimate risk analysis are expressed in terms of numbers of fatalities and, in that sense at least, tend to be an absolute measure of risk. When these risks are compared with other accepted societal risks, the relative risks associated with radioactive material transportation can be established. This information can be used to make decisions at the governmental level and to inform an interested public about these risks. It can be concluded that the risks associated with the transportation of radioactive material are low relative to the other risks that society has already accepted.

259 (SAND--79-2262) PROCEEDINGS OF THE NUCLEAR MATERIALS TRANSPORTATION PROGRAM DEVELOPMENT SEMINAR. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 224p. (CONF-7904121--). Dep. NTIS, PC A10/MF A01.
From Nuclear materials transportation program development seminar; Albuquerque, NM, USA (18 Apr 1979).
This document includes viewographs (overview, systems developments, technology, information and institutional issues), discussions, workshop reports, points of agreement and action items, and independent summary.

260 (SAND--80-0061C) THERMAL ANALYSIS OF HNPF SPENT FUEL SHIPPING CONTAINER IN TORCH ENVIRONMENTS. Eggers, P.E.; Crawford, H.L.; Trujillo, A.A.; Pope, R.B.; Yoshimura, H.R. (Ridihalgh, Eggers and Associates, Columbus, OH (USA); Sandia National Labs., Albuquerque, NM (USA)). 1980. Contract AC04-76DP00789. 7p. (CONF-800723--23). NTIS, PC A02/MF A01.
From 19. national heat transfer conference; Orlando, FL, USA (27 Jul 1980).
A thermal analysis of a modified HNPF cask has been performed to predict cask temperatures in simulated torch fire environments. A portion of this analysis also provided a basis for the modifications leading to the design of external cooling fins, a pressure relief valve system, a spent fuel torch fire analyses will provide comparison with experimentally measured temperatures of the HNPF cask, in torch fire environments, which will be obtained in the future. Scope of this study was analytical in nature and involved the use of a computer-based heat transfer analysis methods. Product of this study is the prediction of cask temperatures and internal pressures under normal and torch-fire accident conditions. This study also involved an analysis of the torch fire literature in order to develop an empirically based thermal model for the torch environment. 8 figures, 3 tables.

261 (SAND--80-0062C) THERMAL RESPONSE MODELING OF A CONTACT-HANDLED TRANSURANIC WASTE SHIPPING CONTAINER SYSTEM TO A FIRE. Suchsland, K.E.; Kwong, K.C.; Fretter, E.F.; Boyd, R.D.; Auerbach, I.; Yoshimura, H.R. (Acurex Corp., Mountain View, CA (USA). Aerotherm Div.; Sandia National Labs., Albuquerque, NM (USA)). 1980. Contract EY-

76-C-04-0789. 21p. (CONF-800723--5). NTIS, PC A02/MF A01.
From 19. national heat transfer conference; Orlando, FL, USA (27 Jul 1980).
Portions of document are illegible.
A one-dimensional thermal model has been developed to predict the response of a transuranic (TRU) waste shipping container accidentally exposed to a fire environment. The basic wall structure of the container consists of polyurethane foam (64 kg/m^3) sandwiched between two steel plates. The foam thermal model, based on high temperature experimental data, is developed for the case in which the virgin foam is in a nonoxidizing environment. The experimental results indicate that foam decomposition is highly heat rate dependent. At low quasi-steady heating rates, the foam changes to a bubbling black viscous liquid. At very high heating rates, pyrolysis gases are formed as the foam decomposes and a 20% (by weight) residual char remains. This porous char acts as a radiation shield which can significantly reduce thermal transport. In the case of a TRU shipping container wall, this char will slow the thermal penetration rate and drastically reduce the heat load to the container contents. When the front surface of the wall was subjected to 1333°K, numerical computations predict that after approximately 1800 s the foam temperature rise at a depth of 10.2 cm was less than 200 K (uncharred). After approximately 3600 s the foam temperature rise at a depth of 20.4 cm was 23°K. Typical waste contents temperature rise was predicted to be less than 56°K after 3600 s of heating.

262 (SAND--80-0085C) ASSESSMENT OF LMFBR SPENT FUEL SHIPPING CASK CONCEPTS FOR THE CRBRP AND THE US CONCEPTUAL DESIGN STUDY. Pope, R.B.; Ortman, J.M.; Eakes, R.G.; Leisher, W.B.; Dupree, S.A. (Sandia National Labs., Albuquerque, NM (USA); Los Alamos Technical Associates, Inc., NM (USA)). 1980. Contract AC04-76DP00789. 8p. (CONF-801115--3). NTIS, PC A02/MF A01.
From 6. international symposium on packaging and transporting radioactive material; Berlin, F.R. Germany (10 Nov 1980).
Study of conceptual shipping systems for CRBRP and CDS spent fuel has shown that systems significantly different from those used for LWR spent fuel will be required. In the conceptual design, liquid sodium was assumed to be the coolant in canisters containing the spent fuel assemblies, and multiple levels of containment were provided by canisters, an inner cask lid and an outer cask lid. Cask cooling at the reactor site during loading, and cooldown at the receiving site prior to unloading are significant but tractable problems.

263 (SAND--80-0761C) POST TEST EVALUATION OF A FIRE TESTED RAIL SPENT FUEL CASK. Rack, H.J.; Yoshimura, H.R. (Sandia National Labs., Albuquerque, NM (USA)). 1980. Contract AC04-76DP00789. 6p. (CONF-801115--2). NTIS, PC A02/MF A01.
From 6. international symposium on packaging and transporting radioactive material; Berlin, F.R. Germany (10 Nov 1980).
Postmortem examination of a large rail-transported spent fuel shipping cask which had been exposed to a JP-4 fuel fire revealed the presence of two macrofissures in the outer cask shell. One, a part-through crack located within the seam weld fusion zone of the outer cask shell, is typical of hot cracks found in stainless steel weldments. The other, a through-crack, was apparently initiated during the formation of a copper-stainless steel dissimilar metal joint, with crack propagation through the cask outer shell having occurred during the fire-test. 8 figures.

264 (SAND--80-0784) PROGRAM STRATEGY DOCUMENT FOR THE NUCLEAR MATERIALS. TRANSPORTATION TECHNOLOGY CENTER (FY 80). Jefferson, R.M. (ed.). (Sandia Labs., Albuquerque, NM (USA)). Apr 1980. Contract FY-76-C-04-0789. 260p. (TTC--0080). Dep. NTIS, PC A12/MF A01.
The TTC's program is divided into four principal areas, Technology and Information Center, Systems Development, Technology, and Institutional Issues. These areas are broken into activities, elements, and subelements which are delineated in this document.

265 (SAND--80-1633C) ANALYSIS AND MODEL TESTING OF A SUPER TIGER TYPE B WASTE TRANSPORT SYSTEM IN ACCIDENT ENVIRONMENTS. May, R.A.; Yoshimura, H.R.; Romesberg, L.E.; Joseph, B.J. (Sandia National Labs., Albuquerque, NM (USA)). 1980. Contract AC04-76DP00789. 4p. (CONF-801107--10). NTIS, PC A02/MF A01.
From ANS international conference; Washington, DC, USA (17 Nov 1980).
Sandia National Laboratories is investigating the response of a Type B packaging containing drums of contact-handled transuranic waste (CH-TRU) as a part of a program to evaluate the adequacy of experimental and analytical methods for assessing the safety of waste transport systems in accident environments. A US NRC certified Type B package known as the Super Tiger was selected for the study. This overpack consists of inner and outer steel shells separated by rigid polyurethane foam and can be used for either highway or rail transportation. Tests using scale models of the vehicular system are being conducted in conjunction with computer analyses.

266 (SAND--80-8021) SAFETY ANALYSIS REPORT FOR PACKAGING A DOT 7A SPECIFICATION CONTAINER FOR TRITIATED LIQUID WASTES. Alford, E. (Sandia National Labs., Livermore, CA (USA)). Aug 1980. Contract AC04-76DP00789. 24p. NTIS, PC A02/MF A01.
This Safety Analysis Report for Packaging (SARP) was prepared in accordance with ERDA (DOE) Appendix 5201 for DOE/ALO review and approval of packaging of tritiated liquid wastes to be shipped from Sandia National Laboratories, Livermore, (SNLL) California. This report presents information pertinent to the construction of tritiated liquid waste shipping containers. It contains design and development considerations, explains tests and evaluations required to prove the container can withstand normal transportation conditions, and demonstrates that the Sandia container-and-radioactive-material shipment package is in compliance with DOE and Department of Transportation (DOT) safety requirements. An internal review of this SARP has been performed in compliance with the ERDA (DOE) Manual, 5201 Appendix V.

267 (SRO--1051-1) ALTERNATIVES FOR WATER BASIN SPENT FUEL STORAGE: EXECUTIVE SUMMARY AND COMPARATIVE EVALUATION. Viebrock, J.M. (Nuclear Assurance Corp., Atlanta, GA (USA)). Sep 1979. Contract EW-78-C-09-1051. 140p. (NAC-C--7915). Dep. NTIS, PC A07/MF A01.
A five part report identifies and evaluates alternatives to conventional methods for water basin storage of irradiated light water reactor fuel assemblies (spent fuel). A recommendation is made for development or further evaluation

of one attractive alternative: Proceed to develop fuel disassembly with subsequent high density storage of fuel pins (pin storage). The storage alternatives were evaluated for emplacement at reactor, in existing away-from-reactor storage facilities and in new away-from-reactor facilities. In the course of the study, the work effort necessarily extended beyond the pool wall in scope to properly assess the affects of storage alternatives on AFT systems.

268 (SRO--1051-3) ALTERNATIVES FOR WATER BASIN SPENT FUEL STORAGE USING PIN STORAGE. Viebrock, J.M.; Carlson, R.W. (Nuclear Assurance Corp., Atlanta, GA (USA)). Sep 1979. Contract EW-78-C-09-1051. 109p. (NAC-C--7917). Dep. NTIS, PC A06/MF A01.

The densest tolerable form for storing spent nuclear fuel is storage of only the fuel rods. This eliminates the space between the fuel rods and frees the hardware to be treated as non-fuel waste. The storage density can be as much as 1.07 MTU/ft^2 when racks are used that just satisfy the criticality and thermal limitations. One of the major advantages of pin storage is that it is compatible with existing racks; however, this reduces the storage density to 0.69 MTU/ft^2. Even this is a substantial increase over the 0.39 MTU/ft^2 that is achievable with current high capacity stainless steel racks which have been selected as the bases for comparison. Disassembly requires extensive operation on the fuel assembly to remove the upper end fitting and to extract the fuel rods from the assembly skeleton. These operations will be performed with the aid of an elevator to raise the assembly where each fuel rod is grappled. Lowering the elevator will free the fuel rod for transfer to the storage canister. A storage savings of $1510 per MTU can be realized if the pin storage concept is incorporated at a new away-from-reactor facility. The storage cost ranges from $3340 to $7820 per MTU of fuel stored with the lower cost applying to storage at an existing away-from-reactor storage facility and the higher cost applying to at-reactor storage.

269 (SRO--1051-4) ALTERNATIVES FOR WATER BASIN SPENT FUEL STORAGE USING RACKED AND UNRACKED CONCEPTS. Viebrock, J.M.; Eggers, P.E. (Nuclear Assurance Corp., Atlanta, GA (USA)). Sep 1979. Contract EW-78-C-09-1051. 178p. (NAC-C--7918). Dep. NTIS, PC A09/MF A01.

Spent fuel storage alternatives to conventional racking were: core plate storage, horizontal racks, stacked racks, and unracked storage. (1) The parameter that controls storage density in water basin spent fuel storage is the spacing between fuel assemblies. One method which will permit closer spacing and greater storage density is to position poison materials within and/or between fuel assemblies by inserting control rods in all positions in PWR assemblies or placing poison plates between BWR assemblies similar to the control scheme used in reactors. This core-plate concept offers little or no improvement over the conventional poisoned storage racks currently in use. (2) Another method is to stack the racks into two tiers, hence, a double rack. This concept is not feasible for a new away-from-reactor facility because of the design limitation of 30 feet for the storage pool depth. Evaluation of the nuclear, thermal, and structural aspects of nonpoison type stacked rack storage indicates a maximum storage density of 0.78 MTU/ft^2 for PWR fuel assemblies and 0.80 MTU/ft^2 for BWR fuel assemblies. These stacked rack storage densities are based on filling every hole in both levels of storage racks; storage densities comparable to poison-type vertical storage racks can be achieved by filling every other hole (checkerboard pattern) and by minimizing the distance between adjacent assemblies. (3) The storage density of horizontal storage racks is controlled by the height of the stacked horizontal storage cells. (4) The storage density of unracked horizontal storage is controlled by the distance between fuel assemblies and the number of rows or levels of storage.

270 (SRO--1051-5) ALTERNATIVES FOR WATER BASIN SPENT FUEL STORAGE: GENERIC ISSUES. Viebrock, J.M.; Blackwood, M.J.; Genser, J.R.; Panter, H.R.; Ridihalgh, J.L.; Ward, J.R. (Nuclear Assurance Corp., Atlanta, GA (USA)). Sep 1979. Contract EW-78-C-09-1051. 138p. (NAC-C--7919). Dep. NTIS, PC A07/MF A01.

The need for fuel storage was examined and categorized storage concepts that provide increased density were categorized. During the categorization process it became apparent that several issues were common to all concepts, and they were separated from the rest for generic study: criticality, licensing considerations, materials and water chemistry. Section A documents the criticality analyses that were performed for both PWR and BWR fuel assemblies including the following parameters: enrichment, burnup, stainless steel thickness, Boral plate thickness, spacing between stainless steel canister and fuel assembly, and boron concentration in water. Results were used in the concept studies to identify acceptable storage rack design ranges and to provide a framework for the design optimization of spent fuel storage racks/canisters, in general. Section B deals with the licensing environment for spent fuel storage and goes into the past, present and future regulatory postures on both the state and federal levels. One of the limiting factors for storage density is the current set of criticality license criteria. It is recommended to have a unified set of criteria for away-from-reactor spent fuel storage which takes advantage of the inherent characteristics of both the fuel and the facility. Materials issues for long-term storage in a water basin system are evaluated in Section C for state-of-the-art and advanced concept storage methods. Section D deals with the water compatibility issues associated with spent nuclear fuel.

271 (UCID--18629) STRESSMETER PLACEMENT AT SPENT FUEL TEST IN CLIMAX GRANITE. Abey, A.E.; Washington, H.R. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 20 May 1980. Contract W-7405-ENG-48. 20p. NTIS, PC A02/MF A01.

Vibrating wire stressmeters were installed in the Spent Fuel Facility at the Nevada Test Site. These stressmeters will measure the changes in in situ stress during the five-year spent fuel test. Before installation, laboratory tests were conducted to study reproducibility of placement and to develop a program hopefully to reduce corrosion of the stressmeters while in place at the Spent Fuel Facility. These laboratory tests are discussed along with the installation of the stressmeters at the Spent Fuel Facility.

272 (UCID--18660) ADVANCED THREE-DIMENSIONAL THERMAL MODELING OF A BASELINE SPENT FUEL REPOSITORY. Altenbach, T.J.; Lowry, W.E. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 29 Apr 1980. Contract W-7405-ENG-48. 55p. Dep. NTIS, PC

A04/MF A01.

A three-dimensional thermal analysis using finite difference techniques was performed to determine the near-field response of a baseline spent fuel repository in a deep geologic salt medium. A baseline design incorporates previous thermal modeling experience and OWI recommendations for areal thermal loading in specifying the waste form properties, package details, and emplacement configuration. The base case in this thermal analysis considers one 10-year old PWR spent fuel assembly emplaced to yield a 36 kW/acre (8.9 W/m²) loading. A unit cell model in an infinite array is used to simplify the problem and provide upper-bound temperatures. Boundary conditions are imposed which allow simulations to 1000 years. Variations studied include a comparison of ventilated and unventilated storage room conditions, emplacement packages with and without air gaps surrounding the canister, and room cool-down scenarios with ventilation following an unventilated state for retrieval purposes. It was found that at this low-power level, ventilating the emplacement room has an immediate cooling influence on the canister and effectively maintains the emplacement room floor near the temperature of the ventilating air.

273 (UCRL--52918) METHOD FOR CALCULATING INTERNAL RADIATION AND VENTILATION WITH THE ADINAT HEAT-FLOW CODE. Butkovich, T.R.; Montan, D.N. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 1 Apr 1980. Contract W-7405-ENG-48. 17p. NTIS, PC A02/MF A01.

One objective of the spent fuel test in Climax Stock granite (SFTC) is to correctly model the thermal transport, and the changes in the stress field and accompanying displacements from the application of the thermal loads. We have chosen the ADINA and ADINAT finite element codes to do these calculations. ADINAT is a heat transfer code compatible to the ADINA displacement and stress analysis code. The heat flow problem encountered at SFTC requires a code with conduction, radiation, and ventilation capabilities, which the present version of ADINAT does not have. We have devised a method for calculating internal radiation and ventilation with the ADINAT code. This method effectively reproduces the results from the TRUMP multi-dimensional finite difference code, which correctly models radiative heat transport between drift surfaces, conductive and convective thermal transport to and through air in the drifts, and mass flow of air in the drifts. The temperature histories for each node in the finite element mesh calculated with ADINAT using this method can be used directly in the ADINA thermal-mechanical calculation.

274 (UCRL--83976) TEST STORAGE OF SPENT REACTOR FUEL IN THE CLIMAX GRANITE AT THE NEVADA TEST SITE. Ramspott, L.D.; Ballou, L.B. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 13 Feb 1980. Contract W-7405-ENG-48. 17p. (CONF-800313--5). Dep. NTIS, PC A02/MF A01.

From Waste management conference; Tucson, AZ, USA (10 Mar 1980).

A test of retrievable dry geologic storage of spent fuel assemblies from an operating commercial nuclear reactor is underway at the Nevada Test Site. This generic test is located 420 m below the surface in the Climax granitic stock. Eleven canisters of spent fuel approximately 2.3 years out of reactor core (about 2 kW/canister thermal output) will be emplaced in a storage drift along with 6 electrical simulator canisters and their effects will be compared. Two adjacent drifts will contain electrical heaters, which will be operated to simulate within the test array the thermal field of a large repository. The test objectives, technical concepts and rationale, and details of the test are stated and discussed.

275 (UNI-SA--74) RESTORATION OF AN IRRADIATED FUEL STORAGE FACILITY. Wahlen, R.K. (United Nuclear Industries, Inc., Richland, WA (USA)). 1980. Contract EY-76-C-06-1857. 13p. (CONF-800542--1). NTIS, PC A02/MF A01.

From Concrete decontamination workshop; Seattle, WA, USA (28 May 1980).

The irradiated fuel storage basin in the KW nuclear production reactor at the Hanford Site in Richland, Washington, was decontaminated and painted in preparation for converting the facility to storage of irradiated fuel from N reactor. Corrosion product, activation product, and some fission product built up in the basin over the years and was present in a layer of sludge about 3 inches deep on the basin floor. The solid waste was packaged in approved containers and buried in the 200 Area burial site on the Hanford Project. The concrete walls and pillars in the basin were decontaminated with a high-pressure aqua-blaster. Using a water jet, the sludge was flushed to a sump where it was picked up with a sludge pump and deposited in a crib which was formed in the basin area using a bulkhead to isolate the crib from the basin. After decanting the excess water from the sludge, it was pumped to a large tank designed to meet the burial and transport regulations. The tank containing the sludge was then transferred to the 200 Area burial site and placed in the burial trench. The cement walls, floor, and columns were painted with an epoxy paint. This paper reviews the procedures and techniques used in cleaning the storage basin.

276 (Y/OWI/SUB--77-22303/4) THERMOELASTIC ANALYSES OF SPENT FUEL REPOSITORIES IN BEDDED AND DOME SALT. TECHNICAL MEMORANDUM REPORT RSI-0054. Callahan, G.D.; Ratigan, J.L. (RE/SPEC, Inc., Rapid City, SD (USA)). 13 Oct 1978. Contract W-7405-ENG-26. 192p. Dep. NTIS, PC A09/MF A01.

Global thermoelastic analyses of bedded and dome salt models showed a slight preference for the bedded salt model through the range of thermal loading conditions. Spent fuel thermal loadings should be less than 75 kW/acre of the repository pending more accurate material modeling. One should first limit the study to one or two spent fuel thermal loading (i.e. 75 kW/acre and/or 50 kW/acre) analyses up to a maximum time of approximately 2000 years. Parametric thermoelastic type analyses could then be readily obtained to determine the influence of the thermomechanical properties. Recommendations for further study include parametric analyses, plasticity analyses, consideration of the material interfaces as joints, and possibly consideration of a global joint pattern (i.e. jointed at the same orientation everywhere) for the non-salt materials. Subsequently, the viscoelastic analyses could be performed.

277 STORAGE AND SHIPMENT OF SPENT FUEL ELEMENTS. INFCE WORKING GROUP 6. Kapteinat, H.P. (Nuklear-Ingenieur Service G.m.b.H., Bonn (Germany, F.R.). Abt. Reaktoranlagen). Atomwritschaft, Atomtechnik ; 25: No. 5, 265-268(May 1980). (In German).

The storage and shipment of spent fuel elements constitute an intermediate step in the fuel cycle to be followed by reprocessing or direct final storage of the fuel. Although INFCE did not offer an answer to the question of the maximum possible duration of temporary storage by indicating a concrete span, its description and evaluation of various technologies and experiences associated with the storage and shipment of spent fuel elements contains information which may serve as a guideline in planning and executing temporary storage as part of a back end fuel cycle concept. In addition, Working Group 6 studied institutional aspects of temporary storage in relation to the non-proliferation of nuclear weapons and the safeguarding of national nuclear programs and back end fuel cycle concepts.

278 EUROPEAN SPENT FUEL EXPERTISE. Messenger, W. de L.M. Hazard. Cargo Bull.; 10-11(May 1980).
A brief description of spent nuclear fuel transport in Europe, with particular reference to Nuclear Transport Ltd., is given.

279 DETERMINATION OF THE STATIONARY TEMPERATURE LEVEL IN AN INTERMEDIARY STORAGE OF SPENT NUCLEAR FUEL ELEMENTS. Jeschar, R.; Tenhumberg, M. (Technische Univ. Clausthal, Clausthal-Zellerfeld (Germany, F.R.). Inst. fuer Waermetechnik und Industrieofenbau); Gardeik, H.O. (Forschungsinstitut der Zementindustrie, Duesseldorf (Germany, F.R.)); Schoenfeld, R. (Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.). Abt. Thermofluiddynamik); Klein, K. (Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.). Abt. Verfahrenstechnik). Brennstoff-Waerme-Kraft ; 32: No. 5, 197-203(May 1980). (In German).
The article presents a calculation method for the determination of the stationary temperature level in an intermediary storage for heat-producing nuclear fuel elements. The heat produced in the storage of nuclear fuel elements is removed to the surrounding air by an indirect cooling through air relying on free flow. The cooling concept and the derivation of the calculation method are extensively discussed and the results shown.

280 PUBLICATION OF THE MINISTER FOR ECONOMIC AFFAIRS, TRADE, AND TRANSPORTATION CONCERNING THE 2ND SUPPLEMENT ON THE TRANSPORT OF SPENT FUEL ELEMENT CASKS TO THE SITE OF GEMEINSCHAFTSKERNKRAFTWERK NECKAR (GKN) AND ITS HANDLING THERE. Roth. Bundesanzeiger ; 32: No. 77, 2(Apr 1980). (In German).
CONTAINERS;LICENSING;MATERIALS HANDLING; NECKAR REACTOR;SPENT FUEL ELEMENTS;SPENT FUEL STORAGE;TRANSPORT;SPENT FUEL CASKS

281 WASTE TRANSPORT. Lewis, A. SCRAM (Scottish Campaign to Resist the Atomic Menace) Energy Bulletin ; No. 16, 4(Feb-Mar 1980).
ACCIDENTS;LAND TRANSPORT;PUBLIC RELATIONS; RADIATION HAZARDS;RADIOACTIVE WASTES;WASTE TRANSPORTATION

282 CRITICALITY EXPERIMENTS WITH SUBCRITICAL CLUSTERS OF LOW ENRICHED UO_2 RODS IN WATER WITH URANIUM OR LEAD REFLECTING WALLS. Bierman, S.R.; Durst, B.M.; Clayton, E.D. (Battelle-Pacific Northwest Labs., Richland, WA). Contract EY-76-C-06-1830. Nuclear Technology ; 47: No. 1, 51-58(Jan 1980).
A series of criticality experiments with 2.35 and 4.31 wt.% ^{235}U enriched UO_2 rods in water has provided well-defined benchmark-type data showing that both depleted uranium and lead reflecting walls, submerged in the water reflector, are better neutron reflectors than water alone. For each fuel enrichment, the critical separation between three subcritical, near optimally moderated fuel clusters was observed to increase as either 77-mm-thick depleted uranium or 102-mm-thick lead reflecting walls were moved toward the fuel. The maximum reactivity effect was observed for the depleted uranium with approx. 20 mm of water between the reflecting walls and the fuel region, whereas for the lead, a maximum effect was obtained with essentially no water between the reflecting walls and the fuel region.

283 UNLOADING AND TRANSFER-TECHNIQUES OF SPENT FUEL. Kunze, P. (Gesellschaft zur Wiederaufarbeitung von Kernbrennstoffen m.b.H., Eggenstein-Leopoldshafen (Germany, F.R.)). Atomkernenergie/Kerntechnik ; 35: No. 2, 105-110(1980). (In German).
This paper shows the handling of spent LWR-fuel in the head-end part of the fuel reprocessing facility. Installations, handling, and transfer techniques are described in the cask unloading area, as well as in the storage pond, in the mechanical cell and also in the dissolve. Furthermore the different technical installations in the most important plants in Europe, USA and Japan are described, together with the concept of the future plants of USA and Great Britain. (orig.) 891 HPH/orig. 892 MKO.

284 INVESTIGATING THE SENSITIVITY OF FUEL STORAGE CONCEPTS WITH NATURAL-DRAFT AIRCOOLING. Hame, W.; Schoenfeld, R. (Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.)). pp 113-116 of Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht Sektion 2: Thermo- und Fluiddynamik. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980). (In German)
From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).
AIR;COOLING SYSTEMS;FUEL POOLS;NATURAL CONVECTION;REACTOR OPERATION;SENSITIVITY;SPENT FUEL STORAGE

285 DRY STORAGE FOR SPENT LWR FUEL ELEMENTS. Kuehnel, R.; Friesen, E.; Bokelmann, R.F. (Kraftwerk Union A.G., Offenbach am Main (Germany, F.R.)). pp 528-534 of Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht. Sektion 4: Brennstoffkreislauf und Spaltstoff-Flusskontrolle. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980). (In German)
From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).
BWR TYPE REACTORS;PWR TYPE REACTORS;SPENT FUEL ELEMENTS;SPENT FUEL STORAGE;WATER COOLED REACTORS;FUEL CYCLE

286 RECOVERABLE TEST STORAGE OF SPENT FUEL ELEMMENTS FROM THE AVR ASSE - CONCEPT AND MEASURING PROGRAMME. Mueller, B.; Bruecher, H. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Chemische Technologie). pp 501-504 of Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht. Sektion 4: Brennstoffkreislauf und Spaltstoff-Flusskontrolle. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik,

Mathematik (1980). (In German)
From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).
AVR REACTOR;COATED FUEL PARTICLES;PLANNING; RADIOACTIVE WASTE STORAGE;RESEARCH PROGRAMS; SALT DEPOSITS;SPENT FUEL ELEMENTS;UNDERGROUND STORAGE;SPENT FUEL STORAGE;FUEL CYCLE

287 NEUTRON PHYSICAL ASPECTS OF THE STORAGE OF BWR FUEL ELEMENTS. Woloch, F.; Sdouz, G.; Suda, M. (Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna. Inst. fuer Reaktorsicherheit). Atomkernenergie/ Kerntechnik ; 35: No. 3, 166-169(1980). (In German).
For the storage of BWR fuel elements in a high density fuel rack using boronated steel absorbers and in a fuel rack with a larger pitch without absorber, criticality calculations are performed. The cooling water density is varied for the storage without absorbers. For the selected pitches of 16.5 cm for the high density fuel rack and 25 cm for the fuel rack without absorber respectively the ksub(infinitely) values of 0.933 and 0.748 are obtained. The dependence of the results on different calculational methods and on the influence of the variation of three important design parameters, i.e. of the concentration of boron, of the thickness of the boronated steel and of the watergap is investigated for the high density fuel rack. The average isothermal temperature coefficient is obtained for the high density fuel rack as -4.5 x 10^{-4} sup(0)C^{-1} and as approx. 2.0 x 10^{-4} sup(0)C^{-1} for the fuel rack without absorbers. For both ways of storage the aspects of safety of the results are discussed thoroughly. (orig.) 891 RW/orig. 892 CKA.

288 NUCLEAR SPENT FUEL STORAGE IN THE PACIFIC. HEARING BEFORE THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS, HOUSE OF REPRESENTATIVES, NINETY-SIXTY CONGRESS, FIRST SESSION ON S. 1119. HEARING HELD IN HONOLULU, HAWAII, DECEMBER 27, 1979. Washington, DC: Committee on Interior and Insular Affairs (1980). 237p. GPO.
This hearing concerned nuclear spent fuel storage in the Pacific. The United States has made preliminary studies on the possibility of establishing in the Pacific basin an international facility for the temporary storage of spent fuel from nuclear power reactors. This work is being undertaken in accordance with US non-proliferation policy. Interim storage constitutes less of a proliferation risk than the alternative of premature reprocessing which would separate out of the spent fuel weapons-usable plutonium. The US has placed attention on the Pacific basin area because of projected future storage needs of Western Pacific countries and the importance that dealing with those needs has for global energy and non-proliferation concerns. No decision will be reached in the near future on whether to build such a facility and where it might be located. A preliminary consideration in determining whether to move forward with the project will be the results of thorough evaluation of the possible impact on health, safety, and environment of the region. The US is asking Japan to join in a full feasibility study of the proposal. The US has informed governments in the region of the concept; futher consultations with interested nations and other parties will be undertaken as this evaluation proceeds. The relevant congressional committees are informed, and congressional approval will be sought at various stages. Permanent disposal of nuclear waste in the Pacific is not being considered. (DP)

289 METHOD TO ENCAPSULE SPENT NUCLEAR FUEL IN A SAFETY CLADDING ENABLING LONG-TERM STORAGE. Fleischer, L.R.; Gunasekaran, M. (to Westinghouse Electric Corp., Pittsburgh, PA (USA)). German(FRG) Patent 2,922,382/A/. 13 Dec 1979. 38p. (In German).
The fuel rods or fuel elements with e.g. UO_2 filling are encapsuled entirely with a specially prepared concrete (one or several layers) which on the one hand retain the radioactive materials and on the other hand remove the decay heat and form a gamma and neutron shield. For this purpose, metal fibres (e.g. Cu) are mixed in the concrete which is impregnated with polymers e.g. a resin mixture. Many examples and tables are given.

290 TRANSPORT AND STORAGE DEVICE FOR RADIOACTIVE MATERIALS. Lovincic, M.; Sobottka, H.C. German(FRG) Patent 2,821,780/A/ . 22 Nov 1979. 18p. (In German).
The spent fuel elements of the LWR are contained in gastight radiation protection containers, where the remaining space is filled with water, graphite, pyrites or glass pebbles. One or more such radiation protection containers are accommodated in a flask shaped case, which has slot shaped openings on both sides. The radiation protection containers are cooled inside the case by natural convection.

291 DYNAMIC ANALYSIS OF STORAGE RACKS FOR SPENT FUEL ASSEMBLIES. Habedank, G.; Habip, L.M.; Swelim, H. (Kraftwerk Union A.G., Offenbach am Main (Germany, F.R.). Hauptbereich Reaktortechnik). Nuclear Engineering and Design ; 54: No. 3, 379-383(Nov 1979).
The dynamic response of storage racks for spent fuel assemblies subjected to base excitation is calculated. While classical methods of linear structural dynamics may be adequate at low levels of excitation, nonlinear effects due to uplift, for example, can no longer be neglected at high excitation levels. Several nonlinear dynamic analyses have been performed for different types of storage racks with uplift capability. With the help of the numerical results, the rocking behavior of storage racks and their structural integrity has been examined.

292 NOTIFICATION OF THE MINISTER FOR SOCIAL AFFAIRS CONCERNING THE DATE OF A DISCUSSION TO BE HELD PURSUANT TO NUCLEAR LAW ON THE INSTALLATION AND OPERATION OF COMPACT-TYPE FUEL STORES IN THE UNTERWESER NUCLEAR POWER PLANT, OF OCTOBER 16, 1979. Knollmann (Niedersaechsisches Sozialministerium, Hannover (Germany, F.R.)). Bundesanzeiger ; 31: No. 206, 5(Oct 1979). (In German).
ATOMIC ENERGY LAWS;FUEL POOLS;LICENSING; SPENT FUEL STORAGE;UNTERWESER REACTOR

293 RADIOACTIVE MATERIAL STORAGE. Sakakibara, M.; Yamada, K.; Fujita, Y. (Hitachi Engineering Co. Ltd., Ibaraki (Japan)). (to Hitachi Ltd., Tokyo (Japan); Hitachi Engineering Co. Ltd., Ibaraki (Japan)). Japanese Patent 54-96,698/A/. 31 Jul 1979. 4p. (In Japanese).
A space (box) accommodating radioactive materials is made movable, and the radiation is effectively shielded by the attenuation of the radioactive materials in storage due to the lapse of the storage time and the shielding of the radiation due to the liquefied shielding material up to the shielding wall of the storage installation, whereby the shielding

wall of the storage installation is made thin and the capacity in the installation is enlarged, thus the accommodation capacity, that is, the storage capacity being increased.

294 SUPPORT FOR A FUEL ELEMENT STORAGE RACK. Schabert, H.P.; Weber, R.; Schwabe, I. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,637,879/8/. 19 Jul 1979. 10p. (In German).
The floor of the storage pond for fuel elements of a PWR is provided with a metal lining, on the surface of which there are projections of spherical shape. They point towards the storage rack and are lined up with the support bolts in the storage rack, so that the hood-shaped design of the ends of the support bolts can surround the spherical surface of the projection. Thus not only axial forces, but bending moments and lateral forces can be absorbed by the supports.

295 NOTIFICATION CONCERNING THE PLANNED INSTALLATION AND OPERATION OF COMPACT-TYPE FUEL ELEMENT STORAGE DEVICES AT UNTERWESER NUCLEAR POWER PLANT, JULY 2, 1979. Knollmann (Niedersaechsisches Sozialministerium, Hannover (Germany, F.R.)). Bundesanzeiger ; 31: No. 131, 5(Jul 1979). (In German).
FUEL POOLS;LEGAL ASPECTS;LICENSING;OPERATION; SPENT FUEL STORAGE;UNTERWESER REACTOR

296 AWAY-FROM REACTOR FUEL ELEMENT STORAGE AND TRANSPORTATION OF NUCLEAR WASTE. Lawrence, M.J. (Dept. of Energy, Washington, DC). Transactions of the American Nuclear Society ; 32: 100-101(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
AWAY-FROM-REACTOR STORAGE;RADIOACTIVE WASTES; TRANSPORT;SAFETY;FORECASTING

297 DESIGN AND OPERATION OF A DRY SPENT-FUEL STORAGE INSTALLATION. Painter, M.J.; Meyer, H.S. (Allied Chemical Corp., Idaho Falls, ID). Transactions of the American Nuclear Society ; 32: 674-675(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
SPENT FUEL STORAGE;FUEL RACKS;FUEL REPROCESSING PLANTS;SPECIFICATIONS

298 USE OF RISK ASSESSMENT IN EVALUATING ISFSI DESIGN CRITERIA. Sargent, I.H. (WESTEC Services, Inc., Ft. Washington, PA). Transactions of the American Nuclear Society ; 32: 678-680(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
SPENT FUEL ELEMENTS;SPENT FUEL STORAGE;FUEL RACKS;RISK ASSESSMENT;LEGAL ASPECTS

299 STATUS OF PERTINENT REGULATIONS AND REGULATORY GUIDES FOR INDEPENDENT SPENT-FUEL STORAGE INSTALLATIONS. Stanford, R.E.L. (Nuclear Regulatory Commission, Washington, DC). Transactions of the American Nuclear Society ; 32: 680(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
SPENT FUEL ELEMENTS;SPENT FUEL STORAGE;FUEL RACKS;LEGAL ASPECTS;REGULATORY GUIDES

300 LICENSING CONSIDERATIONS AND EXPERIENCE WITH APPLICATIONS FOR INDEPENDENT SPENT-FUEL STORAGE INSTALLATIONS. Roberts, J.P. (Nuclear Regulatory Commission, Washington, DC). Transactions of the American Nuclear Society ; 32: 680(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
SPENT FUEL ELEMENTS;SPENT FUEL STORAGE;LEGAL ASPECTS;FUEL POOLS

301 NUCLEAR FUEL ACCOUNTING: FROM ALPHA TO WHERE. Swanson, R. (Arthur Andersen and Co., Columbus, OH). Transactions of the American Nuclear Society ; 32: 374(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
ACCOUNTING;FUEL CYCLE;SPENT FUEL STORAGE; COST;NUCLEAR FUELS;REPROCESSING;RADIOACTIVE WASTE DISPOSAL

302 REGULATORY PROBLEMS WITH NUCLEAR FUEL STORAGE AND DISPOSAL COSTS. McDanal, M.W. (Federal Energy Regulatory Commission, Washington, DC). Transactions of the American Nuclear Society ; 32: 374-375(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
SPENT FUEL STORAGE;SPENT FUELS;RADIOACTIVE WASTE DISPOSAL;COST;ACCOUNTING

303 EVALUATION OF ALTERNATIVE SPENT-FUEL MANAGEMENT FEES. White, M.K. (Battelle Northwest Labs., Richland, WA); Engel, R.L.; Fiore, J.J. Transactions of the American Nuclear Society ; 32: 378-379(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
SPENT FUELS;CHARGES;EVALUATION;GOVERNMENT POLICIES;RADIOACTIVE WASTE MANAGEMENT;SPENT FUEL STORAGE;RADIOACTIVE WASTE DISPOSAL

304 EFFECTS OF AFR STORAGE LOCATION ON SPENT-FUEL TRANSPORTATION. Shappert, L.B.; Joy, D.S. (Oak Ridge National Lab., TN). Transactions of the American Nuclear Society ; 32: 415-416(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
AWAY-FROM-REACTOR STORAGE;SITE SELECTION; SPENT FUELS;TRANSPORT;COST;SPENT FUEL CASKS

305 SPENT-FUEL TRANSPORTATION REQUIRED TO IMPLEMENT THE DOE SPENT-FUEL POLICY. Hanson, A.S. (Yankee Atomic Electric Co., Westboro, MA); Katz, H.; Lieberman, J.A. Transactions of the American Nuclear Society ; 32: 416-418(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
SPENT FUELS;TRANSPORT;ENERGY POLICY; IMPLEMENTATION;SPENT FUEL CASKS;AVAILABILITY

306 WATER-COOLED STORAGE CONCEPTS FOR HTGR SPENT FUEL. Burgoyne, R.M.; Holder, N.D. (General Atomic Co., San Diego, CA). Transactions of the American Nuclear Society ; 32: 419-420(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

SPENT FUEL STORAGE;HTGR TYPE REACTORS;FUEL POOLS

307 TRANSPORTATION OF SPENT FUEL BY BARGE AND BY RAIL: A COMPARISON OF RISK. Fullwood, R.R.; Unione, A.J. (SAI, Palo Alto, CA). Transactions of the American Nuclear Society ; 32: 418-419(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
SPENT FUELS;RAIL TRANSPORT;MARITIME TRANSPORT;COMPARATIVE EVALUATIONS;BARGES;RISK ASSESSMENT

308 PUBLICATION OF THE FIRST AMENDMENT OF THE LICENCE FOR THE TRANSFER OF TRANSPORT CONTAINERS FOR SPENT FUEL ELEMENTS INTO THE FACILITIES OF THE GEMEINSCHAFTSKRAFTWERK NECKAR AND THEIR HANDLING THERE. MAY 28, 1979. Bundesanzeiger ; 31: No. 103, 11(Jun 1979). (In German).
CONTAINERS;LEGAL ASPECTS;LICENSING;REMOTE HANDLING;NECKAR REACTOR;SPENT FUEL ELEMENTS; TRANSPORT;SPENT FUEL CASKS

309 PUBLICATION OF THE ANNOUNCEMENT OF THE 1ST PART OF THE EXPERTS' OPINIONS ON THE INTERMEDIATE STORAGE OF SPENT FUEL ELEMENTS AT AHAUS, ADMINISTRATIVE DISTRICT OF BORKEN, NORTH-RHINE WESTPHALIA, PLANNED BY THE DEUTSCHE GESELLSCHAFT FUER WIEDERAUFARBEITUNG VON KERNBRENNSTOFFEN MBH, HANNOVER , AND THE STEAG KERNENERGIE GMBH, ESSEN, IN THE FRAMEWORK OF THE NUCLEAR LICENSING PROCEDURE AND THE CONSTRUCTIONAL LICENSING PROCEDURE. MAY 15, 1979. Bundesanzeiger ; 31: No. 90, 1(May 1979). (In German).
FEDERAL REPUBLIC OF GERMANY;LEGAL ASPECTS; LICENSING;PERFORMANCE TESTING;REACTOR SAFETY; SITE SELECTION;SPENT FUEL STORAGE

310 REFERRAL TO THE ANNOUNCEMENT OF THE 1ST PART OF THE EXPERTS' OPINIONS ON THE INTERMEDIATE STORAGE OF SPENT FUEL ELEMENTS AT AHAUS, ADMINISTRATIVE DISTRICT OF BORKEN, NORTH-RHINE WESTPHALIA, PLANNED BY THE DEUTSCHE GESELLSCHAFT FUER WIEDERAUFARBEITUNG VON KERNBRENNSTOFFEN MBH, HANNOVER, AND THE STEAG KERNENERGIE GMBH, ESSEN, IN THE FRAMEWORK OF THE NUCLEAR LICENSING PROCEDURE AND THE CONSTRUCTIONAL LICENSING PROCEDURE. MAY 15, 1979. Bundesanzeiger ; 31: No. 90, 1(May 1979). (In German).
FEDERAL REPUBLIC OF GERMANY;LEGAL ASPECTS; LICENSING;PERFORMANCE TESTING;SAFETY;SITE SELECTION;SPENT FUEL STORAGE

311 DRY STORAGE OF IRRADIATED MAGNOX FUEL IN AIR. Maxwell, E.O. (Central Electricity Generating Board, London (UK)); Deacon, D. Nuclear Engineering International ; 24: No. 285, 71-75(May 1979).
A description is given of the large dry store for irradiated Magnox fuel at Wylfa. The storage is basically a concrete box 60 x 1 x 4.5m and 2m thick with a capacity of 350t uranium or 28992 fuel elements, and depending upon natural convection of air for cooling. Freshly irradiated fuel is first stored for 150 days in the original CO_2 cooled dry stores to reduce irradiation to an acceptable level before being removed to a store skip. Details are given of the layout of the plant, method of transfer and the transfer machine, and the skips. Development work and automatic control of the transfer equipment are also discussed.

312 AIR COOLED STORAGE OF CANDU FUEL. Mayman, S.A.; Ohta, M.M. (Atomic Energy of Canada Ltd., Pinawa, Manitoba. Whiteshell Nuclear Research Establishment). Nuclear Engineering International ; 24: No. 285, 69-70(May 1979).
As an alternative to water pools for interim storage of spent fuel the concept of the concrete canister was developed by Whiteshell Nuclear Research Establishment Canada. Fuel bundles loaded into baskets and then sealed in cans are placed in the central cavity of a concrete cylinder. Cooling is by radiation and convection to the wall, by conduction through the concrete, and then by natural air convection over the outer surfaces of the canister. A conceptual design study of a large irradiated fuel storage facility was completed. Studies carried out during the development and demonstration programme are described. The main areas were in fuel handling, heat transfer and thermal stress, and behaviour of defected fuel. The programme has demonstrated that dry storage of irradiated fuel is both economical and practical.

313 ENERGY STORED IN IRRADIATED NACL. Lidiard, A.B. (UKAEA, Harwell. Atomic Energy Research Establishment). Philosophical Magazine, [Part] A: Defects and Mechanical Properties ; 39: No. 5, 647-659(May 1979).
Also available as AERE-TP--760.
Recently reported measurements of the energy stored in heavily irradiated NaCl are reviewed in the light of recent understanding of radiation-damage processes in this material. It is shown that, in the ranges of temperatures and dose rates of these experiments, the F-centres produced by the irradiation are retained principally in the form of colloids: the stored energy is thus a direct measure of the number of F-centres retained in this form. Comparison of these results with the prediction of the recently proposed theory of colloid growth shows that the predictions of the dependence of colloid growth rates upon temperature and dose rate are qualitatively correct. The dependence of stored energy dose, however, appears to require the inclusion of a thermally activated back-reaction and possible modifications to the theory are briefly discussed. However, further experiments in this range of temperatures and dose rates are necessary for more quantitative tests of the theory. This reconsideration of the data does not alter the broad conclusion as to the relative insignificance of stored energy in a natural salt formation used as a radioactive waste repository, although more extensive measurements permitting a more exact test of theory would allow better predictions to be made for such applications.

314 SHROUD FOR STORING RADIOACTIVE SPENT NUCLEAR FUEL ELEMENTS. (to Brooks and Perkins, Inc., Southfield, MI (USA)). British Patent 1,544,233/A/. 19 Apr 1979. 9p.
Tubular shrouds, having neutron absorbing panels between inner and outer spaces, are used for storing spent fuel elements in pools.

315 FRAMEWORK FOR STORING LONG FUEL ELEMENTS. Langhammer, K.H.; Weber, R. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.)); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,742,724/A/. 5 Apr 1979. 12p. (In German).
The fuel elements of square cross section for the PWR are surrounded by boron steel sheaths. An austenitic steel sheet is welded to the upper and lower end of each sheath. With

these ends, the sheaths can contribute to the strength of the framework by forming part of it, as the sheets can be provided with holes or projections - which are mechanically connected to the framework. The forces taken up in this way are transmitted via the welds to large surfaces in the mechanically sensitive boron sheets, which therefore are lightly stressed. The sheaths can consist of several longitudinal parts welded together. In this case the weld is interrupted in the area of impact by boron steel and boron-free steel.

316 DESIGN AND OPERATIONAL CHARACTERISTICS OF HIGH-DENSITY FUEL STORAGE FACILITIES. Grimm, E.A. (General Electric Co., San Jose, CA). Nuclear Technology ; 43: No. 2, 146-154(Apr 1979).

General Electric (GE) experience in operation of the Morris spent fuel storage facility, which now contains over 300 Mg of both boiling water reactor (BWR) and pressurized water reactor spent fuel, confirms that receipt, handling, and storage of spent fuel can be accomplished safely with negligible impact on the environment or the operation itself. Basin water treatment is accomplished with disposable powdered resins applied to a precoated filter-demineralizer unit, and special applications of Zeolites aid in maintaining radiocobalt and radiocesium concentrations to $< 4 \times 10^{-4}$ μCi/ml in the basin water. No gaseous radioisotopes from damaged or leaking fuel have been observed, and no significant increases in radioactivity or loss of cladding integrity have been observed during fuel handling and storage. GE has utilized this experience to design an expansion of the Morris basin and to design Boral-poisoned, high-density, stainless-steel storage modules for BWR reactor pools. These free-standing modules store BWR fuel on 165.1-mm (6.5-in.) center spacing, and a sliding low-friction support system limits the seismic loads applied to the fuel. Application of this fuel storage experience has permitted expansion of storage capacity for spent fuel at Morris ad at BWR reactors, permitting continued operation until federal programs for long-term storage have been clarified and implemented. 8 figures.

317 SUBSURFACE STORAGE OF COMMERCIAL SPENT NUCLEAR FUEL. Richards, L.M.; Szulinski, M.J. (ARCO-Polymers, Inc., Philadelphia). Nuclear Technology ; 43: No. 2, 155-164(Apr 1979).

The Atlantic Richfield Company has developed the concept of storing spent fuel in dry caissons. Cooling is passive; safety and safeguard features appear promising. The capacity of a caisson to dissipate heat depends on site-specific soil characteristics and on the diameter of the caisson. It is estimated that approx. 2 kW can be dissipated in the length of one fuel element. Fuel elements can be stacked with little effect on temperature. A spacing of approx. 7.5 m (25 ft) between caissons appears rasonable. Business planning indicates a cost of approx. 0.2 mill/kWh for a 15-yr storage period. 12 figures, 4 tables.

318 SPENT FUEL STORAGE EXPERIENCE. Johnson, A.B. Jr. (Battelle-Pacific Northwest Labs., Richland, WA). Nuclear Technology ; 43: No. 2, 165-173(Apr 1979).

Irradiated nuclear fuel has been stored in water pools at essentially all nuclear reactors, beginning with the earliest plants in 1943. Fuel from water-cooled power reactors is clad either with Zircaloy or with stainless steel. Zircaloy-clad fuel has been stored US pools since 1959. Some experimental stainless-steel-clad fuel was stored for 12 yr in the US before reprocessing. Canadian Zircaloy-clad fuel has been stored since 1962. There has been no evidence that the fuel has degraded during pool storage, based principally on visual observations and radiation monitoring of pool air and water. However, several fuel rods have been subjected to metallographic examination after pool exposures up to 11 yr, also with no evidence that the fuel cladding has degraded in the pool. Canadian fuel stored up to 10 yr was returned to a reactor and performed well. Favorable storage experience also has been indicated for other countries with fuel residence times of 5 to 10 yr. The pool storage environment is high-purity water at 5.3 to 7.5 pH, except for pools for pressurized water reactors, which utilize boric acid pool chemistry at 4.5 to 6.0 pH. Pool water temperatures generally range between 20 and 50°C. The favorable storage experience, demonstrated technology, successful handling of fuel with reactor-induced defects, benign storage environments, and corrosion-resistant materials offer sufficient bases to proceed with expanded storage capacities and extended fuel storage until questions regarding fuel reprocessing and final storage of nuclear wastes have been resolved. Some surveillance is justified to detect degradation if it becomes significat. Surveillance programs are already under way in several countries. 1 figure, 6 tables.

319 SOME ASPECTS OF THE THERMAL ANALYSIS OF METAL-ENCAPSULATED SPENT FUEL. Jardine, L.J.; Steindler, M.J. (Argonne National Lab., IL). Nuclear Technology ; 43: No. 2, 273-284(Apr 1979).

A thermal analysis was made of a storage concept for a reference intact spent fuel assembly encapsulated in a metal matrix in a cylindrical canister. Maximum temperatures within the canister, as well as the canister surface temperatures, were estimated for interim storage of canisters in environments of a water basin, an air basin, and a vertical sealed storage cask. Comparisons of the thermal analyses of the metal-encapsulated concepts were made with a canister with an air filler (i.e., no metal encapsulation). A similar analysis was also made for a concept employing sheared spent fuel segments rather than an intact fuel assembly. 5 figures, 5 tables.

320 FUEL STORAGE TANK. Peehs, M.; Stehle, H.; Weidinger, H. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,743,453/A/. 29 Mar 1979. 11p. (In German).

The stationary fuel storage tank is immersed below the water level in the spent fuel storage pool. In it there is placed a fuel assembly within a cage. Moreover, the storage tank has got a water filling and a gas buffer. The water in the storage tank is connected with the pool water by means of a filter, a surge tank and a water purification facility, temperature and pressure monitoring being performed. In the buffer compartment there are arranged catalysts a glow plugs for recombination of radiolysis products into water. The supply of water into the storage tank is performed through the gas buffer compartment. (DG).

321 FUEL TRANSPORTING DEVICE. Imoto, K.; Igarashi, R.; Terai, K. (to Toshiba Corp., Kawasaki, Kanagawa (Japan)). Japanese Patent 1954-36,482/A/. 17 Mar 1979. 5p. (In Japanese).

Purpose: To improve the reliability in the transportation of fuels by always providing duplicate or more sealing function during transportation of fuels by a fuel transporting device which connects the upper and the lower fuel pools in a reactor building with a transport pipe. Constitution: A transport pipe for communicating the upper fuel pool with the lower fuel pool is provided with an upper sealing device, an inner sealing device just below the upper sealing device and a lower sealing device always capable of sealing during fuel handling at the lower portion of the vertical transport pipe. This can always ensure duplicate or more sealing function in the fuel transportation and if any one of the sealing means is failed individually, sealing function can be kept maintained. Flow out of the upper pool water can eliminate the danger that the spent fuels are exposed to air and produce undesired irradiation exposure source.

322 RACK FOR HOLDING FUEL ASSEMBLIES OF NUCLEAR REACTORS. Friedrichs, H.; Letic, V.; Ristow, U. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,739,232/A/. 15 Mar 1979. 6p. (In German).

The compact rack made of boron steel is used for storing fuel assemblers from LWR's especially PWR's. It is designed in the shape of a chequeboard pattern. Only one out of two pool elements has got a closed cover of square cross section; in this way positions that are without covers of their own are created. The shielding, which is essential for the reactivity, then results from the neighboring pool elements having closed covers.

323 SPENT FUEL STORAGE FACILITY HAVING FORCED RECYCLE DEVICE. Ochiai, K. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 54-31,898/A/. 8 Mar 1979. 5p. (In Japanese).

The cooling effect for fuel rods can be improved by disposing a jet pump or the like near the bottom of a fuel support rack and pressurizing cooling water to forcibly circulate it from the bottom to the upper portion of the support rack. A grid-like support rack and a fuel support plate for containing and supporting spent fuel rods are mounted by way of a partition wall to an installation frame and disposed in a storage tank. The partition wall is provided with a throat and a nozzle, and pressurized driving water supplied from the outside of the storage tank is jetted by way of an exhaust pipe from the nozzle. Inside cooling water and driving water are mixed and agitated in the throat extending while surrounding the nozzle, recovered with pressure by a diffuser and then supplied through apertures in the support plate to the spent fuels. If no driving water is supplied to the nozzle, spontaneous circulation is effected through the throat to attain moderate cooling effect.

324 COOLING AND DECONTAMINATION INSTALLATION FOR FUEL ELEMENT TRANSPORT CONTAINERS. Dietsch, A. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,732,810/A/. 8 Feb 1979. 7p. (In German).

The system serves as a spray protection device and guide tube for water used to treat the shipping container in a fuel cycle center. It consists of two semi-shells connected by means of bolts along generating lines and jointly variable in height relative to the shipping container.

325 DEVICE FOR THE COOLING AND/OR DECONTAMINATION OF FUEL ELEMENT TRANSPORT CONTAINERS. Schaaf, W. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,732,796/A/. 8 Feb 1979. 7p. (In German).

The chamber consists of a cubic space whose walls are made of prefabricated components (concrete) which can be assembled on the spot. It can be closed by a door consisting of two wings which, in turn, can be swiveled and folded. The fuel transport cask can be secured either to the walls or to the ceiling of the chamber by means of straps. The lid is equipped with a flap which can be firmly and tightly connected with the door. It closes a gap through which the cask can be handled by lifting gear (waste management facility).

326 DEVICE FOR THE COOLING AND/OR DECONTAMINATION OF FUEL ELEMENT TRANSPORT CONTAINERS. Schaaf, W. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,732,815/A/. 8 Feb 1979. 6p. (In German).

The cubic chamber is made of prefabricated concrete components. The fuel element shipping container is suspended in it either by means of claws from the ceiling or on the sidewalls. A penetration opening for a hoisting tool in the ceiling can be firmly and tightly sealed by a lid (fuel cycle center).

327 FUEL ELEMENT POND. Schneider, W. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,731,307/A/. 1 Feb 1979. 7p. (In German).

The fuel element pond is part of a fuel reprocessing centre, to which spent fuel elements from LWR's are supplied, for example. The fuel element transport containers are driven to and fro in the dry state. During loading and unloading of transport containers, the pond is filled with water. After emptying the pond again, its walls may be contaminated. Cleaning of the pond walls takes place with a spray device, which is remotely operated. It consits of a pipe, which is connected to the cleaning liquid (water with citric acid) and which has spray nozzles. It may be connected to a float so that it follows the different water levels, or the nozzles can be closed according to the water level.

328 FUEL ELEMENT TRANSPORT CONTAINER. Benna, P.; Neuenfeldt, W. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,730,331/A/. 25 Jan 1979. 8p. (In German).

The reprocessing system includes a large number of waterfilled ponds next to each other for the intermediate storage of fuel elements from LWR's. The fuel element transport device is allocated to a middle pond. The individual ponds are separated from each other by walls, and are only accessible from the middle pond via narrow passages. The transport device includes a telescopic running rail for a trolley with a grab device for the fuel element. The running rail is supported in turn by a second trolley, which can be moved by wheels on rails. Part of the drive of the first trolley is arranged on the second one. Using

this transport device, adjacent ponds can be served through the passage openings.

329 NUCLEAR REACTOR FACILITY. Weber, R.; Kaetscher, E. (to Siemens A.G., Berlin (Germany, F.R.); Siemens A.G., Muenchen (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,253,232/C/. 25 Jan 1979. 8p. (In German).

The facility consists of a PWR with a fuel pit filled with water and a crane for handling a fuel transport cask. Beside the fuel pit and connected with it there is arranged a depositing shaft for the transport casks. The transport cask and the depositing shaft work together like piston and cylinder. From it there results such hydraulic braking that the inpact of the transport cask hitting the bottom of the shaft is not dangerous. The depositing shaft may also be formed by a steel tube inserted into the fuel pit.

330 LOADING POND FOR A FUEL ELEMENT TRANSPORT CONTAINER. Schneider, W.; Hoeger, E. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,731,274/A/. 25 Jan 1979. 8p. (In German).

The fuel elements from LWR's are supplied for reprocessing in transport containers. These are lowered into the loading pond before unloading. The loading pond can be divided into an upper and a lower part by a conical lid and a ring around the loading pond walls. The transport container is inserted in the dry condition, together with the lid. Its surface is therefore contaminated if the upper part is flooded with contaminated water. The lower part of the loading pond can be filled with clean water, which is compressed by excess pressure below the lid. When the loading pond is emptied and before lifting out the empty transport container, the water from the topside of the lid is lowered in level via a gutter in the surrounding ring, and does not contaminate the transport container.

331 STORAGE RACK FOR SPENT FUEL ELEMENTS. Bauer, N.; Hnilica, K.D.; Rehn, H.; Schmidt, G. (to Nuklear-Ingenieur Service G.m.b.H., Hanau (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,730,850/A/. 25 Jan 1979. 29p. (In German).

The storage rack for the intermediate storage of fuel elements from BWR or PWR type reactors consists of the following: Tubes of square crossection, which are set next to one another in rows or like a chessborad. The walls are double-walled and sealed. In the intermediate spaces there are plates of B_4C compressed with graphite, which are surrounded by load-bearing spacing material. A grid of reinforcing rods and spacers and a support plate ensure sufficient stiffness, so that the wall thickness of the stainless steel can be kept thin. The storage rack is made earthquake proof. The support plate rests on highly adjustable feet.

332 TRANSPORT OF STORAGE CONTAINER FOR RADIOACTIVE MATERIALS, PARTICULARLY FOR IRRADIATED NUCLEAR REACTOR FUEL ELEMENTS. Baatz, H.; Rittscher, D.; Fischer, J. (to Rheinisch-Westfaelisches Elektrizitaetswerk A.G., Essen (Germany, F.R.); STEAG Kernenergie G.m.b.H., Essen (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,740,933/B/. 18 Jan 1979. 4p. (In German).

The container consists of a tank with closing lid. The tank has a metal outer skin, a cast metal intermediate layer and an inner protective skin made of stainless steel. The outer and intermdiate layers are cast from and iron-carbon or Cu alloy, where the intermediate layer may be made as a cast matrix with embedded depleted uranium pellets. The outer and intermediate layers are made as a standard casting made of cast iron with graphite pellets. The outer layer has channels filled with absorber and/or moderator material. The inside of the container can be filled with water or emptied via pipelines.

333 SAFETY IN MARINE TRANSPORT OF SPENT FUEL IN JAPAN. Genshiryoku Iinkai Geppo (Journal of Atomic Energy Commission) ; 23: No. 9, 111-120(Jan 1979). (In Japanese).

Concerning the safety of the marine transport of spent fuel in Japan, a report of the Committee on Examination of Nuclear Fuel Safety to the Atomic Energy Commission of Japan was presented. In Japan, with the operation of a fuel reprocessing plant in the Power Reactor and Nuclear Fuel Development Corporation, the transport of spent fuel by sea is unavoidable due to the geographical features of Japan, and its safety is essential. The following matters are described: the safety evaluation of the marine transport involving shipwreck and sunken spent-fuel casks; research and development of the pressure equilibrium valves for casks; the safety measures in the marine transport including transport ship equipments and navigation; the laws and regulations concerning the standards for the transport, etc.; and safety assessment. In conclusion, the safety in the marine transport of spent fuel in Japan was confirmed because of high degree of cask integrity, the rare possibility of sinking of the ship, the adequate safety design of the ship, etc.

334 DISCUSSION DATE FOR THE PLANNED FUEL ELEMENT INTERMEDIATE STORAGE SITE AT AHAUS ON FEBRUARY 4 AND 7, 1979. GRS (Gesellschaft fuer Reaktorsicherheit) Kurz-Information, Reihe E ; No. 6, 1-3(1979). (In German).

FEDERAL REPUBLIC OF GERMANY;HEARINGS; LICENSING;PLANNING;RADIOACTIVE WASTE FACILITIES; RADIOACTIVE WASTE STORAGE;SAFETY;SPENT FUEL STORAGE;AWAY-FROM-REACTOR STORAGE

335 1ST AMENDMENT TO THE LICENCE FOR STORAGE OF TRANSPORT CONTAINERS FOR SPENT FUEL ELEMENTS IN THE STORAGE FACILITY OF THE GEMEINSCHAFTSKERNKRAFTWERK NECKAR (GKN) AND THEIR HANDLING THERE. GRS (Gesellschaft fuer Reaktorsicherheit) Kurz-Information, Reihe E ; No. 16, 1-4(1979). (In German).

Of the fuel elements spent during operation so far, those spent in 1978 will be transported to the French reprocessing plant at La Hague. The licence refers to the use of suitable transport containers and their handling there.

336 (RISLEY-Trans--4086) ARRANGEMENT FOR THE PREVENTION OF THE CONTAMINATION OF A FUEL ELEMENT STORAGE POOL. (SUPPLEMENT TO: P 27 18 305.7 - VPA 77 P 9317). 1979. Translation of German(FRG) Patent 2,722,870. 5p. Dep. NTIS (US Sales Only), PC A02/MF A01.

The arrangement consists of a metal casing adapted to suit the configuration of the fuel element which is completely sealed by a removable lid, serving at the same time as a grip, and is provided with an overpressure

valve and a water filling system. The overpressure valve consists of a U-tube arranged vertically inside, and a bell head for the collection of gases is provided which is joined to the casing by means of disconnectable catches. (DLC)

337 SPENT FUEL DISPOSITION--THE SITUATION IN THE UNITED STATES. Hanson, A.S. (Yankee At Electr Co, Westboro, Mass). Energy Technology (Washington, D.C.) ; 6: 857-861(1979).
Because neither reprocessing nor spent fuel disposal can be expected in significant quantities during the 1980's, the only alternative near-term disposition of spent fuel in the US will be interim storage. New at-reactor storage techniques and away-from-reactor storage facilities will be needed to provide the required storage capacity. In the long term spent fuel reprocessing and waste disposal must be done if nuclear power is to remain an important energy source for the US.

338 DOE TRANSPORTATION TECHNOLOGY CENTER; A PROGRAM FOR NUCLEAR TRANSPORTATION. Jefferson, R.M. (Sandia Labs., Albuquerque, NM). Transactions of the American Nuclear Society ; 33: 450(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
SPENT FUELS;RADIOACTIVE WASTES;TRANSPORT; TRANSPORTATION SYSTEMS

339 CONTACT- HANDLED TRANSURANIC WASTE TRANSPORTATION. Freedman, J.M.; Sutherland, S.H.; Eakes, R.G. (Sandia Labs., Albuquerque, NM). Transactions of the American Nuclear Society ; 33: 450-451(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADIOACTIVE WASTES;TRANSPORT;TRANSURANIUM ELEMENTS;PACKAGING;CONTAINERS;TRANSPORTATION SYSTEMS

340 ORNL INTERFACE AND LOGISTICS STUDIES. Marshall, J.R.; Joy, D.S.; Hudson, B.J. (Oak Ridge National Lab., TN). Transactions of the American Nuclear Society ; 33: 452-453(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADIOACTIVE MATERIALS;TRANSPORT;P CODES; COMPUTER CODES;N CODES;X CODES;D CODES;O CODES; M CODES;H CODES;COMPUTERIZED SIMULATION; RADIOACTIVE WASTES;PACKAGING;COST;A CODES;S CODES

341 APPLICATION OF ALARA PRINCIPLES TO SHIPMENT OF SPENT NUCLEAR FUEL. Greenborg, J.; Brackenbush, L.W.; Murphy, D.W.; Burnett, R.A.; Lewis, J.R. (Battelle Pacific Northwest Labs., Richland, WA). Transactions of the American Nuclear Society ; 33: 453-454(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
SPENT FUELS;TRANSPORT;RADIATION PROTECTION; DOSE RATES

342 EXPERIENCE IN LICENSING OF A SPENT-FUEL SHIPPING CASK FOR MURR FUEL ELEMENTS. Loyalka, S.K.; Schlapper, G.A.; Hussain, R.; Hwang, H.T.; McGinty, D.; McKibben, C.; Golshani, M.; Oran, C. (Univ. of Missouri, Columbia). Transactions of the American Nuclear Society ; 33: 458-462(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
SPENT FUEL CASKS;LICENSING;MURR REACTOR; SPENT FUEL ELEMENTS;TRANSPORT

343 STORAGE RACK FOR HOLDING SPENT FUEL ELEMENTS FROM NUCLEAR POWER PLANTS. Krieger, F. (to Noell (G.) und Co., Wuerzburg (Germany, F.R.)); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,723,849/A/. 7 Dec 1978. 9p. (In German).
In the fuel rack containing a great number of compartments with square cross-sections, the structural elements required by the system are statically designed in such a way, that optimal utilization of space as well as shielding of the compartments with respect to each other is guaranteed. In order to achieve this the compartments may be formed by profiled sheets having got trapezoidal edges taken off. Two sheets, each running parallel with respect to each other, form a double shell. The compartments are formed by another double shell, also consisting of two sheets and lying mirror-inverted with respect to the first shell touching this one.

344 AMERICAN PROPOSALS FOR LONG RANGE STORAGE OF IRRADIATED FUEL. Sugier, A. (CEA, 75 - Paris (France). Dept. des Programmes). Revue de l'Energie ; No. 310, 641-649(Dec 1978). (In French).
The American politics of irradiated fuel management is reviewed, the short-range storage of huge amounts of wastes being the fundamental problem. Two steps are considered: the "At the Reactor" storage, ensured by the electricity companies, and the "Away From Reactor" storage on the DOE's responsibility. A technical and economical study has been carried out in order to estimate the cost of the AFR provisory storage and a project of taxation has been established on this basis.

345 DRUM FOR STORING FUEL ELEMENT CLUSTERS. Artemiev, L.N.; Batjukov, V.I.; Fadeev, A.I. (to Dautsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,723,681/A/. 30 Nov 1978. 11p. (In German).
The drum has tube-shaped holes being arranged in several rows that are concentrical with respect to the circumference of the cartridge and serve to a accommodate fuel assemblies. These fuel assemblies can be inserted into the holes through the tubes of a transfer line by means of a transfer machine. In order to speed up the transfer process the holes of the individual rows are arranged in such manner that in each position of the drum at least one hole of each row is placed on the trajectory (arc of a circle or straight line) of the gripping equipment of the transfer machine. By this means the heavy drum must be moved less often.

346 STORAGE OF SPENT FUELS IN THE USA. SOME THOUGHTS ON THE LEGAL POSITION. Cagnetta, J.P. Archiv fuer Energiewirtschaft ; 32: No. 11, 899-904(Nov 1978). (In German).
A report is given on the present legal situation concerning the storage of spent nuclear fuel in the USA. Due to the restrictive energy policy of the government which prevents further commercial reprocessing, there are long-term bottle-necks in the intermediate storage of spent nuclear fuel. The alternatives of the electricity supply undertakings in order to prevent the partial shutdown of their plants are discussed. As a result of the lacking legal

foundations, the DOE (Department of Energy) is at the moment not in the position to build disposal plants for spent fuels, nor to operate them, nor to make contracts for the storage with a third party.

347 SPENT FUEL CARRIER ''HINOURA MARU''. Atoms in Japan ; 22: No. 11, 32-38(Nov 1978).
With the development of nuclear power in Japan, the amount of spent fuel has increased gradually, and its reprocessing has become a serious problem. This led to the construction of the first reprocessing plant in Tokai Village, Ibaraki Prefecture. The method to transport spent fuel safely and economically was studied, and it was decided to transport it by sea from various power stations mostly located in coastal areas to the exclusive port for the Tokai Plant, then by land transport from the port to the reprocessing plant about 4 km distant. Ship Inspection Regulation No. 610 was established by the Ministry of Transport in 1974, and the spent fuel carrier ''HINOURA MARU'' was designed and rebuilt on the basis of this regulation. The collision-enduring hull structure, the water depth and size of the ports concerned, the number of casks, the operation cost and others were investigated thoroughly. The main particulars of the ship are as follows: gross tonnage 1290 t, length overall 77.55 m, full load draft 4.20 m, service speed 11 knots, propulsive power 2500 PS, the number of casks loaded 4, and complement 20. The features of this ship are the collision and stranding-enduring structures, stability characteristic, radiation shield structure, hold-cooling equipment, cask-fixing equipment, hold bilge tanks, and water pouring equipment for holds. The management of spent fuel transport is explained.

348 EXTERNAL FUEL ELEMENT POOL AS TEMPORARY STORAGE FACILITY AND PERMANENT REPOSITORY. Stueger, R. (Kernkraftwerk-Planungsgesellschaft m.b.H., Vienna (Austria)); Thurnher, K. (Brown, Boveri und Cie A.G., Mannheim (Germany, F.R.)). Atomwritschaft, Atomtechnik ; 23: No. 10, 465-466(Oct 1978). (In German).
BUILDINGS;BWR TYPE REACTORS;FUEL POOLS;AWAY-FROM-REACTOR STORAGE;SPENT FUEL STORAGE

349 TRANSPORT OF RADIOACTIVE MATERIALS. Swindell, G.E. (International Atomic Energy Agency, Vienna (Austria). Div. of Nuclear Safety and Environmental Protection). International Atomic Energy Agency Bulletin ; 20: No. 5, 17-24(Oct 1978).
This document presents, very briefly, some data which has been collected, in particular for the USA concerning the transport of radioactive materials and other related topics. It also shows up some features on the more specific problems connected with the transport of plutonium or spent fuel.

350 CONTAINER FOR IRRADIATED FUEL. Guy, R. (to Foster Wheeler Power Products Ltd., London (UK); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,709,602/A/. 7 Sep 1978. 6p. (In German).
The transport container for irradiated or used nuclear fuel is provided with an identical heat shield against fires on the top and bottom sides. Each heat shield consists of two inner nickel plates, whose contact surfaces are polished to a mirror finish and an outer plate of stainless steel. The nickel plate on the box is spot welded to it while the second nickel plate is spot welded to the steel plate. Both together are in turn welded so as to be leaktight to the edges of the box. For extreme heat effects and based on the different (bimetal) coefficients of expansion, the steel plate with the nickel plate attached to it bulges away from the box. The second nickel plate remains at the box, so that a subpressure space is formed with the mirror nickel surfaces. The heat radiation and heat conduction to the box are greatly reduced by this.

351 (PNL-TR--399) PERMANENT STORAGE FACILITY FOR SPENT FUEL ASSEMBLIES. Klein, D.; Stuger, R. Translated from Atomwritschaft, Atomtechnik ; 401-403(Sep 1978). 11p. NTIS, PC A02/MF A01.
The capital costs for a permanent storage facility for spent LWR fuel assemblies with a storage capacity of 540 tons of uranium and with its own infrastructure lie on the order of ca. 260 DM/kg U. In the operating costs, a distinction must be made between costs in the charging stage and costs during the subsequent storage period. The specific operating costs amount to ca. 9 DM/kg U during the charging stage and decrease to 3 to 4 DM/kg U during exclusive storage operation. In conclusion, this prototype shows: fuel assemblies can be admitted to an air-cooled storage facility as early as a few years after their removal from the reactor, without being subjected to initial temperature stresses in excess of those during the preceding reactor operation. The system in which the fuel assemblies are cooled by natural convection of outside air offers inherent safety and low operating expenses. Radiological pollution of the environment can be reduced to extremely low levels by suitable precautions.

352 SPENT FUEL CASK. Asano, M. (to Toshiba Corp., Kawasaki, Kanagawa (Japan)). Japanese Patent 53-90,597/A/. 9 Aug 1978. 4p. (In Japanese).
Purpose: In order to ensure safety of a spent fuel cask, a method for strengthening a basket and keeping a interior in the cask at a subcritical state has been described. Constitution: The interior of the hollow cylinder of the cask is partitioned by a lattice-shaped basket accommodating therein a neutron absorption substance. In the thus partitioned chamber there is provided a hollow prismatic bolt, in which spent fuel assemblies are accomodated. The other part of the basket is filled with water, thereby shielding radiation emitted from spent fuel assemblies on one hand and cooling spent fuel assemblies on the other. The filled neutron absorbers are in a powdery or granular state, and diffused rapidly in water when any accident takes place thereby keeping the cask at a subcritical state.

353 SPENT FUEL TRANSPORTATION IN THE FUEL CYCLE. Labrousse, M. (Compagnie Generale des Matieres Nucleaires (COGEMA), 92 - Chatillon (France)). Techniques de l'Energie ; No. 17, 17-20(Jun 1978). (In French).
In the fuel cycle, it is the spent fuel transportation which offers the most original character against conventional transportation as requiring very special packaging which has to fulfill special safety conditions on public thoroughfares or working centers. Facing safety and economy criteria three parameters intervene in designing such packagings: the mass of the package, its internal and external lay out.

354 Shiyozumi kakunenryo no anzen yuso ni kansuru chosa kenkyu hokokusho. (SURVEY AND

RESEARCH REPORT ON THE SAFE TRANSPORT OF SPENT NUCLEAR FUELS). Sekiguchi, A. (Tokyo Univ. (Japan)); Asano, J.; Ueki, K.; Okubo, M.; Orui, K. Tokyo, Japan; Ship Building Research Association of Japan (Mar 1978). 149p. (In Japanese).

This report was prepared by a committee organized by the Shipbuilding Association of Japan to investigate various technical and administrative problems associated with the safety of sea transportation of spent nuclear fuels. The study has been undertaken by three sub-committees, namely transportation sub-committee, radiation protection sub-committee, and sub-committee for evaluation of spatial distribution of radiation. Investigations were made on the following fields. (1) Survey of existing regulations; IMCO recommendation and domestic regulatory guides are included here. (2) Survey on the safety aspects of transportation methods; effects of ship structure in case of accidents (collision, stranding and fire) are included here. (3) Survey on the protection against radiation in the ship with spent fuel; investigations of various regulatory guides are included. The method of radiation measurement and calculational methods are also investigated. Measurement of neutrons from spent fuel and multiplication and shielding of neutrons in the spent fuel casks for PWR fuels are briefly discussed in the appendix.

355 COMPARISON OF CONCEPTS FOR INDEPENDENT SPENT FUEL STORAGE FACILITIES. Held, C.; Hintermayer, H.P. (Kernkraftwerk-Planungsgesellschaft m.b.H., Vienna (Austria)). pp 179-195 of Compte rendu du seminaire de l'AEN sur le stockage des elements combustibles irradies. Paris, France; OECD (1978).

From Seminar on the storage of spent fuel elements; Madrid, Spain (Jun 1978).

The design and the construction costs of independent spent fuel storage facilities show significant differences, reflecting the fuel receiving rate (during the lifetime of the power plant or within a very short period), the individual national policies and the design requirements in those countries. Major incremental construction expenditures for storage facilities originate from the capacity and the type of the facilities (casks or buildings), the method of fuel cooling (water or air), from the different design of buildings, the redundancy of equipment, an elaborate quality assurance program, and a single or multipurpose design (i.e. interim or long-term storage of spent fuel, interim storage of high level waste after fuel storage). The specific costs of different designs vary by a factor of 30 to 60 which might in the high case increase the nuclear generating costs remarkably. The paper also discusses the effect of spent fuel storage on fuel cycle alternatives with reprocessing or disposal of spent fuel.

356 SPENT FUEL STORAGE -- THE MAGNITUDE OF THE PROBLEME. Hogroian, P. (Nuclear Energy Agency, 75 - Paris (France)). pp 31-40 of Compte rendu du seminaire de l'AEN sur le stockage des elements combustibles irradies. Paris, France; OECD (1978).

From Seminar on the storage of spent fuel elements; Madrid, Spain (Jun 1978).

The events that have led to the present state of spent nuclear fuel storage are reviewed, including initiatives in fuel reprocessing and plans for extended storage. An estimate is made of the amounts of spent fuel that may result from nuclear power programmes of the OECD and the world, derived from projections of total energy requirements and nuclear power growth. These are presented on a regional basis up to the year 2000 and in the longerterm, to lend some feeling for the future magnitude of spent fuel storage requirements.

357 U.S. SPENT FUEL POLICY: A STATUS REPORT. Robinson, B. (Department of Energy, Washington, DC (USA)). pp 41-54 of Compte rendu du seminaire de l'AEN sur le stockage des elements combustibles irradies. Paris, France; OECD (1978).

From Seminar on the storage of spent fuel elements; Madrid, Spain (Jun 1978).

On October 18, 1977, the U.S. Department of Energy announced the broad principles of a new U.S. spent fuel storage policy. Since that announcement, there has been a high level of activity focused on fleshing out the detailed policy required to ensure the effective implementation of those principles. The desire to develop a policy which: meets all requirements from the point of view of environment, health, and safety, is integrated into an overall waste management policy, and reflects input and comment from all interested parties, has resulted in a deliberate approach to the development of a comprehensive policy. These efforts will begin to yield significant results over the next several months. The purpose of this paper is to review some of the recent, current and planned events and activities which are relevant to that policy development; to indicate the likely timing of those events and activities; and to discuss the framework for policy development which is currently shaping staff-level analysis.

358 PROSPECTS OF SPENT MANAGEMENT IN SPAIN. Cabanilles Batalla, P.A.; Lopez Perez, B.; Uriarte Hueda, A. (Junta de Energia Nuclear, Madrid (Spain)); Melches Serrano, C.; Ramirez Ontalba, E.; Selgas Suarez, F. pp 55-61 of Stockage des elements combustibles irradies. Paris, France; OECD (1978).

From Seminar on the storage of spent fuel elements; Madrid, Spain (Jun 1978).

The purpose of this paper is to outline the forecast on spent fuel management in Spain, taking into account international developments during the last few years, especially in LWR fuels. This forecast is based on the following plans: increase of storage capacity in reactors; construction of an independent spent fuel storage installation (ISFSI) and a fuel reprocessing pilot plant.

359 COST AND IMPLICATIONS OF A MIDDLE-TERM PROGRAM FOR STORAGE OF SPENT FUEL IN A NUCLEAR POWER STATION (BWR). Mochon, J.L.; Quintana, R. (Hidroelectrica Espanola, Madrid). pp 167-177 of Stockage des elements combustibles irradies. Paris, France; OECD (1978).

From Seminar on the storage of spent fuel elements; Madrid, Spain (Jun 1978).

The paper is based on the experience gained with the Cofrentes Nuclear Power Station Project. Originally, the station had two spent fuel storage pools, in the fuel building, plus a little pool inside the containment, and all were to be fitted with extensive aluminum storage racks with a total capacity for 1+1/3 cores. Due to the present world situation with regard to the 'back-end' of the fuel cycle, it was decided to enlarge the pools' size and to change the design of the racks, to obtain a final storage capacity of 5+1/4 cores, so covering over 18 years of operation. The changes introduced in the project, as well as its costs, and the possibilities of election still open are examined in the paper.

360 EVALUATION OF THE PROBLEMS ASSOCIATED WITH ENEL'S IRRADIATED FUEL MANAGEMENT. Sani, L.; Zelelli, U. (Ente Nazionale per l'Energia Elettrica, Rome (Italy)). pp 153-165 of Stockage des elements combustibles irradies. Paris, France; OECD (1978).

From Seminar on the storage of spent fuel elements; Madrid, Spain (Jun 1978).

The present difficulties in the reprocessing field, which will continue for a period of time not easily definable, impose on the nuclear utilities the research of adequate solutions to solve the problem associated with storage of the fuels discharged by the nuclear power stations in operation. In this context, the paper examines the technical aspects of the various possible alternatives and on the basis of the Italian nuclear program, possible storage strategies are discussed on the assumption of the development of an adequate oxide-fuel reprocessing capacity. The problems related to storage in pools at the station or away from reactor are described in the light of the recent experience made in Italy with the adaptation of an old pool reactor out of service, that is, the Avogadro reactor in Saluggia, to store the fuels of the stations now in operation. Finally some economic aspects are considered in order to ascertain their impact on the cost of energy produced.

361 U.S. DEPARTMENT OF ENERGY PROGRAM TO SUPPORT THE DESIGN AND LICENSING OF A SPENT FUEL STORAGE BASIN. Whitfield, R.P. (Energy Research and Development Administration, Aiken, SC (USA). Savannah River Operations Office). pp 75-82 of Stockage des elements combustibles irradies. Paris, France; OECD (1978).

From Seminar on the storage of spent fuel elements; Madrid, Spain (Jun 1978).

The U.S. Government has announced a policy to accept title to and provide storage capacity for spent nuclear fuel from power reactors in the U.S. and other countries when it is in the non-proliferation interest of the U.S. In support of this policy, the U.S. Department of Energy has underway a program of research, development and design studies to provide the technology base for design and licensing of a spent fuel storage basin. The program is currently on a schedule that would support a storage basin being brought on line in early 1983 and, in addition, develop technology for future generation facilities.

362 CENTRAL SPENT FUEL STORAGE IN SWEDEN. Gustafsson, B.; Hagberth, R. (Swedish Nuclear Fuel Supply Co, SKBF AB Kaernkraft, AKK Stockholm, Sweden). pp 119-133 of Stockage des elements combustibles irradies. Paris, France; OECD (1978).

From Seminar on the storage of spent fuel elements; Madrid, Spain (Jun 1978).

This paper describes a planned central spent fuel storage facility in Sweden. The nuclear power program and quantities of spent fuel generated in Sweden is discussed. A general description of the facility is given with emphasis on the lay-out of the buildings, transport casks and fuel handling. Finally a possible design of a Swedish transportation system is discussed.

363 STUDY ON SEPARATE SPENT FUEL STORAGE FACILITY. Hanelius, A.; Rastas, A. (TVO Power Company, Finland); Ivung, B.; Tiren, I. (ASEA-ATOM AB, Vaesteraas (Sweden)). pp 107-118 of Stockage des elements combustibles irradies. Paris, France; OECD (1978).

From Seminar on the storage of spent fuel elements; Madrid, Spain (Jun 1978).

The TVO Power Company (TVO) has two 660 MWe BWR units under construction on the southwest coast of Finland. In order to support the licensing of the power plant units a study on a separate Spent Fuel Storage Facility (SFSF) located on the power plant site was made by TVO together with AB ASEA-ATOM. The study report contains a principal technical design and preliminary safety assessment of the SFSF. The study proves that the interim storage of spent fuel, if needed, can be safely arranged on the power plant site by technically feasible means.

364 INTERNATIONAL VIEW OF SPENT FUEL STORAGE AS ONE ASPECT OF FUEL CYCLE SAFETY. Ilari, O. (Nuclear Energy Agency, 75 - Paris (France)); Jouannaud, C. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Inst. de Protection et de Surete Nucleaire). pp 85-96 of Stockage des elements combustibles irradies. Paris, France; OECD (1978).

From Seminar on the storage of spent fuel elements; Madrid, Spain (Jun 1978).

The authors outline the current international co-operation connected with the safety of fuel cycle facilities, with particular reference to the safety of facilities for the storage of spent fuel. The view of the NEA/CSNI Working Group on the Safety of the Fuel Cycle are reported and the principal problems of the safety of fuel storage are reviewed in the perspective of the safety of the entire fuel cycle. It is concluded that the problems associated with short-term storage are well understood and managed, and that the additional problem of maintaining the integrity of fuel assemblies during long-term storage requires further research.

365 SOME SHIELDING AND ENGINEERING ASPECTS OF IRRADIATED THERMAL OXIDE FUEL TRANSPORT FLASKS. Twite, M. (British Nuclear Fuels Ltd., Risley); Miller, P.C. (UKAEA Atomic Energy Establishment, Winfrith). pp 139-145 of Radiation protection in nuclear power plants and the fuel cycle. Vol. 2. London, England; British Nuclear Energy Society (1978).

From Conference on radiation protection in nuclear power plants and the fuel cycle; Bristol, UK (27 Nov 1978).

The paper presents some of the basic requirements of transport of irradiated fuel that have been laid down by the International Atomic Energy Agency and describes the latest of a series of transport flasks that has been successfully used by British Nuclear Fuels Limited to meet these and other requirements. It continues with a description of the main shielding components and outlines their methods of manufacture. The models and codes used for evaluating external radiation levels in both the axial and radial directions are described. The flask must have the flexibility to transport either PWR or BWR fuel elements and actual cases are presented for both fuel configuratiens. The paper then goes on to highlight some of the conflicting shielding and engineering requirements e.g. water circulation port diameter optimisation, ullage volume optimisation, lead slump implications and how these problems were resolved. It finally briefly touches on some possible alternative shielding materials and the difficulties encountered in assessing their future technical and economic benefit.

366 CONTAINER FOR TRANSPORT OF RADIOACTIVE MATERIALS. (to UKAEA London Office). French

Patent 2,366,674/A/. 21 Sep 1977. Priority date 30 Sep 1976, United Kingdom of Great Britain and Northern Ireland (UK), 6p. (In French).

A cylindrical receptacle for transporting a radioactive substance comprising a cover that may be hermetically shut and a lining covering the cylindrical wall of the receptacle placed in a movable manner in the latter to form a shield against the gamma radiation. The characteristic of this receptacle is that a movement of the lining in contact with the cover is prevented by means of a ring divided into several segments that is removably secured to the lining and adjusts in a complementary slot machined in the wall of the receptacle between the cover and the lining.

367 FACILITY FOR STORING ELONGATED NUCLEAR FUEL ASSEMBLIES. Wade, E.E. (to Westinghouse Electric Corp., Pittsburgh, PA (USA); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,655,403/A/. 4 Aug 1977. 19p. (In German).

The patent deals with a reduction of the space and financial effort caused by simultaneous storage of several core charges of spent fuel, which possibly may be required in the future. This facility tries to find an optimal solution by means of a compact but sufficiently safe configuration. Thereby it is avoided to place the active zones of neighboring fuel assemblies, extending only over part of their length, e.g. 1/4, directly beside one another, i.e. at the same level. Thus the hazard of a reciprocal reaction as well as the local concentration of the heat going to be produced is excluded. A framework contains 'cells', arranged close together in a honeycomb structure, each of which may contain a vertically placed fuel assembly. By means of a bottom plate which is individually adjusted within each cell each fuel assembly is positioned in a level which is different from that of the 6 neighboring assemblies surrounding it. It is shown that this requirement is met by only 4 level steps. Thus in the rows 1, 3, 5 etc. the levels 'a' and 'b' are alternatingly fixed and in the rows 2, 4, 6 etc the levels 'c' and 'd'. Always two of the 6 neighboring assemblies of a fuel assembly with the level 'a' are positioned at the levels 'b', 'c', and 'd'. The difference of level from one step to the next is equal to the length resp. height of the active zone. If the active zone of each assembly does not exceed 1/4 of its length, also two (or even more) assemblies may be stored one above the other, the level grading of a lower layer being kept up in the layer placed above. Therefore the requirement with respect to the active zone is met in the upper layer of assemblies, too. It is an obvious prerequisite that only fuel assemblies with active zones having got equal axial length and lying at the same level will be stored together. (RW) 891 RW.

368 NUCLEAR FUEL STORAGE ARRANGEMENT. (to Westinghouse Electric Corp., Pittsburgh, PA (USA)). British Patent 1,557,889/A/. 19 Jan 1977. 7p.

A compact nuclear fuel storage arrangement is described and diagrams with explanatory notes and dimensions given. The object of the invention is to provide an arrangement wherein the storage space for spent fuel assemblies is efficiently utilized without accumulation of a critical mass. Elongated nuclear reactor fuel assemblies each with an active and an inactive section along its longitudinal axis are stored. The arrangement comprises a frame structure forming a plurality of elongated cells, one for each fuel assembly, these being positioned radially adjacent to each other without spaces between. The fuel assemblies are axially positioned in staggered relation along the longitudinal axis of the cells so that the active section of each fuel assembly is adjacent to the inactive section of each radially adjacent fuel assembly. This allows a reduction in the storage space required but the radial distance between the closest active sections is at least one cell diameter.

369 SEISMIC ANALYSIS OF A DRY SPENT FUEL CASK HANDLING SYSTEM. Morris, N.F. (Manhattan Coll., New York (USA)); Harstead, G.A.; Soeoet, O. (Soeoet and Harstead Associates, New York, NY, USA). pp K6/6 1-8 of Structural mechanics in reactor technology. Vol. K(b). Jaeger, T.A.; Boley, B.A. (eds.). Amsterdam, Netherlands; North-Holland (1977).

From 4. international conference on structural mechanics in reactor technology; San Francisco, CA, USA (15 Aug 1977).

An unusual system has been developed for handling the spent fuel cask during loading of spent fuel from the storage pool to decontamination and loading of the cask onto a railroad car or truck. The unique feature of this system is that the outer surface of the cask is kept dry. However, since the system is so unusual a seismic analysis of the system was deemed necessary. The dry cask system was analyzed as a three-dimensional framework carrying a tank. It is an unusual system in that the tank is much more rigid than the supporting system. The actual analyses were carried out with the aid of SAP IV. Even though this meant that computer softwear support would not be available, it was felt the system could be modeled so that it would be satisfactorily analyzed with this program. This proved to be the case although, of course, some difficulties arose in the analysis. In summary, a detailed seismic analysis was carried out for a rather complex mechanical/structural system in an efficient manner utilizing state-of-the-art, public domain programs.

370 IMPROVEMENTS OF CONTAINERS FOR HEAT PRODUCING MATERIALS. (to Robatel-S.L.P.I., 69 - Lyon (France)). French Patent 2,368,123/A/. 14 Oct 1976. 10p. (In French).

Container for the transport and/or confinement of irradiated fuel elements, in which the internal containment is filled with a liquid to ensure that the heat given off by the elements is transferred by convection to the external wall. It includes a separate buffer capacity, partially filled with air or gas, which communicates with the containment through a pipe oriented so that this capacity automatically offsets the changes of pressure resulting from temperature variations without ever allowing the occluded air or gas from reaching the containment.

371 METHOD FOR STORING NUCLEAR FUEL IN RESPOSITORIES. Schweitzer, D.G.; Sastre, C. US Patent Application 070,548. [nd]. 5p.

A method for storing radioactive spent fuel in repositories containing polyphenyl or silicon oil as the storage medium is disclosed. Polyphenyls and silicon oils are non-corrosive and are not subject to radiation damage. Thus, storage periods of up to 100 years are possible.

372 METHOD FOR STORING SPENT NUCLEAR FUEL IN REPOSITORIES. Schweitzer, D.G.; Sastre, C.; Winsche, W. US Patent Application 068,359.

[nd]. 8p.
A method for storing radioactive spent fuel in repositories containing sulfur as the storage medium is disclosed. Sulfur is non-corrosive and not subject to radiation damage. Thus, storage periods of up to 100 years are possible.

Marketing and Economics

373 (PNL--3317-2) COMMERCIAL US NUCLEAR REACTORS AND WASTE: THE CURRENT STATUS. Platt, A.M.; Robinson, J.V. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Sep 1980. Contract AC06-76RL01830. 53p. NTIS, PC A04/MF A01.
Between March 1 and June 15, 1980, the declared size of the commercial light waste reactor (LWR) nuclear power industry in the US has decreased another 9 GWe. For the presently declared size: the 165 declared reactors will peak at a capacity of 153 GWe in 2001 and will consume about 870,000 MTU as enrichment feed; the theoretical rate of enrichment requirements will peak at about 19,000,000 SWUs/y in the year 2014; as few as two repositories each with capacity equivalent to 100,000 MTU would hold the waste; and predisposal storage reactor basins and AFRs (away-from-reactor basins) would peak at <85,000 MTU in the year 2020 if the two respositories were commissioned in the years 1997 and 2020. It should be noted that the number of declared LWRs has dropped from 226 on December 31, 1974 to 165 as of this writing. The oil equivalent of the energy loss, assuming a 50% efficiency in use as in cars, is 17,000 million barrels. This is about 10 years of the current rate of US consumption of OPEC oil.

374 CHANGES AHEAD FOR NUCLEAR INDUSTRY. To the Point ; 8: No. 19, 17(11 May 1979).
ACCIDENTS;NUCLEAR INDUSTRY;NUCLEAR POWER PLANTS;RADIOACTIVE WASTE STORAGE;SAFETY;THREE MILE ISLAND-2 REACTOR

375 FUEL CYCLE INDUSTRIALIZATION PROGRAM PREPARED BY N-FUEL RESEARCH COMMITTEE, ANRE. Atoms in Japan ; 22: No. 9, 27-34(Sep 1978).
To meet the new situation resulting from the scaling down of nuclear power development plan in Japan, and the changes due to the new U.S. nuclear non-proliferation policy, the Nuclear Fuel Research Committee of the Agency of Natural Resources and Energy of MITI has prepared the ''Interim Report on the Nuclear Fuel Cycle''. It sets out in precise terms the methods that should be followed for establishing the nuclear fuel cycle in Japan. Major items treated in this report are; uranium ore development, promotion of uranium stockpiling, construction of domestic uranium enrichment plant, promotion of the construction of a nuclear fuel park, Pu utilization and cooperation in international movement for nuclear non-proliferation, and the establishment of measures for radioactive waste management. Discussions are made from technological, economical, and political view points. Also attached are a table of the comprehensive industrialization plan up to the year 2000 and a table of estimated nuclear fuel demand and supply in Japan.

Waste Management

376 (ANL--80-66, pp 128-143) NUCLEAR FUEL CYCLE STUDIES. Jun 1980.
Chemical Engineering Division research highlights, 1979.
For the metal-matrix encapsulation of radioactive waste, brittle-fracture, leach-rate, and migration studies are being conducted. For fuel reprocessing, annular and centrifugal contactors are being tested and modeled. For the LWBR proof-of-breeding project, the full-scale shear and the prototype dissolver were procured and tested. 5 figures. (DLC)

377 (ANL/ES--80) ENGINEERING EVALUATION OF A FORMERLY UTILIZED MED/AEC SITE. SITE A AND PLOT M, PALOS FOREST PRESERVE, PALOS PARK, ILLINOIS. (Argonne National Lab., IL (USA)). Sep 1979. Contract W-31-109-ENG-38. 76p. Dep. NTIS, PC A05/MF A01.
This engineering evaluation report (EER) addresses one of these MED/AEC sites known as Site A/Plot M, located in Palos Park, Illinois. The EER describes in technical detail a number of options for remedial action that could be taken with respect to the contamination at Site A/Plot M and presents estimates of the costs associated with these options. A companion document, Environmental Analysis Report on a Formerly Utilized MED/AEC Site, Site A and Plot M, Palos Forest Preserve, Palos Park, Illinois (ANL/ES-79), has also been prepared. It describes in detail the existing site environment and evaluates the environmental impacts of the various remedial options discussed in this report. This EER contributes to a better understanding of the mitigation or resolution of environmental problems posed by the subject MED/AEC site and serves as a basis for determining whether or not remedial actions are warranted. The knowledge derived from the evaluation of a number of remedial options should be helpful in the final disposition of other MED/AEC sites located elsewhere.

378 (ARH--2619) CAPSULE CALORIMETER DEVELOPMENT REPORT. Hall, J.C. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). 2 Oct 1972. Contract EY-77-C-06-1030. 58p. Dep. NTIS, PC A04/MF A01.
A capsule calorimeter has been designed, fabricated, and tested that is capable of measuring the rate of thermal energy generation of a capsule source with an accuracy of plus or minus five percent over a range of 300 watts to 1,000 watts of power. Three operating modes were investigated. The rate of temperature rise mode of operation was found to be the superior operating mode based on accuracy, time cycle, and simplicity of operation. This mode of operation is recommended for use in the encapsulation plant for performing calorimetric determinations on the strontium and cesium capsules that will be produced in the plant. The heat generation data collected by calorimetry will be used for isotopic assay of the capsule sources. The capsule calorimeter is specifically designed for installation into a remotely operated hot cell.

379 (B-HARC--411-021) PUBLIC PARTICIPATION IN NUCLEAR WASTE MANAGEMENT. Schilling, A.H.; Nealey, S.M. (Battelle Human Affairs Research Center, Seattle, WA (USA)). Apr 1979. Contract EW-78-C-06-1076. 25p. Dep. NTIS, PC A02/MF A01.
The recent report of the Interagency Review Group (IRG) on Nuclear Waste Management formalized what has become increasingly clear in recent years: public participation in nuclear waste management decisions is a fact of life and will be more emphasized in the future

than in the past. The purpose of this paper is to discuss, and stimulate discussion, of major issues which must be considered before attempting to design and implement a program to encourage public participation in this complex and sensitive area. Public participation is a term with many possible meanings. The term is used here to stand for a very wide range of activities including: providing information about programs and intended actions, seeking advice or permission from state or local officials, conducting public meetings to announce plans and receive reactions, conducting hearings, establishing consultative panels of outside experts or special interest group members, and even conducting surveys of public opinion and concern. This paper is not a proposal or a set of specific recommendations, but a stimulus to thought and discussion. It was prepared with DOE's role in waste management in mind, and benefits from the authors' opportunity to observe the public participation process in this topic area to data. The paper is organized into four sections that take account of (1) past participation efforts, (2) why public participation is necessary and what might be gained by it, (3) considerations in designing a participation program, and (4) major principles involved in conducting a public participation program, including a brief review of participation procedures.

380 (BMI-X--702) ACCEPTANCE CRITERIA FOR TRANSURANIC WASTE PACKAGES FOR DISPOSAL IN A LICENSED GEOLOGIC REPOSITORY. Christensen, R.N.; Miller, N.E. (Battelle Columbus Labs., OH (USA)). Sep 1980. Contract W-7405-ENG-92. 79p. NTIS, PC A05/MF A01.

Purpose of the predicted future criteria is to anticipate what changes will be necessary for the TRU wastes which are in storage awaiting disposal. The probable future criteria were predicted on the basis of an evaluation of waste package criteria recently developed by several sources. The BCL/RHO Waste Package Criteria served as a starting point for the present study. Criteria from the other sources were categorized according to the characteristic of the waste package described in the BCL/RHO document. Two additional areas not covered in the BCL/RHO document were added to form a potential list of nineteen criteria. Discussions were held with representatives of NRC, EPA, and ONWI.

381 (CAEC--007(Vol.2)) LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT. VOLUME II. FORECAST REQUIREMENTS. Feizollahi, F. (NUS Corp., Palo Alto, CA (USA)). Nov 1978. 76p. (NUS--3158). California Energy Commission, 1111 Howe Ave., Sacramento, CA 95825.

This report is concerned with the forecast of future requirements for power-reactor low-level-waste management consisting of estimates of the quantities of low-level radioactive wastes that will be generated in commercial light-water-reactor plants. Non-LWR sources are also discussed. This study does not make projections of nuclear power growth beyond 1995 for California, nor beyond 1990 for the United States. However, projections of radwaste quantities are extended beyond 1995 for California, and beyond 1990 for the United States, only for the waste quantities generated by the LWR plants operating, under construction, or formally announced.

382 (CONF-790420--) CERAMICS IN NUCLEAR WASTE MANAGEMENT. Chikalla, T.D.; Mendel, J.E. (eds.). (Battelle Pacific Northwest Labs., Richland, WA (USA)). May 1979. Contract EY-76-C-06-1830. 385p. Dep. NTIS, PC A17/MF A01.

From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).

Seventy-three papers are included, arranged under the following section headings: national programs for the disposal of radioactive wastes, waste from stability and characterization, glass processing, ceramic processing, ceramic and glass processing, leaching of waste materials, properties of nuclear waste forms, and immobilization of special radioactive wastes. Separate abstracts were prepared for all the papers. (DLC)

383 (CONF-790420--, pp 210-212) VISCOSITY AND ELECTRICAL CONDUCTIVITY OF GLASS MELTS AS A FUNCTION OF WASTE COMPOSITION. Plodinec, M.J.; Wiley, J.R. (E.I. du Pont de Nemours and Co., Aiken, SC). May 1979.

From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).

Radioactive waste at the Savannah River Plant contains high concentrations of nonradioactive compounds of iron and aluminum. Simulated waste compositions containing varying ratios of iron to aluminum were added to glass melts to determine the effect on the melt properties. Waste containing high aluminum increased the melt viscosity, but waste containing high iron reduced the melt viscosity. Aluminum and iron both reduced the melt conductivity.

384 (CONF-790420--, pp 198-202) COMPATIBILITY OF ACTINIDES WITH HLW BOROSILICATE GLASS: SOLUBILITY AND PHASE FORMATION. Walker, C.T. (European Inst. for Transuranium Elements, Karlsruhe, Germany); Riege, U. May 1979.

From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).

Actinide oxides in the amounts expected in HLW glass are completely soluble in the glass. At 1400°K, the solubility of PuO_2 in borosilicate glass is about 4.5 wt % and is unaffected by the addition of 20 wt % HLW oxides. The presence of 10 wt % Gd_2O_3 gives rise to a segregate phase of the type $Pu_{0.7}Ce_{0.2}Gd_{0.1}O_2$ and hence decreases the solubility of PuO_2 to 1.3 wt %.

385 (CONF-790420--, pp 36-40) DEVELOPMENT OF COMPREHENSIVE WASTE ACCEPTANCE CRITERIA FOR COMMERCIAL NUCLEAR WASTE. O'Hara, F.A.; Miller, N.E.; Ausmus, B.S.; Yates, K.R.; Means, J.L.; Christensen, R.N.; Kulacki, F.A. (Battelle Columbus Labs., OH). May 1979.

From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).

A detailed methodology is presented for the identification of the characteristics of commercial nuclear waste which may require criteria. This methodology is analyzed as a six-step process which begins with identification of waste operations and proceeds until the waste characteristics affecting the potential release of radionuclides are determined. All waste types and operations were analyzed using the methodology presented. Several illustrative example are included. It is found that thirty-three characteristics can be identified as possibly requiring criteria.

386 (CONF-790420--, pp 41-46) APPROACH

TOWARDS LONG TERM PREDICTION OF STABILITY OF NUCLEAR WASTE FORMS. Yen-Bower, E.L.; Clark, D.E.; Hench, L.L. (Univ. of Florida, Gainesville). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
An experimental method for predicting long-term stability of nuclear waste encapsulants uses various ratios of surface area to the solution volume exposed to the encapsulant. A graphical technique, involving leaching indices and exposure times, illustrates how predictions can be made based on laboratory experiments, field trials, and museum artifacts.

387 (CONF-790420--, pp 52-56) COMPARISON OF GLASS AND CRYSTALLINE WASTE MATERIALS. Ross, W.A.; Turcotte, R.P.; Mendel, J.E.; Rusin, J.M. (Battelle Pacific Northwest Labs., Richland, WA). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Either glass or crystalline materials can be shown to have some advantage when a single property is considered. However, the differences are small and each material has both assests and liabilities. With proper design, either type of waste form can almost certainly be utilized to solidify and contain radioactive waste.

388 (CONF-790420--, pp 57-61) GLASSES AS MATERIALS USED IN FRANCE FOR MANAGEMENT OF HIGH-LEVEL WASTES. Bonniaud, R.A.; Jacquet Francillon, N.R.; Laude, F.L.; Sombret, C.G. (Commissariat a l'Energie Atomique, Marcoule, France). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Sodium borosilicate and sodium aluminoborosilicate glasses have been selected as final materials in the field of the solidification of high-level radioactive wastes. The properties related to long-term storage are reviewed. The effects of alpha emission upon the structure and of aqueous leaching upon radioactive release are emphasized.

389 (CONF-790420--, pp 62-65) CHARACTERIZATION OF BOROSILICATE GLASSES CONTAINING SIMULATED HIGH-LEVEL RADIOACTIVE WASTES FROM PNC. Terai, R.; Eguchi, K.; Yamanaka, H. (Government Industrial Research Inst., Osaka, Japan). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
The characterization of borosilicate glasses containing simulated HLW from PNC has been carried out. Phase separation of molybdates, volatilization, viscosity, electrical resistivity, thermal conductivity, elastic modulus, chemical durability, and devitrification of these glasses have been measured, and the suitability of the glasses for the vitrified solidification processes is discussed from the viewpoint of safety.

390 (CONF-790420--, pp 203-209) INVESTIGATION OF CRYSTALLIZATION IN GLASSES CONTAINING FISSION PRODUCTS. Malow, G. (Hahn-Meitner-Institut fuer Kernforschung, Berlin, Germany). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Five potential solidification products for high-level waste (four borosilicate glasses and one celsian glass ceramic) have been investigated in terms of crystallization. In all glasses and in the glass ceramic, crystallization, and recrystallization, respectively, were observed by heating above 773°K, however, at very different periods of time (0.1d greater than or equal to 100d). The noble metals precipitated into various phases. Crystal growth proceeded at the phase boundary glass-noble metal. In all products rare earth phases crystallized. Silicate phases rarely formed. The leach resistance (by the grain titration and Soxhlet tests) decreased after heat treatment in all cases. The changes were found to be within one order of magnitude for all products. 2 figures, 4 tables.

391 (CONF-790420--, pp 213-217) EFFECTS OF COMPOSITION ON WASTE GLASS PROPERTIES. Mellinger, G.B.; Chick, L.A. (Battelle Pacific Northwest Labs., Richland, WA). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
The electrical conductivity, viscosity, chemical durability, devitrification, and crystallinity of a defense waste glass were measured. Each oxide component in the glass was varied to determine its effect on these properties. A generic study is being developed which will determine the effects of 26 oxides on the above and additional properties of a wide field of possible waste glasses. 5 figures, 2 tables.

392 (CONF-790420--, pp 224-228) PELLETED WASTE FORM FOR HIGH-LEVEL ICPP WASTES. Lamb, K.M.; Priebe, S.J.; Cole, H.S.; Taki, B.d. (Allied Chemical Corp., Idaho Falls, ID). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Simulated zirconia-type calcined waste is pelletized on a 41-cm diameter disc pelletizer using 5% bentonite, 2% metakaolin, and 2% boric acid as a solid binder and 7M phosphoric plus 4M nitric acid as a liquid binder. After heat treatment at 800°C for 2 hours the pellets are impact resistant and have a leach resistance of 10^{-4} g/cm$_2$. day, based on Soxhlet leaching for 100 hours at 95°C with distilled water. An integrated pilot plant is being fabricated to verify the process. 1 figure, 4 tables.

393 (CONF-790420--, pp 233-237) RELATIVE LEACH BEHAVIOR OF WASTE GLASSES AND NATURALLY OCCURRING GLASSES. Adams, P.B. (Corning Glass Works, NY). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Simulated nuclear waste glasses of the sodium-borosilicate type with a low waste loading and of the zinc-borosilicate type with a high waste loading have been compared with obsidians. The resuls indicate that the waste glasses would corrode in normal natural environments at a rate of about 0.1 μm per year at 30°C and about 5 μm per year at 90°C, compared with obsidians which seem to corrode at, or less than, about 0.01 μm per year at 30°C and less than 1 μm per year at 90°C. Activation energies for reactions of the two waste glasses with pure water are about 20 kcal/g-mol. 3 figures, 7 tables.

394 (CONF-790420--, pp 289-293) SIMULATIONS OF RADIATION DAMAGE IN GLASSES. Antonini, M.; Lanza, F.; Manara, A. May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Simulation of the damage produced in glasses by alpha emitters has been performed using fission fragments and accelerated Ni ions. As a unit of damage the number of displaced atoms has been assumed. Stored energy was considered as a basic quantity for verification. The results obtained compare very well with the existing data. 2 figures, 4 tables.

395 (CONF-790420--, pp 294-299) RADIATION EFFECTS IN VITREOUS AND DEVITRIFIED SIMULATED WASTE GLASS. Weber, W.J.; Turcotte, R.P.; Bunnell, L.R.; Roberts, F.P.; Westsik, J.H. Jr. (Battelle Pacific Northwest Labs., Richland, WA). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
The long-term radiation stability of vitreous and partially devitrified forms of high-level waste glass was investigated in accelerated experiments by ^{250}Cm doping. The effects of radiation on microstructure, phase behavior, density, impact strength, stored energy, and leachability are reported to a cumulative radiation dose of 5×10^{18} α decays/cm^3. This dose produces saturation of radiation effects in most properties. 4 figures.

396 (CONF-790420--, pp 300-304) EFFECTS OF IRRADIATION ON STRUCTURAL PROPERTIES OF CRYSTALLINE CERAMICS. Clinard, F.W. Jr.; Hurley, G.F. (Los Alamos Scientific Lab., NM). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Stability of crystalline ceramic nuclear waste may be degraded by self-irradiation damage. Changes in density, strength, thermal conductivity, and lattice structure are of concern. In this paper, structural damage of ceramics under various radiation conditions is discussed and related to possible effects in nuclear waste.

397 (CONF-790420--, pp 315-320) CRYSTAL CHEMISTRY OF THE SYNTHETIC MINERALS IN CURRENT SUPERCALCINE-CERAMICS. McCarthy, G.J. (Pennsylvania State Univ., University Park); Pepin, J.G.; Pfoertsch, D.E.; Clarke, D.R. May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Crystal chemistry of the synthetic mineral phase assemblages in current supercalcine-ceramics has been investigated. X-ray diffraction and a variety of electron optical tools (SEM, STEM, electron microprobe) have been used to characterize the crystal structure types and solid solution substitutions.

398 (CONF-790420--, pp 327-332) EFFECT OF IMPACT ENERGY ON SOLID-WASTE COMPOSITES OF BRITTLE AND DUCTILE MATERIALS. Mecham, W.J.; Jardine, L.J.; Steindler, M.J. (Argonne National Lab., IL). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
A method of analysis of impacts that could occur prior to final geologic isolation is outlined for two generic solid waste forms: (1) a glass monolith and (2) a composite of ceramic pellets embedded in a continuous metal phase. This latter form is also referred to as a metal-matrix waste form. Relevant methods, models, and methodologies reported in the literature for impact analyses of solid radioactive waste forms are summarized. Preliminary descriptive and calculational models are outlined for estimating and for comparing the impact deformations. The models are based on energy balances and are proposed to serve as a basis for design and testing of solid waste forms.

399 (CONF-790420--, pp 305-309) METAMICT STATE RADIATION DAMAGE IN CRYSTALLINE MATERIALS. Haaker, R.F.; Ewing, R.C. (Univ. of New Mexico, Albuquerque). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Metamict minerals provide an excellent basis for the evaluation of long-term radiation damage effects, particularly such changes in physical and chemical properties as microfracturing, hydrothermal alteration, and solubility. This paper summarizes pertinent literature on metamictization and proposes experiments that are critical to the elucidation of structural controls on radiation damage in crystalline phases.

400 (CONF-790420--, pp 310-314) RADIATION DAMAGE STUDIES ON SYNTHETIC NACL CRYSTALS AND NATURAL ROCK SALT FOR WASTE DISPOSAL APPLICATIONS. Klaffky, R.W. (Brookhaven National Lab., Upton, NY); Swyler, K.J.; Levy, P.W. May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Radiation damage studies are being made on synthetic NaCl and natural rock salt crystals from various localities, including potential repository sites. Measurements are being made with equipment for recording the radiation-induced F-center and colloid particle absorption bands during irradiation with 1.5 MeV electrons at various temperatures. A technique has been developed to resolve the overlapping F-center and colloid bands. The resulting spectra and curves of absorption verus dose provide information on colloid particle size and concentration and activation energies for processes occurring during colloid formation; additional data suggest that both strain and radiation-induced dislocations contribute to the colloid formation process. 5 figures, 1 table.

401 (CONF-790420--, pp 13-16) CONCEPT FOR THE TREATMENT AND DISPOSAL OF RADIOACTIVE WASTES IN THE GERMAN ENTSORGUNGSZENTRUM. Salander, C.; Zuehlke, P. (Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen mbH, Hannover, Germany). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
The concept for treatment and disposal of radioactive wastes in the planned German Entsorgungszentrum is presented. HLLW will be converted to borosilicate glass. Medium- and low-level-liquid waste concentrates will be fixed by cementation. The products will be finally disposed of in a salt dome just below the Entsorgungszentrum.

402 (CONF-790420--, pp 27-32) INFLUENCE OF SYSTEM CONSIDERATIONS ON WASTE FORM DESIGN.

Bauer, A.A.; Matthews, S.C.; Peterson, R.W. (Office of Nuclear Waste Isolation, Columbus, OH). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
The design of waste forms is constrained by waste management system considerations imposed during generation, treatment, packaging, transportation, storage, and isolation. In the isolation phase, the waste form provides one of the barriers to release in a multibarrier system that includes the natural geologic and hydrologic barriers as well as other engineered barriers.

403 (CONF-790420--, pp 33-35) IAEA COORDINATED RESEARCH PROGRAM ON THE EVALUATION OF SOLIDIFIED HIGH-LEVEL RADIOACTIVE WASTE PRODUCTS. Grover, J.R..; Schneider, K.J. (International Atomic Energy Agency, Vienna, Austria). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
A coordinated research program on the evaluation of solidified high-level radioactive waste products has been active with the IAEA since 1976. The program's objectives are to integrate research and to provide a data bank on an international basis in this subject area. Results and considerations to date are presented.

404 (CONF-790420--, pp 218-223) PHASE BOUNDARY EFFECTS IN METAL MATRIX EMBEDDED GLASSES. Schiewer, E. (Hahn-Meitner-Institut fuer Kernforschung GmbH, Berlin, Germany). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
An investigation was performed to study reactions at the phase boundaries of glass-lead composites at temperatures up to the softening point of the glass. Some metal was oxidized at the boundary and penetrated into the glass. Solid-state diffusion was rate controlling. In the case of a phosphate glass, fission products were depleted in the boundary area. Molybdenum migrated into the lead, and cesium migrated into the glass core. 2 figures, 3 tables.

405 (CONF-790420--, pp 333-337) STRESS ANALYSIS OF GLASS-CANISTER INTERACTION: A STUDY OF RESIDUAL STRESSES AND FRACTURING. Simonen, F.A.; Friley, J.R. (Battelle Pacific Northwest Labs., Richland, WA). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Residual stresses and cracking in canisters filled with vitrified nuclear waste are simulated using finite element computer calculations. Cooling rates, internal heat generation, and thermal expansion coefficients significantly affect stress levels. Glass behavior within the softening temperature range is taken to follow the instant freezing concept of Bartenev.

406 (CONF-790420--, pp 365-369) CHARACTERISTICS OF STORED HIGH-LEVEL ICPP WASTE CALCINE. Staples, B.A.; Pomiak, G.S.; Wade, E.L. (Allied Chemical Corp., Idaho Falls, ID). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Calcined high-level radioactive defense waste stored at the Idaho Chemical Processing Plant for up to twelve years was sampled for retrievability. The calcine was determined to be retrievable as expected. A program to determine physical and chemical characterisitcs for future retrieval and alternative waste treatment processes has been completed.

407 (CONF-791112--50) CHARACTERIZATION OF IMPACT FRACTURE OF BRITTLE SOLID-WASTE FORMS. Mecham, W.J.; Jardine, L.J.; Pelto, R.H.; Steindler, M.J. (Argonne National Lab., IL (USA)). 1979. Contract W-31-109-ENG-38. 13p. Dep. NTIS, PC A02/MF A01.
From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).
This paper presents a methodology for analyzing particle size distributions obtained in impact testing of brittle waste-form materials. The methodology includes (a) a linear two-parameter lognormal correlation of the weight fraction less than any given size, (b) a mathematical function of the two lognormal parameters to determine the total surface area in terms of a dimensionless shape factor, and (c) a surface-energy constant to predict the anticipated increase of surface area from the known energy absorbed in the impact of the brittle material. Preliminary measurements were made on impacted simulated glass specimens. The analysis is used as an example of the methodology. These results are also compared with reanalyzed impact test data reported by others.

408 (CONF-791112--66) SYSTEMATIC APPROACH FOR ASSESSMENT OF ALTERNATIVE NUCLEAR WASTE MANAGEMENT STRATEGIES. Yeh, G.T. (Oak Ridge National Lab., TN (USA)). 1979. Contract W-7405-ENG-26. 8p. Dep. NTIS, PC A02/MF A01.
From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).
A systematic approach for alternative nuclear waste management assessment is prescribed for evaluating the fate and transport of radwaste in the environment and to man. The approach consists of a system of flow dynamic and waste transport models for the physical environment, transfer models to biota, and dose models to man. Flow dynamic and waste transport models are included for computing spatial-temporal variations of the flow field and radwaste concentration in subsurface aquifers, surface water regimes, estuaries/oceans, and the atmosphere. Transfer models are linked to flow dynamic and waste transport models to study the uptake from and to the physical environment of the waste by aquatic and terrestrial biota. Dose models are used to compute both the radwaste input to man and its effects on man. With these series of computations, the radiation dose from alternative nuclear waste management strategies can be computed. Coupled with the exposure and effect analysis, the approach should facilitate the selection of the best management methodologies among many alternatives.

409 (CONF-791185--2) DISPOSAL OF RADIOACTIVE WASTES. Blomeke, J.O. (Oak Ridge National Lab., TN (USA)). 1979. Contract W-7405-ENG-26. 37p. Dep. NTIS, PC A03/MF A01.
From ANS student chapter seminar; College Station, TX, USA (5 Nov 1979).
Radioactive waste management and disposal requirements options available are discussed. The possibility of beneficial utilization of radioactive wastes is covered. Methods of interim storage of transuranium wastes are listed. Methods of shipment of low-level and

high-level radioactive wastes are presented. Various methods of radioactive waste disposal are discussed. (DC)

410 (CONF-800117--1) NUCLEAR WASTE MANAGEMENT: A PERSPECTIVE. Leuze, R.E. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 37p. Dep. NTIS, PC A03/MF A01.

From American Nuclear Society conference; Tulsa, OK, USA (15 Jan 1980).

The scope of our problems with nuclear waste management is outlined. Present and future inventories of nuclear wastes are assessed for risk. A discussion of what is presently being done to solve waste management problems and what might be done in the future are presented. (DC)

411 (CONF-800403--(Vol.2), pp 1360-1371) PRESENT STATUS OF NUCLEAR WASTE MANAGEMENT IN THE FEDERAL REPUBLIC OF GERMANY. Nickel, H. (Nuclear Research Centre Juelich, Germany). Jun 1980.

From ANS thermal reactor safety meeting; Knoxville, TN, USA (8 Apr 1980).

The German Government and federal authorities have stipulated in a special regulation that new nuclear power stations will only be licensed if safe waste management (entsorgung) is guaranteed. Hence the energy-producing utilities commenced the planning of a national fuel-cycle-centre (Entsorgungszentrum) which includes installations for reprocessing and ultimate storage. Detailed studies have shown that from a safety engineering viewpoint, there is no objection to this waste management concept. However, for political reasons, its realization is not acceptable at present. Hence the Federal Government considered alternative solutions, e.g., the construction of away-from-reactor, temporary storage facilities and a small scale reprocessing plant.

412 (CONF-800416--3) PROGRESS REPORT ON THE DESIGN OF A LOW-LEVEL WASTE PILOT FACILITY AT ORNL. Hensley, L.C.; Turner, V.L.; Pruitt, A.S. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 7p. Dep. NTIS, PC A02/MF A01.

From UCC-ND and GAT waste management seminar program; Portsmouth, OH, USA (22 Apr 1980).

All low-level radioactive solid wastes, excluding TRU wastes, are disposed of by shallow land burial at the Oak Ridge National Laboratory. Contaminated liquids and sludges are hydrofractures. The TRU wastes are stored in a retrievable fashion in concrete storage facilities. Currently, the capacity for low-level radioactive waste burial at the Oak Ridge National Laboratory is adequate for another six years of service at the current solids disposal rate which ranges between 80,000 and 100,000 cu ft per year. Decontamination and decommissioning of a number of ORNL facilities will be a significant activity in the next few years. Quantities of radioactive materials to be stored or disposed of as a result of these activities will be large; therefore, the technology to dispose of large quantities of low-level radioactive wastes must be demonstrated. The UCC-ND Engineering Division, in concert with divisions of the Oak Ridge National Laboratory, has been requested to prepare a conceptual design for a facility to both dispose of the currently produced low-level radioactive waste and also to provide a test bed for demonstration of other processes which may be used in future low-level radioactive wastes disposal facilities. This facility is designated as the Low-Level Waste Pilot Facility (LLWPF). This paper describes the status of the conceptual design of a facility for disposal of the subject radioactive waste.

413 (CONF-800444--1) OVERALL ASSESSMENT OF ACTINIDE PARTITIONING AND TRANSMUTATION FOR WASTE MANAGEMENT PURPOSES. Blomeke, J.O.; Croff, A.G.; Finney, B.C.; Tedder, D.W. (Oak Ridge National Lab., TN (USA); Georgia Inst. of Tech., Atlanta (USA)). 1980. Contract W-7405-ENG-26. 21p. Dep. NTIS, PC A02/MF A01.

From 2. technical meeting on the nuclear transmutation of actinides; Ispra, Italy (21 Apr 1980).

A program to establish the technical feasibility and incentives for partitioning (i.e., recovering) actinides from fuel cycle wastes and then transmuting them in power reactors to shorter-lived or stable nuclides has recently been concluded at the Oak Ridge National Laboratory. The feasibility was established by experimentally investigating the reduction that can be practicably achieved in the actinide content of the wastes sent to a geologic repository, and the incentives for implementing this concept were defined by determining the incremental costs, risks, and benefits. Eight US Department of Energy laboratories and three private companies participated in the program over its 3-year duration. A reference fuel cycle was chosen based on a self-generated plutonium recycle PWR, and chemical flowsheets based on solvent extraction and ion-exchange techniques were generated that have the potential to reduce actinides in fuel fabrication and reprocessing plant wastes to less than 0.25% of those in the spent fuel. Waste treatment facilities utilizing these flowsheets were designed conceptually, and their costs were estimated. Finally, the short-term (contemporary) risks from fuel cycle operations and long-term (future) risks from deep geologic disposal of the wastes were estimated for cases with and without partitioning and transmutation. It was concluded that, while both actinide partitioning from wastes and transmutation in power reactors appear to be feasible using currently identified and studied technology, implementation of this concept cannot be justified because of the small long-term benefits and substantially increased costs of the concept.

414 (CONF-800447--1) BIOLOGICAL DENITRIFICATION OF HIGH-NITRATES WASTES GENERATED IN THE NUCLEAR INDUSTRY. Francis, C.W. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 21p. Dep. NTIS, PC A02/MF A01.

From Water Research Centre and University of Manchester Institute of Science and Technology conference; Manchester, UK (15 Apr 1980).

Biological denitrification appears to be one of the most effective methods to remove nitrates from wastewater streams (Christenson and Harremoes, 1975). However, most of the research and development work has been centered on removal of nitrates from sewage or agricultural drainage waters, nitrate nitrogen concentration usually less than 50 g/m^3. Work was initiated at Oak Ridge National Laboratory (ORNL) in 1974 to test the use of biological nitrification in the removal of high concentrations of nitrate (in excess of 1.0 kg NO_3-N/m^3) from uranium purification waste streams. Since then, a full-scale treatment facility, a stirred reactor, has been installed at the Y-12 plant; and a pilot-plant, using a fluidized bed, has been proposed at Portsmouth Gaseous Diffusion Plant. The objective of this

manuscript is to present some applied microbiological research relating to possible constraints in biologically denitrifying certain waste streams in the nuclear industry and comparing the effectiveness of denitrification of these waste streams in three bench scale reactors, (1) a continuous flow-stirred reactor, (2) stirred bed rector, and (3) a fluidized bed reactor.

415 (CONF-800535--3) OVERVIEW OF RADIOACTIVE WASTE MANAGEMENT. Ritter, G.L. (EG and G Idaho, Inc., Idaho Falls (USA)). 29 May 1980. Contract AC07-76ID01570. 4p. NTIS, PC A02/MF A01.

From ASME Idaho section symposium; Idaho Falls, ID, USA (29 May 1980).

The question of what to do with radioactive wastes is discussed. The need to resolve this issue promptly is pointed out. Two significant events which have occurred during the Carter administration are discussed. An Interagency Review Group (IRG) on waste management was formed to formulate recommendations leading to the establishment of a National policy for managing radioactive wastes. The technical findings in the IRG report are listed. The author points out some issues not addressed by the report. President Carter issued a national policy statement on Radioactive Waste Management in February 1980. The most significant elements of this statement are summarized. The cancellation of the Waste Isolation Pilot Plant is currently meeting opposition in Congress. This and other items in the National Policy Statement are discussed.

416 (CONF-800607--27) DEPARTMENT OF ENERGY LOW-LEVEL WASTE MANAGEMENT STRATEGY. (EG and G Idaho, Inc., Idaho Falls (USA)). 1980. Contract EY-76-C-07-1570. 2p. Dep. NTIS, PC A02/MF A01.

From American Nuclear Society annual meeting; Las Vegas, NV, USA (8 Jun 1980).

The DOE strategy recognizes that public perception of low-level waste management practices is not positive. Actions are included that are aimed at opening the system to the public. A better informed public will be able to better assess the performance of the low-level waste management system.

417 (CONF-800943--(Summ.), pp 6-8) WASTE MANAGEMENT R and D FOR THE NUCLEAR FUEL CYCLE. McElroy, J.L. 1980.

From National topical meeting of fuel cycles for the 80's; Gatlinburg, TN, USA (29 Sep 1980).

RADIOACTIVE WASTE MANAGEMENT;GOVERNMENT POLICIES;RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL;TECHNOLOGY ASSESSMENT;TRANSURANIUM ELEMENTS;HIGH-LEVEL RADIOACTIVE WASTES

418 (CONF-800987--2) LEACH TESTING OF IDAHO CHEMICAL PROCESSING PLANT FINAL WASTE FORMS. Schuman, R.P. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). 1980. Contract AC07-79ID01675. 21p. NTIS, PC A02/MF A01.

From Workshop on comparative leaching behavior of radioactive waste forms; Argonne, IL, USA (3 Sep 1980).

A number of pellets and highly durable glasses prepared from nonradioactive-simulated high-level wasste calcines have been leach tested. The leach tests are patterned on the IAEA standard test and the proposed Materials Characterization Center tests. Most tests are made with static distilled water at 25, 70, 95, 250, and 350°C and in refluxing distilled water, Soxhlet, at 95°C. Leach rates are determined by analyzing the leachate by instrumental activation analysis or spectrochemical analysis and from weight loss. Leaches are run on glass using cast and core drilled cylinders, broken pieces and coarse ground material. Sample form has a considerable effect on leach rates; solid pieces gave higher leach rates than ground glass when expressed in $g/cm^2/day$. Cesium, molybdenum and weight loss leach rates of cast glass cylinders in distilled water varied from $<10^{-7}$ $g/cm^2/day$ at 25°C to approx. 10^{-3} $g/cm^2/day$ at 250°C. The leach rates in static distilled water at 95°C were considerably lower than those in refluxing distilled water, Soxhlet, at the same temperature. Even at 25°C, sodium, cesium, and molybdenum readily leached from the porous pellets, but the pellets showed no visible attack, even at 250°C.

419 (DOE/ET--0081(Revised)) ENVIRONMENTAL AND OTHER EVALUATIONS OF ALTERNATIVES FOR LONG-TERM MANAGEMENT OF STORED INEL TRANSURANIC WASTE. (Department of Energy, Washington, DC (USA). Office of Nuclear Waste Management). Dec 1979. Contract EY-76-C-07-1570. 640p. Dep. NTIS, PC A09/MF A01.

This study identifies, develops, and evaluates, in a preliminary manner, alternatives for long-term management of TRU waste stored at the Radioactive Waste Management Complex (RWMC) at the INEL. The evaluations concern waste currently at the RWMC and waste expected to be received by the beginning of the year 1985. The effects of waste that might be received after that data are addressed in an appendix. The technology required for managing the waste, the environmental effects, the risks to the public, the radiological and nonradiological hazards to workers, and the estimated costs are discussed.

420 (DOE/ET/41900--T2) DEVELOPMENT OF TAILORED CERAMICS FOR GEOLOGIC STORAGE OF NUCLEAR WASTES. QUARTERLY PROGRESS REPORT, JANUARY 1-MARCH 31, 1980. (Rockwell International Corp., Canoga Park, CA (USA). Energy Systems Group). 15 May 1980. Contract AC09-79ET41900. 38p. NTIS, PC A03/MF A01.

In the second quarter of activities on developing Tailored Ceramic waste forms for SRP waste compositions, emphasis was on the chemistry controlling the incorporation of the waste elements into the crystalline phases of the high-alumina content ceramic and the major factors affecting the consolidation process. Research on the design and synthesis of oxide and phosphate ceramic waste forms has continued with emphasis on fluorite-structure oxides and on rare earth phosphates with the monazite structure. Dissolution studies to date indicate that monazite is very stable.

421 (DOE/NE--0008) NUCLEAR WASTE MANAGEMENT PROGRAM SUMMARY DOCUMENT, FY 1981. (Department of Energy, Washington, DC (USA)). Mar 1980. 283p. Dep. NTIS, PC A13/MF A01.

The Nuclear Waste Management Program Summary Document outlines the operational and research and development (R and D) activities of the Office of Nuclear Waste Management (NEW) under the Assistant Secretary for Nuclear Energy, US Department of Energy (DOE). This document focuses on the current and planned activities in waste management for FY 1981. This Program Summary Document (PSD) was prepared in order to explain the Federal nuclear waste management and spent fuel storage programs to Congress and its committees and to interested members of the public, the private sector, and the research

community. The national energy policy as it applies to waste management and spent fuel storage is presented first. The program strategy, structure, budget, management approach, and public participation programs are then identified. The next section describes program activities and outlines their status. Finally, the applicability of departmental policies to NEW programs is summarized, including field and regional activities, commercialization plans, and environmental and socioeconomic implications of waste management activities, and international programs. This Nuclear Waste Management Program Summary Document is meant to serve as a guide to the progress of R and D and other energy technology programs in radioactive waste management. The R and D objective is to provide the Nation with acceptable solutions to short- and long-term management problems for all forms of radioactive waste and spent fuel.

422 (DOE/NV/00410--54) AREA 5 RADIOACTIVE WASTE MANAGEMENT SITE SAFETY ASSESSMENT DOCUMENT. Horton, K.K.; Kendall, E.W.; Brown, J.J. (Reynolds Electrical and Engineering Co., Inc., Las Vegas, NV (USA)). Feb 1980. Contract AC08-76NV00410. 75p. Dep. NTIS, PC A04/MF A01.

The Area 5 Radioactive Waste Management Safety Assessment Document evaluates site characteristics, facilities and operating practices which contribute to the safe handling and storage/disposal of radioactive wastes at the Nevada Test Site. Physical geography, cultural factors, climate and meteorology, geology, hydrology (with emphasis on radionuclide migration), ecology, natural phenomena, and natural resources are discussed and determined to be suitable for effective containment of radionuclides. Also considered, as a separate section, are facilities and operating practices such as monitoring; storage/disposal criteria; site maintenance, equipment, and support; transportation and waste handling; and others which are adequate for the safe handling and storage/disposal of radioactive wastes. In conclusion, the Area 5 Radioactive Waste Management Site is suitable for radioactive waste handling and storage/disposal for a maximum of twenty more years at the present rate of utilization.

423 (DOE/SR-WM--79-1(Suppl.)) DEFENSE TRANSURANIC WASTE AT THE SAVANNAH RIVER PLANT, AIKEN, SOUTH CAROLINA. SUPPLEMENTAL ALTERNATIVES FOR LONG-TERM MANAGEMENT. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Aug 1980. Contract AC09-76SR00001. 53p. NTIS, PC A04/MF A01.

Costs and risks are estimated for four supplementel alternatives for the long-term management of retrievably stored defense transuranic solid waste now stored in trenches and on pads at the Savannah River Plant. These alternatives supplement the twelve alternatives described in Reference 1, Alternatives for Long-Term Management of Defense Transuranic Waste at the Savannah River Plant, Aiken, South Carolina, by adding the use of the planned Alpha Waste Incinerator and Alpha Disassembly and Decontamination facilities to process retrievable stored TRU solid waste. The four supplemental alternatives are compared with three of the twelve alternatives described in Reference 1.

424 (DOE/SR-WM--79-3(Rev.4/80)) LONG-TERM HIGH-LEVEL WASTE TECHNOLOGY PROGRAM. (Department of Energy, Aiken, SC (USA). Savannah River Operations Office). Apr 1980. 43p. NTIS, PC A03/MF A01.

The Department of Energy (DOE) is conducting a comprehensive program to isolate all US nuclear wastes from the human environment. The DOE Office of Nuclear Energy - Waste (NEW) has full responsibility for managing the high-level wastes resulting from defense activities and additional responsiblity for providing the technology to manage existing commercial high-level wastes and any that may be generated in one of several alternative fuel cycles. Responsibilities of the Three Divisions of DOE-NEW are shown. This strategy document presents the research and development plan of the Division of Waste Products for long-term immobilization of the high-level radioactive wastes resulting from chemical processing of nuclear reactor fuels and targets. These high-level wastes contain more than 99% of the residual radionuclides produced in the fuels and targets during reactor operations. They include essentially all the fission products and most of the actinides that were not recovered for use.

425 (DOE/SR-WM--80-1) SAVANNAH RIVER WASTE MANAGEMENT PROGRAM PLAN. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Apr 1980. Contract EY-76-C-09-0001. 338p. Dep. NTIS, PC A15/MF A01.

This document provides the program plan as requested by the Savannah River Operations Office of the Department of Energy. The plan was developed to provide a working knowledge of the nature and extent of the waste management programs being undertaken by Savannah River contractors for the Fiscal Year 1980. In addition, the document projects activities for several years beyond 1980 to adequately plan for safe handling and storage of radioactive wastes generated at Savannah River, for developing technology to immobilize high-level radioactive wastes generated and stored at SR, and for developing technology for improved management of low-level solid wastes.

426 (DOE/TIC--10294) MANAGEMENT OF RADIOACTIVE WASTES. Blomeke, J.O. (Oak Ridge National Lab., TN (USA)). Nov 1979. Contract W-7405-ENG-26. 33p. Dep. NTIS, PC A03/MF A01.

This paper reviews the nature and characteristics of the radwastes, status of the work that has been done, options that are available in waste management, and plans and expectations for the near future. (DLC)

427 (DP--78-125-4) WASTE MANAGEMENT PROGRAM TECHNICAL PROGRESS REPORT, OCTOBER-DECEMBER 1978. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Jan 1980. Contract EY-76-C-09-0001. 156p. Dep. NTIS, PC A08/MF A01.

This quarterly report provides current information on operations and development programs for the management of radioactive wastes from the operation of the Savannah River Plant. The operational status and research progress are reported for the liquid waste treatment and storage facilities, the incinerator for solid waste, the solidification of waste in borosilicate glass, and siting of subsurface storage facilities.

428 (DP--79-125-1) WASTE MANAGEMENT PROGRAM TECHNICAL PROGRESS REPORT, JANUARY-MARCH 1979. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Jan 1980. Contract EY-76-C-09-0001. 79p. Dep. NTIS,

PC A05/MF A01.
This quarterly report provides current informaton on operations and development programs for the management of radioactive wastes from the operation of the Savannah River Plant. The operational status and research progress are reported for the liquid waste treatment and storage facilities, the incinerator for solid waste, the solidification of waste in borosilicate glass, and siting of subsurface storage facilities.

429 (DP--79-125-2) WASTE MANAGEMENT PROGRAM. TECHNICAL PROGRESS REPORT, APRIL-JUNE 1979. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant). May 1980. Contract AC09-76SR00001. 37p. NTIS, PC A03/MF A01.
This quarterly report provides current information on operations and development programs for the management of radioactive wastes from the operation of the Savannah River Plant. The operational status and research progress are reported for the liquid waste treatment and storage facilities, the incinerator for solid waste, the solidification of waste in borosilicate glass, and siting of subsurface storage facilities.

430 (DP--79-125-3) WASTE MANAGEMENT PROGRAM TECHNICAL PROGRESS REPORT, JULY-SEPTEMBER 1979. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Jul 1980. Contract AC09-76SR00001. 50p. NTIS, PC A03/MF A01.
This quarterly report provides current information on operations and development programs for the management of radioactive wastes generated at the Savannah River Plant. The operational status and research progress are reported for the surveillance and maintenance and waste tank evaluation portions of the SR Interim Waste Program, for the process and equipment development studies of the Long-Term HLW Management R and D Program, and for the Office of Nuclear Waste Isolation studies of Other Waste Programs.

431 (DP--79-125-4) WASTE MANAGEMENT PROGRAM. TECHNICAL PROGRESS REPORT, OCTOBER-DECEMBER 1979. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Jul 1980. Contract AC09-76SR00001. 54p. NTIS, PC A04/MF A01.
This quarterly report provides current information on operations and development programs for the management of radioactive wastes from the operation of the Savannah River Plant. The research and development progress and operational status are reported for separation and concentration studies, process and equipment development, surveillance and maintenance of waste tanks, waste concentration, waste tank evaluation, tank replacement/waste transfer (formerly waste tank retirement), and development of criteria for the selection of sites for storage of waste forms produced in the Defense Waste Processing Facility.

432 (DP--80-125-1) WASTE MANAGEMENT PROGRAM TECHNICAL PROGRESS REPORT, JANUARY-MARCH 1980. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Sep 1980. Contract AC09-76SR00001. 77p. NTIS, PC A05/MF A01.
This quarterly report provides current information on operations and development programs for the management of radioactive wastes from operation of the Savannah River Plant. Process and equipment development studies are reported in the Long-Term Management Technology Program. The following studies are reported for Interim Waste Operations: surveillance and maintenance, waste concentration, low-level effluent waste, waste tank evaluation, and tank replacement/waste transfer (formerly waste tank retirement). The development of criteria for the selection of sites for storage of waste forms produced in the Defense Waste Processing Facility is described in the commercial waste program.

433 (DP--1488(Add.)) ELECTRICAL RESISTIVITIES OF GLASS MELTS CONTAINING SIMULATED SRP WASTE SLUDGES. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1978. Contract EY-76-C-09-0001. 6p. Dep. NTIS, PC A02/MF A01.
This addendum corrects the resistivities for Frit 21 glass melts for the resistance developed at high temperatures by the Pt wires in the resistivity probe. (DLC)

434 (DP-MS--79-55) CALCULATION OF RADIONUCLIDES IN THE DEFENSE WASTE PROCESSING FACILITY. Chandler, J.R.; Finch, D.R.; Becker, G.W. Jr. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1979. Contract EY-76-C-09-0001. 15p. (CONF-791103--51). Dep. NTIS, PC A02/MF A01.
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
SHIELD system calculations yield the isotopic inventory, activity, decay heat, and multigroup radiation source spectra for all of the DWPF process streams and for the solidified waste products. One application of these results is the analysis of the radiation emissions of the stored waste. Another application is the analysis of time dependent properties of the solidified waste. Initially, gamma radiation from /sup 137m/Ba decay contributes approximately one-third of the total energy. As the ^{137}Cs content decreases, the gamma contribution declines. The major producers of beta radiation are the ^{90}Sr, ^{137}Cs, and ^{144}Pr decay chains. As the glass age increases, however, the contribution from the actinides dominates increasingly. The inital activity level in the glass is 2000 curies per gallon. The activity and decay heat decrease by a factor of 2 in about fifteen years, and by a factor of 4 in fifty years. A similar analysis was made for the salt cake. Initially, the salt cake produces 0.01 watts per gallon from 2.4 curies per gallon of activity. In five years, the activity is reduced by a factor of 19, and the decay heat declines by a factor of 24. After ten years, both the activity and decay heat levels are less than 1% of their initial values. 7 figures, 4 tables.

435 (DP-MS--80-73) NATIONAL PERSPECTIVE ON WASTE MANAGEMENT. Crandall, J.L. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract AC09-76SR00001. 47p. (CONF-800655--30). NTIS, PC A03/MF A01.
From 21. annual meeting of the Institute of Nuclear Materials Management; Palm Beach, FL, USA (30 Jun 1980).
Sources of nuclear wastes are listed and the quantities of these wastes per year are given. Methods of processing and disposing of mining and milling wastes, low-level wastes, decommissioning wastes, high-level wastes, reprocessing wastes, spent fuels, and transuranic wastes are discussed. The costs and safeguards involved in the management of this radioactive wastes are briefly covered in this

presentation. (DC)

436 (DPSPU--79-30-11) DEMONSTRATION OF RADIOACTIVE SLUDGE REMOVAL FROM SRP STORAGE TANK. Elder, H.H. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Sep 1979. Contract EY-76-C-09-0001. 18p. (CONF-791103--36). Dep. NTIS, PC A02/MF A01.

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

A remote process for removing radioactive sludge from underground waste tanks was demonstrated. Long-shafted centrifugal pumps circulated liquid waste within the tank to suspend the sludge, and the resulting slurry was pumped from the tank. Over 98% of the sludge was removed, while only 1.4 volumes water per volume sludge was added to waste inventory. Cleaning results were determined by remote wide-angle photographic and periscopic inspections. Demonstration data are being used to design facilities for waste removal from an additional 22 SRP waste tanks.

437 (DPST--76-303) RISK OF EARTHQUAKE DAMAGE TO WASTE MANAGEMENT FACILITIES. Poe, W.L. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 23 Jun 1976. Contract EY-76-C-09-0001. 53p. Dep. NTIS, PC A04/MF A01.

This report presents calculated results of the risk of earthquake damage to the solidification and RSSF steps of the long-term waste management. The consequences and risks presented in this report are probably overestimated because of the assumptions made. The earthquake risk for the solidification facility is 6.3×10^5/year. About two thirds of this risk is onplant risk that results from structural damage to the facilities. The other third of the risk is also onplant risk associated with cleanup of the plant site following the earthwuake. Only $1.10/year of the risk results from spread of contamination off plant and the ensuing population dose commitment. The dollar risk included the penalty resulting from 5.5×10^{-3} deaths per year due to earthquake damage. These deaths include instantaneous deaths to plant personnel and statistical deaths from radiation effects to the population exposed to released radionuclides. The risk for the RSSF facility is 4.2×10^5/year. Essentially all of the risk is onplant risk resulting from structural damage to the facility. Off-plant risk is negligible (4×10^{-16}/year) due to the high leach resistance of the waste form, its monolithic structure, and its containment. The risk of death from RSSF operations, caused by earthquake is essentially all onplant deaths and amounts to 1.3×10^{-3} deaths/year or about 25% of that given for the solidification facility.

438 (DPST--78-150-1) GAS PRODUCTION FROM ALPHA RADIOLYSIS OF CONCRETE CONTAINING TRU INCINERATOR ASH. PROGRESS REPORT 1, APRIL 1-JULY 31, 1978. Bibler, N.E. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1978. Contract AC09-76SR00001. 22p. NTIS, PC A02/MF A01.

This is the first progress report of an experimental study of gas evolution from alpha radiolysis of concrete containing ash from the incineration of transuranic (TRU) waste. During this experimental period, concretes containing simulated TRU incinerator ash were prepared from high alumina cement (HAC), from Portland Type I cement (I), and from Portland Type I pozzolanic cement (I-P). ^{238}Pu, an intense alpha emitter, was added to the concretes to produce radiolysis. Then, gas pressures were monitored, and gas compositions were determined. Only hydrogen was produced; its production was calculated as molecules per 100 eV of alpha energy absorbed. This quantity, $G(H_2)$, can be used to calculated H_2 production rates from acutal waste. Based on values of $G(H_2)$ determined in this period (0.30 to 0.65 molecules/100 eV), production rates would range from 660 to 1400 cm^3 of H_2 at STP per year for each curie of alpha activity. Other results were: (1) lowest values for $G(H_2)$ were obtained with concrete made from high alumina content; (2) the presence of ash in the concrete increased $G(H_2)$; (3) no effect of dose rate on $G(H_2)$ in the range 1.0×10^{16} to 1.2×10^{17} eV/min/g of concrete was detected; (4) there was also no effect on $G(H_2)$ of the pH of the water used to make the concrete; (5) presence of an organic complexing agent in the concrete decreased $G(H_2)$ and caused O_2 to be radiolytically consumed; and (6) lowering the water content, heating the concrete, lowered the $G(H_2)$.

439 (EGG-PHYS--5084) ASSESSMENT OF CRITICALITY MONITORING TECHNIQUES FOR A TRANSURANIC WASTE TREATMENT FACILITY. Vegors, S.H. Jr.; Nieschmidt, E.B.; Tsang, F.Y. (EG and G Idaho, Inc., Idaho Falls (USA)). Jul 1980. Contract AC07-76ID01570. 101p. NTIS, PC A06/MF A01.

Passive monitoring techniques were studied and compared for determining the amount of fissile material in transuranic (TRU) waste while in the Transuranic Waste Treatment Facility (TWTF). The passive counting techniques investigated were gamma ray, neutron, x-ray, and alpha particle. In addition, coincidence techniques using the correlation in time between the neutrons and/or gamma rays emitted by fissioning nuclei in a chain reaction were considered. Recommendations are given for the best method of monitoring the waste within the TWTF.

440 (EGG-PHYS--5085) PHOTON INTERROGATION ANNUAL REPORT FOR FY 1979. Nieschmidt, E.B.; Johnson, L.O.; Lawrence, R.S.; Vegors, S.H. Jr. (EG and G Idaho, Inc., Idaho Falls (USA)). Mar 1980. Contract EY-76-C-07-1570. 88p. Dep. NTIS, PC A05/MF A01.

Summaries of experimental information and information from vendors is presented to show the adequacy of the photon interrogation technique for transuranic waste assay. An instrument system is described which has high immunity to gamma flash and has good high count rate capabilities. Comparison of the progress of the program with a schedule presented at its inception is presented.

441 (EGG-RE-M--78-034) MIGRATION OF TRU-CONTAINING SLAG INTO CANDIDATE REFRACTORIES FOR WASTE MANAGEMENT. Seymour, W.C. (EG and G Idaho, Inc., Idaho Falls (USA)). Nov 1978. Contract EY-76-C-07-1570. 24p. Dep. NTIS, PC A02/MF A01.

Results of initial tests on transuranic migration into commercial refractories are reported. Five castable refractories and a plastic-bonded refractory were tested using the cup test method. Initial results indicate that castable materials will not survive conditions expected in the slagging pyrolysis unit; plastic refractories appear to have better performance. The major mechanism of migration into the tested refractories is pore penetration. Al_2O_3 and Al_2O_3-Cr_2O_3 phases appear resistant to chemical diffusion of

transuranics. 2 figures, 16 tables.

442 (EGG-WM--5233) DEVELOPMENT OF CRITERIA AND STANDARDS FOR MANAGEMENT OF LOW-LEVEL RADIOACTIVE WASTE. Grey, A.E.; Falconer, K.L. (EG and G Idaho, Inc., Idaho Falls (USA)). Aug 1980. Contract AC07-76ID01570. 37p. NTIS, PC A03/MF A01.

The basic need for criteria and standards for radioactive waste management is to ensure compliance with Federal and State regulations applicable to this activity. In addition, criteria and standards can establish the parameters by which a radioactive waste disposal site is selected, the form in which the waste is to be disposed, how a disposal site is to be operated, and how that site is to be closed when it reaches the end of its useful life. For developing criteria and standards, this report discusses the nature of low-level radioactive waste and the role government agencies play in regulating its management. It describes subject areas for which criteria and standards could be developed, current and evolving requirements, and future suggested analyses.

443 (ENICO--1012) TECHNICAL QUARTERLY PROGRESS REPORT, JANUARY 1-MARCH 31, 1979. Plung, D.L. (ed.). (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Sep 1979. Contract AC07-79ID01675. 165p. Dep. NTIS, PC A08/MF A01.

Special Materials Production: results are presented on the long-term management of ICPP high-level wastes, on ICPP plant process improvements, on advanced graphite fuels reprocessing, on ICPP waste management development, on technical support tc the Waste Calcining Facility and to the New Waste Calcining Facility, on effluent monitoring methods evaluation and development, and on technical program improvement. Presented are results on pelleted waste form development, actinide removal, calcine solids retrieval, and on a programmatic environmental impact statement. In addition, work on uranium accountability, zirconium fuel recovery, waste flowsheet development, and a mathematical model of ICPF solvent extraction columns is reported. Fuel Cycle Research and Development: results on krypton-85 storage development is reported. In particular, work on krypton-85 process and storage materials testing, zeolite encapsulation storage, and the long-term testing of krypton storage media are reported. Other Projects Supporting Energy Development: results reported include work on the nuclear materials security program, the in-plant source term program, on burnup methods for FBR fuels, and on specialized fuel research-analytical support. Other results include research on analytical methods, and on OKLO studies. In addition, results from the boiling water reactor off-gas systems evaluation are reported.

444 (ENICO--1013) TECHNICAL QUARTERLY PROGRESS REPORT, APRIL 1-JUNE 30, 1979. Plung, D.L. (ed.). (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Jan 1980. Contract AC07-79ID01675. 131p. Dep. NTIS, PC A07/MF A01.

Special Materials Production: results are reported on work done on long-term management of ICPP high-level wastes; this work includes post-calcination treatment, actinide removal, calcine solids retrieval and handling, and work on a Draft Programmatic Environmental Impact Statement. Results are also reported on plant process improvement, waste management development, and technical support to the New Waste Calcining Facility. Results of work done on the evaluation of HEPA filter test methods, and the development of a continuous alpha monitor are reported, as is work on technical program improvement. Fuel Cycle Research and Development: In the krypton-85 storage development program, results of work done are reported on: krypton zeolite encapsulation, krypton pressurized cylinders, and krypton storage development. Other Projects Supporting Energy Development: In the nuclear materials security program results of work done include that on the material control test and evaluation system, sensor and instrument development, and the portable mass spectrometer development. Other results reported include work done on the in-plant source term measurement program, burnup methods for fast breeder reactor fuels, and on specialized fuel research - analytical support. As part of the research on analytical methods, work on uranium separation for isotope dilution mass spectrometry and hexone volatility studies is reported. Results from Oklo studies are also reported.

445 (ENICO--1033) TECHNICAL QUARTERLY PROGRESS REPORT, JULY 1-SEPTEMBER 30, 1979. Plung, D.L. (ed.). (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Mar 1980. Contract AC07-79ID01675. 152p. Dep. NTIS, PC A08/MF A01.

Results are reported on the long-term waste management of ICPP high-level wastes, plant process improvement, waste management development, technical support to the NWCF, effluent monitoring methods evaluation and development, and technical program improvement. Presented are results on post-calcination of high-level wastes, uranium accountability development, fluorinel calcination flowsheet development, development of a continuous alpha monitor and results on process evaluation and monitoring. In addition, results of work on the Idaho Programmatic Environmental Impact Statement and on the evaluation of HEPA filter test methods are presented. In the krypton-85 storage development program, results are reported on krypton zeolite encapsulation and on krypton storage development. This work includes a conceptual design and cost estimate for a commercial-scale krypton encapsulation facility. Results of work on the nuclear materials security program are reported; this includes work on materials control test and evaluation system and on portable mass spectrometer development. Other results reported include work on the reactor source term program, burnup methods for fast breeder reactor fuels, absolute thermal fission yields and specialized fuel research - analytical support. Results from research on analytical methods include results on flame atomic absorption spectrophotometry and the analysis of phosphorous by a new colorimetric procedure. In addition, results from work on OKLO studies are reported.

446 (EPRI-NP--1494) ACTIVITY LEVELS OF TRANSURANIC NUCLIDES IN LOW-LEVEL SOLID WASTSE FROM US POWER REACTORS. FINAL REPORT. Cline, J.E.; Wright, K.L.; Hollcroft, J.W. (Science Applications, Inc., Rockville, MD (USA). Nuclear Environmental Services Div.). Aug 1980. 185p. NTIS, PC A09/MF A01.

This report, the final report on the project, describes the sampling, analytical techniques and results of the nuclide analyses of low-level waste samples from operating nuclear power plants. The complete nuclide data base is given in the report. Distributions of

measured ^{239}Pu concentratiens are presented for the principal sample categories. Median values of transuranic and other nuclide concentrations are calcuated for the same categories from the twenty-five plants included in the study. Samples were collected over a period of three and a half years. Median concentrations of ^{239}Pu are considerably below the ten nanocuries per gram in each waste category. A correlation has been found to exist between the measured concentrations of plutonium and cesium. This correlation can be used to estimate plutonium concentrations indirectly through gamma-ray spectrometry.

447 (EUR--6027) MONITORING OF PLUTONIUM CONTAMINATED SOLID WASTE STREAMS. CHAPTER IV: PASSIVE NEUTRON ASSAY. Birkhoff, G.; Bondar, L. (Commission of the European Communities, Ispra (Italy). Joint Research Centre). 1978. 76p. Dep. NTIS (US Sales Only), PC A05/MF A01.

The fundamentals of the passive neutron technique for the non destructive assay of plutonium bearing materials are summarized. A reference monitor for the passive neutron assay of Pu contaminated solids is described in terms of instrumental design principles and performances. The theoretical model of this reference monitor with pertinent nuclear data and functions for the interpretation of experimental data is given.

448 (HEDL-TME--79-15) DIVISION OF WASTE MANAGEMENT PROGRAMS. PROGRESS REPORT, JULY-DECEMBER 1978. Lerch, R.E.; Allen, C.R.; Richardson, G.L. (comps.). (Hanford Engineering Development Lab., Richland, WA (USA)). Jul 1979. Contract EY-76-C-14-2170. 86p. Dep. NTIS, PC A05/MF A01.

This is the eleventh progress report on Division of Waste Management programs. The report describes progress in the second half of 1978 on the following programs: intermediate-level waste solidification, chemical processing of combustible solid waste, and application of acid digestion to commercial wastes. The latter two programs were combined in October 1978 into a single program, acid digestion of combustible wastes.

449 (IAEA-R--1898-F) WORK WITHIN THE COORDINATED PROGRAMME ON ENVIRONMENTAL EVALUATION AND HAZARD ASSESSMENT OF THE SEPARATION OF THE ACTINIDES FROM THE HIGH-LEVEL WASTE FROM FUEL REPROCESSING FOLLOWED BY EITHER TRANSMUTATION OR SEPARATE DISPOSAL. FINAL REPORT FOR THE PERIOD 1 NOVEMBER 1976 - 31 OCTOBER 1977. Haug, H.O. (International Atomic Energy Agency, Vienna (Austria)). Apr 1978. 8p. NTIS (US Sales Only), PC A02/MF A01.

Reduction of plutonium losses in non-high-level wastes streams from fuel reprocessing is important in the conventional post-fission operations and would be essential in any actinide partitioning alternatives. The balance of input process streams and output waste streams in present reprocessing technology is compared to the balance after process modifications based on recent experimental developments. The results are showing that by the introduction of new electrochemical redox processes and non-salt-forming process chemicals the routinely generated intermediate-level waste streams from PUREX reprocessing can be avoided. Plutonium-bearing waste streams can be extensively recycled within the chemical processing.

450 (INFCE/DEP/WG--7/15) RADIOLOGICAL HEALTH AND SAFETY IMPACT. (INFCE (Argentina)). Sep 1979. 90p. NTIS (US Sales Only), PC A05/MF A01.

The document provides estimates of the radiological impact of an adequate waste management system in terms of collective effective dose equivalent commitments. The assessments are carried out for radioactive wastes generated in every step of seven model fuel cycle strategies. The modelling covers mainly technical and geological isolation, fresh water pathways and ocean pathways, while air pathways are taken into account for mill tailings and for sediment resuspension. The resulting collective dose commitments are normalized per unit electric energy generated, and perspective is provided by evaluating the periods of time during with the same collective dose would be delivered by the natural radiation sources. Maximum doses in stylised critical groups and ''per caput'' doses in the population are also estimated.

451 (INFCE/DEP/WG--7/22) IMPACT FACTORS ON RADIOACTIVE WASTE MANAGEMENT. LEGAL AND INSTITUTIONAL MATTERS. Dejonghe, P. (INFCE (Belgium)). Mar 1979. 17p. NTIS (US Sales Only), PC A02/MF A01.

This paper deals with clear definitions of the responsibilities of all parties involved on short and long-term, adequate financial assurance and some international standards with regard to the specifications on conditioning, storage and disposal. Furthermore, a light is thrown on the specific institutional problems in radioactive waste management, that might arise from the application of the various fuel cycles considered in the INFCE Study.

452 (INIS-mf--4789, pp 11B-14B) ESCAPE PROBABILITY OF GAMMA FROM RADIOACTIVE CONTAMINATED SOLID WASTE. Bar-Ilan, A.; Knoll, A.; Notea, A.; Segal, Y. (Technion-Israel Inst. of Tech., Haifa. Dept. of Nuclear Science). 1978.

From Joint annual meeting of the Israel Nuclear Societies Ben Gurion University of the Negev; Beersheba, Israel (28 Dec 1978).

CESIUM 137;COBALT 60;COMPARATIVE EVALUATIONS; CONTAINERS;CONTAMINATION;EQUATIONS;GAMMA RADIATION;RADIATION DOSE DISTRIBUTIONS; RADIATION SOURCES;SOLID WASTES;RADIOACTIVE WASTES

453 (INIS-mf--5303) NUCLEAR WASTE MANAGEMENT CENTRE. (Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen m.b.H. (DWK), Hannover (Germany, F.R.)). [nd]. 31p. (In German). Dep. NTIS (US Sales Only), PC A03/MF A01.

Popular description of the nuclear waste management centre.

454 (INIS-mf--5372, pp 12-13) DETERMINATION OF ^{233}U CONTENT IN SEALED CONTAINERS AND WASTE PACKAGES BY GAMMA COUNTING. Dingankar, M.V.; Joshi, P.P. (Bhabha Atomic Research Centre, Bombay (India). Health Physics Div.); Kulkarni, L.V. (Bhabha Atomic Research Centre, Bombay (India). Neutron Physics Section). 1979.

From 6. Indian Association for Radiation Protection conference; Bombay, India (7 Mar 1979).

CONTAINERS;GAMMA DETECTION;QUANTITY RATIO; RADIOACTIVE WASTES;RADIOASSAY;SCINTILLATION COUNTERS;THALLIUM 208;THORIUM 232;URANIUM 232; URANIUM 233

455 (INIS-mf--5570) RESEARCH ON DESACTIVATION OF LIQUID, SOLID AND GASEOUS RADIOACTIVE WASTES AND DECONTAMINATION OF SURFACES. PART 1. PROCESSING OF LIQUID RADIOACTIVE WASTES OF LOW AND MEDIUM ACTIVITY. (Sovet Ehkonomicheskoj Vzaimopomoshchi, Moscow (USSR). Postoyanniya Komissiya po Ispol'zovaniyu Atomnoj Ehnergii v Mirnykh Tselyakh). 1978. 143p. (In Russian). (CONF-761260--(Pt.1)). NTIS (US Sales Only), PC A07/MF A01.

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Separate abstracts were prepared for individual papers. (DLC)

456 (INIS-mf--5570, pp 9-14) ACTIVITIES OF THE IAEA IN THE FIELDS OF RADIOACTIVE WASTES HANDLING. Richter, D. (International Atomic Energy Agency, Vienna (Austria)). 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

One of the main problems in the development of nuclear power production is desactivation of radioactive wastes, especially those of high activity and alpha-emitting. The IAEA program on the radioactive wastes management is dealing with wastes from nuclear power plants and nuclear fuel cycle installations. This programm includes: wastes processing and disposal; nuclear power production and its influence in environment; shut down and desactivation of nuclear installations; technical and economic aspects of the radioactive wastes processing and disposal. IAEA is running research programs in the fields: of management of radioactive wastes from the processes of mining and processing of uranium ores, especially on migration of radium in environment; on management of wastes from the processes of uranium purification, enrichment and reactor fuel fabrication; on the alpha-emitting and high activity wastes from reactor fuel reprocessing; on radioactive wastes disposal in ground, geological formations and sea; on radioactivity leakage in environment; on the radionuclides behaviour in environment; on radioactive wastes management in regional fuel cycle centers; on desactivation of nuclear installations. In future international cooperation can be gained in the fields of safety of radioactive wastes burial sites; wastes solidification methods; evaluation of the environment contamination by liquid and gaseous radioactive wastes; trapping of krypton-85, iodine and aerosols from gaseous wastes.

457 (INIS-mf--5571, pp 41-47) INVESTIGATION OF HYDROGEN AND METHANE PRODUCTION WHEN IRRADIATION OF BITUMEN B45 AND BITUMEN B45 MIXED WITH SOLID SUBSTANCES. Pretschner, G.; Dagen, A. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Radiolysis of the bitumen components on influence of ionizing radiation causing gases generation, chiefly hydrogen and methane has been investigated. To avoid formation of explosive mixtures of some gases, for example, hydrogen with air, and to avoid heating of mixtures of bitumen and radioactive wastes because of the heat generation during decay, there is necessary to have cooling of bituminized wastes and removal of the radiolysis products in the stores for bituminized radioactive wastes with high specific activity. Investigations has shown that with specific activity higher than 10 Ci/kg heat removal and removal of radiolysis products were necessary. Bitumen B45 and bitumen compounds based on it has been exposed both to external irradiation by cobalt-60 and to internal irradiation by incorporated into bitumen and bitumen compounds strontium-90, cesium-137 and polonium-270. Internal irradiation is modeling real conditions of bituminized radioactive wastes burial. Parameters of the bitumen B45 are given. After irradiation, by means of the gas chromatography method it has been determined that the main components of the gases produced were hydrogen and methane. Volume of hydrogen and methane produced, depending on absorbed dose has been determined and coefficients of the hydrogen and methane production have been calculated. The results of investigations of methane and hydrogen production coefficients dependance from different conditions during external and internal irradiation are given.

458 (INIS-mf--5571, pp 83-85) TECHNICAL AND ECONOMIC ESTIMATIONS OF LIQUID WASTES LOCALIZATION CONFORMABLY TO THE LENINGRAD NUCLEAR POWER PLANT. Bukina, I.G. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

The problem of localization of liquid radioactive wastes conformably to the project of the Leningradian nuclear power plant is considered. Technical and economic estimation of the methods were considered conformably to the composition of the nuclear plant wastes with in a year of operation cited in the paper. Estimations has been made on two variants of technology. The first variant, - storage of liquid radioactive concentrates in tanks and the second variant, - solidification of liquid wastes by bituminization with subsequent burial of the salt-bitumen compound. Economic calculations have been done in confirmity with methodology accpted at the meeting of specialists from the CMEA member - countries in September 1968. Comparative technical and economic indices of localization of liquid radioactive wastes by the methods mentioned conformably to the project of the Leningradian nuclear power plant are given. It has been shown that in spite of the fact that bituminization were more complicated technological process in comparison to the storage of liquid radioactive concentrates in tanks, as to the safety of storage and technical and economic indices were cocerned the method of bituminization had considerable advantages.

459 (INIS-mf--5574, pp 28-32) EXPERIMENTAL DEVICES FOR STANDARD TESTING OF FILTERS DESIGN IN THE STATE BOARD FOR NUCLEAR SAFETY AND RADIATION PROTECTION OF THE GERMAN DEMOCRATIC REPUBLIC. Ullmann, W.; Przybrowski, S. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

The design of testing stand for the standard tests of aerosol filters is described. The aerosol, containing crystals of the sodium chloride is used as a test-aerosol. The aerosols measurements is based on the principle of the light emission of sodium vapors excited in the flame of a hydrogen burner. The methods are stated of the sodium chloride aerosols

production; determination of the dynamic resistance of the filter tested and determination of the air expenditure.

460 (INKA-Conf--78-396-000, pp 127-131) CHOICE OF OPTIMUM PACKING FOR THE TRANSPORT AND STORAGE OF RADIOACTIVE WASTES. Engelmann, H.J. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Abt. zur Behandlung Radioaktiver Abfaelle). 1978. (In German).
From International VGB conference on power plant auxiliaries with information exhibition; Essen, F.R. Germany (8 Mar 1978).
This report compares the possibilities of using various types of containers and shielding, in order to be able to determine the optimum packing for any given type of waste. The target here is to achieve the maximum possible amount of radio-activity per unit of packing, while complying with the regulations which apply for transport and storage. The producer of waste can save costs in processing, transport and final storage. The storage space in the final store is used to the optimum extent.

461 (K/OP--248) PLOTLIB: A COMPUTERIZED NUCLEAR WASTE SOURCE-TERM LIBRARY STORAGE AND RETRIEVAL SYSTEM. Marshall, J.R.; Nowicki, J.A. (Oak Ridge Gaseous Diffusion Plant, TN (USA)). 31 Mar 1978. Contract W-7405-ENG-26. 83p. NTIS, PC A05/MF A01.
The PLOTLIB code was written to provide computer access to the Nuclear Waste Source-Term Library for those users with little previous computer programming experience. The principles of user orientation, quick accessibility, and versatility were extensively employed in the development of the PLOTLIB code to accomplish this goal. The Nuclear Waste Source-Term Library consists of 16 ORIGEN computer runs incorporating a wide variety of differing light water reactor (LWR) fuel cycles and waste streams. The typical isotopic source-term data consist of information on watts, curies, grams, etc., all of which are compiled as a function of time after reactor discharge and unitized on a per metric ton heavy metal basis. The information retrieval code, PLOTLIB, is used to process source-term information requests into computer plots and/or user-specified output tables. This report will serve both as documentation of the current data library and as an operations manual for the PLOTLIB computer code. The accompanying input description, program listing, and sample problems make this code package an easily understood tool for the various nuclear waste studies under way at the Office of Waste Isolation.

462 (KBS-TR--113, pp 1-19) CHEMICAL STABILITY OF CERAMICS. Carlsson, R.; Hermansson, L. (Svenska Silikatforskningsinstitutet, Goeteborg (Sweden)). Sep 1978. (In Swedish).
Studies of ceramic materials for encapsulation of high-active waste.
In this literature survey the chemical stability of ceramics in acid, neutral and basic hydrated environment has been studied. Furthermore different methods which are useful for the study of corrosion of ceramics are listed.

463 (KBS-TR--113, pp 1-16) INSPECTION OF 'LEACH TESTED' CERAMICS SPECIMENS. Lehtinen, B. (Institutet foer Metallforskning, Stockholm (Sweden)). Sep 1978. (In Swedish).
Studies of ceramic materials for incapsulation of high-active waste.
''Leach tested'' specimens of LD-porcelain, corderite, Corning pyro-ceramics and aluminium oxide have been examined in the SEM. Damage due to the leaching treatment is apparent on the surfaces of all samples, with the exception of the aluminium oxide specimen treated 30 days in water (pH 8,5, 90 deg C). After 100 days however, some indication of leaching is also observed on this material.

464 (KBS-TR--113, pp 1-27) LEACHING OF CERAMICS UNDER SIMULATED DISPOSAL CONDITIONS. Svensson, B.M.; Dahl, L. (Aktiebolaget Atomenergi, Studsvik (Sweden)). Sep 1978. (In Swedish).
Studies of ceramic materials for incapsulation of high-active waste.
Leaching tests have been performed with specimens of LD-porcelain, corderite and borning material, in simulated ground water as well as in day. The weights of all the specimens except the borning material increased after 10-30 days of leaching in water. After leaching in clay the weights decreased for all the elements. Furthermore the rate of corrosion of the borning material was determined to be 11+-6 μ per year between the 40th and the 150th day.

465 (KBS-TR--113) STUDIES OF CERAMIC MATERIALS FOR INCAPSULATION OF HIGH-ACTIVE WASTE. Hyden, L.; Bergstroem, L.; Carlsson, R.; Hermansson, L.;Svensson, B.M.; Dahl, L.; Lehtinen, B.; Leygraf, C.; Hultquist, G.; Olefjord, I. (Kaernbraenslesaekerhet, Stockholm (Sweden)). Sep 1978. 170p. (In Swedish). Dep. NTIS (US Sales Only), PC A08/MF A01.
Individual papers were abstracted separately.

466 (KFK--2519) ANNUAL REPORT 1976. Krause, H. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Entsorgungstechnik; Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Wiederaufarbeitung und Abfallbehandlung). Dec 1977. 139p. (In German). (PWA--43/77). Dep. NTIS (US Sales Only), PC A08/MF A01.
This report is a review over the results of the R + D work of the Waste Management Research Department (ABRA) in 1976. As in the two past years the main objectives were laboratory experiments, process development and remote handling experiments on the solidification of the high active waste liquids in a borosilicate glass. Further work was aimed at the treatment and solidification of medium active waste solutions, the aspects of nuclear technology regarding the final disposal of solidified radioactive materials in salt formations and the migration of actinides in soils.

467 (LA--7857) LOW-LEVEL TRANSURANIC WASTE ASSAY BY PHOTON INTERROGATION AND MODERATED NEUTRON COUNTING. Cates, M.R.; Franks, L.A.; Noel, B.W.; Pigg, J.L.; Close, D.A. (Los Alamos Scientific Lab., NM (USA)). Oct 1979. Contract W-7405-ENG-36. 17p. Dep. NTIS, PC A02/MF A01.
When fission is induced in trace amounts of transuranic contaminants in waste material, it provides signatures from fission products that can be used to assay the material before disposal. Given here are the results from counting photofission-induced delayed neutrons from ^{239}Pu in sample matrices. When delayed neutrons emitted after 5 min of photon irradiation with energies up to 18 MeV in 1-1

samples are counted, assay limits of 10 to 100 nCi/g for matrices with a density of up to 5 g/cm^3 are determined. Counting all delayed neutron emissions or some prompt neutrons improves sensitivities by a factor of 20 or more. The dynamics of photofission and delayed neutron production, use of an electron linear accelerator as a particle source, experimental and electronic details, and future experimental plans are discussed. 15 figures, 3 tables.

468 (LA--7921-PR) NUCLEAR WASTE MANAGEMENT TECHNOLOGY DEVELOPMENT ACTIVITIES. PROGRESS REPORT, JANUARY-DECEMBER 1978. Johnson, L.J.; Desilets, B.H. (comps.). (Los Alamos Scientific Lab., NM (USA)). Jun 1979. Contract W-7405-ENG-36. 73p. Dep. NTIS, PC A04/MF A01.

Summary reports describe progress in Los Alamos Scientific Laboratory (LASL) Health Research Division managed programs by the nuclear waste management task area for calendar year (CY) 1978. Development and application of assay instrumentation for measuring the radioactivity content of waste packages is reported. Work in developing test materials and laser-based instrumentation for in-place testing of high-efficiency particulate aerosol filters is discussed. Development and demonstration of a controlled air incinerator for treatment of radioactively contaminated combustible waste is described. Field data from the environmental geology and hydrology aspect of shallow earth disposal of radioactively contaminated waste are reviewed and related to improvement of land burial technology.

469 (LA--8294-MS) MEASUREMENT OF URANIUM AND PLUTONIUM IN SOLID WASTE BY PASSIVE PHOTON OR NEUTRON COUNTING AND ISOTOPIC NEUTRON SOURCE INTERROGATION. Crane, T.W. (Los Alamos Scientific Lab., NM (USA)). Mar 1980. Contract W-7405-ENG-36. 96p. NTIS, PC A05/MF A01.

A summary of the status and applicability of nondestructive assay (NDA) techniques for the measurement of uranium and plutonium in 55-gal barrels of solid waste is reported. The NDA techniques reviewed include passive gamma-ray and x-ray counting with scintillator, solid state, and proportional gas photon detectors, passive neutron counting, and active neutron interrogation with neutron and gamma-ray counting. The active neutron interrogation methods are limited to those employing isotopic neutron sources. Three generic neutron sources (alpha-n, photoneutron, and ^{252}Cf) are considered. The neutron detectors reviewed for both prompt and delayed fission neutron detection with the above sources include thermal (^{3}He, $^{10}BF_3$) and recoil (^{4}He, CH_4) proportional gas detectors and liquid and plastic scintillator detectors. The instrument found to be best suited for low-level measurements (< 10 nCi/g) is the ^{252}Cf Shuffler. The measurement technique consists of passive neutron counting followed by cyclic activation using a ^{252}Cf source and delayed neutron counting with the source withdrawn. It is recommended that a waste assay station composed of a ^{252}Cf Shuffler, a gamma-ray scanner, and a screening station be tested and evaluated at a nuclear waste site. 34 figures, 15 tables.

470 (LA-UR--80-1274) APPLICATION OF LINEAR ACCELERATOR TECHNOLOGY TO THE DETECTION OF TRACE AMOUNTS OF TRANSURANICS IN WASTE BARRELS. Cates, M.R.; Noel, B.W.; Caldwell, J.T.; Kunz, W.E.; Close, D.A.; Franks, L.A.; Pigg, J.L. (Los Alamos Scientific Lab., NM (USA)). 1980. Contract W-7405-ENG-36. 24p. (CONF-800611--3). NTIS, PC A02/MF A01.

From International symposium on the management of alpha-contaminated wastes; Vienna, Austria (2 Jun 1980).

Electron linear accelerators (linacs), as sources of photons and neutrons, can produce a significant number of fissions in transuranic isotopes contained in large barrels of waste material. Both photons and thermal neutrons have been used to detect about 1 mg of plutonium in 105-kg matrices. A sequential interrogation with neutrons and photons, easily possible with linacs, can show both fertile and fissile constituents among the heavy-mass isotopes. The advantages of linacs in solving existing assay problems include: (1) high available beam current; (2) variable beam current, beam energy, pulse width, and pulse repetition frequency; and (3) beam-scanning ability. They also are compatible with passive assay instruments. Their versatility makes it likely that they will remain useful as assay technology advances.

471 (LA-UR--80-1289) RECENT DEVELOPMENTS AT LOS ALAMOS FOR THE MEASUREMENT OF ALPHA CONTAMINATED WASTE. Caldwell, J.T.; Cates, M.R.; Close, D.A.; Crane, T.W.; Kunz, W.E.; Shunk, E.R.; Umbarger, C.J.; Franks, L.A. (Los Alamos Scientific Lab., NM (USA)). 1980. Contract W-7405-ENG-36. 18p. (CONF-800611--4; IAEA-SM--246/67). NTIS, PC A02/MF A01.

From International symposium on the management of alpha-contaminated wastes; Vienna, Austria (2 Jun 1980).

A comprehensive program is currently in progress for the development of sensitive, practical nondestructive assay techniques for the quantification of low level transuranics in bulk solid wastes. This program encompasses a broad range of nuclear and nonnuclear techniques including sophisticated passive gamma-ray and passive neutron detection systems, isotopic neutron source-based active interrogation systems, pulsed portable neutron generator active interrogation systems, electron accelerator based techniques and laser spectroscopy techniques. The mix of techniques ranges in development maturity from the well established (MEGAS, Shuffler, Passive 4π neutron counters) through the proof-of-principle stage (pulsed neutron generator techniques) to the under investigation stage (electron linac and laser spectroscopy techniques). Matrix compensation methods are being developed to improve the accuracy of waste screening and assay measurements. Specific detection systems have been designed to operate in the high level beta-gamma backgrounds associated with some commercial reactor wastes. The techniques being developed can be used with either low level or high level beta-gamma wastes in either low density or high density matrices.

472 (LA-UR--80-1794) A L-NCI/G SENSITIVITY TRANSURANIC WASTE ASSAY SYSTEM USING PULSED NEUTRON INTERROGATION. Kunz, W.E.; Atencio, J.D.; Caldwell, J.T. (Los Alamos Scientific Lab., NM (USA)). 1980. Contract W-7405-ENG-36. 8p. (CONF-800655--6). NTIS, PC A02/MF A01.

From 21. annual meeting of the Institute of Nuclear Materials Management; Palm Beach, FL, USA (30 Jun 1980).

We have developed a pulsed thermal neutron interrogation system and have demonstrated a sub-1-nCi/g assay sensitivity for high density TRU wastes contained in 200-liter barrels. We detect prompt fission neutrons, resulting in greatly enhanced sensitivity compared to

techniques in which delayed fission neutrons are detected. We observe a linear assay response over at least three orders of magnitude in ^{235}U (or ^{239}Pu) mass. We also have measured a flat (to +-10%) interrogation flux profile throughout the volume of a 200-liter barrel filled with 200 kg of sand and vermiculite, which indicates flatness of response to fissile material at different locations within the barrel.

473 (LA-UR--807145) LIQUID WASTE MANAGEMENT SYSTEMS IMPROVEMENT PROGRAMS AT LOS ALAMOS SCIENTIFIC LABORATORY. Emelity, L.A.; Stanley, P.M.; Buchholz, J.R. (Los Alamos Scientific Lab., NM (USA)). 1980. Contract W-7405-ENG-36. 28p. (CONF-800611--6). Dep. NTIS, PC A03/MF A01.

From International symposium on the management of alpha-contaminated wastes; Vienna, Austria (2 Jun 1980).

Programs at the Los Alamos Scientific Laboratory (LASL) are approximately 50% nuclear weapons related and 50% general energy research and development. Since its beginning in the 1940's liquid industrial wastes have been contaminated with isotopes of plutonium, americium, uranium and various beta-gamma emitters, but management and treatment efforts were, due to the proportions of the various isotopes, directed primarily at the alpha emitters. The evolution in management methods at LASL since the 40's has been reported in previous papers. This treatise discusses the most recent three-phase effort to modernize the systems to the probable standards of the next twenty years. The first phase, provision of double-encased, continuously monitored sewer system will soon be under construction. The second phase, modernization of the treatment facilities, has been funded and is in the final design stage. The third phase, not funded as of this date, will provide lined, monitored solar evaporation ponds for total management of the treated industrial wastes with no release of any liquid to the environment.

474 (LBL--10000, pp 527-543) OTHER PROJECTS. Mar 1980.

Materials and Molecular Research Division annual report 1979.

Progress is reported on: solution thermodynamics of sulfites and sulfite oxidation mechanisms, process chemical parameters in aqueous SO_2 removal by lime/limestone scrubbers, coal liquefaction research, thermodynamic properties of chemical species in nuclear waste, high strength austenitic alloys for generator retaining rings, oxygen reduction in concentrated phosphoric acid by carbon-supported Pt alloy electrocatalysts, and substructure and properties of sodium beta alumina solid electrolytes. (DLC)

475 (MLM--2669) TRITTIUM WASTE CONTROL: APRIL-SEPTEMBER 1979. (Mound Facility, Miamisburg, OH (USA)). 21 Dec 1979. Contract AC04-76DP00053. 28p. NTIS, PC A03/MF A01.

The Combined Electrolysis Catalytic Exchange (CECE) pilot unit has been modified. Start-up of these components has been completed. The 1 Ci/ml test of the solid polymer electrolyte (SPE) membrane was successfully terminated after 29 weeks and the 10 Ci/ml test was initiated immediately using the same cell and SPE membrane. The cryogenic distillation system was successfully integrated with the combined electrolysis catalytic exchange system; with a HT gas mixture containing 1000 Ci/m^3, 0.1 mole % tritium were completed with the integrated system. A high beam quality Nd:YAG pump laser based on an unstable resonator/far-field converter design was developed to pump the angle tuned optical parametric oscillator (OPO) for the ir excitation step in the H_2O/HTO separation. Absorption measurements were made. Gas generation rates caused by radiolysis of tritium waste materials were determined for polymer and non-polymer impregnated tritiated concrete and fixated and non-fixated tritiated waste vacuum pump oil. The pressure change of hydrogen cover gas over tritiated water on cement-plaster was also determined. Tests continue on samples of cement and cement-plaster mixtures which were injected with 386 Ci of tritiated water, cured and then impregnated with catalyzed styrene monomer which were polymerized. After 46 weeks the tritium released from the styrene-impregnated cement blocks equals only one half of the tritium released from the cement block without styrene impregnation. Two of the drums containing waste octane have now been packaged 7.5 y and show a release of 17 mCi. Another drum containing approximately 35,000 Ci of tritiated water solidified on cement, shows a release of nearly 21 mCi after 5 y.

476 (MLM--2714) TRITIUM WASTE CONTROL, OCTOBER 1979-MARCH 1980. (Mound Facility, Miamisburg, OH (USA)). 19 May 1980. Contract EY-76-C-04-0053. 23p. NTIS, PC A02/MF A01.

Modifications were made to the Combined Electrolysis Catalytic Exchange (CECE) pilot unit. After the SPE cell was dismantled to investigate a water circulation problem, an internal short circuit developed. Analyses were done for impurities in the CECE system; the problem appears to be a 1 to 2% oil (mostly insoluble organics) layer. A polystyrene-impregnated, tritiated-concrete waste package was prepared with 7921 Ci of tritium. The study of tritium release from representative burial packages was continued. Gas generation rates were determined for polymer and non-polymer impregnated tritiated concrete and fixated and non-fixated tritiated waste vacuum pump oil. The pressure change of hydrogen cover gas over tritiated water on cement-plaster was determined.

477 (NUREG--0527) REGULATION OF FEDERAL RADIOACTIVE WASTE ACTIVITIES. REPORT TO CONGRESS ON EXTENDING THE NUCLEAR REGULATORY COMMISSION'S LICENSING OR REGULATORY AUTHORITY TO FEDERAL RADIOACTIVE WASTE STORAGE AND DISPOSAL ACTIVITIES. (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Material Safety and Safeguards). Sep 1979. 323p. NTIS.

The report contains two recommendations for extending the Commission's regulatory authority: (1) NRC licensing authority should be extended to cover all new DOE facilities for disposal of transuranic (TRU) waste and nondefense low-level waste. (2) A pilot program, focused on a few specific DOE waste management activities, should be established to test the feasibility of extending NRC regulatory authority on a consultative basis to DOE waste management activities not now covered by NRC's licensing authority or its extension as recommended in Recommendation 1.

478 (NUREG--0644) RADIOACTIVE WASTE PROCESSING AND DISPOSAL. (Department of Energy, Oak Ridge, TN (USA). Technical Information Center; Nuclear Regulatory Commission, Washington, DC (USA)). Jan 1980.

900p. (TID--3311-S9). Dep. NTIS, PC A99/MF A01.
This compilation contains 3597 citations/ abstracts of foreign and domestic research reports, journal articles, patents, conference proceedings, and books, which were entered in the DOE Energy Information Data Base since July 1978. (DLC)

479 (NUREG--0656) STUDY OF ALTERNATIVE METHODS FOR THE MANAGEMENT OF LIQUID SCINTILLATION COUNTING WASTES. Roche-Farmer, L. (Nuclear Regulatory Commission, Washington, DC (USA). Div. of Fuel Cycle and Material Safety). Feb 1980. 41p. NTIS.
The Nuclear Engineering Waste Disposal Site in Richland, Washington, is the only radioactive waste disposal facility that will accept liquid scintillation counting wastes (LSCW) for disposal. That site is scheduled to discontinue receiving LSCW by the end of 1982. This document explores alternatives presently available for management of LSCW: evaporation, distillation, solidification, conversion, and combustion. (DLC)

480 (NUREG/CR--0685) CHARACTERISTICS OF DEFENSE HIGH-LEVEL WASTE. Cheung, H.; Kniazewycz, B.G.; Kvam, D.J. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 31 May 1979. Contract W-7405-ENG-48. 68p. (UCRL--52704). Dep. NTIS, PC A04/MF A01.
This report presents a historical and technical review of the high-level radioactive waste management problems at Savannah River Plant, Hanford Reservation, and Idaho Chemical Processing Plant with major emphases on high-level waste inventory, characteristics, and management technologies. This information is presented for use as a portion of the defense high-level waste data base being developed to provide the US Nuclear Regulatory Commission with the necessary information to develop its regulatory framework and guidelines in this regard. 10 figures, 23 tables.

481 (NUREG/CR--1137) INSTITUTIONAL RADIOACTIVE WASTES, 1977. FINAL REPORT. Beck, T.J.; Cooley, L.R.; McCampbell, M.R. (Maryland Univ., Baltimore (USA). Radiation Safety Office). 1977. 132p. NTIS.
A followup survey to the 1975 institutional radioactive waste study (3) was conducted to obtain data for the calendar year 1977. The survey population of large medical and academic licensees shipped an estimated 7771 m^3 of low level radwaste for burial in 1977. Approximately 7% of the waste volume was ascribed to purely medical sources, 79% to sources conducting biological research and 14% to other academic sources. The estimated total activity shipped by the population in 1977 was 1,688 Ci, of which 81% was ^3H. Approximately 540 Ci of ^3H was shipped as depleted tritium targets for neutron generators. Much of the rest was in the form of labeled compounds or labeling reagents used in biological research. The fastest growing waste form produced by the population is waste liquid scintillation vials which have undergone a 60% increase in volume since 1975. The waste volume produced by the population appears to be increasingly linearly, at approximately the same rate as low-level radwastes in general.

482 (NUREG/CR--1326) PROPERTIES OF RADIOACTIVE WASTES AND WASTE CONTAINERS. QUARTERLY PROGRESS REPORT, OCTOBER-DECEMBER 1979. Manaktala, H.K.; Colombo, P.; Neilson, R.M. Jr. (Brookhaven National Lab., Upton, NY (USA)). Feb 1980. Contract EY-76-C-02-0016. 26p. (BNL-NUREG--51148). Dep. NTIS, PC A03/ MF A01.
Experiments were conducted to establish appropriate waste/binder ratios within which boric acid (simulated reactor waste) may be incorporated into portland type III cement to produce acceptable waste form. Both pH-adjusted and pH-unadjusted boric acid solutions were used. NaOH was used to adjust the boric acid pH. Data are reported for 3, 6, and 12 wt % boric acid wastes, with pH-adjusted values of 7, 10, and 12. Range of waste/binder ratios investigated are from 0.3 to 1.5. Results show: (a) pH-unadjusted 12 wt % boric acid waste (typical reactor waste concentration) does not solidify without neutralization with NaOH at waste/binder ratios investigated; (b) boric acid waste neutralized with NaOH, before solidification, requires shorter cure time compared with pH-unadjusted waste, and (c) the amount of pH adjustment, of boric acid with NaOH, needed to assure satisfactory solidification is a variable related to boric acid concentration in the waste. Impact tests were performed on urea-formaldehyde waste forms containing simulated BWR precoat filter cake in diatomaceous earth. Impact energies of 7.85, 15.7, and 31.4 joules were used. Data are provided, in graphical form, for formulations with waste/binder ratios of 1.6, 2.0, and 2.4. Results show: (a) higher impact loadings generate greater number of particulates in all size ranges, and (b) waste forms with higher waste/binder ratio produce greater number of particulate for a given impact loading. 8 figures, 7 tables.

483 (NUS--3383) POWER-REACTOR LOW-LEVEL RADIOACTIVE WASTE GENERATION AND WASTE MANAGEMENT PRACTICES EVALUATION. REPORT E. POLICY RECOMMENDATIONS, CONCLUSIONS, AND SUMMARY. Feizollahi, F.; Stouky, R.J.; Connelly, J.M.; Jentz, T.L. (NUS Corp., Palo Alto, CA (USA)). Aug 1979. 80p. California Energy Commission, 1111 Howe Ave., Sacramento, CA 95825.
A study was conducted to evaluate nuclear waste management technology and to identify the problems that will have to be solved within the next few years in order to allow the orderly development of large-scale management of low-level radioactive wastes generated at nuclear power facilities and by the nuclear power industry in California. This volume provides a technical, economic, and environmental overview of waste management alternatives that could be pursued by the State of California. (DLC)

484 (NVO--185(Rev.1)) OPERATIONAL RADIOACTIVE WASTE MANAGEMENT PLAN FOR THE NEVADA TEST SITE. (Reynolds Electrical and Engineering Co., Inc., Las Vegas, NV (USA); Department of Energy, Las Vegas, NV (USA). Nevada Operations Office). Jul 1979. Contract EY-76-C-08-0410. 44p. Dep. NTIS, PC A03/MF A01.
The Operational Radioactive Waste Management Plan for the Nevada Test Site establishes procedures and methods for the safe receiving, processing, disposal, or storage of radioactive waste. Included are NTS radioactive waste disposition program guidelines, procedures for radioactive waste management, description of storage areas and facilities, and a glossary of specifications and requirements.

485 (NVO--196-15) NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS. QUARTERLY REPORT, JANUARY-MARCH 1980. (Department of Energy,

Las Vegas, NV (USA). Nevada Operations Office). Jun 1980. 65p. NTIS, PC A04/MF A01.

The Nevada Nuclear Waste Storage Investigations (NNWSI) consist of a variety of studies and evaluations in support of the US Nuclear Waste Management Program. The NNWSI are primarily oriented towards developing or improving the technology of nuclear waste storage and disposal and determining whether selected underground rock media on or adjoining the Nevada Test Site (NTS) are technically acceptable for a licensed, permanent, high-level nuclear waste repository. The NNWSI Project for FY 1980 is comprised of eight tasks which are divided into subtasks: weapons test seismic investigations, geologic and hydrologic investigations, media investigations, engineering and technical support, quality assurance, technical review, Climax spent fuel test, and National Waste Terminal Storage Program support. (DLC)

486 (NVO--196-18) NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS. MANAGEMENT AND OVERVIEW QUALITY ASSURANCE PROGRAM PLAN. (Department of Energy, Las Vegas, NV (USA). Nevada Operations Office). Aug 1980. 33p. NTIS, PC A03/MF A01.

The Nevada Nuclear Waste Storage Investigations (NNWSI) Project Office is the US Department of Energy, Nevada Operations Office (DOE/NV) organization charged with the responsibility of administering and coordinating the activities of the various Participating Organizations and Support Contractors working on the NNWSI project. This Quality Assurance Program Plan (QAPP) describes how the NNWSI Project Office and their consultant and advisory organizations, Technical Overview and Quality Assurance Overview, perform the quality assurance (QA) aspects of administering and coordinating NNWSI activities. This QAPP was developed to comply with the elements of 10CFR50 Appendix B (Ref. A) criteria which apply to the activities of the Project Office and their advisory staff. These activities are intended to conform with the applicable portions of ANSI/ASME NQA-1-1979 (Ref. B).

487 (ONWI--87) CONSULTATION AND CONCURRENCE: WORKSHOP PROCEEDINGS, SEPTEMBER 23-26, 1979, THE ORCAS MEETING, EASTSOUND, WASHINGTON. (Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation). Jan 1980. Contract EY-76-C-06-1830. 159p. Dep. NTIS, PC A08/MF A01.

Purpose of the workshop was to probe the concepts of consultation and concurrence and to address issues in establishing and maintaining an effective state-federal process in nuclear waste management. The workshop was a gathering of some 50 people from industry, the environmental movement, local government, executive and legislative branches of state government, US Congressional staffs, the US Department of Energy, Nuclear Regulatory Commission, ONWI, university social science departments, and other research institutions. The workshop consisted of general sessions at which ten papers covering various aspects of consultation and concurrence were presented and of working groups which further explored issues raised by the papers. This report presents a general summary of discussions, the text of a background paper prepared for the workshop, the presented papers, and individual comments by several participants.

488 (ORNL--5665, pp 111-127) NUCLEAR WASTE CHEMISTRY. Jul 1980.

Chemistry Division annual progress report, February 29, 1980.

The consolidation of salt in flowing brine was studied under uniaxial stress and the results correlated using a model. Adsorption of such ions as Cs(I), Sr(II), Eu(III), and I^- on such earth materials as clays or Al_2O_3 is being studied. Molten-salt processes are being investigated for separating components of high-level wastes; separation of Pd from Ru and complexes formed by $NbCl_5$ in chloro-aluminate melts were studied. Adsorption of actinides (Am,Np) on geological media is being studied. Lanthanide orthophosphates are being synthesized and studied (EPR, Raman,absorption, Moessbauer spctra) as possible alternatives to glass as actinide waste forms. 18 figures. (DLC)

489 (ORNL/OIAPA--13) PUBLIC INFORMATION ON RADIOACTIVE WASTE: A STUDY OF AN EMERGING ISSUE. Bronfman, L.M.; Bronfman, B.H.; Regens, J.L. (Oak Ridge National Lab., TN (USA)). Oct 1979. Contract W-7405-ENG-26. 59p. Dep. NTIS, PC A04/MF A01.

Through an analysis of information provided in the printed media on the topic of radioactive waste, the study analyzes the emergence of radioactive waste as a public issue in the press. Over eight hundred articles printed in both specialized and non-specialized sources from 1973 to 1978 have been content-analyzed in order to describe how the problem of radioactive waste is defined and what dimensions of the problems are receiving attention. Between 1973 and 1978, there was a substantial increase in the amount of information on the topic of radioactive waste available to the public through a variety of popular and specialized media sources. This increase coincides with documented public concern with the problem of radioactive waste. Discussions of radioactive waste have focused for all sources more frequently on themes not directly related to the technical problems of radioactive waste storage or isolation. A substantial amount of the information available to a variety of segments of the public is composed of discussions of real or perceived risk related to the existence of waste or to methods of disposing of it. In addition to risk, a substantial proportion of the discussions deal with institutional themes. Over time, the total amount of information on most dimensions of the radioactive waste problem has increased substantially. Institutional themes have gained relative to other issues over the three time periods. National and local press sources infrequently specify the form of waste being discussed thus providing evidence that the quality of technical information available to some members of the public is very low.

490 (ORNL/OIAPA--14) BIBLIOGRAPHY OF ARTICLES ON RADIOACTIVE WASTE FROM 1973-1978. Bronfman, L.M. (Oak Ridge National Lab., TN (USA)). Oct 1979. Contract W-7405-ENG-26. 47p. Dep. NTIS, PC A03/MF A01.

This bibliography of approximately 900 citations is a supplement to a study on the content of public information on radioactive waste. The bibliography distinguishes between diferent information sources: national press; general scientific press; nuclear scientific press; nuclear industry/utility; environmental press; and local press. In this bibliography articles which appeared in local newspapers in Michigan and Louisiana were included for the years 1976 and 1977, a time of considerable controversy within these states over the OWI's actions.

491 (ORNL/SUB--80/13837/3) PROGRAMMATIC ASSESSMENT OF RADIOACTIVE WASTE MANAGEMENT: NUCLEAR FUEL AND WASTE PROGRAMS. (Gilbert/Commonwealth, Reading, PA (USA)). Jun 1980. Contract W-7405-ENG-26. 135p. NTIS, PC A07/MF A01.

Gilbert/Commonwealth (G/C) has performed an assessment of the waste management operations at Oak Ridge National Laboratory (ORNL). The objective of this study was to review radioactive waste management as practiced at ORNL and to recommend improvements or alternatives for further study. The study involved: (1) an on-site survey of ORNL radioactive waste management operations; (2) a review of radioactive waste source data, records, and regulatory requirements; (3) an assessment of existing and planned treatment, storage, and control facilities; and (4) identification of alternatives for improving waste management operations. Information for this study was obtained from both personal interviews and written reports. The ORNL waste management operations have maintained radioactive releases to the environment well below regulatory requirements and have been successful, in recent years, in consistently reducing emissions. This has been accomplished primarily by upgrading equipment and procedures. However, this upgrading must be an on-going activity because of: (1) the changing nature of ORNL activities; (2) an increase in radioactive burden on-site; (3) the age of existing facilities and equipment; and (4) changes to regulatory requirements. As a result of reviewing ORNL operations, specific suggestions are offered for resolving isolated problems. However, these suggestions should be considered in the context of a comprehensive plan for the management of radioactive wastes at ORNL. Three areas were determined to warrant more detailed, consolidated studies: (1) waste management program planning; (2) development of a centralized computer based data acquisition system; and (3) a review for maintaining exposures to on-site personnel as low as reasonably achievable (ALARA).

492 (ORNL/TM--7253) HIGH-LEVEL WASTE PROGRAM. PROGRESS REPORT, OCTOBER 1, 1979-DECEMBER 31, 1979. (Oak Ridge National Lab., TN (USA)). Mar 1980. Contract W-7405-ENG-26. 51p. Dep. NTIS, PC A04/MF A01.

Waste Management Analysis for Nuclear Fuel Cycles: Example scenarios were evaluated for low-level waste management analysis. Depletion calculations for early- and advanced-oxide U-Pu cycle LMFBRs were completed. Fixation of Waste in Concrete: FUETAP concretes were made that had compressive strengths >60 MPa, thermal conductivities >1 W/m.K and densities of approx. 2 g/cm^3. These solids were able to withstand temperatures of 900°C for 24 h. Study of Ceramic and Cermet Waste Forms: Construction of the 23-cm ID spray calciner to be used for urea-waste solutions is nearing completion. Development of densification techniques at both low and elevated temperatures is continuing. Alternative High-Level Waste Forms Development: Sol-gel Synroc spheres (1 wt % waste) as dense as 95% with 1% open porosity have been prepared by sintering at 1200°C. Initial tests to incorporate as much as 25 wt % of simulated SRP waste sludge in Synroc spheres were successful. Construction has begun on a sphere forming system. High-Level Waste Container Development: A fabrication, assembly, and inspection sequence has been developed for a canister and overpack.

493 (ORNL/TM--7385/V1) RADIOACTIVE WASTE MANAGEMENT INTEGRATED DATA BASE: A BIBLIOGRAPHY. Johnson, C.A.; Garland, P.A. (Oak Ridge National Lab., TN (USA)). Sep 1980. Contract W-7405-ENG-26. 192p. NTIS, PC A09/MF A01.

The purpose of this indexed bibliography is to organize and collect the literature references on waste generation and treatment, characteristics, inventories, and costs. The references were captured into a searchable information file, and the information file was sorted, indexed, and printed for this bibliography. A completion of approximately 1100 references to nuclear waste management, the first of a series, is completed. Each reference is categorized by waste origin (commercial, defense, institutional, and foreign) and by subject area: (1) high-level wastes, (2) low-level wastes, (3) TRU wastes, (4) airborne wastes, (5) remedial action (formerly utilized sites, surplus facilities, and mill tailings), (6) isolation, (7) transportation, (8) spent fuel, (9) fuel cycle centers, and (10) a general category that covers nonspecific wastes. Five indexes are provided to assist the user in locating documents of interest: author, author affiliation (corporate authority), subject category, keyword, and permuted title. Machine (computer) searches of these indexes can be made specifying multiple constraints if so desired. This bibliography will be periodically updated as new information becomes available. In addition to being used in searches for specific data, the information file can also be used for resource document collection, names and addresses of contacts, and identification of potential sources of data.

494 (ORNL/TM--7385/V2) RADIOACTIVE WASTE MANAGEMENT INTEGRATED DATA BASE: A BIBLIOGRAPHY. Johnson, C.A.; Garland, P.A. (Oak Ridge National Lab., TN (USA)). Sep 1980. Contract W-7405-ENG-26. 409p. NTIS, PC A18/MF A01.

RADIOACTIVE WASTE MANAGEMENT;BIBLIOGRAPHIES; RADIOACTIVE WASTE DISPOSAL;RADIOACTIVE WASTES; RADIOACTIVE WASTE PROCESSING

495 (ORO--778) SPENT FUEL AND WASTE INVENTORIES AND PROJECTIONS. Carter, W.L.; Finney, B.C.; Alexander, C.W.; Blomeke, J.O.; McNair, J.M. (Oak Ridge National Lab., TN (USA)). Aug 1980. Contract W-7405-ENG-26. 88p. NTIS, PC A05/MF A01.

Current inventories of commercial spent fuels and both commercial and US Department of Energy radioactive wastes were compiled, based on judgments of the most reliable information available from Government sources and the open literature. Future waste generation rates and quantities to be accumulated over the remainder of this century are also presented, based on a present projection of US commercial nuclear power growth and expected defense-related activities. Spent fuel projections are based on the current DOE/EIA estimate of nuclear growth, which projects 180 GW(e) in the year 2000. It is recognized that the calculated spent fuel discharges are probably high in view of recent reactor cancellations; hence adjustments will be made in future updates of this report. Wastes considered, on a chapter-by-chapter basis, are: spent fuel, high-level wastes, transuranic wastes, low-level wastes, mill tailings (active sites), and remedial action wastes. The latter category includes mill tailings (inactive sites), surplus facilities, formerly utilized sites, and the Grand Junction Project. For each category, waste volume inventories and projections are given through

the year 2000. The land usage requirements are given for storage/disposal of low-level and transuranic wastes, and for present inventories of mill tailings.

496 (ORP/CSD--79-2) ASSESSMENT OF WASTE MANAGEMENT OF VOLATILE RADIONUCLIDES. Altomare, P.M.; Barbier, M.; Lord, N.; Nainan, D. (Mitre Corp., McLean, VA (USA). METREK Div.). May 1979. 124p. (MTR--7719). Environmental Protection Agency, Washington, DC.

This document presents a review of the Technologies for Waste Management of the Volatile Radionuclides of iodine-129, krypton-85, tritium, and carbon-14. The report presents an estimate of the quantities of these volatile radionuclides as are produced in the nuclear power industry. The various technologies as may be used, or which are under investigation, to immobilize these nuclides and to contain them during storage and in disposal are discussed. Also, the alternative disposal options as may be applied to isolate these radioactive wastes from the human environment are presented. The report contains information which was available through approximately January 1978.

497 (PB--80-105042) LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT. VOLUME I: CURRENT POWER REACTOR LOW-LEVEL RADWASTE. FINAL REPORT. Frizollahi, F.; Connelly, J.M.; Jentz, T.L.; White, L.; Woo, D. (NUS Corp., Palo Alto, CA (USA)). Mar 1978. 269p. NTIS, PC A12/MF A01.

This study evaluates low-level waste management technology for light water reactors and identifies the problems that must be solved within the next few years to allow for the orderly development of large-scale management of low-level radioactive wastes generated at nuclear power facilities and by the nuclear power industry in California. This report is the first volume of a series and contains basic information and background data relative to the current industry practice in the area of power reactor low-level-waste management.

498 (PB--105083) LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT. VOLUME V. POLICY RECOMMENDATIONS, CONCLUSIONS AND SUMMARY. FINAL REPORT. Feizollahi, F.; Stoouky, R.J.; Connelly, J.M.; Jentz, T.L. (NUS Corp., Palo Alto, CA (USA)). Aug 1979. 81p. NTIS, PC A A05/MF A01.

This study evaluates low-level waste management technology for light water reactors and identifies the problems that must be solved within the next few years to allow for the orderly development of large-scale management of low-level radioactive wastes generated at nuclear power facilities and by the nuclear power industry in California. Volume 5 provides a technical, economic, and environmental overview of waste-management alternatives that could be pursued by the State of California.

499 (PB--295360) CHARACTERIZATION OF SELECTED LOW-LEVEL RADIOACTIVE WASTE GENERATED BY FOUR COMMERCIAL LIGHT-WATER REACTORS. (New York State Energy Research and Development Authority, New York (USA); Dames and Moore, White Plains, NY (USA)). Dec 1977. Contract EPA-68-01-3294. 78p. NTIS PC A05/MF A01.

An investigation was made of the radionuclide makeup of light-water nuclear reactors' radioactive wastes presently being consigned to shallow land burial. The studies were contracted through the New York State Energy Research and Development Authority and consisted of radiochemical analyses of spent ion exchange resins, evaporator concentrates and filter sludges for specific radionuclides including activation products, fission products and transuranics. Ten waste samples were obtained from two BWRs and two PWRs.

500 (PB--295408) AN ANALYSIS OF LOW-LEVEL SOLID RADIOACTIVE WASTE FROM LWRS THROUGH 1975. Phillips, J.W.; Gaul, G.A. (Office of Radiation Programs, Washington, DC (USA). Technology Assessment Div.). Nov 1977. 106p. NTIS PC A06/MF A01.

In view of the wide disparity of data bases and conflicting conclusions, this study updates a previous EPA study. In addition, this study also provides a break down of projected annual volumes by type of waste, i.e., demineralizer resins and filter sludge, evaporator bottoms, and contaminated trash, and also identify the relative composition of the wastes by major nuclides. These latter results will be compared with similar results from other studies.

501 (PB--296947) LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT. Watson, J.E. (ed.). (Environmental Protection Agency, Washington, DC (USA). Office of Radiation Programs). May 1979. 547p. (EPA--520/3-79-002; CONF-790209--). NTIS, PC A99/MF A01.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

Portions of document are illegible.

This publication contains the proceedings of the Twelfth Mid-year Topical Symposium of the Health Physics Society on Low-Level Radioactive Waste Management held in Williamsburg, Virginia, February 11-15, 1979. There are fifty-seven papers included covering such topics on radioactive waste management as (1) the origin, (2) handling and transportation, (3) disposal operations and alternatives (4) regulatory aspects, (5) environmental, and (6) public health aspects. Separate abstracts are prepared for individual papers.

502 (PB--296947, pp 121-124) VOLUME REDUCTION OF LOW-LEVEL RADIOACTIVE WASTE WITH A HAMMERMILL. Gregory, W.D. (Univ. of Rochester, NY). May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

A Jacobson Model J-3 Hammermill was recently installed at the University of Rochester to process low-level radioactive wastes from hospital and research laboratories. The hammermill will handle both glass and plastic vials of all types. The waste is poured into a hopper located on the top of the seven foot high assembly. The material is gravity fed into the hammermill which is driven by a 15-horsepower motor at 3600 rpm. The waste is pounded by the rotating hammers into a metal screen perforated with one inch holes. The gound-up product is discharged from the bottom of the unit into a 55-gallon shipping drum. A volume reduction of 4:1 has been acheived on an equal mixture of glass and plastic vials.

503 (PB--296947, pp 151-158) PRELIMINARY IMPACT ASSESSMENT OF INSTITUTIONAL RADIOACTIVE WASTE DISPOSAL. Andersen, R. (Univ. of Maryland, Baltimore). May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

A significant fraction of the low level radioactive wastes which are buried in the

commercial, shallow land burial sites in the US originate from non-fuel cycle sources. The primary radwaste producers in this category include large medical and academic institutions. This paper considers, in a preliminary manner, some of the impacts of disposing of institutional radwastes via the same methods and systems as are used to dispose of fuel cycle radwastes. Nuclide content and activity concentrations of institutional and reactor radwastes differ greatly. The varied physical and chemical forms of institutional radwastes may not be compatible for burial with reactor radwastes. Animal carcasses and other biological materials may adversely affect containment and transport parameters in the burial trenches. The time and expense involved in the commercial burial of institutional radwastes may not be commensurate with the actual radiological content of the materials. Finally, this method of disposal may not represent an optimum use of limited burial space.

504 (PB--296947, pp 174-181) WASTE MANAGEMENT OF URANIUM MINING AND MILLING OPERATIONS. Kirner, N.P. (State of Washington, Olympia); Moghissi, A.A.; Blackburn, P.A. May 1979.
From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).
Uranium mining and milling operations associated with waste practices are somewhat different from other nuclear operations in that no new radioactive material is generated. The methods and procedures of uranium mining and milling operations using the acid-leach solvent extraction method are described using the Sherwood Project of Western Nuclear, Inc., as an example.

505 (PB--296947, pp 182-195) MANAGEMENT OF LOW-LEVEL NATURAL RADIOACTIVITY WASTES OF PHOSPHATE MINING AND PROCESSING. Roessler, C.E.; Smith, Z.A.; Bolch, W.E.; Wethington, J.A. Jr. (Univ. of Florida, Gainesville). May 1979.
From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).
Redistribution of the uranium-series radionuclides associated with phosphate deposits produces what are, in effect, low-level radioactive wastes. Proposed management of these materials involved (1) restricting by-product uses to applications not causing significant exposures to man; and (2) returning other material to the land with simulation of the natural radioactivity depth profile by covering high activity overburden, tailings, clays, gypsum and other radioactivity-bearing wastes with a lower activity overburden layer. Radon flux models are being developed to aid design of materials placement.

506 (PB--296947, pp 231-233) REGULATORY ASPECTS OF LOW LEVEL WASTE DISPOSAL. Shealy, H.G. (South Carolina Dept. of Health and Environmental Control, Columbia). May 1979.
From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).
Regulating a low-level waste disposal site reveals many interesting facets of how this nation's low-level waste is being managed. Incidents and occurrences that happen to radioactive waste prior to arriving at a burial site and after it is received at the burial site will be described. Regulating the site involves numerous disciplines of engineering, chemistry, hydrology, geology, health physics, and others. Regulatory involvement of these elements will be reviewed. Classification of low-level waste as presently being implemented at the Chem-Nuclear, Barnwell, South Carolina, site will be discussed.

507 (PNL--3000-2) NUCLEAR WASTE MANAGEMENT. QUARTERLY PROGRESS REPORT, APRIL-JUNE 1979. Platt, A.M.; Powell, J.A. (comps.). (Battelle Pacific Northwest Labs., Richland, WA (USA)). Sep 1979. Contract EY-76-C-06-1830. 53p. Dep. NTIS, PC A04/MF A01.
Progress is reported on: decontamination and densification of chop-leach cladding residues; monitoring methods for particulate and gaseous effluents from waste solidification process; TRU waste immobilization; krypton solidification; ^{14}C and ^{129}I fixation; waste management system and safety studies; waste isolation safety assessment; well logging instrumentation development for shallow land burial; monitoring and physical characterization of unsaturated zone transport; detection and characterization of mobile organic complexes of fission products; and electropolishing for surface decontamination of metals. 9 figures, 14 tables. (DLC)

508 (PNL--3000-3) NUCLEAR WASTE MANAGEMENT. QUARTERLY PROGRESS REPORT, JULY-SEPTEMBER 1979. Platt, A.M.; Powell, J.A. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Nov 1979. Contract EY-76-C-06-1830. 92p. Dep. NTIS, PC A05/MF A01.
Research is reported on: decontamination and densification of chop-leach cladding residues, monitoring of effluents from waste solidification, TRU waste mobilization, Kr solidification, ^{14}C and ^{129}I fixation, waste management system and safety studies, waste isolation safety assessment, logging systems for shallow land burial, unsaturated zone transport, mobile organic complexes of fission products, electropolishing for surface decontamination of metals, and decontamination and decommissioning of Hanford facilities. (DLC)

509 (PNL--3000-4) NUCLEAR WASTE MANAGEMENT. QUARTERLY PROGRESS REPORT, OCTOBER-DECEMBER 1979. Platt, A.M.; Powell, J.A. (comps.). (Battelle Pacific Northwest Labs., Richland, WA (USA)). Apr 1980. Contract EY-76-C-06-1830. 101p. NTIS, PC A06/MF A01.
Progress and activities are reported on the following: high-level waste immobilization, alternative waste forms, nuclear waste materials characterization, TRU waste immobilization programs, TRU waste decontamination, krypton solidification, thermal outgassing, iodine-129 fixation, monitoring of unsaturated zone transport, well-logging instrumentation development, mobile organic complexes of fission products, waste management system and safety studies, assessment of effectiveness of geologic isolation systems, waste/rock interactions technology, spent fuel and fuel pool integrity program, and engineered barriers. (DLC)

510 (PNL--3000-5) NUCLEAR WASTE MANAGEMENT. QUARTERLY PROGRESS REPORT, JANUARY-MARCH 1980. Platt, A.M.; Powell, J.A. (comps.). (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jun 1980. Contract AC06-76RL01830. 107p. NTIS, PC A06/MF A01.
Reported are: high-level waste immobilization, alternative waste forms, nuclear waste materials characterization, TRU

waste immobilization, TRU waste decontamination, krypton solidification, thermal outgassing, iodine-129 fixation, unsaturated zone transport, well-logging instrumentation development, mobile organic complexes of fission products, waste management system and safety studies, assessment of effectiveness of geologic isolation systems, waste/rock interactions, engineered barriers, criteria for defining waste isolation, and spent fuel and pool component integrity. (DLC)

511 (PNL--3036) STRESS ANALYSIS OF HIGH-LEVEL WASTE CANISTERS: METHODS, APPLICATIONS, AND DESIGN DATA. Simonen, F.A.; Slate, S.C. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Oct 1979. Contract EY-76-C-06-1830. 156p. Dep. NTIS, PC A08/MF A01.

An overview of stress analysis methods, structural design procedures, and design data is presented for canisters used to package solidified wastes, particularly borosilicate glass. In addition, waste processing, canister materials, fabrication and inspection methods, and performance testing are summarized. Sources of stress in canisters are lifting and handling loads, internal pressure, high-temperature filling operations, transient heating and cooling, differential thermal expansions of canisters and glass, and impact loadings from low-probability accidents. Results of case studies that illustrate applicable methods of stress analyses are presented for these sources of stress. Existing sections of ASME Boiler and Pressure Vessel Code are applicable to canister fabrication, but the code does not cover many aspects of canister service loadings. Specialized criteria for minimum wall thicknesses to sustain filling stresses are proposed in this report. Results of a test program to measure the creep strength of candidate canister materials are described. Methods to predict residual stresses in the walls of waste canisters are described; predicted residual stress levels agree with measured stress levels. The consequences of these residual stresses are reviewed, and stress-corrosion cracking is identified as the mode of canister failure affected by residual stresses. Canister-closure design is covered in detail, particularly the welding and inspection of the final closure seal-weld. It is shown that the methods of fracture mechanics and fatigue-crack-growth analyses are valuable tools for evaluating the performance of closure welds in the presence of crack-like defects. Canister performance in process trials at PNL shows the ability of canisters to survive high temperatures and loadings during processing. Impact tests show that a suitably designed canister can sustain severe impacts without loss of intergrity.

512 (PNL--3078) NUCLEAR WASTE MANAGEMENT ISSUES: A MULTIDISCIPLINARY EVALUATION FRAMEWORK. TEKNEKRON B-52865-A-L. Hoffman, M. (Teknekron, Inc., Berkeley, CA (USA)). Feb 1980. Contract EY-76-C-06-1830. 90p. Dep. NTIS, PC A05/MF A01.

Initially, this paper characterizes the nuclear waste problem that requires analysis to establish the rationale for an interdisciplinary approach to resolve it. The problem characterization also explains why the specific concern with contaminated groundwater and intrusion through drilling has been selected for the focus of the panel meeting. The Nominal Group Technique (NGT), the group process format chosen for the experts' deliberations, is explained in some detail and its value in facilitating the desired dialogue is described. The dialogue is organized around the various issue areas that would be of concern to a program manager dealing with the potential problem of radioactivity escaping to the biosphere through human intrusion into contaminated groundwater. The participants are identified by professional discipline so that the dialogue can be presented in a realistic fashion. Both the content of the dialogue and its format are evaluated. Particular attention is given to their usefulness in generating a cross-section of subissues and factors that should be addressed when analyzing the waste disposal system's adequacy to prevent contaminated groundwater escaping to the biosphere.

513 (PNL--3152) LEACHING OF ACTINIDES AND TECHNETIUM FROM SIMULATED HIGH-LEVEL WASTE GLASS. Bradley, D.J.; Harvey, C.O.; Turcotte, R.P. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Aug 1979. Contract EY-76-C-06-1830. 104p. Dep. NTIS, PC A06/MF A01.

Leach tests were conducted using a modified version of the IAEA procedure to study the behavior of glass waste-solution interactions. Release rates were determined for Tc, U, Np, Pu, Am, Cm, and Si in the following solutions: WIPP B salt brine, NaCl (287 g/l), NaCl (1.76 g/l), $CaCl_2$ (1.66 g/l), $NaHCO_3$ (2.52 g/l), and deionized water. The leach rates for all elements decreased an order of magnitude from their initial values during the first 20 to 30 days leaching time. The sodium bicarbonate solution produced the highest elemental release rates, while the saturated salt brine and deionized water in general gave the lowest release. Technetium has the highest initial release of all elements studied. The technetium release rates, however, decreased by over four orders of magnitude in 150 days of leaching time. In the prepared glass, technetium was phase separated, concentrating on internal pore surfaces. Neptunium, in all cases except $CaCl_2$ solution, shows the highest actinide release rate. In general, curium and uranium have the lowest release rates. The range of actinide release rates is from 10^{-5} to 10^{-8} g/cm^2/day. 25 figures, 7 tables.

514 (PNL--3176) ^{85}KR MANAGEMENT TRADE-OFFS: A PERSPECTIVE TO TOTAL RADIATION DOSE COMMITMENT. Mellinger, P.J.; Hoenes, G.R.; Brackenbush, L.W.; Greenborg, J. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jan 1980. Contract EY-76-C-06-1830. 126p. Dep. NTIS, PC A07/MF A01.

Radiological consequences arising from the trade-offs for ^{85}Kr waste management from possible nuclear fuel resource recovery activities have been investigated. The reference management technique is to release all the waste gas to the atmosphere where it is diluted and dispersed. A potential alternative is to collect, concentrate, package and submit the gas to long-term storage. This study compares the radiation dose commitment to the public and to the occupationally exposed work force from these alternatives. The results indicate that it makes little difference to the magnitude of the world population dose whether ^{85}Kr is captured and stored or chronically released to the environment. Further, comparisons of radiation exposures (for the purpose of estimating health effects) at very low dose rates to very large populations with exposures to a small number of occupationally exposed workers who each receive much higher dose rates may be misleading. Finally, cost studies (EPA 1976 and DOE 1979a) show that inordinate amounts of money will be required to lower this already extremely small 80-year

cumulative world population dose of 0.05 mrem/person (<0.001% of natural background radiation for the same time period).

515 (PNL--3254) MATERIALS CHARACTERIZATION CENTER PROGRAM PLAN. Nelson, R.D.; Ross, W.A.; Hill, O.F.; Mendel, J.E.; Merz, M.D.; Turcotte, R.P. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Mar 1980. Contract EY-76-C-06-1830. 82p. Dep. NTIS, PC A05/MF A01.

The Materials Characterization Center (MCC) has been established at Pacific Northwest Laboratory as part of the Materials Characterization Organization for providing an authoritative, referenceable basis for establishing nuclear waste material properties and test methods. The MCC will provide a data base that will include information on the components of the waste emplacement package - the spent fuel or processed waste form and the engineered barriers - and their interaction with each other and as affected by the environment. The MCC will plan materials testing, develop and document procedures, collect and analyze existing materials data, and conduct tests as necessary.

516 (PNL--3300(Pt.2), pp 161) DECOMMISSIONING AND DECONTAMINATION (BURIAL GROUND STABILIZATION) STUDIES. Cline, J.F. Feb 1980.

Pacific Northwest Laboratory annual report for 1979 to the DOE Assistant Secretary for Environment. Part 2. Ecological sciences.

The decommissioning and decontamination of retired Hanford facilities and the future use of surrounding landscapes require isolation of contaminated wastes from the biosphere. Burial ground stabilization studies were conducted to determine the effectiveness of physical barriers for isolating contaminated wastes in shallow-land burial sites from plants and animals. This study was undertaken to determine the effectiveness of using a layer of loose rock between the waste and the surface soil covering to prevent both plant root and animal penetrations.

517 (PNL--3317-1) COMMERCIAL NUCLEAR REACTORS AND WASTE: THE CURRENT STATUS. Platt, A.M.; Robinson, J.V. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Apr 1980. Contract EY-76-C-06-1830. 55p. Dep. NTIS, PC A04/MF A01.

During the last five years, the declared size of the commercial light water reactor (LWR) nuclear power industry in the US has steadily decreased. As of January 1980, the total number of power plants had dropped to 191 from the 226 in December 31, 1974. At least another nine were cancelled in the last few months. This report was developed as the first of a series to track implications to waste management due to such changes in the declared size of the industry. For the presently declared size, key conclusions are: the declared reactors will peak at a capacity of 162 GWe and consume about 10^6 MTU as enrichment feed. As few as two repositories of about 100,000 MTHM capacity each would hold the waste. Predisposal storage (reactor basins and AFRs) would peak at less than 100,000 MTHM (in the year 2020) with one repository opening in the year 1997 and the other in the year 2020. Most of the 100,000 MTHM would have to be in AFR storage unless current practice regarding reactor basin size was radically changed.

518 (PNL--3425) WASTES FROM SELECTED ACTIVITIES IN TWO LIGHT-WATER REACTOR FUEL CYCLES. Palmer, C.R.; Hill, O.F. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jul 1980. Contract AC06-76RL01830. 45p. NTIS, PC A03/MF A01.

This report presents projected volumes and radioactivities of wastes from the production of electrical energy using light-water reactors (LWR). The projections are based upon data developed for a recent environmental impact statement in which the transuranic wastes (i.e., those wastes containing certain long-lived alpha emitters at concentrations of at least 370 becquerels, or 10 nCi, per gram of waste) from fuel cycle activities were characterized. In addition, since the WG.7 assumed that all fuel cycle wastes except mill tailings are placed in a mined geologic repository, the nontransuranic wastes from several activities are included in the projections reported. The LWR fuel cycles considered are the LWR, once-through fuel cycle (Strategy 1), in which spent fuel is packaged in metal canisters and then isolated in geologic formations; and the LWR U/Pu recycle fuel cycle (Strategy 2), wherein spent fuel is reprocessed for recovery and recycle of uranium and plutonium in LWRs. The wastes projected for the two LWR fuel cycles are summarized. The reactor operations and decommissioning were found to dominate the rate of waste generation in each cycle. These activities account for at least 85% of the fuel cycle waste volume (not including head-end wastes) when normalized to per unit electrical energy generated. At 10 years out of reactor, however, spent fuel elements in Strategy 1 represent 98% of the fuel cycle activity but only 4% of the volume. Similarly, the packaged high-level waste, fuel hulls and hardware in Strategy 2 concentrate greater than 95% of the activity in 2% of the waste volume.

519 (PNL-SA--7072/T1) MANAGEMENT OF HIGH-LEVEL NUCLEAR WASTES. Platt, A.M.; McElroy, J.L. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Dec 1978. Contract AC06-76RL01830. 33p. NTIS, PC A03/MF A01.

Significant developments in the management of high-level nuclear wastes that have occurred in the last 2 years are reviewed. The principal thrust is on the policy and technical developments in the United States, but some attention is paid to major developments in other countries which have impacted technical direction in the US.

520 (PNL-SA--7540) CHARACTERIZATION OF NUCLEAR WASTE. Platt, A.M. (Battelle Pacific Northwest Labs., Richland, WA (USA)). 14 Feb 1979. Contract EY-76-C-06-1830. 6p. (CONF-790304--9). Dep. NTIS, PC A02/MF A01.

From 19. annual ASME symposium, geological disposal of nuclear waste; Albuquerque, NM, USA (15 Mar 1979).

Nuclear wastes which are logical candidates for deep geologic disposal include commercial (spent fuel, reprocessing) and defense wastes. It is expected that the 5250 metric tons of spent fuel discharged through the end of 1978 would increase to about 100,000 tons by the end of 2000. The individual characteristics of each waste type (spent fuel, solidified waste, defense wastes) are described in turn. (DLC)

521 (PRAV--1-21) ALMA - TRANSPORT CONTAINER: MECHANICAL IMPACT BY ACCIDENTS; CONCEPTUAL DESIGN. Milchert, I. (Programraadet foer Radioaktivt Avfall, Stockholm (Sweden)). Aug 1979. 52p. (In Swedish). NTIS (US Sales Only), PC A04/MF A01.

A recent pilot study of a sea transportation system for the radioactive waste storage project ALMA is continued. The mechanical stresses on special shipping containers (with an internal volume of 25 m^3) were investigated for normal handling and sea going conditions as well as for extreme conditions following free fall in water or air or caused by ship collisions. A non-shielding steel container was designed on the basis of the results obtained. The report contains collision calculations for the proposed vessel and calculations of velocities due to free fall of the container in water and air.

522 (RHO-CD--568) RADIOACTIVE WASTE PACKAGE ACCEPTANCE CRITERIA. Moore, E.L.; Calmus, D.B. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). 1978. Contract EY-77-C-06-1030. 66p. Dep. NTIS, PC A04/MF A01.

Preliminary acceptance criteria have been developed for packages containing nuclear waste which must be stored or disposed of by the US Department of Energy. Acceptance criteria are necessary to ensure that the waste packages are compatible with all elements of the Waste Management System. The acceptance criteria are subject to revision since many of the constraints that will be imposed on the waste packages by the Waste Management System have either not been defined or are being revised. Delineation of the acceptance criteria will provide bases for handling, transporting and disposing of the commercial waste.

523 (RHO-CD--761) COST/RISK/BENEFIT ANALYSIS REPORT ON THE DECONTAMINATION AND DECOMMISSIONING OF Z-PLANT. Melvin, J.P.; Sexton, R.A.; Fort, M.L.; Nunn, S.E. (Atomics International Div., Richland, WA (USA). Rockwell Hanford Operations). 28 Sep 1979. Contract AC06-77RL01030. 104p. NTIS, PC A06/MF A01.

This study was performed to estimate the cost of decontaminating and decommissioning Z-Plant. All of the buildings in the Z-Plant exclusion area except Building 2736-Z, the plutonium storage vault, are included in the study. The study also excludes all underground facilities within the exclusion area which are not contained within a building and all Z-Plant related facilities outside the perimeter fence. The contamination in Z-Plant is primarily ^{239}Pu which has a half-life of 24,360 years. Because of the long half-life of ^{239}Pu, it is not practical to consider the isolation of the facility to await reduction of the contamination level by natural decay. Therefore, this study analyzes the costs, risk and benefit of decontaminating Z-Plant to four different levels of residual contamination. The three principle criteria used in the analysis are cost, the risk of offsite dose to the public, and the occupational exposure to onsite personnel.

524 (RHO-CD--883) NUCLEAR FUEL SERVICES WASTE CHARACTERIZATION AND WASTE REMOVAL SYSTEM. Smith, R.E. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Apr 1980. Contract AC06-77RL01030. 56p. NTIS, PC A04/MF A01.

The work covered by this DOE program is the key to providing necessary technical support to evaluate safety of continued in-tank storage and alternatives for final disposition of wastes at West Valley. The program has been scheduled to be performed as soon as feasible, consistent with budget requirements for accuracy and safety.

525 (RHO-LD--79-101-D) LONG-TERM HIGH-LEVEL DEFENSE WASTE TECHNOLOGY. PROGRESS REPORT, JULY-SEPTEMBER 1979. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Nov 1979. Contract EY-77-C-06-1030. 37p. Dep. NTIS, PC A03/MF A01.

Progress is reported in program management and support, waste preparation, and waste fixation. 3 figures, 5 tables. (DLC)

526 (RHO-SA--50) INSTRUMENT FOR DETERMINING VISCOSITIES AND ELECTRICAL RESISTIVITIES OF MOLTEN GLASS CANDIDATES FOR IMMOBILIZING HANFORD NUCLEAR DEFENSE WASTES. Riebling, E.F. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Sep 1978. Contract EY-77-C-06-1030. 40p. Dep. NTIS, PC A03/MF A01.

Viscosity and electrical resistivity information is required for a variety of glass melts as part of laboratory plant glass composition screening programs and/or part of pre-pilot plant parametric studies of glass composition/physical property relationships. This report describes the design specifications and calibration procedures of a recently assembled, dual-purpose, viscosity/electrical resistivity instrument. The instrument can detect molten glass viscosity between 10 and 16,000 poise and electrical resistivities larger than 2Ω.cm at temperatures between 1,000 and 1,550°C.

527 (RHO-SA--148) USE OF A DECOMMISSIONING COST/RISK/BENEFIT ANALYSIS TO IDENTIFY BENEFICIAL DESIGN FEATURES. Sexton, R.A. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). 1980. Contract EY-77-C-06-1030. 6p. (CONF-800359--1). Dep. NTIS, PC A02/MF A01.

From NEA specialist meeting on decommissioning requirements in the design of nuclear facilities; Paris, France (17 Mar 1980).

A Cost/Risk/Benefit Analysis on the future decommissioning of the Hanford Z-Plant, a plutonium conversion and fabrication facility in the United States, was recently completed. The analysis has been used to identify decommissioning tasks high in cost of occupational radiation exposure. Recommendations for future design considerations have been made. They include ways of easing glove box removal, reducing piping removal requirements, and simplifying decontamination of structural surfaces.

528 (RISLEY-Trans--3999) RADIOACTIVE WASTES, CURRENT QUESTIONS. RADIOACTIVE WASTES AND THEIR MANAGEMENT. Sousselier, Y. (UKAEA Risley Nuclear Power Development Labs.). 1978. 12p. British Library Lending Division, Boston Spa.

The subject is treated under the following headings: usable wastes and by-products; origin of radioactive waste; classification of waste and basic characteristics; principles of waste management (practical rules for management, quantity of radioactive waste, development of waste management, present and future safety of waste management).

529 (SAND--79-0117) GAS GENERATION FROM TRANSURANIC WASTE DEGRADATION: AN INTERIM ASSESSMENT. Molecke, M.A. (Sandia Labs., Albuquerque, NM (USA)). Oct 1979. Contract EY-76-C-04-0789. 53p. Dep. NTIS, PC A04/MF A01.

A review of all available, applicable data pertaining to gas generation from the degradation of transuranic waste matrix material and packaging is presented. Waste forms are representative of existing defense-related TRU wastes and include cellulosics, plastics, rubbers, concrete, process sludges, and mild steel. Degradation mechanisms studied were radiolysis, thermal, bacterial, and chemical corrosion. Gas generation rates are presented in terms of moles of gas produced per year per drum, and in G(gas) values for radiolytic degradation. Comparison of generation rates is made, as is a discussion of potential short- and long-term concerns. Techniques for reducing gas generation rates are discussed. 6 figures, 10 tables.

530 (SAND--79-1245) GAS GENERATION FROM TRANSURANIC WASTE DEGRADATION: DATA SUMMARY AND INTERPRETATION. Molecke, M.A. (Sandia Labs., Albuquerque, NM (USA)). Dec 1979. Contract EY-76-C-04-0789. 71p. Dep. NTIS, PC A04/MF A01.

A comprehensive review of all applicable gas generation data resulting from the degradation of existing and potential forms of transuranic-contaminated wastes is presented. Extensive experimental studies have been performed under both realistic environmental conditions expected in the Waste Isolation Pilot Plant and overtest conditions. Degradation mechanisms investigated were radiolysis, thermal decomposition and dewatering, bacterial action, and chemical corrosion. Waste matrices studied include cellulosics, plastics, rubbers, organic composite, concrete-TRU ash, asphalt, process sludges, and mild steel. Measured gas generation rates are presented in terms of gas moles/year/drum of waste and in G(gas) values for radiolysis. The effects of multiple variables on gas generation are also described. 7 figures, 15 tables.

531 (SAND--79-1667C) MICROSTRUCTURAL CHARACTERIZATION OF GLASS AND CERAMIC SIMULATED WASTE FORMS. Headley, T.J.; Healey, J.T.; Hlava, P.F.; Kupfer, M.J.; Strachan, D.M. (Sandia Labs., Albuquerque, NM (USA); Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). 1979. Contract EY-76-C-04-0789. 7p. (CONF-791112--5). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

The microstructures of three nonradioactive glass samples simulating three Hanford process waste forms were characterized. Two samples of iodine sodalite which simulate the fixation of radioactive iodine were also characterized. X-ray diffraction, electron microscopy + x-ray energy dispersive spectrometry, and electron microprobe analysis were used in the characterization. (DLC)

532 (SAND--79-1886C) TRANSPORTATION OF RADIOACTIVE WASTES FROM NUCLEAR FUEL CYCLES. (Sandia Labs., Albuquerque, NM (USA)). Sep 1979. Contract EY-76-C-04-0789. 35p. (CONF-790957--1). Dep. NTIS, PC A03/MF A01.

From International nuclear fuel cycle evaluation conference; Vienna, Austria (17 Sep 1979).

This paper discusses current and foreseen radioactive waste transportation systems as they apply to the INFCE Working Group 7 study. The types of wastes considered include spent fuel, which is treated as a waste in once-through fuel cycles; high-, medium-, and low-level waste; and gaseous waste. Regulatory classification of waste quantities and containers applicable to these classifications are discussed. Radioactive wastes are presently being transported in a safe and satisfactory manner. None of the INFCE candidate fuel cycles pose any extraordinary problems to future radioactive waste transportation and such transportation will not constitute a decisive factor in the choice of a preferred fuel cycle.

533 (SAND--80-0023C) TECHNOLOGY INFORMATION CENTER. Emerson, E.L.; Shepherd, E.W.; Minor, E.E. (Sandia Labs., Albuquerque, NM (USA)). 1980. Contract EY-76-C-04-0789. 7p. (CONF-800354--1). Dep. NTIS, PC A02/MF A01.

From 2. USDOE environmental control symposium; Washington, DC, USA (17 Mar 1980).

A Transportation Technology Center (TTC) has been established at Sandia to address the transportation of nuclear waste and spent fuel. The Technology Information Center (TIC) acts as TTC's clearing house for nuclear material transportation information. TIC's activities are divided into three activities: public information, policy information, and technical information. Some of the uses of TIC's activities are briefly outlined. (DLC)

534 (UCID--18121) DETERMINATION OF PERFORMANCE CRITERIA FOR HIGH-LEVEL SOLIDIFIED NUCLEAR WASTE. Heckman, R.A.; Holdsworth, T. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 7 May 1979. Contract W-7405-ENG-48. 281p. Dep. NTIS, PC A13/MF A01.

To minimize radiological risk from the operation of a waste management system, performance limits on volatilization, particulate dispersion, and dissolution characteristics of solidified high level waste must be specified. The results show clearly that the pre-emplacement environs are more limiting in establishing the waste form performance criteria than the post-emplacement environs. Absolute values of expected risk are very sensitive to modeling assumptions. The transportation and interim storage operations appear to be most limiting in determining the performance characteristics required. The expected values of risk do not rely upon the repositories remaining intact over the potentially hazardous lifetime of the waste.

535 (UCID--18150) REGULATABLE ELEMENTS IN THE HIGH-LEVEL WASTE MANAGEMENT PROGRAM. Oakley, D. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 26 Dec 1979. Contract W-7405-ENG-48. 32p. Dep. NTIS, PC A03/MF A01.

Regulatable elements of a deep geological nuclear waste isolation system are those characteristics of a candidate system which need to be specified to achieve control of its performance. This report identifies the regulatable elements with respect to waste form, repository design, site suitability, and the modeling and decision analysis processes. Regulatable elements in each section are listed and described briefly as they affect the short-term and long-term performance of a deep geological repository.

536 (UCRL--15143) RADIOLOGICAL PERFORMANCE OBJECTIVES FOR RADIOACTIVE WASTE DERIVED FROM PUBLIC VALUES. FINAL REPORT PR 78-20-80R. Watson, S.R.; Campbell, V.N.; Kuskey, K.P.; Feuerwerger, P.H. (Decisions and Designs, Inc., McLean, VA (USA)). May 1979. Contract W-7405-ENG-48. 174p. Dep. NTIS, PC A08/MF A01.

The study explored the feasibility of

incorporating public values into technical guidelines for nuclear-waste management: to this end (1) a set of value judgments to be elicited from the public was developed; (2) mathematical models for translating those judgments into guidelines were constructed; (3) fifty-eight people were selected and interviewed; and (4) the results of the interviews were used with the mathematical models to demonstrate the calculation of guidelines. Our study tentatively shows that a decision-analytic approach to risk evaluation is a feasible way to incorporate public judgments as to the relative significance of the various possible consequences of a waste repository. An important outcome of the study, however, was to encounter and identify in practice several problems to resolve in the use of public values to develop guidelines. The major problems fall under six headings: (1) definition of the set of values to assess; (2) methodology of assessment; (3) ability of public to quantitate their judgments; (4) social-choice theory behind mathematical models; (5) compatibility of models and data; and (6) technical objectives.

537 (UCRL--15168) PRE-SEALING RISK ANALYSIS. Ensminger, D.A.; Hough, M.E.; Oston, S.G. (Analytic Sciences Corp., Reading, MA (USA)). 7 Jan 1980. Contract W-7405-ENG-48. 85p. Dep. NTIS, PC A05/MF A01.
This report describes studies of accidents involving high-level radioactive waste before sealing the waste into a repository. The report summarizes work done in this area during Fiscal Year 1978 and supplements previous work. Models of accident probability, severity, and consequences are refined and extended.

538 (UCRL--15214) PROCEDURES FOR AGGREGATING CITIZEN PREFERENCES IN THE CONTEXT OF THE NUCLEAR WASTE MANAGEMENT PROBLEM. FINAL REPORT. Brock, H.W.; Sauer, G.L. (SRI International, Menlo Park, CA (USA)). Oct 1978. Contract W-7405-ENG-48. 73p. Dep. NTIS, PC A04/MF A01.
The purpose of the present paper is to provide an introduction to the theory of social choice and related disciplines, and to relate this theory to the concrete problem of nuclear waste management. In Section I of this report, an overview of the problem is provided. In Section II, two candidate preference aggregation procedures that can be used to identify a socially optimal waste management policy are identified. In Section III, a somewhat lengthy defense of the use of these two aggregation procedures is presented. Each is shown to be compatible with four intuitively appealing criteria of collective decision-making. In Section IV the application of one of the procedures to the evaluation of waste management alternatives is discussed. In Section V the problem of inferring evaluation parameters from expert and laypersons' judgments is addressed.

539 (USGS-OFR--80-817) BIBLIOGRAPHY OF REPORTS BY US GEOLOGICAL SURVEY PERSONNEL PERTAINING TO UNDERGROUND NUCLEAR TESTING AND RADIOACTIVE WASTE DISPOSAL AT THE NEVADA TEST SITE, AND RADIOACTIVE WASTE DISPOSAL AT THE WIPP SITE, NEW MEXICO, JANUARY 1, 1979-DECEMBER 31, 1979. Glanzman, V.M. (Geological Survey, Denver, CO (USA). Geologic Div.). 1980. Contract AC13-76GJ01664. 25p. NTIS, PC A02/MF A01.
This bibliography presents reports released to the public between January 1, 1979, and December 31, 1979, by personnel of the US Geological Survey. Reports include information on underground nuclear testing and waste management projects at the NTS (Nevada Test Site) and radioactive waste projects at the WIPP (Waste Isolation Pilot Plant) site, New Mexico. Reports on Project Dribble, Tatum Dome, Mississippi, previously prepared as administrative reports and released to the public as 474-series reports during 1979 are also included in this bibliography.

540 (ZfK--367, pp 101-104) SPECTRAL ANALYSIS OF RADIOACTIVE SOLUTIONS. Flach, N. (Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German Democratic Republic)). Dec 1978. (In German).
Annual report 1978. Nuclear chemistry department.
ATOMIZATION;EMISSION SPECTROSCOPY;IODINE 131; IODINE 132;LIQUID WASTES;MULTI-ELEMENT ANALYSIS; PHOSPHORUS 32;RADIOACTIVE WASTES;TRACE AMOUNTS

541 WHY EXTREMISTS PLAGUE THE NUCLEAR INSPECTOR. Moss, J. Electrical Review (London) ; 207: No. 3, 16-17(18 Jul 1980).
The problems of radioactive waste management were discussed by those of widely differing viewpoints at a joint symposium staged by the British Association for the Advancement of Science and the National Radiological Protection Board. The situation regarding high level waste was of particular concern. From opponents of nuclear power there were accusations of hasty decision making and lack of opportunity for public influence or debate. Deliberate distortion of facts by both the extreme supporters and extreme opponents of nuclear power was criticised by those involved in the regulation and safety of waste storage.

542 NUCLEAR POWER PLANTS AND NUCLEAR WASTE MANAGEMENT IN WEST GERMANY. Guck, R. (Badenwerk A.G., Karlsruhe (Germany, F.R.)). Elektrizitaetswirtschaft ; 79: No. 12, 423-425(Jun 1980). (In German).
On the occasion of the VDEW members' meeting on June 12, 1980, 'Elektrizitaetswirtschaft' has interviewed 10 leading personalities of the German electric power industry on issues of topical interest. The article presents the opinion of one of the interview partners on the title subject.

543 REALITY AND MYTHS. Williams, I.G.K. (Nuclear Energy Agency, 75 - Paris (France)). Atom (London) ; No. 283, 134-135(May 1980).
Extracts are presented from a paper delivered in March, 1980, at the annual conference of the Japan Atomic Industrial Forum. The extracts, and comments, deal with radioactive waste management and the protection of the public against radiation risks from radioactive wastes.

544 MODIFICATION OF THE WASTE MANAGEMENT PRINCIPLES FOR NUCLEAR POWER PLANTS. NEW LICENSING REQUIREMENTS. Haedrich, H. Atomwirtschaft, Atomtechnik ; 25: No. 5, 240-241(May 1980). (In German).
FEDERAL REPUBLIC OF GERMANY;FUEL CYCLE CENTERS;FUEL POOLS;NUCLEAR POWER PLANTS; RADIOACTIVE WASTE PROCESSING;RADIOACTIVE WASTE STORAGE;RADIOACTIVE WASTE MANAGEMENT;SPENT FUEL STORAGE;UNDERGROUND STORAGE

545 ALLOWING FOR UNCERTAINTIES IN THE EXPECTED WASTE MANAGEMENT COSTS. Lehtinen, R.; Silvennoinen, P.; Vira, J. (Technical

Research Centre of Finland, Helsinki). Radioactive Waste Management (New York) ; 1: No. 1, 43-55(May 1980).

By evaluating the estimates available, the uncertainties embedded in the waste management and disposal costs are expressed by means of subjective probability distributions. Cost data for each separate operational step are convoluted into a probability estimate of the total cost. As a case study the LWR spent fuel management is examined for both once-through and recycle alternatives. While the recycle cases entail lower expected costs the associated uncertainty variance is an order of magnitude larger than that for the once-through options.

546 LEACHING BEHAVIOUR OF RHYOLITE GLASS. Karkhanis, S.N.; Bancroft, G.M.; Fyfe, W.S.; Brown, J.D. (University of Western Ontario, London (Canada)). Nature (London) ; 284: No. 5755, 435-437(3 Apr 1980).

In an investigation into the potential use of rhyolite for diluting and stabilising nuclear waste the hydrothermal leaching and recrystallisation properties of the material have been investigated at temperatures up to 300°C using classical leach monitors of weight loss and solution analyses, scanning electron microscopy, electron spectroscopy for chemical analyses and secondary ion mass spectroscopy. It has been shown that rhyolite is more stable to leaching than borosilicates previously studied and that there is no evidence of a surface depleted layer.

547 TREATMENT AND STORAGE OF RADIOACTIVE GASES FROM NUCLEAR FACILITIES. Johannsen, K.H. (Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin (German Democratic Republic)); Schwarzbach, R. (Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German Democratic Republic)). Kernenergie ; 23: No. 3, 78-84(Mar 1980). (In German).

Treatment of exhaust air from nuclear facilities aimed at retaining or separating the radionuclides of iodine, xenon, and krypton as well as of tritium and carbon-14 and their storage are of special interest in connection with increasing utilization of nuclear power in order to reduce releases of radioactive materials to the atmosphere. The state of the art and applicability of potential processes of separating volatile fission and activation products from nuclear power stations and reprocessing plants are reviewed. Possibilities of ultimate storage are presented. An evaluation of the current stage of development shows that processes for effective separation of radioactive gases are available. Recent works are focused on economy and safety optimization. Long-term storage, in particular of extremely long-lived radionuclides, needs further investigation.

548 NUCLEAR WASTES, A QUESTIONNAIRE. Revue Generale Nucleaire ; 53(Feb 1980). (In French).

Questionnaire gives basic information for the public on nuclear wastes and radioactive waste management. Risk and regulations to reduce the risk to permissible limits are more particularly developed. A survey of radioactive wastes is made along the fuel cycle: production, processing, transport, disposal to end on effect of waste management on the cost of nuclear kWh.

549 RADIOACTIVE WASTE MANAGEMENT. SUMMARY OF THE REPORT OF AN EXPERT GROUP WHO STUDIED THE 1959 WHITE PAPER - THE CONTROL OF RADIOACTIVE WASTES. Morley, F. Atom (London) ; No. 279, 15-17(Jan 1980).

A summary is given of the report of an Expert Group appointed in 1976 to consider the 1959 White Paper 'The Control of Radioactive Wastes' in the light of the changes that have taken place since it was written and with the extended remit of examining 'waste management' rather than the original 'waste disposal'. The Group undertook to; review the categories and quantities present and future of radioactive wastes, recommend the principles for the proper management of these wastes, advise whether any changes in practice or statutory controls are necessary and make recommendations.

550 POLYMOLYBDATES AS PLUTONIUM (IV) HOSTS. Penneman, R.A. (Los Alamos Scientific Lab., NM); Haire, R.G.; Lloyd, M.H. pp 571-581 of Actinide separations. Navratil, J.D.; Schulz, W.W. (eds.). Washington, DC; American Chemical Society (1980).

From 177. national meeting of the American Chemical Society; Honolulu, HI, USA (1 Apr 1979).

Plutonium molybdate precipitated in the absence of Zr is a different structure (isostructural with $U(MoO_4)_2$ than the $ZrMo_2O_7(OH)_2(H_2O)_2$ whose structure was determined by Clearfield and Blessing. Because of the difference between Pu-O and Zr-O bond lengths (Δ=0.14A) at the same bond strength, it is expected that the $ZrMo_2O_7(OH)_2(H_2O)_2$ lattice will not accommodate extensive substitution of the larger Pu(IV) for Zr(IV). The plutonium-bearing precipitate obtained from nitric acid solutions (containing molybdenum, zirconium and plutonium) gives an x-ray powder diffraction pattern not distinguishable from that of $ZrMo_2O_7(OH)_2(H_2O)_2$ precipitated without plutonium. However, since the Pu content is low, the Pu could be present either in the Pu molybdate structure or replacing Zr in the Zr molybdate structure and not be detected in the x-ray patterns. Present data on the Zr and Pu molybdates have not provided evidence for the existence of heteropoly molybdate structures for those precipitates obtained from 1-5M HNO_3. Zachariasen's empirical rules relating bond strengths and bond lengths in 4f and 5f oxides is demonstrated to be useful when applied to the simple and complex molybdate structures.

551 EVALUATION OF LARGE CAVERNS FOR IN-SITU SOLIDIFICATION AND FINAL STORAGE OF MAW AND LAW WITH REGARD TO THE HEAT BUILD-UP IN THE WASTE PRODUCT. Hauser, W.; Smailos, E.; Koester, R. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Entsorgungstechnik). pp 473-476 of Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht. Sektion 4: Brennstoffkreislauf und Spaltstoff-Flusskontrolle. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980). (In German)

From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).

INTERMEDIATE-LEVEL RADIOACTIVE WASTES;LIQUID WASTES;LOW-LEVEL RADIOACTIVE WASTES;RADIOACTIVE WASTE STORAGE;SALT DEPOSITS;SOLIDIFICATION; UNDERGROUND;UNDERGROUND STORAGE;RADIOACTIVE WASTE PROCESSING

552 THEORETICAL AND EXPERIMENTAL ANALYSES OF ACTINIDE BUILD-UP AND α-WASTES FOR NUCLEAR DISPOSAL. Schlosser, G.; Porsch, D.; Bergmann, W.H.; Uyttendaele, P. (Kraftwerk Union A.G., Erlangen (Germany, F.R.)). pp 457-460 of Jahrestagung Kerntechnik '80 -

Reaktortagung 1980. Tagungsbericht. Sektion 4: Brennstoffkreislauf und Spaltstoff-Flusskontrolle. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980). (In German)
From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).
ACTINIDES;RADIOACTIVE WASTES;ALPHA DECAY RADIOISOTOPES;BUILDUP;COMPUTER CODES;ISOTOPE RATIO;PROGRAMMING;RADIOACTIVE WASTE STORAGE; REPROCESSING

553 GUIDE TO THE SAFE HANDLING OF RADIOACTIVE WASTES AT NUCLEAR POWER PLANTS. Vienna, Austria; IAEA (1980). 84p.
This guide discusses the responsibilities of the regulatory authorities, the design considerations of waste management systems and the source and characteristics of waste. Present techniques for treating, conditioning, storing and disposing of gaseous, liquid and solid wastes on and from the site are summarized, and a consensus of good practice in waste management based on current knowledge and experience is given. The guide also contains brief chapters on transport of wastes, monitoring systems, safety analyses and a review of future trends in waste management.

554 NUCLEAR POWER PLANT WASTE MANAGEMENT. Environmental Science and Technology ; 13: No. 12, 1456-1458(Dec 1979).
The future of nuclear power use depends largely on the success of efforts to develop an acceptable radioactive waste management strategy. Proposed radioactive waste treatment alternatives include: waste storage and disposal in geologic formations; reprocessing of spent fuel; and recycling of wastes for manufacturing purposes. Sweden's waste storage program is described. A strong federal nuclear waste policy is urged. (2 diagrams)

555 SUMMARY OF THE REPORT TO THE PRESIDENT BY THE INTERAGENCY REVIEW GROUP ON NUCLEAR WASTE MANAGEMENT. Nuclear Safety ; 20: No. 6, 706-721(Nov 1979).
On March 13, 1978, in response to the findings of an internal Department of Energy (DOE) task force which had reviewed the United States nuclear waste management program, President Carter established the Interagency Review Group (IRG) to formulate recommendations for the establishment of an administrative policy with respect to long-term management of nuclear wastes and supporting programs. Chaired by the Secretary of Energy, the IRG is composed of representatives of 14 government entities. The Nuclear Regulatory Commission (NRC) participated in the activities of the IRG as a nonvoting member. The IRG attempted to obtain a broad range of inputs and views from many sources, including Congress, state and local governments, Indian nations, industry, the scientific and technical community, public interest and environmental organizations, and the public. In October 1978 the IRG issued a draft report for public review and comment. Some 3300 comments were received and reviewed, and their final report, which was published in March 1979, reflects their consideration of these comments. This article summarizes the final report, using to the extent practical the same format, wording, and emphasis.

556 OTHER SORTS OF RADIOACTIVE WASTE. Goedkoop, J.A. (Stichting Energieonderzoek Centrum Nederland, Petten). Energiespectrum ; 3: No. 11, 274-278(Nov 1979). (In Dutch).
A nuclear centre with an electrical capacity of 1000 Megawatts has approximately 120 ton of natural uranium necessary. The quantity of one required to produce this depends of the quantity of uranium it contains and the yield with which it can be extracted. Reasonable values for these are 0.2% and 95% respectively. The necessary quantity of ore is therefore 63,000 ton and this is also approximately the quantity of waste remaining after the extraction process. The environmental problems that this ore waste causes and the solutions being tried are described. A comparison is made with nuclear fission waste.

557 NO WASTE MANAGEMENT WITHOUT REPROCESSING. Merz, E. (Instituts fur Chemische Technologie, W Germany). Atomwirtschaft, Atomtechnik ; 24: No. 10, 481-483(Oct 1979).
Arguments against the recent ban in W. Germany on further development of nuclear waste reprocessing techniques are presented. From the point of view of resource conservation, there are valid arguments in favor of reprocessing spent nuclear fuel and recycling fissile material. A recent temporary suspension in the erection of a reprocessing plant is discussed. Despite the W. German ban, a prototype reprocessing plant should be constructed. The plant would offer the possibility of maintaining, expanding, and optimizing existing technical knowledge of reprocessing and safety technologies. (5 references, 1 table)

558 NO WASTE MANAGEMENT WITHOUT REPROCESSING. Merz, E. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Chemische Technologie). Atomwirtschaft, Atomtechnik ; 24: No. 10, 481-483(Oct 1979). (In German).
The suspension of reprocessing has done more than merely cause a gap in the waste management concept of the Federal Government which, in its principles of waste management in nuclear power plants published 1977, laid down the rules for making use of spent fuel elements by reprocessing. From the point of view of resource conservation there are valid arguments in favor of reprocessing and fissile material recycling even now. The announcement of a temporary suspension in the erection of a reprocessing plant is alarming, especially in view of the long development lead required by industrial technologies to mature. Short term waste management needs are ruled mainly by speedy applications for permits, licenses and the construction of temporary fuel element storage facilities. For a repository to be erected at some later date it is necessary that the examination of the Gorleben salt dome be continued without delay. As far as the development of reprocessing technology is concerned, a prototype plant would offer a possibility in the meantime to maintain the technical know-how, expand it and optimize processing and safety technologies.

559 MATERIALS FOR SURFACE PROTECTION IN NUCLEAR FACILITIES. Kunze, S.; Loesch, G. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Entsorgungstechnik). Atomwirtschaft, Atomtechnik ; 24: No. 10, 484-487(Oct 1979). (In German).
Surfaces in nuclear facilities are protected by paint systems, coatings and metallic materials. Tests by the Karlsruhe technique of more than 900 commercial products indicated that only those protective coatings are capable of removing contamination by detergents which have low porosity, are homogeneous, will hardly swell, incorporate little water and are resistant to decontamination agents. In paint

systems with various degrees of gloss, care must be taken to ensure that these are not obtained by hydrophilic dyes or fillers but by matting additives. Floor covering should be installed in widths as large as possible which should be joined so as to be sealed against liquid penetration. In special linings which must use tiles, the joint fillers must be capable of decontamination just as the tiles themselves. Some of the materials tested were used in rooms and plant areas of the Karlsruhe Nuclear Research Center in which there was a hazard of contamination. The results found after these periods of practical use in most cases corresponded to the results of the tests conducted before such use.

560 POSSIBILITY OF UTILIZATION OF HIGH-ACTIVE WASTES FROM THE REGENERATION OF FAST POWER REACTOR FUEL. Vetrov, E.M.; Ikhlov, E.M. Atomnaya Energiya ; 47: No. 3, 187-188(Sep 1979). (In Russian).
BORON SILICATES;FAST REACTORS;GAMMA SOURCES; GLASS;HIGH-LEVEL RADIOACTIVE WASTES;POWER REACTORS;RADIOACTIVITY;USES;REPROCESSING

561 WASTE MANAGEMENT PRACTICES IN SELECTED EUROPEAN COUNTRIES. Morozov, V.A. (International Atomic Energy Agency, Vienna (Austria). Div. of Nuclear Safety and Environmental Protection). International Atomic Energy Agency Bulletin ; 21: No. 4, 17-23(Aug 1979).
In autumn 1978 the IAEA arranged a Study Tour on Radiation Protection and Waste Management. The present review covers radioactive waste management in Czechoslovakia, Federal Republic of Germany, France, German Democratic Republic and Hungary, and is based on lectures given to the tour participants and on scientific visits to research centres and nuclear power plants.

562 RECOVERY PROCESS. Horwitz, E.P.; Delphin, W.H.; Mason, G.W. (to Department of Energy, Washington, DC (USA)). German(FRG) Patent 2,856,489/A/. 5 Jul 1979. 26p. (In German).
ACTINIDES;ADDITIVES;AMERICIUM;CURIUM;FISSION PRODUCTS;LIQUID WASTES;NEPTUNIUM;NITRIC ACID; ORGANIC SOLVENTS;OXALATES;PLUTONIUM;RARE EARTHS; REPROCESSING;SOLVENT EXTRACTION

563 EVALUATIONS OF ALTERNATIVES FOR MANAGEMENT OF INEL TRANSURANIC WASTE. Smith, T.H. (EG and G Idaho, Inc., Idaho Falls). Transactions of the American Nuclear Society ; 32: 390-391(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
RADIOACTIVE WASTE MANAGEMENT;EVALUATION; IDAHO NATIONAL ENGINEERING LABORATORY; TRANSURANIUM ELEMENTS;RADIOACTIVE WASTE STORAGE; COST

564 ALBRECHT'S OFFICIAL STATEMENT CONCERNING GORLEBEN. Energiewirtschaftliche Tagesfragen ; 29: No. 6, 349-351(Jun 1979). (In German).
Although a nuclear waste management centre can principally not be realised with regard to safety aspects, the Lower-Saxonian State Government recommends to the Federal Government to abandon the project of recycling. Instead of this, a new concept of waste management should be decided upon the basic ideas of which might be listed as follows: 1. Immediate construction of inherently safe long-term temporary stores for the management of waste from nuclear power plants. 2. Pushing the research and development work for a safe ultimate storage facility of radioactive waste. 3. Deep drilling and, if positive results are obtained, mining development at the salt dome in Gorleben. If the drillings bring a negative result, to look for other ultimate storage facilities. 4. Decision concerning the most reasonable form of handling and ultimate storage of radioactive waste only when the energy-political future can be seen clearly.

565 MANAGEMENT OF RADIOACTIVE WASTE. Mining Week ; 1: No. 1, 12(25 Apr 1979).
RADIOACTIVE WASTE DISPOSAL;RADIOACTIVE WASTES;REPROCESSING;SPENT FUELS;RADIOACTIVE WASTE MANAGEMENT

566 SYSTEM TO MAKE USE OF ATOMIC WASTE. Mourad, S. (to Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,742,739/A/. 5 Apr 1979. 7p. (In German).
The spent nuclear fuel is formed into plate-shaped blocks. A Si photocell is placed on one or both sides inbetween an α and n absorbing foil of Ca tungstate. The γ and β radiation create a potential difference in one or both photocells. The whole system is surrounded by a radiation protecting jacket. (RW).

567 NUCLEAR WASTE MANAGEMENT TERMINOLOGY. Johnson, L.J. (Los Alamos Scientific Lab., NM (USA)). Health Physics ; 36: No. 4, 535(Apr 1979).
RADIOACTIVE WASTES;RECOMMENDATIONS; STANDARDIZED TERMINOLOGY;RADIOACTIVE WASTE MANAGEMENT

568 RADIOACTIVE WASTE DISPOSAL - POLICY AND PERSPECTIVES. Roberts, L.E.J. (UKAEA, Harwell. Atomic Energy Research Establishment). Nuclear Energy (Formerly Nuclear Energy Engineer) ; 18: No. 2, 85-100(Apr 1979).
Methods are discussed that have been developed and could be used for management and disposal of highly active wastes. The characteristics of such waste are, described and the concept of toxic potential is explained. General principles of waste disposal and the various options which have been considered are discussed. Studies on the incorporation of waste into glass, and on container materials are described. Consideration is also given to the requirements of stores and repositories from the aspect of heat dissipation, design, siting, etc. The advantages and disadvantages of the various types of geological formation ie salt, argillaceous deposits, hardrocks, suitable for containment of highly active wastes are examined. Studies carried out on the safety of repositories and an ocean disposal of the waste are summarised. The review ends with a brief account of the status of the vitrification process in the UK and abroad and of future programmes involving geological and related studies.

569 WASTE MANAGEMENT CENTRE CAN BE TECHNICALLY REALIZED. REPROCESSING OF SPENT FUEL ELEMENTS AS AN INTEGRAL PART OF SAFE WASTE MANAGEMENT. Huebenthal, K. (Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.)). VDI (Verein Deutscher Ingenieure) Nachrichten ; 33: No. 15, 10(Apr 1979). (In German).
From 2. seminar on the chemistry of nuclear waste management; Kaprun, Austria (19 - 23

Mar 1979).
The West German waste management concept was presented by Oberregierungsrat Dr. Karlheinz Huebenthal of the Federal Ministry for Research and Technology at the 2nd seminar on the chemistry of nuclear waste management in Kaprun/ Austria. The article is an abridged version of his paper.

570 FINAL STORAGE IN EXISTING PLANTS TESTED. THE WASTE MANAGEMENT CENTRE WILL PROVIDE UP TO 4000 NEW PLACES OF WORK. Mitschke, J. (Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen m.b.H. (DWK), Hannover (Germany, F.R.)). VDI (Verein Deutscher Ingenieure) Nachrichten ; 33: No. 15, 8(Apr 1979). (In German).
From 2. seminar on the chemistry of nuclear waste management; Kaprun, Austria (19 - 23 Mar 1979).
On March 19 - 23, the 2nd seminar on the chemistry of nuclear waste management was held at Kaprun/Austria, by the Gesellschaft Deutscher Chemiker and the Verein Oesterreichischer Chemiker 'Arbeitsgruppe Radiochemie und Strahlenchemie'. Dipl.-Ing. Joachim Mitschke, board member of the Deutsche Geselischaft fuer Wiederaufarbeitung von Kernbrennstoffen mbH, gave a survey of the state of development of the Gorleben waste management centre. The article is an abridged version of his paper.

571 POSITION OF THE EUROPEAN COMMUNITIES AND BELGIUM CONCERNING THE PROBLEMS RAISED BY RADIOACTIVE WASTE. Hannequart, J.P.; Sancy, M. Amenagement du Territoire et Droit Foncier ; No. 5, 1-12(Apr 1979). (In French).
The first part of this article which concerns the position of the Communities regarding radioactive waste management, illustrates their progressive awareness of the special problems posed as compared to their previous consideration of the subject in the general context of radiation protection. Since the early 70's, the Communities' programme has been oriented towards strengthening research in waste management and in 1975, the European Parliament proposed the creation of a joint undertaking for such management. This is still in the form of a study prepared by the Commission of the European Communities. The author stresses the need for common action by Member countries to organise waste management in the framework of the Communities. The following part describes Belgian legislation applicable to all stages of radioactive waste management. The author stresses that, despite the detailed regularoty mechanism, there is a need for establishing a body responsible for controlling observance of regulatory measures in this field.

572 HIGH-LEVEL WASTE MANAGEMENT RESEARCH. Daglish, J. Atom (London) ; No. 269, 58-62(Mar 1979).
A review is made of world research into long term methods for the management of highly active radioactive wastes, including the options available. These wastes include those resulting from the reprocessing of reactor fuels and also those involving the actual disposal of spent fuel. The vitrification process receives much attention.

573 DECOMMISSIONING OF NUCLEAR FACILITIES. REPORT ON THE INTERNATIONAL SYMPOSIUM HELD IN VIENNA FROM 13 TO 17 NOVEMBER 1978. Schneider, K.J. (International Atomic Energy Agency, Vienna (Austria)). Atomic Energy Review ; 17: No. 1, 193-205(Mar 1979).
The Symposium was jointly sponsored by OECD/ NEA and IAEA and was attended by more than 225 participants from 26 countries. Forty one papers were presented in eight sessions which covered the following topics: national and international policies and planning; engineering considerations relevant to decommissioning; radiological release considerations and waste classifications; decommissioning experience; and decontamination and remote operations. In addition, a panel of decommissioning experts discussed questions from the participants.

574 ADVANCE PAYMENTS ON THE COST OF THE FEDERAL REPOSITORY FOR RADIOACTIVE WASTE. Strabburg, W. Atomwritschaft, Atomtechnik ; 24: No. 3, 130-132(Mar 1979).
Under W. Germany's Atomic Energy Act, the federal government is responsible for the final storage of radioactive wastes. Other steps of the back end fuel cycle must be implemented by private industry. Under the act, the government is entitled to charge for the costs of the erection and operation of any final repositories. To cover the initial investment involved in preparation and planning, the government is requesting advance payments from those wishing to use the repositories in the future. However, there is no legal basis for advance payments to be made, at least until an operating permit has been granted for the planned back-end fuel cycle center. Utilities operating nuclear power plants cannot be forced to make advance storage payments, and even an amendment to the Atomic Energy Act will not change the situation. (in German) (15 references)

575 CURRENT U.S. NUCLEAR REGULATORY COMMISSION LICENSING REVIEW PROCESS: URANIUM MILL TAILINGS MANAGEMENT. Scarano, R.A.; Linehan, J.J. pp 326-343 of Uranium resource/ technology seminar 2, 1979. Golden, CO; Colorado School of Mines (Mar 1979).
From Uranium resource technology seminar; Golden, CO, USA (12 Mar 1979).
The primary tailings management alternatives to be considered should be below-grade burial methods. A surface impoundment may be acceptable. Acceptability will depend on showing that location and design characteristics will assure long-term stability and that erosion will not take place at an accelerated rate compared with the surrounding environs. 1 ref.

576 Guide pratique de gestion des dechets radioactifs. (PRACTICAL GUIDELINES FOR RADIOACTIVE WASTE MANAGEMENT). Paris, France; CEA (Jan 1979). 237p. (In French).
This Guide has been compiled with a view to obtaining a concise and practical document rather than an exhaustive one. It is presented in sectional form, providing for each Centre or Establishment of the CEA the means available, with the identity of those responsible for implementing them. Each section includes the following information: organization chart of the radioactive decontamination department, classification of the wastes used, inventory of the constraints peculiar to the means employed, brief description of these means and cost of services. The information is restricted to the solid and liquid wastes contained in fission or activation products and in transuranic elements. Natural radioelements such as uranium, thorium or descendants have not been included.

577 HIDDEN DIMENSION OF THE NATIONAL ENERGY PLAN: EXECUTIVE POLICY DIRECTION IN NUCLEAR WASTE MANAGEMENT. Light, A.R. (Texas Tech Univ., Lubbock). Publius ; 9: No. 1, 169-187(Win 1979).

President Carter's energy plan excluded nuclear power issues, which he chose to deal with separately rather than risk delaying the passage of a National Energy Act. Proposals to streamline nuclear power plant licensing are shown to reflect an intergovernmental strategy which circumvents special-interest groups and designates state governments as the primary decision makers. A more cautious strategy was applied to nuclear waste management, however, because of the long history of intergovernmental blundering and because of President Carter's anti-reprocessing policy. A review of the Federal government's policies and the intergovernmental actions taken since 1976 focuses on efforts to establish waste sites in New Mexico and the question of state veto power. The discussion illustrates the problem of defining governmental limits and of establishing regulations which meet both national and local goals.

578 SCIENCE UNDERLYING RADIOACTIVE WASTE MANAGEMENT: STATUS AND NEEDS. Roy, R. (Pennsylvania State Univ., University Park, PA). pp 1-20 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY: Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

The technical system constitutes a major - but not necessarily determinative - component of the national plan (or system) for radioactive waste management (RWM). This technical RWM system can be conveniently divided into four subsystems: Storage; Radionuclide Immobilization; Isolation and Post Emplacement. It is essential to consider the interactions among these four subsystems in designing any system. Of these, the first and last have not been given much consideration and their role is delineated herein. Of the middle subsystems, up to 1978 the system designers have relied essentially exclusively on the Isolation subsystem (i.e., removal from the biosphere in a mine or seabed, preventing migration of ions, etc.). History has shown that technically this strategy has proved unacceptable. In the last two years the role of the solid waste form and thence the entire radionuclide immobilization subsystem has assumed a much more significant role. Indeed, it will be shown that recent research results give grounds for hope that this subsystem may carry most of the burden of proof of acceptable and verifiable removal of radionuclides from the biosphere. Recent research results which made some of this possible will be discussed, and indications provided where new science is needed in all four subsystems.

579 RADIOCHEMICAL PROBLEMS IN ATOMIC ENERGY AND THE ROLE OF NUCLEAR POWER PLANTS RESEARCH INSTITUTE IN THEIR SOLUTION. Metke, E. (Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice (Czechoslovakia)). Journal of Radioanalytical Chemistry ; 51: No. 1, 9-13(1979).

The radiochemical problems connected directly with the operation of a nuclear power plant studied in the Nuclear Power Plants Research Institute, Jaslovske Bohunice (Czechoslovakia) are discussed.

580 NUCLEAR WASTE: BEYOND FAUST AND FATE. Maxey, M.N. (Univ. of Detroit, MI). Electric Perspectives ; No. 3, 27-32(1979).

Regarding development of the nuclear industry and the resulting turmoil over generation of nuclear wastes, Dr. Maxey presents as a fundamental bioethical principle for organizing evidence and dealing with conflicting opinions the following formulation: social justice requires an equitable mangement of potential hazards that might have harmful health effects and unjustifiable social consequences. By equitable management she means: (1) comprehensively informing policymakers about the broad spectrum of hazards; (2) make comparisons of actual costs to reduce the effects; and (3) only then make policies and set standards that will get the most public protection out of a finite amount of money. Translating this principle into public policy is no easy task, since opponents have developed several arguments that appeal to nonscientific moral and ethical premises. Briefly, these statements can be summarized as: (a) indefinite delay of high-level waste disposal facilities is regarded as morally preferable to a policy of implementing one of several currently available options, and (b) it is claimed that involuntary risks of radiation exposure imposed on present and unconsulted future generations violate ethical principles of social justice and equity. Dr. Maxey uses most of the article in countering these premises and finally suggests the following bioethical principle for guidance: any involuntary risks imposed by social policies for radiation protection must be congruent with, must not be in excess of, and may be reasonably less than, those involuntary risks imposed by the naturally occurring toxic elements and harmful effects from our natural environment.

581 PROGRAMMABLE CALCULATOR: ALTERNATIVE TO MINICOMPUTER-BASED ANALYZER. Hochel, R.C. (Savannah River Lab., Aiken, SC). pp 582-590 of Computers in activation analysis and gamma-ray spectroscopy. Carpenter, B.S.; D'Agostino, M.D.; Yule, H.P. (eds.). Washington, DC: Department of Energy (1979).

From Conference on computers in activation analysis and gamma-ray spectroscopy; Mayaguez, Puerto Rico (30 Apr 1978).

Described are a number of typical field and laboratory counting systems that use standard stand-alone multichannel analyzers (MCA) interfaced to a Hewlett-Packard Company (HP 9830) programmable calculator. Such systems can offer significant advantages in cost and flexibility over a minicomputyr-based system. Because most laboratories tend to accumulate MCA's over the years, the programmable calculator also offers an easy way to upgrade the laboratory while making optimum use of existing systems. Software programs are easily tailored to fit a variety of general or specific applications. The only disadvantage of the calculator vs a computer-based system is in speed of analyses; however, for most applications this handicap is minimal. Applications discussed give a brief overview of the power and flexibility of the MCA-calculator approach to automated counting and data reduction.

582 CHARACTERISTICS OF SOLIDIFIED HIGH-LEVEL WASTE PRODUCTS. Vienna: IAEA (1979). 112p.

The object of the report is to contribute to the establishment of a data bank for future preparation of codes of practice and standards for the management of high-level wastes. The work currently in progress on measuring the properties of solidified high-level wastes is being studied.

583 PROBLEM OF RADIOACTIVE WASTES FROM THE NUCLEAR INDUSTRY. Duyckaerts, G. (Liege Univ. (Belgium)). Electricite ; No. 168, 3-11(1979). (In French).

The economy of energetical sources leads normally to the fuel reprocessing in order to remove the fission products and the non fissile actinides and to recover the uranium not yet fissioned as well as the formed plutonium. Proliferation problems of nuclear weapons which may find solutions in regulations of international control apart, the irradiated fuels reprocessing presents problems of radiological protection for the very different lifetimes of the fission products and actinides and for their respective toxicity: if a storage of some months before reprocessing allows a considerable reduction in the quantity of radioactive matters by natural decay, some longliving elements contaminate the recovered fuel and complicate the risidues storage. This article is a summary of a study on the problems of radioactive wastes from the nuclear industry effected by research team of the University of Liege.

584 CHALLENGES OF NUCLEAR EFFLUENT MANAGEMENT IN THE NATIONAL PERSPECTIVE. Thomas, K.T. (Bhabha Atomic Research Centre, Bombay (India)). pp 205-230 of Operating experience of nuclear reactors and power plants. Bombay, India; Department of Atomic Energy (1979).

From Symposium on operating experience of nuclear reactors and power plants; Bombay, India (7 Feb 1977).

Most of the chemical and other process industries have to reckon with the inevitable question of disposal of waste materials; nuclear industry is no exception. But in the appreciation of societal responsibility for the preservation of the environment, nuclear industry has been an exception. The magnitude of the problem of nuclear effluents, the philosophy adopted in their management and the operational achievements have been reviewed. A projection into future, in respect of radioactive effluents in the National Nuclear Programme, is also included.

585 LEACHING BEHAVIOUR OF TRITIUM FROM A HARDENED CEMENT PASTE. Matsuzuru, H.; Moriyama, N.; Ito, A. ;arch Inst., Tokai, Ibaraki. Tokai Research Establishment). Annals of Nuclear Energy ; 6: No. 7-8, 417-423(1979).

Leaching of tritium from a hardened cement paste into an aqueous phase has been studied to assess the safety of solidification of the tritiated liquid waste with cement. Leaching tests were carried out in accordance with the method recommended by the International Atomic Energy Agency. The leaching fraction was measured as functions of the waste-cement wt ratio ,(Wa/C), temperature of leachant and curing time. The tritium leachability of cements follows the order: alumina cement > Portland cement > slag cement. The fraction of tritium leached increases with increasing Wa/C and temperature and decreasing curing period. A deionized water as a leachant gives a slightly higher leachability than the synthetic sea water. The coating of the specimen surface with bitumen reduces the leachability to about 5% of its value for the specimen without coating.

586 WASTE INVENTORY REPORT FOR REACTOR AND FUEL FABRICATION FACILITY WASTES. Phillips, J.W.; Feizollahi, F.; Martineit, R.A. (NUS Corp., Rockville, MD). Transactions of the American Nuclear Society ; 33: 433-435(1979). (CONF-791103--).

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

FUEL FABRICATION PLANTS;RADIOACTIVE WASTES; NUCLEAR POWER PLANTS;INVENTORIES;CHEMICAL PROPERTIES;PHYSICAL PROPERTIES;BWR TYPE REACTORS;PWR TYPE REACTORS;VOLUME;RADIOACTIVE WASTE PROCESSING

587 EFFLUENT CONTROLS AND ENVIRONMENTAL MONITORING PROGRAMS FOR URANIUM MILLING OPERATIONS. Maixner, R.D. (Cotter Corp, Canonn City, Colo). pp 266-276 of Uranium resource/technology seminar 2, 1979. Golden, CO; Colorado School of Mines (1979).

From Uranium resource technology seminar; Golden, CO, USA (12 Mar 1979).

Controls will reduce gaseous, particulate, and liquid discharges. Monitoring programs are used to determine effectiveness. The controls and programs discussed are used at Cotter Corporation's Canon City Mill in Colorado. 3 refs.

588 NONDESTRUCTIVE ANALYSIS AT B AND W'S URANIUM CONVERSION PLANT. Hardt, T.L.; Hughes, M.B.; Oedo, M.P. (Babcock and Wilcox Co, Lynchburg, Va). Nuclear Materials Management ; 8: 468-473(1979).

Containers and processing lines bearing high and low enriched uranium are routinely analyzed by nondestructive assay. Measurement systems used at Babcock and Wilcox's nuclear fuels plant in Apollo, Pennsylvania include the segmented gamma scanner (SGS) and the stabilized assay meter (SAM-II). These systems have been calibrated and used for a variety of tasks including uranium holdup measurements prior to decommissioning, in situ filter analysis and assay of calcined waste. 2 refs.

589 ACCEPTABLE RESIDUAL ACTIVITY LEVELS ALLOWING WASTE TO BE CONSIDERED INACTIVE. Chapuis, A.M.; Jacquemin, M. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Inst. de Protection et de Surete Nucleaire). pp 285-296 of Decommissioning of nuclear facilities. Vienna, Austria; IAEA (1979). (In French)

From International symposium on the decommissioning of nuclear facilities; Vienna, Austria (13 Nov 1978).

The dismantling of nuclear facilities will in the course of a few decades give rise to large amounts of activated or contaminated solid waste, a large part of which will in fact have only a very low level of activity. The authors propose residual activity limits below which this type of waste could be disposed of as ordinary waste, which means that the scrap metal could be sold for melting down or the broken concrete could be used as filling material. The proposed limits are defined with reference to permissible concentrations of contaminants in air and in water and in terms of external exposure. Their application would have perfectly acceptable consequences for individuals and the population as a whole.

590 MANAGEMENT OF RADIOACTIVE WASTES IN CANADA. PROCEEDINGS OF A SYMPOSIUM. Toronto, Canada; Canadian Nuclear Association (1979). 199p.

From Symposium on the Management of Radioactive Wastes in Canada; Toronto, Canada (10 - 11 Apr 1979).

Ten papers are presented, dealing with the management and environmental impact of

radioactive wastes, environmental considerations related to uranium mining and milling, the management of uranium refining wastes, reactor waste management, proposals for the disposal of low- and intermediate-level wastes, disposal of nuclear fuel wastes, federal government policy on radioactive waste management, licensing requirements, environmental assessment, and international cooperation in waste management.

591 RADIOACTIVE WASTE: A QUESTION OF PERSPECTIVE. Williams, I.K.G. (Nuclear Energy Agency, 75 - Paris (France)). Ingenioer-nytt ; 14: No. 92, 24-25,39(17 Nov 1978). (In Norwegian).
From International conference on the fuel cycle; London, UK (26 - 29 Sep 1978).
The nature of radioactive waste is briefly discussed and it is concluded that the high level waste is that which requires most attention. It is stated that the widespread opinion that satisfactory methods of treatment and disposal of high level waste cannot be developed is false. The problem of plutonium is then discussed and it is shown that the risk is much less than often assumed. The validity of final disposal in stable geological formations is also discussed, quoting the Oklo phenomenon to show that plutonium migration is unlikely. It is finally stated that by using geological formations which do not contain mineral resources the possibility of future boring disturbing the waste is remote.

592 DISPOSAL OF HAZARDOUS WASTES. Barnhart, B.J. (Los Alamos Scientific Lab., NM). Environmental Science and Technology ; 12: 1132-1136(Oct 1978).
The Fifth Life Sciences Symposium entitled Hazardous Solid Wastes and Their Disposal on October 12 through 14, 1977 was summarized. The topic was the passage of the National Resources Conservation and Recovery Act of 1976 will force some type of action on all hazardous solid wastes. Some major points covered were: the formulation of a definition of a hazardous solid waste, assessment of long-term risk, list of specific materials or general criteria to specify the wastes of concern, Bioethics, sources of hazardous waste, industrial and agricultural wastes, coal wastes, radioactive wastes, and disposal of wastes.

593 REGULATIONS OF COLLECTING RADIOACTIVE WASTES IN HUNGARY. Feher, L.; Kasza, J.; Pataky, J. (Fovarosi Kozegeszsegugyi es Jarvanyugyi Allomas, Budapest (Hungary)). Izotoptechnika ; 21: No. 10, 396-407(Oct 1978). (In Hungarian).
The transportation, processing and final disposal of radioactive wastes is managed in Hungary by the Public Health Station of Budapest. The new Processing and Burial Plant of Radioactive Wastes in Puspokszilagy is sufficient for all Hungarian demands. The new regulations of waste management based on the proper Hungarian Standard are reviewed. The order of storage and transportation of solid and liquid radioactive wastes and spent closed radioactive sources is treated in detail and the regulations for the handling of biological wastes and organic solvents are treated separately.

594 RADIOACTIVE WASTES AND THEIR MANAGEMENT. Sousselier, Y. (CEA, 75 - Paris (France)). Revue Generale Nucleaire ; No. 3, 160-165(Jun-Jul 1978). (In French).
The different categories of radioactive wastes are presented. The principles and practical rules of their management are given and the developements that could arise in this field are indicated.

595 VARIOUS ASPECTS OF TRANSPORTATION, STORAGE AND DISCHARGE OF RADIOACTIVE WASTES: FUTURE PROSPECTS. Olivier, J.-P. (Nuclear Energy Agency, 75 - Paris (France)). Revue Generale Nucleaire ; No. 3, 187-193(Jun-Jul 1978). (In French).
The radioactive waste transportation problems and the storage methods used for the different types of wastes are described. The problems arising from the final discharge of the wastes are analysed, and the possibilities to find appropriate solutions are studied.

596 DETERMINATION OF THE RADIOACTIVITY CATEGORIES IN LIQUID WASTES. Rodionova, L.F. (Leningrad Scientific Research Inst. of Radiation Hygiene, USSR). Gigiena i Sanitariya (U.S.S.R.) Issued in English Translation as Hygiene and Sanitation ; No. 2, 107-108(Feb 1978). (In Russian).
As a rule, radioactive wastes were not segregated by the levels of their radioactivity. A point has been made of the fact that various countries approached this problem completely randomly, designating different values for the low, medium, and high levels of radioactive wastes. It has been recommended to use the international standard No. 101 to 170 in setting up a new set of regulations for radioactive wastes. 2 references.

597 RADIOACTIVE WASTE MANAGEMENT IN WEST GERMANY. Krause, H. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). Gensan Nenji Taikai Gijiroku (Proceedings of Japan Atomic Industrial Forum, Incorporated) ; No. 11, 198-204, 232-240(1978). (In Japanese).
The technologies developed in West Germany for radioactive waste management are widely reviewed. The first topic in this review paper is the disposal of low- and middle-level radioactive liquid wastes. Almost all these liquid wastes are evaporated, and the typical decontamination factor attained is 10^4 -- 10^6. The second topic is the solidification of residuals. Short explanation is given to bituminization and some new processes. The third topic is high-level liquid wastes. Degradation of glass quality due to various radiation is discussed. Embedding of small glass particles containing radioactive wastes into metal is also explained. Disposals of low-level solid wastes and the special wastes produced from reprocessing and mixed oxide fuel fabrication are explained. Final disposal of radioactive wastes in halite is discussed as the last topic. Many photographs are used to illustrate the industrial or experimental use of those management methods.

598 ISSUES ON MANAGEMENT, STABILIZATION AND ENVIRONMENTAL IMPACTS OF URANIUM MILL TAILINGS. Cunningham, R.E. (Nuclear Regulatory Commission, Washington, DC (USA)). pp 13-17 of Management, Stabilization, and environmental impact of uranium mill tailings. Paris, France; OECD Nuclear Energy Agency (1978).
From Management, stabilization, and environmental impact of uranium mill trailings; Albuquerque, NM, USA (24 Jul 1978).
Management and stabilization of uranium mill tailings has been controversial for over two decades. There are two basic issues: the nature of the risk to the public from tailings and

what must be done to mitigate that risk. This paper provides an overview of the issues and sets some goals to be accomplished at the 1978 NEA Seminar on Management, Stabilization and Environmental Impacts of Uranium Mill Tailings that could be helpful in resolving the issues.

599 DIE PROBLEMATIK DES RADIOAKTIVEN ABFALLS IN DER KERNTECHNIK. Essen, Germany, F.R.; Vulkan-Verl. (1978). vp. (In German). (CONF-7710151--; AED-Conf--77-470-005).
From Conference on the problems of radioactive wastes in nuclear technology; Essen, F.R. Germany (20 Oct 1977).
Individual papers are abstracted separately.

600 Kernbrennstoffkreislauf. Bd. 2. Entsorgung der Kernkraftwerke. Umweltaspekte und wirtschaftliche Betrachtungen. (NUCLEAR FUEL CYCLE. VOL. 2. WASTE MANAGEMENT IN NUCLEAR POWER PLANTS. ENVIRONMENTAL ASPECTS AND ECONOMIC CONSIDERATIONS). Keller, C.; Moellinger, H. (eds.). Heidelberg, Germany, F.R.; Huethig Verl. (1978). 219p. (In German).
The chemical reprocessing of irradiated fuels as well as the treatment and ultimate storage of radioactive waste are discussed. Environmental aspects of nuclear power plants, economic problems of the nuclear fuel cycle, and the behaviour of radioactive nuclear pollutants in the organism are presented. The problematic nature of plutonium technology and plutonium recycling is pointed out.

601 MANAGEMENT, STABILIZATION, AND ENVIRONMENTAL IMPACT OF URANIUM MILL TAILINGS. Paris, France; OECD Nuclear Energy Agency (1978). 498p. (CONF-780740--).
From Management, stabilization, and environmental impact of uranium mill trailings; Albuquerque, NM, USA (24 Jul 1978).
Individual papers were abstracted separately.

602 NUCLEAR WASTE MANAGEMENT ACT OF 1977. Mathias, C.McC. Jr.; O'Neill, J.H. Jr. Atomic Energy Law Journal ; 19: No. 1, 3-40(Spr 1977).
The Nuclear Waste Authority which would be created by S-63 and the proposed reforms to the regulatory process with respect to nuclear waste management would provide for institutions and a regulatory structure which could reasonably assure safe management of nuclear wastes in the United States. This proposal could serve as a model for the international management of nuclear wastes. Additionally, streamlining the regulatory structure with respect to nuclear wastes could serve as a paradigm for creating a more efficient framework for regulating other aspects of the energy supply industries. Nuclear waste is the responsibility of the Congress. Congress authorized and encouraged programs which produced nuclear waste. The Nuclear Waste Management Act of 1977 would provide the unified action, centralized responsibility and clearly defined policy essential to a resolution of the critical nuclear waste problem.

603 SUB-SEABED DISPOSAL OF HIGH-LEVEL RADIOACTIVE WASTE: PREVENTION OF MANAGEMENT. Deese, D.A. (Harvard Univ., Cambridge, MA). Atomic Energy Law Journal ; 19: No. 1, 41-71(Spr 1977).
The budgetary and institutional support Washington gives to the sub-seabed program will have a crucial influence on the progress of sub-seabed science and technology over the next three to five years. Despite the growing need of nations, such as Japan and Britain, for a high-level waste disposal option, a sub-seabed program will probably not be employed if it is not strongly funded and supported by the United States. Clearly, there are enough legal and political obstacles to destroy or delay a sub-seabed disposal program. The nontechnical hurdles to seabed disposal at least equal the scientific and technical ones. But, on the other hand, there are important potential social and political benefits to be gained from any serious attempt to mount a successful sub-seabed program. These lie principally in international cooperation on waste management, environmental protection, nonproliferation of nuclear weapons, and governing the deep seabed.

604 INSTRUMENT MAINTENANCE PROBLEMS IN RADIOACTIVE AREAS AND EQUIPMENT. Basu, S.K.; Kulkarni, M.D. (Tarapur Atomic Power Station (India)). pp 120-124 of Nuclear reactor instrumentation. Vol. 2, Sect. 3. Bombay; Department of Atomic Energy (1977).
From Symposium on nuclear reactor instrumentation; Bombay, India (20 Dec 1976).
Some of the problems experienced by instrument maintenance personnel while attending to the deficiencies of the equipment, namely, sump pumps and control valves used in resin regeneration facility are discussed. The deficiencies of these equipment in radioactive environ are required to be attended to during normal plant operation conditions to minimise radiation exposure of personnel. The procedures used to locate faults are given.

605 PROCESS AND PLANT IMPROVEMENTS IN THE MANAGEMENT OF RADIOACTIVE EFFLUENTS. Nabar, P.G.; Kharbanda, J.L.; Panicker, P.K. (Bhabha Atomic Research Centre, Bombay (India). Desalination and Effluent Engineering Div.). pp 331-336 of Operating experience of nuclear reactors and power plants. Bombay; Department of Atomic Energy (1977).
From Symposium on operating experience of nuclear reactors and power plants; Bombay, India (7 Feb 1977).
The effluent treatment plant at Trombay has been in successful operation for about a decade. However, based on operational experience gained so far, a programme was initiated to further improve performance and operational ease. An account of the process plant modifications done as well as the new processing techniques introduced is given. Treatment of effluents resulting from decontamination operations, removal of I^{131}, treatment of uranium mill effluents and other radioactive liquid effluents from processing of uranium concentrates, etc. are discussed in detail.

606 POLICY REPORT ON HIGH LEVEL RADIOACTIVE WASTES. Santa Fe, NM; Energy Resources Administration (1975). 81p. (NP--23948). Executive Office of the Governor, Energy Resources Administration, Santa Fe, New Mexico.
Report from the Governor's Task Force Committee.
For the near term, ERDA and the NRC believe bedded salt formations offer the best approach for implementing high-level radioactive waste disposal. Salt formations will likely be used as the repository site, with those in Southeastern New Mexico the most likely to be selected. If that happens, New Mexico must address the social issues that are bound to arise. Any ultimate waste disposal scheme that

consumes regional resources such as land must pay the opportunity cost of consumption in perpetuity. A federal waste repository, of itself, will provide very little benefit to a region. Little local employment will result and other economic impacts will be minimal. There is no compelling reason for the people of New Mexico to accept a high-level waste repository. The recommendations are made: that a committee of technical competent individuals should be appointed by the Governor and the Energy Resources Board to oversee this federal work in the southeastern salt beds, and that New Mexico should do its own risk-benefit analysis of the high-level radioactive waste repository.

Waste Processing

607 (AECL--6344) CANADIAN DEVELOPMENT PROGRAM FOR CONDITIONING CANDU REACTOR WASTES FOR DISPOSAL. Charlesworth, D.H.; Bourns, W.T.; Buckley, L.P. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Jul 1978. 37p. Dep. NTIS (US Sales Only), PC A03/MF A01.

Currently, radioactive wastes arising from the operation of Canadian nuclear reactors are placed in interim storage in concrete containment structures except for gaseous and liquid wastes containing small amounts of radioactivity which are dispersed. With the objective of replacing storage by permanent disposal, a program is underway to develop and demonstrate an integrated process for converting all reactor wastes to a stable, leach-resistant form which will immobilize the radionuclides in the waste repository. The major tool for this development is a Waste Treatment Centre, now being constructed at Chalk River Nuclear Laboratories, which will combine reverse-osmosis, incineration, evaporation, and bituminizing processes.

608 (AED-Conf--76-760-000, pp 153-167) TREATMENT AND ULTIMATE STORAGE OF RADIOACTIVE WASTE. Levi, H.W. (Hahn-Meitner-Institut fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.)). 1976. (In German).

From German-Dutch university weeks; Kleve, F.R. Germany (21 Jun 1976).

The author deals with the problem of treating and disposing of radioactive waste material and connects this with a concept and its technological realization.

609 (AED-Conf--78-274-018) INVESTIGATIONS ON THE EXTRACTION OF PU FROM MAW. Stoianik, B. (Technische Hochschule Darmstadt (Germany, F.R.). Fachbereich Anorganische Chemie und Kernchemie). (Technische Hochschule Darmstadt (Germany, F.R.). Fachbereich Anorganische Chemie und Kernchemie). 1978. 11p. (In German). (CONF-7810177--26). Dep. NTIS (US Sales Only), PC A02/MF A01.

From Lecture meeting on principles and applications of nuclear-, radio-, and radiation chemistry; Lindau, F.R. Germany (16 Oct 1978).

A suitable method to treat burnable middle active wastes (MAW) is wet ashing. The waste is carbonized in concentrated sulphuric acid at 250°C and oxidized by adding conc. HNO_3. The final product of the wet ashing is a suspension of organic and inorganic solids in conc. sulphuric acid. In order to determine the suitability of wet ashing regarding plutonium separation from MAW, the decomposition power of the acid solution with regard to the different highly annealed plutonium oxides or plutonium-uranium mixed oxides was investigated, as well as the distribution of plutonium between the concentrated sulphuric acid and the solids. Due to the slight solubility of plutonium sulphate, there is an expected enrichment of plutonium in the solid residue which is washed out with dilute sulphuric acid. In order to separate the plutonium from the washing solution, extraction methods (prim. amines), ion exchange and coprecipitation methods are examined. The target of the latter used method is the earliest possible confluence of the method with known plutonium separations in nuclear technology.

610 (AERE-M--3012) PROGRESS TOWARDS THE USE OF DISPOSABLE FILTERS. Macphail, I. (UKAEA Atomic Energy Research Establishment, Harwell. Materials Development Div.). Aug 1979. 13p. Dep. NTIS (US Sales Only), PC A02atMF A01.

Thermally degradable materials have been evaluated for service in HEPA filter units used to filter gases from active plants. The motivation was to reduce the bulk storage problems of contaminated filters by thermal decomposition to gaseous products and a solid residue substantially comprised of the filtered particulates. It is shown that while there are no commercially available alternatives to the glass fibre used in the filter medium, it would be feasible to manufacture the filter case and spacers from materials which could be incinerated. Operating temperatures, costs and the type of residues for disposal are discussed for filter case materials. (U.K.).

611 (AERE-R--9416) DESIGN STUDY FOR A FISSION PRODUCT FIXATION PLANT AND STORAGE AT WINDSCALE. Hill, K.M.; Ridley, G.; Adler, D.G. (UKAEA Authority Fuel Processing Directorate). 1961. 106p. Dep. NTIS (US Sales Only), PC A06/MF A01.

A flowsheet for a production plant has been worked out and the problems of designing a reliable production plant utilising it have been assessed. The properties of current glass compositions have been considered in relation to problems of permanent storage for periods of 800 to 1000 years and various storage proposals assessed. The performance of the preferred type of storage, i.e. dry storage in natural draught air-cooled vaults, has been estimated and consideration given to a number of variables affecting the optimum design. The design problems of a storage of the required life have been investigated in relation to suitable types of site and proposals made as to the types of construction to be used. Design work on tunnel loading facilities has been carried to the state of demonstrating feasibility. The capital costs and the economics of this type of waste storage have been investigated for unalloyed Magnox fuel and brief consideration given to alloyed and cermet fuels. Attention has been given to development problems of the whole system where they arise.

612 (AERE-R--9417) GLASSES AND CERAMICS FOR IMMOBILISATION OF RADIOACTIVE WASTES FOR DISPOSAL. Johnson, K.D.B.; Marples, J.A.C. (UKAEA Atomic Energy Research Establishment, Harwell). May 1979. 28p. Dep. NTIS (US Sales Only), PC A03/MF A01; Available from HMSO, price Pound 1.00.

The U.K. Research Programme on Radioactive Waste Management includes the development of processes for the conversion of high level liquid reprocessing wastes from thermal and fast reactors to borosilicate glasses. The properties of these glasses and their behaviour under storage and disposal conditions have been examined. Methods for immobilising activity

from other wastes by conversion to glass or ceramic forms is described. The U.K. philosophy of final solutions to waste management and disposal is presented.

613 (AERE-R--9432) HIGH-LEVEL WASTE SOLIDIFICATION - WHY WE CHOSE GLASS. Grover, J.R. (UKAEA Atomic Energy Research Establishment, Harwell. Chemical Technology Div.). May 1979. 13p. Dep. NTIS (US Sales Only), PC A02/MF A01.

This paper considers the desirable properties and factors to be assessed in the selection of a solidified waste product, surveys the possible product options and then analyses in detail their suitability in meeting the criteria.

614 (AGNS--47921-3026-TPR-2) DEMONSTRATE FUEL DISASSEMBLY/ENCAPSULATION. TECHNICAL PROGRESS REPORT, JULY 1980-SEPTEMBER 1980. (Allied-General Nuclear Services, Barnwell, SC (USA)). 25 Oct 1980. Contract AC09-79ET47921. 10p. NTIS, PC A02/MF A01.

Work on this project is focused on demonstrating disassembly and encapsulation of nuclear fuels as a means to increase spent fuel storage. The effort commenced on April 17, 1980, and is progressing satisfactorily. The Equipment/Procedure Preparation and Process Assessment Studies sub-tasks are currently underway with the Equipment Demonstration sub-task scheduled to commence February 1, 1981. The equipment design effort associated with the former sub-task and the technical studies and investigations associated with the latter sub-task continue to verify the feasibility of this concept to enhance the use of fuel storage resources.

615 (ANL--78-13) DECONTAMINAION OF METALS CONTAINING PLUTONIUM AND AMERICIUM. Seitz, M.G.; Gerding, T.J.; Steindler, M.J. (Argonne National Lab., IL (USA)). Jun 1979. Contract W-31-109-ENG-38. 57p. Dep. NTIS, PC A04/MF A01.

Melt-slagging (melt-refining) techniques were evaluated as a decontamination and consolidation step for metals contaminated with oxides of plutonium and americium. Experiments were performed in which mild steel, stainless steel, and nickel contaminated with oxides of plutonium and americium were melted in the presence of silicate slags of various compositions. The metal products were low in contamination, with the plutonium and americium strongly fractionated to the slags. Partition coefficients (plutonium in slag/plutonium in steel) of 7 x 10^6 were measured with boro-silicate slag and of 3 x 10^6 with calcium, magnesium silicate slag. Decontamination of metals containing as much as 14,000 ppM plutonium appears to be as efficient as for metals with plutonium levels of 400 ppM. Staged extraction, that is, a remelting of processed metal with clean slag, results in further decontamination of the metal. The second extraction is effective with either resistance-furnace melting or electric-arc melting. Slag adhering to the metal ingots and in defects within the ingots is in the important contributors to plutonium retained in processed metals. If these sources of plutonium are controlled, the melt-refining process can be used on a large scale to convert highly contaminated metals to homogeneous and compact forms with very low concentrations of plutonium and americium. A conceptual design of a melt-refining process to decontaminate plutonium- and americium-contaminated metals is described. The process includes single-stage refining of contaminated metals to produce a metal product which would have less than 10 nCi/g of TRU-element contamination. Two plant sizes were considered. The smaller conceptual plant processes 77 kg of metal per 8-h period and may be portable.The larger one processes 140 kg of metal per 8-h period, is stationary, and may be near te maximum size that is practical for a metal decontamination process.

616 (ANL--79-74) RECOVERY OF ACTINIDES FROM TBP-Na_2CO_3 SCRUB-WASTE SOLUTIONS: THE ARALEX PROCESS. Horwitz, E.P.; Bloomquist, C.A.A.; Mason, G.W.; Leonard, R.A.; Ziegler, A.A. (Argonne National Lab., IL (USA)). Aug 1979. Contract W-31-109-ENG-38. 43p. Dep. NTIS, PC A04/MF A01.

A flowsheet for the recovery of actinides from TBP-Na_2CO_3 scrub-waste solutions has been developed, based on batch extraction data, and tested, using laboratory-scale countercurrent extraction techniques. The process, called the ARALEX process, uses 2-ethyl-1-hexanol (2-EHOH) to extract the TBP degradation products (HDBP and H_2MBP) from acidified Na_2CO_3 scrub waste leaving the actinides in the aqueous phase. Dibutyl and monobutyl phosphoric acids are attached to the 2-EHOH molecules through hydrogen bonds, which also diminish the ability of the HDBP and H_2MBP to complex actinides. Thus all actinides remain in the aqueous raffinate. Dilute sodium hydroxide solutions can be used to back-extract the dibutyl and monobutyl phosphoric acid esters as their sodium salts. The 2-EHOH can then be recycled. After extraction of the acidified carbonate waste with 2-EHOH, the actinides may be readily extracted from the raffinate with DHDECMP or, in the case of tetra- and hexavalent actinides, with TBP. The ARALEX process can also be applied to other actinide waste streams which contain appreciable concentrations of polar organic compounds (e.g., detergents) that interfere with conventional actinide ion exchange and liquid-liquid extraction procedures. 20 figures, 6 tables.

617 (ANL/EIS--11) GENERIC WASTE MANAGEMENT CONCEPTS FOR SIX LWR FUEL CYCLES. DePue, J.D. (ed.). (Argonne National Lab., IL (USA)). Apr 1979. Contract W-31-109-ENG-38. 123p. Dep. NTIS, PC A06/MF A01.

This report supplements the treatment of waste management issues provided in the Generic Environmental Statement on the use of recycle plutonium in mixed oxide fuel in light water cooled reactors (GESMO, NUREG-0002). Three recycle and three no-recycle options are described in this document. Management of the radioactive wastes that would result from implementation of either type of fuel cycle alternative is discussed. For five of the six options, wastes would be placed in deep geologic salt repositories for which thermal criteria are considered. Radiation doses to the workers at the repositories and to the general population are discussed. The report also covers the waste management schedule, the land and salt commitments, and the economic costs for the management of wastes generated.

618 (ARH-SA--203) BIDENTATE ORGANOPHOSPHORUS EXTRACTION OF AMERICIUM AND PLUTONIUM FROM HANFORD PLUTONIUM RECLAMATION FACILITY WASTE. Schulz, W.W. (Atlantic Richfield Hanford Co., Richland, WA (USA)). Sep 1974. Contract AM06-76RL02130. 65p. (CONF-750607--57). NTIS, PC A04/MF A01.

From American Nuclear Society meeting; New Orleans, LA, USA (8 Jun 1975).

Applicability of bidentate organiphosphorus

reagents to recovery of americium and plutonium from Hanford's Plutonium Reclamation Facility acid (approx. 2M HNO_3) waste stream (CAW solution) was studied. A solvent extraction process which employs a 30% DHDECMP (dihexyl-N, N-diethylcarbamylmethylene phosphonate)-CCl_4 extractant was devised and successfully tested in mixer-settler runs with actual CAW solution. Substitution of DHDECMP for DBBP eliminates the need to perform careful neutralization of unbuffered CAW soluton and increases overall americium recovery from the present 60 to 80% level to greater than or equal to 90%. Disadvantages to such substitution include the high cost (approx. $50/liter) of DHDECMP and the need to purify it [by acid (6M HCl) hydrolysis and alkaline washing] from small amounts of an unidentified impurity which prevents stripping of americium with dilute HNO_3. Distribution data obtained in this study confirm Siddall's earlier contention that bidentate organophosphorus regents can be used to remove actinides from concentrated high-level Purex process acid waste; a conceptual flowsheet for such an extraction process is given.

619 (BARC--1028) DEVELOPMENT OF SUITABLE VITRIFIED RADIOACTIVE WASTE PRODUCTS WITH LOW FORMATION TEMPERATURES AND IMPROVED LEACH RESISTANCE - A PRACTICAL APPROACH. Vaswani, G.A.; Jahagirdar, P.B.; Rastogi, R.C.; Sunder Rajan, N.S. (Bhabha Atomic Research Centre, Bombay (India)). 1979. 31p. NTIS (US Sales Only), PC A03/MF A01.

In contrast to normal practice of employing theoretical considerations, a scheme based on practical approach has been evolved for the development of suitable glass compositions to produce vitrified radioactive wastes with low forming temperatures of around 1000degC and low leach rates of the order of 10^{-5} to 10^{-6} gm cm^{-2} d^{-1}. After fixing the percentage of the waste content at a moderate value, a number of formulations in the sodium borosilicate system are studied for their melting and leaching characteristics by simple and quick laboratory techniques. Based on the results, a composition with scope for further lowering of melting temperature and improvement in product durability is subjected to the introduction of different durability enhancing and/or melting temperature lowering oxides as well as the waste oxides so as to obtain an optimum composition. This composition is further subjected to variations in its Na_2O, Ba_2O_3 and SiO_2 content to get a region of compositions with optimum leaching and melting characteristics. A composition selected from the central portion of this region will retain its properties even if the proportion of waste oxides and glass forming additives vary during the commercial production of vitrified radioactive wastes.

620 (BM-RI--8463) ABSORPTION OF RADIUM AND THORIUM FROM NEW MEXICO URANIUM MILL TAILING SOLUTIONS. Beard, H.R.; Salisbury, H.B.; Shirts, M.B. (Bureau of Mines, Salt Lake City, UT (USA). Salt Lake City Research Center). 1980. 17p. Bureau of Mines, Washington, DC.

The absorption of radium and thorium from waste uranium leach liquor by clays and other materials was investigated. This work was conducted in support of the goal of minimizing the environmental conflicts, impacts, and occupational hazards associated with mining and milling operations. Tailing and soil samples from New Mexico were evaluated for their potential to absorb radium and thorium from tailing liquors. Absorption ranged from 0 to 97 pct for radium and 0 to 60 pct for thorium. Some samples that readily absorbed radium were contacted with various salt solutions that could be present in tailing solutions to determine whether desorption would be a potential problem. The desorption of radium ranged from 0 to 75 pct. An alpha spectrometric method was used to determine the radium and thorium concentrations in the solutions and solids.

621 (BNL--28193) KEYNOTE ADDRESS AT THE INTERNATIONAL CONFERENCE ON NUCLEAR WASTE TRANSMUTATION. Steinberg, M. (Brookhaven National Lab., Upton, NY (USA)). Jul 1980. Contract AC02-76CH00016. 13p. (CONF-800743--13). NTIS, PC A02/MF A01.

From International conference on nuclear waste transmutation; Austin, TX, USA (22 Jul 1980).

Most of the US research effort on radioactive waste management is concentrated on its solidification and storage in geologic formations. Transmutation is an alternative. It can be applied to weapons plutonium as well to spent fuel. (DLC)

622 (BNL--28282) APEX ACCELERATOR CYCLE FOR TRANSMUTATION OF LONG-LIVED FISSION WASTES. Powell, J.; Steinberg, M.; Takahashi, H.; Grand, P.; Botts, T.; Kouts, H.J.C. (Brookhaven National Lab., Upton, NY (USA)). 1980. Contract AC02-76CH00016. 30p. (CONF-800743--11). NTIS, PC A03/MF A01.

From International conference on nuclear waste transmutation; Austin, TX, USA (22 Jul 1980).

Based on preliminary studies, some conclusions can be drawn concerning the Accelerator Fuel Enricher and Fission Product Exterminator (APEX). APEX-1 and APEX-2 systems can destroy TU's, ^{137}Cs, and ^{90}Sr at acceptable cost and efficiency. The principal difference between APEX-1 and APEX-2 is the in-reactor and in-circuit inventory of ^{137}Cs and ^{90}Sr. Stable and low hazard wastes can be disposed of by burial. Accelerator breeders can effectively sustain a fission reactor economy indefinitely. Military waste can be blended into commercial fuel cycle for transmutation. Accelerator and target technologies appear practical and could be developed in a few years. More detailed studies are needed to better define the technical and economic features of the LAFER and APEX cycles, so that comparative assessments can be made between these cycles, as well as with other transmutation and waste disposal concepts.

623 (BNL-NCS--28103) ROLE OF THE NATIONAL NUCLEAR DATA CENTER IN THE FIELD OF NUCLEAR WASTE TRANSMUTATION. Rose, P.F. (Brookhaven National Lab., Upton, NY (USA)). 1980. Contract AC02-76CH00016. 21p. (CONF-800743--8). NTIS, PC A02/MF A01.

From International conference on nuclear waste transmutation; Austin, TX, USA (22 Jul 1980).

This report discusses the role of The National Nuclear Data Center (NNDC), formerly the National Neutron Cross Section Center. The NNDC collates and analyzes nuclear physics information for basic and applied research scientists. The NNDC performs functions that are characteristic of an information analysis center, namely bibliographic searches, data compilation, and critical appraisal of available information. Such compilations and searches are of unique importance for investigators in the field of nuclear waste transmutation. In addition, the NNDC issues

publications, provides technical support to its sponsors, and conducts seminars on important topics. A primary concern of the NNDC is the timely production and revision of reference nuclear data. The NNDC coordinates the Cross Section Evaluation Working Group (CSEWG), a cooperative effort of over 20 laboratories, and the Nuclear Data Network (NDN), a group of US Nuclear Data Centers involved in the study of nuclear structure. The NNDC also interfaces with similar groups outside the United States in activities contributing to documented computerized reference data files. The Department of Energy has established the NNDC as the Center to service requests from the research community for bibliographic and data retrievals for neutron, charged particle, nuclear structure, and radioactive decay data.

624 (CAEC--007(Vol.3)) LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT. VOLUME III. FEASIBILITY OF VOLUME-REDUCTION PROCESSES. Feizollahi, F.; Phillips, J.W.; Bell, W.H. (NUS Corp., Palo Alto, CA (USA)). Nov 1978. 96p. (NUS--3183). California Energy Commission, 1111 Howe Ave., Sacramento, CA 95823.

This report contains a survey of the state of the art of volume-reduction technology and an evaluation of this technology for application to low-level radioactive waste from LWR plants. This survey indicated that the nuclear industry is rapidly gaining technological knowledge in the area of processes for volume reduction. Practical experience is rapidly being gained, but for most systems it has not been demonstrated that they can operate efficiently on waste from a US LWR plant with adequate containment of radioactivity and proper treatment of effluent gases and liquids while maintaining low exposure to the plant operators. It is concluded that there is no reason to believe that the use of volume-reduction systems in LWR plants will significantly reduce exposure to operators, either at the power plant or at the burial site. There may be some reduction in the exposure to the public during the waste transportation, but the exposure reduction ratio is smaller than the volume reduction ratio. The effect on the burial space requirements was evaluated and comparisons were made between non-volume-reduction, semi-volume-reduction, and full-volume-reduction systems. For a single-unit reactor plant in the 1000-MW(e) range, located within 300 to 400 miles of a burial site and using drums to package the waste, it is slightly more economical to use a non-volume-reduction system. However, under similar circumstances, for a double-unit reactor plant in the 2000-MW(e) range, both semi-volume-reduction and full-volume-reduction facilities were found to be economically feasible alternatives.

625 (CEA-CONF--4435) APPLICATION OF BORATE GLASSES AND VARIOUS BORON BEARING GLASSES TO THE MANAGEMENT OF FRENCH RADIOACTIVE WASTES. Bonniaud, R.; Redon, A.; Sombret, C. (CEA Centre de Marcoule, 30 - Bagnols-sur-Ceze (France)). 1978. 21p. (CONF-7806117--2). Copies available from Service de Documentation CEN Saclay, B.P. n°2, 91190 Gif-sur-Yvette (France).

From Conference on quality assurance in ceramic industries; Alfred, NY, USA (4 Jun 1978).

Silicates, as the most stable glasses, have been chosen to be basic products. The silicates become boroaluminosilicates for MTR and GG wastes. Boron is introduced as a fluxing agent and Al is used to make allowance of the quantity of Al in the solution. The case of LWR and FBR wastes are a little bit different. The corresponding glasses are borosilicates. Most of the fission product oxides have a tendancy to decrease the liquid temperature and boron is used mainly to loosen the network and to allow an entire vitrification. Some examples of glass composition are given. The main properties investigated are: the behaviour of the products submitted to thermal treatment, the behaviour under β irradiation, the loss of activity by aqueous leaching, the effect of α radionuclides. Two processes, a batch one and a continuous one have been developped. The batch process which is a pot vitrification method was the first in operation. This technique is satisfactory but unfortunately it does not meet the needs due to the growth of commercial nuclear energy. The continuous technique is composed of a rotary calciner coupled to a melting furnace. A first prototype equipment has been operated sucessfully for over 8000 hours with various simulated high level wastes (MTR, LWR, natural U). From this prototype, the Marcoule vitrification Plant was designed and built, scale to scale.

626 (CEA-CONF--4677) COLLECT AND TREATMENT OF RADIOACTIVE WASTES IN LOW ACTIVITY LABORATORIES. Cluchet, J.; Desroches, J. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Service de Protection contre les Rayonnements). 1979. 6p. (In French). (CONF-790181--5). NTIS (US Sales Only), PC A02/MF A01.

From SFRP session on safety in handling of low activity unsealed sources; Fontenay-aux-Roses, France (17 Jan 1979).

After recalling regulations concerning unsealed sources and low activity wastes produced by hospitals and biological laboratories, practical application of these rules is described. Sorting, storage and treatment of the different kind of wastes: solid, liquid, inactive, active of long or short life, containers to be used are examined.

627 (CEA-R--4946) PLUTONIUM SEPARATION BY REDUCTION STRIPPING. APPLICATION TO PROCESSING OF MIXED OXIDE $(U,PU)O_2$ FUEL FABRICATION WASTES. Arnal, T.; Cousinou, G.; Ganivet, M. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Developpement des Elements Combustibles). Nov 1978. 34p. (In French). NTIS (US Sales Only), PC A03/MF A01.

A procedure is described for separating plutonium from a uranium VI and plutonium IV mixture contained in an organic phase (tributyl phosphate diluted in dodecane). This separation is obtained by extracting the plutonium III using two organic reducers: hydrazine and paraminophenol. Paraminophenol has excellent reducing qualities, similar to those of ferrous sulphamate, but has the added advantage of not contaminating extracted plutonium. This procedure is currently used in processing production wastes from mixed oxide $(U,Pu)O_2$ fuels; the installation using this procedure is described in detail in this paper. Operating results show the remarkable efficiency of this procedure: the separated plutonium and uranium mass flows have been increased to 185 and 350 $g.h^{-1}$ respectively; the uranium contains less than 0.1 ppm of plutonium on completion of the purification cycle.

628 (CEGB-RD-B-N--4573) STRUCTURES AND STABILITY OF MEDIA INTENDED FOR THE IMMOBILIZATION OF HIGH LEVEL RADIOACTIVE WASTE. Tempest, P.A. (Central Electricity Generating

Board, Berkeley (UK). Berkeley Nuclear Labs.). May 1979. 28p. Dep. NTIS (US Sales Only), PC A03/MF A01.

High level radioactive waste contains about 40 different elements and, in time, many of these elements are transformed by radioactive decay into different-sized atoms with new chemical properties. The suitability of ordered crystal structures and unordered glass structures as media for immobilising the waste elements is compared. The structural properties of a mixture of synthetic minerals (SYNROC) are described and the various minerals' ability to accommodate ions of different radii and charge assessed. Similary the unordered structure of glass is examined and the probability of the glass remaining non-crystalline during manufacture and storage taken into account. Alternative glassification technologies in the form of the French AVM continuous process and the UK HARVEST batch processes are described and compared, and their likely effect on the structural properties of the final solid glass block considered.

629 (CONF-780506--(Vol.1), pp 304-314) LOW LEVEL RADWASTE PACKAGING: WHY NOT CEMENT. Wilson, R.B. (Hittman Nuclear and Development Corp., Columbia, MD). 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

Over the past several years many words have been expended in a quest to define a variety of competing radioactive waste immobilization technologies. With the more recent recognition of the technical pitfalls of urea-formaldehyde (UF) a liquid chemical binder considered as optimum less than two years ago, utilities, architect-engineers and systems vendors find themselves in a technology void, awaiting the inevitable breakthrough which will identify the perfect immobilization agent. The culmination of these pressures has brought about the introduction of new immobilization technologies including: one which offers both volume reduction and immobilization in yet another new binder agent; the costly development of highly sophisticated volume reduction systems, the highly-concentrated products from which may pose as-yet unknown immobilization problems; and, the marketing of several new more expensive liquid chemical binders which are reputed to have eliminated the kinds of problems associated with urea-formaldehyde. This paper addresses these issues by coming full circle and arriving back at the initial approach employed for low level radwaste immobilization, the use of cement. Based on an evaluation of the three principal competing immobilization approaches, liquid chemical, bitumen and cement, the merits and drawbacks of each is examined. As will be described, an objective assessment of these competing technologies has resulted in a somewhat surprising conclusion that, while none of the approaches is without disadvantages, cement can be shown to offer the most reliable, versatile long-term solution to today's needs.

630 (CONF-780506--(Vol.2), pp 754-762) PACKAGING, TRANSPORTATION AND DISPOSAL OF REACTOR CORE COMPONENTS. Panter, H.R.; Mason, M.E.; Viebrock, J.M. (Nuclear Assurance Corp., Atlanta, GA). 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

In recent years it became apparent in the nuclear industry that discharged fuel channels and other irradiated hardware from LWR's were utilizing significant storage space in plant spent fuel pools. Nuclear Assurance Corporation has fulfilled contracts with major US utilities for packaging and disposal of fuel channels, poison curtains, control rods and instrument sources from their BWR's. In order to conform to various shipping and burial regulations specifying allowable dose rates and isotopic content, activities of the non-fuel bearing components were calculated by the computer code ORIGEN, based on reactor operating parameters, cool times, and ASTM specifications. These data were used to evaluate various packaging configurations and/or shipping casks for conformity to the regulations and disposal site license constraints. Because of the high transportation and burial charges, the overall cost of disposing of this type waste is highly dependent on the number of shipments. NAC developed equipment to cut the bulky items and reduce the packing volume of the individual components tenfold. Equipment design and development also considered remote, underwater environment, physical characteristics of the irradiated material, i.e., zirconium embrittlement, the need to minimize required pool floor space and interference with other pool activities, operating convenience, and maintenance requirements.

631 (CONF-790420--, pp 1-3) DOE MATERIALS PROGRAM SUPPORTING IMMOBILIZATION OF RADIOACTIVE WASTES. Oertel, G.K.; Scheib, W.S. Jr. (Dept. of Energy, Washington, DC). May 1979.

From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).

A summary is presented of the DOE program for developing waste-form criteria, immobilization processes, and generation and evaluation of performance characterization data. Interrelationships are discussed among repository design, materials requirements, immobilization process definition, quality assurance, and risk analysis as part of the National Environmental Policy Act and regulatory processes.

632 (CONF-790420--, pp 17-24) UK PROGRAM: GLASSES AND CERAMICS FOR IMMOBILIZATION OF RADIOACTIVE WASTES FOR DISPOSAL. Johnson, K.D.B. (UKAEA, Harwell, England). May 1979.

From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).

The UK Research Program on Radioactive Waste Management includes the development of processes for the conversion of high-level-liquid-reprocessing wastes from thermal and fast reactors to borosilicate glasses. The properties of these glasses and their behavior under storage and disposal conditions have been examined. Methods for immobilizing activity from other wastes by conversion to glass or ceramic forms are described. The UK philosophy of final solutions to waste management and disposal is presented.

633 (CONF-790420--, pp 73-81) OPERATIONAL EXPERIENCE OF THE FIRST INDUSTRIAL HLW VITRIFICATION PLANT. Chotin, M.M. (Compagnie Generale des Matieres Nucleaires, Marcoule, France); Bonniaud, R.A.; Jouan, A.F.; Rabot, G.E. May 1979.

From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).

Marcoule Vitrification Plant which started up in active operation in June 1978 converts high-level radioactive liquid wastes into glass. The French vitrification process is a

continuous technique involving a calcination step. The glass is cast in stainless steel containers. After the lids are welded, a decontamination stage is operated prior to disposal.

634 (CONF-790420--, pp 82-85) COMPATIBILITY TESTS OF MATERIALS FOR A PROTOTYPE CERAMIC MELTER FOR DEFENSE GLASS-WASTE PRODUCTS. Wicks, G.G. (E.I. du Pont de Nemours and Co., Aiken, SC). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
The corrosion--erosion resistance of potential electrode and refractory materials was evaluated by static and dynamic tests in simulated glass waste. Based on corrosion--erosion behavior, thermal and electrical properties, and cost and availability, Monofrax K3 (Carborundum Co.) and Inconel 690 (International Nickel Co.) were selected as the contact refractory and electrode materials, respectively, for a prototype ceramic melter.

635 (CONF-790420--, pp 86-92) VITRIFICATION OF HIGH-LEVEL RADIOACTIVE WASTE IN A CONTINUOUS LIQUID-FED CERAMIC MELTER. Weisenburger, S.; Gruenewald, W.; Koschorke, H. (Karlsruhe Nuclear Research Center, Germany). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
The vitrification of simulated high-level liquid waste (HLLW) from the nuclear fuel cycle in a ceramic-lined waste melter is described. Particular reference is given to the present status of the melter technology. Some features are discussed arising from direct liquid feeding of the waste solution into the melter. Also presented are results concerning the entrainment of particulates as well as the loss of volatilized material into the melter off-gas. Ruthenium behavior in a liquid-fed ceramic melter is reported, and the extent of ruthenium volatility suppressed by predenitration of the waste solution is discussed. The 1500 h operation experience gained since 1976 with the pilot-scale vitrification unit is outlined, and the construction of an advanced melter having the potential for remote operation is given. The work described here is part of a German cooperative research and development program among seven institutions. One of the major objectives of this program is to provide a vitrification technology for the solidification of the LEWC waste stored at the Eurochemic site in Mol/Belgium. 3 figures, 4 tables.

636 (CONF-790420--, pp 93-96) VITRIFICATION OF HANFORD RADIOACTIVE DEFENSE WASTES. Kupfer, M.J. (Rockwell Hanford Operations, Richland, WA). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Hanford defense waste sludges and residual liquids are effectively immobilized by conversion to borosilicate glasses. The effects of composition on various properties such as chemical durability, viscosity, and devitrification are discussed. 5 tables.

637 (CONF-790420--, pp 97-101) SOLIDIFICATION OF HLW SOLUTIONS WITH THE PAMELA PROCESS. Heimerl, W. (Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen mbH, Mol, Belgium). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
A revised concept for the PAMELA process for the solidification of HLW solutions is described. The reasons for some changes, e.g., future use of borosilicate glass instead of phosphate glass, manufacture of glass blocks as well as blocks of glass beads in metal matrix, are discussed. Plans for a PAMELA demonstration plant to be built at Mol, Belgium, are presented.

638 (CONF-790420--, pp 102-106) DEVELOPMENT OF ENGINEERING SCALE HLLW VITRIFICATION TECHNIQUE AT PNC. Nagaki, H.; Oguino, N.; Tsunoda, N.; Segawa, T. (Power Reactor and Nuclear Fuel Development Corp., Ibaraki, Japan). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Some processes have been investigated to develop the technology of solidification of the high-level radioactive liquid waste generated from the nuclear fuel reprocessing plant operated by the Power Reactor and Nuclear Fuel Development Corporation (PNC) at Tokai-mura. This report covers the present state of development of a Joule-heated ceramic melter and a direct megahertz induction-heated melter. Engineering-scale tests have been performed with both melters. The Joule-heated melter could produce 45 kg or 16 liters of glass per hour. The direct-induction furnace was able to melt 5 kg or 1.8 liters of glass per hour. Both melters were composed of electrofused cast refractory brick. Thus it was possible to melt the glass at above 1200°C. Glass produced at higher melting temperatures is generally superior. 3 figures, 2 tables.

639 (CONF-790420--, pp 107-113) REVIEW OF CONTINUOUS CERAMIC-LINED MELTER AND ASSOCIATED EXPERIENCE AT PNL. Buelt, J.L.; Chapman, C.C.; Barnes, S.M.; Dierks, R.D. (Battelle Pacific Northwest Labs., Richland, WA). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Development of continuous, ceramic-lined melters applicable to immobilization of radioactive wastes began at PNL in 1973. A comprehensive program is curretly in progress. The melters constructed at PNL have incorporated remote and reliable design features necessary for radioactive use. The extensive experience with vitrification of simulated wastes has proven the continuous melter's applicability to radioactive waste immobilization.

640 (CONF-790420--, pp 114-117) PROGRESS IN FISSION PRODUCT SOLIDIFICATION AND CHARACTERIZATION UTILIZING THE JUELICH FIPS PROCESS. Halaszovich, S.; Merz, E.; Odoj, R. (Kernforschungsanlage, Juelich, Germany). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
The FIPS process for solidification of fission product solutions is briefly presented. Its main characteristics concerning process and product control are discussed. A newly developed layout consisting of a thermobalance and a mass spectrometer is described. Possible effects of the results of the thermodynamic investigations on glass composition and processing are discussed.

641 (CONF-790420--, pp 118-121) LABORATORY-

SCALE GLASS MELTER FOR TESTING DEFENSE WASTE GLASS. Gombert, D. II. (Allied Chemical Corp., Idaho Falls, ID). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
A one-liter Joule-heated glass melter was built to test the applicability of continuous melting to simulated high-level calcined defense waste. Inconel 690 electrodes and K-3 refractory brick were chosen for their corrosion resistance to fluoride glass. The melter maintained a full melt at 1100°C using 3 kW. After approximately two months of operation the melter was dismantled for metallurgical examination. The Inconel 690 electrodes were heavily corroded. A second melter is now in operation to verify the findings of the first melter run.

642 (CONF-790420--, pp 122-126) INFLUENCE OF HEAT TRANSFER ON THE POT VITRIFICATION PROCESS. Morris, J.B. (Atomic Energy Research Establishment, Harwell, England). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
The experimental data on the working zone in pot vitrification show that the mean wall heat flux (2 W/cm^2) is independent of vessel size. A simple model of the heat transfer processes is developed in which natural convection through the glass-forming region is the controlling mechanism. 3 figures.

643 (CONF-790420--, pp 127-131) RECENT DEVELOPMENTS IN LOW- AND INTERMEDIATE-LEVEL WASTE FIXATION BY CEMENT. Witte, H.O. (NUKEM GmbH, Hanau, Germany); Koester, R. May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Boron-containing radwaste sludge from PWR's can be incorporated into cement by addition of slaked lime, because in the presence of sufficient calcium the formation of tri-calcium aluminate is not inhibited. Incorporation of sodium nitrate into cement at least up to 20 wt % can be achieved with product qualities within acceptable levels. 5 figures, 2 tables.

644 (CONF-790420--, pp 132-135) FUETAP (FORMED UNDER ELEVATED TEMPERATURES AND PRESSURES) CONCRETES AS HOSTS FOR RADIOACTIVE WASTES. Moore, J.G.; Rogers, G.C.; Paehler, J.H.; Devaney, H.E. (Oak Ridge National Lab., TN). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Cementitious solids formed at less than or equal to 250°C and less than or equal to 70.3 kg/cm^2 (1000 psi) offer excellent possibilities as hosts for radioactive wastes. Preliminary results are presented on the effect of mix composition, temperature, and pressure on the physical properties of the resulting solids. Initial leach results are encouraging in the assessment of the ability of these FUETAP concretes to isolate radionuclides from the environment. 7 tables.

645 (CONF-790420--, pp 136-142) LOW TEMPERATUE CERAMIC RADIOACTIVE WASTE FORM. Roy, D.M.; Scheetz, B.E.; Grutzeck, M.W.; Sarkar, A.K.; Atkinson, S.D. (Pennsylvania State Univ., University Park). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Preliminary research on low temperature ceramic waste forms based upon modified calcium silicate and aluminate cements is described. Compositional and reaction variations, modified to achieve a strongly consolidated waste form which is reistant to significant change under the anticipated ambient, have been investigated. Extending previous studies in this laboratory, the recent work has utilized combinations of calcium aluminate cements and high early strength portland cements, different supercalcine waste formulations, and other additives. Both modified conventional cement composite consolidation methods and low-temperature hot-pressing methods were used to incorporate the supercalcine into a consolidated form. Products after initial consolidation and after drastic accelerated leaching treatment (hydrothermal leaching) were characterized. Uranium and simulated transuranics were found to be highly resistant to leaching; strontium was relatively resistant in many cases; and cesium leaching was found to be compositionally dependent. 8 tables.

646 (CONF-790420--, pp 143-149) SOLIDIFICATION OF HLLW BY GLASS-CERAMIC PROCESS. Oguino N. (Power Reactor and Nuclear Fuel Development Corp., Ibaraki, Japan); Masuda, S.; Tsunoda, N.; Yamanaka, T.; Ninomiya, M.; Sakane, T.; Nakamura, S.; Kawamura, S. May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
The compositions of glass-ceramics for the solidification of HLLW were studied, and the glass-ceramics in the diopside system was concluded to be the most suitable. Compared with the properties of HLW borosilicate glasses, those of diopside glass-ceramic were thought to be almost equal in leach rate and superior in thermal stability and mechanical strength. It was also found that the glass in this system can be crystallized simply by pouring it into a thermally insulated canister and then allowing it to cool to room temperature. 2 figures, 5 tables.

647 (CONF-790420--, pp 150-154) COATING OF WASTE CONTAINING CERAMIC GRANULES. Neumann, W.; Kofler, D. (Researach Centre Seibersdorf, Vienna, Austria). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Simulated high-level waste granules produced by fluidized-bed calcination were overcoated by chemical vapor deposition (CVD) with pyrocarbon and nickel in laboratory-scale experiments. Successful development enables pyrocrbon deposition at temperatures of 600 to 800°K. The coated granules have excellent properties for long-term waste storage.

648 (CONF-790420--, pp 155-159) SOLIDIFICATION OF HLLW INTO SINTERED CERAMICS. O-Oka, K. (Toshiba Corp., Kawasaki, Japan); Ohta, T.; Masuda, S.; Tsunoda, N. May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Simulated HLLW from the PNC reprocessing plant at Tokai was solidified into sintered ceramics by normal sintering or hot-pressing with addition of some oxides. Among various ceramic products obtained so far, the most preferable was nepheline-type sintered solids formed with addition of SiO_2 and Al_2O_3 to the simulated waste calcine. The solid shows

advantageous properties in leach rate and mechanical strength, which suggest that the ceramic solids were prepared with additions of ZrO_2 or MnO_2, and some of them showed good characteristics.

649 (CONF-790420--, pp 160-163) EMBEDDING METHODS OF SOLIDIFIED WASTE IN METAL MATRICES. Neumann, W. (Research Center Seibersdorf, Vienna, Austria). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
The embedding of simulated waste calcines by three different methods (vacuum-pressure casting, centrifugal casting, and metal stirred with the calcines) was investigated. The experimental performance is described and advantages and disadvantages noted. The feasibility of embedding fines by stirring in metal was shown. In addition, an estimation of the influence of porosity on the properties of composites was carried out.

650 (CONF-790420--, pp 164-168) DEVELOPMENT OF CERMETS FOR HIGH-LEVEL RADIOACTIVE WASTE FIXATION. Aaron, W.S.; Quinby, T.C.; Kobisk, E.H. (Battelle Pacific Northwest Labs., Richland, WA). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
A method is currently under development for the solidification and fixation of commercial and defense high-level radioactive wastes in the form of ceramic particles encapsulated by metal, i.e., a cermet. The chemical and physical processing techniques which have been developed and the properties of the resulting cermet bodies are described in this paper. These cermets have the advantages of high thermal conductivity and low leach rates.

651 (CONF-790420--, pp 169-173) DENSIFICATION OF CALCINES AND DIRECT CONTAINMENT OF SPENT NUCLEAR FUEL IN CERAMICS BY HOT ISOSTATIC PRESSING. Larker, H.T. (High-Pressure Lab., Robertsfors, Sweden). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Calcined HLLW and many other types of radioactive waste can be incorporated in synthetic mineral blocks by hot isostatic pressing. The processing can be made relatively simple, and lasting contamination of the hot press can be effectively avoided. The technique can also be applied to make canisters of synthetic corundum for spent fuel and a development up to full scale has been made. Results from corrosion tests on the densified materials are given, and the problem of obtaining relevant long-term leach rates for crystalline materials with mechanically disturbed surface layers is discussed.

652 (CONF-790420--, pp 174-178) IMMOBILIZATION OF HIGH-LEVEL WASTES IN SYNROC TITANATE CERAMIC. Ringwood, A.E.; Kesson, S.E. (Australian National Univ., Canberra). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
The elements occurring in high-level nuclear reactor wastes can be safely immobilized by incorporating them within the crystal lattices of the constituent phases of a titanate ceramic, SYNROC. Close structural analogs of these phases (hollandite, perovskite, and zirconolite) occur in nature and have survived for periods of 20 to 2000 million years. Accelerated leaching tests in water and saline solutions show that SYNROC is unaffected after 24 hours at extreme conditions (up to 900°C and 5000 bars), whereas borosilicate glasses decompose within a few hours under much less severe hydrothermal conditions (e.g., 350°C and 1000 bars). A variant of the SYNROC process appears to be particularly well-suited for immobilization of US military wastes. The modified ceramic waste form consists of the three major SYNROC phases (hollandite, perovskite , and zirconolite) plus a variety of refractory Fe--Al--Mn bearing titanates and spinels, which are thermodynamically compatible with the SYNROC phases. The SYNROC phases serve to immobilize fission products and actinides, while the additional refractory phases serve to immobilize the Fe--Al--Mn oxides, which constitute a very large proportion of the calcined sludges. These additional phases include pseudobrookite (AL_2TiO_5--$FeTi_2O_5$ ss), hercynite ($FeAl_2O_4$), ulvospinel (Fe_2TiO_4), ilmenite ($FeTiO_3$, and BAIT (essentially $BaAl_2Fe_8Ti_{13}O_{38}$). Waste loadings about 4 times higher than those of glass could readily be achieved, offering considerable economic and safety benefits relative to glass technology.

653 (CONF-790420--, pp 179-182) USE OF NATURAL ALUMINOSILICATES AND POROUS CERAMIC MATERIALS FOR THE INCLUSION OF RADIOACTIVE WASTES. Lazarev, L.N.; Shashukov, E.A.; Kuznetsov, Yu.V.; Lyubtsev, R.I. (Radium Inst., Leningrad, USSR). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Data on using the porous inorganic materials, such as diatomite and shamote, for the incorporation of radioactive wastes are presented. In laboratory-scale experiments on simulated liquid wastes it has been shown that the operations of solution absorption by porous materials, drying and calcination of salts in pores, and the subsequent conversion into glassy phosphate-silicate products seem to be promising from a technological point of view. This product is characterized by a sodium leaching rate of the order of 10^{-5} g/cm^2 . d and good resistance to crystallization. The content of various oxides in the wastes can attain 15 to 20 wt %. The data on the dependence of plasticity and open porosity of the clay-like products on Na_2O, SrO, ZrO_2, and MnO_2 content are also given. 3 figures, 3 tables.

654 (CONF-790420--, pp 183-187) VITRIFICATION OF ICPP HIGH-LEVEL ZIRCONIA CALCINE. Berreth, J.R.; Gombert, D. II; Cole, H.S. (Allied Chemical Corp., Idaho Falls, ID). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
High-level radioactive calcined defense waste (approx. 50 wt % CaF_2) is vitrified using a frit containing 66% SiO_2, 24% Na_2O, 8% B_2O_3, and 2% CuO. Effects of Na, B, Li, Zn, Cu, and P on viscosity and acid leach resistance were measured. The glass contains up to 9% fluoride. Glass properties were measured. 6 tables.

655 (CONF-790420--, pp 188-192) DEVELOPMENT AND CHARACTERIZATION OF THE GLASS-CERAMIC VCP 15 FOR INMOBILIZATION OF HIGH-LEVEL-LIQUID RADIOACTIVE WASTE. Guber, W. (Kernforschungszentrum, Karlsruhe, Germany);

Hussain, M.; Kahl, L.; Mueller, W.; Saidl, J. May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Complementary to the glass developments for HAW solidification, a glass-ceramic matrix was synthesized (VC 15) and the derived HAW-containing product (VCP 15) was investigated on both inactive and highly radioactive scales. In comparing the glass-ceramic matrix with the glass products, an improvement in thermal properties was found, but the leaching resistance was only slightly better. The main advantage of the glass-ceramic system is its higher thermodynamic equilibrium, which increases the long-term stability and safety of solidified HAW in final storage.

656 (CONF-790420--, pp 321-326) POROUS GLASS MATRIX METHOD FOR ENCAPSULATING HIGH-LEVEL NUCLEAR WASTES. Macedo, P.B.; Tran, D.C.; Simmons, J.H.; Saleh, M.; Barkett, A.; Simmons, C.J.; Lagakos, N.; DeWitt, E. (Catholic Univ. of America, Washington, DC). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
A novel process which uses solidified porous high-silica glass powder to fixate radioactive high-level wastes is described. The process yields cylinders consisting of a core of high-silica glass containing the waste elements in its structure and a protective layer also of high-silica glass completely free of waste elements. The process can be applied to waste streams containing 0 to 100% solids. The core region exhibits a higher coefficient of thermal expansion and a lower glass transition temperature than the outer protective layer. This leads to mechanical strengthening of the glass and good resistance to stress corrosion by the development of a high residual compressive stress on the surface of the sample. Both the core and the protective layer exhibit extremely high chemical durability and offer an effective fixation of the radioactive waste elements, including ^{239}Pu and ^{99}Tc which have long half-lives, for calculated periods of more than 1 million years, when temperatures are not allowed to rise above 100°C.

657 (CONF-790420--, pp 338-341) UTILIZATION OF BOROSILICATE GLASS FOR TRANSURANIC WASTE IMMOBILIZATION. Ledford, J.A.; Williams, P.M. (Rockwell International, Golden, CO). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Incinerated transuranic waste and other low-level residues have been successfully vitrified by mixing with boric acid and sodium carbonate and heating to 1050°C in a bench-scale continuous melter. The resulting borosilicate glass demonstrates excellent mechanical durability and chemical stability.

658 (CONF-790420--, pp 342-348) CRYSTALLOCHEMICAL STABILIZATION OF RADWASTE ELEMENTS IN PORTLAND CEMENT CLINKER. Jantzen, C.M.; Glasser, F.P. (Univ. of Aberdeen, Old Aberdeen, Scotland). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Most of the elements present in a model PW-4b radwaste have been successfully incorporated during clinkering into the calcium silicate and ferrite phases comprising Portland cement. The bulk composition of a model waste has been systematically altered by the addition of other nonradioactive components to produce an inherently cementitious material. This has the advantage that (1) the radwaste ions are substituted directly into the crystal structure of the anhydrous cement phases, (2) the unhydrated cement continues to behave as a ceramic, (3) during hydration the radwaste ions can be more readily incorporated into the hydration products, and (4) the hydration products should represent a close approach to thermodynamic stability during storage in geological environments, e.g., low pressures and temperatures between 0°C and approx. 180°C. 4 figures, 4 tables.

659 (CONF-790420--, pp 354-358) PROCESSES FOR IMMOBILIZATION OF HIGH-LEVEL SOLID WASTES BY GLASS AND CERAMIC MATRICES. Lin, K.H.; Clark, W.E.; Howerton, W.B. (Oak Ridge National Lab., TN). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Processes for the immobilization of waste SiC hulls and fissile particles from reprocessing of HTGR fuels are presented. Compressed cylinders of waste-matrix material were formed under pressures of approx. 35, 71, or 142 MPa and sintered at temperatures ranging from approx. 500 to 1025°C for approx. 1 h. The cylinders containing 50% SiC-25% soft glass-25% red clay possess the most desirable properties (high mechanical strength, low surface area, and low leachability) of the several different compositions studied. Within the pressure and temperature ranges studied, the pressure of cylinder formation and the sintering temperature appear to have relatively minor effects on those properties except for the initial cesium leachability. Higher pressure and temperature would tend to reduce the initial leachability significantly. 5 tables.

660 (CONF-790420--, pp 359-364) INCORPORATION OF PRECIPITATE FROM TREATMENT OF MEDIUM-LEVEL LIQUID RADIOACTIVE WASTE INTO GLASS MATRIX OR CERAMICS TOGETHER WITH HIGH-LEVEL LIQUID WASTE. Hussain, M. (Kernforschungszentrum, Karlsruhe GmbH, Germany); Kahl, L. May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
MAW-splitting, i.e., precipitation and separation of the radioactive matter from the bulk liquid, has been developed at Kernforschungszentrum Karlsruhe (KfK) as an alternataive to direct solidification of MLLW-concentrates by bituminization or cementation. More than 90% of the total radioactivity is removed from MLLW stream by absorbing it on surface rich precipitate, which is ultimately vitrified with HLLW. An addition of MLLW-precipitate to a matrix (glass or glass-ceramic), to which HLLW has already been incorporated, showed no significant decrease in product quality or increase in product amount. 5 tables.

661 (CONF-790420--, pp 370-373) STABILIZATION OF HIGH-LEVEL WASTE FROM A CHLORIDE VOLATILITY NUCLEAR FUEL REPROCESSING SYSTEM. Smith, L.A.; Thornton, T.A. (Babcock and Wilcox Co., Lynchburg, VA). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Methods for stabilizing high-level waste

from a chloride volatility thorium-based fuel coprocessing system have been studied. The waste, which is present as chloride salts, is combined with SiO_2 or Al_2O_3 and pyrohydrolyzed to remove the chloride ions. The resulting solid is then combined with a flux and glassified. 3 figures, 4 tables.

662 (CONF-790420--, pp 374-377) GLASS-CRYSTALLINE MATERIALS FOR ACTIVE WASTE INCORPORATION. Kulichenko, V.V.; Krylova, N.V.; Vlasov, V.I.; Polyakov, A.S. (State Committee for the Utilization of Atomic Energy, Moscow, USSR). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
This paper presents the results of investigations into the possibility and conditions for using glass-crystalline materials for the incorporation of radionuclides. Materials of a cast pyroxene type that are obtained by smelting calcined wastes with acid blast furnace slags are described. A study was also made of materials of a basalt type prepared from wastes with and without alkali metal salt. Changes in the structure and properties of materials in the process of storage at different temperatures have been studied.

663 (CONF-790420--, pp 229-232) USE OF GLASS-CERAMIC MATERIALS FOR THE FIXATION OF RADIOACTIVE WASTES. Minaev, A.A.; Oziraner, S.N.; Prokhorova, N.P. (State Committee on Peaceful Use of Atomic Energy, Moscow, USSR). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
This paper is concerned with the study of the crystallization of phosphate and silicate glasses. It was shown that temperature and time of storage influence considerably the crystallization of glasses and that crystallization very often increases their rates of leaching to a great extent. However, there are glasses in which crystallization does not result in leaching rate increase. It seems reasonable to use these materials for the fixation of radioactive wastes. The main reasons for the increase in the leaching rate during crystallization are the formation of porosity and soluble crystal phases.

664 (CONF-790420--, pp 25-26) PRINCIPAL TRENDS OF INVESTIGATIONS CARRIED ON IN THE USSR ON INCORPORATION OF HIGHLY ACTIVE WASTES INTO GLASS AND CERAMIC TYPE MATERIALS. Polyakov, A.S. (State Committee for the Utilization of Atomic Energy, Moscow, USSR). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Studies in the USSR on incorporation of high level waste into glass and ceramic materials are described.

665 (CONF-791112--17) TECHNICAL FEASIBILITY OF KRYPTON-85 STORAGE IN SODALITE. Benedict, R.W.; Christensen, A.B.; Del Debbio, J.A.; Keller, J.H.; Knecht, D.A. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). 1979. Contract EY-76-C-07-1570. 7p. Dep. NTIS, PC A02/MF A01.
From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).
Based on these experimental results, the process that is technically feasible for a reference 2000 metric ton of heavy metal (MTHM) per year reprocessing plant producing approx. 17 MCi or approx. 190 m^3 at STP would encapsulate krypton at approx. 20 cm^3/g from krypton at temperatures greater than 575°C and pressures greater than 1600 atm with one batch a day in a 58-L high pressure vessel. Based on preliminary measurements at 500°C, the same process also would be feasible for a 70% krypton and 30% xenon mixture. 7 figures.

666 (CONF-791112--43) VITRIFICATION OF HIGH-LEVEL ALUMINA NUCLEAR WASTE. Brotzman, J.R. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). 1979. Contract EY-76-C-07-1570. 10p. Dep. NTIS, PC A02/MF A01.
From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).
Borophosphate glass compositions have been developed for the vitrification of a high-alumina calcined defense waste. The effect of substituting SiO_2, P_2O_5 and CuO for B_2O_3 on the viscosity and leach resistance was measured. The effect of the alkali to borate ratio and the Li_2O:Na_2O ratio on the melt viscosity and leach resistance was also measured.

667 (CONF-791112--57) DEVELOPMENT AND CHARACTERIZATION OF CERMET FORMS FOR RADIOACTIVE WASTE. Aaron, W.S.; Quinby, T.C.; Kobisk, E.H. (Oak Ridge National Lab., TN (USA)). 1979. Contract W-7405-ENG-26. 8p. Dep. NTIS, PC A02/MF A01.
From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).
Cermets designed to isolate high-level wastes in a solid form are a composite consisting of various ceramic phase particles uniformly dispersed in and microencapsulated by an iron-nickel base alloy matrix. The metal matrix provides this waste form with many advantageous features including excellent thermal conductivity and mechanical strength. These cermets are formed by first dissolving the waste in molten urea, precipitating and calcining all the constituents, compacting the calcine, and sintering and reduction to form the final product. The exact formulation of cermets through additions to the waste is designed to fix most of the fission products in stable, leach resistant ceramic phases which are subsequently microencapsulated by an alloy matrix. The alloy matrix, which is derived primarily from the waste itself and includes the reducible fission and activation products from the waste, can be compositionally adjusted through additions to optimize its corrosion resistance under conditions existing in various disposal environments. The processes by which cermets are formed include several new and unique materials preparation options that are being developed to permit engineering scale-up and to be compatible with remote operations. Cermets formed by alternate processing methods are being characterized. Initially, cermet samples were prepared using a laboratory scale, batch process developed for the preparation of special ceramics having high compositional uniformity and excellent sinterability. The modification of this batch process to one suitable for scale-up and remote operation is the subject of this paper. Cermet characterization is also discussed.

668 (CONF-791112--63) METHODS FOR SEPARATING ACTINIDES FROM REPROCESSING AND REFABRICATION PLANT WASTES. Tedder, D.W.; Finney, B.C.; Blomeke, J.O. (Oak Ridge National Lab., TN (USA)). 1979. Contract W-7405-ENG-26. 8p. NTIS, PC A02/MF A01.
From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

Chemical processing flowsheets have been developed to partition actinides from all actinide-bearing LWR fuel reprocessing and refabrication plant wastes. These wastes include high-activity-level liquids, scrap recovery liquors, HEPA filters and incinerator ashes, and chemical salt wastes such as sodium carbonate scrub solutions, detergent cleanup streams, and alkaline off-gas scrubber liquors. The separations processes that were adopted for this study are based on solvent extraction, cation exchange chromatography, and leaching with Ce^{4+}-HNO_3 solution.

669 (CONF-791112--64) REACTION OF HYDROGEN AND OXYGEN IN THE PRESENCE OF CONCRETES INCORPORATING SIMULATED RADIOACTIVE WASTE. Katz, S. (Oak Ridge National Lab., TN (USA)). 1979. Contract W-7405-ENG-26. 16p. Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

The radiolysis of contained water, with the potential of pressurization due to the accumulation of these radiolytically produced gases, has been identified as a major concern for radioactive wastes fixed in cementitious matrices. One estimate of the pressure build-up is that about 100 atmospheres pressure could accumulate in a standard canister containing alpha waste after 100,000 years. Since the radiolysis of concrete is dependent on the amount of unbound or free water present in the system, removal of all or most of this water would greatly reduce this rate. Regardless of the production rate however, pressurization from the accumulation of hydrogen and oxygen would be avoided if there were sufficient recombination of these gases as, or after, they were generated. These studies were undertaken to determine the recombination rates obtained with special cementitious matrices. The basis for this study was the realization that FUETAP concrete containing radioactive waste or perhaps some other added constituent could provide a surface to catalyze the recombination of any radiolytically produced hydrogen and oxygen. In this investigation, the rate of reaction between hydrogen and oxygen was measured by determining the yield of water or the depletion of oxygen, as mixture of these gases flowed through a bed of the test material. Three cementitious mixtures were examined, a neat cement paste and two FUETAP concretes. The data obtained with each of the three experimental systems show that there is a high hydrogen-oxygen recombination rate in presence of FUETAP concretes containing simulated waste. The data suggest that gas pressurization may not be a problem with FUETAP concretes containing waste, if one can ensure that adequate contact is maintained between the gases and the available solid surfaces. (DC)

670 (CONF-791185--1) ORIGIN, MAGNITUDE, AND TREATMENT OF RADIOACTIVE WASTES. Blomeke, J.O. (Oak Ridge National Lab., TN (USA)). 1979. Contract W-7405-ENG-26. 27p. Dep. NTIS, PC A03/MF A01.

From ANS student chapter seminar; College Station, TX, USA (5 Nov 1979).

Radioactive wastes in solid, liquid, and gaseous forms are generated wherever radioactive materials are handled. Unlike conventional industrial wastes, most of them are not amenable (within presently available technology) to treatment that can destroy their toxicity. They become innocuous only through natural decay, and many of the isotopes of concern decay so slowly that they must be isolated from the environment for hundreds of thousands of years. The primary objective of nuclear waste management is to protect man and his environment from these materials by providing containment by means that are available within present or near-future technology. The origin and nature of the wastes are reviewed, and the methods of treatment that are in use or that soon can be made available are described.

671 (CONF-791234--7) INEL WASTE CLEANUP. Chapin, J.A. (EG and G Idaho, Inc., Idaho Falls (USA)). 1979. Contract AC07-76ID01570. 41p. NTIS, PC A03/MF A01.

From Environmental decontamination workshop; Oak Ridge, TN, USA (4 Dec 1979).

Decommissioning and decontamination activities at the Idaho National Engineering Laboratory are discussed. The projects planned and completed are presented. Problems encountered on these projects are discussed. A developmental program is recommended. Contaminated areas consist of test reactors, reactor support facilities, a fuel reprocessing facility and various soil areas. One D and D project in 1960 occurred as a result of an accident at a low-power reactor in which 3 persons were killed, the reactor and containment building were destroyed, and large areas of land were contaminated. (DC)

672 (CONF-800211--2(Draft)) PROCESSES FOR THE CONTROL OF $^{14}CO_2$ DURING REPROCESSING. Notz, K.J.; Holladay, D.W.; Forsberg, C.W.; Haag, G.L. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 28p. Dep. NTIS, PC A03/MF A01.

From International symposium on management of gaseous wastes from nuclear facilities; Vienna, Austria (18 Feb 1980).

The fixation of $^{14}CO_2$ may be required at some future time because of the significant fractional contribution of ^{14}C, via the ingestion pathway, to the total population dose from the nuclear fuel cycle, even though the actual quantity of this dose is very small when compared to natural background. The work described here was done in support of fuel reprocessing development, of both graphite fuel (HTGRs) and metal-clad fuel (LWRs and LMFBRs), and was directed to the control of $^{14}CO_2$ released during reprocessing operations. However, portions of this work are also applicable to the control of $^{14}CO_2$ released during reactor operation. The work described falls in three major areas: (1) The application of liquid-slurry fixation with $Ca(OH)_2$, which converts the CO_2 to $CaCO_3$, carried out after treatment of the CO_2-containing stream to remove other gaseous radioactive components, mainly ^{85}Kr. This approach is primarily for application to HTGR fuel reprocessing. (2) The above process for CO_2 fixation, but used ahead of Kr removal, and followed by a molecular sieve process to take out the ^{85}Kr. This approach was developed for use with HTGR reprocessing, but certain aspects also have application to metal-clad fuel reprocessing and to reactor operation. (3) The use of solid $Ba(OH)_2$ hydrate reacting directly with the gaseous phase. This process is generally applicable to both reprocessing and to reactor operation.

673 (CONF-800305--4) CORROSION EXPERIENCE IN CALCINATION OF LIQUID NUCLEAR WASTE. Zimmerman, C.A. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). 1980. Contract EY-76-C-07-1570. 26p. Dep. NTIS, PC A03/MF A01.

From Corrosion/80 NACE meeting; Chicago, IL, USA (6 Mar 1980).

The Waste Calcining Facility (WCF) at the Idaho National Engineering Laboratory became operational in 1963. Since that time, approximately 13,337,137 litres (3,523,375 gallons) of liquid nuclear wastes, generated during the reprocessing of spent nuclear fuel materials, have been reduced to dry granular solids. The volume reduction is about seven or eight gallons of liquid waste to one gallon of dry granular solids. This paper covers some of the corrosion experiences encountered in over fifteen years of operating that calcination facility. 7 figures, 7 tables.

674 (CONF-800313--2) VOLUME REDUCTION OF CONTAMINATED METAL WASTE. Copeland, G.L.; Heestand, R.L. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 9p. Dep. NTIS, PC A02/MF A01.

From Waste management conference; Tucson, AZ, USA (10 Mar 1980).

A conceptual waste treatment plan comprises sorting the metal scrap into alloy types, size reduction of the scrap to fit in the melting equipment, further alloy segregation by sequentially raising the temperature of mixed scrap lots and allowing the low-melting alloys to drip-melt out, induction melting of the high-melting alloys, and casting all alloy type into ingots. Laboratory melts of various metals were made to compare the observed partitioning of uranium to the slag with thermodynamic calculations. An engineering-scale demonstration was also conducted in which typical metal scrap contaminated with UO_2 was processed by mechanical size reduction, drip melting, and induction melting. Results show decontamination was successful. 5 figures, 2 tables. (DLC)

675 (CONF-800313--3) OVERVIEW OF HIGH-LEVEL WASTE MANAGEMENT ACCOMPLISHMENTS. Lawroski, H.; Berreth, J.R.; Freeby, W.A. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). 1980. Contract EY-76-C-07-1570. 14p. Dep. NTIS, PC A02/MF A01.

From Waste management conference; Tucson, AZ, USA (10 Mar 1980).

Storage of power reactor spent fuel is necessary at present because of the lack of reprocessing operations particularly in the U.S. By considering the above solidification and storage scenario, there is more than reasonable assurance that acceptable, stable, low heat generation rate, solidified waste can be produced, and safely disposed. The public perception of no waste disposal solutions is being exploited by detractors of nuclear power application. The inability to even point to one overall system demonstration lends credibility to the negative assertions. By delaying the gathering of on-line information to qualify repository sites, and to implement a demonstration, the actions of the nuclear power detractors are self serving in that they can continue to point out there is no demonstration of satisfactory high-level waste disposal. By maintaining the liquid and solidified high-level waste in secure above ground storage until acceptable decay heat generation rates are achieved, by producing a compatible, high integrity, solid waste form, by providing a second or even third barrier as a compound container and by inserting the enclosed waste form in a qualified repository with spacing to assure moderately low temperature disposal conditions, there appears to be no technical reason for not progressing further with the disposal of high-level wastes and needed implementation of the complete nuclear power fuel cycle.

676 (CONF-800416--4) ORNL DECONTAMINATION AND DECOMMISSIONING PROGRAM. Bell, J.P. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 29p. Dep. NTIS, PC A03/MF A01.

From UCC-ND and GAT waste management seminar program; Portsmouth, OH, USA (22 Apr 1980).

A program has been initiated at ORNL to decontaminate and decommission surplus or abandoned nuclear facilities. Program planning and technical studies have been performed by UCC-ND Engineering. A feasibility study for decommissioning the Metal Recovery Facility, a fuel reprocessing pilot plant, has been completed.

677 (CONF-800607--79) SPENT LWR FUEL ENCAPSULATION AND DRY STORAGE DEMONSTRATION. Bahorich, R.J.; Durrill, D.C.; Cross, T.E.; Unterzuber, R. (Westinghouse Electric Corp., Pittsburgh, PA (USA). Advanced Energy Systems Div.). 1980. Contract AC08-76NV00597. 34p. NTIS, PC A03/MF A01.

From American Nuclear Society annual meeting; Las Vegas, NV, USA (8 Jun 1980).

In 1977 the Spent Fuel Handling and Packaging Program (SFHPP) was initiated by the Department of Energy to develop and test the capability to satisfactorily encapsulate typical spent fuel assemblies from commercial light-water nuclear power plants and to establish the suitability of one or more surface and near surface concepts for the interim dry storage of the encapsulated spent fuel assemblies. The E-MAD Facility at the Nevada Test Site, which is operated for the Department of Energy by the Advanced Energy Systems Division (AESD) of the Westinghouse Electric Corporation, was chosen as the location for this demonstration because of its extensive existing capabilities for handling highly radioactive components and because of the desirable site characteristics for the proposed storage concepts. This paper describes the remote operations related to the process steps of handling, encapsulating and subsequent dry storage of spent fuel in support of the Demonstration Program.

678 (CONF-800743--5) EXPERIMENTAL STUDIES AT THE IDAHO CHEMICAL PROCESSING PLANT ON ACTINIDE PARTITIONING FROM ACIDIC NUCLEAR WASTES. McIssaac, L.D.; Baker, J.D.; Meikrantz, D.H.; Schroeder, N.C. (Idaho National Engineering Lab., Idaho Falls (USA)). 1980. Contract AC07-76ID01570. 24p. NTIS, PC A02/MF A01.

From International conference on nuclear waste transmutation; Austin, TX, USA (22 Jul 1980).

Wastes generated at ICPP and in the reprocessing of LWR fuel is discussed separately. DHDECMP is used as extractant. Studies on DHDECMP purification and toxicity, diluent effects, reaction kinetics, radiolysis, mixer-settler performance, etc. are reported. 10 tables, 3 figures. (DLC)

679 (CONF-800743--12) REMOVAL OF ACTINIDES FROM NUCLEAR FUEL REPROCESSING WASTES: ENGINEERING STUDIES. Maxey, H.R.; McIsaac, L.D.; Chamberlain, D.B.; McManus, G.J. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). 1980. Contract AC07-ID01675. 25p. NTIS, PC A02/MF A01.

From International conference on nuclear waste transmutation; Austin, TX, USA (22 Jul 1980).

The major pilot plant effort has been directed towards understanding the behavior of

the extraction column. This emphasis was placed on extraction because the actinide-free raffinate from this column is the process product. Although actual radioactive feeds have been used only in a very limited number of tests, the combination of simulated column tests, minimixer-settler tests, and pilot plant experiments have shown that an actinide-free raffinate can be produced. A pulsed sieve plate column can achieve this separation in a reasonable height. In the design of an extraction process, there are several tradeoffs that have to be examined. One such tradeoff is that between column capacity and separation efficiency; an increase in column diameter (or capacity) means a faster processing rate, but, unfortunately, it also means a decrease in column efficiency. Therefore, the greater the diameter, the larger the HTU and the higher the column has to be to achieve the desired separation. In nuclear applications this is very important since column height is limited by the size of the process containment building. In increasing the diameter from 3 to 8 inches, an increase in HTU's up to 50% was observed by Sege. For plant operations, the pulse columns could probably be pulsed at 40 CPM, 2.5 cm per pulse. At these conditions, the HTU should be no greater than 0.75 m, even considering changes resulting from scaleup.

680 (CONF-800802--11) MELTING METAL WASTE FOR VOLUME REDUCTION AND DECONTAMINATION. Copeland, G.L.; Heshmatpour, B.; Heestand, R.L. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 11p. NTIS, PC A02/MF A01.
From 89. annual meeting of the American Institute of Chemical Engineers; Portland, OR, USA (17 Aug 1980).
Melt-slagging was investigated as a technique for volume reduction and decontamination of radioactively contaminated scrap metals. Experiments were conducted using several metals and slags in which the partitioning of the contaminant U or Pu to the slag was measured. Concentrations of U or Pu in the metal product of about 1 ppM were achieved for many metals. A volume reduction of 30:1 was achieved for a typical batch of mixed metal scrap. Additionally, the production of granular products was demonstrated with metal shot and crushed slag.

681 (CONF-800814--12) MICROBIAL UPTAKE OF URANIUM, CESIUM, AND RADIUM. Strandberg, G.W.; Shumate, S.E. II; Parrott, J.R. Jr.; McWhirter, D.A. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 35p. NTIS, PC A03/MF A01.
From 180. American Chemical Society meeting/2. chemical congress of the North American Continent; Las Vegas, NV, USA (24 Aug 1980).
The ability of diverse microbial species to concentrate uranium, cesium, and radium was examined. Saccharomyces cerevisiae, Pseudomonas aeruginosa, and a mixed culture of denitrifying bacteria accumulated uranium to 10 to 15% of the dry cell weight. Only a fraction of the cells in a given population had visible uranium deposits in electron micrographs. While metabolism was not required for uranium uptake, mechanistic differences in the metal uptake process were indicated. Uranium accumulated slowly (hours) on the surface of S. cerevisiae and was subject to environmental factors (i.e., temperature, pH, interfering cations and anions). In contrast, P. aeruginosa and the mixed culture of denitrifying bacteria accumulated uranium rapidly (minutes) as dense, apparently random, intracellular deposits. This very rapid accumulation has prevented us from determining whether the uptake rate during the transient between the initial and equilibrium distribution of uranium is affected by environmental conditions. However, the final equilibrium distributions are not affected by those conditions which affect uptake by S. cerevisiae. Cesium and radium were concentrated to a considerably lesser extent than uranium by the several microbial species tested. The potential utility of microorganisms for the removal and concentration of these metals from nuclear processing wastes and several bioreactor designs for contacting microorganisms with contaminated waste streams will be discussed.

682 (CONF-800914--3) MICROWAVE ENERGY FOR POST-CALCINATION TREATMENT OF HIGH-LEVEL NUCLEAR WASTES. Gombert, D.; Priebe, S.J.; Berreth, J.R. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). 1980. Contract AC07-79ID01675. 10p. NTIS, PC A02/MF A01.
From IEEE meeting; Cincinnati, OH, USA (29 Sep 1980).
Portions of document are illegible.
High-level radioactive wastes generated from nuclear fuel reprocessing require treatment for effective long-term storage. Heating by microwave energy is explored in processing of two possible waste forms: (1) drying of a pelleted form of calcined waste; and (2) vitrification of calcined waste. It is shown that residence times for these processes can be greatly reduced when using microwave energy rather than conventional heating sources, without affecting product properties. Compounds in the waste and in the glass frit additives couple very well with the 2.45 GHz microwave field so that no special microwave absorbers are necessary.

683 (CONF-800943--(Summ.), pp 65-67) SPENT-FUEL DISASSEMBLY AND CANNING PROGRAMS AT THE BARNWELL NUCLEAR FUEL PLANT (BNFP). Townes, G.A. (Allied-General Nuclear Services, Barnwell, SC). 1980.
From National topical meeting of fuel cycles for the 80's; Gatlinburg, TN, USA (29 Sep 1980).
SPENT FUEL ELEMENTS;RADIOACTIVE WASTE PROCESSING;HOT CELLS;FUEL PINS;REMOVAL; CONTAINERS;PACKAGING;BARNWELL FUEL PROCESSING PLANT;MECHANICAL DECLADDING;SPENT FUEL STORAGE

684 (CONF-800943--(Summ.), pp 68-70) UNDERWATER FUEL DISASSEMBLY AND ROD STORAGE SUMMARY. Viebrock, J.M.; Malin, D.H. 1980.
From National topical meeting of fuel cycles for the 80's; Gatlinburg, TN, USA (29 Sep 1980).
SPENT FUEL ELEMENTS;FUEL RODS;REMOVAL;SPENT FUEL STORAGE;PACKAGING;RADIOACTIVE WASTE PROCESSING;UNDERWATER OPERATIONS;SAFETY; MECHANICAL DECLADDING

685 (CONF-801038--1(Draft)) ORGANIC IODINE REMOVAL FROM SIMULATED DISSOLVER OFF-GAS STREAMS USING SILVER-EXCHANGED MORDENITE. Jubin, R.T. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 31p. NTIS, PC A03/MF A01.
From 16. DOE nuclear air cleaning conference; San Diego, CA, USA (20 Oct 1980).
The removal of methyl iodide by absorption onto silver mordenite was studied using a simulated off-gas from the fuel dissolution step of a nuclear fuel reprocessing plant. The methyl iodide absorption of silver mordenite was examined for the effects of NO/sub x/, humidity, iodine concentration, filter

temperature, and filter pretreatment. The highest iodine loading achieved in these tests has been 34 mg CH_3I per g of substrate, approximately five times less than the elemental iodine loadings. Results indicate that a filter operating at a temperature of 150°C obtained higher iodine loadings than a similar filter operating at 100°C. Pretreatment of the sorbent bed with hydrogen, rather than dry air, at a temperature of 200°C also improved the loading. Variations in the methyl iodide concentration had minimal effects on the overall loading. Filters exposed to moist air streams attained higher loadings than those in contact with dry air. A study of the regeneration characteristics of silver mordenite indicates limited adsorbent capacity after complete removal of the iodine with 4% hydrogen in the regeneration gas stream at 500°C. 9 figures.

686 (CONF-801038--4) VOLATILITIES OF RUTHENIUM, IODINE, AND TECHNETIUM ON CALCINING FISSION PRODUCT NITRATE WASTES. Rimshaw, S.J.; Case, F.N. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 28p. NTIS, PC A03/MF A01.

From 16. DOE nuclear air cleaning conference; San Diego, CA, USA (20 Oct 1980).

Various high-level nitrate wastes were subjected to formic acid denitration. Formic acid reacts with the nitrate anion to yield noncondensable, inert gases according to the following equation: 4 HCOOH + 2 HNO_3 → N_2O + 4 CO_2 + 5 H_2O. These gases can be scrubbed free of ^{106}Ru, ^{131}I, and ^{99}Tc radioactivities prior to elimination from the plant by passage through HEPA filters. The formation of deleterious NO/sub x/ is avoided. Moreover, formic acid reduces ruthenium to a lower valence state with a sharp reduction in RuO_4 volatility during subsequent calcination of the pretreated waste. It is shown that a minimum of 3% of RuO_4 in an off-gas stream reacts with Davison silica gel (Grade 40) to give a fine RuO_2 aerosol having a particle size of 0.5 μ. This RuO_2 aerosol passes through water or weak acid scrub solutions but is trapped by a caustic scrub solution. Iodine volatilizes almost completely on calcining an acidic waste, and the iodine volatility increases with increasing calcination temperature. On calcining an alkaline sodium nitrate waste the iodine volatility is about an order of magnitude lower, with a relatively low iodine volatility of 0.39% at a calcination temperature of 250°C and a moderate volatility of 9.5% at 600°C. Volatilities of ^{99}Tc were generally <1% on calcining acidic or basic wastes at temperatures of 250 to 600°C. Data are presented to indicate that ^{99}Tc concentrates in the alkaline sodium nitrate supernatant waste, with approx. 10 mg ^{99}Tc being associated with each curie of ^{137}Cs present in the waste. It is shown that lutidine (2,4 dimethyl-pyridine) extracts Tc(VII) quantitatively from alkaline supernatant wastes. The distribution coefficient (K/sub D/) for Tc(VII) going into the organic phase in the above system is 102 for a simulated West Valley waste and 191 for a simulated Savannah River Plant (SRP) waste.

687 (CONF-801038--6) INCINERATION OF CONTAMINATED ORGANIC SOLVENTS IN A FLUIDIZED-BED CALCINER. Schindler, R.E. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). 1980. Contract AC07-79ID01675. 9p. NTIS, PC A02/MF A01.

From 16. DOE nuclear air cleaning conference; San Diego, CA, USA (20 Oct 1980).

The reprocessing of expended reactor fuels at the Idaho Chemical Processing Plant (ICPP) generates contaminated organic solvents. An evaluation of potential management alternatives shows that several are suitable for management of contaminated solvents containing tri-butyl phosphate (TBP): the solvent could be burned in a commercially-available burner which absorbs the phosphorus on a fluidized-bed of limestone leaving a solid product for burial; the solvent could be burned in a small fluidized-bed calciner which solidifies non-radioactive feed by in-bed combustion of the contaminated solvent. The fluidized-bed absorbs the phosphate forming a solid product for burial; the solvents could be solidified with a gel or sorbant for burial if the reprocessing system were modified to reduce the solvent volume; and the contaminated solvent could be burned in an existing fluidized-bed calciner designed for solidifying high-level aqueous wastes. Burning the solvent in the existing calciner was selected for process verification because it provides an existing burner, off-gas system, and solids transfer and storage system. No additional wastes are generated. A set of four pilot-plant tests verified the absence of adverse effects from the phosphorus in the fuel when calcining simulated ICPP aqueous wastes. Essentially all of the phosphorus remained in the calcined solids with only a negligible quantity remaining in the scrubbed off-gas. Combustion efficiency was high (93 to 96%). There were no observable adverse effects on solids in the scrubbing system, corrosion rates, or solids flowability (for retrieval). Conclusions of general applicability are: alternative technologies are available for disposal of contaminated solvents, and the use of an existing fuel-using facility, e.g., calciner or incinerator - designed for contaminated wastes will usually be cost effective.

688 (CONF-801038--7) PRELIMINARY SAFETY EVALUATION OF A COMMERCIAL-SCALE KRYPTON-85 ENCAPSULATION FACILITY. Christensen, A.B.; Tanner, J.E.; Knecht, D.A. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). 1980. Contract AC07-79ID01675. 14p. NTIS, PC A02/MF A01.

From 16. DOE nuclear air cleaning conference; San Diego, CA, USA (20 Oct 1980).

This paper demonstrates that a commercial-scale facility for encapsulating krypton-85 in zeolite-5A or glass at a 2000 MTHM per year nuclear fuel reprocessing plant can be designed to contain fragments and the 340 to 850 kCi krypton-85 inventory from an assumed catastrophic failure of the high pressure vessel. The vessel failure was assumed as a worst case and was not based on a detailed design evaluation or operating experience. The process design is based on existing commercial hot isostatic pressing technology operated at up to 40 times the scale required for krypton encapsulation. From the calculated process gas inventory in the pressure vessel and vessel design, the maximum explosive energy of 8.4 kg TNT and resulting vessel plug and fragment velocities were calculated. The facility Containment Cell housing the high pressure vessel was designed to contain the gases, fragments, and the shock wave energy calculated for a hypothetical vessel failure. The Access Cell located directly above the Containment Cell was designed to be a tertiary confinement of krypton-85, should the access hatch be breached. 3 figures, 2 tables.

689 (CONF-801124--9) ADVANCED METHOD FOR MAKING VITREOUS WASTE FORMS. Pope, J.M.; Harrison, D.E. (Westinghouse Research and

Development Center, Pittsburgh, PA (USA)). 1980. Contract AC08-76NV00597. 8p. NTIS, PC A02/MF A01.

From 3. annual meeting of the Materials Research Society; Boston, MA, USA (17 Nov 1980).

A process is described for making waste glass that circumvents the problems of dissolving nuclear waste in molten glass at high temperatures. Because the reactive mixing process is independent of the inherent viscosity of the melt, any glass composition can be prepared with equal facility. Separation of the mixing and melting operations permits novel glass fabrication methods to be employed.

690 (CONF-801206--2) CORRELATION OF LEACHANT ANALYSES AND WEIGHT LOSS MEASUREMENTS IN THE LEACHING OF HIGH-IRON SYNTHETIC BASALTS. Tallman, R.L. (EG and G Idaho, Inc., Idaho Falls (USA)). 1980. Contract AC07-76ID01570. 5p. NTIS, PC A02/MF A01.

From ORNL conference on the leachability of radioactive solids; Gatinburg, TN, USA (9 Dec 1980).

Materials which simulate the slag product of the Slagging Pyrolysis Incinerator under consideration for the INEL Transuranic Waste Treatment Facility have been characterized. This slag is an iron-rich basalt-like material designed to contain the low-level TRU waste stored at INEL. Leach tests on synthetic compositions have been performed to provide information for process design and to indicate the quality of the waste form. Experiments have been performed to confirm that microbalance weight losses agree with the contents of the leachants as determined by chemical analyses. Deionized water was used as the leachant and the leachants from experiments at 70°C were analyzed by atomic absorption and inductively-coupled plasma and flame emission techniques and by isotopic dilution mass spectrometry (for uranium). Leachant analyses provided both elemental leach rates ad weight loss leach rates. The weight loss leach rates were calculated from the sums of the analytically determined elemental contents of the leachants, converted to weights of oxides. These rates correlate with the elemental leach rates calculated from the microbalance weight loss, measured by a substitution-type electronic microbalance. Sample composition and devitrification effects, including microcracking effects, and comparisons of elemental leachant analyses and leach rates with microbalance weight losses are the most significant results of this work.

691 (COO--2510-15) ADVANCED WASTE FORMS RESEARCH AND DEVELOPMENT. FINAL REPORT, OCTOBER 1, 1978-SEPTEMBER 30, 1979. McCarthy, G.J. (Pennsylvania State Univ., University Park (USA). Materials Research Labs.). Aug 1979. Contract EY-76-S-02-2510-092. 36p. Dep. NTIS, PC A03/MF A01.

Research on supercalcine-ceramics was conducted with the objectives of characterizing the phases and of applying them to fluorine-containing Thorex wastes. This report is concerned with quantitative phase analysis of complex ceramics using x-ray powder diffraction methods and with scanning transmission electron microscopy of these ceramics and its correlation with fluorite structure solid solution phase diagrams. (DLC)

692 (CS-INIS--258, pp 134-140) TECHNIQUE OF MASURING DEACTIVATION EFFICIENCY OF WATER TREATMENT EQUIPMENT IN NUCLEAR POWER FACILITIES BY GAMMA SPECTROMETRIC ANALYSIS. Biheller, J. (Vyzkumny Ustav Vodohospodarsky, Prague (Czechoslovakia)). Sep 1978. (In Czech).

From 9. national conference on radionuclides and ionizing radiation in water management; Liberec, Czechoslovakia (28 Sep 1978).

Gamma spectrometry was chosen for investigating the decontamination efficiency of systems for the treatment of water from nuclear installations. Waste water was modelled by a mixture of fission products dissolved in mineral acids, sampling was carried out at several points of the treatment system. The measuring instruments consisted of multi-channel analyzer CANBERRA 8180 and a Ge-Li detector. The analyzer has a punched tape output which allows automatic spectra evaluation. The gamma spectrometric method used to investigate the decontamination efficiency of waste water treatment plants is cost, energy and labour saving.

693 (CS-INIS--258, pp 39-46) PROBLEMS OF DEACTIVATING LIQUID EFFLUENTS FROM NUCLEAR FACILITIES. Bor, J.; Mikolas, P. (Vyzkumny Ustav Vodohospodarsky, Prague (Czechoslovakia)). Sep 1978. (In Czech).

From 9. national conference on radionuclides and ionizing radiation in water management; Liberec, Czechoslovakia (28 Sep 1978).

Laboratory tests were carried out of various types of semi-permeable membranes for the deactivation of water using reverse osmosis. The equipment consisting of a filter press, a high-pressure piston pump and a fan allows the testing of several membranes with a maximum surface of 0.5 m^2 simultaneously. Various techniques of water pre-treatment were tested to comply with demands on the quality of water coming to the membranes. The aim of the treatment was to remove from the water suspensions, colloidal iron and powerful oxidants, and to adjust the pH level to a neutral or weakly acid. A sorption filter was developed consisting of layers of various sorbents. The tests showed that this filter alone is able to reduce water contamination by an order of 1 to 1.5. In the process, the initial water contamination in the region of 10^5 Bq/l (or 10^3 Bq/l in older mixtures) was reduced by 3 to 4 orders of magnitude.

694 (CS-INIS--258, pp 28-30) DECONTAMINATION AND DISPOSAL OF RADIOACTIVE WASTES FROM NUCLEAR FACILITIES. Dlouhy, Z. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Sep 1978. (In Czech).

From 9. national conference on radionuclides and ionizing radiation in water management; Liberec, Czechoslovakia (28 Sep 1978).

A survey and characteristics are given of the main sources of wastes from the operation of nuclear installations. The amounts of liquid and gaseous wastes from PWR and BWR reactors are compared. The main trends of radioactive waste processing in the world are described. In Czechoslovakia, two methods of waste fixation have been developed: vacuum cementation and bituminization. The demands are summed up on radioactive waste storage sites and it is stated that there are a number of suitable localities, namely abolished granite quarries with a very deep ground water level and a low-permeable overburden and exhausted quarries of kaolinitic clays, which meet all criteria and secure the safe disposal of wastes from Czechoslovak nuclear power plants up to the year 2020.

695 (CS-INIS--258, pp 47-52) DEACTIVATION OF WASTE WATERS IN THE CZECHOSLOVAK URANIUM INDUSTRY. Priban, V. (Ceskoslovensky Uranovy

Prumysl, Straz pod Ralskem. Ustredni Laboratore). Sep 1978. (In Czech).
From 9. national conference on radionuclides and ionizing radiation in water management; Liberec, Czechoslovakia (28 Sep 1978).
Deactivation techniques are described used for the treatment of waste waters from uranium mines and uranium chemical treatment plants. With treatment plant waters this is done either by precipitation of radium with barium sulfate or using multistage evaporating units. Mine waste waters are deactivated by sorption on ion exchangers; strongly basic anion exchangers, mostly Wofatit SBW, Varion AP or Ostion AU are used for uranium, while the strongly acidic Ostion KS is used for radium.

696 (CS-INIS--258, pp 8-15) EXPERIENCE WITH LIQUID RADIOACTIVE WASTE TREATMENT. Ruzicka, J. (Ustredi Statni Vodohospodarske Inspekce, Prague (Czechoslovakia)). Sep 1978. (In Czech).
From 9. national conference on radionuclides and ionizing radiation in water management; Liberec, Czechoslovakia (28 Sep 1978).
The treatment technology of industrial waste waters containing trace amounts of radioisotopes does not principally differ from other techniques used in this sphere. Factors are given affecting waste water radioactivity in uranium ore mining and processing and in radiochemical plants. A survey of recent experience shows that while common technologies are available for the individual plants, the use of novel techniques, such as the membrane technique, ion flotation, etc., has so far been limited.

697 (CS-INIS--258, pp 31-38) DISPOSAL OF LIQUID RADIOACTIVE WASTES FROM NUCLEAR POWER PLANTS. Zizka, B. (Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice (Czechoslovakia)). Sep 1978. (In Czech).
From 9. national conference on radionuclides and ionizing radiation in water management; Liberec, Czechoslovakia (28 Sep 1978).
Liquid radioactive wastes from nuclear power plants can be classified into three categories, viz., wastes which can be recycled, wastes which can be discharged after treatment, and wastes which cannot be discharged even after treatment and should therefore be processed into a form suitable for long-term storage. The methods of radioactive waste processing are briefly described such as evaporation, ion exchange column treatment and chemical processing as the preparation for fixation.

698 (CS-INIS--258, pp 53-58) POSSIBLE TREATMENT OF RADIOACTIVE WATERS FROM THE URANIUM MINE HAMR U CESKE LIPY. Zvolanek, S. (Ustav Nerostnych Surovin, Kutna Hora (Czechoslovakia)). Sep 1978. (In Czech).
From 9. national conference on radionuclides and ionizing radiation in water management; Liberec, Czechoslovakia (28 Sep 1978).
The method of radium coprecipitation with barium sulfate in combination with clarification hs been developed and tested for the deactivation of mine waste waters. The pilot plant with a performance of 10 l/min consisted of an aerator, a flocculation chamber, a clarifier and a two-layer, two-way filter. Results of some of the tests carried out in the pilot plant are given as are the mathematical relations for computing the dependence of residual activity on initial concentrations of barium and sulfates. It was found that the coprecipitation of radium in combination with clarification allows a high decontamination efficiency. Flocculation does not affect the coprecipitation of radium with barium sulfate and precipitation does not affect the clarification processes. The costs of treating waste waters have been considerably reduced as compared with currently used methods.

699 (DOE/AL/TRU--8003) ECONOMIC COMPARISON OF CENTRALIZING OR DECENTRALIZING PROCESSING FACILITIES FOR DEFENSE TRANSURANIC WASTE. Brown, C.M. (Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). Jul 1980. Contract AC04-76DP03533. 85p. NTIS, PC A05/MF A01.
This study is part of a set of analyses under direction of the Transuranic Waste Management Program designed to provide comprehensive, systematic methodology and support necessary to better understand options for national long-term management of transuranic (TRU) waste. The report summarizes activities to evaluate the economics of possible alternatives in locating facilities to process DOE-managed transuranic waste. The options considered are: (1) Facilities located at all major DOE TRU waste generating sites. (2) Two or three regional facilities. (3) Central processing facility at only one DOE site. The study concludes that processing at only one facility is the lowest cost option, followed, in order of cost, by regional then individual site processing.

700 (DOE/ET/41900--1) LOW-TEMPERATURE CERAMIC RADIOACTIVE WASTE FORM CHARACTERIZTION OF SUPERCALCINE-BASED MONAZITE-CEMENT COMPOSITES. Roy, D.M.; Wakeley, L.D.; Atkinson, S.D. (Rockwell International Corp., Canoga Park, CA (USA). Energy Systems Group). 18 Apr 1980. Contract AC09-79ET41900. 21p. Dep. NTIS, PC A02/MF A01.
Simulated radioactive waste solidification by a lower temperature ceramic (cement) process is being investigated. The monazite component (simulated by $NdPO_4$) of supercalcine-ceramic has been solidified in cement and found to generate a solid form with low leachability. Several types of commercial cements and modifications thereof were used. No detectable release of Nd or P was found through characterizing the products of accelerated hydrothermal leaching at 473°K (200°C) and 30.4 MPa (300 bars) pressure.

701 (DOE/ET/41900--T1) DEVELOPMENT OF TAILORED CERAMICS FOR GEOLOGIC STORAGE OF NUCLEAR WASTES. QUARTERLY PROGRESS REPORT, OCTOBER 1, 1979-DECEMBER 31, 1979. (Rockwell International Corp., Canoga Park, CA (USA). Energy Systems Group). 15 Feb 1980. Contract AC09-79ET41900. 25p. Dep. NTIS, PC A02/MF A01.
Tailored ceramics are crystalline assemblages made by high-temperature and pressure consolidation of a nuclear waste with selected additives. The multitask program includes waste form development and characterizations, and process and equipment development. (DLC)

702 (DOE/EV--0046(Vol.2), pp 224-235) VOLUME REDUCTION OF METALLIC WASTE. Beitel, G.A.; Ortiz, P.G. (Rockwell Hanford Operations, Richland, WA). Sep 1979.
From Environmental control symposium; Washington, DC, USA (28 Nov 1978).
Most metallic waste from nuclear materials processing operations is bulky and awkward to handle. The waste classed as transuranic will have to be placed in containers of limited size

prior to disposal. Maximizing the density of such waste could greatly reduce the cost of disposal in addition to improving the quality of the waste form. The arc saw is being developed to rapidly dismantle large, radioactively contaminated equipment items in preparation for disposal. The arc saw has already been shown to cut materials with a wider variety of shapes and composition, and at higher rates than a plasma torch. A complete saw system has been built to research the full capability of the saw and to assist in the design of a second-generation saw system which will dismantle vessels up to ten feet in diameter and weigh up to ten tons. The performance of the existing saw is discussed, and the design of the next saw is described. Containment of the fumes, equipment maintenance, and safety have been identified as the major obstacles to melting radioactively contaminated steel. A vacuum furnace system which promises to overcome these obstacles has been designed and is being built. The furnace design is described in detail.

703 (DOE/EV--0046(Vol.2), pp 245-257) RADIOACTIVE WASTE: AVAILABILITY OF SOLUTIONS. Meyers, S. (Department of Energy, Washington, DC). Sep 1979.
From Environmental control symposium; Washington, DC, USA (28 Nov 1978).
Prior reviews of the availability of technology to achieve the goals of radioactive waste management have generally concluded that the basic technologies are available and that the tasks at hand can be categorized as those of reducing technology to practical application. The most comprehensive of these reviews was published in 1976 as ERDA-76-43. The availability of technologies for the four basic waste management functions of storage, treatment, transportation, and disposal is summarized, noting whether the technology is commercially available; ready for initiation of design and construction of a full-scale commercial installation, with possible design verification testing needed; or under development. For the waste management functions to be executed by DOE itself, the scope, direction, and timing of the technology implementation program is reviewed, including the status of the Fiscal Year 1979 budget. Considerations of the constraints imposed by public understanding, regulatory and environmental statement procedures, and relations with state and local governments are also reviewed. Assuming the final decision on commercial nuclear fuel reprocessing has not been made by the date of the symposium, the effects of this uncertainty on the program will be covered, i.e., the uncertainty introduces a need for two-contigency planning, but the basic technology is considered available for both contingencies.

704 (DOE/EV--0046(Vol.2), pp 339-355) WASTE TREATMENT RESEARCH AND DEVELOPMENT. Walton, R.D. Jr. (Department of Energy, Washington, DC); Dempsey, J.C.; Brown, R.; Goldberg, E.S.; Lowrey, R.Y. Sep 1979.
From Environmental control symposium; Washington, DC, USA (28 Nov 1978).
In the standard flowsheets for reprocessing of spent nuclear fuel, either for defense or commercial purposes, nearly all the waste radionuclides are isolated from the useful radionuclides in a single waste stream, traditionally known as high-level liquid waste. Although there have been some concepts for geologic disposal of this waste in liquid form, the usual planning assumptions are that it will be solidified and packaged in relatively compact units to facilitate transport and geologic emplacement. In view of the indefinite deferral of commercial spent fuel reprocessing, the current DOE development work on high-level liquid waste treatment is focused on its own sites. By volume, most of this waste is in the form of damp, bulk salt cakes or sludges stored in underground tanks at the Hanford and Savannah River sites. The status of planning for the retrieval, solidification, and packaging of this material, and also on the ongoing solidification work at the Idaho site are reviewed.

705 (DOE/SF/00701--T52) DECONTAMINATION AND DISPOSITION OF FACILITIES PROGRAM. Graves, A.W. (Rockwell International Corp., Pasadena, CA (USA)). 23 Jan 1975. Contract AM03-76SF00701. 85p. (PP--704-990-002). NTIS, PC A05/MF A01.
The Program Plan represents the top level guidance document for stating and performing the objectives of the Decontamination and Disposition (D and D) Program. The program objectives, historical data, and program description are presented, along with the top level planning. The planning includes a statement of the funding basis and the corresponding first and second level activity network schedules. The management plan is included which describes the procedures to be used for cost and schedule control and reporting, purchasing and subcontract control, and program and engineering data control. The requirements for the quality assurance plan, operational safety plan, and training plan are presented.

706 (DOE/SF/00701--T53) PROCEDURE FOR DECONTAMINATION AND DISPOSAL OF THE KINETICS EXPERIMENT WATER BOILER FACILITY, BUILDING 073. Majors, W.K.; Swanson, V.A. (Rockwell International Corp., Pasadena, CA (USA)). 18 Sep 1974. Contract AM03-76SF00701. 25p. NTIS, PC A02/MF A01.
This Detailed Working Procedure describes the step-by-step requirements for the dismantling, decontaminating, packaging, and shipping for disposal of all radioactive or radioactively contaminated items from the Kinetics Experiment Water Boiler Facility at Santa Susana.

707 (DOE/SF/00701--T57) POST-RETIREMENT PLAN FOR RADIOLOGICAL DECONTAMINATION OF THE SRE SITE. Stelle, A.M. (Rockwell International Corp., Pasadena, CA (USA)). 30 Jul 1979. Contract AM03-76SF00701. 56p. (TI--599-19-103). NTIS, PC A04/MF A01.
The Sodium Reactor Experiment (SRE) post-retirement condition is described in the context of a plan to remove all sources of radiation and to remove hazardous or dangerous materials and equipment from the SRE site. Restraints imposed by contractual provisions between the AEC and North American Rockwell Corporation and by the State of California, Bureau of Radiological Health are discussed and applied. The manpower and the material requirements are estimated for the plan.

708 (DOE/SF/00701--T60) SRE ACTIVITY REQUIREMENT NO. 18 AND 19 DECONTAMINATION AND DISMANTLING OF MARK I AND MARK II FUEL HANDLING MACHINES. Ureda, B.F. (Rockwell International Corp., Pasadena, CA (USA)). 20 Nov 1976. Contract AM03-76SF00701. 6p. (N--704ACR990012). NTIS, PC A02/MF A01.
The SRE Mark I and Mark II Fuel Handling Machines will be decontaminated and dismantled.

Disassembled components will be further decontaminated as necessary to permit disposal of the components as salvage. Components that cannot be decontaminated economically will be packaged and shipped to burial. The dismantling will be performed in the SRE High Bay using appropriate techniques for safely handling radioactivity and sodium containing components.

709 (DOE/SF/71053--T1) HTGR REPROCESSING WASTES AND DEVELOPMENT NEEDS. Pence, D.T. (General Atomic Co., San Diego, CA (USA)). Feb 1976. Contract AT03-76SF71053. 34p. NTIS, PC A03/MF A01.

The objectives of this report are: to provide current estimates on quantities and composition of estimated HTGR reprocessing wastes; to compare these with similar data from LWR reprocessing for long-range waste management planning; to identify waste management development needs for HTGR wastes; and to compare these development needs with those of LWR reprocessing for possible consolidation of efforts to reduce development costs. Characterization of the expected types and quantities of HTGR fuel reprocessing waste is not complete but is about as complete as is practicable at the present. The General Atomic computer programs that predict the distribution of fission and activation products are presently undergoing an updating, and the new numbers will probably differ somewhat from from those presented. But the differences are expected to be slight. Improved processing techniques and flow sheets are also expected. Nevertheless, the reported data are generic for HTGR fuel and should provide reliable HTGR reprocessing waste guides for long-range planning. Most of the waste management development issues have been identified and summarized. Further definition of these issues will require some of the results of the ongoing, planned, and recommended Thorium Utilization and other ERDA-sponsored waste management programs. Little attempt was made to include references to the Federal Republic of Germany HTGR development program because of the lack of current and direct knowledge of these programs, albeit their efforts are more extensive than the US program in some areas.

710 (DOE/SR/00968--6) FUNCTIONALIZED GLASS BEADS FOR THE RECOVERY OF WASTE RADIOACTIVE ELEMENTS. FINAL REPORT. Geldard, J.F. (Clemson Univ., SC (USA). Dept. of Chemistry and Geology). Sep 1979. Contract EY-76-C-09-0968. 57p. Dep. NTIS, PC A04/MF A01.

Various substituted ethylenediamine tetraacetic acids and their precursors have been prepared and characterized. In addition to containing groups that can chelate metal ions, these substances also contain groups that can be used to bond them to glass beads. Experiments have shown, however, that a large enough number of active sites cannot be achieved by this route. An alternative scheme was devised, whereby trimethoxysilyl groups are incorporated into molecules that have the necessary functional groups. These silyl compounds can be bonded directly to glass beads; the ethylenediamine tetraacetic acid can then be formed in place. The prognosis for this reaction scheme is good, based on the experiments done so far. Stability constants have been measured for some metal ion complexes of the acids mentioned above.

711 (DOE/SR-WM--79-2) LONG-TERM HIGH-LEVEL WASTE TECHNOLOGY. COMPOSITE QUARTERLY TECHNICAL REPORT, OCTOBER-DECEMBER 1979. Cornman, W.R. (comp.). (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Jun 1980. 233p. NTIS, PC A11/MF A01.

This document summarizes work for the immobilization of high-level radioactive wastes from the chemical reprocessing of nuclear reactor fuels. The progress is reported in two main areas: site technology, and alternative waste form development. (DLC)

712 (DOE/TIC--10228) EVALUATION AND REVIEW OF ALTERNATIVE WASTE FORMS FOR IMMOBILIZATION OF HIGH LEVEL RADIOACTIVE WASTES. (Department of Energy, Aiken, SC (USA). Savannah River Operations Office). 20 Aug 1979. 27p. Dep. NTIS, PC A03/MF A01.

Objective was to review the relative merits and potential of eleven alternative waste forms being considered for the solidification and disposal of radioactive wastes. A numerical rating of the alternative waste forms was arrived at individually by peer review panel members taking into consideration nine scientific and nine engineering parameters affecting the long-term performance and production of waste forms. A group rating for the alternative forms was achieved by averaging the individiual scores and discussing the available data base. Three final ranking lists comparing: (A) Present Scientific Merits or Least Risk for Use Today; (B) Research Priority; and (3) Present and Potential Engineering Practicality were prepared by the Panel. Each waste form in the lists is assigned a value of either (1) Top Rank, (2) Intermediate Rank, or is assigned a value of either (1) Top Rank, (2) Intermediate Rank, or (3) Bottom Rank. Relative strengths and weaknesses of the alternative waste forms and recommendations for future program directions are discussed.

713 (DOE/TIC--11219) EVALUATION AND REVIEW OF ALTERNATIVE WASTE FORMS FOR IMMOBILIZATION OF HIGH LEVEL RADIOACTIVE WASTES. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1 Jun 1980. Contract AC09-76SR00001. 34p. NTIS, PC A03/MF A01.

The objective of this study was to review the relative merits and potential of 15 (fifteen) alternative waste forms being considered for the solidification and disposal of radioactive wastes. The relative merits of 4 (four) alternative pre-solidification processing approaches were also assessed in this study. A Peer Review Panel composed of 8 (eight) scientists and engineers representing independent, non-DOE laboratories from industry, government, and universities and the disciplines of materials science, ceramics, glass, metallurgy, and geology conducted the review. A numerical rating of alternative waste forms was arrived at individually by the panel members taking into consideration 9 (nine) scientific and 9 (nine) engineering parameters affecting the long term performance and production of waste forms. At a meeting on May 9, 1980, a group ranking for the alternative forms was achieved by averaging the individual scores and discussing the available data base. Three final ranking lists comparing: (A) Present Scientific Merits or Least Risk for Use Today; and (B) Research Priority; and (C) Present and Potential Engineering Practicality were prepared by the Panel. Each waste form in the lists is assigned a value of either (1) Top Rank, (2) Intermediate Rank, or (3) Bottom Rank. A discussion of the relative strengths and weaknesses of the alternative waste forms and recommendations for future program directions is presented in the body of the accompanying Peer Review Panel report.

714 (DP--79-157-3) LONG-TERM HIGH-LEVEL WASTE TECHNOLOGY. COMPOSITE QUARTERLY TECHNICAL REPORT, JULY-SEPTEMBER 1979. Cornman, W.R. (comp.). (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Mar 1980. Contract EY-76-C-09-0001. 74p. Dep. NTIS, PC A04/MF A01.

This report summarizes work performed at participating sites (RHO, ORNL, SRP, SRL, PNL, ANL, LLL, etc., to immobilize high-level radioactive wastes from the chemical reprocessing of nuclear reactor fuels. Progress is reported in the following areas: program management and support, waste preparation, waste fixation (in glass, concrete, ceramics, cermet, SYNROC, or metal), and engineered barriers. (DLC)

715 (DP--80-157-1) LONG-TERM HIGH-LEVEL WASTE TECHNOLOGY. COMPOSITE QUARTERLY TECHNICAL REPORT, JANUARY-MARCH 1980. Cornman, W.R. (comp.). (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Jul 1980. Contract AC09-76SR00001. 58p. NTIS, PC A04/MF A01.

This composite quarterly technical report summarizes work performed at participating sites to immobilize high-level radioactive wastes. This work is under the direction of the Savannah River Operations Office of the Department of Energy (DOE-SR). The Savannah River Laboratory, operated by E. I. du Pont de Nemours and Co. for the US Department of Energy, is serving as the lead office for this program to provide technical assistance to DOE-SR and to coordinate work done at the participating sites. This series of reports summarizes research and development studies on the immobilization of high-level wastes from the chemical reprocessing of nuclear reactor fuels. Immobilization of the wastes (defense and commercial) consists of placing them in a high-integrity form with a very low potential for radionuclide release. Immobilization of commercial wastes is being considered on a contingency basis in the event that reprocessing is resumed. The basic plan for meeting the goal of immobilization of the DOE high-level wastes is: (1) to develop technology to support a realistic choice of waste form alternatives for each of the three DOE sites; (2) to develop product and processing technology with sufficient scaleup to provide design data for full-scale facilities; and (3) to construct and operate the facilities.

716 (DP--1521) DESIGN OF AN EXPERIMENTAL INCINERATOR FOR ALPHA WASTE. Warren, J.H. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Aug 1979. Contract EY-76-C-09-0001. 52p. Dep. NTIS, PC A04/MF A01.

An electrically heated controlled-air two-stage incinerator has been designed for burning small volumes (5 kg/h) of solid wastes. Distinguishing features of the design are compactness, relatively lightweight, and ease of assembly made possible by using prefabricated ceramic components to form two combustion chambers surrounded by packed fiber insulation within a steel case. Electric girdle heaters around the two combustion chambers provide 600 to 1000°C. These temperatures combined with controlled air give minimum ash entrainment and long combustion gas residence times to yield approx. 10^9 off-gas decontamination factors with conventional off-gas cleaning equipment. After decommissioning, the design allows for ease of disassembly and convenient disposal of the ceramic components. 24 figures, 1 table.

717 (DP--1535) SMALL-SCALE, JOULE-HEATED MELTING OF SAVANNAH RIVER PLANT WASTE GLASS. I. FACTORS AFFECTING LARGE-SCALE VITRIFICATION TESTS. Plodinec, M.J.; Chisman, P.H. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Oct 1979. Contract EY-76-C-09-0001. 33p. Dep. NTIS, PC A03/MF A01.

A promising method of immobilizing SRP radioactive waste solids is incorporation in borosilicate glass. In the reference vitrification process, called joule-heated melting, a mixture of glass frit and calcined waste is heated by passage of an electric current. Two problems observed in large-scale tests are foaming and formation of an insoluble slag. A small joule-heated melter was designed and built to study problems such as these. This report describes the melter, identifies factors involved in foaming and slag formation, and proposes ways to overcome these problems.

718 (DP--1540) MODELING PRINCIPLES APPLIED TO THE SIMULATION OF A JOULE-HEATED GLASS MELTER. Routt, K.R. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). May 1980. Contract EY-76-C-09-0001. 47p. NTIS, PC A03/MF A01.

Three-dimensional conservation equations applicable to the operation of a joule-heated glass melter were rigorously examined and used to develop scaling relationships for modeling purposes. By rigorous application of the conservation equations governing transfer of mass, momentum, energy, and electrical charge in three-dimensional cylindrical coordinates, scaling relationships were derived between a glass melter and a physical model for the following independent and dependent variables: geometrical size (scale), velocity, temperature, pressure, mass input rate, energy input rate, voltage, electrode current, electrode current flux, total power, and electrical resistance. The scaling relationships were then applied to the design and construction of a physical model of the semiworks glass melter for the Defense Waste Processing Facility. The design and construction of such a model using glycerine plus LiCl as a model fluid in a one-half-scale Plexiglas tank is described.

719 (DP--1545) PRELIMINARY EVALUATION OF ALTERNATIVE FORMS FOR IMMOBILIZATION OF SAVANNAH RIVER PLANT HIGH-LEVEL WASTE. Stone, J.A.; Goforth, S.T. Jr.; Smith, P.K. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Dec 1979. Contract EY-76-C-09-0001. 98p. Dep. NTIS, PC A05/MF A01.

An evaluation of available information on eleven alternative solid forms for immobilization of SRP high-level waste has been completed. Based on the assessment of both product and process characteristics, four forms were selected for more detailed evaluation: (1) borosilicate glass made in the reference process, (2) a high-silica glass made from a porous glass matrix, (3) crystalline ceramics such as supercalcine or SYNROC, and (4) ceramics coated with an impervious barrier. The assessment includes a discussion of product and process characteristics for each of the eleven forms, a cross comparison of these characteristics for the forms, and the bases for selecting the most promising forms for further study.

720 (DP--1553) VITRIFICATION OF TRANSURANIC

AND BETA-GAMMA CONTAMINATED SOLID WASTES. Dukes, M.D. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Jun 1980. Contract AC09-76SR00001. 19p. NTIS, PC A02/MF A01.

Vitrification of solid transuranic contaminated (TRU) wastes alone and with high-level liquid wastes (HLLW) was studied. Homogeneous glasses containing 20 to 30 wt % ash were made by using glass frits previously developed at the Savannah River Plant and Pacific Northwest Laboratories. If the ash is vitrified along with the HLLW, 1.0 wt % as can be added to the waste forms without affecting their quality. This loading of ash is well above the loading required by the relative amounts of HLLW and TRU ash that will be processed at the Savannah River Plant. Vitrification of TRU-contaminated electropolishing sludges and high efficiency particular air filter materials along with HLLW would require an increase in the quantity of glass to be produced. However, if these TRU-contaminated solids were vitrified with the HLLW, the addition of low-level beta-gamma contaminated ash would require no further increase in glass production.

721 (DP-MS--79-26) DEVELOPMENT OF AN ION-EXCHANGE PROCESS FOR REMOVING CESIUM FROM HIGH-LEVEL RADIOACTIVE LIQUID WASTES. Baumgarten, P.K.; Wallace, R.M.; Whitehurst, D.A.; Steed, J.M. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Nov 1979. Contract EY-76-C-09-0001. 14p. (CONF-791112--35). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

Methods to determine resin characteristics, i.e., cesium equilibria and diffusion rates, were developed. These parameters can now guide resin selection and aid in interpreting column performance. The K/sub D/ cesium ion concentration relation gives evidence of three different types of ion exchange sites. The countercurrent load/elution/regeneration cycle for the removal of cesium by ion exchange repeatedly reached the goal decontamination factor (DF) of 10,000 at throughputs up to 60 column volumes. Resin backwashing appears feasible, but further development of column geometry will be required. The proposed ammonium elutriant is satisfactory. Regeneration end-point can be controlled by electrical conductivity monitoring.

722 (DP-MS--79-39) ATTACK OF HIGH-STRENGTH, OXIDATION-RESISTANT ALLOYS DURING IN-CAN MELTING OF SIMULATED WASTE GLASSES. Rankin, W.N. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract EY-76-C-09-0001. 31p. (CONF-800305--3). Dep. NTIS, PC A03/MF A01.

From Corrosion/80 NACE meeting; Chicago, IL, USA (6 Mar 1980).

The restistance of candidate canister alloys to penetration under the most severe conditions expected during in-can melting was directly proportional to the chromium content of the alloy, and inversely proportional to the Na_2O content of the glass melt. Specimens were exposed for 24 hours, which is the time required for in-can melting full-size waste-glass forms based on tests carried out at Pacific Northwest Laboratories (PNL) and at SRL. The penetration resistance to Frit 211 at 1150°C for 24 hours of most alloys tested was satisfactory. The amount of penetration would not affect the integrity of the waste form. Inconel 625, Hastelloy X, and Inconel 601 were penetrated < 20 mils. This was considered excellent. Incoloy 801, Type 310 stainless steel, Type 304L stainless steel, Inconel 600, and Type 347 stainless steel were penetrated < 40 mils. This was considered good. Hastelloy C-4 was penetrated > 100 mils by a glass composed of 65 wt % Frit 21 and 35 wt % composite sludge (with uranium) at 1150°C for only 7 hours. This amount of penetration of an in-can melting canister would not be satisfactory. 12 figures.

723 (DP-MS--79-40) OPERATION OF A PROTOTYPE HIGH-LEVEL ALPHA SOLID WASTE INCINERATOR. Hootman, H.E.; Trapp, D.J.; Warren, J.H.; Dworjanyn, L.O. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant). 1979. Contract EY-76-C-09-0001. 19p. (CONF-791103--31). Dep. NTIS, PC A02/MF A01.

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

A full-scale (5 kg waste/hour) controlled-air incinerator is presently being tested as part of a program to develop technology for incineration of Savannah River Plant solid transuranic wastes. This unit is designed specifically to incinerate relatively small quantities of solid combustible wastes that are contaminated up to 10^5 times the present nominal 10 nCi/g threshold value for such isotopes as ^{238}Pu, ^{239}Pu, ^{242}Cm and ^{252}Cf. Automatic feed preparation and incinerator operation and control have been incorporated into the design to simulate the future plant design which will minimize operator radiation exposure. Over 250 kg of nonradioactive wastes characteristic of plutonium finishing operations have been incinerated at throughputs exceeding 5 kg/hr for periods up to 6 hours. Safety and reliability were major design objectives. Upon completion of an initial experimental phase to determine process sensitivity and flexibility, the facility will be used to develop bases for the production unit's safety analysis report, technical standards, and operating procedures. An ultimate use of the experimental unit will be the testing of actual production unit components and the training of Savannah River Plant operating personnel.

724 (DP-MS--79-42) VITRIFICATION OF SAVANNAH RIVER PLANT RADIOACTIVE WASTE: PROCESS DEVELOPMENT STUDIES. Plodinec, M.J. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1979. Contract EY-76-C-09-0001. 20p. (CONF-791061--1). Dep. NTIS, PC A02/MF A01.

From American Ceramic Society fall meeting; Bedford, PA, USA (10 Oct 1979).

The reference process for disposal of radioactive waste from the Savannah River Plant is vitrification into borosilicate glass. The effects of frit composition and frit particle size, batch chemicals, soluble salts, charcoal, argon atmosphere, and viscosity on the melting process are discussed.

725 (DP-MS--79-53) REMOTE EXPERIMENTAL FACILITY TO SOLIDIFY SRP HIGH-LEVEL WASTE. Galloway, R.M.; Plodinec, M.J.; Wilhite, E.L.; Chismar, P.H. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1979. Contract EY-76-C-09-0001. 21p. (CONF-791103--33). Dep. NTIS, PC A02/MF A01.

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

Small-scale equipment has been developed and installed in a remotely operated experimental facility at the Savannah River Laboratory (SRL) to study immobilization of radioactive waste in glass. The facility has been in operation for nine months. During this period, two 25-liter

batches of high-level waste from different SRP waste storage tanks were processed. The waste was boiled in sodium hydroxide to dissolve alumina trihydrate, washed with water to remove soluble salts, dried in a fluid-bed dryer, and vitrified in a joule-heated melter. Off-gases from the melter were collected for characterization.

726 (DP-MS--79-70) DEVELOPMENT OF SOLID RADIONUCLIDE WASTE FORMS IN THE UNITED STATES. Crandall, J.L. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1979. Contract EY-76-C-09-0001. 15p. (CONF-791112--12). Dep. NTIS, PC A02/MF A01.
From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).
New ways of reworking the wastes require a new classification in terms of the final waste forms. This paper surveys the candidate forms: encapsulation binders, in-place solidification waste forms, glass and ceramic waste forms, mineral waste forms, matrix waste forms, gaseous waste forms (fixation), and canisters and engineered barriers. Participants in the US-high-level waste form development program are listed. Requirements and selection of waste forms are also discussed. 26 references. (DLC)

727 (DP-MS--79-91) ALTERNATIVE SOLID FORMS FOR SAVANNAH RIVER PLANT DEFENSE WASTE. Stone, J.A.; Goforth, S.T.; Smith, P.K. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract AC09O-76SR00001. 14p. (CONF-800460--4). NTIS, PC A02/MF A01.
From 82. annual American Ceramic Society meeting; Chicago, IL, USA (27 Apr 1980).
Solid forms and processes were evaluated for immobilization of SRP high-level radioactive waste, which contains bulk chemicals such as hydrous iron and aluminium oxides. Borosilicate glass currently is the best overall choice. High-silica glass, tailored ceramics, and coated ceramics are potentially superior products, but require more difficult processes.

728 (DP-MS--79-92) CHARACTERIZATION OF OFF-GASES FROM A SMALL-SCALE, JOULE-HEATED CERAMIC MELTER FOR NUCLEAR WASTE VITRIFICATION. Woolsey, G.B.; Wilhite, E.L. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract EY-76-C-09-0001. 30p. (CONF-800460--1). Dep. NTIS, PC A03/MF A01.
From 82. annual American Ceramic Society meeting; Chicago, IL, USA (27 Apr 1980).
This paper confirmed with actual nuclear waste the thermodynamic predictions of the fate of some of the semivolatiles in off-gas. Ruthenium behaves erratically and it is postulated that it migrates as a finely divided solid, rather than as a volatile oxide. Provisions for handling these waste off-gasses will be incorporated in the design of facilities for vitrifying SRP waste.

729 (DP-MS--79-94) HIGH-LEVEL DEFENSE WASTE SOLIDIFICATION AT THE SAVANNAH RIVER PLANT. Rhoad, H.D. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract EY-76-C-09-0001. 13p. (CONF-800303--11). Dep. NTIS, PC A02/MF A01.
From 179. national meeting of the American Chemical Society; Houston, TX, USA (23 Mar 1980).
Radioactive waste management at the Savannah River Plant is described. Their process for solidifying liquid wastes is discussed. Leaching studies of glass were performed and the results are discussed. (DC)

730 (DP-MS--79-103) VITRIFICATION OF SRP WASTE BY A SLURRY-FED CERAMIC MELTER. Wicks, G.G. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract EY-76-C-09-0001. 20p. (CONF-800460--2). Dep. NTIS, PC A02/MF A01.
From 82. annual American Ceramic Society meeting; Chicago, IL, USA (27 Apr 1980).
Savannah River Plant (SRP) high-level waste (HLW) can be vitrified by feeding a slurry, instead of a calcine, to a joule-heated ceramic melter. Potential advantages of slurry feeding include (1) use of simpler equipment, (2) elimination of handling easily dispersed radioactive powder, (3) simpler process control, (4) effective mixing, (5) reduced off-gas volume, and (6) cost savings. Assessment of advantages and disadvantages of slurry feeding along with experimental studies indicate that slurry feeding is a promising way of vitrifying waste.

731 (DP-MS--79-108) DESIGN AND OPERATION OF SMALL-SCALE GLASS MELTERS FOR IMMOBILIZING RADIOACTIVE WASTE. Plodinec, M.J.; Chismar, P.H. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract AC09-76SR00001. 6p. (CONF-800914--1). NTIS, PC A02/MF A01.
From IEEE meeting; Cincinnati, OH, USA (29 Sep 1980).
A small-scale (3-kg), joule-heated, continuous melter has been designed to study vitrification of Savannah River Plant radioactive waste. The first melter built has been in nonradioactive service for nearly three years. This melter had Inconel 690 electrodes and uses Monofrax K-3 for the contact refractory. Several problems seem in this melter have had an impact on the design of a full-scale system. Problems include uncontrolled electric currents passing through the throat, and formation of a slag layer at the bottom of the melter. The performance of a similar melter in a low-maintenance, radioactive environment is also described. Problems such as halide refluxing, and hot streaking, first observed in this melter, are also discussed.

732 (DP-MS--79-112) SLURRY SPRAY DISTRIBUTION WITHIN A SIMULATED LABORATORY SCALE SPRAY DRYER. Bertone, P.C. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 20 Dec 1979. Contract EY-76-C-09-0001. 50p. Dep. NTIS, PC A03/MF A01.
Thesis. Submitted to Univ. of Virginia, Charlottesville.
It was found that the distribution of liquid striking the sides of a simulated room temperature spray dryer was not significantly altered by the choice of nozles, nor by a variation in nozzle operating conditions. Instead, it was found to be a function of the spray dryer's configuration. A cocurrent flow of air down the drying cylinder, not possible with PNL's closed top, favorably altered the spray distribution by both decreasing the amount of liquid striking the interior of the cylinder from 72 to 26% of the feed supplied, and by shifting the zone of maximum impact from 1.0 to 1.7 feet from the nozzle. These findings led to the redesign of the laboratory scale spray dryer to be tested at the Savannah River Plant. The diameter of the drying chamber was increased from 5 to 8 inches, and a cocurrent flow of air was established with a closed recycle. Finally, this investigation suggested

a drying scheme which offers all the advantages of spray drying without many of its limitations.

733 (DP-MS--80-2) SMALL-SCALE DEMONSTRATION OF HIGH-LEVEL RADIOACTIVE WASTE PROCESSING AND SOLIDIFICATION USING ACTUAL SRP WASTE. Okeson, J.K.; Galloway, R.M.; Wilhite, E.L.; Woolsey, G.B.; Ferguson. R.B. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract AC09-76SR00001. 33p. (CONF-800802--2). NTIS, PC A03/MF A01.

From 89. annual meeting of the American Institute of Chemical Engineers; Portland, OR, USA (17 Aug 1980).

A small-scale demonstration of the high-level radioactive waste solidification process by vitrification in borosilicate glass is being conducted using 5-6 liter batches of actual waste. Equipment performance and processing characteristics of the various unit operations in the process are reported and, where appropriate, are compared to large-scale results obtained with synthetic waste.

734 (DP-MS--80-17) DIRECT DETERMINATION OF CESIUM IN PILOT PLANT EFFLUENTS BY ISOTOPE DILUTION MASS SPECTROMETRY. Chastagner, P. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract AC09-76SR00001. 25p. (CONF-800837--1). NTIS, PC A02/MF A01.

From Rocky Mountain conference; Denver, CO, USA (11 Aug 1980).

At the Savannah River Laboratory, stable cesium at the part per billion levels is routinely determined in simulated defense waste supernate by isotope dilution mass spectroscopy. This work is in support of pilot plant studies of waste immobilization process. A direct method was developed in which spiked samples of simulated waste supernate are loaded directly on the sample filament.

735 (DP-MS--80-25) HIGH-LEVEL NUCLEAR WASTE IMMOBILIZATION PROGRAM. Gordon, D.E. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract AC09-76SR00001. 18p. (CONF-800244--1). NTIS, PC A02/MF A01.

From ASME, IEEE, and Society of Professional Engineer Joint meeting; New London, CT, USA (19 Feb 1980).

Existing high-level nuclear wastes in the United States are described along with current management techniques and long-term disposal options. All of the disposal options involve some type of immobilization operation to restrict radio-nuclide dispersion; the primary option is disposal of immobilized waste packages in deep (500-1000 meter) geological formations. Several immobilized waste forms currently under development are discussed, and form selection factors and regulatory criteria are identified.

736 (DP-MS--80-27) SIGNIFICANCE OF RADIATION EFFECTS IN SOLID RADIOACTIVE WASTE. Permar, P.M.; McDonell, W.R. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract AC09-76SR00001. 55p. (CONF-800609--5). NTIS, PC A04/MF A01.

From 10. international symposium on effects of radiation on materials; Savannah, GA, USA (3 Jun 1980).

Proposed NRC criteria for disposal of high-level nuclear waste require development of waste packages to contain radionuclide for at least 1000 years, and design of repositories to prevent radionuclide release at an annual rate greater than 1 part in 100,000 of the total activity. The high-level wastes that are now temporarily stored as aqueous salts, sludges, and calcines must be converted to high-integrity solid forms that resist deterioration from radiation and other effects of long-term storage. Spent fuel may be encapsulated for similar long-term storage. Candidate waste forms beside the spent fuel elements themselves, include borosilicate and related glasses, mineral-like crystalline ceramics, concrete formulations, and metal-matrix glass or ceramic composites. these waste forms will sustain damage produced by beta-gamma radiation up to 10^{12} rads, by alpha radiation up to 10^{19} particles/g, by internal helium generation greater than about 0.1 atom percent, and by the atom transmutations accompanying radioactive decay. Current data indicate that under these conditions the glass forms suffer only minor volume changes, stored energy deposition, and leachability effects. The crystalline ceramics appear susceptible to the potentially more severe alterations accompanying metamictization and natural analogs of candidate materials are being examined to establish their suitability as waste forms. Helium concentrations in the waste forms are generally below thresholds for severe damage in either glass or crystalline ceramics at low temperatures, but microstructural effects are not well characterized. Transmutation effects remain to be established.

737 (DP-MS--80-35) RECOVERY OF AM-CM FROM HIGH-ACTIVITY WASTE CONCENTRATE BY IN-CANYON-TANK PRECIPITATION AS OXALATES. Gray, L.W.; Burney, G.A.; Wilson, T.W.; McKibben, J.M. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract AC09-76SR00001. 23p. (CONF-800814--5). NTIS, PC A02/MF A01.

From 180. American Chemical Society meeting/ 2. chemical congress of the North American Continent; Las Vegas, NV, USA (24 Aug 1980).

Savannah River Laboratory and Savannah River Plant have been separating actinides for more than 25 years. Work continues to upgrade processes and to initiate new processes. This report summarizes work on a precipitation process to separate kg amounts of Am and Cm from hundreds of kilograms of $NaNO_3$ and $Al(NO_3)_3$. The developed process includes formic acid denitration of the Am-Cm bearing streams for acid adjustment; oxalate precipitation of the Am-Cm; and Mn^{+2} catalyzed oxidation of oxalate in both the decanted supernate and the precipitated actinides. The new process generates one fourth the radioactive waste as the solvent extraction process which it replaced, and produces a cleaner feed solution for downstream processing to separate the Am and Cm before conversion to their respective oxides.

738 (DP-MS--80-39) HIGH LEVEL NUCLEAR WASTE. Crandall, J.L. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract AC09-DPSR00001. 40p. (CONF-800535--1). NTIS, PC A03/MF A01.

From ASME Idaho section symposium; Idaho Falls, ID, USA (29 May 1980).

The DOE Division of Waste Products through a lead office at Savannah River is developing a program to immobilize all US high-level nuclear waste for terminal disposal. DOE high-level wastes include those at the Hanford Plant, the Idaho Chemical Processing Plant, and the Savannah River Plant. Commercial high-level wastes, for which DOE is also developing

immobilization technology, include those at the Nuclear Fuel Services Plant and any future commercial fuels reprocessing plants. The first immobilization plant is to be the Defense Waste Processing Facility at Savannah River, scheduled for 1983 project submission to Congress and 1989 operation. Waste forms are still being selected for this plant. Borosilicate glass is currently the reference form, but alternate candidates include concretes, calcines, other glasses, ceramics, and matrix forms.

739 (DP-MS--80-48) STARTUP AND OPERATION OF A PLANT-SCALE CONTINUOUS GLASS MELTER FOR VITRIFICATION OF SAVANNAH RIVER PLANT SIMULATED WASTE. Willis, T.A. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract AC09-76SR00001. 32p. (CONF-801034--6). NTIS, PC A03/MF A01.
From 33. ACS Pacific Coast meeting; San Francisco, CA, USA (28 Oct 1980).
The reference process for disposal of radioactive waste from the Savannah River Plant is vitrification of the waste in borosilicate glass in a continuous glass melter. Design, startup, and operation of a plant-scale developmental melter system are discussed.

740 (DP-MS--80-49) DEVELOPMENT OF THE IN-CAN MELTING PROCESS FOR VITRIFICATION OF SAVANNAH RIVER PLANT WASTE. Becker, G.W. Jr. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract AC09-76SR00001. 23p. (CONF-801034--4). NTIS, PC A02/MF A01.
From 33. ACS Pacific Coast meeting; San Francisco, CA, USA (28 Oct 1980).
Vitrification is the key step in the reference process for immobilization of high-level radioactive waste generated at the Savannah River Plant. For this step, two types of glass melters are being developed. The design reference is a continuous-pour, joule-heated melter. The backup is an in-can melter. When the in-can melter is used, a canister is placed vertically in a large tube furnace and heated to a temperature as high as the canister can safely tolerate (for stainless steel, about 1050°C). Waste and glass formers are added and melted together until the canister is filled. The canister of glass is then removed from the furnace. The effects of fin design, frit size, waste composition, reductants, and mixing upon the full-scale in-can melter process are discussed.

741 (DP-MS--80-50) EFFECTS OF PROCESSING VARIABLES ON THE PRODUCT QUALITY OF LARGE-SCALE GLASS FORMS CONTAINING SIMULATED SRP WASTE. Plodinec, M.J. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract AC09-76SR00001. 15p. (CONF-801034--2). NTIS, PC A02/MF A01.
From 33. ACS Pacific Coast meeting; San Francisco, CA, USA (28 Oct 1980).
The reference process for disposal of radioactive waste from the Savannah River Plant is immobilization in borosilicate glass. Full-scale canisters containing simulated waste have been made by two processes: in-can melting and continuous joule-heated melting. For each process, melter atmosphere and the degree of feed mixing have been varied. The effects of these variations on glass quality parameters such as leach rate, degree of fracture and porosity, and amount of crystalline material are discussed.

742 (DP-MS--80-60) SMALL-SCALE INTEGRATED DEMONSTRATION OF HIGH-LEVEL RADIOACTIVE WASTE PROCESSING AND VITRIFICATION USING ACTUAL SRP WASTE. Ferguson, R.B.; Woolsey, G.B.; Galloway, R.M.; Baumgarten, P.M.; Eibling, R.E. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract AC09-76SR00001. 9p. (CONF-801124--5). NTIS, PC A02/MF A01.
From 3. annual meeting of the Materials Research Society; Boston, MA, USA (17 Nov 1980).
Experiments have been made to demonstrate the feasibility of immobilizing SRP high-level waste in borosilicate glass. Results to date are encouraging. Equipment performance and processing characteristics for solidifying small batches of actual SRP waste have agreed well with previous experience with small- and large-scale tests synthetic waste, and with theoretical predictions.

743 (DP-MS--80-61) THERMAL FRACTURING IN GLASS WASTE FORMS. Smith, P.K.; Wiley, J.R. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract AC09-76SR00001. 14p. (CONF-8010116--1). NTIS, PC A02/MF A01.
From American Ceramic Society meeting; Bedford, PA, USA (8 Oct 1980).
Fracturing during cooling of large glass waste forms during production has the undesirable potential to increase the surface area available for leaching. Acoustic emission and visual analyses show that cracking in the bulk glass occurs in the annealing range, and that surface cracking occurs at lower temperatures because of canister interactions.

744 (DPE--3584) CONCEPTUAL DESIGN REPORT FOR ALPHA WASTE INCINERATOR. (Du Pont de Nemours (E.I.) and Co., Wilmington, DE (USA). Engineering Dept.). Apr 1979. Contract EY-76-C-09-0001. 102p. Dep. NTIS, PC A06/MF A01.
The Alpha Waste Incinerator, a new facility in the SRP H-Area, will process transuranic or alpha-contaminated combustible solid wastes. It will seal the radioactive ash and scrubbing salt residues in cans for interim storage in drums on site burial ground pads. This report includes objectives, project estimate, schedule, standards and criteria, excluded costs, safety evaluation, energy consumption, environmental assessment, and key drawings. (DLC)

745 (DPST--79-294) GLASS AS A MATRIX FOR SRP HIGH-LEVEL DEFENSE WASTE. Wiley, J.R.; Bibler, N.E.; Dukes, M.D.; Plodinec, M.J. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Jan 1980. Contract EY-76-C-09-0001. 53p. Dep. NTIS, PC A04/MF A01.
Work done at Savannah River Laboratory and elsewhere that has led to development of glass as a candidate for solidifying Savannah River Plant waste is summarized. Areas of development described are glass formulation and fabrication, and leaching and radiation effects.

746 (DPSTD--77-13-3) PRELIMINARY TECHNICAL DATA SUMMARY NO. 3 FOR THE DEFENSE WASTE PROCESSING FACILITY. Landon, L.F. (comp.). (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). May 1980. Contract AC09-76SR00001. 614p. NTIS, PC A99/MF A01.
This document presents an update on the best information presently available for the purpose

of establishing the basis for the design of a Defense Waste Processing Facility. Objective of this project is to provide a facility to fix the radionuclides present in Savannah River Plant (SRP) high-level liquid waste in a high-integrity form (glass). Flowsheets and material balances reflect the alternate CAB case including the incorporation of low-level supernate in concrete. (DLC)

747 (DPSTD--79-34) BETA-GAMMA CONTAMINATED SOLID WASTE INCINERATOR FACILITY. Hootman, H.E. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Oct 1979. Contract AC09-76SR00001. 77p. NTIS, PC A05/MF A01.

This technical data summary outlines a reference process to provide a 2-stage, 400 lb/hour incinerator to reduce the storage volume of combustible process waste contaminated with low-level beta-gamma emitters in response to DOE Manual 0511. This waste, amounting to more than 200,000 ft^3 per year, is presently buried in trenches in the burial ground. The anticipated storage volume reduction from incineration will be a factor of 20. The incinerator will also dispose of 150,000 gallons of degraded solvent from the chemical separations areas and 5000 gallons per year of miscellaneous nonradioactive solvents which are presently being drummed for storage.

748 (EGG--2017) SPI PROJECT CRITICALITY TASK FORCE INITIAL REVIEW AND ASSESSMENT. McKinley, K.B.; Cannon, J.W.; Marsden, R.S.; Worle, H.A. (Idaho National Engineering Lab., Idaho Falls (USA)). Mar 1980. Contract EY-76-C-07-1570. 45p. Dep. NTIS, PC A03/MF A01.

The Slagging Pyrolysis Incinerator (SPI) Facility is being developed to process transuranic waste stored and buried at the Idaho National Engineering Laboratory (INEL) into a chemically inert, physically stable, basalt-like residue acceptable for a Federal Repository. A task force was established by the SPI Project Division to review and assess all aspects of criticality safety for the SPI Facility. This document presents the initial review, evaluations, and recommendations of the task force and includes the following: background information on waste characterization, and criticality control approaches and philosophies, a description of the SPI Facility Waste Processing Building, a review and assessment of potentially relevant codes and regulations; a review and assessment of the present state of criticality and assaying/monitoring studies, and recommendations for changes in and additions to these studies. The review and assessment of potentially relevant codes and regulations indicate that ERDAM 0530, Nuclear Criticality Safety should be the controlling document for criticality safety for the SPI Project. In general, the criticality control approaches and philosophies for the SPI Project comply with this document.

749 (EGG-FM--5041) SUMMARY OF FY 1979 MATERIAL SUPPORT STUDIES FOR SPI - MIGRATION AND IMMOBILIZATION. Flinn, J.E.; Kelsey, P.V.; Seymour, W.C.; Tallman, R.L. (EG and G Idaho, Inc., Idaho Falls (USA)). Sep 1979. Contract EY-76-C-07-1570. 30p. Dep. NTIS, PC A03/MF A01.

Material studies were performed in support of the Slagging Pyrolysis Incinerator Project for characterizing the slag product expected from processing low-level waste. The studies included chemical compositional analysis of slag products from waste feed after pyrolysis, slag/refractory interactions, phase and structure of the slag, and chemical leaching. A series of slag compositions were identified using average waste feed and soil. The slags are termed iron-rich basalt vitrophyre. For the materials tests a series of uranium-doped slags were made in the laboratory. Ruby refractory was observed to be the most compatible with the slag series. Structure studies on the slags disclosed that the primary crystalline phases that develop are diopside ($CaMgSi_2O_6$) and iron oxide. Chemical leach tests performed on the slag series show evidence that the slags have a high resistance to leaching.

750 (EGG-FM--5241) IRON-RICH BASALT-TYPE WASTE FORMS FOR TRANSURANIC AND LOW-LEVEL WASTE CONTAINMENT: EVALUATION OF ELECTROMELT CASTINGS. Flinn, J.E.; Kelsey, P.V. Jr.; Tallman, R.L.; Henslee, S.P.; Seymour, W.C. (Idaho National Engineering Lab., Idaho Falls (USA)). Apr 1980. Contract AC07-76ID01570. 136p. NTIS, PC A07/MF A01.

Seven castings, 90 kg each, were produced by an electromelt process. The melts were solidified in thin-walled mild or galvanized steel containers. The containers showed no evidence of interaction with the slag. Four of the castings, designated as A-series (average INEL transuranic (TRU)/low-level-waste composition plus soil additions), were subjected to more detailed examinations, including sectioning into half pairs and subsequent evaluation. Examinations showed that bulk defects in castings were crust formation, center cavity porosity, and minor cracking. Specimens removed from the castings at selected locations showed that density and chemical composition were relatively uniform within each casting. Casting microstructure showed a 75 to 90% devitrification. Crystalline-phase types were pyroxene (diopside and hedenbergite) and spinel. The amount of spinel in A-series castings was dependent on both the iron content and Fe^{2+}/Fe^{3+} ratio. Leach data on slag specimens showed comparable leach rates, based on weight-loss measurements and elemental analyses of spent leachants. Splitting tensile strengths and fracture toughness values from slag specimens used in this study are less than those measured for borosilicate glass.

751 (EGG-PHYS--5076) ELECTRONICS SYSTEM FOR TRANSURANIC WASTE ASSAYS USING A PHOTON INTERROGATION TECHNIQUE. Johnson, L.O.; Lawrence, R.S. (Idaho National Engineering Lab., Idaho Falls (USA)). Dec 1979. Contract EY-76-C-07-1570. 69p. Dep. NTIS, PC A04/MF A01.

This report documents the development of electronics for a neutron detection system used in experiments to demonstrate the feasibility of a photon interrogation technique for transuranic (TRU) waste assays. The system consists of the neutron detection and signal conditioning circuits, variable time-gate generators, and a data acquisition system. The data acquisition system is configured using commercially available scalers, timers, teletype, and control components. The remainder of the system, with the exception of the neutron detectors, uses components designed in-house. The neutron detection system consists of ^3He proportional counters installed in a polyethylene moderator assembly. The counters are direct-coupled to a high-count-rate, current-sensitive preamplifier. The preamplifier and an additional two-stage amplifier are also installed in the moderator assembly. Signal conditioning includes baseline restoration and fast discrimination. A variable

time-gate generator with logic gates allows for separation of prompt and delayed neutron counts, and generation of prompt and delayed deadtimes. The ^3He proportional counters will detect not only the neutrons from the TRU waste sample, but also the high-energy photons used to induce fission in the sample. The burst of photons (gamma flash) tends to overload and paralyze the electronics. This system has been designed to recover from a worst-case gamma flash overload within 10 microseconds. The system has met all the requirements generated for the photon interrogation experiments.

752 (EGG-RE-M--78-033) IMMOBILIZATION OF INEL LOW-LEVEL RADIOACTIVE WASTES IN CERAMIC CONTAINMENT MATERIALS. Seymour, W.C.; Kelsey, P.V. (EG and G Idaho, Inc., Idaho Falls (USA)). Nov 1978. Contract EY-76-C-07-1570. 22p. Dep. NTIS, PC A02/MF A01.

INEL low-level radioactive wastes have an overall chemical composition that lends itself to self-containment in a ceramic-based material. Fewer chemical additives would be needed to process the wastes than to process high-level wastes or use a mixture containment method. The resulting forms of waste material could include a basalt-type glass or glass ceramic and a ceramic-type brick. Expected leach resistance is discussed in relationshp to data found in the literature for these materials and appears encouraging. An overview of possible processing steps for the ceramic materials is presented.

753 (EGG-RE-M--79-005) LEACHING OF INCINERATOR SLAG FROM MUNICIPAL WASTE. Tallman, R.L.; Flinn, J.E. (EG and G Idaho, Inc., Idaho Falls (USA)). Mar 1979. Contract EY-76-C-07-1570. 21p. Dep. NTIS, PC A02/MF A01.

A leaching study was performed on monoliths obtained by melting iron-rich municipal waste frit. The leachant was distilled water at 363°K. For tests where the leachant was intermittently changed and the specimens weighed, leach rates on the order of 1×10^{-4} $g.cm^{-2}d^{-1}$ were observed. For tests where the samples remained in the unperturbed leachant for the duration, leach rates were on the order of 3×10^{-5} $g.cm^{-2}d^{-1}$. These leach rates are similar to those obtained for other solidified waste forms, and are lower than those reported for concrete.

754 (EGG-TF--5168) BRIEF SUMMARY OF SLAG HANDLING OPTIONS REVIEWED FOR THE SLAGGING PYROLYSIS INCINERATOR IN THE TRANSURANIC WASTE TREATMENT FACILITY (TWIF) AT THE INEL. Darnell, G.R. (EG and G Idaho, Inc., Idaho Falls (USA)). Jun 1980. Contract AC07-76ID01570. 35p. NTIS, PC A03/MF A01.

This report summarizes the technical problems associated with molten transuranic waste slag as it flows from the incinerator shaft (gasifier) of the slagging pyrolysis incinerator. It addresses essential gasifier seals, slag casting and pouring technology, and transportation and packaging problems. Areas requiring further study and testing are identified.

755 (EGG-WM--5103) TRU WASTE PROCESSING COMPARISON: SLAGGING PYROLYSIS VERSUS MODIFIED GLASSMAKER. Bonner, W.F.; Cox, N.D.; Hootman, H.E.; Nelson, D.C.; Pye, D. (EG and G Idaho, Inc., Idaho Falls (USA)). Mar 1980. Contract EY-76-C-07-1570. 114p. Dep. NTIS, PC A06/MF A01.

A task force was assembled to make a technical comparison of the expected performance of two processing systems potentially applicable for treating TRU waste at the Idaho National Engineering Laboratory. One system contained a slagging pyrolysis incinerator; the other a modified Penberthy Electromelt glassmaker. Although the glassmaker technology is essentially undeveloped, it was assumed that the glassmaker could eventually be modified to operate as a combined waste incinerator and melter; that is, to perform the same functions as a slagger. Using a decision analysis methodology to evaluate figures-of-merit, the task force found no significant difference in the performance of the two systems. Some areas for future R and D efforts are recommended for both types of incinerators.

756 (EGG-WM--5116) LOW-LEVEL WASTE INSTITUTIONAL WASTE INCINERATOR PROGRAM. Thompson, J.D. (Idaho National Engineering Lab., Idaho Falls (USA)). Apr 1980. Contract EY-76-C-07-1570. 181p. Dep. NTIS, PC A09/MF A01.

Literature surveyed indicated that institutional LLW is composed of organic solids and liquids, laboratory equipment and trash, and some pathological waste. Some toxic and hazardous chemicals are included in the variety of LLW generated in the nation's hospitals, universities, and research laboratories. Thus, the incinerator to be demonstrated in this program should be able to accept each of these types of materials as feedstock. Effluents from the DOE institutional incinerator demonstration should be such that all existing and proposed environmental standards be met. A design requirement was established to meet the most stringent flue gas standards. LLW incineration practice was reviewed in a survey of institutional LLW generators. Incinerator manufacturers were identified by the survey, and operational experience in incineration was noted for institutional users. Manufacturers identified in the survey were contacted and queried with regard to their ability to supply an incinerator with the desired capability. Special requirements for ash removal characteristics and hearth type were imposed on the selection. At the present time, an incinerator type, manufacturer, and model have been chosen for demonstration.

757 (ENICO--1005) DESCRIPTION OF THE STACK MONITORING SYSTEM AND EFFLUENT MEASURING TECHNIQUES AT THE IDAHO CHEMICAL PROCESSING PLANT. Wong, M.A.; Roberts, R.S. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Aug 1979. Contract AC07-79ID01675. 39p. Dep. NTIS, PC A03/MF A01.

The stack monitoring system used to measure radioactive gas and particulate emissions from the Idaho Chemical Processing Plant is described in detail. The behavior of ^{129}I in the process off-gas and the particulate size distribution from the stack during different plant operations are evaluated. Recommendations for improvements to the system are presented.

758 (ENICO--1006) CALCINING SODIUM-BEARING WASTE BY BLENDING WITH ZIRCONIUM FLUORIDE WASTE. Newby, B.J. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Nov 1979. Contract AC07-79ID01675. 55p. Dep. NTIS, PC A04/MF A01.

A flowsheet, which is a method for converting wastes into granular, free flowing solids, was developed for calcining sodium-bearing waste stored at the Idaho Chemical Processing Plant (ICPP). The flowsheet consists of blending sodium-bearing waste with zirconium-

fluoride waste so that the calcine product contains as much as 5% sodium; calcium nitrate is added to the blend to give a calcium-to-fluoride mole ratio of 0.7. 7 figures, 26 tables.

759 (ENICO--1011) TECHNICAL AND ECONOMIC FEASIBILITY OF ZEOLITE ENCAPSULATION FOR KRYPTON-85 STORAGE. Benedict, R.W.; Christensen, A.B.; Del Debbio, J.A.; Keller, J.H.; Knecht, D.A. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Sep 1979. Contract AC07-79ID01675. 96p. Dep. NTIS, PC A06/MF A01.

This report presents experimental results and analyses to demonstrate the technical and economic feasibility of encapsulation by zeolites as a method to immobilize krypton-85 for safe, long-term storage. The process, which is feasible for a reference 2000 metric ton of heavy metal per year reprocessing plant, would encapsulate krypton at approximately 20 cm^3/g, using temperatures greater than 575°C and pressures greater than 1600 atm. A conceptual design and cost estimate was made for a commercial-scale facility, using well-established technology for building, operating, and containing krypton-85 within such a processing system. Safety considerations to contain any krypton released from the processing equipment are within existing technology. 36 figures, 12 tables.

760 (ENICO--1016) WCF FEED CHEMISTRY STUDIES. Newby, B.J. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Apr 1980. Contract AC07-79ID01675. 103p. Dep. NTIS, PC A06/MF A01.

Two methods using calcium nitrate are reported which effectively suppress fluoride and chloride volatility during calcination of first-cycle zirconium waste with minimum production of solids in calciner feed. Fluoride and chloride volatility suppression was accomplished by either increasing the aluminum concentration of the zirconium waste or blending the zirconium waste with sodium-bearing waste prior to calcium nitrate addition. Both methods were successfully tested in 10-cm diameter, fluidized-bed, pilot-plant calciner runs.

761 (ENICO--1026) PURIFICATION OF DIHEXYL N,N-DIETHYLCARBAMYLMETHYLENEPHOSPHONATE BY MERCURY (II) PRECIPITATION. Schroeder, N.C.; McIsaac, L.D.; Krupa, J.F. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Jan 1980. Contract AC07-79ID01675. 16p. NTIS, PC A02/MF A01.

Dihexyl N,N-diethylcarbamylmethylenephosphonate (DHDECMP) is an important extractant for partitioning actinides from acidic nuclear waste solutions. A new technique for purifying DHDECMP is presented. Reaction of 20% crude DHDECMP in hexane with 1M mercuric nitrate at 40°C precipitates $Hg(DHDECMP)NO_3$. DHDECMP, liberated from the precipitate by treatment with caustic cyanide, is > 95% jpure. The procedue is fast, inexpensive and has a high yield (approx. 85%) compared to previous methods.

762 (ENICO--1032) DESCRIPTION OF A PILOT PLANT TO PRODUCE A PELLETED FORM FROM SIMULATED ICPP HIGH-LEVEL CALCINED WASTES. Priebe, S.J.; Valentine, J.H. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Mar 1980. Contract AC07-79ID01675. 44p. Dep. NTIS, PC A03/MF A01.

The pilot plant uses techniques learned in the laboratory to combine calcine with solid and liquid binders to form hard, leach-resistant pellets. The pilot plant is designed to process up to 25 kg/h of calcine and will provide information necessary to verify the operational feasibility of pelletizing calcined waste. Also, information for the design of a possible full-scale pelletizing plant will be obtained. All components of the pelletizing operations are described. The solids feed system consists of two loss-in-weight feeders: one for calcine and one for solid binders. Intimate mixing of the solids is accomplished in a screw mixer-feeder. A metering pump is used to pump liquid binders to the pelletizer through a spray nozzle. A 12.7 mm mesh, vibro screen separator removes oversize pellets, leaving the pelletizer. A 0-6 kW microwave-heated dryer operating at 150 to 200°C removes moisture from the pellets in about 15 minutes. To impart leach resistance, the pellets are heat treated at 800 to 900°C for 1 to 2 hrs in a kiln. Pellets move down through a set of 6 to 8 stacked, rotating trays inside the kiln. Pellets are collected from the heat treater and tested for strength and leach resistance. An off-gas system cools and removes dust present in the off-gas from the pilot plant. 20 figures.

763 (ENICO--1035) PRODUCT REMOVAL NOZZLES FOR A FLUIDIZED-BED CALCINER. Schindler, R.E.; Cogburn, G.L.; Schrader, J.D. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Jun 1980. Contract AC07-79ID01675. 63p. NTIS, PC A04/MF A01.

Granular solids formed by the fluidized-bed calcination of radioactive liquid wastes are discharged from the calciner into a pneumatic transport line. These solids are discharged at a controlled rate by product removal nozzles consisting of sections of pipe. Dilution air is introduced near the nozzle inlet to dilute the solids and provide an air velocity adequate to prevent solids deposition in the nozzle. Solids discharge rates are controlled by adjusting the dilution air input and the pressure difference across the nozzle. Product removal nozzles designed to remove calcined solids from a fluidized-bed calciner at controlled rates of 1 to 3 kg/min with a pressure drop of 7 to 13 kPa were tested. Major operating parameters are identified and recommended operating conditions established. Graphical capacity correlations are developed for sizing of the product removal nozzles.

764 (ENICO--1036) ROLE OF SEED PARTICLES IN THE PREDICTION AND CONTROL OF PRODUCT PARTICLE SIZE IN FLUIDIZED-BED DRYERS. Grimmett, E.S. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Apr 1980. Contract AC07-79ID01675. 39p. Dep. NTIS, PC A03/MF A01.

Particle size distribution in a fluidized-bed dryer (where a solution is converted to a solid granular particle) depends on several different rate processes taking place. These include particle growth, particle attrition, product rate, feed deposition rate, elutriation rate, and seed attrition rate. While these rate processes are basic, depending on the material being dried, some become more important than others. Few new seed particles are generated within the bed when the physical properties of many materials being dried are such that little particle attrition takes place. Under these conditions, the particle size distribution in the bed continually increases unless some measure is taken to introduce into, or generate within the bed, new seed particles. This paper briefly describes the mathematical model which predicts the particle size distribution

expected when drying solutions in a fluidized bed. The important role that seed particles play in determining the steady-state particle size distribution of the bed is stressed. An experiment is described in which information was obtained that helped determine what seed particles are, and what size particles became seeds.

765 (ENICO--1037) COMPARISON OF HEPA FILTER TEST METHODS IN CORROSIVE ENVIRONMENTS. Murphy, L.P.; Fernandez, S.J.; Motes, B.G. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Jul 1980. Contract AC07-79ID01675. 31p. NTIS, PC A03/MF A01.

An evaluation of the three HEPA filter test methods in corrosive environments was conducted: the dioctyl phthalate (DOP) method (US Standard Method ANSI N-101.1-1972), the sodium chloride method (British Standard 3928:1969), and the soda-fluorescein or uranine method (French Standard AFNOR STD NFX 44-011). The effects of humidity, temperature and oxides of nitrogen (NO/sub x/) on each method was examined. The experimental design used in the evaluation measured and separated both the effect of each variable and any interaction between variables on the test method. Recommendations for changes in the standard methods to reduce erratic online results are presented.

766 (ENICO--1038) PROPERTIES OF VITRIFIED ICPP ZIRCONIA CALCINE. Cole, H.S.; Gombert, D. II; Berreth, J.R. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Jul 1980. Contract AC07-79ID01675. 40p. NTIS, PC A03/MF A01.

Waste glass using a borosilicate frit and simulated zirconia calcine produced at the Idaho Chemical Processing Plant was characterized. Tests included: Soxhlet, acid, and static distilled water leaches, and relative viscosity and crystallinity measurements on both air-quenched and annealed samples. The frit was evaluated to vitrify 10 to 40 wt% calcine. The effects of CaF_2 content on glass viscosity and crystallinity were measured. Changes in viscosity and leach rate caused by other calcines, partially substituted for the zirconia calcine in the glass, were determined. Varying the Na_2O to Li_2O ratio was studied on four modifications of the base glass. Viscosity and leach rates of glasses modified as described above were not significantly altered, but crystalline content of heat-treated glasses significantly increased with increasing CaF_2 content. 10 figures, 11 tables.

767 (ENICO--1040) VITRIFICATION OF HIGH-LEVEL ALUMINA NUCLEAR WASTE. Brotzman, J.R. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Jun 1980. Contract AC07-79ID01675. 23p. NTIS, PC A02/MF A01.

Borosilicate and borophosphate glass compositions have been developed to vitrify simulated high-alumina calcined nuclear defense waste. The effects of the alkali (Li_2O,Na_2O) to borate ratio and the Li_2O to Na_2O ratio on the glass melt viscosity and leach resistance were measured. The effects on the same properties of substituting CaO and P_2O_5 for SiO_2 and of substituting SiO_2, P_2O_5 and CuO for B_2O_3 were measured in the borosilicate and borophosphate glass, respectively.

768 (ENICO--1043) CALCINATION OF SODIUM-BEARING WASTE USING NON-RADIOACTIVE ADDITIVES. Newby, B.J. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Oct 1980. Contract AC07-79ID01675. 69p. NTIS, PC A04/MF A01.

Methods were scoped for converting the sodium-bearing waste stored at the Idaho Chemical Processing Plant into granular, free flowing solids by fluidized-bed calcination at 500°C. The most promising methods were addition of aluminum nitrate or aluminum nitrate, hydrofluoric acid, and calcium nitrate to sodium-bearing waste prior to calcination. These will be used as alternates to a method consisting of adding calcium nitrate to a blend of zirconium fluoride and sodium-bearing wastes prior to calcination. Problems could develop in calcining such a blend, storing the resulting calcine, or in obtaining enough zirconium fluoride waste to blend with sodium-bearing waste.

769 (ENICO--1048) CHARACTERIZATION OF VITRIFIED ICPP ALUMINA WASTE CALCINE. Cole, H.S.; Brotzman, J.R.; Simpson, G.G. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Aug 1980. Contract AC07-79ID01675. 24p. NTIS, PC A02/MF A01.

The properties of one borosilicate and two borophosphate glasses previously developed to vitrify an ICPP alumina nuclear waste calcine are determined. Based on melt viscosity at 1100°C and leach rate, the maximum permissible calcine contents in the borophosphate and borosilicate formulations are 26 and 16 mol%, respectively. Glasses containing lesser amounts of calcine do not develop crystalline compounds upon annealing. Based upon the same viscosity and leach rate criteria, 40 wt % CaO or zirconia calcine can be substituted for alumina calcine in the borophosphate glasses. Ten wt % of either additive can be substituted for alumina calcine in the borosilicate glass. Minor modifications of the alkali or cupric oxide content in the borophosphate glasses does not alter glass characteristics.

770 (ENICO--1051) DEVELOPMENT OF A PELLETED WASTE FORM FOR HIGH-LEVEL ALUMINA WASTES. Kirkbride, R.A. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Sep 1980. Contract AC07-79ID01675. 44p. NTIS, PC A03/MF A01.

A formulation to pelletize simulated high-level ICPP alumina waste calcine was developed. The pellets are formed on a 41-cm-diameter disc pelletizer using 5% bentonite, 2% metakaolin, and 5 wt % calcium hydroxide as a solid binder and a solution of 7M phosphoric acid and 4M nitric acid as a liquid binder. After drying and heat treatment at 800°C for 2 hours, the average crush strength of the pellets is 3.9 MPa and the pellets have a leach resistance of 10^{-3} g/cm^2/day, based on Soxhlet leaching for 48 h at 95°C with distilled water.

771 (ENICO--1062) SOLIDIFICATION OF ICPP ACTINIDE PARTITIONING SOLUTIONS. Schuman, R.P. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Sep 1980. Contract AC07-79ID01675. 23p. NTIS, PC A02/MF A01.

An extensive literature survey has been made of possible methods of solidifying the rare earths and actinides in the solutions from the actinide partitioning columns, and several simple experiments have been run. If both actinides and lanthanides are to be solidified together, direct oxalate precipitation from mildly acid strip solution appears most promising. Oxalate will precipitate Np(IV), Pu(III or IV) and Am(III) from the $NH_2OH.HNO_3$ plus dilute HNO_3 strip solution. Direct evaporation of the solution on a glass frit also appears promising if glass is the final waste form. Many inactive simulated waste

glasses have been prepared and leach tested; highly durable glasses can be prepared at 1100°C. Inorganic titanate, $HTi_2O_5^-$, ion exchanger efficiently sorbs Np and Pu from neutralized strip solution but not from the acid strip solution. Titanate can be pressed to give a durable ceramic waste form.

772 (EUR--5785) COMPARATIVE EVALUATION OF RADIOACTIVE MATERIALS MANAGEMENT BY DIFFERENT METHODS: PT. 1. QUANTITATIVE COMPARISON OF THE DIFFERENT METHODS USED FOR THE REDUCTION OF THE VOLUME OF α CONTAMINATED SOLID WASTES. Ditterich, K.; Schneider, J. (Commission of the European Communities, Ispra (Italy). Joint Research Centre). 1977. 22p. (In German). Dep. NTIS (US Sales Only), PC A03/MF A01.

In order to estimate the various strategies based on different system structures, a methodology is given. It is applied to the radioactive waste management systems. The base of the methodology is constituted of objective criteria to calculate the validity of the considered method. The validity of this method is demonstrated by application to the evaluation of processes for reducing the volume of Pu contaminated solid wastes.

773 (EUR--6213) TESTING AND EVALUATION OF THE PROPERTIES OF VARIOUS POTENTIAL MATERIALS FOR IMMOBILIZING HIGH ACTIVITY WASTE. FIRST ANNUAL REPORT (1977). Malow, G.; Beran, V.; Lutze, W.; Marples, J.A.C.; Dalton, J.T.; Hall, A.R.; Hough, A.; Boult, K.A. (Commission of the European Communities, Brussels (Belgium)). 1979. 38p. Dep. NTIS (US Sales Only), PC A03/MF A01.

Four borosilicate glasses and one Celsian glass ceramic were tested under strictly identical conditions. This report presents the results of the following test: (a) Leach testing of samples, in the as cast state, annealed at 800°C for up to 100 days; (b) Grain titration test of hydrolytic resistance (DIN 12111); (c) Examination of the glass structure and its changes due to thermal effects, differential thermal analysis, x ray diffraction analysis, scanning electron microscopy, microprobe analysis.

774 (GEFR-SP--215) ACTINIDE RECYCLE IN LMFBRS AS A WASTE MANAGEMENT ALTERNATIVE. Beaman, S.L. (General Electric Co., Sunnyvale, CA (USA). Advanced Reactor Systems Dept.). 30 Apr 1980. Contract AM03-76SF00893. 33p. (CONF-800743--2). NTIS, PC A03/MF A01.

From International conference on nuclear waste transmutation; Austin, TX, USA (22 Jul 1980).

A strategy of actinide burnup in LMFBRs has been investigated as a waste management alternative to long-term storage of high level nuclear waste. This strategy has been evaluated because many of the actinides in the waste from spent-fuel reprocessing have half-lives of thousands of years and an alternative to geological storage may be desired. By burning the actinides in LMFBRs the long-lived isotopes can be effectively transmuted to fission products which have significantly shorter half-lives. Actinide burnup in LMFBRs rather than LWRs is preferred because the fission to capture reaction rate ratios are higher in the LMFBR, and the LMFBR performance is not highly sensitive to the addition of the actinide waste material. An actinide target assembly recycle scheme has been analyzed to determine the effects of the actinides on the LMFBR performance, including local power peaking, breeding ratio, and fissile material requirements. The overall efficiency of actinide burnout in LMFBRs has been evaluated, and equilibrium cycle conditions have been determined. The results of the actinide recycle study indicate that the actinide wastes produced by a fission reactor economy could be transmuted in fast reactors with only a two percent penalty in the fissile loading requirements and a one to two percent penalty in the breeding ratio of the host reactors. The actinide target assemblies could be tailored to give a power distribution which is comparable to that of the standard fuel assemblies. However, the total shutdown decay heat from a target assembly would be approximately 43 percent greater than that from a standard assembly.

775 (HEDL-SA--1967) OPERATION OF THE RADIOACTIVE ACID DIGESTION TEST UNIT. Blasewitz, A.G.; Allen, C.R.; Lerch, R.E.; Ely, P.C.; Richardson, G.L. (Hanford Engineering Development Lab., Richland, WA (USA)). 1980. Contract AC14-76FF02170. 19p. (CONF-800611--9). NTIS, PC A02/MF A01.

From International symposium on the management of alpha-contaminated wastes; Vienna, Austria (2 Jun 1980).

The Radioactive Acid Digestion Test Unit (RADTU) has been constructed at Hanford to demonstrate the application of the Acid Digestion Process for treating combustible transuranic wastes and scrap materials. The RADTU with its original tray digestion vessel has recently completed a six-month campaign processing potentially contaminated nonglovebox wastes from a Hanford plutonium facility. During this campaign, it processed 2100 kg of largely cellulosic wastes at an average sustained processing rate of 3 kg/h as limited by the water boiloff rate from the acid feeds. The on-line operating efficiency was nearly 50% on a twelve hour/day, five day/week basis. Following this campaign, a new annular high rate digester has been installed for testing. In preliminary tests with simulated wastes, the new digester demonstrated a sustained capacity of 10 kg/h with greatly improved intimacy of contact between the digestion acid and the waste. The new design also doubles the heat transfer surface, which with reduced heat loss area, is expected to provide at least three times the water boiloff rate of the previous tray digester design. Following shakedown testing with simulated and low-level wastes, the new unit will be used to process combustible plutonium scrap and waste from Hanford plutonium facilities for the purposes of volume reduction, plutonium recovery, and stabilization of the final waste form.

776 (HEDL-SA--2009-FP) REMOTELY OPERATED ORGANIC LIQUID WASTE INCINERATOR FOR THE FUELS AND MATERIALS EXAMINATION FACILITY. Sales, W.L.; Barker, R.E.; Hershey, R.B. (Hanford Engineering Development Lab., Richland, WA (USA)). 1980. Contract AC14-76FF02170. 12p. (CONF-800607--66). NTIS, PC A02/MF A01.

From American Nuclear Society annual meeting; Las Vegas, NV, USA (8 Jun 1980).

The search for a practical method for the disposal of small quantities of oraganic liquid waste, a waste product of metallographic sample preparation at the Fuels and Materials Examination Facility has led to the design of an incinerator/off-gas system to burn organic liquid wastes and selected organic solids. The incinerator is to be installed in a shielded inert-atmosphere cell, and will be remotely operated and maintained. The off-gas system is a wet-scrubber and filter system designed to

release particulate-free off-gas to the FMEF Building Exhaust System.

777 (HEDL-SA--2064) COMBUSTIBLE RADIOACTIVE WASTE TREATMENT BY INCINERATION AND CHEMICAL DIGESTION. Stretz, L.A.; Crippen, M.D.; Allen, C.R. (Los Alamos Scientific Lab., NM (USA); Hanford Engineering Development Lab., Richland, WA (USA)). 28 May 1980. Contract W-7405-ENG-36;AC14-76FF02170. 60p. (CONF-800802--16). NTIS, PC A04/MF A01.
From 89. annual meeting of the American Institute of Chemical Engineers; Portland, OR, USA (17 Aug 1980).
A review is given of present and planned combustible radioactive waste treatment systems in the US. Advantages and disadvantages of various systems are considered. Design waste streams are discussed in relation to waste composition, radioactive contaminants by amount and type, and special operating problems caused by the waste.

778 (IDO--10068(77-1)) WASTE MANAGEMENT ACTIVITIES (NON-PRODUCTION). QUARTERLY REPORT, OCTOBER-DECEMBER 1976. (Idaho National Engineering Lab., Idaho Falls (USA)). Apr 1977. 42p. Dep. NTIS, PC A03/MF A01.
This quarterly report provides current information on the Idaho National Engineering Laboratory (INEL) programs for the management of radioactive wastes (non-production) from the operations at INEL facilities. The report also includes information on development programs for the long-term management of commercial waste including high-level liquid wastes.

779 (INFCE/DEP/WG--7/4) LONG-TERM DISPOSAL OF ENRICHMENT PLANT TAILS. (INFCE (USA)). Aug 1979. 31p. NTIS (US Sales Only), PC A03/MF A01.
Approximately 97% of the uranium fed to the isotope separation plants is recovered as tails containing nominally 0.2 wt percent U-235. Essentially all this tails material produced in the past, as well as that currently being generated, is stored as solidified UF_6 in steel cylinders. This report describes a stand-alone, 10 tU/day facility for converting the UF_6 to a stable uranium oxide powder amenable to long-term storage in steel drums. The conversion is accomplished in a two-step process in which the UF_6 is first reduced to UF_4 with hydrogen in a tower reactor and then the UF_4 is pyrohydrolyzed to UO_2 with steam in a three-stage screw reactor. One reduction reactor supplies the feed for three pyrchydrolysis reactor lines. Included in the process flow sheets and reactor design details are descriptions of the major auxiliary components for vaporizing and feeding the UF_6, a dissociator for ammonia used as a hydrogen source, a system for recovering anhydrous hydrogen fluoride, and a reactor system for the disposal of hydrous hydrogen fluoride. Two of the nominal 10 tU/day plants would be required to handle the tails produced in isotope separation plants supplying enriched uranium to a nuclear power industry with a generation capacity of 50 GWe per year.

780 (INFCE/DEP/WG--7/7) SOLIDIFICATION OF HIGH-LEVEL WASTES FROM REPROCESSING. (INFCE (France)). [nd]. 8p. NTIS (US Sales Only), PC A02/MF A01.
For the solidification of high-level activity liquid wastes, glass has been selected as the best material because of the combination of chemical, radiation and thermal stability. Properties of glass as a barrier are given. The industrial application of the process in the AVM plant at Marcoule (France) is described.

781 (INIS-mf--4551, pp 190-194) NRI'S RESEARCH ON RADIOACTIVE WASTES. Alexa, J.; Dlouhy, Z.; Kepak, F.; Kourim, V.; Napravnik, J.; Razga, J.; Ralkova, J.; Uher, E.; Vojtech, O. 1976. (In Czech).
From Scientific and technical conference commemorating the 20. anniversary of the Nuclear Research Institute's foundation; Rez, Czechoslovakia (10 Jun 1975).
A survey is given (including 41 references) of work carried out at the Nuclear Research Institute. Discussed are sorption processes (a selective sorbent for ^{90}Sr based on $BaSO_4$, etc.), sorption on inorganic ion exchangers (heteropolyacid salts, ferrocyanides for ^{137}Cs capture), on organic cation exchangers (separation of lanthanides), electrocoagulation. The process is described of vitrification of highly radioactive wastes, the arrest of emissions, the deposition of radioactive wastes and surface decontamination.

782 (INIS-mf--4551, pp 195-199) RADIOACTIVE WASTE PROCESSING IN NRI. Dlouhy, Z.; Zaruba, J. 1976. (In Czech).
From Scientific and technical conference commemorating the 20. anniversary of the Nuclear Research Institute's foundation; Rez, Czechoslovakia (10 Jun 1975).
The processing of radioactive wastes from research work carried out at the Nuclear Research Institute is described. The waste processing installation is described as are the technologies used (vacuum concrete casting, bituminization, evaporation). Data on mechanical strength, radiation stability and leaching rate of products obtained by bituminization and concrete casting are listed; no references are given to previous works.

783 (INIS-mf--4637, pp 131) RADIOCHEMICAL SEPARATION OF PLUTONIUM FROM LOW-ACTIVITY WASTE WATERS. Volny, J.; Jasanovsky, P. (Ustav pro Vyzkum, Vyrobu a Vyuziti Radioisotopu, Prague (Czechoslovakia)). Jun 1976. (In Czech).
From 4. national symposium on ionizing radiation dosimetry; Marianake Lazne, Czechoslovakia (8 Nov 1976).
EFFICIENCY;INTERFERING ELEMENTS;LIQUID SCINTILLATION DETECTORS;LIQUID WASTES;LOW-LEVEL RADIOACTIVE WASTES;PLUTONIUM;SEPARATION PROCESSES;RADIOACTIVE WASTE PROCESSING; RADIOMETRIC ANALYSIS;SENSITIVITY;SOLVENT EXTRACTION

784 (INIS-mf--4771) RADIOACTIVITY GENERATION AND CONTROL RADWASTE PROCESSING. Mergan, L.; Storrer, J.; Verbeke, R.; Cordier, J.P. (Societe Belge pour l'Industrie Nucleaire, Brussels). 1978. 12p. (CONF-781022--75). Dep. NTIS (US Sales Only), PC A02/MF A01.
From Meeting on nuclear power reactor safety; Brussels, Belgium (16 Oct 1978).
After a brief recall of the safety problems reported from existing radwaste solidification installations, the paper presents a proposal of safety requirements to be applied to such processes, first, from the standpoint of the installaton features and equipment, second, regarding the properties to be demonstrated for the solidificaton end-products. It also introduces a soidification process which, together with an important waste volume reduction, provides satisfactory answers to above safety aspects.

785 (INIS-mf--5013, pp 3-28) HANDLING OF SPENT NUCLEAR FUEL AND FINAL STORAGE OF NITRIFIED HIGH LEVEL REPROCESSING WASTE. [nd].

Safe handling and storage of high level radioactive waste. A condensed version of the proposals of the Swedish KBS-Project regarding reprocessing waste, spent fuel.

The following stages of handling and transport of the fuel on its way to final storage are dealt with in the report. 1) The spent nuclear fuel is stored at the power station or in the central fuel storage facility awaiting reprocessing. 2) The fuel is reprocessed, i.e. uranium, plutonium and waste are separated from each other. Reprocessing does not take place in Sweden. The highlevel waste is vitrified and can be sent back to Sweden in the 1990s. 3) Vitrified waste is stored for about 30 years awaiting deposition in the final repository. 4) The waste is encapsulated in highly durable materials to prevent groundwater from coming into contact with the waste glass while the radioactivity of the waste is still high. 5) The canisters are emplaced in a final repository which is built at a depth of 500 m in rock of low permeability. 6) All tunnels and shafts are filled with a mixture of clay and sand of low permeability. A detailed analysis of possible harmful effects resulting from normal acitivties and from conceivable accidents is presented in a special section.

786 (INIS-mf--5013) SAFE HANDLING AND STORAGE OF HIGH LEVEL RADIOACTIVE WASTE. A CONDENSED VERSION OF THE PROPOSALS OF THE SWEDISH KBS-PROJECT REGARDING REPORCESSING WASTE, SPENT FUEL. [nd]. 18p. Dep. NTIS (US Sales Only), PC A04/MF A01.

Individual papers are processed for the data base.

787 (INIS-mf--5316) SOLIDIFICATION OF LIQUIDS BY THE USE OF MICROWAVES. Rohrecker, L. (Technische Univ., Vienna (Austria)). Jun 1979. 97p. (In German). Dep. NTIS (US Sales Only), PC A06/MF A01.

Thesis.

A method of heating falling droplets of water by passing them through a microwave resonator excited at 14.5 GHz from a travelling wave tube amplifier is described. Optimum resonator shape is analysed and applications in inducing chemical reactions leading to the solidification of radiactive waste solutions are suggested. A computer program for determining dielectric heating of liquid drops is listed.

788 (INIS-mf--5320, pp 16) URANIUM SORPTION FROM AQUEOUS SOLUTIONS BY BIOLOGICAL ABSORBENT. Jandl, J.; Jilek, R.; Pospisilik, K.; Novosad, J. (Vyzkumny Ustav Veterinarniho Lekarstvi, Brno-Medlanky (Czechoslovakia)). Apr 1979. (In Czech).

From 6. national conference on radionuclide applications in national economy; Valtice na Morave, Czechoslovakia (21 May 1979).

ADSORPTION;AQUEOUS SOLUTIONS;BIOADSORBENTS; DECONTAMINATION;DISTRIBUTION FUNCTIONS;LIQUID WASTES;PENICILLIUM;PH VALUE;URANYL COMPOUNDS; URANIUM;RADIOACTIVE WASTE PROCESSING

789 (INIS-mf--5450, pp 83) ISOLATION OF RADIONUCLIDES FROM WASTE SOLUTIONS USING BITUMINOUS SORBENTS. Sedov, B.M.; Ovsyannikov, A.I. (Leningradskij Tekhnologicheskij Inst. (USSR)). 1978.

From 9. radiochemical conference; Piestany, Czechoslovakia (12 Sep 1978).

BITUMENS;CERIUM 144;CESIUM 134;CHEMISORPTION; COBALT 60;DECONTAMINATION;ION EXCHANGE; MANGANESE 54;ORGANIC ION EXCHANGERS;QUANTITY RATIO;RADIOACTIVE WASTE PROCESSING;RUTHENIUM 106;SODIUM NITRATES;STRONTIUM 89;SORPTIVE PROPERTIES

790 (INIS-mf--5564, pp 198-207) SOLVENT EXTRACTION OF PALLADIUM WITH SULFUR REAGENTS FROM MINERAL ACID MEDIUM. COMMUNICATION 1. SOLVENT EXTRACTION WITH SYMMETRICAL DIALKYL- AND DIARYL SULFIDES FROM NITRIC ACID MEDIUM. Przhigoda, I. 1977. (In Russian).

From 4. symposium on study into irradiated fuel reprocessing; Karlovy Vary, Czechoslovakia (28 Mar 1977).

Investigated has been the extraction process of divalent palladium, present in liquid solution wastes at reprocessing of irradiated nuclear fuel from nitroacid medium by organic solvents of sulfides in benzol, toluene, nitrobenzene, chloroform, tetrachloroethane, tetrachloromethane, 1,2-dichloroethane, n-octane, methylisobuthylketone, di-n-butylether and benzine. It is detected that distribution coefficient of palladium in the majority of instances depends but slightly on the nitric acid concentration. If palladium and sulfide concentration and also the volume of the two phases are respectively equal, palladium distribution coefficient variates in the vicinity of 1. In case sulfide concentration is at least 2 times higher, than the palladium concentration, the extraction effectiveness reaches almost 100%. Palladium(2) extraction kinetics and the effect of organic additions (dimethylsulfoxide, dimethylformamide, and methanol) and salting-out agents on the distribution coefficients have been studied. A conclusion is made that the compound is being extracted with sulfide-palladium ratio 2:1.

791 (INIS-mf--5564, pp 170-179) METHODS FOR SOLVENT EXTRACTION OF STRONTIUM 90 WITH CARBOXYLIC ACIDS AND SEPARATION OF AMERICIUM AND CURIUM BY QUATERNARY AMMONIUM COMPOUNDS. Korpusov, G.V.; Krylov, Yu.S.; Danilov, N.A. 1977. (In Russian).

From 4. symposium on study into irradiated fuel reprocessing; Karlovy Vary, Czechoslovakia (28 Mar 1977).

Experiments on strontium-90 separation by extraction with various carboxylic acids in transient countercurrent regime were carried out. It is shown by the experiments on the laboratory multistage extraction equipment, that strontium separation may be conducted simultaneously with isotope concentration and its purification from neighbouring alkali-earth elements and other impurities. Various extraction systems based on quaternary ammonium compounds are selective to americium and curium in the trivalent state. The effectiveness of countercurrent process of americium and curium separation was confirmed by the experiments on the laboratory extraction equipment.

792 (INIS-mf--5564, pp 188-197) SOLVENT EXTRACTION OF TECHNETIUM FROM NITRIC ACID SOLUTIONS WITH TRIBUTYL PHOSPHATE AND TRI-N-OCTYLAMINE IN TETRACHLOROMETHANE. Matsashek, F.; Raets, P.; Mikulai, V.; Kopunets, R.; Chekh, R. 1977. (In Russian).

From 4. symposium on study into irradiated fuel reprocessing; Karlovy Vary, Czechoslovakia (28 Mar 1977).

The extraction of pertechnetate, present in liquid wastes of irradiated fuel processing, from nitrate solutions by tributyl phosphate

and tri-n-octylamine solutions in carbon tetrachloride is investigated. The TcO_4^--coextraction with uranium by the TBP solutions is explained by the exchange of the NO_3^---TcO_4^- ions, coordinated by uranyl. The TOA/CCl_4 solutions possess good selectivity. Hydrochloric acid excretion during irradiation and storage of the solution may be considered as their disadvantage.

793 (INIS-mf--5564, pp 248-257) SORPTION OF FISSION PRODUCTS ON HUNGARIAN SYNTHETIC ION EXCHANGERS. Tsegledi, B.; Chovari, M. 1977. (In Russian).
From 4. symposium on study into irradiated fuel reprocessing; Karlovy Vary, Czechoslovakia (28 Mar 1977).
Sorption of fission products and chloride ions from boric acid solutions on Hungarian synthetic ion exchanges is studied. Chloride concentration measurements during selectivity study of ion exchangers was carried out by means of chloroselective membrane electrodes. Sorption of fission products was determined by γ-spectra of ionites, obtained after passing of radioactive solutions. It was determined, that high-basic anionite Varion AT-660 and Varion-ATM were sufficiently selective to chloride ion and may be used for purification of circuit waters of nuclear reactor from traces of these ions. The fission products have different sorption on high-acid and high-basic ionites: rare-earth elements and ruthenium are well sorbated on cationite, zirconium and niobium - on anionites.

794 (INIS-mf--5565, pp 166-177) PROBLEMS OF HIGH-ACTIVE WASTE PROCESSING BEFORE DISPOSAL. Kulichenko, V.V.; Krylova, N.V.; Martynov, Yu.P.; Rakov, N.A. 1977. (In Russian).
From 4. symposium on study into irradiated fuel reprocessing; Karlovy Vary, Czechoslovakia (28 Mar 1977).
The ways of reprocessing and disposal of radioactive wastes with specific activity up to $3.7 \times 10^{14} s^{-1}/l$ formed in the process of regeneration of nuclear fuel are regarded. Glasslike (phosphate and silicate) and basalt like materials were studied. The methods of preparation of such materials applicable for disposal are briefly reviewed. The process of phosphate vitrification developed in the USSR includes two stages: calcination in a fluidized bed and followed by the calcinate melting by high frequency heating in a concrete crucible. The KS-KT-100 device developed on this basis and its technological cycle are described. At the calcination temperature of 400 deg C and fluidization velocity of 1.5m/s the productivity of the installation for the initial solution makes up 100l/h and for the glass-20 kg/h. Shortly regarded is the problem of radioactive waste storage and heat exchange by air blow. The undesirability of all the salts except nitrates in the disposed wastes is pointed out.

795 (INIS-mf--5565, pp 98-121) MODERN STATE OF TECHNOLOGY OF EXTRACTION OF TRANSURANIUM AND CERTAIN FISSION ELEMENTS FROM HIGH-ACTIVITY RAFFINATES. Gorski, B.; Pfrepper, G.; Nebel, D.; Khaine, V. 1977. (In Russian).
From 4. symposium on study into irradiated fuel reprocessing; Karlovy Vary, Czechoslovakia (28 Mar 1977).
Present-day methods of extraction of useful transuranium and fission elements are presented. Mainly Cs,Sr,Tc,Pd,Rh,Np, Am and Cm elements are discussed. The methods are estimated according to technology development state, problems that need further working-out and possible utilization in industry. The scheme of separation of these components is suggested and discussed.

796 (INIS-mf--5565, pp 276-281) RESULTS OF INVESTIGATION INTO CORROSION RESISTANCE OF CERTAIN STRUCTURAL STEELS AND NICKEL IN FLUORIDE PRODUCTS OF FAST REACTOR FUEL REPROCESSING. Kirillovich, A.P.; Gazizov, R.K.; Lavrinovich, Yu.G.; Belokopytov, V.S.; Bushkovskii, V.S.; Stupina, L.N. 1977. (In Russian).
From 4. symposium on study into irradiated fuel reprocessing; Karlovy Vary, Czechoslovakia (28 Mar 1977).
The results of investigation into corrosion resistance of carbon steel (steel-3), steel-Kh18N10T and nickel (NP-1) in the spent fuel reprocessing products of BOR-60 reactor by the fluoride volatility method. The effect of chemical medium, temperature and time on metal corrosion is considered. The effect of gamma radiation on corrosion resistance of steels and nickel in fluoride salts is estimated. It is shown that the corrosion of investigated materials increases with temperature and moisture of the environment. The formation of protective films on the metal surface after the durable contact with the fluoride salts is discovered. The protective properties of these films depend on their structure and environment conditions. The investigation into metal corrosion properties provides the recommendations on conditions of their utilization as construction materials in the fluoride volatility reprocessing of spent fuel.

797 (INIS-mf--5567, pp 268-273) Co^{2+} AND Ni^{2+} ION EXCHANGE ON ZIRCONYL PHOSPHATE FROM AQUEOUS SOLUTIONS. Ruvarats, A.; Atanasova, E. 1975. (In Russian).
From 3. CMEA symposium on investigations in the field of spent fuel reprocessing; Marianske Lazne, Czechoslovakia (24 Apr 1974).
The exchange of Co^{2+} and Ni^{2+} ions, formed in the solutions at reprocessing of the spent fuel as corrosion products is studied. Ion-exchange isotherms on zirconyl phosphate show, that with the increasing of the temperature the value of ion exchange in the Ni^{2+}/H^+ process increases and in the process of Co^{2+}/H^+ exchange the ion exchange value decreases with the increasing of the temperature. The process of the Co^{2+}/H^+ ion exchange is exothermal and the process of Ni^{2+}/H^+ ion exchange is endothermal. The thermodynamic parameters of the ion exchange are calculated.

798 (INIS-mf--5567, pp 274-283) SOME METHODS OF INVESTIGATION OF SOLIDIFICATION PROCESS OF HIGH-ACTIVE WASTES CONTAINING ALUMINIUM OXIDE. Voitekh, O.; Vatskova, E. 1975. (In Russian).
From 3. CMEA symposium on investigations in the field of spent fuel reprocessing; Marianske Lazne, Czechoslovakia (24 Apr 1974).
The methods of electron microanalysis, colorimetry, infrared spectroscopy, neutron diffraction analysis and emanation thermal analysis (ETA) for investigation of solidification process of high-active wastes containing aluminium oxide are studied. The practical application of these methods has been demonstrated in the process of Al_2O_3 inclusion into SIAL grade glass produced in CSSR for commercial purposes. It is shown that the ETA method is the most rational and can play a significant role in the process standartization due to its high sensitivity. The electron microanalysis is useful for investigation of space distribution of various components of the

product. The method of coloured chemical reactions and neutron diffraction analysis have the same application. The last one is an important analytical method for measuring products with actual contents of radioactive substances. The methods of infrared spectroscopy and X-ray diffraction analysis are useful for estimating resultant structure of the product and its chemical composition.

799 (INIS-mf--5567, pp 284-290) TO THE PROBLEM OF NEUTRALIZATION OF LOW- AND MEDIUM-ACTIVE SPENT FUEL REPROCESSING WASTES. Dlougi, Z.; Shafarzh, O. 1975. (In Russian).

From 3. CMEA symposium on investigations in the field of spent fuel reprocessing; Marianske Lazne, Czechoslovakia (24 Apr 1974).

Given is the analysis of technical and economic problems of handling low- and medium-active wastes from spent fuel reprocessing. Two methods are suggested for the solidification of liquid concentrates and used solid sorbents: vacuum carburizing and bituminization. Bituminization seems to look more promising from the economic point of view. Possible ways of solidificated radioactive waste strorage in the surface geological formations are considered such as placing into ordinary trenches or a concrete container followed by placing in a trench. For comparison with the above methods the utilization of a half-sunk closed hall with a light ceiling is considered. It is noted that the reliability and safety of the chosen place for radioactive waste storage should be based on the detailed study of local geological and hydrogeological conditions.

800 (INIS-mf--5567, pp 292-300) RADIOACTIVE CONCENTRATE INCLUSION INTO BITUMEN DURING FILMY EVAPORATION. Napravnik, I. 1975. (In Russian).

From 3. CMEA symposium on investigations in the field of spent fuel reprocessing; Marianske Lazne, Czechoslovakia (24 Apr 1974).

The method of fixing concentrated radioactive wastes into bitumen in a filmy evaporating device is described. The bituminization process was carried out by evaporation of the mixture of an aqueous bituminous emulsion and a concentrate. It is shown that the concentrated radioactive wastes can be reprocessed by aqueous bituminous emulsions in the filmy evaporating device. The recommendations on the use of the method in the general flow sheet of concentrate fixation by the vacuum comentation method are given.

801 (INIS-mf--5569, pp 154-162) PROCESSING OF RADIOACTIVE WASTES FORMED IN THE NUCLEAR FUEL RECYCLE FOR DISPOSAL. Kulichenko, V.V.; Martynov, Yu.P. 1975. (In Russian).

From 3. CMEA symposium on investigations in the field of spent fuel reprocessing; Marianske Lazne, Czechoslovakia (24 Apr 1974).

Different solidification technologies to process highly radioactive liquid wastes are briefly surveyed. Major requirements to solidification processes are considered. General characteristics of evaporation and calcination in a fluidized bed and in a spray drying apparatus as well as of vitrification in furnaces or using heat generated in chemical reactions and/or radioactive decay are given. The effect of a chemical and isotopic composition of highly radioactive wastes on the choice of an adequate processing and disposal technology is also considered. The choice is dominated by decay heat of wastes.

802 (INIS-mf--5570) RESEARCH ON DESACTIVATION OF LIQUID, SOLID AND GASEOUS RADIOACTIVE WASTES AND DECONTAMINATION OF SURFACES. PROCEEDINGS OF THE 4-TH SCIENTIFIC AND TECHNICAL CONFERENCE OF CMEA. MOSCOW, 20 - 23 DECEMBER 1976. PART 1. PROCESSING OF LIQUID RADIOACTIVE WASTES OF LOW AND MEDIUM ACTIVITY. (Sovet Ehkonomicheskoj Vzaimopomoshchi, Moscow (USSR). Postoyanniya Komissiya po Ispol'zovaniyu Atomnoj Ehnergii v Mirnykh Tselyakh). 1978. 137p. (In Russian). (CONF-761260--(Pt.1)). NTIS (US Sales Only), PC A07/MF A01.

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

The results of research works done in the field of desactivation of liquid radioactive wastes of low and medium activity are described. Problems of desactivation of sewage from nuclear power plants and other nuclear installations are discussed. The results of efficiency estimation of different methods of sewage radioactivity lowering are discussed including such chemical methods of purification os coprecipitation and coagulation. Problems of application both the organic and the nonorganic sorbents for separation of radioactive substances from liquid wastes are discussed. Results of research on purification methods by electrodialysis and ion exchange are given. More that this, the results of experiments on evaporation of liquid radioactive wastes and problems of long time storage of highly concentrated liquid wastes are discussed.

803 (INIS-mf--5570, pp 104-106) PURIFICATION OF LOW LEVEL ACTIVITY WATER BY MEANS OF SELECTIVE SORBENTS. Berak, L. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Results are stated of the investigations undertaken to study properties of selective sorbents used for purification of radioactive water. Main efforts were directed towards increase of sorption selectivity of sorbents with respect to radioactive isotopes of strontium and radium. Results of the investigations can find an application for therapeutics in the case of radionuclide penetration into the digestive system of man. Works were done for finding a sorbent capable to lower natural water activity when the water contains radium-226 and some type of wastes containing strontium-90 and also a sorbent for maximum reduction of activity of solutions with high salts content. Properties are given of sorbents on the base of alumosilicates in gel from, alcaline earth metals phosphates, hydrated oxides, barium sulphate, some natural organic compounds and ionites made of sulfated styrene copolymers.

804 (INIS-mf--5570, pp 73-79) OPERATION EXPERIENCE IN PLANTS FOR DESACTIVATION OF RADIOACTIVE WASTES OF LOW AND MEDIUM ACTIVITY IN ROMANIA. Bushile, A.; Oikulesku, A.; Rishnovianu, I.; Roshu, N.H. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Operation experience of the station for processing and deactivation of liquid and solid radioactive wastes of low and medium level of activity is described. List of the equipment in the station, specifications of main

installations, methods applied for wastes processing and results obtained are given. Liquid wastes processing includes: chemical processing of sewage, water evaporation; radionuclides separation from distillate by means of ion exchange; dehydratation of slurries; cementation of radioactive concentrates. Solid combustible wastes are burned and combustion products in gaseous form are filtrated. Solid non combustible wastes are splintered and pressed for reduction of their volume. Chemical and physiacal properties of liquid wastes processed are given.

805 (INIS-mf--5570, pp 61-66) REMOVAL OF FISSION AND CORROSION PRODUCTS FROM ALKALINE SOLUTIONS OF BORIC ACID BY THE ION EXCHANGE METHOD. Chonsnowska, V.; Zentek, R. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Results are given for ion exchange on organic resines method application in experiments on removal of some fission products and corrosion products from solutions containing boric acid. As it is known, presence of boric acid in solution makes it difficult for radioactive wastes processing, concentration and solidification. The main task of the investigation was to develop methods for boric acid regeneration from the coolant of primary coolant circuits of nuclear power plant. Speciel attention was made to investigations on cesium sorption from the boric acid solutions, containing potassium ions. It was shown that by means of acidulation of solutions, increase of efficiency of radioactive wastes containing boric acid by means of ion exchange is gained. But this method is practical only in the case when solution is not returned into the primary coolant circuit after purification. Expediency of preliminary removal of cesium from solution by means of selective nonorganic ionites is shown. Attention is called to the danger of boric acid for natural waters and danger of liquid wastes containing boric acid even after removal of radionuclides from them.

806 (INIS-mf--5570, pp 125-134) INVESTIGATION ON POSSIBILITIES OF APPLICATION OF THE BULGARIAN NATURAL SORBENTS FOR DESACTIVATION OF LIQUID RADIOACTIVE WASTES OF MEDIUM AND LOW LEVEL OF ACTIVITY. Gradev, G.D.; Milanov, M.V; Prodanov, Ya.D.; Stefanov, G.I. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

As a results of preliminary investigations on Bulgarian natural minerals, clinoptilolite, vermiculite and bentonite were selected as perspective natural nonorganic sorbents. Results of investigations on natural sorbents properties and their application for radioactive waters purification are stated. Sorption of cerium, silver, thallium, strontium, cobalt, iron and cesium ions has been investigated. It was shown that the greatest sorption ability have univalent ions on clinoptilolite. Twovalent and polyvalent ions and also cesium are well sorbed on vermiculite but bentonite is the best sorbent for extraction of cobalt and cerium. The data are given for sorbents capacity and selectivity. Influence of heat treatment, gamma irradiation and pH of solution on sorbents capacity are concidered. Influence of alkaline and alkaline earth ions on sorption are investigated. Results are given of experiments of nuclear power plant sewage purification.

807 (INIS-mf--5570, pp 50-54) DEVELOPMENT OF THE CATALOG FOR ORDINARY SORPTION AGENTS FOR LOW ACTIVITY SEWAGE PURIFICATION. Jochansen, K.H. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Sorption and ion exchange with natural materials and synthetic resins are widely used in purification of sewage of low and medium level of activity. Properties of different sorbents are compared by means of the unified method for sorptive properties determination. The data obtained were compiled as a catalog of sorbents. This unified method was applied to determine properties of sorbents used for purification of low and medium activity sewage. The unified method includs determination of common and special properties of sorbents. Common properties are: grain size, humidity, mechanical strength, and chemical stability. These properties are presented as standards of the CMEA member-countries for sorbents and ion exchange materials. Determination of special properties is relevant to estimation of efficiency of sorbents in radioactive sewage purification and removal of substances dissolved in water. Substantial effict on the sorbents effeciency is made by the chemical composition of the wates processed. As a sample for determination of sorbent properties three solutions were selected. These sample solutions contain non active salts with additions of cesium-134, cesium-137, strontium-89, strontium-90, sulfur-35 in the form of sulfates and chlorine-36 in the form of chlorides. Methods for determination other sorbents' properties as ion exchange rate, distribution factor, exchange factor and regeneration ability in unified conditions. Catalog of sorbents produsedin member-countries of CMEA is given.

808 (INIS-mf--5570, pp 41-44) EXPERIENCE ON OPERATION OF PILOT PLANT FOR CONCENTRATION OF LIQUID RADIOACTIVE WASTES BY MEANS OF EVAPORATION AT THE TEMPERATURE BELOW BOILING POINT. Liptak, L.; Takach, F. 1976. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Experience of the pilot plant operation for evaporation of the liquid radioactive wastes from atomic power station is described. Evaporation is done at the temperature below boiling point. The installation used for experiments provides opportunity to verify two differentversions of technology, namely: application of the tank-concentrator hawing double walls permitting to use it for transportation wastes to bureal place outside of the site and use of a single walled tank. Following parameters were measured and registered: medium temperature in different points; qooling water and air expenditure; condensate accumulation; air heater power. On determining the heat engineering parameters of the insatllation the main task of experiments performed was determination of heat and mass transfer laws ower the surface of water in condition of vortical movement of air and development of the mathematical model for computation of installation's operation conditions and development of design calculation methodology. Influence of substances with densities less than the density of solution, especially of lubricants, with

productivity of the device. Methods of removal of these substances from the solution surface were investigated. Also the results of investigation on salts crystallization in course of long time operation of the device are given.

809 (INIS-mf--5570, pp 135-237) PURIFICATION OF THE HIGH ACTIVITY WATER FROM LONG TIME STORAGE POOL FOR FUEL ELEMENT CLUSTERS. Ludovit, T. 1978. (In Russian).
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
Problems of corrosion of spent fuel elements clusters on their storage in storage pool are concidered. It was found that cooling solution of potassium bichromates filling containers with clusters do not have enough inhibitive properties with respect to clusters cans of beryllium and magnesium alloy. Especially great influence is caused on corrosion acceleration by presence of carbonic acid. Destruction of fuel elements clusters leads to going out of active solution from containers to cooling water. Radioactivity of cooling water is conditioned by presence of cesium-134 and cesium-137. Investigations were made on different sorbents application for cooling water purification and cesium removal. The best results were obtained in the case of bentonite application. Then, investigations were dane on the possibilities for cesium radionuclides precipitation by means of potassium ferricyanide and copper sulfate. Method of sorption by means of ionites was considered the best.

810 (INIS-mf--5570, pp 64-72) APPLICATION OF HETEROGENEOUS FLOTATION FOR SEPARATION OF SOME LONG LIVING FISSION PRODUCTS. Ogtaza, J. 1978. (In Russian).
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
The purpose of the research work was investigation of flotation separation of colloidal ferricyanides of heavy metals with precipitated cesium and determination of process conditions and possibilities for its practical application. In experiment, as floating collector some surfactants were used. Results of investigations on flotation separation of heavy metals ferricyanides were used for estimation of practical fitness of the method for cesium-137. Influence of pH of medium and different concentrations of reagents with cesuim-137 separation was determined. The method proved to be practically applicable for separation of main quantities of cesium-137 (about 97%) with comparatively small expenditure of ferricianide.

811 (INIS-mf--5570, pp 27-33) INVESTIGATION ON NATURAL CALCIUM CLINOPTILOLITE INTENDED FOR ITS APPLICATION FOR PURIFICATION OF WATER CONTAINING CESIUM, STRONTIUM AND COBALT ISOTOPES. Peskov, G.I.; Daiev, Kh.T.; Gradev, G.D.; Milenov, M.V. 1978. (In Russian).
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
The results of investigations on behaviour of the natural calcium clinoptilolite in sorption of the radioactive nuclides of cesium, strontium and cobalt from liquid radioactive wastes are discussed. The results of determination of calcium clinoptilolite capacity with respect to cesium, strontium and cobalt are given. Capacity determination was made by the methods of radiometry and complexometry. Research was done in static and dynamic conditions. The results obtained has shown that in contrary to the sodium-potassium clinoptilolite, the calcium clinoptilolite has high sorption capacity with respect not only to cesium but also with respect to strontium. There is increase of capacity by 50% with respect to cobalt. The investigations were made on the natural sorbent selectivity with respect to three elements in presence of sodium, which normally presents in substantial amounts in liquid ra. dioactive wastes. The results obtained has shown the high selectivity of the sorbent with respect to cesium and strontium. Sorption of cobalt in presence of substantial amounts of sodium is reduced. If all three elements together are present in liquid wastes, the sorbent selectivity remains high with respect to cesium and substentially decrease with respect to ctrontium and remains low wit respect to cobalt. The results are given of investigations on effects of presence of ions of different elements and some compounds on sorption properties of calcium clinoptilolite.

812 (INIS-mf--5570, pp 79-82) RESULTS OF NEW INVESTIGATIONS ON THE PROCESS OF LIQUID WASTES PURIFICATION BY MEANS OF ION EXCHANGE AND WAYS OF IT'S IMPROVEMENT. Rauzen, F.V.; Trushkov, N.P.; Tugolukov, V.V. 1978. (In Russian).
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
Results are given of research on optimisation of filtration processes of solutions through ion exchange column and improvement of ion exchange resines regeneration process. Basic equation of ion sorption by ionites loaded in the column and expressions for determination of the contact time and purification ratio deduced from this equation are given. Some recommendations are given for the optimum concentration of nitric acid for regeneration of KU-2 kationite depending on composition of solution purified.

813 (INIS-mf--5570, pp 34-40) CONCENTRATION OF LIQUID RADIOACTIVE WASTES BY EVAPORATION AT THE TEMPERATURE BELOW BOILING POINT. Scivos, K.; Lovass, D.; Liptak, L.; Takach, F.; Hirling, J.; Pavlik, O.; Hardy, D.; Putjrskaja, G. 1978. (In Russian).
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
The results are given of research on concentration of liquid radioactive wastes of low and medium activity containing salts in amounts from 1 to 10 g/l. These wastes are produced during nuclear power plants operation. Depending on chemical composition of these liquid wastes they are concentrated by means of water evaporation up to salts concentration of 100-400 g/l. Residues can be stored either in liquid from or solidified by cementation ore bitumenisation. These processes are complicated as technology is concerned and need special equipment. Storage of concentrated wastes in liquid from is not expedient. The most rationally is to reduce volume of wastes by means of evaporation up to solid salt state. The methods of the liquid wastes evaporation by hot ear at the temperature below boiling point are discussed. In this case, the tank for the wastes evaporation is at the same time the container for wastes disposal simplifying

subsequent operations connected with wastes reloading. The process discussed is safe and needs not expensive heat source. As a result of this process in the evaporator tank used as a container for wastes disposal dry mixture of salts is obtained.

814 (INIS-mf--5570, pp 112-116) ELABORATION AND OPERATION EXPERIENCE OF TWO CHAMBER PLANT FOR WASTES BURNING. Sobolev, I.A.; Khomchik, L.M.; Karataev, B.A.; Dmitriev, S.A.; Makarchenko, G.V. 1978. (In Russian).
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
Results are stated of investigations on process of wastes burning in device consisting of two-chamber furnace with liquid fuel and off-gas system of ''dry'' type. Solid wastes are burned in plumes of the first chamber fuel burner but smoke gases finally are burned in plumes of the second chamber. The heat source is disel oil and cobustible liquid radioactive wastes. Dependance is given of solid state phase concentration in the smoke gases on the chamber temperature. The low temperature limit of the process of burning is 900 centigrade. Heat engineering properties of burning furnace are given and some data about ''dry'' cleaning of smoke gases are presented. Design of the device and its designed parameters are described.

815 (INIS-mf--5570, pp 55-60) APPLICATION OF SORPTION METHODS FOR LIQUID RADIOACTIVE WASTES PROCESSING. Tomaczak, W. 1978. (In Russian).
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
Results of laboratory investigations on determination of optimum conditions for removal of cesium-137, strontium-86, cobalt-60 and ruthenium-106 from solution are given. Sorption method on mixture of barium carbonates and copper ferricyanides was investigated. Results of liquid radioactive wastes purification are given and economic effect of this method's application is considered. Copper ferricianide is used as a specific sorbent for cesium, and barium carbonate is the reagent for obtaining the sorbent in the form of barium sulfate having good sorption properties in freshly precipitated form. Dependences of concentrations of sodium sulfates, calcium, sodium chloride ions on strontium, cesium and cobalt sorption and dependence of physical state of sorbent on sorption properties are given. Nonorganic synthetic sorbents of the composition mentioned were tested in radioisotope laboratory sewage purification. Sewage waters contain 0,95 gramme per liter of salts with pH 3; alpha, beta and gamma emitting radionuclides; strontium-90; iodine-133; xenon-133; ruthenium-108; cesim-134; cesium-137; niobium-95; zinc-65; cobalt-60; lanthanum-140; manganese-54; antimony-124. As a result of sewage purification, sorption more than 95% of the radionuclides was obtained. Four times lowering of the purification expenses was gained.

816 (INIS-mf--5570, pp 91-95) NONORGANIC SELECTIVE ADSORPTION AGENTS AND EXPERIENCE OF THEIR APPLICATION FOR DESACTIVATION OF LOW ACTIVITY WASTES HAVING HEIGHTENED SALTS CONCENTRATION. Zajtsev, B.A.; Poznyakov, A.N.; Malinina, E.I.; Plisko, V.N.; Shinkina, M.A. 1978. (In Russian).
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
Possibility is considered of application of nonorganic selective sorbents for purification of low activity wastes especially in the case when they have elevated salts concentration. In selection of nonorganic sorbents folloving demands are made: selectivity, good sorptive properties, low cost and simplicity of the sorbent preparation. Ferricyanide of iron precipitated on activated carbon surface, copper sulfide in addition of zinc powder as a reduction agent and pyroluzite with more than 90% content of manganese dioxide were used. It was shown that in simultaneous application of these sorbents, great values of distribution ratio for every radionuclide is ensured. Sorption of antimony-125 and cobalt-60 is registred for sulfide sorbent. As a shortcoming of the selective sorption, impossibility of removal from wastes radionuclides with stable analogs present in big inough amounts in wastes and removal of chemical impurities with relatively high concentrations are marked.

817 (INIS-mf--5570, pp 67-90) DEVELOPMENT OF SORPTION AGENTS ON THE BASIS OF TRANSITITION METALS HYDROXIDES AND INVESTIGATIONS ON THE MACHANISMS OF THE FIRST AND SECOND GROUP ELEMENTS SORPTION FROM SOLUTIONS WITH HIGH SALT CONTENT BY MEANS OF THESE SORBENTS. Zakharov, M.A.; Balukova, V.D.; Ermolaev, B.M. 1978. (In Russian).
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
Method of preparation of sorbents on the basis of hydroxides of metals, niobium hydroxide and zirconium hydroxides is considered. Niobium hydroxide is reacting with sodium, strontium and barium contained in slightly alkaline solutions and can be treated as a concenrator of alkaline earth elements. It is shown that increase of sodium nitrate content in the solution cause reduction of the strontium absorption by niobium hydroxide. Analogous investigations were made on zirconium hydroxide. Mechanism of niobium hydroxide interaction with strontium compounds in aqueous solutions is described.

818 (INIS-mf--5570, pp 107-111) OPERATION EXPERIENCE OF RADIOACTIVE WASTES PURIFICATION STATION AT THE INSTITUTE FOR NUCLEAR RESEARCH IN REZ (CZECHOSLOVAKIA). Zaruba, J.; Petran, M. 1978. (In Russian).
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
Structure of equipment for the radioactive wastes processing in the Institute of nuclear research in Rez is stated. Technology of liquid radioactive wastes includes chemical processing, filtration, evaporation in vacuum, processing in ion exchange columns, dehydratation of slurries. Radioactive liquid wastes are processed separately depending on radionuclides type. Concentrated slurries are solidified by means of cementation or bitumnisation. Solid wastes are either compacted in waste transportation containers or are cemented in them. Wastes processing station parameters and amounts of radioactive wastes processed are given.

819 (INIS-mf--5571, pp 94-102) COMPARISON OF SOME PROPERTIES OF PHOSPHATE AND SILICATE

GLASSES INTENDED FOR VITRIFICATION OF ALUMINIUM CONTAINING RADIOACTIVE WASTES. Oziraner, S.N.; Minaev, A.A.; Kuznetsov, D.G.; Prokhorova, N.P. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Prospects of application of boronsilicate and phosphate glasses for solidification of liquid high-level of activity wastes containing as main components ions of sodium and aluminium are considered. $Na_2O - Al_2O_3 - CaO - B_2O_3 - SiO_2$ and $Na_2O - Al_2O_3 - P_2O_5$ systems have been examined and also comparison of some properties of glasses has been done for these systems. Cross-sections of the four-component system $Na_2O - Al_2O_3 - B_2O_3 - SiO_2$ with constant content of B_2O_3 equal to 5, 10, 15 and 20% have been examined. Regions of glass formation at different temperatures have been investigated. It has been shown that because of the fact that according to sodium oxide content, region of the optimum glasses lay in narrow interval but sodium oxide content in wastes was changing in the wide limits, glasses of this system could not be used for solidification of wastes containing sodium and aluminium. For phosphate glasses the system $Na_2O - Al_2O_3 - P_2O_5$ turned to be the most perspective. Data are given for chemical resistance phosphate and silicate glasses. Crystallization ability of the glasses examined and crystallization influence with their chemical stability were investigated. Influence of additives with chemical stability of glasses were examined. The conclusion has been made that both types of glass had nearly the same properties and could be used for fixation of radioactive wastes.

820 (INIS-mf--5571, pp 21-24) METHOD OF SIMULTANEOUS EVAPORATION AND CEMENTATION OF RADIOACTIVE WASTES. Pavlik, O.; Fridrik, W. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Method of liquid wastes transformation into unsoluble form by cementation is considered. Cementation is done in conditions of evaporation at the temperature below 100 centigrades. Peculiarity of the method considered is that solidification and burial of the wastes is done at the same tank. Because of big size of the tank it is impossible to mix cement mixture in it. The method is that in course of evaporation, at the moment of crystallization of salts, in supersaturated solution feeding of cement into the tank is started. Solution in the tank is set in rotation which facilitates precipitation of cement on the tank's bottom. Concrete is formed on the tank's bottom consisted of cement and crystallizated salts. The condition for obtaining strong enough concrete is that solution evaporated has to be neutral or alkaline with pH not less than 7. Scheme of the evaporator installation is given for that used on experiment. Design of the experimental installation permitted to take off the concrete block from the evaporator tank for further testing. Composition of the solution used for evaporation and composition of concrete blocks obtained after evaporation an cementation are given. The concrete obtained was subject to testing for leaching, homogenity and strength. The results of testing are given in the paper. The results obtained were compared with the results of testing the concrete blocks of approximately the same composition but obtained by the method of mechanical mixing.

821 (INIS-mf--5571, pp 79-82) APPLICATION OF THE SOLIDIFICATION METHOD FOR DESACTIVATION OF NUCLEAR POWER PLANT WASTES IN CZECHOSLOVAKIA. Shojmir, Sh. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

The problem of disposal of the radioactive wastes from the nuclear power plants situated in densely populated regions is considered. In the conditions of the Czechoslovakia it is considered necessary to transform liquid radioactive wastes into the solid form for long time storage with the purpose to satisfy demands of safety and environment protection. Methods of bituminization and cementation of liquid radioactive wastes from nuclear power plants as waste solidification processes are considered. When solidification of wastes by cementation, method of the vacuum cementation is applied. The product obtained as to its properties are conserned, offers to avoid further packing of blocks. Applicability of the method depends on the salts composition of the wastes solidified. This method can not be aplied to solidification of cation exchange resins. Parameters of the cement blocks and conditions of cementation are given. The bituminization method consists of getting salt-bitumen compound in the film evaporator. This method is applicable for fixation of the all liquid radioactive wastes, including ion exchange resins. Exclusion is for the alcaline metals nitrates causing dangerous oxidation of bitumen at the temperature ower 300 centigrades.

822 (INIS-mf--5571, pp 67-73) DEVELOPMENT AND OPERATION EXPERIENCE FROM PILOT-PLANT FOR BITUMINIZATION OF LIQUID RADIOACTIVE WASTES (UBD-200). Sobolev, I.A.; Khomchik, L.M.; Karataev, B.A.; Lifanov, F.A.; Kulichenko, V.V.; Fomin, Yu.K. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

The results are given for investigations of liquid radioactive wastes bituminization on the pilot-plant of continious operation. The bituminization process is divided into two stages. On the first stage salts with definite moisture content are obtained. On the second stage, wet salts are mixed with melted bitumen. In this process the salts are finally dried and bitumen compound produced is transported towards the discharge assembly. Design of the dryer and mixer is described and their technical parameters are given. Salt-bitumen compound is discharged in moulding bogies with volume of 0.5 m^3. After hardening, salt-bitumen compound blocks are removed for burial. Average composition of liquid radioactive wastes coming for solidification is given. Dependences of the salt-bitumen compound characteristics on the parameters of the technological process of bituminization are given as well as the results of analysis of filling of compound by salts at the block height of 0.3 m. It is shown that division of the bituminization process into two stages do not affect on the chemical stability of compound.

823 (INIS-mf--5571, pp 62-66) INVESTIGATIONS OF POSSIBILITIES FOR IMPROVEMENT OF PROPERTIES OF ORGANIC BINDERS. Volkova, O.I.; Zakharova, K.P.; Karataeva, T.M.; Kulichenko, V.V.; Neroda, A.A.; Sobolev, I.A.; Khomchik, L.M. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

The results are stated of investigations directed to search of ways for improvement of bitumen binders properties ore replacement of bitumens by other binders having definite advantages in comparison with them. The possibility of inclusion of radioactive wastes into different types of resins; solidificated at the room temperature were investigated. Polyester resins having good water resistance and fire resistance were investigated. The results are given for determination of water resistance of samples containing sodium nitrate as a filler and also for chemical compositions of real wastes used for experiment and water resistance characteristics of the samples obtained. The results gained has shown that polyester resines had low water resistance and their application is too complicated. Epoxy resins have much higher water resistance but just as the polyester resines are complicated for use and demand preliminary dehydration of wastes. Thermoplastic materials were investigated too, - styrene derivatives having high radiation resistance but low water resistance. From the oil processing products, asphalts has been investigated beeng a perspective material for waste solidification. Data are given for improvement of bitumens properties by means of introduction of additives (diluters).

824 (INIS-mf--5571, pp 114-121) INVESTIGATIONS IN THE FIELD OF HIGH-ACTIVITY WASTES DESACTIVATION. Woiteh, O.; Napravnik, J.; Steiskal, J.; Neumann, L. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Results are stated of investigations done for development of industrial equipment for high-activity wastes fixation. Different reagents and technological processes of radioactive wastes fixation and also structural materials for devices are examined. Laboratory-scale investigations are directed towards selection of the fixing material and determination of its physical and chemical properties. Special laboratory device has been developed for investigation of the denitration and calcination processes. Lay-out of the devite and the results of structural materials selection are given in the paper. It has sown that combination of the processes of denitration and calcination in the single device made parameters of these processes proceeding worse. More than this, in the case of dosing glass-forming substances at the beginning of the process strong corrosion occures. Description is given of the device for melting of the products of fixation in the vertical furnace with electric heating. Characteristics are stated of different methods of denitration. Properties of calcination products and conditions for these products fixation are given. Pilot-plant installation is described intended for solidification of high-activity wastes. This installation has been build on the basis of analysis of the results of experiments and was destined for verification of technology and equipment.

825 (INIS-mf--5571) RESEARCH ON DESACTIVATION OF LIQUID, SOLID AND GASEOUS RADIOACTIVE WASTES AND DECONTAMINATION OF SURFACES. PROCEEDINGS OF THE 4TH SCIENTIFIC AND TECHNICAL CONFERENCE OF CMEA. MOSCOW, 20-23 DECEMBER 1976. PART 2. IMPROVEMENT OF METHODS AND EQUIPMENT FOR PROCESSING, SOLIDIFICATION AND BURIAL OF RADIOACTIVE WASTES, INCLUDING HIGH-ACTIVITY WASTES. (Sovet Ehkonomicheskoj Vzaimopomoshchi, Moscow (USSR). Postoyanniya Komissiya po Ispol'zovaniyu Atomnoj Ehnergii v Mirnykh Tselyakh). 1978. 152p. (In Russian). (CONF-761260--(Pt.2)). NTIS (US Sales Only), PC A08/MF A01.

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Survey of investigations in the field of radioactive concentrates solidification is given. Low and highe temperature processes of radioactive wastes solidification are described on the basis of last years works. Different designs of apparatus for radioactive wastes solidification by low temperature methods and properties of bitumen compounds and ways for their quality improvement are widely presented. Description is given of vitrification process in the furnace with direct electric heating. Technical and economic estimations of radioactive wastes solidification for the nuclear power plant wastes are given.

826 (INIS-mf--5571, pp 48-55) TECHNOLOGICAL INVESTIGATIONS OF BITUMINIZATION PROCESS FOR LIQUID RADIOACTIVE WASTES. Borzunov, A.I.; Kulichenko, V.V.; Fomin, Yu.K. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Research was carrying on in laboratory scale and pilot-plant scale for solution of some physical and mechanical problems of the technological processes of bituminization of radioactive wastes. The research was carrying on the model and ""universal"" compositions and with use of different sorts of bitumen. The research was intended for development of industrial installations for bituminization of liquid radioactive wastes of low and intermediate-level of activity and with productivity of 200 l/s and more. Investigation of the process of inclusion of humid wastes into bitumens has shown that in the course of process temporary increase of viscosity can take place. The increase of viscosity must be taken into account in calculations of mixers. Examination of reological properties of binders is showing that it is preferably at the stage of mixing to use binders with low viscosity, but at the stage of storage, binders with high viscosity. It seems to be expedient to ensure control properties of binders on different stages of technological chain apparatus - pipeline - burial place by means of introduction of additions, changing of shear forces, changing temperature ore by means of the agregate of the methods mentioned, for influence on the reological properties of compounds. It has been shown that in presence of considerable amounts of surfactants in wastes it was possible to rise water stableness of compounds by means of wastes processing by sorbents.

827 (INIS-mf--5571, pp 34-40) DESIGN AND OPERATION PRINCIPLE OF PILOT-PLANT FOR BITUMINIZATION OF RADIOACTIVE WASTES. Dagen, A.; Kerner, V.; Knappe, I.; Veber, V. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Pilot plant for radioactive wastes

bituminization by the methods of ''hot incorporation'' and continious evaporation of emulsion is described. The pilot plant has been tested by utilization of sediments obtained as a result of the nuclear power plant sewage evaporation. Bituminization by the method of ''hot incorporation'' is characterictic by evaporation of water from the concentrates with dosed feeding of concentrates into bitumen, mixing and simultaneous addition of solid substances into bitumen. The emulsion evaporation method is characteristic by evaporation of water from preliminry prepared emulsion of bitumen and concentrate. Descriptions of the technological processes on the pilot plant and the technological flow-chart of the bituminization methods for radioactive wastes are given. Characteristics of the concentrates subject to bituminization; mixtures of bitumen 845 and solid substances and also results of bituminization of wastes and their concentrates by the method of periodic evaporation of emulsion are given.

828 (INIS-mf--5571, pp 74-78) DEVELOPMENT OF EQUIPMENT FOR PILOT-PLANTS FOR RADIOACTIVE WASTES BITUMINIZATION. Davydov, V.I.; Votintsev, A.F.; Germanyuk, O.M.; Karasev, V.V.; Kulikov, V.A.; Maslova, L.G.; Kozubskii, M.A. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Design of the apparatus for bituminization of liquid radioactive wastes in rotary film-bitumizer is described. Filling of the bitumen compound by salts up to 50% is reached, with high enough fluidity of compound at the temperature of 140-150 centigrades. The results of stand-testing of experimental bitumizers with productivity of 90 and 500 l/hour are given. Technological processes of the model wastes bituminization are described. Characteristics of the pilot-plant bitumizers with productivity of 200 and 550-600 l/hour, developed on the basis of the experiments are given.

829 (INIS-mf--5571, pp 25-33) CONSTRUCTION OF NEW INSTALLATION FOR PROCESSING AND BURIAL OF RADIOACTIVE WASTES IN HUNGARIAN PEOPLES REPUBLIC. Fener, L.; Hirling, I.; Kasa, I. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Facility for desactivation and burial of radioactive wastes has been built in the site with cley soil and has been intended for desactivation liquid radioactive wastes and biological wastes and for burial of solid wastes and solidificated liquid wastes. Data are given concerning types and amounts of wastes and ways for their collection. Collection of wastes is done in centralised mode. Wastes can be solid, ore liquid. Liquid wastes can be collected either in the non processed form or in the form of concentrates. Description of the technology applied in the facility and design of the building for radioactive wastes processing are given. The technological process includes: reception of the wastes collected; decontamination of equipment and rooms, contaminated during wastes handling; unloading, storage and purification of liquid wastes; discharge of surplus clean water; cementation of concentrates; bituminization of biological wastes. The method used for concentration of liquid wastes includes precipitation and ion exchange. For final burial of wastes four types of underground stores are used: the store for solid wastes where wastes in containers and polyethylene bags and also bituminized biological wastes are laid with cement mixture containing radioactive concentrates; store for solidificated liquid organic wastes; store for closed radiation sources of low activity; store for closed radiation sources of high activity.

830 (INIS-mf--5571, pp 56-61) RADIOACTIVE WASTES BITUMINIZATION BY THE PILOT-PLANT EQUIPMENT. Golinsky, M.; Ferenc, M.; Ksendzak, Z.; Tikal, A. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Operation experience of pilot-plant for bituminization of radioactive wastes by the method of hot mixing is described. The results obtained have conffirmed parameters of the process gained in laboratory conditions for asphalts D-35 and P-60. The results are stated for experiments of bituminization of still residuums obtained as a result of distillation of low and intermediate-level of activity sewage waters. Chemical composition of the still residuums and characteristics of the P-60 asphalt are given. Bituminization of crystal sodium nitrate and supersaturated solutions at 200 centigrades up to 30% contents of salt in the compound was performed. It is shown that bituminization results depend on salts composition of radioactive wastes subject to solidification. The results are described of investigations of bituminization by the method of hot mixing of still residuums of radioactive wastes containing sodium nitrates on the pilot-plant. Parameters are given of bituminization process and characteristics of compounds obtained in bituminization of still residuums in a form of concentrates. Leachind process for wastes solidificated by the method of bituminization has been investigated. Leaching rate for radionuclides incorporated into bituminization products depending on time of storage is given. Results of the spectrometric analysis of solidificated concentrates, bituminization product and gaseous products of radioactive wastes processing by the method of hot mixing are given.

831 (INIS-mf--5571, pp 90-93) INVESTIGATIONS OF RADIONUCLIDES BEHAVIOUR DURING VITRIFICATION OF WASTES. Konstantinovich, A.A.; Kulichenko, V.V.; Bel'tyukov, V.A.; Nikiforov, A.S.; Nikipelov, B.V.; Stepanov, S.E.; Baskov, L.I.; Kulakov, S.I. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Behaviour of radionuclides at some stages of the vitrification process was investigated, in particular radionuclides volatilization both during the process of vitrification and from ready glass. Investigations were done at laboratory and experimental installations. It has been shown that in conditions of dehydration, calcination and vitrification strontium was entrained in the form of aerosols and relative entrainment of strontium was at the level of entrainment of main components of solution (sodium, aluminium, phosphor). The highest volatility had ruthenium forming gaseous fouroxide. The results are given for investigations of behaviour of some radionuclides during vitrification of the model high-activity wastes at the electric furnace with direct heating. Behaviour of cesium-137,

strontium-90 and ruthenium-106 during vitrification was examined. Composition of the model solution and information about entrainment of radionuclides are given. Performance parameters of the electric furnace and characteristics of the glass produced are given. Some peculiarities of ruthenium behaviour during vitrification are stated. It has been determined that minimum entrainement of radionuclides was observed during edding molasses into the solution. It has been shown that radionuclides were firmly fixed in phosphate glass.

832 (INIS-mf--5571, pp 110-113) PECULARITIES OF CARRYING OUT RADIOACTIVE WASTES VITRIFICATION PROCESS WITHOUT PRELIMINARY CALCINATION OF WASTES. Konstantinovich, A.A.; Kulichenko, V.V.; Bel'tyukov, V.A.; Nikiforov, A.S.; Nikipelov, B.V.; Stepanov, S.E.; Baskov, L.I.; Kulakov, S.I. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Vitrification technology is considered for liquid radioactive wastes by means of electric furnace where heating of glass-paste is done by electric current passing through the melt. Continious process of gehydration, calcination and vitrification is going on in one apparatus. Testing if the method has been performed by use of a model solution, containing sodium and aluminium nitrates. To obtain phosphoric acid has been added into the solution. Lay-out of the device and its description as well as technical parameters of the electric furnace are given. The results are stated for determination of the optimum operation conditions for the device. To reduce entrainment of solid components, molasses has been added in the solution. Parameters are given for the process of the solution containing 80 g/l molasses processing. It has been shown that edding molasses to the solution permitted to reduse power consumption of the process due to the heat generation during oxidation-reduction reaction on the melt surface. The results are given for investigations of the nitrogen oxides catching in scrubbers. These results have shown that introduction of molasses reduces nitrigen oxides concentration. The results of the experimental works have shown the possibility of the continious process of dehydration, calcination and vitrification in single device with application of remote control and monitoring by means of automatics.

833 (INIS-mf--5571, pp 5-21) DEVELOPMENT OF METHODS FOR SOLIDIFICATION OF RADIOACTIVE CONCENTRATES. Malasek, E.; Voiteh, O. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Survey is given for development of solidification methods for radioactive concentrates. Methods are considered for solidification of radioactive concentrates formed during processing of liquid radioactive wastes of low and intermediate activity. Solidification of wastes reduses possibility for leakage of radionuclides to environment and facilitates wastes management and wastes transportation. Solidification of liquid wastes of high level of activity is necessary not only for rasing safety but by economic reasons is advantageous for prolonged storage. The most wide-spread methods of solidification of wastes of low and intermediate-level of activity, cementation and bituminization are considered. The list is given of the most well-known processes of cementation and bituminization of wastes and also of chemical compositions and properties of portland cement, properties of bitumens and bitumen-base materials used for wastes solidification. List of installations for wastes bituminization and their parameters is given for operational ones. Such processes of high-level activity wastes solidification as calcination, melting and alumothermic process are considered.

834 (INIS-mf--5572, pp 3-10) TECHNOLOGICAL LYNE FOR RECEPTION AND STORAGE OF LIQUID CONCENTRATED RADIOACTIVE WASTES AND SPENT SORBENTS FOR THE LOVIISA NUCLEAR POWER PLANT AND FOR SERIAL BLOCKS OF NUCLEAR POWER PLANTS WITH WWR-440 TYPE REACTORS (SYSTEM TW). Matskevich, G.V.; Novikov, V.D. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Grounds are given for selected schemes of reception and storage of the radioactive wastes from nuclear power plant and technological principles having been assumed as the base for the project are described. Technological process of purification and processing liquid radioactive mediums at the nuclear power plant has been projected assuming that as a result of processing of liquid radioactive mediums, 2 types of wastes, different by their properties, accure: ion exchange resins mixed with different sorbents and dispersion sediments (heterogeneous phase); highly concentrated salt solutions (homogeneous phase). Main volume of radionuclides is absorbed by ion exchange resins during purification of the primary circuit coolant from reactor. According to the scheme proposed, radioactive wastes - concentrates are divided into 3 groups: high-level of activity ion exchange resines and dispersion sediments; low-level of activity ion exchange resines, sorbents and dispersion sediments; highly concentrated salts solutions. Description is given of technological elements of the TW system and parameters of equipment and sewage coming into the system. Water and chemical conditions of radioactive wastes storage are given.

835 (INIS-mf--5572) RESEARCH ON DESACTIVATION OF LIQUID, SOLID AND GASEOUS RADIOACTIVE WASTES AND DECONTAMINATION OF SURFACES. PART 3. BURIAL OF ALL TYPES OF RADIOACTIVE WASTES IN GEOLOGICAL FORMATIONS. (Sovet Ehkonomicheskoj Vzaimopomoshchi, Moscow (USSR). Postoyanniya Komissiya po Ispol'zovaniyu Atomnoj Ehnergii v Mirnykh Tselyakh). 1978. 59p. (In Russian). (CONF-761260--(Pt.3)). NTIS (US Sales Only), PC A04/MF A01.

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Separate abstracts were prepared for papers from the proceedings.

836 (INIS-mf--5573) RESEARCH ON DEACTIVATION OF LIQUID, SOLID AND GASEOUS RADIOACTIVE WASTES AND DECONTAMINATION OF SURFACES. PART 4. PERFECTION OF METHODS AND MEANS FOR AVERTING RADIOACTIVE CONTAMINATION AND FOR DECONTAMINATION OF EQUIPMENT OF NUCLEAR POWER PLANTS, RESEARCH CENTERS, AND NUCLEAR FUEL REPROCESSING INSTALLATIONS. (Sovet Ehkonomicheskoj Vzaimopomoshchi, Moscow (USSR).

Postoyanniya Komissiya po Ispol'zovaniyu Atomnoj Ehnergii v Mirnykh Tselyakh). 1978. 75p. (In Russian). (CONF-761260--(Pt.4)). NTIS (US Sales Only), PC A04/MF A01.
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
Selected papers are processed separately.

837 (INIS-mf--5574, pp 3-7) INVESTIGATIONS ON METHODS AND MEANS FOR REMOVAL OF RADIOACTIVE AEROSOLS AND GASES FROM AIR DISCHARGES FOR PERIOD OF 1971 - 1975. Nakhutin, I.E.; Teverovskij, E.N.; Smirnova, N.M. 1978. (In Russian).
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
Review is given of works carried on in the CMEA member-states in the field of investigations on the methods and means of the radioactive aerosols and gases removal from air discharges from nuclear installations in the period of 1971-1975. Works are stated in the field of catching and analysis of radioactive iodine in the gas discharges of nuclear power plants. Works are described on the search for the sorbents suitable for the iodine organic compounds and on investigations of the sorptive ability of activated carbon. Data are given of the investigations of carbons impregnated by the iodides of metals. Works are listed in the field of investigations of the dynamic adsorption of radioactive noble gases and the clathrate compounds of krypton with hydroquinone. The problem is considered of catching and storage of krypton-85. Works are stated in the field of investigation of cleaning gaseous discharges from aerosols with liquid and solid disperse phase and in the field of development of effective filtration materials and aerosol filters. Brief desription of the works in the field of investigation of the radioactive contamination spreading in the atmosphere is given. General situation in the field of gases cleaning at nuclear power plants in the CMEA member-states and tasks for solution of the problem of nuclear power plants gaseous discharges cleaning from the radioactive contaminations are stated.

836 (INIS-mf--5574, pp 49-53) CATCHING OF RADIOACTIVE IODINE AND IODINE COMPOUNDS BY NONORGANIC SORBENTS. Pietrik, I.; Gladki, Eh. 1978. (In Russian).
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
Problems are considered of the radioactive iodine catching from the atmosphere discharges of the nuclear power plant. Two non-organic sorbents have been investigated: aluminium oxide and diatomite having thermal and rediation resistance properties; resistance against acids and oxidants and non-inflammability. To catch the radioactive iodine and its compounds, the sorbents were impregnated by the silver nitrate or the potassium iodide. Dependance were investigated of the elementary iodine and the methyliodide catching efficiency on the iodine or its compounds concentration; on the relative humidity; on the degree of the sorbents impregnation by the silver nitrate and the potassium iodide; on the time of gas and sorbent contact and on the oil vapors concentration. The possibilities of the pure and impregnated alluminium oxide application for catching of the radioactive iodine in the form of the elementary iodine and the methyliodide have been confirmed.

839 (INIS-mf--5574, pp 58-61) INCLUSION OF KRYPTON INTO CLATHRATES. Schumann, F. 1978. (In Russian).
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
The structure of the hydroquinone clathrate and its modifications and also the clathrate composition $3C_6H_4(OH)_2 \times Kr$ is considered. Description of the experimental part of the research is given and the results obtained are stated. Dependance of the hydroquinone clathrates filling degree on pressure and dependance of krypton content in the clathrates on its content in the gaseous phase and also the temperature and enthalpy of some clathrate decontamination are given. The experiments on investigations of the physical and chemical stability of clathrates have shown that at the room temperature they have long life time if influence of such factors as humidity and oxidity substances is excluded. Calculations have shown that it is possible to neglect selfheating due to inclusion of krypton-85 if the sutable geometry of the containers used is preserved.

840 (INIS-mf--5574, pp 33-39) CAPTURE OF RADIOACTIVE IODINE FROM AIR DISCHARGE OF THE ISOTOPE PRODUCTION LABORATORIES OF THE CENTRAL INSTITUTE FOR NUCLEAR RESEARCH. Schvarzbach, R. 1978. (In Russian).
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
The problem of the discharge air from the hot chambers for radioactive iodine processing cleaning is discussed. The results are given of investigations on some non-organic materials fitness as the sorbtive material for the radioactive iodine aerosols. Diaphorite, porolite, silica gel and aluminium oxide were tested. All the non-organic materials were coated by the silver nitrate. The tests were done with use of CH_3J containing iodine-131 because of the difficulty of its capture in comparison with the elementary iodine. To determine fitness of the sorbents, analysis were made of: influence of the silver content; influence of the temperature; influence of the iodine concentration; influence of the time of a test-gas stay in the filter; influence of the filtering material aging in the affectiviness of the methyliodide catching. It has been shown that application of one of the sorbents tested at the temperature from 80 to 100 deg C caused considerable onloading of the hot cell filtering system.

841 (INIS-mf--5574) RESEARCH ON DESACTIVATION OF LIQUID, SOLID AND GASEOUS RADIOACTIVE WASTES AND DECONTAMINATION OF SURFACES. PART 5. (Sovet Ehkonomicheskoj Vzaimopomoshchi, Moscow (USSR). Postoyanniya Komissiya po Ispol'zovaniyu Atomnoj Ehnergii v Mirnykh Tselyakh). 1978. 116p. (In Russian). (CONF-761260--(Pt.5)). NTIS (US Sales Only), PC A06/MF A01.
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
Problems of cleaning air discharges from radioactive gases and aerosols are considered. Methodology is elucidated of the efficiency determination for aerosol filters and

determination of the granulometric composition of aerosols and of filters testing. Problems are stated of iodine, krypton, xenon and ruthenium catching. Problems of the atmosphere air pollution forecasting around nuclear installations; estimation of the Gaussian model accuracy for the pollution spreading and determination of the pollution distribution for those discharged from the nuclear reactors chimneys are discussed.

842 (INIS-mf--5574, pp 62-66) SORPTION OF KRYPTON-85 ON MOLECULAR SIEVES. Vardashko, T.; Nidetska, Yu. 1978. (In Russian).
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
The results are presented of the sorptive properties investigations of the molecular sieves with respect to krypton-85. The investigations have been done for impravement of the methodology for measuring of krypton-85 concentration in the atmosphere air and for determination of small volumes of concentrate activity. The molecular sieve with the grain size of 1.0 - 1.5 mm was used. Krypton adsorption was going on at the liquid nitrogene temperature (-196 deg C). Description is given of the devices for krypton-85 adsorption and measuring of the gases activity and also of the methodology for the experiment conducting. Dependances are given of the desorbed krypton amounts on different factors of the process proceeding.

843 (INIS-mf--5574, pp 70-71) CAPTURE OF RUTHENIUM, IODINE AND TRIYIUM FROM DISCHARGE GASES, PRODUCED DURING THE PROCESS OF DISSOLUTION AT THE DEVICE SU-2 OF SPENT FUEL ELEMENTS FROM NUCLEAR POWER PLANT WITH WWR REACTORS. Alimova, N.I.; Veselov, V.K.; Gajduk, G.I. 1978. (In Russian).
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
Problem of ruthenium, iodine-129 and tritium removal from the gas discharges on nuclear fuel reprocessing is considered. Separatelly the problems of the ruthenium tetraoxide are considered, because its separation presents the main difficulty during the purification process of uranium and plutonium. To prevent reduction of ruthenium and its irreversible sorption on the equipment surfaces, all devices and pipelines of the distillation and absorption assemblies are made of titanium. On investigation of the process of fuel dissolution, ruthenium dissolution and its catching from the gas flow and behaviour of iodine and tritium in this conditions were examined too. Investigations were done on the spent fuel elements from the Novovoronezh nuclear power plant. These fuel elements had 4 and 1 year of exposure. The results are stated of experiments on dissolution, distillation and adsorption of ruthenium. The method is developed for cleaning gas discharges, produced during the process of nuclear fuel dissolution and subsequent.ruthenium distillation, based on adsorption of volatile compounds by means of alkaline solutions and reducers. This methods permits to catch practically all ruthenium and iodine.

844 (INIS-mf--5574, pp 67-69) INVESTIGATION OF KRYPTON AND XENON CAPTURE FROM DISCHARGE GASES, PRODUCED DURING THE PROCESS OF DISSOLUTION AT THE DEVICE SU-2 SPENT FUEL ELEMENTS FROM THE NUCLEAR POWER PLANT WITH WWR REACTORS. Gaiduk, G.I.; Galkin, B.Ya.; Gusev, Yu.K.; Kirin, I.S.; Lazarev, L.N.; Lyubtsev, R.I.; Trofimov, A.M. 1978. (In Russian).
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
The results are stated of investigations on krypton-85 and xenon stable isotopes separation from the discharge gases, produced during dissolution of the spent fuel elements from the Novovoronezh nuclear power plant. The investigations were done on the laboratory-scale device SU-2. Process of the fuel elements dissolution and the discharge gases cleaning is described. Ruthenium and iodine are catched in the trap with caustic soda and a reducer. To adsorbe krypton and xenon, activated carbon was used. Chemical composition of the discharge gases and the curve of xenon and krypton emittance during dissolution of the spent fuel elements are given.

845 (INIS-mf--5574, pp 8-15) DETERMINATION OF THE AEROSOL FILTERS EFFICIENCY BY MEANS OF THE TRACER TECHNIQUES. Hirling, J. 1978. (In Russian).
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
Estimation of the nonradioactive methods of filters efficiency determination and tracer techniques are given. The methods are stated and discriptions of the instrumentation for estimation of the filters efficiency are given, in particular: methodology of production of the radioactive synthetic test-aerosols by means of the disperse and steamcondensation aerosol generators; the radio isotope method of the aerosol filters investigations; the methodology of filtartion efficiency determination. The results are given of the radioisotope investigations of filters; properties of the artificial radioactive test-aerosols; characteristics of filters, determined by the tracer techniques. Curves are given for the filtration efficiency of the viscose filtering nozzles of different density depending on the filters load.

846 (INIS-mf--5574, pp 16-20) INVESTIGATION ON ELECTROSTATIC INTERACTION OF AEROSOLS PARTICLES AND AEROSOL FILTERS MATERIALS. Hirling, J. 1978. (In Russian).
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
The results are given of investigations on the electrostatic effects influence on the radioactive aerosols filtration. The investigations were performed by means of the radioisotope method. Filters were investigated bouth in the charged state and in the conditions of the electrostatic charge removal by means of the radioisotope eliminator. Filter's charge polarity as well as the filtering nozzles with different degree of compaction of the saim amount of filtering material were changed. Changes of the relative filter efficiency depending on the filtering material density as well as the dependance of penetration and capture of aerosols in the electrically excited and neutral filters of different designe have been investigated.

847 (INIS-mf--5574, pp 21-27) GRANULOMETRIC COMPOSITION ANALYSIS OF RADIOACTIVE AEROSOLS BY MEANS OF THE CENTRIFUGAL AEROSOL SPECTROMETER. Hirling, J. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

The application of a conical aerosol centrifuge - the conifuge is described as an aerosol spectrometer for investigation of the granulometric composition of radioactive aerosols. Application of the radioisotope method of measurement permits to determine the particles distribution according to their mass, analogous to their granulometric composition, quickly and with the great thrustworthiness. Discription of the improved conifuge and the changes in the aerosol-spectrometric method of analysis are given. The improved radioisotope methodology of analysis essentialy raised precision and thrustworthiness of the results obtained. The experimental results are given of the radioisotope analysis of granulometric composition of aerosols by means of the improved conifuge.

848 (INIS-mf--5574, pp 72-76) ADSORPTION-CLATHRATES SYSTEM FOR CLEANING DISCHARGE GASES ON REGENERATION OF SPENT REACTOR FUELS. Kazankin, Yu.N.; Palladiev, A.A.; Trofimov, A.M. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Problems are considered of the gaseous discharges from the installations for nuclear fuels reprocessing cleaning from krypton 85. It has been established that the most effective sorbent for krypton and xenon, activated carbon is at the temperature of 195 K. At the last stage of the gas cleaning process it is practical to use the clathrate compounds for binding stable nuclides of xenon and krypton 85 from the concentrates produced at the preliminary stages of enrichment. It makes possible to obtain reprocessing products in the form suitable for subsequent handling. The results are stated of investigations on the adsorption-clathrates scheme of catching, separation and enrichment of noble gases. The process is going on in 3 stages. 1 stage - adsorption at 195 K; 2 stage - desorption at heating of the sorbent; 3 stage - clathrates forming. Main parameters and dependances of the process are given.

849 (INIS-mf--5574, pp 54-57) CLEANING OF GASEOUS WASTES PRODUCED DURING OPERATION OF THE INSTALLATION FOR DESACTIVATION OF RADIOACTIVE WASTES. Kepak, F.; Binek, B.; Razda, J.; Uger, E. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Problems are considered of the gaseous radioactive wastes catching, produced during the high-activity wastes processing by the calcination method. During the calcination process, besides gaseous wastes, solid state phase dispersed in gases and the ruthenium tetrachloride vapours are produced. Influence of temperature, composition of gases and their chemical agressiveness on the process of filtration is investigated. The results of analysis of the composition of disperse phase of gaseous wastes from the calcination process are given. The results are stated of different filtering materials testing and of investigations of influence of different factors on the filtration and sorption processes. It has been shown that sorption of the ruthenium tetraoxide at great extent was reduced in the presence of the nitrogen oxides in the gases, ''poisoning'' the sorbent.

850 (INIS-mf--5574, pp 46-48) INVESTIGATIONS OF RADIOACTIVE IODINE CATCHING BY VENTILATION SYSTEM OF THE EWA AND MARILA REACTORS. Kostyrko, A.; Filipak, B.; Gladovsky, K. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Problems are concidered of the iodine sorbtion on the filter at a research reactor ventilation system. It is assumed that the radioactive iodine can have the form of the elementary iodine, can be sorbed on the aerosol particles and can have the form of organic compounds. The methodology is described of experiments on the radioactive iodine catching. The sorbents activity according to iodine-131 was determined by the method of gamma-spectroscopy. Lowering of the sorbents efficiency in course of time and also in the case of the air humidity rise were noted.

851 (INKA-Conf--78-156-000, pp 31-33) REDUCTION OF IODINE EMISSIONS FROM NUCLEAR FACILITIES. Wilhelm, J.G. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Lab. fuer Aerosolphysik und Filtertechnik 2). 1978. (In German).

From AGF work meeting on air purity and air pollution; Koeln, F.R. Germany (5 Jun 1978).

AIR FILTERS;EFFICIENCY;IODINE 129;IODINE 131; NUCLEAR FACILITIES;RADIOACTIVE EFFLUENTS

852 (INKA-Conf--78-396-000, pp 123-127) REMOVING RADIO-ACTIVE WASTES FROM NUCLEAR POWER STATIONS BY THE STEAG SYSTEM. EXPERIENCE IN OPERATION. Baatz, H. (Gesellschaft fuer Nuklearservice, Essen (Germany, F.R.)). 1978. (In German).

From International VGB conference on power plant auxiliaries with information exhibition; Essen, F.R. Germany (8 Mar 1978).

The mobile STEAG System for conditioning radio-active wastes from nuclear power stations represents a particularly safe and economic method of removing them in present day conditions. Cementation by the FAFNIR System is used for the greater part of the waste, the liquid concentrate (evaporator concentrate and filter slurry). For the special case of the medium active resin balls from the primary circuits, embedding in plastic by the FAMA process has proved to be the only available successful process so far. The highly active solid waste from the reactor core is decomposed by the MOSAIK System, is packed in transportable and storable containers and is removed from the fuel element storage pond. The systems are so safe that faults or interruptions of power station operation due to faults in removing radio-active wastes can be excluded.

853 (INKA-Conf--79-003-004) ACTINIDE DIFFUSION IN WASTE GLASSES. Matzke, H. (Commission of the European Communities, Karlsruhe (Germany, F.R.). European Inst. for Transuranium Elements). (Commission of the European Communities, Karlsruhe (Germany, F.R.). European Inst. for Transuranium Elements). 1979. 5p. (CONF-790111--14; IAEA-SM--236/5). Fachinformationszentrum, Karlsruhe, Germany.

From International symposium on thermodynamics of nuclear materials; Julich, F.R. Germany (29 Jan 1979).

The diffusion of U-233 and of Pu-238 was

investigated in phosphate glass, in different borosilicate glasses and in glass ceramics. Glasses with and without added simulated fission products were used. Some glasses also contained Gd_2O_3 as neutron poison. The method of thin tracer layers and high resolution alpha-spectroscopy were used to measure both depth and time dependence of diffusion. Above the softening points, the diffusion profiles became distorted due to plastic flow of the glass. Further complications arose due to nucleation of crystallites and subsequent crystallisation of part of the glass at long annealing times and high diffusion temperatures. The kinetics of the crystallisation process could be obtained from the time dependence of tracer penetration since differently crystallized glasses show different diffusion behaviour. In the glass ceramics, frequently composite tracer penetration profiles were observed which could be unfolded to a set of up to three Gaussians yielding different diffusion coefficients for different components of the glass ceramics. The effects of α-radiation damage and radiation enhancement of diffusion were also studied by using Cm- and Am-containing glasses. In all cases, the measured D-values were small, indicating that from the diffusion point of view, the glasses are a safe medium to store actinides.

854 (INKA-Conf--79-003-015) VOLATILITY OF ALKALI FISSION PRODUCTS DURING SOLIDIFICATION PROCESS. Odoi, R. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Chemische Technologie). (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Chemische Technologie). 1979. 7p. (IAEA-SM--236/23). Dep. NTIS (US Sales Only), PC A02/MF A01.

The fixation of High-Level Waste (HLW) in a glass matrix needs melting temperatures of about 1200°C. Volatilization has been established as the predominant mechanism of fission product release from the solidification process. The pressure and composition of the atmosphere above the samples is important, since CO_2 and H_2O will raise the vaporization by some orders of magnitude. The degree of evaporation of alkali metals like Na and Cs is very high, because their oxides begin to react with SiO_2 on reaching temperatures of about 600°C, i.e. after transformation of $\alpha \rightarrow \beta$ quartz. The stability of the final glass products is lower than that of the pure crystalline phases of the same composition. The silicate glasses, however, are of remarkably high solubility for all of the 40 fission products. This universality is particularly significant for radioactive waste disposal.

855 (INR--1740/13/C/A) TREATMENT OF SOLID RADIOACTIVE WASTES BY BALING. Golinski, M. (Institute of Nuclear Research, Warsaw (Poland)). 1977. 31p. (In Russian). Dep. NTIS (US Sales Only), PC A03/MF A01.

In the first part of the paper, the literature data on the solid radioactive waste treatment problem are presented. The second part contains description of hydraulic press, 1.6 MNM (160 t) and capacity of 1200 m^3/y. This press will be used in the first Polish nuclear power plant.

856 (JAERI-M--7852) PRESENT STATUS OF PARTITIGNING DEVELOPMENTS. Nakamura, H.; Kubota, M.; Tachimori, S. (Japan Atomic Energy Research Inst., Tokyo). Sep 1978. 42p. (In Japanese). Dep. NTIS (US Sales Only), PC A03/MF A01.

Evolution and development of the concept of partitioning of high-level liquid wastes (HLLW) in nuclear fuel reprocessing are reviewed historically from the early phase of separating useful radioisotopes from HLLW to the recent phase of eliminating hazardous nuclides such as transuranium elements for safe waste disposal. Since the criteria in determining the nuclides for elimination and the respective decontamination factors are important in the strategy of partitioning, current views on the criteria are summarized. As elimination of the transuranium is most significant in the partitioning, various methods available of separating them from fission products are evaluated.

857 (JAERI-M--8158) COLLECTION EFFICIENCY OF TEDA-IMPREGNATED ACTIVED CHARCOAL FOR LOW CONCENTRATION OF METHYL IODIDE IN AIR. Ohata, T.; Matsui, H.; Naritomi, M.; Yoshida, Y. (Japan Atomic Energy Research Inst., Tokyo). Mar 1979. 10p. (In Japanese). NTIS (US Sales Only), PC A02/MF A01.

In order to collect effectively airborne radioiodine of low concentration released to the atmosphere from nuclear facilities, the collection efficiency of active charcoals with three different grain sizes, impregnated with 5% TEDA was studied as a function of airbone methyl iodide concentration (bed depth 1 cm and face velocity 20 cm/sec). Following are the results: Collection efficiencies are nearly constant in the concentration range of 10^{-8} to 10^{-19} $CH_3I.g/cm^3$. Collection efficiency values are over 99% in 28 -- 60 mesh, 99% in 12 -- 30 mesh and 90% in 4 -- 10 mesh in the experimental conditions.

858 (JAERI-M--8240) SEPARATION METHODS USED FOR LARGE-SCALE PRODUCTION OF TRANSPLUTONIUM ELEMENTS. LITERATURE SURVEY OF THE CHEMICAL PROCESSES OF PARTITIONING TRANSPLUTONIUM ELEMENTS IN THE HIGH-LEVEL LIQUID WASTES OF FUEL REPROCESSING, (1). Tachimori, S. (Japan Atomic Energy Research Inst., Tokyo). May 1979. 88p. (In Japanese). NTIS (US Sales Only), PC A05/MF A01.

The production of transplutonium elements by fission reactor in countries of the world is by combination of reactor technology and chemical engineering. A review is made of the chemical processes for production of transplutonium elements on a large scale from neutron-irradiated actinoids; first, historical progress of the production in macro quantities of transplutonium elements in the world, and then the principal processes developed in respective countries and organizations. Finally, these methods are discussed with emphasis placed on the possibility of application to the partitioning of high-level liquid wastes in fuel reprocessing.

859 (JAERI-M--8339) RECOVERY OF ACTINOIDS FROM WASTE SOLUTIONS OF FUEL REPROCESSING. LITERATURE SURVEY OF THE CHEMICAL PROCESSES OF PARTITIONING TRANSPLUTONIUM ELEMENTS IN THE HIGH-LEVEL LIQUID WASTES OF FUEL REPROCESSING, 2. Tachimori, S. (Japan Atomic Energy Research Inst., Tokyo). Jul 1979. 89p. (In Japanese). NTIS (US Sales Only), PC A05/MF A01.

In part II of the literature survey, characteristics of the principal separation methods, i.e., solvent extraction and ion exchange, for plutonium(IV), americium(III) and lanthanoids(III) are first described to help understand essentials in the actual examples of applications of the methods. Then, some examples of recoverying actinoids from liquid wastes, especially on a large scale, are

presented. Finally, flowsheets being developed in the world for partitioning high-level liquid wastes in fuel reprocessing are given with discussion on their respective problems.

860 (Juel--1593) CONTRIBUTION TO THE TREATMENT OF LOW LEVEL RADIOACTIVE WASTE SOLUTIONS FROM THE FABRICATION OR REFABRICATION OF NUCLEAR FUEL CONTAINING AMMONIUM NITRATE. Mueller, B. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Chemische Technologie; Technische Hochschule Aachen (Germany, F.R.)). May 1979. 94p. (In German). Dep. NTIS (US Sales Only), PC A06/MF A01.

Thesis.

During the fabrication of nuclear fuel a great quantity of low level radioactive waste is produced which can be neither released directly into the environment nor stored for a long period. This waste consists mainly of NH_4NO_3-solutions and can be destroyed by thermal decomposition in a suitable reactor. A process is described for the decomposition of these waste solutions in a spray tower. After the waste solution has been concentrated the heavy metals which are present in small amounts are filtered off to about 99.8%. The concentrate is then sprayed into a heated tower (300°-600°C) to decompose of the ammonium nitrate. The products which are generated in the decomposition tower are mainly N_2, N_2O, NO, NO_2 and H_2O depending on the decomposition conditions. The condensate contains nitric acid. If ammonia or urea is added to the concentrate the pH of the concentrate increases to a value between 6 and 8 and the off-gas does not contain NO_2 any longer. The generation of NO can probably be avoided by slightly varying the flow sheet. The ammonium nitrate remaining amounts to less than 0.1%. In a bench scale apparatus, 6 kg of a waste solution containing 60% by weight ammonium nitrate were continuously decomposed per hour. Since the process equipment is relatively simple a scale-up to an industrial plant can easily be accomplished.

861 (K--2007) ANALYSIS OF A GAS ABSORPTION SYSTEM WITH SOLUBLE CARRIER GAS AND VOLATILE SOLVENT. Kanak, B.E. (Oak Ridge Gaseous Diffusion Plant, TN (USA)). Jan 1980. Contract W-7405-ENG-26. 186p. Dep. NTIS, PC A09/MF A01.

The effects of column diameter, carrier gas coabsorption, and solvent vaporization on the performance of a packed gas absorption column are examined. The system investigated employs dichlorodifluoromethane as a solvent to remove krypton from a nitrogen stream and is characterized by substantial nitrogen coabsorption. Three columns with diameters of 2, 3, and 4 inches were constructed and packed with 34.5 inches of Goodloe packing. In addition to the more conventional data, the experimental evaluation of these columns included the use of a radioisotope and a gamma scanning technique which provided direct measurement of the columns' molar krypton profiles. A multicomponent gas absorption model was developed, based on the two-film mass transfer theory, that allows the fluxes of all species to interact. Verification of this model was achieved through comparison of the calculated results with experimental data. With the feed gas flow rate between 6 and 36 lb moles/hr-ft^2 and the solvent feed rate between 40 and 400 lb moles/hr-ft^2, column diameter was found to have no significant impact on the mass transfer efficiency of this system when carried out in columns with diameters of 2 inches or greater. The absorption of krypton was found to be enhanced and inhibited, respectively, by carrier gas coabsorption and solvent vaporization. An injector system to add gaseous solvent to the feed gas stream prior to its introduction into the packed bed was proposed to eliminate the detrimental effects of solvent vaporization. Using this injector to supersaturate the feed gas stream with solvent enhanced absorber performance in the same manner as carrier gas coabsorption.

862 (K/C--1383) WASTE OIL DISPOSAL AT THE DEPARTMENT OF ENERGY FACILITIES AT OAK RIDGE, TENNESSEE. Jones, J.R.; Mitchell, M.E.; Oakes, T.W.; Sanders, M. Stroud, D.D.; Tate, M.B. (Oak Ridge Gaseous Diffusion Plant, TN (USA)). 22 Apr 1980. Contract W-7405-ENG-26. 9p. Dep. NTIS, PC A02/MF A01.

The disposal of waste oil generated at the USDOE facilities in Oak Ridge has become a significant problem in recent years. The presence of radioactivity and other contaminants in some oils prohibits the use of commercial disposal and oil reclamation firms, and thus, often necessitates on-site disposal. Recent and proposed federal regulations have and will continue to control all waste oil disposal operations, including those of the Department of Energy. In order to ensure adequate and acceptable disposal of waste oils, a special committee of UCC-ND personnel located in Oak Ridge was established in December 1978 and asked to make appropriate recommendations for both near-term and long-range operations. Included in this paper is a brief description of the efforts of the committee, the associated efforts of development and engineering personnel, and conclusions and recommendations pertaining to UCC-ND waste oil disposal.

863 (K/ET--174) ANALYSIS OF A NON-ISOTHERMAL GAS STRIPPER WITH VOLATILE SOLVENT. Stephenson, M.J. (Oak Ridge Gaseous Diffusion Plant, TN (USA)). Aug 1979. Contract W-7405-ENG-26. 31p. (CONF-791108--13). Dep. NTIS, PC A03/MF A01.

From 72. AICHE meeting; San Francisco, CA, USA (25 Nov 1979).

The experimental and theoretical analysis of a non-isothermal packed column is given. A soluble gas concentration peak was found in all tests resulting from gross internal column condensation and reflux of the stripping vapor. A model is presented based on the conventional two-film mass and heat transfer theory. A combination absorber-stripper column is described that is based on the internal peaking phenomenon.

864 (K/ET--5010) ADVANCES IN THE FLUOROCARBON PROCESS FOR DECONTAMINATION OF NUCLEAR FACILITY OFF-GAS. Kanak, B.E. (Oak Ridge Gaseous Diffusion Plant, TN (USA)). 1979. Contract W-7405-ENG-26. 20p. (CONF-791144--1). Dep. NTIS, PC A02/MF A01.

From Annual MRS meeting; Boston, MA, USA (27 Nov 1979).

A selective adsorption process using R-12 was developed for removing noble gas fission products, ^{14}C, etc., from gaseous wastes of nuclear facilities. Its reliability has been proven by 10 years, operation of a 3-column process at ORGDP. A third generation pilot plant has undergone initial testing, which has showed that the combination column can perform essentially as well as the 3-column process. (DLC)

865 (K/ET--5017) SOLID WASTE DISPOSAL STUDY. McGinnis, C.P.; Housley, D.A. (Oak

Ridge Gaseous Diffusion Plant, TN (USA)). 21 May 1980. Contract W-7405-ENG-26. 17p. NTIS, PC A02/MF A01.

Solidification studies conducted on sludge from the K-1407C Retention Basin confirm that cement fixation is a viable method for disposal of waste solids. A model is presented relating cement requirements and sludge moisture level to the final storage volume required for cement fixation. The sludge volume and ultimate disposal cost are strongly related to the moisture of the processed sludge. Dewatering efforts with the sludge using polymer dewatering aides and centrifugation are discussed.

866 (K-L--2397) MOBILE PROCESSING UNIT FOR KRYPTON-XENON ABSORPTION. Merriman, J.R. (Oak Ridge Gaseous Diffusion Plant, TN (USA)). 16 Jun 1967. Contract W-7405-ENG-26. 18p. NTIS, PC A02/MF A01.

One process being considered for the removal of krypton and xenon involves the continuous absorption of the gases in a low temperature solvent such as dichlorodifluoromethane. A preliminary review of the hardware requirements for a mobile unit using this process has been completed and is summarized.

867 (KBS-TR--39) STUDY OF THE ENCAPSULATION OF SPENT NUCLEAR FUELS FOR FINAL STORAGE WITHOUT REPROCESSING. Loennerberg, B. (Kaernbraenslesaekerhet, Stockholm (Sweden)). Sep 1978. 138p. (In Swedish). Dep. NTIS (US Sales Only), PC A08/MF A01.

The second part of the KBS project deals with final storage of spent nuclear fuel without reprocessing. ASEA-ATOM has contributed to this part with a study of the incapsulation process before the final storage in bedrock. The complete handling process is described in the main KBS report. On the following pages a short process description is given, to a certain extent supplementing the KBS report and commenting some of the chosen process stages. Additional detailed studies regarding the various process steps are reported in the enclosed appendices. The description includes the following process steps: - spent fuel cask reception from the central storage - unloading of casks - dismantling of fuel bundles - insertion of fuel rods in copper racks - placing of racks in copper capsules - filling of capsules with lead - welding of capsule lids - capsule transport to the underground final storage The handling of remaining metal parts from the fuel bundles are described as well as collection of lossed particles from damaged fuel in the process.

868 (KBS-TR--111) RADIONUCLIDE INVENTORIES IN SPENT FUEL FROM LWR AND IN HIGH-LEVEL WASTE FROM PLUTONIUM RECYCLE IN PWR. Kjellbert, N. (Kaernbraenslesaekerhet, Stockholm (Sweden)). Jul 1978. 104p. (In Swedish). (STUDSVIK-SM--78/25). Dep. NTIS (US Sales Only), PC A07/MF A01.

An investigation of the importance of physical simplification in the ORIGEN code has been made by comparison with the BEGAFIP and CASMO codes. The most significant discrepancy seems to be due to the ORIGEN overestimation of the self-shielding effect on the neutron capture resonance integral of plutonium-240. This leads to an underestimation of the inventories of heavy nuclides with masses 241 through 246. In connection with the investigation, a recalculation of earlier presented inventories in spent fuel has been made, including studies of helium pressure build-up due to alpha decay, and neutron-induced activity in fuel rod construction materials. A rough estimation of plutonium recycle impact on radionuclide inventories in high-level waste has also been made. It is shown that recycling will have no dramatic effects on the inventories of radiologically significant nuclides.

869 (KEK--78-21) RADIOACTIVE LIQUID WASTE TREATMENT PLANT IN KEK. Yamaguchi, C.; Nishizaka, Y. (National Lab. for High Energy Physics, Oho, Ibaraki (Japan)). Nov 1978. 35p. NTIS (US Sales Only), PC A02/MF A01.

The outline and flow diagram of the low level ($<10^{-5}$ $\mu Ci/cm^3$) radioactive liquid waste treatment plant in the National Laboratory for High Energy Physics are presented. The detailed description of the individual facilities or equipments is given. The decontamination factors (DF) for the flocculation system and evaporation-condensation system have been obtained experimentally using stable $Sr(NO_3)_2$.

870 (KFK--2600, pp 170-222) SEPARATION OF KRYPTON AND XENON FROM THE OFFGAS OF NUCLEAR FACILITIES. von Ammon, R.; Bumiller, W.; Burkhardt, H.G.; Franz, G.; Hutter, E.; Knittel, G.; Neffe, G.; Penzhorn, R.D. May 1978. (In German).

Nuclear safety project. Second semiannual report 1977.

During the test runs of the KRETA plant with the three-component system N_2-Kr-Xe the concentration range of Kr and Xe in the feed gas could be determined where desublimation in the vicinity of the feed entry into the column takes place. This range decreases with decreasing total gas flow and increasing column pressure. The Kr recycle stream which is being planned for the improved offgas specification system of the WAK (project AZUR) was simulated by increasing the Kr feed concentration. The tendency of xenon to freeze out also decreases by this means. Analysis and control of H_2 during the catalytic reduction of O_2 and NO/sub x/ is achieved best using the method of measuring combustion heats. The cell of Leeds and Northrup operates at room temperature and is insensitive towards NO/sub x/. CO_2 is partially reduced by H_2 on the Ru-catalyst, but only if there is no O_2 present. Acid resistant molecular sieves (e.g. Norton Zeolen) adsorb Krypton almost twice as well as the type 5A. The same is true with NO. However, NH_3 and NO_2 are adsorbed less strongly on Zeolen as on 5A.

871 (KFK--2721) PREPARATION AND CHARACTERIZATION OF AN IMPROVED BOROSILICATE GLASS MATRIX FOR THE INCORPORATION OF HIGH LEVEL RADIOACTIVE WASTE (HAW). PT. 1. ANALYSIS OF 25 BORON SILICATE GLASS PRODUCTS FOR THE SELECTION OF AN IMPROVED BORON SILICATE GLASS. Guber, W.; Hussain, M.; Kahl, L.; Ondracek, G.; Saidl, J.; Dippel, T. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Entsorgungstechnik; Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Material- und Festkoerperforschung; Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Wiederaufarbeitung und Abfallbehandlung). Aug 1979. 17p. (In German). NTIS (US Sales Only), PC A03/MF A01.

On the basis of laboratory and technical experience with the preparation and the characterization of borosilicate glasses as solidification matrix for high level radioactive waste solution (HAW), a borosilicate glass composition with optimum properties has been developed. Keeping in view the technical and final storage requirements, a

number of glass compositions with varying proportions of influential components as Al, Mg, Na were prepared and thoroughly investigated for certain parameters as specific gravity, thermal conductivity, impact resistance, thermal expansion, viscosity, characteristic temperature points, specific heat, evaporation losses from the melt, electrical conductivity, leach resistance, tendency toward recrystallization and second phase formation. All the compositions (some with different amounts of Gd_2O_3, an expected neutron poision) contained 15 wt. % simulated HAW oxides. Samples for investigation were fabricated very close to the actual process conditions of vitrification. Two glass products GP12 and GP26 (3.7% Gd_2O_3) have been selected out of 25 glasses as the optimised products for further thorough investigations. Leach resistance, viscosity at 1420 K, tendency towards recrystallization and second phase formation were the most important deciding factors.

872 (KFK--2750, pp 4600-4-4600-8) TECHNICAL DEVELOPMENT OF THE FILTER SYSTEM FOR DISSOLVER OFF GAS CLEANUP. Jannakos, K.; Hoffmann, H.; Jochim, H.; Lange, W.; Mock, H.; Potgeter, G.; Zabel, G. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Hauptabteilung Ingenieurtechnik); Amend, J. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Hauptabteilung Kerntechnische Betriebe). Oct 1979. (In German).

Semiannual report 1978/2.

PASSAT System: All operating data necessary for implementation of the experiments were set with the PASSAT system. The test cycles, which ran continuously over a period of four weeks, proceeded without any incidents. The performance data measured corresponded to the design data, except for the electric output of the trace heating. The overall pressure losses of the system at design data were lower than the differential pressure generated by the blower, which is in accordance with the design. Iodine Filter and Remote Operating Systems: The filters and remote operating systems were mechanically ready for use throughout the experiment. The filter exchanges performed and bagging-out of the spent filter elements together with the attachment of the screw lid of the waste drum (approx. 20 times) proceeded according to expectations and corroborated the correctness of the concept chosen. The required tightness of the iodine filter, which is to be $< 10^{-3}$ Torr l/s (external leak and tightness between the filter drum with the filter housing, i.e., on the polluted and clean air sides), was always checked after filter exchanges and during operation. It always corresponded to the level referred to above.

873 (KFK--2765) DESCRIPTION OF THE R + D-WORK AND THE INACTIVE AND ACTIVE TEST PERIOD OF THE EUROBITUM/EUROSTORAGE FACILITY. Kowa, S. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Entsorgungstechnik; Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Wiederaufarbeitung und Abfallbehandlung). Jan 1979. 59p. (In German). Dep. NTIS (US Sales Only), PC A04/MF A01.

This report gives a survey of the R and D work, regarding the solidification of medium level waste concentrates in bitumen from the reprocessing of spent fuels. It describes the inactive and active test period of the Eurobitum/Eurostorage facility at Eurochemic, related to the KfK/Eurochemic cooperation program. It is known, that special components of radioactive concentrates can lead to an exothermic reaction with bitumen in the temperature range of 160-200°C (working temperature of the bituminization). To investigate the influence of these special components, differential thermal analyses were carried out and calculated. The leaching behaviour of bitumen/waste mixture under static and dynamic conditions was investigated. The leaching rates had been calculated and discussed. The Eurobitum/Eurostorage facility and the difficulties during the inactive and active start-up period are described and discussed in detail.

874 (KFK--2796) SURVEY ON PRODUCT PROPERTIES OF BITUMINIZED WASTE CONCENTRATES FROM REPROCESSING, NUCLEAR INSTALLATIONS AND NUCLEAR POWER PLANTS. Kluger, W.; Koester, R.; Krause, H. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Entsorgungstechnik). Mar 1979. 29p. (In German). Dep. NTIS (US Sales Only), PC A03/MF A01.

This report contains a brief survey on the product properties after solidification with bitumen of waste concentrates from reprocessing plants, nuclear research installations and nuclear power plants. The leach behaviour of bitumen products in water and saturated salt solutions is described as well as the radiolytic and thermal stability of the products. The reports also contain some data on sedimentation of salts fixed in bitumen.

875 (KFK--2842) MATERIAL INVESTIGATIONS ON SOLIDIFICATION OF INTERMEDIATE-LEVEL WASTE SOLUTIONS IN CEMENT: LEACHABILITY OF STRONTIUM AND CESIUM. Rudolph, G.; Koester, R. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Entsorgungstechnik; Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Wiederaufarbeitung und Abfallbehandlung). Aug 1979. 38p. (In German). (PWA--18/79). NTIS (US Sales Only), PC A03/MF A01.

Investigations are reported on reducing cesium and strontium leachability from products formed at the cementation of intermediatelevel waste solutions from reprocessing plants. The leach tests used were the IAEA method and an accelerated test. One particular natural calcium bentonit lowers the cesium leaching by a factor up to 100, depending on the amount added. Strontium leaching is decreased, to a lesser extent, by addition of a barium silicate hydrate; this effect is found mainly at elevated temperatures. Leaching in a salt brine in equilibrium with carnallite and other salts is significantly lower than in distilled water. Excess cesium enhances cesium leaching. Other parameters such as type of cement, setting time, water reducing agents, salt content, have little, if any, effect. Tests on bleeding of cement grouts containing simulated waste solution showed an unfavorable behavior of blast furnace slag cement.

876 (LA--8052-MS) EVALUATION PROCEDURE FOR RADIOACTIVE WASTE TREATMENT PROCESSES. Whitty, W.J. (Los Alamos Scientific Lab., NM (USA)). Nov 1979. Contract W-7405-ENG-36. 28p. Dep. NTIS, PC A03/MF A01.

An aspect of the Los Alamos Scientific Laboratory's nuclear waste management R and D programs has been to develop an evaluation procedure for radioactive waste treatment processes. This report describes the process evaluation method. Process worth is expressed as a numerical index called the Figure-of-Merit (FOM), which is computed using a hierarchial, linear, additive, scoring model with constant

criteria weights and nonlinear value functions. A numerical example is used to demonstrate the procedure and to point out some of its strengths and weaknesses. Potential modifications and extensions are discussed, and an extensive reference list is included.

877 (LA-UR--80-692) USDOE RADIOACTIVE WASTE INCINERATION TECHNOLOGY: STATUS REVIEW. Borduin, L.C.; Taboas, A.L. (Los Alamos Scientific Lab., NM (USA); Department of Energy, Albuquerque, NM (USA). Albuquerque Operations Office). 1980. Contract W-7405-ENG-36. 25p. (CONF-800334--5). Dep. NTIS, PC A02/MF A01.

From 2. DOE environmental control symposium; Reston, VA, USA (17 Mar 1980).

Early attempts were made to incinerate radioactive wastes met with operation and equipment problems such as feed preparation, corrosion, inadequate off-gas cleanup, incomplete combustion, and isotope containment. The US Department of Energy (DOE) continues to sponsor research, development, and the eventual demonstration of radioactive waste incineration. In addition, several industries are developing proprietary incineration system designs to meet other specific radwaste processing requirements. Although development efforts continue, significant results are available for the nuclear community and the general public to draw on in planning. This paper presents an introduction to incineration concerns, and an overview of the prominent radwaste incineration processes being developed within DOE. Brief process descriptions, status and goals of individual incineration systems, and planned or potential applications are also included.

878 (LA-UR--80-696) OVERVIEW OF THE INCINERATOR OFFGAS SYSTEM STUDY. Stretz, L.A. (Los Alamos Scientific Lab., NM (USA)). 1980. Contract W-7405-ENG-36. 5p. (CONF-800313--6). Dep. NTIS, PC A02/MF A01.

From Waste management conference; Tucson, AZ, USA (10 Mar 1980).

The wide range of incineration designs under development or in operation for treatment of a variety of radioactive wastes has resulted in numerous offgas cleanup systems. A study has been undertaken to review current incineration and offgas systems, categorize the waste-incinerator-effluent cases, identify common offgas treatment problems and criteria, and establish class of readily available and required technology. This presentation discusses the general approach of the study and preliminary results from the incinerator and offgas systems review efforts.

879 (LA-UR--80-835) PLUTONIUM SCRAP PROCESSING AT THE LOS ALAMOS SCIENTIFIC LABORATORY. Nixon, A.E.; McKerley, B.J.; Christensen, E.L. (Los Alamos Scientific Lab., NM (USA)). 1980. Contract W-7405-ENG-36. 24p. (CONF-800303--12). Dep. NTIS, PC A02/MF A01.

From 179. national meeting of the American Chemical Society; Houston, TX, USA (23 Mar 1980).

The Los Alamos Scientific Laboratory currently has the newest plutonium handling facility in the nation. Los Alamos has been active in the processing of plutonium almost since the discovery of this man-made element in 1941. One of the functions of the new facility is the processing of plutonium scrap generated at LASL and other sites. The feed for the scrap processing program is extremely varied, and a wide variety of contaminants are often encountered. Depending upon the scrap matrix and contaminants present, the majority of material receives a nitric acid/hydrofluoric acid or nitric acid/calcium fluoride leach. The plutonium nitrate solutions are then loaded onto an anion exchange column charged with DOWEX 1 x 4, 50 to 100 mesh, nitrate form resin. The column is eluted with 0.48 M hydroxyl amine nitrate. The $Pu(NO_3)_3$ is then precipitated as plutonium III oxalate which is calcined at 450 to 500°C to yield a purified PuO_2 product.

880 (LA-UR--80-1168) PLUTONIUM RECOVERY AT THE LOS ALAMOS SCIENTIFIC LABORATORY. Christensen, E.L. (Los Alamos Scientific Lab., NM (USA)). Jun 1980. Contract W-7405-ENG-36. 27p. (CONF-800611--5). NTIS, PC A03/MF A01.

From International symposium on the management of alpha-contaminated wastes; Vienna, Austria (2 Jun 1980).

Portions of document are illegible.

Research programs have led to the adoption of procedures for all phases of plutonium recovery and purification. This report discusses some of the many procedures required to recover and purify the plutonium contained in the residues generated by LASL research, process development, and production activities. The report also discusses general plant facilities, the liquid and gaseous effluents, and solid waste management practices at the New Plutonium Facility, TA-55. Many of the processes or operations are merely steps in preparing the feed for one of the purification systems. For example, the plutonium is currently removed from noncombustibles in the pickling operation with an HNO_3 leach. The HNO_3 leach solution is the product of this operation and is sent to one of the nitrate anion-exchange systems for concentration and purification.

881 (LA-UR--80-1265) PERFORMANCE AND IMPROVEMENTS OF THE TRITIUM HANDLING FACILITY AT THE LOS ALAMOS SCIENTIFIC LABORATORY. Nasise, J.E. (Los Alamos Scientific Lab., NM (USA)). 1980. Contract W-7405-ENG-36. 7p. (CONF-800427--10). NTIS, PC A02/MF A01.

From Tritium technology in fission, fusion, and isotopic applications; Dayton, OH, USA (29 Apr 1980).

A major problem facing todays nuclear energy industry is the release of radioactive waste products to the atmosphere. The DP-East Tritium Handling Facility at the Los Alamos Scientific Laboratory (LASL), activated December 5, 1974 has processed 3.8×10^8 curies of tritium with a total stack release of 704.5 curies as of December 12, 1979. This averages only 11.7 Ci/month which to our knowledge is the lowest stack release any major tritium facility has achieved. The facility includes an 11.5 m^3 dry box with associated gas purification system (GPS) and an effluent treatment system (ETS). The system performance, problems, and improvements are discussed with special emphasis given to the ETS, the new dry box waste disposal system, and the new automated logic control system, all of which contribute significantly to the low level tritium release at this facility.

882 (LA-UR--80-1408) RADIOACTIVE WASTE INCINERATION STUDIES AT THE LOS ALAMOS SCIENTIFIC LABORATORY. Stretz, L.A.; Borduin, L.C.; Draper, W.E.; Koenig, R.A.; Newmyer, J.M. (Los Alamos Scientific Lab., NM (USA)). 1980. Contract W-7405-ENG-36. 20p. (CONF-800607--53). NTIS, PC A02/MF A01.

From American Nuclear Society annual meeting; Las Vegas, NV, USA (8 Jun 1980).

Development and demonstration of a transuranic (TRU) waste volume-reduction process is described. A controlled-air incinerator, based upon commercially available equipment and technology, was modified for radioactive service and was successfully tested and demonstrated with contaminated waste. Demonstration of the production-scale unit was completed in May 1980 with the incineration of 272 kg of waste with an average TRU content of about 20 nCi/g. Weight and volume reduction factors for the demonstration run were 40:1 and 120:1, respectively.

883 (LA-UR--80-1428) CONTROLLED-AIR INCINERATION OF ALPHA-BEARING SOLID WASTES. Koenig, R.A.; Draper, W.E.; Neuls, A.S.; Newmyer, J.M. (Los Alamos Scientific Lab., NM (USA)). 1980. Contract W-7405-ENG-36. 23p. (CONF-800611--8). NTIS, PC A02/MF A01.

From International symposium on the management of alpha-contaminated wastes; Vienna, Austria (2 Jun 1980).

The Los Alamos Scientific Laboratory is completing a study of controlled-air incineration (CAI) as a technique for volume reduction and stabilization of combustible transuranic-contaminated solid wastes. To demonstrate feasibility, a process has been assembled and operated on synthetic and contaminated combustibles. This paper summarizes the CAI project history, process design, provisions for radioactive operation, experimental results to date, and future plans. Achievements include operation at the design feed rate as well as combustion of separate feed compositions including cellulosics, polyethylene, polyvinyl chloride (PVC) and latex rubber. Refractory life has been satisfactory to date, with studies continuing. The offgas cleanup system has proven to be extremely effective; the final high-efficiency filters showing virtually no pressure drop increase. The ability of the system to process high concentrations of PVC has been demonstrated with no chloride-induced degradation detected. Chloride and sulfate removal from the offgas has been excellent with concentrations reaching 8 and 10 ppM maximum, respectively, in the process condensate.

884 (MLM--2644) POLYMER IMPREGNATED TRITIATED CONCRETE. FINAL REPORT. Wieneke, R.E.; Dauby, J.J.; Abell, G.C.; Tadlock, W.E.; Lamberger, P.H.; Gibbs, G.E. (Mound Facility, Miamisburg, OH (USA)). 27 Sep 1979. Contract EY-76-C-04-0053. 31p. Dep. NTIS, PC A03/MF A01.

Mound Facility investigated the polymer-impregnated tritiated-concrete process (PITC) for aqueous tritiated waste as developed by Brookhaven National Laboratory. This technique involves the solidification of tritiated aqueous waste in concrete. The solidified block is then soaked in styrene monomer which permeates the concrete and, when polymerized, effectively microencapsulates the tritium bearing concrete, thus providing added protection in case of a broken package. Small scale samples (in 500-ml polyethylene bottles) were fabricated and tested in order to determine their characteristics in relation to differences in tritium release from the package due to variation of process parameters, radiation effects on the polystyrene, and gas generation. It was determined that varying the factors that increase the polymerization rate of the styrene (higher temperature or more catalyst) will increase the tritium permeation rate because the porosity of the polystyrene layer has been increased. Compressive strength tests, conducted after 75 weeks, showed that the tritiated blocks were consistently weaker than their nonradioactive counterparts, and that the gas release rate from PITC samples was nearly the same as that from nonpolymer impregnated samples. To date, two full-scale, nonradioactive packages have been successfully produced by the following procedure: inject 27 liters of water into the center of the waste package that contains 112 kg of Portland Type III cement inside a 30-gal, open-head steel drum and a 27-gal polyethylene drum liner; cure the cement at ambient temperature for 3 to 5 days, then heat the package to 45°C and soak the cement with 24 kg of styrene monomer containing 3/4 wt % catalyst; increase the heat until 70°C is obtaind at the cement-liner interface. In approximately 7 hr, polymerization will occur.

885 (MLM--2646) MOUND CYCLONE INCINERATOR PRELIMINARY DESIGN CRITERIA: BATCH MODE OPERATION. Klingler, L.M.; Alexander, B.M.; Todd, J.E. (Mound Facility, Miamisburg, OH (USA)). 28 Sep 1979. Contract EY-76-C-04-0053. 24p. Dep. NTIS, PC A02/MF A01.

A cyclone incinerator has been developed at Mound Facility for use in the disposal of radioactive wastes. Although simple in design and operation, the incinerator is capable of high quality combustion and excellent volume reduction. The use of the incinerator for Mound generated waste has demonstrated the effectiveness of the incinerator system. Design simplicity will aid in adapting the incinerator tc a wide variety of applications.

886 (MLM--2667) COMMERCIAL CYCLONE INCINERATOR DEMONSTRATION PROGRAM: APRIL-SEPTEMBER 1979. Alexander, B.M. (Mound Facility, Miamisburg, OH (USA)). 7 Dec 1979. Contract EY-76-C-04-0789. 11p. Dep. NTIS, PC A02/MF A01.

The commercial cyclone incinerator program was designed to study the effects of burning low-level waste contaminated with beta and gamma emitters in a cyclone system. The ultimate program goal is the demonstration of a cyclone incinerator at a nuclear power plant. During the past six months, the first program objective, NRC review of the Feasibility Plan, was achieved, and work began on the second objective, Complete Incinerator Feasibility Plan. Potential applications for the cyclone incinerator have been investigated. The feasibility plan for the incinerator system was reviewed with the Nuclear Regulatory Commission (NRC). Following a series of cold checkout burns, implementation of the feasibility plan was begun with the start of laboratory-scale experiments. Inconel 601 is being investigated as a material of construction for the incinerator burn chamber.

887 (MLM--2670) PELLETIZED WASTE FORM DEMONSTRATION PROGRAM: APRIL-SEPTEMBER 1979. Lewis, E.L.; Herbert, R.F. Jr. (Mound Facility, Miamisburg, OH (USA)). 7 Dec 1979. Contract EY-76-C-04-0053. 25p. Dep. NTIS, PC A02/MF A01.

During the last half of FY-1979, feasibility studies involving hot pilot-scale experiments were conducted. Sludge from the defense cyclone incinerator system was calcined and then successfully immobilized in a Portland cement matrix. This was accomplished mainly through a designed experiment in which the effects of seven variables upon compressive strength were studied. Physical and chemical properties of the sludge were also determined. Leachability

and radiolysis testing of ash/cement and sludge/cement pellets was done at Mound Facility, and offsite radiolysis tests were completed at Savannah River Laboratory. Leachability data obtained indicate that leach rates are greater at ambient temperature than at 70°C. The leach rates were very small with < 0.01% of the PuO_2 leached after 20 days. Radiolysis results from SRL indicated a very low hydrogen gas generation rate, G/sub(H_2)/, caused by radiolysis of water present in pellets. Recent irradiation tests at Mound verify these results, and pressed waste/cement pellets appear to be an excellent waste form based on low gas generation rates.

888 (MLM--2672) DEFENSE WASTE CYCLONE INCINERATOR DEMONSTRATION PROGRAM: APRIL-SEPTEMBER 1979. Klingler, L.M. (Mound Facility, Miamisburg, OH (USA)). 14 Dec 1979. Contract EY-76-C-04-0053. 20p. Dep. NTIS, PC A02/MF A01.

Efforts to demonstrate the versatility of the Mound cyclone incinerator have continued during the last half of FY-1979. Design changes have been made or are in progress to correct known system problems. Work is being directed toward successfully demonstrating liquid burning and continuous feed burning. Preliminary test burning of liquid feed, scintillation vials, and LSA-type shredded solid waste have proved very encouraging. A preliminary conceptual design for a scintillation vial feed system has been prepared. Basic design criteria for a cyclone incinerator system to burn in a batch type mode have been published.

889 (MLM--2684) DEVELOPMENT OF ULTRAFILTRATION AND ADSORBENTS: APRIL-SEPTEMBER 1979. Roberts, R.C.; Herald, W.R. (Mound Facility, Miamisburg, OH (USA)). 14 Mar 1980. Contract EY-76-C-04-0053. 61p. Dep. NTIS, PC A04/MF A01.

Tests were begun on influent from the radioactive waste disposed plant spiked with other actinides, but problems with the laboratory-scale reverse osmosis (RO) unit led to postponement of these tests. Laboratory-scale RO tests on solution spiked with fission products showed very good rejection (98 to 100%) of ^{60}Co, ^{137}Cs, and ^{131}I. A literature search was made for references to actinide and fission product removal from waste streams by adsorbents. A table lists adsorbents and what elements they remove. A cross reference of adsorbents was compiled in a series of tables so that data from different waste treatment reports can be compared. Laboratory column experiments on Co, Cs, and I gave decontamination factors (DF) for several adsorbers. Engineering tests on Am, Pu, U, and Np are reported at several flow rates and at pH values of 3, 7, and 10. DFs for these actinides are reported.

890 (MLM--2692) PLUTONIUM ADSORPTION BY SELECTED INORGANIC COMPOUNDS. Silver, G.L. (Mound Facility, Miamisburg, OH (USA)). 10 Oct 1980. Contract AC04-76DP00053. 44p. NTIS, PC A03/MF A01.

Plutonium may be removed from aqueous solution by adsorption on inorganic materials. Hydroxylapatite, dibasic and tribasic calcium phosphate, calcium cyanamide, and sodium titanate are particularly noteworthy for their ability to concentrate plutonium. The extent of adsorption and pH of maximum adsorption depend upon the chemical form of the dissolved plutonium.

891 (MLM--2697) PELLETIZED WASTE FORM DEMONSTRATION PROGRAM: FINAL DESIGN CRITERIA FOR WASTE PELLETIZATION. Lewis, E.L. (Mound Facility, Miamisburg, OH (USA)). 28 Mar 1980. Contract AC04-76DP00053. 9p. Dep. NTIS, PC A02/MF A01.

A cement fixation process was developed for immobilizing incinerator ash with a radionuclide concentration approx. 200 nCi/g ash. The design criteria include process descriptions for sizing, calcination, blending, pelletization, and packaging-storage operations and performance data for the sizing equipment, calciner, blending apparatus, and press.

892 (MLM--2713) COMMERCIAL CYCLONE INCINERATOR DEMONSTRATION PROGRAM: OCTOBER 1979-MARCH 1980. Alexander, B.M. (Mound Facility, Miamisburg, OH (USA)). 21 May 1980. Contract AC04-76DP00053. 15p. NTIS, PC A02/MF A01.

The commercial cyclone incinerator program was designed to study the effects of burning low-level waste contaminated with beta and gamma emitters in a cyclone system. The ultimate program goal is the demonstration of a cyclone incinerator at a nuclear power plant. During the past six months, progress was made toward achieving the second program objective, Complete Incinerator Feasibility Plan. Forty-one laboratory-scale experiments were completed, with five more experiments remaining to be performed. Sample analysis from completed experiments continues. A promising scrub liquor was identified and is now being used for improved absorption of iodide and chloride from incinerator offgas. Inconel 601 continues to perform well as the material of construction for the laboratory-scale burn chamber.

893 (MLM--2716) DEFENSE WASTE CYCLONE INCINERATOR DEMONSTRATION PROGRAM: OCTOBER 1979-MARCH 1980. Klingler, L.M. (Mound Facility, Miamisburg, OH (USA)). 6 Jun 1980. Contract AC04-76DP00053. 25p. NTIS, PC A02/MF A01.

An improved offgas system is being designed. Significant system modifications will be required for the commercial incinerator full-scale experimentation program planned for later this year. Cost estimates indicated that a number of desired system improvements can be made at the same time for little additional cost. The new system layout will also provide needed space for possible future expansion of incinerator throughput capabilities. Continuous solid and liquid feed experimentation is in progress. Continuous burning is presently being initiated by means of a small batch burn. As the batch burn nears completion, continuous solid feeding is begun. In the limited burning done to date, the feed system has worked extremely well. Liquid burning has been conducted in coordination with continuous solid feed burning. As the solids feed rate is reduced, a liquid stream is introduced to the chamber at another air inlet. Limited burning indicated that both feed systems will work as expected. Combustion quality appears to be excellent, and the burning is smooth and controllable. Efforts are being made to upgrade the offgas sampling program for the incinerator. System changes will include provisions for good sampling procedure.

894 (MLM--2717) PELLETIZED WASTE FORM DEMONSTRATION PROGRAM, OCTOBER 1979-MARCH 1980. Lewis, E.L.; Herbert, R.F. Jr. (Mound Facility, Miamisburg, OH (USA)). 6 Jun 1980. Contract AC04-76DP00053. 12p. NTIS, PC A02/

MF A01.

The main objective of this task is to evaluate several transuranic waste immobilization methods. During the first half of FY-1980, ash/cement and sludge/cement pellets were performance tested. In short-term radiolysis experiments with sludge/cement pellets, a very low hydrogen generation rate of 0.01 molecule/100 eV was obtained. Leachability testing of ash/cement and sludge/cement pellets containing plutonium-238 oxide in both brine and deionized water yielded a very low leach rate of $< 10^{-5}$ (fraction leached) (g) $(cm)^{-2}$ $(day)^{-1}$. Pressed waste/cement pellets, therefore, appear to be an excellent final waste form based on leachability and radiolysis results. Design criteria were developed for the production waste pelletization line (PWPL) and documented. Equipment procurement for the PWPL was started, and installation will be continuing for several months.

895 (MLM--2731) COMMERCIAL CYCLONE INCINERATOR DEMONSTRATION PROGRAM: OCTOBER 1979-MARCH 1980. Alexander, B.M. (Mound Facility, Miamisburg, OH (USA)). 21 May 1980. Contract EY-76-C-04-0053. 15p. NTIS, PC A02/ MF A01.

The commercial cyclone incinerator program was designed to study the effects of burning low-level waste contaminated with beta and gamma emitters in a cyclone system. The ultimate program goal is the demonstration of a cyclone incinerator at a nuclear power plant. During the past six months, progress was made toward achieving the second program objective, Complete Incinerator Feasibility Plan. Forty-one laboratory-scale experiments were completed, with five more experiments remaining to be performed. Sample analysis from completed experiments continues. A promising scrub liquor was identified and is now being used for improved absorption of iodide and chloride from incinerator offgas. Inconel 601 continues to perform well as the material of construction for the laboratory-scale burn chamber. 7 figures, 7 tables.

896 (MLM--2735) DEVELOPMENT OF ULTRAFILTRATION AND ADSORBENTS: OCTOBER 1979-MARCH 1980. Roberts, R.C.; Colvin, C.M. (Mound Facility, Miamisburg, OH (USA)). 2 Jul 1980. Contract AC04-76DP00053. 18p. NTIS, PC A02/MF A01.

Tests on a sample of trench water from the Maxey Flats burial ground effectively demonstrated the new Reverse Osmosis Pilot Plant. The effluent from the 50% salt-rejection membrane was decontaminated well enough with the exception of tritium to be discharged to the environment. The performance of the 97% salt-rejection membrane was superior to that of the 50% membrane. A breakthrough and capacity experiment was conducted with Durasil 10 on a simulated Three Mile Island solution. The maximum decontamination factor was extrapolated to be 10^6, which would reduce the cesium level of TMI water to below the discard limit. Capacity (1/DF = 0.5) was reached at 1260 column volumes. Several adsorbents were tested in the engineering columns for decontamination of cesium-bearing solutions. Under the conditions of the experiment, these adsorbents were ineffective in removing cesium from the solution.

897 (MLM--2774) COMBINED ELECTROLYSIS CATALYTIC EXCHANGE (CECE). Ellis, R.E.; Mills, T.K.; Rogers, M.L. (Mound Facility, Miamisburg, OH (USA)). 30 Sep 1980. Contract AC04-76DP00053. 19p. NTIS, PC A02/ MF A01.

Starting from an effort to control airborne emissions, the Mound tritium containment program has evolved to include development of the Combined Electrolysis Catalytic Exchange (CECE) process. This process separates tritiated aqueous streams into detritiated water and an enriched hydrogen stream that is suitable for use by other tritium recovery processes. Experimentation has shown that the process performs as predicted by bench-scale measurements, and that available process components exhibit acceptable resistance to damage by radiation from tritium exposure. Planned future efforts are concentrated on finalizing automatic control of the process and on developing feed treatment methods for the protection of process components.

898 (MLM--2775(OP)) INCINERATION OF LWR-TYPE WASTE AT MOUND FACILITY. Alexander, B.M.; Grimm, R.S.; Doty, J.W. Jr. (Mound Facility, Miamisburg, OH (USA)). 1980. Contract AC04-76DP00053. 9p. (CONF-801038--2). NTIS, PC A02/MF A01.

From 16. DOE nuclear air cleaning conference; San Diego, CA, USA (20 Oct 1980).

The Mound Cyclone Incinerator, demonstrated over several years for the combustion of radwaste containing plutonium, is now being developed for volume reduction of radwaste containing mixed beta- and gamma-emitters, from LWR facilities. To this end, a laboratory-scale feasibility study was developed and executed. Development of the feasibility study was based on known characteristics of LWR waste and on operating data compiled for the Mound Cyclone Incinerator since 1975. Feed spiked with several isotopes found in LWR waste was burned in the laboratory-scale cyclone incinerator, and samples were collected and analyzed. From these data, the applicability of cyclone incineration was demonstrated, and an efficient scrub liquor composition was chosen for the offgas treatment system. A Health Physics survey of the incinerator system after incineration of 220 μCi of beta/gamma activity showed no exposure readings above background level. Future work planned includes incineration of simulated LWR waste in the full-scale Mound Cyclone Incinerator to begin later this year.

899 (NUREG--0643) RADIOACTIVE WASTE PROCESSING AND DISPOSAL. (Nuclear Regulatory Commission, Washington, DC (USA)). Jan 1980. 942p. (TID--3311-S8-P2). Dep. NTIS, PC A99/ MF A01.

This compilation contains 4144 citations of foreign and domestic reports, journal articles, patents, conference proceedings, and books pertaining to radioactive waste processing and disposal. Five indexes are provided: Corporate Author, Personal Author, Subject, Contract Number, and Report Number.

900 (NUS--3245) LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT. VOLUME IV. RADIOACTIVE WASTE SOLIDIFICATION AND HANDLING PRACTICES. Feizollahi, F. (NUS Corp., Palo Alto, CA (USA)). Aug 1979. 84p. California Energy Commission, 1111 Howe Ave., Sacramento, CA 95825.

This study evaluates low-level waste management technology for light water reactors and identifies the problems that must be solved within the next few years to allow for the orderly development of large-scale management of low-level radioactive wastes generated at nuclear power facilities and by the nuclear power industry in California. This study

provides an independent assessment of current and projected low-level waste management techniques, technology, and advanced volume reduction schemes. This assessment, when evaluated, will become part of the California Energy Commission's policy for licensing sites and facilities for proposed nuclear power plants in California. The results of the study are published in five volumes: Current Power-Reactor Low-Level Radwaste Management Practices; Forecast of Low-Level Radwaste Management Requirements; Feasibility of Volume-Reduction Processes; Radioactive Waste Solidification and Handling Practices; and Policy Recommendations, Conclusions, and Summary.

901 (ONWI--20-NUS-3314) WASTE INVENTORY REPORT FOR REACTOR AND FUEL-FABRICATION FACILITY WASTES. Phillips, J.; Feizollahi, F.; Martineit, R.; Bell, W.; Stouky, R. (NUS Corp., Rockville, MD (USA)). Mar 1979. Contract EY-76-C-06-1830. 417p. Dep. NTIS, PC A18/MF A01.

The physical and chemical characteristics of wastes (other than spent fuel) that are generated at light-water-cooled nuclear reactor (LWR) power plants and nuclear fuel-fabrication facilities are described. The information used to define these characteristics is based on a survey of 30 nuclear power plants and 7 facilities involved in LWR fuel-fabrication. Information on volumes and activity levels of five major categories of LWR and fuel fabrication facility waste was collected. The major categories of waste are spent resin, concentrated liquids, precoat filter sludge (including ground ion-exchange resin), cartridge filters, and compactible and non-compactible trash. The volumes and activity levels of these wastes were used to determine the average waste-generation rates for LWRs and fuel-fabrication facilities, and the typical waste-generation rates for LWRs. Average gross radioactive concentrations were calculated, including concentrations of transuranics, to determine annual activity-generation rates and the total radioactivity of the waste shipped. These generation rates were used in conjunction with projected increases in the gross electrical generating capacity of nuclear power plants to determine annual waste volumes through 2000. A determination of the effect of a broad application of current volume-reduction systems on the waste volumes is also included. The overall waste burial capacity of currently licensed burial site areas was examined and fuel-cycle wastes and nonfuel-cycle wastes were considered.

902 (ONWI--62) PROCEEDINGS OF THE NATIONAL WASTE TERMINAL STORAGE PROGRAM INFORMATION MEETING. (Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation). 30 Oct 1979. Contract AC06-76RL01830. 235p. (CONF-791033--). NTIS, PC A11/MF A01.

From 1. annual ONWI information meeting; Columbus, OH, USA (30 Oct 1979).

This document is a compilation of papers presented at an NWTS information meeting designed to provide a comprehensive review of the progress of the ONWI program as well as an overview of the BWIP (Basalt Waste Isolation Project) program and NNWSI (Nevada Nuclear Waste Storage Investigations). The papers are arranged into seven sections: overview of NWTS program, science/technology studies, geologic studies for site identification program, process/equipment program, systems analysis, site/repository licensing, and facilities engineering. (DLC)

903 (ORNL--5562) VOLATILITY OF RUTHENIUM-106, TECHNETIUM-99, AND IODINE-129, AND THE EVOLUTION OF NITROGEN OXIDE COMPOUNDS DURING THE CALCINATION OF HIGH-LEVEL, RADIOACTIVE NITRIC ACID WASTE. Rimshaw, S.J.; Case, F.N.; Tompkins, J.A. (Oak Ridge National Lab., TN (USA)). Feb 1980. Contract W-7405-ENG-26. 58p. Dep. NTIS, PC A04/MF A01.

The nitrate anion is the predominant constituent in all high-level nuclear wastes. Formic acid reacts with the nitrate anion to yield noncondensable, inert gases (N_2 or N_2O), which can be scrubbed free of ^{106}Ru, ^{129}I, and ^{99}Tc radioactivities prior to elimination from the plant by passing through HEPA filters. Treatment of a high-level authentic radioactive waste with two moles of formic acid per mole of nitrate anion leads to a low RuO_4 volatility of about 0.1%, which can be reduced to an even lower level of 0.007% on adding a 15% excess of formic acid. Without pretreatment of the nitrate waste with formic acid, a high RuO_4 volatility of approx. 35% is observed on calcining a 4.0 N HNO_3 solution in quartz equipment at 350°C. The RuO_4 volatility falls to approx. 1.0% on decreasing the initial HNO_3 concentration to 1.0 N or lower. It is postulated that thermal denitration of a highly nitrated ruthenium complex leads to the formation of volatile RuO_4, while decarboxylation of a ruthenium-formate complex leads to the formation of nonvolatile RuO_2. Wet scrubbing with water is used to remove RuO_4 from the off-gas stream. In all glass equipment, small amounts of particulate RuO_2 are formed in the gas phase by decomposition of RuO_4. The ^{99}Tc volatility was found to vary from 0.2 to 1.4% on calcining HNO_3 and HCOOH (formic acid) solutions over the temperature range of 250 to 600°C. These unexpectedly low volatilities of ^{99}Tc are correlated to the high thermal stability limits of various metal pertechnetates and technetates. Iodine volatilities were high, varying from a low of 30% at 350°C to a high of 97% at 650°C. It is concluded that with a proper selection of pretreatment and operating conditions the ^{106}Ru and ^{99}Tc activities can be retained in the calcined solid with recycle of the wet scrubbing solution.

904 (ORNL--5618) EVALUATION OF THE LOW-LEVEL WASTE TREATMENT PLANT AT OAK RIDGE NATIONAL LABORATORY, AND SUGGESTED CHANGES IN THE DESIGN AND OPERATION. Chilton, J.M. (Oak Ridge National Lab., TN (USA)). Mar 1980. Contract W-7405-ENG-26. 31p. Dep. NTIS, PC A03/MF A01.

The operation of the Low-Level Waste Treatment (LLWT) Plant was monitored for one month to determine why the precipitation-filtration step failed to remove the normal amount of hardness. Each of the three resin beds loaded with Duolite CS-100 resin was taken through one loading-elution cycle. The primary radioactivity in this waste is ^{90}Sr and ^{137}Cs, and, under optimum conditions, the plant discharges about 0.015 dpm/ml of ^{90}Sr and 0.06 dpm/ml of ^{137}Cs. Although no strontium breakthrough was noted, the results showed that cesium broke through each of the beds after the passage of about 550 bed volumes. Development work for this process had indicated a useful capacity of about 2000 bed volumes, however, and the plant has routinely operated using this value. Resin samples showed that the static volumetric distribution coefficient (DC) for cesium had dropped from 3900 for new resin to about 475 for used resin. Also, the DC for strontium dropped from 20,000 to about 5500. The optimum loading of cesium was found at pH 11.9. No clear-cut cause could be established for the occasional incomplete calcium

precipitation. Even using exhausted resin, however, the exit stream is below the permissible concentration for all radionuclides in public streams. Recommendations from this study are immediate replacement of all three resin columns, relocation of the pH-sensing electrode in the precipitation step, use of a more dilute caustic solution for regeneration, institution of a sampling routine to determine more promptly the breakthrough of cesium from the resin, and relocation and possible modification of the gamma detector in the exit stream.

905 (ORNL--5687) PROCESS FOR THE RECOVERY OF CURIUM-244 FROM NUCLEAR WASTE. Posey, J.C. (Oak Ridge National Lab., TN (USA)). Oct 1980. Contract W-7405-ENG-26. 100p. NTIS, PC A05/MF A01.

A process has been designed for the recovery of curium from purex waste. Curium and americium are separated from the lanthanides by a TALSPEAK extraction process using differential extraction. Equations were derived for the estimation of the economically optimum conditions for the extraction using laboratory batch extraction data. The preparation of feed for the extraction involves the removal of nitric acid from the Purex waste by vaporization under reduced pressure, the leaching of soluble nitrates from the resulting cake, and the oxalate precipitation of a pure lanthanide-actinide fraction. Final separation of the curium from americium is done by ion-exchange. The steps of the process, except ion-exchange, were tested on a laboratory scale and workable conditions were determined.

906 (ORNL/EIS--133/V2) LOW-LEVEL RADIOACTIVE WASTE TECHNOLOGY: A SELECTED, ANNOTATED BIBLIOGRAPHY. Fore, C.S.; Vaughan, N.D.; Hyder, L.K. (Oak Ridge National Lab., TN (USA)). Oct 1980. Contract W-7405-ENG-26. 310p. NTIS, PC A14/MF A01.

This annotated bibliography of 447 references contains scientific, technical, economic, and regulatory information relevant to low-level radioactive waste technology. The bibliography focuses on environmental transport, disposal site, and waste treatment studies. The publication covers both domestic and foreign literature for the period 1952 to 1979. Major chapters selected are Chemical and Physical Aspects; Container Design and Performance; Disposal Site; Environmental Transport; General Studies and Reviews; Geology, Hydrology and Site Resources; Regulatory and Economic Aspects; Transportation Technology; Waste Production; and Waste Treatment. Specialized data fields have been incorporated into the data file to improve the ease and accuracy of locating pertinent references. Specific radionuclides for which data are presented are listed in the Measured Radionuclides field, and specific parameters which affect the migration of these radionuclides are presented in the Measured Parameters field. In addition, each document referenced in this bibliography has been assigned a relevance number to facilitate sorting the documents according to their pertinence to low-level radioactive waste technology. The documents are rated 1, 2, 3, or 4, with 1 indicating direct applicability to low-level radioactive waste technology and 4 indicating that a considerable amount of interpretation is required for the information presented to be applied. The references within each chapter are arranged alphabetically by leading author, corporate affiliation, or title of the document. Indexes are provide for (1) author(s), (2) keywords, (3) subject category, (4) title, (5) geographic location, (6) measured parameters, (7) measured radionuclides, and (8) publication description.

907 (ORNL/EIS--154/V1) NUCLEAR FACILITY DECOMMISSIONING AND SITE REMEDIAL ACTIONS. VOLUME 1. A SELECTED BIBLIOGRAPHY. Faust, R.A.; Fore, C.S.; Knox, N.P. (Oak Ridge National Lab., TN (USA)). Sep 1980. Contract W-7405-ENG-26. 463p. (RHO/SFM--80/5). NTIS, PC A20/MF A01.

This bibliography of 633 references represents the first in a series to be produced by the Remedial Actions Program Information Center (RAPIC) containing scientific, technical, economic, and regulatory information concerning the decommissioning of nuclear facilities. Major chapters selected for this bibliography are Facility Decommissioning, Uranium Mill Tailings Cleanup, Contaminated Site Restoration, and Criteria and Standards. The references within each chapter are arranged alphabetically by leading author, corporate affiliation, or title of the document. When the author is not given, the corporate affiliation appears first. If these two levels of authorship are not given, the title of the document is used as the identifying level. Indexes are provided for (1) author(s), (2) keywords, (3) title, (4) technology development, and (5) publication description. An appendix of 123 entries lists recently acquired references relevant to decommissioning of nuclear facilities. These references are also arranged according to one of the four subject categories and followed by author, title, and publication description indexes. The bibliography was compiled from a specialized data base established and maintained by RAPIC to provide information support for the Department of Energy's Remedial Actions Program, under the cosponsorship of its three major components: Surplus Facilities Management Program, Uranium Mill Tailings Remedial Actions Program, and Formerly Utilized Sites Remedial Actions Program. RAPIC is part of the Ecological Sciences Information Center within the Information Center Complex at Oak Ridge National Laboratory.

908 (ORNL/MIT--300) ANALYSIS OF BARIUM HYDROXIDE AND CALCIUM HYDROXIDE SLURRY CARBONATION REACTORS. Patch, K.D.; Hart, R.P.; Schumacher, W.A. (Massachusetts Inst. of Tech., Oak Ridge, TN (USA). School of Chemical Engineering Practice; Oak Ridge National Lab., TN (USA)). May 1980. Contract W-7405-ENG-26. 41p. NTIS, PC A03/MF A01.

The removal of CO_2 from air was investigated by using a continuous-agitated-slurry carbonation reactor containing either barium hydroxide [$Ba(OH)_2$] or calcium hydroxide [$Ca(OH)_2$]. Such a process would be applied to scrub $^{14}CO_2$ from stack gases at nuclear-fuel reprocessing plants. Decontamination factors were characterized for reactor conditions which could alter hydrodynamic behavior. An attempt was made to characterize reactor performance with models assuming both plug flow and various degrees of backmixing in the gas phase. The $Ba(OH)_2$ slurry enabled increased conversion, but apparently the process was controlled under some conditions by phenomena differing from those observed for carbonation by $Ca(OH)_2$. Overall reaction mechanisms are postulated.

909 (ORNL/Sub--80/31038/1) ACTINIDE PARTITIONING-TRANSMUTATION PROGRAM. FINAL REPORT. VII. LONG-TERM RISK ANALYSIS OF THE GEOLOGIC REPOSITORY (APPENDIX). Logan, S.E.; Conarty, R.L.; Ng, H.S.; Rahal, L.J.; Shirley,

C.G. (Los Alamos Technical Associates, Inc., NM (USA)). Jan 1980. Contract W-7405-ENG-26. 612p. NTIS, PC A99/MF A01.

The Chemical Technology Division of ORNL has prepared a set of documents that evaluate a partitioning-transmutation (PT) fuel cycle relative to a reference cycle employing conventional fuel-material recovery methods. The PT cycle uses enhanced recovery methods so that most of the long-lived actinides are recycled to nuclear power plants and transmuted to shorter-lived materials, thereby reducing waste toxicity. Data pertaining to the long-term risk analysis of waste generated from the PT fuel cycle are presented. (DC)

910 (ORNL/TM--6445) SEPARATION OF AMERICIUM, CURIUM, AND RARE EARTHS FROM HIGH-LEVEL WASTES BY OXALATE PRECIPITATION: EXPERIMENTS WITH SYNTHETIC WASTE SOLUTIONS. Forsberg, C.W. (Oak Ridge National Lab., TN (USA)). Jan 1980. Contract W-7405-ENG-26. 103p. Dep. NTIS, PC A06/MF A01.

The separation of trivalent actinides and rare earths from other fission products in high-level nuclear wastes by oxalate precipitation followed by ion exchange (OPIX) was experimentally investigated using synthetic wastes and a small-scale, continuous-flow oxalic acid precipitation and solid-liquid separation system. Trivalent actinide and rare earth oxalates are relatively insoluble in 0.5 to 1.0 M HNO_3 whereas other fission product oxalates are not. The continuous-flow system consisted of one or two stirred-tank reactors in series for crystal growth. Oxalic acid and waste solutions were mixed in the first tank, with the product solid-liquid slurry leaving the second tank. Solid-liquid separation was tested by filters and by a gravity settler. The experiments determined the fraction of rare earths precipitated and separated from synthetic waste streams as a function of number of reactors, system temperature, oxalic acid concentration, liquid residence time in the process, power input to the stirred-tank reactors, and method of solid-liquid separation. The crystalline precipitate was characterized with respect to form, size, and chemical composition. These experiments are only the first step in converting a proposed chemical flowsheet into a process flowsheet suitable for large-scale remote operations at high activity levels.

911 (ORNL/TM--6802) RECOVERY OF PLUTONIUM FROM HEPA FILTERS BY CE(IV): PROMOTED DISSOLUTION OF PuO_2 AND RECYCLE OF THE CERIUM PROMOTER. Scheitlin, F.M.; Bond, W.D. (Oak Ridge National Lab., TN (USA)). May 1980. Contract W-7405-ENG-26. 58p. NTIS, PC A04/MF A01.

Studies carried out in this investigation included (1) electrolytic production of Ce(IV) from Ce(III), (2) leaching of refractory PuO_2 from HEPA filters with maintenance of Ce(IV) by anodic oxidation during leaching, and (3) evaluation of methods for contacting the HEPA solids with the leaching solution and for separating the solid residue from the leaching liquor. Anodic oxidation of Ce(III) was accomplished with an electric current efficiency of about 85% at current densities of 0.04 to 0.4 A/dm^2 at Pt anode. Refractory PuO_2 was dissolved by a 4.0 M HNO_3 - 0.1 M Ce(IV) solution in 1.5 h at 100°C using stirred-contact leaching of the solids or by recirculating the leachant through a packed column of the solids. Cerium(IV) concentrations were maintained continuously by anodic oxidation throughout leaching. Dissolution times up to 10 h were required unless the HEPA media were oxidized initially in air at 300°C to destroy carbonaceous species which consumed Ce(IV) more rapidly than it could be regenerated be anodic oxidation. Leaching solids in packed columns avoided the relatively difficult liquid-solids separation by centrifugation which was required after stirred-contact leaching; however, the solids handling difficulties remain. A flowsheet is proposed for the recovery of actinides from HEPA filters. A 4 M HNO_3 - 0.1 M Ce(IV) nitrate solution is used as the leachant and the Ce(III) is recycled to the leaching operation using bidentate solvent extraction.

912 (ORNL/TM--6983) ACTINIDE PARTITIONING-TRANSMUTATION PROGRAM FINAL REPORT. III. TRANSMUTATION STUDIES. Wachter, J.W.; Croff, A.G. (Oak Ridge National Lab., TN (USA)). Jul 1980. Contract W-7405-ENG-26. 59p. NTIS, PC A04/MF A01.

Transmutation of the long-lived nuclides contained in fuel cycle wastes has been suggested as a means of reducing the long-term toxicity of the wastes. A comprehensive program to evaluate the feasibility and incentives for recovering the actinides from wastes (partitioning) and transmuting them to short-lived or stable nuclides has been in progress for 3 years under the direction of Oak Ridge National Laboratory (ORNL). This report constitutes the final assessment of transmutation in support of this program. Included are (1) a summary of recent transmutation literature, (2) a generic evaluation of actinide transmutation in thermal, fast, and other transmutation devices, (3) a preliminary evaluation of ^{99}Tc and ^{129}I transmutation, and (4) a characterization of a pressurized-water-reactor fuel cycle with and without provisions for actinide recovery and transmutation for use in other parts of the ORNL program. The principal conclusion of the report is that actinide transmutation is feasible in both thermal and fast reactors, subject to demonstrating satisfactory fuel performance, with relatively little impact on the reactor. It would also appear that additional transmutation studies are unwarranted until a firm decision to proceed with actinide transmutation has been made by the responsible authorities.

913 (ORNL/TM--7065) REMOVAL OF HAZARDOUS RADIONUCLIDES FROM URANIUM ORE AND/OR MILL TAILINGS. PROGRESS REPORT, OCTOBER 1, 1978-SEPTEMBER 30, 1979. Scheitlin, F.M.; Bond, W.D. (Oak Ridge National Lab., TN (USA)). Jan 1980. Contract W-7405-ENG-26. 68p. Dep. NTIS, PC A04/MF A01.

The leaching of uranium ore and mill tailings to remove radium was studied. A few scouting tests were performed to obtain data on the recovery of radium, thorium, and uranium from leach liquors and on the recycle of leaching agents. Nitric acid, hydrochloric acid, ethylenediaminetetraacetic acid (EDTA), and diethylenetriaminepentaacetic acid (DTPA) were evaluated as leachants using one sample of a western US ore and two samples of tailings obtained from different uranium mills that employ the sulfuric acid leach process. Leached solids with radium contents approaching 10 pCi/g (98% radium removal) were obtained after six stages of batch, crosscurrent leaching with 3 M HNO_3 at 33% concentration of solids and a temperature of 60°C. On the basis of two-stage tests on mill tailings, 0.5 M EDTA solutions at pH values of 8.2 to 11.6 were found to be more effective, while hydrochloric acid in two- or three-stage tests was less effective than nitric acid. Solutions of 0.3 M EDTA and 0.05 M

DTPA were ineffective. No important differences were observed in the leaching behavior of ore and of mill tailings derived from the same ore. The residue remaining after six stages of nitric acid leaching was relatively intractable to radium leaching with water or additional nitric acid leaching. Tests indicated that the recycle of nitric acid is chemically feasible by evaporating the leach liquors to recover unused acid and then thermally decomposing the metal salts to recover consumed acid. Radium recoveries of 99+% by carrying on barium sulfate were shown to be chemically feasible in a series of experiments with leach liquors, but processing applications would probably require methods for barium recycle and barium-radium separation. Recovery of ^{230}Th and uranium from nitrate leach liquors by tri-n-butyl phosphate extraction appears promising in initial tests.

914 (ORNL/TM--7102) SCRUBBING OF IODINE FROM GAS STREAMS WITH MERCURIC NITRATE-CONVERSION OF MERCURIC IODATE PRODUCT TO BARIUM IODATE FOR FIXATION IN CONCRETE. Rogers, G.C.; Moore, J.G.; Morgan, M.T. (Oak Ridge National Lab., TN (USA)). Jun 1980. Contract W-7405-ENG-26. 19p. NTIS, PC A02/MF A01.

A bench-scale model of a mercuric nitrate scrubber for removal of iodine from off-gas streams was constructed and operated in conjunction with a mercuric iodate-to-barium iodate conversion system to determine the feasibility of total recycle of all processing solutions. The two main aspects of the system examined were (1) the extent of contamination of the barium iodate product, and (2) the effect of cross-contamination of various process solutions on the efficiency of the process. The experimental evidence obtained indicates that, with appropriate control, all solutions can be recycled without significant contamination of the product that would be harmful to the host concrete or to the environment. Mercury contamination was found to be less than or equal to 0.5 wt % of the barium iodate product. The most significant effect on system efficiency was determined to be barium hydroxide contamination of the sodium hydroxide solution used to convert mercuric iodate to sodium iodate. A mole ratio of barium hydroxide to sodium hydroxide of about 1:225 caused a decrease in conversion efficiency of about 45%.

915 (ORNL/TM--7130) IN-SITU STABILIZATION OF RADIOACTIVELY CONTAMINATED LOW-LEVEL SOLID WASTES BURIED IN SHALLOW TRENCHES: AN ASSESSMENT. Arora, H.S.; Temura, T.; Boegly, W.J. (Oak Ridge National Lab., TN (USA)). Sep 1980. Contract W-7405-ENG-26. 67p. NTIS, PC A04/MF A01.

The potential effectiveness of materials for in-situ encapsulation of low-level, radioactively contaminated solid waste buried in shallow trenches is enumerated. Cement, clay materials, and miscellaneous sorbents, aqueous and nonaqueous gelling fluids and their combinations are available to solidify contaminated free water in trenches, to fill open voids, and to minimize radionuclide mobility. The success of the grouting technique will depend on the availability of reliable geohydrologic data and laboratory development of a mix with enhanced sorption capacity for dominant radionuclides present in the trenches. A cement-bentonite-based grout mix with low consistency for pumping, several hours controlled rate of hardening, negligible bleeding, and more than 170 kPa (25 psi) compressive strength are a few of the suggested parameters in laboratory mix development. Cost estimates of a cement-bentonite-based grout mix indicate that effective and durable encapsulation can be accomplished at a reasonable cost (about $113 per cubic meter). However, extensive implementation of the method suggests the need for a field demonstration of the method. 53 references.

916 (ORNL/TM--7371) HIGH-LEVEL WASTE PROGRAM PROGRESS REPORT, JANUARY 1, 1980-MARCH 31, 1980. (Oak Ridge National Lab., TN (USA)). May 1980. Contract W-7405-ENG-26. 31p. NTIS, PC A03/MF A01.

FUETAP concretes cured at 100°C and 0.1 or 0.6 MPa had essentially the same physical properties as those cured at higher temperatures and pressures. Standard specimens containing high concentrations of ^{244}Cm showed little gasification after 1 month. The large (23-cm ID) spray calciner has been completed and is operating satisfactorily. Construction was completed on a sphere-forming system capable of producing 100-g batches of Synroc spheres by internal gelation, and several runs were made. Preparations for the compatibilty tests are underway. (DLC)

917 (ORNL/TM--7427) STATE-OF-THE-ART REPORT ON LOW-LEVEL RADIOACTIVE WASTE TREATMENT. Kibbey, A.H.; Godbee, H.W. (Oak Ridge National Lab., TN (USA)). Sep 1980. Contract W-7405-ENG-26. 155p. NTIS, PC A08/MF A01.

An attempt is made to identify the main sources of low-level radioactive wastes that are generated in the United States. To place the waste problem in perspective, rough estimates are given of the annual amounts of each generic type of waste that is generated. Most of the wet solid wastes arise from the cleanup of gaseous and liquid radioactive streams prior to discharge or recycle. The treatment of the process streams and the secondary wet solid wastes thus generated is described for each type of government or fuel cycle installation. Similarly, the institutional wet wastes are also described. The dry wastes from all sources have smilar physical and chemical characteristics in that they can be classified as compactible, noncompactible, combustible, noncombustible, or combinations thereof. The various treatment options for concentrated or solid wet wastes and for dry wastes are discussed. Among the dry-waste treatment methods are compaction, baling, and incineration, as well as chopping, cutting, and shredding. Organic materials can usually be incinerated or, in some cases, biodegraded. The filter sludges, spent resins, incinerator ashes, and concentrated liquids are usually solidified in cement, urea-formaldehyde, or unsaturated polyester resins prior to burial. Asphalt has not yet been used as a solidificaton agent in the United States, but it probably will be used in the near future. The treatment of radioactive medical and bioresearch wastes is described, but the waste from radiochenmical, pharmaceutical, and other industries is not well defined at the present time. Recovery of waste metals and treatment of hazardous contaminated wastes are discussed briefly. Some areas appearing to need more research, development, and demonstration are specifically pointed out.

918 (ORNL/TM--7476) HIGH-LEVEL WASTE PROGRAM PROGRESS REPORT, APRIL 1, 1980-JUNE 30, 1980. (Oak Ridge National Lab., TN (USA)). Aug 1980. Contract W-7405-ENG-26. 26p. NTIS, PC A03/MF A01.

The highlights of this report are on: waste management analysis for nuclear fuel cycles; fixation of waste in concrete; study of ceramic

and cermet waste forms; alternative high-level waste forms development; and high-level waste container development.

919 (ORO--777) DESCRIPTION OF THE FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM. (Department of Energy, Oak Ridge, TN (USA). Oak Ridge Operations Office). Sep 1980. 85p. NTIS, PC A05/MF A01.

The background and the results to date of the Department of Energy program to identify and evaluate the radiological conditions at sites formerly utilized by the Corps of Engineers' Manhattan Engineer District (MED) and the US Atomic Energy Commission (AEC) are summarized. The sites of concern were federally, privately, and institutionally owned and were used primarily for research, processing, and storage of uranium and thorium ores, concentrates, or residues. Some sites were subsequently released for other purposes without radiological restriction. Surveys have been conducted since 1974 to document radiological conditions at such sites. Based on radiological surveys, sites are identified in this document that require, or are projected to require, remedial action to remove potential restrictions on the use of the property due to the presence of residual low-level radioactive contamination. Specific recommendations for each site will result from more detailed environmental and engineering surveys to be conducted at those sites and, if necessary, an environmental impact assessment or environmental impact statement will be prepared. Section 3.0 describes the current standards and guidelines now being used to conduct remedial actions. Current authority of the US Department of Energy (DOE) to proceed with remedial actions and the new authority required are summarized. A plan to implement the Formerly Utilized Sites Remedial Action Program (FUSRAP) in accordance with the new authority is presented, including the objectives, scope, general approach, and a summary schedule. Key issues affecting schedule and cost are discussed.

920 (PB--80-122740) ABSORPTION OF RADIUM AND THORIUM FROM WYOMING AND UTAH URANIUM MILL TAILINGS SOLUTIONS. REPORT OF INVESTIGATIONS. Beard, H.R.; Nichols, I.L.; Seidel, D.C. (Bureau of Mines, Salt Lake City, UT (USA). Salt Lake City Metallurgy Research Center). 1979. 21p. NTIS, PC A02/MF A01.

The Federal Bureau of Mines investigated the absorption of radium and thorium from waste uranium leach liquor by clays and other materials. This work was conducted in support of the Bureau's goal of minimizing the environmental conflicts, impacts, and occupational hazards associated with mining and mineral processing operations. Tailings and soil samples from Wyoming and Utah were contacted with tailings liquors to determine the degree of absorption. Absorption ranged from 0 to 99 percent for radium and from 0 to 31 percent for thorium. Some samples, which readily absorbed radium, were contacted with various salt solutions that could be present in tailings solutions to determine their effectiveness as desorbents. The desorption of radium ranged from 0.06 to 100 percent. An alpha-spectrometric method was used to determine the radium and thorium concentrations in the solutions and the solids.

921 (PB--290865) CLEANING UP COMMINGLED URANIUM MILL TAILINGS: IS FEDERAL ASSISTANCE NECESSARY. (General Accounting Office, Washington, DC (USA). Energy and Minerals Div.). 5 Feb 1979. 30p. NTIS, PC A03/MF A01.

Commingled uranium mill tailings are the sand-like radioactive wastes produced as a result of the processing of uranium for both Government and commercial purposes. This report primarily addresses the need for the Federal Government to assist active uranium mill owners in cleaning up commingled uranium mill tailings.

922 (PB--296947) A STUDY OF REVERSE OSMOSIS APPLICABILITY TO LIGHT WATER REACTOR RADWASTE PROCESSING. TECHNICAL REPORT. Markind, J.; Van Tran, T. (Oregon Univ., Portland (USA)). Apr 1979. 147p. NTIS, PC A07/MF A01.

The use of membrane technology has demonstrated significant process potential in nuclear radioactive waste applications. Reverse osmosis and ultrafiltration can provide filtration capability without the need of filter aids, minimize the requirements of chemical regeneration and/or disposal of expensive resins and can preconcentrate wastes without requiring major process equipment with large auxiliary heat supplies. Because of these capabilities, a study was undertaken to review, evaluate and document the existing experience, both nuclear and appropriate non-nuclear, of the membrane industry as it applies to the processing of reactor radwaste by membrane technology and, in particular, reverse osmosis and ultrafiltration. Relevant information was collected from both the literature and extensive communications with users and suppliers of membrane equipment. The systems reviewed ranged from experimental laboratory units to full scale process units.

923 (PB--295214) A SURVEY OF THE AVAILABLE METHODS OF SOLIDIFICATION FOR RADIOACTIVE WASTES. Holcomb, W.F. (Office of Radiation Programs, Washington, DC (USA). Technology Assessment Div.). Nov 1978. 99p. NTIS PC A05/MF A01.

This report reviews the numerous solidification techniques and related matrix materials that are presently being offered or proposed for incorporating the radionuclides into an immobile materials. Both high- and low-level waste solidification processes are covered. Key features of the equipment used in individual solidification processes are described. At present the high-level waste solidification methods are being developed by the Government, while the low-level waste solidification methods are being developed commercially.

924 (PB--296164) AVAILABLE METHODS OF SOLIDIFICATION FOR LOW-LEVEL RADIOACTIVE WASTES IN THE UNITED STATES. TECHNICAL NOTE. Holcomb, W.F.; Goldberg, S.M. (Office of Radiation Programs, Washington, DC (USA). Technology Assessment Div.). Dec 1976. 49p. NTIS PC A03/MF A01.

This paper reviews the numerous solidification systems and related matrix materials that are presently being offered, or proposed, to the commercial nuclear power industry. Included, where possible, is the nature of how these materials and/or systems are affected by the physical, chemical, and radiolytic characteristics of the treated radioactive waste materials. Key features of the equipment used in individual solidification processes are discussed in order to clarify the relative utility of these processes for either power plant or fuel cycle application.

925 (PB--296642) IMMOBILIZATION OF HAZARDOUS RESIDUALS BY ENCAPSULATION. FINAL TECHNICAL REPORT. Subramanian, R.V.; Mahalingam, R. (Washington State Univ., Pullman (USA)). Feb 1979. 212p. NTIS, PC A10/MF A01.

Laboratory and pilot plant studies are reported which demonstrate the feasibility of encapsulating hazardous aqueous wastes in a water-extensible polyester matrix for land burial. Laboratory experiments were conducted to determine the leachability of encapsulated wastes. Results indicate that the polyester matrix can be used safely to immobilize low-level radioactive wastes. In addition, acceptable low levels of leachabilities can be achieved for solid wastes incorporated in the matrix. A polyester matrix is much more efficient than cement or urea-formaldehyde polymers in containing wastes. A pilot plant was conducted to handle 15 gal/hr liquid waste. Polymerization was readily controllable, and process upsets were easily handled. An economic evaluation of the polyester process shows it to be two-and-one-half times more expensive than its nearest competitor, the cement silicate process, the major cost item being the polyester resin. It is anticipated that the polyester process will become a viable, if not the sole, process for immobilizing dangerous wastes for underground disposal.

926 (PB--296947, pp 196-202) ACTIVITY MEASUREMENTS AT A WASTE VOLUME REDUCTION FACILITY. Richardson, J.; Lee, D.A. (Ontario Hydro, Tiverton, Canada). May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

The monitoring program for Ontario Hydro's radioactive waste management site will be described, several aspects of which will be discussed in detail. The program at this facility includes categorization, volume reduction processing, and storage of solid radioactive wastes from nuclear generating stations of the CANDU type. At the present time, two types of volume reduction process are in operation - incineration and compaction. Following categorization and processing, wastes are stored in in-ground concrete trenches or tile-holes, or in above-ground quadricells. The monitoring program is divided into three areas: public safety, worker safety, and structural integrity. Development projects with respect to the monitoring program have been undertaken to achieve activity accounting for the total waste management program. In particular, a field measurement for the radioactivity content of radioactive ash containers and compacted waste drums.

927 (PB--296947, pp 74-81) RADIOACTIVE SLUDGE TREATMENT BY THE CENTRIFUGAL DEHYDRATION METHOD. Hwang, S.L.; Tsai, C.M. (Inst. of Nuclear Energy Research, Lun-Tan, Taiwan). May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

The radioactive sludge produced after chemical treatment of radioactive liquid waste usually contains 0.3 to 3% of solid by weight. The gross β activity of sludge produced at the Institute of Nuclear Energy Research (INER) varies 10^{-4} to 10^{-3} μCi/g, and the use of centrifugal method for dehydration is justified. The effluent from the decanter goes through the precipitation and concentration stage and then the supernatant is pumped so that a stable concentration of liquid waste can be maintained during separation stage. The decanter used at INER for treating low level radioactive waste is a Westfalia SD8230 decanter which is of solid-bowl type. The liquid waste from a 40MW(th) Taiwan Research Reactor (TRR) and its associated hot laboratories is described in this report. The treatment capacity is about $2 m^3/h$ and the characteristics of the separator and the associated systems are discussed. As a result of improvement the solid in concentrated sludge is about 20% by weight, and the production rate is about 240 to 250 kg/h. Furthermore, no water is added to the concentrated sludge. The solidification can be done in a closed type sludge-cement premixing system, and the homogeneous concrete can be obtained.

928 (PB--296947, pp 82-90) REDUCTION IN WASTE HANDLING AND TRANSPORTATION. Stewart, J.E. (Werner and Pfleiderer Corp., Waldwick, NJ). May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

The radioactive waste process of volume reduction and solidification is discussed. The following topics are covered: operator exposure reduction, equipment separation; operating reliability; component design; less end product; system design philosophy; process upset; end product benefits, processing and transportation safety; net result at burial site; and the human factor. (DC)

929 (PB--296947, pp 91-100) SOLIDIFICATION OF LOW-LEVEL RADIOACTIVE LIQUID WASTE USING A CEMENT-SILICATE PROCESS. Grandlund, R.W. (Pennsylvania State Univ., University Park); Hayes, J.F. May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

Extensive use has been made of silicate and Portland cement for the solidification of industrial waste and recently this method has been successfully used to solidify a variety of low level radioactive wastes. The types of wastes processed to date include fuel fabrication sludges, power reactor waste, decontamination solution, and university laboratory waste. The cement-silicate process produces a stable solid with a minimal increase in volume and the chemicals are relatively inexpensive and readily available. The method is adaptable to either batch or continuous processing and the equipment is simple. The solid has leaching characteristics similar to or better than plain Portland cement mixtures and the leaching can be further reduced by the use of ion-exchange additives. The cement-silicate process has been used to solidify waste containing high levels of boric acid, oils, and organic solvents. The experience of handling the various types of liquid waste with a cement-silicate system is described.

930 (PNL--2622) ASSESSMENT OF WATER/GLASS INTERACTIONS IN WASTE GLASS MELTER OPERATION. Postma, A.K.; Chapman, C.C.; Buelt, J.L. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Apr 1980. Contract AC06-76RL01830. 88p. NTIS, PC A05/MF A01.

A study was made to assess the possibility of a vapor explosion in a liquid-fed glass melter and during off-standard conditions for other vitrification processes. The glass melter considered is one designed for the vitrification of high-level nuclear wastes and is comprised of a ceramic-lined cavity with electrodes for joule heating and processing equipment required to add feed and withdraw

glass. Vapor explosions needed to be considered because experience in other industrial processes has shown that violent interactions can occur if a hot liquid is mixed with a cooler, vaporizable liquid. Available experimental evidence and theoretical analyses indicate that destructive glass/water interactions are low probability events, if they are possible at all. Under standard conditions, aspects of liquid-fed melter operation which work against explosive interactions include: (1) the aqueous feed is near its boiling point; (2) the feed contains high concentrations of suspended particles; (3) molten glass has high viscosity (greater than 20 poise); and (4) the glass solidifies before film boiling can collapse. While it was concluded that vapor explosions are not expected in a liquid-fed melter, available information does not allow them to be ruled out altogether. Several precautionary measures which are easily incorporated into melter operation procedures were identified and additional experiments were recommended.

931 (PNL--2668-3) MULTIBARRIER WASTE FORMS. PART III: PROCESS CONSIDERATIONS. Lokken, R.O. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Oct 1979. Contract EY-76-C-06-1830. 32p. Dep. NTIS, PC A03/MF A01.

The multibarrier concept for the solidification and storage of radioactive waste utilizes up to three barriers to isolate radionuclides from the environment: a solidified waste inner core, an impervious coating, and a metal matrix. The coating and metal matrix give the composite waste form enhanced inertness with improvements in thermal stability, mechanical strength, and leach resistance. Preliminary process flow rates and material costs were evaluated for four multibarrier waste forms with the process complexity increasing thusly: glass marbles, uncoated supercalcine, glass-coated supercalcine, and PyC/Al_2O_3-coated supercalcine. This report discusses the process variables and their effect on optimization of product quality, processing simplicity, and material cost. 11 figures, 2 tables. (DLC)

932 (PNL--2786) PROCESSING OF WASTE SOLUTIONS FROM ELECTROCHEMICAL DECONTAMINATION. Charlot, L.A.; Allen, R.P.; Arrowsmith, H.W.; Hooper, J.L. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Sep 1979. Contract EY-76-C-06-1830. 52p. Dep. NTIS, PC A04/MF A01.

The use of electropolishing as a decontamination technique will be effective only if we can minimize the amount of secondary waste requiring disposal and economically recycle part of the decontamination electrolyte. Consequently, a solution purification method is needed to remove the dissolved contamination and metal in the electrolyte. This report describes the selection of a purification method for a phosphoric acid electrolyte from the following possible acid reclamation processes: ion exchange, solvent extraction, precipitation, distillation, electrolysis, and membrane separation.

933 (PNL--2904) VITRIFICATION OF HANFORD WASTES IN A JOULE-HEATED CERAMIC MELTER AND EVALUATION OF RESULTANT CANISTERIZED PRODUCT. Chapman, C.C.; Buelt, J.L.; Slate, S.C.; Katayama, Y.B.; Bunnell, L.R. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Aug 1979. Contract EY-76-C-06-1830. 74p. Dep. NTIS, PC A04/MF A01.

Experience gained in the week-long vitrification test and characterization of the glass produced in the run support the following conclusions: The Hanford waste simulated in this test can be readily vitrified in a joule-heated ceramic melter. Physical properties of the molten glass were entirely compatible with melter operation. The average feed rate of 106 kg/h is high enough to make the ceramic melter a feasible piece of equipment for vitrifying Hanford wastes. The glass produced in this trial had good chemical durability, $6(10)^{-5}$ g/cm^2-d. When one of the canisters was purposely dropped onto a steel pad, the damage was limited to deformation of the steel can in the impact area, cracking of a weld, and fracturing of glass in the immediate vicinity of the impact area. No glass was released from the canister as a result of the drop test. The results of this vitrification test support the technical feasibility of vitrifying Hanford wastes by means of a joule-heated ceramic melter. Surface area for large glass castings is equivalent to the mass median particle diameters between 4.27 cm (1.75 in.) and 8.91 cm (3.51 in.) even when allowed to cool rapidly by standing in ambient air. Large canisters (up to 0.91 m in dia) can be cast without large voids while standing in air if the fill rate is over 100 kg/h. 34 figures, 10 tables.

934 (PNL--2925) IN-CAN MELTING PROCESS AND EQUIPMENT DEVELOPMENT FROM 1974 TO 1978. Blair, H.T. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Aug 1979. Contract EY-76-C-06-1830. 160p. Dep. NTIS, PC A08/MF A01.

Both the defense HLLW stores in tanks presently and the HLLW from proposed reprocessing of commercial LWR fuel can be vitrified as borosilicate glass in containers made of 300-series stainless steel by the ICM (in-can melting) process. Melting rates of 50 kg/h in 12-in.-dia cans and 117 kg/h in 28-in.-dia cans can be achieved in the ICM by using the rising-level charging method and internal heat-transfer plate assemblies in the cans. The ICM process can be monitored and remotely controlled without the aid of instrumentation attached to the waste can. The ICM process is compatible with both heated-wall spray calciners and fluidized-bed calciners. The ICM process causes residual tensile stresses as high as the yield strength in vitrified product containers made of 300-series stainless steel. Spall due to oxidation of the exterior of the can during an ICM process can be prevented by using an inert cover gas, by putting a protective coating on the can surface, or by using an oxidation-resistant alloy. Processing problems are minimized and product quality is improved when the complete can is located inside the furnace chamber by setting it on the hearth. A maximum of 24 kW and an average of 15 kW is required per 15-in.-high furnace zone to melt waste borosilicate glass at a rate of 117 kg/h in a 28-in.-dia ICM.

935 (PNL--2999(Pts.1-4)) RESEARCH AND DEVELOPMENT ACTIVITIES: HIGH-LEVEL WASTE IMMOBILIZATION PROGRAM. QUARTERLY PROGRESS REPORTS, JANUARY-DECEMBER 1978. McElroy, J.L.; Mendel, J.E.; Bonner, W.F.; Henry, M.H. (Battelle Pacific Northwest Labs., Richland, WA (USA)). May 1979. Contract EY-76-C-06-1830. 142p. Dep. NTIS, PC A07/MF A01.

This document contains the four quarterly reports for 1978. Accomplishments of each quarter are described separately. Emphasis is on the glass route of solidification. (DLC)

936 (PNL--3027) DESIGN FEATURES OF THE LABORATORY-SCALE RADIOCHEMICAL IMMOBILIZATION SYSTEM. Hansen, M.S.; Knox, C.A.; Berger, D.N. (Battelle Pacific Northwest Labs., Richland, WA (USA)). May 1980. Contract AC06-76RL01830. 46p. NTIS, PC A03/MF A01.

Under the High-Level Waste Immobilization Program, the Pacific Northwest Laboratory (PNL) is studying various ways to solidify high-level nuclear wastes. A variety of waste forms and processes are being investigated, with the most highly developed process being spray calcination coupled with in-can melting. This report describes a remote laboratory-scale system that was designed for the purpose of investigating the effects of different operating conditions and waste compositions on the product and on the effluents generated. It is termed laboratory-scale because of its nominal 1 L/h feed rate as compared to well over 300 L/h for full-scale equipment at PNL. The equipment currently consists of a feed system, a spray calciner, an in-can melter, and an effluent control system. It is operated in a shielded radiochemical hot cell using radioactive high-level liquid waste (HLLW) to answer questions on the deposition of radiochemicals during actual waste processing. The effluent control system can be modified in order to test different effluent systems, one of which has been proposed by the Savannah River Laboratories (SRL) for use in the Savannah River Plant vitrification system. The laboratory-scale system can also be used to test alternative immobilization processes, since spray calcination is a common processing step in many alternative waste form flowsheets. Thus, only the addition of a specific forming step such as pelletizing or sintering is necessary.

937 (PNL--3050-1) RESEARCH AND DEVELOPMENT ACTIVITIES: HIGH-LEVEL WASTE IMMOBILIZATION PROGRAM. QUARTERLY PROGRESS REPORT, JANUARY-MARCH 1979. McElroy, J.L.; Mendel, J.E.; Bonner, W.F.; Henry, M.H. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Nov 1979. Contract EY-76-C-06-1830. 50p. Dep. NTIS, PC A03/MF A01.

Liquid waste, made from zirconium-clad UO_2 power reactor fuel with an average burnup of 25,000 MWd/MT, was converted to glass by the in-can melting process. An intrinsic-gamma melt-level detection system was tested during the NWVP demonstrations; results showed that if a sufficient number of collimators are used the system will track the melt surface with a precision of 1 in. during the filling of cans with waste glass. The two canisters filled in the NWVP are both 8 in. in diameter and contain borosilicate glass of very similar compositions. One canister contains 116 kg of glass that generated 0.38 kW of self-heat when produced; the other contains 145 kg of glass, and generates 1.01 kW. Spray calcination of simulated Savannah River Plant liquid waste at a rate of 400 L/h was demonstrated in the 36-in.-dia. calciner. Five waste forms are being compared: concrete-containing waste calcine, sintered waste glass, glass-ceramic, Synroc B (a crystalline assemblage of titanates), and borosilicate waste glass (composition 76-68). Results of initial tests indicate that the reaction rate of carbon with water, previously found to be very low, may be increased in a radiation field.

938 (PNL--3050-2) RESEARCH AND DEVELOPMENT ACTIVITIES: HIGH-LEVEL WASTE IMMOBILIZATION PROGRAM. QUARTERLY PROGRESS REPORT, APRIL-JUNE 1979. McElroy, J.L.; Mendel, J.E.; Bonner, W.F.; Henry, M.H. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Dec 1979. Contract EY-76-C-06-1830. 48p. Dep. NTIS, PC A03/MF A01.

Test results are available on 21 out of a total of 65 glass compositions in a generic study of composition effects on waste glass properties such as Soxhlet leach rate, viscosity, electrical conductivity, and volatility. Preliminary results indicate the leaching behavior of a Cermet waste form prepared at ORNL is similar to that of waste glass and supercalcine. Scanning transmission electron microscopy has confirmed that supercalcine contains up to 10 vol% glassy phase and that small fractions of Cs, Sr, and rare earth reside in the glassy phase. Two long-term runs were completed in the ceramic melter coupled directly to the full-scale spray calciner. Two new ceramic melters were put into operation. A preliminary test in the small spray calciner indicates that coal, which is present in some Savannah River Plant wastes, is only partially decomposed during spray calcination. 15 figures, 11 tables.

939 (PNL--3060) DEVELOPMENT AND CHARACTERIZATION OF SOLIDIFIED FORMS FOR HIGH-LEVEL WASTES: 1978. ANNUAL REPORT. Ross, W.A.; Mendel, J.E. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Dec 1979. Contract EY-76-C-06-1830. 108p. Dep. NTIS, PC A06/MF A01.

Development and characterization of solidified high-level waste forms are directed at determining both process properties and long-term behaviors of various solidified high-level waste forms in aqueous, thermal, and radiation environments. Waste glass properties measured as a function of composition were melt viscosity, melt electrical conductivity, devitrification, and chemical durability. The alkali metals were found to have the greatest effect upon glass properties. Titanium caused a slight decrease in viscosity and a significant increase in chemical durability in acidic solutions (pH-4). Aluminum, nickel and iron were all found to increase the formation of nickel-ferrite spinel crystals in the glass. Four multibarrier advanced waste forms were produced on a one-liter scale with simulated waste and characterized. Glass marbles encapsulated in a vacuum-cast lead alloy provided improved inertness with a minimal increase in technological complexity. Supercalcine spheres exhibited excellent inertness when coated with pyrolytic carbon and alumina and put in a metal matrix, but the processing requirements are quite complex. Tests on simulated and actual high-level waste glasses continue to suggest that thermal devitrification has a relatively small effect upon mechanical and chemical durabilities. Tests on the effects radiation has upon waste forms also continue to show changes to be relatively insignificant. Effects caused by decay of actinides can be estimated to saturate at near 10^{19} alpha-events/cm^3 in homogeneous solids. Actually, in solidified waste forms the effects are usually observed around certain crystals as radiation causes amorphization and swelling of th crystals.

940 (PNL--3094) HIGH-LEVEL WASTE IMMOBILIZATION PROGRAM: AN OVERVIEW. Bonner, W.R. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Sep 1979. Contract EY-76-C-06-1830. 46p. Dep. NTIS, PC A03/MF A01.

The High-Level Waste Immobilization Program is providing technology to allow safe, affordable immobilization and disposal of

nuclear waste. Waste forms and processes are being developed on a schedule consistent with national needs for immobilization of high-level wastes stored at Savannah River, Hanford, Idaho National Engineering Laboratory, and West Valley, New York. This technology is directly applicable to high-level wastes from potential reprocessing of spent nuclear fuel. The program is removing one more obstacle previously seen as a potential restriction on the use and further development of nuclear power, and is thus meeting a critical technological need within the national objective of energy independence.

941 (PNL--3109) SPRAY CALCINATION/IN-CAN MELTING: EFFLUENT CHARACTERIZATION AND TREATMENT. Hanson, M.S. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Mar 1980. Contract EY-76-C-06-1830. 105p. Dep. NTIS, PC A06/MF A01.

According to data obtained during calcination of nonradioactive, simulated waste, ruthenium and cesium losses from the spray calciner are small, on the order of 3.5×10^{-2}% and 3.4×10^{-2}%, respectively. Calciner-melter and filter decontamination factors for ruthenium and cesium averaged 3.6×10^{4} and 3.9×10^{4}, respectively. Particulate decontamination factors of 10^{3} to 10^{4} have been obtained using sintered stainless steel filters. A significant portion of the ruthenium and cesium lost to the process off-gas system was due to particle penetration of the filters. The particles penetrating the filters have a mass distribution centering about a size large enough to control with available technology. Processing wastes containing fluoride will probably volatilize a portion of the fluoride to the off-gas system, thus increasing the probability of corrosion problems. 34 figures, 30 tables.

942 (PNL--3137) NUMERICAL MODELING OF LIQUID FEEDING IN THE LIQUID-FED CERAMIC MELTER. Hjelm, R.L.; Donovan, T.E. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Oct 1979. Contract EY-76-C-06-1830. 28p. Dep. NTIS, PC A03/MF A01.

A modeling scheme developed by the Pacific Northwest Laboratory numerically simulates the behavior of the Liquid-Fed Ceramic Melter (LFCM) during liquid feeding. The computer code VECTRA (Vorticity Energy Code for TRansport Analysis) was used to simulate the LFCM in the idling and liquid feeding modes. Results for each simulation include molten glass temperature profiles and isotherm contour plots, stream function contour plots, heat generation rate contour plots, refractory isotherms, and heat balances. The results indicated that the model showed no major deviations from real LFCM behavior and that high throughput should be attainable. They also indicated that reboil was a possibility as a steady liquid feeding state was approached, very steep temperature gradients exist in the Monofrax K-3, and that phase separation could occur in the bottom corners during liquid feeding and over the entire floor while idling.

943 (PNL--3145) VITRIFICATION OF RADIOACTIVE HIGH-LEVEL WASTE BY SPRAY CALCINATION AND IN-CAN MELTING. Hanson, M.S.; Bjorklund, W.J. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jul 1980. Contract AC06-76RL01830. 87p. NTIS, PC A05/MF A01.

After several nonradioactive test runs, radioactive waste from the processing of 1.5 t of spent, light-water-reactor fuel was successfully concentrated, dried and converted to a vitreous product. A total of 97 L of waste glass (in two stainless steel canisters) was produced. The spray calcination process coupled to the in-can melting process, as developed at Pacific Northwest Laboratory, was used to vitrify the waste. An effluent system consisting of a variety of condensation of scrubbing steps more than adequately decontaminated the process off gas before it was released to the atmosphere.

944 (PNL--3181) CHARACTERIZATION OF GASEOUS AND PARTICULATE EFFLUENTS FROM THE NUCLEAR VITRIFICATION PROJECT. Goles, R.W.; Hamilton, D.C.; Brauer, F.P.; Rieck, H.G. Jr.; Robertson, D.M.; Gordon, R.L.; Kaye, J.H. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Oct 1979. Contract EY-76-C-06-1830. 39p. Dep. NTIS, PC A03/MF A01.

Samples were taken during the second high-level liquid waste vitrification campaign associated with the NWVP. Sample analysis established the following total average emission levels in the undiluted vitrification off-gas stream: ^{3}H - 1.2 $\mu Ci/m^3$, ^{14}C - 0.2 $\mu Ci/m^3$, ^{129}I - 1 nCi/m^3, NO/sub x/ - 0.5%, ^{99}Tc - 1.6 pCi/m^3, and γ-emitters - $10^{5}(\gamma/s)/m^3$. The aerosol size distribution is composed almost entirely of particles exhibiting smaller diameters than the minimum value for which absolute filters are rated, with an empirical geometric mean diameter of 0.13 μm and a particle mass concentration of 84.7 pg/cm^3. The particulate matter was composed of ^{106}Ru, ^{125}Sb, /sup 125m/Te, ^{134}Cs, ^{137}Cs, ^{144}Ce, ^{154} ^{155}Eu and ^{241}Am. The particulate emission levels in the undiluted process off-gas stream were: ^{106}Ru - 44 nCi/m^3, ^{125}Sb - 0.52 nCi/m^3, /sup 125m/Te - 1.7 nCi/m^3, ^{134}Cs - 7.8 nCi/m^3, ^{137}Cs - 52 nCi/m^3, ^{144}Ce - 0.8 $\mu Ci/m^3$, ^{154}Eu - 0.3 nCi/m^3, ^{155}Eu - 0.18 nCi/m^3, and ^{241}Am - 0.19 nCi/m^3. All these environmental gaseous and airborne emissions level liquid waste were well within PNL waste management guidelines.

945 (PNL--3186) TECHNICAL REQUIREMENTS FOR THE CONTROL OF ^{129}I IN A NUCLEAR FUELS REPROCESSING PLANT. Burger, L.L.; Burns, R.E. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Nov 1979. Contract EY-76-C-06-1830. 34p. Dep. NTIS, PC A03/MF A01.

A proposed regulation would limit the release of ^{129}I to the environment to 0.005 Ci/GWe-yr of nuclear power produced. This corresponds to an overall ^{129}I retention factor of about 250 for the LWR fuel cycle. Technologies available and under development for removing iodine from off-gas and waste water streams in an LWR nuclear fuel reprocessing plant and for converting iodine to stable forms and retaining it for interim and long-term storage, transportation and isolation are discussed. Possible developments are reviewed. Technologies available for retaining iodine from off-gas and excess water streams appear adequate, when properly combined, to meet the proposed regulation in an LWR fuel reprocessing plant, though additional work on solid sorbents is needed. Demonstrations under plant conditions are needed to define and resolve problems not met in laboratory experiments and to define practical operating conditions. Criteria for storage and disposal forms for retained iodine are needed to guide effective development of such forms. Because no disposal form for ^{129}I is likely to survive in any environment for even one half-life (1.6×10^{7} yr), work on a disposal form should seek forms that disintegrate as slowly as possible to maximize dilution before the isotope reaches the biosphere.

946 (PNL--3244) PRELIMINARY EVALUATION OF ALTERNATIVE WASTE FORM SOLIDIFICATION PROCESSES. VOLUME I. IDENTIFICATION OF THE PROCESSES. Treat, R.L.; Nesbitt, J.F.; Blair, H.T.; Carter, J.G.; Gorton, P.S.; Partain, W.L.; Timmerman, C.L. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Apr 1980. Contract AC06-76RL01830. 535p. NTIS, PC A23/MF A01.

This document contains preconceptual design data on 11 processes for the solidification and isolation of nuclear high-level liquid wastes (HLLW). The processes are: in-can glass melting (ICGM) process, joule-heated glass melting (JHGM) process, glass-ceramic (GC) process, marbles-in-lead (MIL) matrix process, supercalcine pellets-in-metal (SCPIM) matrix process, pyrolytic-carbon coated pellets-in-metal (PCCPIM) matrix process, supercalcine hot-isostatic-pressing (SCHIP) process, SYNROC hot-isostatic-pressing (SYNROC HIP) process, titanate process, concrete process, and cermet process. For the purposes of this study, it was assumed that each of the solidification processes is capable of handling similar amounts of HLLW generated in a production-sized fuel reprocessing plant. It was also assumed that each of the processes would be enclosed in a shielded canyon or cells within a waste facility located at the fuel reprocessing plant. Finally, it was assumed that all of the processes would be subject to the same set of regulations, codes and standards. Each of the solidification processes converts waste into forms that may be acceptable for geological disposal. Each process begins with the receipt of HLLW from the fuel reprocessing plant. In this study, it was assumed that the original composition of the HLLW would be the same for each process. The process ends when the different waste forms are enclosed in canisters or containers that are acceptable for interim storage. Overviews of each of the 11 processes and the bases used for their identification are presented in the first part of this report. Each process, including its equipment and its requirements, is covered in more detail in Appendices A through K. Pertinent information on the current state of the art and the research and development required for the implementation of each process are also noted in the appendices.

947 (PNL--3290) ASPHALT EMULSION SEALING OF URANIUM MILL TAILINGS. 1979 ANNUAL REPORT. Hartley, J.N.; Koehmstedt, P.L.; Esterl, D.J.; Freeman, H.D. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jun 1980. Contract AC06-76RL01830. 86p. NTIS, PC A05/MF A01.

Uranium mill tailings are a source of low-level radiation and radioactive materials that may be released into the environment. Stabilization or disposal of these tailings in a safe and environmentally sound way is necessary to minimize radon exhalation and other radioactive releases. One of the most promising concepts for stabilizing uranium tailings is being investigated at the Pacific Northwest Laboratory: the use of asphalt emulsion to contain radon and other potentially hazardous materials in uranium tailings. Results of these studies indicate that radon flux from uranium tailings can be reduced by greater than 99% by covering the tailings with an asphalt emulsion that is poured on or sprayed on (3.0 to 7.0 mm thick), or mixed with some of the tailings and compacted to form an admixture seal (2.5 to 15.2 cm) containing 18 wt % residual asphalt.

948 (PNL--3343) HIGH-TEMPERATURE VITRIFICATION OF HANFORD RESIDUAL-LIQUID WASTE IN A CONTINUOUS MELTER. Barnes, S.M. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Apr 1980. Contract AC06-76RL01830. 39p. NTIS, PC A03/MF A01.

Over 270 kg of high-temperature borosilicate glass have been produced in a series of three short-term tests in the High-Temperature Ceramic Melter vitrification system at PNL. The glass produced was formulated to vitrify simulated Hanford residual-liquid waste. The tests were designed to (1) demonstrate the feasibility of utilizing high-temperature, continuous-vitrification technology for the immobilization of the residual-liquid waste, (2) test the airlift draining technique utilized by the high-temperature melter, (3) compare glass produced in this process to residual-liquid glass produced under laboratory conditions, (4) investigate cesium volatility from the melter during waste processing, and (5) determine the maximum residual-liquid glass production rate in the high-temperature melter. The three tests with the residual-liquid composition confirmed the viability of the continuous-melting vitrification technique for the immobilization of this waste. The airlift draining technique was demonstrated in these tests and the glass produced from the melter was shown to be less porous than the laboratory-produced glass. The final glass produced from the second test was compared to a glass of the same composition produced under laboratory conditions. The comparative tests found the glasses to be indistinguishable, as the small differences in the test results fell within the precision range of the characterization testing equipment. The cesium volatility was examined in the final test. This examination showed that 0.44 wt % of the cesium (assumed to be cesium oxide) was volatilized, which translates to a volatilization rate of 115 mg/cm^2-h.

949 (PNL--3375) ENGINEERING-SCALE VITRIFICATION OF COMMERCIAL HIGH-LEVEL WASTE. Bonner, W.F.; Bjorklund, W.J.; Hanson, M.S.; Knowlton, D.E. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Apr 1980. Contract AC06-76RL01830. 40p. NTIS, PC A03/MF A01.

To date, technology for immobilizing commercial high-level waste (HLW) has been extensively developed, and two major demonstration projects have been completed, the Waste Solidification Engineering Prototypes (WSEP) Program and the Nuclear Waste Vitrification Project (NWVP). The feasibility of radioactive waste solidification was demonstrated in the WSEP program between 1966 and 1970 (McElroy et al. 1972) using simulated power-reactor waste composed of nonradioactive chemicals and HLW from spent, Hanford reactor fuel. Thirty-three engineering-scale canisters of solidified HLW were produced during the operations. In early 79, the NWVP demonstrated the vitrification of HLW from the processing of actual commercial nuclear fuel. This program consisted of two parts, (1) waste preparation and (2) vitrification by spray calcination and in-can melting. This report presents results from the NWVP.

950 (PNL--3405) IN-CAN MELTING DEMONSTRATION OF WASTES FROM THE IDAHO CHEMICAL PROCESSING PLANT. Bjorklund, W.J.; Chick, L.A.; Hollis, H.H.; Mellinger, G.B.; Nelson, T.A.; Petkus, L.L. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jul 1980. Contract AC06-76RL01830. 58p. NTIS, PC A04/MF A01.

The immobilization of Idaho Chemical Processing Plant (ICPP) zirconia calcine using Idaho glass composition (ICPP-127) was evaluated at Pacific Northwest Laboratory (PNL) in two engineering-scale in-can melter tests. The glass was initially characterized in the laboratory to verify processing parameters. Glass was then produced in a pilot-scale melter and then in a full-scale melter to evaluate the processing and the resultant product. Potential corrosion problems were identified with the glass and some processing problems were encountered, but neither is insurmountable. The product is a durable leach-resistant glass. The glass appears to be nonhomogeneous, but chemically it is quite uniform.

951 (PNL--3406) INVESTIGATION OF CORROSION EXPERIENCED IN A SPRAY CALCINER/CERAMIC MELTER VITRIFICATION SYSTEM. Dierks, R.D.; Mellinger, G.B.; Miller, F.A.; Nelson, T.A.; Bjorklund, W.J. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Aug 1980. Contract AC06-76RL01830. 173p. NTIS, PC A08/MF A01.

After periodic testing of a large-scale spray calciner/ceramic melter vitrification system over a 2-yr period, sufficient corrosion was noted on various parts of the vitrification system to warrant its disassembly and inspection. A majority of the 316 SS sintered metal filters on the spray calciner were damaged by chemical corrosion and/or high temperature oxidation. Inconel-601 portions of the melter lid were attacked by chlorides and sulfates which volatilized from the molten glass. The refractory blocks, making up the walls of the melter, were attacked by the waste glass. This attack was occurring when operating temperatures were >1200°C. The melter floor was protected by a sludge layer and showed no corrosion. Corrosion to the Inconel-690 electrodes was minimal, and no corrosion was noted in the offgas treatment system downstream of the sintered metal filters. It is believed that most of the melter corrosion occurred during one specific operating period when the melter was operated at high temperatures in an attempt to overcome glass foaming behavior. These high temperatures resulted in a significant release of volatile elements from the molten glass, and also created a situation where the glass was very fluid and convective, which increased the corrosion rate of the refractories. Specific corrosion to the calciner components cannot be proven to have occurred during a specific time period, but the mechanisms of attack were all accelerated under the high-temperature conditions that were experienced with the melter. A review of the materials of construction has been made, and it is concluded that with controlled operating conditions and better protection of some materials of construction corrosion of these systems will not cause problems. Other melter systems operating under similar strenuous conditions have shown a service life of 3 yr.

952 (PNL--3477) PRELIMINARY EVALUATION OF ALTERNATIVE WASTE FORM SOLIDIFICATION PROCESSES. VOLUME II. EVALUATION OF THE PROCESSES. (Johnson (E.R.) Associates, Inc., Reston, VA (USA)). Aug 1980. Contract AC06-76RL01830. 222p. NTIS, PC A10/MF A01.

This Volume II presents engineering feasibility evaluations of the eleven processes for solidification of nuclear high-level liquid wastes (HHLW) described in Volume I of this report. Each evaluation was based in a systematic assessment of the process in respect to six principal evaluation criteria: complexity of process; state of development; safety; process requirements; development work required; and facility requirements. The principal criteria were further subdivided into a total of 22 subcriteria, each of which was assigned a weight. Each process was then assigned a figure of merit, on a scale of 1 to 10, for each of the subcriteria. A total rating was obtained for each process by summing the products of the subcriteria ratings and the subcriteria weights. The evaluations were based on the process descriptions presented in Volume I of this report, supplemented by information obtained from the literature, including publications by the originators of the various processes. Waste form properties were, in general, not evaluated. This document describes the approach which was taken, the developent and application of the rating criteria and subcriteria, and the evaluation results. A series of appendices set forth summary descriptions of the processes and the ratings, together with the complete numerical ratings assigned; two appendices present further technical details on the rating process.

953 (PNL--3493) SAFETY ASSESSMENT OF THE LIQUID-FED CERAMIC MELTER PROCESS. Buelt, J.L.; Partain, W.L. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Aug 1980. Contract AC06-76RL01830. 113p. NTIS, PC A06/MF A01.

As part of its development program for the solidification of high-level nuclear waste, Pacific Northwest Laboratory assessed the safety issues for a complete liquid-fed ceramic melter (LFCM) process. The LFCM process, an adaption of commercial glass-making technology, is being developed to convert high-level liquid waste from the nuclear fuel cycle into glass. This safety assessment uncovered no unresolved or significant safety problems with the LFCM process. Although in this assessment the LFCM process was not directly compared with other solidification processes, the safety hazards of the LFCM process are comparable to those of other processes. The high processing temperatures of the glass in the LFCM pose no additional significant safety concerns, and the dispersible inventory of dried waste (calcine) is small. This safety assessment was based on the nuclear power waste flowsheet, since power waste is more radioactive than defense waste at the time of solidification, and all accident conditions for the power waste would have greater radiological consequences than those for defense waste. An exhaustive list of possible off-standard conditions and equipment failures was compiled. These accidents were then classified according to severity of consequence and type of accident. Radionuclide releases to the stack were calculated for each group of accidents using conservative assumptions regarding the retention and decontamination features of the process and facility. Two recommendations that should be considered by process designers are given in the safety assessment.

954 (PNL-SA--6768) FULL-SCALE IN-CAN MELTER DEMONSTRATION FOR VITRIFICATION OF NUCLEAR WASTE. Blair, H.T. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jan 1979. Contract EY-76-C-06-1830. 19p. (CONF-780622--82). Dep. NTIS, PC A02/MF A01.

From ANS annual meeting; San Diego, CA, USA (18 Jun 1978).

A full-scale, nonradioactive in-can melter was made operational in April of 1977 at Pacific Northwest Laboratory (PNL). The furnace's six independently controlled hot zones are capable of providing 30 kW each at 1200°C and are able to accommodate canisters up

to 28 in. in dia and 7.5 ft tall. Several new system concepts were demonstrated with this equipment. These included supporting the canister from the bottom, placing the entire can within the furnace, and charging the melter through a water-cooled spout. These new concepts allowed one to eliminate accumulations both of batch over the top of the heat transfer plates and of unvitrified waste in the top of the can by using a test batch of simulated acid waste composition combined with borosilicate glass former; one was able to attain a melting rate of 117 kg/h in a 28-in.-dia canister. A 10-day continuous run was also made in conjunction with a heated wall spray calciner to demonstrate equipment reliability and operability. In addition, the operation of the in-can melting process was demonstrated using only remote monitoing equipment outside of the canister.

955 (PNL-SA--7292) DEVELOPMENT OF MULTIBARRIER NUCLEAR WASTE FORMS. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Mar 1979. Contract EY-76-C-06-1830. 14p. Dep. NTIS, PC A02/MF A01.

The multibarrier concept aims to separate the radionuclide-containing inner core material and the environment by the use of coatings and matrices. Two options were developed for the inner core of the multibarrier concept: supercalcine pellets and glass marbles. Supercalcine is a crystalline assemblage of mutually compatible, refractory, and leach-resistant solid solution phases incorporating high-level liquid waste ions. Supercalcine powder is produced by spray calcining the liquid waste stream to which Al_2O_3, CaO, SiO_2, and SrO have been added. Supercalcine pellets are produced by disc pelletizing. The amorphous supercalcine crystallizes into solid solution phases after subsequent heat treatment. Based on the multibarrier processes described, several conclusions can be made: gravity sintering and vacuum casting are both applicable methods for metal matrix encapsulation. The multibarrier concept of glass marbles encapsulated in a vacuum-cast lead alloy provides enhanced inertness at a minimum increase in technological complexity. If it were desirable to develop a crystalline multibarrier waste form, uncoated sintered supercalcine pellets would offer enhanced inertness at a much lower level of technological complexity than glaze- or CVD-coated supercalcine. The 16-inch diameter pelletizer unit has enough capacity to handle the output of a large PNL spray calciner (52.5 kg of calcine/hr) and it can form spray-calcined material into pellets with diameters of 2 mm to 20 mm having strength enough to withstand handling without significant breakage.Chemical vapor deposition coating of supercalcine should be pursued only if a very high level of inertness is required.

956 (PNL-SA--7414) PROCESSES FOR PRODUCTION OF ALTERNATIVE WASTE FORMS. Ross, W.A.; Rusin, J.M.; McElroy, J.L. (Battelle Pacific Northwest Labs., Richland, WA (USA)). 1979. Contract EY-76-C-06-1830. 14p. (CONF-790204--11). Dep. NTIS, PC A02/MF A01.

From Symposium on waste management and fuel cycles 1979; Tucson, AZ, USA (28 Feb 1979).

During the past 20 years, numerous waste forms and processes have been proposed for solidification of high-level radioactive wastes (HLW). The number has increased significantly during the past 3 to 4 years. At least five factors must be considered in selecting the waste form and process method: 1) processing flexibility, 2) waste loading, 3) canister size and stability, 4) waste form inertness and stability, and 5) processing complexity. This paper describes various waste form processes and operations, and a simple system is proposed for making comparisons. This system suggests that one goal for processes would be to reduce the number of process steps, thereby providing less complex processing systems.

957 (PNL-SA--7499) COMPARISON OF BITUMEN AND CEMENT IMMOBILIZATION OF INTERMEDIATE- AND LOW-LEVEL RADIOACTIVE WASTE. Voss, J.W. (Battelle Pacific Northwest Labs., Richland, WA (USA)). 1979. Contract EY-76-C-06-1830. 26p. (CONF-790204--12). Dep. NTIS, PC A03/MF A01.

From Symposium on waste management and fuel cycles 1979; Tucson, AZ, USA (28 Feb 1979).

This paper discusses a systems comparison of two available immobilization processes for intermediate- and low-level radioactive wastes -- bitumen and cement. This study examines a conceptual coprocessed UO_2 - PuO_2 fuel cycle. Radioactive wastes are generated at each stage of this fuel cycle. This study focuses on these transuranic (TRU) wastes generated at a conceptual Fuel Coprocessing Facility. In this report, these wastes are quantified, the immobilization systems conceptualized to process these wastes are presented, and a comparison of the systems is made.

958 (PNL-SA--8014) DECOMMISSIONING OF COMMERCIAL SHALLOW-LAND BURIAL SITES. Murphy, E.S.; Holter, G.M. (Battelle Pacific Northwest Labs., Richland, WA (USA)). 1979. Contract AC06-76RL01830. 15p. (CONF-790923--13). NTIS, PC A02/MF A01.

From Decontamination and decommissioning of nuclear facilities conference; Sun Valley, ID, USA (16 Sep 1979).

Estimated costs and safety considerations for decommissioning LLW burial grounds have been evaluated. Calculations are based on a generic burial ground assumed to be located at a western and an eastern site. Decommissioning modes include: (1) site stabilization followed by long-term care of the site; and (2) waste relocation. Site stabilization is estimated to cost from $0.4 million to $7.5 million, depending on the site and the stabilization option chosen. Long-term care is estimated to cost about $100,000 annually, with somewhat higher costs during early years because of increased site maintenance and environmental monitoring requirements. Long-term care is required until the site is released for unrestricted public use. Occupational and public safety impacts of site stabilization and long-term care are estimated to be small. Relocation of all the waste from a reference burial ground is estimated to cost more than $1.4 billion and to require more than 20 years for completion. Over 90% of the cost is associated with packaging, transportation, and offsite disposal of the exhumed waste. Waste relocation results in significant radiation exposure to decommissioning workers.

959 (PNL-SA--8085) HIGH LEVEL WASTE PROPERTIES. Turcotte, R.P. (Battelle Pacific Northwest Labs., Richland, WA (USA)). 1979. Contract AC06-76RL01830. 36p. (CONF-7910184--1). NTIS, PC A03/MF A01.

From IAEA evaluation of solidified high level radioactive waste products workshop; Berlin, F.R. Germany (15 Oct 1979).

Devitrification and leaching analyses of four waste glasses were made to compare non-radioactive compositions to compositions made using fully radioactive waste calcine.

Microstructural analyses of the phase behavior of glasses were performed by means of optical microscopy, x-ray diffraction, x-ray fluorescence, scanning electron microscopy, and electron microprobe analysis. The author's summary of the major findings are: Melt insoluables and crystallization products were found to the same extent in both radioactive and non-radioactive glasses of similar composition. High radiation field appeared to have no effect on the crystallization behavior. The results of long-term IAEA static leach tests indicated no significant difference between the average leach rates of the fully radioactive and non-radioactive glass formulations. Glass composition was more important in determining leach rates than was the extent of devitrification. In both short time tests at 75°C or longer leach tests at 25°C elemental analyses suggested that congruent dissolution did not occur.

960 (PNL-SA--8414) URANIUM MILL TAILINGS STABILIZATION. Hartley, J.N.; Koehmstedt, P.L.; Esterl, D.J.; Freeman, H.D. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Feb 1980. Contract AC06-76RL01830. 16p. (CONF-800313--9). NTIS, PC A02/MF A01.

From Waste management conference; Tucson, AZ, USA (10 Mar 1980).

Uranium mill tailings pose a potential radiation health hazard to the public. Therefore, stabilization or disposal of these tailings in a safe and environmentally sound way is needed to minimize radon exhalation and other environmental hazards. One of the most promising concepts for stabilizing U tailings is the use of asphalt emulsion to contain radon and other hazardous materials within uranium tailings. This approach is being investigated at the Pacific Northwest Laboratory. Results of these studies indicate that a radon flux reduction of greater than 99% can be obtained using either a poured-on/sprayed-on seal (3.0 to 7.0 mm thick) or an admixture seal (2.5 to 12.7 cm thick) containing about 18 wt % residual asphalt. A field test was carried out in June 1979 at the Grand Junction tailings pile in order to demonstrate the sealing process. A reduction in radon flux ranging from 4.5 to greater than 99% (76% average) was achieved using a 15.2-cm (6-in.) admix seal with a sprayed-on top coat. A hydrostatic stabilizer was used to apply the admix. Following compaction, a spray coat seal was applied over the admix as the final step in construction of a radon seal. Overburden was applied to provide a protective soil layer over the seal. Included in part of the overburden was a herbicide to prevent root penetration.

961 (PPGM-L--165-78) COPRECIPITATION PROCESS STUDIES OF LIQUID URANIUM WASTE BY USING MANY KINDS FLOCCULENTS. Suroto. (Gama Research Centre, Jogyakarta (Indonesia)). 1978. 18p. (In Indonesian). NTIS (US Sales Only), PC A03/MF A01.

The formation of flocs, will be expected to surface adsorption and interval adsorption to uranium compounds in the solution. When occured the formation of precipitated of hydroxides, the excess of tawas caused to decreasing of the decontamination-factor. However when the phosphate precipitated will be taking place, excessing of mettalic-cations of Al^{+3} and Fe^{+3}, caused to increasing of the decontamination factor.

962 (PPGM-L--181-78) EFFECTS STUDIES OF H_2SO_4/NA_2SO_4 ON SEPARATION OF SR-90 FROM LIQUID SR-90 WASTE BY COPRECIPITATION METHOD USING $BASO_4$ AS A CARRIER. Soetjipto. (Gama Research Centre, Jogyakarta (Indonesia)). 1978. 15p. (In Indonesian). NTIS (US Sales Only), PC A02/MF A01.

Treatment of radioactive liquid waste of Sr-90 less than 10^{-3} Uci/ml by coprecipitation method using $BaSO_4$ as carrier has been studied. The experiment shows that the removal efficiency of Sr-90 is high, if the molarity of H_2SO_4/Na_2SO_4 is high. If Na_2SO_4 is used as source SOsub(4)sup(2-), the removal efficiency is higher than H_2SO_4 as source SOsub(4)sup(2-). The high value of pH which is equivalent to the low concentration of HCl will result in the high removal efficiency of Sr-90 in the waste treatment using H_2SO_4 as source SOsub(4)sup(2-).

963 (PRAV--1.22) PROPERTIES OF BITUMINOUS-EMBEDDED RADIOACTIVE WASTES FROM BARSEBACK NUCLEAR POWER STATION, SWEDEN. (Programraadet foer Radioaktivt Avfall, Stockholm (Sweden)). 1979. 207p. NTIS (US Sales Only), PC A10/MF A01.

A separate abstract was prepared for each section of the report. (HDR)s with fast sodium-cooled reactors which are being planned for the future.

964 (PRAV--1.22, pp 1-13) SOLIDIFICATION OF LOW AND MEDIUM LEVEL WASTES IN BITUMEN AT BARSEBAECK NUCLEAR POWER STATION. Harfors, C. (Sydsvenska Kraft AB, Malmoe (Sweden)). 1979.

Properties of bituminous-embedded radioactive wastes from Barseback Nuclear Power Station, Sweden.

Operating experience is presented from 4 years of bitumen solidification of wastes coming from two boiling water reactors. Methods used to sample, analyse and document the wastes are described. Transport and storage methods without remote handling have been adopted. The risk of fire is discussed and a description is given of the measures taken for fire protection.

965 (PRAV--1.32) COMBUSTION OF ION-EXCHANGE MATERIALS IN FLUIDIZED BED. FINAL REPORT. Bjerle, I.; Svensson, O. (Programraadet foer Radioaktivt Avfall, Stockholm (Sweden)). Sep 1979. 24p. (In Swedish). NTIS (US Sales Only), PC A02/MF A01.

Volume reduction of ion exchange material by combustion in fluidized beds at low temperatures is seriously hampered by the production of inflammable gases, which are combusted uncontrollably above the bed. The addition of platinum catalysts inhibits the gasproduction and confines the combustion to the bed, but increases the production of coke, which means that the volume reduction is less efficient. (L.E.).

966 (PRAV--3-19) SYSTEM FOR THE TRANSFER OF LONG-LIVED RADIOACTIVE NUCLIDES FROM SPENT ORGANIC ION-EXCHANGE RESINS FROM NUCLEAR POWER STATIONS TO ZEOLITES -TITANATES. Arnek, R.; Forberg, S. (Programraadet foer Radioaktivt Avfall, Stockholm (Sweden)). Oct 1979. 21p. NTIS (US Sales Only), PC A02/MF A01.

In order to immobilise radioactive wastes bound in organic ion exchange resin more safely and compactly a simple method for transferring them to zeolites and titanates has been developed. The study has been concentrated on Cs-137, Sr-90 and Co-60. These were eluted from the resins by solutions of sodium citrate or tartarate with an effectiveness of well over 99.9 percent, for Cs-137 and Sr-90 and 97-98 percent for Co-60. Sorption in zeolite and

titanate appears to be more effective than elution, and a ten-fold volume reduction from the spent resins to the final sintered products seems to be a reasonable expectation.

967 (RFP--2798) WASTE MANAGEMENT ANALYSIS FOR THE NUCLEAR FUEL CYCLE: ACTINIDE RECOVERY FROM COMBUSTIBLE WASTE, OCTOBER 1977-MARCH 1978. Thompson, G.H.; Smith, C.M.; Childs, E.L.; Kochen, R.L. (Rockwell International Corp., Canoga Park, CA (USA). Energy Systems Group). 18 Sep 1979. Contract EY-76-C-04-3533. 12p. Dep. NTIS, PC A02/MF A01.

Evaluation of the Ce(IV)-HNO_3 system for recovery of actinides from incinerator ash is continuing. High-fired americium-traced plutonium oxide was completely solubilized in this system and recovery of actinides from incinerator ash was greater than or equal to 95%. Recovery of solubilized plutonium was done by solvent extraction using tributyl phosphate. Tervalent actinides will be recovered by a bidentate organophosphorus solvent extractant. The Ce(IV)-HNO_3 system was compared with the F--HNO_3 system now in common use. Advantages of the former include less equipment corrosion, no volatilization of silica, and better recovery of actinide in the initial contact. However, additional contacts do not significantly improve recovery (because silica is not solubilized), and the system requires a large liquid/solid ratio for efficient actinide recovery.

968 (RFP--2870) CHEMISTRY RESEARCH AND DEVELOPMENT PROGRESS REPORT, MAY-OCTOBER, 1978. Miner, F.J. (Atomics International Div., Golden, CO (USA). Rocky Flats Plant). 30 Aug 1979. Contract EY-76-C-04-3533. 35p. Dep. NTIS, PC A03/MF A01.

Work in progress includes: calorimetry and thermodynamics of nuclear materials; americium recovery and purification; optimization of the cation exchange process for recovering americium and plutonium from molten salt extraction residues, photochemical separations of actinides; advanced ion exchange materials and techniques; secondary actinide recovery; removal of plutonium from lathe coolant oil; evaluation of tributyl phosphate-impregnated sorbent for plutonium-uranium separations; plutonium recovery in advance size reduction facility; plutonium peroxide precipitation; decontamination of Rocky Flats soil; soil decontamination at other Department of Energy sites; recovery of actinides from combustible wastes; induction-heated, tilt-pour furnace; vacuum melting; determination of plutonium and americium in salts and alloys by calorimetry; plutonium peroxide precipitation process; silica removal study; a comparative study of annular and Raschig ring-filled tanks; recovery of plutonium and americium from a salt cleanup alloy; and process development for recovery of americium from vacuum melt furnace crucibles.

969 (RFP--2907) ACTINIDE RECOVERY FROM COMBUSTIBLE WASTE: THE CE(IV)-NHO_3 SYSTEM. FINAL REPORT. Thompson, G.H.; Childs, E.L.; Kochen, R.L.; Schmunk, R.H.; Smith, C.M. (Rockwell International Corp., Canoga Park, CA (USA). Energy Systems Group). 14 Sep 1979. Contract EY-76-C-04-3533. 22p. Dep. NTIS, PC A02/MF A01.

Actinides in ash can be leached effectively by refluxing with Ce(IV) in HNO_3; solubilization of actinide in ash was greater than or equal to 95% at ash concentrations to 30 g/l in stirred leachant. Plutonium and americium were the actinides present in the ash. Solubilized plutonium and americium were recovered from Ce(IV)-HNO_3 solution by solvent extraction. Extraction of plutonium into 30% tributyl phosphate in n-dodecane gave 99.99% recovery. The plutonium-depleted solution was then extracted with 30% dihexyl-N,N-diethylcarbamolylmethylenephosphonate (DHDECMP). Americium recovery was 99.64%. The Ce(IV)-HNO_3 system was compared with the HF-HNO_3 system now in common use. Advantages of the former included less equipment corrosion, no volatilization of silica, safe oxidation of carbon residues, minimal secondary waste (Ce is recycled), and better solubilization of actinide in the initial contact. However, additional contacts do not significantly improve solubilization, and a small fraction of actinide is not solubilized with Ce(IV)-HNO_3 that can be solubilized by HF-HNO_3. The effect of the fission product ruthenium on the dissolution of actinides in the Ce(IV)-HNO_3 system was investigated briefly, and a method for removing the ruthenium electrolytically was developed. Several process flowsheets were also considered. Actinide recovery requirements will suggest which of these might best be used. 6 figures, 7 tables.

970 (RFP--2945) FLUIDIZED BED INCINERATION PROCESS DESIGN FOR TRANSURANIC WASTE. Johnson, A.J.; Meyer, F.G.; Anderson, D.L.; Bell, B.A.; Feng, P.K. (Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). 19 Jul 1980. Contract AC04-76DP03533. 21p. NTIS, PC A02/MF A01.

A fluidized bed incineration facility has been installed at the Rocky Flats Plant to develop and demonstrate a process for the combustion of transuranic waste. The unit's capacity is about 82 kg/hr of combustible solid waste, which is nine times higher than the rate for the operating pilot-scale unit. The facility utilizes nonaqueous, in situ neutralization of acid gases. These gases are generated during the combustion of halogen-containing materials. The low-temperature (550 °C) operation eliminates refractory-lined equipment.

971 (RFP--2952) CHEMISTRY RESEARCH AND DEVELOPMENT. PROGRESS REPORT, NOVEMBER 1978-APRIL 1979. Miner, F.J. (Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). 5 Oct 1979. Contract EY-76-C-04-3533. 35p. Dep. NTIS, PC A03/MF A01.

The status of the following studies is given: calorimetry and thermodynamics of nuclear materials; americium recovery and purification; optimization of the cation exchange process for recovering americium and plutonium from molten net extraction residues; evaluation and comparison of bidentate extractants and methods for actinide recovery; a combined anion exchange-bidontate organophosphorus extraction process for molten salt extraction residues; a combined anion exchange-extraction chromatography technique for secondary recovery; plutonium recovery in the Advanced Size Reduction Facility; decontamination of Rocky Flats soil; separating lead and calcium from americium by chromate and oxalate precipitation; demonstration of the pyroredox process in the induction-heated, tilt-pour furnace; process development for recovery of americium from vacuum melt furnace crucibles; plutonium peroxide precipitation process; and a comparative study of annular and Raschig ring-filled tanks.

972 (RFP--2969) EVALUATION OF REFRACTORY MATERIALS FOR A NUCLEAR WASTE INCINERATOR. Grotzky, V.K.; Kneale, P.A.; Teter, A.R.

(Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). 21 Jul 1980. Contract AC04-76DP03533. 45p. NTIS, PC A03/MF A01.

An experiment to find a suitable refractory lining for a nuclear waste incinerator has been completed. Eleven brick and six castable products were analyzed by optical and scanning microscopy. All the materials were fashioned into cup shapes and subjected to temperatures ranging from 800 to 1200°C for as long as six weeks. Some of the cups were charged weekly with pellets made from ash materials that would contact an incinerator liner. Refractory products containing a high percentage of aluminum oxide had the greatest resistance to cracking and slag buildup. 35 figures.

973 (RFP--2972) ELECTRODECONTAMINATION USING A BASIC ELECTROLYTE. Childs, E.L. (Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). 1979. Contract EY-76-C-04-3533. 17p. (CONF-791103--72). Dep. NTIS, PC A02/MF A01.

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

A decontamination procedure for stainless steel is described that has the following advantages: rapid decontamination, one minute of time to reach nonretrievable level; easy to separate contamination by filtration; contamination is easy to recover in nitric acid; the electrolyte has an extended life - can be reused; and the waste generated from spent electrolyte is compatible with Rocky Flats waste processing.

974 (RFP--3013) DATA ACQUISITION AND CONTROL INSTRUMENTATION FOR FLUIDIZED BED INCINERATION SYSTEM. Tosney, W.F.; Johnson, A.J. (Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). 20 Jun 1980. Contract AC04-76DP03533. 13p. NTIS, PC A02/MF A01.

A fluidized bed incinerator facility utilizing in situ neutralization of acid gases that are generated has been designed, constructed, and is now in operation. Computer process control and data acquisition are provided by an on-line minicomputer that has been integrated successfully with the incineration system. Analog controllers also are used at specific control points for intrasystem interaction.

975 (RFP--3030) FLUIDIZED BED INCINERATION OF TRANSURANIC WASTE. (Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). 1980. Contract AC04-76DP03533. 12p. (CONF-800611--7). NTIS, PC A02/MF A01.

From International symposium on the management of alpha-contaminated wastes; Vienna, Austria (2 Jun 1980).

Fluidized bed incineration has been developed and is being evaluated at the Rocky Flats Plant (RFP) as an alternative to conventional incineration for processing transuranic (TRU) combustible waste. Fluidized bed technology development at RFP began in 1970. Laboratory and bench-scale equipment was used to determine basic fluidizing characteristics and parameters. Sufficient information was obtained so that by 1974, a metal vessel system with a 9 kh/hour (20 lb/hour) throughput was built. Operating success was rapidly achieved and in 1975 a decision was made to scale-up this 9 kg/hour pilot plant to a full scale 82 kg/hour (180 lb/hour) facility. In the subsequent four years, the process was developed beginning with a system analysis including mass and energy balances, process layouts, operating constraints and flow diagrams. Engineering uncertainties in the larger scale equipment and processes were identified, and an integrated laboratory development program was initiated to solve specific scale-up problems. Detailed engineering design then proceeded, followed by construction. By the summer of 1978, the facility was installed and component and systems testing begun. By the summer of 1979, the facility achieved its operational goal of 100 continuous hours of operation including 16 hours of operation on contaminated waste.

976 (RFP--3079) RECOVERY AND PURIFICATION OF AMERICIUM FROM MOLTEN SALT EXTRACTION RESIDUES. Navratil, J.D.; Martella, L.L.; Thompson, G.H. (Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). 1980. Contract AC04-76DP03533. 7p. (CONF-800918--2). NTIS, PC A02/MF A01.

From International solvent extraction conference; Liege, Belgium (6 Sep 1980).

Americium recovery and purification development at Rocky Flats involves the testing of a combined anion exchange - bidentate organophosphorus liquid - liquid extraction or extraction chromatography process for separating americium from molten salt extraction residues. Laboratory-scale and preliminary pilot-plant results have shown that americium can be effectively recovered and purified from impurity elements such as aluminum, calcium, magnesium, plutonium, potassium, sodium, and zinc. The purified americium oxide product from the liquid - liquid extraction process contained greater than 95% AmO_2 with less than 1% of any individual impurity element.

977 (RHO-CD--394) DOUBLE SHELL SLURRY PROCESS TEST EVALUATION. Honeyman, J.O.; Solbakken, M. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Apr 1978. Contract EY-77-C-06-1030. 25p. Dep. NTIS, PC A02/MF A01.

This report discusses results of a plant demonstration of the double shell slurry process which was conducted April 25 to 28, 1977. 274,000 gallons of double shell slurry were produced from 365,000 gallons of Hanford Defense Residual Liquor. The volume reduction was 25%. Process control was maintained near the proper zone in the early part of the run. However, the feed was underconcentrated in the latter part of the run. Hydroxide concentrations of the product samples ranged from 2.1 to 5.9 M. The aluminum to caustic ratio varied from 0.33 to 1.07. The solids were primarily sodium nitrate, carbonate, aluminate, and nitrate. All samples were totally water soluble. The double shell slurry product increased in volume by 19,000 gallons from April to October 1977, probably caused by organic chelating agents.

978 (RHO-CD--739) LABORATORY EVALUATION OF AN ION EXCHANGE PROCESS FOR REMOVING CESIUM FROM PUREX ACID WASTE SOLUTIONS. Buckingham, J.S. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Jun 1979. Contract EY-77-C-06-1030. 106p. Dep. NTIS, PC A06/MF A01.

A laboratory investigation was made of an ion exchange process for removing radioactive cesium from acidic Purex waste. Twenty-seven laboratory ion exchanger runs are reported. Parameters investigated include comparison of Zeolon-900, AW-500 and Duolite ARC-359 ion exchangers, pH of feed solutions, composition of sodium scrub solutions, composition of

eluting solutions and overflow versus downflow elution. The cause and rate of zeolite degradation was investigated.

979 (RHO-CD--783) THEORETICAL CONSIDERATIONS IN SOLID BOWL CENTRIFUGATION. Hamilton, R.T. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). 24 Aug 1979. Contract EY-77-C-06-1030. 25p. Dep. NTIS, PC A02/MF A01.

A combination of literature survey and independent analysis determined three relationships for the prediction of the critical (or minimum recoverable) particle size in a solid bowl centrifuge. The relationships were derived based on three different theories of fluid behavior within the centrifuge; (1) laminar film flow (laminar film model), (2) plug flow (Sharples Model), and parabolic flow (modified Sharples Model). The critical particle size for the centrifuge used in Cs-PTA recovery in the CAW process predicted by the three relationships range from 0.19 to 0.34 μm (1 μm = 10^{-6}m). The laminar film model gives the most conservative estimate of critical particle size (0.34 μm) and the resulting relationship is recommended for use to predict solid bowl centrifuge performance. Three correction factors are incorporated into the predictive equations to account for the effects of fluid turbulence near the centrifuge feed point, fluid lag and hindered settling. Of these factors, turbulence near the feed point (which is accounted for by using an effective centrifuge length) has the greatest impact, increasing the predicted critical particle size by 15%, while the combination of fluid lag and hindered settling factors increase the recoverable particle size by 4%. The overall effect of the correction factors is an approximately 20% decrease in centrifuge effectivity. The fraction of solids smaller than the critical size range has not been reliably determined for laboratory or plant prepared Cs-PTA. In addition, the density of Cs-PTA crystals is reported tc vary from 3.2 to 12 grams per cubic centimeter.

980 (RHO-F--7) CELL 18 ION EXCHANGE FLOWSHEET. Poling, W.E. (Rockwell International Corp., Canoga Park, CA (USA). Energy Systems Group). Jan 1980. Contract AC06-77RL01030. 54p. NTIS, PC A04/MF A01.

Objective is to remove cation impurities from the crude cesium nitrate waste solutions currently stored in B Plant in preparation for final purification in the Cell 38 cesium purification process. Clarified solutions from the crude product centrifugation, solids leach process, and flushes are processed through the ion exchange column in Cell 18 to separate cesium from metallic cation impurities, and to produce a cesium carbonate solution acceptable for final cesium purification feed. Process losses in the ion exchange portion of less than 0.05% are projected. Product generated by the ion exchange process is concentrated and transferred to Cell 37 as cesium carbonate solution. This product is solids free, and has a pH of about 10.5, which is within the desired purification feed pH range. Aluminum and iron decontamination in the clarification process from the cesium is expected to be sufficient to preclude solids formation in the concentrated ion exchange product and hence in the feed makeup step in the purification process. The carbonate solution will be sampled after concentration to verify low solids content. If excessive solids are detected, the product may be clarified for solids removal prior to final purification in Cell 38.

981 (RHO-F--8) ION EXCHANGE FLOWSHEET FOR FINAL PURIFICATION OF B PLANT CESIUM. Carlstrom, R.F. (Rockwell International Corp., Canoga Park, CA (USA). Energy Systems Group). Jan 1980. Contract AC06-77RL01030. 42p. NTIS, PC A03/MF A01.

The primary objective of the final cesium purification process is to produce a cesium carbonate product suitable for the encapsulation process. The encapsulation specifications are designed to minimize the volume of material to be encapsulated and control corrosion rates by assuring that the salt remains in the solid form. The feed for the cesium purification process is transferred from storage in Cell 37 to Cell 38. The feed is diluted with demineralized water and is loaded onto the ion exchange bed. The impurity cations (sodium, potassium, and rubidium) are removed (scrubbed) from the bed with a dilute ammonium carbonate-ammonium hydroxide solution passed through the bed in the same flow direction as the loading step. The cesium is removed from the ion exchange bed with a concentrated ammonium carbonate-ammonium hydroxide solution passed counterflow through the bed and the resulting product is concentrated. The concentrated cesium product is transferred to storage as available feed for the cesium encapsulation process.

982 (RHO-LD--80-101-A) LONG-TERM HIGH-LEVEL DEFENSE WASTE TECHNOLOGY PROGRESS REPORT, OCTOBER-DECEMBER 1979. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Feb 1980. Contract AC06-77RL01030. 25p. NTIS, PC A02/MF A01.

The highlights of the quarter in program management and support, waste preparation, and waste fixation are reported. Technical progress in environmental and safety assessments, in situ storage, waste retrieval, separation and concentration, waste form development and characterization, and process and equipment development is discussed. (DC)

983 (RHO-SA--51) REMOVAL OF RADIONUCLIDES FROM HANFORD DEFENSE WASTE SOLUTIONS. Schulz, W.W. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Jan 1980. Contract EY-77-C-06-1030. 82p. (CONF-800607--30). Dep. NTIS, PC A05/MF A01.

From American Nuclear Society annual meeting; Las Vegas, NV, USA (8 Jun 1980).

The Hanford high-level defense wastes were characterized by their large volume (190,000 m^3) and varying content of inert and radioactive constituents. The water-soluble portion (140,000 m^3) of these wastes, which consists mainly of $NaNO_3$, $NaAl(OH)_4$, Na_2CO_3 and other sodium salts, contains a few milligrams of long-lived (t/sub 1/2/ greater than or equal to 10 years) radionuclides per 1000 kilograms. There is probable economic incentive for long-term management of Hanford defense wastes to partition them into a small volume of highly radioactive material requiring high integrity immobilization and storage and a much larger fraction of low level (e.g., < 10 nCi/g) waste which can be economically and safely stored in bulk form. To aid in achieving this latter objective, an integrated series of aqueous separations processes (precipitation, ion exchange, and solvent extraction methods) was designed to remove ^{137}Cs, ^{90}Sr, actinides, other multivalent cationic fission and activation products, and ^{99}Tc from the water-soluble wastes. Results of generally satisfactory laboratory-scale tests of radionuclide removal technology with actual

Hanford wastes are described.

984 (RHO-SA--91) VOLUME REDUCTION OF METALLIC WASTE. Beitel, G.A.; Ortiz, P.G. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). 24 Oct 1978. Contract EY-77-C-06-1030. 15p. (CONF-791114--1). Dep. NTIS, PC A02/MF A01.
From USDOE environmental control symposium; Washington, DC, USA (29 Nov 1979).
A meltdown system using a direct arc heated vacuum furnace is proposed for equipment disposal. This concept promises to achieve volume reduction factors of 20 to 40 when applied to the large process vessels typically used in nuclear reprocessing facilities. It is believed that the furnace can be remotely operated and maintained safely, with close to absolute fume containment. Furnace size dictates that all feed material be cut into pieces small enough to charge the crucible. Use of a newly developed metal cutting tool, the arc saw, is proposed to reduce the large vessels and equipment to the necessary small sizes. The furnace and systems have been designed. The saw is ready for preliminary testing, and the furnace is to be tested next year.

985 (RHO-SA--98) OZONATION OF HANFORD NUCLEAR DEFENSE WASTE. Lutton, T.W.; Schulz, W.W.; Strachan, D.M.; Bollyky, L.J. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Mar 1980. Contract EY-77-C-06-1030. 27p. (CONF-791182--1). Dep. NTIS, PC A03/MF A01.
From 4. international ozone conference; Houston, TX, USA (26 Nov 1979).
High (e.g., 0.1 to 0.5M) concentrations of ethylenediaminetetraacetate (EDTA), 2-hydroxyethylethylenediaminetriacetate (HEDTA), and other organic complexing agents are present in some of the nuclear waste solutions currently stored at the US Department of Energy Hanford Site in southeastern Washington State. Ozonolysis of these alkaline solutions smoothly and efficiently destroys the organic material thereby facilitating ion exchange removal of ^{90}Sr and other long-lived cationic radionuclides. Successful bench-scale ozonation tests have been performed with both synthetic and actual waste liquids.

986 (RHO-SA--116) RAPID PETROGRAPHIC DIFFERENTIATION OF THE MAJOR CRYSTALLINE COMPONENTS OF SYNTHETIC HANFORD EVAPORATOR SLURRY. Starr, J.L. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). May 1979. Contract EY-77-C-06-1030. 7p. (CONF-790666--6). Dep. NTIS, PC A02/MF A01.
From 34. Northwest regional meeting of the American Chemical Society; Richland, WA, USA (13 Jun 1979).
The four major crystalline components of these synthetic slurry samples were shown to be differentiable by examining their morphology, habits, and interference figures. Since morphology and habit are plainly visible under crossed Nichols and a full wave plate, and since observation of interference figures may be accomplished at the push of a button; differentiation between each of the major crystalline phases present in this system was performed rapidly while observing those same crystals microscopically. Finally, crystal growth was shown to be dramatically affected by the presence of complexants.

987 (RHO-SA--123) CYCLOHEXANONE SOLVENT EXTRACTION OF $^{99}TcO_4$ FROM ALKALINE NUCLEAR WASTE SOLUTIONS. Schulz, W.W. (Rockwell International Corp., Richland, WA (USA). Energy Systems Group). Jan 1980. Contract AC06-77RL01030. 36p. (CONF-800918--4). NTIS, PC A03/MF A01.
From International solvent extraction conference; Liege, Belgium (6 Sep 1980).
Although the ^{99}Tc cyclohexanone solvent extraction process is still in the bench-scale development stage, the process appears well suited for engineering-scale removal of ^{99}Tc from alkaline Hanford waste solutions. The most pressing process development need is to resolve the phase disengaging problems encountered during water stripping operations. Stripping tests in pulse columns and/or centrifugal contactors are particularly needed to determine the magnitude of the phase disengaging problem in engineering-scale equipment and to find suitable remedies. 5 figures, 7 tables.

988 (RHO-SA--145) REMOVAL OF RADIONUCLIDES FROM THE WATER-SOLUBLE FRACTION OF HANFORD NUCLEAR DEFENSE WASTES. Strachan, D.M.; Schulz, W.W. (Battelle Pacific Northwest Labs., Richland, WA (USA); Atomics International Div., Richland, WA (USA). Rockwell Hanford Operations). Feb 1980. Contract AC06-77RL01030. 33p. (CONF-800313--8). NTIS, PC A03/MF A01.
From Waste management conference; Tucson, AZ, USA (10 Mar 1980).
The current Hanford Waste Management Program has operated since 1968 to remove the bulk of the long-lived heat emitters ^{90}Sr and ^{137}Cs from stored high-level wastes. The liquid waste remaining after removal of ^{90}Sr and ^{137}Cs is returned to underground tanks for eventual evaporation to damp solid salt cake. Hanford salt cake is an admixture of large amounts of $NaNO_3$ with minor amounts of $NaAl(OH)_4$, Na_2CO_3, Na_2CrO_4, Na_3PO_4, Na_2SO_4, and NaOH. Small amounts of ^{90}Sr, ^{137}Cs, ^{99}Tc and other radionuclides are also associated with the salt cake. Results of successful bench-scale radionuclide removal tests with various actual salt cakes and certain liquid waste solutions representative of residual liquids were reported earlier. This paper describes conditions and results of recent hot cell tests of the complete Hanford Radionuclide Removal Process. These advanced tests, made with actual residual liquid containing large concentrations of ethylenediaminetetraacetic acid (EDTA) and other organic compounds, provided a rigorous and convincing proof of the process flowsheet.

989 (RHO-SA--173) INTERACTIONS BETWEEN CANDIDATE MELTER ELECTRODE MATERALS AND DEFENSE WASTE GLASS MELTS. Palmer, R.A. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Sep 1980. Contract AC06-77RL01030. 28p. (CONF-801034--3). NTIS, PC A03/MF A01.
From 33. ACS Pacific Coast meeting; San Francisco, CA, USA (28 Oct 1980).
Because electric glass melters for vitrification of nuclear wastes will be operated remotely, the expected lifetime of each component must be maximized. Four candidate electrode materials (two types of tin oxide, molybdenum, and Inconel 690) have been tested in various Hanford Defense waste glasses at temperatures up to 1400°C. The corrosive interaction was characterized by corrosion rates at the melt line and within the melt measured over a 1-week experiment. Molybdenum and Inconel 690 proved to have superior corrosion resistance over tin oxide. Glass chemistry had more of an effect on the corrosion of the metals than either temperature

or glass viscosity. Microscopic examination of changes in the microstructure of the electrode material as well as in the glass are reported. Correlation of these results with the composition and viscosity of the glasses is also made. 8 figures.

990 (RHO-SA--174) TRANSMUTATION OF RADWASTE USING ACCELERATORS. Bruns, L.E. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Jun 1980. Contract AC06-77RL01030. 18p. (CONF-800743--9). NTIS, PC A02/MF A01.

From International conference on nuclear waste transmutation; Austin, TX, USA (22 Jul 1980).

A concept was proposed by Rockwell Hanford Operations, a prime contractor for the Department of Energy (DOE), to deactivate specified nuclear wastes. Work to date was first reviewed which included literature and meetings. Criteria for feasibility were established. Accelerator concepts to meet the criteria centered on the spallation accelerator with added moderation and boost mode. Optimum target was envisioned to be a combination actinide blanket with center fission product core. A figure plotting fraction transmuted vs. time in days showed what fluxes and cross-sections were necessary to achieve practicality. Problems that need to be faced were discussed. The Rockwell proposal was reviewed followed by conclusions and future work proposed.

991 (RHO-ST--30) HANFORD RADIOACTIVE TANK CLEANOUT AND SLUDGE PROCESSING. Rasmussen, O.R. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Mar 1980. Contract AC06-77RL01030. 44p. Dep. NTIS, PC A03/MF A01.

The Hanford Site has successfully applied sluicing for the large-scale removal of radioactive sludges from underground storage tanks. The majority of the sludge recovery effort has been focused on retrieving relatively small quantities of sludge (2000 to 4000 gallons) for batchwise dissolution and shipment to uranium or fission product separation plants. Other efforts have involved transferring sludges between million-gallon tanks. The Hanford sluicing system uses a recirculating water inventory to carry sludge from underground storage tanks to the receiver. Equipment includes a medium pressure sluice pump (175 psi) in the slurry receiver tank, and a mechanical sluicing assembly and a slurry pump in the tank being sluiced. For batchwise sludge recovery, the water/slurry mixture is recirculated until the concentration reaches the 10 to 20 percent solids range. The solids are then settled, the supernatant decanted to the sluice tank, and the solids remaining in the sludge receiver shipped to a dissolution tank for further processing. Seventy-five foot diameter underground storage tanks have been cleaned out to 2000 to 4000-gallon sludge heels.

992 (RHO-ST--33) SYSTEM FOR RETRIEVAL OF SOLIDIFIED HANFORD HIGH-LEVEL DEFENSE WASTES: A DESIGN DESCRIPTION. Strickler, J.K.; Wallskog, H.A.; Wetch, J.R. (Rockwell International Corp., Richland, WA (USA). Energy Systems Group). Jul 1980. Contract AC06-77RL01030. 166p. NTIS, PC A08/MF A01.

The major objective of the Hanford defense waste retrieval activity is to design, develop, demonstrate, and qualify the equipment, staff, and methods required for the safe retrieval of solidified high-level radioactive wastes from the 133 large (75-foot-diameter) single-shell, underground storage tanks at Hanford. The program is currently limited to research, development, and demonstration of systems and technology in support of selecting an alternative for disposal of Hanford high-level defense waste. This report relates the requirements and sets forth much of the data and criteria currently known. It describes the preliminary design of a remotely operated, self-contained, mobile system which incorporates a mechanical, articulated mining boom. This boom, when equipped with a variety of suitable tools, can remotely cut up in-tank equipment, remove the debris, recover the solid wastes, clean the tank walls, and deposit the waste into a bucket elevator. The bucket elevator automatically removes the waste from the tank and deposits it into shielded shipping containers. The containers are remotely sealed, washed, and deposited into sealing containers. The containers are remotely sealed, washed, and deposited into sealing containers which are sealed and placed on a transfer vehicle for transport. All of the retrieval equipment is installed on a mobile platform which bridges the tank domes to avoid loading the dome structure. Mobility provides for progressing from tank to tank until all of the 75-foot-diameter, single-shell tanks have been emptied. Ancillary equipment includes in-tank viewing and lighting systems, positive filtered ventilation equipment for contamination control, equipment for washing tools and mining equipment, and includes provisions for remote maintenance of contaminated equipment, and quick removal and replacement of parts.

993 (RISLEY-Trans--3373) VITRIFICATION OF NUCLEAR WASTE. Barrere, M. (UKAEA Risley Nuclear Power Development Establishment). 1978. 5p. British Library Lending Division, Boston Spa, Wetherby, West Yorkshire, England.

The vitrification of high-level nuclear waste is described. Problems are discussed concerning the long-term stability of the product, particularly when fission products and actinides are vitrified together. Behaviour of the glass under various conditions is considered.

994 (SAI--78-904-LJ) R AND D FOR AN OFF-GAS TREATMENT SYSTEM FOR A SLAGGING PYROLYSIS RADIOACTIVE WASTE INCINERATOR. FINAL REPORT FOR PHASE II. Christian, J.D.; Girton, R.C.; Kirstein, B.E.; Pence, D.T. (Science Applications, Inc., San Diego, CA (USA)). 27 Oct 1978. Contract EY-76-C-07-1570. 134p. Dep. NTIS, PC A07/MF A01.

An analysis of the transport rates for volatilized species in off-gas from the slagging pyrolysis incinerator proposed for the incineration of buried and stored INEL radioactive wastes showed that the only major species that may interfere with operation of the incinerator will be lead oxide vapor and possibly hydrochloric acid. From the regulatory point of view, a decontamination factor (DF) of 10^8 for particulates would appear to satisfy present and anticipated radioactive species control requirements. No emission controls appear to be required for HCl, NO/sub x/, or SO_2 based on existing federal and state regulations. Off-gas treatment processes utilizing both dry and wet system designs are proposed, either of which would satisfy the expected control requirements. Cost estimates were prepared for each design, and the systems were compared. The merits of the dry system design outweighed those of the wet system for this particular application, so the dry system design is the one recommended.

995 (SAI--132-79-764-LJ) R and D FOR AN OFF-GAS TREATMENT SYSTEM FOR A SLAGGING PYROLYSIS RADIOACTIVE WASTE INCINERATOR. FINAL REPORT FOR PHASE III. Kirstein, B.E.; Paplawsky, W.J.; Pence, D.T.; Snow, B.D.; Spaeth, M.E. (Science Applications, Inc., San Diego, CA (USA)). 30 Jun 1979. Contract EY-76-C-07-1570. 210p. Dep. NTIS, PC A10/MF A01.

Results of engineering-scale tests to obtain sintered metal filter particulate removal performance data with fly ash to simulate the expected incinerator particulate are reported. Efficiencies of greater than 99.9999% were obtained at the conditions of the tests. An evaluation of expected spray dryer performance indicated that a commercial unit should provide the desired removal for HCL and SO_2. An off-gas treatment system safety analysis was performed, and no credible postulated accident could be identified that would result in a significant radioactivity exposure to the public. An updated cost estimate for the OGTS is also provided. Several areas were identified in which additional technical data are considered desirable to ensure efficient operation of the proposed OGTS, but nothing was identified that would indicate that the OGTS would not perform satisfactorily as designed.

996 (SAND--79-0199) RADIATION STABILITY OF SODIUM TITANATE ION EXCHANGE MATERIALS. Kenna, B.T. (Sandia Labs., Albuquerque, NM (USA)). Feb 1980. Contract EY-76-C-04-0789. 22p. Dep. NTIS, PC A02/MF A01.

Sodium titanate and sodium titanate loaded macroreticular resin are being considered as ion exchangers to remove ^{90}Sr and actinides from the large volume of defense waste stored at Hanford Site in Washington. Preliminary studies to determine the radiation effect on Sr^{+2} and I^- capacity of these ion-exchange materials were conducted. Samples of sodium titanate powder, sodium titanate loaded macroreticular resin, as well as the nitrate form of macroreticular anion resin were irradiated with up to 2 x 10^9 Rads of ^{60}Co gamma rays. Sodium titanate cation capacity decreased about 50% while the sodium titanate loaded macroeticular resin displayed a dramatic decrease in cation capacity when irradiated with 10^8-10^9 Rad. The latter decrease is tentatively ascribed to radiation damage to the organic portion which subsequently inhibits interaction with the contained sodium titanate. The anion capacity of both macroreticular resin and sodium titanate loaded macroreticular resin exhibited significant decreases with increasing radiation exposure. These results suggest that consideration should be given to the potential effects of radiation degradation if column regeneration is to be used. 5 figures, 2 tables.

997 (SAND--80-1376C) TITANATE WASTE FORMS FOR HIGH LEVEL WASTE: AN EVALUATION OF MATERIALS AND PROCESSES. Dosch, R.G.; Lynch, A.W.; Headley, T.J.; Hlava, P.F. (Sandia National Labs., Albuquerque, NM (USA)). 1980. Contract AC04-76DP00789. 9p. (CONF-801124--4). NTIS, PC A02/MF A01.

From 3. annual meeting of the Materials Research Society; Boston, MA, USA (17 Nov 1980).

Emphasis in this titanate work is directed toward process simplicity as well as enhanced waste form stability. Titanate-based ceramics containing 25% by weight of waste oxides were prepared by a straightforward process involving direct batch contact of an acidic, high level liquid waste with a precursor powder, calcining to volatilize water and nitrates, and hot pressing (1250 to 1275°) to produce a fully dense ceramic. The ceramic has a rutile matrix containing waste constituents distributed in three crystalline oxide phases - with structure types of the mineral analogues perovskite, zirconolite, hollandite - and in metallic phases present in minor amounts as metallic blebs. Addition of boron lowered processing temperatures for both hot pressing and atmospheric pressure sintering to the 925 to 975°C range. Leach rates were less than 10 µg/day.cm^2 for waste constituents and matrix attack was negligible at 250°C.

998 (SGAE--2864) CONDITIONING OF HLW-CALCINES. 1. PYROCARBON COATING. Kofler, O.; Neuman, W. (Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna). Dec 1977. 21p. (In German). (ME--126/77). Dep. NTIS (US Sales Only), PC A03/MF A01.

PyC-coating of simulated HLW-calcines from a fluidized bed calciner was studied. As the wellknown properties of PyC layers meet the demands, which were made in HTR fuel production, for the similar problems a suitable protection of granules by such coating is expected. To avoid volatilization of radioactive components the coating temperature should not exceed 1300 K in regard of the thermal stability of granules, too. Therefore, acetylene was used as coating gas. The obtained low efficiency caused a great content of hydrocarbons and soot in the off gas. Since disturbing effects by deposition of its can occur, a device was designed for burning off these substances. Ceramographical and microoptical controls were performed on each layer. Density and thickness were determined (ρ approximately 1,88 g/cm^3, d 140 µ) and leaching behaviour and mechanical strength were tested, too. The obtained results showed an excellent stability of waste products conditioned by PyC-coating, but you have to consider the suitable temperature range is limited and, therefore, calcines have to be heat esistant up to 1220 K.

999 (SGAE--2932) CONDITIONING OF HLW-CALCINES. 2. NICKEL COATING. Neumann, W.; Kofler, O. (Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna). Jun 1978. 24p. (In German). (ME--133/78). Dep. NTIS (US Sales Only), PC A03/MF A01.

Our program on waste conditioning alternatives includes the study of coatings of simulated highly radioactive waste granules with nickel. From pyrolytical decomposed nickeltetracarbonyl nickel was deposited by chemical vapor deposition in a fluidized bed. Advantages of this method are the low coating temperatures (at about 470 K), at which suitable coatings could be obtained by a special adaption of the performance. Pure nickel layers were deposited, of which the tightness, thickness, mechanical stability, crystallite size and its characterization in optical and microoptical examinations were tested. The results of the quality control showed a remarkable increase in mechanical stability, leach resistance and thermal conductivity of the coated waste granules. Therefore the obtained ductile and well adherent nickel-coatings are preferably applicable as one of protective shells in a multibarrier waste concept.

1000 (SGAE--3006) STUDIES ON THE STABILITY OF BITUMEN SALT MIXTURES. 3. MIXTURES OF BITUMEN AND SIMULATED STEEL CORROSION PRODUCTS.

Zeger, J.; Knotik, K.; Schopper, G. (Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna). Dec 1978. 21p. (In German). (CH--244/78). Dep. NTIS (US Sales Only), PC A03/MF A01.

In connection with the embedding of low - to intermediate active waste, coming from reprocessing plants, into bitumen further studies have been undertaken in continuation of already published tests using samples consisting of bitumen and simulated steel corrosion products. To get these high-quality steels have been submitted to a leaching with nitric acid. The acidic solutions have been evaporated to dryness and embedded into bitumen. The thermogravimetric measurements have been carried out in air and saturated water vapour. It could be shown that, at the embedding temperatures between 180°C and 250°C, weight losses in air or water vapour resulting out of thermic stress are negligible if the embedded salt concentrate has been adjusted to a pH of 9 to 10 prior to the evaporation.

1001 (SGAE--3012) THERMAL CONDUCTIVITY OF GRANULES. Neumann, W.; Huebner, F. (Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna). Dec 1978. 24p. (In German). (ME--151/78). Dep. NTIS (US Sales Only), PC A03/MF A01.

Thermal conductivity measurements of granules became more important particular in regard to their technical application in thermal isolation. Safety considerations in waste management of high level waste need thermal conductivity data of granules also, since a sufficient heat (induced by radiation) release of HLW containing granules have to be guaranteed. The investigations performed based on materials related to the waste management problems. The main task was to study how you can measure thermal conductivity of granule by a longitudinal, comparative heat flow method. Various container materials and forms were used and results obtained were compared. Container made of teflon were found to be most suitable for measurements at temperatures <450°K and therefore most of the investigations of calcines were carried out in it. Some estimations based on empirical results or theoretical models are published in this field but none of them corresponds to the conductivity data measured of uncoated and Nickel- or Pyrocarboncoated granules ($AlPO_4$ based, grain size <3 mm). On the other hand complementary measurements of stainless steel balls, in which the parameters are well defined, show a fairly good agreement with results calculated using the equation of Woodside and Messmer. The application of these equations and models developed for porous materials and granules in a gas environment, were tested for metal granules-composites.

1002 (SGAE--3038) SEPARATION, CONDITIONING, STORAGE AND DISPOSAL OF KRYPTON-85. Patek, P. (Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna). Apr 1979. 39p. (In German). (AV--1/79). NTIS (US Sales Only), PC A03/MF A01.

A review is given on the technical possibilities to remove the gaseous fission product ^{85}Kr from the off-gas streams of nuclear facilities, as reactors and reprocessing plants. The conditioning, storing and disposing methods are described. Safety considerations are showing, that it is not necessary to remove krypton from reactor off-gases, only at reprocessing plants it should be provided. For final disposal deep-sea-dumping is recommended, best in gas cylinders with pressure compensation. Also disposing in geological formations is possible, but only for pressureless conditioned products.

1003 (SKBF/KBS-TR--79-19) DIFFUSION IN THE ROCK MATRIX - AN IMPORTANT FACTOR IN RADIONUCLIDE RETARDATION. Neretnieks, I. (Kaernbraenslesaekerhet, Stockholm (Sweden); Svensk Kaernbraenslefoersoerjning AB, Stockholm). May 1979. 63p. NTIS (US Sales Only), PC A04/MF A01.

This paper analyses the accessiblity of the rock matrix to the radio-nuclides. The transport mechanisms are shown to be flow of water and nuclides in the fissures and transport of nuclides from the water in the fissures into the microfissures of the rock by diffusion. The diffusion of the nuclides into the rock and their sorption is the main retarding mechanism. The diffusivity of the nuclide is as important as its sorption equilibrium constant. Diffusivities in the pores and microfissures in such dense rocks as granite under confining pressure of hundreds of bars can be expected to be 6 - 20% of the diffusivity in water. (author).

1004 (STUDSVIK/K1--79/4) PLANS FOR THE WASTE MANAGEMENT AT STUDSVIK, SWEDEN. Linder, P.; Lindskog, A.; Thegerstroem, C. (Studsvik Energiteknik AB, Nykoeping (Sweden)). Mar 1979. 13p. (In Swedish). Dep. NTIS (US Sales Only), PC A02/MF A01.

The plans for the management of radioactive waste at Studsvik, Sweden, are given in this report. Thus measures, which will be necessary during the next 3 to 4 years in order to continue the waste management, are discussed as well as alternatives for the final waste storage at Studsvik in the future.

1005 (STUDSVIK/K1/3--79/11) SURVEY OF THE ARRANGEMENTS FOR WASTE MANAGEMENT AT STUDSVIK, SWEDEN. Lindskog, A. (Studsvik Energiteknik AB, Nykoeping (Sweden)). Mar 1979. 22p. (In Swedish). Dep. NTIS (US Sales Only), PC A02/MF A01.

A survey of the arrangements at Studsvik, Sweden, for waste management is given. It summarizes the conditions, which are valid, and the principles which have been applied when designing the system. The different units in the total equipment are described together with their functions.

1006 (STUDSVIK/K1/4--79/31) CLEANING OF STACK GASES FROM COMBUSTION OF LOW LEVEL RADIOACTIVE WASTE IN STUDSVIK, SWEDEN. Haard, E. (Studsvik Energiteknik AB, Nykoeping (Sweden)). Jan 1979. 14p. (In Swedish). Dep. NTIS (US Sales Only), PC A02/MF A01.

The plant for combustion of low-level radioactive waste at Studsvik, Sweden, is described. The waste that is treated comes from nuclear power plants, industry, hospitals and universities. It is estimated to be about 270 ton/year in a few years time. The waste consists of plastic, cloth, wood, paper, rubber, biological material and unburnable components such as glass and metals. The bags with waste may have a maximum surface dose rate of 10 mrem/h. For 5 % of the bags the maximum dose rate may be 100 mrem/h. During the combustion, samples of the stack gases are collected. The release of radioactivity is reported to the Swedish authorities. During 1978 three different stack gas cleaning systems, wet cleaning, electrostatic filters and textile filters were investigated. The wet cleaning gave a radioactive sludge which was difficult to take care of. In the electrostatic

filters it was difficult to change components due to radioactivity. Therefore the textile filters were chosen. A textile filter will be installed during 1979. The cleaning capacity of the filter is expected to be 90 % and will decrease the collective doses from stack gases with 6.7 manrem/year. The cost is estimated to 450 000 Sw kr/year (100 000 US dollar).

1007 (UCRL--15147) NUCLEAR WASTE IMMOBILIZATION. PROGRESS REPORT. Ringwood, A.E.; Sinclair, W.; McLaughlin, G.M. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 20 Nov 1979. Contract W-7405-ENG-48. 68p. Dep. NTIS, PC A04/MF A01.

Portions of document are illegible.

United States defense nuclear wastes are presently in tank storage, largely as sludges comprising Fe, Mn, Ni, U and Na oxides and hydroxides, together with 0.5 to 5 percent of fission products and actinides (exclusive of uranium). The relative proportions of Al, Fe, Mn, Ni, U and Na in the sludges from different tanks vary considerably, except that (Fe + Al + Mn) are by far the major components and Fe is more abundant than Mn. Typical compositions of some calcined sludges from Savannah River are given. This paper briefly describes how the SYNROC process, utilizing straightforward technology, can be readily adapted to the problem of defense waste immobilization, yielding a dense, inert, ceramic waste-form, SYNROC-D. Two classes of processes are discussed - one designed to immobilize sludges containing normal amounts of sodium and the other designed for otherwise similar sludges which are, however, strongly depleted in sodium as a result of more efficient washing procedures.

1008 (UCRL--15253) TRANSURANIC CONTAMINATED WASTE CONTAINER CHARACTERIZATION AND DATA BASE. REVISION I. Kniazewycz, B.G. (TERA Advanced Services Corp., Berkeley, CA (USA)). May 1980. Contract W-7405-ENG-48. 330p. NTIS, PC A15/MF A01.

The Nuclear Regulatory Commission (NRC) is developing regulations governing the management, handling and disposal of transuranium (TRU) radioisotope contaminated wastes as part of the NRC's overall waste management program. In the development of such regulations, numerous subtasks have been identified which require completion before meaningful regulations can be proposed, their impact evaluated and the regulations implemented. This report was prepared to assist in the development of the technical data base necessary to support rule-making actions dealing with TRU-contaminated wastes. An earlier report presented the waste sources, characteristics and inventory of both Department of Energy (DOE) generated and commercially generated TRU waste. In this report a wide variety of waste sources as well as a large TRU inventory were identified. The purpose of this report is to identify the different packaging systems used and proposed for TRU waste and to document their characteristics. This document then serves as part of the data base necessary to complete preparation and initiate implementation of TRU waste container and packaging standards and criteria suitable for inclusion in the present TRU waste management program. It is the purpose of this report to serve as a working document which will be used as appropriate in the TRU Waste Management Program. This report, and those following, will be compatible not only in format, but also in reference material and direction.

1009 (UCRL--84356) CRITIQUE OF RATIONALE FOR TRANSMUTATION OF NUCLEAR WASTE. Smith, C.F.; Cohen, J.J. (California Univ., Livermore (USA). Lawrence Livermore National Lab.). Jul 1980. Contract W-7405-ENG-48. 11p. (CONF-800743--3). NTIS, PC A02/MF A01.

From International conference on nuclear waste transmutation; Austin, TX, USA (22 Jul 1980).

It has been suggested that nuclear transmutation could be used in the elimination or reduction of hazards from radioactive wastes. The rationale for this suggestion is the subject of this paper. The objectives of partitioning-transmutation are described. The benefits are evaluated. The author concludes that transmutation would appear at best to offer the opportunity of reducing an already low risk. This would not seem to be justifiable considering the cost. If non-radiological risks are considered, there is a negative total benefit. (DC)

1010 (UCRL--84405) POTENTIAL OF PYROPROCESSING FOR PARTITIONING PUREX WASTES. Coops, M.S.; Sisson, D.H. (California Univ., Livermore (USA). Lawrence Livermore National Lab.). 23 Jul 1980. Contract W-7405-ENG-48. 16p. (CONF-800743--10). NTIS, PC A02/MF A01.

From International conference on nuclear waste transmutation; Austin, TX, USA (22 Jul 1980).

The processes are extremely compact. The process reagents are highly resistant to radiation damage and, therefore, can be used to handle short-cooled, highly concentrated waste with negligible degradation. Most reagents can be recycled back through the process many times, thereby minimizing the generation of waste products, and also reducing the process cost. Fission-product wastes are discharged from the process as concentrated, solid wastes, typically in a metal matrix suitable for permanent disposal. Long cooling periods are not needed prior to conversion to a suitable waste form. The recovered actinides are obtained as metals and can be easily stored or shipped. Pyrochemical processing of nuclear fuels should be considered as a second generation technology.

1011 (UJV--4113-Ch) APPLIED LABORATORY RESEARCH OF HIGH-LEVEL WASTE DENITRATION AND CALCINATION TECHNOLOGIES. PROGRESS REPORT. Napravnik, J. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Jan 1977. 21p. (In Czech). Ustav jaderneho vyzkumu CSKAE, Rez, Czechoslovakia.

Denitration and calcination processes are assessed for model solutions of high-level radioactive wastes. The kinetics was studied of the reaction of HNO_3 with HCOOH with respect to the final composition of the gaseous product. A survey is presented of used denitration agents and of reaction processes. Calcination was studied both as associated with denitration in a single technological step and separately. Also studied was the pyrolysis and chemical decomposition of sodium nitrate which forms an indecomposable melt in the temperature region of 320 to 850 degC under normal conditions. Based on the experiments a laboratory unit was designed and produced for the denitration and calcination of model solutions of high-level radioactive wastes operating in a temperature range of 100 to 550 degC with a capacity of 1000 ml/h. A boiler type stirred evaporator with electric heating (3 kW) was chosen for the denitration unit while a vertical calcinator modified from a film evaporator with a thermal

input of 4 kW was chosen for the calcination unit.

1012 (UJV--4663-Ch) STUDY OF PHOSPHATE SYSTEMS FOR HIGH-LEVEL WASTE SOLIDIFICATION. PART I. Vojtech, O.; Santarova, M.; Stejskal, I.; Suesmilch, I. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Jan 1979. 34p. (In Russian). NTIS (US Sales Only), PC A03/MF A01.

The results of the investigation of the system fission products - corrosion products - sodium, in a phosphate matrix used as a medium for high-level wastes solidification are presented. Solidification products were obtained by the thermal treatment of the initial solutions of radioactive wastes (calcination and melting procedures) with only phosphoric acid as an admixture. Final solidification products were tested for their hydrolytic resistance and structure. Standard methods for leaching and dissolution were used; for the structural analysis most results were obtained by electron microprobe analysis. The orthogonal factorial analysis was used for the mathematical interpretation.

1013 (VTT-REA--40) SUITABILITY OF USING CONCRETE FOR SOLIDIFICATION OF LIQUID RADIOACTIVE WASTES. Boesoek, Tommy; Aittola, J.-P. (Valtion Teknillinen Tutkimuskeskus, Otaniemi (Finland). Reaktorilaboratorio). Dec 1978. 23p. (In Swedish). Dep. NTIS (US Sales Only), PC A03/MF A01.

This critical review discusses the solidification of intermediate and low-level radioactive wastes. Feasibility studies of the incorporation of radioactive wastes from nuclear power plants into concrete has been done especially considering Finnish conditions. Many different types of cements and admixtures have been studied. The reported results in the literature have been somewhat conflicting and because of that the authors proposed research activities in analysing the properties of different types of cements.

1014 EPR INVESTIGATIONS OF GD^{3+} IN SINGLE CRYSTALS AND POWDERS OF THE ZIRCON--STRUCTURE ORTHOPHOSPHATES YPO_4, $SCPO_4$, AND $LUPO_4$. Rappaz, M.; Boatner, L.A.; Abraham, M.M. (Solid State Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). Journal of Chemical Physics, The ; 73: No. 3, 1095-1103(1 Aug 1980).

The tetragonal xenotime (YPO_4) and monoclinic monazite ($CePO_4$) orthophosphates are known to be chemically and physically stable in geological environments and are also radiation resistant. For these reasons, materials of this type are currently candidates for the primary containment of radioactive actinide solid wastes. Single crystals of the tetragonal orthophosphates YPO_4, $ScPO_4$, and $LuPO_4$ doped with Gd^{3+} were grown by slowly cooling a $Pb_2P_2O_7$ flux. Finely divided (<0.1 μ), rare-earth-doped powders of these materials were also prepared using a technique of precipitation in molten urea. Electron paramagnetic resonance investigations have shown that the Gd^{3+} impurities occupy identical substitutional sites in both single crystal and powder specimens of the tetragonal-symmetry orthophosphates. These results provide a basis for future investigations of the effects of heavy-particle radiation damage in the lanthanide orthophosphates.

1015 APPARATUS FOR EXTREME EVAPORATION OF SPECIAL SOLUTIONS. Lehmann, E.; Hladik, O.; Friedrich, H. (Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German Democratic Republic)). Isotopenpraxis ; 16: No. 8, 260-262(Aug 1980). (In German).

A procedure is described for extreme evaporation with good yields of dissolved matter. Some problems and the construction of the equipment are discussed in detail. Radioactive solutions from nuclear processes are used for demonstrating the efficiency of the procedure.

1016 SELECTIVE CATION-EXCHANGE SEPARATION OF CESIUM(I) ON CHROMIUM FERRICYANIDE GEL. Jain, A.K.; Agrawal, S.; Singh, R.P. (Univ. of Roorkee, India). Analytical Chemistry ; 52: No. 8, 1364-1366(Jul 1980).

The removal of ^{137}Cs from liquid streams of nuclear power plants and from processed radioactive waste of nuclear fission has received increasing attention from ion-exchange chemists. A desirable exchanger (adsorbent) for ^{137}Cs removal is one which can adsorb it significantly and selectively in the presence of appreciable amounts (approx. $2 mol L^{-1}$) of Na^+, NH_4^+, and H^+. This paper deals with the exchange properties of the inorganic exchanger, chromium ferricyanide gel (CFiC). The stability of the gel in both acid and salt solutions and its high specificity for cesium are responsible for its good scavanger properties in removing long lived ^{137}Cs from radioactive waste. The chromium ferricyanide exchanger is highly selective for monovalent cations, the order being $Ag^+ > Tl^+ > Cs^+ > Rb^+ > K^+ > Na^+$. It does not adsorb any bivalent, trivalent, and tetravalent ions even when present in trace amounts. (2 figures, 3 tables) (DP)

1017 EVOLUTION OF LOW LEVEL RADWASTE SOLIDIFICATION SYSTEMS IN THE USA. Stewart, J. Nuclear Engineering International ; 25: No. 301, 12-14(Jul 1980).

Disposal of low level radioactive waste in the USA is discussed. Rising operating costs make it essential for newer technologies to employ volume reduction techniques. Solidification systems and volume reduction systems are reviewed. Two systems which both solidify and reduce volume are described. One of these is the wiped or thin film evaporation and the other is the extender-evaporator. They both use asphalt, or bitumen, as the binder and are based on mechanical rather than chemical principles.

1018 VITRIFICATION PROCESS IMPROVES PRODUCT. Nuclear Engineering International ; 25: No. 301, 42-44(Jul 1980).

The development at the Pacific Northwest Laboratory in the USA of a new experimental technique on the vitrification of highly active liquid waste is described. In tests on non-radioactive simulated material, the liquid waste is mixed directly with glass forming matter to create a slurry which is then fed into a special liquid feed ceramic-lined electrically-heated melter. A description is given of the method of operation, together with other features including off-gas production, thermal shock, and vapour explosions.

1019 SORPTION OF ^{106}RU AND ^{95}ZR FROM PUREX SOLVENT ON ORGANIC AND INORGANIC ION EXCHANGERS. Turcanu, C.N.; Radu, D. (Institute for Nuclear Reactors, Bucharest (Romania)). Radiochemical and Radioanalytical Letters ; 43: No. 4, 245-254(15 May 1980).

The removal of ^{106}Ru and ^{95}Zr from degraded 30% TBP-dodecane system, by means of ion-

exchange resins (Dowex 1-X8, Dowex 50 W-X8, IRA-400, CS-3, CS-32, CC-11, AS-13, AT-1) and inorganic ion exchangers (iron(III) hydroxide, aluminium hydroxide and ammonium diuranate microspheres; manganese(IV) hydroxide, uranyl and aluminium phosphates; zirconium(IV), tin(II), titanium(IV) hydroxide and phosphates) has been investigated.

1020 (LA-tr--80-17) RECOVERY, PURIFICATION, AND CONCENTRATION OF PLUTONIUM AND AMERICIUM FROM THE AQUEOUS WASTES DISCHARGED IN THE REPROCESSING STUDIES. Tsujino, T.; Hoshino, T.; Yasu, S.; Kawashima, Y. (Japan Atomic Energy Research Inst., Tokyo). May 1980. Translation of JAERI-M--6106, April 1975 50p. NTIS, PC A03/MF A01.

A standard procedure has been established for use in the laboratory where plutonium and americium, from the aqueous wastes occurring in process studies on reprocessing, are recovered and purified through preliminary tests of the precipitation as hydroxides and the anion exchange in nitrate media. The procedure was proven in the treatment of actual process wastes, of which the results were contributed to determine the process conditions in the plutonium purification and product concentration of the JAERI Reprocessing Test Plant. The preliminary tests also include washing of U and Am recovery from the anion-exchanger in nitrate media, direct ion-exchange recovery of Pu from the TBP phase and elution of Am from the cation-exchanger.

1021 HIGH-LEVEL WASTE SOLIDIFICATION: WHY WE CHOSE GLASS. Grover, J.R. (Radioactive Waste R and D, Harwell, England). Radioactive Waste Management (New York) ; 1: No. 1, 1-12(May 1980).

This paper considers the desirable properties and factors to be assessed in the selection of a solidified waste product, surveys the possible product options and then analyzes in detail their suitability in meeting the criteria. It concludes that glasses are currently the preferred choice for the following reasons: their ability to fix the full spectrum of elements contained in the waste; their tolerance of the composition variations that will occur on a day to day basis in practice; their relatively low formation temperatures that lead to simpler and hence safer processing; their radiation stability; and their adequate leach rates. Suitable compositions are available for the wastes that will arise in the UK and techniques are available for manufacture on a production scale. Lower leach rates might be obtained by choosing glasses with higher formation temperatures or ceramics. However, these latter generally also have higher formation temperatures, have less tolerance for composition variations and their radiation stability is unproven. Supercalcines and synthetic rocks (SYNROC) may eventually be demonstrated to have some advantageous properties, but present indications are that these could be major disadvantages which more than offset any gains. Other advanced concepts (for example, the dispersion of glass beads in a metal matrix) have lower leach rates, but lead to additional complexity in manufacture.

1022 EXTRACTION CHROMATOGRAPHIC REMOVAL OF NP AND PU DURING THE REPROCESSING OF SPENT TH-U FUEL. Wenzel, U.; Merz, E.; Ritter, G. (Inst. of Chemical Tech., Juelich, Germany). Separation Science and Technology ; 15: No. 4, 733-743(May 1980).

Spent high enriched U-Th mixed oxide fuels contain small amounts of the actinides Np and Pu. Although these elements cannot be economically recovered for fuel value, current fuel cycle and waste treatment concepts tend to require that processes be developed to include both elements in one of the Thorex reprocessing effluent streams. Chromatographic separation is described as a method to isolate Pu and Np for subsequent disposal.

1023 APPLICATION OF EXTRACTION CHROMATOGRAPHY TO THE RECOVERY OF NEPTUNIUM, PLUTONIUM AND AMERICIUM FROM AN INDUSTRIAL WASTE. Madic, C.; Kertesz, C.; Sontag, R.; Koehly, G. (Centre d'Etudes Nucleaires, Fontenay aux Roses, France). Separation Science and Technology ; 15: No. 4, 745-762(May 1980).

A pilot scale investigation was made to evaluate the possible application of the extraction chromatographic method (LLC) to the partitioning of alpha emitters from liquid wastes containing traces of transuranium elements. A secondary purpose was to obtain pure AmO_2, which is used to produce alpha, gamma, and neutron sources. The process developed for alpha partitioning consists essentially of the extraction of macro amounts of uranium with 30% TBP in dodecane in mixer-settlers, then coextraction of Np-237, Pu-239, and Am-241 by LLC on a macro column filled with di-n-hexyl-octoxy-methyl-phosphine oxide (POX.11) adsorbed on an inert support. In each run about 200 liters of initial waste are decontaminated of alpha emitters. The loading step is followed by selective elution of americium, neptunium, and plutonium. The americium eluate is then subjected to the following operations: (1) separation of Am from Fe and Cd by LLC on a TBP column and (2) separation of Am from lanthanide traces by LLC on an HD(DiBM)P column after oxidation of Am(III) to Am(VI). The Am in the eluate is subsequently reduced to Am(III) and precipitated as oxalate with oxalic acid. The oxalate is then filtered and calcined to yield pure AmO_2.

1024 REDUCING THE LONG-TERM HAZARD OF REACTOR WASTE THROUGH ACTINIDE REMOVAL AND DESTRUCTION IN NUCLEAR REACTORS. Liljenzin, J.O.; Rydberg, J.; Skarnemark, G. (Chalmers Univ. of Tech., Goeteborg, Sweden). Separation Science and Technology ; 15: No. 4, 799-824(May 1980).

Public opposition to nuclear power has focused on the long-term risks from reactor waste. In the Purex process used in Europe, this waste is a concentrated nitric acid solution containing all nonvolatile fission products and the actinides Np, Am, and Cm, plus smaller amounts of U and Pu. Techniques have recently been described which guarantee an absolutely safe containment of this high-active waste (HAW) for about 1000 years. At longer times, the risk to the biosphere is dominated by the actinides. If these actinides are isolated from the rest of the HAW and destroyed through nuclear incineration, the long-term risks of the HAW will be dramatically reduced. This paper presents a detailed scheme for removing the actinides from the Purex-HAW solution. In principle, the process consists of three different solvent extraction cycles, using HDEHP and TBP in three successive steps. The scheme has been tested on a synthetic HAW solution containing all fission products and actinides (except Z greater than or equal to 96, Cm) using laboratory-scale mixer-settler batteries. Results from runs on old Purex waste are also presented. If applied to fresh Purex waste, the process will encounter problems due to radiation damage to the reagents. In

practice, this difficulty can be circumvented by using short contact times in the solvent extraction process. Extremely rapid multistage solvent extraction separations can be carried out by theSISAK technique (i.e., batteries of static mixers and special centrifugal separators). This technique is also described.

1025 DESORPTION KINETICS OF METHYL IODIDE FROM IMPREGNATED CHARCOAL. Jonas, L.A. (Army Research and Development Command, Aberdeen Proving Ground, MD); Deitz, V.R.; Romans, J.B. Nuclear Technology ; 48: No. 1, 77-83(Apr 1980).

The effect of outdoor weathering of impregnated charcoal beds used for the trapping and retention of methyl ^{127}I vapor was studied under various dynamic flow conditions. The data showed that the first or inlet segment of the bed suffered the greatest degradation in its role as a guard layer for the remaining segments of the bed. Test results were analyzed in terms of the parameters of adsorption capacity and adsorption and desorption rate constants. As was expected, the desorption rate constant was much smaller than the adsorption rate constant. The dimensionless ratio of the adsorption to the desorption rate constant can be considered as a retentivity index for any particular charcoal.

1026 ASSESSMENT OF THE ACCEPTABILITY OF PERFORMANCE OF INSTALLED IODINE TRAPPING PLANT: COMMENTS ON THE PAPER BY HYAM AND MANLEY IN NUCLEAR ENERGY, FEBRUARY 1979, AND A REPLY FROM THESE AUTHORS. May, F.G. (Australian Atomic Energy Commission, New South Wales. Aerosol Physics Group, Safety Dept.). Nuclear Energy (Formerly Nuclear Energy Engineer) ; 19: No. 2, 123-127(Apr 1980).

It is claimed that the article by Hyam and Manley 'Assessment of the acceptability of performance of installed iodine trapping plant', appearing in the February 1979 issue of Nuclear Energy, is based on at least three false premises. These are defined and are discussed. A reply by the authors then follows.

1027 CONFINEMENT OF RUTHENIUM OXIDES VOLATILIZED DURING NUCLEAR FUELS REPROCESSING. Maas, E.T. Jr.; Longo, J.M. (Exxon Research and Engineering Co., Linden, NJ). Nuclear Technology ; 47: No. 3, 451-456(Mar 1980).

While many materials have been suggested and employed as trapping agents for gaseous oxides of fission product ruthenium volatilized during nuclear fuels reprocessing, none that is known to form thermodynamically stable compounds with rutheniunm has been utilized. We have employed alkaline earth metal compounds for this purpose because of their ability to form stable mixed metal oxide phases with ruthenium. Results of experiments in which RuO_4 was volatilized from either a solid source ($RuO_2.xH_2O$) or from solution [$Ru(NO)(NO_3)_3$] in HNO_3 and passed through beds of alkaline earth metal carbonates and calcium oxide held at 600 to 750°C have demonstrated that compounds of formulation $MRuO_3$ (M = calcium, strontium, barium) are formed. Under oxidizing conditions, these materials exist as stable ceramic phases, whereas under reducing conditions, they are transformed into intimate mixtures of the alkaline earth metal oxide and nonvolatile ruthenium metal.

1028 RECOVERING ACTINIDE VALUES. Horwitz, E.P.; Mason, G.W. (to Department of Energy, Washington, DC (USA)). British Patent 2,027,257/A/. 13 Feb 1980. 5p.

Actinide values are recovered from sodium carbonate scrub waste solutions containing these and other values along with organic compounds resulting from the radiolytic and hydrolytic degradation of neutral organophosphorus extractants such as tri-n butyl phosphate (TBP) and dihexyl-N, N-diethyl carbamylmethylene phosphonate (DHDECMP) which have been used in the reprocessing of irradiated nuclear reactor fuels. The scrub waste solution is made acidic with mineral acid, to form a feed solution which is then contacted with a water-immiscible, highly polar organic extractant which selectively extracts the degradation products from the feed solution. The feed solution can then be processed to recover the actinides for storage or recycled back into the high-level waste process stream. The extractant can be recycled after stripping the degradation products with a neutral sodium carbonate solution.

1029 PROCEDURE TO CONVERT MEAN AND LOW ACTIVITY RADIOACTIVE WASTES. Taponier, J.; Pierlas, R. (to Societe Generale pour les Techniques Nouvelles S.G.N., 78 - Saint-Quentin-en-Yvelines (France)). French Patent 2,431,167/A/. 8 Feb 1980. 8p. (In French).

A procedure to convert mean and low activity radioactive effluents into a suitable solid is described. Radioactive compounds are precipitated in this procedure in which 0.6 to 2 parts (by weight) of cement are mixed with 0.5 to 5% (by weight) of asbestos (relative to the cement) together with the necessary quantity of water for the cement to set, and in addition, with 5 to 30% (by weight) of bitumen (relative to the cement).

1030 (PNL-TR--386) FABRICATION AND CHARACTERIZATION OF AN IMPROVED BOROSILICATE GLASS FOR SOLIDIFICATION OF HIGH-LEVEL FISSION-PRODUCT SOLUTIONS (HLW). PART 1. STUDIES OF 25 BOROSILICATE-GLASS PRODUCTS FOR SELECTION OF AN IMPROVED BOROSILICATE GLASS. Guber, W.; Hussain, M.; Kahl, L.; Ondracek, G.; Saidl, J.; Dippel, T. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). 4 Feb 1980. Translation of KFK--2721, August 1979 52p. Dep. NTIS, PC A04/MF A01.

The proportion of the glass constituents in the glass were varied. Taking gadolinia-containing waste into account, this approach led to 25 different basis glasses. Using the basic glasses and 15 wt % of inactive HLW oxides in each case, 25 borosilicate-glass products were melted in the laboratory, under conditions approximating the industrial fabrication process. The density, thermal conductivity, thermal expansion, characteristic temperatures, viscosity, specific heat, vaporization losses from the glass melt, electrical conductance, mechanical strength, hydrolytic resistance, crystallization behavior and tendency towards formation of additional phases were determined. On the basis of the individual values obtained, the glass products GP 98/12 (without Gd_2O_3) and GP 98/26 (with Gd_2O_3) were selected as improved matrix glasses for further characterization. The hydrolytic resistance, viscosity at 1420°K, crystallization tendency and tendency towards formation of further phases proved to be the most important.

1031 TREATMENT AND DISPOSAL OF RADIOACTIVE WASTES FROM THE VIEWPOINT OF THE NUCLEX 78. Koerner, W. (Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin

(German Democratic Republic)). Kernenergie ; 23: No. 2, 44-48(Feb 1980). (In German).
The results and consequences of the NUCLEX 78 are considered in form of a progress report on treatment and disposal of radioactive wastes from the nuclear fuel cycle. Investigations performed in the USA, Western Europe, and Japan are concerned with rationalization of the treatment processes for low-level and intermediate-level radioactive wastes and with the development of industrial methods of high-level waste solidification. In the field of ultimate storage, utilization of stable rock layers in the deep underground - especially of salt rocks - is evaluated to be the only available method of long-term isolation of high-level radioactive wastes and wastes containing long-lived alpha emitters. After technical and economical as well as safety works will have been concluded, commissioning of repositories in the underground is to be expected in the mid nineties.

1032 FURTHER DEVELOPMENTS OF BOROSILICATE GLASS FOR THE NITRIFICATION OF HIGH-LEVEL FISSION PRODUCT SOLUTIONS. Dippel, T.; Kahl, L.; Saidl, J. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Entsorgungstechnik). Atomwritschaft, Atomtechnik ; No. 2, 81-82(Feb 1980). (In German).
BORON SILICATES;CHEMICAL COMPOSITION;GLASS; HIGH-LEVEL RADIOACTIVE WASTES;OPTIMIZATION; VITRIFICATION;BOROSILICATE GLASS;RADIOACTIVE WASTE PROCESSING;SOLIDIFICATION

1033 INFLUENCE OF VARIOUS POLLUTIONS ON THE EFFICIENCY OF NOBLE METAL CATALYSTS. Berndt, M.; Ksinsik, D. (Duerrwaechter (E.) Doduco K.G., Pforzheim (Germany, F.R.)). Chemische Technik (Berlin) ; 9: No. 2, 63-65(Feb 1980). (In German).
In many processes where there is the danger of an oxyhydrogen gas formation, the oxygen or hydrogen concentration may be reduced by catalytic combustion to residual contents way below the explosion limit. This process step is also used in nuclear power plants to mainly decompose the hydrogen arising from radiolysis in normal operation. Under certain conditions, the hydrogen could be removed even in the presence of various impurities. The dependence of the catalyst effect on the concentration of the materials admitted was investigated.

1034 REDUCTION IN THE TOXICITY OF FISSION PRODUCT WASTES THROUGH TRANSMUTATION WITH DEUTERIUM-TRITIUM FUSION NEUTRONS. Parish, T.A.; Davidson, J.W. (Tex AandM Univ, College Station). Nuclear Technology ; 47: No. 2, 324-342(Feb 1980).
A waste management concept that employs irradiation of fission products in fusion reactor blankets is evaluated. The purpose of the irradiation is to reduce the toxicity of the material to be committed to geologic disposal. Extensive chains were employed in the depletion calculations performed to quantify the toxicity of the products. A sharp reduction in the short-term toxicity of the fission wastes could not be accomplished due to the small capture cross sections of /sup 90/Sr and /sup 137/Cs and limitations on the neutron flux.

1035 METHOD AND APPARATUS FOR SEPARATING MATERIALS. Moody, B.R. (to Taylor Hitec Ltd., Chorley (UK)). British Patent 2,025,268/A/. 23 Jan 1980. 6p.
A method and apparatus is described for the separation of individual constituents from an aggregation of materials, for example, the separation of metals from non-metals or of different metals from one another using magnetic fields. It is claimed that the system is of particular use in the breakdown of scrap for recycling and disposal in particular for the automatic, safe sorting of radioactive waste prior to storage or disposal.

1036 METHOD AND EQUIPMENT TO STRIP TRACES OF NOBLE GAS, PARTICULARLY KRYPTON, FROM A GAS MIXTURE HAVING CARBON DIOXIDE AS A COMPONENT. Laser, M.; Beaujean, H. (to Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.)); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,131,507/C/. 10 Jan 1980. 5p. (In German).
The separation of krypton traces of about 200 ppm from the CO_2-contained waste gases of a processing plant for graphite nuclear fuel, is carried out by condensing the CO_2 until liquefaction begins and washing with liquid CO_2 as washing agent. The washing process takes place at temperatures between -50°C and +30°C. The washing process is combined with rectification of the washing agent.

1037 METHOD OF TREATING RADIOACTIVE WASTE MATERIAL. Allison, W. (to B and R Engineering Ltd., Chorley (UK)). British Patent 2,024,498/A/. 9 Jan 1980. 2p.
A method of treating radioactive waste material, particularly a radioactive sludge, is described comprising separating solid material from liquid material, compressing the solid material and encapsulating the solid material in a hardenable composition such as cement, bitumen or a synthetic resin. The separation and compaction stages are conveniently effected in a tube press.

1038 (PNL-TR--377) PRESENT STATUS OF TECHNIQUES USED FOR HIGH-LEVEL LIQUID-WASTE SOLIDIFICATION. Sombret, C. 8 Jan 1980. Translated from Annual meeting of IAEA Technical Committee on Alpha-Bearing Waste, Cadarache, France, October 1979 55p. Dep. NTIS, PC A04/MF A01.
Many nations have pursued research on the solidification of high-level liquid wastes. The different waste forms under consideration are distinguished. Techniques used in making calcinates, glass-metal composites, modified calcinate-metal composites, and glasses (batch and continuous processes) are discussed, particularly the latter. Developments achieved in different countries are summarized. 17 figures. (DLC)

1039 (PNL-TR--387) MATERIAL STUDIES ON SOLIDIFICATION OF MEDIUM-LEVEL WASTE SOLUTIONS WITH CEMENT: LEACHABILITY OF CESIUM AND STRONTIUM. Rudolph, G.; Koester, R. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). Jan 1980. Translation of KFK--2842, August 1979 50p. Dep. NTIS, PC A03/MF A01.
Two leaching techniques, i.e., the IAEA method and an accelerated test, were used to search for methods of reducing the leachability of cesium and strontium from products formed during cementation of medium-level waste solutions from reprocessing plants. A certain natural calcium bentonite lowers the leachability of cesium by a factor of up to 100. This effect increases with the quantity added. Strontium leachability can be reduced to a smaller extent by addition of a barium silicate hydrate. This effect is found particularly at high temperature. Leaching into

a salt brine which is in equilibrium with carnallite and other salts is significantly lower than into distilled water. Excess cesium increases the leachability of cesium. Other parameters such as cement type, curing time, fluidizers and salt content have little or even no influence. Tests on the settlement behavior of cement mortars containing simulated waste solution revealed very unfavorable behavior of blast-furnace slag cement.

1040 UNCONVENTIONAL WASTE TREATMENT AND DISPOSAL METHODS. Bobleter, O. (Innsbruck Univ. (Austria). Inst. fuer Radiochemie und Angewandte Physikalische Chemie). Atomkernenergie/Kerntechnik ; 35: No. 2, 125-127(1980). (In German).

The relative toxicity index (RTI) of geologically deposited light water reactors wastes is given as an ascertained basis of comparison for other waste treatment and disposal methods. On the other hand, it is doubtful whether an 'exhausting extraction' of U, Np, Pu and Am is technically feasible, or even advantageous from a safety point of view. The transmutation of fission products and actinides into short-lived nuclides is in most expensive and, compared with geological disposal, hardly brings a gain in safety. The disposal of separated actinides in outer space could be achieved with a justified increase in the electricity price. By using high active waste of reactors to fuel heating rods, considerable amounts of oil could be saved.

1041 CERAMIC ENCAPSULATION OF NUCLEAR FUEL WASTES. Larker, H.T. (ASEA, Robertfors (Sweden)). Jernkontorets Annaler ; No. 1, 59-61(1980). (In Swedish).

Methods for encapsulation of high level radioactive wastes or spent fuel elements are described. Ceramic materials of very high corrosion resistance are produced through the process of hot isostatic pressing (typcally 1000 bar at 1300 deg C) 3 m high containers of synthetic corundum are suggested for the disposal of fuel elements.

1042 VITRIFICATION OF ACTUAL HIGH-LEVEL WASTE FROM LIGHT WATER REACTOR FUEL. Bjorklund, W.J.; Hansen, M.S. (Battell Pacific Northwest Lab., Richland, WA). pp 396-401 of Proceedings of the 27th conference on remote systems technology. Wallin, D.R. (ed.). La Grange Park, IL; American Nuclear Society, Inc. (1980).

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

The high-level waste from the processing of 1.5 MT of spent light water reactor fuel has been successfully concentrated, dried, and converted to a vitreous product consisting of 94 l of glass contained in two stainless-steel canisters. The spray-calcination process coupled to the in-canister vitrification process as developed at Pacific Northwest Laboratory was used to solidify the waste. An effluent system consisting of a variety of condensation and scrubbing steps gave more than adequate cleanup to the process off-gas before it was released to the atmosphere.

1043 HIGH LEVEL WASTE CONTAINING GRANULES COATED AND EMBEDDED IN METAL AS AN ALTERNATIVE TO HLW GLASSES. Neumann, W. (Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Seibersdorf. Inst. fuer Metallurgie). Atomkernenergie/Kerntechnik ; 35: No. 4, 297-299(1980). (In German).

Simulated high level waste containing granules were overcoated with pyrocarbon or nickel respectively. The coatings were performed by the use of chemical vapour deposition in a fluidized bed. The coated granules were embedded in an aluminium-silicon-alloy to improve the dissipation of radiation induced heat. The metal-granules-composites obtained were of improved product stability related to the high level waste containing glasses.

1044 ACTINIDE PARTITIONING FLOWSHEETS. Tedder, D.D.; Finney, B.C.; Blomeke, J.O. (Oak Ridge National Lab., TN). pp 381-393 of Actinide separations. Navratil, J.D.; Schulz, W.W. (eds.). Washington, DC; American Chemical Society (1980).

From 177. national meeting of the American Chemical Society; Honolulu, HI, USA (1 Apr 1979).

The actinide partitioning program will show that alpha-bearing wastes can probably be partitioned to a level that would significantly reduce the acitinide concentrations in the resulting wastes. Also, the waste quantities would not be greatly increased because of waste treatment facility (WTF) operation. No increase in HL glass quantities is anticipated. The LL and IL fuel reprocessing concrete wastes would increase about 25% in volume while the fuel fabrication waste volumes would increase about 16% with these flowsheets. However, the WTF that partitions fuel reprocessing wastes may actually be larger in size than the main reprocessing plant itself. It appears technically feasible to develop chemical systems for dealing with all types of alpha wastes, but these treatment systems are themselves highly complex. A simple Purex plant only uses one solvent (i.e. TBP); a WTF would utilize at least three different solvents (i.e. TBP, CMP, and 2-ethylhexanol). In addition, the WTF would require complex mechanical hot cells to treat HEPA filter wastes and incinerator ashes, as well as operate a bank of cation exchange chromatography columns. Although the CEC system might be replaced with an equivalent solvent extraction cycle, this improvement would be small since the resulting WTF would then be utilizing four different solvents.

1045 FLOWSHEET DEVELOPMENT WORK AT THE IDAHO CHEMICAL PROCESSING PLANT FOR THE PARTITIONING OF ACTINIDES FROM ACIDIC NUCLEAR WASTE. McIsaac, L.D.; Baker, J.D.; Krupa, J.F.; Meikrantz, D.H.; Schroeder, N.C. (Allied Chemical Corp., Idaho Falls, ID). pp 395-410 of Actinide separations. Navratil, J.D.; Schulz, W.W. (eds.). Washington, DC; American Chemical Society (1980).

From 177. national meeting of the American Chemical Society; Honolulu, HI, USA (1 Apr 1979).

The chemical composition of acid ICPP waste is discussed. The ICPP actinide partitioning program and its latest findings are summarized. DHDECMP and DBDECMP were evaluated as extractants. The problem of mercury extraction and stripping is considered. The flowsheet is outlined. Mini-mixer-settler tests were run, and cold pilot-plant tests are in progress. 6 tables, 3 figures. (DLC)

1046 RECOVERY OF BY-PRODUCT ACTINIDES FROM POWER REACTOR FUELS AND PRODUCTION OF HEAT SOURCE ISOTOPES. Koch, G. (Kernforshungszentrum Karlsruhe, Germany). pp 411-425 of Actinide separations. Navratil, J.D.; Schulz, W.W. (eds.). Washington, DC; American Chemical Society (1980).

From 177. national meeting of the American

Chemical Society; Honolulu, HI, USA (1 Apr 1979).

This paper reviews the processes which were designed by Institut fuer Heisse Chemie for the recovery of raw-material actinides from power reactor fuels and for the production of heat-source isotopes, and describes the state of development which has been reached. These processes include ^{237}Np recovery in WAK plant, recovery of $^{241-243}Am$ and ^{244}Cm from high-level waste, ^{241}Am recovery from Pu scrap, ^{238}Pu recovery from irradiated ^{237}Np, and production of medical-grade ^{238}Pu from irradiated ^{241}Am. 3 figures. (DLC)

1047 SEPARATION OF ACTINIDES FROM PUREX-TYPE HIGH ACTIVE WASTE RAFFINATES: DEVELOPMENT OF EXPERIMENTAL STUDIES AT JRC-ISPRA ESTABLISHMENT. Cecille, L.; Dworschak, H.; Girardi, F.; Hunt, B.A. (JRC-ISPRA Establishment, Varese, Italy). pp 427-440 of Actinide separations. Navratil, J.D.; Schulz, W.W. (eds.). Washington, DC; American Chemical Society (1980).

From 177. national meeting of the American Chemical Society; Honolulu, HI, USA (1 Apr 1979).

On the basis of the laboratory indications presently available, all three proposed partitioning processes appear to be feasible and to have the potential for removing actinides from HAW (TBP, HDEHP, OXAL) up to the necessary level. Additional data on the actinide losses to the various secondary waste streams, on the radiation stability of the chemicals used for stripping operations, as well as on their recycle or removal as wastes still need to be obtained on laboratory scale for fully active HAW. The obtained results will provide the basis for deciding whether to proceed or not to a pilot plant scale experimentation. Until such experiments are performed it will be impossible to demonstrate the overall feasibility of the selected partitioning process with an acceptable degree of reliability. 3 figures, 4 tables.

1048 SEPARATION OF ACTINIDES FROM HIGH ACTIVE WASTE BY MEANS OF COUNTER CURRENT ION MIGRATION. Bilal, B.A.; Herrmann, F.; Metscher, K.; Muehlig, B.; Reichmuth, C.; Schwarz, B. (Hahn-Meitner-Insitut fuer Kernforshung, Berlin, Germany). pp 561-569 of Actinide separations. Navratil, J.D.; Schulz, W.W. (eds.). Washington, DC; American Chemical Society (1980).

From 177. national meeting of the American Chemical Society; Honolulu, HI, USA (1 Apr 1979).

In the countercurrent ion migration process, the actinides in the waste are separated in one stage with a high decontamination factor (approx.10^6). The aqueous medium is less radiosensitive. Principles of the migration process and the processing of high active waste are discussed. Discontinuous and continuous separation of the actinides from the waste are considered. The energy necessary for this separation is estimated to be approx.10^{-5} of the energy gained in the fuel in a LWR. (DLC)

1049 SOLVENT EXTRACTION OF TRANSPLUTONIUM ELEMENTS FROM ACID SOLUTIONS BY POLYDENTATE NEUTRAL ORGANOPHOSPHORUS COMPOUNDS AND FROM ALKALINE SOLUTIONS BY QUATERNARY AMMONIUM BASES AND BY ALKYLPYROCATECHOLS. Myasoedov, B.F.; Chmutova, M.K.; Karalova, Z.K. (Inst. of Geochemistry and Analytical Chemistry, Moscow). pp 101-115 of Actinide separations. Navratil, J.D.; Schulz, W.W. (eds.). Washington, DC; American Chemical Society (1980).

From 177. national meeting of the American Chemical Society; Honolulu, HI, USA (1 Apr 1979).

Polydentate organophosphorus compounds appear to be efficient extractants of trivalent transplutonics (TPE) from acidic solutions. Full-scale use of these compounds in TPE extraction from nuclear acidic waste solutions seems likely in the future. It may be possible to develop highly selective extractants capable of TPE separation from each other as well as from rare earth elements. Some of the reagents described may be used for extraction chromatography separation of certain TPE whose separation factors are high enough. Studies have shown that in the presence of complex-forming agents, actinides and lanthanides can be extracted from alkaline solution by using aliquat 336 and 4 (α,α-dioctylethyl)pyrocatechol, preferably the latter.

1050 METHYL IODIDE AND MOLECULAR IODINE ADSORPTION ON IMPREGNATED ACTIVATED CHARCOAL. Vujisic, L.; Todorovic, M.; Muk, A. (Institut za Nuklearne Nauke Boris Kidric, Belgrade (Yugoslavia)). pp 884-887 of Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht. Sektion 7: Auslegung und Betrieb von kerntechnischen Anlagen. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980).

From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).

ACTIVATED CARBON;AIR FILTERS;IMPREGNATION; IODINE;IODINE ISOTOPES;METHYL IODIDE;OFF-GAS SYSTEMS;ADSORPTION;RADIOACTIVE WASTE PROCESSING

1051 INVESTIGATION OF METHYL IODIDE ADSORPTION ON IMPREGNATED ALUMINA. Vujisic, L.; Todorovic, M.; Muk, A. (Institut za Nuklearne Nauke Boris Kidric, Belgrade (Yugoslavia)). pp 888-892 of Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht. Sektion 7: Auslegung und Betrieb von kerntechnischen Anlagen. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980).

From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).

ADSORBENTS;AIR FILTERS;ALUMINIUM OXIDES; IMPREGNATION;IODINE ISOTOPES;METHYL IODIDE;OFF-GAS SYSTEMS;ADSORPTION;RADIOACTIVE WASTE PROCESSING

1052 KR-85 SEPARATION FROM THE EXHAUST AIR OF REPROCESSING PLANTS. TECHNICAL REALIZATION AND RESULTS. Hutter, E.; von Ammon, R.; Burkhardt, H.G.; Hauss, E.; Kimmig, G.; Neffe, G. (Kernforschungszentrum Karlsruhe G.m.b.H.; Germany, F.R.)). pp 441-444 of Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht. Sektion 4: Brennstoffkreislauf und Spaltstoff-Flusskontrolle. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980). (In German)

From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).

FREEZING OUT;FUEL REPROCESSING PLANTS; KRYPTON 85;OFF-GAS SYSTEMS;VERY LOW TEMPERATURE; RADIOACTIVE WASTE PROCESSING

1053 WET COMBUSTION AS A PROCESS OF TREATING BURNABLE PLUTONIUM-CONTAINING WASTES. Dippel, T.; Kemmler, G.; Muhr, G.; Plessing, J.; Wieczorek, H. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). pp 524-527 of

Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht. Sektion 4: Brennstoffkreislauf und Spaltstoff-Flusskontrolle. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980). (In German)
From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).
FEASIBILITY STUDIES;FLOWSHEETS;GASEOUS WASTES;PLUTONIUM;RADIOACTIVE WASTE FACILITIES; RADIOACTIVE WASTE PROCESSING;SOLID WASTES; TESTING;WET ASHING

1054 ALKALINE PYROHYDROLYSIS OF TBP WITH FORMATION OF CALCIUM PHOSPHATE AND BUTENE. Hofmann, J.; Neupert, D.; Vietzke, H. (Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.)). pp 449-452 of Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht. Sektion 4: Brennstoffkreislauf und Spaltstoff-Flusskontrolle. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980). (In German)
From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).
Technical solution of the method utilising a fluidized bed reactor. CALCIUM PHOSPHATES; DECONTAMINATION;FLUIDIZED BED REACTORS;GASEOUS WASTES;HIGH TEMPERATURE;HYDROLYSIS;LIQUID WASTES;ORGANIC SOLVENTS;PYROLYSIS;RADIOACTIVE WASTE PROCESSING;TBP;DECOMPOSITION

1055 HIGH-DENSITY GRAPHITE WITH ANORGANIC BINDERS AS POSSIBLE MATRIX MATERIAL FOR RADIOACTIVE AND BIOLOGICAL WASTE. Schmidt-Hansberg, T.; Hrovat, M.; Huschka, H. (Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.)). pp 453-456 of Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht. Sektion 4: Brennstoffkreislauf und Spaltstoff-Flusskontrolle. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980). (In German)
From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).
BINDERS;BIOLOGICAL WASTES;COMPRESSION STRENGTH;DENSITY;FEASIBILITY STUDIES;GRAPHITE; LEACHING;PRESSURE DEPENDENCE;PRODUCTION; RADIOACTIVE WASTES;SOLIDIFICATION;RADIOACTIVE WASTE PROCESSING;TEMPERATURE DEPENDENCE;THERMAL CONDUCTIVITY;THERMAL EXPANSION

1056 CURRENT STATUS OF CERAMIC MELTING TANK WITH DIRECT ELECTRICAL HEATING FOR HAW VITRIFICATION. Weisenburger, S. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). pp 512-515 of Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht. Sektion 4: Brennstoffkreislauf und Spaltstoff-Flusskontrolle. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980). (In German)
From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).
CERAMICS;CONTAINMENT;ELECTRIC FURNACES; ELECTRODES;GLASS;HIGH-LEVEL RADIOACTIVE WASTES; MELTING;PERFORMANCE;VITRIFICATION;RADIOACTIVE WASTE PROCESSING

1057 OPERATING EXPERIENCE AND ECONOMIC EVALUATION OF THE PROCESS OF RADIOACTIVE WASTE COMBUSTION IN SHAFT FURNACES. Witte, H.; Bregulla, E. (Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.)); Hempelmann, W.; Hoehlein, G. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). pp 437-440 of Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht. Sektion 4: Brennstoffkreislauf und Spaltstoff-Flusskontrolle. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980). (In German)
From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).
BLAST FURNACES;COMBUSTION;FLUE GAS; KERNFORSCHUNGSZENTRUM KARLSRUHE;OFF-GAS SYSTEMS; OPERATION;RADIOACTIVE WASTE FACILITIES; RADIOACTIVE WASTE PROCESSING;SOLID WASTES

1058 KRYPTON IMPLANTATION INTO METALS - A PROCESS FOR FISSION KRYPTON CONDITIONING UNDER VACUUM. Henrich, E.; Schmidt, H.J. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Heisse Chemie). pp 445-448 of Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht. Sektion 4: Brennstoffkreislauf und Spaltstoff-Flusskontrolle. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980). (In German)
From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).
GASEOUS WASTES;GLOW DISCHARGES;ION IMPLANTATION;KRYPTON ISOTOPES;METALS;OFF-GAS SYSTEMS;RADIOACTIVE WASTE PROCESSING;KRYPTON

1059 DESCRIPTION OF AN INCINERATOR FOR PHOSPHORUS-CONTAINING RADIOACTIVE SOLVENTS. Gale, L.G. (Energy Inc, Idaho Falls, Idaho). pp 615-621 of Proceedings of National Waste Processing Conference, 9th Biennial Resource recovery Today and Tomorrow, 1980. New York, NY: American Society of Methanical Engineers (1980).
From 9. biennial national waste process conference: Washington, DC, USA (11 May 1980).
This paper describes the design and development of an incinerator to process waste solvents containing phosphorus from nuclear fuel reprocessing facilities. A unique feature is a fluidized bed composed of limestone in which combustion occurs and, simultaneously, phosphorus combines with calcium to form a stable, solid product. Solid separators and adsorbers clean the exhaust gas before release to the atmosphere.

1060 APPARATUS AND PROCESS FOR RECOVERING NUCLEAR FUEL FROM SCRAP MATERIAL. Divins, L.A.; Short, L.E. (to General Electric Co.). US Patent 4,177,241. 4 Dec 1979. Filed date 8 Sep 1977. 8p.
A process for recovering compounds of enriched nuclear fuel from scrap materials is disclosed. The process yields an acid solution with the nuclear fuel dissolved therein. Except for spent filter media, the scrap materials are calcined to produce an oxidized material, which is reduced to a particulate material and leached in an acid bath that contains some recycled acid to yield an acid solution of the nuclear fuel material. The scrap materials comprised of spent filter media are mulched and contacted with the acid solution. The insoluble materials are separated from the acid solution, and at least a portion of the acid solution is recycled to the leaching step, while the remainder of the acid solution is collected for subsequent treatment to recover the dissolved nuclear fuel material. Apparatus for performing the foregoing process is also disclosed.

1061 SAFETY ASPECTS OF LIGHT WATER REACTOR RADWASTE SOLIDIFICATION PROCESSES. Mergan, L.; Storrer, J.; Verbeke, R.; Cordier, J.P. (Belgonucleaire Rue du Champ de Mars, Brussels,

Belgium). Nuclear Technology ; 46: No. 3, 606-610(Dec 1979).

Safety problems have been reported from existing radwaste solidification installations (unsetting, free water, decontamination difficulties, outage, etc.). Safety requirements to be applied to such processes are proposed, first from the standpoint of installation features and equipment (i.e., proven process, simplicity, equipment choice, remote decontamination, layout, remote control, backup means) and second, as regards the properties of the solidified end products. The volume reduction technique (four different types of processes are mentioned) offers appreciable safety improvements and important cost savings. Given figures (experimental and calculated) indicate that solidified end product volumes are reduced by a factor of 7 to 8.5 or more.

1062 METHOD FOR ENCAPSULATION OF HIGH LEVEL RADIOACTIVE NUCLEAR FUELS OR WASTES. Larker, H. (to ASEA-ATOM AB, Vaesteraas (Sweden)). Swedish Patent 7,704,488-1/B/. Dec 1979. 7p. (In Swedish).

A method for the encapsulation of spent fuel elements or vitrified high-level radioactive wastes is described. The spent fuel elements or vitrified wastes are placed in a cylindrical pre-sintered aluminium oxide container. The upper end of the cylinder and the lid have conical closing surfaces, which are pickled or sandblown to improve cohesion to a layer of aluminium oxide powder between the surfaces. This layer is sintered in a special oven in which insulation on the outer surface and bottom of the closely fitting gas-tight steel container in which the sintered container is placed restricts the heating mainly to the lid and closure. The oven is pressurised by gas. An alternative form with a convex hemispherical lid is also shown and the patent also covers a bottle-shaped configuration.

1063 METHOD AND EQUIPMENT TO EXTRACT AND RECOVER TRITIUM FROM LIGHT AND HEAVY WATER. Butler, J.P.; Hammerli, M.M. (to Atomic Energy of Canada Ltd., Ottawa, Ontario). German(FRG) Patent 2,900,912/A/. 22 Nov 1979. 17p. (In German).

A combined electrolysis-catalysis exchange process is proposed to extract tritium, with the aim of being able to reduce the tritium value in the heavy water moderation and cooling system of nuclear power plants. The tritium-contained water is brought into contact in a catalyst column in countercurrent with electrolytically produced hydrogen in this process, the hydrogen is then fed to a catalyst-containing separation column whilst the tritium-contained water flows to the electrolysis cell which produces the hydrogen gas. The process is described in detail.

1064 RADIOACTIVE LIQUID WASTE PROCESSING METHOD. Kubota, M.; Fukase, T. (to Japan Atomic Energy Research Inst., Tokyo; Mitsubishi Chemical Industries Ltd., Tokyo (Japan)). Japanese Patent 54-149,000/A/. 21 Nov 1979. 4p. (In Japanese).

Purpose: To separate molybdenum or zirconium together with tellurium efficiently by adding tellurium compounds to a nitric acid solution containing radioactive substances and molybdenum or zirconium. Method: Tellurium compounds (for example telluric acid) are added to a nitric acid solution containing radioactive substances and molybdenum or zirconium. The solution is heated to boil by a heater. This heating completes the precipitating reactions for molybdenum, zirconium and tellurium, and facilitates the succeeding operations such as filtration for the resulted precipitates. The resulted precipitates are separated by way of filtration and centrifugal separation to thereby separate molybdenum or zirconium. The removal rate for molybdenum or the like from the solution can be increased to more than 80% by processing the solution containing the radioactive substances by this method.

1065 PROCESS FOR DISPOSAL OF AQUEOUS SOLUTIONS CONTAINING RADIOACTIVE ISOTOPES. Colombo, P.; Neilson, R.M. Jr.; Becker, W.W. (to Dept. of Energy). US Patent 4,174,293. 13 Nov 1979. Filed date 12 Oct 1977. 8p. PAT-APPL-841,410.

A process for disposing of radioactive aqueous waste solution in which the waste solution is utilized as the water of hydration to hydrate densified powdered portland cement in a leakproof container is described. The waste solution is dispersed without mechanical inter-mixing in situ in the bulk cement. Thereafter the hydrated cement body is impregnated with a mixture of a monomer and polymerization catalyst to form polymer throughout the cement body. The entire process is carried out while the temperature of the components during the process is maintained at a temperature below 99°C. The container containing the solid polymerimpregnated body is thereafter stored at a radioactive waste storage dump such as an underground storage dump.

1066 PROCESS FOR PROCESSING AND CONDITIONING RADIOACTIVE EFFLUENTS OF LOW AND MEDIUM ACTIVITY. Taponier, J.; Pierlas, R. (to Societe Generale pour les Techniques Nouvelles S.G.N., 78 - Saint-Quentin-en-Yvelines (France)). French Patent 2,423,035/A/. 9 Nov 1979. 14p. (In French).

A procedure is described for processing radioactive effluents of low and medium activity. It consists of an effluent pre-treatment: of radioactive compounds by purification to form a stable suspension that can be concentrated. Then a mix is made of 0.6 to 2 parts of cement by weight for one part by weight of suspension, from 0.5 to 5% by weight, of asbestos fibre in relation to the cement, and, if necessary, add water to tthe cement to set, this suspension containing from 15 to 75% by weight of dry extract and a suspension agent. The homogeneous mix achieved is poured into a container.

1067 EXTRACTION METHOD OF TRITIUM. Shimizu, M. (to Doryokuro Kakunenryo Kaihatsu Jigyodan). US Patent 4,173,620. 6 Nov 1979. Priority date 27 Dec 1976, Japan, 6p.

An extraction method of a high purity tritium gas from tritium-containing heavy water is disclosed. Tritium-containing heavy water is led from a heavy water source into an exchange reaction column wherein the heavy water is brought into contact with a tritium-containing heavy hydrogen to thereby transfer tritium in the heavy hydrogen into the heavy water by way of the exchange reaction to obtain a tritium-enriched heavy water. The resulting tritium-enriched heavy water is then led to a heavy hydrogen gas generator such as an electrolytic cell to generate a tritium-enriched heavy hydrogen, a part of which is recycled to the exchange reaction column and the remaining part thereof is led into a hot-wire type thermal diffusion column, e.g. cascade to enrich tritium. The thus enriched tritium gas is

withdrawn from the thermal diffusion column cascade. The tritium-depleted heavy hydrogen withdrawn from the exchange reaction column is burnt to produce a tritium-depleted heavy water which is then recycled to both the heavy water source and the exchange reaction column.

1068 METHOD OF TREATING WASTE MATERIAL CONTAINING RADIOACTIVE CESIUM ISOTOPES. Hayes, J.F. US Patent 4,173,546. 6 Nov 1979. Filed date 26 Apr 1978. 10p.

A method is described for treating waste materials containing radioactive cesium isotopes. The process involves mixing an aqueous solution of an alkali metal silicate (sodium is the most desireable alkali metal), a hardening agent (Portland cement is readily available), and a plurality of shale particles with the waste materials. Once the mass has solidified, it may then be exposed to the leaching action of an aqueous environment. Results have shown that the leachability of cesium from a solidified mass is greatly reduced when shale is present in the solidified material. 14 claims.

1069 COMPARISON OF ANION EXCHANGE RESINS FOR RECOVERING PLUTONIUM FROM NITRIC ACID WASTE. Navratil, J.D.; Martella, L.L. (Rockwell International, Golden, CO). Nuclear Technology ; 46: No. 1, 105-109(Nov 1979).

Microreticular and macroreticular anion exchange resins were compared for their capability of recovering plutonium from nitric acid waste streams. Plutonium breakthrough capacity and elution behavior of the resins were determined as a function of resin properties. Small-bead microreticular resins with a polystyrene matrix containing 4% divinylbenzene cross-linkage showed the best performance. Of the 20- to 50-mesh resins, the macroreticular resin, Amberlite IRA-938, gave the highest plutonium breakthrough capacity and eluted plutonium the fastest.

1070 EXPERIMENTAL EQUIPMENT FOR THE STUDY OF HIGH-LEVEL WASTE FIXATION. Stejskal, J.; Vojtech, O.; Pacovsky, V.; Konarek, F. Nukleon ; No. 3, 25-27(Nov 1979). (In Czech).

Experimental equipment is described for the research of high-level radioactive waste solidification. The main part of the equipment consists of a resistance furnace of a cylindrical shape with six superkanthal heating coils placed vertically. The furnace outer diameter is 600 mm, its outer height is 1200 mm, its weight approx. 450 kg. The maximum power consumption is 8.5 kW. In long-term operation, operating temperatures of up to 1450 degC may be reached. The whole equipment is installed in a hot cell and is remotely controlled.

1071 SEPARATION OF NOBLE GAS MIXTURES BY LOW TEMPERATURE RECTIFICATION: DEVELOPMENT FOR THE PURIFICATION OF THE OFFGAS OF NUCLEAR FACILITIES. von Ammon, R.; Burkhardt, H.G.; Hutter, E.; Neffe, G. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). Berichte der Bunsengesellschaft fuer Physikalische Chemie ; 83: No. 11, 1143-1147(Nov 1979). (In German).

A separation process is under development for the retention of the gaseous radioactive fission isotope Kr-85 from the offgas of nuclear facilities on the basis of the air liquefaction process which is used for the commercial isolation of noble gases. Contrary to the krypton-xenon mixtures obtained in air liquefaction the noble gas mixtures obtained in nuclear fission contain almost the reciprocal molar ratio Kr/Xe(0.104 compared to 13.1). In addition, the carrier gas for the accumulation of the noble gases is nitrogen instead of oxygen as in air liquefaction, because oxygen is separated in a previous step to minimize radiolytic formation of ozone. Both facts enhance the tendency of xenon to freeze out in cryogenic mixtures and thus demand for alterations in the conventional air liquefaction process. - The conditions for the successful operation of a cryogenic column with the desired separation factor are discussed on the basis of the available lqiuid-vapor and liquid-solid equilibrium data in the three-component systems O_2-Kr-Xe and N_2-Kr-Xe. Calculated temperature- and concentration-profiles in the column for the components N_2, Ar, Kr, Xe, and O_2 are compared with experimental profiles obtained in a semiscale pilot plant. (orig.) 891 HK/orig. 892 MKO.

1072 INCINERATION OF WASTES FROM NUCLEAR INSTALLATIONS WITH THE JUELICH INCINERATION PROCESS. Wilke, M. (Kraftanlagen A.G., Heidelberg (Germany, F.R.). Bereich Anlagentechnik). Atom und Strom ; 25: No. 6, 152-155(Nov-Dec 1979). (In German).

In the Juelich Research Center a two-stage incineration process has been developed which, due to an integral thermal treatment stage, is most suitable for the incineration of heterogeneous waste material. The major advantages of this technique are to be seen in the fact that mechanical treatment of the waste material is no longer required and that off gas treatment is considerably facilitated.

1073 INCINERATION OF RADIOACTIVE WASTES IN SHAFT FURNACES. Witte, H.; Bregulla, E. (Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.)). Atom und Strom ; 25: No. 6, 155-159(Nov-Dec 1979). (In German).

Nuclear installations generate considerable amounts of combustible waste. Maximum volume reduction of this waste is achieved by combustion. At the Kernforschungszentrum Karlsruhe, a nuclear waste incinerator was put into active operation in 1971 and has produced excellent results since. The system developed in Karlsruhe has been adopted by the nuclear industry and now is being offered as an efficient volume reduction system for combustible radioactive waste.

1074 METHOD TO SOLIDIFLY HIGHLY AND MEDIUM RADIOACTIVE AND/OR ACTINIDE-CONTAINING AQUEOUS WASTE CONCENTRATES OR OF FINE-GRAIN SOLID WASTES SLURRIED IN WATER, SO THAT THESE ARE READY FOR ULTIMATE STORAGE AND DO NOT HARM THE ENVIRONMENT. Koester, R. (to Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). German(FRG) Patent 2,819,085/A/. 31 Oct 1979. 7p. (In German).

Granulates or pelletes of approx. 1 cm diameter are manufacured by means of a pelleting device and made of 1 kg portland cement with 10% bentonite and 230 g MAW simulate solution. The through-put in adjusted by selecting the diameter of the pelleting plate.

1075 METHOD FOR ANCHORING RADIOACTIVE SUBSTANCES IN A BODY RESISTANT TO LEACHING BY WATER. Larker, H. (to ASEA AS). US Patent 4,172,807. 30 Oct 1979. Priority date 2 Nov 1976, Sweden, 8p.

A method is described for containing high-

level radioactive waste in a body resistant to leaching by water. The process includes steps for mixing the radioactive substances with a material which is resistant to leaching by water, or a material which when heated becomes resistant to leaching. Examples of such materials include insoluble salts or compounds of the radioactive substances such as titanates, silicates, zeolites, aluminium oxide, titanium oxide, quartz and rocks existing in nature. The mass is then to be enclosed in a capsule, evacuated, and subjected to isostatic pressing at a temperature and pressure required for the formation of a coherent mass. The capsule material should be matched to the resistant material so that it has a sufficiently high melting point for the capsule to fulfill its duties, and essentially the coefficient of thermal expansion in the cases when the capsule is left to provide a reinforced containment. The pressure during the isostatic pressing should be between 50 and 300 MPa. The temperature may vary from 700°C to 1300°C. 19 claims, 2 figures.

1076 (MLM--2663(TR)) COMBUSTION OF WASTE IN A 60-LITER DRUM. STATUS REPORT, MARCH 1978. Matteman, J. (Keuring van Electrotechnische Materialen N.V., Arnhem (Netherlands)). 25 Oct 1979. Translation source information not available 18p. Dep. NTIS, PC A02/MF A01.

A pilot experiment on combustion of wastes from nuclear power plants was conducted using a 60-liter drum in place of a 200-liter drum. It is possible to feed waste to it without producing smoke. Continuous stoking produces conditions approaching complete combustion. Volume reduction factors are 25 to 75. HCl and fly ash can be removed using a dry gas cleaning system. The use of the installation for low-level radwaste is discussed. (DLC)

1077 METHOD OF SOLIDIFYING RADIOACTIVE WASTES. Suzuki, K.; Yamamoto, M.; Fujiwara, T.; Yoshimoto, M.; Kawai, M. (to Toshiba Corp., Kawasaki, Kanagawa (Japan)). Japanese Patent 54-130,798/A/. 11 Oct 1979. 7p. (In Japanese).

Purpose: To compression mold, sinter and solidify the calcined bodies of radioactive wastes together with a metal, thereby to form solidified bodies having good heat conductivity and excellent mechanical strength, thermal shock resistance, and mechanical shock resistance, and durable in permanent storage. Method: Powders of calcined bodies of radioactive wastes and metal powders (Pb, Zn, Sn, Cu, Ag, Al, Fe and Ni or alloys of these metals) of more than 10% in apparent volume are mixed with each other and thereafter the mixtures are compression molded into a compression density of more than 40%. Subsequently, the compression molded bodies are sintered at a temperature of below 600°C. Alternatively, the powders of the calcined bodies are granulated and sintered beforehand, and metal coated layers are formed on the surfaces of particles by the non-electrolytic plating method, evaporating method or the like. If necessary, metal powders may be mixed therein, and thereafter the mixtures may be compression molded and sintered in the reducing atmosphere.

1078 APPARATUS TO FILTER, DRY, AND FILL RADIOACTIVE SUSPENSIONS IN PARTICULAR. Pfeifer, K.; Gebauer, R.; Koch, K.H. (to Alpha Chemie und Metallurgie G.m.b.H. (ALKEM), Hanau (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,618,232/B/. 4 Oct 1979. 3p. (In German).

The Am $(NO_3)_4$ occurring in the processing of Pu is converted into HNO_3 and $Am(C_2O_4)_2$ which is suspended in the acid solution. This suspension is introduced into a heated, cylindrical filter vessel via a sampling funnel. Inside the filter vessel is a stirrer. A crushing and a dosing device are attached to the sampling funnel. AmO_2 pieces are crushed here. Sampling funnel, filter vessel, dosing device and stirrer are part of one unit which can be swivelled around a shaft.

1079 REMOVAL OF LOW-LEVEL RADIOACTIVITIES FROM AQUEOUS WASTE SOLUTIONS WITH ACTIVATED CARBON. Litman, R.; Ott, Ch.R.; Gingras, R.; Lowell Univ., MA ;USA)). Radiochemical and Radioanalytical Letters ; 40: No. 5, 309-318(3 Oct 1979).

Activated carbon has been used to remove various radionuclides from the liquid waste from the University of Lowell Reactor's waste tanks. The type and amount of radionuclides removed were determined using γ-ray spectroscopy.

1080 UPDATING RADWASTE PROCESSING, STORAGE. Oyen, L.C.; Tucker, R.F. (Sargent and Lundy). Power ; 123: No. 10, 81-87(Oct 1979).

A brief survey of past and present systems for radioactive waste treatment and storage is presented. Today's systems have improved capability for handling the low-level wastes generated at nuclear stations. Stressing reliability and safety, they feature volume reduction to minimize overall disposal cost for liquid and solid waste. It is concluded that because of the high cost of radwaste processing and disposal, maximum effort must be made to reduce the waste volumes generated. This will probably require installation of some type of volume reduction equipment at most nuclear stations. If the trend toward eliminating shallow land burial of waste continues, the possibility of long-term on-site storage must be taken into account.

1081 PROCEDURE IN ENCAPSULATION OF RADIOACTIVE WASTES. Larker, H. (to ASEA-ATOM AB, Vaesteraas (Sweden)). Swedish Patent 7,704,487-3/B/. Oct 1979. 10p. (In Swedish).

A method is described whereby high-level radioactive waste or spent fuel elements, which have been sintered into a container of corrosion resistant material, e.g. aluminium oxide, may be provided with radiation shielding which itself is protected against corrosion. The sintered block containing the radioactive waste or spent fuel elements is placed in a cylindrical steel container. The sintered block has discs of mild steel plate shielding above and below it and is encased in a mild steel plate shielding. Between the mild steel shielding and the steel container is a layer of corrosion resistant material, e.g. stainless steel, in powder form. The container is then evacuated and the stainless steel powder sintered in a special press-oven.

1082 OPERATION PERFORMANCE OF CONTINUOUS BITUMINIZATION PLANT FOR SOLIDIFYING RADIOACTIVE WASTE AT TSURUGA NUCLEAR POWER STATION. Sano, K. (Ebara Mfg. Co. Ltd., Tokyo (Japan)). Ebara Jiho (Ebara Times) ; No. 110, 50-56(Oct 1979). (In Japanese).

A series of performance survey runs of the bituminization plant was conducted with actual radioactive concentrated waste. This plant reduced the volume to several times smaller

than is achieved by a cement solidification plant. Regular operation with actual radioactive concentrate has begun. Operation of this plant has so far produced 86 drums containing 200 liters each. The bitumen product has demonstrated suitable properties for sea dumping.

1083 METHOD OF PROCESSING LAUNDRY DRAIN. Sugimoto, Y.; Oda, A.; Yusa, H.; Kitamura, M.; Horiuchi, S. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 54-125,400/A/. 28 Sep 1979. 5p. (In Japanese).

Purpose: To subject the laundry drain to flocculation precipitation treatment in the prior stage of an inverse osmotic treatment, and subject only the supernatant to the inverse osmotic treatment and the precipitate directly to the condensation treatment, thereby decreasing the frequency of exchange of the inverse osmotic membranes, and reducing the quantity of purifying water. Method: The laundry drain is supplied to a flocculation precipitation tank, and added and mixed with a flocculant and a neutralizing agent, thus being subjected to a flocculation precipitation treatment. The supernatant is transported to a circulation tank through a transportation pipe, and is subjected to an inverse osmotic treatment in inverse osmotic module through the circulation tank, a filter and a high tension pump, and then returned to the circulation tank. The supernatant is thus concentrated to a predetermined concentration by repeating such operations. On the other hand, the precipitate at the bottom part of the flocculation precipitation tank is supplied through the transportation pipe to an evaporator supply tank together with the concentrate from the drain circulation tank, and evaporated and concentrated in the evaporator.

1084 METHOD TO SOLIDIFY A RADIOACTIVE OR TOXIC AQUEOUS SOLUTION CONTAINING WASTE MATERIALS. Knieper, J.; Printz, H.; May, K. (to Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,531,056/B/. 20 Sep 1979. 2p. (In German).

Stucco with a carbonate content of less than 1% is mixed with pumice stone in a ratio of 1:1 and filled into 200l barrels. A mineral acid, alkalis or water-soluble organic compound is added to this filling. The binding takes place practically without latent heat.

1085 BIDENTATE ORGANOPHOSPHORUS SOLVENT EXTRACTION PROCESS FOR ACTINIDE RECOVERY AND PARTITION. (to Department of Energy, Washington, DC (USA)). British Patent 1,552,956/A/. 19 Sep 1979. 12p.

A liquid-liquid extraction process is described for the recovery and partitioning of actinide values from acidic nuclear waste aqueous solutions, the actinide values including trivalent and tetravalent oxidation states, comprising the steps of contacting the aqueous solutions with a bidentate organophosphorus extractant to extract essentially all of the actinide values into the organic phase, contacting the actinide-loaded organic phase with an aqueous dilute nitric acid solution to extract essentially all of the trivalent actinide values into the aqueous phase, and contacting the organic phase containing the tetravalent actinide values with a dilute aqueous solution of nitric-hydrofluoric acid to extract essentially all of the tetravalent actinide values into the aqueous phase. The process covers Am(III), Cm(III), Pu(IV), Np(IV), and U(VI); and, as the extractant, covers dihexyl-N,N-diethylcarbamylmethylene phosphonate dissolved in dodecane diluent.

1086 SYSTEM FOR DISPOSING OF RADIOACTIVE WASTE. Gablin, K.A.; Hansen, L.J. (to Nuclear Engineering Co.). US Patent 4,168,243. 18 Sep 1979. Filed date 24 Mar 1976. 18p.

A system is described for disposing of radioactive waste material from nuclear reactors by solidifying the liquid components to produce an encapsulated mass adapted for disposal by burial. The method contemplates mixing of radioactive waste materials, with or without contained solids, with a setting agent capable of solidifying the waste liquids into a free standing hardened mass, placing the resulting liquid mixture in a container with a proportionate amount of a curing agent to effect solidification under controlled conditions, and thereafter burying the container and contained solidified mixture. The setting agent is a water-extendable polymer consisting of a suspension of partially polymerized particles of urea formaldehyde in water, and the curing agent is sodium bisulfate. Methods are disclosed for dewatering slurry-like mixtures of liquid and particulate radioactive waste materials, such as spent ion exchange resin beads, and for effecting desired distribution of non-liquid radioactive materials in the central area of the container prior to solidification, so that the surrounding mass of lower specific radioactivity acts as a partial shield against higher radioactivity of the non-liquid radioactive materials. The methods also provide for addition of non-radioactive filler materials to dilute the mixture and lower the overall radioactivity of the hardened mixture to desired Lowest Specific Activity counts. An inhibiting agent is added to the liquid mixture to adjust the solidification time, and provision is made for adding additional amounts of setting agent and curing agent to take up any free water and further encapsulate the hardened material within the container. 30 claims.

1087 METHOD AND APPARATUS FOR PROCESSING LIQUID SODIUM WASTES. Nishizawa, Y. (to Mitsubishi Atomic Power Industries, Inc., Tokyo (Japan)). Japanese Patent 1954-117,900/A/. 12 Sep 1979. 4p. (In Japanese).

Sodium wastes from an LMFBR type reactor are heated to generate sodium aerosols. The sodium aerosols are introduced into a reaction vessel and mixed with reactive gas such as gaseous carbon dioxide, air or the mixture thereof. The sodium aerosols and the reactive gases are thus reacted to produce chemically stable reaction products. The reaction products, which are sodium carbonate or sodium oxide depending on whether gaseous carbon dioxide or air is used as the reactive gas, are accumulated in the bottom of the reaction vessel.

1088 RADIOACTIVE WASTE DISPOSAL. Gablin, K.A.; Hansen, L.J. (to Nuclear Engineering Co.). US Patent 4,167,491. 11 Sep 1979. Filed date 7 Jun 1976. 8p.

A method of disposing of wet radioactive waste materials such as those generated in the water used to cool atomic reactors, comprises combining the waste material with a hydrophilic resin in proportions sufficient to provide a solid mass of the resin with the radioactive waste component distributed within. In its preferred form, the waste material is

concentrated by separating water from the radioactive portions thereof by methods such as evaporation, taking up the waste components with an ion exchange resin and separating the resin from the bulk of the water, or by the addition of flocculating agents or the like and filtering. The preferred hydrophilic resinous material is a conventional urea-formaldehyde dispersion, which is partially polymerized and capable of taking up water and fully polymerizing upon the addition of an acidic curing agent. The method also contemplates adding a substantially waterproof resinous material to the surface of the solid block, or enclosing it in a waterproof container, or both.

1089 METHOD TO PROCESS AMMONIUM NITRATE SOLUTION OCCURRING IN THE MANUFACTURE OF FUEL AND/OR BREEDER MATERIALS FOR NUCLEAR REACTORS. Morschl, P.; Zimmer, E. (to Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.)); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,617,968/8/. 6 Sep 1979. 2p. (In German).

The ammonium nitrate is converted to metal nitrate at temperatures of 100° to 110°C and may then be harmlessly subjected to calcination at high temperatures. The calcium oxide used can be fully recycled. Environmentally harmful materials are not set free.

1090 METHOD AND DEVICE FOR SOLIDIFYING RADIOACTIVE DRY POWDER. Irie, H. (to Toshiba Corp., Kawasaki, Kanagawa (Japan)). Japanese Patent 1954-114,700/A/. 6 Sep 1979. 3p. (In Japanese).

Radioactive liquid wastes or slurries are dried in a drier, and pulverized and introduced into a mixer. This powder is mixed with a solidifying agent such as asphalt, plastics or the like, and is solidified. Vapor generated in the drier is introduced into a cooler, and exhausted as condensed water. This cooler is connected with an ejector through a vent pipe, and the drier and mixer are retained in a negative pressure by the ejector effect and the ejector outlet pipe is water-sealed by a tank. The vent pipe led from the mixer is also connected to the cooler and the cooler outlet pipe is water-sealed by a condensing tank.

1091 USE OF A BACTERIA POLYMER COMPOSITE TO CONCENTRATE PLUTONIUM FROM AQUEOUS MEDIA. Meyer, H.R. (Oak Ridge National Lab., TN (USA)); Johnson, J.E.; Tengerdy, R.P.; Goldman, P.M. Health Physics ; 37: No. 3, 359-363(Sep 1979).

Viable Pseudomonas aeruginosa, in stable association with fine-spun polypropylene web, were shown to be capable of significant concentration of PuO_2 or $PuCl_4$ from aqueous media. These observations confirm previous studies with free-living Pseudomonas and suggest that such a system may be useful for the removal of plutonium from aqueous waste streams. Optimum cell loading of the fine-spun polymer web used in these studies occurred with monolayer filament coverage, resulting in maximum plutonium fixation. Removal of an average of 34% of suspended PuO_2 particles and 94% of soluble $PuCl_4$ was observed under these conditions.

1092 PRECIPITATION OF URANIUM FROM LOW-LEVEL LIQUID WASTES. Bullard, J.E. (Babcock and Wilcox Co., Lynchburg, VA (USA). Research and Development Div.); Baughman, J.C. Talanta ; 26: No. 9, 904-905(Sep 1979).

A method for the recovery of uranium from low-level liquid wastes is described. Uranium(VI) is reduced to uranium(IV) in sulphuric-phosphoric acid solution with iron(II). The uranium(IV) is precipitated as the double fluoride with sodium. The uranium content of the filtrate is in the low ppm range. Possible modifications to the procedure are discussed.

1093 VITRIFICATION OF HIGHLY ACTIVE LIQUID WASTE. PT. 2. THE THERMAL DECOMPOSITION OF HARVEST FEED SLURRIES AND THE CHARACTERIZATION OF THE PRODUCT. Chun, K.S. (Korea Atomic Energy Research Inst., Seoul (Republic of Korea)); Morris, J.B. (Atomic Energy Research Establishment, Harwell (UK)). Journal of the Korean Nuclear Society ; 11: No. 3, 203-212(Sep 1979).

The thermal decomposition of simulated magnox highly active waste and of harvest feed slurries (SN and SG) which include the glass forming chemicals has been studied. The waste and the slurries are almost completely calcined by 500 to 550°C. The colour of the solids from the slurries varies little until about 900°C when it darkens considerably. The slurries begin to vitrify at this temperature and are completely vitrified at 1000 to 1050°C. On the other hand, the sulphate impurity in SN slurry causes a yellow phase to separate above 750°C. The density of the intermediate solids is fairly low until 650°C-700°C is reached. This temperature seems to mark the onset of fluxing as the density rises quickly to 2g/cm³ at 700°-800°C is reached. This temperature seems to mark the onset of fluxing as the density rises quickly to 2g/cm³ at 700°-800°C. The strength of the solids decreases with temperature up to 500°C, and then rises as the solids begin to sinter. Below 500°C the SN solids are the stronger, suggesting that the impurity renders this silica more reactive.

1094 PROCESSING OF HIGH LEVEL RADIOACTIVE WASTES BY A SOLIDIFICATION TECHNIQUE. Chun, K.S. (Korea Atomic Energy Research Inst., Seoul (Republic of Korea)). Journal of the Korean Nuclear Society ; 11: No. 3, 231-239(Sep 1979). (In Korean).

Current status and techniques of solidification of high level radioactive waste are outlined. The source of generation of radioactive wastes, actual process of solidification, properties of the solidified high level wastes and the status of the technique in various countries are reviewed and discussed.

1095 FUNDAMENTAL STUDY ON DECONTAMINATION OF TRITIUM FROM GASEOUS PHASES BY COPPER OXIDE. Kawabata, H.; Yanagi, T.; Tabuchi, T.; Shinagawa, M. (Osaka Univ., Suita (Japan). Faculty of Engineering). Radioisotopes (Tokyo) ; 28: No. 9, 542-545(Sep 1979).

Some fundamental studies on removal of tritium from gaseous streams by a small column of copper oxide were carried out. An about 10 cm length of column packed with 100 g of copper oxide was examined on the conversion ratios of hydrogen and tritium into water. The experiment with hydrogen of 0.1 per cent in argon showed that the logarithmic plot of remaining ratio of hydrogen by passing through the column in proportional to the reciprocal of gas flow rate and to the length of oxide column. The oxide column was also used for treating tritium-bearing waste gas from an evacuating system of a D-T neutron generator. It was observed that at column temperatures lower than 450°C the conversion ratio of tritium in the waste gas into water is considerably smaller than that of hydrogen of 0.1 per cent in argon.

1096 PROCESSING OF RADIOACTIVE RUTHENIUM WITH ALUMINOSILICATE GELS. Kanno, T.; Ichinose, Y.; Ito, K. (Tohoku Univ., Sendai (Japan). Research Inst. of Mineral Dressing and Metallurgy). Nippon Genshiryoku Gakkaishi (Journal of the Atomic Energy Society of Japan) ; 21: No. 9, 732-737(Sep 1979). (In Japanese).

Coprecipitation of radioactive Ru with hydroxides has been studied for the purpose of the management of the high level waste from the nuclear fuel reprocessing. Aluminosilicate gel used as coprecipitant was prepared by addition of aqueous sodium hydroxide to sodium aluminate-sodium silicate solution containing ruthenium nitrate. Ruthenium quantitatively precipitates under the conditions, aluminate > 4 x 10^{-2} M, Al/Si < 0.5 and pH = 6 -- 9. Thermal transformations of aluminosilicate gels were examined by means of DTA and X-ray powder diffraction. Ruthenium is volatilized from aluminosilicate gel above 600°C. However, volatilization rate of Ru is suppressed by coating with mullite phase into which aluminosilicate gel transforms above 900°C. The amount of Ru volatilized in Ar-flow was reduced to about 10% of that in air-flow.

1097 METHOD AND EQUIPMENT TO SOLIDIFY PUMPABLE RADIOACTIVE WASTES IN A WASTE CONTAINER. Baatz, H.; Rittscher, D. (to STEAG Kernenergie G.m.b.H., Essen (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,720,342/B/. 30 Aug 1979. 4p. (In German).

Dry cement is filled into the waste container and a partial vacuum is generated. This subpressure gives rise to a dosed uptake of the pumpable substances in the waste container. An intimate mixture of cement and the wastes is achieved by rotation of the vessel around an axis after decoupling the supply pipes and subpressure pump. The waste container is in a box with drive capstans for the rotational movement.

1098 METHOD AND APPARATUS FOR PROCESSING RADIOACTIVE LAUNDRY WASTE. Shirai, T.; Suzuki, T.; Inami, I. (Nippon Atomic Industry Group Co. Ltd., Tokyo). (to Nippon Atomic Industry Group Co. Ltd., Tokyo; Toshiba Corp., Kawasaki, Kanagawa (Japan)). Japanese Patent 1954-109,600/A/. 28 Aug 1979. 3p. (In Japanese).

Stored liquid wastes are sent to a cyclone to remove particles of greater specific weight and sludges are accumulated in a sludge reservoir. The liquid wastes are sent to a self-cleaning strainer to remove thread dusts, hairs and the likes, and then sent to a storage tank. The liquid wastes are further sent to a self-cleaning type centrifugal settler. Fine clads separated there are stored in a sludge reservoir and cleaned liquid wastes are sent to ultrafilter and an ion exchange resin column to remove radioactive components. The concentration liquid wastes from the ultrafilter are dried in a drier and the resin wastes from the ion exchange column are subjected to solidification. Sludges in the sludge reservoirs are solidified in a solidifier and then packed in drum can.

1099 METHOD FOR THE DENITRATION OF HIGHLY RADIOACTIVE WASTE SOLUTIONS. Gattys, F.J. (to Ingenieurbuero fuer Chemische Maschinen- und Apparatebau, Neu-Isenburg (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,807,324/A/. 23 Aug 1979. 12p. (In German).

The radioactive solution is mixed with formaldehyde solution or para-formaldehyde and sodium nitrate, as well as ortho-phosphoric acid solution or NaH_2PO_4 and is denitrated at 100°C. Furthermore, $C_6H_8O_7 \times H_2O$ phosphate can be used as buffer. The para-formaldehyde is in powder form.

1100 METHOD FOR CALCINING NUCLEAR WASTE SOLUTIONS CONTAINING ZIRCONIUM AND HALIDES. Newby, B.J. (to Dept. of Energy). US Patent 4,164,479. 14 Aug 1979. Filed date 12 Jan 1978. 6p.

PAT-APPL-868,953.

A reduction in the quantity of gelatinous solids which are formed in aqueous zirconium-fluoride nuclear reprocessing waste solutions by calcium nitrate added to suppress halide volatility during calcination of the solution while further suppressing chloride volatility is achieved by increasing the aluminum to fluoride mole ratio in the waste solution prior to adding the calcium nitrate.

1101 METHOD OF PROCESSING RADIOACTIVE WASTES. Kinoshita, M.; Kikuchi, M.; Oda, A.; Yusa, H.; Hirano, M. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 1954-101,100/A/. 9 Aug 1979. 6p. (In Japanese).

Radioactive detergent liquid wastes are passed through an ejector by means a pump. By the operation of the ejector spent ion-exchange resins stored in a separation tank are sucked up and mixed, and then introduced into a tank. The mixture solution is stirred to cause a surfactant in the liquid wastes to be adsorbed to the resin, and thereafter transferred to a centrifugal film drier, and pulverized and dried.

1102 MAGNOX SLUDGE ENCAPSULATION PLANT. Nuclear Engineering International ; 24: No. 289, 54(Aug 1979).

United Kingdom. CONCRETES;ENCAPSULATION;FUEL PINS;LOW-LEVEL RADIOACTIVE WASTES;MAGNOX TYPE REACTORS;SLURRIES;SPENT FUEL ELEMENTS;SPENT FUEL STORAGE;RADIOACTIVE WASTE PROCESSING

1103 HIGH LEVEL FISSION PRODUCT WASTE FORMS FOR FINAL STORAGE. COMPARATIVE EVALUATION OF THE PRODUCTS. Merz, E. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Chemische Technologie). Atomwirtschaft, Atomtechnik ; 24: No. 8/9, 409-413(Aug-Sep 1979). (In German).

In the Federal Republic of Germany, as in other countries, work has been conducted for years on the development of solidification products for high level wastes. The decisive criterion for the quality of the form of waste product is the leaching resistance of radionuclides in final storage. Final intercomparison and evaluation of the best waste form is not yet possible for lack of some specific information. However, it is certain that borosilicate glasses are among the suitable products, judging by the minimum criteria to be fulfilled. Negative consequences in the geological repository can be safely avoided by the proper choice of the fission product concentration in the matrix material, the vessel concept and sufficiently long periods of interim storage above ground. Theoretically, synthetic crystallized rock promises certain advantages. However, it is very doubtful whether it will be possible to make a useful, uniform product of comparable or even better quality from a mixture of more than 40 different elements. The decision in favor of borosilicate glasses as the first choice must

be upheld until there is hard proof of better products and methods of their fabrication on a large technical scale backed up by demonstrations on real hot material.

1104 DECONTAMINATION OF ELLIOT LAKE URANIUM TAILINGS. Raicevic, D. (Department of Energy, Mines and Resources, Ottawa, Ontario (Canada). Canada Centre for Mineral and Energy Technology). CIM (Canadian Institute of Mining and Metallurgy) Bulletin ; 72: No. 808, 109-115(Aug 1979).

After more than 93 percent of the uranium is extracted from Elliot Lake ores by a sulphuric acid leaching process, the leach residue (tailings) contains small amounts of uranium and radioactive isotopes, particularly radium-226, which is the most serious health hazard. Heavy metal components and pyrite are also present, along with the gangue minerals. Currently, over 1000 acres of the Elliot Lake area are covered with these tailings, which contain over five million tons of pyrite. Because of constant oxidation of the pyrite by bacteria (thiobacillus) and the presence of moisture, pyrite slowly generates sulphuric acid, which steadily leaches the metal-bearing constituents from the tailings. The seepage flows of the dissolved contaminants, although often quite low in volume, have an environmental impact on the Elliot Lake area. Although these seepages are treated and most of the contaminants removed and impounded, a small amount of the radioactive contaminants reaches Lake Huron via the Serpent River. A flotation approach for treatment of the Elliot Lake uranium tailings was investigated. It produced decontaminated tailings which were practically free of pyrite, with radium, thorium, and uranium contents considerably reduced. The tailings produced comprise about 75 percent by weight of the current tailings and appears to be suitable for mine backfill. Surface storage of about half of the uranium tailings would be eliminated by this process. Mine backfilling would also increase the mine production and thus enlarge the overall uranium resources due to recovery of the ore from pillars. The pyrite concentrate produced from the current uranium tailings would be suitable for sulphuric acid production.

1105 CURRENT VIEWS ON THE IMPORTANCE OF SEPARATING LONG-LIVED ALPHA EMITTERS FROM HIGH-LEVEL WASTES FROM SPENT FUEL REPROCESSING. Kyrs, M.; Neumann, L. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Jaderna Energie ; 25: No. 8, 289-293(Aug 1979). (In Czech).

The benefits and constraints are compared of alpha emitters separation from high-level radioactive wastes. It is found that so far it has not been possible to unequivocally answer the question of the justification of alpha emitters separation aimed at reducing the risks and costs of high-level radioactive waste processing.

1106 MANAGEMENT OF HIGH-LEVEL RADIOACTIVE WASTES. Lennemann, Wm.L. (International Atomic Energy Agency, Vienna (Austria). Div. of Nuclear Safety and Environmental Protection). International Atomic Energy Agency Bulletin ; 21: No. 4, 2-16(Aug 1979).

The definition of high-level radioactive wastes is given. The following aspects of high-level radioactive waste management are discussed: fuel reprocessing and high-level waste; storage of high-level liquid waste; solidification of high-level waste; interim storage of solidified high-level waste; disposal of high-level waste; disposal of irradiated fuel elements as a waste.

1107 LIQUID EFFLUENT TREATMENT IN NUCLEAR POWER PLANTS WITH LIGHT WATER REACTORS. Kongsted, T. Brown Boveri Review ; 66: No. 8, 526-530(Aug 1979).

A radioactive waste treatment system for the purification of radioactively contaminated liquid effluents of nuclear power plants is presented. The choice of the process plant components, the design of the control and instrumentation systems are outlined. Efficient purification processes ensure that the major part of the effluent can be re-used in the power plant. The filter residues and evaporator concentrates arising during purification can be solidified with bitumen or cement in the solid radwaste system for final storage.

1108 PLASTIC SOLIDIFICATION SYSTEM FOR RADIOACTIVE WASTE. Kani, J.; Irie, Hiromitsu; Obu, E. (Toshiba Corp., Kawasaki, Kanagawa (Japan)); Nakayama, Yasuyuki; Matsuura, Hiroyuki. Toshiba Rebyu (Toshiba Review) ; 34: No. 8, 707-710(Aug 1979). (In Japanese).

The establishment of a new solidification system is an important theme for recent radioactive-waste disposal systems. The conditions required of new systems are: (1) the volume of the solidified product to be reduced, and (2) the property of the solidified product to be superior to the conventional ones. In the plastic solidification system developed by Toshiba, the waste is first dried and then solidified with thermosetting resin. It has been confirmed that the property of the plastic solidified product is superior to that of the cement-or bitumen-solidified product. Investigation from various phases is being carried on for the application of this method to commercial plants.

1109 METHOD FOR SOLIDIFYING LIQUID RADIOACTIVE WASTES. Berreth, J.R. (to Department of Energy, Washington, DC (USA)). Canadian Patent 1,059,307/A/. 31 Jul 1979. 8p.

The liquid wastes generated by the reprocessing of spent fuel can be converted into solid form by using several known processes. When the wastes contain nitrates and nitrites large quantities of noxious nitrogen oxide gases are formed, which are at present released to the atmosphere. Their evolution may be suppressed by adding urea to the waste solution before the solution is heated, so that upon heating the urea reacts wth the nitrates and nitrites to evolve elemental nitrogen, carbon dioxide and ammonia. The addition of urea does not add any additional materials to the solids being formed from the waste solution. A slight excess of a stoichiometric amount of urea relative to the nitrates and nitrites present is added to the liquid waste, and the solution is heated to at least 130° C while bubbling carbon dioxide through the solution. This method can be used with the pot calcination process of waste solidification, or in the fluidized bed calcination process.

1110 SEE-THROUGH SOLUTION TO NUCLEAR WASTE. Morris, B.; Marples, A. (UKAEA, Harwell. Atomic Energy Research Establishment). New Scientist ; 83: No. 1165, 276-278(26 Jul 1979).

The consensus of opinion within the nuclear industry is that the first step in the safe disposal of liquid high-level radioactive waste is the conversion of this waste into a solid such as a block of glass cast in a stainless

steel canister. Steps in the vitrification process are considered. Research being carried out in the UK to obtain chemical engineering information on the vitrification process and to develop and evaluate the best glass for each type of highly active waste is discussed. Work being undertaken in France, India, USA and West Germany to turn the vitrification concept into a working industrial process is described.

1111 METHOD OF PROCESSING RADIOACTIVE WASTES. Horiuchi, S.; Taniguchi, T.; Hirano, M.; Hyakutake, H.; Takamura, Y. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 54-93,800/A/. 25 Jul 1979. 6p. (In Japanese).

Purpose: After removing clads from radioactive wastes, to dry and pulverize the same thereby to reduce hazard of radiation exposure and to obtain a large volume reduction ratio. Method: Regenerated liquid wastes, sludges and spent ion-exchange resin slurries within the tanks are respectively introduced into separation tanks, and the regenerated liquid wastes are sent into a mixing tank after clads within the separation tanks have been precipitated and separated. The sludges are applied with a supersonic wave in the separation tanks, and thereafter are passed through an electromagnetic filter. Then, clads are removed from the sludges, and thereafter the sludges are sent into the mixing tank. The spent ion-exchange resin slurries are applied with a supersonic wave and stirred in the separation tanks, and sent into the mixing tank after the clads have been precipitated and separated. The mixture which has been prepared in the mixing tank is dried and pulverized by a centrifugal film drier, and mixed with burnt ashes discharged from a hopper. Then, the mixture is pelletized and asphalt-hardened.

1112 METHOD FOR RECOVERING PALLADIUM AND TECHNETIUM VALUES FROM NUCLEAR FUEL REPROCESSING WASTE SOLUTIONS. Horwitz, E.P.; Delphin, W.H. (to Dept. of Energy). US Patent 4,162,231. 24 Jul 1979. Filed date 28 Dec 1977. 4p.

PAT-APPL-865,347.

A method is described for recovering palladium and technetium values from nuclear fuel reprocessing waste solutions containing these and other values by contacting the waste solution with an extractant of tricaprylmethylammonium nitrate in an inert hydrocarbon diluent which extracts the palladium and technetium values from the waste solution. The palladium and technetium values are recovered from the extractant and from any other coextracted values with a strong nitric acid strip solution.

1113 METHOD OF IMMOBILIZING CARBON DIOXIDE FROM GAS STREAMS. Holladay, D.W.; Haag, G.L. (to Dept. of Energy). US Patent 4,162,298. 24 Jul 1979. Filed date 9 Aug 1978. 10p.

PAT-APPL-932,152.

This invention comprises a method for rapidly and continuously immobilizing carbon dioxide contained in various industrial off-gas streams, the carbon dioxide being immobilized as dry, stable, and substantially water-insoluble particulates. Briefly, the method comprises passing the gas stream through a fixed or fluidized bed of hydrated barium hydroxide to remove and immobilize the carbon dioxide by converting the bed to barium carbonate. The method has several important advantages: it can be conducted effectively at ambient temperature; it provides a very rapid reaction rate over a wide range of carbon dioxide concentrations; it provides high decontamination factors; and it has a high capacity for carbon dioxide. The invention is especially well suited for the removal of radioactive carbon dioxide from off-gases generated by nuclear-fuel reprocessing facilities and nuclear power plants.

1114 METHOD FOR THE RECOVERY OF ACTINIDE ELEMENTS FROM NUCLEAR REACTOR WASTE. Horwitz, E.P.; Delphin, W.H.; Mason, G.W. (to Dept. of Energy). US Patent 4,162,230. 24 Jul 1979. Filed date 28 Dec 1977. 10p.

PAT-APPL-865,346.

A process is described for partitioning and recovering actinide values from acidic waste solutions resulting from reprocessing of irradiated nuclear fuels by adding hydroxylammonium nitrate and hydrazine to the waste solution to adjust the valence of the neptunium and plutonium values in the solution to the +4 oxidation state, thus forming a feed solution and contacting the feed solution with an extractant of dihexoxyethyl phosphoric acid in an organic diluent whereby the actinide values, most of the rare earth values and some fission product values are taken up by the extractant. Separation is achieved by contacting the loaded extractant with two aqueous strip solutions, a nitric acid solution to selectively strip the americium, curium and rare earth values and an oxalate and oxalic acid or trimethylammonium hydrogen oxalate to selectively strip the neptunium, plutonium and fission product values. Uranium values remain in the extractant and may be recovered with a phosphoric acid strip. The neptunium and plutonium values are recovered from the oxalate by adding sufficient nitric acid to destroy the complexing ability of the oxalate, forming a second feed, and contacting the second feed with a second extractant of tricaprylmethylammonium nitrate in an inert diluent whereby the neptunium and plutonium values are selectively extracted. The values are recovered from the extractant with formic acid.

1115 SEPARATION OF IODINE FROM MERCURY CONTAINING SCRUBBING SOLUTIONS. Burger, L.L.; Scheele, R.D. (to Dept. of Energy). US Patent 4,162,206. 24 Jul 1979. Filed date 16 Nov 1978. 4p.

PAT-APPL-961,174.

Radioactive iodines can be recovered from a nitric acid scrub solution containing mercuric nitrate by passing a current through the scrub solution to react the iodine with the mercuric nitrate to form mercuric iodate which precipitates out. The mercuric iodate can then be reacted to recover the radioiodine for further processing into a form suitable for long-term storage and to recover the mercury for recycling.

1116 ACADEMY SQUABBLES OVER RADWASTE REPORT. Carter, L.J. Science ; 205: 287-289(20 Jul 1979).

The National Academy of Science presented a report to the US Nuclear Regulatory Commission (NRC) on evaluating alternative technologies for solidifying high-level radioactive wastes. The waste management staff at the NRC was pleased with the report, but some members of the Academy were not satisfied. Some felt the report was narrow in focus and highly technical. The fact that glass was an inferior waste form was considered bad news by some leaders of the nuclear enterprise because most of the past research and development work in waste solidification in the US and Europe has centered on glass. Others felt the report would

be seized upon by opponents of nuclear power. Parts of the panel report were rewritten several times. however, in 1978, the report was reviewed by six members of the National Academy of Sciences. In general, their comments on the report were quite favorable. The report offered no coherent discussion comparing the characteristics of glass, ceramics, cement, and other materials in relation to multiple barriers or to any other strategy. The main flaws in the report stemmed from the failure to deal forthrightly with the conflicts in the radwaste committee by means of majority and minority reports. Also, the report review process seems to have been entirely too casual. (DP)

1117 METHOD AND DEVICE TO PACKAGE SOLID RADIOACTIVE OR POISONOUS WASTE MATERIALS. Herzog, J. (to Nuklear-Chemie und - Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.)). German(FRG) Patent 2,243,136/B/. 19 Jul 1979. 3p. (In German).

Solid radioactive wastes should be pressed solid as far as possible before ultimate storage. On the other hand, the number of working stages should be kept as small as possible. A suggestion is made to insert a pipe into the vessel, to then fill it with the wastes, to press these together by means of a piston and then to remove the pipe again. Suitable measures to prevent radioactivity from escaping are necessary (low-pressure chamber, suction devices etc.).

1118 PROCESS FOR TREATING WASTE WATER CONTAINING RADIOACTIVE SUBSTANCES. Kojima, K. (to Daicel Ltd.). US Patent 4,161,447. 17 Jul 1979. Priority date 13 Jun 1974, Japan, 6p.

A process for treating waste water containing radioactive substances comprising treating the waste water by reverse osmosis in the presence of at least one organic surfactant selected from the group consisting of anionic surfactants, cationic surfactants and nonionic surfactants.

1119 RADIOACTIVE GASEOUS WASTE PROCESSING FACILITIES IN NUCLEAR POWER PLANTS. Kako, T. (to Toshiba Corp., Kawasaki, Kanagawa (Japan)). Japanese Patent 1954-99199/A/. 14 Jul 1979. 3p. (In Japanese).

In a gaseous waste processing system, a sub-cooler and a dryer are directly connected, and a damping tube and a sand filter are disposed between the dryer and an activated carbon tower. This can eliminate the energy loss due to temperature increase in the damping tube and the sand filter. Moreover, a pipeway is provided for passing the off-gas not through the sub-cooler but directly to the dryer at the low flow rate of the off-gas. This can save the operation of the sub-cooler upon low flow rate, by which the energy can be economized.

1120 PROCESS FOR THE REMOVAL OF IODINE AND IODINE COMPOUNDS FROM GASES AND VAPOURS AND SORPTION AGENTS IMPREGRATED WITH SILVER NITRATE TO CARRY OUT THE PROCESS. Wilhelm, J.; Schuettelkopf, H.; Dorn, L.; Heinze, G. (to Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.); Bayer A.G., Leverkusen (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,109,146/B/. 12 Jul 1979. 6p. (In German).

The gases and vapours containing the radioactive fission product iodine - in elementary form or as an organic compound, e.g. CH_3I, are led through a loosely packed bed of granulated metal. The granulated metal may be molded into porous plates or cylinders. The granulates consist mainly of amorphous silica gel impregnated with silver nitrate, with a volume porosity of 50 to 70% and a specific surface of 70 to 250 m^2/g according to BET. The silica gel may contain fractions of Al_2O_3 and/ or oxides of alkaline earth metals. (DG) 891 HP/ DG 892 MBE.

1121 SOLIDIFICATION PROCESS FOR AN AQUEOUS SOLUTION CONTAINING RADIOACTIVE OR TOXIC WASTES. Knieper, J.; Printz, H.; May, K. (to Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,559,724/B/. 12 Jul 1979. 2p. (In German).

The binder gypsum, with a content of constitutional water of 4.7 to 6.6% and a carbonate content smaller than 1%, is mixed with water glass. After this, one adds the waste-containing solution with HF, H_2SO_4, $HClO_4$, HCl, HNO_3, or KOH, NaOH, NE_3, CaOH up to content of 40% by weight or with water-soluble organic compounds. (DG) 891 HP/DG 892 MBE.

1122 METHOD FOR THE RECOVERY OF PALLADIUM AND TECHNETIUM. Horwitz, E.P.; Delphin, W.H. (to Department of Energy, Washington, DC (USA); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,855,821/A/. 12 Jul 1979. 10p. (In German).

The Pd (incl. Pd 107) and Tc (incl. Tc 99) are recovered from waste solutions of reprocessing plants for e.g. LWR fuel. For this purpose one brings the waste solution into contact with the extracting agent 0 x 1 M TCMA x NO_3 in DEB. Pd and Tc are recovered from the extracting agent and from all other co-extracted values by means of an 8 m HNO_3 strip solution.

1123 RECOVERY OF PALLADIUM AND TECHNETIUM VALUES. Horwitz, E.P.; Delphin, W.H. (to Department of Energy, Washington, DC (USA)). British Patent 2,011,696/A/. 11 Jul 1979. 3p.

A method is described for recovering palladium and technetium values from nuclear fuel reprocessing waste solutions containing these and other values by contracting the waste solution with an extractant of tricaprylmethylammonium nitrate in an inert hydrocarbon diluent which extracts the palladium and technetium values from the waste solution. The palladium and technetium values are recovered from the extractant and from any other coextracted values with a strong acid strip solution.

1124 RECOVERY OF ACTINIDE VALUES. Horwitz, E.P.; Delphin, W.H.; Mason, G.W. (to Department of Energy, Washington, DC (USA)). British Patent 2,011,697/A/. 11 Jul 1979. 8p.

A process is described for partitioning and recovering actinide values from acidic waste solutions resulting from reprocessing of irradiated nuclear fuels by adding hydroxylammonium nitrate and hydrazine to the waste solution to adjust the valence of the neptunium and plutonium values in the solution to the +4 oxidation state, thus forming a feed solution and contacting the feed solution with an extractant of di-hexoxyethyl phosphoric acid in an organic diluent whereby the actinide values, most of the rare earth values and some fission product values are taken up by the

extractant. Separation is achieved by contacting the loaded extractant with two aqueous strip solutions, a nitric acid solution to selectively strip the americium, curium and rare earth values and an oxalate solution of tetramethylammonium hydrogen oxalate and oxalic acid or trimethylammonium hydrogen oxalate to selectively strip the neptunium, plutonium and fission product values. Uranium values remain in the extractant and may be recovered with a phosphoric acid strip. The neptunium and plutonium values are recovered from the oxalate by adding sufficient nitric acid to destroy the complexing ability of the oxalate, forming a second feed, and contacting the second feed with a second extractant of tricaprylmethylammonium nitrate in an inert diluent whereby the neptunium and plutonium values are selectively extracted. The values are recovered from the extractant with formic acid.

1125 METHOD OF PROCESSING RADIOACTIVE WASTES. Horiuchi, S.; Taniguchi, T.; Hirano, M.; Hyakutake, H.; Takamura, Y. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 1954-87400/A/ . 11 Jul 1979. 5p. (In Japanese).

Ion exchange resin re-generation liquid wastes, used precoat filter aids and used ion exchange resin slurries in tanks are supplied through pipeways to the inside of a centrifugal thin film dryer. They are mixed with miscellaneous solid burning ashes stored in a hopper into pellets. The pellets are charged in drum cans, and the cans are closed after injection of asphalt. The centrifugal thin film dryer consists of a barrel containing therein a revolutional shaft attached with revolutional blades. The supplied slurries are forced to the inner surface of the barrel by the revolutional blades and heated to dry by the steams in jackets.

1126 PROCESS FOR SOLIDIYING NUCLEAR MATERIALS. Dosch, R.G. (to Department of Energy, Washington, DC (USA)). Canadian Patent 1,057,947/A/. 10 Jul 1979. 30p.

A process is described for solidifying radioactive liquid waste which employs complex anions having the general formula (M sub(x) O sub(y) H sub(z)), where M is titanium, niobium, tantalum or zirconium and x is at least two. Water-insoluble materials containing the radioactive components are formed which may be subsequently heated at from about 100 deg C to 1000 deg C to form chemically stable complex oxide mixtures. Four specific complex anions which may be employed are $(Ti_2O_5H)^-$, $(Zr_2O_5H)^-$, $(Nb_2O_6H)^-$, and $(Ta_2O_6H)^-$, referred to respectively as titanate, zirconate, niobate, and tantalate. Instructions for their preparation are given. They may be contacted with radioactive waste containing ions of selenium, rubidium, strontium, yttrium, zirconium, niobium, molybdenum, technetium, ruthenium, rhodium, palladium, silver, cadmium, indium, tin, antimony, tellurium, cesium, barium, lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, or dysprosium either in one batch equilibration contacting step, or by passing the radioactive solution through an ion exchange column containing $Na(Ti_2O_5H)$ or a similar material, or using a combination of these processes. The stable solid formed is dried by heating from about 100 deg C to 500 deg C in an atmosphere of air, inert gas, or reducing gas at reduced pressure. After drying the solid may be compressed and sintered to form a chemically stable, inert oxide ceramic product. It is claimed that greater than about 99.9 percent of multivalent radioactive elements are removed from aqueous solution using this process.

1127 BEHAVIOURS OF TRINITRATONITROSYL COMPLEXES OF RUTHENIUM IN DILUTE NITRIC ACID SOLUTIONS. Sugimoto, S. (Radia Industry Co. Ltd., Takasaki (Japan)). Radioisotopes (Tokyo) ; 28: No. 7, 425-430(Jul 1979). (In Japanese).

This study aimed to elucidate the protolysis and condensation processes of the Ru complexes in relation to the concentration of nitric acid. The compositions of the dissociated and undissociated complexes were determined by the extraction with tributyl phosphate (TBP) and absorption spectroscopy in order to follow the rather rapid protolysis reaction of the complexes. The test solutions were prepared by dissolving the freshly obtained complexes into 0.50 - 0.001 M nitric acid solutions. The amounts of the undissociated complexes were determined at different elapses of time in the test solutions. The protolysis became significant when the concentration was below 0.15 M, and the dissociation rate suddenly increased at this concentration. At the concentrations above 0.2 M, the absorption peak of the complexes at 480 nm survived even after 144 hours. But below 0.15 M, the formation of dissociation products by protolysis was observed after the disappearance of the absorption peak. The amount of dissociation products rapidly increased after the preparation of the test solution as the concentration decreased below 0.15 M.

1128 SETTING UP OF REACTION MODEL FOR THE DENITRATION OF EFFLUENTS FROM THE PROCESSING OF NUCLEAR FUELS. Holze, K.; Finke, H.D.; Deckwer, W.D. (Hannover Univ. (Germany, F.R.). Inst. fuer Technische Chemie); Kelm, M. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Entsorgungstechnik). Chemie-Ingenieur-Technik ; 51: No. 7, 754-755(Jul 1979). (In German).

DENITRATION;FORMIC ACID;ISOTHERMAL PROCESSES; NITRIC ACID;NUCLEAR FUELS;REPROCESSING;TIME DEPENDENCE;RADIOACTIVE WASTE PROCESSING

1129 CONTINUOUS BITUMINIZATION PLANT FOR SOLIDIFYING RADIOACTIVE WASTES. Ishikawa, T.; Hamano, M.; Misawa, H.; Hidaka, Tsukasa; Negishi, I. (Ebara Mfg. Co. Ltd., Tokyo (Japan)). Ebara Jiho (Ebara Times) ; No. 109, 49-52(Jul 1979). (In Japanese).

Following the delivery of two units to BWR power stations, another continuous bituminization plant of the same capacity has been delivered to Kansai Electric Power Co., Inc.'s Mihama Nuclear Power Station and is now operating smoothly. This unit is the first in the world for a PWR power station on an industrial scale and has been designed to solidify mainly radioactive boric acid waste solution, using a vertical centrifugal thin film evaporator. This equipment has demonstrated a rated water evaporation capacity of more than 200 kg/h with actual radioactive concentrated waste.

1130 STUDIES ON THE REMOVAL OF HYDROPHILIC RADIOACTIVE SUBSTANCES FROM RADIOACTIVE WASTE. Kojima, S. (Teikyo Univ., Tokyo (Japan)); Kubodera, A. Radioisotopes (Tokyo) ; 28: No. 7, 447-449(Jul 1979). (In Japanese).

CALCIUM CHLORIDES;CARBON 14;DECONTAMINATION; DEHYDRATION;RADIOACTIVE WASTE PROCESSING; DISTILLATION;LIQUID SCINTILLATORS;LIQUID WASTES; RADIOACTIVE WASTE DISPOSAL;RADIOACTIVE WASTES; TRITIUM

1131 DEVELOPMENT AND VERIFICATION TEST ON REMOTE PLASMA CUTTING OF LARGE METALLIC WASTE. Ozawa, T.; Yamada, K.; Abe, T. (Kawasaki Heavy Industries Ltd., Kobe (Japan)). FAPIG (Tokyo) ; No. 92, 37-40(Jul 1979). (In Japanese).

Plasma cutting is the cutting method to melt and scatter cut objects by generating arc between an electrode in a nozzle and the cut objects and making working gas fed to surround it into high temperature, high speed plasma jet. In case of remote plasma cutting, a torch for the plasma cutting is operated remotely with a manipulator from the outside of a cell. At the time of planning the method of breaking up solid wastes, the type of cutting machines and the method of remote operation of the cutting machines and cut objects were examined. It was decided to adopt plasma cutting machines, because their cutting capability such as materials, thickness and cutting speed is excellent, and the construction and handling are simple. The form of the solid wastes to be cut is not uniform, accordingly the method of manipulator operation was adopted to respond to various forms flexibly. Cut objects are placed on a turntable to change the position successively. In case of remote plasma cutting, the controls of torch speed and gap must be made with a manipulator. The use of light-shielding glasses reduces largely the watchability of cut objects and becomes hindrance in the operation. As for the safety aspect, the suitable gas for cutting, which does not contain hydrogen, must be selected. The tests carried out for two years since November, 1977, are reported in this paper, and most of the problems have been solved.

1132 METHOD OF PROCESSING RADIOACTIVE LIQUID WASTES. Matsuura, H.; Kuribayashi, N.; Minami, Y.; Kamiyama, H. (Nippon Atomic Industry Group Co. Ltd., Tokyo). (to Nippon Atomic Industry Group Co. Ltd., Tokyo; Toshiba Corp., Kawasaki, Kanagawa (Japan)). Japanese Patent 1954-81499/A/. 28 Jun 1979. 3p. (In Japanese).

Radioactive liquid wastes within a storage tank are supplied to a drier where the wastes are subjected to evaporation treatment, and pulverized. The thus dried powders are temporarily stored in a hopper by means of a screw feeder. The dry powders which have reached a predetermined quantity are supplied to a stirrer-granulator by means of a quantitative screw feeder, and mixed and stirred with a binder sent from a binder storage tank through a binder quantity determining device, whereby the powders are granulated. After the granulation, the granulated powders are extruded by a centrifugal force, and filled in the storage vessel by way of a conduit.

1133 METHOD AND DEVICE FOR CONTROLLING THE RADIOACTIVE LIQUID WASTES PROCESSING SYSTEMS. Watanabe, T. (to Toshiba Corp., Kawasaki, Kanagawa (Japan)). Japanese Patent 1954-74999/A/. 15 Jun 1979. 26p. (In Japanese).

A method is claimed to conduct sampling for liquid wastes and processing water with no overlaps in a nuclear power plant by scattering the starting time for the sampling in each of a plurality of pure water cleaning systems by an interval exceeding a predetermined of time in a nuclear power plant. Among output signals from level meters of liquid wastes tanks, the signal selection station of a control unit selectively issues a liquid level signal from a liquid waste tank now in collecting liquid wastes to a precasting station for the start of sampling and a liquid level signal from a liquid waste tank now in conducting water cleaning procession for the liquid wastes to an output station for sampling instruction. The signal from each of the output stations for sampling instruction is issued to the inlet valve of a liquid waste tank to determine if the tank is in collecting the liquid wastes. While on the other hand, the output station for the sampling instruction combines the precast time for the start of water cleaning procession in each of the systems inputted from the precasting station for the start of sampling and each of the signals inputted from a processing amount operating station to conduct logic operation and issues output signal for the sampling operation.

1134 METHOD OF PROCESSING RADIOACTIVE WASTES. Horiuchi, S.; Hirano, M.; Yusa, H.; Chino, K.; Hayashi, T. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 54-75,000/A/. 15 Jun 1979. 4p. (In Japanese).

The purpose is to dry and pulverize radioactive solid wastes by a centrifugal thin film dryer provided with a revolutional blade to reduce their volume. Exhausted ion exchange resins in a storage tank are added to the main body of centrifugal thin film dryer. The main body is inserted with a revolutional shaft with blades and heated by steam from a boiler. The slurry with ion exchange resins are deposited into the inner wall of the main body under the centrifugal force of the rotation of the revolutional shaft, dried while falling along the inner wall and then finely pulverized by the rotation of the blades. The resulting dry powder is pelletized in a pelletizer.

1135 TREATMENT OF RADIOACTIVE SLUDGE. Allison, W.; Payne, B.J.; Pegler, G.E. (to Central Electricity Generating Board, London (UK)). British Patent 2,009,486/A/. 13 Jun 1979. 12p.

Radioactive sludge e.g. that which may accumulate in irradiated nuclear fuel element storage ponds, is treated by pumping it from a settling tank to a particle separator, conveniently a hydrocyclone and a sloping plate separator, the liquid being returned to the settling tank and the solids being metered into a drum pre-lined with dry cement. The drums are in a containment box in which they are transferred to a mixing station where the particles and cement are mixed and thence to a curing station. After curing the drums are embedded in cement in outer containers for transport to a long-term storage site.

1136 SOLIDIFICATION DEVICE FOR RADIOACTIVE GASEOUS WASTES. Shimada, M.; Terasawa, M. (to Toshiba Corp., Kawasaki, Kanagawa (Japan)). Japanese Patent 54-74,100/A/. 13 Jun 1979. 3p. (In Japanese).

The purpose is to improve the efficiency of the solidifying process of radioactive gaseous wastes by ionizing radioactive gases, and then injecting them ina storing terget opposing to a sputtering target thereby solidifying them. Gaseous wastes such as radioactive gases, are ionized by an ion source into ion beams, accelerated in an accelerator and then injected to an ion injection chamber. A storing target and a sputtering target are placed opposite each other in the ion injection chamber. When the ion beams are injected into the sputtering target, atoms are discharged and deposited in storing target. Since ion injection and the solidification of the injected ions can be effected simultaneously, the efficiency of the solidifying process can be improved.

1137 METHOD OF PROCESSING ORGANIC MATERIALS CONTAINING RADIOACTIVE ELEMENTS. Kitazato, H.; Hashimoto, S.; Asakura, Y. (to Chiyoda Chemical Engineering and Construction Co. Ltd., Tokyo (Japan)). Japanese Patent 54-71,300/A/. 7 Jun 1979. 4p. (In Japanese).

The purpose is to bond radioactive organic wastes containing ^{3}H and ^{14}C from laboratories and hospitals to inorganic solids by a sample and safe method so that they are inflammable and are easily transpoiled and stored. The solid components of the liquid waste separated in a sedimentation tank and a solid-liquid separator are then added a closed type burner reactor. The condensed water of the flammable gas is separated in a vapor-liquid separator, and the gas is sent to a solidification section. The solidification section consists of a reveral of towers absorbing or adsorbing respective components of the gas, to purify it. Solids from the sedimentation tank, and the solid-liquid separator are stored in a tank, later burned in a solid burner reactor, and the resulting residue and condensed water from the vapor-liquid separating tank are collected in the storage tank and sent to the solidification device and solidified with cement.

1138 METHOD AND DEVICE FOR REMOVING VOLATILE COMPONENTS IN RADIOACTIVE LIQUID WASTES. Suzuki, T.; Inami, I.; Shirai, T.; Sakurai, M. (Nippon Atomic Industry Group Co. Ltd., Tokyo). (to Nippon Atomic Industry Group Co. Ltd., Tokyo; Toshiba Corp., Kawasaki, Kanagawa (Japan)). Japanese Patent 54-69,700/A/. 4 Jun 1979. 4p. (In Japanese).

The purpose is to cool and condense vapor obtained from concentrating radioactive liquid wastes at temperature in the range of from 60 to 80 C, and to blow a carrier gas into the condensed water to cause the water to carry out vapor-liquid contact and to remove volatile components mixed in the condensed water. A volatile component removing device consists of a cooler for cooling vapor containing volatile components generated in a vapor concentrator, in the range of from 60 to 80 C, a device for aerating condensed water in the cooler, a device for supplying a carrier gas such as nitrogen to be blown in the aeration device, and a device for treating volatile components and carrier gas removed in accompaniment with the blown-in gas. In this case, the interior of the aeration device is formed by a tank partitioned into several chambers by baffle boards, and both sides of the tank are provided with an inlet and an outlet with thermocouples. Gas from the carrier gas supplying device some into the tank through a flowmeter and an air blow-off part.

1139 US PROGRAM FOR THE IMMOBILIZATION OF HIGH-LEVEL NUCLEAR WASTES. Crandall, J.L. (Savannah River Lab., Aiken, SC). Transactions of the American Nuclear Society ; 32: 101-104(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

RADIOACTIVE WASTE PROCESSING;HIGH-LEVEL RADIOACTIVE WASTES;SOLIDIFICATION;STABILITY; LEACHING

1140 LOGISTICAL ADVANTAGES OF MOBILE RADWASTE PROCESSING SYSTEMS. Potter, J.R. (Chem-Nuclear Systems, Inc., Barnwell, SC). Transactions of the American Nuclear Society ; 32: 695(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

RADIOACTIVE WASTE DISPOSAL;LOW-LEVEL RADIOACTIVE WASTES;RADIOACTIVE WASTE PROCESSING; RADIOACTIVE WASTE FACILITIES;MOBILITY; SOLIDIFICATION;FILTRATION;DEMINERALIZATION;UREA; FORMALDEHYDE;EQUIPMENT

1141 VOLUMETRIC REDUCTION TECHNIQUES FOR LOW-LEVEL RADIOACTIVE WASTE. Benda, G.A. (Chem-Nuclear Systems, Inc., Barnwell, SC). Transactions of the American Nuclear Society ; 32: 696(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

RADIOACTIVE WASTE PROCESSING;LOW-LEVEL RADIOACTIVE WASTES;VOLUME;RADIOACTIVE WASTE DISPOSAL;COMPACTING;FILTRATION;DEMINERALIZATION; SOLIDIFICATION;COMBUSTION

1142 INERT-CARRIER RADWASTE VOLUME REDUCTION AND SOLIDIFICATION SYSTEM. Green, T.A. (General Electric Co., San Jose, CA); Sheeline, R.D. Transactions of the American Nuclear Society ; 32: 696-697(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

RADIOACTIVE WASTE PROCESSING;SOLIDIFICATION; VOLUME;LOW-LEVEL RADIOACTIVE WASTES

1143 OPERATION OF A PILOT SOLID WASTE INCINERATOR. Hootman, H.E.; Trapp, D.J.; Warren, J.H. (Savannah River Lab., Aiken, SC). Transactions of the American Nuclear Society ; 32: 391-392(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

INCINERATORS;OPERATION;SOLID WASTES;BENCH-SCALE EXPERIMENTS;RADIOACTIVE WASTE PROCESSING; COMBUSTION;TRANSURANIUM ELEMENTS

1144 SLURRY FEEDING OF NUCLEAR WASTES TO AN ELECTRIC GLASS MELTER. Buelt, J.L.; Chapman, C.C. (Battelle Northwest Labs., Richland, WA). Transactions of the American Nuclear Society ; 32: 393-394(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

JOULE HEATING;CERAMICS;HEATERS;SLURRIES; MATERIALS HANDLING;EQUIPMENT;LIQUID WASTES; RADIOACTIVE WASTE PROCESSING;SOLIDIFICATION; VITRIFICATION

1145 DRY RECOVERY OF CERAMIC URANIUM DIOXIDE WASTE MATERIAL. Schwartz, I.; Mintz, M.H.; Hadari, Z. (Ben-Gurion Univ. of the Negev, Beersheba (Israel). Dept. of Nuclear Engineering). Journal of Nuclear Materials (Journal des Materiaux Nucleaires) ; 82: No. 1, 54-59(Jun 1979).

Three dry recovery routes of ceramic uranium dioxide waste material were studied: (a) calcination of waste material to U_3O_8 and blending with the original UO_2 powder; (b) calcination to U_3O_8 then reduction to UO_2 and blending with the original UO_2 powder; (c) grinding the waste material to a fine powder and blending with the original UO_2 powder. The first route resulted in an increased open porosity and decreased closed porosity of the sintered UO_2 pellets. The second recovery route had almost no effect on the quality of the sintered pellets, while the third route caused an increase in open porosity up to about 15 to 18 wt% of the added scrap material and increased closed porosity for higher concentrations of the added recovery material.

Effects of sieving the recovered scrap powders were also investigated. No effects were observed for the first and second recovery routes, while for the third route more pronounced effects were obtained for coarsely ground powders.

1146 GLASSES WITH AMORPHOUS STRUCTURE USED FOR THE PACKAGING OF RADIO-ACTIVE WASTE. Sombret, C. (CEA Centre de Marcoule, 30 - Bagnols-sur-Ceze (France). Service des Ateliers Pilotes). Journal of Nuclear Materials (Journal des Materiaux Nucleaires) ; 82: No. 1, 163-171(Jun 1979). (In French).

The vitrification of solutions of fission products enables them to be stored in solid form, which is most important for the safety of this type of highly radio-active waste. The glasses used have a silica base. Their physico-chemical properties affecting their workability and their behaviour during long-term storage are reviewed. The accent is particularly on their chemical and thermal stability. Fabrication techniques are described. One of these, a continuous process using a preliminary calcination stage, has been employed in an industrial unit. This unit, called AVM (Atelier de Vitrification de Marcoule), after a test period, was put into commercial use in June 1978. It has been provided for treatment of the production of the Marcoule works and for treatment of the stock in less than ten years. This work re-treats the fuel and graphite from experimental reactors, the glasses used being of the alumino-boro-silicate and boro-silicate types, respectively.

1147 DISPOSAL OF RADIOACTIVE WASTES BY VITRIFICATION. Mukerji, J. (Central Glass and Ceramic Research Inst., Calcutta (India)). Science Reporter (New Delhi) ; 16: No. 6, 371-378(Jun 1979).

Disposal of the three catagories of radioactive wastes viz. low level, intermediate level and high level is discussed. Low level wastes are generally diluted and dispersed in the environment. Intermediate level wastes are chemically treated for disposal. High level wastes are stored in underground stainless steel tanks with concrete casing. There are some drawbacks with storage of annually increasing liquid radioactive waste, such as space, storage time, corrosion etc. Various methods of immobilisation of wastes are stated, however immobilisation in a glassy matrix offers a safe method for long term storage of high level radioactive wastes. Disposal of waste by vitrification is described in brief. Advantages of immobilisation of fission products in a glassy matrix are given. In India, Central Glass and Ceramic Research Institute (CGCRI), Calcutta took up the project on development of glass composition for high level waste. Several glass compositions have been examined by CGCRI for containment of fuel reprocessing wastes. Four component glass forming systems are represented in a trial diagram at fixed level of 20 percent $Na_2B_4O_7$ and 13 percent of Fe_2O_3. Release of ^{90}Sr, ^{137}Cs and ^{144}Ce by the glass when it comes into contact with distilled water or sea water over extended period is shown with diagrams. Ways to prevent the escape of ^{106}Ru and ^{137}Cs from the glass melt in glass fixation plant are mentioned. Changes which may occur in the glass during storage of the sealed pot are briefly discussed.

1148 DECOMMISSIONING AND REBUILDING ACTIVE REPROCESSING PLANT. Barrett, T.R.; Thom, D. (UKAEA, Dounreay. Nuclear Power Development Establishment). Atom (London) ; No. 272, 142-145(Jun 1979).

The Fast Reactor Irradiated Fuel Reprocessing Plant at Dounreay, built originally to reprocess fuel from the experimental Dounreay Fast Reactor, is being recommissioned for the purpose of servicing the 250 MWe Prototype Fast Reactor fuel cycle. This marks the culmination of a remarkable exercise in the modification of active plant.

1149 EFFECTS OF NITRITE ON DENITRATION OF NUCLEAR FUEL REPROCESSING WASTE WITH ORGANIC REDUCTANTS. Kubota, M.; Yamaguchi, I.; Nakamura, H. (Japan Atomic Energy Research Inst). Journal of Nuclear Science and Technology (Tokyo) ; 16: No. 6, 426-432(Jun 1979).

Denitration with an organic reductant, such as formic acid or formaldehyde, to control the acidity of high radioactive nuclear fuel reprocessing waste, cannot suppress vigorous chemical reactions. To overcome this problem, nitrite was added to nitric acid solution before denitration, reducing the induction period to almost zero and the maximum gas evolution rate to less than 60% of the rate obtained in the absence of nitrite. The effective nitrite concentration was ¹m gr ¹e 0.01 mol/l in the reaction mixture. (1 diagram, 10 graphs, 9 references, 1 table)

1150 CHARACTERIZATION AND DISPOSAL OF RADIOACTIVE EFFLUENTS FROM URANIUM MINING. Moffett, D. (Rio Algom Limited, Elliot Lake, Ontario). CIM (Canadian Institute of Mining and Metallurgy) Bulletin ; 72: No. 806, 152-156(Jun 1979).

Rio Algom has mined uranium at Elliot Lake, Ontario for 20 years. The production of this energy-generating element results in the need to dispose of low-level radioactive solid wastes and liquid effluents. Because of the wet-temperate climate at Elliot Lake, the liquid effluents are of particular importance. Radium-226 is the isotope which requires most attention, and the current practice for its control is by addition of barium chloride and retention of the resultant precipitates in large settling ponds. Analyses of typical effluents and waste streams are discussed and typical levels of radium-226, thorium-230, thorium-232, thorium-228, lead-210, polonium-210, and uranium isotopes are presented. (author).

1151 STUDY ON DECONTAMINATION OF RADIOACTIVE RUTHENIUM BY STEEL WOOL IN WASTE SOLUTION. Sugimoto, S.; Sakaki, T. (Radia Industry Co. Ltd., Takasaki, Gunma (Japan)). Radioisotopes (Tokyo) ; 28: No. 6, 361-366(Jun 1979). (In Japanese).

Tracer experiments were done in order to establish a decontamination process of ^{106}Ru in radioactive waste solution by column method paying special attention on the solution of nitrato-nitrosyl complex of Ru which is often encountered as a low level radioactive solution. It turned out that metallic iron was the most effective decontaminating agent among the several tens of materials tested. The decontamination factor (DF) of ^{106}Ru increased in proportion to the total surface area of iron and it sensitively depended on the oxidation state of the surface as revealed by the batchwise and columnwise tests. Iron samples with high corrosiveness gave a much larger DF than those with low corrosiveness. The decontamination process proceeded as iron was being oxidized via Fe(metal) → Fe(II) → Fe(III). As the results, the DF initially

increased after initiating the passage of water through the column but it then decreased as the oxidation process became inactive. An excellent durability up to 10000 bed volumes was demonstrated by the column method at a high average DF of 150.

1152 PHASE SEPARATION IN THE GLASS CONTAINING HIGH LEVEL RADIOACTIVE WASTE. Yamane, M.; Nakao, Y. (Tokyo Inst. of Tech. (Japan). Faculty of Engineering). Yogyo Kyokai Shi (Journal of the Ceramic Association of Japan) ; 87: No. 1006, 327-332(Jun 1979). (In Japanese).

The phase separation in the glass of the system Na_2O-B_2O_3-SiO_2-MoO_3 has been investigated as the basic study on the solidification of high level radioactive waste with glass. The amount of MoO_3 or sham-waste to be introduced without phase separation into the glass increased with the substitution of B_2O_3 for SiO_2 in the basic glass composition. Parameters for estimating the limiting amount of MoO_3 to be introduced into a glass of given composition were determined from experimental data, assuming the melt of the system Na_2O-B_2O_3-SiO_2-MoO_3 to be the regular solution of pseudo-binary system consists of two end members, Na_2MoO_4 and the remaining oxides. The limiting amount of waste to be introduced, estimated using the parameter for respective structural unit which is expected for a melt of given composition, agreed to the experimental result.

1153 SEPARATION OF TRANSPLUTONIUM AND RARE-EARTH ELEMENTS BY EXTRACTION WITH DI-ISODECYL PHOSPHORIC ACID FROM DTPA SOLUTION. Tachimori, S.; Sato, A.; Nakamura, H. (Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Journal of Nuclear Science and Technology (Tokyo) ; 16: No. 6, 434-440(Jun 1979).

The distribution ratio Df and the separation factor β for Nd(III) to Am(III) were studied in DIDPA-DTPA systems to determine optimum conditions for applying DIDPA to the TALSPEAK type extraction process to separate transplutonides from lanthanoids in the partitioning of high-level waste of nuclear fuel reprocessing. Extraction of lanthanoids from 0.05 -- 0.1 M DTPA-1 M lactic acid (pH 3.0) aqueous solution into 0.2 -- 0.3 M DIDPA in DIPB gives the separation factor of 20 revealing practicability of this system in the partitioning. The nature of diluent affects greatly Df, and DIPB proved to be the most appropriate one for the separation of transplutonides from lanthanoids. The presence of lactic acid in the aqueous phase improved the extraction kinetics in DIDPA-DTPA system.

1154 REMOVAL PROCESSES FOR RADIOACTIVE RARE GAS OF FUEL REPROCESSING PLANT. Nakajima, K.; Nakanishi, Y. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). Nippon Genshiryoku Gakkaishi (Journal of the Atomic Energy Society of Japan) ; 21: No. 6, 463-470(Jun 1979). (In Japanese).

With the advance in atomic energy utilizations, the problem of environmental radiation is attracting more attention. For radioactive rare gases from nuclear power plants and fuel reprocessing plants, therefore, efforts are being made world-wide to develop the techniques of reducing their releases to the environment as far as practically possible. First, the world situation of the removal and also storage techniques for krypton is described as follows: liquefaction-distillation, low-temperature active carbon adsorption, solvent absorption, and membrane. Then, a Kr recovery facillity planned by Power Reactor and Nuclear Fuel Development Corporation (PNC) for its fuel reprocessing plant is explained. Construction of the Kr recovery facility in PNC will start in fiscal 1979, and the completion in fiscal 1981. Its gas treatment capacity is 1,200 Nm^3/d, and the facility is based on air separation, i.e. liquefaction-distillation process. Special emphasis in the design is placed on the careful treatment of gas to improve safety and the leakage prevention of radioactive gas.

1155 EFFECTS OF NITRITE ON DENITRATION OF NUCLEAR FUEL REPROCESSING WASTE WITH ORGANIC REDUCTANTS. Kubota, M.; Yamaguchi, I.; Nakamura, H. (Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Journal of Nuclear Science and Technology (Tokyo) ; 16: No. 6, 426-433(Jun 1979).

Denitration with organic reductant such as formic acid is exclusively used for controlling acidity of the highly radio-active liquid waste (HLW) from nuclear fuel reprocessing. This method, however, has a problem in suppressing a vigorous chemical reaction. The present study aimed at overcoming the disadvantage by the addition of nitrite to nitric acid solution before denitration. As a result, the nitrite addition in the denitration of simulated HLW could reduce the induction period to almost zero and the maximum gas evolution rate to less than 60% of that obtained in the absence of nitrite. Effectiveness of nitrite addition was enhanced especially for HNO_3 concentration higher than 8 mol/l. The effective nitrite concentration was over 0.01 mol/l in the reaction mixture.

1156 REMOVAL OF PLUTONIUM AND AMERICIUM FROM ALKALINE WASTE SOLUTIONS. Schulz, W.W. (to Dept. of Energy). US Patent 4,156,646. 29 May 1979. Filed date 16 Jun 1978. 12p.

High salt content, alkaline waste solutions containing plutonium and americium are contacted with a sodium titanate compound to effect removal of the plutonium and americium from the alkaline waste solution onto the sodium titanate and provide an effluent having a radiation level of less than 10 nCi per gram alpha emitters.

1157 METHOD TO IMPROVE THE LEACHING RESISTANCE OF BITUMEN SOLIDIFICATION PRODUCTS. Hild, W.; John, E.; Kluger, W. (to Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). German(FRG) Patent 2,748,098/A/. 10 May 1979. 11p. (In German).

The method to stabilize radioactive slurries intercalated in bitumen described in the main patent 2628286 is improved upon by having an insert of inorganic structure material for the used container which has been impregnated with bitumen or similar water-resistant materials. Tissues of glass fibre, mineral fibres or asbestos fibres, thin structured metal foils are suitable. When the hot bitumen has been filled in the container, the insert forms a unit with the content which is very resistant to leaching.

1158 METHOD OF TREATING DISCHARGE WATER FROM PREPARATION PLANTS OF URANIUM ORES. Klicka, V.; Mitas, J.; Vacek, J. Canadian Patent 1,053,912/A/. 8 May 1979. 10p.

A process is described for the treatment of radioactively contaminated waste water emitted from an installation for chemically preparing

uranium ore by an alkaline process, which comprises evaporating the waste water to increase its concentration, crystallizing an inorganic salt (sodium sulfate) from the resulting concentrated solution, separating the crystallized salt from the mother liquor, returning the mother liquor to the installation and feeding condensate distilled from the waste water during the evaporation back to the installation to provide fresh water for use in the ore treatment.

1159 GASIFICATION OF GRAPHITE. Sugikawa, S. (to Japan Atomic Energy Research Inst., Tokyo). Japanese Patent 1954-55,297/A/. 2 May 1979. 3p. (In Japanese).

Purpose: To process the waste contaminants of graphite moderated reactors by gasifying the moderator and fuel can graphite in the presence of carbon dioxide. Method: Graphite blocks used as moderator and reflector are impregnated with a solution containing $Co(NO_3)_2$ (0.6 - 1.5 M), $NaNO_3$ (0.5 - 1.5M), and HNO_3 (1 - 18M) at about 20 - 80°C. After dehydration and denitration in air or nitrogen at a temperature above 100°C, the fuel compacts or graphite blocks are added with Co-Na catalyst. The graphite matrix or block is then gasified by contact with a stream of 100% CO at about 850°C.

1160 NUCLEAR ENERGY AND THE FUEL CIRCUIT. Dejonghe, P. (Centre d'Etude de l'Energie Nucleaire, Mol (Belgium)). Atom und Strom ; 25: No. 3, 71-77(May-Jun 1979). (In German).

The author gives a review of the nuclear fuel circuit and discusses the final storage of the conditioned waste from the Belgian point view.

1161 IONIC FLOTATION OF STRONTIUM 89. Berezyuk, V.G.; Evtyukhova, O.V. (Ural'skij Politekhnicheskij Inst., Sverdlovsk (USSR)). Zhurnal Prikladnoi Khimii (Leningrad) ; 52: No. 5, 1038-1042(May 1979). (In Russian).

The experimental results are given on ^{89}Sr ionic flotation out of sewage after deactivation using sodium dodecylbenzene sulfonate (DBSNa) as a foamer. Strontium was used in the form of $SrCl_2$ at the 1.5-2.0 μCi/l isotopic concentration. It is established that the best condition of ^{89}Sr flotation is the 2.0-2.5 pH range. During ionic flotation interaction of ^{89}Sr microquantities with DBSNa has in the main an ion exchange character. The experimental data satisfactorily obey the equation being a consequence of the law of mass action. The process kinetics can be described by the equation of the first-order reaction.

1162 PRESENT STATE AND POLICY OF LOW-LEVEL RADIOACTIVE MANAGEMENT. Yonemoto, H. (Science and Technology Agency, Tokyo (Japan). Nuclear Safety Bureau). Kogai To Taisaku (Journal of Environmental Pollution Control) ; 15: No. 5, 643-649, 660(May 1979). (In Japanese).

Radioactive wastes can be grouped broadly in those from nuclear fuel cycle and those from radioisotope utilizations. In the former group, low-level wastes arise from nuclear power plants, and from fuel reprocessing plants, low-level wastes and also small quantities of high-level ones arise. In the latter group, wastes are mostly low-level ones in small quantities, but the sources, kinds and properties are various. In view of the rapidly rising quantities of such wastes in future, their management in proper and adequate manners is essential for sakes of safety and environment protection. The following matters are described: the laws and regulations on radioactive wastes; the sources of radioactive wastes and their treatments and disposals in nuclear power generation, uranium fuel fabrication and RI utilizations; future quantities of radioactive wastes; the policy of radioactive waste management for low-level solid wastes, sea disposal and land disposal.

1163 SOLIDIFICATION OF HIGHLY ACTIVE WASTES GENERATED BY REPROCESSING: REALIZATION AND FORECASTING. Amaury, P. (Compagnie Generale des Matieres Nucleaires (COGEMA), La Boursidiere, 92 - Le Plessis-Robinson ; France)). Techniques de l'Energie ; No. 26, 57-59(May 1979). (In French).

Cogema operates two major reprocessing plants in France - one at Marcoule, the other at La Hague. The Commissariat a l'Energie Atomique has developed for Cogema a continuous industrial process for solidifying highly active wastes coming from these and any future plants. After several years of development at the pilot levels, this industrial process has been working on a large-scale demonstration plant since June last year. The plant is called the 'Marcoule Vitrification Workshop' (Atelier de Vitrification de Marcoule AVM).

1164 DEHYDRATION OF CONTAMINATED ANIMAL CARCASSES WITH A COMMERCIAL LYOPHILIZER. Suda, H.; Ishige, K.; Yokota, S.; Fujita, H.; Mori, T. (Tokai Univ., Tokyo (Japan)). Radioisotopes (Tokyo) ; 28: No. 5, 319-321(May 1979). (In Japanese).

AERIAL MONITORING;AIR FILTERS;CARBON 14; CUTTING;DEHYDRATION;DRYING;LYOPHILIZATION; RADIOACTIVE WASTE DISPOSAL;RADIOACTIVE WASTES; TEMPERATURE DEPENDENCE;TIME DEPENDENCE;TRITIUM; LABORATORY ANIMALS;RADIOACTIVE WASTE PROCESSING

1165 EXPERIENCES OF RADIOACTIVE WASTE PROCESSING AND STORAGE. Feher, L.; Kasza, J. (Fovarosi Kozegeszsegugyi es Jarvanyugyi Allomas, Budapest (Hungary)). Izotoptechnika ; 22: No. 3, 127-136(May 1979). (In Hungarian).

The experiences in the field of radioactive waste disposal after two and a half year long operation period are reviewed. Detailed data are given on the quantity and origin of deposited solid phase wastes, sealed radiation sources (alpha, beta, gamma, neutron), biological materials, radioactive sewage and organic solvents. The methods of waste processing and deposition and the control of environmental contamination are also discussed.

1166 FILTRATION OF RADIOACTIVE WATER. Mueller, H. Informations Chimie ; No. 189, 213-216(May 1979). (In French).

The Funda filters developed for nuclear uses are fitted with a certain number of conical discs whose upper side is covered with a filtering mesh. These discs are mounted horizontally on the hollow vertical shaft that supports the entire filtering package. The spaces between the discs can vary with the spacers used and depend on the type and volume of cake to be achieved. The filtering of the waste waters and radioactive sludge has two purposes. The filter withholds the solids (suspended matter) and if an adequate filtering additive is used, it also withholds the dissolved components (salts) by adsorption and/or ion exchange. In this way the waste waters are decontaminated.

1167 TREATMENT OF ANIMAL WASTES CONTAMINATED WITH RADIOISOTOPES. Morikawa, N. (Tokyo Univ.

(Japan)). Kogai To Taisaku (Journal of Environmental Pollution Control) ; 15: No. 5, 661-666(May 1979). (In Japanese).

With increase of isotope utilizations as tracers in medicine, pharmacy, agriculture, biology and others, the management of resultant organic waste liquids and animal wastes is becoming a major problem. For the animal wastes contaminated with radioisotopes, numbers of studies and tests showed that drying them fully and the subsequent suitable disposal would be the most feasible procedures. This new method is being carried out since last year, which will shortly take the place of the keeping in formalin. For the drying, two alternative processes in particular are being investigated. As the one, freeze-drying apparatuses consist of refrigerating and freeze-drying devices. As the other, microwave-drying apparatuses feature rapid dehydration. The following matters are described: problems emerged in the course of studies and test; the drying processes, i.e. freeze-drying and microwave-drying, and their respective characteristics; and views of the Nuclear Safety Bureau, Science and Technology Agency, on animal waste drying. (J.P.N.).

1168 ELIMINATION OF MANGANESE-54 IN WASTE WATER BY OXINE-IMPREGNATED ACTIVATED CHARCOAL. Motojima, K.; Tachikawa, E.; Kamiyama, H. (Japan Atomic Energy Research Inst., Oarai, Ibaraki. Oarai Research Establishment). Journal of Nuclear Science and Technology (Tokyo) ; 16: No. 5, 356-362(May 1979).

Manganese ion in solution has been adsorbed in a column packed with oxine-impregnated activated charcoal. In an initial stage, the distribution of Mn ion along the column follows a first order kinetic equation, and the apparent rate constant was determined. With an additional supply of the solution, however, the distribution tends to deviate from the first order kinetic plots. A bed depth/service time relation has been determined experimentally. By introducing a concept of the effective ''adsorption capacity'' and ''adsorption rate constant of the adsorbent, an equation has been presented for estimating the feed application time for breakthrough at any given experimental conditions. With the assumption of a simple first order kinetic adsorption, a bed depth/service time relation was also determined by a numerical calculation, for further examining the characteristics of the relation.

1169 RADIOACTIVE ORGANIC SOLVENT WASTES. Nakano, E. (Nagoya Univ. (Japan)). Kogai To Taisaku (Journal of Environmental Pollution Control) ; 15: No. 5, 657-660(May 1979). (In Japanese).

In recent years, the tracer experiments using low-energy β-ray nuclides such as ^{3}H and ^{14}C have been increasingly performed in biological sciences. For the measurements involved, liquid scintillation counters are used, so that large amounts of liquid scintillator wastes arise in the organizations concerned. The radioactivity level in environment is insignificantly low; but they must be disposed of properly because of their inflammable as well as radioactive properties. It is then preferable not to collect the wastes, but to treat and dispose of them in respective places where they were used. As indications, the organic wastes containing ^{3}H or ^{14}C beyond a certain level are separated into the organic solvent and the radioactive residue by suitable means, then the solvent is burned off. The organic wastes containing ^{3}H or ^{14}C below the level are burned off as they are. The following matters are described: the amounts of such wastes and the radioactive concentrations, treatments of the wastes by distillation, incineration, solidification and adsorption; and so on. (J.P.N.).

1170 RADIATION DAMAGE OF ORGANIC EXTRACTANT IN PARTITIONING OF HIGH-LEVEL LIQUID WASTE, (2). CALCULATION OF RADIATION DOSE ABSORBED IN ORGANIC SOLVENT IN EXTRACTION PROCESS. Tachimori, S.; Nakamura, H. (Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Journal of Nuclear Science and Technology (Tokyo) ; 16: No. 5, 363-370(May 1979).

Radiation dose absorbed in the organic extractant was estimated for the countercurrent extraction with mixer-settler in the partitioning of the high-level liquid waste of fuel reprocessing. The radiation dose due to the absorption of α- and β-particles was calculated to be 10, 5.0 and 0.42 Wh/l for 150 days, 1 year and 10 years after fuel discharge from the reactor, respectively. About 70 -- 90% of the total dose was due to the absorption of β-particles. These values were discussed in comparison with the published data for the fuel reprocessing. On the basis of the calculated data, the radiolytic effects upon the extraction of strontium, lanthanoids and transplutonium elements in partitioning were estimated be sufficiently small.

1171 METHOD OF PROCESSING RADIOACTIVE WASTES. Kizawa, H.; Nakai, Y.; Funakoshi, T.; Izumoji, Y. (to Mitsubishi Heavy Industries Ltd., Tokyo (Japan)). Japanese Patent 54-50,798/A/. 20 Apr 1979. 5p. (In Japanese).

The purpose is to feed tritium-eliminated water to a cooling system by providing a tritium separator at the downstream of a chemical volume control system or a liquid waste processing system. Method: A chemical volume control system consists of a coolant storage tank, a desalting tower and boric acid recovery system and a monitor tank, which maintains quality and quantity of coolants in the primary cooling system of a PWR type reactor. Coolants outgoing from the reactor cooling system are processed in the chemical volume control system and recovered in a primary purified water tank. A liquid waste processing system consists of a liquid waste storage tank, an evaporator, a desalting tower and a monitor tank, which processes the liquid wastes so as to be usable as supplemental water to the primary cooling system and recovers it to the primary purified water tank. Water from these processing systems is separated with tritium in a tritium separator and then returned to the primary purified water tank.

1172 DEVICE TO DRAW OFF ONE OR SEVERAL PHASES. Finsterwalder, L. (to Gesellschaft zur Wiederaufarbeitung von Kernbrennstoffen m.b.H., Eggenstein-Leopoldshafen (Germany, F.R.)); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,624,936/B/. 12 Apr 1979. 4p. (In German).

The self-controlling of the phase boundary with proportional characteristics between the light and heavy phase (e.g. TBP/dodecane mixture and H_3PO_4) can be performed by means of the airlift principle. An extraction funnel with ascending pipe on one side is placed on the mixer-settler suitable for use in phosphoric acid adduct processes to treat organic solvent wastes of reprocessing plants. The ascending pipe is pulled up to the level of the light phase and contains the air lift. (orig./RW).

1173 METHOD TO FIX IRRADIATED FUEL ELEMENTS OF NUCLEAR REACTORS INTO FUEL CANS. Wehmeier, J. (to Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.)); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,745,175/A/. 12 Apr 1979. 7p. (In German).

In order to intermediately store fuel elements, e.g. of LWR, the latter are stored in fuel element casks. There is a binder between the fuel element and the inner walling of the cask in order to protect the fuel element cladding from e.g. oxygen. This binder consists of burnt lime, slaked calcium hydroxide and/or partly slaked lime. Fillers of sand and alkaline earth salts of carbonic acids are added to the binder. These convert fast to CO_2 or H_2O under radiolytic or thermal effect. The carbonates hardening is hence accelerated.

1174 REMOVING RADIONUCLIDES FROM WATER. Silver, G.L. (to Department of Energy, Washington, DC (USA)). British Patent 2,004,857/A/. 11 Apr 1979. 3p.

The invention relates to a process for decontaminating or removing radionuclides from aqueous solution, by contacting the aqueous solution with comminuted chitin.

1175 METHOD OF CEMENT-SOLIDIFICATION OF RADIOACTIVE LIQUID WASTES CONTAINING SURFACTANT. Sugimoto, Y.; Yusa, H. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 54-45,499/A/. 10 Apr 1979. 4p. (In Japanese).

Purpose: To provide the subject method comprising the steps of adjusting the concentration of the surfactant to a value less than the predetermined value even when the concentration of the surfactant is high, and rendering the uniaxial compression strength of the cement-solidification body into more than the defined fabrication reference value. Method: To radioactive liquid wastes there are applied means for boiling and heating liquid wastes by addition of sulfuric acid, means for cracking surfactants by the addition of oxidants and means for precipitating and arresting surfactants. After suppressing the hindrance of the cement hydration reaction by surfactants, the radioactive liquid wastes are cement-solidified. (Nakamura, S.).

1176 REMOVAL OF RADIONUCLIDES FROM WATER. Silver, G.L. (to Department of Energy, Washington, DC (USA); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,842,050/A/. 5 Apr 1979. 8p. (In German).

The actinides contained in waste water, in particular Pu, are contacted and absorbed by crushed chitin. This chitin is then separated from the aqueous solution, e.g. with pH 5 to 10, and reduced to ash.

1177 METHOD TO ENCAPSULATE SPENT FUEL ELEMENTS OR HIGH-LEVEL RADIOACTIVE WASTES. Larker, H. (ASEA-ATOM AB, Vaesteraas (Sweden)). Swedish Patent 7,614,376-7/B/. Apr 1979. 5p. (In Swedish).

A method to encapsulate radioactive waste through isostatic pressing is described. The capsules are to be made of a aluminumoxidepowder or a aluminumsilicatepowder, such as mullite. The pressing is performed at about 1 kbar and at a temperature of 1350 C.

1178 METHOD FOR THE COVERING OF A BODY INCLUDING RADIOACTIVE WASTES WITH A LAYER OF SOME CORROSION RESISTANT MATERIAL. Larker, H. (ASEA-ATOM AB, Vaesteraas (Sweden)). Swedish Patent 7,614,375-9/B/. Apr 1979. 7p. (In Swedish).

A method for the covering of a body including radioactive wastes with a layer of some corrosion resistant material is described. The method is especially applicable to high-level radioactive wastes obtained from nuclear fuel reprocessing. The body is embedded in a mass including particles of the corrosion resistant material. The whole of it is enclosed in a gas-light sealed can and is then isostatically pressed at a temperature and a pressure suitable for the certain corrosion resistant material in order to obtain a continuous and compact layer of this material. Tantalum, titanium, zirconium, tungsten and molybdenum are corrosion resistant elements of interest in this connection.

1179 REMOVAL OF ACTINIDES FROM SELECTED NUCLEAR FUEL REPROCESSING WASTES. Navratil, J.D.; Thompson, G.H. (Rockwell International, Golden, CO). Nuclear Technology ; 43: No. 2, 136-145(Apr 1979).

The US Department of Energy awarded Oak Ridge National Laboratory a program to develop a cost-risk-benefit analysis of partitioning long-lived nuclides from waste and transmuting them to shorter lived or stable nuclides. Two subtasks of this program were investigated at Rocky Flats. In the first subtask, methods for solubilizing actinides in incinerator ash were tested. Two methods appear to be preferable: reaction with ceric ion in nitric acid or carbonate-nitrate fusion. The ceric-nitric acid system solubilizes 95% of the actinides in ash; this can be increased by 2 to 4% by pretreating ash with sodium hydroxide to solubilize silica. The carbonate-nitrate fusion method solubilizes greater than or equal to 98% of the actinides, but requires sodium hydroxide pretreatment. Two additional disadvantages are that it is a high-temperature process, and that it generates a lot of salt waste. The second subtask comprises removing actinides from salt wastes likely to be produced during reactor fuel fabrication and reprocessing. A preliminary feasibility study of solvent extraction methods has been completed. The use of a two-step solvent extraction system - tributyl phosphate (TBP) followed by extraction with a bidentate organophosphorous extractant (DHDECMP) - appears to be the most efficient for removing actinides from salt waste. The TBP step would remove most of the plutonium and > 99.99% of the uranium. The second step using DHDECMP would remove > 99.91% of the americium and the remaining plutonium (> 99.98%) and other actinides from the acidified salt waste. 8 figures, 11 tables.

1180 EXPERIENCE WITH THE USE OF RECYCLE PLUTONIUM IN MIXED-OXIDE FUEL IN LIGHT WATER REACTORS IN THE FEDERAL REPUBLIC OF GERMANY. Schenk, H.J. (Kernkraftwerk Obrigheim GmbH, Orbrigheim/Neckar, Germany); Huppert, K.L.; Stoll, W. Nuclear Technology ; 43: No. 2, 174-185(Apr 1979).

In the Federal Republic of Germany (FRG), the reprocessing of spent fuel assemblies and the recycling of the recovered plutonium are essential for the final disposal of high-level nuclear waste. In addition, the recycling of uranium and plutonium is an effective measure to avoid proliferation of plutonium for weapons and to reduce the needs of uranium. Therefore, the technology of recycling has been developed in the FRG since 1966. In the prototype boiling water reactor (BWR) of Kahl, in the BWR nuclear

power plant at Gundremmingen, and the pressurized water reactor plant at Obrigheim mixed-oxide fuel (MOX) assemblies have been operated with good success. Also, the experience gained at Alkem's MOX fuel fabrication plant is very positive. Reprocessing tests of spent MOX fuel rods have indicated that a nearly homogeneous mixture of PuO_2 and UO_2 should be used to achieve a good solubility of MOX fuel in nitric acid. In all, very important experience in safeguarding plutonium and MOX fuel material was gained. 7 figures, 3 tables.

1181 LIQUID WASTE HANDLING FACILITIES FOR A CONCEPTUAL LIGHT WATER REACTOR SPENT FUEL REPROCESSING COMPLEX. Witt, D.C.; Bradley, R.F. (E.I. duPont de Nemours and Co., Aiken, SC). Nuclear Technology ; 43: No. 2, 244-258(Apr 1979).

One alternative for closing the nuclear fuel cycle is efficient, high decontamination separation of uranium and plutonium and fabrication of a Pu-U mixed-oxide fuel. Detailed flowsheets were prepared by Savannah River Laboratory for a conceptual 10 MT/day reprocessing facility. The generation of liquid waste and the associated liquid waste handling facilities for the reprocessing plant were defined. Over 40 individual waste streams were identified. The reference facility generates 6.4 m^3 (1700 gal) of high-level liquid waste (HLLW) per day, which is converted to 0.5 m^3 (130 gal) of glass contained in three packages, each 0.3 m (12 in.) in diameter x 3 m (10 ft) high. Each operating day, the process converts 2.9 m^3 (775 gal) of concentrated intermediate-level liquid waste (ILLW) to 4 m^3 (1050 gal) of cemented solid in 21 carbon steel drums. Large-scale underground tank storage of liquid waste is eliminated by prompt solidification of the HLLW and ILLW. Each container of glass contains 30 kW nuclear decay heat and must be stored in water for an interim period prior to shipment to a federal repository. 10 figures, 1 table.

1182 WIPED-FILM EVAPORATORS FOR EVAPORATING ALKALINE LIGHT WATER REACTOR RADIOACTIVE WASTES. Goodlett, C.B. (E.I. du Pont de Nemours and Co., Aiken, SC). Nuclear Technology ; 43: No. 2, 259-267(Apr 1979).

Evaporation tests with synthetic alkaline wastes typical of intermediate-level waste streams from the processing of spent reactor fuel were made at the Savannah River Laboratory (SRL) with two small wiped-film evaporators [0.93 and 0.46 m^2 (10 and 5 ft^2) heat transfer area]. Each feed (six total) was processed separately within the operating range of each evaporator. Feed flows varied from 0.026 to 0.24 l/min (0.1 to 0.9 gal/min) in increments of 0.026 to 0.013 l/min (0.1 or 0.05 gal/min). Steam chest temperatures were maintained at 130, 150, 170, or 182°C. Rotor-tip speed was maintained at 10.7 m/s (35 ft/s). Concentrate and process condensate from the evaporator were sampled at each set of operating conditions. The concentrate sample was analyzed for density (at exit temperature), volume percent of solids at room temperature, weight percent of water, and sodium concentration. Each evaporator condensate sample was analyzed for sodium to calculate entrainment from the evaporator based on sodium carryover. All concentrates from waste feeds high in NaOH and $NaAlO_2$ flowed freely in liquid form out of the evaporator. Concentrates from waste feeds containing Na_2SO_4 and Na_2CO_3 included appreciable amounts of precipitated solids at high boildowns. The tests showed that all of the feeds could be converted in one pass to a free-flowing slurry that solidifies upon cooling to ambient temperature. 11 figures, 2 tables.

1183 METHODS FOR DECONTAMINATION OF RADIOACTIVE WASTES. Schaf, R. (VEB Chemiekombinat Bitterfeld (German Democratic Republic)). Energia es Atomtechnika ; 32: No. 4, 169-171(Apr 1979). (In Hungarian).

The treatments for decontamination of radioactive sewage are discussed. The following methods can be used for the decontamination of radioactive sewage: precipitation, vaporization and ion-exchange. The ion-exchange method is discussed in details. The regeneration process of ion-exchange resins is treated. Decontamination by ion-exchange is suggested to be used at low ionic contents of sewages.

1184 STRUCTURAL ANALYSIS AND EVALUATION OF A HORIZONTAL RESERVOIR. Matsuda, F. (Kobe Steel Ltd. (Japan). Central Research and Development Lab.). 29: No. 2, 77-82(Apr 1979). (In Japanese).

The structural strength of a horizontal water reservoir is analysed by a finite element analysis program for general purpose, MARC. Prior to analysis, an automatic mesh generator program is developed and some test runs are performed to check the accuracy of the analysis. The stresses in the reservoir are evaluated according to ASME Sec. III, and the results have shown that the design of this type of reservoir is in compliance with the design requirements of ASME.

1185 VOLUME REDUCTION SYSTEM OF RADIOACTIVE WASTE BY ELECTRODIALYSIS. Miyagawa, M.; Mizutani, T.; Miki, M. (Chubu Electric Power Co. Inc., Nagoya (Japan)); Ohuchi, I. Karyoku Genshiryoku Hatsuden (Thermal and Nuclear Power) ; 30: No. 4, 351-364(Apr 1979). (In Japanese).

It is significantly important to attempt the volume reduction of radioactive wastes produced in nuclear power stations. Observing that the main component of radioactive wastes produced in BWR nuclear power stations is the reproduction liquid waste from condensate demineralizers and waste treatment system demineralizers, the volume reduction by electrodialysis has been studied. As the concrete system, the decrease of Glauber's salt remaining in neutralized waste liquid, the resulting raising of the concentration rate of the neutralized waste liquid and the drastic reduction of radioactive wastes produced as concentrated waste liquid were investigated, considering the recovery of high purity sulphuric acid and caustic soda by means of electrodialysis using ion exchange membranes from the waste liquids of sulphuric acid and caustic soda produced at the time of the above reproduction processes. The results of electrodialysis experiments demonstrated that the recovery rate reached 91% in case of sulphuric acid and 92% in case of caustic soda. This paper details on the electrode reaction and electrolysis conditions, decontamination of deposition in a bath, the shape and conditions of the bath and gas processing system, and discusses the operation and safety measures. The features of this system are the capability of volume reduction to 1/5 of the concentrated liquid wastes mainly composed of reproduction agent, large effect expected by combining the system with intermediate volume reduction and asphalt solidification, small amount of secondary wastes, and highly safe operation and system.

1186 RADIOACTIVE SUBSTANCE SOLIDIFYING

DEVICE. Sakoda, Kotaro. (to Babcock Hitachi K.K., Tokyo (Japan)). Japanese Patent 54-41,000/A/. 31 Mar 1979. 4p. (In Japanese).

The purpose is to easily solidify radioactive substances adhering to the surfaces of solid wastes without scattering in the circumference by paints, and further to reduce surface contamination concentrations. Constitution: Solid wastes are placed on a hanging plate, and dipped in paints within a paint dipping treatment tank installed at the lower part of a treatment tank by means of a monorail hoist, and the surfaces of said solid wastes are coated with paints, thereby to solidify the radioactivity on the surfaces of the solid wastes. After dipping, the solid wastes are suspended up to a paint spraying tank to dry the paints. After drying, non-contaminated paints are atomized to apply through an atomizing tube onto the solid wastes. After drying the atomized paints, the solid wastes are carried outside the treatment tank by means of the monorail hoist.

1187 METHOD TO RECOVER NUCLEAR FUEL FROM WASTE MATERIAL AND DEVICE TO CARRY OUT THE METHOD. Divins, L.A.; Short, L.E. (to General Electric Co., Schenectady, NY (USA)). German(FRG) Patent 2,839,010/A/. 22 Mar 1979. 20p. (In German).

The waste materials of interest here are ventilator filters, combustion ashes of clothes and working gloves, particle-formed material. In order to obtain nuclear fuels again (in dissolved form) from these materials, the latter are subjected to calcination, crushing, acid extraction, the insoluble separated off and the acid solution can be further processed. Additional steps are necessary for the filters (crushing, rolling-out). The nuclear fuels are uranium oxide or a mixture of uranium and plutonium oxide. The equipment required and the single steps are described in detail.

1188 HIGH LEVEL NUCLEAR WASTE ISOLATION: BOROSILICATE GLASS VERSUS CRYSTALS. De Marsily, G. (Arizona Univ., Tucson (USA)). Nature (London) ; 278: No. 5701, 210-212(15 Mar 1979).

The leachability and stability in a geological environment of glass and Synroc, an artificial rock proposed by Ringwood et al (Nature, 278(5701) 15 March 1979, pp 219-223), are briefly compared.

1189 IMMOBILISATION OF HIGH LEVEL NUCLEAR REACTOR WASTES IN SYNROC. Ringwood, A.E.; Kesson, S.E.; Ware, N.G.; Hibberson, W.; Major, A. (Australian National Univ., Canberra. Inst. of Advanced Studies). Nature (London) ; 278: No. 5701, 219-223(15 Mar 1979).

It is stated that the elements occurring in high-level nuclear reactor wastes can be safely immobilised by incorporating them within the crystal lattices of the constituent minerals of a synthetic rock (SYNROC). The preferred form of SYNROC can accept up to 20% of high level waste calcine to form dilute solid solutions. The constituent minerals, or close structural analogues, have survived in a wide range of geochemical environments for periods of 20 to 2,000 Myr whilst immobilising the same elements present in nuclear wastes. SYNROC is unaffected by leaching for 24 hours in pure water or 10 wt % NaCl solution at high temperatures and pressure whereas borosilicate glasses completely decompose in a few hours in much less severe hydrothermal conditions. The combination of these leaching results with the geological evidence of long-term stability indicates that SYNROC would be vastly superior to glass in its capacity to safely immobilise nuclear wastes, when buried in a suitable geological repository. A dense, compact, mechanically strong form of SYNROC suitable for geological disposal can be produced by a process as economical as that which incorporates radioactive waste in borosilicate glasses.

1190 SCREW MIXER. Meintker, M.; Puthawala, A.; Schabert, H.P. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,740,490/A/. 15 Mar 1979. 11p. (In German).

The screw mixer is used to introduce low or intermediate level radioactive wastes from cooling water treatment of a PWR into bitumen filled in drums for final storage. The machine has a steam outlet leading from a steam dome to a condenser. The steam dome is designed as a pipe and is surrounded by the condenser, the connection between the two units being made by an annular gap. Through this annular gap the steam can enter the condenser on a large area.

1191 PLANT FOR SEPARATING GASEOUS HYDROCARBONS AND RADIOACTIVE IODINE ISOTOPES FROM WASTE AIR. Mathewes, W. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,625,275/C/. 15 Mar 1979. 5p. (In German).

In order to raise the efficiency of the filter plant for waste air in nuclear plant, it is proposed to precede and succeed the usual suspension filter in the waste air line by an activated charcoal filter. Measuring equipment which responds to gaseous impurities is situated between the first filter and the suspension filter, which causes a partial exchange of the activated charcoal in the filters. Details of the pipework are described.

1192 SYSTEM FOR PROCESSING GASEOUS WASTE OF RESIN-REGENERATION. Tsuruoka, R.; Ishihara, S.; Ikeda, K.; Mitani, S. (to Hitachi Ltd., Tokyo ;Japan)). Japanese Patent 54-30,399/A/. 6 Mar 1979. 3p. (In Japanese).

Purpose: To introduce a gas generated upon regeneration of an ion-exchange resin into a main condensator and processing it together with radioactive waste gas generated from the main condensator. Method: Radioactive waste gases generated from a cation exchange resin regeneration tower enter through an exhaust gas conduction path provided with a control valve, a pressure gauge and a check valve into a main condensator. The waste gases are extracted together with the exhaust gas generated in the main condensator by an air extractor, passed through an off-gas condensator, a decay pipe and multiple stages of active carbon adsorption towers, whereby the radioactivity is decayed, and then discharged from an exhaust tower to the atmosphere.

1193 METHOD OF SOLIDIFYING RADIOACTIVE WASTES. Saito, N.; Matsuura, H. (to Nippon Atomic Industry Group Co. Ltd., Tokyo). Japanese Patent 54-29,000/A/. 3 Mar 1979. 3p. (In Japanese).

Purpose: To improve toughness and water impermeability of asphalts used as waste binders. Method: Waste binders used are prepared by incorporating from several to abou 20% synthetic rubber into asphalt and further adding a small amount of resin or plastic therein. The asphalt compound is melted by

heating, to which radioactive wastes are mixed and dried to obtain solid wastes. Since the asphalt compound shows no embrittlement even at a low temperature, it is highly impact resistant and convenient in the handling such as upon transportation.

1194 SUCCESSFUL ENCAPSULATION OF NUCLEAR WASTE. Metal Powder Report ; 34: No. 3, 119(Mar 1979).
CONTAINERS;CORUNDUM;ENCAPSULATION;HOT PRESSING;RADIOACTIVE WASTE STORAGE;SPENT FUEL ELEMENTS;SPENT FUELS;SWEDEN;RADIOACTIVE WASTES

1195 PYROLYSIS MODEL FOR AN ALPHA WASTE INCINERATOR PROTOTYPE. Orloff, D.I. (duPont, Aiken, SC). Journal of Energy ; 3: No. 2, 90-94(Mar-Apr 1979).
The development of a theoretical model of the pyrolysis stage of a Savnnah River Laboratory prototype alpha waste incinerator is discussed. pyrolysis rates for single-component porous bed of Teflon (registered trademark of Du Pont de Nemours and Co.) have been measured on a bench-scale furnace. Experimental pyrolysis rates compare favorably to the predictions of a quasisteady regression model. In addition, the pyrolysis rate is shown to be a weak function of the thermal diffusivity of the porous polymer bed. 13 refs.

1196 EFFECTS OF VARIOUS CARRIER GASES, TEMPERATURE AND INTRAPARTICLE DIFFUSIVITY ON BREAKTHROUGH CHARACTERISTICS OF KRYPTON IN CHARCOAL BED. Kobayashi, S. (Hitachi Engineering Co. Ltd., Ibaraki (Japan)); Takashima, Y. Nippon Genshiryoku Gakkaishi (Journal of the Atomic Energy Society of Japan) ; 21: No. 3, 268-275(Mar 1979). (In Japanese).
The breakthrough characteristics of Kr gas in charcoal bed were studied at the temperature of 30 -- -75°C, and theoretically analyzed taking account of the Kr, carrier gas-charcoal equilibrium, and the intraparticle diffusivity. It was found that the effects of various carrier gases on the breakthrough characteristics of Kr, and the effect of temperature on the dynamic equilibrium coefficient and the selectivity of adsorption can be explained by modifying the langmuir's equation for binary gas mixtures. The intraparticle diffusivity was affected by the surface diffusion, and its temperature dependence could be explained by considering the parallel pore model for the gas phase diffusion and the equation of surface diffusivity by Sladek and Gilliland et al.

1197 ADSORPTION OF RADIONUCLIDES IN WASTE WATER ON OXINE-IMPREGNATED ACTIVATED CHARCOAL. ADSORPTION CHARACTERISTICS OF MANGANESE-54 ION. Motojima, K.; Tachikawa, E.; Kamiyama, H. (Japan Atomic Energy Research Inst., Oarai, Ibaraki. Oarai Research Establishment). Journal of Nuclear Science and Technology (Tokyo) ; 16: No. 3, 200-206(Mar 1979).
Radio-cobalt and -manganese constitute more than 90% of the radionuclides in waste water released from various nuclear facilities. The adsorption characteristics of Mn ion on oxine-impregnated activated charcoal have been examined. In the adsorption, Mn ion will be in the chemical interaction with oxine on activated charcoal. Thus, the impregnation of oxine on activated charcoal considerably improves the adsorption properties of the latter, although the adsorption shows a strong pH-dependence. Two important parameters of the adsorption, initial adsorption rate constant and adsorption capacity, have been experimentally determined at various ion concentrations and have been discussed in a comparison with those for Co ion.

1198 STUDIES ON TREATMENT OF RADIOACTIVE ANIMAL CARCASS, (1). A PROPOSAL OF MULTI-STEP PROCESSING AND ITS PROSPECT. Matsuoka, O.; Koizumi, A.; Fukuda, S. (National Inst. of Radiological Sciences, Chiba (Japan)). Hoken Butsuri (Journal of Japan Health Physics Society) ; 14: No. 1, 11-17(Mar 1979). (In Japanese).
A new method of waste treatment of animal carcass contaminated with plutonium was proposed. A multi-step process was designed and tested at a laboratory scale which was composed of the following processes; microwave dehydration, heat decomposition and ashing. Microwave dehydration was found the most adequate as the first step of the treatment because of the negligible release of nonvolatile radioactivity. About 70% of body weight was reduced by microwave dehydration. Dehydrated animal carcass was decomposed by graded electric heating under anaerobic condition. Burnable gas and vapour produced by the heat decomposition were oxidized by passing through a reheating tube with excess air. The exhaust gas had no significant radioactivity. The residue of charred carcass was oxidized by heating with excess air. The weight of final product was up to 8% of original wet weight. The proposed multi-step process provided to be adequate for the waste disporsal of Pu contaminated animal carcass.

1199 METHOD OF RECOVERING AND REGENERATING ORGANIC SOLVENTS USED FOR THE REPROCESSING OF RADIOACTIVE WASTES. Kuroda, Y.; Ogi, K. (to Mitsubishi Metal Corp., Tokyo ;Japan)). Japanese Patent 54-23,900/A/. 22 Feb 1979. 4p. (In Japanese).
Purpose: To perform solidification for extractants used for the treatment of radioactive isotopes and containing tributyl phosphate as a main ingredient resulted from nuclear fuel reprocessing facility or the like. Method: One or more oxides, hydroxides, basic carbonates or carbonates of alkaline earth metals are added to radioactive organic solvent wastes containing tributyl phosphate as a basic ingredient and containing decomposition products of tributyl phosphate which are used as the extractant for radioactive isotopes. The amount of these additives used is such as sufficient for neutralizing P-OH groups of the decomposition products of tributyl phosphate contained in the above solvent (from neutralizing equivalent to ten times of that equivalent). The mixture thus obtained is distilled under a reduced pressure or using water vapor at a temperature below the decomposition point of tributyl phosphate to recover tributyl phosphate as a distillation fraction and solidify and separate the decomposition products of tributyl phosphate as the salts of alkaline earth metals.

1200 STIRRING VESSEL FOR CEMENT SOLIDIFICATION OF RADIOACTIVE WASTES. Hattori, K. (to Hitachi Ltd., Tokyo ;Japan)). Japanese Patent 54-19,100/A/. 13 Feb 1979. 2p. (In Japanese).
Purpose: To make it possible to omit a step of filling the upper space portion required for the drum-filled solidification treatment of radioactive liquid wastes. Constitution: When a kneading and stirring liquid of radioactive wastes and cements are stirred in a drum, a splash guard for accommodating a compensation

stirring liquid in a volumetric part corresponding to the case of taking out stirring vanes installed in the drum is attached liquid-tightly to the opening part of the drum.

1201 SLUDGE RECOVERY APPARATUS. Marmo, A.R. (to Westinghouse Electric Corp., Pittsburgh, PA (USA)). British Patent 2,014,482/A/. 12 Feb 1979. 4p.

An improved design of a sludge recovery apparatus used in the fabrication of nuclear fuel is described. This apparatus provides for automatic separation of sludge from the grinder coolant, drying of the sludge into a flowable powder and transfer of the dry powder to a salvage container. It can be constructed to comply with criticality-safe-geometry requirements and to obviate need for operating personnel in its immediate vicinity. (UK).

1202 COMBUSTION FURNACE FOR WASTES. Mallek, H.; Jablonski, W. (to Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,735,107/A/. 8 Feb 1979. 16p. (In German).

As an improvement of the method for burning wastes described in the patent 2604407 there is proposed for the design of the combustion furnace to provide, below the transition between central shaft and combustion furnace, for a baffle in the form of a partition wall. By this means in the range of the narrow point there may be achieved temperatures of about 1500°C, resulting in melting of the slag. The variations in pipe connections caused by that measure are described.

1203 METHOD AND COMBUSTION FURNACE FOR BURNING WASTE. Mallek, H.; Ermisch, D.; Jablonski, W. (to Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,734,973/A/. 8 Feb 1979. 17p. (In German).

The method described in patent no. 2604405 provides for a furnace that has got between the space containing the waste and the combustion chamber a narrow spot where the waste is stowed. This additional application describes that part of the burnable gases produced is branched off at the narrow spot and that from this point pipes lead to a suction device.

1204 METHOD FOR CALCINING RADIOACTIVE WASTES. Bjorklund, W.J.; McElroy, J.L.; Mendel, J.E. (to Exxon Nuclear Co., Inc., Bellevue, WA (USA)). British Patent 1,539,999/A/. 7 Feb 1979. 5p.

High level radioactive wastes are calcined by a process using a fluidized bed of glass particles, spraying the liquid waste into the bed and melting the resulting product to give a low leaching solid.

1205 PROCESS FOR DRAINING OFF RADIOACTIVE WASTES MIXED WITH BITUMEN. Stegmaier, W.; Kluger, W.; Boden, H.; Schneider, F. (to Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.); Werner und Pfleiderer Maschinenfabrik, Stuttgart (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,732,031/A/. 1 Feb 1979. 9p. (In German).

The process is to be improved by lowering the temperature of the mixture leaving a spiral evaporator, which was previously about 160°C quite considerably. According to the invention, an additional outlet case is added after the extruder, which has heating and cooling ducts, so that the temperature can be controlled, without blocking the spiral. Details are shown.

1206 RADIOACTIVE KRYPTON AND XENON IN NUCLEAR POWER PLANT FUEL CYCLE. Wilhelmova, L.; Cejnar, F. Jaderna Energie ; 25: No. 2, 67-74(Feb 1979). (In Czech).

Data are summed up characterizing the production and behaviour of radioactive krypton and xenon in nuclear power plant operation and in fuel reprocessing. Separation processes and block diagrams of facilities for the treatment of the waste radionuclides are briefly described.

1207 WASTE DISPOSAL FOR LIQUID SCINTILLATOR 'COCKTAIL', SOLIDIFICATION OF THE EVAPORATED 'COCKTAIL'. Kaneko, T.; Matsuo, M. (Tokyo Metropolitan Inst. of Gerontology (Japan)). Radioisotopes (Tokyo) ; 28: No. 2, 92-94(Feb 1979). (In Japanese).

DISTILLATION;EPOXIDES;LIQUID SCINTILLATORS; LIQUID WASTES;POLYURETHANES;RADIOACTIVE WASTE PROCESSING;RESINS;SOLIDIFICATION;SURFACTANTS; YOUNG MODULUS

1208 PROCESS AND PLANT FOR MANIPULATING RADIOACTIVE WASTE. Baatz, H.; Rittscher, D. (to STEAG Kernenergie G.m.b.H., Essen (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,731,548/A/. 25 Jan 1979. 9p. (In German).

To prepare waste for engineered storage, it is vitrified or calcined (pelleted) into solid pieces in a hot cell. Subsequently the pieces are filled into a radiation protection container made of spherulite cast iron, in which there is a liquid metal. The pieces are embedded in this metal matrix. During the embedding process, the radiation protection container may be heated externally or internally (lost heat device).

1209 DEVICE FOR SOLIDIFICATION OF GASEOUS WASTES. Shimada, M.; Kamei, H. (to Toshiba Corp., Kawasaki, Kanagawa ;Japan)). Japanese Patent 54-8,299/A/. 22 Jan 1979. 4p. (In Japanese).

Purpose: To provide the subject device wherein gaseous wastes such as krypton 85 and the like are ionized and accelerated to be injected into solid targets and stored therein, thereby removing the rediscarge of gas and making it possible to treat a large quantity of said gas. Constitution: Krypton gas is ionized and accelerated to high energy by an accelerator, and then introduced into an ion injection chamber. In the ion injection chamber a band-shaped target is delivered from a first take-up roll, and krypton ions are injected to said target. Thereafter, other band-shaped target delivered from a second take-up roll is brought into contact with the target in which krypton ions have been injected, and both targets are taken up together while compressing these targets. In this way, even when injected energy is small, the injected gas is not redischarged and can be continuously treated.

1210 SOLIDIFICATION METHOD OF RADIOACTIVE WASTE ORGANIC SOLVENTS. Tsunoda, N.; Nemoto, S.; Ikeda, S.; Kobayashi, H.; Kobayashi, S. (to Power Reactor and Nuclear Fuel Development Corp., Tokyo ;Japan)). Japanese Patent 54-8,300/A/. 22 Jan 1979. 3p. (In Japanese).

Purpose: To convert liquefied radioactive waste organic solvents into stable solidified

state by a compact device and simple operations. Method: This treatment method is to solidify radioactive waste organic solvents generated from nuclear fuel retreatment facilities and other various related facilities, and to a radioactive waste organic solvents consisting essentially of organic phosphoric acid esters there is added a solidification agent consisting essentially of one member or more than two members selected from the group consisting of hydroxides such as calcium and the like, basic carbonates thereof and carbonates thereof, and stirred and mixed, thereby converting the above described waste organic solvents into stable solidified bodies. In this case, when cement and sodium silicate are added to the waste organic solvents together with said solidification agent, the solvents can be converted in more stable solidified bodies.

1211 METHOD FOR SOLIDIFICATION OF HIGH LEVEL RADIOACTIVE LIQUID WASTES. Tanaka, Y.; Tsukumo, K. (to Kawasaki Heavy Industries Ltd., Kobe ;Japan)). Japanese Patent 54-7,099/A/. 19 Jan 1979. 4p. (In Japanese).

Purpose: To calcine high level radioactive liquid wastes without crystallizing it, and to subject nitric acid contained in the liquid wastes to thermal cracking and stabilize it, thereby improving so-called calcination efficiency and preventing corrosion of the canister due to nitric acid. Method: A predetermined quantity of a crude solution supplied from a storage tank to a feedwater control tank is introduced in an evaporation condenser thereby to evaporate the water content and volume reduce it. The water contents of the thus treated high level radioactive liquid wastes are further evaporated in a spray drying tower to be formed in powdery state. The powdery liquid wastes are supplied to a calcining melter, heated uniformly to decomoose nitrate, and glassified.

1212 LIQUID WASTE CONCENTRATING SYSTEM. Kodama, K.; Nishimizu, S. (to Mitsubishi Heavy Industries Ltd., Tokyo (Japan)). Japanese Patent 1954-5200/A/. 16 Jan 1979. 4p. (In Japanese).

The stored radioactive liquid wastes are poured into a round flask by means of a pump. Vapor evaporated in the round flask by heating using a mantle heater is condensed by cooling water in a cooler, and introduced into a storage tank. Vapor exhausted by a vacuum pump is exhausted to the exhaust system. In this case, in treating the concentrated liquid wastes which have been completely treated in the flask, the connector is removed and then the insertion plug is also removed. Thereafter, a slight amount of a solidifying agent is charged into the flask through the opening to harden the same. After solidifying the same, the flask is thrown away. Accordingly, the operation of taking out the concentrated liquid is not required, and the ratio of concentration can be improved.

1213 METHOD FOR THE INCLUSION OF RADIOACTIVE FISSION PRODUCTS. Thiele, D. (to Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.)); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,611,689/C/. 11 Jan 1979. 3p. (In German).

The invention concerns the composition of the glass melt with the purpose of closing in radioactive fission products so that they can be stored for a long time resistant to water and without signs of devitrification. Highly radioactive wastes from processing spent fuel elements from nuclear reactors are concerned. For one part weight of active material, 4 parts weight of melt are taken which is composed of the following: 45 - 52 wt% SiO_2, 26 - 32wt% B_2O_3, 3 - 7 wt% Na_2O and 13 - 20 wt% CaO. The method may also be applied with the presence of fluorides, sulphates or phosphates.

1214 PROCESS AND DEVICE FOR CONCENTRATING LIQUID RADIOACTIVE WASTE. Szivos, K.; Lovass, G.; Liptak, L.; Hirling, J.; Pavlik, O. (to Magyar Tudomanyos Akademia Izotop Intezete, Budapest; Eroemue es Halozattervezoe Vallalat Eroeterv, Budapest (Hungary); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,400,123/C/. 4 Jan 1979. 8p. (In German).

The process envisages concentration liquid radioactive waste in a container by guiding air over it (in the form of tangential turbulent flow.). The heated air is taken out of the circuit, and the water picked up from the surface of the condensate is separated. The invention concerns the technical details of air guidance.

1215 METHOD AND EQUIPMENT OF SOLIDIFICATION ESPECIALLY OF RADIOACTIVE HARMFUL AND WASTE MATERIALS. Strecker, J. (to Ingenieurbuero Stecker, Koeln (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,728,469/A/. 4 Jan 1979. 19p. (In German).

It is proposed to take up radioactive waste materials present as solution or suspension in a precoated filter, to free the latter from the liquid by freeze-drying and to then completely enclose it with a solidifying agent. Hardening plastics as well as alkali silicates are suitable for this purpose. An appropriate system is described in great detail.

1216 DECONTAMINATION AND RECOVERY OF 1,4 DIOXANE-BASED LIQUID SCINTILLATOR. Sachan, S.E.; Soman, S.D. (Bhabha Atomic Research Centre, Bombay (India). Health Physics Div.). Health Physics ; 36: No. 1, 67-68(Jan 1979).

DECONTAMINATION;DIOXANE;ECONOMICS; EXPERIMENTAL DATA;GRAPHS;HEAVY WATER;LIQUID SCINTILLATORS;PERFORMANCE;RADIOACTIVE WASTE PROCESSING;SODIUM HYDROXIDES;TABLES;TOLUENE; TRITIUM;TRITIUM OXIDES

1217 PROBLEM OF DETOXICATION OF CYANIDE-CONTAINING RADIOACTIVE WASTE. A BIBLIOGRAPHIC SURVEY. Roos, H.; Schmidt, M. (Wuerzburg Univ. (Germany, F.R.). Inst. fuer Anorganische Chemie). Chemie-Ingenieur-Technik ; 51: No. 1, 41(Jan 1979). (In German).

CYANIDES;TOXICITY;WASTES;RADIOACTIVE WASTE PROCESSING;REMOVAL;COMPARATIVE EVALUATIONS; INFORMATION;REVIEWS

1218 MICROWAVE EVAPORATION SYSTEM FOR THE WASTE TREATMENT OF RADIOACTIVE ANIMALS. APPLICATION TO THE WASTE ANIMALS CONTAINING TRITIUM OR CARBON-14. Saito, T.; Nishiyama, Y.; Hikita, A. (Sagami Chemical Research Center, Sagamihara, Kanagawa (Japan)); Takaoka, A.; Nakamura, A. Radioisotopes (Tokyo) ; 28: No. 1, 15-20(Jan 1979). (In Japanese).

A microwave evaporation system was developed for the waste treatment of animal wastes contaminated with tritium or carbon-14. The apparatus composed of a 2450 MHz microwave range, a cooling unit, a receiver, a ^{3}H and ^{14}C sampler, an evacuating system and an automatic controller unit gave satisfactory results. The extent of evaporation can be optionally

controlled in the range of 80% to 100%. The maximum rate of evaporation under reduced pressure reaches 10 g of water per minute at 480 W high frequency power level and 12.5 g per minute at 600 W. The evaporation of water in the carcass weighing 1 kg is generally completed in about 1 hour, and the weight is reduced by approximately 70%. The distribution in the apparatus of tritium or carbon-14 released from carcass by the microwave evaporation was studied using such labelled compounds as [^{3}H] water, [6-^{3}H] thymidine, [methyl-^{3}H] thymidine, [2-^{14}C] thymidine, [U-^{14}C] glutamic acid, [U-^{14}C] fructose and [U-^{14}C] glucose. The difference in activity trapped by the cooler and sampler was observed between the case of aqueous solutions of labelled compounds and that of animals administered with the same labelled compounds. The reason for this difference probably lies in metabolism of labelled compounds or exchange of tritium atoms within the animal body.

1219 OPERATION PERFORMANCE OF THE BITUMINIZATION PLANT AT TSURUGA NUCLEAR POWER STATION. Sano, K.; Hayashi, T. (Ebara Mfg. Co. Ltd., Tokyo (Japan)). Ebara Jiho (Ebara Times) ; No. 107, 36-41(Jan 1979). (In Japanese).

A series of test runs of the bituminization plant was conducted at Tsuruga Nuclear Power Station, at first with a simulated waste solution of sodium sulfate only, next with a simulated waste solution of sodium sulfate and an anti-swelling agent and finally with radioactive concentrate. Approximately 200 drums of bitumen product were made with the simulated waste and more than 25 drums of bitumen product were produced with radioactive waste. Radiation dose rate was throughly measured on the drum surface. The plant is now running at the water evaporation rate of 180 to 200 kg/h. Oil content in the condensate is 5 to 15 ppm before oil separation and 2 to 7 ppm after oil separation.

1220 COST-EFFICIENCY ANALYSIS AND RADIOPROTECTION OF THE PUBLIC. THE APPLICATION TO THE CASE OF RADIOACTIVE EFFLUENTS BY THE U.S. ENVIRONMENTAL PROTECTION AGENCY. Lochard, J.; Peges, P. (Centre d'Etude sur l'Evaluation de la Protection dans le Domaine Nucleaire, 92 - Fontenay-aux-Roses (France)). Revue Generale Nucleaire ; No. 1, 43-53(Jan-Feb 1979). (In French).

The authors make the cost-efficiency analysis and describe the general methodological framework applied to the retained topic. They then present the study work carried out by the U.S. Environmental Protection Agency and describe the main steps in the analysis. Finally, they comment on the method used and the results recorded.

1221 RADIATION DAMAGE OF ORGANIC EXTRACTANT IN PARTITIONING OF HIGH-LEVEL LIQUID WASTE, (1). RADIOLYSIS OF DI(2-ETHYLHEXYL)PHOSPHORIC ACID BY IRRADIATION WITH COBALT-60 GAMMA-RAYS. Tachimori, S. (Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Journal of Nuclear Science and Technology (Tokyo) ; 16: No. 1, 49-56(Jan 1979).

Di(2-ethylhexyl)phosphoric acid (DEHPA), which is a useful extractant for the treatment of high-level liquid waste, was exposed to ^{60}Co γ-rays and the radiolysis products and their yields were determined. The major radiolytic decomposition process of DEHPA was found to be a stepwise splitting of two alkyl groups resulting in MEHPA and H_3PO_4. 1-Methyl-1-ethylpentyl radical, C_4H_9-C*(CH_3)-C_2H_5, was found to form with a large G value in the γ-irradiated DEHPA. Reactions involving 1-methyl-1-ethylpentyl radical were also discussed.

1222 SCIENTIFIC BASIS FOR NUCLEAR WASTE MANAGEMENT. McCarthy, G.J. (ed.). Contract ET-78-C-02-5009. New York, NY; Plenum Press (1979). 581p. (CONF-781121--(Vol.1)). Plenum Press, 227 West 17th Street, New York, NY.

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

Seventy-two papers were presented. Sessions were held on waste solidification, waste isolation, cement and concrete in solidification and isolation, and modeling and safety assessment. Individual papers were processed for the data base.

1223 METAL ENCAPSULATION OF CERAMIC NUCLEAR WASTE. Jardine, L.J.; Steindler, M.J. (Argonne National Lab., IL). pp 181-189 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

A conceptual flowsheet is presented for encapsulating a ceramic waste form in solid lead, using existing or developing technologies. Unresolved and potential problem areas of the flow sheet are outlined, and suggestions are made on how metal encapsulation might be applied to other solid radioactive wastes from the nuclear fuel cycle. It is concluded that metal encapsulation is a technique applicable to many forms of solid wastes and is likely to meet future waste isolation criteria and regulations.

1224 RAMAN SPECTRA OF CESIUM ALUMINOSILICATE WASTE FORMS. Hartwig, C.M. (Sandia Labs., Livermore, CA). pp 219-225 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

Raman spectra have been obtained from pollucite and similar aluminosilicate materials. Pollucite is used to fix radioactive cesium in the supercalcine reactor waste form and in beneficial-use, radioactive sources. Vibrational modes of Cs in an oxygen atom cage are identified at 141 and 201 cm^{-1}. Stretching vibrations of the Si-O bond are at 1120 cm^{-1} and of the Si-O-Al bond at 1040 cm^{-1}. Fifteen of the 28 Raman active modes of crystalline pollucite have been distinguished. Monomeric water molecules are shown spectroscopically to exist in mineral pollucite. The use of Raman spectroscopy to identify structural changes is demonstrated.

1225 TECHNIQUES FOR HIGH LEVEL WASTE SOLIDIFICATION IN EUROPE. Heimerl, W. (Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen GmbH, Hanover, Germany). pp 21-29 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

A review of progress toward the development and demonstration of a solidification process for high level waste solutions on an industrial scale in four European countries (France, United Kingdom, Germany and Belgium) is given. Historical development, present status and

future plans are presented. Three of the processes which seem to be of major importance are described (AVM-France, HARVEST-United Kingdom, PAMELA-Germany).

1226 PREPARATION AND CHARACTERIZATION OF AN IMPROVED HIGH LEVEL RADIOACTIVE WASTE (HAW) BOROSILICATE GLASS. Guber, W.; Hussain, M.; Kahl, L.; Ondracek, G.; Saidl, J. (Kernforschungszentrum, Karlsruhe, Germany). pp 37-42 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

Five series of modified glasses based on a reference borosilicate formulation (GP 98) have been prepared and investigated. On the basis of comparisons of properties of the different glasses, two compositions have been selected for more detailed investigations and for technical application in the future. Simultaneously, glass products with real HAW oxides from German fuel reprocessing have been investigated. No structural change caused by irradiation has been detected after two year shortage.

1227 VITRIFICATION OF HIGH SODIUM-ALUMINUM WASTES: COMPOSITION RANGES AND PROPERTIES. Brezneva, N.E.; Minaev, A.A.; Oziraner, S.N. (Institute of Physical Chemistry, Moscow, USSR). pp 43-50 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

Studies of the vitrification of wastes that contain sodium and aluminum are summarized. High Na-Al-wastes can be vitrified to form both phosphate and borosilicate glasses having suitably low leaching rates. Up to 50 wt % waste oxides can be vitrified. From the technological viewpoint, phosphate glasses have two advantages over borosilicate types: they have low melting ranges and the glass-forming additives can be liquid. Cs volatility depends on a diffusion mechanism and is about 5% at 1000°C. All Ru volatilizes during melting but Ru volatility can be reduced to 5 to 10% by addition of reducing agents to the melt.

1228 NON-RADIOACTIVE OPERATION EXPERIENCE WITH A JOULE HEATED CERAMIC MELTER FOR VITRIFICATION OF HIGH-LEVEL LIQUID WASTE. Weisenburger, S. (Kernforschungszentrum, Karlsruhe, Germany). pp 51-56 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

A ceramic-lined melter for HLLW-vitrification has been tested at Karlsruhe Nuclear Research Center. The results of these tests look very promising and are described in detail. Further development of the vitrification unit are outlined in respect to remote operation and process control.

1229 NATURAL GLASSES: ANALOGUES FOR RADIOACTIVE WASTE FORMS. Ewing, R.C. (Univ. of New Mexico, Albuquerque). pp 57-68 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

The long-term effects of alteration and radiation damage on waste glass forms are difficult to assess in time-limited laboratory experiments. It is important to evaluate the long-term stability of naturally occurring analogues. Age distributions and alteration effects observed in natural glasses in different geologic environments provide insight into variables controlling the rates of devitrification, alteration and radiation damage. Volcanic glasses are often altered by weathering and leaching, crystallizing to their fine-grained compositional equivalents (rhyolites and felsites). The oldest reliably dated volcanic glasses are 40 million years old, but the majority of the dated glasses are much younger. Experimental studies have produced devitrification textures; and laboratory experiments, as well as empirical measurements, have determined hydration rates for volcanic glasses as a function of composition, temperature and climate. The presence of water and the temperature are the most important rate controlling variables. Even material that still may be described as glassy often exhibits evidence of alteration and crystallization. Of the volcanic glasses that are preserved in the geologic record it would be rare to describe such a glass as pristine. Glasses formed as a result of impact, tektites and lunar glasses, may occur in a substantially unaltered form. In the case of tektites, their resistance to alteration is a result of their high SiO_2 and low alkali content. Lunar glasses have been preserved for hundreds of millions of years because they exist in a dry environment. Direct comparisons between the stabilities of natural glasses and waste glasses are inappropriate because their compositions and thermal histories are very different; however, natural glasses may serve as standards of comparison, and they suggest experimental techniques that allow the evaluation of the long term stability of glass waste forms.

1230 CHARACTERIZATION OF GLASS AND GLASS CERAMIC NUCLEAR WASTE FORMS. Lutze, W.; Borchardt, J.; De, A.K. (Hahn-Meitner-Institut fuer Kernforschung, GmbH, Germany). pp 69-81 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

Characteristics of solidified nuclear waste forms, glass and glass ceramic compositions and the properties (composition, thermal stability, crystallization, phase behavior, chemical stability, mechanical stability, and radiation effects) of glasses and glass ceramics are discussed. The preparation of glass ceramics may be an optional step for proposed vitrification plants if tailored glasses are used. Glass ceramics exhibit some improved properties with respect to glasses. The overall leach resistance is similar to that of glasses. An increased leach resistance may become effective for single radionuclides being hosted in highly insoluble crystal phases mainly when higher melting temperatures are applicable in order to get more leach resistant residual glass phases. The development of glass ceramic is going on. The technological feasibility is still to be demonstrated. The potential gain of stability when using glass ceramics qualifies the material as an alternative nuclear waste form.

1231 THERMAL, CHEMICAL AND RADIATION STABILITY OF VITREOUS RADIOACTIVE WASTES. Nikiforov, A.S.; Kulichenko, V.V.; Krylova, N.V.; Mustatov, N.D.; Polyakov, A.S. (All-Union Scientific Research Inst. of Inorganic Materials, Moscow, USSR). pp 117-121 of

Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY: Plenum Press (1979).
From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).
Some USSR studies of the chemical, thermal, and radiation stability of silicate glasses and glass-like products are reviewed briefly. Compositional effects on chemical stability of nuclear waste glasses correspond to well known commercial glass behavior, namely that chemical stability increases with increasing SiO_2 and Al_2O_3 content and decreases with increased alkali metal oxides. The rate of ^{137}Cs leaching varied according to the chemical composition, with the high SiO_2 materials showing the lowest rates at 10^{-8} g $cm^{-2}d^{-1}$. The leachability of ^{90}Sr followed similar trends. Release of radioisotopes from glass-like products can also occur without contact with water, namely by evaporation or disintegration of the materials. Contamination through a gas phase is also observed in the process of storage of glass-like samples at room temperature. Radiation induced sublimates are not only observed after the storage of radioactive materials, but also after the irradiation of inactive ones using a ^{60}Co source. Effects of storage of glass-like products at elevated temperatures on their subsequent chemical stability in water are described. A variety of materials was studied, and they showed increases, decreases, and no change in stability. Three classes of materials were studied in order to explore the effects of structural changes resulting from heat treatment on chemical stability in water.

1232 DEVELOPMENT OF MULTIBARRIER NUCLEAR WASTE FORMS. Rusin, J.M. (Battelle Pacific Northwest Labs., Richland, WA); Browning, M.F.; McCarthy, G.J. pp 169-180 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY: Plenum Press (1979).
From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).
The multibarrier concept aims to separate the radionuclide-containing inner core material and the environment by the use of coatings and metal matrices. The resultant composite waste form exhibits enhanced inertness due to improved thermal stability and mechanical strength, and the added barriers greatly improve leach resistance. Two options were developed for the inner core of the multibarrier concept: supercalcine pellets and glass marbles. The development of coatings for supercalcine was pursued to provide an additional protective layer between the radionuclides and the environment. The coatings include the application of a 40 μm pyrolytic carbon layer as a barrier to enhance leach resistance and a 60-μm Al^2O^3 layer as a barrier to increase oxidation resistance. Glass coating of supercalcine by frit and glaze was also investigated.

1233 CLAY-PHOSPHATE CERAMICS AND VITROMETS: ALTERNATIVES TO MONOLITHIC HIGH LEVEL WASTE GLASS PRODUCTS. Zemlyanukhin, V.I.; Kuznetsov, Y.V.; Lazarev, L.N.; Lyubtsev, R.I.; Shashukov, E.A.; Khlopin, V.C. (Radium Institute, Leningrad, USSR). pp 195-200 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY: Plenum Press (1979).
From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).
Some of the results from investigations on high level waste incorporated into ceramic, cermet, and vitromet products are reported.

1234 SYNTHETIC RUTILE MICROENCAPSULATION: A RADIOACTIVE WASTE SOLIDIFICATION SYSTEM RESULTING IN AN EXTREMELY STABLE PRODUCT. Forberg, S. (Royal Inst. of Tech., Stockholm, Sweden); Westermark, T.; Larker, H.; Widell, B. pp 201-215 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY: Plenum Press (1979).
From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).
Results of the investigations indicate that: using titanate ion exchangers it is feasible to adsorb most of the active species in high level liquid waste; hot isostatic pressing has been successfully employed for crystallization and consolidation of the loaded exchangers; and extremely low radionuclide release rates are indicated by the Soxhlet leaching studies performed so far.

1235 HOT ISOSTATIC PRESSING FOR THE CONSOLIDATION AND CONTAINMENT OF RADIOACTIVE WASTE. Larker, H.T. (High-Pressure Lab. ASEA AB, Robertsfors, Sweden). pp 207-210 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY: Plenum Press (1979).
From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).
Hot isostatic pressing has been applied for making synthetic mineral blocks from several types of simulated high-level radioactive waste. In addition, a method to make synthetic corundum canisters for spent fuel by a similar technique has been developed. Full scale canisters (0.5 m outside diameter by 3 m) have been made and an irradiated fuel rod has been enclosed successfully in a monolithic half scale synthetic corundum canister.

1236 INVESTIGATIONS OF THE VOLATILITY OF CESIUM FROM ALUMINOSILICATES BY MASS SPECTROMETRY. Odoj, R.; Hilpert, K.; Gerads, H. (Kernforschungsanlage, Juelich, Germany). pp 227-229 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY: Plenum Press (1979).
From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).
The different volatility of cesium from the crystalline compounds of the ternary system Cs_2O-Al_2O_3-SiO_2 is demonstrated. Three different crystalline compounds $CsAlSiO_4$, $CsAlSi_2O_6$, and $CsAlSi_5O_{12}$ were found.

1237 ROLE OF ADMIXTURES IN PREPARING DENSE CEMENTS FOR RADIOACTIVE WASTE ISOLATION. Roy, D.M.; Daimon, M.; Scheetz, B.E.; Wolfe-Confer, D.; Asaga, K. (Pennsylvania State Univ., University Park). pp 461-466 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY: Plenum Press (1979).
From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).
Sulfonated naphthalene and melamine formaldehyde condensates have been studied as superplasticizing admixtures used to reduce the necessary water content of cement mixes. Their role in producing dense low porosity composites in nuclear waste isolation applications is discussed. Zeta potential, flow, adsorption characteristics, viscosity, setting time and compressive strength data are reported.

1238 IMMOBILIZATION OF STRONTIUM AND CESIUM IN INTERMEDIATE-LEVEL LIQUID WASTES BY SOLIDIFICATION IN CEMENTS. Rudolph, G.; Koester, R. (Kernforschungszentrum, Karlsruhe, Germany). pp 467-470 of Scientific

basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY: Plenum Press (1979).
From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).
An accelerated leach test at elevated temperature has been developed which gives intercomparable results within one day. It is very useful for product quality control at large throughputs. Using this test, it has been shown that cesium leachabilities from cement products containing a simulated waste typical of fuel reprocessing plants can be reduced by addition of a bentonite. Addition of barium silicate hydrate retards strontium leaching in these cements. Leach rates in tap water and in salt brine are lower than in distilled water and sodium chloride solution.

1239 CONFINEMENT OF VOLATILIZED RUTHENIUM OXIDES. Maas, E.T. Jr.; Longo, J.M. (Exxon Research and Engineering Co., Linden, NJ). pp 487-490 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY: Plenum Press (1979).
From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).
Fission product ruthenium poses unique problems in nuclear fuels reprocessing due to the volatility of RuO_4. Results are presented from studies that demonstrate the ability of alkaline earth metal carbonates and calcium oxide to form thermodynamically stable ruthenium compounds and thus fix the volatile ruthenium oxides.

1240 SEPARATION OF URANIUM AND PLUTONIUM FROM AN AQUEOUS SOLUTION CONTAINING PHOSPHORIC, SULFURIC, AND NITRIC ACIDS BY SOLVENT EXTRACTION. Thiagarajan, R.; Swarup, R.; Patil, S.K. (Bhabha Atomic Research Centre, Bombay, India). Separation Science and Technology ; 14: No. 8, 749-755(1979).
A solvent-extraction method has been developed to separate uranium and plutonium from an aqueous solution containing phosphoric, sulfuric, and nitric acids by extracting them into 0.5 M TOPO in xylene followed by stripping with ammonium carbonate solution. In the case of plutonium, spectral evidence reveals that the complex species extracted into TOPO is predominantly the neutral nitrate complex of Pu(IV).

1241 BONDING OF METAL OXIDES IN SODIUM SILICATE GLASS. Lam, D.J.; Veal, B.W.; Chen, H.; Knapp, G.S. (Argonne National Lab., IL). pp 97-107 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY: Plenum Press (1979).
From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).
X-ray photoelectron spectroscopy (XPS) and extended x-ray absorption fine structure (EXAFS) studies have been undertaken on sodium disilicate glasses containing varying amounts of Fe_2O_3 and UO_2. The XPS results enable one to distinguish the different bonding characteristics of iron and uranium in these glasses. A three dimensional model for the iron coordination in the sodium disilicate glass is inferred from the combined XPS and EXAFS results.

1242 DISTRIBUTION RATIOS AND EMPIRICAL EQUATIONS FOR THE EXTRACTION OF ELEMENTS IN PUREX HIGH LEVEL WASTE SOLUTION. 1. TBP. Svantesson, I.; Hagstroem, I.; Persson, G.; Liljenzin, J.O. (Chalmers Tekniska Hoegskola, Goeteborg (Sweden)). Journal of Inorganic and Nuclear Chemistry ; 41: No. 3, 383-389(1979).
Distribution ratios for nitric acid, actinides, fission products and corrosion products between PUREX HLW-solution and 50% tributylphosphate in an aliphatic diluent have been investigated in the range 0.1 to 6 M nitric acid. Comparable measurements for some of the elements have been made in pure HNO_3 in the range 0.05 to 11 M. Empirical equations have been derived for elements with distribution ratios above 0.01 in the investigated acidity range.

1243 EXPERIENCE IN DECONTAMINATION AND WASTE HANDLING AT A SHUT-DOWN PLANT FOR REGENERATION OF SPENT FUEL ELEMENTS. Detilleux, E.; Eschrich, H. Atomnaya Tekhnika za Rubezhom ; No. 1, 28-33(1979). (In Russian).
Described is the program executed at the ''Eurochemic'' plant, which included washing away and decontamination of the equipment as well as processing and temporary storage of radioactive wastes of different types taking into account safety requirements. Described are several processes of waste treatment, permitting to obtain solidified products and to fix non-volatile high-active wastes. Ways of storage of solid or solidificated wastes are described.

1244 RADIATION EFFECTS ON THE SEPARATION OF LANTHANIDES AND TRANSPLUTONIDES BY THE TALSPEAK-TYPE EXTRACTION. Tachimori, S.; Nakamura, H. (Japan Atomic Energy Research Inst., Tokyo). Journal of Radioanalytical Chemistry ; 52: No. 2, 343-354(1979).
Effects of radiation of the extraction system composed of DEHPA extractant and DTPA aqueous solution containing nitrate were studied by measuring distribution ratios of Am(III) and Nd(III) with the extractant and DTPA solution either one of which was irradiated with ^{60}Co γ-rays or the organic-aqueous mixed phase irradiated under continuous stirring. The irradiation causes an increase of Df and a decrease of the Nd/Am separation factor β, to an especially large extent in the mixed phase system. These effects are due firstly to the radiolytic decomposition of DTPA and secondarily to the formation of MEHPA. The replacement of nitrate with lactate stops the degradation of DTPA and DEHPA resulting in the retardation of the increase of Df and a decrease of the separation factor. The DEHPA - DTPA - lactic acid system is concluded to sustain absorption of radiation at an absorbed dose up to 200 $Whxl^{-1}$ in the partitioning of transplutonium elements in HLW.

1245 IRON BEHAVIOUR X-RAYING DURING VITRIFICATION OF RADIOACTIVE WASTES. Minaev, A.A.; Prokhorova, N.P.; Kozlov, A.A.; Gavrish, A.A.; Shakh, G.E. Radiokhimiya ; 21: No. 1, 28-33(1979). (In Russian).
The X-ray method has been used for studying the iron behaviour in the process of vitrification of radioactive wastes with the aid of a reducer. Iron in a different valent crystal phases and the rates of their separation upon cooling of the phosphates melts. Iron (2) accelerates their crystallization. Analysis of X-ray diffraction patterns of different melts with iron and oxides of other elements (Cr, Ni, Mn, et.al.) and without them has shown that upon caking of melts with molasses as a reducer iron is present in bivalent state. Acceleration of melt crystallization caused by bivalent iron positivety affects the properties of the melt: thermal stability increases without deterioration of their chemical stability as

compared with glasses.

1246 Systemanalyse und Prozessstrategie. (SYSTEMS ANALYSIS AND PROCESS STRATEGY). Ditterich, K.; Schneider, H. (Commission of the European Communities, Ispra (Italy). Joint Research Centre). Muenchen, Germany, F.R.; Thiemig (1979). 215p. (In German).
Using the methods of systems analysis presented in the main chapters, the system of 'radioactive waste management' is chosen in order to show how to deal with such problems and to outline the principle of the method.

1247 SEPARATION OF ^{137}CS FROM NUCLEAR WASTE. Kenna, B.T.; Murphy, K.D. (Sandia Labs., Albuquerque, NM (USA)). Journal of Inorganic and Nuclear Chemistry ; 41: No. 11, 1535-1540(1979).
Sodium zirconate is one member of a family of new inorganic ion exchange materials which have high affinity for all actinides and fission product cations except for Cs^+. A combination of cold, tracer and high level liquid waste experiments with sodium zirconate has shown that 70 to 80 and 80 to 100% of the Cs^+ in high level liquid waste remains in solution following batch or column equilibration, respectively. The fact that ^{137}Cs can be obtained in relatively pure form permits subsequent conversion directly to an insoluble radiation source. This is of prime importance in areas such as sewage sludge sterilization via γ-ray irradiation.

1248 POLYMERIC SOLIDIFICATION OF LOW-LEVEL RADIOACTIVE WASTE. Filter, H.E. (Dow Chemical Co., Midland, MI). Transactions of the American Nuclear Society ; 33: 387-388(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADIOACTIVE WASTE PROCESSING;SOLIDIFICATION; VINYL MONOMERS;RESINS;LOW-LEVEL RADIOACTIVE WASTES;ESTERS

1249 OFF-GAS TREATMENT SYSTEM FOR INEL RADIOACTIVE SLAGGING PYROLYSIS INCINERATOR. Christian, J.D.; Choi, E.C.; Cox, N.D.; Haff, K.W.; Hootman, H.E.; Ziegler, D.L. Transactions of the American Nuclear Society ; 33: 410(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
INCINERATORS;OFF-GAS SYSTEMS;RADIOACTIVE WASTE PROCESSING;COMBUSTION;PYROLYSIS;SLAGS; TRANSURANIUM ELEMENTS;DESIGN

1250 DEVELOPMENT OF A PORTABLE VOLUME REDUCTION AND SOLIDIFICATION SYSTEM. Darrin, J.C. (Nuclear Power Services, Inc., Secaucus, NJ); Yamaguchi, T. Transactions of the American Nuclear Society ; 33: 411-412(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADIOACTIVE WASTE PROCESSING;SOLIDIFICATION; VOLUME;DESIGN;EQUIPMENT

1251 PROGRESS ON THE CERMET APPROACH TO NUCLEAR WASTE MANAGEMENT. Aaron, W.S.; Kobisk, E.H.; Quinby, T.C.; Thomas, D.K. (Oak Ridge National Lab., TN). Transactions of the American Nuclear Society ; 33: 412-413(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADIOACTIVE WASTE PROCESSING;SOLIDIFICATION; CERMETS;HIGH-LEVEL RADIOACTIVE WASTES; EVALUATION;IRON ALLOYS;NICKEL BASE ALLOYS; CERAMICS

1252 ANALYSIS OF RADIONUCLIDES IN THE DEFENSE WASTE PROCESSING FACILITY. Chandler, J.R.; Finch, D.R.; Becker, G.W. (Savannah River Lab., Aiken, SC). Transactions of the American Nuclear Society ; 33: 415-416(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
COMPUTERIZED SIMULATION;RADIOACTIVE WASTE FACILITIES;SOLIDIFICATION;RADIOACTIVE WASTE PROCESSING;HIGH-LEVEL RADIOACTIVE WASTES; INVENTORIES;FLOWSHEETS

1253 MODELING OF GLASS LEACHING. Pescatore, C.; Machiels, A.J. (Univ. of Illinois, Urbana). Transactions of the American Nuclear Society ; 33: 416-417(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
GLASS;RADIOACTIVE WASTES;LEACHING;KINETICS; MATHEMATICAL MODELS;STRONTIUM 90;DIFFUSION

1254 REVIEW OF HIGH-LEVEL WASTE-FORM PROPERTIES. Rusin, J.M.; McElroy, J.L. (Battelle Pacific Northwest Labs., Richland, WA). Transactions of the American Nuclear Society ; 33: 418-419(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
Sintered ceramics, concrete, glass-ceramics, hot-pressed ceramics, and metal matrices waste forms evaluated. RADIOACTIVE WASTE PROCESSING; SOLIDIFICATION;HIGH-LEVEL RADIOACTIVE WASTES; GLASS;CERAMICS;CALCINATION;EVALUATION;CONCRETES; SOLID WASTES

1255 IN SITU NONDESTRUCTIVE PLUTONIUM ASSAY FOR AN ELECTROPOLISHING BATH. Close, D.A.; Booth, T.E. (Los Alamos Scientific Lab., NM). Transactions of the American Nuclear Society ; 33: 423-425(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
PLUTONIUM;NONDESTRUCTIVE ANALYSIS; ELECTROPOLISHING;RADIOACTIVE WASTE PROCESSING; FISSILE MATERIALS;ELECTROLYTES;CRITICALITY; MONTE CARLO METHOD;DECONTAMINATION;METALS; SURFACES

1256 BASIC ELECTROLYTE FOR LOW-LEVEL DECONTAMINATION. Long, J.L. (Rockwell International, Golden, CO). Transactions of the American Nuclear Society ; 33: 428-429(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
ELECTROLYTES;DECONTAMINATION;PLUTONIUM; AMERICIUM;METALS;EQUIPMENT;ELECTROPOLISHING; SURFACE CLEANING

1257 ELECTRODECONTAMINATION USING A BASIC ELECTROLYTE. Childs, E.L. (Rockwell International, Golden, CO). Transactions of the American Nuclear Society ; 33: 429-430(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
METALS;DECONTAMINATION;ELECTROPOLISHING; ELECTROLYTES;EQUIPMENT;PLUTONIUM;SURFACE CLEANING

1258 CHEMICAL DECONTAMINATION OF METALS. Partridge, J.A.; Lerch, R.E. (Hanford Engineering Development Lab., Richland, WA). Transactions of the American Nuclear Society ; 33: 430-431(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
Inorganic reduction-oxidation system in nitric acid to chemically dissolve the metal surface layer. METALS;EQUIPMENT;DECONTAMINATION; SURFACES;REDOX REACTIONS;NITRIC ACID

1259 STRATEGY ANALYSIS FOR ^{85}KR WASTE MANAGEMENT. Knecht, D.A.; Brown, R.A. (Exxon Nuclear Idaho, Idaho Falls). Transactions of the American Nuclear Society ; 33: 431-433(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
KRYPTON 85;RADIOACTIVE WASTE MANAGEMENT; RADIOACTIVE WASTE PROCESSING;RADIOACTIVE WASTE DISPOSAL;RADIOACTIVE WASTE STORAGE

1260 DIRECT DENITRATION OF PLUTONIUM NITRATE-NITRIC ACID SOLUTION IN A SCREW CALCINER. Bryan, G.H.; Wheelwright, E.J.; Browne, L.M. (Battelle Pacific Northwest Labs., Richland, WA). Transactions of the American Nuclear Society ; 33: 468(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
PLUTONIUM NITRATES;DENITRATION;NITRIC ACID; RADIOACTIVE WASTE PROCESSING;CALCINATION

1261 GLASS: AN AVAILABLE MATERIAL FOR THE IMMOBILIZATION OF NUCLEAR WASTE. Mendel, J.E. (Battelle Pacific Northwest Labs., Richland, WA). Transactions of the American Nuclear Society ; 33: 278(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
GLASS;RADIOACTIVE WASTE PROCESSING; SOLIDIFICATION;STABILITY;RADIATION EFFECTS; LEACHING;MATERIALS;COMPATIBILITY

1262 SYNTHETIC MINERAL NUCLEAR WASTE CERAMICS. Scheetz, B.E. (Pennsylvania State Univ., University Park); McCarthy, G.J. Transactions of the American Nuclear Society ; 33: 278-280(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
CERAMICS;RADIOACTIVE WASTE PROCESSING;SYNROC PROCESS;SOLIDIFICATION;CALCINATION

1263 OPERATION OF A PROTOTYPE ALPHA SOLID WASTE INCINERATOR. Hootman, H.E.; Trapp, O.J.; Warren, J.H.; Dworjanyn, L.O. (E.I. duPont de Nemours and Co., Aiken, SC). Transactions of the American Nuclear Society ; 33: 947-948(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
INCINERATORS;OPERATION;ALPHA SOURCES;SOLID WASTES;RADIOACTIVE WASTE PROCESSING;COMBUSTION; TRANSURANIUM ELEMENTS

1264 DEMONSTRATION OF RADIOACTIVE SLUDGE REMOVAL FROM SRP STORAGE TANK. Elder, H.H. (E.I. duPonte de Nemours and Co., Aiken, SC). Transactions of the American Nuclear Society ; 33: 939-940(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
SAVANNAH RIVER PLANT;SLUDGES;TANKS; RADIOACTIVE WASTE STORAGE;MATERIALS HANDLING; PUMPS

1265 EQUIPMENT FOR COLLECTING SLUDGE SAMPLES FROM SAVANNAH RIVER PLANT WASTE TANKS. Allen, B.M. Jr. (E.I. duPonte de Nemours and Co., Aiken, SC). Transactions of the American Nuclear Society ; 33: 941-942(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
SLUDGES;SAMPLERS;RADIOACTIVE WASTE PROCESSING;SAVANNAH RIVER PLANT;SAMPLING; EQUIPMENT;TANKS

1266 REMOTE EXPERIMENTAL FACILITY TO SOLIDIFY SRP HIGH-HEAT WASTE. Galloway, R.M.; Plodinec, M.J.; Wilhite, E.L.; Chisman, P.H. (E.I. duPonte de Nemours and Co., Aiken, SC). Transactions of the American Nuclear Society ; 33: 942-943(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADIOACTIVE WASTE PROCESSING;SOLIDIFICATION; SAVANNAH RIVER PLANT;RADIOACTIVE WASTE FACILITIES;HIGH-LEVEL RADIOACTIVE WASTES; VITRIFICATION

1267 VITRIFICATION OF ACTUAL HIGH-LEVEL WASTE FROM LWR FUEL. Bjorklund, W.J.; Hanson, M.S. (Battelle Pacific Northwest Labs., Richland, WA). Transactions of the American Nuclear Society ; 33: 943-944(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADIOACTIVE WASTE PROCESSING;SOLIDIFICATION; VITRIFICATION;HIGH-LEVEL RADIOACTIVE WASTES; DEMONSTRATION PROGRAMS

1268 RADIOACTIVE WASTE INCINERATION STUDIES AT THE LOS ALAMOS SCIENTIFIC LABORATORY. Borduin, L.C.; Draper, W.E.; Koenig, R.A.; Newmyer, J.M. (Los Alamos Scientific Lab., NM). Transactions of the American Nuclear Society ; 33: 946-947(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADIOACTIVE WASTE PROCESSING;COMBUSTION;LASL; TRANSURANIUM ELEMENTS;SOLID WASTES

1269 BACKGROUND ON LEACH TESTING OF SOLIFIFIED RADIOACTIVE WASTES. Mendel, J.E. (Batelle Pacific Northwest Labs., Richland, WA). Transactions of the American Nuclear Society ; 33: 203(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
LOW-LEVEL RADIOACTIVE WASTES;LEACHING;SOLID WASTES;STANDARDS;RADIOACTIVE WASTE DISPOSAL; SAFETY

1270 RADIOACTIVE WASTES. CHAPTER 9. George, D. (UKAEA Atomic Energy Research Establishment, Harwell. Chemical Technology Div.). pp 259-311 of Developments in environmental control and public health - 1. Porteous, A. (Open Univ., Milton Keynes (UK)) (ed.). London; Applied Science (1979).
The three kinds of radioactivity and their units of measurement are briefly described, and the principles of control and the legislation governing the disposal of radioactive waste are explained, including the critical group approach, registration of users, authorisation for disposal, and site licensing. Examples are given to illustrate the ways in which these controls are put into effect. The various types and origins of the wastes which arise as a result of the production and use of

radioactive materials and the nuclear power programme are described, together with their treatment and disposal. Research which is in progress and future developments are both discussed.

1271 TREATMENT OF LOW RADIOACTIVE LIQUID WASTE BY COMPOUNDS HAVING AN ENHANCED AFFINITY FOR THE CONTAMINANTS. Iten, D.; Loewenschuss, H. (Eidgenoessisches Inst. fuer Reaktorforschung, Wuerenlingen (Switzerland)). pp 297-307 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France; OECD (1979).

From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).

This paper describes a study carried out on an alternative method based on precipitation followed by centrifugation. Tests have been carried out on samples of liquid RADWASTE from the Swiss Reactor Research Institute (EIR) and also on primary coolant water samples from a Swiss P.W.R. at Beznau. Radioactive heavy metals are removed from the liquid by inducing precipitation of ferric hydroxide. The heavy metals are both adsorbed and coprecipitated. The addition of potassium zinc ferrocyanide affects the removal of cesium by the formation of a cesium zinc ferrocyanide complex of low solubility. Strontium is removed in a similar fashion by adding a specially prepared phosphate resin. The study has shown that the sequence in which the reagents are added is important. The contaminated precipitates were all removed with an on-line centrifuge. The activity level of the resulting effluent was below the limit prescribed by the Swiss Authorities concerned with environmental release.

1272 SOLIDIFICATION OF WASTE WATER CONCENTRATES USING A ROLLER DRIER. Laser, M.; Mallek, H.; Jablonski, W. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Abt. Dekontamination). pp 373-377 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France; OECD (1979).

From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).

Because of the relatively high costs for package material, transportation and final disposal of radioactive waste the final volume of the waste must be reduced. In the case of waste water concentrates it is econmical to install an additional step to dry the waste before monolithization with cement. In the Nuclear Research Centre in Juelich a roller drier is in operation since 9 years with very good results. The final volume of the solidified waste is lower by a factor of 5 compared with the direct solidification of the concentrate with cement. This results in a remarkable reduction of the costs.

1273 VOLUME REDUCTION AND SOLIDIFICATION OF LIQUID AND SOLID LOW-LEVEL RADIOACTIVE WASTE. May, J.R. (Newport News Industrial Corporation, VA (USA)). pp 419-437 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France; OECD (1979).

From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).

This paper presents a brief background of the development of a method of radioactive waste volume reduction using a unique fluidized bed calciner/incinerator. The volume reduction system is capable of processing a variety of liquid chemical wastes, spent ion exchange resin beads, filter treatment sludges, contaminated lubricating oils, and miscellaneous combustible solids such as paper, rags, protective clothing, wood, etc. All of these wastes are processed in one chemical reaction vessel. Detailed process data is presented that shows the system is capable of reducing the total volume of disposable radioactive waste generated by light water reactors by a factor of 10. Equally important to reducing the volume of power reactor radwaste is the final form of the stored or disposable radwaste. This paper also presents process data related to a new radwaste solidification system, presently being developed, that is particularly suited for immobilizing the granular solids and ashes resulting from volume reduction by calcination and/or incineration.

1274 VOLUME REDUCTION, A SAFER AND CHEAPER WAY OF RADWASTE MANAGEMENT. Mergan, L.M.; Cordier, J.P.; Storrer, J.A. (Societe Belge pour l'Industrie Nucleaire, Brussels). pp 407-418 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France; OECD (1979).

From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).

Development of 'Volume Reduction' has demonstrated that it is a safer and cheaper radwaste management method. Safer, because of several advantages: decrease of solidified product volume, satisfactory product properties, absence of free water, better control of process parameters, increased encapsulation efficiency ... The corresponding impact on the waste management costs, results in important savings on different factors, as well as regards the operational costs as the investment expenses. Economy in the range of BF 35.000 per m^3 of incoming waste is achievable. The main volume reduction techniques readily available are briefly reviewed.

1275 DECOMMISSIONING OF A ^{239}PU CONTAMINATED INCINERATOR FACILITY. Harper, J.; Garde, R. (Los Alamos Scientific Lab., NM (USA)). pp 601-607 of Decommissioning of nuclear facilities. Proceedings of an international symposium jointly organized by the IAEA and the OECD NEA and held in Vienna, 13-17 November 1978. Vienna; IAEA (1979).

From International symposium on the decommissioning of nuclear facilities; Vienna, Austria (13 Nov 1978).

In early 1978, a plutonium contaminated incinerator facility at the Los Alamos Scientific Laboratory (LASL), Los Alamos, New Mexico, was decommissioned. The project involved dismantling the facility and disposal by burial or by retrievable storage of the debris at an on-site waste disposal area. Contaminated soil from the 0.5 hectare area was buried. The facility was constructed in 1951 to incinerate plutonium contaminated wastes. It was later used as a decontamination facility. The major features included a 185 m^2 control building, incinerator, cyclone dust collector, spray cooler, venturi scrubber, air filter bank, ash separator, and two 140,000 litres ash storage tanks. Preliminary soil contamination surveys were performed by a LASL developed portable phoswich detector system. Final soil

contamination levels were measured with a zinc sulphide gross alpha scintillation system. Six hundred cubic metres of debris and 1200 m^3 of soil contaminated with less than 10 nCi ^{239} Pu/g were buried at the LASL disposal area. Five cubic metres of ^{239} Pu contaminated ash residues were packed and stored to meet the Department of Energy's 20 year retrievable storage criteria.

1276 TOXIC AND HAZARDOUS WASTE DISPOSAL. VOLUME 1. PROCESSES FOR STABILIZATION/SOLIDIFICATION. Pojasek, R.B. (ed.). Ann Arbor, MI; Ann Arbor Science Publishers, Inc. (1979). 408p. $36.00.

Processes for the stabilization and/or solidification of toxic, hazardous, and radioactive wastes are reviewed. The types of wastes classified as hazardous are defined. The following processes for the solidification of hazardous wastes are described: lime-based techniques; thermoplastic techniques; organic polymer techniques; and encapsulation. The following processes for the solidification of high-level radioactive wastes are described: calcination; glassification; and ceramics. The solidification of low-level radioactive wastes with asphalt, cement, and polymeric materials is also discussed. Other topics covered include: the use of an extruder/evaporator to stabilize and solidify hazardous wastes; effect disposal of fine coal refuse and flue gas desulfurization slurries using Calcilox additive stabilization; the Terra-Tite Process; the Petrifix Process; the SFT Terra-Crete Process; Sealosafe Process; Chemfix Process; and options for disposal of sulfur oxide wastes. (DMC)

1277 ZERO RELEASE FOR LIQUID RADIOACTIVE WASTES. PROCESSING OF WASTES FROM NUCLEAR POWER PLANTS USING THE ACEREN EVAPORATOR. Arod, J.; Chauvet, P. (CEA Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-les-Durance (France). Service de Chimie Appliquee); Monboeuf, M. (Societe Ducatel, Vinon-sur-Verdon (France)). pp 281-295 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 Mars 1979. Paris, France; OECD (1979). (In French)

From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).

Zero release for the liquid radioactive wastes of the power reactors is not an utopic position. The ACEREN evaporator is able to concentrate the liquid wastes without distillate formation. In this apparatus, the liquid waste flows down on vertical canvas in synthetic tissue (CPV); at counter-current an insaturated air is blowing and increases its hygrometric degree. Some liquid wastes were treated with good results on a pilot plant (250 l/h). An industrial apparatus, with a flow-rate of 1 m3/h is described.

1278 DECONTAMINATION OF LARGE COMPONENTS AT ECN. Koning, C. (Stichting Energieonderzoek Centrum Nederland, Petten). pp 517-527 of Decommissioning of nuclear facilities. Vienna, Austria; IAEA (1979).

From International symposium on the decommissioning of nuclear facilities; Vienna, Austria (13 Nov 1978).

A description of the decontamination facility at ECN, Petten, is given. The layout of the low-level decontamination and the in-cell decontamination of high-level contaminated objects is explained. The results of the recent decontamination of large components, such as boxes used for handling of active materials, and reactor pool equipment, are presented.

1279 TREATMENT OF METALLIC WASTES BY SMELTING. Cavendish, J.H. (National Lead Co. of Ohio, Cincinnati (USA)). pp 611-630 of Decommissioning of nuclear facilities. Vienna, Austria; IAEA (1979).

From International symposium on the decommissioning of nuclear facilities; Vienna, Austria (13 Nov 1978).

A programme designed to promote the constructive re-use of metal scrap slightly contaminated with radioactive nuclides is described. This programme is being conducted by the Oak Ridge Operations Office of the U.S. Department of Energy. Its primary impetus was the generation of large quantities of potentially valuable metal scrap by an extensive renovation and improvement of the three U.S. gaseous diffusion enrichment plants. The programme includes three phases: (1) to characterize the type and quantity of scrap being generated; (2) to develop techniques for decontamination of the scrap to insignificant levels of radioactivity; (3) to obtain amendments to current federal regulations which would permit commercial sale and use of the decontaminated metal.

1280 VITRIFICATION OF RADIOACTIVE WASTES. van Iseghem, P.; de Batist, R. (Centre d'Etude de l'Energie Nucleaire, Mol (Belgium)). Consensus ; No. 3-4, 79-96(1979). (In French).

A review of the different techniques of radioactive waste conditioning is given (vitrification, Lotes and Pamela procedures). The incorporation of radioactive products in glass is treated more thoroughly. The chemical and physical stability of the glasses, and the influence of radiation on the vitrified waste is carefully examined.

1281 ATTEMPT TO OPTIMIZE THE CONDITIONS FOR CLEANING WASTE SOLUTIONS FROM TISSUE DECONTAMINATION. Simova, G.; Boyadzhiev, A.; Shopov, N.; Mikhajlov, M. (Meditsinska Akademiya, Sofia (Bulgaria). Nauchen Inst. po Rentgenologiya i Radiobiologiya). Rentgenologiya i Radiologiya ; 18: No. 3, 187-191(1979). (In Bulgarian).

The perspective use of Bulgarian natural calcium clinoptilolite for cleaning liquid wastes from decontamination of work clothes encouraged the authors to study the possibilities for improvement of the effectiveness of the sorption process, by applying four factors of presorption treatment. Experiments were carried out on liquids, obtained from decontamination of embolene from strontium and cesium radionuclides. The effect was studied of acidity of medium, reduction factor (diminution of radioactive waste volume), ageing time and incorporated gamma radiation dose in the tested liquids upon the degree of their sorption decontamination under static conditions and room temperature. Reduction factor 250, pH of medium 10, ageing time 14 days and incorporated dose 250 kilorad were considered optimal. After this presorption treatment the degree of decontamination of the tested liquids was increased by an average of 20 per cent.

1282 ION CHROMATOGRAPHIC DETERMINATION OF DIBUTYLPHOSPHORIC ACID IN NUCLEAR FUEL REPROCESSING STREAMS. Lash, R.P.; Hill, C.J. (Allied Chemical Corp., Idaho Falls, ID). pp 67-74 of Ion chromatographic analysis of

environmental pollutants. Volume 2. Mulik, J.D.; Sawicki, E. (eds.). Ann Arbor, MI; Ann Arbor Science Publishers, Inc. (1979).

From 2. national symposium of ion chromatographic analysis of environmental pollutants; Research Triangle Park, NC, USA (11 Oct 1978).

A rapid method was developed for the determination of dibutylphosphoric acid (DBP), a degradation product of tributylphosphate (TBP), which is used in a solvent extraction process for recovery of uranium. DBP, along with any monobutylphosphoric acid (MBP) and phosphoric acid, are extracted from the organic phase into dilute sodium hydroxide. DBP is separated from MBP and phosphoric acid by ion chromatography (IC) and is determined on a peak height ratio basis. The method required only 30 minutes per analysis as compared to the conventional alumina column separation-colorimetric determination procedure, which requires eight hours to complete. DBP has been quantified to a lower limit of 1.5 mg/l. Relative standard deviations ranging from 5.7 to 0.4% were obtained for DBP concentrations ranging from 1.5 to 500 mg/l, respectively.

1283 PROCESS FOR AN ULTIMATE STORAGE-MATURE, ENVIRONMENTALLY HARMLESS SOLIDIFICATION OF HIGHLY AND MEDIUM RADIOACTIVE AND/OR ACTINIDES-CONTAINING AQUEOUS WASTE CONCENTRATES OR OF FINE-GRAINED SOLID WASTES IN WATER SLURRIES. Scheffler, K.; Riege, U. (to Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,726,087/C/. 21 Dec 1978. 6p. (In German).

The aqueous solutions or slurries of highly and medium radioactive materials are mixed with absorbent or hydraulically binding inorganic materials in definite ratios, ceramic burned, so that a solid sinter body is formed. The invention claims a combination of advantageous process steps in which exact mixing ratios and additions are given in order that the end products all meet with the requirements for ultimate storage.

1284 METHOD OF PROCESSING RADIOACTIVE LIQUID WASTES. Sugimoto, Y.; Kikuchi, M.; Funabashi, K.; Yusa, H.; Horiuchi, S. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 53-147,200/A/. 21 Dec 1978. 6p. (In Japanese).

Purpose: To decrease the volume of radioactive liquid wastes essentially consisting of sodium hydroxide and boric acid. Method: The concentration ratio of sodium hydroxide to boric acid by weight in radioactive liquid wastes essentially consisting of sodium hydroxide and boric acid is adjusted in the range of 0.28 - 0.4 by means of a pH detector and a sodium concentration detector. Thereafter, the radioactive liquid wastes are dried into powder and then discharged.

1285 METHOD OF SOLIDIFYING RADIOACTIVE WASTES. Matsuura, H.; Kuribayashi, N.; Kamiyama, H.; Saito, N. (to Nippon Atomic Industry Group Co. Ltd., Tokyo). Japanese Patent 53-146,100/A/. 19 Dec 1978. 3p. (In Japanese).

Purpose: To enable solidification of asphalt at relatively low temperature (100 -- 120°C), as well as prevent asphalt from intruding into condensates. Method: Radioactive wastes discherged from the nuclear facility are dry-processed in a dryer and the powder thus resulted is fed by way of a powder feeder to an extruding kneader. The powder and asphalt previously supplied in a predetermined amount are compounded in the extruding kneader to form solidified asphalt products at a low temperature.

1286 METHOD FOR FIXING ORGANIC RADIOACTIVE SOLVENT WASTES. Ichinose, S.; Masuda, T.; Murata, M.; Tsunoda, N.; Nemoto, S. (to Topy Industries Ltd., Tokyo (Japan)). Japanese Patent 53-143,900/A/. 14 Dec 1978. 7p. (In Japanese).

Purpose: To process organic radioactive solvent wastes of a high concentration by causing them to absorb and fix in swelling synthetic mica. Method: Organic radioactive solvent wastes are contacted and adsorbed to swelling synthetic mica and absorbed therein. Then, the synthetic mica is subjected to hydrophobic treatment with a hydrophobic agent (for example, quarternary ammonium salt) so that the absorbed organic solvent may not leach out into water. The mica is further calcinated and then the powdered products are molded and sintered.

1287 GAS-ABSORPTION PROCESS. Stephenson, M.J.; Eby, R.S. (to Dept. of Energy). US Patent 4,129,425. 12 Dec 1978. Filed date 18 Jul 1977. 12p.

PAT-APPL-816,575.

A gas-absorption process for the recovery of a desired component from a feed-gas mixture is described. The process is conducted in a closed-loop system including a gas-liquid contacting column which has upper, intermediate, and lower contacting zones. A liquid absorbent for the desired component is circulated through the loop, passing downward through the column, is regenerated and then withdrawn from a boiler, and returned to the column. The desired component is concentrated in a narrow section of the intermediate zone.

1288 ASEA HAVE DEVELOPED A NEW SAFE CONTAINER FOR NUCLEAR FUEL WASTE. CORUNDUM CONTAINER WHICH TAKES ABOUT 400KG OF URANIUM. Elektro ; 91: No. 22, 31(12 Dec 1978). (In Norwegian).

The method of encapsulating spent fuel elements in corundum, processed by isostatic pressing at high temperature, which has been developed by ASEA, has now been tested using spent fuel elements from the Oskarshamn nuclear power plant. Ultrasonic testing showed complete fusion of the corundum container and lid. The capacity of such coatainers is about 400kg unreprocessed fuel.

1289 SOME STUDIES OF NUCLIDE LOSSES. 2. COLD FINGER. Ghattas, N.K. (Atomic Energy Establishment, Cairo (Egypt)); Hild, W.; Guber, W. Journal of Applied Chemistry and Biotechnology (England) Supersedes J. Appl. Chem. ; 28: No. 12, 847-853(Dec 1978).

The vaporisation behaviour during vitrification of simulated high active waste containing radioactive isotopes of special interest was studied using the cold-finger technique. Relatively high loss was observed for both caesium and tellurium as compared with ruthenium, strontium and cerium. The losses were significantly increased starting from 900°C. Heat fractionation results in low losses of radioactive nuclides. A simple formula was proposed for predicting and comparing the vaporisation losses of similar melts using different installations.

1290 IMPROVEMENT OF BWR RADIOACTIVE WASTE DISPOSAL SYSTEM. Kani, J.; Amoh, K; Irie, H.

(Toshiba Corp., Kawasaki, Kanagawa (Japan)); Nakayama, Yasuyuki. Toshiba Rebyu (Toshiba Review) ; 33: No. 12, 1009-1012(Dec 1978). (In Japanese).

Descriptions of thehe improvements of the disposal systems for liquid and solid radioactive waste in recent BWR plants. Regarding the improvement of liquid waste disposal systems in Toshiba, emphasis was laid on crud removal and laundry drain treatment; as a result, a crud removal system utilizing a centrifugal separation mechanism and an evaporative enriching system using anti-foaming agent have been practicalized. An important problem left for solution is the method of volume reduction of solid waste. A method attracting attention of late is the plastic solidification which is far superior to the conventional cement and bitumen solidification. In Toshiba, this method is promising to be practicalized, in which the waste is dried and then solidified with thermosetting resin.

1291 DISTRIBUTION OF CS, SR, CE, EU AND TB INTO NA- AND H-TYPE ZEOLITES. Mimura, H.; Kanno, T. (Tohoku Univ., Sendai (Japan). Research Inst. of Mineral Dressing and Metallurgy). Tohoku Daigaku Senko Seiren Kenkyusho Iho (Bulletin of the Research Inst. of Mineral Dressing and Metallurgy, Tohoku University) ; 34: No. 2, 85-94(Dec 1978). (In Japanese).

Effects of pH on the distribution of radioisotopes, ^{137}Cs, ^{85}Sr, ^{144}Ce, sup(152,4)Eu and ^{160}Tb, into synthetic zeolites (A, X and Y), synthetic mordenite, natural mordenite and clinoptilolite have been investigated. Cesium ion was preferentially distributed into mordenite with a high distribution coefficient (K sub(cs) = 10^4) from acidic aqueous solution of pH 1 to 3. As for strontium, the K sub(sr) values into zeolites A, X and Y attained about 10^4 in the neutral region, but markedly decreased with increasing acidity. The distributions of rare earth elements at tracer-level concentrations into six kinds of Na-type zeolites were shown by the curves with a maximum at a different equilibrium pH. In the presence of carrier (10 ppm), these distribution curves broadened and overlapped. In the case of H-type zeolites, the cesium ion was also captured by zeolite in the acidic region (K sub(cs) = 10^4), while the multivalent cations had low distribution coefficients less than 10^2 at pH 2 and the K values decreased with increase in acidity.

1292 DRYING EQUIPMENT FOR RADIOISOTOPE-TREATED ANIMALS. Fujikake, T. (Fuji Electric Co. Ltd., Kawasaki, Kanagawa (Japan)); Ohmori, A.; Takada, Y.; Nakano, S.; Tamai, S. Fuji Jiho (The Fuji Electric Journal) ; 51: No. 12, 697-701(Dec 1978). (In Japanese).

The animal experiments using radioisotopes have been carried out over wide fields, accordingly, the number of radioisotope-contaminated animal cadavers has been increasing rapidly. It was decided that each establishment employing radioiosotopes dries those cadavers to such state as to be able to burn up with the device in Japan Atomic Energy Research Institute. The animal waste-drying device meeting the above mentioned purpose was developed by the joint work of Fuji Electric General Devices Co. and Fuji Electric Co. It is known as the micro-wave drying device for animals (its nickname is Microdry). This device dehydrates at high speed by micro-wave drying method. By using along with a moisture detector, it gives the drying state as requested regardless of the water content of each animal. The animal wastes after perfect dehydration are reduced to the weight of about one-third, and the dried animal cadavers can be preserved for a long time at room temperature because of the sterilizing effect of the micro-wave heating. This device is noted for its excellent safeness, simple operation, and low treatment cost. It is anticipated that it can be further applied to other fields such as excreta, breeding materials, etc.

1293 RADIOACTIVE LIQUID WASTES PROCESSING SYSTEM. Funabashi, K.; Kikuchi, M.; Kamiya, K.; Yusa, H. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 53-137,400/A/. 30 Nov 1978. 7p. (In Japanese).

Purpose: To decrease the amount of drum cans stored in the site by ionizing radioactive substances adsorbed on solids while adjusting pH value and selectively eliminating these ions by inorganic ion exchangers. Method: Concentrated liquid wastes stored in a concentrated liquid waste tank are sent into a pH adjusting tank for pH adjustment and, thereafter, to a reaction and settling separation tank for elutriation of cobalt and separation of most of clads. The liquid wastes completely separated with clads in the filter and containing only ions are sent to another pH adjusting tank for pH adjustment. Then, they are sent to a reaction and settling separation tank, where they are treated with inorganic ion exchangers and separated into clads and ion exchangers, which are packed respectively in drum cans.

1294 METHOD AND DEVICE FOR FIXING RADIOACTIVE GASES. Ozaki, S. (to Toshiba Corp., Kawasaki, Kanagawa (Japan)). Japanese Patent 53-136,200/A/. 28 Nov 1978. 3p. (In Japanese).

Purpose: To enable stable and long storage for radioactive gases by converting the radioactive gases into neutral particles and injecting them into a substrate to solidify. Method: Radioactive gases such as Kr-85 separated in a rare gas separator are introduced into a gas reservoir to store and then sent by way of a flow rate control valve to an ion source to ionize. Then, ionized rare gas in an accelerator is accelerated to a high energy and injected to a neutral particle cell containing diluted Kr gas from the gas reservoir to convert the same into neutral particles. They are further introduced in a high speed particle injection chamber and injected into a substrate disposed in the chamber to thereby reduce the diversion of the high speed particle beams and be solidified.

1295 CHARGING FACILITY FOR DRUMS WITH RADIOACTIVE CONTENT. Hempelmann, W. (to Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,659,691/A/. 16 Nov 1978. 14p. (In German).

The facility has a packing press which at least partly is contained within an alpha-tight box. The waste can be made compact and fixed in the 200 l iron-hooped drums by means of concrete. The press consists of two tie rods with a press cylinder and a press die acting downwards and fitting into the drum opening. The drum is standing on a pressing table fastened to the ends of the tie rods. The pressing table can be raised against the press die together with the drum. The lifting mechanisms to do this consist of hydraulic cylinders mounted at the lower end of the tie rods and whose piston rods, acting axially in extension of the tie rods, are hinged on the

pressing table. In addition there may be mounted a bottom plate in the drum for reinforcement.

1296 METHOD FOR PROCESSING RADIOACTIVE WASTES. Nakayama, Y. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 53-131,400/A/. 16 Nov 1978. 4p. (In Japanese).

Purpose: To make it possible to carry out the cement solidification treatment of radioactive wastes by compact facilities. Method: Predetermined quantities of radioactive wastes, cement and water are fed in a drum, and stirring vanes are inserted therein thereby stirring and mixing these substances. Then, an empty drum is carried to the lower parts of said stirring vanes, and a predetermined quantity of cleaning water is fed into the drum to clean the stirring vanes. After cleaning, the drum is left standing, and the cement parts contained in the cleaning water are precipitated to exhaust the water content within the drum into other drum, thereafter the precipitate being measured. After the measurement, wastes, cement and water to be added are supplied into the drum, and they are stirred and mixed as described above.

1297 METHOD OF PROCESSING RADIOACTIVE GAS. Saito, M. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 53-131,399/A/. 16 Nov 1978. 2p. (In Japanese).

Purpose: To reduce the quantity of radioactive gas discharged at the time of starting a nuclear power plant. Method: After the stoppage of a nuclear power plant air containing a radioactive gas is extracted from a main condenser by operating an air extractor. The air is sent into a gaseous waste disposal device, and then introduced into the activated carbon adsorptive tower of a rare gas holdup device where xenon and krypton are trapped. Thereafter, the air passes through pipelines and returned to the main condenser. In this manner, the radioactive gas contained in air within the main condenser is removed during the stoppage of the operation of the nuclear power plant. After the plant has been started, when it enters the normal operation, a flow control valve is closed and another valve is opened, and a purified gas exhausted from the rare gas holdup device is discharged into the atmosphere through an exhaust cylinder.

1298 METHOD AND APPARATUS FOR RECOVERING LEAKED RADIOACTIVE KRYPTON GAS. Otsuka, N.; Tsukui, K. (to Japan Atomic Energy Research Inst., Tokyo). Japanese Patent 53-129,800/A/. 13 Nov 1978. 4p. (In Japanese).

Purpose: To surely recover and purify Kr-gas leaked from Kr-85 gas processing device. Method: If Kr-85 gas leaks from a Kr-85 gas processing device into an air tight vessel previously displaced with helium gas, the gas mixture of Kr-85 and He is recycled through a flow meter, a cold trap, a radioactive instrument, an activated carbon column and a pump, in the course of which the Kr-85 gas is selectively adsorbed to collect in the activated carbon column. Then, the gas mixture of Kr-85 desorbed from the activated carbon column and small amount of He is caused to flow through a liquid helium purifier, a cold trap and a vacuum pump. Since a pipe way is immersed in the liquid helium in the above purifier, the Kr-85 gas is recovered to solidify.

1299 METHOD FOR PROCESSING POWDERY RADIOACTIVE WASTES. Yasumura, K.; Matsuura, H.; Tomita, T.; Nakayama, Y. (to Nippon Atomic Industry Group Co. Ltd., Tokyo). Japanese Patent 1953-126,498/A/. 4 Nov 1978. 2p. (In Japanese).

Purpose: To solidify radioactive wastes with ease and safety at a high reaction speed but with no boiling by impregnating the radioactive wastes with chlorostyrene. Method: Beads-like dried ion exchange resin, powdery ion exchange resin, filter sludges, concentrated dried waste liquor or the like are mixed or impregnated with a chlorostyrene monomer dissolving therein a polymerization initiator such as methyl ethyl ketone peroxide and benzoyl peroxide. Mixed or impregnated products are polymerized to solid after a predetermined of time through curing reaction to produce solidified radioactive wastes. Since inflammable materials are used, this process has a high safety. About 70% wastes can be incorporated. The solidified products have a strength as high as 300 - 400 kg/cm^3 and are suitable to ocean disposal. The products have a greater radioactive resistance than other plastic solidification products.

1300 METHOD FOR SOLIDIFYING POWDERY RADIOACTIVE WASTES. Yasumura, K.; Matsuura, H.; Tomita, T. (to Nippon Atomic Industry Group Co. Ltd., Tokyo). Japanese Patent 1953-126,500/A/. 4 Nov 1978. 2p. (In Japanese).

Purpose: To solidify powdery radioactive wastes through polymerization in a vessel at a high impregnation speed with no cloggings in pipes. Method: A drum can is lined with an inner liner layer of a predetermined thickness made of non-flammable material such as glass fiber. A plurality of pipes for supplying liquid plastic monomer are provided in adjacent to the upper end face of the non-flammable material or inserted between the vessel and the non-flammable material. Then powdery radioactive wastes are filled in the vessel and the liquid plastic monomer dissolving therein a polymerization initiator is supplied through the pipes. The liquid plastic monomer impregnates through the non-flammable material layer into the radioactive wastes and the plastic monomer is polymerized by the aid of the polymerization initiator after a predetermined of time to produce solidified plastic products of radioactive wastes.

1301 METHOD FOR REMOVING TRITIUM. Shinpo, K. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 53-126,497/A/. 4 Nov 1978. 4p. (In Japanese).

Purpose: To remove tritium produced in a nuclear power plant facility by reaction with an intermetallic compound. Method: Gaseous tritium and gas containing tritium compound are introduced into an oxidation device, where the tritium compounds are converted through oxidation into ^3H_2O. Then, they are subjected to reduction in a gas generating device into gaseous tritium. The gaseous tritium is introduced in a tritium absorption device and absorbed to fix therein. The tritium absorption device is filled with an intermetallic compound of rare earth element and Ni (or Co), preferably, $LaNi_5$. 430 g $LaNi_5$ can absorb about 56 litre hydrogen in the form of $LaNi_5H_5$.

1302 APPARATUS FOR REDUCING RADIOACTIVE GASEOUS WASTES. Mitani, S.; Ishihara, S. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 1953-125,599/A/. 1 Nov 1978. 3p. (In Japanese).

Exhaust gas is highly purified by reducing the radioactive waste therein discharged from a pump of a vacuum pump processing system operated upon start-up and stopping of a

nuclear power plant. An exhaust gas processor in a vacuum pump system and an exhaust gas processor in a tank ventilation system are connected by way of a vacuum pump exhaust surge tank and a vacuum exhaust dehydrator. The vacuum degree in a main condensator is kept at a predetermined value by the operation of a vacuum pump upon start-up and stopping of a turbine. After storing the exhaust gas in the vacuum pump exhaust surge tank, the exhaust gas is dehydrated by the dehydrator. Then, the dehydrated exhaust gas is sent by way of a pre-filter to the processor and removed with iodine radioactivity.

1303 METHOD OF REFINING URANIUM-CONTAINING WASTE OILS. Nagayama, Y. (Power Reactor and Nuclear Fuel Development Corp., Tokai, Ibareki (Japan). Tokai W.). (to Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). Japanese Patent 1953-123,800/A/. 28 Oct 1978. 5p. (In Japanese).

Purpose: To economically refine radioactive waste oils containing uranium fluorides as reprocessed oils usable as lubricating oils for an oil-lubricated rotational vacuum pump. Method: Waste lubircating oils containing uranium fluorides are filtered through column-like filtration material in a shape of ultra-fine long fibers such as α-cellulose or the like to remove contamination substances of a size above several microns. Then, the filtered waste oils are incorporated with active white clay, stirred and filtered again. Since the white clay used in the above processing is inexpensive, reprocessed oils reusable as lubricating oils for the oil-lubricated rotational vacuum pump can be refined economically from radioactive waste oils containing uranium fluorides.

1304 PROCESS FOR DECOMPOSING NITRIC ACID AND/OR NITRIC ACID IONS. Yamaguchi, I.; Kubota, M. (to Japan Atomic Energy Research Inst., Tokyo). Japanese Patent 1953-120,100/A/. 20 Oct 1978. 4p. (In Japanese).

Purpose: To provide the subject process comprising shortening the induction period of a reduction reaction in decomposing nitric acid or nitric acid ions contained in liquid wastes from a nuclear fuel retreatment plant, and reducing the maximum gas generating velocity. Method: A solution containing nitric acid or nitric acid ions is boiled, and nitrite or nitrous acid is added to this solution. Nitrous acid which is an initiator for the decomposition reaction is caused to be present in advance in the reaction system. When a reducing agent such as formic acid or formalin is injected in this solution, the concentration of nitrous acid increases autocatalytically to maintain the nitric acid decomposition reaction.

1305 INVESTIGATION OF THE UTILITY OF CHEMICALLY TREATED INDIGENOUS MINERALS IN RADIOACTIVE WASTE TREATMENT. Satya Brat (Bhabha Atomic Research Centre, Bombay (India)). Journal of the Indian Institute of Science ; 60: No. 10, 185-194(Oct 1978).

Ion exchange studies have been carried out on two indigenous micaceous minerals treated with: (i) sodium cobaltinitrite and (ii) sodium chloride + hydrogen peroxide, and their utility in radioactive liquid waste treatment assessed.

1306 EFFECT OF PLATINUM GROUP ELEMENTS ON DENITRATION OF HIGH-LEVEL LIQUID WASTE WITH FORMIC ACID. Nakamura, H.; Yamaguchi, I.; Kubota, M. (Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Journal of Nuclear Science and Technology (Tokyo) ; 15: No. 10, 760-764(Oct 1978).

High-level waste (HLW) from nuclear fuel reprocessing containing platinum group elements could be denitrated effectively with formic acid, and the solution indicated neutral even after the addition of excess formic acid. Platinum group elements, rhodium above all, were found to decompose formic acid and the action was more effective in the decomposition of excess formic acid in HLW. When HLW did not contain platinum group elements, both of unaltered nitric and formic acids remained after addition of stoichiometric amount of formic acid, leaving the solution slightly acidic. Excess formic acid in HLW not containing platinum metals was decomposed almost completely by irradiation with ^{60}Co γ-rays up to 2 x 10^8R.

1307 REMOVAL OF RADIOACTIVE IONS FROM NUCLEAR WASTE SOLUTIONS BY ELECTRODIALYSIS. Sugimoto, S. (Radia Industries Co. Ltd., Takasaki, Gunma (Japan)). Journal of Nuclear Science and Technology (Tokyo) ; 15: No. 10, 753-759(Oct 1978).

Removal of radioactive ions was studied from low and medium level radioactive waste solutions by electrodialysis using ion exchange membranes. The test solutions contained $^{137}Cs^+$, $^{106}Ru^{3+}$ or fission products (F.P.) as active ions and NaCl, Na_2SO_4 or $Ca(NO_3)_2$ as inactive coexisting salts. The decontamination factor of the active ions was in the order: $^{137}Cs^+$ (greater than 99%) > $^{90}Sr^{2+}$ > F.P. > $^{106}Ru^{3+}$. The dialysis time required to attain the saturation was the shortest for monovalent cations K^+, Cs^+ and Na^+, intermediate for divalent cation Sr^{2+}, and the longest for trivalent cation Ru^{3+}. The ratio of the decontamination factor of an active ion eta sub(a) to the desalination factor of an inactive ion eta sub(b) was nearly equal to unity for ^{24}Na, ^{42}K, ^{137}Cs and ^{90}Sr. On the other hand, the apparent selective permeability of an active ion (A^+) against Na^+ ion, T sub(Na^+) sup(a) was higher than unity for all the active ions tested, and was in the order of ^{137}Cs > ^{90}Sr > ^{42}K > ^{24}Na, where T sub(Na^+) sup(a) is defined by the ratio of γsub(a) to γsub(Na^+) with γsub(a) being the ratio of dilution of A in the diluate the γsub(Na^+) being that of Na^+ in the same diluate. The decontamination factor of the active ions did not depend significantly on the species and concentration of the coexistent salts or on the concentration of the active ions.

1308 EXPERIMENTS ON THE ADSORPTIVE REMOVAL OF RARE GASES FROM THE GASEOUS WASTE OF A FUEL REPROCESSING PLANT. Juentgen, H.; Schroeter, H.J. (Bergbau-Forschung G.m.b.H., Essen (Germany, F.R.)); Ammon, R. von; Leichsenring, C.H. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). Kerntechnik Vereinigt mit Atompraxis. The Journal for Nuclear Engineers and Scientists ; 20: No. 10, 450-456(Oct 1978). (In German and English).

It has been shown in laboratory experiments that it is technically possible to separate radioactive krypton from inactive xenon by means of activated charcoal, at room temperature and without a change in temperature between adsorption and desorption, as a preliminary step before low temperature distillation. Adsorption can take place atmospheric pressure. Desorption takes place by evacuation in the same direction of flow as the adsorption, followed by flusing under low pressure. During evacuation and flusing, krypton and xenon are desorbed separately from

each other. By appropriately controlling the level of the xenon front in the adsorber during the adsorption phase, the swith-over from krypton flushing to xenon flushing can be defined sufficiently sharply to ensure that neither fraction is unduly contaminated by the other. (orig.) 891 HP 892 EKI.

1309 THE STORY OF NUKEY POO. Wilkes, O.; Mann, R. (Intl Peace Research Inst, Norway; Univ of Auckland, New Zeal). B Atomic Scientists; 34: No. 8, 32-36(Oct 1978).

Under the terms of the Arctic Treaty, the U.S. Navy has shut down and dismantled a portable, medium-power nuclear reactor at McMurdo Base. The U.S. Navy has shipped out 8000 tons of earth contaminated as a result of the reactor's inadequate design and numerous malfunctions. Removal disclosed that leaks had occurred. Cracks had appeared three times during 11 years of operation. Throughout the entire period of operation, slightly radioactive effluent had run down a drain pipe and soaked into the soil. The Navy has dug a 9000 cu m hole to restore the site to its original condition. The contaminated soil has been shipped to California and Georgia. (1 photo, 10 references)

1310 METHOD FOR INCORPORATING WATER-CONTAINING RADIOACTIVE WASTE IN CEMENT. Puthawala, A.; Stuenkel, H. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,648,263/A/. 28 Sep 1978. 7p. (In German).

Low- to intermediate-activity wastes, as e.g. spent resins from ion exchange filters in LWR's, are pourably dried and, in dosed quantities, filled into a storage drum in which dry cement is contained. By means of a stirrer, mounted on a hood which can be put on the drum, cement and wastes are mixed together while adding an amount of water - also in dosed quantities. The hood can be removed again from the drum which then may be closed by means of a cover. Subsequently the drum is brought to the ultimate storage.

1311 METHOD FOR RETENTION OF TRITIUM RELEASED DURING REPROCESSING SPENT NUCLEAR FUEL AND STORING THE LIQUID RADIOACTIVE WASTE PRODUCED THEREBY. Hesky, H.; Wunderer, A. (to Farbwerke Hoechst A.G., Frankfurt am Main (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,711,373/A/. 21 Sep 1978. 6p. (In German).

The highly active liquid waste and the tritium water produced in recovering HNO_3 are mixed with oxygen Subsequently the oxygen charged with tritium is supplied to a reduction facility where the O_2 is reduced with NO and the higher nitric oxides are converted to HNO_3. The resulting tritium is stored; the bottom product HNO_3 is recycled into the reprocessing process. The same process may be applied to Rb forming hydrides respectively tridides with tritium.

1312 METHOD OF PURIFYING GASES FROM REPROCESSING OF SPENT FUEL ELEMENTS CONTAINING RADIOACTIVE SUBSTANCES. Hesky, H.; Wunderer, A. (to Farbwerke Hoechst A.G., Frankfurt am Main (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,711,374/A/. 21 Sep 1978. 9p. (In German).

During reprocessing there are produced gases consisting of H_2O vapor, N, NO, higher NO, HNO_3 vapor, Xe, Kr, I, and ^3H. From this gas mixture Kr and I are quantitatively separated. For this purpose a carrier gas with nearly equal separating performance is admixed to the gases, this mixture is split up into a fraction containing the radioactive substances and another one free of them and then the carrier gas us separated again from the fraction with the substances. As a carrier gas there may be used NO (for Kr) and CO (for Ar). The carrier gas is e.g. oxidized before separation and the higher oxides are separated by condensation, distillation, or washing. The separation of the gas/carrier gas mixture is done by distillation, thereby receiving fractions with carrier gas plus substances respectively without substances. The admixture of the carrier gas is achieved e.g. by disproportionation of higher NO. Thereby the iodine is preferably absorbed and separated and desorbed again. By means of the drag gas O_2 the desorbed iodine then is conducted towards filtration.

1313 RADIOACTIVE RARE GAS SEPARATION PERFORMANCE OF A TWO-UNIT SERIES-TYPE SEPARATION CELL. Ohno, M.; Heki, H.; Ozaki, O. (Toshiba Corp., Kawasaki, Kanagawa (Japan). Research and Development Center); Miyauchi, T. Journal of Nuclear Science and Technology (Tokyo) ; 15: No. 9, 668-677(Sep 1978).

Enhancement of the separation factor in a separation cell has been desired as one means of reducing the cascade scale required for a radioactive rare gas membrane separation. It is already known that the separation factor of the separation cell increases as cut increases. Hence, in a series-type separation cell which consists of two-unit cells, an appropriate selection of cuts for each unit cell can be expected to provide a marked improvement in separation factor under symmetric separation. This paper presents analytical and experimental results for separation characteristics of a series-type separation cell whose separation factors are far from unity. It was found that the series-type separation cell has a larger separation factor than other types of separation cells, such as recycle separation cell and conventional separation cell. The series-type separation cell requires less power consumption and membrane area than the recycle separation cell while it requires more than the conventional separation cell. As both the two-unit series-type separation cell and the conventional separation cell have individual merits and demerits, a comparison is also made between the cascade consisting of series-type separation cells and that of conventional separation cells. The cascade of series-type separation cells requires fewer stages and less power consumption but somewhat more membranearea than that of conventional separation cells. Based on results of this study, the scale of a cascade can be reduced by using series-type separation cell.

1314 METHOD TO FABRICATE BODIES CONTAINING RADIOACTIVE MATERIALS. Heimerl, W.; Schiewer, E.; Kumar, A. de. (to Gelsenberg A.G., Essen (Germany, F.R.); Hahn-Meitner-Institut fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,704,147/A/. 10 Aug 1978. 5p. (In German).

To secure the ultimate storage of highly radioactive wastes, it is suggested to transfer the radioactive substances enclosed in glass in the known manner, into a glass ceramic by tempering in a metal bath. The glass particles are brought to crystallize in a specific manner in a metal melt (lead and its alloys or

aluminium and its alloys). It is preferable to temper directly the container for ultimate storage.

1315 OUTLINE OF THE CHEMICAL PROCESSING FACILITY (CPF). Arita, K. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). Doryokuro Giho (Power Reactor Technology (Tokyo)) ; No. 27, 105-110(Aug 1978). (In Japanese).

Concerning the Chemical Processing Facility (CPF), a high level radioactive material research facility, to be installed in Tokai Works of Power Reactor and Nuclear Fuel Development Corporation (PNC), the detailed design and the governmental safety inspection were finished. The construction has been already started, and it will be completed in 1980. Under the national policy of establishing a nuclear fuel cycle, PNC is now carrying out the development of its downstream technology. The objects of the Chemical Processing Facility are the researches of the treatment techniques of high level radioactive liquid wastes from fuel reprocessing and of the reprocessing of fast reactor fuel. The following matters are described: purpose of the CPF, i.e. fast reactor fuel reprocessing and high-level liquid waste treatment; construction of the CPF, i.e. buildings, cells and an exhaust stack; test systems, i.e. fuel reprocessing and liquid waste vitrification; and facility safety.

1316 SOLIDIFICATION OF HIGH-LEVEL RADIOACTIVE WASTES. Grover, J.R. (International Atomic Energy Agency, Vienna (Austria). Div. of Nuclear Safety and Environmental Protection). International Atomic Energy Agency Bulletin ; 20: No. 4, 23-29(Aug 1978).

A summary is presented of the IAEA Technical Reports Series No.176 ''Techniques for the Solidification of High-Level Radioactive Wastes'' covering mainly the basic features of the many processes that are being developed to illustrate the wide variety of potential solutions to the problem. The paper concludes with a review of the current status and future prospects for waste solidification in the wider context of the management of wastes in the nuclear fuel cycle.

1317 NUCLEAR WASTE VITRIFICATION. Barrere, Martine. Recherche, La (Paris) (France) Supersedes Atomes (Paris) and Nucleus ; 9: No. 91, 698-702(Jul-Aug 1978). (In French).

The first industrial facility of vitrification started at Marcoule, last June. The principle of the continuous nuclear waste vitrification envisaged by France is briefly recalled together with both main functions of this vitrification: waste compaction and radioactivity confinement in time.

1318 GAS FILTER AND DEVICE INTENDED FOR REMOVING FROM THE HOUSING THE ABSORBANT AND GRANULAR MATTER. Revell, A.E. (to American Air Filter Co., Inc., Louisville, KY). French Patent 2,395,062/A/. 20 Jun 1978. 16p. (In French).

This invention concerns separators in general and in particular those intended for separating from a gas the impurities it contains by means of a solid absorbant substance. Before filling the gas filters, particularly those employed in the nuclear industry, with the solid absorbant substance for cleaning the gas, it is necessary from time to time to remove the filtering substance that has been soiled or contaminated by the radioactive elements separated from the gas flow. The description is given of an apparatus for removing from the housing of a gas filter the solid granular and absorbant matter with which the gas was treated. This apparatus is not only reliable but also inexpensive to build and maintain.

1319 STUDY ON THE FIXATION OF CESIUM-137 IN CLINOPTILOLITE. Lee, S.H.; Sung, N.J.; Park, W.J. (Korea Atomic Energy Research Inst., Seoul (Republic of Korea)). Bangason Bango Hakhoe Chi ; 3: No. 1, 1-5(Jun 1978). (In Korean).

Low level liquid radioactive wastes consisted of long half-life nuclide such as cesium-137 were treated by using the Korean clinoptilolite, a kind of zeolites. Column operation using a activated clinoptilolite shows good results in terms of break-through curves comparing with the clinoptilolite classified by the WARD in U.S. Korean clinoptilolite shows a tailing phenomena longer than those of the WARD. The fixation quantity of the radioactivity in the Korean clinoptilolite was about 75 μCi/100g in the case of using a 2.5×10^{-3} μCi/ml solution. (author).

1320 REMOVAL OF TRITIATED SPECIES FROM GAS STREAMS COMPRISED THEREOF. Collins, M.F.; Michalek, R. (to Engelhard Minerals and Chemicals Corp., Newark, NJ (USA). Engelhard Industries Div). Australian Patent 492,850/B/ . 5 May 1978. 25p.

A process is described for the removal of radioactive tritium, and/or compounds of tritium compounds such as tritiated water, and/or tritiated hydrocarbons (hereinafter the 'tritiated species') over a precious metal catalyst with sufficient air or oxygen to convert all of the tritiated species to tritiated water and, in the case of hydrocarbons, to carbon dioxide. At this point in time, all of the tritium has been converted to tritiated water. The tritiated water, and any other moisture that might be present in the gas stream, is then absorbed by a desiccant dryer to less than about one part per million total water. Preferably, the effluent from the desiccant dryer is next swamped of flooded with ordinary non-radioactive water (protium oxide, or even deuterium oxide for that matter) to dilute the tritiated water by a factor of at least about 1,000:1.

1321 INFLAMMABILITY AND EXPLOSIVENESS IN BITUMINIZATION. Zakharova, K.P.; Kulichenko, V.V.; Nazin, E.R.; Sadovnikov, Yu.N.; Ukke, O.V. Atomnaya Energiya ; 44: No. 3, 436-437(May 1978). (In Russian).

Results of a study of safety in the bituminization of radioactive wastes and storage of the final product are presented. The temperature of interaction of bitumen with one of the basic waste components, i.e. sodium nitrate, is 385-408 deg C. A noticeable decrease in this value is observed only in the presence of an alkali. The introduction of an additive in bitumen does not increase its inflammability as measured by a number of indicators. Bituminous substances containing less than 15% bitumen are capable of detonating, while those with a higer percentage are not.

1322 RADIOISOTOPE WASTE PROCESSING SYSTEMS. Machida, T. (Japan Radioisotope Association, Tokyo). Proceedings of the Japan Conference on Radioisotopes ; No. 13, 315-317(May 1978). (In Japanese).

From 13. Japan conference on radioisotopes;

Tokyo, Japan (7 - 9 Dec 1977).

The Atomic Energy Safety Bureau established the policy entitled "On Common Processing System of Radioactive Wastes" consulting with the Liaison Committee of Radioactive Waste Processing. Japan Atomic Energy Research Institute (JAERI) and Japan Radioisotope Association (JRIA) had been discussing the problems required for the establishment of the common disposal facilities based on the above policy, and they started the organization in spring, 1978. It is a foundation borrowing equipments from JAERI though installing newly some of them not available from JAERI, and depending the fund on JRIA. The operation expenses will be borne by those who want to dispose the wastes produced. The staffs are sent out from JAERI and JRIA. For animal wastes contaminated with RI, formaldehyde dipping should be abolished, but drying and freezing procedures will be taken before they are burnt up in a newly planned exclusive furnace with disposing capacity of 50 kg/hour. To settle the problems of other wastes, enough understanding and cooperation of users are to be requested.

1323 PRESENT SITUATION OF TREATMENT OF RADIOACTIVE WASTES IN RESEARCH INSTITUTIONS. Matsuo, M. (Tokyo Metropolitan Inst. of Gerontology (Japan)). Proceedings of the Japan Conference on Radioisotopes ; No. 13, 310-314(May 1978). (In Japanese).

From 13. Japan conference on radioisotopes; Tokyo, Japan (7 - 9 Dec 1977).

The quantities of unsealed radioisotopes used in educational organizations and research institutions and radioactive wastes collected from each category of organization in fiscal year 1975 are presented. These data show that main radioisotopes used in hospitals and clinics, educational organizations, research institutions and industrial firms are ^{3}H, ^{14}C, ^{32}P, ^{35}S and ^{45}Ca as beta ray-emitting radioisotopes, and ^{51}Cr, ^{59}Fe, ^{85}Kr, ^{125}I, ^{131}I, ^{133}Xe and ^{198}Au as gamma ray-emitting radioisotopes. The number of containers of the collected radioactive wastes is about 5,700. Although radioactive wastes are dealt with according to the law, the treatment system is meager and many problems have arisen. In this paper, the several points are analyzed, and solutions to the problems are pointed out.

1324 METHOD TO DRY BORIC ACID AND/OR BORATE-CONTAINING SOLUTION CONCENTRATES. Cordier, J.P.; Vandorpe, M. (to Societe Belge pour l'Industrie Nucleaire, Brussels; Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,705,470/8/. 20 Apr 1978. 3p. (In German).

The patent deals with an improvement of the method to dry solutions containing concentrates of boric acid or borates. These kind of solutions occur during operation of pressurized-water nuclear reactors where boron compounds are used as absorbant for neutrons. The concentrates are mixed with lime prior to drying to improve the consistency. An oxidizing agent - preferably hydrogen peroxide - is also added. It prevents polymerization during drying by forming unsoluble peroxyborates and thus results in a further increase of the decontamination factor for radioactive impurities in the evaporation of water from the concentrates. The dried concentrates are stabilized with bitumen or similar solidification agents before storing.

1325 FIXATION OF RADIOACTIVE MATERIALS IN A GLASS MATRIX. Macedo, P.B. de; Litovitz, T.A. Danish Patent 1,468/78/A/. 3 Apr 1978. 29p. (In Danish).

A patent description is given of a non-porous glass composition containing radioactive material encapsulated and immobilized in the glass matrix, said composition being characterized by: (a) at least 75 mol percent SiO_2, (b) a radiation activity above one millicurie per cubic centimeter of said composition, and (c) high chemical durability to aqueous solution.

1326 FIXATION OF RADIOACTIVE MATERIALS IN A GLASS MATRIX. Macedo, P.B.; Litovitz, T.A.; Simmons, J.H. South African Patent 1978/1,888/A/. 3 Apr 1978. Priority date 4 Apr 1977, United States of America (USA), 54p.

A non-porous glass composition containing radioactive material encapsulated and immobilized in the glass matrix has a composition characterized by: (a) at least 75 mol percent SiO_2, (b) a radiation activity above one millicure per cubic centimeter of said composition, and (c) high chemical durability to aqueous solution.

1327 PURIFICATION OF OFF-GASES IN A METAL-CLOTH FILTER WHILE BURNING SOLID WASTES. Lokotanov, N.S.; Nosyrev, O.A. Atomnaya Energiya ; 44: No. 4, 370-371(Apr 1978). (In Russian).

AIR FILTERS;ASBESTOS;COMBUSTION;EFFICIENCY; FLOW RATE;GAS FLOW;HIGH TEMPERATURE; PURIFICATION;RADIOACTIVE WASTE PROCESSING; FILTRATION;OFF-GAS SYSTEMS;SOLID WASTES;TIME DEPENDENCE

1328 FIXATION OF RADIOACTIVE SUBSTANCES IN A GLASS MATRIX. Macedo, P.B.; Litovitz, T.A.; Simmons, J.H. French Patent 2,386,889/A/. 31 Mar 1978. 32p. (In French).

This invention concerns the fixing of radioactive substances in a glass matrix. The composition is given of non-porous glass containing a radioactive substance enclosed and immobilised in the glass matrix, this composition being characterized by (a) not less than 75 moles per cent of SiO_2, (b) a radiation activity exceeding around 1 millicurie per cm^3 of the composition and (c) a high chemical durability in an aqueous solution.

1329 IODINE ABSORPTION IN MIXED SOLUTION OF SODIUM HYDROXIDE-BORIC ACID. Eguchi, W.; Adachi, M.; Miyake, Y. (Kyoto Univ., Uji (Japan). Inst. of Atomic Energy). Kyoto Daigaku Genshi Enerugi Kenkyusho Iho (Bulletin of the Institute of Atomic Energy, Kyoto University) ; No. Suppl. 1, 66-69(Mar 1978). (In Japanese).

In the absorption solution used for the removal of radioactive iodine in the exhaust gas from nuclear facilities by washing with water, boron compounds with large neutron capture cross section are mixed in many cases as nuclear reaction inhibitor. Generally sodium hydroxide aqueous solution in which boric acid is dissolved is employed. Therefore in practical point of view, absorption of iodine in the mixed solution of sodium hydroxide - boric acid is important, and the partition equilibrium of iodine in sodium hydroxide - boric acid, vapor - liquid overall dissolution equilibrium coefficient between the mixed solution and decarboxilated air, and iodine absorption rate in the mixed solution were experimented and discussed. Boric acid partly becomes ions by hydrolysis in the mixed solution of sodium hydroxide - boric acid and acts as a pH control agent. It only affects the partition of iodine in liquid phase through its

dissociation and electric charge equilibrium. Overall absorption rate of iodine decreases by adding the boric acid. Alkaline water of 9.5 to 10 pH containing boric acid of 1 to 3 g-boron/kg-water is very often used as the absorption solution for the removal of radioactive iodine by washing with alka- line water. This condition of boric acid concentration is higher than the condition in this investigation, and hence the detailed examination by the experiments over a wide range of concentration will be necessary. (Wakatsuki, Y.

1330 KINETICS OF ABSORPTION OF TRACE IODINE VAPOR IN AQUEOUS SOLUTION OF SODIUM HYDROXIDE, (2). EFFECT OF REACTION OF LIQUID PHASE MATERIAL IN CONSTANT INTERFACE AREA TYPE STIRRED ABSORPTION TANK. Eguchi, W.; Adachi, M.; Miyake, Y. (Kyoto Univ., Uji (Japan). Inst. of Atomic Energy). Kyoto Daigaku Genshi Enerugi Kenkyusho Iho (Bulletin of the Institute of Atomic Energy, Kyoto University) ; No. Suppl. 1, 59-61(Mar 1978). (In Japanese).

A liquid column was used for the experiments reported in Part 1. However, it only gives the observation of the effect of fast reaction because the liquid flow was controlled to uniform laminar flow and the contact is limited to short time of around 10 ms. In practical absorbing operation, turbulence is involved in liquid flow, and the residence time for contact is long. Hence, the absorption of trace iodine in the purified air has been experimented by using a constant interface area type stirred absorption tank. Prior to the experiment, the characteristics of the absorption tank was investigated by conducting pure carbon dioxide absorption test with purified water. It gave the conclusion that the tank was sufficiently usable for fundamental researches. In short contact time absorption, the iodine dissolved and absorbed in liquid phase is affected by reaction of hypoiodous acid and poly-iodide ion formation due to hydrolysis by basic catalyst, proceeding in the laminar film. In longer contact absorption, however, the reaction of iodic acid ion formation due to the oxidation-reduction of hypoiodous acid in liquid phase material also affects the absorption rate, in addition to the above reactions.

1331 EFFECT OF CARBON DIOXIDE ON THE RATE OF IODINE VAPOR ABSORPTION BY AQUEOUS SOLUTION OF SODIUM HYDROXIDE. Eguchi, W.; Adachi, M.; Miyake, Y. (Kyoto Univ., Uji (Japan). Inst. of Atomic Energy). Kyoto Daigaku Genshi Enerugi Kenkyusho Iho (Bulletin of the Institute of Atomic Energy, Kyoto University) ; No. Suppl. 1, 62-65(Mar 1978). (In Japanese).

There is always carbon dioxide in the atmosphere as an impurity. Since this is an acid gas similar to iodine, each absorption rate seems to be affected by the other due to the coexistence of these two. Experiments have been conducted to clarify the absorption rate and absorption mechanism of iodine in the simultaneous absorption of iodine and carbon dioxide. Carbon dioxide coexisting with gas phases as an impurity decreases the absorption rate of iodine in the removal by washing with water of iodine mixed in the air. The first cause of this is that the diffusion coefficient of iodine in gas phase decreases with the carbon dioxide content in the gas phase. The second cause is that coexistent carbon dioxide is an acid gas, dissociates by dissolving into the absorbing solution, increases hydrogen ion concentration together with the formation of negative ions of bicarbonate and carbonate, and reduces hydroxyl ion concentration as a result. It is more important that existence of iodine has a catalytic effect to the rate of basic catalytic hydrolysis of carbon dioxide simultaneously dissolved in water phase, and accelerates this reaction rate. The mechanism of catalytic effect of iodine for the hydrolysis of carbon dioxide can not be clarified in detail only by this experiment, but the simultaneous absorption rate of iodine and carbon dioxide can be explained satisfactorily. (Wakatsuki, Y.

1332 KINETICS OF IODINE REMOVAL BY WASHING WITH WATER. Adachi, M. (Kyoto Univ., Uji (Japan). Inst. of Atomic Energy). Kyoto Daigaku Genshi Enerugi Kenkyusho Iho (Bulletin of the Institute of Atomic Energy, Kyoto University) ; 2: 100-102(Mar 1978). (In Japanese).

From Meeting on nuclear safety problems; Kyoto, Japan (14 - 15 Mar 1977).

Removal of iodine vapor by washing with water is an important problem in the safety and protection of environmental air in the surrounding of nuclear facilities. Investigations on its development and practical use have been conducted in Japan. However, it seems to be important that the theoretical proof for these experimental results should be fully made through the fundamental researches. From the above described point of view, absorption mechanism and absorption rate have been investigated concerning iodine removal by washing with water as seen in the previous report. In the investigation, the effect of carbon dioxide on the vapor-liquid equilibrium of iodine in air-sodium hydroxide solution system has been measured by using semi-continuous type and batch type vapor-liquid equilibrium measuring apparatuses. Over-all vapor-liquid partition coefficient of iodine significantly reduced with the increase of carbon dioxide concentration. This is due to the fact that the existence of carbon dioxide greatly decreases the iodine and iodate ions. These experimental results can be explained by considering carbon dioxide reaction in sodium hydroxide solution together with iodine reaction.

1333 WASTE WATER TREATMENT INSTALLATION. Stuenkel, H. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,612,510/B/. 2 Feb 1978. 4p. (In German).

Modifications in a plant for the decontamination of liquid waste, i.e. the washing-out of volatile radioactive substances with the aid of an acid and an alkaline washing liquid are proposed. The modifications will make the process more efficient by using washing liquids of different pHs in one evaporator. They refer mainly to the arrangement of the evaporator bottom plates and the installation of a pump.

1334 RADIOACTIVE WASTE TREATMENT SYSTEM FOR TSURUGA NUCLEAR POWER STATION. Taniguchi, T.; Takeshima, M.; Saito, T.; Kikkawa, R. (Hitachi Ltd., Ibaraki (Japan). Hitachi Works). Hitachi Hyoron (The Hitachi Review) ; 60: No. 2, 137-140(Feb 1978). (In Japanese).

The augmentation of the radioactive waste treatment system in the Tsuruga Nuclear Power Station was planned in 1973, and this enlarged facility was completed in June, 1977. The object of this augmentation is to increase the storage capacity for wastes and to enlarge the treating capacity utilizing the newly installed facility. The operating experience in the facility having been already constructed was fed back for the engineering of this new

facility. This new facility contains the newly developed vacuum forced circulation type concentrator, the exclusive storage pool for solid wastes, etc. At the design stage of this new system, the pilot plant test of slurry transportation and the corrosion test of long hours were carried out as the research and developmental works for the confirmation of correct design condition. The measures for augmenting this radioactive waste treatment system are the installation of a long time storage tank with the capacity of 350 m^3, the sit bunker facility and the drum storage as the storage facility, and the vacuum forced circulation type concentrator with the circulating flow rate more than 200 times as much as the treating flow rate and vacuum level of 0.255 ata. The augmented system is shown with the flow sheet of whole waste disposal system. The flow sheet of the concentrator is separately shown, and the relating research and developmental works, for example, the test of the cause of corrosion, the surface finishing test, the material test, the blockage test for heat transfer tubes and the inhibiter test, are explained with the test results. The ion exchange resin is transported by air and water as the slurry state, and the long distance transport of about 250 m is required in this new system. As clogging has to be avoided in this transportation, the experimental work was conducted to obtain the flow characteristics of slurry, and the test result is outlined.

1335 DEVELOPMENT OF A LAUNDRY WASTE TREATMENT SYSTEM FOR NUCLEAR POWER PLANTS. Kikuchi, M.; Sugimoto, Y.; Yusa, H.; Ebara, K. (Hitachi Ltd., Ibaraki (Japan). Hitachi Research Lab.); Horiuchi, S. Hitachi Hyoron (The Hitachi Review) ; 60: No. 2, 141-144(Feb 1978). (In Japanese).

The test for putting the treatment of laundry waste containing very low radioactivity from 10^{-7} to 10^{-8} μCi/ml in practical use was carried out utilizing the new process combining reverse osmosis method and evaporation process. The special feature of this process is to use cleaning sponge balls for preventing the decrease of process capacity caused by the deposit of scale on reverse osmosis diaphragms and also to apply the newly developed, heat resistant and bubble-extinguishing silicon chemicals to control bubble generation which is caused by surfactant in evaporators. The test utilizing the practical scale model plant with the capacity of 200 l/h was carried out using dummy waste liquid. As the result of this test, it was recognized that the key operational characteristics including efficiency of eliminating radioactivity and concentration factor were satisfactory for practical use. The main specifications of the test facility are as follows: tubular type, diaphragm surface area 6.8 m^2, treated liquid temperature 25 deg C, treated liquid pH 5, and pressure 40 kg/cm^2g for the reverse osmosis system; and the forced circulation type, heat transfer area 4 m^2, and treated liquid pH 8 to 9 for the evaporator. The characteristic parameters of laundry waste liquid are as follows: cleanser 200 to 500 ppm, surfactant 30 to 60 ppm, suspending material 10 to 30 ppm, ion (Ca^{++}) 2 to 5 ppm, electric conductivity 100 to 300 μmho/cm, pH 7 to 8, and radioactivity 10^{-7} μCi/ml. The flow sheet for this experimental facility system is shown, and the outline of the test, the features of the reverse osmosis facility and the evaporator are introduced. (Nakai, Y.).

1336 FIXATION MECHANISM BETWEEN ZEOLITE AND SOME RADIOACTIVE ELEMENTS. Hafez, M.B.; Nazmy, A.F.; Salem, F.; Eldesoki, M. (Atomic Energy Establishment, Cairo (Egypt)). Journal of Radioanalytical Chemistry ; 47: No. 1, . 115-119(1978).

Fixation of some fission products and actinide elements from aqueous solutions on zeolite was investigated. Studies showed that the interaction between the radionuclides and zeolite followed the exchange and the adsorption mechanism. The relative importance of each depends on the type, the nature, and the size of the radioelement.

1337 WEST GERMAN R + D ACTIVITIES, IN THE FIELD OF LWR FUEL ELEMENT REPROCESSING AND DISPOSAL. STATUS AND OUTLOOK. Kroebel, R. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Kernphysik). pp 26-32 of Die Problematik des radioaktiven Abfalls in der Kerntechnik. Essen, Germany, F.R.; Vulkan-Verl. (1978). (In German)

From Conference on the problems of radioactive wastes in nuclear technology; Essen, F.R. Germany (20 Oct 1977).

Report on tasks and goals of the 'Projekt Wiederaufarbeitung und Abfallbehandlung (PWA)', founded in 1974 by the Federal Government with the aim of coordinating all R + D activities in this field with a view to the erection of a large waste management centre for reactor fuels. There are already a number of laboratories and test benches for the testing of important subfields of waste management; further plants for the testing of systems and components are in the planning stage or under construction.

1338 EXPERIENCE WITH CEMENT USAGE AS THE BINDING AGENT FOR RADWASTE. Brownstein, M.; Levesque, R.G. (ATCOR, Inc, Peekskill, NY). American Society of Mechanical Engineers, [Paper] ; No. 78-NE-15, 1-10(1978).

Much of the confusion that exists in the radwaste solidification field is due to poor communication between chemists, who propose exotic solidification agents and the design engineers, who have had to incorporate them into working systems. An explanation is given as to how cement systems function in solidifying typical radioactive waste streams. Through understanding these basic principles, the design of a highly efficient waste system has been possible. Experience has shown this system to be extremely reliable in the operating environment of nuclear power plants and has produced a product which has been universally accepted at commercial burial sites.

1339 APPLICATION OF EUROPEAN RADWASTE TECHNOLOGY IN NORTH AMERICA. Stewart, J.E. (Warner and Pfleiderer Corp, Waldwick, NJ). American Society of Mechanical Engineers, [Paper] ; No. 78-NE-16, 1-9(1978).

The technology initially developed in Europe for treating radioactive wastes is now being used in Canada, Mexico, and the United States. While North America led in the development of Light Water Reactors (LWR) and Heavy Water Reactors (HWR), the Europeans focused on other technologies, one of which is radwaste treatment. The methods discussed include offgas treatment by charcoal absorption, liquid effluent treatment by solidification, incineration of combustible wastes, and storage/disposal methods.

1340 CANADIAN DEVELOPMENT PROGRAM FOR CONDITIONING CANDU REACTOR WASTES FOR DISPOSAL. Charlesworth, D.H.; Bourns, W.T.; Buckley, L.P. (AECL, Chalk River Nucl Lab, Ont). American

Society of Mechanical Engineers, [Paper] ; No. 78-NE-18, 1-11(1978).

Currently, radioactive wastes arising from the operation of Canadian nuclear reactors are placed in interim storage in concrete containment structures except for gaseous and liquid wastes containing small amounts of radioactivity which are dispersed. With the objective of replacing storage by permanent disposal, a program is underway to develop and demonstrate an integrated process for converting all reactor wastes to a stable, leach-resistant form which will immobilize the radionuclides in the waste repository. The major tool for this development is a Waste Treatment Center, now being constructed at Chalk River Nuclear Laboratories, which will combine reverse-osmosis, incineration, evaporation and bituminizing processes.

1341 BIOLOGICAL REMOVAL OF METAL IONS FROM AQUEOUS PROCESS STREAMS. Shumate, S.E. II; Strandberg, G.W.; Parrott, J.R. Jr. (Oak Ridge National Lab., TN). Contract W-7405-ENG-26. Biotechnology and Bioengineering Symposium ; No. 8, 13-20(1978).

Resting (washed, resuspended) microbial cells have been shown to effect rapid removal of uranium from aqueous solution. The rate and degree of uranium isolation from solution make this approach to heavy-metal removal quite promising as a means for the decontamination of process wastewaters from the nuclear fuel cycle. The complexed, concentrated uranium could conceivably be removed from the microbial cells and recycled. A bench-scale process is being developed to test this concept for the removal of radioactive heavy metals from aqueous process steams. 5 figures.

1342 GLASS AS A MATERIAL FOR THE FINAL DISPOSAL OF FISSION PRODUCTS. Jacquet-Francillon, N.; Bonniaud, R.; Sombret, C. (CEA Centre de Marcoule, 30 - Bagnols-sur-Ceze (France). Dept. de Genie Radioactif). Radiochimica Acta ; 25: No. 3;4, 231-240(1978).

High-level liquid waste solutions from nuclear fuel reprocessing plants occupy a central position in radioactive waste disposal. Conversion of fission products and actinides into a vitreous solid is a trend that many nations have chosen for waste disposal. This paper sums up the state of knowledge of the properties of glasses used for the ultimate disposal of wastes.

1343 ION-IMPLANTATION AND STORAGE OF RADIOACTIVE WASTE IN METAL MATRIX. Terasawa, M.; Ozaki, S.; Mawatari, K.; Shinya, K.; Kamei, H. (Toshiba Corp., Kawasaki, Kanagawa (Japan). Research and Development Center). pp 131-132 of Dai-ni-kai shinpojiumu; ion-gen to sono oyo. Tokyo, Japan; Institute of Electrical Engineers of Japan (1978).

From 2. symposium on ion sources and application technology; Tokyo, Japan (16 Feb 1978).

FOILS;GASEOUS WASTES;ION IMPLANTATION; KRYPTON 85;PILOT PLANTS;RADIOACTIVE WASTE PROCESSING;RADIOACTIVE WASTE STORAGE; SPECIFICATIONS

1344 KRYPTON-85 ABSORPTION AND DESORPTION IN DIFFERENT LIQUIDS. Butkus, D.V.; Styro, B.I. pp 27-31 of Chemical and radioactive pollution of the atmosphere and hydrosphere. V. 4. Atmospheric physics. Styro, B.I. (ed.). Vil'nyus; Mokslas (1978). (In Russian)

The results of the experiment on the ^{85}Kr absorption and desorption in distilled water, toluene and kerosene as well as in the mixture of coal (1.25% by weight) with the liquids are given. The scheme of the experiment is presented. The best absorbent among the materials investigated is found to be the mixture of BAU type coal aerosol particles (0.4-2 mkm in diameter) with kerosene. The highest desorption rate is observed in kerosene and the lowest one - in the distilled water. A conclusion is drawn that ^{85}Kr is absorbed by different liquids and is in dynamic equilibrium with the concentration in the air. The quantity of absorbed ^{85}Kr depends on chemical content of the liquid as well as on its purity.

1345 RUBIDIUM RB AND CESIUM CS. Busev, A.I.; Tiptsova, V.G.; Ivanov, V.M. pp 47-56 of Rukovodstvo po analiticheskoj khimii redkikh ehlementov. Moscow, USSR; Khimiya (1978). (In Russian)

Methods for determining cesium in the presence of rubidium and ions of other alkaline metals are summarized. It is suggested to determine cesium by way of extraction with solutions of 2-thenoyltrifluoroacetone in nitromethane or nitrobenzene at pH=8.7-9.0. The method is recommended for separating cesium from uranium fission products in the production of highly active preparations of ^{137}Cs and for separating Cs from the effluents produced by reprocessing of nuclear fuel, prior to their burial. In this way, 99.5% of cesium can be extracted. Also suggested is a titrametric method of determining Cs in pollucite, i.e. aluminium-cesium silicate. The technique is based on the ability of cadmium hexacyanoferrate to quantitatively exchange Cd ions with Cs ions. Cs is determined from the amount of cadmium titrated with a $K_4[Fe(CN)_6]$ solution. The determination is hindered by Rb, Cu, Zn, Fe, K ions and not hindered by Na, Mg, Ca, Al ions. According to still another method, $>=10^{-3}$% Cs can be determined by flame photometry with respect to the 852.1 nm line in a low-temperature flame (a mixture of illuminating gas with air).

1346 APPLICATION OF ION EXCHANGERS WITH CROWN ETHERS AS ANCHOR GROUPS IN ANALYTICAL AND PREPARATIVE CHEMISTRY. Blasius, E.; Janzen, K.P.; Luxenburger, H.; Nguyen, V.B.; Klotz, H.; Stockemer, J. (Universitaet des Saarlandes, Saarbruecken (Germany, F.R.). Inst. fuer Analytische Chemie und Radiochemie). pp P63-P81 of Chromatography 1978. Schomburg, G.; Rohrschneider, L. (eds.). Amsterdam, Netherlands; Elsevier (1978).

From 12. international symposium on chromatography; Baden-Baden, F.R. Germany (25 Sep 1978).

A number of exchangers with cyclic polyethers as anchor groups is prepared by condensation, substitution and polymerisation reactions. The exchangers show high resistance to chemicals, temperatures and radiolyses. The selectivity for different salts depends on the cation, anion, solvent and size of the ring as well as on the type and basicity of the heteroatom (O, N, S). In analytical chemistry the new exchangers have a very extensive field of application. The preparative application of the exchangers includes salt conversions and the activation of anions for organic syntheses. A number of reactions can be carried out or improved in anhydrous solutions with the help of the exchangers. They can easily be recovered by filtration and the solvent is not contaminated. Just as the exchanger with dibenzo-24-crown-8 as anchor group, adducts of the crown ether with dodecaolybdatophosphoric acid are suitable for the extraction of ^{137}Cs

from medium-active waste solutions. Liquid exchangers are also used to separate ^{137}Cs from medium-active waste solutions.

1347 RADIATION SHIELD INTEGRITY TESTING AT THE NEW WASTE CALCINING FACILITY. Henry, R.N.; Olson, N.C. (Idaho Chemical Corp., Idaho Falls (USA)). pp 235-241 of Radiation protection in nuclear power plants and the fuel cycle. Vol. 1. London; British Nuclear Energy Society (1978).

From Conference on radiation protection in nuclear power plants and the fuel cycle; Bristol, UK (27 Nov 1978).

A New Waste Calcining Facility for processing high-level liquid radioactive waste is being built at the Idaho National Engineering Laboratory. The integrity of the facility's radiation shielding is being tested prior to 'hot' operations. A two phase program consisting of spot and large area surveys was developed and applied to the testing. Phase I testing has identified several shield deficiencies. Some work on phase II has begun.

1348 EFFECT OF GAMMA RADIATION ON YIELDS OF METHANE GAS FROM THE ANAEROBIC BACTERIAL DIGESTION OF SEWAGE SLUDGE. Guerrero, J. (ed.). Golden, CO; Colorado School of Mines Publications Department (1978). 33p. (NP--25149). Colorado Energy Research Inst., 2221 East Street, Golden, CO.

Anaerobic digestion is widely employed to degrade soluble and insoluble organic materials in sewage sludge into the gaseous products carbon dioxide and methane. Previous research has established that gamma radiation at sufficiently high dose levels sterilizes the irradiated material and interacts with high molecular weight organic substrates to produce crosslinking or degradation, or both. Considering the increased scarcity and price of natural gas, investigators in this preliminary research program explored the interaction of two wastes, sewage sludge and spent nuclear fuel rods, to determine if a combination of processes could increase the yield or production rate of gas from sewage sludge. The study was designed to determine enhancement of methane production when radiation was used in conjunction with microbial action. Several conclusions can be stated as a result of the experiments in this research program. Treatment of anaerobically digested sewage sludge with gamma radiation from a cobalt 60 source for 24 hours at a dose of approximately 0.4 M rad per hour produces very little methane from direct scission of the organic material in the sludge. Sludge suspensions treated with the same radiation dose in the presence of excess oxygen consistently increased gas yield, up to 50%, from anaerobic bacterial digestion. Gas production increased up to 16% when air dried sludge was treated in an air atmosphere. When sludge suspensions were treated with a restricted access to air, decreases in gas production, though small (up to 26%), were noted in every case.

1349 SAFE ENCAPSULATION OF NUCLEAR FUEL WASTE. ASEA PLANT SOON IN FULL SCALE PRODUCTION. Ingenioer-nytt ; 13: No. 104, 1, 4, 15(30 Dec 1977). (In Norwegian).

Some details are given of the processing of spent fuel elements for final disposal, in a plant nearing completion. It is expected that the plant will be ready to demonstrate the process in 1978. Of the three methods previously described, that in which unreprocessed spent fuel elements are encapsulated is that concentrated on. The fuel pins are placed in flat stainless steel tubes and rolled into discs which are packed in a container. This container is placed in an outer container of aluminium oxide and the whole isostatically compressed at 900-1300°C, to corundum.

1350 METHOD TO PROCESS THE AMMONIUM NITRATE OCCURING IN THE MANUFACTURE OF FUELS OR BREEDER MATERIALS FOR NUCLEAR REACTORS. Morschl, P.; Zimmer, E. (to Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.)); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,617,968/A/. 3 Nov 1977. 8p. (In German).

The ammonium nitrate occuring in the manufacture of nuclear fuels is radioactively contaminated; it is thus necessary to subject it to special processing. According to the invention, the NH_4NO_3-containing solution is mixed with a basic metal oxide or hydroxide at about 100°C, the ammonia formed is evaporated off and the nitrate solution is dried. The solid metal nitrate is thermally decomposed to metal oxide and nitrogen oxide. The thus obtained compounds can be used again in the manufacture of nuclear fuels.

1351 METHOD TO SOLIDIFY WASTE MATERIALS SUCH AS AQUEOUS SOLUTIONS CONTAINING RADIOACTIVE OR TOXIC SUBSTANCES. Knieper, J.; Printz, H.; May, K. (to Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.)); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,559,724/A/. 27 Oct 1977. 7p. (In German).

A method is proposed to solidify aqueous solutions containing radioactive or toxic substances. The aqueous solution which may also be strongly acidic or basic, is mixed with gypsum and water glass (1kg gypsum : 100 to 500ml water glass) and poured into a container for solidification. One example on a laboratory scale is given.

1352 VITRIFICATION PROCESS OF WASTES CONTAINING RADIOACTIVE SUBSTANCES. Bjorklund, W.J.; MacElroy, J.L.; Mendel, J.E. (to Exxon Nuclear Co., Inc., Richland, WA (USA)). French Patent 2,371,046/A/. 19 Oct 1977. Priority date 10 Nov 1976, United States of America (USA), 10p. (In French).

A process is described for the vitrification of wastes containing radioactive substances. A heated bed is created of particles forming glass in a reactor, a gaseous agent is used to fluidise the bed; the waste matter containing radioactive substances in the fluidised bed is sprayed so that the metals and fission products in the waste are calcinated on the particles of the substance forming the bed and the remaining part of the waste is vaporised. The particles forming glass and the calcinated wastes are then removed from the reactor.

1353 METHOD AND EQUIPMENT TO PREPARE AQUEOUS RADIOACTIVE WASTE FOR NON-POLLUTING AND SAFE HANDLING, TRANSPORT, AND FINAL STORAGE. Drobnik, S.; Hild, W.; Kaufmann, F.; Koschorke, H. (to Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,609,299/A/. 15 Sep 1977. 15p. (In German).

A system is proposed which allows the joint execution of the process steps of denitration, drying and calcination necessary for the treatment of radioactive waste and the subsequent injection of superheated water vapor into the reaction chamber so as to also clean

the offgases produced and discharge them from the facility through a filter system without polluting the environment. Several design variants are described which mainly relate to the arrangement of the spray nozzle and its environment. The vitrified radioactive materials are then put into repositories.

1354 METHOD AND EQUIPMENT FOR THE DRY PROCESSING OF URANIUM DIOXIDE NUCLEAR FUEL WASTES. Pirk, H.; Roepenack, H.; Goeldner, U. (to Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 1,667,851/C/. 1 Sep 1977. 5p. (In German).

The patent deals with the dry reprocessing of scrap wastes occuring in the manufacture of ceramic sinter bodies of uranium dioxide to be used as nuclear fuel. One obtains by oxidation at 350-500°C a very pure, fine U_3O_8 powder if during the oxidation process one vibrationally sieves it. A suitable equipment is described.

1355 USE OF ELECTROCOAGULATION TECHNIQUE IN WASTE DISPOSAL. Napravnik, J. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Nukleon ; No. 3, 45(Sep 1977). (In Czech).

ELECTRODES;FISSION PRODUCTS;FLOCCULATION; LIQUID WASTES;LOW-LEVEL RADIOACTIVE WASTES; RADIOACTIVE WASTE PROCESSING;SUSPENSIONS

1356 REMOVAL OF RADIOACTIVE WASTE DURING IN-SITU LEACHING OF URANIUM. Learmont, R.P. (to USS Engineers and Consultants, Inc., Pittsburgh, PA (USA)). Australian Patent 77/28,001/A/. 17 Aug 1977. vp.

In the process for the in-situ leaching of mineral values from an underground formation, wherein an aqueous solution of a leaching agent is delivered to the formation through an injection well, the solution remains in contact with the formation for a period of time sufficient to effect the solubilization of the mineral values, but the contact also effects the solubilization of undesirable mineral values including radium ion containing radioactive waste. An improved process is described for abating the contamination and minimizing the problem of waste disposal, which comprises passing the solution through a sand pack, the graded size pack containing a graded size fraction of a barium containing ion exchange material in an amount sufficient to decrease the radium-ion concentration of said pregnant solution to a level which is no greater than 0.1 the level of the incoming unexchanged pregnant solution in said formation.

1357 METHOD TO SOLIDIFY AND DISPOSE RADIOACTIVE BORATE-CONTAINING LIQUIDS. Iffland, N.; Isensee, H.J.; Wagner, G.; Witte, H. (to Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,603,116/A/. 11 Aug 1977. 10p. (In German).

A suggestion is made to add quenched lime and cement to solidify radioactive boron-containing solutions. It is advantageous to also add silicic acid or kieselguhr to the cement part; likewise the addition of water glass or phosphoric acid or hydrogen phosphate. The two latter additions increase the solidity of the resulting blocks and accelerate the binding. 4 examples illustrate that the amount of additive is very large. Example 1: 200l solution + 40kg lime + 120kg cement + 40kg water glass.

1358 METHOD TO DISPOSE OF SOLID RADIOACTIVE WASTES. Liehmann, G. (to Deutsche Schachtbau und Tiefbohrgesellschaft m.b.H., Lingen (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,603,916/A/. 4 Aug 1977. 6p. (In German).

Contaminated metallic nuclear reactor components must be divided into handy transportable parts before one can take them to a place of ultimate storage. A suggestion is made to grout these waste products with concrete and to cover them and then to divide the concrete blocks into the required sizes. One thus avoids radiation exposure to the personnel performing this work. The concrete body can be divided by powder flame cutting or powder melt cutting. In order to simplify this procedure, one can add exothermal oxidizable materials such as Al or Fe powder to the concrete.

1359 METHOD FOR THE DISPOSAL OF ESPECIALLY RADIOACTIVE WASTES. (to Siempelkamp Giesserei K.G., Krefeld (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,600,790/A/. 14 Jul 1977. 9p. (In German).

It is proposed to solidify high level radioactive wastes from nuclear power plants in the known way, to fill the parts in a container within a hot cell, and to enclose this container there immediately by means of a shielding shell of sufficient thickness, cast from gray cast iron or cast steel, and to seal the shell gas tight. These shielded containers there are brought into a service-heat power plant as a thermal source of energy, used as an intermediate storage facility for decay as well as for economically utilizing the decay heat produced. This is followed by ultimate storage.

1360 PROCESS FOR PACKAGING FISSION PRODUCTS RESULTING FROM REPROCESSING BY DRY METHODS. Blum, Jacques; Verot, J.L. (to Compagnie de Produits Chimiques et Electrometallurgiques Pechiney-Ugine Kuhlmann, 75 - Paris (France)). French Patent 2,395,573/A/. 24 Jun 1977. 5p. (In French).

A process is described for packaging fission products obtained by the dry method with a view to making a resulting product that offers great innocuousness with respect to the environment, the characteristic being that a mix is made comprising a major proportion of a zeolite of formula $nSiO_2$, mAl_2O_3, MO, zH_2O and a minor proportion of processed primary fission products; this mix is brought to its melting temperature at an appropriate temperature rise rate, this temperature being maintained until a homogeneous phase is obtained, after which it is allowed to cool.

1361 BITUMINIZATION OF BIOLOGICALLY HARMFUL WASTES. Freund, M.; Magyar, M.; Mozes, G.; Csikos, R.; Kristof, M.; Toth, L.; Hima, G. Czech Patent 169,880/B/. 15 Jun 1977. 6p. (In Czech).

The invention claims the bitumenization of biologically harmful wastes, such as industrial wastes containing radioactive materials. These wastes containing water are transported from sludge basins, this either by gravity or by mechanical stirring, into a suitably adapted absorption zone or to several parallel zones filled with bitumen heated to 100 to 250 degC. An inert gas is forced into the system foaming the zone contents. The foam phase is decomposed by the action of heat while water is evaporated

and condensed. Bitumen containing dry matter of the radioactive wastes is discharged from the bottom part of the absorption zone and stored in a tank.

1362 CONVERSION OF RADIOACTIVE CYANIDE COMPOUNDS. Schulz, W.W.; Dressen, A.L. (to Energy Research and Development Administration, Washington, DC (USA); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,652,858/A/. 2 Jun 1977. 11p. (In German).

The invention deals with the conversion of radioactive ferrocyanide compounds into practically insoluble glass. Cs^{137} is one of the fission products obtained during the chemical reprocessing of nuclear fuel. It is extremely radioactive and is therefore separated from lower-activity components. This is done by precipitation from alkali solutions by adding potassium ferrocyanide. A caesium-containing ferrocyanide precipitate is obtained which is nearly insoluble but not completely and must therefore be converted into an insoluble product for ultimate storage. According to the invention, the ferrocyanide precipitate is therefore converted into hard-to-dissolve glass by melting the ferrocyanide with sodium carbonate and a mixture of a) basalt and boron trioxide, or b) silicon dioxide and lime. The fine-grained components are mixed in the dry state and melted at 1250 - 1350°C. The batch may contain 10-30% of the ferrocyanide.

1363 ORGANIC WASTE PROCESS CONTAINING AT LEAST ONE RADIOACTIVE ELEMENT. Le Roy, F. (to Rockwell International Corp., El Segundo, CA (USA)). French Patent 2,350,668/A/. 26 Apr 1977. Priority date 3 May 1976, United States of America (USA), 21p. (In French).

The description is given of an organic waste process containing at least one element from the group comprising strontium, cesium, iodine and ruthenium. It comprises the introduction of the organic waste and gaseous oxygen in a bath of melted salt containing an alkaline carbonate, the bath being maintained at a high temperature between 400 and 1000°C and at a pressure of 0.5 to 10 bars, so that the organic waste is burnt and oxidised at least partly, the element selected being retained by the bath of melted salt.

1364 STORAGE PREPARATION PROCESS OF FRACTIONATED SOLID MATERIALS. Archer, J. (to Novatome Industries, 92 - Le Plessis-Robinson (France)). French Patent 2,388,379/E/. 18 Apr 1977. 8p. (In French).

Encasing fractionated solid materials in a cylindrincal metal container, by vibration in finite length tubes with leaktight side walls and both ends sealed by seaming and welding; compacting these fractionated solid materials in their cylindrical metal containers by extrusions, flattening, etc. Placing the product thereby obtained in a continuous medium.

1365 METHOD AND EQUIPMENT FOR EVAPORATION BELOW BOILING POINT AND FINAL STORAGE OF LIQUID RADIOACTIVE WASTES. Szivos, K.; Lovass, G.; Liptak, L.; Hirling, J.; Pavlik, O. Czech Patent 168,687/B/. 15 Apr 1977. 8p. (In Czech).

Liquid radioactive waste is evaporated on the storage site by a flowing gas medium (air, nitrogen) at a pressure of 0.5 to 1.5 at transporting heat and steam. The medium flows in a closed circuit. Steam is blown into the medium condensing with the medium vapour. Following concentration the radioactive waste is wrapped with self-hardening watertight material, eg., bitumen. Radioactive waste concentration proceeds in a jacketed tank where the space between the two tank walls is filled with watertight material.

1366 PROCESS FOR DECONTAMINATING A RADIOACTIVE EFFLUENT IN PARTICULAR RUTHENIUM. Berton, Y.; Chauvet, P. (to CEA, 75 - Paris (France)). French Patent 2,379,141/A/. 27 Jan 1977. 11p. (In French).

Process for decontaminating a radioactive effluent containing ruthenium at least. Under this process, in an effluent containing radioactive elements, a certain number of precipitates are formed which exhibit absorbent and/or co-precipitant properties with respect to the radioactive elements contained in the effluent, the precipitates being formed without intermediate phase separation. It is characterised in that a cobalt sulphide precipitate is formed in the effluent to be processed.

1367 PROCESS FOR REDUCING THE VOLUME OF RADIOACTIVE ORGANIC WASTES. Tanaka, H. (to JGC Corp., Tokyo (Japan)). Japanese Patent 1953-88,500/A/. 14 Jan 1977. 3p. (In Japanese).

A process is claimed to reduce the volume of radioactive organic wastes with no generation of SO sub(x) and NO sub(x) by decomposing them with concentrated sulfuric acid and hydrogen peroxide. Method: Upon feeding radioactive organic wastes in a stirrer type reaction vessel containing concentrated sulfuric acid, the radioactive wastes are partially decomposed by the heated concentrated sulfuric acid, and the decomposition is further promoted by the dropwise addition of an aqueous solution of hydrogen peroxide. Carbon dioxide and steam resulting from the chemical decomposition are cooled by cooling water into recovered water. After distillation, it is recycled by way of a cooler and a separator. Gas leaving a cooling adsorption tower is purified in an adsorption tower and then discharged.

1368 METHOD OF PROCESSING RADIOACTIVE WASTES. Hattori, K.; Fujii, M. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 1953-85,300/A/. 5 Jan 1977. 4p. (In Japanese).

A method is claimed to attain a more complete processing for radioactive wastes by settling radioactive waste-containing cement in a cleaning can after being cleaned with a mixer settler by effectively utilizing the settling nature of the cement. After mixing radioactive wastes, water and solidifying agent in a solidification can using a mixer, the stirring vanes of the mixer are pulled out from the solidification can and then transferred to a cleaning can. When the cement is settled and accumulated to a predetermined amount in the cleaning can by repeatedly cleaning the stirring vanes for required number of times in the cleaning can, the supernatant liquid is sucked up by a sucker to a metering tank for addition water, which is reused as cement solidification water. The cement slurry in the cleaning can is further incorporated with cement and solidified in the cleaning can. Then, the can is capped for disposal.

1369 PROCESSING RADIOACTIVE WASTES FROM NUCLEAR POWER PLANTS IN CZECHOSLOVAKIA. Seliga, M. Spravodajstvo SEP ; 3: No. 2, 26-29(1977). (In Slovak).

In view of the high population density of

Czechoslovakia and the country's lack of big rivers, salt mines or other geologic formations suitable for permanent storage of radioactive wastes, wastes from nuclear power plants should be treated prior to their permanent disposal and long-term storage; of radioactive wastes in liquid form should thus be excluded. Cementation and bituminization processes are envisaged for liquid radioactive waste fixation. Suitable sites were found for permanent storage of solidified radioactive wastes. Their nature will be that of regional storage sites. Currently, feasibility studies are under way for first regional storage sites for the A-1, V-1 and V-2 nuclear power plants.

1370 FILTERS USED IN THE PROCESSING OF RADIOACTIVE FLUIDS. French Patent 2,333,329/A/. 25 Nov 1976. Priority date 25 Nov 1975, Spain, 15p. (In French).

The description is given of an improvement to the filters used in the processing of radioactive fluids and comprising interchangeable filtering elements. In the proposed installation, the exposure to radiation of the personnel in charge of handling during the changing of the filtering element is made very weak and the cost of these operations is reduced. The filter is of the type comprising a casing containing the filter element, a lid, and it is housed inside an anti-radiation protection chamber, provided with access openings in the form of anti-radiation protection doors or slabs; one of these openings faces the filter. The lid of the filter case, which forms a hermetic seal by means of seals or screws, includes an anti-radiation protection which is integral with it and has an appropriate shape to fit into the opening of the protection chamber that faces the filter, to act as cover or closure slab for this opening and to serve as upper part to ensure the hermetic closure of the upper part of a bell used as anti-radiation protection during the extraction of the filter element and to serve as cover for the protective transport case for the filter element.

1371 PULVERULENT BODY CHANGE-OVER DEVICE IN RADIOACTIVE WASTE PROCESSING FACILITIES. Akiyama, K.; Kawagoe, T.; Tadokoro, M. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 1953-65,600/A/. 22 Nov 1976. 5p. (In Japanese).

A pulverulent body change-over device is described which selectively switches and feeds the pulverulent body to granulating means or reproduction line in compliance with the moisture content in the pulverulent body supplied from drying means, wherein its reliability is increased and a safe and precise waste liquid capacity decreasing and solidifying treatment is possible. After the waste liquid has been concentrated, it is made into a pulverulent body by a drier and reaches a hopper where the moisture content is detected by neutron at a moisture detector. When the percentage of the moisture content has been detected to be less than 3%, a change-over motor is driven to rotate a main change-over structure, and as a result, the first path of the main change-over structure communicates with a granulating machine and the pulverulent body is sent to the granulating line. On the other hand, when the percentage of the moisture content exceeds 3%, the second path of the main change-over structure communicates with the reproduction line and the flow of the pulverulent body is changed over to the reproduction line.

1372 DEVICE FOR PROCESSING RADIOACTIVE LIQUID WASTE. Some, E.; Hashimoto, T. (to Japan Steel Works Ltd., Tokyo). Japanese Patent 1953-64,200/A/. 18 Nov 1976. 2p. (In Japanese).

A device is provided for processing a radioactive liquid waste, wherein, in a bitumen treatment of middle and low level waste, a port for feeding waste liquid is provided at a position closer to the discharge port side than a port for feeding asphalt thereby to prevent the liquid waste from counterflowing in the direction of the ground sealed part and leaking therefrom. Radioactive waste water is fed in the feeding portion cylinder through the feed port closer to the discharge port side, and asphalt for solidifying is fed through the feed port disposed farther from the discharge port side. By the rotation of a screw shaft both waste liquid and asphalt are pushed forward in the direction of the discharge port while being mixed with each other, and the mixing and dehydration operations are carried out in the dehydration and extrusion part cylinder. The water content is evaporated and taken up through a vent hole, and bitumen containing radioactive salts is exhausted out of the discharge port. The solidified bitumen is put in an adequate vessel and thrown away in the seawater.

1373 METHOD FOR SOLIDIFYING AND DISPOSING RADIOACTIVE LIQUID WASTE. Nakayama, Y.; Matsumoto, K.; Kamiyama, H.; Takiguchi, Y.; Irie, H. (to Nippon Atomic Industry Group Co. Ltd., Tokyo). Japanese Patent 1953-62,100/A/. 15 Nov 1976. 4p. (In Japanese).

A method is claimed to store solid waste, which has been obtained by vaporizing and drying radioactive waste, in the form of a stable solidified body, and to re-use separated water. Constitution: Enriched liquid waste, waste resin and sludge are respectively stored in a storage tank, after which they are fed into an adjusting tank at the rate suitably determined. The thus adjusted liquid waste is extracted by a pump and fed to a vertical-type film scraper and dryer to subject to heating, vaporizing and drying. The vaporized steam is formed into condensed water by means of a condenser and recovered into a sample tank for re-use. On the other hand, dried powder is fed to a powder storage tank until it reached a predetermined level of quantity, after which they are fed to a cement, asphalt or plastic solidifying device. Slurry-like material not sufficiently dried and washing water of dryer are collected tin a drain tank, and they are re-dried by the adjusting tank through the pump or returned to the waste disposal system.

1374 DEVICE FOR RADIOACTIVE WASTES PROCESSING. Wase, K. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 1953-60,499/A/. 10 Nov 1976. 3p. (In Japanese).

A device for radioactive waste disposal comprises a dryer for forming radioactive liquid waste into powdery material, a hopper through which the powdery material is guided and having means for measuring water contents within said powdery material, a granulator to which said powdery material having a predetermined percentage of water content within said hopper, and means for preventing said powdery material having water contents in excess of the predetermined percentage of water content from being guided into said granulator. Said dryer, said preventing means, said hopper and said granulator are arranged on a vertical line.

1375 CLEANING PROCESS FOR SOLIDIFICATION APPARATUS OF RADIOACTIVE LIQUID WASTE. Hirano, M.; Horiuchi, S. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 1953-56,500/A/. 1 Nov 1976. 4p. (In Japanese).

A process is claimed to facilitate the maintenance of solidifying equipment for drying radioactive liquid waste and rendering it into solid by granulation by arranging such that when the water content of the powder before granulation is not a predetermined water content, rinsing liquid is forced into the powder to permit the powder to be readily excluded from the system. Radioactive liquid wastes mainly composed of Na_2SO_4 produced in a nuclear power plant are dried by a centrifugal thin film drier and is rendered into powder. The powder thus produced is stored in a hopper, and the water content of the powder within the hopper is measured by batch measurement. When the water content of the powder is within a predetermined range, the powder within the hopper is supplied to a granulating machine and rendered into granules, which are then charged into a drum can. When the water content of the powder is outside the predetermined range, rinsing liquid such as hot water is forced into a hopper from below to dissolve the powder. In this way, the powder is efficiently rendered into granules with the water content held within a predetermined range.

1376 PROCESS FOR THE STORAGE PREPARATION OF FRACTIONISED SOLID MATERIALS. Archer, Jacques. (to Novatome Industries, 92 - Le Plessis-Robinson (France)). French Patent 2,353,117/A/. 25 May 1976. 7p. (In French).

A process is described for the storage preparation of fractionated nuclear materials; it comprises the three following operations: wrapping the materials in a metal cylindrical envelope and then welding it, draw the envelope and place the wire obtained in a continuous environment. The two first operations at least are carried out automatically in an enclosure separate from the outside environment. The nuclear materials wrapped in this manner are wound into coils.

1377 RADIOACTIVE WASTE PROCESSING. Curtiss, D.H.; Heacock, H.W. (to United Nuclear Industries, Inc., Richland, WA (USA)). French Patent 2,349,194/A/. 20 Apr 1976. 7p. (In French).

The description is given of a process for treating radioactive waste whereby a mud of radioactive waste and cementing material is formed in a mixer. This mud is then transferred from the mixer to a storage and transport container where it is allowed to harden. To improve transport efficiency an alkali silicate or an alkaline-earth metal silicate is added to the mud. For one hundred parts by weight of radioactive waste in the mud, twenty to one hundred parts by weight of cementing material are added and five to fifty parts by weight of silicate, the amount of waste in the mud exceeding the combined amount of cementing and silicate material.

1378 ORGANIC BOND FOR RADIOACTIVE WASTES. Volkova, O.I.; Zakharova, K.P.; Kopylov, E.B.; Neroda, A.A. USSR Patent 556,665/A/. 19 Mar 1976. 2p. (In Russian).

The aim of the invention is to reduce the danger of the environment deterioriation by the radioactive isotopes being produced at a NPP. As an organic binding substance for the radioactive wastes proposed is the application of cubic residue, forming at sublimation of dimethylpereftalate (DMT) in the evaporation chamber (EC) at the ratio of dry residue of radioactive wastes in DMT from 2:3 up to 3:2. The process goes at 140-160 deg and may go in the apparatus for bitumization. The DMT (EC) application permits to increase the per cent of filling that reduces the usage of the binding substance in one and a half times and decreases the volume of expensive storages of radioactive wastes, and permits to decrease the price of the waste solidification process in 11 times in accordance with bitumization and to improve waterproofness of solidified radioactive wastes.

1379 METHOD OF HANDLING RADIOACTIVE ALKALI METAL WASTE. Wolson, R.D.; McPheeters, C.C. US Patent Application 043,855. [nd]. 21p.

Radioactive alkali metal is mixed with particulate silica in a rotary drum reactor in which the alkali metal is converted to the monoxide during rotation of the reactor to produce particulate silica coated with the alkali metal monoxide suitable as a feed material to make a glass for storing radioactive material. Silica particles, the majority of which pass through a 95 mesh screen or preferably through a 200 mesh screen, are employed in this process, and the preferred weight ratio of silica to alkali metal is 7 to 1 in order to produce a feed material for the final glass product having a silica to alkali metal monoxide ratio of about 5 to 1.

1380 ELECTRIC CONTROLLED AIR INCINERATOR FOR RADIOACTIVE WASTES. Warren, J.H.; Hootman, H.E. US Patent Application 058,420. [nd]. 15p.

A two-stage incinerator is provided which includes a primary combustion chamber and an afterburner chamber for offgases. The latter is formed by a plurality of vertical tubes in combination with associated manifolds which connect the tubes together to form a continuous tortuous path. Electrically-controlled heaters surround the tubes while electrically controlled plate heaters heat the manifolds. A gravity-type ash removal system is located at the bottom of the first afterburner tube while an air mixer is disposed in that same tube just above the outlet from the primary chamber. A ram injector in combination with rotary magazine feeds waste to a horizontal tube forming the primary combustion chamber.

Waste Disposal and Storage

1381 (AD-B--024442/6) BOREHOLE PLUGGING PROGRAM (WASTE DISPOSAL). REPORT 1. INITIAL INVESTIGATIONS AND PRELIMINARY DATA. MISCELLANEOUS PAPER. Boa, J.A. Jr. (Army Engineer Waterways Experiment Station, Vicksburg, MS (USA)). Jan 1978. 39p. NTIS, PC A03/MF A01.

This report covers efforts during the first year of the program. A study was initiated to find competent grouts to be used in stemming boreholes associated with radioactive waste disposal. The grouts must be durable for several thousand years and be essentially impermeable. In addition, the grouts should be pumpable to depths of several thousand feet into environments of high temperature. Grouts for use in both salt and nonsalt formations are to be studied. This program is still underway.

1382 (AECB--1120) RADIOACTIVE WASTE STORAGE AND DISPOSAL: THE CHALLENGE. Prince, A.T. (Atomic Energy Control Board, Ottawa, Ontario

(Canada)). Mar 1978. 18p. NTIS (US Sales Only), PC A02/MF A01.

Solutions to waste management problems are available. After radium is removed, tailings from uranium ores can be disposed of safely in well-designed retention areas. Work is being done on the processing of non-fuel reactor wastes through incineration, reverse osmosis, and evaporation. Spent fuels have been stored safely for years in pools; dry storage in concrete cannisters is being investigated. Ultimate disposal of high-level wastes will be in deep, stable geologic formations.

1383 (AECL--6188-1) RADIOACTIVE WASTE REPOSITORY STUDY. PART 1. (Acres Consulting Services Ltd., Toronto, Ontario (Canada); Atomic Energy of Canada Ltd., Pinawa, Manitoba. Whiteshell Nuclear Research Establishment). Nov 1978. 189p. Dep. NTIS (US Sales Only), PC A10/MF A01.

This is the first part of a report of a preliminary study for Atomic Energy of Canada Limited. It considers the requirements for an underground waste repository for the disposal of wastes produced by the Canadian Nuclear Fuel Program. The following topics are discussed with reference to the repository: 1) underground layout, 2) cost estimates, 3) waste handling, 4) retrievability, decommissioning, sealing and monitoring, and 5) research and design engineering requirements.

1384 (AECL--6188-2) RADIOACTIVE WASTE REPOSITORY STUDY. PART 2. (Acres Consulting Services Ltd., Toronto, Ontario (Canada); Atomic Energy of Canada Ltd., Pinawa, Manitoba. Whiteshell Nuclear Research Establishment). Nov 1978. 198p. Dep. NTIS (US Sales Only), PC A11/MF A01.

This is the second part of a report of a preliminary study for AECL. It considers the requirements for an underground waste repository for the disposal of wastes produced by the Canadian Nuclear Fuel Program. The following topics are discussed with reference to the repository: 1) geotechnical assessment, 2) hydrogeology and waste containment, 3) thermal loading and 4) rock mechanics.

1385 (AECL--6188-3) RADIOACTIVE WASTE REPOSITORY STUDY. PART 3 (SUMMARY). (Acres Consulting Services Ltd., Toronto, Ontario (Canada); Atomic Energy of Canada Ltd., Pinawa, Manitoba. Whiteshell Nuclear Research Establishment). Nov 1978. 20p. Dep. NTIS (US Sales Only), PC A03/MF A01.

This is the third part of a report of a preliminary study for AECL. It summarizes the topics considered in reports AECL-6188-1 and AECL-6188-2 as requirements for an undergpound repository for disposal of wastes produced by the Canadian Nuclear Fuel Program.

1386 (AECL--6308) PRELIMINARY ASSESSMENT OF TEMPERATURE DISTRIBUTIONS ASSOCIATED WITH A RADIOACTIVE WASTE VAULT. Tammemagi, H.Y. (Atomic Energy of Canada Ltd., Pinawa, Manitoba. Whiteshell Nuclear Research Establishment). 1978. 46p. Dep. NTIS (US Sales Only), PC A03/MF A01.

The temperature distributions of models which simulated radioactive waste vaults were determined, using a finite difference computer code to solve the transient heat conduction equation. Input parameters to the code included thermal properties for granitic rock and heat generation decay data for wastes that would be separated from CANDU fuel if it were recycled. Due to the preliminary nature of the study, only simple models were analyzed. A disc source was utilized to approximate a one-level repository. Various parmeters were investigated such as depth of disc, thermal properties of rock, and long-term effects. It was shown that, for a vault at 500 m depth with an initial areal heat flux of 31 W/m^2, a maximum temperature increase of about 80°C occurs at the vault level about 30 years after waste emplacement; maximum increases near the earth's surface occur after about 1000 years and are less than 1°C. Modelling the vault by a number of vertical waste boreholes on one horizontal level, instead of by a disc, with the gross areal heat flux again 31 W/m^2, did not cause serious local temperature increases as long as the initial heat generation rate of each container was less than about 750 W. It was also shown that, by using the vertical dimension available in granitic plutons and constructing either multiple-level vaults or very deep boreholes, initial areal heat fluxes greater than 31 W/m^2 can be utilized without exceeding the 80°C maximum temperature increase anywhere in the vault. 14 figures, 8 tables.

1387 (AECL--6353) PROGRESS IN WASTE MANAGEMENT TECHNOLOGY. Hart, R.G. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Aug 1978. 11p. (CONF-7806125--7). Dep. NTIS (US Sales Only), PC A02/MF A01.

From 1978 annual conference of the Canadian Nuclear Association; Ottawa, Canada (11 Jun 1978).

In a previous paper by the same author, emphasis was placed on the role that 'pathways analysis' would play in providing 'beyond reasonable doubt' that a particular method and a particular formation would be suitable for the safe geologic disposal of nuclear wastes. Since that paper was released, pertinent pathways analyses have been published by Bernard Cohen, de Marsily et al., the American Physical Society's Special Study Group on Nuclear Fuel Cycles and Waste Management, and KBS of Sweden. The present paper reviews and analyses the strengths and weaknesses of each of these papers and their implications for the Canadian plan for the geologic disposal of nuclear waste. The conclusion is that the Canadian plan is on the right track and that the disposal of nuclear wastes is not an intractable problem. Indeed the analyses show that several options, each with large safety factors, are likely eventually to be identified.

1388 (AERE-R--8301) MEASUREMENT SYSTEM FOR USE IN THE SELECTION OF PLUTONIUM CONTAMINATED WASTE FOR DISPOSAL. Leake, J.W.; Lambert, K.P.; Warner, M.C. (UKAEA Atomic Energy Research Establishment, Harwell). Apr 1979. 11p. Dep. NTIS (US Sales Only), PC A02/MF A01.

Calculations have been carried out for a total neutron counting system which show that it may be used to sentence for disposal solid waste contaminated with low levels of plutonium of unspecified origin and burn up.

1389 (AERE-R--9343) PRACTICAL ASPECTS OF HEAT TRANSFER IN RADIOACTIVE-WASTE REPOSITORY DESIGN. Deane, J.S.; Hollis, A.A. (UKAEA Atomic Energy Research Establishment, Harwell). Jan 1979. 19p. Dep. NTIS (US Sales Only), PC A02/MF A01; Also available from H.M. Stationery Office, price Pound1.00.

An assessment has been made of the effect on temperature rises of the practical features associated with the disposal of high-level

radioactive wastes in a repository constructed within a granite formation. Encapsulation, the use of a backfill material, and reduction in the axial spacing between blocks to 8m will have little effect on temperature rises. On the other hand thermal conductivity does have a marked effect on the temperature rises in the granite, and there is clear need for the measurement of granite thermal conductivity at selected sites.

1390 (AERE-R--9445) RADIOACTIVE WASTE DISPOSAL BY UKAEA ESTABLISHMENTS DURING 1978 AND ASSOCIATED ENVIRONMENTAL MONITORING RESULTS. Flew, E.M. (UKAEA Atomic Energy Research Establishment, Harwell. Environmental and Medical Sciences Div.). May 1979. 24p. NTIS (US Sales Only), PC A03/MF A01.

This report gives details of the amounts of solid and liquid radioactive waste disposed of by the principal establishments of the UKAEA during 1978. Waste arising at the UKAEA Nuclear Power Development Laboratories at Windscale and Springfields, which are both situated on British Nuclear Fuels Ltd. (BNFL) sites, is disposed of by BNFL and included in their authorisations. Discharges to atmosphere of airborne radioactive waste are also included in the report. A summary of the results of the environmental monitoring programmes carried out in connection with the radioactive waste discharges is given.

1391 (AERE¬R--9518) PREDICTED PEAK TEMPERATURE-RISES AROUND A HIGH-LEVEL RADIOACTIVE WASTE CANISTER EMPLACED IN THE DEEP OCEAN BED. Kipp, K.L. (UKAEA Atomic Energy Research Establishment, Harwell. Chemical Technology Div.). Jun 1978. 20p. NTIS (US Sales Only), PC A03/MF A01.

A simple mathematical model of heat conduction was used to evaluate the peak temperature-rise along the wall of a canister of high-level radioactive waste buried in deep ocean sediment. Three different amounts of vitrified waste, corresponding to standard Harvest, large Harvest, and AVM canisters, and three different waste loadings were studied. Peak temperature-rise was computed for the nine cases as a function of canister geometry and storage time between reprocessing and burial. Lower waste loadings or longer storage times than initially envisaged are necessary to prevent the peak temperature-rise from exceeding 200°C. The use of longer, thinner cylinders only modestly reduces the storage time for a given peak temperature. Effects of stacking of waste canisters and of close-packing were also studied.

1392 (AERE-R--9548) DEVELOPMENT OF A HIGH LEVEL RADIOACTIVE WASTE MANAGEMENT STRATEGY. Beale, H. (UKAEA Atomic Energy Research Establishment, Harwell. Chemical Technology Div.). Nov 1979. 11p. NTIS (US Sales Only), PC A02/MF A01.

The management of high level radioactive waste, from the removal of spent fuel from reactors to final disposal of vitrified waste, involves a complex choice of operational variables which interact one with another. If the various operations are designed and developed in isolation, a suboptimal choice will almost certainly result. Management of highly active waste should therefore be viewed as a complete system and analysed in such a way that account is taken of the interactions between the various operations. This system must have clearly defined and agreed objectives as well as criteria against which performance can be judged. A thorough analysis of the system will provide a framework within which the necessary research and development can be carried out in a co-ordinated fashion and lead to an optimised strategy for managing highly active wastes.

1393 (ALO--0789-T12) TEST RESULTS AND SUPPORTING ANALYSIS OF A NEAR-SURFACE HEATER EXPERIMENT IN THE ELEANA ARGILLITE. McVey, D.F.; Lappin, A.R.; Thomas, R.K. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 21p. Dep. NTIS, PC A02/MF A01.

A preliminary evaluation of the in-situ thermomechanical response of argillite to heating was obtained from a near-surface heater test in the Eleana Formation, at the United States Department of Energy, Nevada Test Site. The experiment consisted of a 3.8 kW, 3-m long x 0.3-m diameter electrical heater in a central hole surrounded by peripheral holes containing instrumentation to measure temperature, gas pressures, and vertical displacement. A thermal model of the experiment agreed well with experimental results; a comparison of measured and predicted temperatures indicates that some nonmodeled vertical transport of water and water vapor occurred near the heater, especially at early times. A mechanical model indicated that contraction of expandable clays in the argillite produced a region 1.5 - 2.0 m in radius, in which opening of preexisting joints occurred as a result of volumetric contraction. Results of thermal and mechanical modeling, laboratory property measurements, experimental temperature measurements, and post-test observations are all self-consistent and provide preliminary information on the in-situ response of argillaceous rocks to the emplacement of heat-producing nuclear waste.

1394 (ANL--78-81) FEASIBILITY OF UNDERGROUND STORAGE/DISPOSAL OF NOBLE GAS FISSION PRODUCTS. Winar, R.M.; Trevorrow, L.E.; Steindler, M.J. (Argonne National Lab., IL (USA)). Aug 1979. Contract W-31-109-ENG-38. 87p. Dep. NTIS, PC A05/MF A01.

The quantities of ^{85}Kr that can be released to the environment from nuclear energy production are to be limited after 1983 by Federal regulations. Although procedures for collecting the ^{85}Kr released in the nuclear fuel cycle have been developed to the point that they are commercially available, procedures for terminal disposal of the collected gas are still being examined for their feasibility. In this work, the possibilities of underground disposal of ^{85}Kr by several techniques were evaluated. It was concluded that (1) disposal of ^{85}Kr as a solution in water or other solvents in deep wells would have the major disadvantages of liquid migration and the requirement of extremely large volumes of solvent; (2) disposal as bubbles entrained in cement grout injected underground presents the uncertainty of gaseous migration through permeable solid grout; (3) disposal by injection into abandoned oil fields would be favored by solubility of krypton in residual hydrocarbons, but has the disadvantages that such fields contain numerous shafts offering avenues of escape and also that the fields may be reworked in the future for their hydrocarbon residues; (4) underground retention of ^{85}Kr injected as a gas may be promising, given the right lithology, through entrapment in interstices between fine sand grains held together by the interfacial tension of wetted surfaces. 9 figures, 5 tables.

1395 (ANL--80-36) STUDIES OF NUCLEAR WASTE

MIGRATION IN GEOLOGIC MEDIA. ANNUAL REPORT, OCTOBER 1978-SEPTEMBER 1979. Seitz, M.G.; Rickert, P.G.; Couture, R.A.; Williams, J.; Meldgin, N.; Fried, S.M.; Friedman, A.M.; Steindler, M.J. (Argonne National Lab., IL (USA)). 1980. Contract W-31-109-ENG-38. 66p. NTIS, PC A04/MF A01.

Experimental results obtained this year confirm the results obtained in previous years - that nuclides migrating by fluid flow in rock often exhibit complex behavior not predicted by simple chromatographic-type models. A phenomenon found previously to lead to complex behavior for leached radionuclides is that the amount of adsorbed nuclide was not proportional to the nuclide concentration in solution (nonlinear adsorption isotherm). For cesium adsorption on limestone and on basalt, nonlinear isotherms were found this year to occur in the range of cesium concentrations in the groundwater of about 10^{-3} to 10^{-9}M. Because cesium concentrations in this range can readily be attained by the leaching of solid waste by groundwater, the effects of nonlinear isotherms are germane to nuclide migration. This dependence of cesium migration on the leached concentration of cesium emphasizes the importance of treating the leaching and migration processes simultaneously such as is done in the leach-migration experiments performed in this work. The existence of nonlinear isotherms precludes the use of a single partition coefficient (K_d) to describe cesium migration at an arbitrary cesium concentration above 10^{-9}M. Nonetheless, nonlinear isotherms can be studied experimentally (e.g., to give K_d as a function of concentration) and effects of nonlinear adsorption can be predicted quantitatively. Comparison of results from column and batch tests indicate that, in addition to nonlinear adsorption, kinetic effects need to be considered in predicting nuclide migration from the partition coefficients measured in batch tests. Results of batch experiments of 2 weeks or longer duration pertained to migration expected only at the very lowest (< 50 m/y) groundwater flow rates of interest.

1396 (ANL/EES-TM--68) REVIEW OF THE NUCLEAR WASTE DISPOSAL PROBLEM. Poch, L.A.; Wolsko, T.D. (Argonne National Lab., IL (USA)). Oct 1979. Contract W-31-109-ENG-38. 18p. Dep. NTIS, PC A02/MF A01.

Regardless of future nuclear policy, a nuclear waste disposal problem does exist and must be dealt with. Even a moratorium on new nuclear plants leaves us with the wastes already in existence and wastes yet to be generated by reactors in operation. Thus, technologies to effectively dispose of our current waste problem must be researched and identified and, then, disposal facilities built. The magnitude of the waste disposal problem is a function of future nuclear policy. There are some waste disposal technologies that are suitable for both forms of HLW (spent fuel and reprocessing wastes), whereas others can be used with only reprocessed wastes. Therefore, the sooner a decision on the future of nuclear power is made the more accurately the magnitude of the waste problem will be known, thereby identifying those technologies that deserve more attention and funding. It is shown that there are risks associated with every disposal technology. One technology may afford a higher isolation potential at the expense of increased transportation risks in comparison to a second technology. Establishing the types of risks we are willing to live with must be resolved before any waste disposal technology can be instituted for widespread commercial use.

1397 (ARH-CD--304) FUNCTIONAL DESIGN CRITERIA: ADDITIONAL HIGH-LEVEL WASTE STORAGE AND HANDLING FACILITIES. Tanaka, K.H. (Atlantic Richfield Hanford Co., Richland, WA (USA)). May 1975. Contract EY-77-C-06-1030. 14p. Dep. NTIS, PC A02/MF A01.

For liquid and slurry wastes. HIGH-LEVEL RADIOACTIVE WASTES;LIQUID WASTES;UNDERGROUND STORAGE;TANKS;HANFORD RESERVATION;PIPES;PUMPS; VENTILATION;QUALITY ASSURANCE;DESIGN; RADIOACTIVE WASTE STORAGE;SEISMIC EFFECTS; SAFETY;REGULATIONS

1398 (ARH-CD--362) FUNCTIONAL DESIGN CRITERIA ADDITIONAL HIGH-LEVEL WASTE STORAGE FACILITIES. Tanaka, K.H. (Energy Research and Development Administration, Richland, WA (USA). Richland Operations Office). 30 Jun 1975. Contract EY-77-C-06-1030. 17p. Dep. NTIS, PC A02/MF A01.

Six one-million-gallon double shell waste storage tanks will be constructed for safe and reliable containment and storage of high-level radioactive wastes. The design and safety features of these tanks are discussed including: architecture; structure; primary and secondary tanks; reinforced concrete tank; tank dome penetrations; processing and transfer facilities; piping; auxiliary equipment; pumps; slurry distributors; and ventilation. (DC)

1399 (ARH-CD--549) FUNCTIONAL DESIGN CRITERIA ADDITIONAL HIGH-LEVEL WASTE HANDLING AND STORAGE FACILITIES. Tanaka, K.H. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). 1 Mar 1976. Contract EY-77-C-06-1030. 14p. Dep. NTIS, PC A02/MF A01.

Four one-million-gallon underground tanks will be constructed for safe and reliable containment and storage of high-level radioactive wastes. Transfer facilities and encased, insulated, and heat traced piping will provide transport connections to the existing evaporator-crystallizer and storage tank systems. Flushing facilities and associated utilities will be provided for tank farm operation. The tank, pumping, and ventilation equipment and controls will be provided with instrumentation and alarms. Instrumentation will monitor the waste and facilities to detect high temperatures, waste levels, radiation, and process leakages. Gaseous radioactive containment will be provided by the high efficiency ventilation filtration. The tank farm facilities will provide personnel radiation protection.

1400 (ARH-CD--719) OPERATIONAL SAFETY ANALYSIS REPORT: DOUBLE-SHELL WASTE STORAGE TANKS. Mirabella, J.E.; Willis, N.P. (Atlantic Richfield Hanford Co., Richland, WA (USA)). 20 May 1977. Contract EY-77-C-06-1030. 65p. Dep. NTIS, PC A04/MF A01.

RADIOACTIVE WASTE STORAGE;TANKS;SAFETY; ACCIDENTS;STORAGE FACILITIES;TORNADOES; RADIATION DOSES

1401 (ARH-CD--743-4Q) RADIOACTIVE LIQUID WASTES DISCHARGED TO GROUND IN THE 200 AREAS DURING 1976. Mirabella, J.E. (Atlantic Richfield Hanford Co., Richland, WA (USA)). 9 May 1977. Contract AC06-77RL01030. 229p. NTIS, PC A11/MF A01.

An overall summary is presented giving the radioactive liquid wastes discharged to ground during 1976 and since startup (for both total and decayed depositions) within the Production

and Waste Management Division control zone (200 Area plateau). Overall summaries are also presented for 200 East Area and for 200 West Area. The data contain an estimate of the radioactivity discharged to individual ponds, cribs and specific retention sites within the Production and Waste Management Division during 1976 and from startup through December 31, 1976; an estimate of the decayed activities from startup through 1976; the location and reference drawings of each disposal site; and the usage dates of each disposal site. The estimates for the radioactivity discharged and for decayed activities dicharged from startup through December 31, 1976 are based upon Item 4 of the Bibliography. The volume of liquid discharged to the ponds also includes major nonradioactive streams. The wastes discharged during 1976 to each active disposal site are detailed on a month-to-month basis, along with the monthly maximum concentration and average concentration data. An estimate of the radioactivity discharged to each active site along with the remaining decayed activities is given.

1402 (ARH-CD--745) INPUT AND DECAYED VALUES OF RADIOACTIVE LIQUID WASTES DISCHARGED TO THE GROUND IN THE 200 AREAS THROUGH 1975. Anderson, J.D. (Atlantic Richfield Hanford Co., Richland, WA (USA)). 8 Jul 1976. Contract AC06-77RL01030. 61p. NTIS, PC A04/MF A01.

Low and intermediate level liquid wastes from chemical separations processing of spent reactor fuel elements have been discharged to the ground in the 200-Areas since 1944. Large volumes of process cooling water, normally free of radioactive contaminants, are discharged to surface ditches or natural surface depressions (ponds). Lesser volumes of liquid waste such as steam condensates; process condensates; scavenged process waste supernatants, and plutonium processing wastes have been, or are being discharged to subsurface disposal sites (cribs). Only input volumes and radioactivity discharged to each disposal site have been reported periodically.

1403 (BARC--947) STUDY OF SEEPAGE BENEATH A MODEL WASTE DISPOSAL CRIB. Umesh Chandra; Balu, K.; Nagaraja, S.H.; Panikar, J.T. (Bhabha Atomic Research Centre, Bombay (India)). 1978. 27p. Dep. NTIS (US Sales Only), PC A04/MF A01.

For the proper evaluation of the safety aspects of disposal of radioactive liquid wastes through cribs, it is necessary to know seepage of liquid and total discharge beneath a crib. With this objective in view, seepage of liquid and total discharge beneath a model waste disposal crib has been studied taking into consideration the various parameters, namely, permeability of the subsurface strata; boundaries of the waste disposal site; depth and slope of the rock; water table - its depth, slope and fluctuations; level of liquid wastes in the crib and dimensions of the crib. Three approaches, namely, analytical, numerical and analog model simulations have been followed in the study. Exact analytical solution developed by using Schwarz-Christoffel transformation to compute discharge revealed the significant effect of crib width on discharge. Curves thus obtained are useful in predicting the discharge from a crib. Potential lines and stream lines (flownets) constructed theoretically by solving boundary value problem numerically using the computer code POTAL help in establishing migration route of the pollutants. Numerical results of the flownets compare reasonably well with the experimentally observed plots. Conductive liquid model based on electrical analogy and Hele-Shaw model based on viscous flow analogy were set up in the laboratory experimentally to determine the flow nets and discharge, after simulating the field conditions in the model. The study is, however, more useful in a homogeneous viz., sandy aquifer, as there is a limitation to simulate varying permeability in a heterogeneous strata. Hele-Shaw model study reveals that for a given condition of the initial water table, the slope of the impervious bed has negligible effect on discharge and free surface slopes.

1404 (BNL--26455) STRAIN RELATED RADIATION DAMAGE MEASUREMENTS IN ROCK SALT FOR WASTE DISPOSAL APPLICATIONS. QUARTERLY REPORT, APRIL 1, 1979-JUNE 30, 1979. Swyler, K.J.; Teutonico, L.J.; Levy, P.W. (Brookhaven National Lab., Upton, NY (USA)). 10 Jul 1979. Contract EY-76-C-02-0016. 23p. (ONWI/Sub--78/E511-01000-8). Dep. NTIS, PC A02/MF A01.

Radiation damage in natural rock salt, synthetic NaCl crystals, and other minerals of interest for radioactive waste disposal application was studied. The following topics were covered: (1) temperature dependence of radiation induced F-center formation in rock salt from drill hole AEC-8, (2) temperature dependence of the radiation induced colloid formation in AEC-8 rock salt, (3) thermally induced colloid formation, (4) radiation induced colloid and color-center formation in different regions of non-uniformly colored crystals, (5) comment on differences in colloid formation between natural and synthetic rock salt, and (6) theoretical studies on dislocations in rock salt. (DMC)

1405 (BNL--26555) RECENT RADIATION EFFECT STUDIES ON NATURAL AND SYNTHETIC ROCK SALT FOR WASTE DISPOSAL APPLICATIONS. Swyler, K.J.; Klaffky, R.W.; Levy, P.W. (Brookhaven National Lab., Upton, NY (USA)). 1979. Contract EY-76-C-02-0016. 5p. Dep. NTIS, PC A02/MF A01.

The spectra (F band and colloid band) of irradiated synthetic rock salt were studied. Differences between synthetic and natural salt were found and are discussed. (DLC)

1406 (BNL--26931) STRAIN RELATED RADIATION DAMAGE MEASUREMENTS IN ROCK SALT FOR WASTE DISPOSAL APPLICATIONS. QUARTERLY REPORT, JULY 1-SEPTEMBER 30, 1979. Swyler, K.J.; Teutonico, L.J.; Levy, P.W. (Brookhaven National Lab., Upton, NY (USA)). 10 Oct 1979. Contract EY-76-C-02-0016. 26p. (ONWI/Sub--78/E511-01000-11). Dep. NTIS, PC A03/MF A01.

Radiation damage in natural rock salt, synthetic NaCl crystals, and other minerals of interest for radioactive waste disposal application was studied. The following topics were covered: (1) the role of strain applied prior to irradiation on the radiation-induced defect formation in natural rock salt from Drill Hole AEC-8, (2) studies to determine why synthetic and natural rock salt exhibit different radiation damage characteristics, (3) new yield point measurements on Alt Aussee natural rock salt, and (4) theoretical studies on the role of dislocations in the nucleation of colloidal sodium particles in the irradiated rock salt. (DC)

1407 (BNL--27841) RADIATION DAMAGE MEASUREMENTS ON ROCK SALT AND OTHER MINERALS FOR WASTE DISPOSAL APPLICATIONS. QUARTERLY REPORT, JANUARY 1, 1980-MARCH 31, 1980. Swyler, K.J.; Loman, J.M.; Teutonico, L.J.;

Elgort, G.E.; Levy, P.W. (Brookhaven National Lab., Upton, NY (USA)). 10 Apr 1980. Contract AC02-76CH00016. 31p. (ONWI/Sub--78/E511-01000-17). NTIS, PC A03/MF A01.

Different aspects of radiation damage in both synthetic NaCl crystals and various natural rock salt samples as well as granite, basalt and other minerals which will be important for radioactive waste disposal applications are being investigated. The principal means of measuring radiation damage is the determination of F-center concentrations, and the concentration and size of sodium metal colloid particles. Formation of these and other defects during irradiation and the annealing of defects and characterization of other processes occurring after irradiation are being studied as a function of dose rate, total dose, sample temperature during irradiation, strain applied prior to and during irradiation, etc. Measurements are being made on synthetic NaCl and natural rock salt samples from different geological locations, including some potential repository sites. It will be necessary to determine if radiation damage in the minerals from different localities is similar. If non-negligible differences are observed a detailed study must be made for each locality under consideration. Almost all current studies are being made on rock salt but other minerals particularly granite and basalt are being phased into the program. It is now established that radiation damage formation in both natural and synthetic rock salt is strongly dependent on strain. The strain related effects strongly indicate that the damage formation processes and in particular the colloid nucleation processes are related to the strain induced disolcations. A temporary theoretical effort has been started to determine which dislocation related effects are important for radiation damage processes and, most importantly, what dislocation interactions are most likely to create nucleation sites for colloid particles. If these preliminary studies indicate that additional theoretical studies will be useful an effort will be made to have them extended.

1408 (BNL-NUREG--27235) CHARACTERIZATION OF ORGANICS IN LEACHATES FROM LOW-LEVEL RADIOACTIVE WASTE DISPOSAL SITES. Francis, A.J.; Iden, C.R.; Nine, B.; Chang, C. (Brookhaven National Lab., Upton, NY (USA); State Univ. of New York, Stony Brook (USA)). 1979. Contract EY-76-C-02-0016. 18p. (CONF-790602--93). Dep. NTIS, PC A02/MF A01.

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

Low-level radioactive wastes generated by the nuclear industry, universities, research institutions, and hospitals are disposed of in shallow-land trenches and pits. In 1962 the first commercial disposal site was opened in Beatty, Nevada. Since then, the industry has grown to include three private companies operating six disposal areas located in sparsely populated areas: at Maxey Flats (Morehead), Kentucky; Beatty, Nevada; Sheffield, Illinois; Barnwell, South Carolina; West Valley, New York; and Richland, Washington. Although the facilities are operated by private industry, they are located on public land and are subject to federal and state regulation. Although inventories of the radioactive materials buried in the disposal sites are available, no specific records are kept on the kinds and quantities of organic wastes buried. In general, the organic wastes consist of contaminated paper, packing materials, clothing, plastics, ion-exchange resins, scintillation vials, solvents, chemicals, decontamination fluids, carcasses of experimental animals, and solidification agents. Radionuclides such as ^{14}C, ^{3}H, ^{90}Sr, ^{134} ^{137}Cs, ^{60}Co, ^{241}Am, and ^{238} ^{239} ^{240}Pu have been identified in leachate samples collected from several trenches at Maxey Flats and West Valley. The purpose of this report is to identify some of the organic compounds present in high concentrations in trench leachates at the disposal sites in order to begin to evaluate their effect on radionuclide mobilization and contamination of the environment.

1409 (CEA-R--4937) GEOCHEMICAL ASPECT FOR THE EVALUATIONS OF RADIOELEMENTS TRANSFERS IN SUBTERRANEAN POROUS MEDIA. Rancon, D. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Dept. de Protection). Oct 1978. 46p. (In French). Dep. NTIS (US Sales Only), PC A03/MF A01.

Radiological safety studies upon radioactivity transfers in soils and subterranean waters need geochemical studies to evaluate the retention of radionuclides by the solid matrix of porous media. The interaction between radionuclides water and substratum allow determination of the retention term in the transfer equation and estimation of relative speeds of the pollutant and the water which carries it. The retention, characterized by the distribution coefficient or by the soption isotherms, can be due to several mechanisms: precipitation, adsorption, ions exchange which have to be determined because they introduce the important concepts of reversibility, irreversible fixation and saturation. Retention is a function of various factors which can have a great influence: temperature, nature and texture of the solid, composition and pH of the solution, presence of complexing agent. This report is illustrated by original examples chosen among well know elements (Cs, Sr) and mainly among less studied elements (Co, Ba, Ra, U, Th, Np, Pu). Recommendations are proposed to make these transfer measurements more realistic and more adapted to the natural conditions of subterranean media.

1410 (CONF-790420--, pp 4-8) MATERIALS ASPECTS OF NUCLEAR WASTE DISPOSAL IN CANADA. Cameron, D.J.; Strathdee, G.G. (Whiteshell Nuclear Research Establishment, Pinawa, Manitoba). May 1979.

From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).

The concept of disposal of nuclear waste in a deep, hard-rock vault raises a number of questions concerning the behavior of materials. The man-made materials under consideration are the waste form, engineered containment, and the buffer and backfill materials. The general approach to developing each of these barriers is presented.

1411 (CONF-790420--, pp 47-51) GLASSY AND CRYSTALLINE HIGH-LEVEL NUCLEAR WASTE FORMS: AN ATTEMPT AT CRITICAL EVALUATION. Lutze, W. (Hahn-Meitner-Institut fuer Kernforschung GmbH, Berlin, Germany). May 1979.

From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).

Pros and cons of glassy and crystalline nuclear waste forms are discussed. An evaluation is given in terms of technological simplicity and safety-relevant product properties, i.e., thermal, chemical, mechanical, and radiation stability, showing that glasses are the first choice and

alternatives are either the backup solution or second-generation products.

1412 (CONF-790420--, pp 66-72) CHARACTERIZATION AND EVALUATION OF MULTIBARRIER NUCLEAR WASTE FORMS. Rusin, J.M.; Lokken, R.O.; Wald, J.W. (Battelle Pacific Northwest Labs., Richland, WA). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Four multibarrier concepts using coatings and metal matrices were developed and demonstrated on a 1-liter scale. The effect of volatility, leachability, and impact resistance on product integrity is discussed. Results of radiation stability tests are also included.

1413 (CONF-790420--, pp 238-242) EVALUATION OF LONG-TERM LEACHING OF BOROSILICATE GLASS IN PURE WATER. Lanza, F.; Parnisari, E. (CEC, Joint Research Centre, Ispra, Italy). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
In order to confirm the validity of the model of the dissolving sphere, a series of tests of leaching of borosilicate glasses has been performed. The leaching rate is followed by measurements of weight loss and analysis of the surface composition. An accumulation at the surface of the less soluble cations is observed.

1414 (CONF-790420--, pp 243-247) DEVELOPMENT OF ALUMINOSILICATE AND BOROSILICATE GLASSES AS MATRICES FOR CANDU HIGH-LEVEL WASTE. Strathdee, G.G.; McIntyre, N.S.; Taylor, P. (Atomic Energy of Canada Ltd., Pinawa, Manitoba). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
This paper covers the results of analyses of two radioactive nepheline syenite glass blocks recovered from in-ground leaching experiments at the Chalk River Nuclear Laboratories. Current research on borosilicate glasses for immobilization of high-level waste is also described.

1415 (CONF-790420--, pp 248-255) LEACHING OF RADIOACTIVE WASTE STORAGE GLASSES. Boult, K.A.; Dalton, J.T.; Hall, A.R.; Hough, A.; Marples, J.A.C. (Atomic Energy Research Establishment, Harwell, England). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Results are reported of leach tests under various conditions on glass compositions proposed for the vitrification of the highly radioactive waste from the reprocessing of Magnox fuel. Among the variables studies are waste composition, glass devitrification, the source and pH of the water, temperature, and radiation dose to the glass.

1416 (CONF-790420--, pp 256-262) CORROSION BEHAVIOR OF ZINC BOROSILICATE SIMULATED NUCLEAR WASTE GLASS. Clark, D.E.; Yen-Bower, E.L.; Hench, L.L. (Univ. of Florida, Gainesville). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
The corrosion behavior of a zinc borosilicate glass containing simulated nuclear wastes (SNWG) is evaluated in acidic, neutral, and basic solutions. Auger electron spectroscopy coupled with argon ion milling (AES-IM) and infrared reflection spectroscopy (IRRS) coupled with sequential polishing are used to determine the depth of the leached layers. Leaching rates based on solution analyses are calculated for several species including cesium and strontium. The leaching rates of some species from the glass are at least an order of magnitude greater in acidic than in neutral and basic solutions. Scanning electron microscopy in conjunction with energy dispersive X-ray spectroscopy (SEM-EDS) is used to monitor surface morphological changes that accompany glass corrosion.

1417 (CONF-790420--, pp 263-268) CHEMICAL DURABILITY OF NUCLEAR WASTE GLASSES. Simmons, J.H.; Barkatt, A.; Macedo, P.B.; Pehrsson, P.E.; Simmons, C.J.; Barkatt, A.; Tran, D.C.; Sutter, H.; Saleh, M. (Catholic Univ. of America, Washington, DC). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Test methods are presented for the measurement of chemical durability of glass media proposed for nuclear waste fixation. The release rates of individual components are measured to determine matrix dissolution rates, possible transport of components through the matrix, and the corrosion mechanism. Measurement on a model glass, a borosilicate, and a high-silica glass fixation medium are reported. The extrapolation of short-term laboratory tests to long-time storage is discussed, and the essential parameters for accurate long-term predictions are determined and evaluated.

1418 (CONF-790420--, pp 269-273) CHEMICAL DURABILITY AND CHARACTERIZATION OF NUCLEAR WASTE FORMS IN A HYDROTHERMAL ENVIRONMENT. Braithwaite, J.W.; Johnstone, J.K. (Sandia Labs., Albuquerque, NM). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
The chemical durability of a simulated copper borosilicate waste glass and titanate waste ceramic has been studied in hydrothermal environments which could possibly be encountered in a bedded salt or sub-sealed waste isolation repository. The major parameters investigated which affect matrix corrosion and cesium solubilization include solution saturation and equilibrium phenomena, solution composition (especially the Mg^{+2} ion concentration), pH, particle size, temperature, and time.

1419 (CONF-790420--, pp 274-276) HYDROTHERMAL STABILITY OF SPENT FUEL AND HIGH-LEVEL WASTE CERAMICS IN THE GEOLOGIC REPOSITORY ENVIRONMENT. McCarthy, G.J.; White, W.B.; Komarneni, S.; Scheetz, B.E.; Freeborn, W.P.; Smith, D.K. (Pennsylvania State Univ., University Park). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
The stability trends for four simulated waste forms (stent fuel, a reference glass, a supercalcine ceramic) under hydrothermal conditions (100 to 300°C; 400°C for the coated ceramic; 300 bars) with solutions alone and in contact with basalt and shale are summarizd. 2 tables.

1420 (CONF-790420--, pp 277-283)
DEVITRIFICATION AND LEACHING EFFECTS IN HLW GLASS: COMPARISON OF SIMULATED AND FULLY RADIOACTIVE WASTE GLASS. Wald, J.W.; Westsik, J.H. Jr. (Battelle Pacific Northwest Labs., Richland, WA). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
A detailed examination of four fully radioactive nuclear waste glass compositions has been conducted and includes microstructural characterization and leaching behavior. All results have indicated that the fully radioactive glasses are quite stable under the temperature conditions studied, and their behavior can be typified by nonradioactive products of similar compositions. 2 figures, 6 tables.

1421 (CONF-790420--, pp 284-288) LONG-TERM LEACH RATES OF GLASSES CONTAINING ACTUAL WASTE. Wiley, J.R.; LeRoy, J.H. (E.I. du Pont de Nemours and Co., Aiken, SC). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
Leach rates of borosilicate glasses that contained actual Savannah River Plant waste were measured. Leaching was done by water and by buffer solutions of pH 4, 7, and 9. Leach rates were then determined from the amount of ^{137}Cs, ^{90}Sr, and plutonium released into the leach solutions. The cumulative fractions leached were fit to a mathematical model that included leaching by diffusion and glass dissolution. 5 figures, 3 tables.

1422 (CONF-790420--, pp 349-353) IODIDE AND IODATE SODALITES FOR THE LONG-TERM STORAGE OF IODINE-129. Strachan, D.M.; Babad, H. (Rockwell Hanford Operations, Richland, WA). May 1979.
From International symposium on ceramics in nuclear waste management; Cincinnati, OH, USA (30 Apr 1979).
There exist several proposals for the storage of ^{129}I. None of these propose the use of a mineral with demonstrated geologic stability. The work described in this paper has identified the minerals iodide and iodate sodalites [$Na_8(AlSiO_4)_6I_2/(IO_3)_2$] as good candidates for the long-term storage of ^{129}I. 4 tables.

1423 (CONF-790881--1) MAGNETIC SUSCEPTIBILITY OF SODIUM DISILICATE GLASSES CONTAINING PuO_2. Aldred, A.T. (Argonne National Lab., IL (USA)). 1979. Contract W-31-109-ENG-38. 12p. Dep. NTIS, PC A02/MF A01.
From 5. university conference on glass science: electrical, magnetic and optical properties of glass; Troy, NY, USA (22 Aug 1979).
A solubility limit of approx. 6 mol % PuO_2 in sodium disilicate ($Na_2O.2SiO_2$) glass has been determined. Magnetic susceptibility measurements on these glasses yield approximate Curie-Weiss behavior, in contrast to the temperature-independent susceptibility of crystalline PuO_2. This result is interpreted to indicate that the local site symmetry around the Pu ion in the sodium disilicate glass is much different than in crystalline PuO_2. The effective paramagnetic moments determined from the temperature dependence of the susceptibility are found to be consistent with calculated free-ion values based on the most likely 5f electron configurations.

1424 (CONF-790938--5) UNITED STATES NATIONAL WASTE TERMINAL STORAGE ARGILLACEOUS ROCK STUDIES. Brunton, G.D. (Oak Ridge National Lab., TN (USA)). 1979. Contract W-7405-ENG-26. 6p. Dep. NTIS, PC A02/MF A01.
From Workshop on the use of argillaceous materials for the isolation of radioactive wastes; Paris, France (10 Sep 1979).
The past and present argillaceous rock studies for the US National Waste Terminal Storage Program consist of: (1) evaluation of the geological characteristics of several widespread argillaceous formations in the United States; (2) laboratory studies of the physical and chemical properties of selected argillaceous rock samples; and (3) two full-scale in-situ surface heater experiments that simulate the emplacement of heat-generating radioactive waste in argillaceous rock.

1425 (CONF-790938--6) INVESTIGATION OF THE REGIONAL CHARACTERISTIC OF THE DEVONIAN SHALES FOR THE STORAGE/DISPOSAL OF RADIOACTIVE WASTES. Lomenick, T.F.; Laughon, R.B. (Oak Ridge National Lab., TN (USA); Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation). 1979. Contract W-7405-ENG-26. 6p. Dep. NTIS, PC A02/MF A01.
From Workshop on the use of argillaceous materials for the isolation of radioactive wastes; Paris, France (10 Sep 1979).
Devonian-age shales underlie a large portion of the northeastern quadrant of the country and are abundantly thick and relatively near to the land surface within the Appalachian, Illinois and Michigan basins of that area. Although these thick accumulations of argillaceous sediments are best-known for their natural gas production and potential, they would also appear to be good candidate rocks for radioactive waste repositories as the shale is generally impermeable, and therefore, relatively free of circulating ground waters to disperse any waste emplacements.

1426 (CONF-791103--42) SUBSURFACE-MIGRATION STUDIES AT THE RADIOACTIVE WASTE MANAGEMENT COMPLEX, IDAHO. Humphrey, T.G. (EG and G Idaho, Inc., Idaho Falls (USA)). 1979. Contract EY-76-C-07-1570. 16p. Dep. NTIS, PC A02/MF A01.
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
Based on core drilling and subpit data, it appears that radionuclide migration has been restricted to a few centimeters below the waste and apparently poses no hazard to the Snake River Plain aquifer. Preliminary results of the modeling study tend to support this conclusion. The model does indicate, however, that some migration to the surface will occur over long periods of time.

1427 (CONF-791103--98) INTERRELATION OF SHORT-TERM LEACH TESTS AND LONG-TERM LEACHING. Compere, E.L.; Godbee, H.W. (Oak Ridge National Lab., TN (USA)). 1979. Contract W-7405-ENG-26. 6p. Dep. NTIS, PC A02/MF A01.
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
A standard leach test must permit accumulation of sufficient data to determine material parameters, such as figures of merit (FOMs) in a short time. Leach test results should be extended to other sizes, longer times, other temperatures, and other leaching solutions. This paper provides insights into the complexities in interpreting leach tests. (DLC)

1428 (CONF-791112--24) ENVIRONMENTAL EFFECTS FROM DISPOSAL OF DEFENSE HIGH-LEVEL RADIOACTIVE WASTES IN A GENERIC GEOLOGIC REPOSITORY. Chipman, N.; Simpson, G.; Rodger, W.; Frendberg, R.; Lawroski, H. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA); Nuclear Safety Associates, Bethesda, MD (USA)). 1979. Contract EY-76-C-07-1570. 7p. Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

High-level radioactive wastes generated during the reprocessing of defense-related nuclear fuels are presently stored as calcined solids at the Idaho Chemical Processing Plant (ICPP). This method of handling nuclear waste has proved to be both safe and cost effective. However, for permanent disposal, the waste form and/or disposal location may need to be altered. Many plans for nuclear waste management can be advanced; however, the preferered alternatives for the ICPP waste are in these general categories: (1) Continue current operations, (2) Modify the waste form and dispose at the Idaho National Engineering Laboratory (INEL), (3) Modify the waste form and dispose at an off-site geologic repository, (4) Remove actinides from the waste, dispose of the actinide-depleted waste at the INEL, and dispose of the acitinide waste at an off-site geologic repository. The environmental impacts of disposing of the waste at the INEL and transporting it to an off-site repository have been previously reported. The radiological consequences of disposing of the wastes in a generic geologic repository are reported here. The calculations are based on the scenarios used in the preparation of the Draft Environmental Impact Statement; Management of Commerically Generated Radioactive Waste. Calculations were completed for both the calcine and glass waste forms. Calcine will be stabilized by a heating process to remove residual nitrates and/or water; all other properties remain the same. The glass waste form has two sub-options, the actinide fraction of the waste made into a glass, and the calcine made into a glass.

1429 (CONF-791112--28) CONTROL OF RADIONUCLIDE MIGRATION IN SOIL BY THE APPLICATION OF DC ELECTRIC CURRENT. Case, F.N.; Cutshall, N.H. (Oak Ridge National Lab., TN (USA)). 1979. Contract W-7405-ENG-26. 5p. Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

Shallow land burial in humid regions as a disposal method for low-level solid waste provides the potential for water-driven migration of leachable radionuclides present in the waste. A number of methods to control this migration have been suggested and studied. One such method involves the use of a dc electric current to move ions countercurrent to the water flow. Laboratory studies using trays of soil indigenous to the Oak Ridge National Laboratory (ORNL) low-level burial grounds have shown ^{137}Cs, ^{90}Sr, and ^{99}Tc ions can be moved countercurrent to a water flow using small dc currents of 20 mA at 40 volts. A field test of the method has been under way for over one year in an ORNL low-level waste disposal area. Results of the field test are given in this paper.

1430 (CONF-791112--45) GENERAL CRITERIA FOR RADIOACTIVE WASTE DISPOSAL. Maxey, M.N.; Musgrave, B.C.; Watkins, G.B. (Detroit Univ., MI (USA); Idaho National Engineering Lab., Idaho Falls (USA); New York State Dept. of Health, Albany (USA)). 1979. Contract EY-76-C-07-1570. 6p. Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

Techniques are being developed for conversion of radioactive wastes to solids and their placement into repositories. Criteria for such disposal are needed to assure protection of the biosphere. The ALARA (as low as reasonably achievable) principle should be applicable at all times during the disposal period. Radioactive wastes can be categorized into three classes, depending on the activity. Three approaches were developed for judging the adequacy of disposal concepts: acceptable risk, ore body comparison, and three-stage ore body comparison. (DLC)

1431 (CONF-791112--49) RADIOLYTIC OXIDATION AND REDUCTION OF PLUTONIUM. Fried, S.; Friedman, A.; Sullivan, J.C.; Nash, K.; Cohen, D.; Sjoblom, R. (Argonne National Lab., IL (USA)). 1979. Contract W-31-109-ENG-38. 23p. Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

It has been shown on several occasions that all other things being equal, the rate of migration of plutonium through an aquifer is greatly influenced by its oxidation state. It is a reasonable expectation that other actinides exhibiting multiple oxidation states will behave similarly. By and large the more highly charged ions in solution move through rock strata more slowly than those of lesser charge. Thus for comparative experiments on the relative migration rates of Pu(IV) and Am(III) one would expect Pu(III) to move about 10 times faster than Pu(IV) and it has been shown that PuO_2^{2+} moves about 250 times more rapidly than Pu(IV). Since one of the more important parameters of safety assessment is radionuclide migration rate it can be seen that it becomes important to know the oxidation states of radionuclides (actinides for the purpose of this report) existing in possible leachates from the material originally emplaced in a repository. It was with this in mind that a study of the intrinsic stability of plutonium oxidation states in ground water solutions was undertaken. One of the most prominent proposals for a waste repository in WIPP (Waste Isolation Pilot Project) which intends to utilize bedded salt strata as the isolating medium. Ground water in that context is saturated brine and is made up to specifications issued by Sandia Laboratories and designated as Solution A. The net result of these series of reactions is that plutonium may undergo a cycle of oxidation and reduction. This is a composite effect since it is the sum of radiolytic oxidation and reduction and disproportionation and reproportionation reactions. The period of the cycle must depend on concentration of Pu, radiation field intensity, pH of solution, temperature, and formation of complexes. Thus the migration characteristics of all of the oxidation states of Pu (with the possible exception of Pu(VII) will have to be considered.

1432 (CONF-791112--52) MEASUREMENT OF PENETRATION DEPTHS OF PLUTONIUM AND AMERICIUM IN SEDIMENT FROM THE OCEAN FLOOR. Fried, S.; Friedman, A.; Hines, J.; Sjoblom, R.; Schmitz, G.; Schreiner, F. (Argonne National Lab., IL (USA)). 1979. Contract W-31-109-ENG-38. 17p. Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

The clay-like sediment covering the ocean floor constitutes the last barrier that shields

the biosphere from contamination by radionuclides stemming from the nuclear wastes of a subseabed repository. In the event of a failure of the engineered barriers the mobility of the released radionuclides in the sediment determines the rate and the extent of entry into the water of the ocean. The initial results of measurements designed to determine the mobility of transuranium elements in sediment from the ocean floor are presented. Data indicate very low migration rates and imply strong chemisorptive interaction with the sediment.

1433 (CONF-791112--58) CHEMICAL REACTIONS IN THE BEDROCK-GROUNDWATER SYSTEM OF IMPORTANCE FOR THE SORPTION OF ACTINIDES. Beall, G.W.; Allard, B.; Krajewski, T.; O'Kelley, G.D. (Oak Ridge National Lab., TN (USA)). 1979. Contract W-7405-ENG-26. 7p. Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

Most suggested alternatives for deep underground disposal of high-level radioactive wastes rely upon several independent barriers like resistant canister materials, waste forms of low solubility in groundwaters and the use of back-fill material of low permeability and with nuclide retaining capacity. These barriers would retard the eventual release of radionuclides from the repository into the groundwater/bedrock system. The final and the only non-engineered barrier would be the host-rock itself. It would be desirable if the rock alone would be able to retain the long-lived radionuclides coming from the waste for long enough times to allow decay to harmless activity levels before they might reach the biosphere. The biological hazards from high-level reprocessng waste as well as from unreprocessed spent uranium fuel are dominated by the actinides and their daughter products (americium, plutonium, neptunium, thorium, radium) from about three hundred years after discharge from the reactor up to millions of years. In order to allow predictions of the migration of the actinides in the ground, the chemical behavior of these elements in groundwater under environmental conditions and their interactions with geologic media must be studied in detail. In this paper, studies of the sorption of americium (trivalent) and neptunium (pentavalent under oxic conditions) on some major rock-forming minerals of igneous rocks and accessory minerals are reported.

1434 (CONF-800313--1) RISK EVALUATIONS OF TRANSURANIC WASTE AT THE IDAHO NATIONAL ENGINEERING LABORATORY. Smith, T.H.; Keneshea, F.J. (EG and G Idaho, Inc., Idaho Falls (USA); Nuclear Services Corp., Campbell, CA (USA)). 1980. Contract EY-76-C-07-1570. 38p. Dep. NTIS, PC A03/MF A01.

From Waste management conference; Tucson, AZ, USA (10 Mar 1980).

Approximately 75% of the defense low-level transuranic (TRU) waste stored in the United States and 25% of the buried TRU waste is located at the Idaho National Engineering Laboratory (INEL). Studies have been performed to identify and evaluate technical alternatives for the long-term management of this waste. (The alternatives range from leaving the waste in place as is to reviewing, processing, and shipping it to an offsite geological repository.) Among the evalations that have been performed were preliminary risk evaluations. The dose commitment and risk of hypothetical, near-term, accidental or uncontrolled releases of radionuclides have been evaluated for each alternative. The following potential causes of radionuclide release have been studied: process and handling accidents, shipping accidents, natural events (e.g., earthquakes), man-caused events (e.g., airplane crashes), and future intrusion by individuals or small populations after loss of societal control over the waste. The hypothetical releases have been evaluated, in terms of dose commitment and (if pertinent) probability and risk, for all operational steps making up each concept. The dominant scanerios in terms of near-term risk are (1) lava flow up through or over the waste, leading to airbone releases; (2) an explosion or a criticality accident in the waste-processing facility; and (3) a tornado strike or a fire during waste retrieval. The dominant long-term releases are (1) volcanic action; and (2) intrusion of people on the waste site.Although substantial dose commitments to individual members of the public were calculated for the lava flow and intrusion scenarios, no prompt health effects would be expected from the exposures. The effects would be in the form of a slightly increased likelihood of latent cancer induction.

1435 (CONF-800334--3) ADVANCED BIOLOGICAL TREATMENT OF AQUEOUS EFFLUENT FROM THE NUCLEAR FUEL CYCLE. Pitt, W.W. Jr.; Hancher, C.W.; Patton, B.D.; Shumate, S.E. II. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 15p. Dep. NTIS, PC A02/MF A01.

From 2. DOE environmental control symposium; Reston, VA, USA (17 Mar 1980).

Many of the processing steps in the nuclear fuel cycle generate aqueous effluent streams bearing contaminants that can, because of their chemical or radiological properties, pose an environmental hazard. Concentration of such contaminants must be reduced to acceptable levels before the streams can be discharged to the environment. Two classes of contaminants, nitrates and heavy metals, are addressed in this study. Specific techniques aimed at the removal of nitrates and radioactive heavy metals by biological processes are being developed, tested, and demonstrated. Although cost comparisons between biological processes and current treatment methods will be presented, these comparisons may be misleading because biological processes yield environmentally better end results which are difficult to price. The fluidized-bed biological denitrification process is an environmentally acceptable and economically sound method for the disposal of nonreusable sources of nitrate effluents. A very high denitrification rate can be obtained in a FBR as the result of a high concentration of denitrification bacteria in the bioreactor and the stagewise operation resulting from plug flow in the reactor. The overall denitrification rate in an FBR ranges from 20- to 100-fold greater than that observed for an STR bioreactor. It has been shown that the system can be operated using Ca^{2+}, Na^{+}, or NH_4^{+} cations at nitrate concentrations up to 1 g/liter without inhibition. Biological sorption of uranium and other radionuclides (particularly the actinides) from dilute aqueous waste streams shows considerable promise as a means of recovering these valuable resources and reducing the environmental impact, however, further development efforts are required.

1436 (CONF-800416--1) CHEMICAL TREATMENTS OF SOIL TO DECREASE RADIOSTRONTIUM LEACHABILITY. Spalding, B.P. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 22p. Dep. NTIS, PC A02/MF A01.

From UCC-ND and GAT waste management seminar program; Portsmouth, OH, USA (22 Apr 1980).

The ready leachability of radiostrontium from radioactive waste is one of the most salient problems with shallow-land burial as a disposal method. The continuous leaching of buried waste at the Oak Ridge National Laboratory, for periods up to thirty years, has led to contamination of significant volumes of soil with ^{90}Sr. The goal of the present investigation was to evaluate methods to effect the in situ fixation or decrease the leachability of ^{90}Sr from soil. Small columns of three soils, collected from the solid waste disposal areas at ORNL, were labelled with ^{85}Sr as a convenient tracer for ^{90}Sr. After this labelling but prior to leaching, the soil columns were percolated with equivalent amounts of sodium salt solutions of hydroxide, fluoride, carbonate, phosphate, silicate, or aluminate. Leaching was then initiated with 0.1 N $CaCl_2$ (calcium chloride), and fractions of the leachate were analyzed for ^{85}Sr. The $CaCl_2$ solution was selected to qualitatively simulate groundwater which contains Ca as the dominant dissolved cation. With two soils which were high in indigenous exchangeable Ca, only 30 to 35% of the ^{85}Sr could be leached from the carbonate-treated columns. Presumably, the ^{85}Sr was coprecipitated with the nascent $CaCO_3$ formed during this treatment. In contrast, greater than 98% of the ^{85}Sr was readily leached from all untreated soils. Other anions fixed variable but generally less ^{85}Sr than the carbonate treatment. Thus, sodium carbonate appears to have potential application to immobilize ^{90}Sr in situ in contaminated soil.

1437 (CONF-800607--6) LONG-TERM SUBSURFACE MIGRATION OF RADIONUCLIDES FROM BURIED INEL TRANSURANIC WASTE. Humphrey, T.G.; Smith, T.H. (EG and G Idaho, Inc., Idaho Falls (USA)). 1980. Contract EY-76-C-07-1570. 12p. Dep. NTIS, PC A02/MF A01.

From American Nuclear Society annual meeting; Las Vegas, NV, USA (8 Jun 1980).

Studies have been conducted to project long-term subsurface migration of radionuclides from transuranic (TRU-contaminated solid waste buried at the Idaho National Engineering Laboratory (INEL). Projections are given for several conceptual methods of waste confinement.

1438 (CONF-800607--80) EQUIPMENT DESIGNS FOR THE SPENT LWR FUEL DRY STORAGE DEMONSTRATION. Steffen, R.J.; Kurasch, D.H.; Hardin, R.T.; Schmitten, P.F. (Westinghouse Electric Corp., Pittsburgh, PA (USA). Advanced Energy Systems Div.). 1980. Contract AC08-76NV00597. 41p. NTIS, PC A03/MF A01.

From American Nuclear Society annual meeting; Las Vegas, NV, USA (8 Jun 1980).

In conjunction with the Spent Fuel Handling and Packaging Program (SFHPP) equipment has been designed, fabricated and successfully utilized to demonstrate the packaging and interim dry storage of spent LWR fuel. Surface and near surface storage configurations containing PWR fuel assemblies are currently on test and generating baseline data. Specific areas of hardware design focused upon include storage cell components and the support related equipment associated with encapsulation, leak testing, lag storage, and emplacement operations.

1439 (CONF-800611--1) MANAGEMENT OF ALPHA-CONTAMINATED WASTES AT THE RADIOACTIVE WASTE MANAGEMENT COMPLEX AT THE IDAHO NATIONAL ENGINEERING LABORATORY. McCormack, M.A. (EG and G Idaho, Inc., Idaho Falls (USA)). 1980. Contract EY-76-C-07-1570. 3p. Dep. NTIS, PC A02/MF A01.

From International symposium on the management of alpha-contaminated wastes; Vienna, Austria (2 Jun 1980).

Problems related to above ground storage of radioactive wastes at the Idaho National Engineering Laboratory and steps taken to resolve these difficulties are discussed. The quantity of wastes now in storage and the amount forecasted to be in place by 1985 are disclosed. The condition of containers placed for storage between 1954 and 1970 is described. Programs for retrieval and repackaging for shipment to federal repositories are discussed. (DC)

1440 (CONF-800918--3) REMOVAL OF ACTINIDES FROM NUCLEAR REPROCESSING WASTES: A PILOT PLANT STUDY USING NON-RADIOACTIVE SIMULANTS. Maxey, H.R.; McIsaac, L.D.; Chamberlain, D.B.; McManus, G.J. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). 1980. Contract AC07-76ID01570. 11p. NTIS, PC A02/MF A01.

From International solvent extraction conference; Liege, Belgium (6 Sep 1980).

Nuclear fuel reprocessing wastes generated at the ICPP contain small amounts of actinides, primarily Pu and Am. Removal of these actinides reduces the long term storage hazards of the waste. The development of a flowsheet to remove trivalent actinides is discussed in this paper. Pilot plant studies used actinide simulants. As a result of these studies, the Height of a Transfer Unit (HTU) was selected as the better measure of pulse column separation efficiency.

1441 (CONF-800987--1) LEACHING PROPERTIES AND CHEMICAL COMPOSITIONS OF CALCINES PRODUCED AT THE IDAHO CHEMICAL PROCESSING PLANT. Staples, B.A.; Paige, B.E.; Rhodes, D.W.; Wilding, M.W. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). 1980. Contract AC07-79ID01675. 18p. NTIS, PC A02/MF A01.

From Workshop on comparative leaching behavior of radioactive waste forms; Argonne, IL, USA (3 Sep 1980).

No significant chemical differences were determined between retrieved and fresh calcine based on chemical and spectrochemical analyses. Little can be derived from the amounts of the radioisotopes present in the retrieved calcine samples other than the ratios of strontium-90 to cesium-137 are typical of aged fission product. The variations in concentrations of radionuclides within the composite samples of each bin also reflect the differences in compositions of waste solutions calcined. In general the leaching characteristics of both calcines by distilled water are similar. In both materials the radionuclides of cesium and strontium were selectively leached at significant rates, although cesium leached much more completely from the alumina calcine than from the zirconia calcine. Cesium and strontium are probably contained in both calcines as nitrate salts and also as fluoride salts in zirconia calcine, all of which are at least slightly soluble in water. Radionuclides of cerium, ruthenium, and plutonium in both calcines were highly resistant to leaching and leached at rates similar to or less than those of the matrix elements. These elements exist as polyvalent metal ions in the waste solutions before calcination and they probably form insoluble oxides and fluorides in the calcine. The relatively slow leaching of nitrate ion from zirconia calcine and radiocesium from both calcines suggests that the calcine matrix in some manner prevents complete or immediate contact of the soluble ions with water. Whether

radiostrontium forms slightly fluoride salts or forms nitrate salts which are protected in the same manner as radiocesium is unknown. Nevertheless, selective leaching of cesium and strontim is retarded in seme manner by the calcine matrix.

1442 (COO--4917-1) LEGAL, POLITICAL, AND INSTITUTIONAL IMPLICATIONS OF THE SEA-BED PROGRAM FOR RADIOACTIVE WASTE DISPOSAL. ANNUAL TECHNICAL PROGRESS REPORT. Doty, P. (Harvard Univ., Cambridge, MA (USA). Center for Science and International Affairs). 19 Apr 1979. Contract EW-78-S-02-4917. 5p. Dep. NTIS, PC A02/MF A01.

Both domestic and international political feasibility studies are being conducted for sub-seabed disposal. (DLC)

1443 (CS-INIS--258, pp 59-69) REDUCING RADIOACTIVE CONTAMINATION BY SORPTION ON IMPREGNATED WATER WORKS SAND. Zacek, L. (Vyzkumny Ustav Vodohospodarsky, Prague (Czechoslovakia)). Sep 1978. (In Czech).

From 9. national conference on radionuclides and ionizing radiation in water management; Liberec, Czechoslovakia (28 Sep 1978).

The feasibility was studied of using a sand filter bed for the deactivation of waste waters. This procedure is mainly suitable for the treatment of water into potable water. The advantage of the method is that it allows partial regeneration of the sand fill. Results of pilot plant trials show that the effectiveness of the deactivation method depends on the composition of the sand fill, mainly on the MnO_2 content, and increases with the increased content of this substance. It has also been shown that sands with a higher $CaCO_3$ content are not only less effective but also more difficult to regenerate. The trapping of radium in the sand bed is not even and it was shown that the upper layers have a higher activity than corresponds to computations.

1444 (DOE/EDP--0063) ENVIRONMENTAL DEVELOPMENT PLAN. LWR COMMERCIAL WASTE MANAGEMENT. (Department of Energy, Washington, DC (USA)). Aug 1980. 123p. NTIS, PC A06/MF A01.

This Environmental Development Plan (EDP) identifies the planning and managerial requirements and schedules needed to evaluate and assess the environmental, health and safety (EH and S) aspects of the Commercial Waste Management Program (CWM). Environment is defined in its broadest sense to include environmental, health (occupational and public), safety, socioeconomic, legal and institutional aspects. This plan addresses certain present and potential Federal responsibilities for the storage, treatment, transfer and disposal of radioactive waste materials produced by the nuclear power industry. The handling and disposal of LWR spent fuel and processed high-level waste (in the event reprocessing occurs) are included in this plan. Defense waste management activities, which are addressed in detail in a separate EDP, are considered only to the extent that such activities are common to the commercial waste management program. This EDP addresses three principal elements associated with the disposal of radioactive waste materials from the commercial nuclear power industry, namely Terminal Isolation Research and Development, Spent Fuel Storage and Waste Treatment Technology. The major specific concerns and requirements addressed are assurance that (1) radioactivity will be contained during waste transport, interim storage or while the waste is considered as retrievable from a repository facility, (2) the interim storage facilities will adequately isolate the radioactive material from the biosphere, (3) the terminal isolation facility will isolate the wastes from the biosphere over a time period allowing the radioactivity to decay to innocuous levels, (4) the terminal isolation mode for the waste will abbreviate the need for surveillance and institutional control by future generations, and (5) the public will accept the basic waste management strategy and geographical sites when needed.

1445 (DOE/EIS--0015(Vol.1)) FINAL ENVIRONMENTAL IMPACT STATEMENT: US SPENT FUEL POLICY. EXECUTIVE SUMMARY. (Department of Energy, Washington, DC (USA)). May 1980. 94p. NTIS, PC E03/MF E03.

The analysis of the environmental impacts for storage of domestic fuel shows that the impacts for the full range of alternatives considered are relatively small compared with available resources or background exposure of the population from natural radiation sources. The differences in impacts of storage of domestic fuel are attributed to the amount of fuel stored in Independent Spent Fuel Storage (ISFS) facilities, the storage time, and, to a lesser degree, the differences in spent fuel transportation. The differences between comparable alternatives of implementing the policy or not implementing the policy are small. The difference in impacts of storage of foreign fuel are attributed to the amount of fuel received under the policy and to the disposition mode analyzed. The impact of storage of foreign fuel (a small fraction of the amount of domestic fuel considered) is also small. As a result of the small differences in environmental impacts of all cases considered for foreign fuel, environmental impacts probably will not strongly influence the selection of the case that best meets US nonproliferation goals. Proliferation benefits of the various cases analyzed vary significantly. The structure and level of fee charged for storage of spent fuel will affect the degree of participation in the spent fuel storage program by utilities. However, the range of participation is within the range of alternatives analyzed in the draft EISs on storage of US and foreign fuels, for which the environmental effects were found to be relatively small. The fee computed on the basis of full recovery of government costs should not significantly affect the cost of generating nuclear power.

1446 (DOE/EIS--0015(Vol.2)) FINAL ENVIRONMENTAL IMPACT STATEMENT: US SPENT FUEL POLICY. STORAGE OF US SPENT POWER REACTOR FUEL. (Department of Energy, Washington, DC (USA)). May 1980. 303p. NTIS, PC E05/MF E05.

The activities associated with implementing or not implementing the proposed policy are similar for a given disposition facility startup date, and environmental impacts vary with the amount of fuel received, the number of Interim Spent Fuel Storage (ISFS) facilities required, the storage time, and to a lesser degree to the amount of spent fuel transported. The environmental impacts from all alternatives considered, either from implementing or not implementing the spent fuel storage policy, are small. The decreased resource consumptions and environmental impacts of alternatives that assume reactor discharge basin operation at less than full-core reserve must be balanced against the reduced flexibility in reactor operation and the possibility of forced

shutdowns which could lead to the use of higher-cost substitute power or reduction of electrical power generation. Providing full-core reserve capacity is prudent and economical to avoid reactor outages due to inspections or emergency situations. The impacts for decentralized ISFSs providing full-core reserve are considered the same for either government or private facilities. Nevertheless, utilities have operated without full-core reserve rather than shut down. At-reactor storage increases environmental effects compared with ISFS basin storage because additional storage basins are constructed and operated. However, the impacts are relatively small compared with available resources and risks from natural radiation sources.

1447 (DOE/EIS--0015(Vol.3)) FINAL ENVIRONMENTAL STATEMENT: US SPENT FUEL POLICY. STORAGE OF FOREIGN SPENT POWER REACTOR FUEL. (Department of Energy, Washington, DC (USA)). May 1980. 227p. NTIS, PC E03/MF E03.

In October 1977, the Department of Energy (DOE) announced a Spent Fuel Storage Policy for nuclear power reactors. Under this policy, as approved by the President, US utilities will be given the opportunity to deliver spent fuel to US Government custody in exchange for payment of a fee. The US Government will also be prepared to accept a limited amount of spent fuel from foreign sources when such action would contribute to meeting nonproliferation goals. Under the new policy, spent fuel transferred to the US Government will be delivered - at user expense - to a US Government-approved site. Foreign spent fuel would be stored in Interim Spent Fuel Storage (ISFS) facilities with domestic fuel. This volume of the environmental impact statement includes effects associated with implementing or not implementing the Spent Fuel Storage Policy for the foreign fuels. The analyses show that there are no substantial radiological health impacts whether the policy is implemented or not. In no case considered does the population dose commitment exceed 0.000006% of the world population dose commitment from natural radiation sources over the period analyzed. Full implementation of the US offer to accept a limited amount of foreign spent fuel for storage provides the greatest benefits for US nonproliferation policy. Acceptance of lesser quantities of foreign spent fuel in the US or less US support of foreign spent fuel storage abroad provides some nonproliferation benefits, but at a significantly lower level than full implementation of the offer. Not implementing the policy in regard to foreign spent fuel will be least productive in the context of US nonproliferation objectives. The remainder of the summary provides a brief description of the options that are evaluated, the facilities involved in these options, and the environmental impacts, including nonproliferation considerations, associated with each option.

1448 (DOE/EIS--0015(Vol.4)) FINAL ENVIRONMENTAL IMPACT STATEMENT: US SPENT FUEL POLICY. CHARGE FOR SPENT FUEL STORAGE. (Department of Energy, Washington, DC (USA)). May 1980. 104p. NTIS, PC E03/MF E03.

The United States Government policy relating to nuclear fuel reprocessing, which was announced by President Carter on April 7, 1977, provides for an indefinite deferral of reprocessing, and thus commits light water reactor (LWR) plants to a once-through fuel cycle during that indefinite period. In a subsequent action implementing that policy, the Department of Energy (DOE) on October 18, 1977 announced a spent fuel policy which would enable domestic, and on a selective basis, foreign utilities to deliver spent fuel to the US Government for interim storage and final geologic disposal, and pay the Government a fee for such services. This volume addresses itself to whether the fee charged for these services, by its level or its structure, would have any effect on the environmental impacts of implementing the Spent Fuel Policy itself. This volume thus analyzes the fee and various alternatives to determine the interaction between the fee and the degree of participation by domestic utilities and foreign countries in the proposed spent fuel program for implementing the Spent Fuel Policy. It also analyzes the effect, if any, of the fee on the growth of nuclear power.

1449 (DOE/EIS--0015(Vol.5)) FINAL ENVIRONMENTAL IMPACT STATEMENT: US SPENT FUEL POLICY. COMMENT LETTERS ON DRAFT STATEMENTS AND MAJOR COMMENTS WITH DOE RESPONSES. (Department of Energy, Washington, DC (USA)). May 1980. 496p. NTIS, PC E05/MF E05.

Notice of availability of the draft environmental impact statement for storage of US spent power reactor fuel was published by DOE in the Federal Register on September 6, 1978. A subsequent notice was published in the Federal Register on December 14, 1978, on the availability of the draft EISs on storage of foreign fuel, on charge for spent fuel storage, and a supplement to the draft EIS on storage of US fuel. Copies of the draft EISs were distributed for review and comment by appropriate Federal agencies, state governments, and other organizations and individuals who were known to have an interest in spent fuel storage activities and those who requested them. Comments and views concerning the draft EISs were requested from other interested agencies, organizations, and individuals by means of the Federal Register notices. Approximately 1600 copies each of the draft Domestic, Foreign, and Charge EISs were distributed for comment. The closing date for comments to be received on the draft EISs was February 15, 1979. Copies of the EISs (upon publication) and comment letters received were placed for public inspection in DOE public document rooms at 10 locations throughout the country. To the extent practicable, comments received after the closing date were also considered in the preparation of the final EIS. A total of 78 comment letters (some with supplements) were received. These comment letters are reproduced in their entirety in Section I of this volume. Approximately 600 specific comments were identified in these letters.

1450 (DOE/EIS--0023) FINAL ENVIRONMENTAL IMPACT STATEMENT. LONG-TERM MANAGEMENT OF DEFENSE HIGH-LEVEL RADIOACTIVE WASTES (RESEARCH AND DEVELOPMENT PROGRAM FOR IMMOBILIZATION), SAVANNAH RIVER PLANT, AIKEN, SOUTH CAROLINA. (Department of Energy, Washington, DC (USA)). Nov 1979. 304p. Dep. NTIS, PC A14/MF A01.

The present statement explores the environmental implications of a large research and development (R and D) program aimed at developing the proposed continuation of technology for removing the wastes from the tanks and immobilizing the radionuclides in solid forms for subsequent disposal. The proposed R and D program is directed toward developing technology for converting the waste into two fractions: a durable waste form containing over 99% of the radioactivity, and decontaminated salt, with storage or disposal of the waste form, e.g., in an off-site

geological repository, an on-site surface storage vault, or an on-site geological repository (bedrock cavern) and storage of the salt in: decontaminated waste tanks at SRP, an on-site surface vault, or an off-site geologic repository. The following alternatives to the proposed immobilization R and D program are assessed for environmental impact: continue storing high-level waste in subsurface storage tanks, which is a continuation of the present management practice, or, slurry the high-level waste into bedrock caverns, an on-site geological repository. (This alternative has been designated as environmentally unacceptable by the US EPA).

1451 (DOE/EIS--0026(Vol.1)) FINAL ENVIRONMENTAL IMPACT STATEMENT. WASTE ISOLATION PILOT PLANT. (Department of Energy, Washington, DC (USA). Assistant Secretary for Defense Programs). Oct 1980. 649p. NTIS, PC E08/MF E08.

In accordance with the National Environmental Policy Act (NEPA) of 1969, the US Department of Energy (DOE) has prepared this document as environmental input to future decisions regarding the Waste Isolation Pilot Plant (WIPP), which would include the disposal of transuranic waste, as currently authorized. The alternatives covered in this document are the following: (1) Continue storing transuranic (TRU) waste at the Idaho National Engineering Laboratory (INEL) as it is now or with improved confinement. (2) Proceed with WIPP at the Los Medanos site in southeastern New Mexico, as currently authorized. (3) Dispose of TRU waste in the first available repository for high-level waste. The Los Medanos site would be investigated for its potential suitability as a candidate site. This is administration policy and is the alternative preferred by the DOE. (4) Delay the WIPP to allow other candidate sites to be evaluated for TRU-waste disposal. This environmental impact statement is arranged in the following manner: Chapter 1 is an overall summary of the analysis contained in the document. Chapters 2 and 4 set forth the objectives of the national waste-management program and analyze the full spectrum of reasonable alternatives for meeting these objectives, including the WIPP. Chapter 5 presents the interim waste-acceptance criteria and waste-form alternatives for the WIPP. Chapters 6 through 13 provide a detailed description and environmental analysis of the WIPP repository and its site. Chapter 14 describes the permits and approvals necessary for the WIPP and the interactions that have taken place with Federal, State, and local authorities, and with the general public in connection with the repository. Chapter 15 analyzes the many comments received on the DEIS and tells what has been done in this FEIS in response. The appendices contain data and discussions in support of the material in the text.

1452 (DOE/EIS--0026(Vol.2)) FINAL ENVIRONMENTAL IMPACT STATEMENT. WASTE ISOLATION PILOT PLANT. (Department of Energy, Washington, DC (USA). Assistant Secretary for Defense Programs). Oct 1980. 808p. NTIS, PC E08/MF E08.

This volume contains the appendices for the Final Environmental Impact Statement for the Waste Isolation Pilot Plant (WIPP). Alternative geologic environs are considered. Salt, crystalline rock, argillaceous rock, and tuff are discussed. Studies on alternate geologic regions for the siting of WIPP are reviewed. President Carter's message to Congress on the management of radioactive wastes and the findings and recommendations of the interagency review group on nuclear waste management are included. Selection criteria for the WIPP site including geologic, hydrologic, tectonic, physicochemical compatability, and socio-economic factors are presented. A description of the waste types and the waste processing procedures are given. Methods used to calculate radiation doses from radionuclide releases during operation are presented. A complete description of the Los Medanos site, including archaeological and historic aspects is included. Environmental monitoring programs and long-term safety analysis program are described. (DMC)

1453 (DOE/ER/04972--2) MICROCRACK TECHNOLOGY. PROGRESS REPORT, 1 APRIL 1979-29 FEBRUARY 1980. Simmons, G.; Caruso, L.; Padovani, E. (Massachusetts Inst. of Tech., Cambridge (USA). Dept. of Earth and Planetary Sciences). Mar 1980. Contract AC02-78ER04972. 62p. Dep. NTIS, PC A04/MF A01.

Microcracks in samples of core from a 3000-foot hole in the Conway granite, near North Conway, New Hampshire, are abundant and most of them are sealed with siderite, chlorite, quartz, hematite, clay, or microbreccia. The sealed cracks are 1 to 100μ wide, intersect many grain boundaries, often coincide with grain boundaries, and both intersect and contain minerals that are normally rich in U and Th. The abundances of U and Th in 100-gm-bulk samples range from 0.1 to 30 ppM and from 6 to 100 ppM, respectively. The working hypothesis that U and Th have migrated through the microcracks in CO_2-rich waters is proposed. In the Redstone Quarry core, the presently open microcracks are preferentially oriented; most open cracks have horizontal surfaces. Samples of Devonian shales have been obtained for the purpose of examining microcracks in relation to the production of natural gas. The problems of sample preparation for fissile shale have been largely solved. Samples from the NTS have been prepared for the examination of microcracks in relation to possible disposal sites for radioactive waste.

1454 (DOE/ER/10412--2) [RELATIVE MOBILITIES AND TRANSPORT MECHANISMS OF TRACE ELEMENTS DURING CONTACT METAMORPHISM OF CARBONATE ROCKS]. PROGRESS REPORT. (State Univ. of New York, Stony Brook (USA). Research Foundation). [nd]. Contract AC02-79ER10412. 15p. NTIS, PC A02/MF A01.

The main objective of this study is to investigate the relative mobilities and transport mechanisms of major, minor, and trace elements during the contact metamorphism of carbonate rocks. The large contrasts in chemical potentials of SiO_2, Al_2O_3, and CaO across a granitic pluton-limestone contact may induce metasomatism. In addition, rare earth and transition metal elements may act as tracers, and their redistribution during metamorphism may record convective cooling processes. The results of this study may have an application toward the problem of radioactive waste disposal and the degree to which radioactive nuclides may be expected to migrate during geologically significant periods of time.

1455 (DOE/EV--0046(Vol.2), pp 259-272) TECHNICAL PROGRAM FOR ESTABLISHING THE SCIENTIFIC BASIS FOR GEOLOGIC DISPOSAL. Heineman, R.E.; Carbiener, W.A.; Basham, S.J. (Battelle Memorial Inst., Columbus, OH). Sep 1979.

From Environmental control symposium;

Washington, DC, USA (28 Nov 1978).

Work performed to date on characterization of geologic media, design of repositories and support facilities, and safety assessments of geologic isolation have provided an understanding of the important variables in the technology required. Reviews of this work by technical peer groups and by DOE, as well as an evaluation by an Interagency Review Group during 1978, have provided additional insights into the requirements for basic scientific data, engineering development, and systems modeling that should be developed or augmented to accomplish the goals of the NWTS program. The DOE and its major contractors in the program are responding to these identified needs by utilizing the resources of the US Geological Survey, universities, national laboratories, and industry in a coordinated program to characterize the properties of promising geologic and hydrologic regimes, to obtain basic scientific knowledge of the effects of heat-producing waste forms on the geochemistry and rock mechanics aspects of the media, to extend the programs of testing and model validation from salt to other candidate media such as granite and basalt, and to prepare a consolidated conceptual design to assess the safety and reliability of operation under normal and abnormal conditions. These programs will be guided by licensing plans which define how and when the data obtained will be utilized in reports on various topics important to the assessment of the short- and long-term safety of the repository. Design and licensing criteria are available, in part, and the remainder are being developed by DOE in parallel with a similar effort by the Environmental Protection Agency and the Nuclear Regulatory Commission. These on-going and planned NWTS programs will be described.

1456 (DOE/NE--0005) SPENT FUEL STORAGE. FACTS BOOKLET. (Department of Energy, Washington, DC (USA)). Apr 1980. 66p. NTIS, PC A04/MF A01.

In October 1977, the Department of Energy (DOE) announced a spent nuclear fuel policy where the Government would, under certain conditions, take title to and store spent nuclear fuel from commercial power reactors. The policy is intended to provide spent fuel storage until final disposition is available. DOE has programs for providing safe, long-term disposal of nuclear waste. The spent fuel storage program is one element of waste management and compliments the disposal program. The costs for spent fuel services are to be fully recovered by the Government from the utilities. This will allow the utilities to confidently consider the costs for disposition of spent fuel in their rate structure. The United States would also store limited amounts of foreign spent fuel to meet nonproliferation objectives. This booklet summarizes information on many aspects of spent fuel storage.

1457 (DOE/NE--0007) STATEMENT OF POSITION

1458 (DOE/RL/01830--14) REPORT ON GEOLOGIC EXPLORATION ACTIVITIES. Breslin, J.; Laughon, R.B.; Hall, R.J.; Voss, J.W. (comps.). (Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation). Jan 1980. Contract EY-76-C-06-1830. 83p. Dep. NTIS, PC A05/MF A01.

This report provides an overview of the geological exploration activities being carried out as part of the National Waste Terminal Storage (NWTS) Program, which has been established by the US Department of Energy (DOE) to develop the technology and provide the facilities for the safe, environmentally acceptable isolation of civilian high-level and transuranic nuclear wastes, including spent fuel elements, for which the Federal government is responsible. The principal programmatic emphasis is on disposal in mined geologic repositories. Explorations are being conducted or planned in various parts of the country to identify potential sites for such repositories. The work is being undertaken by three separate but coordinated NWTS project elements. Under the Basalt Waste Isolation Project (BWIP), basalt formations underlying DOE's Hanford Reservation are being investigated. Granite, tuff, and shale formations at the DOE Nevada Test Site (NTS) are being similarly studied in the Nevada Nuclear Waste Storage Investigations (NNWSI). The Office of Nuclear Waste Isolation (ONWI) is investigating domed salt formations in several Gulf Coast states and bedded salt formations in Utah and Texas. The ONWI siting studies are being expanded to include areas overlying crystalline rocks, shales, and other geohydrologic systems. The current status of these NWTS efforts, including the projected budgets for FY 1981, is summarized, and the criteria and methodology being employed in the explorations are described. The consistency of the overall effort with the recommendations presented in the Report to the President by the Interagency Review Group on Nuclear Waste Management (IRG), as well as with documents representing the national technical consensus, is discussed.

1459 (DOE/RL/C--14) REPORT ON GEOLOGIC EXPLORATION ACTIVITIES. (Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation). Jan 1980. Contract AC06-76RL01830. 83p. NTIS, PC A05/MF A01.

This report provides an overview of the geological exploration activities being carried out as part of the National Waste Terminal Storage (NWTS) Program, which has been established by the US Department of Energy (DOE) to develop the technology and provide the facilities for the safe, environmentally acceptable isolation of civilian high-level and transuranic nuclear wastes, including spent fuel elements, for which the Federal government is reponsible. The principal programmatic emphasis is on disposal in mined geologic repositories. Explorations are being conducted or planned in various parts of the country to

overlying crystalline rocks, shales, and other geohydrologic systems. The current status of these NWTS efforts, including the projected budgets for FY 1981, is summarized, and the criteria and methodology being employed in the explorations are described. The consistency of the overall effort with the recommendations presented in the Report to the President by the Interagency Review Group on Nuclear Waste Management (IRG), as well as with documents representing the national technical consensus, is discussed.

1460 (DOE/SR-SF--2004(Rev.1)) RERACKING TO INCREASE SPENT FUEL STORAGE CAPACITY. (Department of Energy, Aiken, SC (USA). Savannah River Operations Office). May 1980. 12p. NTIS, PC A02/MF A01.

Many utilities have already increased their spent fuel pool storage capacity by replacing aluminum racks having storage densities as low as 0.2 MTU/ft^2 with stainless steel racks which can more than double storage densities. Use of boron-stainless steel racks or thin stainless steel cans containing reassembled fuel rods allows even higher fuel storage densities (up to approximately 1.25 MTU/ft^2). This report evaluates the economics of smaller storage gains that occur if pools, already converted to high density storage, are further reracked.

1461 (DOE/SR-WM--79-2) HYDROLOGY OF BURIED CRYSTALLINE ROCK AT SAVANNAH RIVER PLANT NEAR AIKEN, SOUTH CAROLINA. Marine, I.W. (Department of Energy, Aiken, SC (USA). Savannah River Operations Office). Oct 1979. Contract AC09-76SR00001. 76p. NTIS, PC A05/MF A01.

The purpose of this report is to present the results of hydrologic investigations that were made on buried crystalline rock at the Savannah River Plant in connection with an investigation of the feasibility of storing high-level radioactive waste in artificially excavated chambers in the rock. The methods pursued in this investigation may be applicable to other investigations of low permeability metamorphic and igneous rocks. Fractures occurring in single boreholes were investigated by core inspection, geophysical logs, packer tests, and in-hole tracer tests. The correlation of fractures between holes was based on the rapidity of water level response to hydraulic activities in nearby wells and on an in-hole tracer test conducted in one boring while a nearby boring was being pumped. Values for hydraulic conductivity and other hydraulic parameters were determined from laboratory tests, packer tests, pumping tests, a two-well tracer test, and a numerical model that duplicated the results of a year-long pumping test. Dispersivity of the fractured crystalline rock was determined using a two-well tracer test. Water geochemistry and isotropic composition were evaluated. The age of the water was determined to be about 840,000 years. The average velocity of regional flow in crystalline rock is about 0.2 ft/y.

1462 (DOE/TIC--11260) SOCIAL IMPACT MITIGATION AND NUCLEAR WASTE REPOSITORY SITING. Peelle, E. (Oak Ridge National Lab., TN (USA)). 26 Aug 1980. Contract W-7405-ENG-26. 17p. NTIS, PC A02/MF A01.

Some aspects of the socioeconomic impacts of siting, constructing, and operating radioactive waste repositories in rural areas are discussed. These include public perceptions of high risk and uncertainty; limited benefits and no incentives; dissociations of costs and benefits; remoteness and inaccessibility of the decision making process for large energy facilities; no institutions to provide protection and accountability for those who may be affected by the siting; the fact that not all risks or impacts are fully mitigable; and constraints on DOE's present ability or authority to mitigate impacts. (DMC)

1463 (DP--1533) EARTHQUAKE RELATED DISPLACEMENT FIELDS NEAR UNDERGROUND FACILITIES. Pratt, H.R.; Zandt, G.; Bouchon, M. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Apr 1979. Contract AC09-76SR00001. 70p. NTIS, PC A04/MF A01.

Relative displacements of rock masses are evaluated in terms of geological evidence, seismological evidence, data from simulation experiments, and analytical predictive models. Numerical models have been developed to determine displacement fields as a function of depth, distance, and azimuth from an earthquake source. Computer calculations for several types of faults indicate that displacements decrease rapidly with distance from the fault, but that displacements can either increase or decrease as a function of depth depending on the type and geometry of the fault. For long shallow vertical strike-slip faults the displacement decreases markedly with depth. For square strike slip faults and for dip slip faults displacement does not decrease as markedly with depth. Geologic structure, material properties, and depth affect the seismic source spectrum. Amplification of the high frequencies of shear waves is larger by a factor of about 2 for layered geologic models than for an elastic half space.

1464 (DP-MS--78-92) EARTHQUAKE DAMAGE TO UNDERGROUND FACILITIES. Pratt, H.R.; Stephenson, D.E.; Zandt, G.; Bouchon, M.; Hustrulid, W.A. (Terra Tek, Inc., Salt Lake City, UT (USA); Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract EY-76-C-09-0001. 48p. (CONF-800603--1). Dep. NTIS, PC A03/MF A01.

From Rapid excavation and tunneling conference; Littleton, CO, USA (Jun 1980).

In order to assess the seismic risk for an underground facility, a data base was established and analyzed to evaluate the potential for seismic disturbance. Substantial damage to underground facilities is usually the result of displacements primarily along pre-existing faults and fractures, or at the surface entrance to these facilities. Evidence of this comes from both earthquakes and large explosions. Therefore, the displacement due to earthquakes as a function of depth is important in the evaluation of the hazard to underground facilities. To evaluate potential displacements due to seismic effects of block motions along pre-existing or induced fractures, the displacement fields surrounding two types of faults were investigated. Analytical models were used to determine relative displacements of shafts and near-surface displacement of large rock masses. Numerical methods were used to determine the displacement fields associated with pure strike-slip and vertical normal faults. Results are presented as displacements for various fault lengths as a function of depth and distance. This provides input to determine potential displacements in terms of depth and distance for underground facilities, important for assessing potential sites and design parameters.

1465 (DP-MS--79-20) MIGRATION OF TRANSURANIC NUCLIDES IN EARTHEN BURIAL TRENCHES

AT THE SAVANNAH RIVER PLANT. Johnson, D.R.; Wilhite, E.L. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1979. Contract EY-76-C-09-0001. 37p. Dep. NTIS, PC A03/MF A01.

The objectives, incentives and benefits derived from the data collected at the Savannah River Laboratory on waste migration were discussed, and encapsulated transmission waste burial data were presented. Factors influencing radionuclide migration were characterized. A map of the burial ground was included. The trench sampling strategy was summarized. A description of the coring samples was included. Actual soil recovery results were tabulated, and a specific problem which reduced recoveries even when using a Shelby tube core was discussed. Data on waste strike distribution and activity as a function of depth were tabulated. The composition of recovered waste was tabulated. Wood and paper were well preserved in spite of long burial. Radiation of core samples was measured. The distribution of plutonium among soil particle sizes was determined.

1466 (DP-MS--79-25) RADIOLYTIC GAS GENERATION IN CONCRETE MADE WITH INCINERATOR ASH CONTAINING TRANSURANIUM NUCLIDES. Bibler, N.E. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1979. Contract EY-76-C-09-0001. 9p. (CONF-791112--13). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

The effects of various factors on H_2 generation by alpha radiolysis of concrete containing TRU incinerator ash were studied. Methods for reducing H_2 generation were investigated. Samples of Portland and high-alumina cement containing up to 30% calcined ash (dry basis) were doped with $^{238}PuO_2$. Gas pressures were measured as a function of radiation dose; gas compositions were determined. Gas yields were calculated in terms of G values (molecules produced per 100 eV of alpha energy absorbed). These yields were used to estimate pressures in containers of radioactive concrete waste during storage. 4 figures.

1467 (DP-MS--79-30) CANISTER COMPATIBILITY WITH CARLSBAD SALT. Rankin, W.N. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1979. Contract EY-76-C-09-0001. 11p. (CONF-800305--1; CONF-791112--46). Dep. NTIS, PC A02/MF A01.

From Corrosion/80 NACE meeting; Chicago, IL, USA (6 Mar 1980).

No significant reaction was found when candidate canister alloys were heated with salt from Carlsbad, New Mexico, for up to 5000 hours in sealed capsules and for up to 10,000 hours in unsealed capsules at temperatures (80 to 225°C) that bracket the maximum temperature calculated for reference Savannah River Plant (SRP) waste containers at 20-foot spacings in salt. Additional tests were made at 600°C in sealed capsules to characterize reactions that may occur between candidate canister alloys and any component of the salt that is released when decrepitation occurs. Under these extreme conditions there was no significant attack of Type 304L stainless steel. But, there was up to 20-mils attack of the low-carbon steel.

1468 (DP-MS--79-31) MULTIBARRIER STORAGE OF SAVANNAH RIVER PLANT WASTE. Dukes, M.D.; Mosley, W.C.; Rankin, W.N.; Tennant, M.H.; Wiley, J.R. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1979. Contract EY-76-C-09-0001. 10p. (CONF-791112--8). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

Borosilicate glass will perform well as part of a multibarrier system for SRP high level waste. Storage temperatures can be kept to less than or equal to 100°C with appropriate spacing of the reference canisters. Undry dry conditions the waste package should remain intact for very long periods of time. Even if the package is breached and water contacts the glass, the radionuclide release rate will be very low. 5 figures, 2 tables.

1469 (DP-MS--79-37) TEMPERATURES GENERATED BY UNDERGROUND STORAGE OF DEFENSE WASTE CANISTERS. Tennant, M.H. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant). 1979. Contract EY-76-C-09-0001. 9p. (CONF-791112--11). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

For conditions conducive to leaching, i.e., moisture in contact with glass, the glass surface temperature would essentially be the canister cavity temperature because temperature rises across wet annuli are small. In turn, canister cavity temperatures are dominated by canister spacing for a given canister power and decay curve. Actual canister powers may be as much as 40% less than those used for these calculations. For dry salt in contact with the storage container, the temperature rises across the annuli may be large. The container temperature would tend to peak earlier for dry annuli than for wet annuli. When canister cavity temperatures peak, salt temperatures would be increased over normal approximately 500 feet in any direction extending from the repository. 5 figures.

1470 (DP-MS--79-49) EQUIPMENT FOR COLLECTING SLUDGE SAMPLES FROM SAVANNAH RIVER PLANT WASTE TANKS. Allen, B.M. Jr. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1979. Contract EY-76-C-09-0001. 16p. Dep. NTIS, PC A02/MF A01.

A sampler was developed to take 25-L samples of sludge from Savannah River Plant waste tanks. The cylindrical sample vessel has a retractable nose section. Sludge enters an annular space at the nose section as the sampler is forced through the sludge layer with rigid drive pipes. Two samples have been taken and transported in a special cask to a waste processing research facility at the Savannah River Laboratory. 7 figures.

1471 (DP-MS--80-4) SENSITIVITY CALCULATIONS FOR LOW HEAT GENERATING DEFENSE WASTE REPOSITORY TEMPERATURES. Tennant, M.H. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract AC09-76SR00001. 21p. (CONF-800723--14). NTIS, PC A02/MF A01.

From 19. national heat transfer conference; Orlando, FL, USA (27 Jul 1980).

Repository temperatures were calculated for Savannah River wastes by using both two- and three-dimensional numerical schemes. The error introduced by using the simpler and more efficient two-dimensional models is less than the present uncertainties introduced by waste power generation and host rock properties. Waste canister temperatures were found to be relatively insensitive to geometric asymmetry and model detail.

1472 (DP-MS--80-7) COMPARISON OF LABORATORY, IN SITU, AND ROCK MASS MEASUREMENTS OF THE HYDRAULIC CONDUCTIVITY OF METAMORPHIC ROCK AT THE SAVANNAH RIVER PLANT NEAR AIKEN, SOUTH CAROLINA. Marine, I.W. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract AC09-76SR00001. 18p. (CONF-800556--1). NTIS, PC A02/MF A01.

From Annual spring meeting of the American Geophysical Union; Toronto, Ontario, Canada (22 May 1980).

In situ testing of exploratory wells in metamorphic rock indicates that two types of fracturing occur in the rock mass. Rock containing small openings that permit only extremely slow movement of water is termed virtually impermeable rock. Rock containing openings of sufficient size to permit transmission of water at a significantly faster rate is termed hydraulically transmissive rock. Laboratory methods are unsuitable for measuring hydraulic conductivity in hydraulically transmissive rock; however, for the virtually impermeable rock, values comparable to the in situ tests are obtained. The hydraulic conductivity of the rock mass over a large region is calculated by using the hydraulic gradient, porosity, and regional velocity. This velocity is determined by dividing the inferred travel distance by the age of water which is determined by the helium content of the water. This rock mass hydraulic conductivity value is between the values measured for the two types of fractures, but is closer to the measured value for the virtually impermeable rock. This relationship is attributed to the control of the regional flow rate by the virtually impermeable rock where the discrete fractures do not form a continuous open connection through the entire rock mass. Thus, laboratory methods of measuring permeability in metamorphic rock are of value if they are properly applied.

1473 (DPE--3519) REPORT OF CONCEPTUAL DESIGN FOR TRU SOLID WASTE FACILITIES ADJACENT TO 200H AREA: SAVANNAH RIVER PLANT. (Du Pont de Nemours (E.I.) and Co., Wilmington, DE (USA). Engineering Dept.). Feb 1978. Contract AC09-76SR00001. 564p. NTIS, PC A24/MF A01.

Facilities for consolidating Savannah River Plant solid transuranic (TRU) waste and placing in long-term safe, retrievable storage have been designed conceptually. A venture guidance appraisal of cost for the facilities has been prepared. The proposed site of the new processing area is adjacent to existing H Area facilities. The scopes of work comprising the conceptual design describe facilities for: exhuming high-level TRU waste from buried and pad-stored locations in the plant burial ground; opening, emptying, and sorting waste containers and their contents within shielded, regulated enclosures; volume-reducing the noncombustibles by physical processes and decontaminating the metal waste; burning combustibles; fixing the consolidated waste forms in a concrete matrix within a double-walled steel container; placing product containers in a retrievable surface storage facility adjacent to the existing plant burial ground; and maintaining accountability of all special nuclear materials. Processing, administration, and auxiliary service buildings are to be located adjacent to existing H Area facilities where certain power and waste liquid services will be shared.

1474 (ECN--63) COMPARISON OF TEMPERATURE CALCULATIONS FOR AN ARBITRARY HIGH-LEVEL WASTE DISPOSAL CONFIGURATION IN SALT FORMATIONS. Kevenaar, J.W.A.M.; Janssen, L.G.J.; Ploumen, P.; Winske, P. (Stichting Energieonderzoek Centrum Nederland, Petten). May 1979. 33p. Dep. NTIS (US Sales Only), PC A03/MF A01.

The objective of this report is the comparison of the results of temperature analyses for an arbitrary high-level radioactive waste disposal configuration in salt formations. The analyses were carried out at the RWTH and ECN. The computer programs used are based on finite difference and finite element techniques. From the local temperature analyses that were intended to check the solution techniques, it could be concluded that both finite difference and finite elements are capable to analyse this type of problems. From the global temperature analyses it could be concluded that both analysis approaches: temperature dependent and iteratively determined temperature independent material properties, are suited to analyse the global temperature distribution in the salt formation.

1475 (ENICO--1031) FOURTH CALCINED SOLIDS STORAGE FACILITY. FINAL SAFETY ANALYSIS REPORT. Schindler, R.E. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Feb 1980. Contract AC07-79ID01675. 90p. NTIS, PC A05/MF A01.

This safety analysis report describes the Fourth Calcined Solids Storage Facility and presents the results of a safety evaluation of the facility including a design basis accident. The Idaho Chemical Processing Plant (ICPP) is a multi-purpose facility for recovering enriched U-235 from a wide variety of spent reactor fuels. Solvent extraction processes employed in recovery of fissile materials generate radioactive liquid wastes containing nuclear fission products. These liquid wastes are stored for several years in cooled, stainless steel tanks to allow decay of most short-lived radionuclides prior to calcination. In the Waste Calcining Facility (WCF), liquid waste are atomized in a hot-air-fluidized-bed of granular solids. A New Waste Calcining Facility (NWCF) is being designed to replace the WCF. The Fourth Calcined Solids Storage Facility will receive solids from the NWCF. There are currently three calcined solids storage facilities in service at ICPP; two are full and the third is being filled. The Fourth Calcined Solids Storage Facility provides an additional 17,000 ft^3 of storage. The new facility is similar to the existing facilities and will not alter appreciably the low risk level associated with existing storage of calcined solids. Double containment of the calcined solids is provided in three 12-ft diameter, 50-ft high, stainless steel bins enclosed in a reinforced concrete vault as shown. The facility is designed to withstand effects of local natural catastrophies, viz. flood, tornado and earthquake. Decay heat will be removed from the vault by conduction through the vault walls to the surrounding air and soil. During the first few years of facility use, supplementary cooling will be provided by the natural convection of cooling air through the vault. The new facility is similar to the existing calcined solids storage facilities; however, the number of bins is reduced from seven to three.

1476 (ENICO--1044) INVENTORY OF CALCINED WASTE STORED AT THE ICPP AS OF SEPTEMBER 1979. Kirkbride, R.A. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Sep 1980. Contract AC07-79ID01675. 46p. NTIS, PC A03/MF A01.

An option in the program for Long-Term Management of High-Level Idaho Chemical

Processing Plant (ICPP) Wastes calls for retrieving calcined waste stored at ICPP and converting it to a more stable, less dispersible form. Waste solidification options include vitrification, pelletization, or conversion to a ceramic form. A calcine inventory, from December 1963 to September 1979, has been prepared based on calciner run and solids storage facilities information which gives the range of chemical compositions of calcined waste stored at ICPP. Information researched includes calciner startup data, waste solution types and volumes calcined, calciner operating schedules, solids storage bin capacities, calcine storage bin distributor systems and solids storage bin thermocouple locations and temperature records. A recommendation for improving calcine inventory control is given.

1477 (ENICO--1060) STORAGE AND RETRIEVABILITY OF EXISTING AND FUTURE ICPP CALCINES. Cresap, D.A. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Oct 1980. Contract AC07-79ID01675. 38p. NTIS, PC A03/MF A01.

Calcine caking and retrievability tests were conducted to ensure that calcine stored at ICPP is retrievable by conventional vacuum methods. This report describes results of shearing strength (Jenike and Johanson) tests and retrieval tests on zirconia and zirconium-sodium blended calcines. Results of Jenike tests on calcine containing phosphate and calcine containing candidate anti-caking additives are also given. All calcines tested were retrievable with standard vacuum methods and nozzle vibration at storage temperatures anticipated at ICPP.

1478 (EPRI-NP--1197) STATUS REPORT ON RISK ASSESSMENT FOR NUCLEAR WASTE DISPOSAL. INTERIM REPORT. Koplik, C.M.; Oston, S.G.; Bartlett, J.W.; Kaplan, M.F. (Analytic Sciences Corp., Reading, MA (USA)). Oct 1979. 182p. Dep. NTIS, PC A09/MF A01.

This document reports the results of a comparative analysis and evaluation of reported studies on long-term safety for geologic disposal of nuclear wastes. The scope of work included consideration of uncertainty issues and their impact on results; assessment of the effects of design, siting and operational strategy alternatives on safety levels; and assessment of the adequacy of scope of the available results. Results obtained by the studies reviewed are reconciled and analyzed by normalizing the results to a common basis of repository contents at closure and environmental scenario conditions. The normalization greatly reduces the range of results and produces two classes of risk predictions: conservative (extreme) case studies for which individual doses are about 1% of background, and less conservative, more realistic studies for which doses are about a thousand times lower than those for the conservative studies. The scope of work also includes a comparative analysis of safety levels for disposal of spent fuel and vitrified high-level waste. The inherently higher risk levels associated with spent fuel disposal are demonstrated. The report concludes with a discussion of significant resolved and unresolved safety issues. It also discusses future work needed.

1479 (EUR--5947) EVALUATION OF LONG TERM LEACHING OF BOROSILICATE GLASSES. Lanza, F.; Parnisari, E. (Commission of the European Communities, Ispra (Italy). Joint Research Centre). 1978. 27p. Dep. NTIS (US Sales Only), PC A03/MF A01.

For the evaluation of long term hazard of glass, data on long term glass leaching are needed. Moreover for long term leaching a model of homogeneous dissolution seems reasonable and ask for confirmation. Tests were performed at 30°, 80°, 100°, using an apparatus of the Soxhlet type, to 3.600 hours. Results were obtained as a weight loss and analysed following a relation with time composed by a parabolic and a linear part. Analysis of the surface layer using energy dispersion X ray spectrometry were performed. A critical analysis of the results and of the apparatus is presented.

1480 (EUR--6128) COMMUNITY'S R AND D PROGRAMME ON RADIOACTIVE WASTE MANAGEMENT AND STORAGE. 1977 2. ANNUAL PROGRESS REPORT. (Commission of the European Communities, Brussels (Belgium)). 1978. 228p. Dep. NTIS (US Sales Only), PC A11/MF A01.

The objective of the R and D actions is the demonstration of either the technical potential or, for further advanced projects, the feasibility and even the industrial availability of methods for treating and storing radwaste. The following aspects are investigated: processing of solid waste from reactors, reprocessing plants and the plutonium manufacture; intermediate and terminal storage of high activity and alpha waste; advanced waste management methods as the storage of gaseous waste. In addition to the scientific-technical R and D actions, a survey of the legal, administrative and financial problems encountered in radwaste management and storage is an essential part of the Communities' programme.

1481 (FBOU--289-01) ENGINEERING STUDY OF STORED WASTE RETRIEVAL AT IDAHO NATIONAL ENGINEERING LABORATORY. Baird, R.D.; Hill, F.J.; Hunter, P.H.; Rich, D.C.; Ricks, B.L.; Robertson, B.C.; Thomas, J.E. (Ford, Bacon and Davis Utah, Inc., Salt Lake City (USA)). Sep 1979. Contract EY-76-C-07-1570. 156p. Dep. NTIS, PC A08/MF A01.

A large quantity of transuranic waste is currently stored at the Transuranic Storage Area (TSA) at the Idaho National Engineering Laboratory. It is anticipated that a Slagging Pyrolysis Incinerator (SPI) will be constructed near the TSA to process this waste. The study described identifies design criter, provides a preliminary conceptual system design and performs engineering analyses of various strategies for retrieving waste from the TSA and delivering it to the SPI.

1482 (GJBX--122(80)) PLUTONIUM WASTE CRIB LOGGING USING THE PROMPT FISSION NEUTRON URANIUM LOGGING SYSTEM. Barnard, R.W.; Stephenson, W.A. (Sandia National Labs., Albuquerque, NM (USA)). May 1980. Contract AC04-76DP00789. 48p. (SAND--79-2131). NTIS, PC A03/MF A01.

Sandia Laboratories' Uranium Logging Project has demonstrated their prompt fission neutron (PFN) logging system at the Hanford, WA, site for Rockwell-Hanford Operations (RHO). The dates of the demonstration were July 31 through August 2, 1979. The purpose was to show RHO the capabilities of the system for measuring plutonium concentration. An underground effluent disposal crib associated with their processing facilities was used as the test site. The performance criterion was to be able to detect a 10 nCi/g concentration of plutonium. Six test wells penetrating the crib

were logged, as were three other wells. The PFN tool was able to maintain a good signal-to-noise ratio even under the most extreme conditions of high count rate and high background. The wells at the center of the crib indicated very high concentrations of plutonium, while those at the periphery indicated much less. Concentrations estimated to be lower than 10 nCi/g were detected. Comparisons with core data were not made. The technique used to obtain physical samples for analysis did not follow uranium-exploration coring practice so comparisons were not possible. The data interpretation model used was originally developed for uranium and was modified to calculate plutonium concentration. Results indicated that the operation of a PFN logging system by RHO personnel would provide a suitable technique for monitoring transuranic waste storage sites.

1483 (HEDL-SA--1892-FP) SURVEY TEST OF CANISTER, GEOLOGY, AND FUEL CLADDING MATERIAL INTERACTIONS. Krogness, J.C.; Almassy, M.Y.; Cantley, D.A.; Davis, R.B. (Hanford Engineering Development Lab., Richland, WA (USA)). Aug 1979. Contract EY-76-C-14-2170. 30p. (CONF-791033--7). Dep. NTIS, PC A03/MF A01.

From 1. annual ONWI information meeting; Columbus, OH, USA (30 Oct 1979).

Portions of document are illegible.

A series of Material Interaction Test (MIT) is being conducted. The first test is being conducted in the Dry Surface Storage Demonstration at the EMAD facility on NTS. This paper discusses details of this first test and gives a status report on the MIT series. 17 figures. (DLC)

1484 (HEDL-SA--2055) REMOTE CHARACTERIZATION OF SPENT LWR FUEL FOR GEOLOGIC DISPOSAL DEMONSTRATIONS. Davis, R.B.; Fish, R.L.; Pasupathi, V.; Stellrecht, D.E. (Hanford Engineering Development Lab., Richland, WA (USA)). Mar 1980. Contract AC14-76FF02170. 20p. (CONF-800607--78). NTIS, PC A02/MF A01.

From American Nuclear Society annual meeting; Las Vegas, NV, USA (8 Jun 1980).

State-of-the-art hot cell examination techniques are being used to evaluate spent fuel performance during exposure to simulated geologic repository environments. Forty-five pressurized light water reactor fuel rods were examined prior to emplacement in geologic disposal tests. Sufficient data were collected on both cladding and fuel to provide a basis, along with post-test examination data, for assessing the ability of the spent fuel to retain radionuclides.

1485 (HEDL-TC--1283(Rev.1)) DATA PACKAGE FOR THE TURKEY POINT MATERIAL INTERACTION TEST CAPSULES. Krogness, J.C.; Davis, R.B. (Hanford Engineering Development Lab., Richland, WA (USA)). Feb 1980. Contract EY-76-C-14-2170. 98p. Dep. NTIS, PC A05/MF A01.

Objective of the test is to obtain interaction information on candidate package storage materials and geologies under prototypic temperatures in gamma and low-level neutron fields. This document provides a fabrication record of the experiment. (DLC)

1486 (HEDL-TC--1331(Rev.1)) MATERIALS INTERACTION TEST SUMMARY DESCRIPTION. Krogness, J.C. (Hanford Engineering Development Lab., Richland, WA (USA)). Jan 1980. Contract EY-76-C-14-2170. 17p. Dep. NTIS, PC A02/MF A01.

The Materials Interaction Test is designed to provide early scoping data on host rock performance and interaction between nuclear waste canister materials and host repository media under conditions representative of expected disposal environments. Capsules containing these materials were put in a spent fuel assembly and subsequently placed in a disposal test to study behavior in a low-level radiation environment at temperaures expected to range between 300 to 400°F. Thermal control capsules are being exposed in laboratory furnaces to allow a determination and separation of thermal and radiation effects. Post-test specimen examinations are planned to determine material property changes and interaction effects and provide data for understanding the effectiveness of host rock, canister, and cladding materials in long-term waste isolation.

1487 (HEDL-TC--1384(Rev.1)) SPENT FUEL CHARACTERIZATION FOR THE COMMERCIAL WASTE AND SPENT FUEL PACKAGING PROGRAM. Fish, R.L.; Davis, R.B.; Pasupathi, V.; Klingensmith, R.W. (Hanford Engineering Development Lab., Richland, WA (USA); Battelle Columbus Labs., OH (USA)). Mar 1980. Contract EY-76-C-14-2170. 55p. Dep. NTIS, PC A04/MF A01.

This document presents the rationale for spent fuel characterization and provides a detailed description of the characterization examinations. Pretest characterization examinations provide quantitative and qualitative descriptions of spent fuel assemblies and rods in their irradiated conditions prior to disposal testing. This information is essential in evaluating any subsequent changes that occur during disposal demonstration and laboratory tests. Interim examinations and post-test characterization will be used to identify fuel rod degradation mechanisms and quantify degradation kinetics. The nature and behavior of the spent fuel degradation will be defined in terms of mathematical rate equations from these and laboratory tests and incorporated into a spent fuel performance prediction model. Thus, spent fuel characterization is an essential activity in the development of a performance model to be used in evaluating the ability of spent fuel to meet specific waste acceptance criteria and in evaluating incentives for modification of the spent fuel assemblies for long-term disposal purposes.

1488 (HEDL-TME--78-70) PROPERTIES OF LIGHT WATER REACTOR SPENT FUEL CLADDING. INTERIM REPORT. Farwick, D.G.; Moen, R.A. (Hanford Engineering Development Lab., Richland, WA (USA)). Aug 1979. Contract EY-76-C-14-2170. 97p. Dep. NTIS, PC A05/MF A01.

The Commercial Waste and Spent Fuel Packaging Program will provide containment packages for the safe storage or disposal of spent Light Water Reactor (LWR) fuel. Maintaining containment of radionuclides during transportation, handling, processing and storage is essential, so the best understanding of the properties of the materials to be stored is necessary. This report provides data collection, assessment and recommendations for spent LWR fuel cladding materials properties. Major emphasis is placed on mechanical properties of the zircaloys and austenitic stainless steels. Limited information on elastic constants, physical properties, and anticipated corrosion behavior is also provided. Work is in progress to revise these evaluations as the program proceeds.

1489 (IAEA--210) OCEANOGRAPHIC BASIS OF THE IAEA REVISED DEFINITION AND RECOMMENDATIONS CONCERNING HIGH-LEVEL RADIOACTIVE WASTE UNSUITABLE FOR DUMPING AT SEA. (International Atomic Energy Agency, Vienna (Austria)). 1978. 59p. (CONF-7706186--). Dep. NTIS (US Sales Only), PC A04/MF A01.

From Consultants meeting to review the radiological basis of the provisional definition and recommendations for the convention on the prevention of marine pollution by dumping of wastes and other matter; London, UK (13 Jun 1977).

The oceanographic basis of the provisional definition is reviewed. General recommendations on the controlled disposal of radioactive wastes are made.

1490 (IAEA--211) RADIOLOGICAL BASIS OF THE IAEA REVISED DEFINITION AND RECOMMENDATIONS CONCERNING HIGH-LEVEL RADIOACTIVE WASTE UNSUITABLE FOR DUMPING AT SEA. (International Atomic Energy Agency, Vienna (Austria)). 1978. 58p. (CONF-7703125--). Dep. NTIS (US Sales Only), PC A04/MF A01.

From Advisory group meeting to review the oceanographic basis of the provisional definition and recommendations for the convention on the prevention of marine pollution by dumping of wastes and the other matter; Vienna, Austria (21 Mar 1977).

The report of the Advisory Group considered the oceanographic basis and made suggestions concerning biological pathways that might be considered when estimating the potential transfer of radioactivity of man, and recommended that the assessment of radiation doses to man and of possible damage to the ecosystem should be carried out by a suitable constituted group of consultants.

1491 (IDO--10074(Rev.1)) CRITERIA FOR PACKAGING TRANSURANIC WASTE FOR RECEIPT AT THE IDAHO NATIONAL ENGINEERING LABORATORY RADIOACTIVE WASTE MANAGEMENT COMPLEX OFFSITE GENERATED WASTE. Anderson, B.C. (Idaho National Engineering Lab., Idaho Falls (USA)). Apr 1980. Contract AC07-76ID01570. 45p. NTIS, PC A03/MF A01.

This document delineates the packaging criteria requirements for storage of transuranic radioactive waste (> 10 nCi/g) at the Idaho National Engineering Laboratory. The Department of Energy, Idaho Operation Office (DOE-ID) will only accept transuranic waste from an offsite DOE location after an agreement has been reached between DOE-ID and the cognizant DOE field office. Several memoranda of agreements are currently in effect. The detailed criteria in these previously approved memoranda of agreements are superseded by the criteria in this document. Any deviations by the waste generator from the criteria stated herein must have prior approval of DOE-ID. In addition, DOE-ID will notify waste generators of any changes to the criteria prior to implementation.

1492 (IDO--10085) ENVIRONMENTAL AND OTHER EVALUATIONS OF ALTERNATIVES FOR LONG-TERM MANAGEMENT OF BURIED INEL TRANSURANIC WASTE. (Idaho National Engineering Lab., Idaho Falls (USA)). Dec 1979. Contract EY-76-C-07-1570. 527p. Dep. NTIS, PC A23/MF A01.

This study identifies, develops, and evaluates, in a preliminary manner, alternatives for long-term management of the TRU waste buried at the RWMC at the INEL. The technology required for managing the waste, the environmental effects, the risks to the public, the radiological and nonradiological hazards to workers, and the estimated costs are discussed. The RWMC was established in the southwestern corner of the INEL in 1952 as a controlled area for burial of solid radioactive waste generated by INEL operations. It encompasses about 144 acres. Since 1954, solid waste contaminated with transuranic radionuclides has been received from defense-related activities at the RFP and from other operations of the AEC and its successor agencies. Approximately 2,200,000 ft^3 of TRU waste was buried in pits and trenches at the RWMC between 1954 and 1970. Since 1970, about 1,100,000 ft^3 of TRU waste has been received and stored retrievably on aboveground asphalt pads at the RWMC. The containers (metal bins and drums and wooden boxes) for the stored waste are generally in good condition. However, the containers for the buried waste have deteriorated badly; some of the waste, such as large pieces of equipment, was buried without containers. Some of the soil immediately adjacent to the buried waste has become contaminated. Six alternatives for the long-term management of the buried TRU waste were studied. These alternatives are identified and concepts within these alternatives developed and evaluated.

1493 (IDO--22027-USGS) GEOLOGY, WATER SUPPLY, AND WASTE DISPOSAL AT SITES II AND IIA, BURIAL GROUND D, AND VICINITY, NATIONAL REACTOR TESTING STATION, IDAHO. Voegeli, P.T.; Deutson, M. (Geological Survey, Boise, ID (USA). Water Resources Div.). Jun 1953. Contract EW-78-X-07-0115. 97p. Dep. NTIS, PC A05/MF A01.

The problems of geology, water-supply, and waste disposal at the National Reactor Testing Station (NRTS), Idaho are studied. The geologic and hydrologic information about sites II and IIA are summarized. Information about the physical properties of geologic materials is summarized. Information obtained from deep test holes and wells near the mapped area and data from test pits and shallow test holes within the area are included. Chemical analysis of samples of ground water was performed. Ion exchange tests of sediments were also performed. These results are included. (DC)

1494 (INFCE/DEP/WG--7/10) INTERMEDIATE STORAGE FACILITY FOR VITRIFIED HIGH LEVEL WASTE FROM THE REPROCESSING OF SPENT NUCLEAR FUEL. (INFCE (Sweden)). Apr 1978. 13p. NTIS (US Sales Only), PC A02/MF A01.

An intermediate storage facility for vitrified high level waste is described. The design was made specifically for Swedish conditions but can due to modular design be applied also for other conditions. Most of the plant is located underground with a rock cover of about 30 m in order to provide protection against external forces such as acts of war and sabotage. The storage area consists of four caverns each with 150 pits. Each pit can take 10 waste cylinders of 0.4 m diameter and 1.5 m length containing 150 liters of glass. The capacity can be increased by adding additional caverns. Cooling is obtained by forced air convection. Reception areas, auxiliary systems and operation of the plant are also described.

1495 (INFCE/DEP/WG--7/13) GRANITE-REPOSITORY - GEOCHEMICAL ENVIRONMENT. (INFCE (Sweden)). Apr 1979. 23p. NTIS (US Sales Only), PC A02/MF A01.

Some geochemical data of importance for a radioactive waste repository in hard rock are reviewed. The ground water composition at depth

is assessed. The ground water chemistry in the vicinity of uranium ores is discussed. The redox system in Swedish bedrock is described. Influences of extreme climatic changes and of repository mining and construction are also evaluated.

1496 (INFCE/DEP/WG--7/16) RELEASE CONSEQUENCE ANALYSIS FOR A HYPOTHETICAL GEOLOGIC RADIOACTIVE WASTE REPOSITORY IN SALT. (INFCE (USA)). Aug 1979. 180p. NTIS (US Sales Only), PC A09/MF A01.

One subtask conducted under the INFCE program is to evaluate and compare the health and safety impacts of different fuel cycles in which all radioactive wastes (except those from mining and milling) are placed in a geologic repository in salt. To achieve this objective, INFCE Working Group 7 examined the radiologic dose to humans from geologic repositories containing waste arisings as defined for seven reference fuel cycles. This report examines the release consequences for a generic waste repository in bedded salt. The top of the salt formation and the top of the repository are assumed to be 250 and 600 m, respectively, below the surface. The hydrogeologic structure above the salt consists of two aquifers and two equitards. The aquifers connect to a river 6.2 km from the repository. The regional gradient to the river is 1 m/km in all aquifers. Hydrologic, transport, and dose models were used to model two release scenarios for each fuel cycle, one without a major disturbance and one in which a major geologic perturbation breached the repository immediately after it was sealed. The purpose of the modeling was to predict the rate of transport of radioactive contaminants from the repository through the geosphere to the biosphere, and to determine the potential dose to humans. Of the many radionuclides in the waste, only ^{129}I and ^{226}Ra arrived at the river in sufficient concentrations for a measurable dose calculation. Radionuclide concentrations in the ground water pose no threat to man because the ground water is a concentrated brine and it is diluted by a factor of 10^6 to 10^7 upon entering the river.

1497 (INFCE/DEP/WG--7/23) BRIEF ACCOUNT OF THE PROCEEDINGS OF WORKING GROUP 7, WASTE MANAGEMENT AND DISPOSAL, OF THE INTERNATIONAL NUCLEAR FUEL CYCLE EVALUATION. (INFCE Working Group 7. Secretariat). [nd]. 6p. NTIS (US Sales Only), PC A02/MF A01.

FUEL CYCLE;INTERNATIONAL COOPERATION; MEETINGS;RADIOACTIVE WASTE DISPOSAL;NUCLEAR INDUSTRY;RADIOACTIVE WASTE MANAGEMENT

1498 (INIS-mf--4782, pp 155-170) WASTE MANAGEMENT AS THE CENTRAL TASK OF NUCLEAR ENERGY POLICY. Boehm, H. 1977. (In German).

From Energy policies forum of the Landesregierung; Stuttgart, F.R. Germany (9 May 1977).

A survey article deals with the tasks of the different steps of waste disposal, the amounts of fuel elements and waste obtained and the role of reprocessing in waste management, the intermediate storage of fuel elements and the alternative reprocessing or direct ultimate storage of fuel elements. The present state of the art of large-scale waste management in West Germany, is briefly outlined including responsibilities.

1499 (INIS-mf--4782, pp 187-202) PROBLEMS OF THE FINAL STORAGE OF RADIOACTIVE WASTE IN SALT FORMATIONS. Hofrichter, E. 1977. (In German).

From Energy policies forum of the Landesregierung; Stuttgart, F.R. Germany (9 May 1977).

The geological conditions for the final storage of radioactive waste, the occurrence of salt formations, and the tectonics of salt domes are discussed. The safety of salt rocks, the impermeability of the rocks, and the thermal problems in the storage of high-activity waste are dealt with. Possibilities and preconditions of final storage in West Germany are discussed.

1500 (INIS-mf--4921) REGULATORY ASPECTS OF UNDERGROUND DISPOSAL OF RADIOACTIVE WASTE - DANISH NOTES. 1978. 6p. Dep. NTIS (US Sales Only), PC A02/MF A01.

In Denmark, provisions regulating nuclear installations (their licensing, and the disposal of radioactive waste amongst other matters) are contained in an Act of 12 May 1976. This act, however, will only come into force if Denmark decides to implement a nuclear power programme. Under the provisions of this Act, the Minister of the Environment is the licensing authority. He receives recommendations from various bodies, including the Inspectorate of Nuclear Installations, and may impose any conditions thought necessary. Three permits are required - site approval, construction permit, and operation permit - and applications must be accompanied by documentation relevant to environmental and nuclear safety and health aspects. Operation of a nuclear installation may be suspended in cases of urgency. As yet, no detailed safety regulations or guidelines on the disposal of nuclear waste have been issued, but a working party, established by the Environmental Protection Agency, is currently studying the problem.

1501 (INIS-mf--5101) POSSIBLE MICROBIAL CORROSION OF DECAY TANKS FOR LIQUID RADIOACTIVE WASTES IN NUCLEAR POWER PLANTS. Zizka, B.; Tittlova, E.; Karacon, J. (Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice (Czechoslovakia)). (Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice (Czechoslovakia)). [nd]. 3p. (In Czech). (CONF-7804146--8(Summ.)). Dep. NTIS (US Sales Only), PC A02/MF A01.

From Corrosion problems on nuclear reactor components; Piestany, Czechoslovakia (12 Apr 1978).

BACTERIA;ELECTROCHEMICAL CORROSION;LIQUID WASTES;RADIOACTIVE WASTE STORAGE;TANKS

1502 (INIS-mf--5209) NUCLEAR POWER. THE NUCLEAR FUEL CYCLE. APPENDIX TO ''ENERGY POLITICAL REVIEW FROM THE MINISTRY OF TRADE, ER79''. (Handelsministeriet, Copenhagen (Denmark)). Mar 1979. 30p. (In Danish). Dep. NTIS (US Sales Only), PC A03/MF A01.

The Danish government has stated officially that the application of nuclear energy is a part of the government's energy politics; however, before the government can take a final position on the utilization of nuclear power the problem of radioactive waste disposal must be solved. The government anticipates that this will be cleared up before 1980. The present note reviews the government's contribution in providing national solutions to the storage problems and to establish bilateral or multilateral waste storage arrangements. As an appendix is reprinted an account from a Ministry of Trade committee on the nuclear fuel cycle.

1503 (INIS-mf--5211) FINAL DISPOSAL OF HIGH-LEVEL WASTE FROM NUCLEAR POWER PLANTS. (Akademiet for de Tekniske Videnskaber, Lyngby (Denmark)). May 1979. 67p. (In Danish). Dep. NTIS (US Sales Only), PC A04/MF A01.

A report on the possibilities of high-level radioactive waste disposal is presented by a working group appointed by the Danish Academy of Technical Sciences which consists of specialists in nuclear power, corrosion, health physics, chemistry, geology, physics, and zoology. If nuclear power is introduced in Denmark five nuclear power plants with a total installed power of about 5000 MW are expected to be established. Dependent on the handling procedures the volume of the high-level wastes will be between 10 and 50 cubic meters yearly. As the amount of wastes that would be produced in Danish nuclear power plants will be small compared to the amount from other countries, it is natural to try to solve a Danish waste problem through an arrangement on waste disposal with a foreign plant. Also, for economic and technical reasons this solution would be the best, and the entering into a satisfactory agreement should therefore be given high priority. However, it is not possible to know for sure that such an agreement could be reached, and it is therefore necessary to evaluate the possibilities for geologic waste disposal in Denmark. It is concluded that without doubt several geologic formations in the Danish deeper underground are suitable for waste disposal. A main problem is to find a formation which can prove to be isolated from the biosphere for many millennia. It is recommended that geological formations be studied in detail and that some locations suitable for waste disposal should be selected in order that they can be reserved for this purpose.

1504 (INIS-mf--5298) VITRIFIED RADWASTE FROM REPROCESSING. MATERIAL CONCERNING THE EXAMINATION BY THE SWEDISH NUCLEAR POWER INSPECTORATE OF THE SUPPLEMENTARY GEOLOGY REPORT FROM THE KBS-PROJECT. (Kaernbraenslesaekerhet, Stockholm (Sweden)). 1979. 210p. (In Swedish). Dep. NTIS (US Sales Only), PC A11/MF A01.

The Swedish Nuclear Power Inspectorate was designated by the Swedish Government to examine the supplementary geologic investigations performed by the utilities' KBS-project and to judge wheather the area investigated, Sternoe in southern Sweden, could be used for constructing a safe repository for radioactive wastes or not. This report contains material that was ordered by or sent to the Nuclear Power Inspectorate as well as the report by the Inspectorate to the Government.

1505 (INIS-mf--5299) VITRIFIED RADWASTE FROM REPROCESSING. SUPPLEMENTARY GEOLOGICAL INVESTIGATIONS OF THE KBS-PROJECT, SWEDEN. (Kaernbraenslesaekerhet, Stockholm (Sweden)). 1979. 34p. (In Swedish). Dep. NTIS (US Sales Only), PC A03/MF A01.

The Swedish nuclear power utilities' application to load two new reactors, according to the so called Stipulation Act was denied by the Swedish Government i Novermber 1978. According to the Government the utilities' KBS-project had not demonstrated the existence of a large, light rockformation suited for disposal of the radioactive wastes or the spent fuels. In this report an account is given of the futher investigations that were undertaken by the KBS-project to prove that such a rockformation exists at Sternoe in Southern Sweden.

1506 (INIS-mf--5549) ACT NO. 298 OF 16 MARCH 1979 ON PREVENTION OF MARINE POLLUTION. 1 Apr 1979. 3p. (In Finnish). NTIS (US Sales Only), PC A02/MF A01.

This Act enables implementation in Finland of the Convention on the Protection of Marine Environment of the Baltic Sea, 1974 (the so-called Helsinki Convention) and the Convention on the Prevention of Marine Pollution by Dumping of wastes and Other Matter, 1972 (the so-called London Convention). The Act prohibits the dumping of any high-level radioactive waste or matter. A prior permit is required for dumping lower level waste or matter.

1507 (INIS-mf--5570, pp 15-26) DESACTIVATION OF LIQUID RADIOACTIVE WASTES OF LOW AND MEDIUM ACTIVITY. Golinski, M.; Charomska, K. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

The results of research made according to the program of scientific and technical cooperation of the CMEA countries are discussed. The main direction of these research works is on future improvement of installations for purification of liquid radioactive wastes by chemical methods of coprecipitation and coagulation, ion exchange, sorption, distillation and electrolysis. It was shown that methods of coprecipitation and coagulation have low efficiency and the activity reduction factor seldom was more than 10. In sorption processes different sorbents, both organic and nonorganic were used. The modified bentonite used as a sorbent agent has shown high selectivity towards cesium ions. Waste concentration by means of distillation is an universal but rather expensive method and is applied mainly in the cases of high salts concentration and high specific activity of liquid wastes. Electrolysis, as a method of the liquid wastes purification is used in the USSR and has high efficiency with low energy consumption.

1508 (INIS-mf--5570, pp 100-103) PROLONGED STORAGE OF HIGHLY CONCENTRATED LIQUID RADIOACTIVE WASTES IN SPECIAL TANKS. Sobolev, I.A.; Khomchik, L.M.; Mingatina, R.G.; Nazsryuk, A.G.; Bazhenov, Yu.M.; Khozyainov, V.A. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Results of investigations for determination and estimation of processes occuring in liquid radioactive wastes when long period storage (1 - 5 years) are stated. These investigations were conducted at the Central station for radiation safety. Results are given for determination of physical state of solutions in tanks depending on the depth of sampling and also on chemical composition of wastes and composition of gas - air mixture ower the solution surface. Results of radiochemical analysis of samples are given. On the grounds of the results of investigations, conclusions are made and recomendations are given concerning prolonged storage of highly concentrated radioactive liquid wastes. Prolonged storage of this type of wastes is recognized potentially dangerous and hence unacceptable.

1509 (INIS-mf--5571, pp 129-133)

NONSTATIONARY TEMPERATURE FIELDS ON DISPOSAL OF SOLID RADIOACTIVE WASTES OF HIGH ACTIVITY INTO GROUND. Verigin, N.N.; Martynov, Yu.P.; Kryukov, I.I. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

The method is given for calculation of the temperature developed by vitrificated high-activity wastes as a result of selfheating in burial into ground. Nonstationary method is applied in calculation of the temperature fields. Two nonstationary problems are considered for deepened burial sites of idealized shape of sphere and horizantally placed cylinder. External temperature field is taken into account particularly. The external temperature field plaid the main role in the temperature regime establishment in burial into ground. As an example, temperature calculations are given for bituminized product with inclusion of spent ion exchange rasines from nuclear power plant. The results are given obtained in calculation of the temperature of solidificated radioactive wastes in deepened burial site of spheric shape. The salculations has been done by stationary and non-stationary methods of calculations.

1510 (INIS-mf--5571, pp 122-128) SURFACE DEPOSITORIES FOR VITRIFICATED HIGH-ACTIVITY WASTES. Azamaeva, L.G.; Kondrat'ev, A.N.; Kryukov, I.I.; Kulichendo, V.V.; Martynov, Yu.P.; Paramoshkin, V.I.; Terekhov, V.G. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Influence of specific heat emission and permissible storage temperature of vitrificated wastes and also influence of methods of the wastes cooling on the degree of necessary reduction of the size of tanks for wastes storage are stated. Influence of the degree of the liquid wastes concentration during the process of vitrification on economy of waste storage in the stores of different types are discussed. Calculations were made for vitrificated wastes from the reactor fuel reprocessing plant. Dependence is given for permissible diameter of the container on specific heat emission and thermal stability of vitrificated wastes. Design of the store for vitrificated wastes is described in particular cooling system for containers. Two variants of the store cooling system are considered; air cooling system and water cooling system. Technical and economic estimations of the storage methods for vitrificated wastes are given.

1511 (INIS-mf--5571, pp 134-140) DEVELOPMENT OF A STAND-DEPOSITORY FOR STORAGE AND INVESTIGATION OF HIGH-ACTIVITY SOLID WASTES BEHAVIOUR. Kirillovich, A.P.; Grushanin, A.A.; Grachev, E.A.; Skiba, O.V.; Lavrinovich, Yu.G.; Yur'ev, V.G.; Kazmenko, V.D. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Problems are considered connected with development of experimental stand-depository for controlled storage and investigation of behaviour of high-activity wastes. Behaviour of the high-activity wastes from the fast reactor BOR-60 fuel reprocessing is examined. Actuality of the problem is caused by the specifity of solid wastes from fuel regeneration process by the gaseous fluoride method. These solid wastes have specific activity of order of tenths and hundreds of thousands of curi per kilogram. Design of the depository built in two variants, with air and water cooling, is described. Characteristics of the wastes subject to storage and results of calculations of dependance of container radius from specific heat emittance of wastes are given. Some methods are stated of ensuring safety of especially higly active wastes. The results are given of calculation of maximum after-heat for the depositiry and for selection of basic parameters and dementions of the depository for high-active wastes.

1512 (INIS-mf--5571, pp 145-150) RESULTS OF INVESTIGATIONS OF BEHAVIOUR OF HIGH-ACTIVITY SOLID WASTES AND THEIR COMPATIBILITY WITH STRUCTURAL MATERIALS OF PROTECTIVE AMPULES DURING LONG PERIOD STORAGE. Kirillovich, A.P.; Dem'yanovich, M.A.; Lavrinovich, Yu.G.; Skiba, O.V.; Gazizov, R.K.; Vorobei, M.P.; Starozhukov, D.I.; Belokopytov, V.S. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Some results are presented of investigations of properties and behaviour of high-activity wastes, produced during regeneration of the BOR-60 reactor fuel by gaseous-fluorine method. The following characteristics were determined: energy emittance; radiation and thermal resistance; thermal conductivity; fission products volatility; corrosion effects of wastes on structural materials. As samples of the structural materials, austenite- and carbon-steels and nickel were examined. Changes of wastes and container walls temperature as well as preasure changes inside container during the period of experiment were determined. The results are given of investigations of corrosion resistance of the tested structural materials samples depending on the temperature and wastes type. It has shown that corrosion of the structural materials depends on elevation of the temperature and humidity of medium.

1513 (INIS-mf--5571, pp 103-109) THERMAL, CHEMICAL AND RADIATION STABILITY OF VITRIFICATED RADIOACTIVE WASTES. Kulichenko, V.V.; Krylova, N.V.; Musatov, N.D.; Vlasov, V.I. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Ionizing radiation and elevated temperature influence on the changes of leaching rate of high-activity vitrificated wastes during long time storage were examined. In addition, possibilities of radionuclides delocalization to different rocks in condition out of contact with water was investigated. It has shown that possibilities of environmental contamination due to radionuclides diffusion from glass, for instance diffusion of strontium-90, during storage of solid radioactive materials was excluded. Data are given for determination of delocalization rate for cesium-137 and strontium-90 during storage of vitrificated wastes at different temperatures. It has been found that the delocalization rate for radionuclides at the room temperature considerably rised as a result of storage at the open air. Leaching process for radionuclides is little dependent on the storage temperature when materials are in contact with water. Reduction of chemical stability is explained by the structural

changes of compound. The X-ray phase analysis has shown that compounds structure considerably depended on annealing time at 900 and 1100 centigrades. Increase of the annealing time leads to sharp increase of chemical stability. It has shown that prospective materials for vitrification of wastes from fast reactors fuel elements reprocessing could be basalt- and pyroxene- like materials obtained on the basis of blast-furnace slags.

1514 (INIS-mf--5571, pp 86-89) PROJECT FOR BURIAL OF NUCLEAR POWER PLANT WASTES IN CZECHOSLOVAKIA. Marek, J.; Petr, Ya. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Problems of ensuring safety of radioactive wastes burial for nuclear power plants wastes produced during their exploitation are discussed. The research programm is stated directed towards investigation and determination of the method for desactivation of liquid radioactive wastes from nuclear power plants. Estimation of the following variants of radioactive wastes desactivation are given: storage of liquid radioactive wastes in underground tanks at the nuclear power plant territory; processing of the wastes and storage of solidificated wastes at the territiry of the nuclear power plant; processing of the wastes at the territory of nuclear power plant and storage of the solidificated wastes in the centralized store; processing and storage of the wastes at the territiry of centralized store outside of the territory of nuclear power plant. Volumes and characteristics of the wastes processed and methods of wastes processing are given. Technology of solidification of liquid wastes from nuclear power plants by bituminization and technology of solid wastes processing are stated. Problems of the processed wastes transportation and storage are considered.

1515 (INIS-mf--5572) RESEARCH ON DESACTIVATION OF LIQUID, SOLID AND GASEOUS RADIOACTIVE WASTES AND DECONTAMINATION OF SURFACES. PART 3. (Sovet Ehkonomicheskoj Vzaimopomoshchi, Moscow (USSR). Postoyanniya Komissiya po Ispol'zovaniyu Atomnoj Ehnergii v Mirnykh Tselyakh). 1978. 56p. (In Russian). (CONF-761260--(Pt.3)). NTIS (US Sales Only), PC A04/MF A01.

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Problems are discussed concerning burial of liquid wastes both in deep and in surface geological formations. Some problems are elucidated concerning ionizing radiations effects on sorptive properties of soils and effects of radioactive load on them, methods of calculations of temperature fields of radioactive wastes containing mediums. Express-methods are discribed for control of radionuclides migration in stratum-collectors. The data presented have been obtained as a result of many years industrial-scale operation of burial sites.

1516 (INIS-mf--5572, pp 29-33) EFFECT OF IONIZING RADIATION ON THE SORPTIVE CAPACITY OF SOILS. Balukova, V.D.; Kosareva, I.M. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Sorptive capacity of soils and rocks with respect to radionuclides was investigated. Sorption of radionuclides from the wastes, buried in surface soil or underground geological formations was examined. Soils and rocks are considered as natural sorbents having, in general, cation exchange properties. Radiochemical composition of the wastes investigated and calculated values of absorbed dose in system soil- waste are given. Effect of ionizing radiation on sorptive parameters of soils and rocks were determined. It has been established that sorptive capacity of soils or rocks encreased by the grouth of the absorbed dose during irradiation of the rock-solution system. During irradiation only the solid phase, sorptive capacity is decreasing. It has been established that there was effect of the medium of solution in which irradiation occured and changes of sorption capacity of soils and rocks was connected with changes of surface structure of minerals and their dispersity during irradiation.

1517 (INIS-mf--5572, pp 48-53) RADIATION BURDEN IN UNDERGROUND STORES AND METHODS FOR CONTROL OF SPECIFIC RADIONUCLIDES CONTENT. Balukova, V.L.; Kabakchi, S.A.; Kosareva, I.M. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

It has been shown that radiation load in the stratum-depository during burial of liquid high-activity wastes was determined by mineralogical characteristics of rocks, by sorptive parameters of minerals, by chemical and radiochemical properties of wastes and by the radioactivity level of wastes and effective porosity of rocks. Radiochemical composition of the wastes examined is given. Distribution of every radionuclide in the stratum is characterized by the parameter of sorption rate and by the parameter of sorption equilibrium. Equation is given for calculation of sorption rate and the experimental data are given for the limit of possible accumulation of separate elements on rocks formed by sandstones, during filtration throungh the wastes, containing different amouts of surplus nitric acid. Data are stated for the results on investigations of wastes radiolysis during burial, for measurements of dose rate in time, for nitric acid decomposition and gase emittance and also for the results of investigations of nuclides desorption from rocks surfaces as a result of their treatment by weak solution of nitric acid.

1518 (INIS-mf--5572, pp 11-23) CALCULATION OF THE TEMPERATURE FIELD DURING BURIAL OF RADIOACTIVE WASTES. Bottcher, A. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

The problem of temperature field estimation for burial of solid radioactive wastes in salt deposits is considered. The temperature field is estimated caused by burial regions in the whole deposit during long period of time and taking into account geological situation. While solving the problem, maximum heating at the centre of burial region and the maximum temperature for definite scheme of burial are determined. The mathematical models are formulated as boundary problems for differential equations in quotient derivatives. Calculations of variants are interpreted

relative to the main task: ensuring maximum safety with minimum expenditure. Several ways for solution of the thermal conduction equation for different models are concidered. Comparisons are given for the results of measuring in natural conditions and the results of calculated values. For calculation, specially compiled computer codes are used.

1519 (INIS-mf--5572, pp 34-37) CALCULATION OF TEMPERATURE FIELD OF MEDIA, CONTAINING RADIOACTIVE WASTES. Burmistrova, N.M.; Okun'kov, G.A.; Yudin, F.P. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Method is considered for calculation of a temperature field in rock during burial of liquid wastes with addition of cement by the method of hydraulic rapture of watertight stratum and also during burial of wastes in deep pits in the form of cylindric solid blocks. To simplify the problem, heat physics properties of surraunding rocks and also properties of solidificated radioactive wastes have been taken equal and constant. Methodology of the temperature field calculation and results of the temperature change, depending to time, obtained by calculations for radiation sources of different shape are given. Computations have been performed on computer.

1520 (INIS-mf--5572, pp 38-47) RADIOACTIVE WASTES BURIAL IN SURFACE GEOLOGICAL FORMATIONS. Dlougly, Eh.; Shafarzh, O. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

The task of the research was to check safety conditions of solidificated radioactive wastes burial and to select geological formations excluding essential diffusion of radionuclides into environment. By means of geological models, migration of radionuclides in some soils and their disperse properties were investigated. The results attained were checked in real conditions at the sites for construction of nuclear power plants. By means of classificational study of soils and rocks frequently met with in the surface geological formations, search was done for litological types having low permeability with high sorptive capacity. Demands for the radioactive wastes burial site and criterions for the waste disposal station site selection are stated. Basic parameters of burial site and some design solutions are given. Results of comparison of several methods for solidificated wastes burial are given. Lay-out of the burial site exploitation is given. The results are stated of investigations on radionuclides migration in surface formations.

1521 (IS-M--273) ISSUES RELEVANT TO NUCLEAR WASTE CANISTER MATERIALS. Scott, T.E. (Ames Lab., IA (USA)). 1980. Contract W-7405-ENG-82. 38p. (CONF-800305--7). Dep. NTIS, PC A03/MF A01.

From Corrosion/80 NACE meeting; Chicago, IL, USA (6 Mar 1980).

This paper focuses on the canister as a component of multibarrier systems for the containment and isolation of high-level radioactive wastes and spent fuel from nuclear reactor burning. It provides perspective for the role of canisters in the overall nuclear fuel cycle with special emphasis on the multibarrier concept of waste isolation. Attention is given to the chemical composition of wastes, waste forms, interim storage environments, and geologic isolation repository environments; these will all have to be considered in canister materials selection. In addition, other factors such as mechanical loads, radiation effects, and radioactive decay-heat generation rates are cited. The paper culminates with a summary of the author's opinion of the technical issues which need to be resolved before canisters can be considered viable components of a multibarrier system for geologic waste isolation.

1522 (JAB--00099-128) CONSIDERATIONS FOR DEVELOPING SEISMIC DESIGN CRITERIA FOR NUCLEAR WASTE STORAGE REPOSITORIES. Owen, G.N.; Yanev, P.I.; Scholl, R.E. (URS/John A. Blume and Associates, Engineers, San Francisco, CA (USA)). Apr 1980. Contract AC08-76DP00099. 73p. Dep. NTIS, PC A04/MF A01.

The function of seismic design criteria is to reduce the potential for hazards that may arise during various stages of the repository life. During the operational phase, the major concern is with the possible effects of earthquakes on surface facilities, underground facilities, and equipment. During the decommissioned phase, the major concern is with the potential effects of earthquakes on the geologic formation, which may result in a reduction in isolation capacity. Existing standards and guides or criteria used for the static and seismic design of licensed nuclear facilities were reviewed and evaluated for their applicability to repository design. This report is directed mainly toward the development of seismic design criteria for the underground structures of repositories. An initial step in the development of seismic design criteria for the underground structures of repositories is the development of performance criteria, or minimum standards of acceptable behavior. A number of possible damage modes are identified for the operating phase of the repository; however, no damage modes are foreseen that would perturb the long-term function of the repository, except for the possibility of increased permeability within the rock mass. Subsequent steps in formulating acceptable seismic design criteria for the underground structures involve the quantification of the design process. The report discusses the necessity of specifying the form of ground motion that would be needed for seismic analysis and the procedures that may be used for making ground motion predictions. Further discussions outline what is needed for analysis, including rock properties, failure criteria, modeling techniques, seismic hardening criteria for the host rock mass, and probabilistic considerations.

1523 (JAERI-M--7780) INTEGRITY DEMONSTRATION TEST OF RADIOACTIVE WASTE PACKAGES DEEP-SEA DISPOSAL. HANGING DOWN-DRAWING UP SEA TESTS OF MULTISTAGE TYPE AND MONOLITHIC SOLID TYPE PACKAGES. Seki, S.; Ouchi, K.; Hisa, I.; Ito, A.; Morishita, S. (Japan Atomic Energy Research Inst., Tokyo). Jul 1978. 41p. (In Japanese). Dep. NTIS (US Sales Only), PC A04/MF A01.

Hanging down-drawing up tests in the sea were carried out down to 5000m depth of the model wastes, i.e. D-50 multi-stage type package and monolithic solid type package (packed in M class drum). 1) Hanging down-drawing up tests in the sea were successful. 2) In consecutive photographing a D-50 multi-stage package in deep sea, clear photographs were

obtained. 3) For the D-50 multi-stage type package, visual inspection of the drum outside and lining outside and cross-section and the consecutive photographs, and for the cement monolithic solid type package, the visual inspection of the drum outside and solid outside, showed no problems in safety.

1524 (JAERI-M--7936) LEACHING OF TRITIUM FROM A CEMENT COMPOSITE. Matsuzuru, Hideo; Ito, Akihiko. (Japan Atomic Energy Research Inst., Tokyo). Oct 1978. 17p. (In Japanese). Dep. NTIS (US Sales Only), PC A03/MF A01.

Leaching of tritium from cement composites into an aqueous phase has been studied to evaluate the safety of incorporation of the tritiated liquid waste into cement. Leaching tests were performed by the method recommended by the International Atomic Energy Agency. The Leaching fraction was measured as functions of waste-cement ratio (Wa/C), temperature of leachant and curing time. The tritium leachability of cement in the long term test follows the order: alumina cement portland cement slag cement. The fraction of tritium leached increases with increasing Wa/C and temperature and decreasing curing period. A deionized water as a leachant gives a slightly higher leachability than synthetic sea water. The amount leached of tritium from a 200 l drum size specimen was estimated on the basis of the above results.

1525 (JAERI-M--8044) RADIOLOGICAL SAFETY STUDIES ON THE GROUND DISPOSAL OF RADIOACTIVE WASTES. DISTRIBUTION AND MIGRATION OF RADIONUCLIDES IN AN AERATED ZONE. Takebe, S.; Wadachi, Y. (Japan Atomic Energy Research Inst., Tokyo). Jan 1979. 19p. (In Japanese). Dep. NTIS (US Sales Only), PC A03/MF A01.

A fundamental study on the safety evaluation of ground disposal of radioactive wastes is reported. In order to reveal the behavior of radionuclides in an aerated zone, the distribution coefficient, distribution ratio and migration rate of ^{60}Co, ^{137}Cs and ^{90}Sr-^{90}Y were measured with a sand layer model apparatus. Each radionuclide shows a large distribution coefficient (unsaturated) in the acidic and small value in both the neutral and the alkaline condition. In pouring a radioactive aqueous solution into the sand layer, most of the radionuclide is adsorbed on the surface of sand layer and the distribution ratio decreases exponentialy towards the deeper layer. The migration rates of ^{60}Co, ^{137}Cs and ^{90}Sr-^{90}Y were calculated by Inoue's equation regarding the radionuclide migration in an aerated zone. Each migration rate is small in the acidic and large in the alkaline condition. These migration rates, however, are considerably smaller as compared with that of water itself: ^{60}Co ca. 1/100, ^{137}Cs ca. 1/10,000 and ^{90}Sr-^{90}Y ca. 1/1,000.

1526 (Juel--1581) INVESTIGATIONS OF TRITIATED WATER FIXATION IN SILICAGEL, ZEOLITES AND DIFFERENT TYPES OF CEMENT. Todorovic, M. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Chemische Technologie). Mar 1979. 9p. NTIS (US Sales Only), PC A03/MF A01.

The exchange of tritiated water fixed in zeolites, silicagel and different kinds of cement has been studied as well as the leach behaviour of cements, using IAEA standard method. From the experiments a leach factor L has been evaluated according to Bell's mathematical model.

1527 (KBS-TR--47, pp 78-96) THREE DIMENSIONAL MODEL OF GROUNDWATER FLOW GOVERNED BY TOPOGRAPHY. Stokes, J.; Thunvik, R. (Tekniska Hoegskolan, Stockholm (Sweden)). May 1978.

Investigations of groundwater flow in rock around repositories for nuclear waste.

As a complement to the two-dimensional computations for the Forsmark Area, a three-dimensional flow model was developed. In this model, which is a finite-element model, the conductivity is defined separately for each element. In this way fracture zones have been included as well as a conductivity varying in space. The results are presented as equipotentials, travel times and maps describing conditions of in- and out flow.

1528 (KBS-TR--47, pp 62-77) LOCAL GROUNDWATER DEPRESSION AROUND A REPOSITORY. Thunvik, R. (Tekniska Hoegskolan, Stockholm (Sweden)). May 1978.

Investigations of groundwater flow in rock around repositories for nuclear waste.

A two-dimensional flow analysis was made to study the effect on the groundwater table due to drainage of the storage tunnels during the construction resp. operation period. The net accretion to the phreatic surface was assumed evenly distributed in space and time. Numerical examples with equipotentials and consecutive positions of the phreatic surface are presented.

1529 (KBS-TR--49) ROCK STRESS MEASUREMENTS IN STRIPA MINE. Carlsson, H. (Kaernbraenslesaekerhet, Stockholm (Sweden)). Aug 1977. 27p. (In Swedish). Dep. NTIS (US Sales Only), PC A03/MF A01.

Rock stress measurements at 340 m levels of the Stripa Mine have been carried out with the Leeman tri-axial equipment. The largest principal stress is found to be 20.0 MPa and directed parallel with the strike of the granite. The intermediate principal stress is 11.5 MPa and directed almost horizontal and perpendicular to the contact. The minor principal stress has a magnitude of 5.4 MPa. The deduced vertical stress is approximately of the same value as can be theoretically calculated.

1530 (KBS-TR--109) LEACHABLE GAP ACTIVITIES. Devell, L.; Hesboel, R. (Kaernbraenslesaekerhet, Stockholm (Sweden)). Oct 1978. 26p. (In Swedish). Dep. NTIS (US Sales Only), PC A03/MF A01.

In the event of ground water penetration into fuel pins after ultimate disposal in crystalline rock a certain fraction of the volatile fission products iodine-129 and cesium-135 may be leached from the fuel within a shorter time period than the rest of the fuel. This fraction based on gap activities and leach experiments has been estimated to be: For BWR-fuel 0.1-1 per cent; and for PWR-fuel 1-10 per cent, for both isotopes.

1531 (KBS-TR--110) IN SITU EXPERIMENTS ON NUCLIDE MIGRATION IN FRACTURED CRYSTALLINE ROCKS. Landstroem, O.; Klockars, C.E.; Holmberg, K.E.; Westerberg, S.; Klockars, C.E. (Kaernbraenslesaekerhet, Stockholm (Sweden)). Jul 1978. 29p. Dep. NTIS (US Sales Only), PC A03/MF A01.

Nuclide migration in fractured rocks was studied in field experiments in a granite-gneissic outcrop within the Studsvik research

centre area. Radionuclides representing long-lived fission products of the elements selenium, technetium, tin, cesium, iodine, neodymiun and strontium were injected into a fracture zone intersecting one of the testholes at a depth of 72 metres below the ground surface. Concentration time curves of activities arriving at the pumping borehole were measured. The distance between the boreholes was 51 metres and the pumping rate 0.1 litre/s. The mean transit time and the dispersion coefficient for water were calculated to be 57 h and 8.8 m^2/h, respectively. The radioactivity measurement techniques included gammaspectrometric borehole logging, continuous activity measurements of pumped water and water sampling followed by laboratory analysis. Technetium and iodine travelled as anions with the same velocity as that of water. Strontium was retarded by a factor of about 6. Neither cesium nor neodymium could be detected. In a second series of experiments it was shown that the fracture system surrounding the injection borehole could be effectively grouted with bentonite. Subsequent tracer tests with strontium-85 showed that after more than twelve months all the injected activity still remained in the borehole. It was found that bentonite injection is a very effective way of reducing the radionuclide migration through strongly fractured rock.

1532 (KBS-TR--113, pp 1-48) REPORT ON STABILITY OF MINERALS AT HYDROTHERMAL CONDITIONS. Bergstroem, L. (Goeteborg Univ. (Sweden)). Sep 1978. (In Swedish).
Studies of ceramic materials for incapsulation of high-active waste.
In the first part of this report summarizing discussions and recommendations are given while a literature survey together with references are presented in the second part.

1533 (KBS-TR--113, pp 1-7) PROPOSAL OF MATERIALS FOR THE STORAGE OF RADIOACTIVE WASTES. Carlsson, R. (Svenska Silikatforskningsinstitutet, Goeteborg (Sweden)). Sep 1978. (In Swedish).
Studies of ceramic materials for incapsulation of high-active waste.
On the basis of a literature study concerning the chemical stability of ceramics as well as of different experiencies of persons working with ceramics in Sweden a proposal of candidate materials for the storage of radioactive wastes is presented. Advantages and disadvantages in connection with the use of different ceramics have been tabulated.

1534 (KBS-TR--113, pp 1-16) AL_2O_3 SAMPLES EXPOSED TO SIMULATED UNDERGROUND WATER HAVE BEEN INVESTIGATED BY ELECTRON SPECTROSCOPY FOR CHEMICAL ANALYSIS (ESCA). Olefjord, I.; Rilby, U. (Chalmers Tekniska Hoegskola, Goeteborg (Sweden)). Sep 1978. (In Swedish).
Studies of ceramic materials for incapsulation of high-active waste.
Al_2O_3 samples, which have been exposed to simulated underground water during 30, 100 and 268 days at a temperature of 90 deg C and with pH=8.5, have been studied by ESCA (Electron Spectroscopy for Chemical Analysis). This technique was chosen due to its surface sensitivity and the possibilities to obtain information on the chemical condition of the surface layer and its thickness. Synthetic oxides and hydroxides as well as their correspondences normally formed on metals have also been studied.

1535 (KBS-TR--113, pp 1-8) STUDY WITH AUGER ELECTRON SPECTROSCOPY OF A NUMBER OF CERAMIC SPECIMENS AFTER LEACHING. Leygraf, C.; Hultquist, G. (Tekniska Hoegskolan, Stockholm (Sweden)). Sep 1978. (In Swedish).
Studies of ceramic materials for incapsulation of high-active waste.
A number of ceramic specimens have been investigated with Auger electron spectroscopy in order to make chemical analyses of the remaining ceramic surfaces after leaching or of the leaching product outside the surfaces.

1536 (KBS-TR--114) GAMMA-RADIOLYSIS OF ORGANIC COMPOUNDS AND ALPHA-RADIOLYSIS OF WATER. Christensen, H. (Kaernbraenslesaekerhet, Stockholm (Sweden)). Sep 1978. 32p. (In Swedish, English). Dep. NTIS (US Sales Only), PC A03/MF A01.
This KBS-report is a collection of five technical reports. Various radiolytic problems in connection with the disposal of high-active waste are dealt with. The English titles of the five reports are: 1) Radiolysis of fulvic acids; 2) Radiolysis of organic compounds in bentonite; 3) α-radiolysis of water during the disposal of fuel without reprocessing; 4) Radiolysis of water during the disposal of unreprocessed spent fuel. Oxidation by hydrogen peroxide; 5) Formation and decomposition of hydrogen peroxide by α-radiolysis. These reports (in Swedish) are attached as Appendices A-E.

1537 (KBS-TR--119) FINAL STORAGE IN CONCRETE OF ACTIVATED METAL PARTS. Romben, L.; Tuutti, K. (Kaernbraenslesaekerhet, Stockholm (Sweden)). Jul 1978. 42p. (In Swedish). Dep. NTIS (US Sales Only), PC A04X/MF A01.
A part of the medium-level nuclear waste problem is the disposal of metal parts which have been activated during use in nuclear reactors. Some alloys contain Ni-59 with a half-life or 75000 years. A proposed method for final disposal consists in storing the waste in rock tunnels at a depth of 300-500 m inside containers which are surrounded by a buffer consisting of compacted quartz-bentonite mixture. This paper deals with the possibilities to use containers made of concrete and designed as cubic boxes enclosing the waste material cast and incorporated into cement mortar matrix. Special regard is given to the containment problem in relation to the mechanical and chemical processes that are operating. A calculation of the rate of release of Ni-59 through the walls of a container has given a figure of about 10^{-5} kg Ni per year for undeteriorated container walls. In 6 appendices the sizes of different quantities describing the mechanical and chemical processes which are operating in this containment problem are given.

1538 (KBS-TR--120) SOME NOTES IN CONNECTION WITH THE KBS STUDIES OF FINAL DISPOSAL OF SPENT FUEL. (Kaernbraenslesaekerhet, Stockholm (Sweden)). Sep 1978. 39p. Dep. NTIS (US Sales Only), PC A03/MF A01.
Individual papers were abstracted separately.

1539 (KBS-TR--120, pp 16-19) NOTE ON THE CONSEQUENCE OF HYDROGEN PRODUCTION IN THE REPOSITORY. Neretnieks, I. (Kungliga Tekniska Hoegskolan, Stockholm (Sweden)). Sep 1978.
Some notes in connection with the KBS studies of final disposal of spent fuel.
Hydrogen may be produced in the copper

capsule by zircalloy-corrosion and by radiolysis. Hydrogen diffuses slowly in compacted bentonite. If the production of hydrogen is fast it will not have time to escape by diffusion at the same rate at which it is produced. A gas bubble may form. In the present work it is concluded that no grave consequences are expected if escaping hydrogen opens a channel in the clay and in the rock.

1540 (KFK--2552) CHEMICAL COMPATIBILITY OF HLW BOROSILICATE GLASSES WITH ACTINIDES. SOLUBILITIES AND SEGREGATION PROCESSES. Walker, C.T.; Scheffler, K.; Riege, U. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Entsorgungstechnik; Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Wiederaufarbeitung und Abfallbehandlung). Nov 1978. 23p. (EUR--5750e; PWA--90/78). Dep. NTIS (US Sales Only), PC A03/MF A01.

During liquid storage of HLLW the formation of actinide enriched sludges is being expected. Also during melting of HLW glasses an increase of top-to-bottom actinide concentrations can take place. Both effects have been studied. Besides, the vitrification of plutonium enriched wastes from Pu fuel element fabrication plants has been investigated with respect to an isolated vitrification process or a combined one with the HLLW. It is shown that the solidification of actinides from HLLW and actinide waste concentrates will cause no principal problems. The leaching of actinides has been measured in salt brine at 23°C and 115°C.

1541 (KFK--2750, pp 4600-1-4600-4) PROCESS-DEVELOPMENT AND IMPROVEMENT OF OFF GAS FILTERS FOR REPROCESSING PLANTS. Furrer, J.; Barth, H.; Herrmann, R.; Hunsinger, H.; Linek, A.; Oberst, R. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Lab. fuer Aerosolphysik und Filtertechnik 2). Oct 1979. (In German).

Semiannual report 1978/2.

The PASSAT facility was commissioned without major technical problems. The equipment for droplet generation and measurement could be calibrated. First investigations of the removal by prototype fiber package units, using droplets of about 1-10 μm diameter, yielded high retention factors for water droplets. At nitrogen monoxide concentrations up to 1 vol.% in pure nitrogen as the carrier gas and with 24 h of expourse at test bed temperatures of 130°C and 150°C noticeable effects have not been found on the loading capacity and iodine removal of the AC 6120-12% Ag iodine sorption material.

1542 (KFK--2750, pp 4600-26-4600-33) INVESTIGATIONS FOR THE KR-85 STORAGE. Penzhorn, R.D.; Noppel, H.E. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Radiochemie); Borgstedt, H.U. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Material- und Festkoerperforschung 1). Oct 1979. (In German).

Semiannual report 1978/2.

First results on the corrosion by Rb and Rb_2O on the inner wall of stainless steal pressure cylinders (material Nr. 1.4306 and 1.4301) and welds (material Nr. 1.4316) under 100 bar Ar pressure after 3000 h at 150°C were obtained. The fixation of noble gases in zeolites was investigated as an alternative to the storage of Kr-85 in pressure cylinders.

1543 (KFK--2798) NEUTRON WELL COUNTER FOR PLUTONIUM ASSAY IN 200 L WASTE DRUMS. Eyrich, W.; Kuechle, M.; Shafiee, M. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik; Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Spaltstoffflusskontrolle). May 1979. 20p. Dep. NTIS (US Sales Only), PC A03/MF A01.

A neutron well counter is briefly described which will be used for monitoring the plutonium content of 200 l barrels in the waste treatment plant of the Kernforschungszentrum Karlsruhe. Measurements on simulated waste were made to study the influence of matrix material and non-homogeneous plutonium distribution. The variation in detection efficiency could be reduced from 28% to 10% when the signals from inner and outer neutron detectors in the polyethylene annulus are counted separately and a correction is applied, using this information. This method is superior to the source addition technique. Coincidence counting shows a larger variation which could not be reduced to below 18%.

1544 (KFK--2857) CALCULATIONS ON HEAT GENERATION AND TEMPERATURE RISE DURING STORAGE AND SOLIDIFICATION OF MLW/LLW IN LARGE CAPACITY CAVERNS. REFERENCE SYSTEMS A AND B OF THE IN-SITU-PROJECT. Hauser, W.; Smailos, E.; Koester, R. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Entsorgungstechnik). Sep 1979. 31p. (In German). NTIS (US Sales Only), PC A03/MF A01.

Investigations were made on the conditions under which the containerless final disposal of liquid radioactive MLW/LLW (in-situ project) from the back-end fuel cycle center in caverns of 82 500 m^3 (and 134 000 m^3, respectively) capacity (reference systems A and B) about 1 000 m below ground level will be feasible without involving problems of heating. The waste product to be introduced by layers via a vertical pipeline in reference system A consists of a cemented granulated material (diameter about 10 mm) containing the MLW/LLW concentrate, and a cementitious grout mixed with tritium effluents, which serves as the filler material. In reference system B the cemented MLW/LLW concentrate is packed into 200-400 l units. The maximum permissible temperature for the waste product is fixed at 90°C for reasons of product quality. Calculations have been performed on the temperature rise in the product due to the decay heat and the heat of setting of cements in the caverns. The calculations were related to the degree of solidification of the preconditioned granulated material and to cements of different hydratation heats (Portland cement 350 F, blast-furnace cement), to different sand admixtures in the grout and to different rates of storing. It could be shown that under the aspect of heat generation both reference systems are suited in principle for storing the MLW/LLW considered here, provided that following assumption are made: 1) complete setting of the granulated material prior to filling; 2) high sand content in the grout; 3) storage by thin layers of the waste product amount produced every year.

1545 (LA--7931-PR) STUDIES OF TRANSURANIC WASTE STORAGE UNDER CONDITIONS EXPECTED IN THE WASTE ISOLATION PILOT PLANT (WIPP). INTERIM SUMMARY REPORT, OCTOBER 1, 1977-JUNE 15, 1979. Kosiewicz, S.T.; Barraclough, B.L.; Zerwekh, A. (Los Alamos Scientific Lab., NM (USA)). Jan 1980. Contract W-7405-ENG-36. 33p. Dep. NTIS, PC A03/MF A01.

The major focus of the program has been on

the gas generation potential of organic wastes produced by radiolytic and thermal degradation under simulated WIPP storage conditions. The effects of TRU contamination level, temperature, waste type, pressure, and exposure time on radiolysis are presented. In addition, results from preliminary experiments on processed sludge dewatering are discussed. A summary is presented here of the results of a detailed study of all retrievably stored TRU wastes present at LASL before January 1, 1978. The data indicate a gross volume for the LASL inventory of 1610 m^3 with a total weight of nearly 1.24×10^6 kg (1240 metric tonnes). The dominant radionuclide contents of the waste are plutonium (primarily ^{239}Pu) and americium.

1546 (LA--7974-PR) RESEARCH AND DEVELOPMENT RELATED TO NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS. PROGRESS REPORT, APRIL 1-JUNE 30, 1979. Wolfsberg, K. (comp.). (Los Alamos Scientific Lab., NM (USA)). Aug 1979. Contract W-7405-ENG-36. 14p. Dep. NTIS, PC A02/MF A01.

Geochemical laboratory support for Subtask 3.2.2, Tuff Media Investigations; geologic support for Subtask 2.5, Tectonics, Seismicity, and Volcanism; and administrative support for Subtask 5.2, Quality Control are presented. Mineralogic-petrologic examination of material from Yucca Mountain hole UE25Anumber1 is nearing completion. Sorption measurements on tuff from holes J-13 and UE25Anumber1 are continuing with both natural and synthetic ground waters and under aerobic and anoxic conditions. Column work is continuing. A standardized batch procedure for Am and Pu has been adopted. A preliminary probability analysis has been performed for volcanic hazards of the Crater Flats basalts.

1547 (LA--8049-MS) PRELIMINARY CONCEPTS: MATERIALS MANAGEMENT IN AN INTERNATIONALLY SAFEGUARDED NUCLEAR-WASTE GEOLOGIC REPOSITORY. Ostenak, C.A.; Whitty, W.J.; Dietz, R.J. (Los Alamos Scientific Lab., NM (USA)). Nov 1979. Contract W-7405-ENG-36. 66p. Dep. NTIS, PC A04/MF A01.

Preliminary concepts of materials accountability are presented for an internationally safeguarded nuclear-waste geologic repository. A hypothetical reference repository that receives nuclear waste for emplacement in a geologic medium serves to illustrate specific safeguards concepts. Nuclear wastes received at the reference repository derive from prior fuel-cycle operations. Alternative safeguards techniques ranging from item accounting to nondestructive assay and waste characteristics that affect the necessary level of safeguards are examined. Downgrading of safeguards prior to shipment to the repository is recommended whenever possible. The point in the waste cycle where international safeguards may be terminate depends on the fissile content, feasibility of separation, and practicable recoverability of the waste: termination may not be possible if spent fuels are declared as waste.

1548 (LA--8088-PR) LABORATORY STUDIES OF RADIONUCLIDE DISTRIBUTIONS BETWEEN SELECTED GROUNDWATERS AND GEOLOGIC MEDIA. ANNUAL REPORT, OCTOBER 1, 1978-SEPTEMBER 30, 1979. Erdal, B.R. (comp.). (Los Alamos Scientific Lab., NM (USA)). Feb 1980. Contract W-7505-ENG-36. 91p. Dep. NTIS, PC A05/MF A01.

Extensive studies of the behavior of plutonium and americium in pH approx. = 8 groundwaters were made, particularly with respect to container sorption, filtering, and centrifugation. Significant improvements in the method used for measuring sorption ratios for these elements were developed, and their sorption-desorption ratios on argillite and tuff were measured. Effects of particle size, temperature, sampling location, mineralogy, and time were investigated for these elements. The chemical composition of the water was found to be a major factor that governs sorption behavior. Studies of the sorption of strontion, cesium, barium, cerium, europium, uranium, and americium on Hainesville salt dome materials were made under aerobic and anoxic (<0.2 ppM oxygen) conditions using two synthetic groundwaters: one represented the Wilcox aquifer in the Hainesville region and the second was a dilute brine. Studies of the sorption of strontium, cesium, barium, cerium, europium, and uranium(VI) on granite and argillite were made under anoxic (<0.2 ppM oxygen) conditions and the results were compared to earlier measurements made under aerobic conditions. The sorption of uranium(VI) on argillite under atmospheric conditions was investigated. Measurements of migration rates in crushed granite, argillite, and tuff were made and compared with batch results. Infiltration experiments involving the forced injection of activity into intact and fractured cores were also performed. Microautoradiographic techniques were used to detect specific sorption sites. This latter technique was also used to characterize the sorption of plutonium and neptunium on polished thin-sections of alluvium, granite, tuff, and argillite and to assess the amount of aggregation that occurred. Additional physical and chemical characterizations of the materials used in these studies were made, and new analytical techniques were developed.

1549 (LA--8110-MS) SORPTION-DESORPTION STUDIES ON TUFF. II. CONTINUATION OF STUDIES WITH SAMPLES FROM JACKASS FLATS, NEVADA AND INITIAL STUDIES WITH SAMPLES FROM YUCCA MOUNTAIN, NEVADA. Vine, E.N.; Aguilar, R.D.; Bayhurst, B.P. (Los Alamos Scientific Lab., NM (USA)). Jan 1980. Contract W-7405-ENG-36. 75p. Dep. NTIS, PC A04/MF A01.

Distruibution coefficients were determined by a static (batch) technique for sorption-desorption of radionuclides between tuffs from drill holes UE25a No. 1 and J-13 at the Nevada Test Site and water from well J-13. Measurements were performed under atmospheric and controlled atmosphere conditions. Under atmospheric conditions tuffs high in zeolite minerals had sorption ratios of approx. 10^3 to 10^4 ml/g with Sr, Cs, Ba, Ce, Eu, Am, and Pu. For tuffs similar mineralogically to a microgranite the sorption ratios were approx. 10^2 to 10^3 ml/g. Values for U and Tc were obtained under controlled atmosphere (< 0.2 ppM O_2) conditions. Studies were also begun to measure distribution ratios by a dynamic (column) technique. The ratios obtained for the elements studied, Sr, Cs, and Ba, were similar to, although lower than, those obtained by batch methods.

1550 (LA--8152-PR) RESEARCH AND DEVELOPMENT RELATED TO THE NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS. PROGRESS REPORT, JULY 1-SEPTEMBER 30, 1979. Crowe, B.M. (comp.). (Los Alamos Scientific Lab., NM (USA)). Nov 1979. Contract W-7405-ENG-36. 14p. Dep. NTIS, PC A02/MF A01.

Sorption under anoxic conditions is reported for core samples of tuff from exploratory drill hole UE25a-1. Sorption for Sr, Cs, Ba, Ce, and Eu is somewhat lower in pure nitrogen than in ambient atmosphere, but generally by less than

a factor of two. U and Tc sorb poorly in nitrogen; however, an increase over atmospheric conditions is noted for Tc. Final results for sorption of Pu and Am on core samples from drill hole J-13 are presented, and problems with Am are discussed. Ground water composition is found to be a major factor in sorption. Autoradiography indicates that Pu sorbs indiscriminately on rock thin sections and that Np deposits in aggregate form. Zeolite minerals are present within two distinct horizons of tuff in the stratigraphic section penetrated by exploratory drill hole UE25a-1. The horizons occur in low density tuff (partially to nonwelded and bedded tuff) within the lower part of and stratigraphically below Paintbrush Tuff. Zeolite minerals include clinoptilotite and minor amounts of low silica, high alkali mordenite. The zeolite is characteristic of low temperature (<100°C) ground water alteration of glass in an open hydrologic system. Prototype containment vessels for the hydrothermal soak tests have been assembled and tested. Regional studies of the occurrence and tectonic setting of Plio-Pleistocene age basaltic volcanic centers of the southern Great Basin are in progress. Revised volcanic disruption probability calculations for a 60-km radius circle around Yucca Mountain fall into the range of 10^{-9}/year. Petrographic and geochemical data for the basalts of Crater Flat show a strong control of basalt type with structural setting. Models of crystal-liquid fractionation of the basalts of Crater Flat using observed phenocryst phases cannot account for chemical variations of basalt types.

1551 (LA--8177) ENVIRONMENTAL SAMPLING PROGRAM FOR A SOLAR EVAPORATION POND FOR LIQUID RADIOACTIVE WASTES. Romero, R.; Gunderson, T.C.; Talley, A.D. (Los Alamos Scientific Lab., NM (USA)). Apr 1980. Contract W-7405-ENG-36. 10p. NTIS, PC A02/MF A01.

Los Alamos Scientific Laboratory (LASL) is evaluating solar evaporation as a method for disposal of liquid radioactive wastes. This report describes a sampling program designed to monitor possible escape of radioactivity to the environment from a solar evaporation pond prototype constructed at LASL. Background radioactivity levels at the pond site were determined from soil and vegetation analyses before construction. When the pond is operative, the sampling program will qualitatively and quantitatively detect the transport of radioactivity to the soil, air, and vegetation in the vicinity. Possible correlation of meteorological data with sampling results is being investigated and measures to control export of radioactivity by biological vectors are being assessed.

1552 (LA--8210-PR) LABORATORY STUDIES OF RADIONUCLIDE DISTRIBUTIONS BETWEEN SELECTED GROUNDWATERS AND GEOLOGIC MEDIA. PROGRESS REPORT, OCTOBER 1-DECEMBER 31, 1979. Erdal, B.R. (comp.). (Los Alamos Scientific Lab., NM (USA)). Mar 1980. Contract W-7405-ENG-36. 49p. Dep. NTIS, PC A03/MF A01.

This report presents the Los Alamos Scientific Laboratory contribution to the Waste/Rock Interactions Technology program. The majority of the effort involved extensive studies under reduced oxygen and carbon dioxide conditions, measurements of isotherms, microautoradiographic studies, and migration rate studies. Efforts to estimate uranium, plutonium, and neptunium solubilities were initiated.

1553 (LA--8224-PR) STUDIES OF TRANSURANIC WASTE STORAGE UNDER CONDITIONS EXPECTED IN THE WASTE ISOLATION PILOT PLANT (WIPP). PROGRESS REPORT, OCTOBER 1-DECEMBER 31, 1979. Kosiewicz, S.T.; Zerwekh, A. (Los Alamos Scientific Lab., NM (USA)). Mar 1980. Contract W-7405-ENG-36. 8p. Dep. NTIS, PC A02/MF A01.

This is the ninth quarterly report describing progress in an experimental program to determine the effects of radiolytic, thermal, and catalyzed thermal degradation of various forms of existing or developmental transuranic wastes proposed for Waste Isolation Pilot Plant emplacement. We conclude that there is no dose rate dependency for the radiolysis of cellulosics. Data from desiccation experiments indicate that 8% of the contained water in process sludge is mildly bound.

1554 (LA--8230-MS) HEAT PIPE COOLING SYSTEM FOR UNDERGROUND, RADIOACTIVE WASTE STORAGE TANKS. Cooper, K.C.; Prenger, F.C. (Los Alamos Scientific Lab., NM (USA)). Feb 1980. Contract W-7405-ENG-36. 21p. Dep. NTIS, PC A02/MF A01.

An array of 37 heat pipes inserted through the central hole at the top of a radioactive waste storage tank will remove 100,000 Btu/h with a heat sink of 70°F atmospheric air. Heat transfer inside the tank to the heat pipe is by natural convection. Heat rejection to outside air utilizes a blower to force air past the heat pipe condenser. The heat pipe evaporator section is axially finned, and is constructed of stainless steel. The working fluid is ammonia. The finned pipes are individually shrouded and extend 35 ft down into the tank air space. The hot tank air enters the shroud at the top of the tank and flows downward as it is cooled, with the resulting increased density furnishing the pressure difference for circulation. The cooled air discharges at the center of the tank above the sludge surface, flows radially outward, and picks up heat from the radioactive sludge. At the tank wall the heated air rises and then flows inward to comple the cycle.

1555 (LA--8297-PR) POTENTIAL MICROBIAL IMPACT ON TRANSURANIC WASTES UNDER CONDITIONS EXPECTED IN THE WASTE ISOLATION PILOT PLANT (WIPP). ANNUAL REPORT, OCTOBER 1, 1978-SEPTEMBER 30, 1979. Barnhart, B.J.; Campbell, E.W.; Martinez, E.; Caldwell, D.E.; Hallett, R. (Los Alamos Scientific Lab., NM (USA)). Jul 1980. Contract W-7405-ENG-36. 27p. NTIS, PC A03/MF A01.

Previous results were confirmed showing elevated frequencies of radiation-resistant bacteria in microorganisms isolated from shallow transuranic (TRU) burial soil that exhibits nanocurie levels of beta and gamma radioactivity. Research to determine whether plutonium could be methylated by the microbially produced methyl donor, methylcobalamine, was terminated when literature and consulting radiochemists confirmed that other alkylated transuranic elements are extremely short-lived in the presence of oxygen. Emphasis was placed on investigation of the dissolution of plutonium dioxide by complex formation between plutonium and a polyhydroxamate chelate similar to that produced by microorganisms. New chromatographic and spectrophotometric evidence supports previous results showing enhanced dissolution of alpha radioactivity when ^{239}Pu dioxide was mixed with the chelate Desferol. Microbial degradation studies of citrate, ethylenediamine tetraacetate (EDTA), and nitrilo triacetate (NTA) chelates of europium are in progress. Current results are summarized. All of the

chelates were found to degrade. The average half-life for citrate, NTA, and EDTA was 3.2, 8.0, and 28 years, respectively. Microbial CO_2 generation is also in progress in 72 tests on several waste matrices under potential WIPP isolation conditions. The mean rate of gas generation was 5.97 μg CO_2/g waste/day. Increasing temperature increased rates of microbial gas generation across treatments of brine, varying water content, nutrient additions, and anaerobic conditions. No microbial growth was detected in experiments to enumerate and identify the microorganisms in rocksalt cores from the proposed WIPP site. This report contains the year's research results and recommendations derived for the design of safe storage of TRU wastes under geologic repository conditions.

1556 (LA--8339-PR) LABORATORY STUDIES OF RADIONUCLIDE DISTRIBUTIONS BETWEEN SELECTED GROUNDWATERS AND GEOLOGIC MEDIA. PROGRESS REPORT, JANUARY 1-MARCH 31, 1980. Erdal, B.R. (comp.). (Los Alamos Scientific Lab., NM (USA)). May 1980. Contract W-7405-ENG-36. 55p. NTIS, PC A04/MF A01.

This report covers the technical activities on Waste-Rock Interactions and Technology (WRIT) contracts B-A2377-A-K and 78996-A-K to the Los Alamos Scientific Laboratory. Much of the activity during the second quarter of FY-80 involved those sorption studies needed to extend the current data base for tuff, to continue studies of sorption isotherms, to continue chemical analysis and characterization techniques, to continue studies using the microautoradiographic technique, and to continue measurements of migration rates in crushed and fractured materials. Finally, preparation of status reports has involved appreciable effort.

1557 (LA--8345-PR) STUDIES OF TRANSURANIC WASTE STORAGE UNDER CONDITIONS EXPECTED IN THE WASTE ISOLATION PILOT PLANT (WIPP). PROGRESS REPORT, JANUARY 1-MARCH 25, 1980. Kosiewicz, S.T.; Zerwekh, A. (Los Alamos Scientific Lab., NM (USA)). Jul 1980. Contract W-7405-ENG-36. 13p. NTIS, PC A02/MF A01.

This is the tenth and final progress report in an experimental program to determine the effects of radiolytic, thermal, and catalyzed thermal degradation of various forms of existing or developmental transuranic (TRU) wastes proposed for Waste Isolation Pilot Plant (WIPP) emplacement. This report contains short conclusions on all phases of research conducted during this program. Several journal publications are in various stages of the publication process. All contract requirements were met or exceeded.

1558 (LA--8422-MS) RADIOCHEMICAL ANALYSES OF SAMPLES FROM BENEATH A SOLID RADIOACTIVE WASTE DISPOSAL PIT AT LOS ALAMOS, NEW MEXICO. Purtymun, W.D.; Rogers, M.A.; Wheeler, M.L. (Los Alamos Scientific Lab., NM (USA)). Jun 1980. Contract W-7405-ENG-36. 18p. NTIS, PC A02/MF A01.

Solid radioactive wastes are disposed of by burial in pits excavated in rhyolite tuff at the Los Alamos Scientific Laboratory (LASL). Contaminants in the waste include fission products, uranium, and transuranic elements. In 1976, horizontal core holes were drilled beneath a waste disposal pit that was used from 1963 to 1966. Samples of the core were analyzed for gross alpha, gross beta, total uranium, ^{90}Sr, ^{137}Cs, ^{238}Pu, $^{239,240}Pu$, and ^{241}Am. The measured gross alpha, gross beta, and uranium concentrations were above minimum detection limits; concentrations of the remaining radionuclides, all of which are man-made isotopes, were below the minimum detection limits. Statistical comparisons were made of the gross alpha, gross beta, and uranium data to identify any significant variations from natural concentrations in the tuff. The comparisons demonstrated that none of the radioactivity detected in the samples can be attributed to migration from the disposal pit.

1559 (LA--8472-PR) LABORATORY STUDIES OF RADIONUCLIDE DISTRIBUTIONS BETWEEN SELECTED GROUNDWATERS AND GEOLOGIC MEDIA. QUARTERLY TECHNICAL PROGRESS REPORT, APRIL 1-JUNE 30, 1980. Erdal, B.R. (comp.). (Los Alamos Scientific Lab., NM (USA)). Sep 1980. Contract W-7405-ENG-36. 30p. NTIS, PC A03/MF A01.

This quarterly report presents the Los Alamos Scientific Laboratory contribution to the Waste-Rock Interactions Technology program, Tasks 3 and 4, for the third quarter of FY-1980.

1560 (LA-UR--79-2992) PARAMENTERS AFFECTING RADIONUCLIDE MIGRATION IN GEOLOGIC MEDIA. Erdal, B.R.; Bayhurst, B.P.; Daniels, W.R. (Los Alamos Scientific Lab., NM (USA)). 1979. Contract W-7405-ENG-36. 11p. (CONF-791112--23). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

Adsorption of several nuclides (Sr, Tc, Cs, Ba, Ce, Eu) on tuff, monzonite, and argillite was studied experimentally. 3 tables. (DLC)

1561 (LA-UR--80-437) LABORATORY STUDIES OF RADIONUCLIDE DISTRIBUTIONS BETWEEN SELECTED GROUNDWATERS AND GEOLOGIC MEDIA. Erdal, B.R. (ed.). (Los Alamos Scientific Lab., NM (USA)). 1980. Contract W-7405-ENG-36. 91p. Dep. NTIS, PC A05/MF A01.

Extensive studies of the behavior of plutonium and americium in pH 8 groundwaters were made, particularly with respect to container sorption, filtering, and centrifugation. Significant improvements in the method used for measuring sorption ratios for these elements were developed, and their sorption-desorption ratios on argillite and tuff were measured. Effects of particle size, temperature, sampling location, mineralogy, and time were investigated for these elements. The chemical composition of the water was found to be a major factor that governs sorption behavior for some elements. Studies of the sorption of strontium, cesium, barium, cerium, europium, uranium, and americium on Hainesville salt dome materials were made under aerobic and anoxic (< 0.2 ppm oxygen) conditions using two synthetic groundwaters: one represented the Wilcox aquifer in the Hainesville region and the second was a dilute brine. Studies of the sorption of strontium, cesium, barium, cerium, europium, and uranium(VI) on granite and argillite were made under anoxic (< 0.2 ppm oxygen) conditions and the results were compared to earlier measurements made under aerobic conditions. The sorption of uranium(VI) on argillite under atmospheric conditions was investigated. Measurements of migration rates in crushed granite, argillite, and tuff were made and compared with batch results. Infiltration experiments involving the forced injection of activity into intact and fractured cores were also performed. Microautoradiographic techniques were used to detect specific sorption sites. This latter technique was also used to characterize the sorption of plutonium and neptunium on polished

thin-sections of alluvium, granite, tuff, and argillite and to assess the amount of aggregation that occurred. Additional physical and chemical characterizations of the materials used in these studies were made, and new analytical techniques were developed.

1562 (LBL--7061) CALCULATED THERMALLY INDUCED DISPLACEMENTS AND STRESSES FOR HEATER EXPERIMENTS AT STRIPA, SWEDEN. LINEAR THERMOELASTIC MODELS USING CONSTANT MATERIAL PROPERTIES. Chan, T.; Cook, N.G.W. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.; California Univ., Berkeley (USA). Dept. of Materials Science and Mineral Engineering). Dec 1979. Contract W-7405-ENG-48. 133p. (SAC--22). NTIS, PC A07/MF A01.

Thermally induced displacements and stresses have been calculated by finite element analysis to guide the design, operation, and data interpretation of the in situ heating experiments in a granite formation at Stripa, Sweden. There are two full-scale tests with electrical heater canisters comparable in size and power to those envisaged for reprocessed high level waste canisters and a time-scaled test. To provide a simple theoretical basis for data analysis, linear thermoelasticity was assumed. Constant (temperature-independent) thermal and mechanical rock properties were used in the calculations. These properties were determined by conventional laboratory testing on small intact core specimens recovered from the Stripa test site. Two-dimensional axisymmetric models were used for the full-scale experiments, and three-dimensional models for the time-scaled experiment. Highest compressive axial and tangential stresses are expected at the wall of the heater borehole. For the 3.6 kW full-scale heated experiment, maximum compressive tangential stress was predicted to be below the unconfined compressive strength of Stripa granite, while for the 5 kW experiment, the maximum was approximately equal to the compressive strength before the concentric ring of eight 1 kW peripheral heaters was activated, but would exceed that soon afterwards. Three zones of tensile thermomechanical stresses will occur in each full-scale experiment. Maximum vertical displacements range from a fraction of a millimeter over most of the instrumented area of the time-scaled experiment to a few millimeters in the higher-power full-scale experiment. Radial displacements are typically half or less than vertical displacements. The predicted thermomechanical displacements and stresses have been stored in an on-site computer to facilitate instant graphic comparison with field data as the latter are collected.

1563 (LBL--7083) CHARACTERIZATION OF DISCONTINUITIES IN THE STRIPA GRANITE. TIME-SCALE HEATER EXPERIMENT. Thorpe, R. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Jul 1979. Contract W-7405-ENG-48. 110p. Dep. NTIS, PC A06/MF A01.

The report describes the methodology and results of a detailed study of geologic discontinuities associated with the time-scale heater test at the Stripa mine in Sweden. Mapping of the floor of the experiment tunnel coupled with observation of core samples from beneath the drift indicate that four N-striking shear fractures dip steeply through the 6 x 10 x 25-m rock mass. Oblique-thrust faulting has produced displacements of up to 2 m on one of the surfaces, and its inferred 3-D configuration is consistent with observed slickensiding. Resolution of locally measured principal stresses on the shear plane yields a theoretical shear direction that also coincides with the slickensiding. Four distinct joint sets exist locally, one of which coincides with the shear fractures. Another lies nearly horizontal, and two others are steeply inclined. Fracture length and spacing distributions for the four joint sets are shown to be lognormal. Two of the sets lie perpendicular to principal stress directions. The fact that one of these two joint sets apparently post-dates other fracturing and is normal to the minimum principal stress suggests that it is due to isostatic rebound.

1564 (LBL--7089) VERY DEEP HOLE CONCEPT: EVALUATION OF AN ALTERNATIVE FOR NUCLEAR WASTE DISPOSAL. O'Brien, M.T.; Cohen, L.H.; Narasimhan, T.N.; Simkin, T.L.; Wollenberg, H.A.; Brace, W.F.; Green, S.; Pratt, H.P. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.; Terra Tek, Inc., Salt Lake City, UT (USA)). Jul 1979. Contract W-7405-ENG-48. 56p. Dep. NTIS, PC A04/MF A01.

One proposal for disposing of radioactive waste is to put it in drill holes or mined cavities so deep that the waste would be effectively isolated from the surface. Even if radioisotopes escaped from the disposal canister, they would be removed from the circulating groundwater system by sorption and/or chemical reaction in their transit on very long paths to the surface. This report summarizes the feasibilities and costs of making deep holes and deep mine shafts; estimates probable technological advances by the year 2000; presents thermal history and thermally induced stress calculations based on several assumptions regarding age of waste and density of emplacement; and summarizes lack of knowledge that bear upon the isolation of waste at great depth. In strong rock, present technology would probably enable us to drill a hole 20 cm in diameter to a depth of 11 km and sink a shaft 10 m in diameter to about 4.4 km. By the year 2000, with advancement of technology, holes of 15 km depth and 20 cm diameter could be drilled, and shafts of 6.4 km or deeper could be sunk. The heat output of 5.5-year-old spent fuel and 6.5-year-old reprocessed waste is used to calculate temperature increases and stress buildings in the surrounding rocks. Some waste configurations may cause unacceptably high temperature increases; indeed, limitations on temperatures reached will in some cases limit the packing density of waste canisters and/or require longer cooling of the waste before emplacement. Sealing boreholes and shafts for significant times, i.e. 1,000 to 100,000 years presents additional problems. The casing or ling of the borehole or shaft would have to be removed in the region where seals are constructed, or the lining material would have to be designed to function as an integral part of the long-term seal. Sealing fractures in the rock around the borehole or shaft will be quite important.

1565 (LBL--8271(Rev.)) STUDY OF REGIONAL TEMPERATURE AND THERMOHYDROLOGICAL EFFECTS OF AN UNDERGROUND REPOSITORY FOR NUCLEAR WASTES IN HARD ROCK. Wang, J.S.Y.; Tsang, C.F.; Cook, N.G.W.; Witherspoon, P.A. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Oct 1979. Contract W-7405-ENG-48. 68p. Dep. NTIS, PC A04/MF A01.

Heat released by the radioactive decay of nuclear wastes in an underground repository causes a long-term thermal disturbance in the surrounding rock mass. The nature of this disturbance for a planar repository 3000 m in diameter at a depth of 500 m below surface is

investigated for various waste forms. The effects of changes in the density and viscosity of groundwater caused by the temperature changes on the flow through a simple model of a vertical fracture connected to a horizontal fracture in a rock mass are evaluated. It is concluded that different waste forms and time periods before burial have significant effects on the thermal disturbance and that buoyant groundwater flow is a function of both the vertical and horizontal fracture transmissivities, as well as the changes in temperature. Loaded initially with a power density of 10 W/m^2 of spent fuel assemblies 10 years after discharge from a reactor, the maximum increase in temperature of the repository in granite is about 50°C and the epicentral thermal gradient about 70°C/km. 30 figures, 4 tables.

1566 (LBL--8313) INSTRUMENT EVALUATION, CALIBRATION, AND INSTALLATION FOR THE HEATER EXPERIMENTS AT STRIPA. Schrauf, T.; Pratt, H.; Simonson, E.; Hustrulid, W.; Nelson, P.; DuBois, A.; Binnall, E.; Haught, R. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.; Terra Tek, Inc., Salt Lake City, UT (USA)). Dec 1979. Contract W-7405-ENG-48. 187p. (SAC--25). NTIS, PC A09/MF A01.

Borehole instrumentation for the measurement of temperature, displacement, and stress was evaluated, modified, calibrated, and installed in an underground site at Stripa, Sweden where experiments are currently underway to investigate the suitability of granite as a storage medium for nuclear waste. Three arrays of borehole instrumentation measure the thermomechanical effects caused by electrical heaters which simulate the thermal output of canisters of radioactive waste. Because most rock mechanics investigations are carried out at modest temperatures, a sustained operating temperature as high as 200°C was an unusual and most important criterion governing the instrumentation program. Extensive laboratory experiments were conducted to determine the effect of high temperature on instrument behavior and also to develop calibration and data-reduction procedures. The rod extensometers were tested for anchor creep, the selection of a suitable high-temperature pressurizing fluid, and the thermal stability of the grout. Four temperature corrections are incorporated into the data reduction of the USBM borehole deformation measurement: the bridge voltage offset correction, the change in calibration factor induced by temperature, and the thermal expansion of the gage and of the rock. The vibrating wire gages were calibrated in the laboratory by loading gages installed in a granite block at pressures up to 13 MPa and at temperatures ranging from 20° to 200°C. Both the slope and offset of the response equation are corrected for temperature effects. Most thermocouples were calibrated in an oven at the field site. Thermocouples were emplaced with individual gages and into holes backfilled with sand or grout.

1567 (LBL--8423) DETERMINATION OF IN-SITU THERMAL PROPERTIES OF STRIPA GRANITE FROM TEMPERATURE MEASUREMENTS IN THE FULL-SCALE HEATER EXPERIMENTS: METHOD AND PRELIMINARY RESULTS. TECHNICAL INFORMATION REPORT NO. 24. Jeffry, J.A.; Chan, T.; Cook, N.G.W.; Witherspoon, P.A. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). May 1979. Contract W-7405-ENG-48. 34p. (SAC--24; CONF-781246--2). Dep. NTIS, PC A03/MF A01.

From American Geophysical Union annual fall meeting; San Francisco, CA, USA (4 Dec 1978).

The in-situ thermal conductivity and thermal diffusivity of a granite rock mass at the Stripa mine, Sweden, have been extracted from the first 70 days of temperature data for the 5 kW full-scale heater experiment by means of least-squares fit to a finite-line source solution. Thermal conductivity and thermal diffusivity have been determined to be 3.69 W/(m-°C) and 1.84 x 10^{-6} m^2/s, respectively, at an average rock temperature of 23°C (the average value of the actual temperature data used). These values are only slightly higher than the corresponding laboratory values, i.e., there is no significant size effect in the thermal properties of this rock mass. Since the size and shape of the heater canister used are similar to those considered for nuclear waste canisters and a substantial volume of rock is heated, the thermal properties obtained in this study are representative of in-situ rock mass properties under actual nuclear repository operating conditions.

1568 (LBL--8648, pp 199-209) SWEDISH-AMERICAN COOPERATIVE PROGRAM ON RADIOACTIVE WASTE STORAGE IN MINED CAVERNS IN CRYSTALLINE ROCK. Witherspoon, P.A.; Cook, N.G.W.; Gale, J.E. 1978.

Earth Sciences Division. Annual Report 1978.

SWEDEN;USA;INTERNATIONAL COOPERATION; RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL; GRANITES;ROCK CAVERNS;TEMPERATURE EFFECTS;ROCK MECHANICS;FRACTURES;GROUND WATER;GEOCHEMISTRY; GEOPHYSICS;ULTRASONIC TESTING;GEOLOGIC DEPOSITS

1569 (LBL--8648, pp 210-213) REGIONAL THERMO-HYDROLOGICAL EFFECTS OF A RADIOACTIVE WASTE REPOSITORY IN HARD ROCK. Wang, J.S.Y.; Tsang, C.F.; Cook, N.G.W.; Witherspoon, P.A. 1978.

Earth Sciences Division. Annual Report 1978.

RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL;GRANITES;TEMPERATURE EFFECTS; THERMODYNAMICS;SPENT FUELS;HIGH-LEVEL RADIOACTIVE WASTES;GROUND WATER;HYDROLOGY;MASS TRANSFER;HEAT TRANSFER;GEOLOGIC DEPOSITS

1570 (LBL--8648, pp 214-215) VERY DEEP HOLE CONCEPT: EVALUATION OF AN ALTERNATIVE FOR NUCLEAR WASTE DISPOSAL. O'Brien, M.T.; Cohen, L.H.; Narasimhan, T.N.; Simkin, T.L.; Wollenberg, H.A.; Brace, W.F.; Green, S.; Pratt, H.P. 1978.

Earth Sciences Division. Annual Report 1978.

RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL;DRILLING;SHAFT EXCAVATIONS;DEPTH 6-9 KM;TECHNOLOGY ASSESSMENT;POROSITY;PERMEABILITY; GROUND WATER;FEASIBILITY STUDIES

1571 (LBL--8648, pp 215-218) GEOTECHNICAL ASSESSMENT AND INSTRUMENTATION NEEDS FOR NUCLEAR WASTE ISOLATION IN CRYSTALLINE AND ARGILLACEOUS ROCKS. O'Brien, M.T. 1978.

Earth Sciences Division. Annual Report 1978.

RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL;GRANITES;ARGILLITE;GEOLOGY;ROCK MECHANICS;BOREHOLES;STRESSES;FRACTURES; HYDROLOGY;GEOCHEMISTRY;GEOLOGIC DEPOSITS

1572 (LBL--8648, pp 219-228) GEOHYDROLOGICAL STUDIES FOR NUCLEAR WASTE ISOLATION AT THE HANFORD RESERVATION. Apps, J.; Doe, T.; Doty, B. 1978.

Earth Sciences Division. Annual Report 1978.

HANFORD RESERVATION;RADIOACTIVE WASTE

DISPOSAL;UNDERGROUND DISPOSAL;BASALT; GEOPHYSICAL SURVEYS;HYDROLOGY;MATHEMATICAL MODELS;WELLS;PERMEABILITY;PRESSURE MEASUREMENT; AQUIFERS;SAMPLING;WATER CHEMISTRY;GROUND WATER; WELL LOGGING;WASHINGTON;COLUMBIA RIVER BASIN; GEOLOGIC DEPOSITS

1573 (LBL--8648, pp 241-246) WASTE ISOLATION SAFETY ASSESSMENT PROGRAM. Silva, R.J.; Benson, L.V.; Apps, J.A. 1978.
Earth Sciences Division. Annual Report 1978.
RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL;ROCK-FLUID INTERACTIONS;RADIONUCLIDE MIGRATION;MATHEMATICAL MODELS;BASALT;QUARTZ; SHALES;POROSITY;PERMEABILITY;CHEMICAL COMPOSITION;SCANNING ELECTRON MICROSCOPY; SORPTIVE PROPERTIES;AUTORADIOGRAPHY;GEOLOGIC DEPOSITS;SAFETY

1574 (LBL--8907) GEOLOGY AND FRACTURE SYSTEM AT STRIPA. TECHNICAL INFORMATION REPORT NO. 21. Olkiewicz, A.; Gale, J.E.; Thorpe, R.; Paulsson, B. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.; Waterloo Univ., Ontario (Canada)). Feb 1979. Contract W-7405-ENG-48. 171p. (SAC--21). Dep. NTIS, PC A08/MF A01.
The Stripa test site has been excavated in granitic rock between 338 m and 360 m below the ground surface, and is located under the north limb of an ENE-plunging synclinal structure. The granitic rocks, in the areas mapped, are of Archean age and are dominated by a reddish, medium-grained, massive monzogranite that shows varying degrees of deformation. The granitic rocks have been intruded by diabase (dolerite) and pegmatite dikes. Surface and subsurface mapping shows that the Stripa granite is highly fractured and that there are at least four joint sets in the area of the test excavations. In addition to the joints, the rock mass contains fissures, fracture zones, and small-scale shear zones, representing the complete spectrum of the fracture family. Most of the fractures are lined with chlorite, occasionally with calcite. Many of the small-scale shear fractures are filled or coated with epidote. Offsets of pegmatite dikes formed by these fractures are usually limited to one to two meters. Water seepage is observed only as drops from fractures or moist fracture surfaces. It was found that reconstruction of the local three-dimensional fracture system is the heater-experiment sites was difficult, and in some cases subjective. Such reconstruction is a prerequisite to accurate interpretation of thermal and mechanical data from such sites.

1575 (LBL--9392) I. SOME RESULTS FROM A FIELD INVESTIGATION OF THERMO-MECHANICAL LOADING OF A ROCK MASS WHEN HEATERS ARE EMPLACED IN THE ROCK. II. THE APPLICATION OF FIELD DATA FROM HEATER EXPERIMENTS CONDUCTED AT STRIPA, SWEDEN TO PARAMETERS FOR REPOSITORY DESIGN. SAC-26. Hood, M.; Carlsson, H.; Nelson, P.H. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Jul 1979. Contract W-7405-ENG-48. 47p. NTIS, PC A03/MF A01.
Separate abstracts were prepared for Parts I and II.

1576 (LBL--9392, pp 1-23) I. SOME RESULTS FROM A FIELD INVESTIGATION OF THERMO-MECHANICAL LOADING OF A ROCK MASS WHEN HEATERS ARE EMPLACED IN THE ROCK. Hood, M. (Univ. of California, Berkeley). Jul 1979.
I. Some results from a field investigation of thermo-mechanical loading of a rock mass when heaters are emplaced in the rock. II. The application of field data from heater experiments conducted at Stripa, Sweden to parameters for repository design. SAC-26.
Results are presented of a field experiment to monitor the response of a rock mass to thermomechanical loading from electrically heated canisters emplaced in the rock at a depth of 340 m. Measurements made to date of temperature, displacement, and stress fields indicate that heat is transferred through the rock mainly by conduction; discontinuities within the rock mass have a minimal effect on the heat flow. Displacements within the rock from thermal expansion are shown to be much less than those predicted by linear thermoelastic theory. A plausible, though not complete, reason for these reduced displacements is the absorption of the initial rock expansions into discontinuities within the rock mass. Difficulties have been experienced in obtaining reliable stress measurement data using borehole deformation gauges to monitor changes in rock stress. Some data have been obtained and are being analyzed. Rock decrepitation in the heater boreholes is discussed.

1577 (LBL--9392, pp 24-39) II. APPLICATION OF FIELD DATA FROM HEATER EXPERIMENTS CONDUCTED AT STRIPA, SWEDEN, TO PARAMETERS FOR REPOSITORY DESIGN. Hood, M.; Carlsson, H.; Nelson, P.H. (Univ. of California, Berkeley). Jul 1979.
I. Some results from a field investigation of thermo-mechanical loading of a rock mass when heaters are emplaced in the rock. II. The application of field data from heater experiments conducted at Stripa, Sweden to parameters for repository design. SAC-26.
Current experiments are designed to yield information about both the near-field and the far-field effects of thermomechanical loading of an in-situ, granitic rock mass. Electrically heated canisters, constructed to represent high-level radioactive waste canisters, are emplaced in boreholes from excavations some 340 m below the surface. Thermally induced spalling along the heater borehole wall, a near-field effect, has been monitored and two types of spalling, one serious and one not serious, have been identified. A suggested failure criterion for the serious type of spalling is sigma/sub max/ greater than or equal to C_o (where sigma/sub max/ is the maximum induced compressive stress at the borehole wall and C_o is the uniaxial compressive strength of the rock). In one of these experiments this criterion was exceeded, and gross failure at the wall occurred when the equivalent power to the heater was increased beyond 5 kW. The far-field effects of the applied loading are investigated by measuring the temperature, displacement, and stress fields and then comparing the results with predictions which were made based on linear thermoelastic theory. The results show that the dominant mode of heat transfer through the rock is by conduction and, therefore, that predictions of the temperature field are made readily using simple calculations. However, displacements and stresses within the rock mass are measured to be only one-half or less of the values predicted. Two reasons for this major discrepancy are suggested. Work to verify this result is in progress.

1578 (LBL--9424) WASTE DISPOSAL IN GRANITE: PRELIMINARY RESULTS FROM STRIPA, SWEDEN. Cook, N.G.W.; Gale, J.E.; Witherspoon, P.A. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.; Waterloo Univ., Ontario (Canada)). Mar 1979. Contract W-7405-ENG-48. 11p. (CONF-790304--8). Dep. NTIS, PC

A02/MF A01.
From 19. annual ASME symposium, geological disposal of nuclear waste; Albuquerque, NM, USA (15 Mar 1979).
The results of this experiment to date indicate that the temperature fields in a rock mass contaning geologic discontinuities can be predicted with accuracy using the simple linear theory of heat conduction. Geologic discontinuities appear to introduce significant non-linear thermomechanical behavior into the rock mass as a result of which the thermally induced displacements are much less than those predicted by the simple theory of thermoelasticity, using laboratory values for Poisson's ratio and the coefficient of thermal expansion. The additional compliance introduced into the rock mass by geologic discontinuities affects the thermally induced stresses but to a lesser degree than the displacements. Further analytical, laboratory and field studies are expected to resolve many of the current uncertainties, especially field data gathered during a planned cooling down period following the switching off of the heaters scheduled in the near future.

1579 (LBL--9426) EXPERIMENTAL RESULTS FROM STRIPA. Hood, M. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Jun 1979. Contract W-7405-ENG-48. 18p. (CONF-790683--3). Dep. NTIS, PC A02/MF A01.
From ONWI-LLL workshop on thermomechanical modeling for a hard rock repository; Berkeley, CA, USA (25 Jun 1979).
The results indicate that the temperature fields in a rock mass containing geologic discontinuities can be predicted accurately using the simple theory of heat conduction. Geologic discontinuities appear to introduce significant nonlinear thermomechanical deformation into the rock mass, as a result of which the thermally induced displacements are much less than those predicted by the simple theory of thermo-elasticity. In addition, the assumption that the rock properties are temperature independent appears to increase the values predicted for these displacements significantly. Therefore, it is important that the temperature dependence of these properties is known and that these values be used in the calculations. The onset of significant thermal spalling along the walls of the heater boreholes appears to be related to conditions where the maximum induced compressive stress exceeds the uniaxial compressive strength of the rock. 7 figures.

1580 (LBL--9582) LABORATORY INVESTIGATIONS ON THE HYDRAULIC AND THERMOMECHANICAL PROPERTIES OF FRACTURED CRYSTALLINE ROCKS. Witherspoon, P.A.; Watkins, D.J.; Cook, N.G.W.; Hood, M.; Gale, J.E. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Aug 1979. Contract W-7405-ENG-48. 19p. (CONF-791033--3). Dep. NTIS, PC A02/MF A01.
From 1. annual ONWI information meeting; Columbus, OH, USA (30 Oct 1979).
The laws of fluid flow in fractures, the dependence of fracture conductivity on the size of the sample tested, and the thermomechanical properties of both intact and discontinuous samples in crystalline rocks were discussed. (DC)

1581 (LBL--9677) STUDY OF ROCK-WATER-NUCLEAR WASTE INTERACTIONS IN THE PASCO BASIN, WASHINGTON. PART I. DISTRIBUTION AND COMPOSITION OF SECONDARY AND PRIMARY MINERAL PHASES IN BASALTS OF THE PASCO BASIN, WASHINGTON. Benson, L.V.; Teague, L.S. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Sep 1979. Contract W-7405-ENG-48. 157p. NTIS, PC A08/MF A01.
In Part I of this report the results of Task III are presented and discussed. The subject of Task III is the study and identification of secondary and primary mineral assemblages in basalts of the Pasco Basin of southeastern Washington. In particular, we have determined the relative amounts, crystallization sequence, and compositions of secondary minerals found lining vesicle and fracture surfaces. This information, together with data on the chemical composition of primary minerals and the extent to which they have undergone dissolution, has been used in theoretical simulations of mass transfer which is the subject of Part II (Task IV) of this report.

1582 (LBL--9903) ROLE OF LARGE-SCALE PERMEABILITY MEASUREMENTS IN FRACTURED ROCK AND THEIR APPLICATION AT STRIPA. Witherspoon, P.A.; Wilson, C.R.; Long, J.C.S.; DuBois, A.D.; Gale, J.E.; McPherson, M. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.; Waterloo Univ., Ontario (Canada); Nottingham Univ. (UK)). Oct 1979. Contract W-7405-ENG-48. 11p. (CONF-791112--26). Dep. NTIS, PC A02/MF A01.
From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).
Completion of the macropermeability experiment will provide: (i) a direct, in situ measurement of the permeability of 10^5 to 10^6 m^3 of rock; (ii) a potential method for confirming the analysis of a series of small scale permeability tests performed in surface and underground boreholes; (iii) a better understanding of the effect to open borehole zone length on pressure measurement; (iv) increased volume in fractured rock; (v) a basis for evaluating the ventilation technique for flow measurement in large scale testing of low permeability rocks.

1583 (LBL--9945) WASTE ISOLATION SAFETY ASSESSMENT PROGRAM. TASK 4. COLLECTION AND GENERATION OF TRANSPORT DATA THEORETICAL AND EXPERIMENTAL EVALUATION OF WASTE TRANSPORT IN SELECTED ROCKS. ANNUAL PROGRESS REPORT, OCTOBER 1, 1978-SEPTEMBER 30, 1979. Silva, R.J.; Benson, L.V.; Yee, A.W.; Parks, G.A. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). 30 Sep 1979. Contract W-7405-ENG-48. 108p. Dep. NTIS, PC A06/MF A01.
The objective of the program is to establish a basis for the prediction of radionuclide sorption in geologic environments. In FY 79, experimental and theoretical efforts were concentrated on a study of the sorption of cesium on the solid substrates Min-u-sil (quartz) and Belle Fourche clay (montmorillonite). Cesium sorption isotherms were obtained for the two substrates at 26°C as a function of initial Cs concentration in solution (10^{-3}M to 10^{-9}M), pH (5 to 10) and supporting electrolyte concentration (0.002M, 0.01M, 0.1M, and 1M) NaCl and a simulated basalt groundwater in batch-type experiments using crushed material. Characterization of the solid phases included measurements of chemical compositions, particle sizes, surface areas, and cation-exchange capacities. In addition, potentiometric acid/base titrations of the solid phases were conducted in order to determine the acid dissociation and electrolyte exchange constants of the surfaces. Preliminary analysis of the sorption data indicate that while the clay data could be explained by simple mass-action expressions, the quartz data could not. Theoretical efforts were aimed at

developing and testing an electrolyte binding electrical double-layer model to predict sorption isotherms. A computerized version of the model, MINEQL, which simultaneously considers surface and solution chemical equilibria, was brought to operational status. Input parameters required by MINEQL were determined and sorption isotherms for Cs on the Belle Fourche clay were calculated over the same range of parameters as the experimental measurements. Comparisons showed that the model was able to simulate the isotherms quite well except at the lowest pH values for the 0.002M and 0.01M NaCl solutions.

1584 (LBL--9952) ROCK INSTRUMENTATION PROBLEMS EXPERIENCED DURING IN-SITU HEATER TESTS. Binnall, E.; DuBois, A.; Lingle, R. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.; Terra Tek, Inc., Salt Lake City, UT (USA)). Oct 1979. Contract W-7405-ENG-48. 11p. (CONF-791112--51). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

A large amount of valid data has been obtained from the Stripa experiments by the use of modified and calibrated off-the-shelf rock instrumentation. The elevated temperatures and the need for long time integrity in a wet environment revealed unsolved problems. The identification and solution of these problems would greatly benefit future experiments. More effort should be applied to the development of instruments to meet the environmental, reliability and accuracy requirements for test site observations.

1585 (LBL--10193(Rev.)) THERMOMECHANICAL MODELING AND DATA ANALYSIS FOR HEATING EXPERIMENTS AT STRIPA, SWEDEN. Chan, T.; Littlestone, N.; Wan, O. (California Univ., Berkeley (USA). Lawrence berkeley Lab.). Nov 1979. Contract W-7405-ENG-48. 11p. (CONF-800507--7(Rev.)). NTIS, PC A02/MF A01.

From Rock mechanics symposium; Rolla, MO, USA (27 May 1980).

Comparisons were made between predicted and measured thermomechanical displacements and stresses for in situ heating experiments at a depth of 340 m in a granite body at Stripa, Sweden. We found that taking into account the temperature dependence of the thermal expansion coefficient and the mechanical properties of the rock substantially improves the agreement between theory and experiment. In general, the displacements calculated using laboratory values of rock properties agree better with field data than in the case of stresses. This may be due to the difference between in situ and laboratory rock modulus. The significance of temperature-dependent rock properties and strength to thermomechanical failure is also discussed.

1586 (LBL--10358) PREDICTED AND MEASURED TEMPERATURES, DISPLACEMENTS AND STRESSES FROM THE STRIPA HEATER EXPERIMENTS. Chan, T.; Hood, M.; Witherspoon, P.A. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Jan 1980. Contract W-7405-ENG-48. 10p. (CONF-800645--2). NTIS, PC A02/MF A01.

From Special session on nuclear waste disposal; Stockholm, Sweden (23 Jun 1980).

A summary of the results of heater experiments conducted at the Stripa Mine in Sweden is given. These results for the induced temperature, displacement and stress fields, are compared with the original predictions for these parameters which were made using both analytical and finite-element calculations assuming that the material properties of the rock remained temperature independent. Discrepancies between the measured and the predicted results are discussed. Additional calculations, based on a limited amount of laboratory data for the temperature dependence of these material properties, are described. These new predictions are found to agree better with the measured field data.

1587 (LBL--10387) SECONDARY MINERALS FOUND IN THE CORES DC2 A1 AND DC2 A2 TAKEN FROM THE GRANDE RONDE BASALT FORMATION, PASCO BASIN, WASHINGTON. Teague, L.S. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Jan 1980. Contract W-7405-ENG-48. 36p. NTIS, PC A03/MF A01.

The results obtained for Task I are presented and discussed in this report. The subject of Task I is the study and identification of secondary mineral assemblages in two slant cores drilled off core DC2. The data were obtained from scanning electron microscopic (SEM/EDAX), x-ray diffraction (XRD), and thin section petrographic studies. In addition, an attempt was made to determine the lateral continuity of the secondary mineralization and the extent to which the fissures in this potential repository horizon were interconnected. Differences between the slant cores and DC2 may be due to variations in the vertical distribution of the samples and the fewer slant core samples studied. As a result, firm conclusions cannot be drawn regarding the depth dependence and relationship of mordenite precipitation to clinoptilolite dissolution. The limited data obtained in this and previous reports supports the preliminary conclusion that secondary mineralization is laterally continuous. Secondary mineral assemblages and morphologies in all cores are similar and no significant horizontal changes are observed.

1588 (LBL--10483) BETWEEN-HOLE ACOUSTIC SURVEYING AND MONITORING OF A GRANITIC ROCK MASS. Paulsson, B.N.P.; King, M.S. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Feb 1980. Contract W-7405-ENG-48. 19p. Dep. NTIS, PC A02/MF A01.

The purpose of this technical note is to present preliminary results of an acoustic monitoring study performed as part of a comprehensive rock mechanic and geophysics research program (Ref.20) associated with large-scale heater tests in an abandoned iron-ore mine in central Sweden. The investigation was performed in a fractured granitic rock mass at a sub-surface depth of 340 m, in a drift adjacent to the original iron-ore mine workings. Acoustic monitoring took place between four empty, dry, vertical boreholes of 10 m depth spaced in the vicinity of a vertical heater borehole in the floor of a drift.

1589 (LBL--10517) ROCK PROPERTIES AND THEIR EFFECT ON THERMALLY-INDUCED DISPLACEMENTS AND STRESSES. Chan, T.; Hood, M.; Board, M. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.; California Univ., Berkeley (USA). Dept. of Materials Science and Mineral Engineering; Terra Tek, Inc., Salt Lake City, UT (USA)). Feb 1980. Contract W-7405-ENG-48. 22p. (CONF-800204--10). NTIS, PC A02/MF A01.

From Energy-sources technology conference; New Orleans, LA, USA (3 Feb 1980).

A discussion is given of the importance of material properties in the finite-element calculations for thermally induced displacements and stresses resulting from a

heating experiment in an in-situ granitic rock, at Stripa, Sweden. Comparisons are made between field measurements and finite element method calculations using (1) temperature independent, (2) temperature dependent thermal and thermomechanical properties and (3) in-situ and laboratory measurements for Young's modulus. The calculations of rock displacements are influenced predominantly by the temperature dependence of the thermal expansion coefficient, whereas the dominant factor affecting predictions for rock stresses is the in-situ modulus.

1590 (LBL--10541) TABULATION AND EVALUATION OF ION EXCHANGE DATA ON SMECTITES, CERTAIN ZEOLITES AND BASALT. Benson, L.V. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). May 1980. Contract W-7405-ENG-48. 51p. NTIS, PC A04/MF A01.

An extensive search of the literature has been made for ion exchange data on smectites, certain zeolites and basalt. The data are in the form of thermodynamic equilibrium constants, corrected selectivity coefficients, and distribution coefficients. Room temperature alkali and alkaline earth metal cation ion exchange data for smectites are extensive. Correlation between the exchange free energies of alkali metal cations on Camp Berteau montmorillonite values with their Debeye-Hueckel parameter was found. Significant differences in values of exchange constants for the same reaction on different smectites were noted. While this in part may be attributable to differences in experimental procedures, much of the variance is probably due to differences in charge densities and the effective field strengths of the smectites. Differences in field strength are related to the type and amount of substitution on intercrystalline octahedral and tetrahedral sites. Data on smectites suggest that cation exchange selectivities are very strong functions of temperature. Experiments on the exchange properties of clinoptilolite and mordenite have been generally confined to alkali and alkaline earth cations although data for certain transition metal ions are also available for synthetic mordenite. The temperature dependences of zeolite exchange selectivities remain largely unknown. Distribution coefficients for groundwater-basalt systems have been measured for a variety of elements at temperatures up to 150°C. Steady state concentrations are often never achieved either from the sorption or the desorption side. Classical models of ion exchange have been applied successfully to zeolite and smectite exchange reactions. The sorption behavior of a basalt is better treated with models of the interface which take surface ionization and complexation into account.

1591 (LBL--10559) PROGRESS WITH FIELD INVESTIGATIONS AT STRIPA. Witherspoon, P.A.; Cook, N.G.W.; Gale, J.E. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Feb 1980. Contract W-7405-ENG-48. 62p. (SAC--27). NTIS, PC A04/MF A01.

It is generally agreed that the most practicable method of isolating nuclear wastes from the biosphere is by deep burial in suitable geologic formations. Such burial achieves a high degree of physical isolation but raises questions concerning the rate at which some of these wastes may return to the biosphere through transport by groundwater. Any suitable repository site will be disturbed first by the excavation of the repository and second by the thermal pulse caused by the radioactive decay of the wastes. To assess the effectiveness of geologic isolation it is necessary to develop the capability of predicting the response of a rock mass to such a thermal pulse. Ultimately, this requires field measurements at depths below surface and in media representative of those likely to be encountered at an actual repository. Access to a granitic rock mass adjacent to a defunct iron ore mine at Stripa in Sweden at a depth of about 350 m below surface has provided a unique opportunity to conduct a comprehensive suite of hydrological and thermo-mechanical experiments under such conditions virtually without delay. The results of these field tests have shown the importance of geologic structure and the functional dependence of the thermo-mechanical properties on temperature in developing a valid predictive model. The results have also demonstrated the vital importance of being able to carry out large scale investigations in a field test facility.

1592 (LBL--10849) CROSS-HOLE INVESTIGATION OF A ROCK MASS SUBJECTED TO HEATING. Paulsson, B.N.P.; King, M.S. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Apr 1980. Contract W-7405-ENG-48. 9p. (CONF-800645--1). NTIS, PC A02/MF A01.

From Special session on nuclear waste disposal; Stockholm, Sweden (23 Jun 1980).

A cross-hole high-frequency acoustic investigation of a granitic rock mass subjected to sustained heating is reported. Compressional and shear-wave velocity measurements along four different paths between four vertical boreholes made prior to turning on the heater, during 398 days of heating and after the heater was turned off correlated well with the presence of fracture zones, in which the fractures were closed by thermal expansion of the rock upon heating. When the rock mass cooled, the velocity measurements indicated a greater intensity of fracturing than had existed prior to heating. Laboratory compressional and shear-wave velocity measurements have been made on intact rock specimens obtained from the site and subjected to axial stress. When used to interpret the increases in velocities measured in the field upon heating the rock mass, increases in horizontal normal stresses to between 30 and 40 MPa were inferred. Increases of these magnitudes agree with stress measurements made by the other techniques. The ratio of measured compressional to shear-wave velocity appears to provide a sensitive measure of the fraction of crack porosity containing water or gas.

1593 (LBL--10876) HEAT TRANSFER IN UNDERGROUND HEATING EXPERIMENTS IN GRANITE, STIPA, SWEDEN. Chan, T.; Javandel, I.; Witherspoon, P.A. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Apr 1980. Contract W-7405-ENG-48. 29p. (CONF-801102--17). NTIS, PC A03/MF A01.

From ASME winter annual meeting; Chicago, IL, USA (16 Nov 1980).

Electrical heater experiments have been conducted underground in granite at Stripa, Sweden, to investigate the effects of heating associated with nuclear waste storage. Temperature data from these experiments are compared with closed-form and finite-element solutions. Good agreement is found between measured temperatures and both types of models, but especially for a nonlinear finite-element heat conduction model incorporating convective boundary conditions, measured nonuniform initial rock temperature distribution, and temperature-dependent thermal conductivity. In situ thermal properties, determined by least-squares regression, are very close to

laboratory values. A limited amount of sensitivity analysis is undertaken.

1594 (MAFF-FL--17) OBSERVATIONS ON THE USE OF COST-BENEFIT ANALYSIS IN THE CONTROL OF RADIOACTIVE WASTE DISPOSAL. Shepherd, J.G.; Hetherington, J.A. (Ministry of Agriculture, Fisheries and Food, Lowestoft (UK). Fisheries Radiobiological Lab.). Oct 1975. 5p. NTIS (US Sales Only), PC A02/MF A01.

The disposal of radioactive waste to the environment can lead to the irradiation of large numbers of people, and although the individual doses may be very small compared with the ICRP dose limits the total population dose may not be insignificant. In these circumstances the control procedure is likely to be determined by the requirement that doses be kept 'as low as is readily achievable'(see ICRP-9, para. 52). This recommendation has been interpreted in ICRP-22, where the use of cost-benefit analysis is suggested as a means of application in practice. This paper discusses some of the implications of these recommendations in relation to the control of radioactive waste disposal, under the following headings: the use of collective dose; the costing of collective dose; the assessment and use of detrimental costs; and the payment of detrimental costs.

1595 (MTR--7718) ALTERNATIVE DISPOSAL CONCEPTS FOR HIGH-LEVEL AND TRANSURANIC RADIOACTIVE WASTE DISPOSAL. Altomare, P.; Bernardi, R.; Gabriel, D.; Nainan, D.; Parker, W.; Pfundstein, R. (Mitre Corp., McLean, VA (USA). METREK Div.). May 1979. 278p. Mitre Corp., McLean, VA.

Various alternatives have been proposed for the disposal of high-level and transuranic radioactive waste generated from the nuclear electric power industry and the US Defense program. The most advanced disposal option, and the one under active development, is the US owned and operated deep-mined geologic repository. This report reviews the primary alternative concepts to the geologic repository, their present state-of-development and, to the extent possible, their environmental implications. The concepts included are: transmutation, extraterrestrial disposal, seabed disposal, ice sheet disposal, and other continental geologic disposal (matrix of drilled holes, etc.). Projections of radioactive waste quantities and the technologies for partitioning and fractionation of the waste are also discussed. This study reviewed information which was available through approximately January of 1978.

1596 (N--79-25869) THERMAL CONTROL OF HIGH ENERGY NUCLEAR WASTE, SPACE OPTION. Peoples, J.A. (National Aeronautics and Space Administration, Huntsville, AL (USA). George C. Marshall Space Flight Center). May 1979. 45p. NTIS, PC A03/MF A01.

Problems related to the temperature and packaging of nuclear waste material for disposal in space are explored. An approach is suggested for solving both problems with emphasis on high energy density waste material. A passive cooling concept is presented which utilized conduction rods that penetrate the inner core. Data are presented to illustrate the effectiveness of the rods and the limit of their capability. A computerized thermal model is discussed and developed for the cooling concept.

1597 (N--79-27193) SPACE AUGMENTATION OF MILITARY HIGH-LEVEL WASTE DISPOSAL. English, T.; Lees, L.; Divita, E. (Jet Propulsion Lab., Pasadena, CA (USA)). 1 May 1979. Contract NAS7-100. 54p. NTIS, PC A04/MF A01.

Space disposal of selected components of military high-level waste (HLW) is considered. This disposal option offers the promise of eliminating the long-lived radionuclides in military HLW from the earth. A space mission which meets the dual requirements of long-term orbital stability and a maximum of one space shuttle launch per week over a period of 20-40 years, is a heliocentric orbit about halfway between the orbits of earth and Venus. Space disposal of high-level radioactive waste is characterized by long-term predicability and short-term uncertainties which must be reduced to acceptably low levels. For example, failure of either the Orbit Transfer Vehicle after leaving low earth orbit, or the storable propellant stage failure at perihelion would leave the nuclear waste package in an unplanned and potentially unstable orbit. Since potential earth reencounter and subsequent burn-up in the earth's atmosphere is unacceptable, a deep space rendezvous, docking, and retrieval capability must be developed.

1598 (NEDG--24749) ALTERNATIVE CONCEPTS FOR SPENT FUEL STORAGE BASIN EXPANSION AT MORRIS OPERATION. Graf, W.A. Jr.; King, C.E.; Miller, G.P.; Shadel, F.H.; Sloat, R.J. (General Electric Co., San Jose, CA (USA). Nuclear Fuel and Services Div.). Aug 1980. Contract AC09-76SR00001. 263p. NTIS, PC A12/MF A01.

Alternative concepts for increasing basin capabilities for storage of spent fuel at the Morris Operation have been defined in a series of simplified flow diagrams and equipment schematics. Preliminary concepts have been outlined for (1) construction alternatives for an add-on basin, (2) high-density baskets for storage of fuel bundles or possible consolidated fuel rods in the existing or add-on basins, (3) modifications to the existing facility for increasing cask handling and fuel receiving capabilities and (4) accumulation, treatment and disposal of radwastes from storage operations. Preliminary capital and operating costs have been prepared and resource and schedule requirements for implementing the concepts have been estimated. The basin expansion alternatives would readily complement potential dry storage projects at the site in an integrated multi-stage program that could provide a total storage capacity of up to 7000 tonnes of spent fuel.

1599 (NIRS-R--7, pp 90-94) CONCEPTION DESIGN FOR EXPERIMENTAL FACILITY OF THE RESEARCH ON INTERNAL EMITTERS. Matsuoka, D.; Koizumi, A.; Fukuda, S.; Ogiso, Y. (National Inst. of Radiological Sciences, Chiba (Japan)). Apr 1978. (In Japanese).

Interim progress report of the project research 'assessment of human risks after exposure to low level radiation'. (April 1973 - March 1978).

The conception design of the experimental facility for research on internal emitters was conducted in 1976 and 1977. This facility is effective for research on the evaluation of injury due to internal emitters, i.e. toxic isotopes such as Pu. Facilities for breeding and keeping many kinds of experimental animals for a long time and for the safe handling of toxic isotopes must be provided for the experimental facility. This facility must have a special facility for waste disposal including the treatment of radioactive cadovers and

radioactive raw sewage of animals. These treatments must be carried out completely within the facility as the nuclides are nuclear fuel substances, and the wastes of animals are apt to putrefy. The first step considers the design of air conditioning and ventilation systems to satisfy the requirements of animal breeding and the treatment of radioisotopes, the liquid waste treatment system, including the purifying plant for activated raw sewage, and the treatment system for animal codovers. The second stage of this conceptual design evaluates, the special function structure and specification of the laboratories the architecture planning, and the planning of disaster prevention from the viewpoint of treating transuranic elements. Research an the treatment of radioactive wastes, including the treatment of animal cadovers was begun, and the multistep treatment process was planned. This method envolves freezing fracturing, Tihydrating, thermally decomposing, ash encapsulating, and storing the animal cadovers. This method is effective for preventing the dispersion of Pu. The new dehydrating process, utilizing microwave heating, for cadavers was tested. The new liquid waste treatment system for radioisotopes is introduced.

1600 (NUREG--0527(Summ.)) REGULATION OF FEDERAL RADIOACTIVE WASTE ACTIVITIES. SUMMARY OF REPORT TO CONGRESS ON EXTENDING THE NUCLEAR REGULATORY COMMISSION'S LICENSING OR REGULATORY AUTHORITY TO FEDERAL RADIOACTIVE WASTE STORAGE AND DISPOSAL ACTIVITIES. Smith, R.D. (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Material Safety and Safeguards). Sep 1979. 14p. NTIS.

The NRC Authorization Bill for FY 1979 directed NRC to conduct a study of extending the Commission's licensing or regulatory authority to include categories of existing and future Federal radioactive waste storage and disposal activities not presently subject to such authority. The report includes a complete listing and inventory of all radioactive waste storage and disposal activities now being conducted or planned by Federal agencies. The NRC study has attempted to present a general comparison of the relative hazards associated with defense-generated and commercial wastes. Options for extending Commission authority were developed and analyzed. The implications of NEPA were analyzed in the context of these options. The national security implications of extending NRC's regulatory authority over DOE programs are examined and evaluated. Costs and benefits are identified and assessed. The Commission's recommendations, based on the study, are to extend licensing authority over new DOE disposal activities involving transuranic wastes and non-defense low-level waste and to initiate a pilot program to test the feasibility of NRC playing a consultative role in the evaluation of existing DOE activities.

1601 (NUREG/CP--0008, pp 200-228) LOW LEVEL WASTE BURIAL GROUND. Murphy, E.S. Dec 1979.

From State workshop of review of the Nuclear Regulatory Commission's decommissioning policy; Seattle, WA, USA (25 Sep 1979).

The study to decommission shallow land burial sites for the disposal of low level radioactive waste is discussed. The study was to provide information on the available technology, the probable costs, and the safety considerations of decommissioning low level waste burial grounds.

1602 (NUREG/CR--0612) INVESTIGATIONS OF THE PERFORMANCE OF SOLIDIFIED HIGH-LEVEL NUCLEAR WASTE FORMS. Cheung, H. (California Univ., Livermore (USA). Lawrence Livermore Lab.). Jan 1979. Contract W-7405-ENG-48. 198p. (UCRL--52700). Dep. NTIS, PC A09/MF A01.

The Lawrence Livermore Laboratory has been providing technical support to the Nuclear Regulatory Commission in the development of regulations, regulatory guides, and branch technical positions for the management of nuclear wastes. Studies of solidified high-level waste during the period from 1976 to 1978, when work was terminated because of shifting of national emphasis onto spent fuel disposal, are presented in this report. The problem of management, i.e., handling, generation, and disposal of solidified high-level waste derived from operation of commercial light-water reactors, requires a thorough systematic solution to protect health and ensure safety. A definition of the problem by describing the components of the waste management system is given: the waste form, the containers, storage and transportation appurtenances, handling equipment, the repository surface and underground facilities, the repository site, and the operations. A systems analysis methodology to assess the hazards of waste management is developed. Data on accident probabilities, waste form characteristics, and geological and hydrological properties of potential repository sites are compiled. A wide range of management scenarios are generated. Limited sensitivity and uncertainty analyses are performed. On the basis of available information, preliminary investigations showed that transportation and interim storage are of most concern. Also identified are areas needing further study: transportation data base, thermal and seismic aspects of interim storage, human factors, geochemical transport of radionuclides, and ground water composition, among others. In addition to the technical solution of the problems, brief consideration to historical and socioeconomic aspects is also given.

1603 (NUREG/CR--0619) PROPERTIES OF RADIOACTIVE WASTES AND WASTE CONTAINERS. FIRST TOPICAL REPORT. Becker, W.; Colombo, P.; Francis, A.J. (Brookhaven National Lab., Upton, NY (USA)). Aug 1979. Contract EY-76-C-02-0016. 164p. (BNL-NUREG--50957). Dep. NTIS, PC A08/MF A01.

This topical report summarizes the results of the NRC sponsored program, Properties of Radioactive Wastes and Waste Containers, from its inception through September 1978. The properties of waste forms and packages resulting from the solidification of liquid concentrate and solid wastes generated as by-products of the liquid radioactive waste treatment systems in commercial BWRs and PWRs have been determined. The solidification agents currently employed at power reactors in the United States and (to a lesser extent) agents actively marketed for solidification of these wastes were considered. The waste form and package properties that have been studied in the experimental program include leachability, thermal stability, combustibility, thermal conductivity, mechanical strength, dispersibility, radiation stability, corrosion, and biodegradability. In addition, work has been conducted to determine the effects of various processing parameters on basic waste form criteria. This information is required to assess the safety and environmental impacts of radioactive waste disposal and to support quality control and assurance standards for radioactive waste treatment systems in operating facilities.

1604 (NUREG/CR--0794) GENERAL INVESTIGATION OF RADIONUCLIDE RETENTION IN MIGRATION PATHWAYS AT THE WEST VALLEY, NEW YORK LOW-LEVEL BURIAL SITE. ANNUAL REPORT, SEPTEMBER 1, 1977-SEPTEMBER 30, 1978. Dana, R.H. Jr.; Molello, S.A.; Fickies, R.H.; Fakundiny, R.H. (New York State Geological Survey, Albany (USA)). Nov 1979. 106p. (NYSGS--79-2403). NTIS.

The scope of this research program includes several basic parts: a surface water program, a geomorphic and erosion study, a trench water study, and a soil analysis study. The study involved the collection of surface water data, a geomorphic study and mapping of a 4.1 km reach of Buttermilk Creek and adjacent areas within the drainage basin, the analysis of water samples collected from waste burial trenches, and the analysis of soil samples collected from a research trench near the burial site. Buttermilk Creek Valley is being actively subjected to erosion by a combination of fluvial transport, lateral channel scour processes, transport on alluvial fans, and landsliding. Local ponding may contribute to landsliding and slumping by bringing moisture contents close to the liquid limit of the soil. Tests indicate that the soil in which the waste is buried has been subjected to a load greater than the present day overburden loadng. The theoretical depth limit to which cracks can penetrate in the soil is approximately 50 feet.

1605 (NUREG/CR--0795) GEOMORPHIC AND EROSION STUDIES AT THE WESTERN NEW YORK NUCLEAR SERVICE CENTER, WEST VALLEY, NEW YORK. Boothroyd, J.C.; Timson, B.S.; Dana, R.H. Jr. (New York State Geological Survey, Albany (USA); Mahoosuc Corp., Augusta, ME (USA)). Dec 1979. 74p. (NYSGS--79-2406). NTIS.

This report is one in a series of related reports presenting the results of a study to evaluate the containment capability of a low-level, solid radioactive waste-burial ground at West valley, NY. This project is the first portion of a detailed geomorphic and erosion study of the reach of Buttermilk Creek adjacent to the waste-burial site. Buttermilk Creek valley is being actively modified by fluvial transport, lateral channel scour, and landsliding. High surface runoff rates create highly variable but enhanced stream flows that result in coarse-gravel sediment transport within the active channel. The active channel morphology indicates that braided stream processes are common in Buttermilk, leading to active channel down-cutting and lateral migration. Where lateral migration of the active channel has undercut valley wall slopes, large-scale landsliding enhances valley wall retreat. A major site of historical and recent slide activity lies adjacent to the low-level burial trenches. Initial, post-glacial Buttermilk Creek incision began before 9920 +-240 B.P., the age of the oldest dated fluvial terrace. Future evolution of the system is expected to proceed by Buttermilk valley lowering, tributary and landslide widening, and stream capture.

1606 (NUREG/CR--0857) PROPERTIES OF RADIOACTIVE WASTES AND WASTE CONTAINERS. PROGRESS REPORT NO. 10, JULY-SEPTEMBER 1978. Colombo, P.; Neilson, R.M. Jr. (Brookhaven National Lab., Upton, NY (USA)). May 1979. Contract EY-76-C-02-0016. 39p. (BNL-NUREG--51026). Dep. NTIS, PC A03/MF A01.

Modified IAEA and equilibrium leaching studies were performed using portland cement, urea-formaldehyde and vinyl ester-styrene waste forms containing BWR chemical regenerative waste. This set of experiments, with its range of leachant replacement intervals, should cover the range of expected leach rates for most conditions. The equilibrium leach method generally resulted in lower release rates than the modified IAEA method. In the case of strontium-85 release from portland cement, this decrease was dramatic. The use of finite and semi-infinite diffusional mass transport models for leaching data analysis to predict long-term releases from full scale waste forms is discussed. While the finite model can give a more accurate description of activity release since it considers specimen depletion effects, the double series function solution converges slowly for small effective diffusivities and small total numbers of summation terms. This can result in computer truncation error dominating in the solutions for small releases. In this report period, the first topical report for the program Properties of Radioactive Wastes and Waste Containers was also written. This document appears under a separate cover.

1607 (NUREG/CR--0911) PROPERTIES OF RADIOACTIVE WASTES AND WASTE CONTAINERS. PROGRESS REPORT NO. 11, OCTOBER-DECEMBER 1978. Colombo, P.; Neilson, R.M. Jr. (Brookhaven National Lab., Upton, NY (USA)). Jun 1979. Contract EY-76-C-02-0016. 33p. (BNL-NUREG--51042). Dep. NTIS, PC A03/MF A01.

Portland cement waste forms were tested to determine the extent of particulate formation and the particle size distribution resulting from an impact loading environment. Test specimens which were cylindrical with a diameter of 2.5 cm and a height of 3.8 cm were formulated using various simulated wastes. Impact energies of 0.8 kg-m (7.85 joule) to 3.2 kg-m (31.4 joule) were employed. The cumulative weight percentage particulate was measured versus particle size as a function of impact energy, waste/binder ratio, and waste type. Because of the porosity initially present in portland cement waste forms, this data cannot be interpreted directly relative to the formation of increased surface area. The effect of cobalt-60 radiation exposure on the leachability of portland cement and urea-formaldehyde waste forms was investigated. Total doses of 10^5-10^8 rad were employed. The release of cesium-137 and strontium-85 from cement waste forms was unaffected by radiation dose in the range considered. The leachability of urea-formaldehyde waste forms did increase with dose for 10^7 to 10^8 rad. At lower total dose, no effect on leachability was noted. A photomicroscopic technique was employed to examine the particle size of waste solids in bitumen waste forms. The twin screw extruder used to produce these waste forms provided significant comminution of waste solids.

1608 (NUREG/CR--0912(Vol.1)) GEOSCIENCE DATA BASE HANDBOOK FOR MODELING A NUCLEAR WASTE REPOSITORY. VOLUME 1. Isherwood, D. (California Univ., Livermore (USA). Lawrence Livermore Lab.). Dec 1979. Contract W-7405-ENG-48. 327p. (UCRL--52719(Vol.1)). Dep. NTIS, PC A15/MF A01.

This handbook contains reference information on parameters that should be considered in analyzing or modeling a proposed nuclear waste repository site. Only those parameters and values that best represent the natural environment are included. Rare extremes are avoided. Where laboratory and field data are inadequate, theoretical treatments and informed engineering judgements are presented. Volume 1 contains a data base on salt as a repository medium. Chapters on the geology of bedded and dome salt, the geomechanics of salt, hydrology, geochemistry, natural and man-made features,

and seismology provide compiled data and related information useful for studying a proposed repository in salt. These and other data will be needed to derive generic deep geologic modeling parameters and will also serve as background for the verification of source data that may be presented in licensing applications for nuclear waste repositories. Volume 2 is the result of a scoping study for a data base on the geology, geomechanics, and hydrology of shale, granite, and basalt as alternative repository media. Except for the geomechanics of shale, most of the sections contain relatively complete compilations of the available data, as well as discussions of the properties that are unique to each rock type.

1609 (NUREG/CR--0912(Vol.2)) GEOSCIENCE DATA BASE HANDBOOK FOR MODELING A NUCLEAR WASTE REPOSITORY. Isherwood, D. (California Univ., Livermore (USA). Lawrence Livermore Lab.). Feb 1980. Contract W-7405-ENG-48. 331p. (UCRL--52719(Vol.2)). NTIS.

The three chapters of Volume 2 are the results of a scoping study on the geology, geomechanics, and hydrology of basalt and granite, and on the geology and hydrology of shale. The chapters include relatively complete compilations of the data currently available, as well as discussions of the properties that are unique to each rock type. Most of the data are, however, undigested; many of the figures and tables were taken from the original sources without extensive review. The use of symbols, especially in the sections on geomechanics, has been made generally consistent with the chapters of Volume 1; nonetheless, owing to the inconsistencies that pervade the literature, some differences remain. The discussion of shales in the present volume presents brief geologic descriptions of shale formations in the US and compiles extensive hydrologic data. The most thorough data are from the Great Basin, the Rocky Mountains, and the Colorado Plateau. The data on basalts are less copious. Nonetheless, geomechanical data are presented from a variety of places, notably Amchitka Island, the Great Lakes region (the Dresser Basalt), and the Columbia Plateau. The most useful hydrologic data have been collected at the Idaho National Engineering Laboratory and the Hanford Reservation on the Columbia Plateau. The geological descriptions of basalt flows focus on the Pacific Northwest. Data on granites come from widely scattered sources, including dam sites, tunnel sites, and quarries around the world.The most systematic geomechanical data, including the results of thermal modeling experiments, have been collected at the Stripa mine project currently underway in Sweden. The chapter on granites also includes descriptions of the major granite batholiths of the US and a discussion of fracture flow that is equally applicable to other rock types.

1610 (NUREG/CR--1005(Vol.1)) RADIOACTIVE WASTE DISPOSAL CLASSIFICATION SYSTEM. Rogers, V.C. (Ford, Bacon and Davis Utah, Inc., Salt Lake City (USA)). Sep 1979. 62p. NTIS.

The Nuclear Regulatory Commission, as part of its development of regulations for the disposal of radioactive waste, has contracted for the development of a radioactive waste classification system. The need for removing the waste from man's environment increases as the potential for endangering the health and safety of the public increases. The classification system being proposed is based on the requirements for safe disposal. The steps which were followed are: define safe, determine the pathways through the environment, formulate categories for the classification system and recommend disposal concentration guides for each category. The proposed categories are based on the length of administrative controls, the accessability of the waste and the hydrologic conditions. 13 figures, 6 tables.

1611 (NUREG/CR--1005(Vol.2)) RADIOACTIVE WASTE DISPOSAL CLASSIFICATION SYSTEM. VOLUME 2. THE COMPUTER PROGRAM AND GROUNDWATER MIGRATION MODELS. Rogers, V.C.; Baird, R.D.; Robertson, B.C.; Macbeth, P.J. (Ford, Bacon and Davis Utah, Inc., Salt Lake City (USA)). Sep 1979. 57p. NTIS.

The Nuclear Regulatory Commission, as part of its development of regulations for the disposal of radioactive waste, has contracted for the development of a radioactive classification system. A five category system, based on requirements for safe disposal, has been proposed. A computer program which calculates the Disposal Concentration Guides for individual isotopes for each category was prepared. The program allows parameters for the isotopes and condition of the disposal to be varied. A description of the equations representing the potential exposure mechanisms is also provided.

1612 (NUREG/CR--1037) EVALUATION OF ISOTOPE MIGRATION, LAND BURIAL. WATER CHEMISTRY AT COMMERCIALLY OPERATED LOW-LEVEL RADIOACTIVE WASTE DISPOSAL SITES. PROGRESS REPORT NO. 10, JULY-SEPTEMBER 1978. Colombo, P.; Weiss, A.J. (Brookhaven National Lab., Upton, NY (USA)). Sep 1979. Contract EY-76-C-02-0016. 44p. (BNL-NUREG--51083). Dep. NTIS, PC A03/MF A01.

Water samples were collected by anoxic procedures from trenches 2, 3, 4, 5, 8, and 9 at the West Valley, New York low-level radioactive waste disposal site. In-situ measurements of pH, Eh, specific conductance, and temperature were made. The results of inorganic, organic, and radiochemical analyses are reported. Acid-base titration curves exhibit the complex nature of these waters compared to local ground water. The methylene chloride extraction technique used to isolate acidic, neutral, and basic organic compounds from trench waters is described. Gas chromatograms and concentrations of individual compounds identified by GC/MS methods are shown. Cobalt-60, strontium-90, cesium-137, and plutonium-238, 239, 240 were found dissolved in all trench waters. Dissolved sodium-22 and cesium-134 were found in most trenches, whereas americium-241 was found dissolved only in trench 8.

1613 (NUREG/CR--1325) EVALUATION OF ISOTOPE MIGRATION: LAND BURIAL. WATER CHEMISTRY AT COMMERCIALLY OPERATED LOW-LEVEL RADIOACTIVE WASTE DISPOSAL SITES. QUARTERLY PROGRESS REPORT, OCTOBER-DECEMBER 1979. Weiss, A.J.; Colombo, P. (Brookhaven National Lab., Upton, NY (USA)). Feb 1980. Contract EY-76-C-02-0016. 27p. (BNL-NUREG--51147). Dep. NTIS, PC A03/MF A01.

Decreasing radionuclide sorption, K/sub d/, was observed for ^{241}Am, ^{85}Sr, and ^{60}Co when organic substances were added to well water and shale from the Maxey Flats, Kentucky, disposal site. Ethylenediaminetetraacetic acid (EDTA) caused the greatest decrease in K/sub d/. Several reference clays were also used for comparison. Only montmorillonite maintained its sorption capability in the presence of EDTA. Experiments were performed to establish the existence of organoradionuclide complexes in trench waters from the low level radioactive

waste disposal sites. Fractionations of trench waters were accomplished by gel filtration chromatography. Preliminary results indicated that cesium isotopes in the trench water from West Valley, New York, may be associated with organic molecules as species with molecular weight less than 700, and that it is unlikely an EDTA complex.

1614 (NVO--196-11) NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS. QUARTERLY REPORT, APRIL-JUNE 1979. (Department of Energy, Las Vegas, NV (USA). Nevada Operations Office). Sep 1979. 62p. Dep. NTIS, PC A04/MF A01.
Seven subtasks are reported on: seismic, geology/hydrology, media (argillite, tuff, granite), NTS support, quality assurance, technical overview, and spent fuel test. Yucca Mountain is recommended by USGS. (DLC)

1615 (NVO--196-12) NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS. QUARTERLY REPORT, JULY-SEPTEMBER 1979. (Department of Energy, Las Vegas, NV (USA). Nevada Operations Office). Dec 1979. 62p. Dep. NTIS, PC A04/MF A01.
Geohydrologic cross sections through the Kern Mountains, Lone Mountain-Weepah Hills, and Clipper Gap granitic areas indicate that the groundwater flow paths from the Kern Mountains are the longest and those from Clipper Gap the shortest. Probability of both the recurrence of volcanism and the disruption of a repository site at Yucca Mountain fall in the range of 10^{-9} per year. Global thermomechanical calculations of the response of argillite to thermal expansion have been completed. A study of Spent Fuel Test-Climax showed that radiation exposure would not induce sufficient hydrogen production to create an explosive mixture during the five-year experiment - even without any ventilation.

1616 (NVO--196-13) NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS: FY 1980 PROJECT PLAN AND FY 1981 FORECAST. (Department of Energy, Las Vegas, NV (USA). Nevada Operations Office). Feb 1980. 112p. Dep. NTIS, PC A06/MF A01.
The DOE is responsible for developing or improving the technology for safely and permanently isolating radioactive wastes from the biosphere. The National Waste Terminal Storage Program, which is a part of the US Nuclear Waste Management Program, is concerned with disposing of the high-level wastes associated with DOE and commercial nuclear reactor fuel cycles. The DOE/NV has been delegated the responsibility to evaluate the geohydrologic setting and underground rock masses of the Nevada Test Site (NTS) area to determine whether a suitable site exists for constructing a repository for isolating highly radioactive solid wastes. Accordingly, the Nevada Nuclear Waste Storage Investigations (NNWSI) were established by NV to conduct these evaluations. The NNWSI are managed by the DOE/NV, but the field and laboratory investigations are being performed by scientific investigators from several organizations. The four primary organizations involved are: Los Alamos Scientific Laboratory (LASL), Lawrence Livermore Laboratory (LLL), Sandia Laboratories (SL), and the US Geological Survey (USGS). DOE/NV is responsible for coordinating these investigations. This document presents the Project Plan for the NNWSI for FY 1980 and forecasts activities for FY 1981. Each task is divided into subtasks and described. This Plan is subject ot periodic review and revision by the DOE/NV. Changes will be addressed as they occur in NNWSI Quarterly Reports. This document also presents information on the Project's technical approach as well as its history, organization, and management.

1617 (NVO--196-14) NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS. QUARTERLY REPORT, OCTOBER-DECEMBER 1979. (Department of Energy, Las Vegas, NV (USA). Nevada Operations Office). Mar 1980. 61p. Dep. NTIS, PC A04/MF A01.
Eight tasks are reported: Weapons Test Seismic Investigations, Geologic and Hydrologic Investigations, Media Investigations, Engineering and Technical Support, Quality Assurance, Technical Overview, Spent Fuel Test (Climax), and National Waste Terminal Storage Program Support.

1618 (NVO--196-16) NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS. FY 1979 PEER REVIEW SUMMARIES AND RELATED DOCUMENTATION. (Department of Energy, Las Vegas, NV (USA). Nevada Operations Office). Jun 1980. 192p. NTIS, PC A09/MF A01.
The NNWSI FY 1979 Project Plan (NVO-196-9) describes the accomplishment plan and objectives of the FY 1979 investigations. Three critical tasks and one critical subtask were selected by Project management for in-depth external peer review at meetings held at the DOE/NV in Las Vegas. The four technical peer review meetings held during FY 1979 were conducted to obtain an external assessment of the sufficiency and quality of the four selected critical investigative segments of the NNWSI. Peer reviewers representing appropriate fields of expertise were invited to attend each meeting. Within about two weeks of each meeting, the invited reviewers summarized their impressions of the technical activities presented to them and transmitted their summaries and recommendations to DOE/NV by letter. This document is a compilation, according to the individual meetings, of all correspondence between reviewers and Project personnel that is relevant to the technical activities of the NNWSI. The section for each meeting briefly summarizes the major activities of the NNWSI being reviewed and the effects of the reviewers comments and recommendations on Project planning. Each section also includes a list of the invited peer reviewers, a meeting agenda, and a copy of all technical correspondence relating to the review meeting. General impressions of the overall peer review process and improvements to be incorporated into future peer review activities are discussed in the next section as an introduction to the four subsequent sections which are devoted to the individual FY 1979 peer reviews.

1619 (NVO--196-17) NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS: QUALITY ASSURANCE PLAN. (Department of Energy, Las Vegas, NV (USA). Nevada Operations Office). Aug 1980. 30p. NTIS, PC A03/MF A01.
The Nevada Nuclear Waste Storage Investigations (NNWSI) were established by DOE/NV to evaluate the geohydrologic setting and underground rock masses of the Nevada Test Site (NTS) and contiguous areas to determine whether a suitable site exists for constructing a repository for isolating highly radioactive solid wastes. Since the results of these evaluations will impact possible risks to public health and safety, a quality assurance program which conforms to the criteria given in the Code of Federal Regulations is needed to control the quality aspects of the work. This Quality Assurance Plan (QAP) describes the general quality assurance program for the overall NNWSI project under which the quality

assurance programs of the individual participating organizations and support contractors are to operate. The details of how each of these groups will meet the criteria will differ among participating organizations and support contractors, and those details are given in the QAPP's listed in Appendix A. It is the purpose of this plan to show the commonality of quality assurance programs in effect within the project and to define how each element fits into the entire picture to give total quality assurance coverage for the NNWSI Project.

1620 (NVO--196-19) NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS. QUARTERLY REPORT, APRIL - JUNE 1980. (Department of Energy, Las Vegas, NV (USA). Nevada Operations Office). Aug 1980. 61p. NTIS, PC A04/MF A01.

Geologic reconnaissance of the Crater Flat tuff and correlations with existing drill hole data revealed at least three ash-flow tuff members. A topographic base map of the southwest quadrant of the NTS was compiled. A major effort was devoted to integrating all electrical traverse data obtained near Yucca Mountain with the mapped geology to produce a map of inferred faulting in the area of interest. The collection, inversion, and analysis of all vertical electrical sounding (VES) data obtained from the Amargosa Desert were completed in support of the NTS regional hydrologic investigations. Precipitation data were analyzed to assess relationships and correlations between the amounts of groundwater recharge from area to area for use in the sensitivity studies. A simplified computer program and mathematical model were completed in a study of erosion rates in the Great Basin. The data obtained on NTS seismicity show diffuse seismicity occurring in an east-west band on the north of the NTS and a U-shaped band of near-quiescence that encompasses the NTS on the south. The Nevada Bureau of Mines completed its literature research and appraisal of the mineral-resource poential of the following granitic sites: Clipper Gap, the Manhatten District, and the Kern Mountains. The In Situ Tuff Water Migration/Heater Experiment was completed and cooldown behavior was monitored; the water generation rates during the experiment were consistent with the values determined previously. Preparations for and loading of the spent fuel canisters into the SFT-C test array were successfully completed without incident; activation of the electrical simulators and guard heaters was accomplished and data collection is in progress. Two new investigative tasks were incorporated into the NNWSI this quarter, Rock Mechanics and Radionuclide Migration; detailed program plans are currently being developed and will be the subject of peer reviews.

1621 (ONWI--9(2)) TECHNICAL PROGRESS REPORT FOR THE QUARTER JANUARY 1-MARCH 31, 1979. (Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation). 1979. Contract EY-76-C-06-1830. 352p. Dep. NTIS, PC A16/MF A01.

The ONWI program is designed to provide all of the technology and engineering design bases for a waste repository to isolate nuclear waste safely, with protection to the environment. The technical programs required to meet the challenge of the NRC licensing process are site characterization, technology development, and facilities engineering. This document is divided into sections dealing with: science and technology, process/equipment development, systems analysis, geologic exploration, facilities engineering, and site qualification and licensing. (DLC)

1622 (ONWI--9(3)) TECHNICAL PROGRESS REPORT, APRIL 1-JUNE 30, 1979. (Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation). 1979. Contract EY-76-C-06-1830. 275p. Dep. NTIS, PC A12/MF A01.

Objective is to provide the technology and engineering design bases for a waste repository to isolate nuclear waste safely, with protection to the environment. This document reports progress on technology development, systems analysis, site characterization, licensing, and facility engineering. (DLC)

1623 (ONWI--9(4)) TECHNICAL PROGRESS REPORT FOR THE QUARTER JULY 1-SEPTEMBER 30, 1979. (Battelle Columbus Labs., OH (USA)). 1979. Contract AC06-76RL01830. 394p. NTIS, PC A17/MF A01.

This report describes the technical accomplishments on the commercial nuclear waste management programs under the direction of the Office of Nuclear Waste Isolation (ONWI). The ONWI program is designed to provide all of the technology and engineering design bases for a waste repository to isolate nuclear waste safely, with protection to the environment.

1624 (ONWI--19(Rev.1)) NATIONAL WASTE TERMINAL STORAGE PROGRAM. OFFICE OF NUCLEAR WASTE ISOLATION TECHNICAL PROGRAM PLAN. (Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation). Dec 1979. Contract EY-76-C-06-1830. 131p. Dep. NTIS, PC A07/MF A01.

The National Waste Terminal Storage Program (NWTS) was established in 1976 with the objective of developing a system for the permanent isolation of nuclear wastes. DOE is charged with developing programs for the long term management of highly radioactive nuclear wastes by federal law. This legislation specifies that DOE must provide facilities for the successful isolation of these wastes from the biosphere in federally licensed and owned repositories for as long as they represent a significant hazard. The scope of NWTS activities includes providing the technology and facilities for the terminal isolation of commercial wastes by disposal in stable geologic repositories deep underground. Steps leading to the accomplishment of this purpose include: site exploration, characterization, and recommendation; design, licensing, construction, and operation of a geologic repository (or repositories); provision of spent fuel packaging and transportation facilities; technology to support these steps; and coordination of studies of altenate disposal concepts (i.e., deep hole, seabed, space, etc.). Emphasis is being placed on a system of multiple barriers - natural and man-made - to isolate nuclear waste from the environment. Because the nature of the host rock is basic to determination of other barriers, work in the geologic aspects of the multiple barrier system is well under way in several candidate media. Throughout the process, the NWTS Program has the responsibility to provide public information on all aspects of the program and to encourage public interaction.

1625 (ONWI--23) PRELIMINARY EVALUATION OF THE ENVIRONMENTAL ASPECTS OF POTENTIAL RADIOACTIVE WASTE REPOSITORY STUDY AREAS IN THE OHIO AND NEW YORK PORTIONS OF THE SALINA BASIN. (Battelle Memorial Inst., Columbus, OH (USA)).

Sep 1979. Contract AC06-76RL01830. 95p. NTIS, MF A01.

Portions of document are illegible.

Various geographical regions and geological media are being evaluated to determine their potential suitability as an underground repository for commercial radioactive wastes. All three areas and the subarea of Ohio and New York have good highway and rail-transport access. More information is needed on the agricultural viability of all areas. Surface and ground-water usage are much greater in the urbanized Ohio area; because of its rural nature, New York Study Area 1 and the Beaver Dams Subarea have the lowest demand for either water source. Of the New York areas, Study Area 1 appears to provide greater possibilities, considering the objective of minimizing environmental impact. The Ohio study area includes a large part that is within the urbanized area surrounding Cleveland. In addition, the entire study area is marked by a high density of other screening factors such as historic and archaeological sites, natural areas and scenic highways. While more detailed study in the Ohio area might reveal subareas relatively lightly developed and sufficient in size for a repository, significant land use conflicts are likely for most of the area of geologic interst. The Ohio area, from a nongeologic standpoint, appears to be the least promising of the areas identified.

1626 (ONWI--24) ASSUMPTIONS AND GROUND RULES USED IN NUCLEAR WASTE PROJECTIONS AND SOURCE TERM DATA. Storch, S.N.; Prince, B.E. (Union Carbide Corp., Oak Ridge, TN (USA). Nuclear Div.). Sep 1979. Contract W-7405-ENG-26;AC06-76RL01830. 137p. NTIS, PC A07/MF A01.

Assumptions and ground rules of long term domestic commercial nuclear waste projections published in studies by Union Carbide's Office of Waste Isolation, Arthur D. Little, Inc., and DOE are compared to those of the Commercial Waste Management Impact Statement, prepared by Battelle Pacific Northwest Laboratory. Target capacity growths associated with these projections range from 183 to 570 GW(e) for the year 2000. Each study regards the once-through (no recycle) fuel cycle as a reference case; however, fuel cycles employing reprocessing and various recycle strategies were also considered. The studies are compared with respect to characteristics and packaging/shipment features of spent fuel and wastes generated from reprocessing and other fuel cycle activities. Issues associated with the interim storage of spent fuel are discussed along with the characteristics and issues relating to ore mill tailings and non-fuel cycle wastes. Finally, assumptions and limitations associated with certain computer codes (viz., ORIGEN, KWIKPLAN, WASPR, and DISFUL) employed in the four waste projection studies are outlined. Overall, the report is intended to serve as a guidebook in relating information contained in the published waste projection studies.

1627 (ONWI--29) REGIONAL SUMMARY AND RECOMMENDED STUDY AREA FOR OHIO AND NEW YORK PORTIONS OF THE SALINA BASIN. (Battelle Memorial Inst., Columbus, OH (USA)). Sep 1979. Contract AC06-76RL01830. 43p. NTIS, MF A01.

Portions of document are illegible.

Various geographical regions and geological media are being evaluated to determine their potential suitability as an underground repository for commercial radioactive wastes. The geologic information shows that the salt thickness, depth, and lateral extent within these areas is sufficient to warrant further detailed examination. The geologic structure is relatively complex in New York when compared with Ohio, but meets minimum screening requirements. Deep and interaquifer ground-water flow patterns are not known. The Salina basin is considered to be tectonically stable. Areas with industrial activities such as oil and gas fields, salt mining, and brining operations have been excluded in the geologic screening process, which has led to certain areas being recommended for further evaluation. The preliminary environmental examination revealed no reasons for excluding the search areas of geologic interest in New York from further study. Of the New York areas, Study Area I appears to provide greater possibilities, considering the objective of minimizing environmental impact. The Ohio study area includes a large part that is within the urbanized area surrounding Cleveland. In addition, the entire study area is marked by a high density of other screening factors such as historic and archaeological sites, natural areas and scenic highways. While more detailed study in this area might reveal subareas relatively lightly developed and sufficient in size for a repository, significant land-use conflicts are likely for most of the area of geologic interest. From a nongeologic standpoint, the Ohio area appears to be the least promising of the areas identified.

1628 (ONWI--39(Vol.2)) ASSESSMENT OF LWR SPENT FUEL DISPOSAL OPTIONS. VOLUME 2. SYSTEM DEFINITION AND ASSESSMENTS. TECHNICAL REPORT. (Bechtel National, Inc., San Francisco, CA (USA)). Jul 1979. Contract EY-76-C-06-1830. 211p. Dep. NTIS, PC A10/MF A01.

Volume 2, in addition to introducing and defining the requirements for the study, contains the detailed evaluation of the study cases in each of six assessment areas, and describes and evaluates a number of study variations.

1629 (ONWI--39(Vol.3)) ASSESSMENT OF LWR SPENT FUEL DISPOSAL OPTIONS. VOLUME 3. STUDY BASES AND SYSTEM DESIGN CONSIDERATIONS (APPENDICES). TECHNICAL REPORT. (Bechtel National, Inc., San Francisco, CA (USA)). Jul 1979. Contract EY-76-C-06-1830. 462p. Dep. NTIS, PC A20/MF A01.

Volume 3 (Appendices) provides a tabulation of the bases and assumptions used in the study as well as preconceptual design description and cost estimates of the facilities and transportation systems necessary to implement the various study cases.

1630 (ONWI--59) DISPOSAL OF SPENT NUCLEAR FUEL. (Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation). Dec 1979. Contract EY-76-C-06-1830. 72p. Dep. NTIS, PC A04/MF A01.

This report addresses the topic of the mined geologic disposal of spent nuclear fuel from Pressurized Water Reactors (PWR) and Boiling Water Reactors (BWR). Although some fuel processing options are identified, most of the information in this report relates to the isolation of spent fuel in the form it is removed from the reactor. The characteristics of the waste management system and research which relate to spent fuel isolation are discussed. The differences between spent fuel and processed HLW which impact the waste isolation system are defined and evaluated for the nature and extent of that impact, What is

known and what needs to be determined about spent fuel as a waste form to design a viable waste isolation system is presented. Other waste forms and programs such as geologic exploration, site characterization and licensing which are generic to all waste forms are also discussed. R and D is being carried out to establish the technical information to develop the methods used for disposal of spent fuel. All evidence to date indicates that there is no reason, based on safety considerations, that spent fuel should not be disposed of as a waste.

1631 (ONWI--60) WASTE ISOLATION PERFORMANCE ASSESSMENT: A STATUS REPORT. Burkholder, H.C. (Battelle Memorial Inst., Columbus, OH (USA)). Nov 1979. Contract EY-76-C-06-1830. 31p. Dep. NTIS, PC A03/MF A01.

The assessment of system performance following emplacement of the waste is a key activity in the development of nuclear waste isolation systems. The assessment results provide a technical basis for decisions concerning site selection, repository design selection, engineered barrier selection, and system acceptability, and they bear directly on the central issue of nuclear waste isolation, Do the proposed isolation systems sufficiently protect humans from the waste. The objective of this paper is to describe the performance assessment problem, outline general approaches to its solution, and describe the status of the development, validation, and application of performance assessment technology.

1632 (ONWI--65) ALTERNATIVE WASTE DISPOSAL CONCEPTS. AN INTERIM TECHNICAL ASSESSMENT, TECHNICAL REPORT. Crandall, D.B. (Bechtel National, Inc., San Francisco, CA (USA)). Nov 1979. Contract AC06-76RL01830. 262p. NTIS, PC A12/MF A01.

ONWI's objectives under the NWTS program are (1) to identify and develop geologic sites for use as nuclear waste repositories and (2) to manage the development and application of specific supporting data and base technologies. The investigation and evaluation of alternative waste disposal technologies is required to satisfy the second objective and to comply with the NEPA process. The study (1) provides a preliminary identification and description of alternative waste disposal concepts, (2) combines them selectively with particular forms of spent fuel and waste into specific cases, and (3) provides a preliminary comparative assessment of the cases with respect to radiological impact, environmental impact, degree of development, resource consumption, safeguards, and economics. This report provides a tentative ranking of the cases studied, based on the assessments made, and contains recommendations for additional work required to provide a more thorough definition of disposal concepts and a means for developing final evaluations of the alternatives.

1633 (ONWI--74) SUITABILITY OF PALESTINE SALT DOME, ANDERSON CO., TEXAS FOR DISPOSAL OF HIGH-LEVEL RADIOACTIVE WASTE. Patchick, P.F. (Battelle Memorial Inst., Columbus, OH (USA)). Jan 1980. Contract AC06-76RL01830. 39p. NTIS, PC A03/MF A01.

The suitability of Palestine salt dome, in Anderson County, Texas, is in serious doubt for a repository to isolate high-level nuclear waste because of abandoned salt brining operations. The random geographic and spatial occurrence of 15 collapse sinks over the dome may prevent safe construction of the necessary surface installations for a repository. The dissolution of salt between the caprock and dome, from at least 15 brine wells up to 500 feet deep, may permit increased rates of salt dissolution long into future geologic time. The subsurface dissolution is occurring at a rate difficult, if not impossible, to assess or to calculate. It cannot be shown that this dissolution rate is insignificant to the integrity of a future repository or to ancillary features. The most recent significant collapse was 36 feet in diameter and took place in 1972. The other collapses ranged from 27 to 105 feet in diameter and from 1.5 to more than 15 feet in depth. ONWI recommends that this dome be removed from consideration as a candidate site.

1634 (ONWI--77) INVESTIGATION OF SALT TRANSPORT IN VERTICAL BOREHOLES IN BRINE INVASION INTO FRESHWATER AQUIFERS. TECHNICAL REPORT. Knapp, R.M.; Podio, A.L. (Texas Univ., Austin (USA)). May 1979. Contract AC06-76RL01830. 87p. NTIS, PC A05/MF A01.

This report contains numerical and experimental studies convective-diffusive flow in wellbores and a numerical simulation of brine invasion of a freshwater aquifer. In the numerical study, comparisons of observed concentrations with values calculated from a one dimensional salt transport model demonstrated the model's adequacy in representing the salt transport. The experimental study generated data regarding salt concentration buildup in vertical tubes as a function of time. In the numerical simulation through comparison of several methods, the feasibility of using a high order finite difference method in multidimensional problems was demonstrated.

1635 (ONWI--79/E511-00300-4) LOCATING FIELD CONFIRMATION STUDY AREAS FOR ISOLATION OF NUCLEAR WASTE IN THE TEXAS PANHANDLE. ANNUAL REPORT, OCTOBER 1, 1978-SEPTEMBER 30, 1979. Gustavson, T.C.; Handford, C.R.; Presley, M.W.; Baumgardner, R.W. Jr.; Dutton, S.P.; Finley, R.J.; McGillis, K.A.; Simpkins, W.W. (Texas Univ., Austin (USA). Bureau of Economic Geology). 1 Dec 1979. Contract AC97-79ET44614. 115p. Dep. NTIS, PC A06/MF A01.

Since early 1977, the Bureau of Economic Geology has been evaluating several salt-bearing basins within the State of Texas as part of the national nuclear repository program. The Bureau, a research unit of the University of Texas at Austin and the State of Texas, is carrying out a long-term program to gather and interpret all geologic and hydrologic information necessary for description, delineation, and evaluation of salt-bearing strata in the Palo Duro and Dalhart Basins of the Texas Panhandle. The program in FY 79 has been subdivided into four broad research tasks, which are addressed by a basin analysis group, a surface studies group, a geohydrology group, and a host-rock analysis group. The basin analysis group has delineated the structural and stratigraphic framework of the basins, initiated natural resource assessment, and integrated data from 8000 ft (2400 m) of core material into salt-stratigraphy models. Salt depth and thickness have been delineated for seven salt-bearing stratigraphic units. Concurrently, the surface studies group has collected ground and remotely sensed data to describe surficial processes, including salt solution, slope retreat/erosion mechanisms, geomorphic evolution, and fracture system development. The basin geohydrology group has begun evaluating both shallow and deep fluid circulation within the basins. The newly formed host-rock analysis group has

initiated study of cores from two drilling sites for analysis of salt and the various lithologies overlying and interbedded with salt units. This paper, a summary report of progress in FY 79, presents principal conclusions and reviews methods used and types of data and maps generated. Topical reports, discussing various geological aspects of the Palo Duro and Dalhart Basins in detail, will be forthcoming as phases of the study are completed.

1636 (ONWI--84) STATUS REPORT ON THE IMPORTANCE OF NATURAL ORGANIC COMPOUNDS IN GROUNDWATER AS RADIONUCLIDE-MOBILIZING AGENTS. Means, J.L.; Hastings, D.W. (Battelle Columbus Labs., OH (USA)). Dec 1979. Contract EY-76-C-06-1830. 33p. Dep. NTIS, PC A03/MF A01.

This status report describes the results of our preliminary chemical analyses of the uranium solution mine leachate and the deep groundwater from Hanford. Some particularly interesting results have been obtained on the speciation of uranium in the leachate. Also included in this report are detailed literature reviews on three subjects of great importance to this program: (1) The origin and geochemistry of humic substances; (2) the aqueous transport of actinides by humic substances; and (3) the enrichment of actinides by organic substrates. The last section of this report describes plans for FY 1979-80.

1637 (ONWI--85) THERMAL GRADIENT BRINE INCLUSION MIGRATION IN SALT STUDY: GAS-LIQUID INCLUSIONS, PRELIMINARY MODEL. Olander, D.R.; Machiels, A.J. (California Univ., Berkeley (USA)). Oct 1979. Contract EY-76-C-06-1830. 53p. Dep. NTIS, PC A04/MF A01.

Natural salt deposits contain small cubical inclusions of brine distributed through the salt. Temperature gradients, resulting from storing heat-generating wastes in the salt, can cause the inclusions to move through the salt. Prediction of the rate and amount of brine-inclusion migration is necessary for the evaluation of bedded or domed salts as possible media for waste repositories. Inclusions filled exclusively with liquid migrate up the temperature gradient towards the heat source. The solubility of salt in the brine inclusion increases with temperature. Consequently, salt dissolves into the inclusion across the hot surface and crystallizes out at the cold surface. Diffusion of salt within the liquid phase from the hot to the cold faces causes the inclusions to move in the opposite direction. In so doing, they change shape and eventually become rectangular parallelipipeds with a width (dimension perpendicular to the thermal gradient) much larger than the thickness (dimension in the direction of the thermal gradient). The inclusions may also contain a gas phase predominantly consisting of water vapor. These entities are termed two-phase or gas-liquid inclusions. The two-phase inclusions usually migrate down the temperature gradient away from the heat source remaining more-or-less cubical. A two-phase inclusion also forms when an all-liquid inclusion reaches the waste package; upon opening up at the salt-package interface, the brine partially evaporates and the inclusion reseals with some insoluble gas trapped inside. These gas-liquid inclusions proceed to move down the temperature gradient, in the opposite sense of the all-liquid inclusions. The gas-liquid inclusions phenomenon provides a pathway by which radionuclides leached from the wasteform by the brine can be transported away from the waste package and thus might have greater access to the biosphere.

1638 (ONWI--88) WASTE ISOLATION PERFORMANCE ASSESSMENT AND IN-SITU TESTING. Maass, K.E.; Pomplun, E.; Weis, M. (eds.). (Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Clausthal-Zellerfeld (Germany, F.R.). Inst. fuer Tieflagerung; Hahn-Meitner-Institut fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.)). 1979. Contract EY-76-C-06-1830. 435p. (CONF-791087--). NTIS, PC A19/MF A01.

From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).

Thirty-three papers and summaries are included, under the categories of plenary lectures, performance assessment, and Asse experiments. Separate abstracts were prepared for 27 of the papers; one was previously abstracted. (DLC)

1639 (ONWI--88, pp 7-14) OVERVIEW OF SOME CURRENT US DESIGN CONCEPTS FOR NUCLEAR WASTE/SPENT FUEL REPOSITORIES IN SALT. Claiborne, H.C. (Oak Ridge National Lab., TN). 1979.

From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).

Conceptual designs for geologic disposal of high-level waste or spent fuel elements in salt deposits are compared with each other and with the reference repository design which is under development. 2 figures, 2 tables. (DLC)

1640 (ONWI--88, pp 15-36) FRG CONCEPTUAL DESIGN AND DESIGN BASIS. Roethemeyer, H. (Physikalisch-Technische Bundesanstalt, Braunschweig, Germany). 1979.

From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).

For the site-independent conceptual design the following requirements have been laid down: (1) for safety reasons retrievability is not considered; (2) standard mining techniques and experience gained at Asse should be used; (3) two shafts should be sufficient; (4) different waste forms and containers shall be disposed of in different storage areas; (5) ventilated sections must allow the shutting off of each storage area from the rest of the mine; (6) the mining method of retreat working should be applied; (7) the mine works shall have a lateral safety distance to the caprock of 200 m and a vertical safety zone beneath salt level of 300 m; (8) all disposal areas shall be on one level; (9) salt and waste shall be transported in different drifts, mainly in a one way system.

1641 (ONWI--88, pp 37-61) PROJECT SAFETY-STUDIES ENTSORGUNG IN THE FEDERAL REPUBLIC OF GERMANY. Levi, H.W. (Hahn-Meitner-Institut fuer Kernforschung Berlin, Germany). 1979.

From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).

The project SAFETY-STUDIES ENTSORGUNG (PSE) has been initiated by the Federal Ministry of Research and Technology. Entsorgung stands for back-end of the fuel cycle. Purpose of PSE is to analyze important safety aspects of the German nuclear Entsorgungs-Center (NEC) in considerable depth, to collect reliability and performance data, to adapt or to develop models and computer programs concerning radionuclide release mechanisms and release consequences and eventually to test them out with suitable subsystems of the NEC. Much of the efforts spent in PSE is devoted to the geologic subsystem, the waste repository. Two points are

considered important pecularities of waste repository safety analyses: employment of a deterministic rather than of a probabilistic approach, and definition of a significant period of the waste repository hazard to serve as a guideline for a time limitation of the analysis.

1642 (ONWI--88, pp 62-74) US PERFORMANCE ASSESSMENT. Burkholder, H.C. (Battelle Memorial Inst., Columbus, OH). 1979.
From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).
Viewographs are given illustrating the procedures used in assessing the performance of nuclear wasste isolation. The procedures include the ONWI, WIPP, BWIP, NRC-LLL, EPRI, EPA, and NRC-Sandia programs. (DLC)

1643 (ONWI--88, pp 75-82) US IN-SITU STUDIES IN SALT. Robinson, R.A. (Battelle Memorial Inst., Columbus, OH). 1979.
From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).
The in-situ field tests are necessary to provide data for performance assessment model verification and for comparison to a much broader data base obtained in laboratory and engineering-scale facilities. The justification for conducting relatively large and costly in-situ experiments is to encompass important geologic variables (e.g., lithostatic stress fields, heterogeneous geologic properties, and local hydrologic factors) that cannot be adequately simulated in a laboratory environment. Also, there is a need to examine possible synergistic effects such as coupling and feedback of temperature, radiation, stress relaxation, etc., that cannot be completely evaluated in a laboratory environment.

1644 (ONWI--88, pp 83-97) GERMAN IN-SITU STUDIES IN SALT. Kuehn, K. (Gesellschaft fuer Strahlen- und Umweltforschung, Clausthal-Zellerfeld, Germany). 1979.
From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).
The overall objective for the German program of radioactive waste disposal is construction and operation of a repository for all waste categories in a salt dome. The related in situ, studies in a salt test facility can therefore be divided into six categories: development and test of disposal methods, studies related to the stability of underground openings at ambient temperatures; studies related to all consequences of putting high-level heat generating waste into a salt repository, studies related to the backfilling and sealing of boreholes and of the repository, studies related to failure scenarios, and special studies necessary for operating the test facility. The main test facility in the Federal Republic of Germany is the Asse Salt Mine.

1645 (ONWI--88, pp 98-118) GEOLOGICAL AND HYDROLOGICAL EXPLORATION OF GULF COAST SALT DOMES. Laughon, R.B. (Battelle Memorial Inst., Columbus, OH). 1979.
From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).
The geologic exploration program in the Gulf Coast Salt Dome Region is based on a screening process that includes a series of increasingly detailed studies. The screening procedure takes the following steps: (1) determination of regions for further study (in this case, the salt domes of the interior Gulf Coast); (2) regional surveys and the determination of areas within those regions which are thought to be most suitable and which are recommended for further evaluation (in this case, eight specific salt domes); (3) area characterizations and the determination of locations within the areas which are thought to have a high probability of suitability (in this case, two or three of the eight salt domes); (4) location studies and the determination of a potential repository site, which is thought to be suitable and licensable and which is recommended for completion of site characterization studies (in this case, a single salt dome).

1646 (ONWI--88, pp 119-132) UNITED STATES GEOLOGICAL EXPLORATION AND HYDROLOGY, SOUTHEASTERN NEW MEXICO. Brannen, J.P. (Sandia Labs., Albuquerque, NM). 1979.
From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).
This discussion focuses on those features viewed as having a major impact on performance. Those features are potential contributors to a repository breach or are important in the movement of materials to the biosphere. The proposed WIPP site is in southeastern New Mexico in the Delaware Basin, a structural subelement of the Permian Basin. Major siting criteria and factors considered in the Los Medanos studies are outlined.

1647 (ONWI--88, pp 133-155) GERMAN GEOLOGICAL EXPLORATION AND HYDROLOGY OF ASSE II. Batsche, H.; Klarr, K.; von Stempel, C. (Gesellschaft fuer Srahlen- end Umweltforschung, Clausthal-Zellerfeld, Germany). 1979.
From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).
For the following reasons the Asse II salt mine was acquired by the Gesellschaft fuer Strahlen- und Umweltforschung in 1965 for the disposal of radioactive wastes: the large safety margin observed in shaft 2 towards Asse 1 and the overlying rocks, the nonexistence of Hauptanhydrit anhydrite which was often the cause of groundwater intrusion in salt mines, the fact that the caprock found here is dry. The disposal of radioactive wastes on an experimental basis involved an extensive geological and hydrological exploration of both the salt anticline itself and the overlying rocks. These consist in a multiple succession of jointed and fissured permeable and clayey marly impermeable layers with diagonal and transverse faults.

1648 (ONWI--88, pp 169-185) WASTE ISOLATION SAFETY ASSESSMENT PROGRAM WISAP RELEASE SCENARIO ANALYSIS. Benson, G.L. (Battelle Pacific Northwest Labs., Richland, WA). 1979.
From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).
This paper consists of viewographs which outline the release scenario analysis and disruptive event analysis methodologies for a simulated waste repository over a 10^6 year time frame. (DLC)

1649 (ONWI--88, pp 226-247) THERMAL/MECHANICAL MODELLING FOR REPOSITORY DESIGN AND IN-SITU TESTING. Gnirk, P.F. (RE/SPEC Inc., Rapid City, SD). 1979.

From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).

A thermomechanical model of a radioactive waste repository in a geologic medium is used to evaluate the time and spatial response of the rock mass to repository excavation and emplacement of heat-generating wastes. Modeling results are presented for repository temperature, vertical surface displacements, room closure, canister/rock interface temperatures, etc. (DLC)

1650 (ONWI--88, pp 248-319) THERMAL MECHANICAL MODELLING. Langer, M. Delisle, G.; Wallner, M. (Bundesanstalt fuer Geowissenschaften und Rohstoffe, Hannover, Germany). 1979.

From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).

This discussion of thermal and thermo-mechanical effects of a nuclear waste repository onthe host formation (salt concerns itself with the research results gained in Germany since the last US/FRG Workshop in Richland/Wash. Thermal aspects are considered first, followed by a discussion of recent results of investigations dealing with thermo-mechanical effects.

1651 (ONWI--88, pp 325-339) SUMMARY OF CONVERGENCE AND STRESS MEASUREMENTS IN THE TEMPERATURE-TEST-FIELD 4. Duerr, K. (Institut fuer Tieflagerung, Zellerfeld, Germany). 1979.

From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).

Aim of ongoing convergence measurements in the gallery sides, roof, and floor of Temperature-test-field 4 (TVF 4) will determine the alterations of the rock's physical parameters by the temperature increase. For this purpose wire and rod extensometers have been used. In the boreholes, which will be heated later on, convergence sounds are installed. To know the initial rock-mechanical conditions in the test field extensometer measurements will be necessary before heating.

1652 (ONWI--88, pp 340-345) WASTE ISOLATION PILOT PLANT (WIPP) EXPERIMENTAL PROGRAM. Hunter, T.O. (Sandia Labs., Albuquerque, NM). 1979.

From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).

The Waste Isolation Pilot Plant (WIPP) proposed for implementation in southeastern New Mexico provides a facility for the retrievable storage of defense transuranic wastes. WIPP will also include a location for generic experimentation on the interaction of defense wastes and bedded salt. These experiments will include waste forms which have heat and radiation production commensurate with defense high-level wastes (DHLW). Experiments will also be performed with enhanced temperature and radiation conditions which accelerate the interactions of interest. All experiments on DHLW are planned for removal after the experimentation is complete.

1653 (ONWI--88, pp 346-351) SUMMARY OF SHAPED CAVERN CONVERGENCE MEASUREMENTS. Staupendahl, G. (Institut fuer Tieflagerung, Zellerfeld, Germany). 1979.

From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).

Preliminary conclusions can be drawn from observation at present: (1) the time dependent wall closure of the cavity and displacements within the surrounding salt stratum in a global sence are running with almost decreasing rates; (2) the long-term deformation and strains accumulated up to now are smaller than anticipated before; (3) the structural safety of this cavity is ensured at present; (4) it could be demonstrated, that the monitoring system installed can be operated successfully as well over a long-term period as under most severe conditions; (5) these observations and in situ experiments are nessessary and suggestive; (6) results and conclusions from these measurements are not only important with regard to this cavity, moreover for other projects at Asse and other sites in comparable salt formations.

1654 (ONWI--88, pp 377-384) BRINE EXPERIMENTS BY THE BGR IN THE ASSE II. Kopietz, J. (Bundesanstalt fuer Geowissenschaften und Rohstoffe, Hannover, Germany). 1979.

From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).

Objectives of these simple thermomechanical heating experiments in the Asse is to investigate the influence of radioactive heat production on repository integrity. The increase in temperature was accompanied by an increase in the brine level in the boreholes due to borehole convergence caused by the heating. The brine levels in the outer observation boreholes are still rising about one year after turning the heater off. 6 figures. (DLC)

1655 (ONWI--88, pp 385-391) ASSE II IN-SITU BRINE MIGRATION TESTS. Rothfuchs, T. (Institut fuer Tieflagerung, Zellerfeld, Germany). 1979.

From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).

For measuring the heat-induced brine inflow into a heater borehole an experimental area in the Older Halite formation on the 750m level of the ASSE II salt mine was selected. In March and April 1978 the mining of the room in preparation for this experiment was completed. Five 2KW - heaters will be placed in the borehole No. 2. These heaters simulate High Active Waste (HAW) and will give data in regard to the thermal, thermal-mechanical and physical-chemical response of the Older Halite Formation by electrical heating.

1656 (ONWI--88, pp 405-416) EXPERIMENTS ON THE CORROSION OF MATERIALS FOR BOREHOLE CASINGS AND FOR WASTE PACKAGING CANISTER IN SALT. Gies, H. (Institut fuer Tieflagerung, Zellerfeld, Germany). 1979.

From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).

For the test storage initially planned of HLW-canisters at the Asse salt mine a possibility of safe recovery must be provided. For this purpose the borehole must be cased. To ensure safe operation, suitable corrosion resistant materials must be used for the canister and for the borehole casings. This requires studies providing information about the corrosion resistance of the materials throughout the test storage. The catalogue of requirements to be met by the materials for the canisters and for the boreholes drafted

initially has been rediscussed with responsible technical institutions, and in the light of this discussion the corrosion resistance of the materials has been reformulated and the test programme has been expanded.

1657 (ONWI--91) POTENTIAL US/CANADIAN COOPERATIVE ACTIVITIES IN GEOLOGICAL DISPOSAL OF RADIOACTIVE WASTE. Duguid, J.O. (Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation). Mar 1980. Contract AC06-76RL01830. 43p. (TR--104). NTIS, PC A03/MF A01.

A joint review meeting between the US and Canada was held on June 19 and 20, 1979 to discuss waste isolation activities in crystalline rocks. The review meeting served the purposes of an initial information transfer and as a mechanism to stimulate thinking for a workshop on US/Canadian cooperative programs which was held on June 21, 1979. The workshop participants divided into working groups to discuss areas of potential cooperation: the Administrative Working Group established protocol for information exchange and cooperative activities; the Geotechnical Working Group selected activities in exploration, field testing, instrumentation and measurement technique development, monitoring, and quality assurance where cooperation would be of benefit to both countries; and the Assessment/Modeling Working Group discussed areas in model development and verification, engineered barriers, radiation effects, hydrologic properties of fractured rocks, waste form leaching, and sorption where cooperation would enhance both the US and Canadian programs.

1658 (ONWI--98) PROCEEDINGS OF A WORKSHOP ON THERMOMECHANICAL MODELING FOR A HARDROCK WASTE REPOSITORY. Holzer, F.; Ramspott, L. (eds.). (California Univ., Livermore (USA). Lawrence Livermore Lab.). 1979. Contract W-7405-ENG-48. 138p. (UCAR--10043; CONF-790683--(Summ.)). NTIS, PC A07/MF A01.

From ONWI-LLL workshop on thermomechanical modeling for a hard rock repository; Berkeley, CA, USA (25 Jun 1979).

These proceedings summarize the discussions, conclusions, and recommendations reached in a workshop on Thermomechanical Modeling for a Radioactive Waste Respository in hard crystalline rock from June 25-27, 1979, in Berkeley, California. The workshop was arranged and chaired by the Lawrence Livermore Laboratory under the sponsorship of the Office of Nuclear Waste Isolation and the DOE. About 100 participants from national laboratories, universities, private companies, and government organizations spent 2-1/2 days exchanging information and developing a set of conclusions and recommendations. The objectives of the workshop were as follows: (1) identify the key issues connected with modeling and validating the response of a hard rock respository to the emplaced waste source; and (2) identify status and develop a list of recommended activities, in order of priority, which would serve as programmatic input to ONWI and DOE for future consideration and implementation. Discussions covered modeling and calculations, laboratory and field measurements of properties and effects, instruments and techniques, and field experimentation for validation and model testing. Emphasis was placed on the thermomechanical response of the rock to the radioactive waste source emplaced within it. Hydrologic and radionuclide transport properties were specifically excluded, because they were to be the subject of a subsequent workshop.

1659 (ORNL--5485, pp 106-108) ENVIRONMENTAL CHEMISTRY. Feb 1979.

Chemistry Division annual progress report for period ending August 31, 1978.

A brief description is given of the kinetic model for predicting the composition of chlorinated estuary or sea water discharged from power plants. Flow of brines through salt beds under thermal gradients was studied. 2 figures. (DLC)

1660 (ORNL--5578) EFFECTS OF GASEOUS RADIOACTIVE NUCLIDES ON THE DESIGN AND OPERATION OF REPOSITORIES FOR SPENT LWR FUEL IN ROCK SALT. Jenks, G.H. (Oak Ridge National Lab., TN (USA)). Dec 1979. Contract W-7405-ENG-26. 114p. Dep. NTIS, PC A06/MF A01.

Information relating to the identities and amounts of gaseous radionuclides present in spent LWR fuel and to their release from canistered spent fuel under plausible storage and disposal conditions was assembled, reviewed, and analyzed. Information was also reviewed and analyzed on several other subjects that relate to the integrity of the carbon steel canister in which the spent fuel is to be encapsulated and to the expected rates of transfer of gaseous radionuclides through crushed salt backfill within a disposal room in a reference repository in rock salt. The advantages and disadvantages were considered for several different canister-backfill materials, and recommendations were made regarding preferred materials. Other recommendations relate to encapsulation procedures and specifications and to needs for additional experimental studies. The objective of this work was to provide reference information, conclusions, and recommendations that could be used to establish design and operating conditions and procedures for a bedded salt repository for spent LWR fuel and that could also be used to help evaluate the safety of the repository. The results of this work will also generally apply to spent fuel repositories in domal salt. However, because the domal salt may have little or no brine inclusions within it, there may be little or no possibility that brine will migrate into open spaces around an emplaced canister. Addordingly, some of the concerns that result from the possible occurrence of brine migration in bedded salt may be of no importance in domal salt.

1661 (ORNL--5607) REVIEW OF INFORMATION ON THE RADIATION CHEMISTRY OF MATERIALS AROUND WASTE CANISTERS IN SALT AND ASSESSMENT OF THE NEED FOR ADDITIONAL EXPERIMENTAL INFORMATION. Jenks, G.H.; Baes, C.F. Jr. (Oak Ridge National Lab., TN (USA)). Mar 1980. Contract W-7405-ENG-26. 80p. Dep. NTIS, PC A05/MF A01.

The brines, vapors, and salts precipitated from the brines will be exposed to gamma rays and to elevated temperatures in the regions close to a waste package in the salt. Accordingly, they will be subject to changes in composition brought about by reactions induced by the radiations and heat. This report reviews the status of information on the radiation chemistry of brines, gases, and solids which might be present around a waste package in salt and to assess the need for additional laboratory investigations on the radiation chemistry of these materials. The basic aspects of the radiation chemistry of water and aqueous solutions, including concentrated salt solutions, were reviewed briefly and found to be substantially unchanged from those presented

in Jenks's 1972 review of radiolysis and hydrolysis in salt-mine brines. Some additional information pertaining to the radiolytic yields and reactions in brine solutions has become available since the previous review, and this information will be useful in the eventual, complete elucidation of the radiation chemistry of the salt-mine brines. 53 references.

1662 (ORNL--5617) AUTORADIOGRAPHIC STUDY OF ACTINIDE SORPTION ON CLIMAX STOCK GRANITE. Beall, G.W.; O'Kelley, G.D.; Allard, B. (Oak Ridge National Lab., TN (USA)). Jun 1980. Contract W-7405-ENG-26. 30p. NTIS, PC A03/MF A01.

An autoradiographic technique that employed an arrangement for placing in firm contact Polaroid sheet film, a scintillator screen, and the radioactive face of a specimen was applied to a study of the sorption of americium, neptunium, plutonium, and uranium on Climax Stock granite under varying conditions of pH and Eh. Qualitative agreement was found between the sorption of americium on crushed, pure minerals and on the minerals comprising the specimen of Climax Stock granite. The observations also supported a mechanism for reduction of Np(V) to Np(IV) and Pu(VI) to Pu(IV) by Fe(II)-containing minerals. There was no evidence for reduction of U(VI) by the Fe(II)-containing minerals, although the uranium, assumed to be present as UO_2^{2+}, appeared to be the only actinide species to exhibit sorption by a simple, cation-exchange mechanism at particular mineral sites. Some implications of these results for nuclear waste isolation are discussed briefly.

1663 (ORNL--5620, pp 113-120) BURIAL GROUND TECHNOLOGY. Cutshall, N.H. Mar 1980.

Environmental Sciences Division. Annual progress report for period ending September 30, 1979.

The shallow land burial of low-level radioactive waste is a common disposal method which has been practiced for many years. This technique has the advantage of being inexpensive and technologically simple when compared to other treatment or disposal alternatives. Usual methods practiced to date were simply to place containers of contaminated material, untreated, in excavations and cover them with the native geologic material. Such methods have not provided complete containment of radionuclides because circulating ground water migrates through the buried waste and transports contaminants to the surface. If such a condition develops at a disposal site, the exhumation of buried waste, repackaging, transport to an alternative disposal site, and site cleanup is an expensive process and presents numerous problems related to logistics and personnel radiation exposure. Therefore, it is imperative from both a safety and economic viewpoint that radioactive waste be buried such that the risk of release if minimal and any resultant dose to man is as low as reasonably achievable.

1664 (ORNL/CSD/TM--84) DIFFUSION FROM SOLID CYLINDERS. Nestor, C.W. Jr. (Oak Ridge National Lab., TN (USA)). Jan 1980. Contract W-7405-ENG-26. 31p. Dep. NTIS, PC A03/MF A01.

The problem considered is the diffusion of material from a solid cylinder initially containng a uniform concentration and immersed in a well-stirred bath which maintains the external concentration at zero. The Fourier-Bessel series form of the fraction of the original material removed from the cylinder as a function of time converges very slowly for small time. An alternate form was obtained, which converges reasonably rapidly for small time. The convergence acceleration method of P. Wynn was also used to provide an efficient method for computation. Numerical examples and program listings are included.

1665 (ORNL/EIS--156/V1) SELECTED, ANNOTATED BIBLIOGRAPHY OF STUDIES RELEVANT TO THE ISOLATION OF NUCLEAR WASTES. Hyder, L.K.; Fore, C.S.; Vaughan, N.D.; Faust, R.A. (Oak Ridge National Lab., TN (USA)). Sep 1980. Contract W-7405-ENG-26. 459p. NTIS, PC A20/MF A01.

This annotated bibliography of 705 references represents the first in a series to be published by the Ecological Sciences Information Center containing scientific, technical, economic, and regulatory information relevant to nuclear waste isolation. Most references discuss deep geologic disposal, with fewer studies of deep seabed disposal; space disposal is also included. The publication covers both domestic and foreign literature for the period 1954 to 1980. Major chapters selected are Chemical and Physical Aspects; Container Design and Performance; Disposal Site; Envirnmental Transport; General Studies and Reviews; Geology, Hydrology and Site Resources; Regulatory and Economic Aspects; Repository Design and Engineering; Transportation Technology; Waste Production; and Waste Treatment. Specialized data fields have been incorporated to improve the ease and accuracy of locating pertinent references. Specific radionuclides for which data are presented are listed in the Measured Radionuclides field, and specific parameters which affect the migration of these radionuclides are presented in the Measured Parameters field. The references within each chapter are arranged alphabetically by leading author, corporate affiliation, or title of the document. When the author is not given, the corporate affiliation appears first. If these two levels of authorship are not given, the title of the document is used as the identifying level. Indexes are provided for author(s), keywords, subject category, title, geographic location, measured parameters, measured radionuclides, and publication description.

1666 (ORNL/ENG/INF--80/1) MANAGEMENT OF SOLID WASTE. Thompson, W.T.; Stinton, L.H. (Union Carbide Corp., Oak Ridge, TN (USA). Nuclear Div.). 16 Apr 1980. Contract W-7405-ENG-26. 21p. (CONF-800416--2). Dep. NTIS, PC A02/MF A01.

From UCC-ND and GAT waste management seminar program; Portsmouth, OH, USA (22 Apr 1980).

Compliance with the latest regulatory requirements addressing disposal of radioactive, hazardous, and sanitary solid waste requires the application of numerous qualitative and quantitative criteria in the selection, design, and operation of solid waste management facilities. Due to the state of flux of these regulatory requirements from EPA and NRC, several waste management options were identified as being applicable to the management of the various types of solid waste. This paper highlights the current regulatory constraints and the design and operational requirements for construction of both storage and disposal facilities for use in management of DOE-ORO solid waste. Capital and operational costs are included for both disposal and storage options.

1667 (ORNL/SUB--75/87989) PRELIMINARY

REGIONAL STUDY OF THE PRESENT AND POSSIBLE FUTURE OIL AND GAS DEVELOPMENT IN THE AREAS OF THICK ROCK SALT AND SHALE DEPOSITS OF MICHIGAN, OHIO, PENNSYLVANIA, AND WESTERN NEW YORK AS OF DECEMBER 1975. (Netherland, Sewell and Associates, Inc., Dallas, TX (USA)). Dec 1975. Contract W-7405-ENG-26. 43p. NTIS, PC A03/MF A01.

The objective of this study was to make a preliminary investigation of those areas of the Michigan basin and the Ohio-Pennsylvania-western New York portion of the Appalachian basin which are underlain by thick beds of rock salt and certain shale deposits for the overall purpose of locating general areas where present and/or possible future oil and gas development would not interfere with the possible storage of radioactive waste material in the thick beds of salt or shale deposits underlying these areas. Some of the more pertinent factors included in our investigation were: (1) the location of the present oil and gas fields in the areas of interest; (2) the general geology, including structure, stratigraphy, and general thickness of the sediments above and below the thick salt beds and shale deposits; (3) the trends indicated by past and present oil and gas development as well as the indicated trends of possible future oil and gas development throughout the areas of interest; (4) the density and depth of holes drilled, either successful or unsuccessful, in the search for oil and gas and the effect which these holes might have on the use of the thick beds of salt and shale deposits as possible storage sites for radioactive waste material; and (5) the general areas where the past, present and/or possible future oil and gas development would not interfere with the possible storage of radioactive waste in such salt beds and shale deposits underlying the major portion of the Michigan basin and that portion of the Appalachian basin found in Ohio, Pennsylvania and western New York.

1668 (ORNL/Sub--79/13617/2) LOW LEVEL WASTE MANAGEMENT: A COMPILATION OF MODELS AND MONITORING TECHNIQUES. VOLUME 1. Mosier, J.E.; Fowler, J.R.; Barton, C.J. (comps.). (Science Applications, Inc., Oak Ridge, TN (USA)). Apr 1980. Contract W-7405-ENG-26. 633p. (SAI/OR--565-2). NTIS, PC A99/MF A01.

In support of the National Low-Level Waste (LLW) Management Research and Development Program being carried out at Oak Ridge National Laboratory, Science Applications, Inc., conducted a survey of models and monitoring techniques associated with the transport of radionuclides and other chemical species from LLW burial sites. As a result of this survey, approximately 350 models were identified. For each model the purpose and a brief description are presented. To the extent possible, a point of contact and reference material are identified. The models are organized into six technical categories: atmospheric transport, dosimetry, food chain, groundwater transport, soil transport, and surface water transport. About 4% of the models identified covered other aspects of LLW management and are placed in a miscellaneous category. A preliminary assessment of all these models was performed to determine their ability to analyze the transport of other chemical species. The models that appeared to be applicable are identified. A brief survey of the state-of-the-art techniques employed to monitor LLW burial sites is also presented, along with a very brief discussion of up-to-date burial techniques.

1669 (ORNL/SUB--79/13837/1) STATE OF THE ART REVIEW OF ALTERNATIVES TO SHALLOW LAND BURIAL OF LOW LEVEL RADIOACTIVE WASTE. (Gilbert/Commonwealth, Jackson, MI (USA); Gilbert/Commonwealth, Reading, PA (USA)). Apr 1980. Contract W-7405-ENG-26. 101p. Dep. NTIS, PC A06/MF A01.

A review of alternatives to shallow land burial for disposal of low level radioactive waste was conducted to assist ORNL in developing a program for the evaluation, selection, and demonstration of the most acceptable alternatives. The alternatives were categorized as follows: (1) near term isolation concepts, (2) far term isolation concepts, (3) dispersion concepts, and (4) conversion concepts. Detailed descriptions of near term isolation concepts are provided. The descriptions include: (1) method of isolation, (2) waste forms that can be accommodated, (3) advantages and disadvantages, (4) facility and equipment requirements, (5) unusual operational or maintenance requirements, (6) information/technology development requirements, and (7) related investigations of the concept.

1670 (ORNL/SUB--79/13837/2) STATE OF THE ART REVIEW OF RADIOACTIVE WASTE VOLUME REDUCTION TECHNIQUES FOR COMMERCIAL NUCLEAR POWER PLANTS. (Gilbert/Commonwealth, Reading, PA (USA); Gilbert/Commonwealth, Jackson, MI (USA)). Apr 1980. Contract W-7405-ENG-26. 251p. Dep. NTIS, PC A12/MF A01.

A review is made of the state of the art of volume reduction techniques for low level liquid and solid radioactive wastes produced as a result of: (1) operation of commercial nuclear power plants, (2) storage of spent fuel in away-from-reactor facilities, and (3) decontamination/decommissioning of commercial nuclear power plants. The types of wastes and their chemical, physical, and radiological characteristics are identified. Methods used by industry for processing radioactive wastes are reviewed and compared to the new techniques for processing and reducing the volume of radioactive wastes. A detailed system description and report on operating experiences follow for each of the new volume reduction techniques. In addition, descriptions of volume reduction methods presently under development are provided. The Appendix records data collected during site surveys of vendor facilities and operating power plants. A Bibliography is provided for each of the various volume reduction techniques discussed in the report.

1671 (ORNL/SUB--80/13619/1) IDENTIFICATION OF TECHNICAL PROBLEMS ENCOUNTERED IN THE SHALLOW LAND BURIAL OF LOW-LEVEL RADIOACTIVE WASTES. Jacobs, D.G.; Epler, J.S.; Rose, R.R. (Oak Ridge National Lab., TN (USA)). Mar 1980. Contract W-7405-ENG-26. 187p. Dep. NTIS, PC A09/MF A01.

A review of problems encountered in the shallow land burial of low-level radioactive wastes has been made in support of the technical aspects of the National Low-Level Waste (LLW) Management Research and Development Program being administered by the Low-Level Waste Management Program Office, Oak Ridge National Laboratory. The operating histories of burial sites at six major DOE and five commercial facilities in the US have been examined and several major problems identified. The problems experienced st the sites have been grouped into general categories dealing with site development, waste characterization, operation, and performance evaluation. Based on this grouping of the problem, a number of major technical issues have been identified which should be incorporated into program plans for further research and development. For each

technical issue a discussion is presented relating the issue to a particular problem, identifying some recent or current related research, and suggesting further work necessary for resolving the issue. Major technical issues which have been identified include the need for improved water management, further understanding of the effect of chemical and physical parameters on radionuclide migration, more comprehensive waste records, improved programs for performance monitoring and evaluation, development of better predictive capabilities, evaluation of space utilization, and improved management control.

1672 (ORNL/TM--6473) INFILTRATION CONTROL FOR LOW-LEVEL RADIOACTIVE SOLID WASTE DISPOSAL AREAS: AN ASSESSMENT. Arora, H.S. (Oak Ridge National Lab., TN (USA)). Nov 1980. Contract W-7405-ENG-26. 63p. NTIS, PC A04/MF A01.

The primary mode of radionuclide transport from shallow land-disposal sites for low-level wastes can be traced to infiltration of precipitation. This report examines the factors that affect surface water entry and movement in the ground and assesses available infiltration-control technology for solid-waste-disposal sites in the humid eastern portion of the United States. A survey of the literature suggests that a variety of flexible and rigid liner systems are available as barriers for the stored waste and would be effective in preventing water infiltration. Installation of near-surface seals of bentonite clay admixed with dispersive chemicals seem to offer the required durability and low permeability at a reasonable cost. The infiltration rate in a bentonite-sealed area may be further retarded by the application of dispersive chemicals that can be easily admixed with the surface soil. Because the effectiveness of a dispersive chemical for infiltration reduction is influenced by the physico-chemical properties of the soil, appropriate laboratory tests should be conducted prior to field application.

1673 (ORNL/TM--6882) FLOWABILITY OF BULK SOLIDS USED IN SHALE FRACTURING GROUTS AS DETERMINED BY THE JENIKE AND JOHANSON METHOD. McDaniel, E.W.; Weeren, H.O. (Oak Ridge National Lab., TN (USA)). Sep 1979. Contract W-7405-ENG-26. 22p. Dep. NTIS, PC A02/MF A01.

Smooth operation of the shale fracturing facility at Oak Ridge National Laboratory requires that an even, uninterrupted flow of dry solids be delivered to a mixer at a rate of approximately 1200 lb/min. Some operational difficulties have been experienced with the dry solids system at the existing facility. Occasionally the solids flow from a bin was difficult to initiate or was irregular, particularly when the storage bin was nearly empty. A new shale fracturing facility is now being designed with a solids handling system that will eliminate the current problems. This report describes the tests made to obtain the necessary information about bulk-flow properties of the dry solids that are required for the facility modifications. Flow properties of fly ash, attapulgite, pottery clay, and a blended solids mix were determined in a Jenike and Johanson Flowfactor Tester. Tests with this unit involve the consolidation of a solid at a given pressure and the measurement of the force required to create a shear plane. The procedure is repeated several times at different consolidating pressures to determine a locus of points that can be displayed graphically. Results indicate that a bottom-hopper opening of about 4 ft will be required on the new, bulk storage bins if mass flow is to be achieved. It was also found that the existing bins are quite unsuitable for either their present function or their proposed function. Since these bins have served moderately well for 14 years, the effect of aeration is obviously major; these tests indicate only an upper limit to the size of the hopper opening that will be required. Pottery clay and attapulgite were found to have flow characteristics considerably inferior to blended solids. It is known, however, that attapulgite clay will flow from the existing bins, and modification of the bin bottoms to enlarge the openings does not appear to be justified.

1674 (ORNL/TM--6987) ACTINIDE PARTITIONING-TRANSMUTATION PROGRAM FINAL REPORT. VII. LONG-TERM RISK ANALYSIS OF THE GEOLOGIC REPOSITORY. Logan, S.E.; Conarty, R.L.; Ng, H.S.; Rahal, L.J.; Shirley, C.G. (Los Alamos Technical Associates, Inc., NM (USA)). Sep 1980. Contract W-7405-ENG-26. 130p. NTIS, PC A07/MF A01.

This report supports the overall assessment by Oak Ridge National Laboratory of actinide partitioning and transmutation by providing an analysis of the long-term risks associated with the terminal storage of wastes from a fuel cycle which incorporates partitioning and transmutation (P-T) and wastes from a cycle which does not. The system model and associated computer code, called AMRAW (Assessment Method for Radioactive Waste), are used for the analysis and are applied to the Los Medanos area in southeastern New Mexico. Because a conservative approach is used throughout, calculated results are believed to be consistently higher than reasonable expectations from actual disruptive incidents at the site and therefore are not directly suited for comparison with other analyses of the particular geologic location. The assessment is made with (1) the probabilistic, or risk, mode that uses combinations of reasonable possible release incidents with their probability of occurrence distributed and applied throughout the assessment period, and (2) the consequence mode that forces discrete release events to occur at specific times. An assessment period of 1 million years is used. The principal results are: (1) In all but the expulsive modes, ^{99}Tc and ^{129}I completely dominate cumulative effects based on their transport to man through leaching and movement with groundwater, effecting about 33,000 health effects (deaths) over the 1 million years; (2) P-T has only limited effectiveness in reducing long-term risk from a radionuclide waste repository under the conditions studied, and such effectiveness is essentially confined to the extremely unlikely (probability of occurrence 10^{-12}/year) expulsive events; (3) Removal or immobilization of ^{99}Tc and ^{129}I might provide benefits sufficiently tangible to warrant special consideration.

1675 (ORNL/TM--7092) CEMENT TECHNOLOGY FOR BOREHOLE PLUGGING: AN INTERIM REPORT ON PERMEABILITY MEASUREMENTS OF CEMENTITIOUS SOLIDS. McDaniel, E.W. (Oak Ridge National Lab., TN (USA)). Jan 1980. Contract W-7405-ENG-26. 25p. Dep. NTIS, PC A02/MF A01.

The permeability of borehole plug solids and plug-wall rock junctions is a property of major interest in the Borehole Plugging Program. This report describes the equipment and techniques used to determine the permeabilities of possible borehole plugging materials and presents results from tests on various cementitious solids and plug-rock combinations. The cementitious solids were made from mixtures

of cement, sand, salt, fly ash, and water. Three different types of cement and four different fly ashes were used. Permeabilities ranged from a high value of 3×10^{-4} darcy for a neat cement paste to a low of 5×10^{-8} darcy for a saltcrete containing 30 wt % sodium chloride. Miniature boreholes were made in the following four different types of rock: Westerly granite, Dresser basalt, Sioux quartzite, and St. Cloud granodiorite. These small holes were plugged with a mix consisting of 23 wt % Type I Portland cement, 20 wt % bituminous fy ash, 43.2 wt % sand, and 13.8 wt % water. After curing for 91 days at ambient temperature, the permeability of the plug-wall rock junctions ranged from 3×10^{-5} to $< 1 \times 10^{-8}$ darcy. Three of the four miniature plugged boreholes exhibited permeabilities of < 10 microdarcys.

1676 (ORNL/TM--7106) CEMENT TECHNOLOGY FOR BOREHOLE PLUGGING: INTERIM REPORT ON THE EFFECTS OF FLY ASH AND SALT ON THE PHYSICAL PROPERTIES OF CEMENTITIOUS SOLIDS. Moore, J.G.; Morgan, M.T.; McDaniel, E.W.; Greene, H.B.; West, W.A. (Oak Ridge National Lab., TN (USA)). Mar 1980. Contract W-7405-ENG-26. 31p. Dep. NTIS, PC A03/MF A01.

Results of initial studies of a systematic investigation to determine the effects of fly ash and salt on the physical properties of pozzolanic concretes and saltcretes are reported. Addition of fly ash to mortars decreased the set time and bleed characteristics and increased the compressive strength and permeability, but it had very little effect on the density or the thermal conductivity of the solid. The magnitude of these effects was only slightly related to the lime content of the fly ash. In the case of saltcretes, low-lime fly ash slightly decreased the set time and the bleed characteristics of the wet mix. However, a high-lime fly ash doubled the set time and decreased the bleed characteristics to essentially zero. The compressive strength of saltcretes was increased by the addition of fly ash and was independent of the lime content. Such additions had little effect on the thermal conductivity or density. The thermal conductivities of cement pastes containing fly ash showed a near-linear relationship with the density of the resulting solids. In the case of mortars, the thermal conductivity decreased with increasing temperature and showed some hysteresis in the initial heating cycle. After the first cycle, the thermal conductivity decreased from about 1.32 W/m.K at 350°K to 1.27 W/m.K at 475°K.

1677 (ORNL/TM--7112) COMPARISON OF THE RESULTS OF SEVERAL HEAT TRANSFER COMPUTER CODES WHEN APPLIED TO A HYPOTHETICAL NUCLEAR WASTE REPOSITORY. Claiborne, H.C.; Wagner, R.S.; Just, R.A. (Oak Ridge National Lab., TN (USA)). Dec 1979. Contract W-7405-ENG-26. 69p. Dep. NTIS, PC A04/MF A01.

A direct comparison of transient thermal calculations was made with the heat transfer codes HEATING5, THAC-SIP-3D, ADINAT, SINDA, TRUMP, and TRANCO for a hypothetical nuclear waste repository. With the exception of TRUMP and SINDA (actually closer to the earlier CINDA3G version), the other codes agreed to within +-5% for the temperature rises as a function of time. The TRUMP results agreed within +-5% up to about 50 years, where the maximum temperature occurs, and then began an oscillary behavior with up to 25% deviations at longer times. This could have resulted from time steps that were too large or from some unknown system problems. The available version of the SINDA code was not compatible with the IBM compiler without using an alternative method for handling a variable thermal conductivity. The results were about 40% low, but a reasonable agreement was obtained by assuming a uniform thermal conductivity; however, a programming error was later discovered in the alternative method. Some work is required on the IBM version to make it compatible with the system and still use the recommended method of handling variable thermal conductivity. TRANCO can only be run as a 2-D model, and TRUMP and CINDA apparently required longer running times and did not agree in the 2-D case; therefore, only HEATING5, THAC-SIP-3D, and ADINAT were used for the 3-D model calculations. The codes agreed within +-5%; at distances of about 1 ft from the waste canister edge, temperature rises were also close to that predicted by the 3-D model.

1678 (ORNL/TM--7125) WASTE SLUDGE RESUSPENSION AND TRANSFER: DEVELOPMENT PROGRAM. Weeren, H.O.; Mackey, T.S. (Oak Ridge National Lab., TN (USA)). Feb 1980. Contract W-7405-EN-26. 95p. Dep. NTIS, PC A05/MF A01.

The six Gunite waste tanks at Oak Ridge National Laboratory (ORNL) contain about 400,000 gal of sludge that has precipitated from solution and settled during the 35 years these tanks have been in service. Eventual decommissioning of the tanks has been proposed. The first part of this program is to resuspend the accumulated sludge, to transfer it to new storage tanks in Melton Valley, and to dispose of it by the shale-fracturing process. On the basis of preliminary information, a tentative operational concept was adopted. The sludge in each tank would be resuspended by hydraulic sluicing and pumped from the tank. This resuspended sludge would be treated as necessary to keep the particles in suspension and would be pumped to the new waste-storage tanks. Subsequently the sludge would be pumped from the tanks, combined with a cement-base mix, and disposed of by the shale-fracturing facility. Verification of the feasibility of this concept required development effort on characterization of the sludge and development of techniques for resuspending the sludge and for keeping it in suspension. These development efforts are described in this report. Sections of the report describe both the known properties of the sludge and the tests of grinding methods investigated, discuss tests of various suspenders, describe tests with cement-base mixes, summarize hot-cell tests on actual sludge samples, and describe tests that were made at a mockup of a Gunite tank installation. On the basis of the tests made, it was concluded that reslurrying and resuspension of the sludge is quite feasible and that the suspensions can be made compatible with cement mixes.

1679 (ORNL/TM--7201) EXPECTED ENVIRONMENTS IN HIGH-LEVEL NUCLEAR WASTE AND SPENT FUEL REPOSITORIES IN SALT. Claiborne, H.C.; Rickertsen, L.D., Graham, R.F. (Oak Ridge National Lab., TN (USA)). Aug 1980. Contract W-7405-ENG-26. 206p. NTIS, PC A10/MF A01.

The purpose of this report is to describe the expected environments associated with high-level waste (HLW) and spent fuel (SF) repositories in salt formations. These environments include the thermal, fluid, pressure, brine chemistry, and radiation fields predicted for the repository conceptual designs. In this study, it is assumed that the repository will be a room and pillar mine in a rock-salt formation, with the disposal horizon

located approx. 2000 ft (610 m) below the surface of the earth. Canistered waste packages containing HLW in a solid matrix or SF elements are emplaced in vertical holes in the floor of the rooms. The emplacement holes are backfilled with crushed salt or other material and sealed at some later time. Sensitivity studies are presented to show the effect of changing the areal heat load, the canister heat load, the barrier material and thickness, ventilation of the storage room, and adding a second row to the emplacement configuration. The calculated thermal environment is used as input for brine migration calculations. The vapor and gas pressure will gradually attain the lithostatic pressure in a sealed repository. In the unlikely event that an emplacement hole will become sealed in relatively early years, the vapor space pressure was calculated for three scenarios (i.e., no hole closure - no backfill, no hole closure - backfill, and hole closure - no backfill). It was assumed that the gas in the system consisted of air and water vapor in equilibrium with brine. A computer code (REPRESS) was developed assuming that these changes occur slowly (equilibrium conditions). The brine chemical environment is outlined in terms of brine chemistry, corrosion, and compositions. The nuclear radiation environment emphasized in this report is the stored energy that can be released as a result of radiation damage or crystal dislocations within crystal lattices.

1680 (ORNL/TM--7310) STATISTICAL SENSITIVITY ANALYSIS OF A SIMPLE NUCLEAR WASTE REPOSITORY MODEL. Ronen, Y.; Lucius, J.L.; Oblow, E.M. (Oak Ridge National Lab., TN (USA)). Jun 1980. Contract W-7405-ENG-26. 75p. NTIS, PC A05/MF A01.

This report represents a preliminary step in what should be a comprehensive sensitivity analysis of the modeling of a nuclear waste repository. The purpose of the complete analysis will be to determine which modeling parameters and physical data are most important in determining key design performance criteria and then to obtain the uncertainty in the design for safety considerations. The theory for a statistical screening design methodology is developed for later use in the overall program. The theory was applied to the test case of determining the relative importance of the sensitivity of near field temperature distribution in a single-level salt repository to modeling parameters. The exact values of the sensitivities to these physical and modeling parameters were then obtained using direct methods of recalculation. The sensitivity coefficients found to be important for the sample problem were thermal loading, distance between the spent fuel canisters and their radius. Other important parameters were those related to salt properties at a point of interest in the repository. In particular, the screening methodology singled out four parameters related to the salt as having high sensitivities: salt conductivity, heat capacity, and density, and initial temperature of salt at the point of interest. These predictions of the screening theory were confirmed by direct recalculations which also reveal the time behavior of these sensitivities. It was found that the sensitivities of thermal loading, distance between the fuel canisters, their radius and salt density and heat capacity increase (in absolute value) during the 50-year period studied. The sensitivity of the initial temperature decreases (in absolute value) whereas the sensitivity of the salt conductivity is important at the time the temperature of the salt is equal to the response temperature. It was found that nonlinearity effects of the input parameters on the responses are negligible.

1681 (ORNL/TM--7421) SHALE FRACTURING INJECTIONS AT OAK RIDGE NATIONAL LABORATORY: 1977-1979 SERIES. Weeren, H.O. (Oak Ridge National Lab., TN (USA)). Sep 1980. Contract W-7405-ENG-26. 117p. NTIS, PC A06/MF A01.

Intermediate-level waste solution generated at ORNL is periodically mixed with a cement-base blend of dry solids and injected into an impermeable shale formation at an approximate depth of 240 m (800 ft). The grout mix sets shortly after the injection, permanently fixing the radionuclides in the shale formation. A series of four injections of intermediate-level waste solution was made between 1977 and 1979. A total of 1.2 million l (314,000 gal) of waste solution containing 81,780 Ci of radionuclides was injected. This report is an account of this injection series - preparations, injections, results, and conclusions. The volumes and activities that were injected are summarized. In Injection ILW-15 a small leak of grout to the waste pit eroded the drain valves and forced a shutdown of the injection while repairs were made. The injection was completed 2 days later. Injection ILW-16 was terminated about two-thirds through the injection when the diesel drive of the injection pump blew a connecting rod through the block. The facility and well were washed down with the standby pump. Prior to Injection ILW-17, air pads were installed on all bulk solids storage bins. All subsequent injections have been marked by a much more even flow of solids and a resulting improvement in the mix ratio control. Injections ILW-17 and ILW-18 were made without notable incidents. Logs of the observation wells indicated that all grout sheets were within the disposal zone.

1682 (ORNL/TM--7497) RHEOLOGY OF SLUDGE-SLURRY GROUTS. McDaniel, E.W. (Oak Ridge National Lab., TN (USA)). Oct 1980. Contract W-7405-ENG-26. 28p. NTIS, PC A03/MF A01.

A series of rheograms was developed that relates the critical velocity (velocity where flow changes from laminar to turbulent) of a cementitious grout that incorporates a suspended sludge-slurry to the critical velocity of a reference grout made with a simulated waste solution. The sludge that is now in the Gunite waste tanks at the Oak Ridge National Laboratory (ORNL) will be suspended and pumped to the new waste storage tanks in Melton Valley. The sludge will then be blended with a cement mix base to form a grout which will be injected underground by the shale fracturing process. This report describes the materials, equipment, and techniques used in the laboratory studies to suspend sludges and mix sludge-slurry grouts that have flow properties similar to those of current shale fracturing grouts. Bentonite clay is an effective suspender in dilute $NaNO_3$ solutions; 15 wt % solids can be suspended with 2.0 wt % bentonite in a 0.1 M $NaNO_3$ solution. Other suspending materials were evaluated, but bentonite gave the best results. If a slurry grout becomes too viscous to pump, methods must be available to thin the mixture. A number of thinners, friction reducers, and plasticizers were examined. Q-Broxin, a thinner supplied by Baroid, reduced the velocity of a grout required for turbulent flow in a 5.0-cm (2-in.)-diam tube from 1.76 to 1.20 m/s (5.79 to 3.95 ft/s); FX-32C, a plasticizer supplied by Fox Industries, Inc., reduced the velocity from

1.76 to 0.75 m/s (5.6 to 2.45 ft/s).

1683 (ORO--4447-102) ANION EFFECTS ON THE RETENTION OF SELECTED ACTINIDES ON GEOLOGIC MEDIA. Krajewski, T.M. (Tennessee Univ., Knoxville (USA)). Mar 1980. Contract EY-76-S-05-4447. 75p. Dep. NTIS, PC A04/MF A01.

The distribution coefficients of ^{241}Am and ^{235}Np were measured on several minerals in synthetic groundwater and NaCl solutions. The minerals studied contain complexing anions within their crystalline lattices, and they were characterized for purity, ion exchange capacity, and surface area. A batch equilibration technique was used to determine the uptake of ^{241}Am and ^{235}Np by the minerals over a pH range of 4.0 to 9.0. It was found that apatite [$Ca_5(PO_4)_3(F,OH,Cl)$], dolomite [$CaMg(CO_3)_2$], marble ($CaCO_3$), fluorite (CaF_2), and (to a lesser extent) anhydrite ($CaSO_4$) sorbed ^{241}Am more strongly than did the other minerals. The distribution coefficients obtained on these minerals were higher in value and less pH dependent than the distribution coefficients obtained on the majority of minerals. Apatite was found to be the only mineral to sorb ^{235}Np very strongly. Precipitation and ion exchange reactions were found not to be important sorption mechanisms. Anionic complexation, especially with OH^- and CO_3^{2-}, and/or chemisorption were reasoned to be playing an important role in the sorption of ^{241}Am and ^{235}Np on apatite, dolomite, marble, fluorite, and anhydrite. The significance of these results lies in isolation of nuclear wastes. 17 figures, 12 tables.

1684 (ORO--5366-T1(Vol.1)) NATIONAL WASTE TERMINAL STORAGE REPOSITORY IN A BEDDED SALT FORMATION FOR SPENT UNREPROCESSED FUEL. VOLUME I. CONCEPTUAL DESIGN REPORT. (Kaiser Engineers, Oakland, CA (USA)). Dec 1978. Contract EY-77-C-05-5366. 357p. NTIS, PC A10/MF A01.

In February 1976, the Energy Research and Development Administration (ERDA), now the Department of Energy (DOE), established a National Waste Terminal Storage (NWTS) program. As a part of this program, two parallel conceptual design efforts were initiated in January 1977. One was for deep geologic storage, in domed salt, of high level waste resulting from the reprocessing of spent fuel. The other was for deep geologic storage of unreprocessed spent fuel in bedded salt. These two concepts are identified as NWTS Repository 1 and Repository 2, respectively. Repository 2 (NWTSR2) is the concept which is covered by this Conceptual Design Report. Volume I of the conceptual design report contains the following information: physical description of the report; project purpose and justification; principal safety, fire, and health hazards; environmental impact considerations; quality assurance considerations; assessment of operational interfaces; assessment of research and development interfaces; project schedule; proposed method of accomplishment; summary cost estimate; and outline specifications. The conceptual design for Repository 2 was developed in sufficient detail to permit determination of scope, engineering feasibility, schedule, and cost estimates, all of which are necessary for planning and budgeting the project.

1685 (ORO--5366-T1(Vol.2)) NATIONAL WASTE TERMINAL STORAGE REPOSITORY IN A BEDDED SALT FORMATION FOR SPENT UNREPROCESSED FUEL. VOLUME II. CONCEPTUAL DESIGN REPORT. (Kaiser Engineers, Oakland, CA (USA)). Dec 1978. Contract EY-77-C-05-5366. 99p. NTIS, MF A01.

Portions of document are illegible.

This volume documents the conceptual design of a National Waste Terminal Storage Repository in bedded salt for spent unreprocessed nuclear fuel. Drawings and specifications are included.

1686 (ORO--5366-T2) NATIONAL WASTE TERMINAL STORAGE REPOSITORY IN A BEDDED SALT FORMATION FOR SPENT UNREPROCESSED FUEL. OCCUPATIONAL EXPOSURE AND HEALTH PHYSICS STUDIES. KE REPORT NO. 78-21-R. (Kaiser Engineers, Oakland, CA (USA)). Sep 1978. Contract EY-77-C-05-5366. 174p. NTIS, PC A08/MF A01.

This report includes the Occupational Exposure and Health Physics studies of the National Waste Terminal Storage Repository Number 2 (NWTSR2). Section 1 deals with occupational radiation exposures. The results of dose equivalent and dose commitment calculations are summarized. The man-rem total is a summation of all doses to all personnel throughout a year. It would have to be divided by the number of total personnel involved, to obtain an average annual dose per person. Section 2 presents the occupational exposures due to nonradiological pollutants. The activities of workers and the equipment used during the construction, storage/retrieval and decommissioning of the facility are outlined. Tabulations are presented of the substances (dusts, fumes, gases and vapors) and physical agents (heat, vibration, and nonionizing radiation) to which personnel will be exposed in various surface and underground work areas during construction and decommissioning, and during storage and retrieval operations. Some significant nonradiological occupational exposures are summarized. Section 3 outlines the health physics program for the NWTSR2 facility. It is important to initiate the health physics program one or two years before the facility is placed in operation to establish the radiation background levels at the site and its surrounding area, and to collect environmental samples, both on-site and off-site, prior to waste storage and retrieval operations. The health physics organization consists of 15 persons, including five health physicists.

1687 (ORO--5366-T3) NATIONAL WASTE TERMINAL STORAGE REPOSITORY IN A BEDDED SALT FORMATION FOR SPENT UNREPROCESSED FUEL. SPECIAL STUDY NO. 1. TWENTY-FIVE-YEAR RETRIEVABILITY CAPITAL EQUIPMENT COST ESTIMATE. (Kaiser Engineers, Oakland, CA (USA)). Nov 1978. Contract EY-77-C-05-5366. 203p. NTIS, MF A01.

Portions of document are illegible.

This estimate covers capital equipment costs of facilities for the receipt, handling, and storage in bedded salt, of canistered spent fuel assemblies from both BWR and PWR commercial power plants. The estimate includes all capital equipment and replacement costs for a repository constructed in accordance with the design shown in the Conceptual Design Report (CDR), and Special Study No. 1, KE Report No. 78-60-RE for 25-year retrievability.

1688 (ORO--5366-T4) NATIONAL WASTE TERMINAL STORAGE REPOSITORY IN A BEDDED SALT FORMATION FOR SPENT UNREPROCESSED FUEL. SPECIAL STUDY NO. 1. 25-YEAR RETRIEVABILITY. (Kaiser Engineers, Oakland, CA (USA)). Dec 1978. Contract EY-77-C-05-5366. 132p. NTIS, PC A07/MF A01.

National Waste Terminal Storage Repository 2 (NWTSR2), in bedded salt, for spent unreprocessed fuel is the subject of a

conceptual design project which began in January 1977. In the base conceptual design the spent fuel is to be stored in a retrievable mode for 5 years. This report presents the results of a separate study on 25-year retrievability with open storage rooms. Drawings prepared for 25-year retrievability are only those which differ from the companion 5-year retrievability drawings which comprise Volume II of the Conceptual Design Report (CDR). NWTSR2 capital facilities originally were to be constructed in phases. Phase I was to include those facilities required for the first 5 years of operation, which were hypothesized to be from 1985 through 1990; Phase II was to include facilities required from 1991 until the capacity of the 2000-acre mine was reached. These dates are used as the basis for conceptual design and for Special Study No. 1 but do not represent actual schedule dates for the repository. The terms Phase I and Phase II are used throughout the drawings and test, so they need to be understood. However, it is not now intended to phase the capital construction because of the relatively small effort represented by Phase II surface construction. An optional future expansion of the mine, Phase III, would add 1000 acres on the end of the mine opposite the shaft pillar. The optional Phase III expansion would commence operation upon completion of Phase II operations. The drawings and design comparisons for Phase III mine operations appear only in this report.

1689 (ORO--5366-T5) NATIONAL WASTE TERMINAL STORAGE REPOSITORY IN A BEDDED SALT FORMATION FOR SPENT UNREPROCESSED FUEL. QUALITY ASSURANCE PROGRAM FOR LICENSING. (Kaiser Engineers, Oakland, CA (USA)). Dec 1978. Contract EY-77-C-05-5366. 83p. NTIS, PC A05/MF A01.

A National Waste Terminal Storage Repository, in bedded salt, for spent unreprocessed fuel is the subject of a conceptual design project which began in January 1977. This volume presents a preliminary quality assurance program to guide the license applicant in developing a detailed program that will be compatible with anticipated National Waste Terminal Storage (NWTSR2) contracting arrangements and provide the documentation required by regulatory bodies. This QA program is designed to provide confidence that the quality-related activities pertaining to safety-related structures, systems, and components will be identified and controlled. Specific responsibilities for quality-related activities are documented and assigned to personnel and organizations for the major phases of facility design and construction. These responsibilities encompass a broad range of activities and are addressed in this preliminary program. The quality assurance program elements are organized and discussed herein as follows: (1) quality assurance during design and construction; (2) the applicant (DOE); (3) siting contractor; (4) architect/engineer; (5) project field management; and (6) operations contractor.

1690 (ORO--5366-T6) NATIONAL WASTE TERMINAL STORAGE REPOSITORY IN A BEDDED SALT FORMATION FOR SPENT UNREPROCESSED FUEL. SPECIAL STUDY NO. 3. WASTE RETRIEVAL FROM BACKFILLED REGIONS. (Kaiser Engineers, Oakland, CA (USA)). Sep 1978. Contract EY-77-C-05-5366. vp. NTIS, MF A01.

Portions of document are illegible.

Methods and costs were studied for delayed canister retrieval from rooms that had been backfilled immediately after canister storage. The effects of this method of storage on mine geometry, thermal and rock mechanics environments, mine development and operations, mine ventilation, time schedule, retrieval machinery and safety were investigated. Salt and air temperatures were determined. Pillar width, number of rooms, extraction ratio, tonnages of mined salt, and salt handling and hoisting requirements were calculated. The required changes in mining equipment were established. Salt handling and elapsed time schedules were developed. Ventilation requirements - size and number of shafts, size the arrangement of airways, number of stacks, and size and number of fans were then calculated. The development sequence of these facilities was established. Canister retrieval problems were analyzed for canisters stuck in the hole as well as free. Retrieval methods and machinery were studied and are described. Safety with respect to both radiation and room collapse was studied and compared with CDR safety conditions. The effects of a reduced themal loading of 30 KW/acre on temperatures, room closure, mine layout, ventilation and ground control were studied and reported. A cost estimate was prepared, giving cost differentials between the base CDR costs and Special Study No. 3. Two appendices are included. The first contains nine Heat Transfer memoranda that state the thermal basis of this study. The second appendix provides a detailed operating time analysis of the retrieval machinery.

1691 (ORO--5366-T7) NATIONAL WASTE TERMINAL STORAGE REPOSITORY IN A BEDDED SALT FORMATION FOR SPENT UNREPROCESSED FUEL. SPECIAL STUDY NO. 1. TWENTY-FIVE-YEAR RETRIEVABILITY, DECOMMISSIONING COST ESTIMATE. (Kaiser Engineers, Oakland, CA (USA)). Nov 1978. Contract EY-77-C-05-5366. 25p. NTIS, PC A02/MF A01.

This estimate covers decommissioning costs of facilities for the receipt, handling, and storage in bedded salt of canistered spent fuel assemblies from both BWR and PWR commercial power plants. The estimate includes all decommissioning costs for a repository, based on 25-year retrievability, constructed in accordance with the design shown in Conceptual Design Report (CDR), as modified by Special Study No. 1 (KE Report No. 78-60-RE) and decommissioned in accordance with the program outlined in the Conceptual Design Description Report, KE Report No. 78-58-R. Costs for Operating Contractor personnel on the site at this time are included in this report and not in the Operating Cost Estimate (KE Report 78-63-RE). The operating cost estimates end with the completion of storage room backfilling. The three major elements of decommissioning are: demolition of surface facilities, backfilling of main entries and airways, and shaft liner removal and shaft plugging. EDIT, ECON, and DELOX computer programs and a chart of accounts were furnished by UCC-ND under direction of the Government and the line item-capital-cost estimate was prepared according to the prescribed format. The decommissioning cost estimate referenced herein is in the same format as its companion line item-capital-cost estimate KE Report 78-62-RE.

1692 (ORO--5366-T8) NATIONAL WASTE TERMINAL STORAGE REPOSITORY IN A BEDDED SALT FORMATION FOR SPENT UNREPROCESSED FUEL: CONSTRUCTION ACCOUNTING MANUAL. (Kaiser Engineers, Oakland, CA (USA)). Dec 1978. Contract EY-77-C-05-5366. 167p. NTIS, PC A08/MF A01.

The preparation of a cost estimate for a program to construct a new or add-on waste

storage facility is one of the major objectives of the conceptual design effort. It is essential that a construction accounting manual be developed for use in estimating (conceptual, Title 1 and working estimates), cost accounting and cost control purposes on a consistent basis throughout life of the project. In order to meet this objective, itemized cost estimates and cost accounting data must be in sufficient detail to assure the reliability of such cost estimates and cost data. A cost accounting manual for contractors involved in the project is set forth in this document. For the conceptual design cost estimate, the estimate will be prepared in accordance with this construction accounting manual and all future estimates will be prepared on this basis. When work starts under the project, cost data will be accumulated and reported in accordance with this manual to provide consistency between estimates and actual cost data for cost control programs.

1693 (PB--80-138993) SUMMARY REPORT ON THE LOW-LEVEL RADIOACTIVE WASTE BURIAL SITE, WEST VALLEY, NEW YORK (1963-1975). Giardina, P.A.; DeBonis, M.F.; Eng, J.; Meyer, G.L. (Environmental Protection Agency, New York (USA). Region II). Oct 1977. 136p. NTIS, PC A07/MF A01.

The purpose of this report is to take the information gathered in the lithological boring study along with information from other pertinent studies performed on the West Valley low-level radioactive waste burial site through March 1975 and examine the several pathways, actual and potential, for radioactivity to move from the site. Using the same information an examination of the status of this site will be compared with recommendations made for low-level nuclear waste disposal sites and hazardous material disposal sites. Possible improvements in the areas of the site selection, development, and operation to reduce environmental impacts of this and similar sites will be recommended. Finally, follow up studies that are either needed or being performed will be described.

1694 (PB--80-147754) ASSESSMENT OF WASTE MANAGEMENT OF VOLATILE RADIONUCLIDES. TECHNICAL NOTE. Altomare, P.M.; Barbier, M.; Lord, N.; Nainan, D. (Mitre Corp., McLean, VA (USA). METREK Div.). May 1979. Contract EPA-68-01-3997. 125p. NTIS, PC A06/MF A01.

This document presents a review of the technologies for waste management of the volatile radionuclides of iodine-129, krypton-85, tritium, and carbon-14. The report presents an estimate of the quantities of these volatile radionuclides as are produced in the nuclear power industry. The various technologies as may be used, or which are under investigation, to immobilize these nuclides and to contain them during storage, and in disposal are discussed. Also, the alternative disposal options as may be applied to isolate these radioactive waste from the human environment are presented.

1695 (PB--80-801772) RADIOACTIVE WASTE DISPOSAL IN SALT DEPOSITS (A BIBLIOGRAPHY WITH ABSTRACTS). REPORT FOR 1964-NOVEMBER 1979. Cavagnaro, D.M. (National Technical Information Service, Springfield, VA (USA)). Dec 1979. 257p. NTIS PC N01/MF N01.

This bibliography contains reports on underground disposal of radioactive wastes in salt deposits. The citations cover radiation protection, efficiency of the disposal method, sites that are selected, stability of the sites, mathematical models of the disposal method, hydrology, and design. (This updated bibliography contains 248 abstracts, 80 of which are new entries to the previous edition.)

1696 (PB--292735) SOCIAL DECISION-MAKING FOR HIGH CONSEQUENCE, LOW PROBABILITY OCCURRENCES. FINAL REPORT 1975-77. (National Planning Association, Washington, DC (USA); Haldi Associates, Inc., New York (USA)). Oct 1978. Contract EPA-68-01-3228. 220p. NTIS PC A10/MF A01.

Part I reviews the two main classes of criteria proposed for social decisions: (1) market mechanisms and cost-benefit analysis and (2) the approaches of Rawls and Buchanan to arrive at a social consensus. The authors propose an eight element criteria for evaluating a social decision process capable of application in judicial, legislative, academic, and managerial situations. Parts II and III are case studies of different decision procedures. The former inspects the administrative law procedure using the U.S. EPA chlordane/heptachlor suspension hearings for example. The legal procedure is concluded to be a forward-looking decision process in an effort to increase social acceptability of the outcome. The latter examines the disjointed decision procedure concerning the disposal of nuclear waste. In both cases the eight criteria proposed in Part I nevertheless provide a useful tool for evaluating the process.

1697 (PB--293401) INFORMATION BASE FOR WASTE REPOSITORY DESIGN. VOLUME 1. BOREHOLE AND SHAFT SEALING. TECHNICAL REPORT. Koplik, C.M.; Pentz, D.L.; Talbot, R. (Analytic Sciences Corp., Reading, MA (USA)). Mar 1979. Contract NRC-02-77-129. 124p. NTIS, PC AA06/MF A01.

This report is Volume 1 of a seven volume document on nuclear waste repository design issues. This report discusses the design requirements and the current technology for sealing shafts and boreholes in an underground disposal facility for nuclear waste. The discussion is focused upon repositories for high-level waste disposal in bedded salt. The type of data necessary to evaluate a particular proposal for shaft or borehole sealing is presented.

1698 (PB--293402) INFORMATION BASE FOR WASTE REPOSITORY DESIGN. VOLUME 2. EQUIPMENT PERFORMANCE REQUIREMENTS. TECHNICAL REPORT. Koplik, C.M.; Pentz, D.L.; Talbot, R. (Analytic Sciences Corp., Reading, MA (USA)). Mar 1979. Contract NRC-02-77-129. 132p. NTIS, PC AA07/MF A01.

This report is Volume 2 of a seven volume document on nuclear waste repository design issues. This report describes equipment requirements for the operation of a nuclear waste repository. Only equipment which can significantly affect nuclear safety was considered. A conceptual repository layout is presented and mining and ventilation methods are reviewed. Major emphasis is placed on nuclear waste handling operations, since these are peculiar to the situation at hand. A discussion of existing applicable regulations is also included.

1699 (PB--293403) INFORMATION BASE FOR WASTE REPOSITORY DESIGN. VOLUME 3. WASTE/ROCK INTERACTIONS. TECHNICAL REPORT. Koplik, C.M.; Oston, S.G.; Pentz, D.L.; Talbot, R. (Analytic Sciences Corp., Reading, MA (USA)). Mar 1979. Contract NRC-02-77-129. 137p. NTIS, PC AA07/MF A01.

This report is Volume 3 of a seven volume document on nuclear waste repository design issues. This report describes the important effects resulting from interaction between radioactive waste and the rock in a nuclear waste repository. The state-of-the-art in predicting waste/rock interactions is summarized. Where possible, independent numerical calculations have been performed. Recommendations are made pointing out areas which require additional research.

1700 (PB--293404) INFORMATION BASE FOR WASTE REPOSITORY DESIGN. VOLUME 4. MINE STRUCTURAL FEATURES. TECHNICAL REPORT. Byrne, R.J.; Koplik, C.M.; Oston, S.G.; Giuffre, M.S.; Myer, L.R. (Analytic Sciences Corp., Reading, MA (USA)). Mar 1979. Contract NRC-02-77-129. 373p. NTIS, PC AA16/ MF A01.

This report is Volume 4 of a seven volume document on nuclear waste repository design issues. This report discusses the mine structural features of an underground nuclear waste disposal facility which are important to repository operation, waste retrieval, and long-term waste containment. Emphasis is on repositories for high-level waste disposal in bedded salt, although much of the material is relevant to other geologic disposal mediums. The results of a numerical structural analysis of a depository in bedded salt are presented.

1701 (PB--293405) INFORMATION BASE FOR WASTE REPOSITORY DESIGN. VOLUME 5. DECOMMISSIONING OF UNDERGROUND FACILITIES. TECHNICAL REPORT. Giuffre, M.S.; Plum, R.L.; Koplik, C.M.; Talbot, R. (Analytic Sciences Corp., Reading, MA (USA)). Mar 1979. Contract NRC-02-77-129. 96p. NTIS, PC AA05/ MF A01.

This report is Volume 5 of a seven volume document on nuclear waste repository design issues. This report discusses the requirements for decommissioning a deep underground facility for the disposal of radioactive waste. The techniques for sealing the mined excavations are presented and an information base on potential backfill materials is provided. Possible requirements for monitoring the site are discussed. The performance requirements for backfill materials are outlined. The advantages and disadvantages of each sealing method are stated.

1702 (PB--293406) INFORMATION BASE FOR WASTE REPOSITORY DESIGN. VOLUME 6. EXCAVATION TECHNOLOGY. TECHNICAL REPORT. Koplik, C.M.; Pentz, D.L.; Talbot, R. (Analytic Sciences Corp., Reading, MA (USA)). Mar 1979. Contract NRC-02-77-129. 85p. NTIS, PC AA05/ MF A01.

This report is Volume 6 of a seven volume document on nuclear waste repository design issues. This report discusses the excavation technology to be used for a nuclear waste facility in a deep geologic formation. Particular emphasis is placed on the requirement to minimize the disturbance to the depository rock. This can reduce the probability of radionuclide migration through the rock surrounding the excavation. An information base is provided to assist in the evaluation of mining methods. A methodology is presented which can be used to determine performance requirements for excavation techniques.

1703 (PB--293407) INFORMATION BASE FOR WASTE REPOSITORY DESIGN. VOLUME 7. EXECUTIVE SUMMARY. TECHNICAL REPORT. Bartlett, J.W.; Pentz, D.L.; Talbot, R. (Analytic Sciences Corp., Reading, MA (USA)). Mar 1979. Contract NRC-02-77-129. 27p. NTIS, PC AA03/ MF A01.

This report is Volume 7 of a seven volume document on nuclear waste repository design issues. This report is an executive summary of studies in support of design performance criteria for radioactive waste repositories. Details of the study are provided in six companion volumes. The work developed information bases concerning shaft and borehole sealing, equipment performance requirements, waste/rock interactions, mine structural features, decommissioning performance, and excavation technology requirements. Results are summarized here under four headings: factors that are currently adequate, technology needing further development, critical information needs, and prudent repository operating procedures. Design option studies that are needed and the interactions between repository design and overall waste management strategy are also discussed.

1704 (PB--295038) A SURVEY OF PACKAGING FOR SOLIDIFIED LOW-LEVEL RADIOACTIVE WASTE. TECHNICAL NOTE. Miller, N.E. (Battelle Columbus Labs., OH (USA)). Sep 1978. Contract EPA-68-01-3924. 46p. NTIS PC A03/ MF A01.

There are presently no federal regulations controlling the packaging of low-level radioactive wastes for disposal by shallow land burial. The packaging of low-level radioactive wastes for ocean disposal by the European community has been controlled by guidelines of the Nuclear Energy Agency of the OECD. For both methods of disposal, the 55-gallon steel drum has been the most commonly used container. The use of nonmetal packaging has been more common for contaminated trash and other low-level wastes at DOE shallow land burial sites. The life of the disposal container is affected by the structural stresses imposed by the handling and disposal operations, and by deterioration from corrosion in the disposal environment.

1705 (PB--296947, pp 219-230) HISTORICAL REVIEW OF FEDERAL/STATE ROLES IN REGULATING COMMERCIAL LOW LEVEL RADIOACTIVE WASTE BURIAL GROUND. Kerr, G.W. (Nuclear Regulatory Commission, Washington, DC). May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

The subject of disposal of low level radioactive waste has generated considerable interest among state and federal agencies, state and federal legislatures, the public and the industry in the past three to four years. The background and regulatory processes which have been followed since 1961 in regulating the low level waste burial grounds provide a useful point of reference for consideration of the currently evolving changes in this sector of the nuclear industry. The background is discussed in this paper as well as the type of activities conducted at the burial sites and the processes followed in licensing and regulating the existing commercial burial sites. The paper also discusses the possible future roles of federal and state governments in regulating such sites.

1706 (PB--296947, pp 1-9) LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT: RETROSPECT AND PROSPECT. Lieberman, J.A. (Nuclear Safety Associates, Bethesda, MD). May 1979.

From 12. Health Physics Society midyear

topical symposium; Williamsburg, VA, USA (12 Feb 1979).

The history of the disposal of low-level radioactive wastes is recounted. Incineration, shallow burial, and sea disposal are discussed. Political and social impacts on safeguard regulations relating to radioactive waste disposal were also discussed. The technical, institutional and administrative issues involved in future prospects of waste disposal are presented. A classification system for radioactive wastes, alternative disposal systems, federal-state relationships, commercial waste burial grounds, and on-site management at reactor sites are also discussed in this lecture. (DC)

1707 (PB--296947, pp 16-26) PERSPECTIVE ON THE RELATIVE HAZARD OF LOW-LEVEL RADIOACTIVE WASTE DISPOSAL. Dornsife, W.P. (Pennsylvania Dept. of Environmental Resources, Harrisburg). May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

Low-level radioactive waste disposal is presently one of the major problems facing most of the industries and institutions which use and produce radioactive materials. A more widespread but less publicized waste disposal problem may, however, be facing almost all major industries. This problem is the disposal of other hazardous wastes. This paper will examine the problem of radioactive waste management and the management of other hazardous wastes by comparing their relative toxicities. The relative risks of othe total problem will then be assessed by comparing the generation rates of each. In addition, the radioactive wastes produced by the nuclear fuel cycle will be compared with the potentially hazardous waste produced by alternate energy sources, namely, the coal fuel cycle and the manufacturing of equipment for the collection of solar energy. These comparisons suggest that the consequences of the disposal of other hazardous waste could result in risk to current and future generations which are comparable with or which may exceed that due to radioactive waste disposal. Other aspects of the problems inherent in the safe management of hazardous waste compared to radioactive waste will also be explored.

1708 (PB--296947, pp 27-37) PROFILE OF INSTITUTIONAL RADIOACTIVE WASTES GENERATED IN 1977. Beck, T.J.; McCampbell, M.R.; Cooley, L.R. (Univ. of Maryland, Baltimore). May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

A national survey of radwaste volumes and characteristics generated by large medical and academic institutions in 1977 was performed. This is a followup to a survey which obtained 1975 data. The estimated total waste volume generated by the survey population in 1977 was 7771 m^3 (274,400 ft^3). These data and those from the previous survey show that the volume is increasingly linearly and consistently accounts for approximately 11% of the total volume of low level radwaste buried commercially. Most of the waste shipped by respondents (78%) was shipped to the shallow land burial site at Barnwell, South Carolina. Included in this profile of institutional radwastes are: a report of the principal radionuclides present as waste contaminants, and a breakdown of waste by form; an estimate of the effects of mechanical compaction of dry waste and a review of the extent to which alternative disposal methods are used by the study population for the various waste forms.

1709 (PB--296947, pp 49-60) LOW-LEVEL RADIOACTIVE WASTE FROM RARE METALS PROCESSING FACILITIES. Eng, J. (Bureau of Radiation Protection, Trenton, NJ); Hendricks, D.W.; Feldman, J.; Giardina, P.A. May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

In the past year, problems of disposal of byproducts, tailings, and wastes from rare metals and thorium producing facilities have received the attention of radiological agencies. Many of the raw ores used by these processing facilities were rich in natural radioactivity and the residues of production were often not disposed of properly. Mill tailings from the uranium mining industry have only recently come under federal regulation. It can be expected that similar attention will be focused on the environmental impacts of the rare metals processing industry as illustrated by interest in the problems of Parkersburg, WV, and Albany, OR. One other site in Akron, NY, does not appear to be an immediate problem, but its situation is typical of the many yet unsurveyed inactive rare metal facilities in the country. The radiological problems presented by and tydecontamination activities which may be required of these rare metal facilities are examined.

1710 (PB--296947, pp 62-66) DOE'S LOW-LEVEL WASTE MANAGEMENT PROGRAM. Meyers, S. (Dept. of Energy, Washington, DC). May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

Government policies on the management of low-level radioactive wastes are discussed. The DOE program of radioactive waste disposal at DOE sites is described. Ten major program elements are highlighted: program management; systems analysis; criteria and standards development; public and regulatory interface; technology development; waste generation reduction; current systems operations; future systems development and acquisition, commercial wastes, and alternatives to shallow land burial. (DC)

1711 (PB--296947, pp 67-73) NUCLEAR POWER PLANT APPROACH TO TEMPORARY ON-SITE STORAGE OF RADIOACTIVE WASTE. Buring, M.R. (Metropolitan Edison Co., Reading, PA); Gutwein, E.E. May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

Designed storage space for solidified radioactive waste and spent filters at nuclear power plants has long been an area of concern. Increased personnel exposures arise when waste cannot be shipped for offsite disposal on a timely basis. In addition, significant cost savings can be realized in both transportation and burial costs if the short-lived isotopes in the solidified waste are permitted to decay. In order to increase flexibility in plant operations a large storage area for radioactive waste was designed. The design utilized existing structures as much as possible. A large concrete roof over a heat exchanger vault was connected by a dock to the radwaste processing area. The maximum anticipated radiation levels from the solidified waste were utilized in designing the shield wall around the storage area. Salient features of the storage area include four spent filter storage wells, a dual track overhead crane for moving

50 ft³ liners and an enclosed truck pad to facilitate loading. The 6000 ft² storage area can conveniently handle 99 50 ft³ liners on 5 ft x 5 ft pallets or 396 55 gal drums on similar 5 ft x 5 ft pallets. This is approximately one half of one unit's (PWR) average annual output of solidified evaporator bottoms. The spent filter storage wells will permit approximately two years decay with an estimated annual savings in transportation and burial charges of $12,000. Provisions for maintaining radiation exposures ALARA were included in the design of the facility. It was felt that conservatively estimated savings in radiation exposures and shipping and burial costs justified the project.

1712 (PB--296947, pp 101-106) COLLECTION AND DISPOSAL OF LOW LEVEL WASTE AT AN EDUCATIONAL INSTITUTION. Andrews, D.L.; Gilchrist, J.R.; Berk, H.W. (Univ. of Virginia, Charlottesville). May 1979.
From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).
Low level radioactive wastes are generated by a number of different laboratories and departments at the University of Virginia. Radioactive materials are utilized in a variety of research applications including medical and basic sciences, as well as for diagnostic and therapeutic uses at the University Hospital. Radioisotopes are purchased from commercial sources and are produced locally for use in research and medical diagnosis and treatment by the University of Virginia Reactor. In 1974, the University Radiation Safety Committee adopted rules for discharging radioisotopes to the environment which are more restrictive than the Nuclear Regulatory Commission regulations. The committee's philosophy is that no radioactive substances should be discharged to the environment which can be reasonably avoided, including those used in medical diagnosis and therapy. This policy has caused a significant increase in the accumulation of low-level radioactive wastes. The volume of low-level wastes at the University has increased from about 1.5 M³ in 1969 to over 68 M³ in 1977. Disposal costs have increased proportionately. Currently the University employs a full-time technician to collect and package radioactive wastes under the supervision of the health physics staff of the Radiation Safety Office. In 1976, the Radioactive Waste Management Facility (RWMF) was completed. This facility houses the Radiation Safety Office staff and has modern facilities for collecting and packaging all types of radioactive wastes. The facility is being used to limit the total cost of radioactive waste disposal, while fulfilling the objectives of the Radiation Safety Committee. Methods used to limit waste disposal volumes and costs are compaction, storage and decay of short half-life isotopes, solidification of liquid wastes, and education and training of radioactive material users throughout the University in reducing waste volume.

1713 (PB--296947, pp 107-115) COLLECTION AND HANDLING OF RADIOACTIVE WASTES FROM A LARGE UNIVERSITY. Shotts, J.G.; Spate, D.L.; Lee, P.K. (Univ. of Missouri, Columbia). May 1979.
From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).
Various types, levels, and amounts of radioactive wastes are generated by the Universtiy of Missouri, Columbia research, teaching, and clinical programs. Health Physics Services is responsible for collecting these wastes from the more than 200 laboratories spread over the sprawling campus and disposing of the wastes in an economical and safe manner. Most of the radioactive wastes are laboratory paper trash and liquids containing low levels of activity but some high level wastes and contaminated large animal carcasses also require disposal. The wastes are stored at one of four interim storage locations until ultimately disposed of by incineration, sewer release, local burial, shipment for commercial waste disposal or decay. The economics, safety, and handling aspects of the various disposal methods must be considered.

1714 (PB--296947, pp 126-132) REGULATORY CONSIDERATIONS FOR RADIOACTIVE WASTE DIPOSAL. Fuhrman, D.R.; Black, S.A.; Pasinosky, J.P. (Teledyne Isotopes, Westwood, NJ). May 1979.
From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).
Packaging, transportation, and burial of radioactive wastes involves a complex, sometimes nebulous set of regulatory conditions, restrictions, and exceptions for proper handling. These regulations affect the shipper of radioactive wastes directly as in the case of the Department of Transportation (DOT), Nuclear Regulatory Commission (NRC), state highway permits or bridge and tunnel authorities, or indirectly by imposing restrictions on the burial site of which the shipper must be aware. Due to the complexity of the regulations involving the various levels and types of radioactive wastes, this paper concentrates on low level (i.e., Type A and LSA quantities) wastes. When considering the shipment of Type A or LSA waste, the shipper must first consider the packaging, marking, labeling, etc. requirements as specified by the DOT and compatible with the respective burial site restrictions. The appropriate shipping papers must be completed certifying the packaging, marking, and labeling in accordance with DOT regulations. In transporting radioactive wastes, the DOT imposes requirements and restrictions on the carrier. Driver's logs and examination certificates must be in the driver's possession. In addition, requirements for the safe operation of vehicles carrying hazardous materials are imposed by the DOT. In addition to the DOT regulations, certain states, localities, highway authorities or bridge and tunnel authorities impose restrictions or require permit authorization prior to transporting radioactive wastes through their jurisdiction. In many states, the respective environmental agencies have recently imposed permit requirements for transport of any hazardous materials. The regulatory process governing radioactive waste disposal has become a maze of requirements, conditions, restrictions, and exemptions which are often redundant and ambiguous, which raises the costs to commercial waste disposal companies, carriers, and ultimately the generator.

1715 (PB--296947, pp 133-140) OPERATIONAL EXPERIENCE AT CHEM-NUCLEAR'S BARNWELL FACILITY. Ebenhack, D.G. (Chem-Nuclear Systems, Inc., Barnwell, SC). May 1979.
From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).
Chem-Nuclear's low level burial ground located in Barnwell, SC with primary licensing by the state of South Carolina has seen a substantial increase in volume of waste and presently serves the majority of fuel and non-

fuel cycle radwaste generators in the country. The waste, upon receipt, is monitored and disposed of in one of our engineered trenches. The packaging requirements, trench design and surface management minimize the possibility of release through the water pathway. The Health Physics practices and the environmental programs evaluate and monitor the personnel and population exposure pathways.

1716 (PB--296947, pp 141-150) MANAGEMENT AND SURVEILLANCE OF A UNIVERSITY RADIOACTIVE WASTE BURIAL SITE. Lee, P.K.; Shotts, J.G.; Spate, D.L. (Univ. of Missouri, Columbia). May 1979.
From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).
A radioactive waste burial site is operated at the University of Missouri under the conditions of 10 CFR 20.304. Over 90% of the radioactive wastes generated by the laboratories and clinics, exclusive of the Research Reactor Facility, are economically disposed at this site. During the seven year operation about 200 cubic meters of low-level wastes containing about 1.5×10^{11} becquerels have been buried in 3.6 meter deep and 0.6 meter wide trenches. A radiation surveillance program confirms that radiation levels in the vicinity of the burial site are well within acceptable limits.

1717 (PB--296947, pp 159-167) STATUS OF LOW-LEVEL RADIOACTIVE WASTE DISPOSAL: HOW TO PLAN A DISASTER. McArthur, W.C. (Hittman Nuclear and Development Corp., Columbia, MD). May 1979.
From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).
The nuclear industry is faced with serious problems in the transportation and burial of low-level radioactive wastes. Soaring burial costs, state regulations regarding transportation routes, and lack of direction from regulatory agencies are problems that must quickly be resolved. In order to gain control of this situation four major steps must be taken. First, states must accept their fair share of responsibility in the waste problem. Regulatory agencies must recognize the seriousness of the problem and develop a schedule for action. The nuclear industry must assert itself in a positive manner regarding the safety of nuclear power, and the low-level waste burial ground situation must improve.

1718 (PB--296947, pp 168-173) SHALLOW LAND BURIAL: WHY OR WHY NOT. Thompson, W.T.; Ledbetter, J.O.; Rohlich, G.A. (Univ. of Texas, Austin). May 1979.
From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).
This paper summarizes a master's thesis on the state-of-the-art for shallow land burial of solid low-level radioactive wastes. The coverage of the thesis, which is condensed for this paper, ranges from site selection to problem case histories. Inherent in such coverage is the assessment of risk, the discussion of operational and management problems and the real significance of off-site migration - this topic will be discussed in light of the stands taken that the migration is a serious problem and that it is not. Emphasis is on the engineering parameters of importance in site selection, and what pretreatment, if any, is needed.

1719 (PB--296947, pp 203-212) COMPARISON OF ALTERNATIVES FOR LOW-LEVEL RADIOACTIVE WASTE DISPOSAL. Macbeth, P.J. (Ford, Bacon and Davis Inc. Salt Lake City, UT). May 1979.
From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).
A comparative analysis of alternatives for disposal of low-level radioactive wastes has been performed for the US NRC. A systematic evaluation of all possible disposal mechanisms identifying options most viable for further analysis is presented. Generic reference disposal facility concepts for each viable alternative are evaluated to provide a consistent, meaningful comparison based on technological, economic, and sociopolitical factors. The results of the comparative analysis are presented in a convenient matrix format to facilitate intercomparisons and to promote understanding of the complexities of the tradeoffs involved in selecting waste disposal options. The concepts judged to be the most viable alternatives to the current practice in this country of disposal of low-level wastes by shallow land burial include improvements to shallow land burial, ocean disposal, intermediate depth burial (10- to 15 m deep), disposal in natural or mined cavities, and disposal in exposed or covered structures. Representative waste disposal facility concepts for each of these alternatives were analyzed as the basis of the evaluation, using reference waste volumes and facility lifetimes.

1720 (PB--296947, pp 214-218) DISPOSAL CLASSIFICATION OF LOW-LEVEL RADIOACTIVE WASTE. Adam, J.A. (Nuclear Regulatory Commission, Washington, DC). May 1979.
From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).
A system for classifying radioactive wastes is presented. This system is based on the minimum requirements for safe disposal. Study guidelines for this project are discussed. Two types of pathways are investigated: onsite reclaimer events and offsite migration. The classification system postulates 5 classes of terrestrial disposal. These are discussed. (DC)

1721 (PB--296947, pp 234-237) BURIAL OF SMALL QUANTITIES OF RADIONUCLIDES WITHOUT PRIOR NRC APPROVAL. Hickey, J.W.N. (Nuclear Regulatory Commission, Washington, DC). May 1979.
From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).
The US Nuclear Regulatory Commission has proposed to delete a regulation (10 CFR 20.304) which allows licensees to bury specified small quantities of radionuclides anywhere without notification or approval of NRC, subject to certain conditions. In developing this proposed deletion, the NRC staff contacted licensees, state officials, inspectors, and others to obtain information on disposal practices. The Commission and its staff tentatively concluded that burials pursuant to 10 CFR Section 20.304 should stop, and that the impact of the proposed deletion would be small. If review of public comments does not change this evaluation, 10 CFR Section 20.304 will be deleted, and burials will have to be specifically approved in advance by NRC.

1722 (PB--296947, pp 252-260) DECOMMISSIONING STANDARDS: THE RADIOACTIVE WASTE IMPACT. Russell, J.L.; Crofford, W.N.

(Environmental Protection Agency, Washington, DC). May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

Several considerations are important in establishing standards for decommissioning nuclear facilities, sites and materials. The review includes discussions of some of these considerations and attempts to evaluate their relative importance. Items covered include the form of the standards, timing for decommissioning, occupational radiation protection, costs and financial provisions, and low-level radioactive waste. Decommissioning appears more closely related to radiation protection than to waste management, although it is often carried under waste management programs or activities. Basically, decommissioning is the removal of radioactive contamination from facilities, sites and materials so that they can be returned to unrestricted use or other actions designed to minimize radiation exposure of the public. It is the removed material that is the waste and, as such, it must be managed and disposed of in an environmentally safe manner. It is important to make this distinction even though, for programmatic purposes, decommissioning may be carried under waste management activities. It was concluded that the waste disposal problem from decommissioning activities is significant in that it may produce volumes comparable to volumes produced during the total operating life of a reactor. However, this volume does not appear to place an inordinate demand on shallow land burial capacity. It appears that the greater problems will be associated with occupational exposures and costs, both of which are sensitive to the timing of decommissioning actions.

1723 (PB--296947, pp 261-269) MODELING AND ENVIRONMENTAL ASSESSMENT OF LAND DISPOSAL METHODS FOR LOW-LEVEL RADIOACTIVE WASTES. Meyer, G.L.; Bard, S.T.; Hung, C.Y.; Neiheisel, J. (Environmental Protection Agency, Washington, DC). May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

The Environmental Protection Agency (EPA) is evaluating the potential environmental impact and risk to man from disposing of low-level radioactive waste (LLW) in the ground. A generic model is being developed to simulate the interaction of a variety of LLW waste types and land disposal methods and operations with the natural characteristics of the site and their potential impact on the environment. Shallow land burial will be used as a base case. This model will be an important tool in EPA's work to develop environmental standards for LLW. This paper presents the general objectives, information requirements, components, and pathways considered in the environmental assessment model and some considerations in developing the model.

1724 (PB--296947, pp 366-372) RECOMMENDATIONS FOR REMEDIAL ACTION AND DECOMMISSIONING OF A RADIOACTIVE WASTE BURIAL SITE. Giardina, P.A. (Environmental Protection Agency, New York, NY); Eng, J.; Feldman, J. May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

For the past year, the Nuclear Fuel Services, Inc. (NFS) site located in West Valley, NY has been the subject of state and federal efforts to determine decontamination and decommissioning options. In 1978, the US Environmental Protection Agency (EPA) issued Criteria for Radioactive Wastes for storage and disposal of all forms of radioactive wastes. Under an Atomic Energy Commission (AEC) license, NFS operated the only commercial fuel reprocessing facility in the United States. As a result of the reprocessing activities, the site contains liquid high-level radioactive waste, buried cladding hulls and defective fuel elements, a spent fuel storage pool, and a low-level burial ground. Low-level radioactive material contained therein also comes from sources other than NFS's operations. The site received a license from the state of New York to perform low-level burial operations and radioactive material was buried until 1975. Studies of the low-level burial area show radioactive gases have leaked through the trench caps and the caps are more permeable than the surrounding soil allowing water infiltration into the trenches. Active site maintenance is used to prevent trench water overflow through the trench caps. Other remedial actions have been described for the site and are undergoing implementaion. The West Valley site will be examined to determine the extent of remedial action and decommissioning activities which may be necessary based on the proposed EPA environmental criteria for radioactive waste.

1725 (PB--296947, pp 38-48) HEALTH PHYSICS CONSIDERATIONS IN ACCELERATOR DECOMMISSIONING AND DISPOSAL. Mundis, R.L.; Kikta, M.J.; Marmer, G.J.; Opelka, J.H.; Peterson, J.M.; Siskind, B. (Argonne National Lab., IL). May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

There are perhaps as many as 1200 particle accelerators in the United States, ranging in size from the very small Cockroft-Walton and electron linear accelerators to the multi-GeV research synchrotrons. When an accelerator has reached the end of its useful life the radioactivity induced in the components then presents several disposal problems. At least fifty accelerators produce significant induced activation, and several hundred more are capable of producing fluxes of neutrons which could result in activation of various components of the accelerator facility. This is generally of low level except for the very high energy/high intensity machines. In most cases, the induced radioactivity is confined to relatively few parts of the machine and the disposition of these is through the normal radioactive waste channels without complication. However, some machines leave a legacy of low level induced radioactivity in massive components. Examples of massive items are large magnets, shield blocks and beam stops of concrete, earth or iron, and even the walls and floors of the building itself. These need to be dealt with in a manner so as to pose no potential health hazards to persons in the vicinity of the public at large. The disposition of radioactive waste from major past decommissionings, including the Cambridge Electron Accelerator (CEA) and the Brookhaven Cosmotron, will be discussed. The extent of the induced radioactivity problmes in decommissioning of smaller accelerators will also be discussed.

1726 (PNCT--841-78-69) STUDIES ON THE DISPERSION OF LOW-LEVEL LIQUID EFFLUENT RELEASED FROM THE FUEL REPROCESSING PLANT INTO THE SEA. Iwasaki, K.; Fukuda, S.; Hirayama, A.; Kitahara, Y.; Kishimoto, Y. (Power

Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). Dec 1978. 127p. (In Japanese). NTIS (US Sales Only), PC A07/MF A01.

The low level liquid waste effluent has been released batchwise into the Pacific Ocean from the fuel reprocessing plant of PNC sited in Tokai-mura since September 1977. The liquid effluent is discharged from the nozzle located about sixteen meters below the sea surface and dispersed by ambient cross stream. Gross beta activity, tritium and ^{137}Cs concentrations in seawater were measured from November 1972 to June 1973 in accordance with a special monitoring program to examine the dilution and dispersion of effluent in seawater. The results of tritium measurement showed that the effluent was diluted by two or three orders of magnitude by jet mixing immediately after the discharge from the nozzle, and was further diluted by one or two orders of magnitude by traveling several hundred meters along the current. It was observed that the areal concentration of tritium in surface water raised temporarily after the discharge of more than several tens curies, but returned to the background level within a day or so. No significant increase in concentration of gross beta activity and ^{137}Cs activities in seawater was observed in this period.

1727 (PNL--2557) CHARACTERIZATION OF THE HANFORD 300 AREA BURIAL GROUNDS. FINAL REPORT: DECONTAMINATION AND DECOMMISSIONING. Phillips, S.J.; Ames, L.L.; Fitzner, R.E.; Gee, G.W.; Sandness, G.A.; Simmons, C.S. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jan 1980. Contract EY-76-C-06-1830. 255p. Dep. NTIS, PC A12/MF A01.

Pacific Northwest Laboratory conducted a series of investigations at the Hanford Site to develop technologies for characterizing and monitoring radioactive waste burial facilities that could be used in determining appropriate decommissioning alternatives. Specific objectives were to develop unique functional geophysics, geochemical, soil physics, numerical modeling, and biological methodologies needed to better characterize and monitor buried radioactive waste disposal sites. To meet these objectives the project was divided into four tasks: Task I, Geophysical Evaluation - Geophysical surveys were taken to locate and define the gross composition of waste materials. Task II, Geochemical Analysis - The interaction of disposed radionuclides with geologic media was analyzed through an integrated radiochemical procedure. Task III, Fluid Transport and Modeling - Computer modeling of water migration in partially saturated groundwater systems was verified with actual data collected at a field test facility used to monitor micrometeorological and geohydrological energy and mass transfer factors. Task IV, Biological Transport - Several biological organisms were evaluated for potential radionuclide uptake and transport. Along with the four tasks, the project included a review of pertinent literature and regulatory issues that might affect the alternatives selected. Surveys were taken of the surrounding area and specific sites and operations. The overall results indicated that the 300 Area Burial Grounds have been adequate in containing radioactive waste. Based on the results of the project, the alternatives identified for decommissioning these sites are exhumation and translocation, entombment, perpetual care, and abandonment. Perpetual care (currently used) appears to be the best decommissioning alternative for these burial grounds at this time. However, another alternative may be selected depending on future waste management policies, plans, or activities.

1728 (PNL--2563) ORGANIC COMPONENTS OF NUCLEAR WASTES AND THEIR POTENTIAL FOR ALTERING RADIONUCLIDE DISTRIBUTION WHEN RELEASED TO SOIL. McFadden, K.M. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Aug 1980. Contract AC06-76RL01830. 34p. NTIS, PC A03/MF A01.

Normal waste processing at the Hanford operations requires the use of many organic materials, chiefly in the form of complexing agents and diluents. These organic materials and their chemical and radiolytic degradation products, have potential for complexing fission products and transuranium elements, both in the waste streams and upon infiltration into soil, perhaps influencing future sorption or migration of the nuclides. Particular complexation characteristics of various nuclides which constitute the major fission products, long-lived isotopes, and the most mobile in radioactive wastes are discussed briefly with regards to their anticipated sorption or mobility in soils. Included in the discussion are Am, Sb, Ce, Cs, Co, Cm, Eu, I, Np, Pm, Pu, Ra, Ru, Sr, Tc, U, and Zr. 107 references.

1729 (PNL--2776) NATURALLY OCCURRING GLASSES: ANALOGUES FOR RADIOACTIVE WASTE FORMS. Ewing, R.C.; Haaker, R.F. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Apr 1979. Contract EY-76-C-06-1830. 82p. Dep. NTIS, PC A05/MF A01.

Volcanic glasses are very often altered by weathering and leaching and recrystallize to their fine-grained equivalents (rhyolites, felsites). The oldest volcanic glasses are dated at 40 million years before the present, but the majority are much younger. Devitrification textures was produced experimentally; and hydration rates for volcanic glasses were determined as a function of composition, temperature, and climate. Presence of water and temperature are the most important rate controlling variables. Even material that may still be described as glassy often exhibits evidence of alteration and recrystallization. Of the volcanic glasses that are preserved in the geologic record, it would be rare to describe such a glass as pristine. Despite the common alteration and recrystallization effects observed in volcanic glasses, glasses formed as a result of impact, tektites and lunar glasses, may occur in substantially unaltered form. In the case of tektites, their resistance to alteration is a result of their high SiO_2 content and low alkali content. Lunar glasses have been preserved for hundreds of millions of years because they exist in an environment with a low oxygen fugacity and an extremely low water vapor partial presssure. Thus one might expect glasses of particular compositions or in specific types of environment to be stable for long periods of time. These conclusions are applied to radioactive waste disposal over several time periods (0-30h, 30h-20y, 20-200y).

1730 (PNL--2782) ASSESSMENT OF EFFECTIVENESS OF GEOLOGIC ISOLATION SYSTEMS. TEST CASE RELEASE CONSEQUENCE ANALYSIS FOR A SPENT FUEL REPOSITORY IN BEDDED SALT. Raymond, J.R.; Bond, F.W.; Cole, C.R.; Nelson, R.W.; Reisenauer, A.E.; Washburn, J.F.; Norman, N.A.; Mote, P.A.; Segol, G. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jan 1980. Contract EY-76-C-06-1830. 82p. Dep. NTIS, PC A05/MF A01.

Geologic and geohydrologic data for the

Paradox Basin have been used to simulate movement of ground water and radioacrtive contaminants from a hypothetical nuclear reactor spent fuel repository after an assumed accidental release. The pathlines, travel times and velocity of the ground water from the repository to the discharge locale (river) were determined after the disruptive event by use of a two-dimensional finite difference hydrologic model. The concentration of radioactive contaminants in the ground water was calculated along a series of flow tubes by use of a one-dimensional mass transport model which takes into account convection, dispersion, contaminant/media interactions and radioactive decay. For the hypothetical site location and specific parameters used in this demonstration, it is found that Iodine-129 (I-129) is tthe only isotope reaching the Colorado River in significant concentration. This concentration occurs about 8.0×10^5 years after the repository has been breached. This I-129 groundwater concentration is about 0.3 of the drinking water standard for uncontrolled use. The groundwater concentration would then be diluted by the Colorado River. None of the actinide elements reach more than half the distance from the repository to the Colorado River in the two-million year model run time. This exercise demonstrates that the WISAP model system is applicable for analysis of contaminant transport. The results presented in this report, however, are valid only for one particular set of parameters. A complete sensitivity analysis must be performed to evaluate the range of effects from the release of contaminants from a breached repository.

1731 (PNL--2851) SUMMARY OF FY-1978 CONSULTANT INPUT FOR SCENARIO METHODOLOGY DEVELOPMENT. Scott, B.L.; Benson, G.L.; Craig, R.A. (eds.); Harwell, M.A. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Nov 1979. Contract EY-76-C-06-1830. 180p. Dep. NTIS, PC A04/MF A01.

Associated with commercial nuclear power production in the United States is the generation of potentially hazardous radioactive waste products. The Department of Energy (DOE), through the National Waste Terminal Storage (NWTS) Program, is seeking to develop nuclear waste isolation systems in geologic formations. These underground waste isolation systems will preclude contact with the biosphere of waste radionuclides in concentrations which are sufficient to cause deleterious impact on humans or their environments. Comprehensive analyses of specific isolation systems are needed to assess the postclosure expectations of the systems. Assessment of Effectiveness of Geologic Isolation Systems (AEGIS) program has been established for developing the capability of making those analyses. The assessment of repository post-closure safety has two basic components: identification and analyses of breach scenarios and the pattern of events and processes causing each breach, and identification and analyses of the environmental consequences of radionuclide transport and interactions subsequent to a repository breach. Specific processes and events which might affect potential repository sites and, the rates and probabilities for those phenomena are presented. The description of the system interactions and synergisms and of the repository system as an evolving and continuing process are included. Much of the preliminary information derived from the FY-1978 research effort is summarized in this document. This summary report contains information pertaining to the following areas of study: climatology, geomorphology, glaciology, hydrology, meteorites, sea level fluctuations, structural geology and volcanology.

1732 (PNL--2851) SUMMARY OF FY-1978 CONSULTATION INPUT FOR SCENARIO METHODOLOGY DEVELOPMENT. Scott, B.L.; Benson, G.L.; Craig, R.A.; Harwell, M.A. (eds.). (Battelle Pacific Northwest Labs., Richland, WA (USA)). Nov 1979. Contract EY-76-C-06-1830. 180p. Dep. NTIS, PC A09/MF A01.

The Scenario Methodology Development task is concerned with evaluating the geologic system surrounding an underground repository and describing the phenomena (volcanic, seismic, meteorite, hydrologic, tectonic, climate, etc.) which could perturb the system and possibly cause loss of repository integrity. This document includes 14 individual papers. Separate abstracts were prepared for all 14 papers. (DLC)

1733 (PNL--2851, pp I.1-I.9) DISRUPTIVE EVENT ANALYSIS: VOLCANISM AND IGNEOUS INTRUSION. Crowe, B.M. (Los Alamos Scientific Lab., NM). Nov 1979.

Summary of FY-1978 consultation input for Scenario Methodology Development.

Three basic topics are addressed for the disruptive event analysis: first, the range of disruptive consequences of a radioactive waste repository by volcanic activity; second, the possible reduction of the risk of disruption by volcanic activity through selective siting of a repository; and third, the quantification of the probability of repository disruption by volcanic activity.

1734 (PNL--2854) ASSESSMENT OF EFFECTIVENESS OF GEOLOGIC ISOLATION SYSTEMS. GEOLOGIC FACTORS IN THE ISOLATION OF NUCLEAR WASTE: EVALUATION OF LONG-TERM GEOMORPHIC PROCESSES AND CATASTROPHIC EVENTS. Mara, S.J. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Mar 1980. Contract EY-76-C-06-1830. 54p. Dep. NTIS, PC A04/MF A01.

SRI International has projected the rate, duration, and magnitude of geomorphic processes and events in the Southwest and Gulf Coast over the next million years. This information will be used by the Department of Energy's Pacific Northwest Laboratory (PNL) as input to a computer model, which will be used to simulate possible release scenarios and the consequences of the release of nuclear waste from geologic containment. The estimates in this report, although based on best scientific judgment, are subject to considerable uncertainty. An evaluation of the Quaternary history of the two study areas revealed that each had undergone geomorphic change in the last one million years. Catastrophic events were evaluated in order to determine their significance to the simulation model. Given available data, catastrophic floods are not expected to occur in the two study areas. Catastrophic landslides may occur in the Southwest, but because the duration of the event is brief and the amount of material moved is small in comparison to regional denudation, such events need not be included in the simulation model. Ashfalls, however, could result in removal of vegetation from the landscape, thereby causing significant increases in erosion rates. Because the estimates developed during this study may not be applicable to specific sites, general equations were presented as a first step in refining the analysis. These equations identify the general relationships among the important variables and suggest those areas of concern for which further data are required. If the current model indicates that geomorphic

processes (taken together with other geologic changes) may ultimately affect the geologic containment of nuclear waste, further research may be necessary to refine this analysis for application to specific sites.

1735 (PNL--2858) HYDROGEOLOGIC EFFECTS OF NATURAL DISRUPTIVE EVENTS ON NUCLEAR WASTE REPOSITORIES. Davis, S.N. (Arizona Univ., Tucson (USA)). Jun 1980. Contract AC06-76RL01830. 41p. NTIS, PC A03/MF A01.

Some possible hydrogeologic effects of disruptive events that may affect repositories for nuclear wastte are described. A very large number of combinations of natural events can be imagined, but only those events which are judged to be most probable are covered. Waste-induced effects are not considered. The disruptive events discussed above are placed into four geologic settings. Although the geology is not specific to given repository sites that have been considered by other agencies, the geology has been generalized from actual field data and is, therefore, considered to be physically reasonable. The geologic settings considered are: (1) interior salt domes of the Gulf Coast, (2) bedded salt of southeastern New Mexico, (3) argillaceous rocks of southern Nevanda, and (4) granitic stocks of the Basin and Range Province. Log-normal distributions of permeabilities of rock units are given for each region. Chapters are devoted to: poresity and permeability of natural materials, regional flow patterns, disruptive events (faulting, dissolution of rock forming minerals, fracturing from various causes, rapid changes of hydraulic regimen); possible hydrologic effects of disruptive events; and hydraulic fracturing.

1736 (PNL--2859) PRELIMINARY SUBSURFACE HYDROLOGIC CONSIDERATIONS: COLUMBIA RIVER PLATEAU PHYSIOGRAPHIC PROVINCE. ASSESSMENT OF EFFECTIVENESS OF GEOLOGIC ISOLATION SYSTEMS. Veatch, M.D. (Battelle Pacific Northwest Labs., Richland, WA (USA); Shannon and Wilson, Inc., Seattle, WA (USA)). Apr 1980. Contract EY-76-C-06-1830. 43p. NTIS, PC A03/MF A01.

This report contains a discussion of the hydrologic conditions of the Columbia River Plateau physiographic province. The Columbia River Plateau is underlain by a thick basalt sequence. The Columbia River basalt sequence contains both basalt flows and sedimentary interbeds. These sedimentary interbeds, which are layers of sedimentary rock between lava flows, are the main aquifer zones in the basalt sequence. Permeable interflow zones, involving the permeable top and/or rubble bottom of a flow, are also water-transmitting zones. A number of stratigraphic units are present in the Pasco Basin, which is in the central part of the Columbia River Plateau. At a conceptual level, the stratigraphic sequence from the surface downward can be separated into four hydrostratigraphic systems. These are: (1) the unsaturated zone, (2) the unconfined aquifer, (3) the uppermost confined aquifers, and (4) the lower Yakima basalt hydrologic sequence. A conceptual layered earth model (LEM) has been developed. The LEM represents the major types of porous media (LEM units) that may be encountered at a number of places on the Columbia Plateau, and specifically in the Pasco Basin. The conceptual LEM is not representative of the actual three-dimensional hydrostratigraphic sequence and hydrologic conditions existing at any specific site within the Columbia Plateau physiographic province. However, the LEM may be useful for gaining a better understanding of how the hydrologic regime may change as a result of disruptive events that may interact with a waste repository in geologic media.

1737 (PNL--2862) ASSESSMENT OF EFFECTIVENESS OF GEOLOGIC ISOLATION SYSTEMS: THE FEASIBILITY OF COMPUTER INTERROGATION OF EXPERTS FOR WISAP. Wight, L.H. (Battelle Pacific Northwest Labs., Richland, WA (USA); TERA Corp., Berkeley, CA (USA)). May 1980. Contract EY-76-C-06-1830. 101p. NTIS, PC A06/MF A01.

Simulation of the response of a waste repository to events that could initiate a fault tree to breach and failure is currently a keystone to the Battelle Waste Isolation Safety Assessment Program (WISAP). The repository simulation, which is part of the Disruptive Event Analysis Task, models the repository for its entire design life, one million years. This is clearly a challenging calculation, requiring input unlike any other response analysis by virtue of the long design life of the facility. What technology will provide design criteria for a million year design life. Answers to questions like this can, to some extent, be based on data, but always require some subjective judgments. The subjectivity, which is sometimes driven by inadequate or incomplete data or by a lack of understanding of the physical process, is therefore a crucial ingredient in an analysis of initiating events. Because of the variety of possible initiating events (glaciation, man-caused disruption, volcanism, etc.), many expert opinions will be solicited as input. The complexity of the simulation, the variety of experts involved, and the volume of applicable data all suggest that there may be a more direct, economical method to solicit the expert opinion. This report addresses the feasibility of such a system. Background information is presented that demonstrates the advantages of a computer interrogation system over conventional interrogation and assessment techniques. In the subsequent three sections the three elements - structure and decomposition, scaling, and synthesis - that are basic to any interrogation and assessment technique are reviewed. The interrelationship are schematically illustrated between these three fundamental elements and, therefore, serves as a useful guide to these three sections. Each of these three sections begins with a recommended approach to the particular element and ends with an illustration of representative dialogue.

1738 (PNL--2863) GLACIOLOGICAL PARAMETERS OF DISRUPTIVE EVENT ANALYSIS. Bull, C. (Battelle Pacific Northwest Labs., Richland, WA (USA); Ohio State Univ., Columbus (USA)). Apr 1980. Contract EY-76-C-06-1830. 55p. Dep. NTIS, PC A04/MF A01.

The possibility of complete glaciation of the earth is small and probably need not be considered in the consequence analysis by the Assessment of Effectiveness of Geologic Isolation Systems (AEGIS) Program. However, within a few thousand years an ice sheet may well cover proposed waste disposal sites in Michigan. Those in the Gulf Coast region and New Mexico are unlikely to be ice covered. The probability of ice cover at Hanford in the next million years is finite, perhaps about 0.5. Sea level will fluctuate as a result of climatic changes. As ice sheets grow, sea level will fall. Melting of ice sheets will be accompanied by a rise in sea level. Within the present interglacial period there is a definite chance that the West Antarctic ice sheet will melt. Ice sheets are agents of erosion, and some estimates of the amount of material they erode

have been made. As an average over the area glaciated by late Quaternary ice sheets, only a few tens of meters of erosion is indicated. There were perhaps 3 meters of erosion per glaciation cycle. Under glacial conditions the surface boundary conditions for ground water recharge will be appreciably changed. In future glaciations melt-water rivers generally will follow pre-existing river courses. Some salt dome sites in the Gulf Coast region could be susceptible to changes in the course of the Mississippi River. The New Mexico site, which is on a high plateau, seems to be immune from this type of problem. The Hanford Site is only a few miles from the Columbia River, and in the future, lateral erosion by the Columbia River could cause changes in its course. A prudent assumption in the AEGIS study is that the present interglacial will continue for only a limited period and that subsequently an ice sheet will form over North America. Other factors being equal, it seems unwise to site a nuclear waste repository (even at great depth) in an area likely to be glaciated.

1739 (PNL--2874) WASTE ISOLATION SAFETY ASSESSMENT PROGRAM. TECHNICAL PROGRESS REPORT FOR FY-1978. Brandstetter, A.; Harwell, M.A.; Howes, B.W.; Benson, G.L.; Bradley, D.J.; Raymond, J.R.; Serne, R.J.; Schilling, A.H. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jul 1979. Contract EY-76-C-06-1830. 338p. NTIS, PC A15/MF A01.

Associated with commercial nuclear power production in the United States is the generation of potentially hazardous radioactive wastes. The Department of Energy (DOE) is seeking to develop nuclear waste isolation systems in geologic formations that will preclude contact with the biosphere of waste radionuclides in concentrations which are sufficient to cause deleterious impact on humans or their environments. Comprehensive analyses of specific isolation systems are needed to assess the expectations of meeting that objective. The Waste Isolation Safety Assessment Program (WISAP) has been established at the Pacific Northwest Laboratory (operated by Battelle Memorial Institute) for developing the capability of making those analyses. Progress on the following tasks is reported: release scenario analysis, waste form release rate analysis, release consequence analysis, sorption-desorption analysis, and societal acceptance analysis. (DC)

1740 (PNL--2928) ASSESSMENT OF EFFECTIVENESS OF GEOLOGIC ISOLATION SYSTEMS. PERSPECTIVES ON THE GEOLOGICAL AND HYDROLOGICAL ASPECTS OF LONG-TERM RELEASE SCENARIO ANALYSES. Stottlemyre, J.A.; Wallace, R.W.; Benson, G.L.; Zellmer, J.T. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jun 1980. Contract AC06-76RL01830. 123p. NTIS, PC A06/MF A01.

Information that may be relevant to individuals involved with analyzing long-term release scenarios of specific repositories for nuclear waste is presented. The bulk of the information is derived from recent studies in West Germany and the United States. Emphasis is on the specific geological and hydrological phenomena that, alone or in concert, could potentially perturb the area around specific repository sites. Research is continuing on most of the topics discussed within this report. Because research is ongoing, statements and conclusions described in this document are subject to change. The main topics of this report are: (1) fracturing, (2) geohydrology, (3) magmatic activity, and (4) geomorphology. Therefore, the site-specific nature of the problem cannot be overemphasized. As an example of how one might combine the many synergistic and time-dependent parameters into a concise format the reader is referred to A Conceptual Simulation Model for Release Scenario Analysis of a Hypothetical Site in Columbia Plateau Basalts, PNL-2892. For additional details on the topics in this report, the reader is referred to the Pacific Northwest Laboratory (PNL) consultant report listed in the bibliography.

1741 (PNL--2939) FINITE-ELEMENT THREE-DIMENSIONAL GROUND-WATER (FE3DGW) FLOW MODEL - FORMULATION, PROGRAM LISTINGS AND USERS' MANUAL. Gupta, S.K.; Cole, C.R.; Bond, F.W. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Dec 1979. Contract EY-76-C-06-1830. 283p. Dep. NTIS, PC A13/MF A01.

The Assessment of Effectiveness of Geologic Isolation Systems (AEGIS) Program is developing and applying the methodology for assessing the far-field, long-term post-closure safety of deep geologic nuclear waste repositories. AEGIS is being performed by Pacific Northwest Laboratory (PNL) under contract with the Office of Nuclear Waste Isolation (OWNI) for the Department of Energy (DOE). One task within AEGIS is the development of methodology for analysis of the consequences (water pathway) from loss of repository containment as defined by various release scenarios. Analysis of the long-term, far-field consequences of release scenarios requires the application of numerical codes which simulate the hydrologic systems, model the transport of released radionuclides through the hydrologic systems to the biosphere, and, where applicable, assess the radiological dose to humans. Hydrologic and transport models are available at several levels of complexity or sophistication. Model selection and use are determined by the quantity and quality of input data. Model development under AEGIS and related programs provides three levels of hydrologic models, two levels of transport models, and one level of dose models (with several separate models). This document consists of the description of the FE3DGW (Finite Element, Three-Dimensional Groundwater) Hydrologic model third level (high complexity) three-dimensional, finite element approach (Galerkin formulation) for saturated groundwater flow.

1742 (PNL--2954) TESTS FOR DETERMINING IMPACT RESISTANCE AND STRENGTH OF GLASS USED FOR NUCLEAR WASTE DISPOSAL. Bunnell, L.R. (Battelle Pacific Northwest Labs., Richland, WA (USA)). May 1979. Contract EY-76-C-06-1830. 41p. Dep. NTIS, PC A03/MF A01.

Tests are described for determining the impact resistance (Section A) and static tensile strength (Section B) of glasses containing simulated or actual nuclear wastes. This report describes the development and use of these tests to rank different glasses, to assess effects of devitrification, and to examine the effect of impact energy on resulting surface area. For clarity this report is divided into two sections, Impact Resistance and Tensile Strength.

1743 (PNL--3070) COMPARISON OF INTERA AND WISAP CONSEQUENCE MODEL APPLICATION. ASSESSMENT OF EFFECTIVENESS OF GEOLOGIC ISOLATION SYSTEMS. Cole, C.R.; Bond, F.W. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jan 1980. Contract EY-76-C-06-1830. 66p. Dep. NTIS, PC A04/MF A01.

The Waste Isolation Safety Assessment Program (WISAP) is being conducted to develop,

for the Office of Nuclear Waste Isolation (ONWI), the methodology necessary to perform long-term safety assessments of deep geologic repositories. The Waste Isolation Pilot Plant (WIPP) program is developing a nuclear waste storage facility and is performing assessments of that site. WISAP and WIPP have similar, though independent, methodologies for assessing the consequences of a repository breach subsequent to closure. Intera Environmental Consultants are under contract to Sandia Laboratories to conduct the hydrologic and transport modeling for the WIPP Site Release Consequence Analysis (WIPP EIS/ER 1978). To provide a mutual benchmark check of the radionuclide and ground-water transport models of these two programs, ONWI has requested WISAP to perform a release consequence analysis based on the WIPP site, utilizing the same data and conceptual model which the WIPP program used for its environmental assessments. Therefore, only a portion of the WISAP methodology was used; specifically, only WISAP geotransport models were exercised. The other important parts of WISAP assessment methodology were not used, so that WISAP did not develop the scenario nor did WISAP interpret the field data to develop the conceptual model of the geohydrology of the WIPP site. The results of the comparative assessment are presented. Although the different models required slightly different input parameters, the results of the hydrologic simulations show a very close correspondence between the WISAP and WIPP predictions. This was as expected, since the various hydrologic codes available essentially utilize and solve the same basic flow equations. In addition, this report presents the results of the WISAP radionuclide transport model simulations. These results will provide the basis for comparison with WIPP results when these become available.

1744 (PNL--3139) STATUS OF SORPTION INFORMATION RETRIEVAL SYSTEM. Hostetler, D.D.; Serne, R.J.; Brandstetter, A. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Sep 1979. Contract EY-76-C-06-1830. 64p. Dep. NTIS, PC A04/MF A01.

A Sorption Information Retrieval System (SIRS) is being designed to provide an efficient, computerized, data base for information on radionuclide sorption in geologic media. The data bank will include Kd values for a large number of radionuclides occurring in radioactive wastes originating from the commercial nuclear power industry. Kd values determined to date span several groundwater compositions and a wide variety of rock types and minerals. The data system will not only include Kd values, but also background information on the experiments themselves. This will allow the potential user to retrieve not only the Kd values of interest but also sufficient information to evaluate the accuracy and usefulness of the data. During FY-1979, the logic structure of the system was designed, the software programmed, the data categories selected, and the data format specified. About 40% of the approximately 5000 Kd experiments performed by the Waste Isolation Safety Assessment Program (WISAP) and its subcontractors during FY-1977 and FY-1978 have been evaluated, coded and keypunched. Additional software improvements and system testing are needed before the system will be fully operational. A workshop requested by the NEA was held to discuss potential internatioal participation in the data system.

1745 (PNL--3160-3) VARIABLE THICKNESS TRANSIENT GROUND-WATER FLOW MODEL. VOLUME 3. PROGRAM LISTINGS. Reisenauer, A.E. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Dec 1979. Contract EY-76-C-06-1830. 236p. Dep. NTIS, PC A11/MF A01.

The Assessment of Effectiveness of Geologic Isolation Systems (AEGIS) Program is developing and applying the methodology for assessing the far-field, long-term post-closure safety of deep geologic nuclear waste repositories. AEGIS is being performed by Pacific Northwest Laboratory (PNL) under contract with the Office of Nuclear Waste Isolation (ONWI) for the Department of Energy (DOE). One task within AEGIS is the development of methodology for analysis of the consequences (water pathway) from loss of repository containment as defined by various release scenarios. Analysis of the long-term, far-field consequences of release scenarios requires the application of numerical codes which simulate the hydrologic systems, model the transport of released radionuclides through the hydrologic systems to the biosphere, and, where applicable, assess the radiological dose to humans. Hydrologic and transport models are available at several levels of complexity or sophistication. Model selection and use are determined by the quantity and quality of input data. Model development under AEGIS and related programs provides three levels of hydrologic models, two levels of transport models, and one level of dose models (with several separate models). This is the third of 3 volumes of the description of the VTT (Variable Thickness Transient) Groundwater Hydrologic Model - second level (intermediate complexity) two-dimensional saturated groundwater flow.

1746 (PNL--3161-1) ASSESSMENT OF EFFECTIVENESS OF GEOLOGIC ISOLATION SYSTEMS. CIRMIS DATA SYSTEM. VOLUME 1. INITIALIZATION, OPERATION, AND DOCUMENTATION. Friedrichs, D.R. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jan 1980. Contract EY-76-C-06-1830. 164p. Dep. NTIS, PC A08/MF A01.

The Assessment of Effectiveness of Geologic Isolation Systems (AEGIS) Program is developing and applying the methodology for assessing the far-field, long-term post-closure safety of deep geologic nuclear waste repositories. AEGIS is being performed by Pacific Northwest Laboratory (PNL) under contract with the Office of Nuclear Waste Isolation (ONWI) for the Department of Energy (DOE). One task within AEGIS is the development of methodology for analysis of the consequences (water pathway) from loss of repository containment as defined by various release scenarios. The various input parameters required in the analysis are compiled in data systems. The data are organized and prepared by various input subroutines for use by the hydrologic and transport codes. The hydrologic models simulate the groundwater flow systems and provide water flow directions, rates, and velocities as inputs to the transport models. Outputs from the transport models are basically graphs of radionuclide concentration in the groundwater plotted against time. After dilution in the receiving surface-water body (e.g., lake, river, bay), these data are the input source terms for the dose models, if dose assessments are required. The dose models calculate radiation dose to individuals and populations. CIRMIS (Comprehensive Information Retrieval and Model Input Sequence) Data System, a storage and retrieval system for model input and output data, including graphical interpretation and display is described. This is the first of four volumes of the description of the CIRMIS Data System.

1747 (PNL--3161-2) CIRMIS DATA SYSTEM. VOLUME 2. PROGRAM LISTINGS. Friedrichs, D.R. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jan 1980. Contract EY-76-C-06-1830. 291p. Dep. NTIS, PC A13/MF A01.

The Assessment of Effectiveness of Geologic Isolation Systems (AEGIS) Program is developing and applying the methodology for assessing the far-field, long-term post-closure safety of deep geologic nuclear waste repositories. AEGIS is being performed by Pacific Northwest Laboratory (PNL) under contract with the Office of Nuclear Waste Isolation (OWNI) for the Department of Energy (DOE). One task within AEGIS is the development of methodology for analysis of the consequences (water pathway) from loss of repository containment as defined by various release scenarios. Analysis of the long-term, far-field consequences of release scenarios requires the application of numerical codes which simulate the hydrologic systems, model the transport of released radionuclides through the hydrologic systems, model the transport of released radionuclides through the hydrologic systems to the biosphere, and, where applicable, assess the radiological dose to humans. The various input parameters required in the analysis are compiled in data systems. The data are organized and prepared by various input subroutines for utilization by the hydraulic and transport codes. The hydrologic models simulate the groundwater flow systems and provide water flow directions, rates, and velocities as inputs to the transport models. Outputs from the transport models are basically graphs of radionuclide concentration in the groundwater plotted against time. After dilution in the receiving surface-water body (e.g., lake, river, bay), these data are the input source terms for the dose models, if dose assessments are required.The dose models calculate radiation dose to individuals and populations. CIRMIS (Comprehensive Information Retrieval and Model Input Sequence) Data System is a storage and retrieval system for model input and output data, including graphical interpretation and display. This is the second of four volumes of the description of the CIRMIS Data System.

1748 (PNL--3161-3) ASSESSMENT OF EFFECTIVENESS OF GEOLOGIC ISOLATION SYSTEMS. CIRMIS DATA SYSTEM. VOLUME 3. GENERATOR ROUTINES. Friedrichs, D.R.; Argo, R.S. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jan 1980. Contract EY-76-C-06-1830. 157p. Dep. NTIS, PC A08/MF A01.

The Assessment of Effectiveness of Geologic Isolation Systems (AEGIS) Program is developing and applying the methodology for assessing the far-field, long-term post-closure safety of deep geologic nuclear waste repositories. AEGIS is being performed by Pacific Northwest Laboratory (PNL) under contract with the Office of Nuclear Waste Isolation (ONWI) for the Department of Energy (DOE). One task within AEGIS is the development of methodology for analysis of the consequences (water pathway) from loss of repository containment as defined by various release scenarios. The various input parameters required in the analysis are compiled in data systems. The data are organized and prepared by various input subroutines for utilization by the hydraulic and transport codes. The hydrologic models simulate the groundwater flow systems and provide water flow directions, rates, and velocities as inputs to the transport models. Outputs from the transport models are basically graphs of radionuclide concentration in the groundwater plotted against time. After dilution in the receiving surface-water body (e.g., lake, river, bay), these data are the input source terms for the dose models, if dose assessments are required. The dose models calculate radiation dose to individuals and populations. CIRMIS (Comprehensive Information Retrieval and Model Input Sequence) Data System, a storage and retrieval system for model input and output data, including graphical interpretation and display is described. This is the third of four volumes of the description of the CIRMIS Data System.

1749 (PNL--3161-4) ASSESSMENT OF EFFECTIVENESS OF GEOLOGIC ISOLATION SYSTEMS. CIRMIS DATA SYSTEM. VOLUME 4. DRILLER'S LOGS, STRATIGRAPHIC CROSS SECTION AND UTILITY ROUTINES. Friedrichs, D.R. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jan 1980. Contract EY-76-C-06-1830. 242p. 11.

The Assessment of Effectiveness of Geologic Isolation Systems (AEGIS) Program is developing and applying the methodology for assessing the far-field, long-term post-closure safety of deep geologic nuclear waste repositories. AEGIS is being performed by Pacific Northwest Laboratory (PNL) under contract with the Office of Nuclear Waste Isolation (ONWI) for the Department of Energy (DOE). One task within AEGIS is the development of methodology for analysis of the consequences (water pathway) from loss of repository containment as defined by various release scenarios. Analysis of the long-term, far-field consequences of release scenarios requires the application of numerical codes which simulate the hydrologic systems, model the transport of released radionuclides through the hydrologic systems to the biosphere, and, where applicable, assess the radiological dose to humans. The various input parameters required in the analysis are compiled in data systems. The data are organized and prepared by various input subroutines for use by the hydrologic and transport codes. The hydrologic models simulate the groundwater flow systems and provide water flow directions, rates, and velocities as inputs to the transport models. Outputs from the transport models are basically graphs of radionuclide concentration in the groundwater plotted against time. After dilution in the receiving surface-water body (e.g., lake, river, bay), these data are the input source terms for the dose models, if dose assessments are required. The dose models calculate radiation dose to individuals and populations. CIRMIS (Comprehensive Information Retrieval and Model Input Sequence) Data System is a storage and retrieval system for model input and output data, including graphical interpretation and display. This is the fourth of four volumes of the description of the CIRMIS Data System.

1750 (PNL--3162) PATHS GROUNDWATER HYDROLOGIC MODEL. Nelson, R.W.; Schur, J.A. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Apr 1980. Contract AC06-76RL01830. 156p. NTIS, PC $10.50/MF $3.50.

A preliminary evaluation capability for two-dimensional groundwater pollution problems was developed as part of the Transport Modeling Task for the Waste Isolation Safety Assessment Program (WISAP). Our approach was to use the data limitations as a guide in setting the level of modeling detail. PATHS Groundwater Hydrologic Model is the first level (simplest) idealized hybrid analytical/numerical model for two-dimensional, saturated groundwater flow and single component transport; homogeneous geology. This document consists of the description of the PATHS groundwater hydrologic model. The preliminary evaluation capability

prepared for WISAP, including the enhancements that were made because of the authors' experience using the earlier capability is described. Appendixes A through D supplement the report as follows: complete derivations of the background equations are provided in Appendix A. Appendix B is a comprehensive set of instructions for users of PATHS. It is written for users who have little or no experience with computers. Appendix C is for the programmer. It contains information on how input parameters are passed between programs in the system. It also contains program listings and test case listing. Appendix D is a definition of terms.

1751 (PNL--3173) STATUS REPORT ON LWR SPENT FUEL IAEA LEACH TESTS. Katayama, Y.B.; Bradley, D.J.; Harvey, C.O. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Mar 1980. Contract EY-76-C-06-1830. 59p. NTIS, PC A04/MF A01.

Spent light-water-reactor (LWR) fuel with an average burnup of 28,000 MWd/MTU was leach-tested at 25°C using a modified version of the International Atomic Energy Agency procedure. Leach rates were determined from tests conducted in five different solutions: deionized water, sodium chloride (NaCl), sodium bicarbonate ($NaHCO_3$), calcium chloride ($CaCl_2$) and Waste Isolation Pilot Plant B brine solutions. Elemental leach rates are reported based on the release of ^{90}Sr + ^{90}Y, ^{106}Ru, ^{137}Cs, ^{144}Ce, ^{154}Eu, /sup 239 + 240/Pu, ^{244}Cm and total uranium. After 467 days of cumulative leaching, the elemental leach rates are highest in deionized water. The elemental leach rates uin the different solutions generally decreased from deionized water to the 0.03M NaCl solution to the WIPP B brine solution to the 0.03M $NaHCO_3$ solution and was a factor of 20 lower in 0.015M $CaCl_2$ solution than in deionized water. The leach rates of spent fuel and borosilicate waste-glass were also compared. In sodium bicarbonate solution, the leach rates of the two waste forms were nearly equal, but the glass was increasingly more resistant than spent fuel in calcium chloride solution, followed by sodium chloride solution, WIPP B brine solution and deionized water. In deionized water the glass, based on the elemental release of plutonium and curium, was 50 to 400 times more leach resistant than spent fuel.

1752 (PNL--3179) MULTICOMPONENT MASS TRANSPORT MODEL: A MODEL FOR SIMULATING MIGRATION OF RADIONUCLIDES IN GROUND WATER. Washburn, J.F.; Kaszeta, F.E.; Simmons, C.S.; Cole, C.R. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jul 1980. Contract AC06-76RL01830. 120p. NTIS, PC A06/MF A01.

This report presents the results of the development of a one-dimensional radionuclide transport code, MMT2D (Multicomponent Mass Transport), for the AEGIS Program. Multicomponent Mass Transport is a numerical solution technique that uses the discrete-parcel-random-wald (DPRW) method to directly simulate the migration of radionuclides. MMT1D accounts for: convection;dispersion; sorption-desorption; first-order radioactive decay; and n-membered radioactive decay chains. Comparisons between MMT1D and an analytical solution for a similar problem show that: MMT1D agrees very closely with the analytical solution; MMT1D has no cumulative numerical dispersion like that associated with solution techniques such as finite differences and finite elements; for current AEGIS applications, relatively few parcels are required to produce adequate results; and the power of MMT1D is the flexibility of the code in being able to handle complex problems for which analytical solution cannot be obtained. Multicomponent Mass Transport (MMT1D) codes were developed at Pacific Northwest Laboratory to predict the movement of radiocontaminants in the saturated and unsaturated sediments of the Hanford Site. All MMT models require ground-water flow patterns that have been previously generated by a hydrologic model. This report documents the computer code and operating procedures of a third generation of the MMT series: the MMT differs from previous versions by simulating the mass transport processes in systems with radionuclide decay chains. Although MMT is a one-dimensional code, the user is referred to the documentation of the theoretical and numerical procedures of the three-dimensional MMT-DPRW code for discussion of expediency, verification, and error-sensitivity analysis.

1753 (PNL--3226) FIELD TEST FACILITY FOR MONITORING WATER/RADIONUCLIDE TRANSPORT THROUGH PARTIALLY SATURATED GEOLOGIC MEDIA: DESIGN, CONSTRUCTION, AND PRELIMINARY DESCRIPTION. Phillips, S.J.; Campbell, A.C.; Campbell, M.D.; Gee, G.W.; Hoober, H.H.; Schwarzmiller, K.O. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Nov 1979. Contract EY-76-C-06-1830. 52p. Dep. NTIS, PC A04/MF A01.

Shallow land burial has been a common practice for disposing radioactive waste materials since the beginning of plutonium production operations. Accurate monitoring of radionuclide transport and factors causing transport within the burial sites is essential to minimizing risks associated with disposal. However, monitoring has not always been adequate. Consequently, the Department of Energy (DOE) has begun a program aimed at better assuring and evaluating containment of radioactive wastes at shallow land burial sites. This program includes a technological base for monitoring transport. As part of the DOE program, Pacific Northwest Laboratory (PNL) is developing geohydrologic monitoring systems to evaluate burial sites located in arid regions. For this project, a field test facility was designed and constructed to assess monitoring systems for near-surface disposal of radioactive waste and to provide information for evaluating site containment performance. The facility is an integrated network of monitoring devices and data collection instruments. This facility is used to measure water and radionuclide migration under field conditions typical of arid regions. Monitoring systems were developed to allow for measurement of both mass and energy balance. Work on the facility is ongoing. Continuing work includes emplacement of prototype monitoring instruments, data collection, and data synthesis. At least 2 years of field data are needed to fully evaluate monitoring information.

1754 (PNL--3226(App.1)) FIELD TEST FACILITY FOR MONITORING WATER/RADIONUCLIDE TRANSPORT THROUGH PARTIALLY SATURATED GEOLOGIC MEDIA: DESIGN, CONSTRUCTION, AND PRELIMINARY DESCRIPTION. APPENDIX I. ENGINEERING DRAWINGS. Phillips, S.J.; Campbell, A.C.; Campbell, M.D.; Gee, G.W.; Hoober, H.H.; Schwarzmiller, K.O. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Nov 1979. Contract EY-76-C-06-1830. 20p. Dep. NTIS, PC A02/MF A01.

The engineering plans for a test facility to monitor radionuclide transport in water through partially saturated geological media are included. Drawings for the experimental set-up

excavation plan and details, lysimeter, pad, access caisson, and caisson details are presented. (DC)

1755 (PNL--3227) GEOPHYSICAL SURVEYS FOR BURIED WASTE DETECTION AT THE IDAHO NATIONAL ENGINEERING LABORATORY. Sandness, G.A.; Rising, J.L.; Kimbrough, J.R. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Dec 1979. Contract EY-76-C-06-1830. 77p. Dep. NTIS, PC A05/MF A01.

This report describes a series of geophysical surveys performed at the Idaho National Engineering Laboratory (INEL). The main purpose of the surveys was to evaluate techniques, principally ground-penetrating radar, for detecting and mapping radioactive wastes buried in shallow trenches and pits. A second purpose was to determine the feasibility of using ground-penetrating radar to measure the depth of basalt bedrock. A prototype geophyscal survey system developed by the US Department of Energy's Pacific Northwest Laboratory was used for this study. Radar, magnetometer, and metal detector measurements were made at three sites in the Radioactive Waste Management Complex (RWMC) at INEL. Radar measurements were made at fourth site adjacent to the RWMC. The combination of three geophysical methods was shown to provide considerable information about the distribution of buried waste materials. The tests confirmed the potential effectiveness of the radar method, but they also pointed out the need for continued research and development in ground-penetrating radar technology. The radar system tested in this study appears to be capable of measuring the depth to basalt in the vicinity of the RWMC.

1756 (PNL--3318) MATERIALS CHARACTERIZATION CENTER WORKSHOP ON LEACHING OF RADIOACTIVE WASTE FORMS. SUMMARY REPORT. Ross, W.A.; Strachan, D.M.; Turcotte, R.P.; Westsik, J.H. Jr. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Apr 1980. Contract EY-76-C-06-1830. 104p. Dep. NTIS, PC A06/MF A01.

At the first Materials Characterization Center (MCC) workshop, on the leaching of radioactive waste forms, there was general agreement that, after certain revisions, the proposed leach test plan set forth by the MCC can be expected to meet most of the nuclear waste community's waste form durability data requirements. The revisions give a clearer definition of the purposes of each test and the end uses of the data. As a result of the workshop, the format of the test program has been recast to clarify the purposes, limitations, and interrelationships of the individual tests. There was also a recognition that the leach test program must be based on an understanding of the mechanistic principles of leaching, and that further study is needed to ensure that the approved data from the MCC leach tests will be compatible with mechanistic research needs. It was agreed that another meeting of the participants in Working Groups 3 and 4, and perhaps some other experts, should be held as soon as possible to focus just on the definition of leach test requirements for mechanistic research. The MCC plans to hold this meeting in April 1980. Many of the tests that will lead to increased understanding of mechanisms will of necessity be long-term tests, sometimes lasting for several years. But the MCC also faces pressing needs to produce approved data that can be used for the comparison of waste forms in the relative near-term, i.e., in the next 1 to 3 yr. Therefore, it was decided to initiate a round-robin test of the MCC short-term static leach procedure as soon as practicable. The MCC has tentative plans for organization of the round robin in May 1980.

1757 (PNL--3326) LEACH TEST METHODOLOGY FOR THE WASTE/ROCK INTERACTIONS TECHNOLOGY PROGRAM. Bradley, D.J.; McVay, G.L.; Coles, D.G. (Battelle Pacific Northwest Labs., Richland, WA (USA)). May 1980. Contract AC06-76RL01830. 49p. NTIS, PC A03/MF A01.

Experimental leach studies in the WRIT Program have two primary functions. The first is to determine radionuclide release from waste forms in laboratory environments which attempt to simulate repository conditions. The second is to elucidate leach mechanisms which can ultimately be incorporated into nearfield transport models. The tests have been utilized to generate rates of removal of elements from various waste forms and to provide specimens for surface analysis. Correlation between constituents released to the solution and corresponding solid state profiles is invaluable in the development of a leach mechanism. Several tests methods are employed in our studies which simulate various proposed leach incident scenarios. Static tests include low temperature (below 100°C) and high temperature (above 100°C) hydrothermal tests. These tests reproduce nonflow or low-flow repository conditions and can be used to compare materials and leach solution effects. The dynamic tests include single-pass, continuous-flow(SPCF) and solution-change (IAA)-type tests in which the leach solutions are changed at specific time intervals. These tests simulate repository conditions of higher flow rates and can also be used to compare materials and leach solution effects under dynamic conditions. The modified IAEA test is somewhat simpler to use than the one-pass flow and gives adequate results for comparative purposes. The static leach test models the condition of near-zero flow in a repository and provides information on element readsorption and solubility limits. The SPCF test is used to study the effects of flowing solutions at velocities that may be anticipated for geologic groundwaters within breached repositories. These two testing methods, coupled with the use of autoclaves, constitute the current thrust of WRIT leach testing.

1758 (PNL--3333) SUMMARY OF NON-US NATIONAL AND INTERNATIONAL RADIOACTIVE WASTE MANAGEMENT PROGRAMS 1980. Harmon, K.M.; Kelman, J.A.; Stout, L.A.; Hsieh, K.A. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Mar 1980. Contract EY-76-C-06-1830. 110p. Dep. NTIS, PC A06/MF A01.

Many nations and international agencies are working to develop improved technology and industrial capability for nuclear fuel cycle and waste management operations. The effort in some countries is limited to research in university laboratories on treating low-level waste from reactor plant operations. In other countries, national nuclear research institutes are engaged in major programs in all phases of the fuel cycle and waste management, and there is a national effort to commercialize fuel cycle operations. Since late 1976, staff members of Pacific Northwest Laboratory have been working under US Department of Energy sponsorship to assemble and consolidate openly available information on foreign and international nuclear waste management programs and technology. This report summarizes the information collected on the status of fuel cycle and waste management programs in selected countries making major efforts in these fields

as of the end of January 1980.

1759 (PNL--3349) METHODS FOR DETERMINING RADIONUCLIDE RETARDATION FACTORS: STATUS REPORT. Relyea, J.F.; Serne, R.J.; Rai, D. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Apr 1980. Contract AC06-76RL01830. 65p. NTIS, PC A04/MF A01.

This report identifies a number of mechanisms that retard radionuclide migration, and describes the static and dynamic methods that are used to study such retardation phenomena. Both static and dynamic methods are needed for reliable safety assessments of underground nuclear-waste repositories. This report also evaluates the extent to which the two methods may be used to diagnose radionuclide migration through various types of geologic media, among them unconsolidated, crushed, intact, and fractured rocks. Adsorption is one mechanism that can control radionuclide concentrations in solution and therefore impede radionuclide migration. Other mechanisms that control a solution's radionuclide concentration and radionuclide migration are precipitation of hydroxides and oxides, oxidation-reduction reactions, and the formation of minerals that might include the radionuclide as a structural element. The retardation mechanisms mentioned above are controlled by such factors as surface area, cation exchange capacity, solution pH, chemical composition of the rock and of the solution, oxidation-reduction potential, and radionuclide concentration. Rocks and ground waters used in determining retardation factors should represent the expected equilibrium conditions in the geologic system under investigation. Static test methods can be used to rapidly screen the effects of the factors mentioned above. Dynamic (or column) testing, is needed to assess the effects of hydrodynamics and the interaction of hydrodynamics with the other important parameters. This paper proposes both a standard method for conducting batch Kd determinations, and a standard format for organizing and reporting data. Dynamic testing methods are not presently developed to the point that a standard methodology can be proposed. Normal procedures are outlined for column experimentation and the data that are needed to analyze a column experiment are identified.

1760 (PNL--3398) ASSESSMENT OF EFFECTIVENESS OF GEOLOGIC ISOLATION SYSTEMS: A SHORT DESCRIPTION OF THE AEGIS APPROACH. Silviera, D.J.; Harwell, M.A.; Napier, B.A.; Zellmer, J.T.; Benson, G.L. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Sep 1980. Contract AC06-76RL01830. 59p. NTIS, PC A04/MF A01.

To meet licensing criteria and protection standards for HLW disposal, research programs are in progress to determine acceptable waste forms, canisters, backfill materials for the repository, and geological formations. Methods must be developed to evaluate the effectiveness of the total system. To meet this need, methods are being developed to assess the long-term effectiveness of isolating nuclear wastes in geologic formations. This work was started in 1976 in the Waste Isolation Safety Assessment Program (WISAP) and continues in the Assessment of Effectiveness of Geologic Isolation Systems (AEGIS) Program. The evaluation of this long-term effectiveness involves a number of distinct steps. AEGIS currently has the methods for performing these evaluation steps. These methods are continuously being improved to meet the increasing level of sophistication which will be required. AEGIS develops a conceptual description of the geologic systems and uses computer models to simulate the existing groundwater pathways. AEGIS also uses a team of consulting experts, with the assistance of a computer model of the geologic processes, to develop and evaluate plausible release scenarios. Then other AEGIS computer models are used to simulate the transport of radionuclides to the surface and the resultant radiation doses to individuals and populations. (DLC)

1761 (PNL--3484) INVESTIGATION OF METALLIC, CERAMIC, AND POLYMERIC MATERIALS FOR ENGINEERED BARRIER APPLICATIONS IN NUCLEAR-WASTE PACKAGES. Westerman, R.E. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Oct 1980. Contract AC06-76RL01830. 119p. NTIS, PC A06/MF A01.

An effort to develop licensable engineered barrier systems for the long-term (about 1000 yr) containment of nuclear wastes under conditions of deep continental geologic disposal has been underway at Pacific Northwest Laboratory since January 1979, under the auspices of the High-Level Waste Immobilization Program. In the present work, the barrier system comprises the hard or structural elements of the package: the canister, the overpack(s), and the hole sleeve. A number of candidate metallic, ceramic, and polymeric materials were put through mechanical, corrosion, and leaching screening tests to determine their potential usefulness in barrier-system applications. Materials demonstrating adequate properties in the screening tests will be subjected to more detailed property tests, and, eventually, cost/benefit analyses, to determine their ultimate applicability to barrier-system design concepts. The following materials were investigated: two titanium alloys of Grade 2 and Grade 12; 300 and 400 series stainless steels, Inconels, Hastelloy C-276, titanium, Zircoloy, copper-nickel alloys and cast irons; total of 14 ceramic materials, including two grades of alumina, plus graphite and basalt; and polymers such as polyamide-imide, polyarylene, polyimide, polyolefin, polyphenylene sulfide, polysulfone, fluoropolymer, epoxy, furan, silicone, and ethylene-propylene terpolymer (EPDM) rubber. The most promising candidates for further study and potential use in engineered barrier systems were found to be rubber, filled polyphenylene sulfide, fluoropolymer, and furan derivatives.

1762 (PNL-SA--6698) KRYPTON ENTRAPMENT IN PULSE BIASED SPUTTER-DEPOSITED METALS. Bayne, M.A.; Moss, R.W.; McClanahan, E.D. (Battelle Pacific Northwest Labs., Richland, WA (USA)). 1978. Contract EY-76-C-06-1830. 27p. (CONF-780430--7). Dep. NTIS, PC A03/MF A01.

From Conference on metallurgical coatings; San Francisco, CA, USA (3 Apr 1978).

A supported gas discharge sputtering system was constructed to investigate krypton entrapment in high-rate sputter-deposited thick films. Krypton entrapment was studied as a function of substrate and target voltage for nickel, aluminum, titanium and iron deposits. Control of substrate and target voltages was achieved with pulse circuits capable of adjusting the pulse duration and repetition rate. A water-cooled cylindrical copper substrate 15 cm in diameter was used to collect the sputtered metal from a 9-cm diameter cylindrical target. To observe the immediate effect of changes in sputtering parameters on gas trapping, as well as measure the total gas trapped, a sensitive mass flow indicator was installed in the krypton supply of the dynamically pumped system. Data relating krypton content to substrate bias conditions

and deposition rate are discussed in light of the theory of Carter, Colligon and Leck on ion absorption in the presence of sputtering. Krypton contents > 2 at.% were found in the metals studied, all of which were deposited at rates exceeding 1 nm/sec. Computed krypton concentrations agreed with concentrations in samples that were analyzed chemically.

1763 (PNL-SA--7184) METHODOLOGY FOR ASSESSING THE LONG-TERM SAFETY OF RADIOACTIVE WASTE STORAGE IN GEOLOGIC FORMATIONS. Brandstetter, A. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Sep 1978. Contract EY-76-C-06-1830. 4p. (CONF-7809198--1). Dep. NTIS, PC A02/MF A01.

From Meeting on migration of radionuclides in crystalline rocks; Studsvik, Sweden (11 Sep 1978).

The development of the safety assessment methodology currently consists of four major tasks: release scenario analysis, waste release studies, release consequence analysis, and radionuclide sorption studies. Each of these tasks and plans for each are discussed. International cooperation on these tasks is urged. (DLC)

1764 (PNL-SA--7197) WORKSHOP ON POTENTIALLY DISRUPTIVE PHENOMENA FOR NUCLEAR WASTE REPOSITORIES, JULY 27-28, 1977. Jacobson, J.J. (Battelle Pacific Northwest Labs., Richland, WA (USA)). 1977. Contract EY-76-C-06-1830. 37p. Dep. NTIS, PC A03/MF A01.

The workshop on Potentially Disruptive Phenomena for Nuclear Waste Repositories brought together experts in the geosciences to identify and evaluate potentially disruptive events and processes and to contribute ideas on how to extrapolate data from the past into the next one million years. The analysis is to be used to model a repository in geologic media for long-term safety assessments of nuclear waste storage. The workshop included invited presentations on the following items: an overview of the Waste Isolation Safety Assessment Program (WISAP), simulation techniques, subjective probabilities and methodology of obtaining data, similar modeling efforts at Lawrence Livermore and Sandia Laboratories, and geologic processes or events.

1765 (PNL-SA--7243) WASTE ISOLATION SAFETY ASSESSMENT PROGRAM. Brandstetter, A.; Harwell, M.A. . (Battelle Pacific Northwest Labs., Richland, WA (USA)). May 1979. Contract EY-76-C-06-1830. 15p. (IAEA-SM--243/35; CONF-790711--4). Dep. NTIS, PC A02/MF A01.

From International symposium on underground disposal of radioactive wastes; Otaniemi, Finland (2 Jul 1979).

Associated with commercial nuclear power production in the United States is the generation of potentially hazardous radioactive wastes. The Department of Energy (DOE), through the National Waste Terminal Storage (NWTS) Program, is seeking to develop nuclear waste isolation systems in geologic formations that will preclude contact with the biosphere of waste radionuclides in concentrations which are sufficient to cause deleterious impact on humans or their environments. Comprehensive analyses of specific isolation systems are needed to assess the expectations of meeting that objective. The Waste Isolation Safety Assessment Program (WISAP) has been established at the Pacific Northwest Laboratory (operated by Battelle Memorial Institute) for developing the capability of making those analyses. Among the analyses required for isolation system evaluation is the detailed assessment of the post-closure performance of nuclear waste repositories in geologic formations. This assessment is essential, since it is concerned with aspects of the nuclear power program which previously have not been addressed. Specifically, the nature of the isolation systems (e.g., involving breach scenarios and transport through the geosphere), and the time-scales necessary for isolation, dictate the development, demonstration and application of novel assessment capabilities. The assessment methodology needs to be thorough, flexible, objective, and scientifically defensible. Further, the data utilized must be accurate, documented, reproducible, and based on sound scientific principles.

1766 (PNL-SA--7352(Vol.1), pp 231-329) SYSTEMATIC STUDY OF METAL ION SORPTION ON SELECTED GEOLOGIC MEDIA. SESQUIANNUAL REPORT, APRIL 1977-SEPTEMBER 1978. Meyer, R.E. (comp.). (Oak Ridge National Lab., TN). 1978.

From 2. contractor information meeting; Seattle, WA, USA (1 Oct 1978).

Results of the first year and a half of a research program on equilibria of inorganic ions between selected minerals and aqueous solutions covering a wide range of composition are summarized. The work is motivated by needs of information for enhanced oil recovery and isolation of nuclear waste, as well as by interest in the fundamental chemistry. A method using an axial filter configuration was adapted to these adsorbents. A technique of supporting clay on filteraid (diatomaceous earth) of low adsorptive properties was developed to allow measurements with columns of dispersible adsorbents, such as montmorillonite. These approaches, which are advantageous under some conditions, were shown to give distribution coefficients (D; adsorbate per weight of clay/adsorbate concentration in equilibrium solution) concordant with values obtained by batch equilibrations. Equilibria of non-hydrolyzed, non-complexed cations and clays were found to be in accord with ion-exchange predictions to a good approximation over a wide range of conditions. As expected on this basis, distribution coefficients of ions present in low concentration declined rapidly as salinity increased. Values of D for many ions at trace levels were the same as at moderate fractional loadings of the ion-exchange capacity. Exceptions were alkali metal ions on the calcium form of montmorillonite, for which decreases of D with loading were found to occur at unexpectedly low loadings, and the dependence of D's of rare earth and actinide (III) ions on salinity, for which a minimum or levelling was found at moderate ionic strength. Adsorption of Cs(I) and Sr(II) on rock samples were much lower from solutions of high salinity than from solutions of low salinity; D-values of Pu, present in unknown species, were erratic.

1767 (PNL-SA--7352(Vol.1)) PROCEEDINGS OF THE TASK 4 WASTE ISOLATION SAFETY ASSESSMENT PROGRAM SECOND CONTRACTOR INFORMATION MEETING. (Battelle Pacific Northwest Labs., Richland, WA (USA)). 1978. Contract EY-76-C-06-1830. 522p. (CONF-7810227--(Vol.1)). Dep. NTIS, PC A22/MF A01.

From 2. contractor information meeting; Seattle, WA, USA (1 Oct 1978).

Volume 1 contains the following papers: Solution Species of ^{239}Pu in Oxidizing Environments; Solution Species of ^{239}Pu in the Environment; Theoretical and Experimental Evaluation of Waste Transport in Selected Rocks;

Studies of Radionuclide Availability and Migration at the Nevada Test Site Relevant to Radioactive Waste Disposal; Systematic Study of Metal Ion Sorption on Selected Geologic Media; Chromatographic K/sub d/ values of Radionuclides; Effects of Redox Potentials on Sorption of Radionuclides by Geologic Media; and Transport Properties of Nuclear Waste in Geologic Media. Individual papers were processed.

1768 (PNL-SA--7352(Vol.1), pp 97-185)
THEORETICAL AND EXPERIMENTAL EVALUATION OF WASTE TRANSPORT IN SELECTED ROCKS. Silva, R.J.; Benson, L.V.; Apps, J.A. (Univ. of California, Berkeley). 1978.
From 2. contractor information meeting; Seattle, WA, USA (1 Oct 1978).
The experimental results obtained in FY 1978 in the study of rock interaction with U, Np, Pu, Am, and Cm are discussed, as well as the progress in the development and application of mass transfer codes to simulate groundwater conditions in low permeability rocks. Basalt, granite, and shale were used in the study.

1769 (PNL-SA--7352(Vol.1), pp 187-230)
STUDIES OF RADIONUCLIDE AVAILABILITY AND MIGRATION AT THE NEVADA TEST SITE RELEVANT TO RADIOACTIVE WASTE DISPOSAL. Tewhey, J.D.; Weed, H.C.; Coles, D.G.; Ramspott, L.D.; MacLean, S.C. (Univ. of California Livermore). 1978.
From 2. contractor information meeting; Seattle, WA, USA (1 Oct 1978).
The sorption distribution coefficient, K/sub d/, of a nuclide is defined as the concentration of a nuclide on a solid phase divided by its concentration in the liquid phase subsequent to equilibrium being attained. In the case of batch K/sub d/ measurements done in the laboratory, it is difficult to ascertain the extent of equilibration, and experiments may not reflect true K/sub d/ values. Kurt Wolfsberg of Los Alamos Scientific Laboratory has referred to laboratory K/sub d/ measurements as distribution ratios or R/sub d/'s. An R/sub d/ is obtained in the same manner as a K/sub d/ but does not imply equilibrium. The term R/sub d/ is used in this study. The results from the batch R/sub d/ studies are listed in tabular form. The standard deviation of the counting data for each R/sub d/ is given. The R/sub d/ values can be arranged according to the following inequalities: Pu > Cs, except for biotite; Cs > Sr, except for limestone; and Sr > Tc. The exceptions are considered significant for Pu vs Cs on biotite, but not for Cs vs Sr on limestone. The low R/sub d/ values for Tc indicate that within the limits of measurement it is not sorbed under the experimental conditions in this study. One possible cause for the negative values is preferential sorption of the sample on the walls of the sample container, so that the sample container sorbs less Tc than the blank container does.

1770 (PNL-SA--7352(Vol.1), pp 405-508)
TRANSPORT PROPERTIES OF NUCLEAR WASTES IN GEOLOGIC MEDIA. ANNUAL REPORT, OCTOBER 1, 1977-SEPTEMBER 30, 1978. Seitz, M.G.; Rickert, P.G.; Fried, S.M.; Friedman, A.M.; Steindler, M.J. (Argonne National Lab., IL). 1978.
From 2. contractor information meeting; Seattle, WA, USA (1 Oct 1978).
Laboratory experiments were performed with nuclides of strontium, tin, cesium, plutonium, and americium to determine their migration characteristics in rocks from formations that may be suitable for geologic repositories for nuclear waste. Infiltration experiments have been performed at high pressures and at different solution flows, using columns of massive porous rock, porous beds of granulated minerals, or impermeable rock having fissures. Experimental results obtained this year confirm results obtained in the previous year - that nuclides migrating by fluid flow in rock often exhibit complex behavior (bleeding, dispersion of nuclide velocities, etc.) not predicted by simple chromatographic-type models. Experimental results this year, obtained using two radically different geologic media (mineral sand and rock fissures), were in agreement with a migration model which considers the kinetics of nuclides reacting with the solution and geologic media.

1771 (PNL-SA--7352(Vol.1), pp 59-68)
SOLUTION SPECIES OF ^{239}PU IN OXIDIZING ENVIRONMENTS: I. POLYMERIC PU(IV). Rai, D.; Serne, R.J. (Battelle Pacific Northwest Labs., Richland, WA). 1978.
From 2. contractor information meeting; Seattle, WA, USA (1 Oct 1978).
The uncertainties regarding the presence of Pu(IV) polymer in environmental studies is a source of error in evaluation of adsorption and in estimation of Pu migration rates. Our data suggest that Pu(IV) polymer is similar to $Pu(OH)_4$ in its solubility and that the presence of the polymer may be predicted from pH and total Pu in solution.

1772 (PNL-SA--7352(Vol.1), pp 69-95)
SOLUTION SPECIES OF ^{239}PU [V] IN THE ENVIRONMENT. Rai, D.; Serne, R.J.; Swanson, J.L. (Battelle Pacific Northwest Labs., Richland, WA). 1978.
From 2. contractor information meeting; Seattle, WA, USA (1 Oct 1978).
Information regarding the oxidation states of Pu in environmental samples is needed for estimating its migration through the geologic media. Thermodynamic data were used to develop stability fields for different Pu species. The data indicate that in the Eh-pH range of natural aqueous environments, the dominant species of Pu is likely to be Pu[V] in relatively oxidizing environments and Pu[III] in reducing environments. Because of the lack of methods of determining Pu[V] in environmental samples containing trace concentrations of Pu, Pu[V] has not been previously identified in these samples. Plutonium [VI] is generally assumed to be the dominant species in relatively oxidizing environments. However, a combination of solvent extraction and spectrophotometric techniques used in this study show that solutions (> 10^{-5} M Pu) in equilibrium with ^{239}Pu[IV] hydroxide contain Pu[V], which is in agreement with the thermodynamic predictions. Although this method could not be used conclusively with the remaining solutions (< 10^{-5} M Pu) contacting ^{239}Pu[IV] hydroxide and $^{239}PuO_2$, the solvent extraction and Eh-pH results are similar for all the samples suggesting the strong possibility that all samples contain Pu[V]. Thus the possibility, ignored in the past, that Pu[V] may be the dominant species in relatively oxidizing environments should be considered.

1773 (PNL-SA--7352(Vol.2)) PROCEEDINGS OF THE TASK 4 WASTE ISOLATION SAFETY ASSESSMENT PROGRAM SECOND CONTRACTOR INFORMATION MEETING. (Battelle Pacific Northwest Labs., Richland, WA (USA)). 1978. Contract EY-76-C-06-1830. 494p. (CONF-7810227--(Vol.2)). Dep. NTIS, PC A21/MF A01.

From 2. contractor information meeting; Seattle, WA, USA (1 Oct 1978).
Volume II contains the following papers: Laboratory Studies of Radionuclide Distributions between Selected Groundwaters and Geologic Media; Applicability of Microautoradiography to Sorption Studies; The Kinetics and Reversibility of Radionuclide Sorption Reactions with Rocks; Mobility and Sorption Processes of Radioactive Waste Materials in Subsurface Migration; Batch K/sub d/ Experiments with Common Minerals and Representative Groundwaters; Cesium and Strontium Migration in Unconsolidated Geologic Material; Statistical Investigation of the Mechanics Controlling Radionuclide Sorption; The ARDISC Model - A Computer Program to Calculate the Distribution of Trace Element Migration in Partially-Equilibrating Media; and Some Geochemical Aspects of the Canadian Nuclear Waste Disposal System. Individual papers were processed.

1774 (PNL-SA--7352(Vol.2), pp 161-218)
KINETICS AND REVERSIBILITY OF RADIONUCLIDE SORPTION REACTIONS WITH ROCKS. PROGRESS REPORT FOR FISCAL YEAR 1978. Barney, G.S.; Anderson, P.D. (Rockwell International, Richland, WA). 1978.
From 2. contractor information meeting; Seattle, WA, USA (1 Oct 1978).
Sorption reactions of environmentally significant radionuclides with rocks from proposed waste repository sites were examined. The kinetics and reversibility of sorption were studied by measuring the distribution of radioactive tracers between synthetic groundwaters and crushed basalt, granite, and argillite in batch experiments. The initial rapid sorption reaction is followed by a slow reaction which results from changes in the composition of the rock surface and bulk solution. Equilibrium concentrations of radionuclides were not reached even after 91 days. Dissolution of some rock components is also incomplete after this time. A relatively large amount of silica is dissolved in groundwaters contacted with basalt due to dissolution of the glassy phase of the basalt sample. This silica appears to increase the solubility of plutonium and americium. Artificially weathering basalt greatly increases the sorption capacity for each of the radionuclides studied. Weathering of granite had no observable effect on sorption. However, weathered argillite sorbs cesium, plutonium, and americium more strongly than unweathered argillite. Several irreversible sorption reactions were identified. Cesium is irreversibly sorbed on granite and ruthenium is irreversibly sorbed on basalt, granite, and argillite. Strontium and neptunium sorption are reversible for each rock type.

1775 (PNL-SA--7352(Vol.2), pp 219-258)
MOBILITY AND SORPTION PROCESSES OF RADIOACTIVE WASTE MATERIALS IN SUBSURFACE MIGRATION. Eichholz, G.G.; Wahlig, B.G. (Georgia Inst. of Tech., Atlanta). 1978.
From 2. contractor information meeting; Seattle, WA, USA (1 Oct 1978).
The present work has been directed to the study of two related phenomena: the movement of submicron particles of a type expected near disposal sites through aquifers of appropriate characteristics, and the sorption processes associated with the uptake of waste ions in trace concentrations on submicron particles and the measurement of subsequent partition coefficients leading to competitive transfer from the particles to surrounding media. Because of the late date of finalization of the research contract and, hence, the limited manpower devoted to this project until recently, the results obtained so far are largely preliminary in nature. Work done has included some of the following: setting up of two types of columns with detector systems; determination of sensitivity and spatial resolution of the collimated GM and scintillation detectors; preparation of suspensions of kaolin particles; measurement of particulate movements through the bed with neutron-activated particles; determination of the Pu-237 γ-ray spectrum; and planning of the next phases of the work, using several columns and a larger research group. The results obtained so far illustrate the kind of differential movement between soluble tracers and active particulates that takes place in a permeable rock medium. It is hoped to obtain more definite results on the parameters concerned in the near future.

1776 (PNL-SA--7352(Vol.2), pp 259-332)
BATCH KD DETERMINATIONS WITH COMMON MINERALS AND REPRESENTATIVE GROUNDWATERS. Relyea, J.F.; Ames, L.L.; Serne, R.J.; Fulton, R.W.; Washburne, C.D. (Battelle Pacific Northwest Labs., Richland, WA). 1978.
From 2. contractor information meeting; Seattle, WA, USA (1 Oct 1978).
Adsorption and desorption Kd's have been determined for seven elements (Pu, Am, I, Tc, Cs, Np, Sr) in tracer concentrations using four simulated groundwaters and twelve minerals (illite, kaolinite, montmorillonite, vermiculite, biotite, quartz, albite, anorthite, microcline, hornblende, enstatite, augite) in all their 336 combinations. System parameters have been measured in an attempt to characterize each system in as complete a manner as possible. The mineralogy and chemical composition of each mineral used have been determined (both before and after crushing bulk samples). Eh and pH have been measured for each system. The mineral-solution effluent is presently being analyzed using effluent from experiments without tracers. The data generated will be analyzed by Adaptronics to produce empirical equations for Kd's which will be used in models to predict nuclide migration in geologic media. Multiple oxidation state elements have been found to behave differently than single oxidation state elements in certain situations. Research beyond the scope of this study is required to determine the cause of this anomalous behavior (specifically: Tc, Np and Pu). To obtain an understanding of adsorption phenomenon under reducing conditions in geologic media, the batch Kd determinations just described will be carried out under anoxic and reducing conditions with the same nuclides, minerals and solutions.

1777 (PNL-SA--7352(Vol.2), pp 333-425)
STATISTICAL INVESTIGATION OF THE MECHANICS CONTROLLING RADIONUCLIDE SORPTION. PART II. FINAL TECHNICAL REPORT. Mucciardi, A.N.; Booker, I.J.; Orr, E.C.; Cleveland, D. (Adaptronics, Inc., McLean, VA). 1978.
From 2. contractor information meeting; Seattle, WA, USA (1 Oct 1978).
The results in this report demonstrate the feasibility of modeling empirically the transport of radionuclides (sorption coefficient, K/sub d/) in several geologic media/groundwater solution environments. Nonlinear Adaptive Learning Network models were synthesized to predict adsorption and desorption K/sub d/'s for seven radionuclides as a function of 16 minerals and four groundwaters. The major results reported here are comparisons between the actual K/sub d/'s

and those predicted by the models, and a rank-ordering of the importance of the geologic medium/solution variables per nuclide K/sub d/ model.

1778 (PNL-SA--7352(Vol.2), pp 429-435) ARDISC MODEL: A COMPUTER PROGRAM TO CALCULATE DISTRIBUTION OF TRACE ELEMENT MIGRATION IN PARTIALLY-EQUILIBRATING MEDIA. Strickert, R. (Battelle Pacific Northwest Labs., Richland, WA). 1978.

From 2. contractor information meeting; Seattle, WA, USA (1 Oct 1978).

The computer model used is similar to the standard mixing model, in which a one-dimensional box is divided into zones. Each zone can sorb a solute such that, at equilibrium, the distribution of the species between the surface of the zone and the volume of the solution is α/β, where α = the relative amount of species on the surface, and $\beta = 1 - \alpha$. Following this distribution, the solution from one zone is transferred to the next zone and another equilibrium distribution cycle can occur, and so on for additional cycles and zones. To incorporate a kinetic effect into this migrational model, the α/β distribution was modified.

1779 (PNL-SA--7352(Vol.2), pp 437-445) SOME GEOCHEMICAL ASPECTS OF THE CANADIAN NUCLEAR WASTE DISPOSAL PROGRAM. Vandergraaf, T. (Atomic Energy of Canada, Pinawa, Manitoba). 1978.

From 2. contractor information meeting; Seattle, WA, USA (1 Oct 1978).

The Canadian disposal program concept calls for the disposal of radioactive wastes in a deep underground repository in an igneous intrusion (pluton) in the Canadian Precambrian Shield. The experiment program involves exploratory drilling and radionuclides adsorption studies. The main interest is in measuring surface adsorption coefficients for 20 radioactive elements on force rock types as a function of time, temperature, groundwater composition, and aging of the rock.

1780 (PNL-SA--7897) MATHEMATICAL SIMULATION FOR SAFETY ASSESSMENT OF NUCLEAR WASTE REPOSITORIES. Brandstetter, A.; Raymond, J.R.; Benson, G.L. (Battelle Pacific Northwest Labs., Richland, WA (USA)). 1979. Contract EY-76-C-06-1830. 24p. (CONF-790994--1). Dep. NTIS, PC A02/MF A01.

From 26. Pacific Northwest regional meeting of the American Geophysical Union; Bend, OR, USA (17 Sep 1979).

Mathematical models are being developed as part of the Waste Isolation Safety Assessment Program (WISAP) for assessing the post-closure safety of nuclear waste storage in geologic formations. The objective of this program is to develop the methods and data necessary to determine potential events that might disrupt the integrity of a waste repository and provide pathways for radionuclides to reach the bioshpere, primarily through groundwater transport. Four categories of mathematical models are being developed to assist in the analysis of potential release scenarios and consequences: (1) release scenario analysis models; (2) groundwater flow models; (3) contaminant transport models; and (4) radiation dose models. The development of the release scenario models is in a preliminary stage; the last three categories of models are fully operational. The release scenario models determine the bounds of potential future hydrogeologic changes, including potentially disruptive events. The groundwater flow and contaminant transport models compute the flowpaths, travel times, and concentrations of radionuclides that might migrate from a repository in the event of a breach and potentially reach the biosphere. The dose models compute the radiation doses to future populations. Reference site analyses are in progress to test the models for application to different geologies, including salt domes, bedded salt, and basalt.

1781 (PNL-SA--7953) NATURE OF GLASS LEACHING. McVay, G.L.; Buckwalter, C.Q. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jul 1979. Contract EY-76-C-06-1830. 40p. (CONF-7909102--2). Dep. NTIS, PC A03/MF A01.

From Argonne specialists' workshop on basic research needs for nuclear waste management; Argonne, IL, USA (5 Sep 1979).

Several models have been proposed in the literature to describe glass leaching behavior in aqueous solutions, but they are primarily applicable to relatively simple glasses. Their shortcoming is that they do not incorporate enough of the phenomena occurring during leaching. Leaching characteristics of a complex waste containment glass are discussed. Gamma irradiation increases the leach rates. Since bulk diffusion does not play a major role in leaching, the existing models are totally indequate for complex glasses. 4 figures, 3 tables. (DLC)

1782 (PNL-SA--7992) PROCEEDINGS OF THE TASK 2 WORKSHOP WASTE ISOLATION SAFETY ASSESSMENT PROGRAM. Bradley, D.J. (Battelle Pacific Northwest Labs., Richland, WA (USA)). 1979. Contract EY-76-C-06-1830. 234p. Dep. NTIS, PC A11/MF A01.

The reports from the workshop on waste form release rate analysis are presented. The workshop started with overview presentations on the Office of Nuclear Waste Isolation (ONWI), the Waste Isolation Safety Assessment Program (WISAP), WISAP Task 2 (Waste Form Release Rate Analysis), and WISAP Task 4 (Sorption/Desorption Analysis). Technical presentations followed in these areas: leaching studies on spent fuels, leaching studies on high-level waste glass, waste form surface science experiments, radiation effects, and leach modeling. Separate abstracts were prepared for each.

1783 (PNL-SA--7992, pp 1-10) OVERVIEW OF THE OFFICE OF NUCLEAR WASTE ISOLATION. Kircher, J.F. (Office of Nuclear Waste Isolation, Columbus, OH). 1979.

Proceedings of the Task 2 workshop Waste Isolation Safety Assessment Program.

The role of the Office of Nuclear Waste Isolation (ONWI) is discussed. The 2 main goals are to identify and characterize geological sites for use as nuclear waste depositories and to manage the development and application of specific supporting data and base technologies. The specific means of carrying out these goals and an organizational chart are included.

1784 (PNL-SA--7992, pp 11-19) WASTE ISOLATION SAFETY ASSESSMENT PROGRAM. Brandstetter, A. (Battelle Pacific Northwest Lab., Richland, WA). 1979.

Proceedings of the Task 2 workshop Waste Isolation Safety Assessment Program.

Associated with commercial nuclear power production in the United States is the generation of potentially hazardous radioactive wastes. The Department of Energy (DOE), through

the National Waste Terminal Storage (NWTS) Program, is seeking to develop nuclear waste isolation systems in geologic formations that will preclude contact with the biosphere of waste radionuclides in concentrations which are sufficient to cause deleterious impact on humans or their environments. Comprehensive analyses of specific isolation systems are needed to assess the expectations of meeting that objective. The Waste Isolation Safety Assessment Program (WISAP) has been established at the Pacific Northwest Laboratory (operated by Battelle Memorial Institute) for developing the capability of making those analyses. The objectives of the Waste Isolation Safety Assessment Program (WISAP) are to: (1) develop the capabilities needed to assess the post-closure safety of geologic repositories, (2) obtain scientifically defensible generic and site-specific data necessary for safety assessments, (3) provide, as needed, studies to further support these data and analyses, (4) demonstrate the assessment capabilities by performing analyses of reference sites, (5) apply the assessment methodology to assist the National Waste Terminal Storage Program in site selection, and (6) perform repository site analyses responsive to the time schedule and to the level of sophistication required to meet the licensing needs of the National Waste Terminal Storage Program. Release scenario analysis, Task 1, is discussed.

1785 (PNL-SA--7992, pp 21-31) WASTE ISOLATION SAFETY ASSESSMENT PROGRAM. TASK 2: WASTE FORM RELEASE RATE ANALYSIS. Bradley, D.J. (Battelle Pacific Northwest Lab., Richland, WA). 1979.
Proceedings of the Task 2 workshop Waste Isolation Safety Assessment Program.
The purpose of this task is to measure and understand radionuclide release rates for waste forms anticipated for geologic isolation. At the present time, these waste forms include spent fuel, High-Level Waste (HLW) glass, and for TRU, concrete, bitumen, urea-formaldehyde, and polymers. Radionuclide release processes are of major importance to breach consequence analyses because slower leach rates delay the transport of radionuclides from a breached repository to the biosphere. These processes are also responsible for determining the source term for migration away from the repository.

1786 (PNL-SA--7992, pp 33-43) WISAP TASK 4 (SORPTION-DESORPTION ANALYSIS). Serne, R.J. (Battelle Pacific Northwest Lab., Richland, WA). 1979.
Proceedings of the Task 2 workshop Waste Isolation Safety Assessment Program.
The overall objective of Task 4 is to provide the WISAP Task 3, release consequence analysis modelers the necessary information on long-term migration potential of leached nuclear wastes. The data being generated on nuclide sorption-desorption and precipitation-dissolution is obtained by both theoretical and experimental studies. At present only rock-nuclide interactions in the far-field (away from the waste induced heat and radiation fields) are under the preview of WISAP Task 4. The transport rate of nuclides is quantified by measurement of a parameter called Kd, the distribution coefficient. Kd is defind as the ratio of the amount of nuclide adsorbed on the solid media (rock) divided by the amount of nuclide remaining in the contacting solution (groundwater). This distribution, for each nuclide, can be dependent on the rock type, groundwater composition, nuclide concentration, nuclide valence state, and rock-nuclide contact time and surface area contacted. Presently the thrust of the Task 4 program is generic in nature. Until more direction and actual samples are available, work is being performed to gather data on nuclide-rock interactions for a wide range of rocks and groundwater types.

1787 (PNL-SA--7992, pp 45-66) NON-FLOW RELEASE STUDIES. Bradley, D. (Battelle Pacific Northwest Lab., Richland, WA). 1979.
Proceedings of the Task 2 workshop Waste Isolation Safety Assessment Program.
Associated with commercial nuclear power production in the United States is the generation of potentially hazardous radioactive wastes. The Department of Energy (DOE), through the National Waste Terminal Storage (NWTS) Program, is seeking to develop nuclear waste isolation systems in geologic formations that will preclude contact with the biosphere of waste radionuclides in concentrations which are sufficient to cause deleterious impact on humans or their environments. Comprehensive analyses of specific isolation systems are needed to assess the expectations of meeting that objective. The Waste Isolation Safety Assessment Program (WISAP) has been established at the Pacific Northwest Laboratory (operated by Battelle Memorial Institute) for developing the capability of making those analyses. The subtask with this title encompasses all the tests that are not run above 100°C, which falls into the Autoclave release subtask. Currently we are conducting IAEA and static leach tests in parallel on both spent fuel and cold and actinide doped waste glasses.

1788 (PNL-SA--7992, pp 67-71) AUTOCLAVE RELEASE STUDIES. Westsik, J.H. Jr. (Battelle Pacific Northwest Lab., Richland, WA). 1979.
Proceedings of the Task 2 workshop Waste Isolation Safety Assessment Program.
Associated with commercial nuclear power production in the United States is the generation of potentially hazardous radioactive wastes. The Department of Energy (DOE), through the National Waste Terminal Storage (NWTS) Program, is seeking to develop nuclear waste isolation systems in geologic formations that will preclude contact with the biosphere of waste radionuclides in concentrations which are sufficient to cause deleterious impact on humans or their environments. Comprehensive analyses of specific isolation systems are needed to assess the expectations of meeting that objective. The Waste Isolation Safety Assessment Program (WISAP) has been established at the Pacific Northwest Laboratory (operated by Battelle Memorial Institute) for developing the capability of making those analyses. Among the analyses required for isolation system evaluation is the detailed assessment of the post-closure performance of nuclear waste repositories in geologic formations. The objective of this subtask is to examine the behavior of a high-level waste glass and spent fuel in aqueous solutions at high temperatures and pressures. By studying the waste water interactions we will (1) generate leach rate data, (2) gain some understanding of the kinetics and mechanisms of the interactions, (3) simulate long time, low temperature leaching, and (4) provide input to the leach model subtask.

1789 (PNL-SA--7992, pp 73-81) RELEASE MODEL DEVELOPMENT. Turcotte, R.P. (Battelle Pacific Northwest Lab., Richland, WA). 1979.
Proceedings of the Task 2 workshop Waste Isolation Safety Assessment Program.
Associated with commercial nuclear power

production in the United States is the generation of potentially hazardous radioactive wastes. The Department of Energy (DOE), through the National Waste Terminal Storage (NWTS) Program, is seeking to develop nuclear waste isolation systems in geologic formations that will preclude contact with the biosphere of waste radionuclides in concentrations which are sufficient to cause deleterious impact on humans or their environments. Comprehensive analyses of specific isolation systems are needed to assess the expectations of meeting that objective. The Waste Isolation Safety Assessment Program (WISAP) has been established at the Pacific Northwest Laboratory (operated by Battelle Memorial Institute) for developing the capability of making those analyses. Among the analyses required for isolation system evaluation is the detailed assessment of the post-closure performance of nuclear waste repositories in geologic formations. The objective of this subtask is to develop a release model. Although leaching studies of nuclear waste glasses and other solid forms have been part of every development effort, we are not yet at a point where a defensible leach model can be presented. A major result of our work during the last year has been a clearer recognition that leaching models proposed previously, based on studies of simple glasses, are simply not applicable to typical nuclear waste glasses.

1790 (PNL-SA--7992, pp 93-111) LEACHING CHARACTERISTICS OF ACTINIDES FROM SIMULATED REACTOR WASTE GLASS. Weed, H.C. (Lawrence Livermore Lab., CA); Coles, D.G.; Bradley, D.J.; Mensing, R.W.; Schweiger, J.S.; Rego, J.H. 1979.

Proceedings of the Task 2 workshop Waste Isolation Safety Assessment Program.

This investigation is conducted for the Office of Nuclear Waste Isolation through Task 2 of the PNL Waste Isolation Safety Assessment Program (WISAP). One of the important goals of this program is to be able to calculate the rate of radionuclide release from candidate waste forms for geologic repository disposal. The present study has the following objectives in support of that goal: (1) to provide radionuclide source term information for use in release consequence analysis and migration rate calculations - this includes the effect of leaching, solution composition, flow rate, temperature, and time on the leach rate of simulated high level reactor waste glass; (2) to compare results obtained from the dynamic one-pass leaching method at LLL with those from the IAEA method at PNL. This progress report includes results to 120 days. Additional reports will be issued as the results are analyzed statistically, and a final report will be issued with PNL after the end of the experiments.

1791 (PNL-SA--7992, pp 113-146) LEACHING PROPERTIES OF SOLIDIFIED TRU WASTE FORMS (WBS ELEMENT 0206). Colombo, P.; Neilson, R.M. Jr. (Brookhaven National Lab., Upton, NY). 1979.

Proceedings of the Task 2 workshop Waste Isolation Safety Assessment Program.

Approximately 12 x 10^6 ft^3 of defense TRU wastes are in storage or burial at various DOE installations, principally at the Idaho National Engineering Laboratory (INEL), Hanford, and the Savannah River Plant. (Continued waste generation rates of 2 x 10^5 ft^3/yr are estimated.) These wastes will ultimately be moved and placed into a geologic repository for disposal. While there is some question as to whether existing TRU wastes will be disposed in their current form or first undergo some additiona volume reduction process, it is evident that volume reduction will be required for future TRU wastes. There are a number of volume reduction options available for combustible TRU wastes, the most viable option currently being some form of incineration. While incineration does result in a large volume reduction for combustible solid wastes, the ash that results is highly dispersible. As such, the immobilization of incinerator ash by solidification producing a solid monolithic waste form is desirable. Safety analysis of solidified TRU contaminated incinerator ash waste forms requires an estimate of the ability of these waste forms to retain activity in the disposal environment. The primary mechanism for the potential release of this activity is assumed to be by leaching. The experimental program conducted at Brookhaven National Laboratory will determine the leaching properties of TRU contaminated incinerator ash waste forms using hydraulic cement, urea-formaldehyde, bitumen, and vinyl ester-styrene as solidification agents. The data obtained will indicate the relative activity retention abilities of these waste forms and provide the basis for long-term release projections from full-scale waste forms.

1792 (PNL-SA--7992, pp 159-166) LEACHING U-NP-PU-LOADED SIMULATED WASTE-GLASS. Diamond, H.; Friedman, A. (Argonne National Lab., IL). 1979.

Proceedings of the Task 2 workshop Waste Isolation Safety Assessment Program.

Static leaching measurements were made in an oxygen-free environment. Three solutions, water, 0.3 M $NaHCO_3$ and brine were used; three intervals 2d, 8d, and 32d, and 23°C and 75°C temperatures were examined. The preliminary results show a varied response to temperature and some evidence that the leached material is not bound in siliceous fragments.

1793 (PNL-SA--7992, pp 167-179) SPENT FUEL LEACH TESTS. Katayama, B. (Battelle Pacific Northwest Lab., Richland, WA). 1979.

Proceedings of the Task 2 workshop Waste Isolation Safety Assessment Program.

This presentation is divided into two parts, pre-WISAP and WISAP. The pre-WISAP leach tests were started before WISAP sponsorship and do not give data directly applicable to the spent fuel release modeling studies being done in WISAP Task 2. However, the general leaching trends have suggested the general approach to some mechanistic studies. The WISAP portion of this presentation was started under WISAP sponsorship and is designed to fulfill the requirement of obtaining radionuclide release rates from spent fuel and understanding the radionuclide release process under simulated geologic storage conditions.

1794 (PNL-SA--7992, pp 181-204) FUEL AND WASTE IMMOBILIZATION IN CANADA RELATED TO WISAP TASK 2. Strathdee, G.G. (Battelle Seattle Research Center, WA); Cameron, D.J.; Sargent, F.P.; Vandergraaf, T.T.; Johnson, L.H.; Shoesmith, D.W.; Taylor, P.; McIntyre, N.S.; Tait, J.C. 1979.

Proceedings of the Task 2 workshop Waste Isolation Safety Assessment Program.

Durable glass samples which are leached for prolonged periods in standard tests behave in unexpected ways, particularly with respect to deposition of multi-valent cations at the glass alteration layer-solution interface. The standard leach tests normally used to provide comparisons of glass product durabilities may

yield leach rate values which are conservative and high with respect to those within an actual repository environment. Depth profile studies indicate that addition of certain cations to waste glasses (i.e., those found to concentrate at the aqueous-glass interface and which promote mineralization of the alteration layer) may lead to in-situ generation of an additional barrier to radionuclide loss.

1795 (PNL-SA--7992, pp 205-229) WIPP WASTE CHARACTERIZATION AND EXPERIMENTAL PROGRAMS. Molecke, M.A. (Sandia Labs., Albuquerque, NM). 1979.
Proceedings of the Task 2 workshop Waste Isolation Safety Assessment Program.
The Waste Isolation Pilot Plant (WIPP) is intended to serve as a nuclear waste repository for those defense transuranic wastes, both contact-handled and remote-handled, which the Department of Energy (DOE) may designate as requiring deep geologic disposal. The WIPP will also provide a separate underground facility in which in-situ experiments with various waste forms, including high-level waste (HLW) and spent fuel, may be conducted. The DOE has also recommended (but not determined) that the WIPP be used to demonstrate the disposal of a limited number (no more than 1000) of spent fuel assemblies from commercial nuclear reactors. All the wastes, both TRU and spent fuel, placed into the WIPP for intended disposal would be retrievable for the periods required to demonstrate the validity of the disposal concept. These periods are not expected to exceed 10 years for TRU waste and 25 years for spent fuel. Wastes used in the experimental program will be removed at the conclusion of the experiments.

1796 (PNL-SA--7992, pp 147-157) X-RAY PHOTOEMISSION SPECTROSCOPY (XPS) AND EXTENDED X-RAY ABSORPTION FINE STRUCTURE (EXAFS) STUDIES OF SILICATE BASED GLASSES. Karim, D.; Lam, D.J. (Argonne National Lab., IL). 1979.
Proceedings of the Task 2 workshop Waste Isolation Safety Assessment Program.
The application of the x-ray photoemission spectroscopy (XPS) technique to study the electronic structure and bonding of heavy metal oxides in alkali- and alkali-earth-silicate glasses had been demonstrated. The bonding characteristics of the iron oxide and uranium oxide in sodium silicate glasses were deduced from the changes in the oxygen 1s levels and the heavy metal core levels. It is reasonable to expect that the effect of leaching on the heavy metal ions can be monitored using the appropriate core levels of these ions. To study the effect of leaching on the glass forming network, the valence band structure of the bridging and nonbridging oxygens in sodium silicate glasses were investigated. The measurement of extended x-ray absorption fine-structure (EXAFS) is a relatively new analytical technique for obtaining short range (<5 A) structural information around atoms of a selected species in both solid and fluid systems. Experiments have recently begun to establish the feasibility of using EXAFS to study the bonding of actinides in silicate glasses. Because of the ability of EXAFS to yield specific structural data even in complex multicomponent systems, it could prove to be an invaluable tool in understanding glass structure.

1797 (PNL-SA--7992, pp 83-91) GAMMA-IRRADIATION EFFECTS ON LEACHING CHARACTERISTICS OF WASTE CONTAINMENT MATERIALS. McVay, G.L. (Battelle Pacific Northwest Lab., Richland, WA). 1979.
Proceedings of the Task 2 workshop Waste Isolation Safety Assessment Program.
Materials which contain typical radioactive waste are subjected to gamma-irradiation from the waste itself. Therefore, it is important to understand the effect of this irradiation on the leaching characteristics of waste containing materials in the event of an exposure to water during the time span when significant gamma-irradiation is occurring. With this goal in mind, an experiment has been initiated to characterize the leaching behavior of 7668 glass, supercalcine ceramic, and UO_2 during exposure to gamma-irradiation.

1798 (PNL-SA--8011) RADIOLOGICAL ASPECTS OF SEA BED DUMPING IN THE DEEP OCEANS. Templeton, W.L. (Battelle Pacific Northwest Labs., Richland, WA (USA)). 1979. Contract EY-76-C-06-1830. 19p. (CONF-791050--2). Dep. NTIS, PC A02/MF A01.
From 3. Nuclear Energy Agency seminar on marine radioecology; Tokyo, Japan (1 Oct 1979).
In order to control coastal discharges or ocean dumping of any kind of material, it is necessary to determine a release rate. This can only come from a knowledge of the composition and chemical form of the source materials, the distribution and bioavailability of these materials in the ocean ecosystem, the degree and rates of bioaccumulation and the actual or potential use of the ocean resources. With this information release rates within acceptable limits for man and the ecosystem can then be determined. Today, probably the only situations which apply this approach are the controlled disposal of radioactive wastes. In this paper a recent radiological assessment of the dumping of packaged radioactive wastes on the seabed is discussed and some environmental aspects of the United States Department of Energy program are described examining the feasibility of the emplacement of contained radioactive wastes within the deep ocean sediments.

1799 (PNL-SA--8571(Vol.1)) WASTE ISOLATION SAFETY ASSESSMENT PROGRAM. TASK 4. THIRD CONTRACTOR INFORMATION MEETING. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jun 1980. Contract AC06-76RL01830. 558p. (CONF-7910160--(Vol.1)). NTIS, PC A24/MF A01.
From 3. contractor information meeting on waste isolation safety assessment program task 4; Seattle, WA, USA (14 Oct 1979).
The Contractor Information Meeting (October 14 to 17, 1979) was part of the FY-1979 effort of Task 4 of the Waste Isolation Safety Assessment Program (WISAP): Sorption/Desorption Analysis. The objectives of this task are to: evaluate sorption/desorption measurement methods and develop a standardized measurement procedure; produce a generic data bank of nuclide-geologic interactions using a wide variety of geologic media and groundwaters; perform statistical analysis and synthesis of these data; perform validation studies to compare short-term laboratory studies to long-term in situ behavior; develop a fundamental understanding of sorption/desorption processes; produce x-ray and gamma-emitting isotopes suitable for the study of actinides at tracer concentrations; disseminate resulting information to the international technical community; and provide input data support for repository safety assessment. Conference participants included those subcontracted to WISAP Task 4, representatives and independent subcontractors to the Office of Nuclear Waste Isolation, representatives from other waste disposal programs, and experts in the area of

waste/geologic media interaction. Since the meeting, WISAP has been divided into two programs: Assessment of Effectiveness of Geologic Isolation Systems (AEGIS) (modeling efforts) and Waste/Rock Interactions Technology (WRIT) (experimental work). The WRIT program encompasses the work conducted under Task 4. This report contains the information presented at the Task 4, Third Contractor Information Meeting. Technical Reports from the subcontractors, as well as Pacific Northwest Laboratory (PNL), are provided along with transcripts of the question-and-answer sessions. The agenda and abstracts of the presentations are also included. Appendix A is a list of the participants. Appendix B gives an overview of the WRIT program and details the WRIT work breakdown structure for 1980.

1800 (PTB-SE--1) SEMINAR ON R + D WORK AND STUDIES ON THE DISPOSAL AND FINAL STORAGE OF RADIOACTIVE WASTE. REPORT SE-1. (Physikalisch-Technische Bundesanstalt, Braunschweig (Germany, F.R.). Abt. Sicherstellung und Endlagerung Radioaktiver Abfaelle). Oct 1979. 60p. (In German). NTIS (US Sales Only), PC A04/MF A01.

The Seminar had following goals: The research- and development works for safeguarding and final storage of waste are discussed and gone through with regard to their complete processing in due time. A survey on possible co-operation in R+D work is to be set up. The PTB (Physical-technical federal organisation) can normally not order any R+D work nor can it financially support them; it will, however support necessary R+D works with all possibilities it has, for example by sending letters of recommendation and agreement to ministries and other competent institutions. For special investigations relevant for the permission, there are also own means in restricted volume available.

1801 (PTB-SE--2) PROTOCOL OF THE RESULTS OF THE 18TH PTB SEMINAR 'SITE-INDEPENDENT PLANNING OF THE FINAL STORAGE FACILITY AT THE SITE OF THE GORLEBEN INTEGRATED NUCLEAR WASTE MANAGEMENT CENTRE. (Physikalisch-Technische Bundesanstalt, Braunschweig (Germany, F.R.). Abt. Sicherstellung und Endlagerung Radioaktiver Abfaelle). Nov 1979. 15p. (In German). NTIS (US Sales Only), PC A02/MF A01.

On 24 April 1979 the Seminar on site-independent planning of the final storage mine at the site of the integrated waste management centre Gorleben under the leadership of H. Roethemeyer took place in PTB, Braunschweig. The Seminar was attended by PTB-staff and by 45 invited attendees from several federal ministries and their consulting committees and from industry, authorities, universities, and research institutes. In several presentations, PTB and the industry reported on the situation of the planning works. The new task to set up the systems of the Federal Government for safeguarding and final storage of radioactive waste and to operate them was given PTB with the 4th supplementary atomic law of 31st October 1976. Furthermore PTB has to take care of the R-D works necessary to realise these systems to be finished in due time. This point was also reported in several presentations on the present situation of the works concerned. Numerous contributions made in the discussions following to the prescutations brought valuous ideas for the progress of the plannings and the R-D programmes.

1802 (RFP--3110) US DEPARTMENT OF ENERGY ACCEPTANCE OF COMMERCIAL TRANSURANIC WASTE. Taboas, A.L.; Bennett, W.S.; Brown, C.M. (Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). Feb 1980. Contract AC04-76DP03533. 27p. NTIS, PC A03/MF A01.

Contaminated transuranic wastes generated as a result of non-defense activities have been disposed of by shallow land burial at a commercially operated (NECO) facility located on the Hanford federal reservation, which is licensed by the State of Washington and by the NRC. About 15,000 ft^3 of commercial TRU waste have been generated each year, but generation for the next three years could triple due to decontamination and decommissioning scheduled to start in 1980. Disposal at other commercial burial sites has been precluded due to sites closing or prohibitions on acceptance of transuranic wastes. The State of Washington recently modified the NECO-Hanford operating license, effective February 29, 1980, to provide that radioactive wastes contaminated with transuranics in excess of 10 nCi/g will not be accepted for disposal. Consistent with the state policy, the NRC amended the NECO special nuclear material license so that Pu in excess of 10n Ci/g cannot be accepted after February 29, 1980. As a result, NRC requested DOE to examine the feasibility of accepting these wastes at a DOE operated site. TRU wastes accepted by the DOE would be placed in retrievable storage in accordance with DOE policy which requires retrievable storage of transuranic wastes pending final disposition in a geologic repository. DOE transuranic wastes are stored at six major DOE sites: INEL, Hanford, LASL, NTS, ORNL, and SRP. A specific site for receiving commercial TRU waste has not yet been selected. Shipments to DOE-Hanford would cause the least disruption to past practices. Commercial TRU wastes would be subject to waste form and packaging criteria established by the DOE. The waste generators would be expected to incur all applicable costs for DOE to take ownership of the waste, and provide storage, processing, and repository disposal. The 1980 charge to generators for DOE acceptance of commercial TRU waste is $147 per cubic foot.

1803 (RHO-BWI--79-100) BASALT WASTE ISOLATION PROJECT. ANNUAL REPORT, FISCAL YEAR 1979. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Nov 1979. Contract EY-77-C-06-1030. 265p. Dep. NTIS, PC A12/MF A01.

This project is aimed at examining the feasibility and providing the technology to design and construct a radwaste repository in basalt formations beneath and within the Hanford Site. The project is divided into seven areas: systems integration, geosciences, hydrologic studies, engineered barriers, near-surface test facility, engineering testing, and repository engineering. This annual report summarizes key investigations in these seven areas. (DLC)

1804 (RHO-BWI--79-100-3Q) BASALT WASTE ISOLATION PROGRAM. QUARTERLY REPORT, APRIL 1, 1979-JUNE 30, 1979. Deju, R.A. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Jul 1979. Contract EY-77-C-06-1030. 51p. Dep. NTIS, PC A04/MF A01.

During the quarter, progress was made in all areas of the Basalt Waste Isolation Program. In the Geosciences, Hydrology, and Engineered Barriers areas, work continued on schedule aimed at being able to make a site selection decision in 1981, as scheduled. Emphasis

continued to be placed on geologic mapping studies, on hydrologic data gathering, and on definition of waste/basalt interactions and needed engineered barriers. Progress at the end of the quarter on the Near-Surface Test Facility was approximately on schedule and the rate of work was accelerating to better than scheduled due to some equipment improvements and tunnel design modifications. In the Engineering Testing area, design work, test planning, and fabrication of heaters and auxiliary equipment continued on schedule. In the Repository area, an Architect/Engineer Evaluation Board was formally designed by the US Department of Energy-Headquarters during October 1978. The evaluation board will select an architect/engineer for repository conceptual design with an option for follow-on Title I, Title II, and Title III engineering services. Selection will be completed by October 1979. Questionnaire information was received from a number of interested architect/engineer firms by the US Department of Energy-Richland Operations Office and has been evaluated. Onsite visits with the qualified firms were completed during April 1979. In addition, repository preconceptual design studies continued on schedule with emphasis on compilation of repository functional design criteria by July 1979, and the repository preconceptual design report in September 1979.

1805 (RHO-BWI--79-100-4Q) BASALT WASTE ISOLATION PROJECT. QUARTERLY REPORT, JULY 1, 1979-SEPTEMBER 30, 1979. Deju, R.A. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Oct 1979. Contract EY-77-C-06-1030. 58p. Dep. NTIS, PC A04/MF A01.

Progress in various areas of the Basalt Waste Isolation Project during the last quarter is reported. Systems integration, licensing, geologic activities, hydrology, borehole studies, geophysical logging, engineered barriers, test facilities, testing of canisters, and selection process for architect-engineer services for repository conceptual design are discussed. (DC)

1806 (RHO-BWI--80-100-2Q) BASALT WASTE ISOLATION PROJECT. QUARTERLY REPORT, JANUARY 1-MARCH 31, 1980. Deju, R.A. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Apr 1980. Contract AC06-77RL01030. 94p. NTIS, PC A05/MF A01.

This report addresses the technical progress for the Basalt Waste Isolation Project for the second quarter of fiscal year 1980. Seismic design values were developed for preliminary repository design purposes; 0.25 g horizontal and 0.125 g vertical maximum accelerations for surface, zero-period conditions. Preliminary seismic data indicate broad, smooth areas exist in the bedrock surface in the western portion of the Cold Creek syncline and a gently undulating bedrock surface in the eastern portion. Test results indicate hydraulic property values fall within the range previously reported for sedimentary and interflow zones in basalt formations at the Hanford Site. Preliminary results of available hydrochemical data obtained from several borehole sites indicate that little, if any, vertical mixing of groundwaters is taking place across this stratigraphic boundary. Multiple barrier studies indicate that the primary candidate canister/overpack alloys are TiCode-12, Inconel 625, Incoloy 825, and Zircaloy 2. Low-carbon steel and cast iron are among the list of secondary candidate canister alloys. Laboratory tests of borehole plug designs have shown that it is feasible to design a composite plug system that will satisfactorily seal a nuclear waste repository in Columbia River basalt. The National Lead Industries, Inc., NLI-1/2 Universal Spent Fuel Shipping Cask was selected for use in Phase II operations. Creep test results of samples of Umtanum basalt from borehole DC-6 were plotted and show the day-to-day variation in deformation versus time. The concept selection phase of repository conceptual design was completed in March 1980. A test plan for the Exploratory Shaft Test Facility was developed and is scheduled for submittal to the US Department of Energy in May 1980.

1807 (RHO-BWI--80-100-3Q) BASALT WASTE ISOLATION PROJECT. QUARTERLY REPORT, APRIL 1, 1980-JUNE 30, 1980. (Rockwell International Corp., Canoga Park, CA (USA). Energy Systems Group). Jul 1980. Contract AC06-77RL01030. 74p. NTIS, PC A04/MF A01.

Progress is reported in the following work areas: systems integration, geosciences, hydrology, engineered barriers, near-surface test facility, engineering testing, and repository studies. (DLC)

1808 (RHO-BWI--80-100-19) BASALT WASTE ISOLATION PROJECT. QUARTERLY REPORT, OCTOBER 1, 1979-DECEMBER 31, 1979. (Rockwell International Corp., Canoga Park, CA (USA). Energy Systems Group). Jan 1980. Contract EY-77-C-06-1030. 84p. Dep. NTIS, PC A05/MF A01.

Progress in geology and hydrology is reported. Engineered barrier experiments with spent fuel indicate that basalt favorably affects the repository performance: experiments leaching simulated spent fuel alone remove 90 to 100% of the cesium, rubidium, and molybdenum present, while leaching in the presence of basalt produced residual solutions containing less than 10% of these cations. The following alloys appear to be best for use as a waste canister and/or overpack in a basalt environment: Ticode 12, Hastelloy C-276, Inconel 625, Incoloy 825, and 90-10 Cupronickel. The Title II design of the Bottom Loading Transporter was completed this quarter. The design of the heaters for Block Tests No. 1 and No. 2 was completed.

1809 (RHO-BWI-C-13) DRILLING HISTORY CORE HOLE DC-6 HANFORD, WASHINGTON. (Fenix and Scisson, Inc., Richland, WA (USA)). Jun 1978. Contract EY-77-C-06-1030. 55p. Dep. NTIS, PC A04/MF A01.

Core hole DC-6 was completed in May 1978 by Boyles Brothers Drilling Company, Spokane, Washington, under subcontract to Fenix and Scisson, Inc. The hole was cored for the US Department of Energy and the Rockwell Hanford Operations' Basalt Waste Isolation Program. Fenix and Scisson, Inc. furnished the engineering, daily supervision of the core drilling activities, and geologic core logging for hole DC-6. Core hole DC-6 is located within the boundary of the Hanford Site at the old Hanford town site. The Hanford Site coordinates for DC-6 are North 54,127.17 feet and West 17,721.00 feet. The surface elevation is approximately 402 feet above sea level. The purpose of core hole DC-6 was to core drill vertically through the basalt and interbed units for stratigraphic depth determination and core collection and to provide a borehole for hydrologic testing. The total depth of core hole DC-6 was 4336 feet. Core recovery was 98.4% of the total footage cored.

1810 (RHO-BWI-C--29) DRILLING HISTORY CORE HOLE DC-8. (Fenix and Scisson, Inc., Richland, WA (USA)). Oct 1978. Contract EY-77-C-06-1030. 51p. Dep. NTIS, PC A04/MF A01.

Core hole DC-8 was completed in August, 1978 by Boyles Brothers Drilling Company, Spokane, Washington, under subcontract to Fenix and Scission, Inc. The hole was cored for the US Department of Energy and the Rockwell Hanford Operations' Basalt Waste Isolation Program. Fenix and Scisson, Inc. furnished the engineering, daily supervision of the core drilling activities, and geologic core logging for hole DC-8. Core hole DC-8 is located on the Hanford Site near the Wye Barricade and 50 feet northwest of rotary hole DC-7. The Hanford Site vation coordinates for DC-8 are North 14,955.94 feet and West 14,861.92 coordinates for DC-8 are North 14,955.94 feet and West 14,861.92 mean sea level. The purpose of core hole DC-8 was to core drill vertically through the basalt and interbed units for stratigraphic depth determination and core collection, and to provide a borehole for hydrologic testing and cross-hole seismic shear and pressure wave velocity studies with rotary hole DC-7. The total depth of core hole DC-8 was 4100.5 feet. Core recovery exceeded 97 percent of the total footage cored.

1811 (RHO-BWI-C--40) DRILLING HISTORY CORE HOLE DC-4. (Fenix and Scisson, Inc., Richland, WA (USA)). Dec 1978. Contract EY-77-C-06-1030. 48p. Dep. NTIS, PC A03/MF A01.

Core hole DC-4 was completed at a depth of 3998 feet in December, 1978 by Boyles Brothers Drilling Company, Spokane, Washington, under subcontract to Fenix and Scission, Inc. The hole was cored for the US Department of Energy and the Rockwell Hanford Operations' Basalt Waste Isolation Program. Fenix and Sicsson, Inc. furnished the engineering, daily supervision of the cable tool and core drilling activities, and geological core logging for DC-4. Core hole DC-4 is located on the Hanford Site about 3 miles east of the Yakima Barricade and approximately 103 feet southwest of rotary hole DC-5, which was completed to 3990 feet in February, 1978. Hanford Site coordinates reported for hole DC-4 are north 49,385.62 feet and west 85,207.63 feet, and Washington State coordinates are north 454,468.73 feet and east 2,209,990.87 feet. No elevation survey is available for hole DC-4, but it is approximately 745 feet above mean sea level based upon the survey of hole DC-5, which has a reported elevation of 745.16 feet on the top of the 3-inch flange. The purpose of core hole DC-4 was to core drill vertically through the basalt and interbed units for stratigraphic depth determination and core collection, and to provide a borehole for hydrologic testing, cross-hole seismic shear, and pressure wave velocity studies with rotary hole DC-5. Hole DC-4 was drilled through the overburden into basalt bedrock by cable tool methods (0-623 feet) and continuously cored through the final interval (623 to 3998 feet).Core recovery was 95.8 percent of the total footage cored.

1812 (RHO-BWI-C--45) HYDROLOGIC BIBLIOGRAPHY OF THE COLUMBIA RIVER BASALTS IN WASHINGTON WITH SELECTED ANNOTATIONS. Tanaka, H.; Wildrick, L.; Pearson, B. (Washington State Dept. of Ecology, Olympia (USA)). Aug 1979. Contract AC06-77RL01030. 118p. NTIS, PC A06/MF A01.

The objective of this compilation is to present a comprehensive listing of the published, unpublished, and open file references pertaining to the surface and subsurface hydrology of the Columbia River basalts within the State of Washington and is presented in support of Rockwell's hydrologic data compilation effort for the Basalt Waste Isolation Program. A comprehensive, annotated bibliography of the Pasco Basin (including the Hanford Site) hydrology has been prepared for Rockwell as part of the Pasco Basin hydrology studies. In order to avoid unnecessary duplication, no effort was made to include a complete list of bibliographic references on Hanford in this volume.

1813 (RHO-BWI-C--47) SPRING INVENTORY OF THE RATTLESNAKE HILLS. Schwab, G.E.; Colpitts, R.M. Jr.; Schwab, D.A. (Summers (W.K.) and Associates, Inc., Socorro, NM (USA)). May 1979. Contract EY-77-C-06-1030. 207p. Dep. NTIS, PC A10/MF A01.

Springs and reported spring locations within about 182 square miles of the Rattlesnake Hills in Benton and Yakima Counties, Washington, were studied for this report. One hundred twenty-five discrete locations were visited. Water was tested at 74 locations. Of the remainder, 35 were dry, 7 were iced over, and 7 were damp (too little water to sample). Two cisterns were not sampled. Eighty-three water samples from 73 springs and 1 cistern were analyzed in the field. Temperature, specific conductance, and pH were measured at each sample site. Water from each of these sources was titrated to determine carbonate, bicarbonate, and carbon dioxide contents. Seventy-one sketch maps show sample sites plus 9 other locations. Profile sections accompany the sketches where such views are informative. Altitudes of visited locations range from 700 feet to 3360 feet. Altitudes of sampled springs range from 1150 feet to 3275 feet. Discharge rates within the study area range from seeps estimated at less than one-quarter gallon per minute to a multiple-spring stream measured at about 70 gallons per minute.

1814 (RHO-BWI-C--49) BOREHOLE PLUGGING OF MAN-MADE ACCESSES TO A BASALT REPOSITORY: A PRELIMINARY STUDY. Taylor, C.L.; Anttonen, G.J.; O'Rourke, J.E.; Niccum, M.R. (Woodward-Clyde Consultants, San Francisco, CA (USA)). Sep 1979. Contract AC06-RL7701030. 318p. NTIS, PC A14/MF A01.

This report describes the status of work currently in progress for the Basalt Borehole Plugging Program (BBPP). The primary objectives of the BBPP outlined in this report have been met during this first phase of work. These objectives included: (1) the preparation of a preliminary list of candidate plug materials; (2) a description of available machinery capable of placing candidate plug materials; and (3) the development of physical and geochemical testing programs to help evaluate the chemical stability and physical properties of candidate plug materials. The most significant finding from work to date is that given reasonable regulatory criteria, nothing has been identified which would prevent design of a plug system to seal manmade openings leading to a nuclear waste repository in Columbia River basalt for significantly long periods of time (on the order of thousands of years). Work accomplished to date indicates that this plug system can be designed using both natural and manufactured materials and can be emplaced with existing placement machinery and modifications of that machinery. The objectives of Task II are to conduct laboratory tests to evaluate the suitability of preferred candidate materials for plugging boreholes in

the proposed repository, select plug system(s), initiate preconceptual machinery design for the placement of materials in plug system(s), and prepare a preliminary Task II report. As with Task I project organization, Task II is divided into subtasks that are identified by written subtask work summaries.

1815 (RHO-BWI-C--59) BIBLIOGRAPHY OF THE GEOLOGY OF THE COLUMBIA BASIN AND SURROUNDING AREAS OF WASHINGTON. Tucker, G.B.; Rigby, J.G. (Washington State Dept. of Natural Resources, Olympia (USA)). Jul 1979. Contract AC06-77RL01030. 543p. NTIS, PC A23/MF A01.

In the fall of 1977, the Washington State Department of Natural Resources, Division of Geology and Earth Resources (WDGER), entered into a contract with the US Department of Energy, administered by Rockwell Hanford Operations (Rockwell) in Richland, Washington, as a principal contributor to a geologic study of feasibility of storing radioactive waste within Columbia River basalt. WDGER's responsibility was the production of this bibliography and a reconnaissance geologic map of the sediments overlying the Columbia River Basalt Group in the State of Washington. This bibliography is a compilation of all known published, unpublished, and open-file references dealing with geology and geophysics of the Columbia Basin of eastern Washington. The citations were obtained primarily from the WDGER and Washington State libraries; the Geo-Ref bibliographic system was also utilized. Because the WDGER portion of the study included preparation of a reconnaissance geologic map of surficial deposits in the Columbia Basin, available references dealing with this subject have been annotated. Many abstracts in the annotated section are quotations and have been copied directly from their respective publications.

1816 (RHO-BWI-C--60) REGIONAL BASALT HYDROLOGY OF THE COLUMBIA PLATEAU IN WASHINGTON. Tanaka, H.; Barrett, G.; Wildrick, L. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Oct 1979. Contract AC06-77RL01030. 855p. NTIS, PC A99/MF A01.

This study is part of the Basalt Waste Isolation Project, operated for the US Department of Energy by Rockwell Hanford Operations. The overall purpose of the study is to assess locations within the Columbia River Basalt Group beneath the Hanford Site in south-central Washington suitable for a geologic repository for radioactive waste. This hydrologic study was made to describe the hydrologic characteristics of the basalt units of the Columbia Plateau. This was done by comprehensive data compilation, data interpretation and analysis. Data are presented in the form of maps and tables suitable as input information about the regional hydrology for possible future analysis by computer models. The report includes: an introduction; basic data; interpretation which covers stratigraphic trend surface, water levels, transmissivity and storage of aquifers, recharge, discharge, flow, subbasins, cross sections, references and appendix of record of wells.

1817 (RHO-BWI-C--62(Vol.1)) SITE LOCALITY IDENTIFICATION STUDY: HANFORD SITE. VOLUME I. METHODOLOGY, GUIDELINES, AND SCREENING. (Woodward-Clyde Consultants, San Francisco, CA (USA)). Jul 1980. Contract AC06-77RL01030. 194p. NTIS, PC A09/MF A01.

Presented in this report are the results of the site locality identification study for the Hanford Site using a screening process. To enable evaluation of the entire Hanford Site, the screening process was applied to a somewhat larger area; i.e., the Pasco Basin. The study consisted of a series of screening steps that progressively focused on smaller areas which are within the Hanford Site and which had a higher potential for containing suitable repository sites for nuclear waste than the areas not included for further study. Five site localities, designated H-1, H-2, H-3, H-4, H-5 (Figure A), varying in size from approximately 10 to 50 square miles, were identified on the Hanford Site. It is anticipated that each site locality may contain one or more candidate sites suitable for a nuclear waste repository. The site locality identification study began with definition of objectives and the development of guidelines for screening. Three objectives were defined: (1) maximize public health and safety; (2) minimize adverse environmental and socioeconomic impacts; and (3) minimize system costs. The screening guidelines have numerical values that provided the basis for the successive reduction of the area under study and to focus on smaller areas that had a higher likelihood of containing suitable sites.

1818 (RHO-BWI-C--62(Vol.2)) SITE LOCALITY IDENTIFICATION STUDY: HANFORD SITE. VOLUME II. DATA CATALOGING. (Woodward-Clyde Consultants, San Francisco, CA (USA)). Jul 1980. Contract AC06-77RL01030. 199p. NTIS, PC A09/MF A01.

Data compilation and cataloging for the candidate site locality identification study were conducted in order to provide a retrievable data cataloging system for the present siting study and future site evaluation and licensng processes. This task occurred concurrently with and also independently of other tasks of the candidate site locality identification study. Work in this task provided the data utilized primarily in the development and application of screening and ranking processes to identify candidate site localities on the Hanford Site. The overall approach included two steps: (1) data acquisition and screening; and (2) data compilation and cataloging. Data acquisition and screening formed the basis for preliminary review of data sources with respect to their probable utilization in the candidate site locality identification study and review with respect to the level of completeness and detail of the data. The important working assumption was that the data to be used in the study be based on existing and available published and unpublished literature. The data compilation and cataloging provided the basic product of the Task; a retrievable data cataloging system in the form of an annotated reference list and key word index and an index of compiled data. The annotated reference list and key word index are cross referenced and can be used to trace and retrieve the data sources utilized in the candidate site locality identification study.

1819 (RHO-BWI-C--66) PRELIMINARY GEOCHEMICAL AND PHYSICAL TESTING OF MATERIALS FOR PLUGGING OF MAN-MADE ACCESSES TO A REPOSITORY IN BASALT. Taylor, C.L.; Anttonen, G.J.; O'Rourke, J.E.; Allirot, D. (Woodward-Clyde Consultants, San Francisco, CA (USA)). Apr 1980. Contract AC06-77RL01030. 398p. NTIS, PC A17/MF A01.

The available data on environmental conditions (both natural and man-made) at the Hanford Site are sufficient for preconceptual

plug system design. Results of the geochemical testing program indicate that preferred candidate plug materials are chemically nonreactive during laboratory tests that simulated some of the expected environmental conditions. Agitated, crushed-basalt samples and mixtures containing basalt were found to be self-cementing under the hydrothermal conditions. Materials considered most suitable for consideration in future test programs and preconceptual plug design are mixtures of natural materials (basalt, clay, glaciofluvial sand, gravel, and zeolite) and processed natural materials (portland cement Type V and grouts plus additives).

1820 (RHO-BWI-C--68) ADDITIONS AND CORRECTIONS TO THE BIBLIOGRAPHY OF GEOLOGIC STUDIES, COLUMBIA PLATEAU (COLUMBIA RIVER BESALT) AND ADJACENT AREAS, IN IDAHO, 1980. Strowd, W. (Idaho Bureau of Mines and Geology, Moscow (USA). Dept. of Lands). 1980. Contract AC02-77RL01030. 124p. NTIS, PC A06/MF A01.

This bibliography is an update to Idaho Bureau of Mines and Geology Open-File Report 78-6, Bibliography of Geological Studies, Columbia Plateau (Columbia River Basalt Group) and adjacent areas in Idaho (also known as Rockwell Hanford Operations' contractor report RHO-BWI-C-44). To keep the original document current, this additions and corrections report was prepared for the Basalt Waste Isolation Project of Rockwell Hanford Operations. This update is supplementary; therefore, references cited in the original document have not been included here. What is included are materials that have become available since the original publication and pertinent literature that had originally been overlooked. Accompany this updated bubliography are index maps that show locations of geologic studies and geochemical petrographic, remanent paleomagnetic, and radiometric age-dated sites within the Columbia River Basalt Group field within Idaho; also identified are archeological sites, test wells, mines, quarries, and other types of excavations. References on the index maps are keyed to the bibliography and cover the Spokane, Pullman, Hamilton, Grangeville, Elk City, Baker, Boise, and Jordan Valley Army Map Service two-degree quadrangles.

1821 (RHO-BWI-C--70) HYDROTHERMAL INTERACTIONS OF CESIUM AND STRONTIUM PHASES FROM SPENT UNREPROCESSED FUEL WITH BASALT PHASES AND BASALTS. Komarneni, S.; Scheetz, B.E.; McCarthy, G.J.; Coons, W.E. (Pennsylvania State Univ., University Park (USA); Atomics International Div., Richland, WA (USA). Rockwell Hanford Operations). Mar 1980. Contract AC06-77RL01030. 39p. NTIS, PC A03/MF A01.

This investigation is a segment of an extensive research program aimed at investigating the feasibility of long-term, subsurface storage of commercial nuclear waste. Specifically, it is anticipated that the waste will be housed in a repository mined from the basalt formations which lie beneath the Hanford Site. The elements monitored during the present experiments were Cs and Sr. These two elements represent significant biohazards if released from a repository and are the major heat producing radionuclides present in commercial radioactive waste. Several Cs phases and/or solutions were reacted with either isolated basalt phases or bulk-rock basalt, and the resulting solids and solutions were analyzed. The hydrothermal reactivity of $SrZrO_3$, which is believed to be a probable host for Sr in SFE was investigated. While so far no evidence exists which indicates that Sr is present in a water soluble phase in spent fuel elements (SFE), detailed investigation of a potential hazard is warranted. This investigation has determined that some Cs compounds likely to be stable components of spent fuel (i.e., CsOH, Cs_2MoO_4, $Cs_2U_2O_7$) have significant hydrothermal solubilities. These solubilities are greatly decreased in the presence of basalt and/or basalt minerals. The decrease in the amount of Cs in solution results from reactions which form pollucite and/or $CsAlSiO_4$, with the production of pollucite exceeding that of $CsAlSiO_4$. Dissolution of β-$Cs_2U_2O_7$ implies solubilizing a uranium species to an undetermined extent. The production of schoepite ($UO_3.3H_2O$) during some experiments containing basalt phases, indicates a tendency to oxidize U^{4+} to U^{6+}. When diopside (nominally $CaMgSi_2O_6$) and β-$Cs_2U_2O_7$ were hydrothermally reacted, at 300°C both UO_2 and $UO_3.3H_2O$ were produced. Results of experiments on $SrZrO_3$ show it to be an unreactive phase.

1822 (RHO-BWI-C--76) THERMAL PROPERTY MEASUREMENTS OF POMONA MEMBER BASALT FROM CORE HOLES DB-5 AND DB-15, HANFORD SITE, SOUTHEASTERN WASHINGTON. Erikson, R.L.; Krupka, K.M. (Rockwell International Corp., Canoga Park, CA (USA). Energy Systems Group). 1980. Contract AC06-77RL01030. 42p. NTIS, PC A03/MF A01.

Thermal diffusivities of dense samples of Pomona basalt from core holes DB-5 and DB-15 were calculated between 25°C and 300°C from measured values of thermal conductivity, thermal expansion, and specific heat. The bulk densities and apparent porosities of the samples studied ranged from 2.86 to 2.88 g/cm³, and 0.50 to 0.60%, respectively. Experimental values of thermal conductivity, linear thermal expansion, and specific heat were determined with a steady-state, cut-bar apparatus, a dilatometer, and a drop calorimeter, respectively. The thermal conductivity of Pomona basalt from core holes DB-5 and DB-15 increases with increasing temperature. The experimental conductivity data for these samples of Pomona basalt are adequately represented by the equations: (1) $k = (2.4 \times 10^{-3})T + 3.52$; and (2) $k = (2.5 \times 10^{-3})T + 3.79$, respectively. Thermal expansion data suggest that the tested samples of Pomona basalt expand linearly between 100°C and 300°C; the expansion coefficients for these samples are in the range 2.0 to 3.0 x 10^{-6}/°C. There are no significant differences in the values of relative enthalpies measured by drop calorimetry for Pomona basalt from core holes DB-5 and DB-15. Consequently, the specific heats as a function of temperature of both basalts are identical. A Maier-Kelley equation which represents the specific heat of Pomona basalt between 25°C and 350°C was derived from the relative enthalpy measurements: $Cp = 0.306216 - (2.58056 \times 10^{-5})T - (1.15331 \times 10^{4})T^{-2}$. The calculations of thermal diffusivity for the samples of Pomona basalt from core holes DB-5 and DB-15 imply a small decrease in diffusivity as a function of temperature between 25°C and 300°C. The approximate range of diffusivity values for these samples of basalt calculated between 25°C and 300°C is 8.0 to 5.8.

1823 (RHO-BWI-CD--2(Rev.1)) NUCLEAR WASTE REPOSITORY IN BASALT: PRECONCEPTUAL DESIGN GUIDELINES. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Jun 1979. Contract EY-77-C-06-1030. 192p. Dep. NTIS, PC A09/MF A01.

The development of the basalt waste

isolation program parallels the growing need for permanent, environmentally safe, and secure means to store nuclear wastes. The repository will be located within the Columbia Plateau basalt formations where these ends can be met and radiological waste can be stored. These wastes will be stored such that the wastes may be retrieved from storage for a period after placement. After the retrieval period, the storage locations will be prepared for terminal storage. The terminal storage requirements will include decommissioning provisions. The facility boundaries will encompass no more than several square miles of land which will be above a subsurface area where the geologic makeup is primarily deep basaltic rock. The repository will receive, from an encapsulation site(s), nuclear waste in the form of canisters (not more than 18.5 feet x 16 inches in diameter) and containers (55-gallon drums). Canisters will contain spent fuel (after an interim 5-year storage period), solidified high-level wastes (HLW), or intermediate-level wastes (ILW). The containers (drums) will package the low-level transuranic wastes (LL-TRU). The storage capacity of the repository will be expanded in a time-phased program which will require that subsurface development (repository expansion) be conducted concurrently with waste storage operations. The repository will be designed to store the nuclear waste generated within the predictable future and to allow for reasonable expansion. The development and assurance of safe waste isolation is of paramount importance. All activities will be dedicated to the protection of public health and the environment. The repository will be licensed by the US Nuclear Regulatory Commission (NRC). Extensive efforts will be made to assure selection of a suitable site which will provide adequate isolation.

1824 (RHO-BWI-CD--22(Rev.1)) PRECONCEPTUAL DESIGN MANAGEMENT PLAN BASALT WASTE ISOLATION PROGRAM BASALT REPOSITORY. Marron, J.F. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). 10 Nov 1978. Contract EY-77-C-06-1030. 25p. Dep. NTIS, PC A02/MF A01.

The repository in Columbia Plateau basalt will receive nuclear waste in canisters (spent fuel, HLW, and ILW) and drums (low-level waste). This document establishes the management plan for the preconceptual design of the basalt repository. (DLC)

1825 (RHO-BWI-CD--35) NUCLEAR WASTE REPOSITORY IN BASALT PROJECT B-301 PRECONCEPTUAL DESIGN REPORT. (Rockwell International Corp., Richland, WA (USA). Energy Systems Group). Feb 1980. Contract AC06-77RL01030. 730p. NTIS, PC A99/MF A01.

The functions and design requirements are consistent with the DOE initially approved functional design criteria. The reference preconceptual design meets the initially approved criteria with two significant exceptions. Codes, standards, and regulations governing the design are summarized. Many design criteria are yet to be determined. Documentation regarding the nuclear waste forecast used (namely 380 GWe in the year 2000) is presented. This forecast provides a conservative basis for repository sizing, budgeting, risk assessment, and license planning during the early design stages and was used in preference to more recent forecasts. Each part of the report is presented in terms of the preconceptual waste breakdown structure (WBS) elements so that the schedules and cost estimates correlate with the design descriptions. The preconceptual WBS used is presented. The WBS will be modified and expanded during the conceptual design, consistent with the heirarchy of physical elements, project phases, organizational responsibilities, and funding categories. The WBS and its further expansions will govern the development of the system design description, project schedule, and cost estimate. Designs are available for nuclear waste repositories in several geologic mediums in the United States and elsewhere. To assure maximum technology transfer, designs and criteria for these other repositories have been reviewed. Key design parameters for a repository in basalt are compared with those for repositories in other geologic media. Repositories in different geologic media differ primarily in their subsurface features. Consequently, design emphasis was placed on the shafts, subsurface facilities, and subsurface systems. Rock mechanics and trade studies are included, documenting significant subsurface design features, alternatives considered.

1826 (RHO-BWI-CD--42) RESEARCH BOREHOLE DRILLING ACTIVITY FOR BOREHOLES DH-18, DH-19, DC-12, DC-13, DC-14, DC-15, AND DEEPENING OF EXISTING BOREHOLE DC-7. (Atomics International Div., Richland, WA (USA). Rockwell Hanford Operations). Sep 1979. Contract AC06-77RL01030. 27p. NTIS, PC A03/MF A01.

This report is an environmental evaluation of the impacts of proposed borehole drilling activities at the Hanford Site, northwest of Richland, Washington. The proposed action is to drill six research boreholes ranging in depth from 137 to 1372 meters (m) [250 to 4500 +- feet (ft)]. In addition, an existing borehole (DC-7) will be extended from 1249 to 1524 m (4099 to 5000 +- ft). The purpose of the US Department of Energy's (DOE) borehole drilling activities is to collect data on in situ rock formations that are considered potentialy suitable for nuclear waste repositories. The technical program efforts necessary to identify and qualify specific underground waste facility sites in candidate rock formations include geologic and hydrologic studies (seismicity and tectonics, rock structure and stratigraphy, lithology, etc.). Borehole drilling is an integral part of the geological studies and is essential to a thorough understanding of potentially suitable geologic formations. The purpose of the proposed drilling activities is to obtain data for evaluating Columbia River basalts that are being evaluated by the National Waste Terminal Storage (NWTS) Program to determine their suitability potential for nuclear waste repositories. Unavoidable impact to the environment is limited primarily to the clearing of land needed for access and drilling operations. Considerations exercised during site preparation, drilling, and subsequent site restoration will limit modification of the natural environment to the minimum required for accomplishment of test objectives.

1827 (RHO-BWI-LD--19) TECHNICAL REQUIREMENTS FOR QUALIFICATION OF A POTENTIAL NUCLEAR WASTE REPOSITORY SITE IN BASALT. Johnson, R.E.; Deju, R.A. (Rockwell International Corp., Palo Alto, CA (USA). Energy Systems Group). Sep 1979. Contract AC06-77RL01030. 27p. NTIS, PC A03/MF A01.

A site identification study has been conducted to identify and categorize a number of candidate sites that appear to be suitable for the location of a repository for radioactive waste on the Hanford Site. Three objectives were defined as a basis for the selection of guidelines for screening. These

were: (1) maximize public health and safety; (2) minimize adverse environmental and socioeconomic impact; and (3) minimize system costs. For each objective, appropriate considerations were identified; a guideline for which would be the delineation of progressively smaller siting areas and sites that may be suitable for locating a repository. This document is designed to be used as the reference framework for guiding the qualification of identified sites in lieu of formal NRC-issued criteria. As such, it will serve as a framework for guiding our research and development effort. A site will be considered qualified when, having been characterized in detail, it is demonstrated to meet these requirements and thus can be offered for formal licensing by the NRC.

1828 (RHO-BWI-LD--22) SITE IDENTIFICATION PRESENTATION: BASALT WASTE ISOLATION PROJECT. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Nov 1979. Contract EY-77-C-06-1030. 77p. Dep. NTIS, PC A05/MF A01.

The final step in the site identification process for the Basalt Waste Isolation Project is described. The candidate sites are identified. The site identification methodology is presented. The general objectives which must be met in selecting the final site are listed. Considerations used in the screening process are also listed. Summary tables of the guidelines used are included. (DMC)

1829 (RHO-BWI-LD--23) FUNCTIONS OF AN ENGINEERED BARRIER SYSTEM FOR A NUCLEAR WASTE REPOSITORY IN BASALT. Coons, W.E.; Moore, E.L.; Smith, M.J.; Kaser, J.D. (Atomics International Div., Richland, WA (USA). Rockwell Hanford Operations). Jan 1980. Contract AC06-77RL01030. 35p. NTIS, PC A03/MF A01.

Defined in this document are the functions of components selected for an engineered barrier system for a nuclear waste repository in basalt. The definitions provide a focal point for barrier material research and development by delineating the purpose and operative lifetime of each component of the engineered system. A five-component system (comprised of waste form, canister, buffer, overpack, and tailored backfill) is discussed in terms of effective operation throughout the course of repository history, recognizing that the emplacement environment changes with time. While components of the system are mutually supporting, redundancy is provided by subsystems of physical and chemical barriers which act in concert with the geology to provide a formidable barrier to transport of hazardous materials to the biosphere. The operating philosophy of the conceptual engineered barrier system is clarified by examples pertinent to storage in basalt, and a technical approach to barrier design and material selection is proposed. A method for system validation and qualification is also included which considers performance criteria proposed by external agencies in conjunction with site-specific models and risk assessment to define acceptable levels of system performance.

1830 (RHO-BWI-SA--19) STATUS REPORT ON STUDIES TO ASSESS THE FEASIBILITY OF STORING NUCLEAR WASTE IN COLUMBIA PLATEAU BASALTS. Deju, R.A. (Atomics International Div., Richland, WA (USA). Rockwell Hanford Operations). Jul 1979. Contract EY-77-C-06-1030. 18p. (IAEA-SM--243/36; CONF-790711--5). Dep. NTIS, PC A02/MF A01.

From International symposium on underground disposal of radioactive wastes; Otaniemi, Finland (2 Jul 1979).

Basalts, such as the Columbia Plateau basalts, which underlie a large portion of the Pacific Northwest and the Hanford Site, were selected for initial geologic reconnaissance. Geologic exploration of Columbia Plateau basalts was needed to determine the feasibility of utilizing those formations as a site for terminal storage of commercial nuclear waste. The Basalt Waste Isolation Program within Rockwell Hanford Operations has been chartered with the responsibility of conducting these investigations. This program is divided into systems integration, geology, hydrology, engineered barriers studies, engineering testing, and the construction of a near-surface test facility.

1831 (RHO-BWI-SA--20) NUMERICAL MODELING OF THE GEOMECHANICAL RESPONSE OF A ROCK MASS TO A RADIOACTIVE WASTE REPOSITORY. Hardy, M.P.; St. John, C.M.; Hocking, G. (Minnesota Univ., Minneapolis (USA). Mineral Resources Research Center; Dames and Moore, Boston, MA (USA)). Jun 1979. Contract EY-76-C-06-2130. 16p. (CONF-790944--1). Dep. NTIS, PC A02/MF A01.

From 4. international congress on rock mechanics; Montreux, Switzerland (2 Sep 1979).

Geotechnical numerical models capable of predicting the thermomechanical response and groundwater movements around an underground radioactive waste repository are vital to the success of the nuclear waste disposal program. In the absence of directly related engineering experience, the design, risk assessment, and licensing procedures of a repository will be reliant on predictions made using such models. This paper reviews models being used to assist in repository design and summarizes the results of a recent parametric study of underground disposal in basaltic rocks. On the basis of preliminary site data, it is concluded that the allowable areal density of heat-generating waste will be controlled by the stability of placement rooms and the boreholes in which waste canisters are placed. Regional effects including thermally induced upward groundwater flow, appear to present less severe problems.

1832 (RHO-BWI-SA--21) BASALT NEAR-SURFACE TEST FACILITY TEST PLANS. Krug, A.D. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Jun 1979. Contract EY-77-C-06-1030. 15p. (CONF-790683--2). Dep. NTIS, PC A02/MF A01.

From ONWI-LLL workshop on thermomechanical modeling for a hard rock repository; Berkeley, CA, USA (25 Jun 1979).

The NSTF is under construction at Gable Mountain for in-situ testing, which will be conducted in two phases: Phase I, using electric heaters to simulate nuclear waste canisters in order to study the thermomechanical response of basalt; and Phase II, using spent fuel canisters. The tests planned for Phases I and II are described. (DLC)

1833 (RHO-BWI-SA--25) STATUS REPORT ON STUDIES TO ASSESS THE FEASIBILITY OF STORING NUCLEAR WASTE IN COLUMBIA PLATEAU BASALTS. Deju, R.A.; Evans, G.C. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Nov 1979. Contract EY-77-C-06-1030. 13p. (CONF-791033--2; CONF-791112--44). Dep. NTIS, PC A02/MF A01.

From 1. annual ONWI information meeting; Columbus, OH, USA (30 Oct 1979).

The Basalt Waste Isolation Project, is part of the National Waste Terminal Storage Program. The program, as presently structured, is aimed at assessing the feasibility and providing the technology needed to design and construct a repository for storage of commercial radioactive waste in the extensive basalts beneath the Hanford Site of the United States Department of Energy. The program is presently in the research and development phase to assess feasibility. Geologic site selection studies are to be completed in September 1981, to allow a feasibility decision at that time, whereupon if feasibility is proven and the United States Department of Energy goes forward with the project, we would move into the licensing phase of the project. Ultimately, it would be up to the United States Nuclear Regulatory Commission to grant a construction license and, later on, an operating license. During the research and development phase, the program includes seven areas of study; namely, geosciences, hydrology multiple engineered barriers, test facility design and construction, engineering testing, systems integration, and preliminary repository engineering design. The progress made to date in each of these areas is detailed.

1834 (RHO-BWI-SA--29) RATE OF DEFORMATION IN THE PASCO BASIN DURING THE MIOCENE AS DETERMINED BY DISTRIBUTION OF COLUMBIA RIVER BASALT FLOWS. Reidel, S.P.; Ledgerwood, R.K.; Myers, C.W.; Jones, M.G.; Landon, R.D. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Mar 1980. Contract EY-77-C-06-1030. 43p. (CONF-800342--1). Dep. NTIS, PC A03/MF A01.

From 76. annual meeting Cordilleran Section Geological Society of America; Corvallis, OR, USA (19 Mar 1980).

Detailed mapping of over 8000 square kilometers and logs from 20 core holes were used to determine the distribution and thickness of basalt flows and interbeds in the Pasco Basin. The data indicate the high-MgO Grande Ronde Basalt and Wanapum Basalt thicken from the northeast to the southwest. Deformation began in late Frenchman Springs time in the Saddle Mountains along a northwest-southeast trend and in Roza time along an east-west trend. By late Wanapum time, basalt flows were more restricted on the east side. Saddle Mountains Basalt flows spread out in the basin from narrow channels to the east. The Umatilla Member entered from the southeast and is confined to the south-central basin, while the Wilbur Creek, Asotin, Esquatzel, Pomona, and Elephant Mountain Members entered from the east and northeast. The distribution of these members is controlled by flow volume, boundaries of other flows, and developing ridges. The Wilbur Creek, Asotin, and Esquatzel flows exited from the basin in a channel along the northern margin of the Umatilla flow, while the Pomona and Elephant Mountain flows exited between Umtanum Ridge and Wallula Gap. The thickness of sedimentary interbeds and basalt flows indicated subsidence and/or uplift began in post-Grande Ronde time (14.5 million years before present) and continued through Saddle Mountains time (10.5 million years before present). Maximum subsidence occurred 40 kilometers (24 miles) north of Richland, Washington with an approximate rate of 25 meters (81 feet) per million years during the eruption of the basalt. Maximum uplift along the developing ridges was 70 meters (230 feet) per million years.

1835 (RHO-BWI-SA--30) STRAIN DISTRIBUTION AND MODEL FOR FORMATION OF EASTERN UMTANUM RIDGE ANTICLINE, SOUTH-CENTRAL WASHINGTON. Price, E.H. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Oct 1979. Contract EY-77-C-06-1030. 27p. (CONF-800342--3). Dep. NTIS, PC A03/MF A01.

From 76. annual meeting Cordilleran Section Geological Society of America; Corvallis, OR, USA (19 Mar 1980).

Umtanum Ridge in south-central Washington is the topographic expression of a complex anticline within the Yakima Fold system in the Miocene Columbia River Basalt Group. The Yakima Fold system, which is partly contained within the Hanford Site, is an example of a layered basalt sequence folded near the surface of the earth. The Pasco Basin stratigraphic nomenclature is used in this repot. Rockwelll Hanford Operations, under contract to the US Department of Energy, is investigating the feasibility of therminal high-level nuclear waste storage in mined repositories in basalt beneath the Hanford Site. Because thereis essentially no basalt within the Site that has not been involved in some folding, any potential location for a repository will be either on the limbs or near the hinge zone of a Yakima Fold structure. Umtanum Ridge is the best exposed Yakima Fold structure in the vicinity of the Site for studying the nature and three-dimensional style of deformation of a multilayered basalt sequence. The structural geometry, distribution of strain within the Umtanum structure and deformational mechanisms of the Umtanum Ridge are discussed.

1836 (RHO-BWI-SA--32) CHEMICAL STRATIGRAPHY OF GRANDE RONDE BASALT, PASCO BASIN, SOUTH-CENTRAL WASHINGTON. Long, P.E.; Ledgerwood, R.K.; Myers, C.W.; Reidel, S.P.; Landon, R.D.; Hooper, P.R. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Feb 1980. Contract EY-77-C-06-1030. 33p. (CONF-800342--2). Dep. NTIS, PC A03/MF A01.

From 76. annual meeting Cordilleran Section Geological Society of America; Corvallis, OR, USA (19 Mar 1980).

Grande Ronde Basalt in the Pasco Basin, south-central Washington, can be subdivided into three chemical types and two chemical subtypes based on x-ray fluorescence major element analysis of samples from seven deep core holes and three surface sections. These chemical types are: (1) high-Mg Grande Ronde chemical type; (2) low-Mg Grande Ronde chemical type; (3) low-K (very high-Mg.) Grande Ronde chemical type; and (4) Umtanum Grande Ronde chemical subtype. A possible fifth subdivision is the McCoy Canyon Grande Ronde chemical subtype. The Umtanum and the McCoy Canyon subtypes are both single flows which belong to the low Mg and high-Mg chemical types, respectively. These subdivisions are all distinguished on a plot of MgO versus TiO_2 and/or MgO versus P_2O_5, but other major and minor elements, as well as trace elements, also reflect consistent chemical differences between the chemical types. Identification of these chemical types in the Pasco Basin subsurface shows that the high-Mg and low-Mg chemical types are ubiquitous, but the low-K chemical type is limited to the central, southern, and eastern parts of the basin. The Umtanum chemical subtype is present throughout the Pasco Basin subsurface, although it thins in the northeastern part of the basin and is apparently absent from surface exposures 40 kilometers (25 miles) north of the basin. The McCoy Canyon chemical subtype is also present throughout the basin.

1837 (RHO-BWI-SA--43) LANDSAT DATA AS A BASIS FOR REGIONAL ENVIRONMENTAL ASSESSMENT WITHIN THE COLUMBIA PLATEAU. Leonhart, L.S.; Stephan, J.G. (Atomics International Div., Richland, WA (USA). Rockwell Hanford Operations; Battelle Pacific Northwest Labs., Richland, WA (USA)). May 1980. Contract AC06-77RL01030. 19p. (CONF-800577--1). NTIS, PC A02/MF A01.

From 6. Canadian symposium on remote sensing; Halifax, Canada (21 May 1980).

LANDSAT data are being used to assist in classifying land cover for the purpose of providing regional environmental assessments of a 105,000 km² area within the Columbia Plateau region of the northwestern United States. The environmental assessment is being performed in conjunction with siting a radioactive waste terminal-storage facility within the federally operated Hanford Site in south-central Washington. Initial assessments involved classification of four contiguous LANDSAT scenes recorded over the region during the summer of 1975 and about 300 1978 high-altitude (U-2) photographs. The resulting mosaic was segregated into ten land-cover classes. The classified land-cover data were then machine-integrated with digital irrigation well-location data taken from the US Geological Survey's Ground-Water Site Inventory. The resulting groundwater multi-source data product was required by hydrologists to segregate potential artificial recharge areas from artificial groundwater discharge areas. Related studies have employed LANDSAT data and aerial imagery to identify linear structures and other geologic features which may have a significant bearing on the tectonic and/or hydrologic setting of the Columbia Plateau. Future plans call for attempts to correlate land-cover patterns with other physical and environmental parameters such as digital terrain and hydrometeorological data.

1838 (RHO-BWI-SA--49) BASALT WASTE ISOLATION PROJECT BOREHOLE PLUGGING STUDIES: AN OVERVIEW. Smith, M.J.; McCarel, S.C. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). 1980. Contract AC06-77RL01030. 14p. (CONF-800527--7). NTIS, PC A02/MF A01.

From International BHP symposium; Columbus, OH, USA (7 May 1980).

The objective of the Basalt Waste Isolation Project (BWIP) is to establish the feasibility of constructing a geologic repository for commercial high-level nuclear waste in the basalt flows within the Columbia Plateau and to provide the technology needed for design and construction of such a facility. The success of a repository located in basalt is dependent upon the ability to seal the facility at the end of the operational period. Therefore, a borehole plugging study is being conducted by the engineered barriers group of the BWIP in order to develop,test, and demonstrate materials, equipment, and techniques for plugging the various man-made openings (boreholes, shafts, and tunnels) in and around the repository. These plugs are intended to severely restrict groundwater transport of toxic materials by both chemical and physical retardation. Verification of engineered plug system designs is accomplished through a proposed series of field tests and demonstrations.

1839 (RHO-BWI-SA--50) SEALING A NUCLEAR WASTE REPOSITORY IN COLUMBIA RIVER BASALT: PRELIMINARY RESULTS. Hodges, F.N.; O'Rourke, J.E.; Anttonen, G.J. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations; Woodward-Clyde Consultants, San Francisco, CA (USA)). 1980. Contract AC06-77RL01030. 21p. (CONF-800527--6). NTIS, PC A02/MF A01.

From International BHP symposium; Columbus, OH, USA (7 May 1980).

The long containment time required of repositories for nuclear waste (10^4 to 10^6 years) requires that materials used for repository seals be stable in the geologic environment of the repository and of proven longevity. A list of candidate materials for sealing a repository in Columbia River basalts has been prepared and refined through laboratory testing. The most feasible techniques for emplacing preferred plug materials have been identified and the resultant plugs have been evaluated on the basis of design functions. Preconceptual designs for tunnel, shaft, and borehole seals consist of multiple zone plugs with each zone fulfilling one or more design functions. Zones of disturbed rock around tunnels and shafts, resulting from excavation and subsequent stress release, are zones of higher permeability and of possible fluid migration. In preliminary designs the disturbed zones are blocked by cut-off collars filled with low permeability materials.

1840 (RHO-BWI-SA--51) TECHNICAL APPROACH TO RESOLVING ISSUES ON ROCK MECHANICS AS APPLIED TO DEVELOPMENT OF A NUCLEAR WASTE REPOSITORY IN A CRYSTALLINE ROCK FORMATION. Case, J.B. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Mar 1980. Contract AC06-77RL01030. 25p. (CONF-800377--1). NTIS, PC A02/MF A01.

From Meeting on radioactive waste storage in mined caverns; Stockhol, Sweden (4 Mar 1980).

This paper summarizes the technical efforts for resolving issues on rock mechanics as applied to development of a nuclear waste repository in a crystalline rock formation. This section provides background information and definitions pertinent to rock mechanics. Section 2.0 presents the rock mechanics issues related to licensing, design, and construction of a waste repository. Section 3.0 presents the technical approach to the resolution of issues and concludes that a multi-faceted approach involving principally site characterization, laboratory testing, numerical modeling and analysis, and in situ testing and monitoring is required. While this technical approach is directed to further scientific understanding and quantification of the phenomena involved accompanying the thermal heating of rock from nuclear waste, it is emphasized that formulation of a design basis for an engineered rock structure will precede the development of a large waste repository. Section 4.0 summarizes the status of resolution activities in the areas of thermomechanical effects, coupled thermal, mechanical, and hydrological phenomena, mine-induced fracturing, mine stability, and seismicity. Section 5.0 gives a concluding statement. Under the present project plans, technical activities are proceeding on multiple fronts involving field, laboratory, and numerical modeling and analysis studies of the important phenomena related to the disposal of radioactive waste in crystalline rock. The advancement of the state of the art in rock mechanics from these activities will culminate in the risk analysis and the formulation of a design basis for repositories.

1841 (RHO-BWI-SA--66) EVALUATION OF PRECONCEPTUAL PLUG DESIGNS USING EXPERTS' JUDGEMENT. Sioshansi, F.P.; O'Rourke, J.E. (Woodward-Clyde Consultants, San Francisco, CA

(USA)). Mar 1980. Contract AC06-77RL01030. 35p. (CONF-801106--1). NTIS, PC A03/MF A01.
From American Institute for Decision Sciences conference; Las Vegas, NV, USA (5 Nov 1980).
A number of preconceptual plug designs for an underground nuclear waste repository were to be evaluated based on the available information on plug materials and placement techniques. Because of complex environment and loading conditions, long time frame under consideration, rigid performance characteristics and considerable uncertainties present in preconceptual design and material properties, a qualitative and judgmental evaluation procedure was needed to supplement technical studies. A structured procedure was developed to qualitatively capture evaluator's views and reservations on the proposed preconceptual schemes. Since a thorough evaluation of each proposed plug scheme required in-depth experience and familiarity with many components of the plug, three knowledgeable experts with specialties in the most relevant aspects of the problem were independently interviewed. Each plug scheme was broken down into three subcomponents and each subcomponent was evaluated separately. The proposed schemes were then rated taking their subcomponents into consideration. Because the experts had different specialties, their subcomponent and overall ratings were not in full agreement. Each plug scheme's lowest overall rating was used as the most significant determinant of the judgmental preference categories reported in this study. The approach used discriminated between the proposed schemes for those with highest probability of being successful. The most preferred schemes were then reviewed with respect to the data produced in the technical analysis performed during the project. The results of the judgmental analysis were then synthesized and modified with results of the technical analysis to produce the preconceptual plug designs.

1842 (RHO-BWI-ST--7) ENGINEERED BARRIER DEVELOPMENT FOR A NUCLEAR WASTE REPOSITORY IN BASALT: AN INTEGRATION OF CURRENT KNOWLEDGE. Smith, M.J. (Rockwell International Corp., Canoga Park, CA (USA). Energy Systems Group). May 1980. Contract AC06-77RL01030. 647p. NTIS, PC A99/MF A01.
This document represents a compilation of data and interpretive studies conducted as part of the engineered barriers program of the Basalt Waste Isolation Project. The overall objective of these studies is to provide information on barrier system designs, emplacement and isolation techniques, and chemical reactions expected in a nuclear waste repository located in the basalts underlying the Hanford Site within the state of Washington. Backfills, waste-basalt interactions, sorption, borehole plugging, etc., are among the topics discussed.

1843 (RHO-BWI-ST--8) NEAR-SURFACE TEST FACILITY. PHASE I. GEOLOGIC SITE CHARACTERIZATION REPORT. Moak, D.J.; Wintczak, T.M. (Rockwell International Corp., Richland, WA (USA). Energy Systems Group). Aug 1980. Contract AC06-77RL01030. 234p. NTIS, PC A11/MF A01.
The report is a description of the geology and characterization of the rock mass of the area in which the Phase I qualification tests at the Near-Surface Test Facility (NSTF) are being performed. The NSTF is located on Gable Mountain within the Hanford Site near Richland, Washington. It is located in the entablature of the Pomona Member, an upper flow in the Columbia River Basalt Group, and is approximately 150 feet (47.5 meters) below the surface. Core logging from the instrument boreholes coupled with joint mapping, statistics, and other test data provided the basis for a detailed characterization of the 16-foot x 20-foot x 28-foot (5-meter x 6-meter x 9-meter) rock masses surrounding Full-Scale Heater Tests No. 1 and No. 2. The Pomona entablature contains three joint sets delineated by their degree of dip, each with apertures averaging 0.25 millimeter and having no preferred strike orientation. Although joint frequencies in the study area exceed 4 joints per foot (13 per meter), the rock-mass classification rating is good.

1844 (RHO-BWI-ST--9) IDENTIFICATION OF KEY RADIONUCLIDES IN A NUCLEAR WASTE REPOSITORY IN BASALT. Barney, G.S.; Wood, B.J. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). May 1980. Contract AC06-77RL01030. 33p. NTIS, PC A03/MF A01.
Radionuclides were identified which appear to pose the greatest potential hazard to man during long-term storage of nuclear waste in a repository mined in the Columbia Plateau basalt formation. The criteria used to select key radionuclides were as follows: quantity of radionuclide in stored waste; biological toxicity; leach rate of the wastes into groundwater; and transport rate via groundwater flow. The waste forms were assumed to be either unreprocessed spent fuel or borosilicate glass containing reprocessed high-level waste. The nuclear waste composition was assumed to be that from a light water reactor. Radionuclides were ranked according to quantity, toxicity, and release rate from the repository. These rankings were combined to obtain a single list of key radionuclides. The ten most important radionuclides in order of decreasing hazard are: ^{99}Tc, ^{129}I, ^{237}Np, ^{226}Ra, ^{107}Pd, ^{230}Th, ^{210}Pb, ^{126}Sn, ^{79}Se, and ^{242}Pu. Safety assessment studies and the design of engineered barriers should concentrate on containment of radionuclides in this list.

1845 (RHO-C--22) STRENGTH AND ELASTIC PROPERTIES OF CONCRETES FROM WASTE TANK FARMS. Gillen, M. (Portland Cement Association, Skokie, IL (USA). Construction Technology Labs.). Dec 1978. Contract EY-77-C-06-1030. 59p. Dep. NTIS, PC A04/MF A01.
Tests were conducted on concretes from Hanford Waste Tank Farms, and on concrete cast by the Portland Cement Association using Hanford mix designs and materials. Elastic modulus (static method), Poisson's ratio, and compressive and splitting tensile strengths were determined at room temperature, and for specimens maintained at 250F for varying lengths of time. Variables examined were temperature, length of exposure to elevated temperature, and geometry of test specimens. Compressive strength generally decreased after specimens were exposed to heat. Maximum losses were 20 to 33 percent of room temperature strength. Initially stronger concretes lost a proportionately larger percentage of their strength after exposure than did weaker concrete. In some series, concrete appeared to gain strength after exposure. In other series, concrete initially lost strength, then recovered strength after prolonged heating. Splitting tensile strength of heated specimens followed trends similar to those obtained for compressive strength. Highest strength losses were about 40 percent. However, in most cases, considerably less strength deterioration resulted from exposure to heat. Modulus of

elasticity and Poisson's ratio also decreasd after exposure to heat. Greatest losses were about 40 percent of room temperature values, but amounts differed widely among test series.

1846 (RHO-C--28) ELASTIC AND STRENGTH PROPERTIES OF HANFORD CONCRETE MIXES AT ROOM AND ELEVATED TEMPERATURES. Abrams, M.S.; Gillen, M.; Campbell, D.H. (Portland Cement Association, Skokie, IL (USA). Construction Technology Labs.). Mar 1979. Contract EY-77-C-06-1030. 111p. Dep. NTIS, PC A06/MF A01.

The effects of long-term exposure to elevated temperatures on the physical properties of concrete mixes used in Hanford radioactive waste storage tanks were determined. Temperature had a significant effect on the elastic modulus of concretes. Poisson's ratio determined by the sonic method remained relatively constant. The splitting tensile strength increased rapidly up to 190 days of age. Then strength decreased to about 350 days and either leveled off or increased from that point on. Compressive strength data were erratic. (FS)

1847 (RHO-C--39) COMPARISON OF THE MICROSTRUCTURE OF HANFORD TYPE II CONCRETE STRUCTURES AND TEST SPECIMENS. Daniel, J.L.; Buck, A.D. (Battelle Pacific Northwest Labs., Richland, WA (USA); Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations; Corps of Engineers, Vicksburg, MS (USA). Waterways Exeriment Station). Apr 1980. Contract AC06-77RL01030. 96p. NTIS, PC A05/MF A01.

High-level radioactive waste from the current waste management operation at Hanford is stored in underground reinforced concrete tanks with a steel liner on the sides and bottom. The removal of pumpable liquid results in a moist salt-cake of sodium salts that is relatively immobile compared to its original liquid state. Additional immobilization and isolation techniques are being studied to further improve waste isolation and containment. Retrieval of the waste and permanent disposal will be deferred until a permanent disposal mode and location is selected. The integrity of the storage tanks is of critical importance during this interim period. Technical studies and laboratory tests have been performed to determine the effect of the stored waste's temperatures and chemistry on the reinforced concrete's strength and elastic properties. However, relatively little attention has been given to studying or predicting very long-term behavior based on short-term specimen examination. This report describes the results of the first phase of a laboratory program for which the ultimate goal is the ability to predict the probable condition of Hanford Type II concrete structures after 100 years of more of lifetime. The purpose of this phase was the evaluation of the microstructure of several existing test and field samples of Hanford concrete, and to correlate microstructural data with the physical test measurements on hand from other programs and tasks.

1848 (RHO-CD--34-4Q) RADIOACTIVE LIQUID WASTE DISCHARGED TO GROUND IN THE 200 AREAS DURING 1977. Anderson, J.D.; Poremba, B.E. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). 20 Mar 1978. Contract AC06-77RL01030. 233p. NTIS, PC A11/MF A01.

An overall summary is presented giving the radioactive liquid wastes discharged to ground during 1977 and since start-up (for both total and decayed depositions) within the Rockwell Hanford Operations control zone (200 Area plateau). Overall summaries are also presented for 200 East Area and for 200 West Area. The data contain an estimate of the radioactivity discharged to individual ponds, cribs and specific retention sites during 1977 and from startup through December 31, 1977; an estimate of the decayed activities from startup through 1977; the location and reference drawings of each disposal site; and the usage dates of each disposal site. The estimates for the radioactivity discharged to the ponds also includes major nonradioactive streams. The waste discharged during 1977 to each active disposal site are detailed on a month-to-month basis, along with the monthly maximum concentration and average concentration data.

1849 (RHO-CD--78-34-4Q) RADIOACTIVE LIQUID WASTES DISCHARGED TO GROUND IN THE 200 AREAS DURING 1978. Anderson, J.D.; Poremba, B.E. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). 26 Mar 1979. Contract EY-77-C-06-1030. 235p. Dep. NTIS, PC A11/MF A01.

Portions of document are illegible.

This document is issued quarterly for the purpose of summarizing the radioactive liquid wastes that have been discharged to the ground in the 200 Areas. In addition to data for 1978, cumulative data since plant startup are presented. Also, in this document is a listing of decayed activity to the various plant sites.

1850 (RHO-CD--78-35-4Q) RADIOACTIVITY IN GASEOUS WASTE DISCHARGED FROM THE SEPARATIONS FACILITIES DURING 1978. Anderson, J.D.; Poremba, B.E. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). 30 Mar 1979. Contract EY-77-C-06-1030. 25p. Dep. NTIS, PC A02/MF A01.

This document is issued quarterly for the purpose of summarizing the radioactive gaseous wastes that are discharged from the facilities of the Rockwell Hanford Operations. Data on alpha and beta emissions during 1978 are presented where relevant to the gaseous effluent. Emission data are not included on gaseous wastes produced within the 200 Areas by other Hanford contractors.

1851 (RHO-CD--79-34-4Q) RADIOACTIVE LIQUID WASTES DISCHARGED TO GROUND IN THE 200 AREAS DURING 1979. Sliger, G.J. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). 6 Mar 1980. Contract AC06-77RL01030. 227p. NTIS, PC A11/MF A01.

An overall summary is presented giving the radioactive liquid waste discharged to the ground during the current year of 1979 and since startup (for both total and decayed depositions) with the Rockwell Hanford Operations (Rockwell) control zone (200 Area plateau). Overall summaries are also presented for 200 East and for 200 West Area. The data contains an estimate of the radioactivity discharged to individual ponds, cribs and specific retention sites during the following periods: (1) All four quarters of 1979; and (2) from startup through December 31, 1979. The location and reference drawings of each disposal site, and the usage dates of each disposal site are given. The estimates for the radioactivity discharged to the ponds also include major nonradioactive streams. The waste discharged during 1979 to each active disposal site is detailed on a month-to-month basis, along with the monthly maximum concentration and average concentration data.

1852 (RHO-CD--132(Rev.4)) TECHNICAL PROGRAM PLAN, BASALT WASTE ISOLATION PROJECT. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). 19 Oct 1979. Contract EY-77-C-06-1030. 60p. Dep. NTIS, PC A04/MF A01.

The Basalt Waste Isolation Program covers all activities necessary to assess the feasibility and provide the technology needed to design and construct a nuclear waste repository in basalt. The program is divided into the following areas: program management; systems integration; scientific technology; near-surface test facility; and repository studies. The program is discussed in detail.

1853 (RHO-CD--132(Rev.5)) TECHNICAL PROGRAM PLAN, BASALT WASTE ISOLATION PROJECT. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Dec 1979. Contract AC06-77RL01030. 128p. NTIS, PC A07/MF A01.

The Basalt Waste Isolation Project (BWIP) program as administered by the DOE's Richland Operations Office and Rockwell Hanford Operations is described. The objectives, scope and scientific technologies are discussed. The work breakdown structure of the project includes: project management and support, systems integration, geosciences, hydrology, engineered barriers, test facility design and construction, engineering testing, repository studies, and schedules. The budget of the program including operating and capital cost control is also included. (DC)

1854 (RHO-CD--773) INTERIM REPORT ON STATUS OF CONTAINMENT INTEGRITY STUDIES FOR CONTINUED IN-TANK STORAGE OF HANFORD HIGH-LEVEL DEFENSE WASTE. Mercier, P.F. (Atomics International Div., Richland, WA (USA). Rockwell Hanford Operations). Sep 1979. Contract EY-77-C-06-1030. 25p. Dep. NTIS, PC A02/MF A01.

This interim report supplements technical information reported in RHO-LD-52, Status of Containment Integrity Studies for Continued In-Tank Storage of Hanford Defense High-Level Waste, September 1978. Only new data from the continuing laboratory programs and those studies initiated in the past year are included. Analyses of waste tank concrete integrity continued through the year. Laboratory tests to determine the effect of long-term elevated temperatures on the strength and elastic properties of concrete showed that the modulus of elasticity, compressive strength, and splitting tensile strength continued to decrease as a function of temperature; Poisson's ratio was relatively unchanged. The durability tests of reinforced concrete specimens exposed to simulated waste chemicals showed no evidence of deterioration after 6 months exposure. Temperature cycling effects after 17 cycles showed little change in the compressive strength but a large reduction in the modulus of elasticity. A structural failure mode analysis was initiated to estimate the effect of constant dead load, elevated temperature, and aggressive chemicals on tank structural integrity after 100 years of waste storage. No results are presently available. A report is scheduled for completion in early 1980. An electron microscopy analysis was initiated to determine if microstructural changes in concrete can be detected which would provide a key for correlating relatively short-term laboratory data to predicting long-term structural behavior. Documented results are scheduled for late 1980.

1855 (RHO-CD--810) PRELIMINARY CRITERIA FOR SHALLOW-LAND STORAGE/DISPOSAL OF LOW-LEVEL RADIOACTIVE SOLID WASTE IN AN ARID ENVIRONMENT. Shord, A.L. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Sep 1979. Contract EY-77-C-06-1030. 81p. Dep. NTIS, PC A05/MF A01.

Preliminary criteria for shallow land storage/disposal of low level radioactive solid waste in an arid environment were developed. Criteria which address the establishment and operation of a storage/disposal facility for low-level radioactive solid wastes are discussed. These were developed from the following sources: (1) a literature review of solid waste burial; (2) a review of the regulations, standards, and codes pertinent to the burial of radioactive wastes; (3) on site experience; and (4) evaluation of existing burial grounds and practices. (DMC)

1856 (RHO-CD--882) INSPECTION AND EVALUATION OF NUCLEAR FUEL SERVICES HIGH-LEVEL WASTE STORAGE SYSTEM. PROGRAM PLAN. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Jan 1980. Contract AC06-77RL01030. 64p. NTIS, PC A04/MF A01.

The Nuclear Regulatory Commission has expressed the need for additional information concerning the condition of the high-level waste tanks at the Western New York State Nuclear Service center near West Valley, New York. This information is intended to be used in evaluating the safety of continued storage and in the development of alternatives for final disposition of the high-level waste.

1857 (RHO-CD--896) REVIEW OF CLASSIFICATION OF NINE HANFORD SINGLE-SHELL QUESTIONABLE INTEGRITY TANKS. Schulz, W.W. (comp.). (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Jan 1980. Contract EY-77-C-06-1030. 112p. Dep. NTIS, PC A06/MF A01.

Based upon this latest thorough review of the historical and current data base for Tanks 107-B, 110-B, 201-B, 101-C, 110-SX, 108-T, 111-T, 101-TY, and 112-U, Rockwell finds that Tanks 107-B, 201-B, 101-C, and 112-U should be reclassified as Confirmed Leakers. The volumes of liquid waste estimated to have leaked from these four tanks are: (1) Tank 107-B, 8,000 gallons (May 1968 to August 1969); (2) Tank 201-B, 1,200 gallons (April 1968 to June 1971); (3) Tank 101-C, 17,000 to 24,000 gallons (January 1968 to December 1969); and (4) Tank 112-U, 7,000 to 10,000 gallons (February 1969 to March 1970). Tanks 110-B, 110-SX, 108-T, 111-T, and 101-TY should continue to be classified as of Questionable Integrity.

1858 (RHO-CD--980) WASTE TANK CORE DRILLING DEMONSTRATION RESULTS. DeFigh-Price, C. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). May 1980. Contract AC06-77RL01030. 38p. NTIS, PC A03/MF A01.

In order to develop a strong data base and methodology for evaluating the structural integrity of the existing waste storage tanks, it is desirable to obtain concrete core samples from load bearing areas (the haunch, wall and footing) of actual waste tanks. The cores can be tested and compared with laboratory test data. Before cores are removed from the load bearing areas of an actual waste tank, it must be demonstrated that the drilling operation, including water control, can be safely performed. Two drilling tests were successfully

completed in the 100-F Area during February and March 1980 demonstrating the feasibility of core drilling the wall of a 1 million gallon underground waste tank. This report summarizes the results of the demonstrations.

1859 (RHO-LD--45) GRANULOMETRIC DATA 216-B CRIB FACILITIES MONITORING WELL SEDIMENTS. Fecht, K.R.; Last, G.V.; Marratt, M.C. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Mar 1978. Contract EY-77-C-06-1030. 276p. Dep. NTIS, PC A13/MF A01.

Approximately 3400 sediment samples collected during the drilling of wells in the 216-B Crib Facilities have been analyzed for grain size and calcium carbonate content. The grain size data were used to categorize the sediment samples into sediment classes. The granulometric data, the calcium carbonate data, and the sediment class of each of the 3400 sediment samples are documented in this report.

1860 (RHO-LD--71) STRATIGRAPHY OF THE LATE CENOZOIC SEDIMENTS BENEATH THE 216-A CRIB FACILITIES. Fecht, K.R.; Last, G.V.; Marratt, M.C. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Feb 1979. Contract EY-77-C-06-1030. 168p. Dep. NTIS, PC A08/MF A01.

The stratigraphy of the late Cenozoic sediments beneath the 216-A Crib Facilities is presented as lithofacies cross sections and is based on textural variations of the sedimentary sequence lying above the basalt bedrock. The primary source of data in this study is geologic information obtained from well drilling operations and geophysical logging. Stratigraphic interpretations are based primarily on textural analysis and visual examination of sediment samples and supplemented by drillers logs and geophysical logs.

1861 (RHO-LD--72) STRATIGRAPHY OF THE LATE CENOZOIC SEDIMENTS BENEATH THE 216-B AND C CRIB FACILITIES. Fecht, K.R.; Last, G.V.; Marratt, M.C. (Rockwell International Corp., Canoga Park, CA (USA). Energy Systems Group). Feb 1979. Contract EY-77-C-06-1030. 206p. Dep. NTIS, PC A10/MF A01.

The stratigraphy of the late Cenozoic sediments beneath the 216-B and C Crib Facilities is presented as lithofacies cross sections and is based on textural variations of the sedimentary sequence lying above the basalt bedrock. The primary source of data in this study is geologic information obtained from well drilling operations and geophysical logging. Stratigraphic interpretations are based primarily on textural analysis and visual examination of sediment samples and supplemented by drillers logs and geophysical logs.

1862 (RHO-LD--82) SOIL (SEDIMENT) PROPERTIES OF TWELVE HANFORD WELLS WITH GEOLOGIC INTERPRETATION. Routson, R.C.; Fecht, K.R. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Nov 1979. Contract EY-77-C-06-1030. 58p. Dep. NTIS, PC A04/MF A01.

Laboratory soil (sediment) properties were determined for twelve study wells from an area south of the Hanford 200 West Area. Properties measured included: (1) mechanical analysis; (2) porosity; (3) $CaCO_3$ content; (4) moisture content at 0.33, 1.5, and 15 bars water potential; (5) field moisture content; (6) cation exchange capacity; and (7) bulk density. Geologic, stratigraphic cross sections were prepared using the above data and previously published data for the study area.

1863 (RHO-LD--97) PROJECT PLAN FOR INSPECTION AND EVALUATION OF NUCLEAR FUEL SERVICES HIGH-LEVEL WASTE STORAGE SYSTEM. Reep, I.E. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Aug 1979. Contract EY-77-C-06-1030. 77p. Dep. NTIS, PC A05/MF A01.

Information is needed about the condition of the high-level waste tanks and their contents in the NFS West Valley, New York reprocessing facility. This project plan will inspect the two carbon steel waste tanks 8D-1 and 8D-2 and characterize and analyze the waste. Soil transport studies will also be conducted around the tanks to determine the consequences of hypothetical tank leakage. Soil thermal properties and the total heat generation rate of the high-level waste will be measured. (DLC)

1864 (RHO-LD--98) LEACHING TECHNIQUE FOR STUDYING ACTINIDE-CONTAMINATED HANFORD SEDIMENTS. Gallagher, S.A. (Atomics International Div., Richland, WA (USA). Rockwell Hanford Operations). Oct 1979. Contract AC06-77RL01030. 23p. NTIS, PC A02/MF A01.

For more than 30 years, liquid wastes containing low concentrations of actinides from chemical processing plants have been disposed directly to the ground of the Hanford Site via trenches. These liquid wastes contained trace amounts of the actinides plutonium and americium. Because these elements are biologically harmful to man, they must remain isolated from the biosphere. Therefore, the ability of the sediments to provide this protection must be studied. Assessment of the stability of the actinides in the trench sediments is necessary to evaluate the need for long-term radionuclide stabilization measures. Three possible mechanisms exist for the transport of plutonium and americium in the sediments. These are leaching, diffusion, and particulate transport. Compared to particulate transport, diffusion is generally a slow method of transport, and leaching can occur at the same time as solutions percolate through the sediments. For this reason, three leaching techniques were reviewed, and small column leaching was chosen as the best method for assessing the stability of the actinides in contaminated sediments. This method most closely approximates natural conditions and employs a realistic solution/soil ratio. Procedures are given for implementing this technique. Both the stability and the chemical form of plutonium will be studied. Data will be input to the modeling of transport of radionuclides in sediments and also input to the ongoing assessment of waste sites.

1865 (RHO-LD--100) HEAT TRANSFER ANALYSIS FOR A LOSS OF INSTITUTIONAL CONTROL EVENT AT THE WASTE ENCAPSULATION AND STORAGE FACILITY. Allen, G.K. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Sep 1979. Contract EY-77-C-06-1030. 21p. Dep. NTIS, PC A02/MF A01.

A heat transfer analysis was made for a hypothetical loss of institutional control accident at the WESF 100 years after implementation of the Continued Present Action alternative. Three separate storage configurations were studied. The storage configuration with the maximum number of capsules per storage rack produced maximum capsule temperatures of 2475°F and maximum

concrete temperatures of 2435°F. The storage configuration with the minimum number of capsules per storage rack produced maximum capsule temperatures of 1030°F and maximum concrete temperatures of 1011°F. These maximum temperatures will be reached in less than 2.5 years after loss of cooling water. The time required to boil a storage pool dry for the maximum number of capsules per storage rack was calculated to be 48 days; for the minimum number of capsules per storage rack, 190 days.

1866 (RHO-LD--136) SUMMARY REPORT OF WASTE TANK IMPROVEMENT STUDIES. Mercier, P.F. (Rockwell International Corp., Canoga Park, CA (USA). Energy Systems Group). Aug 1980. Contract AC06-77RL01030. 18p. NTIS, PC A02/MF A01.

Conceptual studies to improve the safety of storing high-level defense waste in the single-shell tanks were directed toward methods that would not prevent retrieval of the waste. Two concepts could be beneficial: (1) provide an impervious barrier between the storage tanks and the biosphere, and (2) strengthen the tank structure. Cement grout, chemical additives, subsurface slurry walls, and steel sheet piling were investigated to provide the impervious barrier. No method was found acceptable for providing assured, long-term, leak-free containment. A demonstration test of a chemical grout was not successful. A consultant report on subsurface slurry wall construction concluded that the wall would be only 95% leak free at installation and repairs to assure 100% would not be economically feasible. Cement grouts displace soil and could develop considerable pressure against the side of a tank. Sheet steel piling would require development of a method to seal the long, vertical joint of adjoining sections. Conceptual studies for strengthening the tank structure were directed toward providing support for the tank dome because of its flexibility and the magnitude of the soil cover load supported. The studies considered external dome supports, internal dome supports, and filling of the tank void volume. External support methods, while technically feasible, would require access for examination and maintenance. Internal supports are feasible. Filling of the tank void with crushed basalt or Hanford soil is feasible and would allow retrieval with currently planned equipment.

1867 (RHO-SA--108) STRUCTURAL EVALUATIONS OF EXISTING UNDERGROUND REINFORCED CONCRETE TANKS FOR RADIOACTIVE WASTE STORAGE. Vollert, F.R. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Oct 1979. Contract AC06-77RL01030. 40p. (CONF-791196--1). NTIS, PC A03/MF A01.

From Symposium on evaluation of existing concrete structures; Washington, DC, USA (1 Nov 1979).

Structural integrity evaluations are being conducted for underground, steel-lined reinforced concrete tanks for storing radioactive wastes. The tanks sustain large soil overburden loads and elevated temperatures from the waste for long time periods. The evaluations include laboratory experiments to determine the long-term effects of elevated temperatures on the elastic properties of concrete, and to estimate the effect of the waste chemicals on concrete durability. Available concrete samples from the tanks were also tested to determine the quality of the concrete in the tanks and for comparison with the laboratory data. Finite element, nonlinear, time-dependent analyses are performed to show the thermal creep, cracking, and stresses occurring in the concrete tanks due to the service conditions. Ultimate load analyses are made to assess the safety margin in the tanks. Finally, seismic analyses of a tank in the stressed condition due to the soil and thermal loadings were conducted to determine that the structure has sufficient reserve capacity to withstand 0.25 g earthquake accelerations.

1868 (RHO-SA--117) PARAMETRIC STUDY OF GLASS FORMULATIONS. Hill, L.R.; Jensen, L.; Rubinstein, S. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Aug 1979. Contract EY-77-C-06-1030. 7p. (CONF-790825--6). Dep. NTIS, PC A02/MF A01.

From Annual meeting of the American Statistical Association; Washington, DC, USA (12 Aug 1979).

Experiments were run on a limited system of glass formulations to test their resistance to leaching by water. Nuclear waste may be incorporated into glasses to provide a method of long-term waste storage. The effects of varying the amounts of six of seven components were estimated using fractions of 2^6 factorial designs. The seventh component was assumed to be neutral and allowed to float to complete the composition. This was used as an alternative to a mixture design. Using main-effects and first order interactions, a model for predicting weight percent of the composition dissolved by water was constructed having an R^2 value of 0.973. The residuals were well behaved. These results indicate that the problems encountered with mixture designs can be avoided by using fractions of factorials if a neutral component is available.

1869 (RHO-SA--131) TRANSURANIC DISTRIBUTION BENEATH A RETIRED UNDERGROUND DISPOSAL FACILITY, HANFORD SITE. Kasper, R.B.; Price, S.M.; Addition, M.K.; Smith, R.M.; Last, G.V.; Wagenaar, G.L. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Nov 1979. Contract EY-77-C-06-1030. 24p. (CONF-791103--62). Dep. NTIS, PC A02/MF A01.

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

Past liquid waste disposal practices at the Hanford Site included the discharge of solutions containing low-level concentrations of transuranics directly to the ground via structures collectively termed cribs. A study was conducted to determine the present spatial distribution of plutonium and americium beneath the retired 216-Z-1A Crib, which contains one of the highest cumulative plutonium inventories, 57 kilograms. Sixteen shallow wells were drilled in the unsaturated sediments underlying the facility using specialized, totally contained drilling techniques. Samples from each well were analyzed to obtain profiles of both sediment type and plutonium and americium concentrations as a function of depth beneath the facility. The results of the study show that the highest concentration of plutonium (>10^4 nCi/g of sediment) occurs within the first 3 meters of sediment beneath the central distribution pipe. The high activity at this position is tentatively attributed to the removal of solid particles from the waste stream by sediment filtration. The distributions of plutonium and americium in the sediments are similar. Peak transuranic activity in the sediment profile is generally associated with silt lenses or with major sedimentary unit interfaces (ie, sand to gravel). The maximum vertical extent of transuranic activity found is approximately 30 meters below the bottom of the crib or

approximately 25 meters above the regional water table. No contamination greater than the instrumental limit of detection of 10^{-5} nCi/g of sediment was found from a depth of 30 to 40 meters, the maximum depth of sampling.

1870 (RHO-SA--142) RISK PERSPECTIVES IN WASTE MANAGEMENT. Rowe, W.D.; Bartfeld, C.I.; Boykin, R.F.; Wood, D.E. (American Univ., Washington, DC; Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). May 1980. Contract AC06-77RL01030. 11p. (CONF-800565--1). NTIS, PC A02/MF A01.
From TIMS/ORSA national meeting; Washington, DC, USA (4 May 1980).
The consequences of an array of events in nuclear waste management and their relative likelihoods have been addressed in many instances. The question of what these risks mean to the scientific community, to the public, and to the decision makers is as important as the risk estimates themselves. Perspectives for attaching meaning to these estimates are investigated and reported in this study.

1871 (RHO-SA--143) REAL-TIME MONITORING OF HANFORD NUCLEAR WASTE. McNeece, S.G.; Glasscock, J.A.; Rosnick, C.K. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Oct 1979. Contract EY-77-C-06-1030. 19p. Dep. NTIS, PC A02/MF A01.
Two minicomputers are used to perform real time monitoring of radioactive waste storage tanks on the Hanford Nuclear Reservation. The Computer Automated Surveillance System, CASS, consists of a network of six field microprocessors, a central microprocessor and two central Eclipse minicomputers. The field microprocessors are each responsible for monitoring alarm sensors, liquid levels and temperatures. The field microprocessors report alarm conditions immediately to the central microprocessor. The central minicomputer reports all alarm conditions to the user terminals, requests data from the field on a scheduled and requested basis, and generates reports. It handles all requests for information from the user and stores all incoming data for historical purposes. The CASS software consists of five major segments: (1) process creation, (2) report generation, (3) file updating, (4) terminal communication, and (5) microprocessor communication. Since CASS must operate 24 hours a day, 7 days a week, the system cannot be allowed to abnormally terminate. For this reason all processes are started by the creation process. Having a single process responsible for creating all other processes provides the ability to detect a failure of a subordinate process and to automatically restart the failed process. The report generation process schedules reports, requests the data to be gathered to produce the reports, forms the reports, and distributes the reports to the user terminals. The file updating process handles all data file modifications. There is a terminal communication process for each user terminal which is responsible for printing scheduled reports and for allowing the user to request information from the CASS system. The microprocessor communication process handles all communication with the central microprocessor.

1872 (RHO-SA--155) SORPTION STUDIES AT HANFORD FOR THE CONTROL OF RADIOACTIVE WASTES. Routson, R.C.; Barney, G.S.; Smith, R.M. (Rockwell International Corp., Richland, WA (USA). Energy Systems Group). Jan 1980. Contract EY-77-C-06-1030. 15p. (CONF-800607--31). Dep. NTIS, PC A02/MF A01.
From American Nuclear Society annual meeting; Las Vegas, NV, USA (8 Jun 1980).
Since 1944, the Hanford Site has been a location for the storage and disposal of radioactive wastes, nuclear reactor operations, and the chemical separations of nuclear materials. These activities resulted in the storage and disposal of fission products and low-level transuranic (TRU) radioactive wastes in the near future sediments above the water table. With the scale-down of Hanford reactor operations and fuel separation activities after 1967, increased emphasis was placed on waste management activities. Assessment of future impact of past Hanford operations required the development and verification of transport sorption models to make such assessments. Present Hanford sorption models and current studies for the sorption of strontium, cesium, and cobalt on the sediments of the Hanford Separation Areas based on a waste property/areal site-specific measurement concept are discussed.

1873 (RHO-SA--160) HEAT TRANSFER ANALYSIS OF THE GEOLOGIC DISPOSAL OF SPENT FUEL AND HIGH-LEVEL WASTE STORAGE CANISTERS. Allen, G.K. (Atomics International Div., Richland, WA (USA). Rockwell Hanford Operations). Aug 1980. Contract AC06-77RL01030. 47p. (CONF-801102--28). NTIS, PC A03/MF A01.
From ASME winter annual meeting; Chicago, IL, USA (16 Nov 1980).
Near-field temperatures resulting from the storage of high-level waste canisters and spent unreprocessed fuel assembly canisters in geologic formations were determined. Preliminary design of the repository was modeled for a heat transfer computer code, HEATING5, which used the Crank-Nicolson finite difference method to evaluate transient heat transfer. The heat transfer system was evaluated with several two- and three-dimensional models which transfer heat by a combination of conduction, natural convention, and radiation. Physical properties of the materials in the model were based upon experimental values for the various geologic formations. The effects of canister spacing, fuel age, and use of an overpack were studied for the analysis of the spent fuel canisters; salt, granite, and basalt were considered as the storage media for spent fuel canisters. The effects of canister diameter and use of an overpack were studied for the analysis of the high-level waste canisters; salt was considered as the only storage media for high-level waste canisters. Results of the studies on spent fuel assembly canisters showed that the canisters could be stored in salt formations with a maximum heat loading of 134 kw/acre without exceeding the temperature limits set for salt stability. The use of an overpack had little effect on the peak canister temperatures. When the total heat load per acre decreased, the peak temperatures reached in the geologic formations decreased; however, the time to reach the peak temperatures increased. Results of the studies on high-level waste canisters showed that an increased canister diameter will increase the canister interior temperatures considerably; at a constant areal heat loading, a 381 mm diameter canister reached almost a 50°C higher temperature than a 305 mm diameter canister. An overpacked canister caused almost a 30°C temperature rise in either case.

1874 (RHO-SA--170) BATTLE FOR NUCLEAR

POWER. Nees, W.L. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). 4 Apr 1980. Contract AC06-77RL01030. 10p. (CONF-800535--2). NTIS, PC A02/MF A01.
From ASME Idaho section symposium; Idaho Falls, ID, USA (29 May 1980).
With the emotional level running so high over nuclear power these days, it is more important than ever that you communicate your ideas and information in a way that it will be heard and understood by your audience. Keep your presentation simple and to the point. As the issues surrounding nuclear change frequently, keep informed on these issues. The central area of discussion these days is high level radioactivity waste storage. Make an effort to become informed about the technical information that is available on high level waste storage.

1875 (RHO-ST--23) GEOLOGY OF THE SEPARATION AREAS, HANFORD SITE, SOUTH-CENTRAL WASHINGTON. Tallman, A.M.; Fecht, K.R.; Marratt, M.C.; Last, G.V. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Jun 1979. Contract EY-77-C-06-1030. 204p. Dep. NTIS, PC A10/MF A01.
The major geologic units beneath the Separation Areas are: basement rocks of undetermined origin, the Columbia River Basalt Group with intercalated sediments of the Ellensburg Formation, the Ringold Formation, and the glaciofluvial sediments (Hanford Formation). A loess deposit (early Palouse soil) occurs between the Ringold and Hanford formations in parts of 200 West Area. The surface of the Separation Areas is veneered with loess and sand dunes of varying thickness. The sediments of the Hanford Formation are the most significant geologic unit in the transport and sorption of radionuclides from surface and near surface waste storage facilities. The Hanford sediments in the Separation Areas effectively isolate and sorb most radiocontaminants (half life greater than one year) discharged to or stored in the ground due to a thick sequence of unsaturated sediments with an adequate sorption capacity. The general horizontal bedding of the Hanford sediments promotes lateral spreading of moisture and retards downward transport of radionuclides.

1876 (SAND--77-0274(Add.A)) WIPP CONCEPTUAL DESIGN REPORT. ADDENDUM A. DESIGN CALCULATIONS FOR WASTE ISOLATION PILOT PLANT (WIPP). (Sandia Labs., Albuquerque, NM (USA)). Apr 1977. Contract EY-76-C-04-0789. 368p. Dep. NTIS, MF A01.
Portions of document are illegible.
The design calculations for the Waste Isolation Pilot Plant (WIPP) are presented. The following categories are discussed: general nuclear calculations; radwaste calculations; structural calculations; mechanical calculations; civil calculations; electrical calculations; TRU waste surface facility time and motion analysis; shaft sinking procedures; hoist time and motion studies; mining system analysis; mine ventilation calculations; mine structural analysis; and miscellaneous underground calculations.

1877 (SAND--77-0274(Add.B)) WIPP CONCEPTUAL DESIGN REPORT. ADDENDUM B. TAILINGS DISPOSAL PROPOSAL. Poli, D.L. (Sandia Labs., Albuquerque, NM (USA)). Apr 1977. Contract EY-76-C-04-0789. 7p. Dep. NTIS, PC A02/MF A01.
The disposal of tailings (mostly salt) created as a result of mining for underground emplacement of nuclear wastes at the Waste Isolation Pilot Plant (WIPP) is discussed. The alternatives are presented and recommendations are included. (DC)

1878 (SAND--77-0274(Add.C)) WIPP CONCEPTUAL DESIGN REPORT. ADDENDUM C. COST WORKSHEETS FOR WASTE ISOLATION PILOT PLANT (WIPP). (Holmes and Narver, Inc., Anaheim, CA (USA); Fenix and Scisson, Inc., Tulsa, OK (USA); Sandia Labs., Albuquerque, NM (USA)). Apr 1977. Contract EY-76-C-04-0789. 364p. Dep. NTIS, MF A01.
Portions of document are illegible.
The cost worksheets for the Waste Isolation Pilot Plant (WIPP) are presented. A summary cost estimate, cost estimate for surface facilities, and cost estimate for shafts and underground facilities are included. (DC)

1879 (SAND--77-0274(Add.D)) WIPP CONCEPTUAL DESIGN REPORT. ADDENDUM D. A REPORT TO HOLMES and NARVER, INC., ANAHEIM, CALIFORNIA ON ALTERNATIVE ENERGY SOURCES FOR WASTE ISOLATION PILOT PLANT, CARLSBAD, NEW MEXICO. (Envirodyne Energy Services, Anaheim, CA (USA)). Mar 1977. Contract EY-76-C-04-0789. 65p. Dep. NTIS, PC A04/MF A01.
This report presents the results of a technical and economic analysis of alternative methods of meeting the energy needs of a proposed Waste Isolation Pilot Plant (WIPP) to be located in southeastern New Mexico. The WIPP is a facility for underground storage of radioactive wastes in a deep salt bed. The report analyzes a total of sixteen possible methods for meeting WIPP energy requirements, consisting of purchased electricity and on-site generation in various combinations from full purchased to full on-site.

1880 (SAND--77-0274(Add.E)) WIPP CONCEPTUAL DESIGN REPORT. ADDENDUM E. ELECTRICAL LOAD SUMMARY FOR WASTE ISOLATION PILOT PLANT. (Holmes and Narver, Inc., Anaheim, CA (USA)). Apr 1977. Contract EY-76-C-04-0789. 21p. Dep. NTIS, PC A02/MF A01.
The electrical load summary for the Waste Isolation Pilot Plant (WIPP) is presented. (DC)

1881 (SAND--77-0274(Add.F)) WIPP CONCEPTUAL DESIGN REPORT. ADDENDUM F. HVAC SYSTEMS ENERGY ANALYSIS FOR WASTE ISOLATION PILOT PLANT. (Holmes and Narver, Inc., Anaheim, CA (USA)). Apr 1977. Contract EY-76-C-04-0789. 39p. Dep. NTIS, PC A03/MF A01.
This report presents the results of a technical and economic analysis of alternative methods of meeting the heating, ventilating, and air conditioning requirements of the Waste Isolation Pilot Plant (WIPP) facilities proposed to be constructed in southeastern New Mexico. This report analyzes a total of ten WIPP structures to determine the most energy and economic efficient means of providing heating, ventilating, and air conditioning services. Additional analyses were performed to determine the merits of centralized versus dispersed refrigeration and heating facilities, and of performing supplemental domestic hot water heating with solar panels.

1882 (SAND--77-0274(Add.G)) WIPP CONCEPTUAL DESIGN REPORT. ADDENDUM G. ACCIDENT ANALYSIS FOR WASTE ISOLATION PILOT PLANT. Shefelbine, H.C.; Metcalf, J.H. (Sandia Labs., Albuquerque, NM (USA)). Jun 1977. Contract EY-76-C-04-0789. 19p. Dep. NTIS, PC A02/MF A01.

The types of accidents or risks pertinent to the Waste Isolation Pilot Plant (WIPP) are presented. Design features addressing these risks are discussed. Also discussed are design features that protect the public. (DC)

1883 (SAND--77-0274(Add.H)) WIPP CONCEPTUAL DESIGN REPORT. ADDENDUM H. SPECIAL EQUIPMENT DEVELOPMENT PROGRAM FOR WASTE ISOLATION PILOT PLANT (WIPP). Stinebaugh, R. (Sandia Labs., Albuquerque, NM (USA)). Jun 1977. Contract EY-76-C-04-0789. 13p. Dep. NTIS, PC A02/MF A01.

This addendum outlines the planned development program for equipment, identified and conceptually shown in the Waste Isolation Pilot Plant (WIPP) Conceptual Design Report (CDR), that is required for storage emplacement and retrieval of all wastes accepted at the WIPP.

1884 (SAND--77-0274(Add.I)) WIPP CONCEPTUAL DESIGN REPORT. ADDENTUM I. SOILS AND FOUNDATION INVESTIGATION FOR PROPOSED WASTE ISOLATION PILOT PLANT, EDDY COUNTY, NEW MEXICO. (Pettigrew (Richard R.) and Associates, Clovis, NM (USA)). Apr 1977. Contract EY-76-C-04-0789. 67p. Dep. NTIS, PC A04/MF A01.

This report presents the results of a soils and foundation investigation for the proposed Waste Isolation Pilot Plant (WIPP) located in Section 21, Township 22 South, Range 31 East, N.M.P.M., Eddy County, New Mexico. The purpose of this investigation was to determine the physical characteristics of the subsoils in order to provide foundation design recommendations. The investigation was performed and the report prepared in accordance with the requirements received from John West Engineering Company and Mr. Bill Wowak, Sandia Laboratories. These were: (1) statement of work for WIPP soils investigation program, and (2) WIPP soil investigation revised drill hole location.

1885 (SAND--77-0274(Add.J)) WIPP CONCEPTUAL DESIGN REPORT. ADDENDUM J. SUPPORT EQUIPMENT IN THE HIGH LEVEL WASTE FACILITY OF THE WASTE ISOLATION PILOT PLANT. Rieb, M.J.; Foley, R.S. (Aerojet Mfg. Co., Fullerton, CA (USA)). Apr 1977. Contract EY-76-C-04-0789. 115p. Dep. NTIS, PC A06/MF A01.

The Aerojet Manufacturing Company (AMCO) received a contract in November 1976 to provide consulting services in assisting Holmes and Narver, Incorporated with the conceptual designs, cost estimates, and schedules of equipment used to handle waste casks, to decontaminate waste canisters and to overpack damaged or highly contaminated waste canisters for the Waste Isolation Pilot Plant (WIPP). Also, the layout of the hot cell in which canister handling, overpack and decontamination takes place was to be reviewed along with the time and motion study of the cell operations. This report has been prepared to present the results of the efforts and contains all technical and planning data developed during the program. The contents of this report are presented in three sections: (1) comments on the existing design criteria, equipment conceptual designs, hot cell design and time and motion studies of projected hot cell activities; (2) design descriptions of the equipment concepts and justification for varying from the existing concept (if a variation occurred). Drawings of each concept are provided in Appendix A. These design descriptions and drawings were used as the basis for the cost estimates; and (3) schedule projections and cost estimates for the equipment described in Section 2. Detail cost estimate backup data is provided in Appendix B.

1886 (SAND--77-0274(Add.L)) WIPP CONCEPTUAL DESIGN REPORT. ADDENDUM L. MINE SAFETY CODE REVIEW FOR WASTE ISOLATION PILOT PLANT (WIPP). (Fenix and Scisson, Inc., Tulsa, OK (USA)). Jun 1977. Contract EY-76-C-04-0789. 16p. Dep. NTIS, PC A02/MF A01.

An initial review of New Mexico and Federal mining standards and regulations has been made to determine their applicability to the WIPP conceptual design. These standards and regulations are reviewed point by point and the enclosed listing includes comments and recommendations for those which will affect the design and/or eventual operations of WIPP. The majority of the standards, both federal and state, are standard safe mining practices. Those standards are listed which are thought should be emphasized for development of the design; also those that would increase the hazard risk by strict compliance. Because the WIPP facility is different in many respects from mines for which the regulations were intended, strict compliance in some respects would provide an increased hazard, while in other instances the regulations are less strict than is desirable. These are noted in the attached review.

1887 (SAND--77-0274(Add.M)) WIPP CONCEPTUAL DESIGN REPORT. ADDENDUM M. COMPUTER SYSTEM AND DATA PROCESSING REQUIREMENTS FOR WASTE ISOLATION PILOT PLANT (WIPP). Young, R. (Sandia Labs., Albuquerque, NM (USA)). Jun 1977. Contract EY-76-C-04-0789. 10p. Dep. NTIS, PC A02/MF A01.

Data-processing requirements for the Waste Isolation Pilot Plant (WIPP) dictate a computing system that can provide a wide spectrum of data-processing needs on a 24-hour-day basis over an indeterminate time. A computer system is defined as a computer or computers complete with all peripheral equipment and extensive software and communications capabilities, including an operating system, compilers, assemblers, loaders, etc., all applicable to real-world problems. The computing system must be extremely reliable and easily expandable in both hardware and software to provide for future capabilities with a minimum impact on the existing applications software and operating system. The computer manufacturer or WIPP operating contractor must provide continuous on-site computer maintenance (maintain an adequate inventory of spare components and parts to guarantee a minimum mean-time-to-repair of any portion of the computer system). The computer operating system or monitor must process a wide mix of application programs and languages, yet be readily changeable to obtain maximum computer usage. The WIPP computing system must handle three general types of data processing requirements: batch, interactive, and real-time. These are discussed. Data bases, data collection systems, scientific and business systems, building and facilities, remote terminals and locations, and cables are also discussed. (DC)

1888 (SAND--78-1147) PRELIMINARY THERMAL EXPANSION SCREENING DATA FOR TUFFS. Lappin, A.R. (Sandia Labs., Albuquerque, NM (USA)). Mar 1980. Contract AC04-76DP00789. 40p. Dep. NTIS, PC A03/MF A01.

A major variable in evaluating the potential of silicic tuffs for use in geologic disposal of heat-producing nuclear wastes is thermal

expansion. Results of ambient-pressure linear expansion measurements on a group of tuffs that vary treatly in porosity and mineralogy are presente here. Thermal expansion of devitrified welded tuffs is generally linear with increasing temperature and independent of both porosity and heating rate. Mineralogic factors affecting behavior of these tuffs are limited to the presence or absence of cristobalite and altered biotite. The presence of cristobalite results in markedly nonlinear expansion above 200°C. If biotite in biotite-hearing rocks alters even slightly to expandable clays, the behavior of these tuffs near the boiling point of water can be dominated by contraction of the expandable phase. Expansion of both high- and low-porosity tuffs containing hydrated silicic glass and/or expandable clays is complex. The behavior of these rocks appears to be completely dominated by dehydration of hydrous phases and, hence, should be critically dependent on fluid pressure. Valid extrapolation of the ambient-pressure results presented here to depths of interest for construction of a nuclear-waste repository will depend on a good understanding of the interaction of dehydration rates and fluid pressures, and of the effects of both micro- and macrofractures on the response of tuff masss.

1889 (SAND--79-0172) DEFENSE HIGH-LEVEL WASTE AND SPENT FUEL CHARACTERIZATION FOR GEOLOGIC WASTE REPOSITORIES. Sutherland, S.H.; Bennett, D.E. (Sandia Labs., Albuquerque, NM (USA)). Sep 1979. Contract EY-76-C-04-0789. 32p. Dep. NTIS, PC E04/MF E04.

Results of SANDIA-ORIGEN calculations are given for the total thermal output and radionuclide content, up to 100,000 years decay time, for defense high-level waste expected from the Savannah River Plant, the Hanford Reservation and the Idaho National Engineering Laboratory, and for one pressurized water reactor and five boiling water reactor spent fuel types. These results are expected to be of value in evaluating the potential for storing defense high-level waste and/or spent fuel in geologic waste repositories.

1890 (SAND--79-0273) BASIC DATA REPORT FOR DRILLHOLE WIPP 13 (WASTE ISOLATION PILOT PLANT - WIPP). (Geological Survey, Albuquerque, NM (USA); Sandia Labs., Albuquerque, NM (USA)). Oct 1979. Contract EY-76-C-04-0789. 75p. Dep. NTIS, PC A04/MF A01.

The borehole WIPP-13 was drilled in the SW 1/4 section 17, T22S, R31E of eastern Eddy County during July and August, 1978, to investigate the nature of a resistivity anomaly. The stratigraphic section was normal, consisting of 13 feet of Quaternary deposits (including artificial fill for drill pad), 53 feet of the Triassic Santa Rosa Sandstone, 451 feet of Dewey Lake Red Beds, 269 feet of the Rustler Formation and 179 feet of the upper member of the Salado Formation. Consecutive cores were taken from 570 to 595, 656 to 729, and 827 to 878 feet. Cuttings were collected at 10-foot intervals throughout the rest of the hole. Geophysical logs were run to aid in interpretation of the stratigraphy. The WIPP is to demonstrate (through limited operations) disposal technology for transuranic (TRU) defense wastes. Eventual conversion of the facility to a repository for TRU defense wastes is anticipated. The WIPP will also provide research facilities for interactions between high-level waste and salt.

1891 (SAND--79-0275) BASIC DATA REPORT FOR DRILLHOLE WIPP 18 (WASTE ISOLATION PILOT PLANT - WIPP). (Sandia Labs., Albuquerque, NM (USA)). Mar 1980. Contract AC04-76-DP00789. 73p. NTIS, PC A04/MF A01.

WIPP 18 is an exploratory borehole whose objective is to determine the nature of the near-surface formations after seismic information indicated a possible fault. The borehole is located in section 20, T.22S., R.31E., in eastern Eddy County, New Mexico, and was drilled between March 14 and 30, 1978. The hole was drilled to a depth of 1060 feet and encountered, from top to bottom, surficial Holocene deposits (5', including artificial fill for drill pad), the Mescalero caliche (4'), the Santa Rosa Sandstone (129'), the Dewey Lake Red Beds (475'), the Rustler Formation (315'), and the upper portion of the Salado Formation (132'). Cuttings were collected at 10-foot intervals. A suite of geophysical logs was run to measure acoustic velocities, density, and radioactivity. On the basis of comparison with other geologic sections drilled in the area, the WIPP 18 section is a normal stratigraphic sequence and it does not show structural disruption. The WIPP is to demonstrate (through limited operations) disposal technology for transuranic defense wastes. The WIPP will also provide facilities to research interactions between high-level waste and salt.

1892 (SAND--79-0277) BASIC DATA REPORT FOR DRILLHOLE WIPP 21 (WASTE ISOLATION PILOT PLANT - WIPP). (Sandia Labs., Albuquerque, NM (USA)). Mar 1980. Contract AC04-76DP00789. 62p. NTIS, PC A04/MF A01.

WIPP 21 is an exploratory borehole whose objective is to determine the nature of the near-surface formations after seismic information indicated a possible fault. The borehole is located in section 20, T.22S., R.31E., in eastern Eddy County, New Mexico, and was drilled between May 24 and 26, 1978. The hole was drilled to a depth of 1046 feet and encountered, from top to bottom, surficial Holocene deposits (6', including artificial fill for drill pad), the Mescalero caliche (6'), the Santa Rosa Sandstone (34'), the Dewey Lake Red Beds (487'), the Rustler Formation (308'), and the upper portion of the Salado Formation (178'). Cuttings were collected at 10-foot intervals. A suite of goephysical logs was run to measure acoustic velocities, density, and radioactivity. On the basis of comparison with other geologic sections drilled in the area, the WIPP 21 section is a normal stratigraphic sequence and it does not show structural disruption. The WIPP is to demonstrate (through limited operations) disposal technology for transuranic defense wastes. The WIPP will also provide facilities to research interactions between high-level waste and salt.

1893 (SAND--79-0278) BASIC DATA REPORT FOR DRILLHOLE WIPP 22 (WASTE ISOLATION PILOT PLANT, WIPP). (Sandia Labs., Albuquerque, NM (USA); Geological Survey, Albuquerque, NM (USA)). Mar 1980. Contract AC04-76DP00789. 72p. NTIS, PC A04/MF A01.

WIPP 22 is an exploratory borehole whose objective is to determine the nature of the near-surface formations after seismic information indicated a possible fault. The borehole is located in section 20, T.22S., R.31E., in eastern Eddy County, New Mexico, and was drilled between March 14 and 30, 1978. The hole was drilled to a depth of 1448 feet and encountered, from top to bottom, surficial Holocene deposits (6', including artificial fill for drill pad), the Mescalero caliche

(7'), the Santa Rosa Sandstone (68'), the Dewey Lake Red Beds (492'), the Rustler Formation (311'), and the upper portion of the Salado Formation (565'). Cuttings were collected at 10-foot intervals. A suite of geophysical logs was run to measure acoustic velocities, density, and radioactivity. On the basis of comparison with other geologic sections drilled in the area, the WIPP 22 section is a normal stratigraphic sequence and it does not show structural disruption. The WIPP is to demonstrate (through limited operations) disposal technology for transuranic defense wastes. The WIPP will also provide facilities to research interactions between high-level waste and salt.

1894 (SAND--79-0279) BASIC DATA REPORT FOR DRILLHOLE WIPP 25 (WASTE ISOLATION PILOT PLANT - WIPP). (Sandia Labs., Albuquerque, NM (USA)). Sep 1979. Contract EY-76-C-04-0789. 62p. Dep. NTIS, PC A04/MF A01.

WIPP 25 was drilled on the eastern edge of Nash Draw (SW 1/4, Sec. 15, T22S, R30E) in Eddy County, New Mexico, to determine subsurface stratigraphy and examine dissolution features above undisturbed salt in the Salado Formation. Determination of dissolution rates will refine previous estimates and provide short-term (geologically) rates for WIPP risk assessments. The borehole encountered, from top to bottom, Pleistocene sediments (17 ft with fill material for pad), Dewey Lake Red Beds (215 ft, Rustler Formation (333 ft, and 90 ft of the upper Salado Formation. A dissolution residue, 37 ft thick, is at the top of the Salado Formation overlying halite-rich beds. In addition to obtaining nearly continuous core from the surface to total depth (655 ft, geophysical logs were taken to measure acoustic velocities, density, radioactivity, and formation resistivity. An interpretive report on dissolution in Nash Draw will be based on combined borehole basin data, surface mapping, and laboratory analyses of Nash Draw rocks and fluids. The WIPP is to demonstrate (through limited operations) disposal technology for transuranic defense wastes and to then be converted to a repository. The WIPP will also provide research facilities for interactions between high-level waste and salt.

1895 (SAND--79-0280) BASIC DATA REPORT FOR DRILLHOLE WIPP 26 (WASTE ISOLATION PILOT PLANT - WIPP). (Sandia Labs., Albuquerque, NM (USA); Geological Survey, Albuquerque, NM (USA)). Aug 1979. Contract EY-76-C-04-0789. 92p. Dep. NTIS, PC A05/MF A01.

WIPP 26 was drilled in Nash Draw (SE 1/4 NE 1/4, sec. 29, T22S, R30E) in Eddy County, New Mexico, to determine subsurface stratigraphy and examine dissolution features above undisturbed salt in the Salado Formation. Determination of dissolution rates will refine previous estimates and provide short-term (geologically) rates for WIPP risk assessments. The borehole encountered, from top to bottom, surficial deposits (10 ft with full materials for pad), Rustler Formation (299 ft), and the upper 194 ft of the Salado Formation. A dissolution residue, 11 ft thick, is at the top of the Salado Formation overlying halite-rich beds. In addition to obtaining nearly continuous core from the surface to total depth (503 ft), geophysical logs were taken to measure acoustic velocities, density, radioactivity, and formation resistivity. An interpretive report on dissolution in Nash Draw will be based on combined borehole basin data, surface mapping, and laboratory analyses of Nash Draw rocks and fluids. The WIPP is to demonstrate (through limited operations) disposal technology for transuranic defense wastes and to then be converted to a repository. The WIPP will also provide research facilities for interactions between high-level waste and salt.

1896 (SAND--79-0281) BASIC DATA REPORT FOR DRILLHOLE WIPP 27 (WASTE ISOLATION PILOT PLANT). (Sandia Labs., Albuquerque, NM (USA); Geological Survey, Denver, CO (USA)). Oct 1979. Contract EY-76-C-04-0789. 84p. Dep. NTIS, PC A05/MF A01.

WIPP 27 was drilled in Eddy County, New Mexico (NW 1/4 sec. 21, T21S, R30E) to investigate evaporite dissolution features and to determine the stratigraphy of surface and near-surface formations. The borehole encountered, from top to bottom, 79 feet of Quaternary deposits, 73 feet of the Rustler Formation, and 171 feet of the upper portion of the Salado Formation. Consecutive cores were obtained for the entire depth of WIPP 27. Geophysical logs measure acoustic velocities, density, radioactivity, and formation resistivity. An interpretive report on dissolution in Nash Draw will be based on combined borehole data, surface mapping and laboratory analyses of Nash Draw rocks and fluids.

1897 (SAND--79-0283) BASIC DATA REPORT FOR DRILLHOLE WIPP 29 (WASTE ISOLATION PILOT PLANT-WIPP). (Sandia Labs., Albuquerque, NM (USA); Geological Survey, Denver, CO (USA)). Sep 1979. Contract EY-76-C-04-0789. 78p. Dep. NTIS, PC A05/MF A01.

WIPP 29 was drilled in Nash Draw (SE 1/4, Sec. 34, T22S, R29E) in Eddy County, New Mexico, to determine subsurface stratigraphy and examine dissolution features above undisturbed salt in the Salado Formation. Determination of dissolution rates will refine previous estimates and provide short-term (geologically) rates for WIPP risk assessments. The borehole encountered, from top to bottom, unnamed Pleistocene deposits (12' with fill material for pad), Dewey Lake Red Beds (203'), Rustler Formation (131'), and the upper 234' of the Salado Formation. A dissolution residue, 105' thick, is at the top of the Salado Formation overlying halite-rich beds. In addition to obtaining nearly continuous core from the surface to total depth (358'), geophysical logs were taken to measure acoustic velocities, density, radioactivity, and formation resistivity. An interpretive report on dissolution in Nash Draw will be based on combined borehole basin data, surface mapping, and laboratory analyses of Nash Draw rocks and fluids. The WIPP is to demonstrate (through limited operations) disposal technology for transuranic defense wastes and to then be converted to a repository. The WIPP will also provide research facilities for interactions between high-level waste and salt.

1898 (SAND--79-0284) BASIC DATA REPORT FOR DRILLHOLE WIPP 30 (WASTE ISOLATION PILOT PLANT - WIPP). (Sandia National Labs., Albuquerque, NM (USA)). Apr 1980. Contract AC04-76DP00789. 84p. NTIS, PC A05/MF A01.

WIPP 30 was drilled in east-central Eddy County, New Mexico, in NW 1/4, Sec. 33, T21S, R31E, to obtain drill core for the study of dissolution of near-surface rocks. The borehole encountered from top to bottom, the Dewey Lake Red Beds (449' including artificial fill for drill pad), Rustler Formation (299'), and the upper 160' of the Salado Formation. Continuous core was cut from the surface to total depth. Geophysical logs were taken the full length of

the borehole to measure acoustic velocities, density, and distribution of potassium and other radioactive elements. Information from this borehole will be included in an interpretive report on dissolution in Nash Draw based on combined borehole data, surface mapping and laboratory analyses of rocks and fluids. The WIPP is to demonstrate (through limited operations) disposal technology for transuranic defense wastes and to then be converted to a repository. The WIPP will also provide research facilities for interactions between high-level waste and salt. Administration policy as of February 1980 is to hold the WIPP site in reserve until the first disposal site can be chosen from several potential sites, including the WIPP.

1899 (SAND--79-0344) SMALL SCALE HEATER TESTS IN ARGILLITE OF THE ELEANA FORMATION AT THE NEVADA TEST SITE. McVey, D.F.; Thomas, R.K.; Lappin, A.R. (Sandia Labs., Albuquerque, NM (USA)). Nov 1979. Contract EY-76-C-04-0789. 62p. Dep. NTIS, PC A04/MF A01.

Near-surface heater tests were run in the Eleana Formation at the Nevada Test Site, in an effort to evaluate argillaceous rock for nuclear waste storage. The main test, which employed a full-scale heater with a thermal output approximating commercial borosilicate waste, was designed to operate for several months. Two smaller, scaled tests were run prior to the full-scale test. This report develops the thermal scaling laws, describes the pretest thermal and thermomechanical analysis conducted for these two tests, and discusses the material properties data used in the analyses. In the first test, scaled to a large heater of 3.5 kW power, computed heater temperatures were within 7% of measured values for the entire 96-hour test run. The second test, scaled to a large heater having 5.0 kW power, experienced periodic water in-flow onto the heater, which tended to damp the temperature. For the second test, the computed temperatures were within 7% of measured for the first 20 hours. After this time, the water effect became significant and the measured temperatures were 15 to 20% below those predicted. On the second test, rock surface spallation was noted in the bore hole above the heater, as predicted. The scaled tests indicated that in-situ argillite would not undergo major thermostructural failure during the follow-on, 3.5 kW, full-scale test. 24 figures, 6 tables.

1900 (SAND--79-0377) BOREHOLE-INCLUSION STRESSMETER MEASUREMENTS IN BEDDED SALT. Cook, C.W.; Ames, E.S. (Sandia National Labs., Albuquerque, NM (USA)). Jul 1980. Contract AC04-76DP00789. 28p. NTIS, PC A03/MF A01.

Sandia purchased borehole-inclusion stressmeters from a commercial supplier to measure in situ stress changes in bedded salt. However, the supplied stressmeters were difficult to set in place and gave erratic results in bedded salt. These problems were overcome with a new extended platen design. Also a straingaged transducer was designed which can be read with a conventional data logger. Due to the nonlinear behavior of bedded salt under uniaxial loading, a new empirical calibration scheme was devised. In essence, the stressmeters are calibrated as force transducers and this calibration curve is then used to determine the relationship between uniaxial stress changes in bedded salt and the gage's output. The stressmeter and calibration procedures have been applied under mine conditions and produced viable results. Future work will involve finite element analysis to calculate the observed behavior of the stressmeters. The response of the stressmeters in bedded salt is neither that of a true stressmeter or of a true strainmeter. However, repeatable calibrations make the gages very useful.

1901 (SAND--79-0625) PRE-WIPP IN-SITU EXPERIMENTS IN SALT. PART I. EXECUTIVE SUMMARY. PART II. PROGRAM DESCRIPTION. Sattler, A.R.; Hunter, T.O. (Sandia Labs., Albuquerque, NM (USA)). Aug 1979. Contract EY-76-C-04-0789. 96p. Dep. NTIS, PC A05/MF A01.

This document presents plans for in-situ experiments in a specific location in southeastern New Mexico. Schedule and facility design were based on features of a representative local potash mine and on contract negotiations with mine owners. Subsequent WIPP program uncertainties have required a delay in the implementation of the activities discussed here; however, the relative schedule for various activities are appropriate for future planning. The document represents a matrix of in-situ activities to address relevant technical issues prior to the availability of a bedded salt repository.

1902 (SAND--79-0895C) PROBABILISTIC ASPECTS OF FAULTING IN ANISOTROPIC MEDIA. Cranwell, R.M.; Donath, F.A. (Sandia Labs., Albuquerque, NM (USA); Illinois Univ., Urbana (USA)). 1979. Contract EY-76-C-04-0789. 8p. (CONF-791112--6). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

The potential is estimated for new faults occurring and intersecting a radwaste repository. In-situ stress measurements and seismic activity records are needed. (DLC)

1903 (SAND--79-0905C) IN SITU EXPERIMENTS TO SUPPORT DEVELOPMENT OF THE WASTE ISOLATION PILOT PLANT (WIPP). Sattler, A.R.; Walker, H.C.; Hunter, T.O. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 16p. (CONF-791112--33). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

Most of the WIPP in-situ experiments are associated with the WIPP early shaft complex. They include: HLW interactions, thermal/structural experiments, stable nuclide migration, permeability, brine migration, borehole plugging, operation/design, and instrumentation development. (DLC)

1904 (SAND--79-0907C) GEOLOGIC WASTE DISPOSAL AND A MODEL FOR THE SURFACE MOVEMENT OF RADIONUCLIDES. Helton, J.; Iman, R.; Brown, J.; Schreurs, S. (Sandia Labs., Albuquerque, NM (USA); Atomenergikommissionen, Copenhagen (Denmark); Nuclear Regulatory Commission, Washington, DC (USA)). 1979. Contract EY-76-C-04-0789. 8p. (CONF-791112--18). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

A model for the surface movement of radionuclides is presented. This model, which is referred to as the Pathways Model, was constructed in a NRC project to develop a methodology to assess the risk associated with the geologic disposal of high-level radioactive waste. The methodology development involves

work in two major areas: (a) models for physical processes, and (b) statistical techniques for the use and assessment of these models. The presentation of the Pathways Model involves topics from both areas.

1905 (SAND--79-0911C) GAS GENERATION FROM TRANSURANIC WASTE DEGRADATON. Molecke, M.A. (Sandia Labs., Albuquerque, NM (USA)). Oct 1979. Contract EY-76-C-04-0789. 9p. (CONF-791112--21). Dep. NTIS, PC A02/MF A01.
From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).
Based on experimental data the relative quantities of gas generated by individual mechanism for existing forms of TRU-contaminated wastes under expected WIPP environmental conditions are ranked in order as: (1) BACTERIAL (greatest potential, but large variability); (2) THERMAL (at 40°C; probably insignificant at 25°C); (3) RADIOLYSIS (most predictable; potential short-term risks); (4) CORROSION (under the dry conditions expected in WIPP); and (5) ALPHA DECAY (insignificant). Results indicate that waste processing to minimize such gas generation is not technically required.

1906 (SAND--79-0954C) MECHANISM FOR ELEVATED TEMPERATURE LEACHING. Kenna, B.T.; Murphy, K.D. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 8p. (CONF-791112--31). Dep. NTIS, PC A02/MF A01.
From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).
Long-term, elevated temperature leaching and subsequent electron microprobe analysis of simulated waste glass and ceramic materials have been completed. A cyclic leaching pattern was found in all systems over a 20-month period. It appears that the leaching of mobile ions by simple diffusional processes is modified by more complex chemical interactions. The release of immobile ions is primarily a function of their chemical interactions in the matrix which suggests that these ions may be complex species when released into solution. A mechanism is proposed which incorporates these ideas and the cyclic phenomenon observed.

1907 (SAND--79-0981C) TRACER TESTS PERFORMED IN THE FIELD FOR WIPP IN SOUTHEASTERN NEW MEXICO. Gonzalez, D.D.; Hill, L.R. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 3p. (CONF-791112--19). Dep. NTIS, PC A02/MF A01.
From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).
A two-well recirculating tracer test began in October, 1979, to define as accurately as possible the hydraulic character of a fractured carbonate aquifer, the Culebra dolomite member of the Rustler Formation at the WIPP site in Eddy and Lee Counties, New Mexico. The Culebra dolomite overlies a zone planned for isolation of transuranic contaminated waste generated by the United States defense programs. The storage zone of the proposed facility is in nearly pure halite and about 1400 feet (427 meters) below the Culebra dolomite, the most likely pathway for the migration of radionuclides to the biosphere in the event the repository is breached by groundwater. Included in the definition of the hydraulic character of the Culebra aquifer are natural groundwater velocities, aquifer porosity and components of dispersivity. The proposed tracer test using sodium benzoate, a homologous series of chlorofluoromethanes and pentafluorobenzoic acid as tracers is described. Results of the test will be reported at a later date.

1908 (SAND--79-0988C) RADIONUCLIDE SORPTION STUDIES ON ABYSSAL RED CLAYS. Erickson, K.L. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 7p. (CONF-791112--48). Dep. NTIS, PC A02/MF A01.
From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).
The radionuclide sorption properties of a widely distributed abyssal red clay are being experimentally investigated using batch equilibration techniques. This paper summarizes sorption equilibrium data obtained when 0.68 N NaCl solutions containing either Tc, U, Pu, Am or Cm were contacted with samples of the red clay and also summarizes some initial results from experiments designed to determine the relative selectivity of the clay for various nuclides. Under mildly oxidizing conditions, the sorption equilibrium distribution coefficients for technetium were essentially zero. At solution-phase nuclide concentrations on the order of 10^{-6} M and less and at solution pH values of about 6.9, the distribution coefficients for plutonium were about 3×10^3 ml/gm and for uranium, americium, and curium were about 10^5 ml/gm or greater. However, at solution pH values of about 2.7, the distribution coefficients for each of the nuclides were greatly diminished. Initial experiments conducted in order to determine the relative selectivity of the clay for cesium, barium, and cerium, indicated that the silicate phases in the clay were selective for cesium over barium and cerium. These experiments also indicated that the hydrous oxide phases were selective for cerium over barium and for barium over cesium.

1909 (SAND--79-0989C) PRELIMINARY RATE EXPRESSIONS FOR ANALYSIS OF RADIONUCLIDE MIGRATION RESULTING FROM FLUID FLOW THROUGH JOINTED MEDIA. Erickson, K.L. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 10p. (CONF-791112--47). Dep. NTIS, PC A02/MF A01.
From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).
A theoretical and experimental basis is being developed for analysis of radionuclide transport in jointed geologic media. Batch equilibration and rate experiments involving samples of Eleana argillite and tertiary silicic tuffs in contact with solutions containing Cs, Sr, or Pm indicated that most radionuclide sorption was associated with the surfaces of very small intergranular regions and that the rate of sorption was controlled by diffusion of the nuclides into such regions. Based on these experimental results, the continuity equations for radionuclides in the mobile and immobile phases were reduced to a model analogous to Rosen's equations for packed beds and were solved similarly. Using the model and experimental data, limited radionuclide transport analyses were made which indicated that important parameters controlling transport include the intergranular porosity and nuclide penetration depth, fracture plate spacing and length, fluid velocity and sorption distribution coefficient. Many of these parameters represent physical quantities or processes which can be quantified in the laboratory. However, fluid velocities and fracture plate spacings and lengths must be obtained from the field, and methods must be developed to establish reliable bounds for such field-determined parameters.

1910 (SAND--79-0990C) BACKFILL AS AN

ENGINEERED BARRIER FOR NUCLEAR WASTE MANAGEMENT. Nowak, E.J. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 8p. (CONF-791112--42). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

Portions of document are illegible.

The swelling, plastic flow, and relative impermeability of bentonite and hectorite were observed and measured after wetting with concentrated brines. Measurements of stable values of pH > 6.5 for the interstitial brines in wetted bentonite and hectorite confirmed conditions favorable for precipitation and sorption of transuranics. Values of K/sub d/ > 2000 ml/g were measured for Pu and Am. Calculated estimates of the effectiveness of a one-foot-thick backfill barrier are presented. They show that the breakthrough of Pu and other transuranics (K/sub d/ = 2000 ml/g) can be delayed for 10^4 to 10^5 years. The breakthrough of most fission products (K/sub d/ = 200 ml/g) can be delayed for 10^3 to 10^4 years, sufficient time for them to decay to very low concentrations. A backfill barrier can contribute significantly to a radioactive waste isolation system.

1911 (SAND--79-1000C) THERMAL ASPECTS OF WASTE EMPLACEMENT IN LAYERED TUFFS. Bulmer, B.M.; Lappin, A.R. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 4p. (CONF-791112--2). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

The thermal response of layered tuffs in Yucca Mountain at NTS to radwaste emplacement at 711 m depth (Bullfrog tuff) was analyzed. Three in-situ boiling criteria were examined. No boiling is predicted for any burial depth with power densities up to 150 kW/acre. Allowable powerdensities are plotted vs depth below 711 m for both HLW and spent fuels. (DLC)

1912 (SAND--79-1013C) FAR FIELD THERMAL CALCULATIONS FOR THE WIPP SITE IN SENM. Pahwa, S.B.; Wayland, J.R. (INTERA Environmental Consultants, Inc., Houston, TX (USA); Sandia Labs., Albuquerque, NM (USA)). Oct 1979. Contract EY-76-C-04-0789. 20p. (CONF-791112--14). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

This idealized study indicates that there is little impact upon the far thermal field from water expansion or for stoppage of aquifer flow. The variability of salt thermal conductivity in the Salado Formation can be as important to the magnitude of the temperature fields as the extremes proposed for thermal loading densities. 5 figures, 3 tables.

1913 (SAND--79-1019C) INTERACTION OF RADIONUCLIDES WITH GEOMEDIA FROM THE NEVADA TEST SITE. Lynch, A.W.; Dosch, R.G. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 7p. (CONF-791112--34). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

Aqueous/solid distribution coefficients have been measured for ^{137}Cs, ^{85}Sr, ^{99}Tc, ^{152}Eu, ^{144}Ce, ^{238}Pu, ^{243}Am and ^{244}Cm on powdered argillite and hornfels obtained from the Nevada Test Site. The fluid phases included a groundwater simulant and deionized water preequilibrated with powdered argillite. Distribution coefficients for lanthanides and actinides are generally high and Eleana shale was found to effectively sorb technetium.

1914 (SAND--79-1036C) THERMAL ASPECTS OF THE ELEANA NEAR-SURFACE HEATER EXPERIMENT. McVey, D.F.; Lappin, A.R. (Sandia Labs., Albuquerque, NM (USA)). [nd]. Contract W-7405-ENG-36. 3p. (CONF-791112--4). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

An electrically powered heater simulating a full size High Level Waste canister has been operated for 250 days at a depth of 23 meters in Eleana argillite on the DOE Nevada Test Site. A constant 3.8 kW was input to the 0.3 m diameter x 3 m long (heated section) heater. This presentation discusses results of the thermal modeling for this test, compares model results with measured temperatures, and discusses present limitations in code and modeling capability.

1915 (SAND--79-1047C) MECHANICAL MODELING OF NUCLEAR WASTE DISPOSAL IN ARGILLITE AT THE NEVADA TEST SITE. Thomas, R.K.; Lappin, A.R. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 4p. (CONF-791112--3). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

Numerical calculations for a near surface heater experiment in argillite conducted at the Nevada Test Site were performed using the finite element code ADINA assuming a two-dimensional axisymmetric geometry. The existence and extent of the region of tensional opening of joints surrounding the heater, predicted by the mechanical model, were confirmed by posttest borehole inspection, permeability measurements, and drillback. Exrapolation of near surface heater model to repository depths reveals the necessity for prior knowledge of the mechanical properties and state of stress in-situ. The extent of the joint opening zone, for example, is not altered by changes in the elastic modulus at the near surface, but is significantly decreased beyond certain depths depending upon the in-situ elastic modulus. Results of these calculations are presented. To further define the behavior at depth, and place bounds on the joint opening zone, far-field calculations were performed for a generic repository in argillite. Both spent fuel and high level waste heat sources were considered at different burial densities and depths. Results of a parametric study are presented in which the mechanical properties, in-situ stresses, and waste heat sources were varied.

1916 (SAND--79-1076C) PERSPECTIVE OF WASTE ISOLATION RESEARCH ISSUES AND ASSESSMENT OF CONSEQUENCES FOR RADIONUCLIDE RELEASE. Hunter, T.O. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 9p. (CONF-791112--29). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

The finiteness of research resources to address technical issues for nuclear waste management requires a realistic assessment of their importance. The most appropriate method for making this assessment is the combination of system studies, which include consideration of the role of all protective barrier, and consequence assessment models that can estimate the potential hazard imposed upon man for assumed violations of these barriers. Sensitivity analyses on certain issues can then be performed to determine the impact of various

descriptive parameters. Work commensurate with this strategy has been initiated at Sandia. Some conclusions drawn from these studies specifically applicable to WIPP for the scenarios considered are that: Waste form and protective canisters are not essential as barriers. Assumed radionuclide dissolutioning is far in excess of that possible with developmental waste forms. Brine migration plays no significant role in long-term isolation; complications to retrievability can be avoided with numerous technical alternaives. Radionuclide sorption in geomedia near repositories plays an important role in reducing consequences, but sites with favorable geologic and hydrologic settings such as WIPP can tolerate essentially no reliance on sorption and still achieve inconsequential predicted doses. Plutonium sorption with K/sub d/ greater than 10 are sufficient to eliminate direct doses from plutonium. Borehole plugs are not required for primary protection. Continued scientific resolution of both real and perceived issues can, however, provide additional assurance and public confidence that consequences can be reduced beyond those predicted in bounding scenarios. In addition, such investigation will assure that appropriate limits are instituted for defining parameters and that all assumptions in predictive models are technically sound.

1917 (SAND--79-1109) BACKFILL BARRIER AS A COMPONENT IN A MULTIPLE BARRIER NUCLEAR WASTE ISOLATION SYSTEM. Nowak, E.J. (Sandia National Labs., Albuquerque, NM (USA)). May 1980. Contract AC04-76DP00789. 32p. NTIS, PC A03/MF A01.

Quantitative estimates of the potential effectiveness of backfill barriers based on a linear sorption model are presented. Using getters such as clays (known sorbents), a backfill approximately 1-foot-thick can delay by 10^4 to 10^5 years the breakthrough of transuranics. A delay of 10^3 years is possible for major cationic fission products. These delays can be achieved provided that (1) the distribution coefficient (K/sub d/, a measure of affinity for sorbed species) for the barrier material is equal to or greater than 2000 ml/g for transuranics and 200 ml/g for fission products; (2) the interstitial groundwater velocity through the barrier is limited to 1 ft/year or less; (3) the effective porosity of the barrier is equal to or less than 0.1; and (4) the physical integrity of the barrier is maintained (no channels or cracks). Mixtures containing expanding clays such as smectites and other getters are expected to satisfy these criteria.

1918 (SAND--79-1110) RADIONUCLIDE SORPTION AND MIGRATION STUDIES OF GETTERS FOR BACKFILL BARRIERS. Nowak, E.J. (Sandia National Labs., Albuquerque, NM (USA)). Jul 1980. Contract AC04-76DP00789. 57p. NTIS, PC A04/MF A01.

Bentonite and hectorite clay minerals were chosen for study and development as potential backfill materials for testing in the proposed Waste Isolation Pilot Plant (WIPP), a radioactive waste repository and test facility in bedded salt. This choice of materials was based on initial screening results which are presented and on the predicted physical properties of these materials. These properties were verified experimentally in concentrated brines specific to the WIPP site. Distribution coefficients, K/sub d/, were calculated from batch sorption measurements on bentonite and hectorite in the nearly saturated brines A and B. The resulting K/sub d/ values were in the range of (1 to 5) x 10^3 ml/g for europium; (2 to 40) x 10^3 ml/g for plutonium(IV); and (4 to 16) x 10^3 ml/g for americium(III). A silica- and calcite-containing sand mixed with bentonite and hectorite acted as a sorber of americium(III) but was merely an inert diluent for plutonium(IV). Pertechnetate anions (TcO_4^-) sorbed on activated charcoal with K/sub d/ values in the range of (0.2 to 0.4) x 10^3 ml/g. Pertechnetate, cesium, and strontium ions in brine were not sorbed appreciably by bentonite or hectorite. Although experimental evidence is given for a possible role of solubility in the sorption of europium on getters, other data presented here and evidence from the literature are inconsistent with a simple single reaction sorption mechanism. It is concluded that a backfill containing bentonite on hectorite and activated charcoal is potentially an effective barrier to the migration of Eu(III), Pu(IV), and Am(III) cations and, with further development, to the migration of TcO_4^- anions as well.

1919 (SAND--79-1156) PROCEEDINGS OF THE FOURTH ANNUAL SEABED WORKING GROUP MEETING, ALBUQUERQUE, NEW MEXICO USA, MARCH 5-7, 1979. Anderson, D.R. (ed.). (Sandia Labs., Albuquerque, NM (USA)). Aug 1979. Contract EY-76-C-04-0789. 223p. Dep. NTIS, PC A10/MF A01.

Objectives of the meeting were: (1) to review the technical status and policies of national programs regarding assessment of deep ocean bed disposal of high-level radioactive wastes; (2) to provide a forum for discussions, information exchange, and planning of future efforts; (3) to identify and coordinate research vessel cruises and experiments, and establish cooperative programs, and (4) to identify one-of-a-kind test facilities and consider multinational use of such facilities. Seven countries (Canada, France, Japan, Federal Republic of Germany, the Netherlands, the United Kingdom, and the United States) participated. A representative of the Commission of European Communities, Ispra Establishment, was also present. Papers submitted at the meeting, together with the reports of the Seabed Working Group Executive Committee and the individual task groups, are compiled in this document.

1920 (SAND--79-1197C) SENSITIVITY STUDY ON THE PARAMETERS OF THE REGIONAL HYDROLOGY MODEL FOR THE NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS. Iman, R.L.; Davenport, J.M.; Waddell, R.K.; Stephens, H.P.; Leap, D.I. (Sandia Labs., Albuquerque, NM (USA); Texas Tech Univ., Lubbock (USA); Geological Survey, Denver, CO (USA)). 1979. Contract EY-76-C-04-0789. 31p. (CONF-791016--3). Dep. NTIS, PC A03/MF A01.

From 1979 DOE statistical symposium; Gatlinburg, TN, USA (24 Oct 1979).

Statistical methodology has been applied to the investigation of the regional hydrologic systems of a large area encompassing the Nevada Test Site (NTS) as a part of the overall evaluation of the NTS for deep geologic disposal of nuclear waste. Statistical techniques including Latin hypercube sampling were used to perform a sensitivity analysis on a two-dimensional finite-element code of 16 geohydrologic zones used to model the regional ground-water flow system. The Latin hypercube sample has been modified to include correlations between corresponding variables from zone to zone. From the results of sensitivity analysis it was found that: (1) the ranking of the relative importance of input variables between locations within the same

geohydrologic zone were similar, but not identical; and (2) inclusion of a correlation structure for input variables had a significant effect on the ranking of their relative importance. The significance of these results is discussed with respect to the hydrology of the region.

1921 (SAND--79-1199) HEATED MINE ROOM AND PILLAR SECONDARY CREEP RESPONSE. Tillerson, J.R.; Dawson, P.R. (Sandia Labs., Albuquerque, NM (USA)). Apr 1980. Contract AC04-76DP 00789. 47p. NTIS, PC A03/MF A01.

Heated salt mine room and pillar simulations have been performed to provide information regarding parameters affecting room closure rates to designers of radioactive waste isolation facilities. A coupled secondary creep and heat transfer formulation with large strain capabilities was used to assess the effects of variations in creep law parameters, thermal properties, imposed boundary conditions, temporal integration, and meshing resolution on room closure rates. Results indicate that the greatest effect results from variations in parameters appearing in the creep constitutive equation.

1922 (SAND--79-1259C) THERMOPHYSICAL PROPERTIES OF ROCKS: A PERSPECTIVE ON DATA NEEDS, SOURCES AND ACCURACY. Stephens, H.P.; Sinnock, S. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 27p. (CONF-791205--10). Dep. NTIS, PC A03/MF A01.

From ASME winter annual meeting; New York, NY, USA (2 Dec 1979).

Recent emphasis on research in geologic isolation of nuclear wastes and geoenergy resource development has created a renewed demand for engineering thermophysical property data for rocks and other geologic materials at elevated pressures and temperatures. In contrast to fabricated engineering materials, with properties which can be specified, rocks used in engineering design are complex, naturally occurring materials having properties which must be characterized, rather than specified, for engineering studies. Much difficulty in measuring, reporting, and using thermophysical properties of rocks results from (1) rock inhomogeneity and anisotropy on both microscopic and macroscopic scales; (2) inclusion of pore fluids, such as water; and (3) measurement of laboratory properties under conditions quite different from those of in situ material. Because measurements on in situ materials are scarce, many analyses must depend on extrapolated values of uncertain accuracy. A survey of thermophysical property data available for geologic thermal transport studies indicates that caution must be taken to effectively match data abstracted from the literature with project objectives.

1923 (SAND--79-1265) PRELIMINARY ONE-DIMENSIONAL THERMAL ANALYSIS OF WASTE EMPLACEMENT IN TUFFS. Bulmer, B.M.; Lappin, A.R. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1980. Contract AC04-76DP00789. 31p. NTIS, PC A03/MF A01.

One-dimensional calculations of near-field temperatures resulting from waste emplacement in a multiple-layered tuff stratigraphy are presented. Results indicate a marked sensitivity of peak temperatures to assignment of in-situ fluid pressure, geothermal-heat flux, waste type, and location of waste relative to a specific stratigraphic discontinuity. Under the criterion that allowable initial-power densities are limited by the occurrence of boiling at a distance of 10 m from emplaced waste, allowable power densities are calculated to range up to 150 kW/acre or more, depending upon geothermal heat flux and waste type.

1924 (SAND--79-1276) IN-SITU TUFF WATER MIGRATION/HEATER EXPERIMENT: EXPERIMENTAL PLAN. Johnstone, J.K. (Sandia National Labs., Albuquerque, NM (USA)). Aug 1980. Contract AC04-76DP00789. 166p. NTIS, PC A08/MF A01.

Tuffs on the Nevada Test Site (NTS) are currently under investigation as a potential isolation medium for heat-producing nuclear wastes. The National Academy of Sciences has concurred in our identification of the potentially large water content (less than or equal to 40 vol %) of tuffs as one of the important issues affecting their suitability for a repository. This Experimental Plan describes an in-situ experiment intended as an initial assessment of water generation/migration in response to a thermal input. The experiment will be conducted in the Grouse Canyon Welded Tuff in Tunnel U12g (G-Tunnel) located in the north-central region of the NTS. While the Grouse Canyon Welded Tuff is not a potential repository medium, it has physical, thermal, and mechanical properties very similar to those tuffs currently under consideration and is accessible at depth (400 m below the surface) in an existing facility. Other goals of the experiment are to support computer-code and instrumentation development, and to measure in-situ thermal properties. The experimental array consists of a central electrical heater, 1.2 m long x 10.2 cm diameter, surrounded by three holes for measuring water-migration behavior, two holes for measuring temperature profiles, one hole for measuring thermally induced stress in the rock, and one hole perpendicular to the heater to measure displacement with a laser. This Experimental Plan describes the experimental objectives, the technical issues, the site, the experimental array, thermal and thermomechanical modeling results, the instrumentation, the data-acquisition system, posttest characterization, and the organizational details.

1925 (SAND--79-1278) PRETEST THERMAL ANALYSIS OF THE TUFF WATER MIGRATION/IN-SITU HEATER EXPERIMENT. Bulmer, B.M. (Sandia Labs., Albuquerque, NM (USA)). Feb 1980. Contract AC04-76DP00789. 43p. NTIS, PC A03/MF A01.

This report describes the pretest thermal analysis for the Tuff Water Migration/In-Situ Heater Experiment to be conducted in welded tuff in G-tunnel, Nevada Test Site. The parametric thermal modeling considers variable boiling temperature, tuff thermal conductivity, tuff emissivity, and heater operating power. For nominal tuff properties, some near field boiling is predicted for realistic operating power. However, the extent of boiling will be strongly determined by the ambient (100% water saturated) rock thermal conductivity. In addition, the thermal response of the heater and of the tuff within the dry-out zone (i.e., bounded by boiling isotherm) is dependent on the temperature variation of rock conductivity as well as the extent of induced boiling.

1926 (SAND--79-1305) SUMMARY OF RESEARCH AND DEVELOPMENT ACTIVITIES IN SUPPORT OF WASTE ACCEPTANCE CRITERIA FOR WIPP. Hunter, T.O. (comp.). (Sandia Labs., Albuquerque, NM (USA)). Nov 1979. Contract EY-76-C-04-0789. 244p. Dep. NTIS, PC A11/MF A01.

The development of waste acceptance criteria for the Waste Isolation Pilot Plant (WIPP) is summarized. Specifications for acceptable waste forms are included. Nine program areas are discussed. They are: TRU characterization, HLW interactions, thermal/structural interactions, nuclide migration, permeability, brine migration, borehole plugging, operation/design support, and instrumentation development. Recommendations are included. (DC)

1927 (SAND--79-1306) TEST PLAN: POTASH CORE TEST. WIPP EXPERIMENTAL PROGRAM BOREHOLE PLUGGING. Christensen, C.L. (Sandia Labs., Albuquerque, NM (USA)). Sep 1979. Contract EY-76-C-04-0789. 40p. Dep. NTIS, PC A03/MF A01.

The Potash Core Test will utilize a WIPP emplaced plug to obtain samples of an in-situ cured plug of known mix constituents for bench scale testing. An earlier effort involved recovery at the salt horizon of Plug 217, a 17 year old plug in a potash exploration hole for bond testing, but the lack of particulars in the emplacement precluded significant determination of plug performance.

1928 (SAND--79-1429C) CORROSION RESISTANT METALLIC CANISTERS: AN IMPORTANT ELEMENT OF A MULTIBARRIER DISPOSAL PROGRAM. Magnani, N.J.; Braithwaite, J.W. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 8p. (CONF-791112--30). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

A program with the goal of qualifying a material for a 300 year lifetime as a nuclear waste canister is underway at Sandia Laboratories. The corrosion and stress corrosion cracking behavior of the leading candidate, TiCode-12 (Ti-0.8% Ni-0.3% Mo), is contrasted to that of a commonly used engineering alloy, 304 stainless steel. Experimental evidence is presented which shows the inadequacy of 304 stainless steel in simulated repository environments and shows that TiCode-12 may survive the desired 300 years. Further work required to qualify TiCode-12 is outlined.

1929 (SAND--79-1474C) CONASAUGA NEAR SURFACE HEATER EXPERIMENT. IMPLICATIONS FOR A REPOSITORY SITED IN A WATER-SATURATED ARGILLACEOUS FORMATION. Krumhansl, J.L.; Sundberg, W.D. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 10p. (CONF-790938--3). Dep. NTIS, PC A02/MF A01.

From Workshop on the use of argillaceous materials for the isolation of radioactive wastes; Paris, France (10 Sep 1979).

Results of the Conasauga Near Surface Heater Experiment suggest that the effects of ground water on a repository located in shale would be most pronounced in their influence on chemical processes. Despite the water-saturated condition of the Conasauga shale, conduction, not convection, was the principal mode of heat transport. Metal corrosion, however, was found to be significantly enhanced by the refluxing steam. The several centimeters of scale left behind by the boiling water, in a repository, could interfere with retrieval operations or form a coating of low thermal conductivity material on a canister. Finally, alternate wetting and drying due to sporadic steam generation caused up to 20 microns of alteration on a sample of borosilicate waste glass simulant (PNL 75-25) included in the test.

1930 (SAND--79-1475C) THERMAL AND CHEMICAL PROPERTIES OF SATURATED MARINE CLAYS IN A NEAR FIELD ENVIRONMENT. Krumhansl, J.L.; Hadley, G.R. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 13p. (CONF-790938--1). Dep. NTIS, PC A02/MF A01.

From Workshop on the use of argillaceous materials for the isolation of radioactive wastes; Paris, France (10 Sep 1979).

Thermal and geochemical investigations were made on water saturated marine clays for the purpose of determining whether such sediments would have properties favorable for the disposal of high level waste. Thermal conductivity and diffusivity were found to remain relatively constant between 25 and 300°C. The chemistry of seawater-sediment mixtures, however, undergoes marked changes with heating. A distinctly acidic condition may be generated above 200°C and many trace elements are solubilized. Mineralogic changes are dominated by the formation of a magnesium-rich smectite clay. These changes are, however, of sufficiently localized extent that a considerable barrier to radionuclide migration would remain between an emplaced waste canister and the ocean floor.

1931 (SAND--79-1484) STATUS OF SHAFT 78 WITH RESPECT TO MODELING RADIOACTIVE WASTE BURIAL IN ELEANA ARGILLITE, INCLUDING CALCULATIONS TO DATE. Eaton, R.R.; Sundberg, W.D.; Larson, D.E.; Sherman, M.P. (Sandia National Labs., Albuquerque, NM (USA)). May 1980. Contract AC04-76DP00789. 28p. NTIS, PC A03/MF A01.

The SHAFT 78 Code (multidimensional, two fluid phases, porous medium) has been used to begin assessment of the consequences of nuclear waste burial in a 1000-acre repository emplaced in argillite. The methodology used can well be applied to other argillaceous rocks as well as to hard rocks in general so long as their in-situ rock permeability can reasonably be assumed to be temperature- and stress-independent. The repository is assumed to contain spent fuel (SF) UO_2 at an initial power loading of 150 kW/acre and located at a depth of 600 m. It was found that with perfect backfill (permeabilty = 1×10^{7} darcy), a maximum fluid pressure of 770 bars existed in the repository at a time of 55 y after burial. Holding all other input variables constant, the maximum fluid pressure in the repository never exceeded the local lithostatic pressure when the permeability of the backfill material was increased to 1×10^{-1} darcy. The calculated temperature histories are essentially independent of backfill permeability and porosity, indicating that heat transfer is conduction-dominated.

1932 (SAND--79-1514) BOREHOLE PLUGGING MATERIALS DEVELOPMENT PROGRAM, REPORT 2. Gulick, C.W. Jr.; Boa, J.A. Jr.; Walley, D.M.; Buck, A.D. (Sandia Labs., Albuquerque, NM (USA); Army Engineer Waterways Experiment Station, Vicksburg, MS (USA)). Feb 1980. Contract EY-76-C-04-0789. 89p. Dep. NTIS, PC A05/MF A01.

The data for 2 yr of grout mixtures durability studies developed for the borehole plugging program of the Nuclear Waste Isolation Pilot Plant (WIPP) are reported. In addition, data for 1 yr of durability studies of grout mixture field samples used to plug the ERDA No. 10 exploratory drill hole near the WIPP site are included. The grout samples and the data do not show any evidence of deterioration during the durability studies that include exposure to

brine at both ambient and elevated temperatures. The data include strength, compressional wave velocity, dynamic modulus, expansion, weight change, porosity, permeability, bond strength, chemical analysis of cements, and petrographic examinations. The work was performed at the Concrete Division of the Structures Laboratory of the US Army Engineer Waterways Experiments Station (WES), Vicksburg, Mississippi. The work is continuing at WES.

1933 (SAND--79-1618/1) SUBSEABED DISPOSAL PROGRAM. ANNUAL REPORT, JANUARY-DECEMBER 1978. Talbert, D.M. (ed.). (Sandia Labs., Albuquerque, NM (USA)). Feb 1980. Contract EY-76-C-04-0789. 50p. Dep. NTIS, PC $8.50/MF $3.80.

This is the fifth annual report describing the progress and evaluating the status of the Subseabed Disposal Program (SDP), which was begun in June 1973. The program was initiated by Sandia Laboratories to explore the utility of stable, uniform, and relatively unproductive areas of the world as possible repositories for high-level nuclear wastes. The program, now international in scope, is currently focused on the stable submarine geologic formations under the deep oceans.

1934 (SAND--79-1618(Vol.2)) SUBSEABED DISPOSAL PROGRAM ANNUAL REPORT, JANUARY-DECEMBER 1978. VOLUME II. PRINCIPAL INVESTIGATOR PROGRESS REPORTS. (Sandia Labs., Albuquerque, NM (USA)). Oct 1979. Contract EY-76-C-04-0789. 1014p. Dep. NTIS, PC A99/MF A01.

The topics covered in this report include: geologic siting considerations for the disposal of radioactive wastes into submarine geologic formations; geologic assessment of the MPG-1 regions Central North Pacific; site mapping; geotechnical aspects of subsurface seabed disposal; heat transfer, thermal and fluid physics in the deep ocean sediments; mechanical response predictive capability; sediment-seawater interaction at 300°C, 500 bars; stability of actinides in chloride media; cannister corrosion studies; nuclide sorption and migration; development of apparatus and measurement of thermal conductivity of seabed illite and smectite at temperatures to 500°C at simulated depths to 15,000 ft (9000 psi); in-situ heat transfer experiments; preliminary seabed disposal transport modeling studies; radionuclide migration studies; radionuclide distributions in deep ocean cores; benthic biological studies; deep sea microbial studies; activity rates of abyssal communities; Deep-towed RUM III (Sandia Seabed working platform): a third-generation remote underwater manipulator; long coring facility program; transportation; legal, political, and institutional implications of the Seabed Program for radioactive waste disposal.

1935 (SAND--79-1634C) FIELD TEST PROGRAMS OF BOREHOLE PLUGS IN SOUTHEASTERN NEW MEXICO. Christensen, C.L. (Sandia Labs., Albuquerque, NM (USA)). Oct 1979. Contract EY-76-C-04-0789. 10p. (CONF-791033--1; ONWI/Sub--79-E-511-03700). Dep. NTIS, PC A02/MF A01.

From 1. annual ONWI information meeting; Columbus, OH, USA (30 Oct 1979).

This paper presents the status of the Borehole Plugging Program underway for the plugging of drill holes on and near the proposed Waste Isolation Pilot Plant (WIPP) in southeastern New Mexico. This program will provide the technology for plugging wellbores when required at repository decommissioning.

1936 (SAND--79-1665) THERMAL CONDUCTIVITY OF ROCKSALT AND OTHER GEOLOGIC MATERIALS FROM THE SITE OF THE PROPOSED WASTE ISOLATION PILOT PLANT. Sweet, J.N.; McCreight, J.E. (Sandia Labs., Albuquerque, NM (USA)). 19 Mar 1980. Contract EY-76-C-04-0789. 33p. Dep. NTIS, PC A03/MF A01.

The measurements first reported by Acton on the thermal conductivity of samples taken from a borehole at the site of the proposed nuclear waste isolation pilot plant (WIPP) near Carlsbad, NM, have been extended to include additional samples and higher temperature measurements. Samples for measurements were taken from several depths of three wells, including the well AEC 8 from which Acton obtained his samples. These samples ranged from relatively pure rocksalt (NaCl) with small amounts of interstitial anhydrite to essentially nonsalt samples composed of gypsum or clay. The measurements in this latest series were conducted at Sandia, the Los Alamos Scientific Laboratory (LASL), and at Dynatech Corp. In general, the data from the three laboratories agreed reasonably well for similar coarse grained translucent rock salt samples, with the LASL and Sandia results typically being about 20% higher than those of Dynatceh. On the basis of these experiments, it is concluded that the thermal conductivity of materials found at the site can be predicted to an accuracy +-30% from knowledge of the composition and grain size of these materials.

1937 (SAND--79-1679) SEABED DISPOSAL PROJECT TWO-DIMENSIONAL AXISYMMETRIC PENETROMETER SIMULATIONS. Chavez, P.F.; Dawson, P.R.; Schuler, K.W. (Sandia Labs., Albuquerque, NM (USA)). Mar 1980. Contract EY-76-C-04-0789. 54p. Dep. NTIS, PC A04/MF A01.

Preliminary two-dimensional, one-constituent hole closure analyses of an experimental apparatus and the flow of in situ ocean sediments following a penetrometer explacement have been performed. Boundary conditions associated with the experimental apparatus were found to greatly affect cavity response. Difficulties were encountered in modelling penetrometer-sediment interfaces and in obtaining smooth stress histories. The use of a different computer code in later analyses led to more realistic penetrometer-sediment interface models and to improved success in obtaining stress histories. These results along with some recommendations for future work are presented.

1938 (SAND--79-1746C) TEST RESULTS AND SUPPORTING ANALYSIS OF A NEAR SURFACE HEATER EXPERIMENT IN THE ELEANA ARGILLITE. McVey, D.F.; Lappin, A.R.; Thomas, R.K. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 21p. (CONF-790938--4). Dep. NTIS, PC A02/MF A01.

From Workshop on the use of argillaceous materials for the isolation of radioactive wastes; Paris, France (10 Sep 1979).

A preliminary evaluation of the in-situ thermomechanical response of argillite to heating was obtained from a near-surface heater test in the Eleana Formation, at the Nevada Test Site. The experiment consisted of a 3.8 kW, 3-m long x 0.3-m diameter electrical heater in a central hole surrounded by peripheral holes containing instrumentation to measure temperature, gas pressures, and vertical displacement. A thermal model of the experiment agreed well with experimental results; a comparison of measured and predicted

temperatures indicates that some nonmodeled vertical transport of water and water vapor occurred near the heater, especially at early times. A mechanical model indicated that contraction of expandable clays in the argillite produced a region 1.5 to 2.0 m in radius, in which opening of preexisting joints occurred as a result of volumetric contraction. Results of thermal and mechanical modeling, laboratory property measurements, experimental temperature measurements, and post-test observations are all self-consistent and provide preliminary information on the in situ response of argillaceous rocks to the emplacement of heat-producing nuclear waste. 9 figures, 2 tables.

1939 (SAND--79-1855) CONASAUGA NEAR-SURFACE HEATER EXPERIMENT. FINAL REPORT. Krumhansl, J.L. (Sandia Labs., Albuquerque, NM (USA)). Nov 1979. Contract EY-76-C-04-0789. 98p. Dep. NTIS, PC A05/MF A01.

The Conasauga Experiment was undertaken to begin assessment of the thermomechanical and chemical response of a specific shale to the heat resulting from emplacement of high-level nuclear wastes. Canister-size heaters were implanted in Conasauga shale in Tennessee. Instrumentation arrays wee placed at various depths in drill holes around each heater. The heaters operated for 8 months and, after the first 4 days, were maintained at 385°C. Emphasis was on characterizing the thermal and mechanical response of the formation. Conduction was the major mode of heat transport; convection was perceptible only at temperatures above the boiling point of water. Despite dehydration of the shale at higher temperatures, in situ thermal conductivity was essentially constant and not a function of temperature. The mechanical response of the formation was a slight overall expansion, apparently resulting in a general decrease in permeability. Metallurgical observations were made, the stability of a borosilicate glass wasteform simulant was assessed, and changes in formation mineralogy and groundwater composition were documented. In each of these areas, transient nonequilibrium processes occur that affect material stability and may be important in determining the integrity of a repository. In general, data from the test reflect favorably on the use of shale as a disposal medium for nuclear waste.

1940 (SAND--79-1889) STRATEGY FOR INVESTIGATION OF FLUID MIGRATION IN EVAPORITES (WASTE ISOLATION PILOT PLANT - WIPP). Lambert, S.J.; Shefelbine, H.C. (Sandia Labs., Albuquerque, NM (USA)). Mar 1980. Contract EY-76-C-04-0789. 27p. Dep. NTIS, PC A03/MF A01.

The proposed strategy for WIPP project investigations of fluid migration in evaporites focuses upon a quantitative evaluation of each of several processes. Potential short- and long-term problems arising from fluid migration are complication of waste retrieval and mobilization of waste nuclides. The strategy will attempt to determine the degree to which these potentials are realized with respect to five hypothetical types of waste-rock interactions: movement of waste containers, migration of nuclides, formation of radioactive brine pocket, radiolytic generation of gas, and degradation of waste container. Of eight identified processes whose combinations could lead to the five types of interactions, only five are to be quantitatively investigated by the studies of fluid migration per se: presence of fluids, fluid mobilization toward heat-producing and contact-handled waste, encounter of fluids with influence of waste form, reversal of direction of fluid mobilization, and entrainment of nuclides in fluids. Methods of investigation entail an iterative combination of laboratory experimentation and mathematical modeling.

1941 (SAND--79-1902) INSTRUMENTATION DEVELOPMENT FOR THE WASTE ISOLATION PILOT PLANT (WIPP) BOREHOLE PLUGGING PROGRAM (BHP). Cook, C.W. (Sandia Labs., Albuquerque, NM (USA)). Nov 1979. Contract EY-76-C-04-0789. 17p. Dep. NTIS, PC A02/MF A01.

This report discusses the instrumentation development needs of the borehole testing program as it now exists. Although requirements may change as the program progresses, the items indicated are basic to any borehole plugging program. Instrumentation is discussed both for the plug environment and for the plug itself. For the plug environment, a probe for measuring the disturbed region and a coordinate logging tool are required. For the plug itself, instrumentation includes measurements above, within, and below the plug. Instrumentation for most measurements above the plug is currently available; for measurements within and below the plug, however, further development is required. Specifically, resistivity, induction, and acoustic probes; an in situ stressmeter; and a hardwire, feedthrough system need to be developed.

1942 (SAND--79-1950C) SUMMARY OF RESULTS AND PLANS OF THE EXPERIMENTAL PROGRAM FOR THE WASTE ISOLATION PILOT PLANT. Hunter, T.O. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 20p. Dep. NTIS, PC A02/MF A01.

Four programs are reported: WIPP experimental program, brine migration experiments, canister material studies, and mine environment studies. (DLC)

1943 (SAND--79-1959C) WASTE ISOLATION PILOT PLANT (WIPP) RELEASE SCENARIOS. Brannen, J.P. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 11p. (CONF-791087--1). Dep. NTIS, PC A02/MF A01.

From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).

The selection of release scenarios utilized in the assessment of the Waste Isolation Pilot Plant (WIPP) performance studies is discussed. The first scenario selected was an uncased 9'' borehole penetrating the Rustler Formation, the Repository, and the Bell Canyon Aquifer. The second scenario selected was described as a U tube scenario. It postulated events which lead to a flow from the Rustler Formation through the Repository then back to the Rustler Formation. The third scenario selected covered the formation of a nonflowing communication between the Repository and the Rustler Formations. Here the movement of radionuclides is up the salinity gradient by molecular diffusion. The last scenario assumed that at some future date, a drill crew cored through a cannister and brought the material to the surface.

1944 (SAND--79-2015) PRELIMINARY INVENTORY OF PRE-CENOZOIC CLAY SHALES AND ARGILLITES OF THE CONTERMINOUS UNITED STATES. Connolly, J.R.; Woodward, L.A. (Sandia Labs., Albuquerque, NM (USA)). Mar 1980. Contract EY-76-C-04-0789. 51p. Dep. NTIS, PC A04/MF A01.

Cretaceous shales of the Western Interior of

the United States occur in vast quantities and in thickness greater than 150 m (500 ft). Some older Mesozoic, Paleozoic, and Precambrian shale and argillites also appear to approach these thicknesses in deposits of considerable lateral extent. These older rocks commonly have a lower proportion of expandable clays and lower water contents.

1945 (SAND--79-2019C) CALCULATED HYDROGEOLOGIC PRESSURES AND TEMPERATURES RESULTING FROM RADIOACTIVE WASTE IN THE ELEANA ARGILLITE. Eaton, R.R.; Sundberg, W.D.; Larson, D.E.; Sherman, M.P. (Sandia Labs., Albuquerque, NM (USA); Rochester Inst. of Technology, NY (USA)). 1979. Contract EY-76-C-04-0789. 9p. (CONF-791112--32). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

The SHAFT 78 code (multi-dimensional, two fluid phases, porous medium) has been used to begin assessment of the consequences of nuclear waste burial in a 1000-acre repository emplaced in argillite. The repository is assumed to contain spent fuel [SF (UO_2)] at a loading of 150 kW/acre and to be located at a depth of 600 m. It was found that with perfect backfill, permeability = 1.0×10^{-7} Darcys, a maximum fluid pressure in the repository of 770 bars existed at a time of 55 years after burial. Holding all other input variables constant, the maximum fluid pressure in the underground workings never exceeded the local lithostatic pressure when the permeability of the backfill material was increased to 1.0×10^{-1} Darcys. The calculated temperature profiles are essentially independent of backfill permeability and porosity indicating that the heat flow is conduction dominated.

1946 (SAND--79-2023C) TITANIUM ALLOY CORROSION IN NUCLEAR WASTE ENVIRONMENTS. Braithwaite, J.W.; Magnani, N.J.; Munford, J.W. (Sandia Labs., Albuquerque, NM (USA)). 1980. Contract EY-76-C-04-0789. 35p. (CONF-800305--5). Dep. NTIS, PC A03/MF A01.

From Corrosion/80 NACE meeting; Chicago, IL, USA (6 Mar 1980).

A corrosion study has been conducted on the titanium alloys Ti-50A, TiCode 12, and Ti-Pd to evaluate their suitability as a long lifetime (300 to 600 year) canister material for the isolation of nuclear wastes. TiCode 12, selected as the primary candidate material, is shown to be very resistant to environmental attack. Results of electrochemical, general corrosion, and stress corrosion cracking experiments are presented. These data, including those from severe overtests, have shown that TiCode 12 is a viable candidate material for long-term waste isolation. 17 figures.

1947 (SAND--79-2073) BIOLOGICAL STUDIES OF THE US SUBSEABED DISPOSAL PROGRAM. Gomez, L.S.; Hessler, R.R.; Jackson, D.W.; Marietta, M.G.; Smith, K.L. Jr.; Talbert, D.M.; Yayanos, A.A. (Sandia National Labs., Albuquerque, NM (USA); Scripps Institution of Oceanography, La Jolla, CA (USA); Falcon Research and Development, Albuquerque, NM (USA)). Feb 1980. Contract AC04-76DP00789. 18p. NTIS, PC A02/MF A01.

The Subseabed Disposal Program (SDP) of the US is assessing the feasibility of emplacing high level radioactive wastes (HLW) within deep-sea sediments and is developing the means for assessing the feasibility of the disposal practices of other nations. This paper discusses the role and status of biological research in the SDP. Studies of the disposal methods and of the conceived barriers (canister, waste form and sediment) suggest that biological knowledge will be principally needed to address the impact of accidental releases of radionuclides. Current experimental work is focusing on the deep-sea ecosystem to determine: (1) the structure of benthic communities, including their microbial component; (2) the faunal composition of deep midwater nekton; (3) the biology of deep-sea amphipods; (4) benthic community metabolism; (5) the rates of bacterial processes; (6) the metabolism of deep-sea animals; and (7) the radiation sensitivity of deep-sea organisms. A multicompartment model is being developed to assess quantitatively the impact (on the environment and on man) of releases of radionuclides into the sea.

1948 (SAND--79-2117) BIOLOGICAL RAMIFICATIONS OF THE SUBSEABED DISPOSAL OF HIGH-LEVEL NUCLEAR WASTE. Gomez, L.S.; Hessler, R.R.; Jackson, D.W.; Marietta, M.G.; Smith, K.L. Jr.; Talbert, D.M.; Yayanos, A.A. (Sandia National Labs., Albuquerque, NM (USA)). May 1980. Contract AC04-76DP00789. 31p. NTIS, PC A03/MF A01.

The primary goal of the US Subseabed Disposal Program (SDP) is to assess the technical and environmental feasibility of disposing of high-level nuclear waste in deep-sea sediments. The subseabed biology program is charged with assessing possible ecosystem effects of radionuclides as well as possible health effects to man from radionuclides which may be released in the deep sea and transported to the ocean surface. Current biological investigations are attempting to determine benthic community structure; benthic community metabolism; the biology of deep-sea mobile scavengers; the faunal composition of midwater nekton; rates of microbial processes; and the radiation sensitivity of deep-sea organisms. Existing models of the dispersal of radionuclides in the deep sea have not considered many of the possible biological mechanisms which may influence the movement of radionuclides. Therefore, a multi-compartment foodweb model is being developed which considers both biological and physical influences on radionuclide transport. This model will allow parametric studies to be made of the impact on the ocean environment and on man of potential releases of radionuclides.

1949 (SAND--79-2117C) BIOLOGICAL RAMIFICATIONS OF THE SUBSEABED DISPOSAL OF HIGH-LEVEL NUCLEAR WASTE. Gomez, L.S.; Hessler, R.R.; Jackson, D.W.; Marietta, M.G.; Smith, K.L. Jr.; Talbert, D.M.; Yayanos, A.A. (Sandia Labs., Albuquerque, NM (USA); Scripps Institution of Oceanography, La Jolla, CA (USA); Falcon Research and Development, Albuquerque, NM (USA)). 1980. Contract EY-76-C-04-0789. 30p. (CONF-800420--1). Dep. NTIS, PC A03/MF A01.

From 2. international ocean disposal symposium; Woods Hole, MA, USA (15 Apr 1980).

Portions of document are illegible.

The primary goal of the US Subseabed Disposal Program (SDP) is to assess the technical and environmental feasibility of disposing of high-level nuclear waste in deep-sea sediments. The subseabed biology program is charged with assessing possible ecosystem effects of radionuclides as well as possible health effects to man from radionuclides which may be released in the deep sea and transported to the ocean surface. Current biological investigations are attempting to determine benthic community structure; benthic community

metabolism; the biology of deep-sea mobile scavengers; the faunal composition of midwater nekton; rates of microbial processes, and the radiation sensitivity of deep-sea organisms. Existing models of the dispersal of radionuclides in the deep sea have not considered many of the possible biological mechanisms which may influence the movement of radionuclides. Therefore, a multi-compartment foodweb model is being developed which considers both biological and physical influences on radionuclide transport. This model will allow parametric studies to be made of the impact on the ocean environment and on man of potential releases of radionuclides.

1950 (SAND--79-2141) BOREHOLE PLUGGING PROGRAM. STATUS REPORT, OCTOBER 1, 1978-SEPTEMBER 30, 1979. Christensen, C.L.; Cook, C.W.; Gulick, C.W. (Sandia Labs., Albuquerque, NM (USA)). Jan 1980. Contract EY-76-C-04-0789. 24p. Dep. NTIS, PC A02/MF A01.

This program is in support of the Waste Isolation Pilot Plant (WIPP) proposed for southeastern New Mexico. Current-year activities cover management, materials, instrumentation, and field tests. Proposed FY 80 activities are also outlined. (DLC)

1951 (SAND--79-2212) CREEP CONSOLIDATION OF NUCLEAR DEPOSITORY BACKFILL MATERIALS. Butcher, B.M. (Sandia National Labs., Albuquerque, NM (USA)). Oct 1980. Contract AC04-76DP00789. 28p. NTIS, PC A03/MF A01.

Evaluation of the effects of backfilling nuclear waste repository rooms is an important aspect of waste repository design. Consolidation of the porous backfill takes place as the room closes with time, causing the supporting stress exerted by the backfill against the intact rock to increase. Estimation of the rate of backfill consolidation is required for closure rate predictions and should be possible if the creep law for the solid constituent is known. A simple theory describing consolidation with a spherical void model is derived to illustrate this relationship. Although the present form of the theory assumes a homogeneous isotropic incompressible material atypical of most rocks, it may be applicable to rock salt, which exhibits considerable plasticity under confined pressure. Application of the theory is illustrated assuming a simple steady-state creep law, to show that the consolidation rate depends on the externally applied stress, temperature, and porosity.

1952 (SAND--79-2216A) DEGRADATION OF TRANSURANIC-CONTAMINATED WASTES UNDER GEOLOGIC ISOLATION CONDITIONS. Molecke, M.A. (Sandia Labs., Albuquerque, NM (USA)). Nov 1979. Contract EY-76-C-04-0789. 3p. (CONF-800611--2). Dep. NTIS, PC A02/MF A01.

From International symposium on the management of alpha-contaminated wastes; Vienna, Austria (2 Jun 1980).

An extensive experimental study of the degradation of existing forms of defense-related, transuranic-contaminated (TRU) wastes is being conducted by and for Sandia Laboratories. Studies have been performed under environmental conditions expected for deep geologic isolation in the Waste Isolation Pilot Plant (WIPP), a bedded-salt TRU waste repository planned for southeastern New Mexico. A primary purpose of this program has been to support the US Department of Energy in establishing waste acceptance criteria for TRU wastes for isolation in the WIPP. TRU waste forms investigated include cellulosics (paper, rags, wood), plastics, rubbers, mixed organic composite, bitumen, a developmental concrete-TRU ash matrix, mild steel, and inorganic process sludges. This review includes laboratory and field results for waste degradation under a range of conditions, resultant gas generation rates, gas compositions, corrosion rates, and microbial formation and degradation of chelating agents.

1953 (SAND--79-2226) SALT BLOCK II: DESCRIPTION AND RESULTS. Hohlfelder, J.J. (Sandia National Labs., Albuquerque, NM (USA)). Jun 1980. Contract AC04-76DP00789. 69p. NTIS, PC A04/MF A01.

A description of and results from the Salt Block II experiment, which involved the heating of and measurement of water transport within a large sample of rock salt, are presented. These results include the measurement of water released into a heated borehole in the sample as well as measured temperatures within the salt. Measured temperatures are compared with the results of a mathematical model of the experiment.

1954 (SAND--79-2244C) THERMAL, CHEMICAL, AND MASS-TRANSPORT PROCESSES INDUCED IN ABYSSAL SEDIMENTS BY THE EMPLACEMENT OF NUCLEAR WASTE: EXPERIMENTAL AND MODELING RESULTS. McVey, D.F.; Erickson, K.L.; Seyfried, W. (Sandia Labs., Albuquerque, NM (USA); Minnesota Univ., Minneapolis (USA). Dept. of Geology). 1980. Contract EY-76-C-04-0789. 52p. (CONF-800420--3). Dep. NTIS, PC A04/MF A01.

From 2. international ocean disposal symposium; Woods Hole, MA, USA (15 Apr 1980).

This paper discusses heat and mass transport studies of marine red clay sediments being considered as a nuclear waste isolation medium. Numerical models indicate that for a maximum allowable sediment/canister interface temperature of 200 to 250°C, the sediment can absorb about 1.5 kW initial power from waste in a 3 m long by 0.3 m dia canister buried 30 m in the sediment. Fluid displacement due to convection is found to be less than 1 m. Laboratory studies of the geochemical effects induced by heating sediment/seawater mixtures indicate that the canister and waste form must be designed to resist a hot, acid (pH 3 to 4) oxidizing environment. Since the thermally altered sediment volume of about 5.5 m^3 is small relative to the sediment volume overlying the canister, the acid and oxidizing conditions are not anticipated to effect the properties of the far field. Using sorption coefficient correlations, the migration of four nuclides ^{239}Pu, ^{137}Cs, ^{129}I, and ^{99}Tc were computer for a canister buried 30 m deep in a 60 m thick red clay sediment layer. It was found that the ^{239}Pu and ^{137}Cs are essentially completely contained in the sediments, while ^{129}I and ^{99}Tc broke through the 30 m of sediment in about 5000 years. The resultant peak injection rates of 4.6×10^{-5} μCi/year-m^2 for ^{129}I and 1.6×10^{-2} μCi/year-m^2 for ^{99}Tc were less than the natural radioactive flux of ^{226}Ra (3.5 to 8.8 x 10^{-4} μCi/year-m^2) and ^{222}Rn (0.26 to 0.88 μCi/year-m^2).

1955 (SAND--79-2245) STRATEGY FOR ASSESSING THE TECHNICAL, ENVIRONMENTAL, AND ENGINEERING FEASIBILITY OF SUBSEABED DISPOSAL. Anderson, D.R.; Talbert, D.M.; Reese, D.; Boyer, D.G.; Herrmann, H.; Kelly, J. (Sandia National Labs., Albuquerque, NM (USA); Harvard Univ., Cambridge, MA (USA); Department of Energy, Washington, DC (USA); New Hampshire Univ., Durham (USA)). Jul 1980. Contract AC04-

76DP00789. 26p. NTIS, PC A03/MF A01.
This report presents the strategy and management techniques used in the development of the US Subseabed Disposal Program (SDP) for possible disposal of both high-level waste and spent fuel. These have been developed through joint efforts of the Department of Energy (DOE), Division of Waste Isolation, the Sandia Technical Program Manager, the Technical Program Coordinators, the Advisory Group, and the Principal Investigators. Three subsections of this paper address the various components which make up the SDP strategy and management techniques. The first section summarizes the US DOE high-level waste and spent-fuel disposal program and the position that the SDP occupies within that program. The second section, the Subseabed Program Plan, addresses the technical and administrative tools which are employed to facilitate the day-to-day operation of the SDP. The third section addresses the current studies and future plans for addressing the legal, political, and international uncertainties that must be resolved before the SDP reaches the final engineering phases.

1956 (SAND--79-2245C) STRATEGY FOR ASSESSING THE TECHNICAL, ENVIRONMENTAL, AND ENGINEERING FEASIBILITY OF SUBSEABED DISPOSAL. Anderson, D.R.; Boyer, D.G.; Herrmann, H.; Kelly, J.; Talbert, D.M. (Sandia Labs., Albuquerque, NM (USA)). 1980. Contract EY-76-C-04-0789. 32p. (CONF-800420--2). Dep. NTIS, PC A03/MF A01.
From 2. international ocean disposal symposium; Woods Hole, MA, USA (15 Apr 1980).
This paper presents the strategy and management techniques used in the development of the US Subseabed Disposal Program (SDP) for possible disposal of both high-level waste and spent fuel. These have been developed through joint efforts of the Department of Energy (DOE), Division of Waste Isolation, the Sandia Technical Program Manager, the Technical Program Coordinators, the Advisory Group, and the Principal Investigators. Three subsections of this paper address the various components which make up the SDP strategy and management techniques. The first section will summarize the US DOE high-level waste and spent fuel disposal program and the position that the SDP occupies within that program. The second section, the Subseabed Program Plan, addresses the technical and administrative tools which are employed to facilitate the day-to-day operation of the SDP. The third section addresses the current studies and future plans for addressing the legal, political, and international uncertainties that must be resolved prior to the time the SDP reaches the final engineering phases.

1957 (SAND--79-2250) COMPUTER THERMAL MODELING FOR THE SALT ROCK II EXPERIMENT. George, O.L. Jr. (Sandia National Labs., Albuquerque, NM (USA)). Oct 1980. Contract AC04-76DP00789. 28p. NTIS, PC A03/MF A01.
The Salt Block II experiment consisted of a cylindrical block of bedded salt which was heated from within by a cylindrical electric heater. It was an extensively instrumented laboratory experiment that served, among other things, as a touchstone against which to measure the validity of a computer thermal model. The thermal model consisted of 282 nodes joined by 572 conductors, and was constructed for use with the CINDA heat transfer code. Both transient and steady-state temperature distributions within the salt were computed for heater power levels of 200, 400, 600, 1000 and 1500 watts. Temperature versus time plots are presented for 23 locations throughout the Block over a 58-day period. Comparisons of the model results and experimental results are shown for both transient and steady-state conditions. The computed steady-state results were used to develop equations describing both the temperature and the temperature derivative as functions of radial location.

1958 (SAND--79-2254) MEASUREMENTS OF VERY LARGE DEFORMATIONS IN POTASH SALT IN CONJUNCTION WITH AN ONGOING MINING OPERATION. Sattler, A.R.; Christensen, C.L. (Sandia National Labs., Albuquerque, NM (USA)). Jun 1980. Contract AC04-76DP00789. 29p. NTIS, PC A03/MF A01.
Room and pillar deformation were measured in conjunction with a relatively new type of mining operation in a southeastern New Mexico potash mine. The extraction ratio was approximately 90 percent in a first mining operation. Due to severe deformations encountered, instrumentation had to be developed/modified for these measurements. This paper concentrates on experiment design, design of special instrumentation, field installation of equipment, and presentation of the data. Measurements made include extensometers in the pillar, in the floor and ceiling in the room between pillars, absolute level measurements, floor ceiling closure, and stress (strain) measurements. Associated laboratory rock mechanics measurements of samples from the mine are being done separately. Two separate room pillar complexes were instrumented. In the first complex, floor-ceiling deformations of approximately 1 inch/day and pillar deformations around 1/2 inch/day were measured. In the second complex, instrumentation was installed while the pillar was a part of a long wall and the subsequent sequential mining (long wall-pillar with only one adjoining room on one side - pillar in the middle of room pillar complex) was observed. Data return from this operation was good.

1959 (SAND--79-2254C) MEASUREMENTS OF VERY LARGE DEFORMATIONS IN POTASH SALT IN CONJUNCTION WITH AN ONGOING MINING OPERATION. Sattler, A.R.; Christensen, C.L. (Sandia Labs., Albuquerque, NM (USA)). 1980. Contract EY-76-C-04-0789. 10p. (CONF-800507--4). Dep. NTIS, PC A02/MF A01.
From Rock mechanics symposium; Rolla, MO, USA (27 May 1980).
Room and pillar deformation were measured in conjunction with a relatively new type of mining operation in a southeastern New Mexico potash mine. The extraction ration was approximately 90 percent in a first mining operation. Due to severe deformations encountered, instrumentation had to be developed/modified for these measurements. This paper concentrates on experiment design, design of special instrumentation, field installation of equipment, and presentation of the data. Measurements made include extensometers in the pillar, in the floor and ceiling in the room between pillars, absolute level measurements, floor ceiling closure, and stress (strain) measurements. Associated laboratory rock mechanics measurements of samples from the mine are being done separately. Two separate room pillar complexes were instrumented. In the first complex, floor-ceiling deformations of approximately 1 inch/day and pillar deformations around 1/2 inch/day were measured. In the second complex, instrumentation was installed while the pillar was a part of a long wall and the subsequent sequential mining (long wall-pillar with only one adjoining room on one side - pillar in the middle of room pillar complex) was observed. Data return from this

operation was good.

1960 (SAND--79-2328C) CREEP OF OCEAN SEDIMENTS RESULTING FROM THE ISOLATION OF RADIOACTIVE WASTES. Dawson, P.R.; Chavez, P.F.; Lipkin, J.; Silva, A.J. (Cornell Univ., Ithaca, NY (USA). Sibley School of Mechanical and Aerospace Engineering; Rhode Island Univ., Kingston (USA). Dept. of Ocean Engineering). 1980. Contract AC04-76DP00789. 39p. (CONF-800420--4). NTIS, PC A03/MF A01.
From 2. international ocean disposal symposium; Woods Hole, MA, USA (15 Apr 1980).
Predictive models for the creep of deep ocean sediments resulting from the disposal of radioactive wastes are presented and preliminary observations of a program for evaluation of creep constitutive equation parameters are discussed. The models are used to provide calculated response of sediments under waste disposal conditions.

1961 (SAND--79-2423) MINERALOGICAL ASPECTS OF FLUID MIGRATION IN THE SALT BLOCK II EXPERIMENT. Lambert, S.J. (Sandia National Labs., Albuquerque, NM (USA)). May 1980. Contract AC04-76DP00789. 33p. NTIS, PC A03/MF A01.
A block of evaporite rock containing the mineral assemblage halite (88%) - polyhalite (8%) - sylvite (4%) was machined into a cylinder one meter in diameter and one meter high, and was fitted with an axial heater, thermocouples and an off-gas collection system. After about 100 days of heating, identification of mineral efflorescences at the heater hole (carnallite and bischofite) showed that a significant portion of the 111 grams of water recovered (out of around 8500 grams available in the rock) migrated as a liquid, not as a vapor. A microscopic examination of rock slices from within 15 cm of the heater hole (where the temperature was 100 to 200°C, and the gradient was 3 to 15°C/cm) revealed that: (1) fluid inclusions had migrated, but rarely across grain boundaries; (2) fluid inclusions had not been mobilized at distances greater than about 15 cm from the heater hole; and (3) intergranular liquid had been conspicuously mobilized within 15 cm of the heater hole.

1962 (SAND--79-2468) ASSESSMENT OF POTENTIAL RADIONUCLIDE TRANSPORT IN SITE-SPECIFIC GEOLOGIC FORMATIONS. Dosch, R.G. (Sandia National Labs., Albuquerque, NM (USA)). Aug 1980. Contract AC04-76DP000789. 42p. NTIS, PC A03/MF A01.
Associated with the development of deep, geologic repositories for nuclear waste isolation is a need for safety assessments of the potential for nuclide migration. Frequently used in estimating migration rates is a parameter generally known as a distribution coefficient, K/sub d/, which describes the distribution of a radionuclide between a solid (rock) and a liquid (groundwater) phase. This report is intended to emphasize that the use of K/sub d/ must be coupled with a knowledge of the geology and release scenarios applicable to a repository. Selected K/sub d/ values involving rock samples from groundwater/brine simulants typical of two potential repository sites, WIPP and NTS, are used to illustrate this concern. Experimental parameters used in K/sub d/ measurements including nuclide concentration, site sampling/rock composition, and liquid-to-solid ratios are discussed. The solubility of U(VI) in WIPP brine/groundwater was addressed in order to assess the potential contribution of this phenomena to K/sub d/ values. Understanding mehanisms of sorption of radionuclides on rocks would lead to a better predictive capability. Sorption is attributed to the presence of trace constituents (often unidentified) in rocks. An attempt was made to determine if this applied to WIPP dolomite rocks by comparing sorption behavior of the natural material with that of a synthetic dolomite prepared in the laboratory with reagent grade chemicals. The results were inconclusive. The results of a study of Tc sorption by an argillite sample from the Calico Hills formation at NTS under ambient laboratory conditions were more conclusive. The Tc sorption was found to be associated with elemental carbon. Available evidence points to a reduction mechanism leading to the apparent sorption of Tc on the solid phase.

1963 (SAND--79-7042) METEOROLOGICAL AND AIR QUALITY DATA QUARTERLY REPORT WIPP SITE: EDDY COUNTY, NEW MEXICO. WINTER QUARTER, DECEMBER 1976-FEBRUARY 1977. Pocalujka, L.P.; Babij, E.; Church, H.W. (TRC, Inc., Wethersfield, CT (USA); Sandia Labs., Albuquerque, NM (USA)). Aug 1979. Contract EY-76-C-04-0789. 216p. Dep. NTIS, PC A10/MF A01.
The Wipp meteorological, air quality, and radiological measurements program was implemented to support the environmental effort for the evaluations of the site selection suitability. This data report is the third of a series of seasonal quarterly data summaries to be issued for the southeastern New Mexico site.

1964 (SAND--79-7050) SALT BLOCK I TEST: EXPERIMENTAL DETAILS AND COMPARISON WITH THEORY. FINAL REPORT. Duffey, T.A. (Los Alamos Technical Associates, Inc., NM (USA)). Feb 1980. Contract EY-76-C-04-0789. 85p. Dep. NTIS, PC A05/MF A01.
A series of laboratory experiments has been completed at Sandia Laboratories to provide an understanding of the steady state and transient thermal response of a large salt block containing an internal heat source. In this report, details of the experimental program are presented along with results of related efforts, such as thermal conductivity experiments, done in support of the heater experiments (Salt Block I). Finite element temperature field predictions, both transient and steady state, are performed utilizing the COYOTE nonlinear heat conduction program. Comparisons of experimental and theoretical results are generally quite good.

1965 (SAND--79-7102) BIBLIOGRAPHY OF MARINE RADIATION ECOLOGY PREPARED FOR THE SEABED PROGRAM. Schultz, V.S. (Lockheed Missiles and Space Co., Palo Alto, CA (USA)). Feb 1980. Contract EY-76-C-04-0789. 318p. Dep. NTIS, PC A14/MF A01.
References on the effects of ionizing radiation on aquatic organisms have been obtained from a number of sources. Many were obtained from reviews and other publications. Although the primary purpose of preparing this bibliography was to obtain information related to the nuclear wastes Seabed Disposal Biology Program of Sandia Laboratories, freshwater organisms are included as a matter of convenience and also with the belief that such a bibliography would be of interest to a wider audience than that restricted to the Seabed Program. While compilation of a list in an area broad in scope is often somewhat arbitrary, an attempt was made to reference publications that were related to field or laboratory studies of wild species of plants and animals with respect to radiation effects. Complete information concerning each reference are provided without

excessive library search. Since one often finds references listed in the literature that are incompletely cited, it was not always possible to locate the reference for verification or completion of the citation. Such references are included where they appeared to be of possible value. When known, a reference is followed with its Nuclear Science Abstract designation, or rarely other abstract sources. Those desiring additional information should check Nuclear Science Abstracts utilizing the abstract number presented or other abstracting sources. In addition, the language of the article, other than English, is given when it is known to me.

1966 (SAND--79-7111) THERMOMECHANICAL RESPONSE OF WIPP REPOSITORIES. Maxwell, D.E.; Wahi, K.K.; Dial, B. (Science Applications, Inc., San Leandro, CA (USA); Civil Systems, Inc., Albuquerque, NM (USA)). May 1980. Contract AC04-76DP00789. 77p. NTIS, PC A05/MF A01.

Coarsely zoned STEALTH 2D calculations were used to investigate two candidate WIPP repositories. The grid was designed for one hundred thousand years of response with modest computing costs. As a result, the early time mechanical response was compromised by non-real oscillations that could not be damped completely before a few thousand years. In spite of these oscillations, it was possible to see that the dominant effects of stress and strain peaked between one and two thousand years, at the time of maximum heat in the site. This time corresponded to the condition that the surface heat loss rate balanced the heat generation rate. Though the creep strains were quite small, a large volume of salt was involved and the effects were significant. The peak surface uplift of 75HLW was increased by about 25% due to creep. However, the deviatoric stress relaxation due to creep produced large changes in the stress fields. The Rustler layer survived reasonable failure criterion for the 75HLW case with creep, and failed both in tension and shear, according to these same criterion, when the calculation was repeated without creep. The deviatoric stress fields, with and without salt creep, concentrated near the repository as expected and also in the Rustler layer due to its relatively high Young's modulus compared to the neighboring layers. Since the time of interest is so much smaller than the 100,000 years this calculation was designed to examine, it is possible to model the WIPP stratigraphy in much more detail and still be able to calculate the response for the time of interest. A finer zoned calculation of the response of the WIPP stratigraphy to a repository similar to the 75 K watt/acre repository is modeled in this report. In this calculation the Rustler formation is modeled as a five layered formation using material properties derived from data taken at the Nome site.

1967 (SAND--80-0007/1) SUBSEABED DISPOSAL PROGRAM PLAN. VOLUME I. OVERVIEW. (Sandia Labs., Albuquerque, NM (USA)). Jan 1980. Contract EY-76-C-04-0789. 67p. Dep. NTIS, PC A04/MF A01.

Some of the most stable geologic formations are underneath the deep oceans. Purpose of this program is to assess the technical, environmental, and engineering feasibility of disposing of packaged high-level waste and/or repackaged spent reactor fuel in these formations. (DLC)

1968 (SAND--80-0007/2) SUBSEABED DISPOSAL PROGRAM PLAN. VOLUME II. FY80 BUDGET AND SUBTASK WORK PLANS. (Sandia Labs., Albuquerque, NM (USA)). Jan 1980. Contract EY-76-C-04-0789. 63p. Dep. NTIS, PC A04/MF A01.

This volume of the Subseabed Disposal Program Plan presents a breakdown of the master program structure by major activity. Each activity is described and accompanied by a specific cost plan schedule and a milestone plan. The costs have been compiled in the Cost Plan Schedules attached to each Subtask Work Plan. The FY 1980 budget for the Subseabed Disposal Program is summarized at the second level of the Work Breakdown Structure. The milestone plans for FY 80 are presented. The milestones can be changed only with the concurrence of the Sandia Subseabed Program Manager.

1969 (SAND--80-0039) ANALYTIC SOLUTIONS FOR THERMAL CONDUCTION FROM HEAT PRODUCING CYLINDERS AND SPHERES. Gartling, D.K. (Sandia National Labs., Albuquerque, NM (USA)). May 1980. Contract AC04-76DP00789. 39p. PC A03/MF A01.

Solution methods are developed to determine the temperature fields surrounding time dependent, cylindrical or spherical heat sources located in an infinite or semi-infinite medium. The method of superposition is employed to extend the single source solutions to the case of multiple heat sources. Numerical procedures are developed to efficiently evaluate the integral heat source solutions. Two computer programs based on the solution procedure are described. Complete user instructions and example problems for these programs are presented.

1970 (SAND--80-0087) CREEP CURVES AND FITTING PARAMETERS FOR SOUTHEASTERN NEW MEXICO BEDDED SALT. Herrmann, W.; Wawersik, W.R.; Lauson, H.S. (Sandia National Labs., Albuquerque, NM (USA)). Mar 1980. Contract AC04-76DP00789. 171p. NTIS, PC A08/MF A01.

Existing experimental data for 68 separate creep tests on rock salt from the Salado formation of SE New Mexico have been analyzed. The experimental conditions covered an intermediate temperature range from 22°C to 200°C, and shear stresses from 1000 psi (7 MPa) to 6000 psi (31 MPa). Most tests exhibited both transient and steady-state creep. Data for individual tests have been fitted both to an exponential transient creep law expected to hold at high temperaures (> 200°C) and a logarithmic transient creep law expected to hold at low temperature (< 50°C). A few tests also exhibited accelerating creep, and these were fitted with an exponential creep law which included an accelerating term. The exponential and logarithmic fits yielded steady-state creep rates which were in good agreement with each other. Low temperature and low stress tests were fitted much better by the logarithmic creep law. At higher tempertures both logarithmic and exponential creep laws were found to fit equally well. Tabulations of fitting parameters and plots of the experimental data and fitted creep curves are presented for each experiment, for use in further analysis.

1971 (SAND--80-0149) COMPARISON OF THERMOMECHANICAL CALCULATIONS FOR HIGHLY NON-LINEAR QUASISTATIC DRIFT DEFORMATIONS. Wayland, J.R.; Bertholf, L.D. (Sandia National Labs., Albuquerque, NM (USA)). Jul 1980. Contract AC04-76DP00789. 64p. NTIS, PC A04/MF A01.

Results of code calculations for the

November 14, 1979, Waste Isolation Pilot Plant (WIPP) Code Benchmark Workshop are compared. The results from five different codes (COUPLEFLO, JAC, SANCHO, SPECTROM, and STEALTH) are given for a problem involving the creep closure of an underground drift. The basic features of the codes are summarized and the codes are evaluated in terms of their applicability to WIPP problems. The codes predicted essentially the same response for this problem, and they appear to be nearly equally applicable to problems of this type. Also, a new benchmark problem is suggested along with a more realistic creep model for bedded salt.

1972 (SAND--80-0201) EVAPORATIVE WATER LOSS FROM WELDED TUFF. Hadley, G.R.; Turner, J.R. Jr. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1980. Contract AC04-76DP00789. 21p. NTIS, PC A02/MF A01.

Welded tuff is one of the many candidate rocks presently being considered as a host medium for the disposal of radioactive waste. In the case where the disposal site lies above the water table, the host rock will in general be only partially saturated. This condition leads to a number of mass transfer processes of interest, including evaporative drying, two-phase water flow due to pressure gradients, capillary movement, plus others. Although these processes have all been known about for decades, it is not clear at this time what the relative importance of each is with regard to geologic media in a waste disposal environment. In particular, there seems to be no data available for tuff that would allow an investigator to sort out mechanisms. This work is intended to be a start in that direction. This paper reports the measurement of water loss rate for welded tuff at various temperatures due to the action of evaporative drying. The initial saturation was unknown, but the average initial water content was found to be 7% by weight. The resulting data show that the water loss rate declines monotonically with time at a given temperature and increases with increasing temperature as expected. Somewhat surprising, however, is the fact that over 90% of the water from a sample was lost by evaporation at room temperature within 72 hours. All the water loss data, including that taken at temperatures as high as 150°C, are explained to within a factor of two by a simple evaporation front model. The latter assumes the water is lost by the molecular diffusion of water vapor from a receding evaporation front. The motion of the evaporation front seems to depend on mass balance rather than energy balance. Capillary forces and the resulting liquid diffusion are evidently not strong enough to wash out the evaporation front, since the front model seems to fit the data well.

1973 (SAND--80-0304C) SUBSEABED RADIOACTIVE WASTE DISPOSAL FEASIBILITY PROGRAM: OCEAN ENGINEERING CHALLENGES FOR THE 80'S. Talbert, D.M. (Sandia National Labs., Albuquerque, NM (USA)). 1980. Contract AC04-76DP00789. 16p. (CONF-800921--1). NTIS, PC A02/MF A01.

From IEEE/Oceans '80 conference; Seattle, WA, USA (8 Sep 1980).

The objective of the Subseabed Disposal Program is to assess the feasibility of disposing of high-level radioactive wastes or spent fuel in suitable geologic formations beneath the deep ocean floor. The program is entering a phase which will address engineering feasibility. While the current phase of the program to determine the scientific and environmental feasibility of the concept is not yet complete, activities to assess the engineering aspects are being initiated in parallel to facilitate the development of the concept on a time scale commensurate with other related programs both in the United States and abroad. It is anticipated that engineering aspects will become the central focus of the program during the early 80's and will continue so through the establishment of a pilot-plant level activity which could occur by the mid-90's.

1974 (SAND--80-0307C) SEDIMENT MECHANICAL RESPONSE DUE TO EMPLACEMENT OF A WASTE CANISTER. Karnes, C.H.; Dawson, P.R.; Silva, A.J.; Brown, W.T. (Sandia National Labs., Albuquerque, NM (USA)). 1980. Contract AC04-76DP00789. 11p. (CONF-800921--3). NTIS, PC A02/MF A01.

From IEEE/Oceans '80 conference; Seattle, WA, USA (8 Sep 1980).

Preliminary studies have been conducted to determine the interaction between a waste canister and seabed sediment during and after emplacement. Empirical and approximate methods for determining the depth reached by a freefall penetrator indicate that a boosted penetrator emplacement method may be necessary. Hole closure is necessary, but has not been verified because calculations and laboratory experiments show sensitivity to boundary conditions which control the degree of dynamic hole closure. Laboratory studies show that closure will take place by creep deformation but closure times in seabed environments are uncertain. For assumed thermomechanical properties of sediments, it is shown that a heat generating waste canister will probably not move a significant distancce during the heat generation period.

1975 (SAND--80-0310C) FINITE ELEMENT ANALYSIS OF THERMAL CONVECTION IN DEEP OCEAN SEDIMENTS. Gartling, D.K. (Sandia Labs., Albuquerque, NM (USA)). 1980. Contract EY-76-C-04-0789. 15p. (CONF-800515--1). Dep. NTIS, PC A02/MF A01.

From 3. international conference on finite elements in water resources; Oxford, MS, USA (19 May 1980).

Of obvious importance to the study and engineering of a seabed disposal is the determination of the temperature and fluid flow fields existing in the sediment layer and the perturbation of these fields due to the implantation of localized heat sources. The fluid mechanical and heat transfer process occurring in oceanic sediments may be characterized as free (or natural) convection in a porous material. In the case of an undisturbed sediment layer, the driving force for the natural circulation of pore water comes from the geothermal heat flux. Current theories for heat flow from the sea floor suggest the possibility of large scale hydrothermal circulation in the oceanic crust (see e.g., Ribando, et al. 1976) which is in turn coupled with a convection process in the overlying sediment layer (Anderson 1980, Anderson, et al. 1979). The introduction of a local heat source, such as a waste canister, into a saturated sediment layer would by itself initiate a convection process due to buoyancy forces. Since the mathematical description of natural convection in a porous medium is of sufficient complexity to preclude the use of most analytic methods of analysis, approximate numerical procedures are often employed. In the following sections, a particular type of numerical method is described that has proved useful in the solution of a variety of porous flow problems. However, rather than concentrate on the details of the numerical algorithm the main emphasis of the presentation will be on the types of

problems and results that are encountered in the areas of oceanic heat flow and seabed waste disposal.

1976 (SAND--80-0312C) ANALYSIS OF HEAT AND MASS TRANSFER IN SUB-SEABED DISPOSAL OF NUCLEAR WASTE. Hickox, C.E.; Gartling, D.K.; McVey, D.F.; Russo, A.J.; Nuttall, H.E. (Sandia National Labs., Albuquerque, NM (USA); New Mexico Univ., Albuquerque (USA)). 1980. Contract AC04-76DP00789. 22p. (CONF-801020--2). NTIS, PC A02/MF A01.
From Marine technology conference; Washington, DC, USA (6 Oct 1980).
Portions of document are illegible.
A mathematical basis is developed for the prediction of thermal and radionuclide transport in marine sediments. The theory is applied to the study of radioactive waste disposal by emplacement, in specially designed containers, well below the sediment/water interface. Numerical results are obtained for a specified model problem through use of two computer programs designed primarily for the analysis of waste disposal problems. One program (MARIAH) provides descriptions of the temperature and velocity fields induced by the presence of a container of thermally active nuclear waste. A second program (IONMIG), which utilizes the results of the thermal analysis, is used to provide predictions for the migration of four representative radionuclides: ^{239}Pu, ^{137}Cs, ^{129}I, and ^{99}Tc.

1977 (SAND--80-0323C) TECHNICAL ISSUES IN THE GEOLOGIC DISPOSAL OF RADIOACTIVE WASTES. Weart, W.D. (Sandia Labs., Albuquerque, NM (USA)). 1980. Contract EY-76-C-04-0789. 10p. (CONF-800517--2). Dep. NTIS, PC A02/MF A01.
From 26. annual technical meeting of the Institute for Environmental Sciences; Philadelphia, PA, USA (11 May 1980).
The status of technical understanding regarding radioactive waste repositories in geologic media is improving at a rapid rate. Within a few years the knowledge regarding non-salt repositories will be on a par with that which now exists for salt. To date there is no technical reason to doubt that geologic repositories in several different geologic media can be safely implemented to provide long-term isolation of radioactive wastes. Indeed, for bedded salt, there is now sufficient knowledge to allow all the identified phenomena to be bounded with satisfactory resultant consequences. It is possible to now proceed with technical confidence in an orderly development of a bedded-salt repository at a satisfactory site. This development would call for in-situ experiments, at the earliest possible stage, to confirm or validate the predictions made for the site. These in-situ experiments will be necessary for each repository in a different rock type. If, for non-technical reasons, repository development is delayed, field test facilities should be located as soon as possible in geologic settings typical of proposed repositories. Extensive testing to resolve generic issues will allow subsequent development of repositories to proceed more rapidly with only minimal in-situ testing required to resolve site-specific concerns.

1978 (SAND--80-0358C) BELL CANYON TEST (BCT): CEMENT DEVELOPMENT REPORT. Gulick, C.W.; Boa, J.A. Jr.; Buck, A.D. (Sandia National Labs., Albuquerque, NM (USA); Army Engineer Waterways Experiment Station, Vicksburg, MS (USA). Structures Lab.). May 1980. Contract AC04-76DP00789. 32p. (CONF-800527--5). NTIS, PC A03/MF A01.
From International BHP symposium; Columbus, OH, USA (7 May 1980).
The Borehole Plugging (BHP) materials development program which has been underway at WES under Sandia sponsorship for about five years is reviewed. Development testing data for candidate grout mixtures for the BCT plug are presented. Field batching, mixing, and placement operations are discussed. Data from field samples molded during the two plug placements include strength, expansion, compressional wave velocity, dynamic modulus, density, and porosity. Microstructure and composition are compared for grout samples at ages of a few weeks and one year.

1979 (SAND--80-0359C) STRATEGY FOR EVALUATING THE LONG-TERM STABILITY OF HOLE-PLUGGING MATERIALS IN THEIR GEOLOGICAL ENVIRONMENTS. Lambert, S.J. (Sandia National Labs., Albuquerque, NM (USA)). 1980. Contract EY-76-C-04-0789. 11p. (CONF-800527--2). Dep. NTIS, PC A02/MF A01.
From International BHP symposium; Columbus, OH, USA (7 May 1980).
Material used to plug boreholes will not in general be in chemical equilibrium with its host rock. Adverse long-term performance of a plug can involve changes in phase assemblage in the plug/rock system which are difficult to observe at low temperatures in real time. The thermodynamics of multiphase equilibria provides a technique of predicting what phase changes might occur. The thermodynamic treatment of plug/rock systems utilizes (1) a formulation of possible chemical reactions among phases in the system and (2) determinations of changes in values of Gibbs' free energies for the hypothetical reactions, to identify the theoretically-permitted reactions which could degrade plug performance. Time-dependent prediction of phase changes requires a knowledge of rate laws and constants for specific reactions whose mechanisms are well known.

1980 (SAND--80-0390C) SANDIA BOREHOLE PLUGGING PROGRAM FOR THE WASTE ISOLATION PILOT PLANT (WIPP). Christensen, C.L. (Sandia Labs., Albuquerque, NM (USA)). 1980. Contract EY-76-C-04-0789. 30p. (CONF-800527--1). Dep. NTIS, PC A03/MF A01.
From International BHP symposium; Columbus, OH, USA (7 May 1980).
This paper presents the current Borehole Plugging Program (BHP) at Sandia National Laboratories and addresses the four major functional tasks considered necessary for a successful program: (1) project management, including methods to identify, design, and control needed experimentation; (2) identification of candidate materials, emphasizing cement-based products as the most advanced alternatives due to the extensive existing technology base, but recognizing the potential application of alternate materials; (3) development of test instrumentation based on utilization of existing techniques, evaluation of their adequacy, and identifying modifications necessary to improve effectiveness; (4) field test program, which includes testing and verification of plug performance. The scope of the current program on wellbores, cementitious grouts, and available technology is compared to planned extension to shafts and drifts, alternate materials, and improved instrumentation. The relationship of this program with assessments of long-term suitability performed in the geochemical program is presented. A brief

presentation of current and planned field tests is given along with projections for future activities and results.

1981 (SAND--80-0416) STORED ENERGY OF GAMMA-IRRADIATED WIPP SALT. Moss, M. (Sandia Labs., Albuquerque, NM (USA)). Mar 1980. Contract EY-76-C-04-0789. 21p. Dep. NTIS, PC A02/MF A01.

Samples of WIPP salt exposed at 363°K to gamma radiation from a ^{60}Co source were annealed at constant rates of heating in a differential scanning calorimeter in order to release the energy stored. Radiation doses were 2.2, 5.4, 8.2, 11 and 13 x 10^7 rad, and temperature scans were conducted from room temperature to 800°K. The specific stored energy-dose relationship deduced from 80 K/min scans could be only approximately established due to the extreme variability of the specific energy in samples of a given dose. This variability probably results from unequal amounts of impurities in the 10 to 25 mg samples required for the calorimeter. The energy-dose relationship is best described empirically by $\ln Q_0(cal/g) = (-40.6 +- 2.6) + (1.84 +- 0.12) \ln D(rad)$. Temperature scans of 10, 20, 40, and 80 K/min were performed to determine the activation energy E of the annealing process. For the four more highly dosed samples, E = 31.1 +- 5.6 kcal/mole. Based upon criteria established elsewhere, there appears to be no danger of the stored energy being released quickly in a nuclear waste repository of bedded salt, nor could serious consequences result from such a release by some unforeseen mechanism.

1982 (SAND--80-0426C) THERMAL CONVECTION AT LOW RAYLEIGH NUMBER FROM CONCENTRATED SOURCES IN POROUS MEDIA. Hickox, C.E. (Sandia National Labs., Albuquerque, NM (USA)). 1980. Contract AC04-76DP00789. 29p. (CONF-801102--9). NTIS, PC A03/MF A01.

From ASME winter annual meeting; Chicago, IL, USA (16 Nov 1980).

A simple mathematical theory is proposed for the analysis of natural convective motion, at low Rayleigh number, from a concentrated source of heat in a fluid-saturated porous medium. The theory consists of retaining only the leading terms of series expansions of the dependent variables in terms of the Rayleigh number, is thus linear, and is valid only in the limit of small Rayleigh number. Based on fundamental results for a variety of isolated sources, superposition is used to provide solutions for situations of practical interest. Special emphasis is given to the analysis of sub-seabed disposal of nuclear waste. 8 figures.

1983 (SAND--80-0440) SYSTEMS ENGINEERING PROGRAMS FOR GEOLOGIC NUCLEAR WASTE DISPOSAL. Klett, R.D.; Hertel, E.S. Jr.; Ellis, M.A. (Sandia National Labs., Albuquerque, NM (USA); Dikewood Corp., Albuquerque, NM (USA)). Jun 1980. Contract AC04-76DP00789. 136p. NTIS, PC A07/MF A01.

The design sequence and system programs presented begin with general approximate solutions that permit inexpensive analysis of a multitude of possible wastes, disposal media, and disposal process properties and configurations. It then continues through progressively more precise solutions as parts of the design become fixed, and ends with repository and waste form optimization studies. The programs cover both solid and gaseous waste forms. The analytical development, a program listing, a users guide, and examples are presented for each program. Sensitivity studies showing the effects of disposal media and waste form thermophysical properties and repository layouts are presented as examples.

1984 (SAND--80-0459) DOWNHOLE TELEVISION (DHTV) APPLICATIONS IN BOREHOLE PLUGGING. Christensen, C.L.; Statler, R.D.; Peterson, E.W. (Systems, Science and Software, La Jolla, CA (USA)). May 1980. Contract AC04-76DP00789. 32p. NTIS, PC A03/MF A01.

The Borehole Plugging (BHP) Program is a part of the Sandia experimental program to support the Waste Isolation Pilot Plant (WIPP). The Sandia BHP program is an Office of Nuclear Waste Isolation (ONWI)-funded program designed to provide inputs to the generic plugging program while simultaneously acquiring WIPP-specific data. For this reason a close liaison is maintained between the Sandia WIPP project and the ONWI generic program. Useful technology developed within the Sandia BHP to support WIPP is made available and considered for further development and application to the generic Borehole Plugging and Repository Sealing Program at ONWI. The purpose of this report is to illustrate the usefulness of downhole television (DHTV) observations of a borehole to plan plugging operations. An indication of the wellbore conditions observed is provided. The equipment and setup procedure used in the evaluation of AEC-7 for the Bell Canyon test series are illustrated. A sequence of pictures at various depths as the DHTV rig is lowered through the wellbore is presented. Sample photographs taken with both dry and underwater lamps for illumination are included. The caliper logs for the same depth are included for comparison. General comments are provided on the illustrations.

1985 (SAND--80-0467) NUMERICAL SIMULATION OF CREEP CLOSURE OF DEEP POTASH MINES (WITH APPLICATION TO WASTE ISOLATION). Munson, D.E.; Dawson, P.R. (Sandia Labs., Albuquerque, NM (USA); Cornell Univ., Ithaca, NY (USA). Dept. of Mechanical and Aerospace Engineering). Jul 1980. Contract AC04-76DP00789. 28p. NTIS, PC A03/MF A01.

In this work, numerical simulation of the mechanical response of a deep mine opening in potash is shown to match measured room closures to within a factor of two. In this case, the calculated closure rates after eight years are within 25 to 75 percent of those measured. In making the calculations, a constitutive model for creep, as determined from laboratory triaxial tests of salt and short cylinder compressive tests of potash, was incorporated into a coupled thermal-mechanical fluid flow code, COUPLEFLO. The model is a multimechanism formulation of thermally activated processes acting in parallel. Because the field tests were well-documented, two-dimensional configurations and because the constitutive model was uniquely determined by laboratory data, the agreement between calculations and field data for these significant time durations is a first step in verification of the simulation technique. Application of the model and numerical methods presented here can be used to understand deformation in deep potash mines and, very importantly, to aid also in design of the waste isolation and petroleum storage facilities.

1986 (SAND--80-0502C) ROLE OF BOREHOLE PLUGGING IN THE EVALUATION OF THE WASTE ISOLATION PILOT PLANT. Hunter, T.O. (Sandia National Labs., Albuquerque, NM (USA)). 1980. Contract EY-76-C-04-0789. 20p. (CONF-800527--3). Dep. NTIS, PC A02/MF A01.

From International BHP symposium; Columbus, OH, USA (7 May 1980).

Research on borehole plugging (BHP) is part of an integrated strategy to develop technology that can assure successful nuclear waste isolation. The application of this strategy to the Waste Isolation Pilot Plant (WIPP) in southeastern New Mexico has included an assessment of the role BHP plays in the development of a repository at that site. This paper presents a description of the WIPP site, repository design, and the current research and development program. The status of drill holes - those drilled for petroleum and potash exploration and those drilled for site characterization - within the proposed site boundaries is presented. Sixty-six holes are present on the 7700 hectare (19,000 acre) site, yet only 8 penetrate as deep as the proposed repository location. The assumptions made about shaft and borehole sealing in consequence assessment studies are presented. The results of these studies indicate that borehole seals with effective permeabilities greater than tens of darcies would result in doses to maximally exposed individuals of less than 0.01% of natural background.

1987 (SAND--80-0531C) APPLICATION OF QA GEOSCIENCE INVESTIGATIONS. Henderson, J.T. (Sandia National Labs., Albuquerque, NM (USA)). 1980. Contract AC04-76DP00789. 10p. (CONF-8005105--1). NTIS, PC A02/MF A01.

From 35. annual technical conference; San Francisco, CA, USA (11 May 1980).

This paper discusses the evolution of a classical hardware QA program (as currently embodied in DOE/ALO Manual Chapter 08XA; NRC 10CFR Part 50, Appendix B; and other similar documents) into the present geoscience quality assurance programs that address eventual NRC licensing, if required. In the context of this paper, QA will be restricted to the tasks associated with nuclear repositories, i.e. site identification, selection, characterization, verification, and utilization.

1988 (SAND--80-0558) ANALYSIS OF STEADY STATE CREEP OF SOUTHEASTERN NEW MEXICO BEDDED SALT. Herrmann, W.; Wawersik, W.R.; Lauson, H.S. (Sandia National Labs., Albuquerque, NM (USA)). Mar 1980. Contract AC04-76DP00789. 41p. NTIS, PC A03/MF A01.

Steady state creep rates have been obtained from a large suite of existing experimental creep data relating to bedded rock salt from the Salado formation of S.E. New Mexico. Experimental conditions covered an intermediate temperature range from 22°C to 200°C, and shear stresses from 1000 psi (7 MPa) to 6000 psi (31 MPa). An expression, based on a single diffusion controlled dislocation climb mechanism, has been found to fit the observed dependence of steady state creep rate on shear stress and temperature, yielding an activation energy of 12 kcal/mole (50 kJ/mole) and a stress exponent of 4.9. Multiple regression analysis revealed a dependence on stratigraphy, but no statistically significant dependence on pressure of specimen size. No consistent dilatancy or compaction associated with steady state creep was found, although some individual specimens dilated or compacted during creep. The steady state creep data were found to agree very well with creep data for both bedded and dome salt from a variety of other locations.

1989 (SAND--80-0632) IMPULSE RADAR SCANNING OF INTACT SALT AT THE AVERY ISLAND MINE. Cook, C.W. (Sandia Labs., Albuquerque, NM (USA)). May 1980. Contract AC04-76DP00789. 36p. NTIS, PC A03/MF A01.

A series of experiments was run in the Avery Island Mine to evaluate the capability of an impulse radar to locate anomalies and simulated waste targets in intact dome salt. Voids in salt were difficult to detect. On the positive side, metal targets and simulated waste (glass) were easily located in intact salt. Radar scanning at ranges of greater than 25 meters and short-range resolution of target positions to within a few centimeters were achieved.

1990 (SAND--80-0705C) PRESSURE MEASUREMENTS IN LOW PERMEABILITY FORMATIONS. Veneruso, A.F.; McConnell, T.D. (Sandia National Labs., Albuquerque, NM (USA)). 1980. Contract AC04-76DP00789. 19p. (CONF-800344--2). NTIS, PC A02/MF A01.

From 3. invitational well testing symposium; Oakland, CA, USA (26 Mar 1980).

This paper examines the performance requirements and identifies candidate hardware implementations for pressure instrumentation that is needed to provide well test data in low permeability formations. Low permeability values are typically defined to be less than 1 microdarcy and are usually encountered in hard rock formations, such as granite, that are of interest in hot dry rock geothermal, deep exploration drilling, and fluid waste disposal. Groundwater flow in these tight formations has been shown to be dominated by flow-through fractures rather than through the formation's intrinsic permeability. In these cases, we cannot use Darcy's law or the usual dimensionless coefficients to estimate the expected scale factors and dynamic responses necessary to properly select and setup the wellbore pressure instrument. This paper shows that the expected instrument responses can be estimated using some recent work by Wang, Narasimhan, and Witherspoon. This paper further describes the minimum electronic capability that the downhole pressure instrument must have in order to provide the required measurement resolution, dynamic range, and transient response. Three specific hardware implementations are presented based on the following transducers: a quartz resonator, a capacitance gauge, and a resistance strain gauge.

1991 (SAND--80-0781C) SYSTEMS ANALYSIS APPROACH TO THE DISPOSAL OF HIGH-LEVEL WASTE IN DEEP OCEAN SEDIMENTS. de Marsily, G.; Hill, M.D.; Murray, C.N.; Talbert, D.M.; Van Dorp, F.; Webb, G.A.M. (Sandia National Labs., Albuquerque, NM (USA); Centre d'Informatique Geologique Ecoles des Mines de Paris, Fontainebleu (France); National Radiological Protection Board, Harwell (UK); Commission of the European Communities, Ispra (Italy). Joint Research Centre; Instituut voor Toepassing van Atoomenergie in de Landbouw, Wageningen (Netherlands)). 1980. Contract AC04-76DP00789. 17p. (CONF-801063--2; IAEA-SM--248/115). NTIS, PC A02/MF A01.

From International symposium on the impacts of radionuclide releases into the marine environment; Vienna, Austria (6 Oct 1980).

Among the different options being studied for disposal of high-level solidified waste, increasing attention is being paid to that of emplacement of glasses incorporating the radioactivity in deep oceanic sediments. This option has the advantage that the areas of the oceans under investigation appear to be relatively unproductive biologically, are relatively free from cataclysmic events, and are areas in which the natural processes are slow. Thus the environment is stable and predictable so that a number of barriers to the

release and dispersion of radioactivity can be defined. Task Groups set up in the framework of the International Seabed Working Group have been studying many aspects of this option since 1976. In order that the various parts of the problem can be assessed within an integrated framework, the methods of systems analysis have been applied. In this paper the Systems Analysis Task Group members report the development of an overall system model. This will be used in an iterative process in which a preliminary analysis, together with a sensitivity analysis, identifies the parameters and data of most importance. The work of the other task groups will then be focussed on these parameters and data requirements so that improved results can be fed back into an improved overall systems model. The major requirements for the development of a preliminary overall systems model are that the problem should be separated into identified elements and that the interfaces between the elements should be clearly defined. The model evolved is deterministic and defines the problem elements needed to estimate doses to man.

1992 (SAND--80-0799) THERMAL PROPERTIES MEASUREMENTS ON ROCKSALT SAMPLES FROM THE SITE OF THE PROPOSED WASTE ISOLATION PILOT PLANT. Sweet, J.N.; McCreight, J.E. (Sandia Labs., Albuquerque, NM (USA)). 13 May 1980. Contract AC04-76DP00789. 76p. NTIS, PC A05/ MF A01.

Thermal conductivity, thermal expansion, and specific heat measurements have been made on a number of specimens. The specific heat measurements were made by differential scanning calorimetry and the results showed that the specific heats of both clean rocksalt samples and of dirty samples with less than or equal to 7% insoluble impurities were essentially identical to the published specific heat for pure NaCl. In the thermal expansion measurements, two distinct groups of samples were identified. The first group had average expansion coefficients in the temperature range 300 to 700°K close to that reported for pure NaCl. All the samples in this group were composed predominantly of halite, with only small amounts of other minerals or materials present. A second group of samples had expansion coefficients only approx. 0.3 to 0.5 that of NaCl. The samples in this group were composed largely of polyhalite, anhydrite, or siltstone. The measurements first reported by Acton on the thermal conductivity of samples taken from a borehole at the site of the proposed nuclear waste isolation pilot plant (WIPP) near Carlsbad, NM, have been extended to include additional samples and higher temperature measurements. This is not believed to be the result of the onset of radiative thermal transport because the deviations are negative as well as positive. Infrared transmission measurements on rocksalt samples from the proposed WIPP site show no transmission in the 3 to 10 μm wavelength range for samples > 5 cm thick. Use of the estimated infrared absorption coefficient leads to the conclusion that there is little radiative heat transport for T < 800°K. All samples were dense with little or no porosity evident. On the basis of these experiments, it is concluded that the thermal conductivity of materials found at the site can be predicted to an accuracy +- 30% from knowledge of the composition and grain size of these materials.

1993 (SAND--80-0812) RECOMMENDED ANALYSIS PLAN FOR THE BOREHOLE PLUGGING PROGRAM POTASH CORE TEST. Lambert, S.J. (Sandia National Labs., Albuquerque, NM (USA)). May 1980. Contract AC04-76DP00789. 22p. NTIS, PC A02/ MF A01.

A four-year old plugged potash core hole near the Waste Isolation Pilot Plant (WIPP) site in southeastern New Mexico has been proposed for overcoring, in order to examine the behavior of known grout mix constituents in contact with a variety of rock types during an extended grout-curing interval. This report recommends that various geochemical analyses be applied to the core samples containing both grout and rock and the interface between the two. The methods to be used include optical petrography, electron microscopy, electron probe microanalysis, x-ray diffraction, thermal analysis (TGA, DSC, DTA) with gas chromatography/mass spectrometry, and bulk chemical analysis. These analyses would allow identification of phases which have developed during grout curing, and provide evidence of reactions which may have taken place among constituents in the system grout-rock-groundwater. These reactions, and their sequence of occurrence will be compared with reactions predicted by thermodynamic modeling as the system seeks its lowest Gibbs' free energy. Identification of reactions which have the potential for compromising the integrity of a grout plug will receive special attention. Since not all such detrimental reactions can be observed directly in a human lifetime, due to kinetic inhibitions, and since a capability of time-dependent prediction of their degree of occurrence cannot be developed, thermodynamic modeling is the only known way of evaluating the long-term stability of a grout plug. The analysis of the plug-rock system will give an indication of in situ curing history of grout plug, and will allow an early occurrence of potentially detrimental reactions to be detected. Thus, this activity will be a case-study of suitability of certain grout mixtures for use in evaporites, as an example of evaluation of grouts for long-term compatability with a variety of rock types.

1994 (SAND--80-1020/1) PREDICTION OF GROUND MOTION FROM UNDERGROUND NUCLEAR WEAPONS TESTS AS IT RELATES TO SITING OF A NUCLEAR WASTE STORAGE FACILITY AT NTS AND COMPATIBILITY WITH THE WEAPONS TEST PROGRAM. Vortman, L.J. IV. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1980. Contract EY-76-C-04-0789. 44p. NTIS, PC A03/MF A01.

This report assumes reasonable criteria for NRC licensing of a nuclear waste storage facility at the Nevada Test Site where it would be exposed to ground motion from underground nuclear weapons tests. Prediction equations and their standard deviations have been determined from measurements on a number of nuclear weapons tests. The effect of various independent parameters on standard deviation is discussed. That the data sample is sufficiently large is shown by the fact that additional data have little effect on the standard deviation. It is also shown that coupling effects can be separated out of the other contributions to the standard deviation. An example, based on certain licensing assumptions, shows that it should be possible to have a nuclear waste storage facility in the vicinity of Timber Mountain which would be compatible with a 700 kt weapons test in the Buckboard Area if the facility were designed to withstand a peak vector acceleration of 0.75 g. The prediction equation is a log-log linear equation which predicts acceleration as a function of yield of an explosion and the distance from it.

1995 (SAND--80-1020/1) PREDICTION OF GROUND

MOTION FROM UNDERGROUND NUCLEAR WEAPONS TESTS AS IT RELATES TO SITING OF A NUCLEAR WASTE STORAGE FACILITY AT NTS AND COMPATIBILITY WITH THE WEAPONS TEST PROGRAM. Vortman, L.J. III. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1980. Contract EY-76-C-04-0789. 44p. NTIS, PC A03/MF A01.

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1996 (SAND--80-1319C) SANDIA'S ACTIVITIES IN URANIUM MILL TAILINGS REMEDIAL ACTION. Neuhauser, S. (Sandia National Labs., Albuquerque, NM (USA)). 1980. Contract AC04-76DP00789. 9p. (CONF-800584--1). NTIS, PC A02/MF A01.

From Fish and wildlife service workshop; Ft Collins, CO, USA (28 May 1980).

The Uranium Mill Tailings Radiation Control Act of 1978 requires that remedial action be taken at over 20 inactive uranium mill tailings sites in the United States. Standards promulgated by the EPA under this act are to be the operative standards for this activity. Proposed standards must still undergo internal review, public comment, and receive Nuclear Regulatory Commission concurrence before being finalized. Briefly reviewed, the standards deal separately with new disposal sites (Part A) and cleanup of soil and contaminated structures at existing locations (Part B). In several cases, the present sites are felt to be too close to human habitations or to be otherwise unacceptably located. These tailings will probably be relocated. New disposal sites for relocated tailings must satisfy certain standards. The salient features of these standards are summarized.

1997 (SAND--80-1407C) GEOCHEMICAL STUDIES SUPPORTING THE US SUBSEABED DISPOSAL PROGRAM. Erickson, K.L.; Seyfried, W.E.; Heath, G.R.; Krumhansl, J.L.; Bowen, V.T. (Sandia National Labs., Albuquerque, NM (USA); Minnesota Univ., Minneapolis (USA); Oregon State Univ., Corvallis (USA); Woods Hole Oceanographic Institution, MA (USA)). 1980. Contract AC04-76DP00789. 18p. NTIS, PC A02/MF A01.

The important chemical phenomena associated with emplacing high-level radioactive waste in subseabed geologic formations are being identified and experimentally investigated. Studies of processes occuring in the hydrothermal environment near the canister have focused on sediment-seawater interactions at elevated temperatures and pressures and the resulting potential effects on canister, wasteform, and radionuclide source term. Significant changes in oxidation potential and pH have been related to variations in temperature and mineralogy. Investigation of phenomena occurring in the sediment outside of the hydrothermal environment have focused on actinide solution chemistry, sorption phenomena, and radionuclide diffusion rates. Data for several radionuclides and sediment types are being used to compare predicted and experimental results from diffusion experiments. Studies of processes occurring near the sediment-seawater interface have emphasized establishing a data base for evaluating the geochemical, physical, biological, and fluid-mechanical mechanisms determining radionuclide fluxes across the interface.

1998 (SAND--80-1464) EVALUATION OF TUFF AS A MEDIUM FOR A NUCOLEAR WASTE REPOSITORY: INTERIM STATUS REPORT ON THE PROPERTIES OF TUFF. Johnstone, J.K.; Wolfsberg, K. (eds.). (Sandia National Labs., Albuquerque, NM (USA); Los Alamos Scientific Lab., NM (USA)). Jul 1980. Contract AC04-76DP00789. 139p. NTIS, PC A07/MF A01.

This report is the second in a series of summary briefings to the National Academy of Science's (NAS) Committee on Radioactive Waste Management dealing with feasibility of disposal of heat-producing radioactive waste in silicic tuff. The interim status of studies of tuff properties determined on samples obtained from Yucca Mountain and Rainier Mesa (G-tunnel) located on the Nevada Test Site (NTS) are discussed. In particular, progress is described on resolving issues identified during the first briefing to the NAS which include behavior of water in tuff when heated, the effect of the presence or absence of water and joints on the thermal/physical properties of tuff and the detailed/complex sorptive properties of highly altered and unaltered tuff. Initial correlations of thermal/physical and sorptive properties with the highly variable porosity and mineralogy are described. Three in-situ, at-depth field experiments, one nearly completed and two just getting underway are described. In particular, the current status of mineralogy and petrology, geochemistry, thermal and mechanical, radiation effects and water behavior studies are described. The goals and initial results of a Mine Design Working Group are discussed. Regional factors such as seismicity, volcanism and hydrology are not discussed.

1999 (SAND--80-1533C) THERMOPHYSICAL PROPERTIES OF DEEP OCEAN SEDIMENTS. Hadley, G.R.; McVey, D.F.; Morin, R. (Sandia National Labs., Albuquerque, NM (USA); Rhode Island Univ., Kingston (USA). Dept. of Ocean Engineering). 1980. Contract AC04-76DP00789. 12p. (CONF-801020--1). NTIS, PC A02/MF A01.

From Marine technology conference; Washington, DC, USA (6 Oct 1980).

Here we report measurements of the thermal conductivity and diffusivity of reconsolidated illite and smectite ocean sediments at a pore pressure of 600 bars and temperatures ranging from 25 to 420°C. The conductivity and diffusivity were found to be in the range of 0.8 to 1.0 W/m-K and 2.2 to 2.8 x 10^{-7} m^2/s, respectively. These data are consistent with a mixture model which predicts sediment thermal properties as a function of constituent properties and porosity. Comparison of pre- and post-test physical properties indicated a decrease in pore water content and an order of magnitude increase in shear strength and permeability.

2000 (SAND--80-1566C) RADIATION HARDENING OF ROCKSALT. Arnold, G.W. (Sandia National Labs., Albuquerque, NM (USA)). 1980. Contract AC04-76DP00789. 6p. (CONF-801124--7). NTIS, PC A02/MF A01.

From 3. annual meeting of the Materials Research Society; Boston, MA, USA (17 Nov 1980).

This report gives indentation hardness results for irradiated (^{60}Co γ-irradiated and ion implanted) natural and synthetic NaCl for irradiation temperatures less than 95°C. Both rocksalt and synthetic NaCl increase in indentation hardness (by a factor of about 1.7) when exposed to γ-ray doses in excess of 10^{10} rads at temperatures less than 95°C. The large optical densities produced make it very difficult to assess the importance, if any, of colloidal Na upon the change in hardness. This difficulty has been circumvented by using ion implantation to get high concentrations of defects in a thin surface layer. Annealing of such implanted layers produces colloidal Na. Increases in hardness by a factor of about 2.1 have been found by this technique when only the colloidal Na band is present in the optical absorption. It is important to note that the colloidal band disappears in a matter of hours at 170°C and thus the changes in hardness we have noted will depend critically upon the interface temperature in the repository, the accumulated dose, and the time of exposure at a given temperature.

2001 (SAND--80-1592C) GEOMECHANICS ACTIVITIES CONDUCTED AT SANDIA NATIONAL LABORATORIES IN SUPPORT OF THE WASTE ISOLATION PILOT PLANT. Krieg, R.D.; Hunter, T.O. (Sandia National Labs., Albuquerque, NM (USA)). 1980. Contract AC04-76DP00789. 16p. (CONF-800751--1). NTIS, PC A02/MF A01.

From Workshop on thermomechanical-hydrochemical modeling for hardrock waste repository; Bereley, CA, USA (29 Jul 1980).

The geotechnical characterization associated with the development of the WIPP includes: (a) studies of the hydrologic flow system in surrounding aquifer systems, and (b) studies of thermal-structural interaction between the repository and the rock formation. The former is summarized in a companion paper. The latter, to be discussed here, includes the development and verification of methods to evaluate the response of the host rock to both ambient conditions upon excavation and the enhanced deformations anticipated with heat-producing wastes. This program includes development and application of analytical models, laboratory materials testing, and in situ testing. The thermostructural analysis capability for the WIPP repository in halite is advancing rapidly. The creep characteristics of halite, while not completely established for short-time or primary creep behavior, seems well established for long-time behavior. There are several operational computer programs which have demonstrated a capability to work these problems. They are presently being compared with the second in a series of benchmark problems. A single, but important concern with the codes is the long running times and therefore high cost of running meaningful problems. Three-dimensional calculations have not been considered at this time for that reason. An understanding of the role of various stratigraphic details is being developed as more calculations are made. This experience base will be valuable in narrowing alternatives in design work. A detailed correlation of the codes with field data is just beginning. This correlation and the characterization of primary creep in halite are the two areas receiving the most research emphasis at this time.

2002 (SAND--80-1599C) TECHNICAL DEVELOPMENTS IN THE WIPP PROGRAM. Weart, W.D. (Sandia Labs., Albuquerque, NM (USA)). 1980. Contract AC04-76DP00789. 37p. (CONF-801077--1). NTIS, PC A03/MF A01.

From Association of Engineering Geologists annual meeting; Dallas, TX, USA (20 Oct 1980).

More than five years of site specific studies have led to the conclusion that radioactive wastes can be safely isolated in the bedded salt of the Delaware Basin in southeast New Mexico. Aspects of particular concern for site integrity, such as regional or local dissolution processes and salt deformation have been thoroughly evaluated and are not believed to present hazards to the repository. Hydrology of the site area has been shown to possess many desirable features with respect to transport of radioisotopes to the bioshpere in the event of a repository breach. Natural resources, potash and hydrocarbons, are present in the area of the site but can be exploited with appropriate precautions. Safety analyses have considered the consequences of their possible attraction to future man. Repository behavior and interactions between waste and the host rock have been studied in the laboratory, in field tests and by calculational methods. In particular, such issues as brine migration and canister corrosion may be shown to have little detrimental impact if modest and practical engineering measures are adopted. Calculations indicate salt deformation and room closure rates may be great enough that a salt repository must be carefully designed in order to assure ready retrieval of emplaced waste over long periods of time. Safety assessment calculations have been performed to determine the consequences of assumed repository failure scenarios. Even the most dire credible (but improbable) natural failure scenarios prove to be benign in their consequences to man. Direct penetration by unknowing, future man could result in significant exposures to the specific individuals involved but would not cause significant population effects.

2003 (SAND--80-1606C) OVERVIEW OF THE SUBSEABED DISPOSAL PROGRAM. Anderson, D.R.; Boyer, D.G.; Hessler, R.R.; Hollister, C.D.; Talbert, D.M.; Yayanos, A.A. (Sandia National Labs., Albuquerque, NM (USA)). 1980. Contract AC04-76DP00789. 7p. (CONF-801020--3). NTIS, PC A02/MF A01.

From Marine technology conference; Washington, DC, USA (6 Oct 1980).

This presentation addresses the rationale, history, strategy, and management techniques used in the development of the US Subseabed Disposal Program (SDP) for both high level waste and spent fuel. The three subsections will summarize first, the US Department of Energy (DOE) high level waste and spent fuel waste disposal strategy and the position that the SDP occupies within that strategy; second, the technical and administrative tools developed to support the long range research and engineering plans defined by the DOE, program management, and program participants and employed to facilitate the day-to-day operation of the SDP; and third, the current studies and plans for addressing the legal, political, and international uncertainties that must be addressed before the SDP reaches the final engineering phases.

2004 (SAND--80-1616C) STORED ENERGY OF

GAMMA-IRRADIATED 97% PURE ROCKSALT. Moss, M. (Sandia National Labs., Albuquerque, NM (USA)). 1980. Contract AC04-76DP00789. 7p. (CONF-801102--21). NTIS, PC A02/MF A01.

From ASME winter annual meeting; Chicago, IL, USA (16 Nov 1980).

Samples of 97% pure NaCl from the Waste Isolation Pilot Plant (WIPP) site near Carlsbad, New Mexico, were exposed at 363°K to gamma radiation from a ^{60}Co source, and annealed at constant rates of heating in a differential scanning calorimeter in order to release the stored energy. Radiation doses were 2.2, 5.4, 8.2, 11, and 13 x 10^9 rad, and temperature scans were conducted from room temperature to 800°K. The stored energy-dose relationship is best described empirically by $\ln Q_0(kJ/kg) = (-39.2 \pm 2.6) + (1.84 \pm 0.12) \ln D(rad)$. Temperature scans of 0.17, 0.33, 0.67, and 1.33 K/s were performed to determine the activation energy E of the annealing process. For the four most highly irradiated samples, E = 113 +- 31 kJ/mol. The values of stored energy and activation energy for the annealing process are similar to those reported by previous investigators. These data, then, support their conclusion that there appears to be no danger of a rapid release of the stored energy in a nuclear waste respository of bedded salt, nor could serious consequences result from such a release by some unforeseen mechanism.

2005 (SAND--80-2035C) GEOTECHNICAL PROPERTIES OF SEDIMENTS FROM NORTH PACIFIC AND NORTHERN BERMUDA RISE. Silva, A.J.; Laine, E.P.; Lipkin, J.; Heath, G.R.; Akers, S.A. (Sandia National Labs., Albuquerque, NM (USA)). 1980. Contract AC04-76DP00789. 9p. (CONF-801020--5). NTIS, PC A02/MF A01.

From Marine technology conference; Washington, DC, USA (6 Oct 1980).

Studies of geotechnical properties for the Sub-seabed Disposal Program have been oriented toward sediment characterization related to effectiveness as a containment media and determination of detailed engineering behavior. Consolidation tests of the deeper samples in the North Pacific clays indicate that the sediment column is normally consolidated. The in-situ coefficient of permeability (k) within the cored depth of 25 meters is relatively constant at 10^{-7} cm/sec. Consolidated undrained (CIU) triaxial tests indicate stress-strain properties characteristic of saturated clays with effective angles of friction of 35° for smectite and 31° for illite. These results are being used in computer modeling efforts. Some general geotechnical property data from the Bermuda Rise are also discussed.

2006 (SAND--80-2096C) ENVIRONMENTAL STUDIES DATA BASE: DEVELOPMENT AND DATA SYNTHESIS ACTIVITIES OF THE US SUBSEABED DISPOSAL PROGRAM. Gomez, L.S.; Hessler, R.R.; Jackson, D.W.; Marietta, M.G.; Smith, K.L. Jr.; Yayanos, A.A. (Sandia Labs., Albuquerque, NM (USA); Scripps Institution of Oceanography, La Jolla, CA (USA); Concepts Development, Inc., Albuquerque, NM (USA)). 1980. Contract AC04-76DP00789. 25p. (CONF-801063--3; IAEA-SM--248/142). NTIS, PC A02/MF A01.

From International symposium on the impacts of radionuclide releases into the marine environment; Vienna, Austria (6 Oct 1980).

The US Subseabed Disposal Program is assessing the scientific feasibility of subseabed emplacement of high-level nuclear wastes. Studies of disposal methods and of the barriers to radionuclide migration (canister, waste form and sediment) suggest that environmental information will be needed to address the impact of accidental release of radionuclides in the deep sea. Biological, physical, and geochemical data are being collected from field and laboratory studies as well as from literature searches. These data are being analyzed using a multicompartmental radionuclide transport model and appropriate physical oceanographic models. The data integrated into this framework will help answer two questions: what are the environmental effects of radionuclides which may be released in the deep sea, and what are the effects of such a release upon man.

2007 (SAND--80-2414C) BELL CANYON TEST AND RESULTS. Christensen, C.L.; Hunter, T.O. (Sandia National Labs., Albuquerque, NM (USA)). 1980. Contract AC04-76DP00789. 9p. (CONF-801124--3). NTIS, PC A02/MF A01.

From 3. annual meeting of the Materials Research Society; Boston, MA, USA (17 Nov 1980).

The purposes of the Borehold Plugging Program are: to identify issues associated with sealing boreholes and shafts; to establish a data base from which to assess the importance of these issues; and to develop sealing criteria, materials, and demonstrative test for the Waste Isolation Pilot Plant (WIPP). The Bell Canyon Test described in this report is one part of that program. Its purpose was to evaluate, in situ, the state of the art in borehole plugs and to identify and resolve problems encountered in evaluating a typical plug installation in anhydrite. The test results are summarized from the work of Peterson and Christensen and divided into two portions: system integrity and wellbore characterization tests prior to plug installation, and a series of tests to evaluate isolation characteristics of the 1.8-m-long plug. Conclusions of the Bell Canyon Test are: brine and fresh-water grouts, with acceptable physical properties in the fluid and hardened states, have been developed; the field data, taken together with laboratory data, suggest that the predominant flow into the test region occurs through the cement plug/borehold interface region, with lesser contributions occurring through the wellbore damage zone, the plug core, and the surrounding undisturbed anhydrite bed; and the 1.8-m-long by 20-cm-diameter grout plug, installed in anhydrite at a depth of 1370 m in the AEC-7 borehole, limits flow from the high pressure Bell Canyon aquifer to 0.6 liters/day.

2008 (SAND--80-2462C) BOREHOLE PLUGGING TEST ACTIVITIES IN SOUTHEASTERN NEW MEXICO. Hunter, T.O. (Sandia National Labs., Albuquerque, NM (USA)). 1980. Contract AC04-76DP00789. 8p. (CONF-801209--4). NTIS, PC A02/MF A01.

From 2. annual National Waste Terminal Storage (NWTS) information meeting; Columbus, OH, USA (9 Dec 1980).

Conclusions from these studies indicated that borehole seals with effective permeabilities on the order of tens of darcies would result in doses to maximally exposed individuals of less than 0.01% of natural background. In addition to overall assessments, techniques have been developed to evaluate the effectiveness of a plug/formation system to block fluid flow along the axis of the borehole. These techniques allow the characterization of the flow region within or surrounding a plug. They have been applied to results from tests in which flow was measured around an in situ plug. Current emphasis has been on evaluation of cementitious grouts. Grout mixes with expansive cement have been

developed using various additives and both brines and fresh water. These mixes have been tailored to specific rocks for use in field tests. The characteristics (e.g., permeability bond strength) of these mixes and associated rocks have been determined in the laboratory and then compared with in situ performance. Studies of grout feasibility have been coupled with strategies for assessing long-term stability.

2009 (SGAE--3035) PROPERTIES OF SPENT FUEL ELEMENTS. Kamelander, G.; Stimpfl, G. (Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna). Mar 1979. 35p. (In German). (RS--149/79). Dep. NTIS (US Sales Only), PC A03/MF A01.

The report gives a presentation of the physical behaviour of spent fuel elements. Radioactivity, heat production and nuclide concentration of typical LWR-fuel-elements have been calculated for the period after removal from the reactor. The calculations have been performed by means of the NEA-Code ORIGEN.

2010 (SKBF-KBS-TR--79-01) CLAY PARTICLE REDISTRIBUTION AND PIPING PHENOMENA IN BENTONITE/QUARTZ BUFFER MATERIAL DUE TO HIGH HYDRAULIC GRADIENTS. Pusch, R. (Svensk Kaernbraenslefoersoerjning AB, Stockholm; Kaernbraenslesaekerhet, Stockholm (Sweden)). Jan 1979. 18p. Dep. NTIS (US Sales Only), PC A03/MF A01.

The deposition of canisters with highly radioactive wastes in tunnels at 500 m depth involves application of in siter compacted bentonite/quartz buffer material in tunnels and shafts. Such material is sometimes also specified for the deposition holes as well. One possible drawback of this procedure could be that the water which enters the buffer mass from the surrounding rock may cause erosion either by washing out tiny clay paritcles from the mass or by creating ''piping'' in it. Two test series were made in the laboratory to investigate the clay transporting power of percolating water. The tests show that piping and temporarily rapid water flow may take place. It requires, however, that rather extreme and improbably high gradients are produced in the tunnel fill. The tests also show that a steady homogeneous water flow does not transport clay particles through the grain matrix even under high gradients. The fact that a tunnel filled with 20 % Na bentonite does not obey Darcy's law, means that it will be practically impervious when only regional gradients are finally in operation.

2011 (SKBF/KBS-TR--79-03) TEMPERATURE LOADING AND ROCKS MECHANICS AT FINAL STORAGE OF RADIOACTIVE WASTE. Leijon, B.; Stephansson, O. (Kaernbraenslesaekerhet, Stockholm (Sweden); Svensk Kaernbraenslefoersoerjning AB, Stockholm). Jan 1979. 32p. (In Swedish). Dep. NTIS (US Sales Only), PC A03/MF A01.

This report describes the rock mechanical effects - in the far field - from the thermal loading at a final storage of radioactive waste in crystalline rocks. The stress distribution of a two-storey storage is described in more details. The temperature rise in a final storage of radiactive waste will create thermal stresses which may cause a failure of the rock mass, and thereby an increase of its permeability. However, the state of stress in the Earth's crust is able to neutralize the thermal stresses. By this analysis we have been able to demonstrate that the thermal stresses due to heat conduction from the final storage are compensated by the state of stress in the upper part of the crust. The absolute stress, which is the superposition of thermal stress and virgin rock stress, is in all cases found to be below the limit of failure due to frictional resistance between surfaces of constituent blocks in the rock mass. Failure by sliding friction is the most conservative failure criterion for a rock mass.

2012 (SKBF/KBS-TR--79-04) TEMPERATURE AND STRESS CALCULATION FOR FINAL DISPOSAL. Tarandi, T. (Kaernbraenslesaekerhet, Stockholm (Sweden); Svensk Kaernbraenslefoersoerjning AB, Stockholm). Feb 1979. 47p. (In Swedish). Dep. NTIS (US Sales Only), PC A04/MF A01.

Temperature and stress distribution in and around the final storage facility has been calculated for three different arrangements of the tunnels: - 2 planes with 60 m vertical distance between them - 2 planes with 100 m distance and - 1 plane. The highest temperatures and stresses occur for the 2 plane alternative with distance 60 m between planes. The maximum compressive stress is in this case 24.0 MPa 140 years after the time of deposition, compared with 12.6 MPa in the 1 plane case. The maximum tensile stress exists at the surface and is in the 2 plane case 6.0 MPa 800 - 1,500 years after deposition, compared with 4.2 MPa for the 1 plane variant. An estimation of maximum tensile stresses between the tunnel planes yields a value of 1.5 MPa. The above-mentioned stresses are due to temperature distribution induced by the radioactive waste. To obtain the total stresses, initial stresses in the undisturbed rock, which vary according to location, are to be added to these stresses.

2013 (SKBF/KBS-TR--79-09) EVALUATION OF THE HYDROGEOLOGIC AND BED ROCK GEOLOGIC CONDITIONS AT STERNOE, SWEDEN. Ahlbom, K.; Carlsson, L.; Gidlund, G.; Klockars, C.E.; Scherman, S.; Thoregren, U. (Kaernbraenslesaekerhet, Stockholm (Sweden)). Feb 1979. 27p. (In Swedish). Dep. NTIS (US Sales Only), PC A03/MF A01.

The bedrock at Sternoe is known from surface mapping and from five deep boreholes with core recovery. The results from these investigations can be summarized as follows: 1. The bedrock consists of three different rock types a) Coastal gneiss b) Gneissic granite c) Karlshamn granite 2. The investigated area is limited by northwest and northeast striking fracture zones in the northern part of Sternoe and by a west-east striking fracture zone in the southern part. A dike of diabase appears in the eastern part of Sternoe. A fracture zone parallell to the diabase is dividing the investigated area into two blocks. 3. The fracture frequency in the main part of the cores are low, 0 - 4 fractures/3 meter core length. Fractured zones are found mainly in boreholes Ka 3 (1.6 m), Ka 2 (1.25 m) and to a higher degree in Ka 4. 4. There is no specific difference in fracturing between different rock types. 5. The evaluation of the hydraulic conductivity at Sternoe from measurings in four of the boreholes shows two volumes of bedrock, separated by a north-north-east striking fracture zone, which has a very low hydraulic conductivity ($< 10^{-11}$ m/s) below 300 meter. 6. The hydraulic conductivity in the fracture zones varies between 1×10^{-9} m/s to 1.5×10^{-8} m/s.

2014 (SKBF/KBS-TR--79-12) GEOPHYSICAL BOREHOLE MEASUREMENTS. Magnusson, K.A.; Duran, O. (Kaernbraenslesaekerhet, Stockholm (Sweden)). Feb 1979. 32p. (In Swedish).

Dep. NTIS (US Sales Only), PC A03/MF A01.
Measurements have been performed in two boreholes at Sternoe, Sweden, with the exception of the granite in one borehole (Ka4), the bedrock is of very high quality. The bedrock has few sparsely dispersed fissure zones with large parts of unfractured rock. The borehole wall is smooth which indicates that most of the fissures are closed or partly closed. The granite in Ka4 has several zones which are strongly fractured with open fractures and high water content.

2015 (SKBF/KBS-TR--79-14) CORROSION TESTING OF UNALLOYED TITANIUM IN SIMULATED DISPOSAL ENVIRONMENTS FOR REPROCESSED NUCLEAR WASTE. Henrikson, S.; de Pourbaix, M. (Kaernbraenslesaekerhet, Stockholm (Sweden)). May 1979. 34p. (In Swedish). (STUDSVIK/E1--79/83). NTIS (US Sales Only), PC A03/MF A01.
On the commission of the Nuclear Safety Project (KBS) corrosion tests have been carried out on unalloyed titanium, which is planned to be used as an outer corrosion resistant canister for reprocessed nuclear waste. Tests were conducted for 300 days in a corrosive medium of modified Baltic water at 100 and 130 degC with high (8 ppm) or a low (< 10 ppb) oxygen content. The tests at low oxygen content and 100 degC were continued for 600 days. Very low oxidation rates (0.01 - 0.1 μm/year) were obtained, corresponding to a life time of ten to hundred thousands of years for a 6 mm thick titanium canister. In spite of the considerably more severe corrosive contitions (higher temperature, higher chloride and fluoride contents as well as lower pH) compared with those estimated for the final disposal, no signs of localized corrosion were found, nor could any hydrogen pick-up be detected.

2016 (STUDSVIK/E2--79/38) PRELIMINARY MINI EXPERIMENTS ON LEACHING OF GLASS. A REPORT OF THE SITUATION 1979-03-15. Blomqvist, G. (Studsvik Energiteknik AB, Nykoeping (Sweden)). Apr 1979. 13p. (In Swedish). Dep. NTIS (US Sales Only), PC A02/MF A01.
The work performed within a project concerning preliminary mini experiments on the leaching of glass up to 1979-03-15 is summarized. It is shown that steady states are not obtained during one month for the investigated elements (Na, Cs, Sr, Ba) while the concentration of Ca in the leachate decreases to almost zero. The solubility of glass seems to be dependent on the volume.

2017 (STUDSVIK-K2--78/20) ALMA. CALCULATIONS OF DIFFUSION AND RADIATION DOSES IN CONNECTION WITH FINAL STORAGE OF RADIOACTIVE WASTES. Gelin, R.; Kjellbert, N.; Stenquist, C. (Aktiebolaget Atomenergi, Studsvik (Sweden)). Sep 1978. 30p. (In Swedish). Dep. NTIS (US Sales Only), PC A03/MF A01.
Calculations of diffusion and radiation doses in connection with final storage of low-level and intermediate-level radioactive wastes. The results show that the doses obtained with realistic values of parameters used in the calculations are very low. However, substantially simplified assumption have been applied in the calculations. Thus more detailed models for the description of the diffusion process have to be developed.

2018 (STUDSVIK-K2--78/70) CALCULATIONS OF THE DIFFUSION OF NUCLIDES THROUGH CRACKS IN CONTAINERS MADE OF CONCRETE. Haeggblom, H. (Studsvik Energiteknik AB, Nykoeping (Sweden)). Dec 1978. 29p. (In Swedish). Dep. NTIS (US Sales Only), PC A03/MF A01.
Active nuclear waste from Oskarshamn and Ringhals, Sweden, is encapsulated in containers made of concrete. The containers have plane surfaces. The diffusion of nuclides through the concrete as well as through an assumed crack with thicknesses of 0.1 and 1.0 mm, respectively, has been calculated with the computer code TEMPER 3. The density of nuclids outside the containers was assumed to be zero. The calculations were performed with two different values of the diffusion constant in concrete and with two different values of the retardation factor for nuclides in the crack. The results of the calculations show that the migration time through the crack varied between 18 days and 300 years depending on the different assumptions. The times before maximum migration velocities were obtained were a factor of 6 longer.

2019 (STUDSVIK-SA--78/34) STUDIES CONCERNING THE CONDITIONS FOR UNDERGROUND STORAGE OF SHORT-LIVED RADIOACTIVE WASTES. Carlsson, T.; Jacobsson, A.; Linder, P.; Holmberg, K.E. (Aktiebolaget Atomenergi, Studsvik (Sweden)). Aug 1978. 18p. (In Swedish). Dep. NTIS (US Sales Only), PC A05/MF A01.
Studies concerning the conditions for underground storage of short-lived radioactive wastes at different places are reported. Thus a literature study of the different factors affecting the radionuclide migration in the ground is reported as well as experiments, in which the distribution constant for radionuclide migration have been determined. Furthermore measuring methods for the determination of different migration parameters are described.

2020 (UCID--17893) DISRUPTIVE EVENT UNCERTAINTIES IN A PERTURBATION APPROACH TO NUCLEAR WASTE REPOSITORY RISK ANALYSIS. Harvey, T.F. (California Univ., Livermore (USA). Lawrence Livermore Lab.). Sep 1980. Contract W-7405-ENG-48. 59p. NTIS, PC A04/MF A01.
A methodology is developed for incorporating a full range of the principal forecasting uncertainties into a risk analysis of a nuclear waste repository. The result of this methodology is a set of risk curves similar to those used by Rasmussen in WASH-1400. The set of curves is partially derived from a perturbation approach to analyze potential disruptive event sequences. Such a scheme could be useful in truncating the number of disruptive event scenarios and providing guidance to those establishing data-base development priorities.

2021 (UCID--18009) TECHNICAL CONCEPT FOR ROCK MECHANICS TESTS, CLIMAX GRANITE, NTS. Hearst, J.R. (California Univ., Livermore (USA). Lawrence Livermore Lab.). Feb 1979. Contract W-7405-ENG-48. 74p. Dep. NTIS, PC A04/MF A01.
If we are to believe our predictions of the thermomechanical behavior of the material surrounding a nuclear waste repository in granite, we must test the computational methods used in making the predictions. If thermal loadings appropriate to a real repository are used, thermally induced displacements and strains are quite small, and available geotechnical instrumentation is only marginally able to measure these effects to the accuracy desired to make thorough tests of the predictions. We outline a three-step program to address these issues. (1) Conduct experiments

in which the thermal loading is large compared to that induced by a real repository. This will permit us to make accurate measurements with available instrumentation. (2) Simultaneously, develop improved instrumentation that will enable us to make accurate measurements of motions induced by thermal loadings appropriate to a real repository. (3) Finally, conduct a second set of experiments, with the improved instrumentation and thermal loading similar to that of a real repository in granite. If we can predict the effects of this thermal loading to a few percent over distances of tens of meters for time periods of a few years, and demonstrate that these predictions are correct, we can have reasonable confidence that, using the same methods, we can predict the behavior over thousands of meters for hundreds of years to an order of magnitude. That accuracy should be satisfactory for those distances and times.

2022 (UCID--18125) SEISMIC SAFETY IN NUCLEAR-WASTE DISPOSAL. Carpenter, D.W.; Towse, D. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 26 Apr 1979. Contract W-7405-ENG-48. 62p. Dep. NTIS, PC A04/MF A01.

Seismic safety is one of the factors that must be considered in the disposal of nuclear waste in deep geologic media. This report reviews the data on damage to underground equipment and structures from earthquakes, the record of associated motions, and the conventional methods of seismic safety-analysis and engineering. Safety considerations may be divided into two classes: those during the operational life of a disposal facility, and those pertinent to the post-decommissioning life of the facility. Operational hazards may be mitigated by conventional construction practices and site selection criteria. Events that would materially affect the long-term integrity of a decommissioned facility appear to be highly unlikely and can be substantially avoided by conservative site selection and facility design. These events include substantial fault movement within the disposal facility and severe ground shaking in an earthquake epicentral region. Techniques need to be developed to address the question of long-term earthquake probability in relatively aseismic regions, and for discriminating between active and extinct faults in regions where earthquake activity does not result in surface ruptures.

2023 (UCID--18133(Rev.1)) ABSTRACTS: NRC WASTE MANAGEMENT PROGRAM REPORTS. Heckman, R.A.; Minichino, C. (California Univ., Livermore (USA). Lawrence Livermore Lab.). Nov 1979. Contract W-7405-ENG-48. 150p. Dep. NTIS, PC A07/MF A01.

This document consists of abstracts of all reports published by the Nuclear Regulatory Commission (NRC) Waste Management Program at Lawrence Livermore Laboratory (LLL). It will be updated at regular intervals. Reports are arranged in numerical order, within each category. Unless otherwise specified, authors are LLL scientists and engineers.

2024 (UCID--18502) CLIMAX GRANITE TEST RESULTS. Ramspott, L.D. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 15 Jan 1980. Contract W-7405-ENG-48. 24p. Dep. NTIS, PC A02/MF A01.

The Lawrence Livermore Laboratory (LLL), as part of the Nevada Nuclear Waste Storage Investigations (NNWSI) program, is carrying out in situ rock mechanics testing in the Climax granitic stock at the Nevada Test Site (NTS). This summary addresses only those field data taken to date that address thermomechanical modeling for a hard-rock repository. The results to be discussed include thermal measurements in a heater test that was conducted from October 1977 through July 1978, and stress and displacement measurements made during and after excavation of the canister storage drift for the Spent Fuel Test (SFT) in the Climax granite. Associated laboratory and field measurements are summarized. The rock temperature for a given applied heat load at a point in time and space can be adequately modeled with simple analytic calculations involving superposition and integration of numerous point source solutions. The input, for locations beyond about a meter from the source, can be a constant thermal conductivity and diffusivity. The value of thermal conductivity required to match the field data is as much as 25% different from laboratory-measured values. Therefore, unless we come to understand the mechanisms for this difference, a simple in situ test will be required to obtain a value for final repository design. Some sensitivity calculations have shown that the temperature field is about ten times more sensitive to conductivity than to diffusivity under the test conditions.The orthogonal array was designed to detect anisotropy. After considering all error sources, anisotropic efforts in the thermal field were less than 5 to 10%.

2025 (UCID--18575) PARAMETER IDENTIFICATION IN GROUNDWATER FLOW: A FEASIBILITY STUDY. Azevedo, S.G.; Doerr, T.A.; Candy, J.V.; Pimentel, K.D. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 11 Mar 1980. Contract W-7405-ENG-48. 57p. Dep. NTIS, PC A04/MF A01.

A set of first-order differential state equations is developed from taking finite differences of the partial differential equation that describes groundwater flow during a pump-drawdown test. The number of states in the model is a direct function of the number of discrete spatial segments used in the approximate model. This number of states is studied to determine a reasonably low-order model that preserves the accuracy of resulting simulations when compared with an available analytical solution. The resulting reduced-order model is then used in an extended Kalman filter for combined state and parameter estimation. This report summarizes work done in a recent pilot study to demonstrate the feasibility of these techniques in groundwater research and points the way toward other approaches to this problem area now under study.

2026 (UCID--18650) DEVELOPMENT AND UTILIZATION OF A TWO-DIMENSIONAL MODEL OF TRANSIENT FLUID FLOW IN A GENERIC REPOSITORY (OGRE). Korver, J.A. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 10 Oct 1979. Contract W-7405-ENG-48. 61p. Dep. NTIS, PC A04/MF A01.

An existing time-dependent numerical model (OGRE) has been modified to examine the time frames associated with repressuring the formation rocks surrounding a generic nuclear waste repository following the operational period when wastes are being stored. The model is two-dimensional in the vertical plane, and assumes that the entire regime is saturated, but the repository is at one atmosphere during the operational period. For the physical and geometric parameters assumed, the results of a simulation of the time necessary to repressurize the formation after the operational period was 421.5 years. These

results were in close agreement with a steady-state calculation performed by Golder Associates, Inc., in 1977. The fact that the time-dependent model results were close to the steady-state calculation resulted from the use (in the model) of a very small compressibility value, which caused the simulation to reach a steady-state condition in a relatively short time. Based on these studies, the magnitude of the system (water plus matrix) compressibility is of great importance in determining whether the time for repressurization can be determined from analytical methods or requires the use of a time-dependent numerical model.

2027 (UCID--18651) APPLICATION OF FRAMIS TO K/SUB D/ DATA. Storch, N. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 20 Mar 1980. Contract W-7405-ENG-48. 25p. NTIS, PC A02/MF A01.

This report documents an application of the FRAMIS relational data base management system. A geochemical data base of ion exchange distribution coefficients (K/sub D/) is created and maintained by using very simple commands. Reports are automatically generated. Familiarity with the LLL Octopus Time-Sharing System and FRAMIS is assumed.

2028 (UCID--18662) ANNULAR AIR SPACE EFFECTS ON NUCLEAR WASTE CANISTER TEMPERATURES IN A DEEP GEOLOGIC WASTE REPOSITORY. Lowry, W.E.; Cheung, H.; Davis, B.W. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 13 May 1980. Contract W-7405-ENG-48. 37p. NTIS, PC A03/MF A01.

Air spaces in a deep geologic repository for nuclear high level waste will have an important effect on the long-term performance of the waste package. The important temperature effects of an annular air gap surrounding a high level waste canister are determined through 3-D numerical modeling. Air gap properties and parameters specifically analyzed and presented are the air gap size, surfaces emissivity, presence of a sleeve, and initial thermal power generation rate; particular emphasis was placed on determining the effect of these variables have on the canister surface temperature. Finally a discussion based on modeling results is presented which specifically relates the results to NRC regulatory considerations.

2029 (UCID--18664) REVIEW OF GEOCHEMICAL MEASUREMENT TECHNIQUES FOR A NUCLEAR WASTE REPOSITORY IN BEDDED SALT. Knauss, K.G.; Steinborn, T.L. (California Univ.; Livermore (USA). Lawrence Livermore Lab.). 22 May 1980. Contract W-7405-ENG-48. 72p. NTIS, PC A04/MF A01.

A broad, general review is presented of geochemical measurement techniques that can provide data necessary for site selection and repository effectiveness assessment for a radioactive waste repository in bedded salt. The available measurement techniques are organized according to the parameter measured. The list of geochemical parameters include all those measurable geochemical properties of a sample whole values determine the geochemical characteristics or behavior of the system. For each technique, remarks are made pertaining to the operating principles of the measurement instrument and the purpose for which the technique is used. Attention is drawn to areas where further research and development are needed.

2030 (UCID--18665) REMARKS ON THE ASSESSMENT, REPRESENTATION, AGGREGATION AND UTILIZATION OF EXPERT OPINION. Fine, T.L. (California Univ., Livermore (USA). Lawrence Livermore Lab.). Apr 1980. Contract W-7405-ENG-48. 42p. NTIS, PC A03/MF A01.

This report considers the relevance of recent ideas in the foundations of probability to the rational use of expert opinion in the design of a nuclear waste repository, and the assessment of its performance. The main probability concepts introduce are those of modal (probably A), comparative (A is at least as probable as B) and interval-valued (the lower probability of A is P(A) and the upper probability of A is P(anti A)) probabilities. We then outline an approach first using comparative probability to model the resuls of binary elicitation of an expert's opinions concerning repository uncertainties and then employing interval-valued probability to represent comparative probability in a computationally convenient form. We further consider the issue of aggregating or amalgamating the responses of several experts, and we emphasize the need to preserve some measure of the disagreements among the experts. The resulting aggregated interval-valued representation of the responses concerning the uncertainties surrounding the performance of a nuclear waste repository design can then be used to numerically assess this performance in a manner parallel to that of utility theory. Utility theory is the basis for statistical decision theory. Our recommendations can only be tentative, and research is recommended to gain some working experience with the results of the proposed decision-making process in the repostory design context.

2031 (UCID--18666) BRINE: A COMPUTER PROGRAM TO COMPUTE BRINE MIGRATION ADJACENT TO A NUCLEAR WASTE CANISTER IN A SALT REPOSITORY. Duckworth, G.D.; Fuller, M.E. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 10 Jun 1980. Contract W-7405-ENG-48. 29p. NTIS, PC A03/MF A01.

This report presents a mathematical model used to predict brine migration toward a nuclear waste canister in a bedded salt repository. The mathematical model is implemented in a computer program called BRINE. The program is written in FORTRAN and executes in the batch mode on a CDC 7600. A description of the program input requirements and output available is included. Samples of input and output are given.

2032 (UCID--18678) WASTE FORM DISSOLUTION IN BEDDED SALT. Kaufman, A.M. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 16 Sep 1980. Contract W-7405-ENG-48. 24p. NTIS, PC A02/MF A01.

A model was devised for waste dissolution in bedded salt, a hydrologically tight medium. For a typical Spent UnReprocessed Fuel (SURF) emplacement, the dissolution rate will be diffusion limited and will rise to a steady state value after t/sub eq/ approx. = 250 (1+(1-epsilon$_o$) K/sub D//epsilon$_o$) (years) epsilon$_o$ is the overpack porosity and K/sub d/ is the overpack sorption coefficient. The steady state dissolution rate itself is dominated by the solubility of UO_2. Steady state rates between 5 x 10^{-5} and .5 (g/year) are achievable by SURF emplacements in bedded salt without overpack, and rates between 5 x 10^{-7} and 5 x 10^{-3} (g/year) with an overpack having porosity of 10^{-2}.

2033 (UCID--18681) EFFECTS OF DIMENSIONALITY AND BOUNDARY CONDITIONS ON THERMAL CALCULATIONS. Thorson, L.D.; Montan,

D.N. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 29 Sep 1980. Contract W-7405-ENG-48. 19p. NTIS, PC A02/MF A01.

We consider several aspects of the thermal modeling of an underground nuclear waste repository. These are the long term temperature response due to different ground surface boundary conditions, the effects of treating the three-dimensional problem in 2-D, and the consequences of using a constant power load rather than decaying power typical of radioactive waste. Our approach is superposition in time and space of the appropriate analytic solutions.

2034 (UCID--18700) NUMERICAL CALCULATION OF THERMAL CONVECTION IN POROUS MEDIA IN TWO DIMENSIONS WITH APPLICATIONS TO NUCLEAR REPOSITORY DESIGN. Maiden, D.E. (California Univ., Livermore (USA). Lawrence Livermore Lab.). May 1980. Contract W-7405-ENG-48. 15p. NTIS, PC A02/MF A01.

Thermal convection induced by nuclear waste heating could be an important mechanism in the transport of radioactive nuclides to the biosphere. A computer code HP2D was developed to calculate this effect. The code calculates transient and steady state heat and fluid flow in porous media. It allows for anisotropy of hydraulic conductivities, temperature dependent fluid density and viscosity. A heat source and a variety of temperature and flow boundary conditions can be easily employed. The code solves two coupled governing equations. The time dependent heat transport is solved by an alternating direction implicit technique; and the steady state flow of water is solved by a Gauss-Seidel Poisson solver. A sample calculation of thermal convection about a repository is given.

2035 (UCID--18796-80-1) WASTE ISOLATION PROGRAM EVALUATION ASSISTANCE. QUARTERLY TECHNICAL PROGRESS REPORT. Maninger, R.C.; Harvey, T.F. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 25 Sep 1980. Contract W-7405-ENG-48. 20p. NTIS, PC A02/MF A01.

This report covers the effort for the first quarter on the Waste Isolation Program Evaluation Assistance Project at LLNL. The basic principles of a method of portraying the National Waste Terminal Storage Program are outlined and an example of their applcations is given.

2036 (UCRL--15095) PROCESSES AND PARAMETERS INVOLVED IN MODELING RADIONUCLIDE TRANSPORT FROM BEDDED SALT REPOSITORIES. FINAL REPORT. TECHNICAL MEMORANDUM. Evenson, D.E.; Prickett, T.A.; Showalter, P.A. (Camp Dresser and McKee, Boston, MA (USA)). Jul 1979. Contract W-7405-ENG-48. 76p. Dep. NTIS, PC A05/MF A01.

The parameters necessary to model radionuclide transport in salt beds are identified and described. A proposed plan for disposal of the radioactive wastes generated by nuclear power plants is to store waste canisters in repository sites contained in stable salt formations approximately 600 meters below the ground surface. Among the principal radioactive wastes contained in these canisters will be radioactive isotopes of neptunium, americium, uranium, and plutonium along with many highly radioactive fission products. A concern with this form of waste disposal is the possibility of ground-water flow occurring in the salt beds and endangering water supplies and the public health. Specifically, the research investigated the processes involved in the movement of radioactive wastes from the repository site by groundwater flow. Since the radioactive waste canisters also generate heat, temperature is an important factor. Among the processes affecting movement of radioactive wastes from a repository site in a salt bed are thermal conduction, groundwater movement, ion exchange, radioactive decay, dissolution and precipitation of salt, dispersion and diffusion, adsorption, and thermomigration. In addition, structural changes in the salt beds as a result of temperature changes are important. Based upon the half-lives of the radioactive wastes, he period of concern is on the order of a million years. As a result, major geologic phenomena that could affect both the salt bed and groundwater flow in the salt beds was considered. These phenomena include items such as volcanism, faulting, erosion, glaciation, and the impact of meteorites. CDM reviewed all of the critical processes involved in regional groundwater movement of radioactive wastes and identified and described the parameters that must be included to mathematically model their behavior. In addition, CDM briefly reviewed available echniques to measure these parameters.

2037 (UCRL--15111) RETRIEVAL SYSTEM FOR EMPLACED SPENT UNREPROCESSED FUEL (SURF) IN SALT BED DEPOSITORY: ACCIDENT EVENT ANALYSIS AND MECHANICAL FAILURE PROBABILITIES. FINAL REPORT. Bhaskaran, G.; McCleery, J.E. (California Univ., Livermore (USA). Lawrence Livermore Lab.). Oct 1979. Contract W-7405-ENG-48. 250p. Dep. NTIS, PC A11/MF A01.

This report provides support in developing an accident prediction event tree diagram, with an analysis of the baseline design concept for the retrieval of emplaced spent unreprocessed fuel (SURF) contained in a degraded Canister. The report contains an evaluation check list, accident logic diagrams, accident event tables, fault trees/event trees and discussions of failure probabilities for the following subsystems as potential contributors to a failure: (a) Canister extraction, including the core and ram units; (b) Canister transfer at the hoist area; and (c) Canister hoisting. This report is the second volume of a series. It continues and expands upon the report Retrieval System for Emplaced Spent Unreprocessed Fuel (SURF) in Salt Bed Depository: Baseline Concept Criteria Specifications and Mechanical Failure Probabilities. This report draws upon the baseline conceptual specifications contained in the first report.

2038 (UCRL--15141) REVIEW OF GEOTECHNICAL MEASUREMENT TECHNIQUES FOR A NUCLEAR WASTE REPOSITORY IN BEDDED SALT. (International Engineering Co., Inc., San Francisco, CA (USA)). Dec 1979. Contract W-7405-ENG-48. 282p. Dep. NTIS, PC A13/MF A01.

This report presents a description of geotechnical measurement techniques that can provide the data necessary for safe development - i.e., location, design, construction, operation, decommissioning and abandonment - of a radioactive waste repository in bedded salt. Geotechnical data obtained by a diversity of measurement techniques are required during all phases of respository evolution. The techniques discussed in this report are grouped in the following categories: geologic, geophysical and geodetic; rock mechanics; hydrologic, hydrogeologic and water quality; and thermal. The major contribution of the report is the presentation of extensive tables that provide a review of available measurement techniques for each of these categories. The techniques are

also discussed in the text to the extent necessary to describe the measurements and associated instruments, and to evaluate the applicability or limitations of the method. More detailed discussions of thermal phenomena, creep laws and geophysical methods are contained in the appendices; references to detailed explanations of measurement techniques and instrumentation are included throughout the report.

2039 (UCRL--15152) GEOSCIENCE PARAMETER DATA BASE HANDBOOK: GRANITES AND BASALTS. (Owens (Willard) Associates, Inc., Wheat Ridge, CO (USA)). Dec 1979. Contract W-7405-ENG-48. 407p. Dep. NTIS, PC A18/MF A01.

The Department of Energy has the responsibility for selecting and constructing Federal repositories for radioactive waste. The Nuclear Regulatory Commission must license such repositories prior to construction. The basic requirement in the geologic disposal of radioactive waste is stated as: placement in a geologic host whereby the radioactive waste is not in mechanical, thermal or chemical equilibrium with the object of preventing physical or chemical migration of radionuclides into the biosphere or hydrosphere in hazardous concentration (USGS, 1977). The object of this report is to document the known geologic parameters of large granite and basalt occurrences in the coterminous United States, for future evaluation in the selection and licensing of radioactive waste repositories. The description of the characteristics of certain potential igneous hosts has been limited to existing data pertaining to the general geologic character, geomechanics, and hydrology of identified occurrences. A description of the geochemistry is the subject of a separate report.

2040 (UCRL--15163) SURVEY OF NEAR-FIELD FLOW CALCULATIONS FOR NUCLEAR WASTE REPOSITORIES NMA L21. Wilson, R.N.; Holland, D.H. (New Millennium Associates, Santa Barbara, CA (USA)). Nov 1979. Contract W-7405-ENG-48. 39p. Dep. NTIS, PC A03/MF A01.

A survey of methods and codes which describe the flow of groundwater and the migration of radioactive waste in and about nuclear repositories was performed. A number of laboratories engaged in studies of waste migration and groundwater flow were visited in order to discuss the general problem and obtain reports of work being performed. The results of this survey are discussed. (DMC)

2041 (UCRL--15166(Vol.1)) DERIVATION OF PARAMETERS NECESSARY FOR THE EVALUATION OF PERFORMANCE OF SITES FOR DEEP GEOLOGICAL REPOSITORIES WITH PARTICULAR REFERENCE TO BEDDED SALT, LIVERMORE, CALIFORNIA. VOLUME I. MAIN TEXT. Ashby, J.P.; Rawlings, G.E.; Soto, C.A.; Wood, D.F.; Chorley, D.W. (Golder Associates, Inc., Kirkland, WA (USA)). Dec 1979. Contract W-7405-ENG-48. 289p. Dep. NTIS, PC A13/MF A01.

A survey of parameters to be considered in the evaluation of sites for deep geologic nuclear waste repositories is presented. As yet, no comprehensive site selection procedure or performance evaluation approach has been adopted. A basis is provided for the development of parameters by discussing both site selection and performance evaluation. Three major groups of parameters are considered in this report: geologic, mining/rock mechanics, and hydrogeologic. For each type, the role of the parameter in the evaluation of repository sites is discussed. The derivation of the parameter by measurement, correlation, inference, or other method is discussed. Geologic parameters define the framework of the repository site and can be used in development of conceptual models and the prediction of long-term performance. Methods for deriving geological parameters include mapping, surveying, drilling, geophysical investigation, and historical and regional analysis. Rock mechanics/mining parameters are essential for the prediction of short-term performance and the development of initial conditions for modeling of long-term performance. Rock mechanics/mapping parameters can be derived by field or laboratory investigation, correlation, and theoretically or empirically based inference. Hydrogeologic parameters are the most important for assessment of long-term radionuclide confinement, since transport throughout the regional hydrogeologic system is the most likely mode of radionuclide escape from geologic repositories. Hydrogeologic parameters can be derived by hydrogeologic mapping and interpretation, hydrogeologic system modeling, field measurements, and lab tests. Procedures used in determination and statistical evaluation of geologic and rock mechanics parameters are discussed.

2042 (UCRL--15166(Vol.2)) DERIVATION OF PARAMETERS NECESSARY FOR THE EVALUATION OF PERFORMANCE OF SITES FOR DEEP GEOLOGICAL REPOSITORIES WITH PARTICULAR REFERENCE TO BEDDED SALT, LIVERMORE, CALIFORNIA. VOLUME II. APPENDICES. Ashby, J.P.; Rawlings, G.E.; Soto, C.A.; Wood, D.F.; Chorley, D.W. (Golder Associates, Inc., Kirkland, WA (USA)). Dec 1979. Contract W-7405-ENG-48. 173p. Dep. NTIS, PC A08/MF A01.

The method of selection of parameters to be considered in the selection of a site for underground disposal of radioactive wastes is reported in volume 1. This volume contains the appendix to that report. The topics include: specific rock mechanics tests; drilling investigation techniques and equipment; geophysical surveying; theoretical study of a well text in a nonhomogeneous aquifer; and basic statistical and probability theory that may be used in the derivation of input parameters.

2043 (UCRL--15167(Vol.1)) ASPECTS OF NUCLEAR WASTE MANAGEMENT. VOLUME 1. PRE-EMPLACEMENT RISKS. Ensminger, D.A.; Oston, S.G. (Analytic Sciences Corp., Reading, MA (USA)). 10 Aug 1979. Contract W-7405-ENG-48. 58p. Dep. NTIS, PC A04/MF A01.

Results of the previous one-dimensional thermal analysis of interim storage accidents are confirmed by more detailed two-dimensional calculations. Waste temperatures calculated for interim storage accidents are moderately sensitive to assumptions concerning canister spacing and are much less sensitive to boundary conditions at the canister top. For an individual 100 m from a transportation accident involving solidified high-level waste, the expected dose from gamma radiation is on the order of or smaller than the other possible exposures in the same accident. For the calculation of expected doses to the worst-situated individual in accidents: Expected population dose should remain the primary measure of pre-emplacement risk in order to maintain comparability of consequences of different types of accidents.

2044 (UCRL--15173) PRECIPITATION AND LAKE-LEVEL CHANGES IN THE WEST AND MIDWEST OVER THE PAST 10,000 TO 24,000 YEARS. FINAL REPORT.

Webb, T. III; Street, F.A.; Howe, S. (Brown Univ., Providence, RI (USA). Dept. of Geological Sciences; Oxford Univ. (UK). Geography School; Carnegie-Mellon Univ., Pittsburgh, PA (USA). Dept. of Statistics). 4 Feb 1980. Contract W-7405-ENG-48. 129p. Dep. NTIS, PC A07/MF A01.

The goal of the research described in this report is to document the climatic variability over the past 10,000 to 20,000 years in areas in which sites may be designated for the burial of nuclear wastes. Three separate data sets were studied, and the results are presented in three chapters. The first data set consisted of radiocarbon dates documenting past changes in lake levels in lakes and playas in the western United States. The sites were mapped where water levels were higher than the levels today and were presented in a table telling what evidence is available at each site. The lake-level fluctuations for the past 24,000 years at sites in the West were also mapped and time series for these fluctuations at four sites were presented. The second data set was a selection of the published radiocarbon-dated pollen diagrams from the western United States. These data are a valuable source of climatic information and complement the geological evidence of lake-level fluctuations in the West. A table is presented that gives the location, elevation, and number of radiocarbon dates for each site. The third data set was a set of fossil pollen data from 20 sites in the upper Midwest. These data were calibrated in terms of precipitation changes over the past 10,000 years, and maps are presented of the estimated precipitation changes between 10,000 and 7000 years ago and between 7000 years ago and today.

2045 (UCRL--15176) NUMERICAL MODELING CAPABILITIES TO PREDICT REPOSITORY PERFORMANCE. (Golder Associates, Inc., Golden, CO (USA)). Sep 1979. Contract W-7405-ENG-48. 118p. Dep. NTIS, PC A06/MF A01.

This report presents a summary of current numerical modeling capabilities that are applicable to the design and performance evaluation of underground repositories for the storage of nuclear waste. The report includes codes that are available in-house, within Golder Associates and Lawrence Livermore Laboratories; as well as those that are generally available within the industry and universities. The first listing of programs are in-house codes in the subject areas of hydrology, solute transport, thermal and mechanical stress analysis, and structural geology. The second listing of programs are divided by subject into the following categories: site selection, structural geology, mine structural design, mine ventilation, hydrology, and mine design/construction/operation. These programs are not specifically designed for use in the design and evaluation of an underground repository for nuclear waste; but several or most of them may be so used.

2046 (UCRL--15177) REVIEW OF Y/OWI/TM-36: REPOSITORY DESIGN PERFORMANCE IN SALT, GRANITE, SHALE OR BASALT. Talbot, R.; Nair, O.B. (Golder Associates, Inc., Golden, CO (USA)). Sep 1979. Contract W-7495-ENG-48. 76p. Dep. NTIS, PC A05/MF A01.

As part of the ongoing work by the Lawrence Livermore Laboratory to evaluate repository design performance, this memorandum presents a review of the preconceptual repository design described in Y/OWI/TM-36, Technical Support for GEIS: Radioactive Waste Isolation in Geologic Formations, April 1978. The purpose of this review is: to assess the adequacy of the design procedures and assumptions; to identify inappropriate or unsubstantiated design issues; to identify areas where additional numerical analyses may be required; and to develop data for inclusion in a reference repository design. The preconceptual repository design is presented in the form of 23 volumes of data base, analyses, and design layouts for four rock types: bedded salt, shale, granite and basalt. This memorandum reviews all four repository designs.

2047 (UCRL--15178) GENERAL BASIN MODELING FOR SITE SUITABILITY. DRAFT REPORT 1. BASELINE DATA. (Golder Associates, Inc., Golden, CO (USA)). Apr 1979. Contract W-7405-ENG-48. 80p. Dep. NTIS, PC A05/MF A01.

This report summarizes work completed by Golder Associates under Task 2 - Site Suitability specifically for modeling of fluid flow and mass transport in sedimentary basins containing thick shale or salt. It also describes ongoing and future work on the above topic. The purpose of the study is to develop a general model for a nuclear waste repository situated in a deep sedimentary basin environment. The model will be used in conjunction with Golder's fluid flow and mass transport codes to study specific aspects of nuclide transport by groundwater flow.

2048 (UCRL--15179) NUMERICAL MODELING OF SOLUTE TRANSPORT IN GROUNDWATER. Miller, I. (Golder Associates, Inc., Grand Junction, CO (USA)). Dec 1979. Contract W-7405-ENG-48. 41p. Dep. NTIS, PC A03/MF A01.

Although the Galerkin finite element method has been used for problems of solute transport by flowing groundwater for nearly a decade, there are a number of problems which make its use as a routine modeling technique somewhat difficult. This report discussed three problem areas: boundary conditions, interfaces between materials of different permeabilities or radically different velocity vectors, and numerical instability. Methods are proposed for improving these problem areas and are demonstrated using a sample problem.

2049 (UCRL--15180) DEVELOPMENT OF AN INTER-LAYER SOLUTE TRANSPORT ALGORITHM FOR SOLTR COMPUTER PROGRAM. PART 1. THE ALGORITHM. Miller, I.; Roman, K. (Golder Associates, Inc., Kirkland, WA (USA)). Dec 1979. Contract W-7405-ENG-48. 37p. NTIS, PC A03/MF A01.

In order to perform studies of the influence of regional groundwater flow systems on the long-term performance of potential high-level nuclear waste repositories, it was determined that an adequate computer model would have to consider the full three-dimensional flow system. Golder Associates' SOLTR code, while three-dimensional, has an overly simple algorithm for simulating the passage of radionuclides from one aquifer to another above or below it. Part 1 of this report describes the algorithm developed to provide SOLTR with an improved capability for simulating interaquifer transport.

2050 (UCRL--15181) REGIONAL FLOW AND SOLUTE TRANSPORT MODELING FOR SITE SUITABILITY. PART I. Rowe, J.; Miller, I. (Golder Associates, Inc., Golden, CO (USA)). Dec 1979. Contract W-7405-ENG-48. 172p. Dep. NTIS, PC A08/MF A01.

The nature of regional flow systems in large sedimentary basins will largely determine the effectiveness of regional flow as a barrier to

radionuclide escape from deep geologic repositories. The purpose of the work reported herein and the proposed future work is to develop a methodology for evaluating regional flow barriers by using numerical models. The Williston Basin was chosen as an archetype case for the regional modeling study. However, due to the simplified nature of the study, the results are not meant to represent the behavior of a repository actually placed within the Williston Basin. The major components of this Phase I study are: (1) assembly and reduction of available data; (2) formulation of a simplified geohydrologic model; (3) computer simulation of fluid flow; and (4) computer simulation of solute transport. As of this report, the first two items are essentially completed. Computer simulation of fluid flow will require some revision and further study, which will be done in the second phase of this study. Computer simulation of solute transport has been considered only on a very preliminary basis. Important conclusions of this Phase I study are as follows. Assembly and reduction of data require an extensive work effort. Generally, the parameters describing fluid flow are poorly known on a regional basis and those describing solute transport are unknown.

2051 (UCRL--15184) PRELIMINARY ANALYTICAL REPOSITORY FLOW MODEL. Oston, S.G. (Analytic Sciences Corp., Reading, MA (USA)). 1 Aug 1979. Contract W-7405-ENG-48. 16p. Dep. NTIS, PC A02/MF A01.

This memo describes a preliminary model that predicts the flow of dissolved nuclear waste in an underground repository. The model is based on the flow of water that enters regions of the repository in which the waste is actually contained; it is expected to be an improvement over the current approach that assumes the waste flow is proportional to total flow of water along various pathways. The repository flow model is intended for implementation in the TASC WASTE computer code. The model treats the repository as a homogeneous two-dimensional slab contained in a geologic formation and penetrated by a shaft leading to an aquifer. Flow of water both perpendicular and along the central corridor is determined in order to compute the heads of the repository as a function of position. The heads are then used to estimate the fraction of waste that leaks to the formation and the fraction that travels up the shaft. The waste-splitting fractions are presented as closed form analytical expressions to facilitate rapid calculations. Numerical results for a typical geometry are also given.

2052 (UCRL--15203) GEOLOGIC, STRATIGRAPHIC, THERMAL, AND MECHANICAL FACTORS WHICH INFLUENCE REPOSITORY DESIGN IN THE BEDDED SALT ENVIRONMENT. Ashby, J.P.; Nair, O.; Ortman, D.; Rowe, J. (Golder Associates, Inc., Kirkland, WA (USA)). Dec 1979. Contract W-7405-ENG-48. 89p. Dep. NTIS, PC A05/MF A01.

This report describes the geologic, stratigraphic, thermal, and mechanical considerations applicable to repository design. The topics discussed in the report include: tectonic activity; geologic structure; stratigraphy; rock mechanical properties; and hydrologic properties.

2053 (UCRL--15204) ROCK SALT CONSTITUTIVE MODELING. Nickell, R.E. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 18 Mar 1980. Contract W-7405-ENG-48. 11p. Dep. NTIS, PC A02/MF A01.

The Serata model is the best operational model available today because it incorporates: (1) a yield function to demarcate between viscoelastic and viscoplastic behavior of rock salt; (2) a pressure and temperature dependence for yield stresses; and (3) a standard linear solid, which can be readily extended into the non-linear regime, to represent creep behavior. Its only deficiencies appear to be the lack of secondary creep behavior (a free dashpot) and some unsettling arbitrariness about the Poisson's ratio ($\nu \rightarrow 0.5$) argument for viscoplasticity. The Sandia/WIPP model will have good primary and secondary creep capability, but lacks the viscoplastic behavior. In some cases, estimated inelastic strains may be underpredicted. If a creep acceleration mechanism associated with brine inclusions is observed, this model may require extensive revision. Most of the other models available (SAI, RE-SPEC, etc.) are only useful for short-term calculations, because they employ temporal power law (t/sup n/) primary creep representations. These models are unsatisfactory because they cannot represent dual mechanisms with differing characteristic times. An approach based upon combined creep and plasticity is recommended in order to remove the remaining deficiency in the Serata model. DOE/Sandia/WIPP should be encouraged to move aggressively in this regard.

2054 (UCRL--15205) EFFECTS OF RESOURCE ACTIVITIES UPON REPOSITORY SITING AND WASTE CONTAINMENT WITH REFERENCE TO BEDDED SALT. Ashby, J.; Rowe, J. (Golder Associates, Inc., Kirkland, WA (USA)). Feb 1980. Contract W-7405-ENG-48. 66p. Dep. NTIS, PC A04/MF A01.

The primary consideration for the suitability of a nuclear waste repository site is the overall ability of the repository to safely contain radioactive waste. This report is a discussion of the past, present, and future effects of resource activities on waste containment. Past and present resource activities which provide release pathways (i.e., leaky boreholes, adjacent mines) will receive initial evaluation during the early stages of any repository site study. However, other resource activities which may have subtle effects on containment (e.g., long-term pumping causing increased groundwater gradients, invasion of saline water causing lower retardation) and all potential future resource activities must also be considered during the site evaluation process. Resource activities will affect both the siting and the designing of repositories. Ideally, sites should be located in areas of low resource activity and low potential for future activity, and repository design should seek to eliminate or minimize the adverse effects of any resource activity. Buffer zones should be created to provide areas in which resource activities that might adversely affect containment can be restricted or curtailed. This could mean removing large areas of land from resource development. The impact of these frozen assets should be assessed in terms of their economic value and of their effect upon resource reserves. This step could require a major effort in data acquisition and analysis followed by extensive numerical modeling of regional fluid flow and mass transport. Numerical models should be used to assess the effects of resource activity upon containment and should include the cumulative effects of different resource activities. Analysis by other methods is probably not possible except for relatively simple cases.

2055 (UCRL--15208) SOURCES OF DATA FOR BIODOSE SIMULATIONS USED IN BEDDED SALT REPOSITORY ANALYSIS. Duffy, J.J.

(California Univ., Livermore (USA). Lawrence Livermore Lab.). 4 Jan 1980. Contract W-7405-ENG-48. 65p. Dep. NTIS, PC A04/MF A01.

Sources of parameter data for BIODOSE simulations are documented. These simulations were used in bedded salt repository analysis. Water system parameters are presented for a southwestern river system (patterned after the lower Colorado River). Nuclide-specific parameters are given also.

2056 (UCRL--15217) EXAMPLE OF MONTE CARLO ANALYSIS APPLIED TO REPOSITORY SITING. Giuffre, M.S.; Kaplan, M.F. (Analytic Sciences Corp., Reading, MA (USA)). 31 Aug 1979. Contract W-7405-ENG-48. 54p. Dep. NTIS, PC A04/MF A01.

This report contains a detailed description of a Monte Carlo analysis of a hypothetical nuclear waste repository performed for the Lawrence Livermore Laboratory as part of their mock siting exercise. Field measurements had been used to construct a hydrology model of the geologic medium surrounding a nuclear waste repository, complete with specified uncertainties. The Monte Carlo analysis has been used to ascertain the uncertainty in the radioactive release from the repository given the uncertainty in the geohydrologic parameters, and correlation analysis has identified some input parameters that have a potentially large influence on the output (radioactivity release) uncertainty.

2057 (UCRL--15228) CONCEPTUAL DESIGN OF RETRIEVAL SYSTEMS FOR EMPLACED TRANSURANIC WASTE CONTAINERS IN A SALT BED DEPOSITORY. FINAL REPORT. Fogleman, S.F. (International Engineering Co., Inc., San Francisco, CA (USA)). Apr 1980. Contract W-7405-ENG-48. 110p. Dep. NTIS, PC A06/MF A01.

The US Department of Energy and the Nuclear Regulatory Commission have jurisdiction over the nuclear waste management program. Design studies were previously made of proposed repository site configurations for the receiving, processing, and storage of nuclear wastes. However, these studies did not provide operational designs that were suitable for highly reliable TRU retrieval in the deep geologic salt environment for the required 60-year period. The purpose of this report is to develop a conceptual design of a baseline retrieval system for emplaced transuranic waste containers in a salt bed depository. The conceptual design is to serve as a working model for the analysis of the performance available from the current state-of-the-art equipment and systems. Suggested regulations would be based upon the results of the performance analyses.

2058 (UCRL--15229) TRANSURANIC CONTAMINATED WASTE FUNCTIONAL DEFINITION AND IMPLEMENTATION. Kniazewycz, B.G. (TERA Corp., Berkeley, CA (USA)). Mar 1980. Contract W-7405-ENG-48. 157p. Dep. NTIS, PC A08/MF A01.

The purpose of this report is to examine the problem(s) of TRU waste classification and to document the development of an easy-to-apply standard(s) to determine whether or not this waste package should be emplaced in a geologic repository for final disposition. Transuranic wastes are especially significant because they have long half-lives and some are rather radiotoxic. Transuranic radionuclides are primarily produced by single or multiple neutron capture by U-238 in fuel elements during the operation of a nuclear reactor. Reprocessing of spent fuel elements attempts to remove plutonium, but since the separation is not complete, the resulting high-activity liquids still contain some plutonium as well as other transuranics. Likewise, transuranic contamination of low-activity wastes also occurs when the transuranic materials are handled or processed, which is primarily at federal facilities involved in R and D and nuclear weapons production. Transuranics are persistent in the environment and, as a general rule, are strongly retained by soils. They are not easily transported through most food chains, although some reconcentration does take place in the aquatic food chain. They pose no special biological hazard to humans upon ingestion because they are weakly absorbed from the gastrointestional tract. A greater hazard results from inhalation since they behave like normal dust and fractionate accordingly.

2059 (UCRL--15232) MONITORING SYSTEM SPECIFICATIONS: RETRIEVAL OF SURF FROM A SALT REPOSITORY. (EA and T Co., Inc., Marina del Rey, CA (USA)). Jan 1980. Contract W-7405-ENG-48. 87p. Dep. NTIS, PC A05/MF A01.

The task of developing specifications for a reference monitoring system determined by repository environmental conditions, retrieval operations, and federal regulatory criteria is discussed. The monitoring system specified in this report is capable of measuring (1) package position and orientation, (2) vault deformation, (3) brine accumulation, (4) spent fuel dissolution, (5) temperature, (6) nuclear radiation, and (7) package condition with sufficient accuracy to provide data input to a general risk assessment model. In order to define a monitoring system which can provide probabilistic data on radiological risk to operating personnel and the general public for a salt mine repository, the following information is required: (1) a complete design of the salt SURF repository including inventory, density and waste package design details; (2) probalistic failure rate data on containment integrity of the SURF waste package; (3) probabilistic failure rate data on the monitoring system components (i.e., monitoring procedure, instrumentation, data acquisition, data processing and data interpretation).

2060 (UCRL--15235) SPATIAL PATTERNS OF RADIOLOGICAL DOSE FROM WELLS DRILLED NEAR NUCLEAR WASTE REPOSITORIES. (Analytic Sciences Corp., Reading, MA (USA)). 31 Mar 1980. Contract W-7405-ENG-48. 63p. NTIS, PC A04/MF A01.

This report describes methodology for assessing the spatial patterns of radiological dose to man from wells drilled near nuclear waste repositories. Descriptions of the various categories of water wells and a model of a typical aquifer are presented. The equation governing the one-dimensional flow of waste in groundwater through porous media to a well is discussed. This is followed by development of a method for constructing lines of constant dose from a well located randomly in the plane of the aquifer. An area of hazard, in which the dose to man from a well exceeds a given statuatory or recommended limit, is then defined within this dose pattern. This technique is then used to compute dose and hazard profiles for wells adjacent to a repository located in either impermeable or permeable bedded salt. The repository and geologic parameters employed in this example are taken from a Lawrence Livermore Laboratory report for which this report serves as a supporting document. Scenarios with impermeable salt involve waste entering the repository through the shaft/tunnel fracture zone and exiting through a single additional flaw

(borehole). Permeable-salt scenarios involve waste escaping from the repsitory through a borehole and via interstitial flow. Calculations are performed assuming both a single-layer (sandstone) aquifer and a double-layer (sandstone/shale) aquifer in the strate overlying the repository. Results indicate a time-varying area of hazard from well drilling, whose size depends on the permeability of the salt, the regional hydrology, and the surface ecosystem assumed in the potential hazard calculations.

2061 (UCRL--15236) BEDDED-SALT REPOSITORY ANALYSIS. FINAL REPORT. Guiffre, M.S.; Kaplan, M.F.; Ensminger, D.A.; Oston, S.G.; Nalbandian, J.Y. (Analytic Sciences Corp., Reading, MA (USA)). 31 Mar 1980. Contract W-7405-ENG-48. 214p. NTIS, PC A10/MF A01.

This report contains a description of an analysis of generic nuclear waste repository in bedded salt. This analysis was performed by TASC for inclusion in a major Lawrence Livermore Laboratory report to NRC; this report therefore should be viewed as providing more complete and detailed information about this analysis than was possible to include in the LLL report. The analysis is performed with the NUTRAN computer codes which are described in the report. The model to be analyzed is defined, and the results of a series of possible waste migration scenarios are presented. Several of these scenarios are used as the basis for a sensitivity analysis, and an uncertainty analysis utilizing Monte Carlo techniques is also performed. A new method for defining the consequences to users of a well drilled near the repository is also described, and results are presented based on two of the waste migration scenarios.

2062 (UCRL--15238) DEEP GEOLOGICAL ISOLATION OF NUCLEAR WASTE: NUMERICAL MODELING OF REPOSITORY SCALE HYDROLOGY. Dettinger, M.D. (Camp Dresser and McKee, Boston, MA (USA)). Apr 1980. Contract W-7405-ENG-48. 79p. NTIS, PC A05/MF A01.

The Scope of Work undertaken covers three main tasks, described as follows: (Task 1) CDM provided consulting services to the University on modeling aspects of the study having to do with transport processes involving the local groundwater system near the repository and the flow of fluids and vapors through the various porous media making up the repository system. (Task 2) CDM reviewed literature related to repository design, concentrating on effects of the repository geometry, location and other design factors on the flow of fluids within the repository boundaries, drainage from the repository structure, and the eventual transport of radionucldies away from the repository site. (Task 3) CDM, in a joint effort with LLL personnel, identified generic boundary and initial conditions, identified processes to be modeled, and recommended a modeling approach with suggestions for appropriate simplifications and approximations to the problem and identifiying important parameters necessary to model the processes. This report consists of two chapters and an appendix. The first chapter (Chapter III of the LLL report) presents a detailed description and discussion of the modeling approach developed in this project, its merits and weaknesses, and a brief review of the difficulties anticipated in implementing the approach. The second chapter (Chapter IV of the LLL report) presents a summary of a survey of researchers in the field of repository performance analysis and a discussion of that survey in light of the proposed modeling approach. The appendix is a review of the important physical processes involved in the potential hydrologic transport of radionuclides through, around and away from deep geologic nuclear waste repositories.

2063 (UCRL--15249) SPECIFICATIONS FOR THE DEVELOPMENT OF A FULLY THREE-DIMENSIONAL NUMERICAL GROUNDWATER MODEL FOR REGIONAL MASS TRANSPORT OF RADIONUCLIDES FROM A DEEP WASTE REPOSITORY. Prickett, T.A. (Camp Dresser and McKee, Inc., Champaign, IL (USA). Water Resources Div.). Apr 1980. Contract W-7405-ENG-48. 326p. NTIS, PC A15/MF A01.

Specifications are given which are necessary to develop a three-dimensional numerical model capable of simulating regional mass transport of radionuclides from a deep waste repository. The model to be developed will include all of the significant mass transport processes including flow, chemical, and thermal advection, mechanical dispersion, molecular diffusion, ion exchange reactions, and radioactive decay. The model specifications also include that density and viscosity fluid properties be functions of pressure, temperature, and concentration and take into account fluid and geologic heterogenieties by allowing possible assignment of individual values to every block of the model. The model specifications furthermore include the repository shape, input/output information, boundary conditions, and the need for documentation and a user's manual. Model code validation can be accomplished with the included known analytical or laboratory solutions. It is recommended that an existing finite-difference model (developed by INTERCOMP and INTERA, Inc.) be used as a starting point either as an acceptable basic code for modification or as a pattern for the development of a completely different numerical scheme. A ten-step plan is given to outline the general procedure for development of the code.

2064 (UCRL--15250) CONCEPTUAL MODEL FOR REGIONAL RADIONUCLIDE TRANSPORT FROM A SALT DOME REPOSITORY: A TECHNICAL MEMORANDUM. Kier, R.S.; Showalter, P.A.; Dettinger, M.D. (Camp Dresser and McKee, Inc., Champaign, IL (USA). Water Resources Div.). 30 May 1980. Contract W-7405-ENG-48. 146p. NTIS, PC A07/MF A01.

Disposal of high-level radioactive wastes is a major environmental problem influencing further development of nuclear energy in this country. Salt domes in the Gulf Coast Basin are being investigated as repository sites. A major concern is geologic and hydrologic stability of candidate domes and potential transport of radionuclides by groundwater to the biosphere prior to their degradation to harmless levels of activity. This report conceptualizes a regional geohydrologic model for transport of radionuclides from a salt dome repository. The model considers transport pathways and the physical and chemical changes that would occur through time prior to the radionuclides reaching the biosphere. Necessary, but unknown inputs to the regional model involve entry and movement of fluids through the repository dome and across the dome-country rock interface and the effect on the dome and surrounding strata of heat generated by the radioactive wastes.

2065 (UCRL--15251) DISPERSIVE PROCESSES IN MODELS OF REGIONAL RADIONUCLIDE MIGRATION. TECHNICAL MEMORANDUM. Evenson, D.E.; Dettinger, M.D. (Camp Dresser and McKee, Inc., Walnut Creek, CA (USA)). May 1980. Contract W-7405-ENG-48. 141p. NTIS, PC A07/MF A01.

Three broad areas of concern in the development of aquifer scale transport models will be local scale diffusion and dispersion processes, regional scale dispersion processes, and numerical problems associated with the advection-dispersion equation. Local scale dispersion processes are fairly well understood and accessible to observation. These processes will generally be dominated in large scale systems by regional processes, or macro-dispersion. Macro-dispersion is primarily the result of large scale heterogeneities in aquifer properties. In addition, the effects of many modeling approximations are often included in the process. Because difficulties arise in parameterization of this large scale phenomenon, parameterization should be based on field measurements made at the same scale as the transport process of interest or else partially circumvented through the application of a probabilistic advection model. Other problems associated with numerical transport models include difficulties with conservation of mass, stability, numerical dissipation, overshoot, flexibility, and efficiency. We recommend the random-walk model formulation for Lawrence Livermore Laboratory's purposes as the most flexible, accurate and relatively efficient modeling approach that overcomes these difficulties.

2066 (UCRL--15252) CONCEPTUAL MODEL FOR REGIONAL RADIONUCLIDE TRANSPORT FROM A BASALT REPOSITORY SITE. FINAL DRAFT, TECHNICAL MEMORANDUM. Walton, W.C.; Voorhees, M.L.; Prickett, T.A. (Camp Dresser and McKee, Inc., Champaign, IL (USA). Water Resources Div.). 23 May 1980. Contract W-7405-ENG-48. 77p. NTIS, PC A05/MF A01.

This technical memorandum was prepared to: (1) describe a typical basalt radionuclide repository site, (2) describe geologic and hydrologic processes associated with regional radionuclide transport in basalts, (3) define the parameters required to model regional radionuclide transport from a basalt repository site, and (4) develop a "conceptual model" of radionuclide transport from a basalt repository site. In a general hydrological sense, basalts may be described as layered sequences of aquifers and aquitards. The Columbia River Basalt, centered near the semi-arid Pasco Basin, is considered by many to be typical basalt repository host rock. Detailed description of the flow system including flow velocities with high-low hydraulic conductivity sequences are not possible with existing data. However, according to theory, waste-transport routes are ultimately towards the Columbia River and the lengths of flow paths from the repository to the biosphere may be relatively short. There are many physical, chemical, thermal, and nuclear processes with associated parameters that together determine the possible pattern of radionuclide migration in basalts and surrounding formations. Brief process descriptions and associated parameter lists are provided. Emphasis has been placed on the use of the distribution coefficient in simulating ion exchange. The use of the distribution coefficient approach is limited because it takes into account only relatively fast mass transfer processes. In general, knowledge of hydrogeochemical processes is primitive.

2067 (UCRL--15268) STATE-OF-THE-ART FOR EVALUATING THE POTENTIAL EFFECTS OF EROSION AND DEPOSITION ON A RADIOACTIVE WASTE REPOSITORY. FINAL REPORT. (Geotechnical Engineers, Inc., Winchester, MA (USA)). 16 Jul 1980. Contract W-7405-ENG-48. 64p. NTIS, PC A04/MF A01.

The potential impact of future geologic processes on the integrity of a deep, high-level radioactive-waste repository is evaluated. The following study identifies the potential consequences of surface erosion and deposition on sub-surface repository containment characteristics and assesses the ability to measure and predict quantitatively the rates and corresponding extent of these processes in the long term. Numerous studies of the magnitudes and rates of surficial erosion and deposition that have been used to determine the minimum allowable depth for a geologic repository (300 m - NRC Code of Federal Regulations, Part 60.122, Draft 10) are cited in this report. Measurement and interpretation of potential rates and extent of surficial processes in these studies involved considerable uncertainty, and the implications of this uncertainty on presently proposed repository siting criteria are addressed herein. Important concepts that should be considered when developing siting criteria to protect against deleterious effects arising from future erosion or deposition are highlighted. Erosion agents that could affect deep repositories are distinguished in this report so that their individual and combined impacts may be examined. This approach is recommended when evaluating potential repository sites in diverse environments that are susceptible to different agents of erosion. In contrast, agents of sedimentation are not differentiated in this report because of their relatively minor impact on a deep repository.

2068 (UCRL--52736) MACRO1: A CODE TO TEST A METHODOLOGY FOR ANALYZING NUCLEAR-WASTE MANAGEMENT SYSTEMS. Edwards, L.L. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 14 Dec 1979. Contract W-7405-ENG-48. 56p. Dep. NTIS, PC A04/MF A01.

The code is primarily a manager of probabilistic data and deterministic mathematical models. The user determines the desired aggregation of the available models into a composite model of a physical system. MACRO1 then propagates the finite probability distributions of the inputs to the model to finite probability distributions over the outputs. MACRO1 has been applied to a sample analysis of a nuclear-waste repository, and its results compared satisfactorily with previously obtained Monte Carlo statistics.

2069 (UCRL--52747) NEW DEVELOPMENTS IN MEASUREMENT TECHNOLOGY RELEVANT TO THE STUDIES OF DEEP GEOLOGICAL REPOSITORIES IN DOMED SALT AND BASALT. Ramirez, A.L.; Mao, N.H. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 21 May 1980. Contract W-7405-ENG-48. 73p. NTIS, PC A04/MF A01.

This report briefly describes recent geophysical and geotechnical instrumentation developments relevant to the studies of deep geologic repositories. Special emphasis has been placed on techniques that appear to minimize measurement problems associated with repositories constructed in basalt or domed salt. Included in the listing are existing measurement capabilities and deficiencies that have been identified by a few authors and instrumentation workshops that have assessed the capabilities of existing instrumentation with respect to repository applications. These deficiencies have been compared with the reported advantages and limitations of the new developments described. Based on these comparisons, areas that merit further research and development have been identified. The report is based on a thorough literature review and on discussions with several instrumentation

specialists involved in instrumentation development.

2070 (UCRL--52749) RECOMMENDED NEW CRITERIA FOR THE SELECTION OF NUCLEAR WASTE REPOSITORY SITES IN COLUMBIA RIVER BASALT AND US GULF COAST DOMED SALT. Steinborn, T.L.; Wagoner, J.L.; Qualheim, B.; Fitts, C.R.; Stetkar, R.E.; Turnbull, R.W. (California Univ., Livermore (USA). Lawrence Livermore National Lab.). 16 Jun 1980. Contract W-7405-ENG-48. 66p. NTIS, PC A04/MF A01.

Screening criteria and specifications are recommended to aid in the evaluation of sites proposed for nuclear waste disposal in basalt and domed salt. The recommended new criteria proposed in this report are intended to supplement existing repository-related criteria for nuclear waste disposal. The existing criteria are contained in 10 CFR 60 sections which define siting criteria of the Nuclear Regulatory Commission (NRC), and ONWI 33(2) which defines siting criteria of the Office of Nuclear Waste Isolation (ONWI) for the Department of Energy. The specifications are conditions or parameter values that the authors recommend be applied in site acceptance evaluations. The siting concerns covered in this report include repository depth, host rock extent, seismic setting, structural and tectonic conditions, groundwater and rock geochemistry, volcanism, surface and subsurface hydrology, and socioeconomic issues, such as natural resources, land use, and population distribution.

2071 (UCRL--81147(Pt.2)(Rev.1)) LEACHING CHARACTERISTICS OF ACTINIDES FROM SIMULATED REACTOR WASTE. Weed, H.C.; Coles, D.G.; Bradley, D.J.; Mensing, R.W.; Schweiger, J.S.; Rego, J.H. (Battelle Pacific Northwest Labs., Richland, WA (USA); California Univ., Livermore (USA). Lawrence Livermore Lab.). 1979. Contract W-7405-ENG-48. 9p. (CONF-791112--69(Pt.2)(Rev.1)). NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

Leach rates for ^{237}Np and ^{239}Pu are investigated with a single-pass leaching system. The factorial experimental design uses several combinations of solution composition and flow rate; and two temperatures, 25° and 75°C. The 25°C results are compared with those form a modified IAEA procedure. At 25°C, leach rates decrease with time. Agreement between results from the single-pass and modified IAEA methods is fair with WIPP brine leachant, good with $NaHCO_3$, and good with distilled H_2O. Leach rates are approximately independent of flow rates at room temperature, but increase with flow rates at high temperature. Rates for ^{237}Np increase with temperature, but those fro ^{239}Pu either decrease or do not change with temperature.

2072 (UCRL--82228(Rev.1)) MODELING OF BRINE MIGRATION IN HALITE. Cheung, H.; Fuller, M.E.; Gaffney, E.S. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 19 Oct 1979. Contract W-7405-ENG-48. 10p. (CONF-791112--53). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

When canisters containing radwastes are emplaced in a repository the heat produced by the decaying radwaste will cause moderate thermal gradients to develop which will cause the brine present in a halite medium (salt deposits) to accumulate around the canister. Four different models of the migration process have been reviewed to determine their suitability as a working model. One model predicts that inclusions smaller than 0.1 mm dimension probably will not migrate. The other models do not consider size as a factor. Thermal diffusion (Soret effect) is considered insignificant in three models, while in the fourth model it is added to the concentration diffusion term. The following conclusions can be made: Temperature is the most significant parameter in all models and must be known as a function of time, and distance from the canister. All four models predict about the same migration velocity for it is a given set of conditions; for 100°C and 1°C/cm thermal gradient, it is 3.0, 4.8, 5.6 and 6.4 mm/y. Diffusion of ions through the brine inclusions is the rate controlling mechanism. The difference between the thermal gradients in the liquid and in the solid should always be considered and is a function of droplet shape. The model based upon work by Nernst is easiest to use, but it predicts the lowest migration rate. The maximum volume of pure brine accumulated at the canister surface would be less than 20-40 liters in 50 years, for a canister initial thermal power of 3.5 kW.Bitterns would migrate proportionately less volume. A computer code, BRINE, was developed to make these calculations by means of any of the four models.

2073 (UCRL--82798) RADIOCHEMICAL SEPARATION OF NEPTUNIUM AND PLUTONIUM FROM LEACHING OF REACTOR WASTE GLASS IN BRINE SOLUTIONS. Rego, J. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 3 Oct 1979. Contract W-7405-ENG-48. 6p. (CONF-791049--3). Dep. NTIS, PC A02/MF A01.

From 23. conference on analytical chemistry in energy technology; Gatlinburg, TN, USA (9 Oct 1979).

The work described in this paper is part of a leaching study being conducted for the Battelle Pacific Northwest Laboratory's Waste Isolation Safety Assessment Program. Simulated high-level reactor waste glass was leached with three solutions, one of which was a saturated-salt brine. Because chemical separation of Np and Pu using organic extraction or anionic exchange is not effective for the brine samples, a procedure has been developed to first separate neptunium and plutonium from high concentrations of brine before proceeding with an extraction of neptunium from plutonium. Samples were equilibrated with tracers, Np and Pu were co-precipitated with $La(OH)_3$, and interfering ions were removed by washing the hydroxide precipitate with water. Pu and Np were separated by reducing Pu to Pu^{3+} and extracting the Np^{4+} into thenoyltrifluoroacetone; control of oxidation states and contaminant concentration is critical.

2074 (UCRL--83285) SOLVING THE GEOLOGIC ISSUES IN NUCLEAR WASTE DISPOSAL. Towse, D. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 7 Sep 1979. Contract W-7405-ENG-48. 33p. (CONF-790948--1). Dep. NTIS, PC A03/MF A01.

From Annual meeting of the American Institute of Professional Geologists; Lafayette, LA, USA (21 Sep 1979).

Technical problems with nuclear waste disposal are largely geological. If these are not solved, curtailment of nuclear power development may follow, resulting in loss of an important element in the national energy supply. Present knowledge and credible advances are capable of solving these problems provided a systems view is preserved and a national development plan is followed. This requires

identification of the critical controllable elements and a systematic underground test program to prove those critical elements. Waste migration can be understood and controlled by considering the key elements in the system: the system geometry, the hydrology, and the waste-rock-water chemistry. The waste program should: (1) identify and attack the critical problems first; (2) provide tests and demonstration at real disposal sites; and (3) schedule elements with long lead-times for early start and timely completion.

2075 (UCRL--83328) RADIATION SAFETY AND HEALTH EFFECTS RELATED TO LOW-LEVEL RADIOACTIVE WASTES. King, W.C. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 17 Sep 1979. Contract W-7405-ENG-48. 22p. (CONF-7710224--1). Dep. NTIS, PC A02/MF A01.

From Western occupational health conference; Monterey, CA, USA (11 Oct 1977).

The hazards associated with low-level radioactive waste, one of the nation's greatest concerns, are discussed from a health physicist's perspective. Potential biological hazards, four stages of the low-level radioactive waste disposal process, and suggested methods of reducing the risks of handling and disposal, based on previous studies, are defined. Also discussed are potential pathways of human exposure and two scenarios designed to demonstrate the complexity of modeling exposure pathways. The risks of developing a fatal cancer from exposure to the radioactive material, should it occur, is compared to other more commonly accepted risks.

2076 (UCRL--83488) COMPUTER MODELING OF NUCLEAR WASTE STORAGE CANISTER CORROSION. Cottrell, P.T.; Ludemann, W.D.; McCright, R.D. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 18 Oct 1979. Contract W-7405-ENG-48. 11p. (CONF-791112--25). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

Current plans for nuclear waste disposal include placing the waste in a canister to isolate it from the repository environment for 1000 years. Corrosion prediction techniques are currently inadequate to guarantee the canister performance over this length of time. We are attempting to better predict the corrosion process with the help of computer modeling. We developed a program to calculate anodic and cathodic polarization curves using Tafel slopes, equilibrium exchange current densities, and other electrochemical parameters obtained from the experimental corrosion literature. The model generates and displays polarization curves for different values of environmetal parameters such as temperature, pH, and concentrations of pertinent species in the vicinity of the canister material. For the case of uniform corrosion in acidic media, our model predicts corrosion rates in fair agreement with literature values.

2077 (UCRL--83728) SPENT FUEL HANDLING SYSTEM FOR A GEOLOGIC STORAGE TEST AT THE NEVADA TEST SITE. Duncan, J.E.; House, P.A.; Wright, G.W. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 1 May 1980. Contract W-7405-ENG-48. 20p. (CONF-800607--54). NTIS, PC A02/MF A01.

From American Nuclear Society annual meeting; Las Vegas, NV, USA (8 Jun 1980).

The Lawrence Livermore Laboratory is conducting a test of the geologic storage of encapsulated spent commercial reactor fuel assemblies in a granitic rock at the Nevada Test Site. The test, known as the Spent Fuel Test-Climax (SFT-C), is sponsored by the US Department of Energy, Nevada Operations Office. Eleven pressurized-water-reactor spent fuel assemblies are stored retrievably for three to five years in a linear array in the Climax stock at a depth of 420 m.

2078 (UCRL--83789) THERMAL CONDUCTIVITY, DIFFUSIVITY AND EXPANSION OF AVERY ISLAND SALT AT PRESSURE AND TEMPERATURE. Durham, W.B.; Abey, A.E.; Trimmer, D.A. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 4 Jan 1980. Contract W-7405-ENG-48. 18p. (CONF-791134--10). Dep. NTIS, PC A02/MF A01.

From 16. international thermal conductivity conference; Chicago, IL, USA (7 Nov 1979).

Preliminary data on the thermal properties of a coarse-grained rock salt from Avery Island, Louisiana, indicates that hydrostatic pressure to 50 MPa has little effect on the thermal conductivity, diffusivity and linear expansion at temperatures from 300 to 573 K. The measurements were made in a new apparatus under conditions of true hydrostatic loading. At room temperature and effective confining pressure increasing from 10 to 50 MPa, thermal conductivity and diffusivity are constant at roughly 7W/mK and 3.6×10^{-6} m^2/s, respectively. At 50 MPa and temperature increasing from 300 to 573K, both conductivity and diffusivity drop by a factor of 2. Thermal linear expansion at 0 MPa matches that at 50 MPa, increasing from roughly 4.2×10^{-5}/K at 300 K to 5.5×10^{-5} at 573 K. The lack of a pressure effect on all three properties is confirmed by previous work. Simple models of microcracking suggest that among common geological materials the lack of pressure dependence is unique to rock salt.

2079 (UCRL--83995) THERMAL ANALYSIS FOR A SPENT REACTOR FUEL STORAGE TEST IN GRANITE. Montan, D.N. (California Univ., Livermore (USA). Lawrence Livermore Lab.). Sep 1980. Contract W-7405-ENG-48. 11p. (CONF-801124--8). NTIS, PC A02/MF A01.

From 3. annual meeting of the Materials Research Society; Boston, MA, USA (17 Nov 1980).

A test is conducted in which spent fuel assemblies from an operating commercial nuclear power reactor are emplaced in the Climax granite at the US Department of Energy's Nevada Test Site. In this generic test, 11 canisters of spent PWR fuel are emplaced vertically along with 6 electrical simulator canisters on 3 m centers, 4 m below the floor of a storage drift which is 420 m below the surface. Two adjacent parallel drifts contain electrical heaters, operated to simulate (in the vicinity of the storage drift) the temperature fields of a large repository. This test, planned for up to five years duration, uses fairly young fuel (2.5 years out of core) so that the thermal peak will occur during the time frame of the test and will not exceed the peak that would not occur until about 40 years of storage had older fuel (5 to 15 years out of core) been used. This paper describes the calculational techniques and summarizes the results of a large number of thermal calculations used in the concept, basic design and final design of the spent fuel test. The results of the preliminary calculations show the effects of spacing and spent fuel age. Either radiation or convection is sufficient to make the drifts much better thermal conductors than the rock that was removed to create them. The combination of radiation and convection causes the drift surfaces to be nearly isothermal even

though the heat source is below the floor. With a nominal ventilation rate of 2 m^3/s and an ambient rock temperature of 23°C, the maximum calculated rock temperature (near the center of the heat source) is about 100°C while the maximum air temperature in the drift is around 40°C. This ventilation (1 m^3/s through the main drift and 1/2 m^3/s through each of the side drifts) will remove about 1/3 of the heat generated during the first five years of storage.

2080 (UCRL--84152) EFFECTS OF ANNULAR AIR GAPS SURROUNDING AN EMPLACED NUCLEAR WASTE CANISTER IN DEEP GEOLOGIC STORAGE. Lowry, W.E.; Davis, B.W.; Cheung, H. (California Univ., Livermore (USA). Lawrence Livermore National Lab.; Northern Arizona Univ., Flagstaff (USA)). 5 Jun 1980. Contract W-7405-ENG-48. 9p. NTIS, PC A02/MF A01.

Annular air spaces surrounding an emplaced nuclear waste canister in deep geologic storage will have significant effects on the long-term performance of the waste form. Addressed specifically in this analysis is the influence of a gap on the thermal response of the waste package. Three dimensional numerical modeling predicts temperature effects for a series of parameter variations, including the influence of gap size, surface emissivities, initial thermal power generation of the canister, and the presence/absence of a sleeve. Particular emphasis is placed on determining the effects these variables have on the canister surface temperature. We have identified critical gap sizes at which the peak transient temperature occurs when gap widths are varied for a range of power levels. It is also shown that high emissivities for the heat exchanging surfaces are desirable, while that of the canister surface has the greatest influence. Gap effects are more pronounced, and therefore more effort should be devoted to optimal design, in situations where the absolute temperature of the near field medium is high. This occurs for higher power level emplacements and in geomedia with low thermal conductivities. Finally, loosely inserting a sleeve in the borehole effectively creates two gaps and drastically raises the canister peak temperature. It is possible to use these results in the design of an optimum package configuration which will maintain the canister at acceptable temperature levels. A discussion is provided which relates these findings to NRC regulatory considerations.

2081 (UCRL--84153) THREE-DIMENSIONAL THERMAL ANALYSIS OF A BASELINE SPENT FUEL REPOSITORY. Altenbach, T.J.; Lowry, W.E. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 5 Jun 1980. Contract W-7405-ENG-48. 9p. (CONF-801102--14). NTIS, PC A02/MF A01.

From ASME winter annual meeting; Chicago, IL, USA (16 Nov 1980).

A three-dimensional thermal analysis has been performed using finite difference techniques to determine the near-field response of a baseline spent fuel repository in a deep geologic salt medium. A baseline design incorporates previous thermal modeling experience and OWI recommendations for areal thermal loading in specifying the waste form properties, package details, and emplacement configuration. The base case in this thermal analysis considers one 10-year old PWR spent fuel assembly emplaced to yield a 36 kw/acre (8.9 w/m^2) loading. A unit cell model in an infinite array is used to simplify the problem and provide upper-bound temperatures. Boundary conditions are imposed which allow simulations to 1000 years. Variations studied include a comparison of ventilated and unventilated storage room conditions, emplacement packages with and without air gaps surrounding the canister, and room cool-down scenarios with ventilation following an unventilated state for retrieval purposes. At this low power level ventilating the emplacement room has an immediate cooling influence on the canister and effectively maintains the emplacement room floor near the temperature of the ventilating air. The annular gap separating the canister and sleeve causes the peak temperature of the canister surface to rise by 10°F (5.6°C) over that from a no gap case assuming perfect thermal contact. It was also shown that the time required for the emplacement room to cool down to 100°F (38°C) from an unventilated state ranged from 2 weeks to 6 months; when ventilation initiated after times of 5 years to 50 years, respectively. As the work was performed for the Nuclear Regulatory Commission, these results provide a significant addition to the regulatory data base for spent fuel performance in a geologic repository.

2082 (UCRL--84613) STATUS OF LLNL GRANITE PROJECTS. Ramspott, L.D. (California Univ., Livermore (USA). Lawrence Livermore National Lab.). 1980. Contract W-7405-ENG-48. 11p. (CONF-800751--3). NTIS, PC A02/MF A01.

From Workshop on thermomechanical-hydrochemical modeling for hardrock waste repository; Bereley, CA, USA (29 Jul 1980).

The status of LLNL Projects dealing with nuclear waste disposal in granitic rocks is reviewed. This review covers work done subsequent to the June 1979 Workshop on Thermomechanical Modeling for a Hardrock Waste Repository and is prepared for the July 1980 Workshop on Thermomechanical-Hydrochemical Modeling for a Hardrock Waste Repository. Topics reviewed include laboratory determination of thermal, mechanical, and transport properties of rocks at conditions simulating a deep geologic repository, and field testing at the Climax granitic stock at the USDOE Nevada Test Site.

2083 (UCRL--84643) REVIEW OF THE 1979 WORKSHOP ON THERMOMECHANICAL MODELING FOR A HARD ROCK WASTE REPOSITORY. Holzer, F. (California Univ., Livermore (USA). Lawrence Livermore National Lab.). 1980. Contract W-7405-ENG-48. 5p. (CONF-800751--2). NTIS, PC A02/MF A01.

From Workshop on thermomechanical-hydrochemical modeling for hardrock waste repository; Bereley, CA, USA (29 Jul 1980).

The 1979 Workshop discussed and considered issues and needs in the areas of Modeling, Laboratory Measurements, Instruments and Field Measurements, and In-situ Tests and Model Validation. A set of conclusions and recommendations was developed, which focused on the necessity of treating the rock mass response to the waste emplaced in it. The conclusions dealt with characterizing the fracture system, determining the mechanical and thermal properties, developing an understanding of the physical process, predicting and measuring the response, and carrying out meaningful validation tests. Measured against the stated objectives, the 1979 Workshop was successful. With respect to implementation of its recommendations, this conclusion is not so obvious, although some activities of the past year suggest the Workshop has had a beneficial influence.

2084 (UCRL--84918) NUCLEAR WASTE MANAGEMENT;

STORAGE AND DISPOSAL ASPECTS. Patterson, B.D.; Dave, S.A.; O'Connell, W.J. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 1980. Contract W-7405-ENG-48. 15p. (CONF-800904--2). NTIS, PC A02/MF A01.

From American Society of Civil Engineers specialty conference: civil engineering and nuclear power; Knoxville, TN, USA (15 Sep 1980).

Long-term disposal of nuclear wastes must resolve difficulties arising chiefly from the potential for contamination of the environment and the risk of misuse. Alternatives available for storage and disposal of wastes are examined in this overview paper. Guidelines and criteria which may govern in the development of methods of disposal are discussed.

2085 (UNI--1454) INTERIM REPORT ON CONCRETED URANIUM FINES AND CHIPS BILLET CURING TESTS: A BASIS FOR RESUMING SHIPMENT OF CONCRETED URANIUM SCRAP BILLETS. Weakley, E.A. (United Nuclear Industries, Inc., Richland, WA (USA)). 2 May 1980. Contract AC06-76RL01857. 37p. NTIS, PC A03/MF A01.

Through extensive testing and analyses of the concretion process, billets and shipping conditions, it has been determined that properly cured concreted billets can be safely shipped to National Lead Company of Ohio (NLO), Fernald. During curing, billets will be dried for 26 days prior to shipment with the last 10 days between 54 to 66°C (130 to 150°F). Such dried billets can withstand temperatures up to 85°C (185°F). The maximum billet temperature that can be expected to occur in shipment is 50°C (123°F). Thus, the drying cycle becomes a burning test at temperatures which the billets will not reach during shipment to NLO.

2086 (USGS--1543-4) GEOHYDROLOGY OF HOLE UE-17A, SYNCLINE RIDGE AREA, NEVADA TEST SITE. Weir, J.E. Jr.; Hodson, J.N. (Geological Survey, Denver, CO (USA)). Dec 1979. Contract EW-78-I-08-1543. 23p. Dep. NTIS, PC A02/MF A01.

Hole UE-17a was drilled as part of a study to evaluate the suitability of Unit J of the Eleana Formation of Mississippian age as a medium for storage of nuclear wastes. The 1214-foot (370-meter) hole penetrated alluvium of Quaternary age, a thrust plate of the Tippipah Limestone of Pennsylvania and Permian age, and 668 feet (204 meters) of the Eleana Formation. A small amount of groundwater occurs in fractured quartzites and limestones of the Eleana Formation; jetting produced only 20 gallons per minute (1.3 liters per second) from the completed hole. Approximate transmissivity, calculated from jetting test results, is 1.2 feet squared per day (0.11 meters squared per day). The hydraulic head has almost steadily declined in the hole since September 29, 1976, a few days after the hole was completed. Water from the Eleana Formation is a sodium bicarbonate and sodium sulfate type.

2087 (USGS--1543-6) PRELIMINARY GEOLOGIC AND GEOPHYSICAL DATA OF THE UE25A-3 EXPLORATORY DRILL HOLE, NEVADA TEST SITE, NEVADA. Maldonado, F.; Muller, D.C.; Morrison, J.N. (Geological Survey, Denver, CO (USA)). Sep 1979. Contract EW-78-I-08-1543. 61p. Dep. NTIS, PC A04/MF A01.

The UE25a-3 drill hole, located in the Calico Hills area, was drilled as part of an effort to evaluate the Calico Hills area as a possible nuclear waste repository site. The purpose of the drill hole was to verify the existence of an intrusive crystalline body in the subsurface and to determine the stratigraphy, structure, and nature of fractures of the cored rocks. Cored samples were obtained for mineral, chemical, and material property analyses. Numerous high-angle faults and brecciated zones were intersected by the drill hole. The units cored were intensely fractured with fracture analysis of the core consisting of frequency of fractures, dips of fractures, open and closed (sealed) fractures and types of fracture sealing or coating material. Twenty-four hundred and thirty fractures, representing approximately 30 percent of the fractures present, indicate an average fracture frequency of 13.2 fractures per meter, predominantly high-angle dips with 66 percent of the fractures closed. Fractures in the argillite interval are sealed or coated predominantly with kaolinite, nacrite, and dickite. Calcite, chlorite, and magnetite are present in fractures in the altered argillite interval. Fractures in the marble interval are sealed or coated with calcite, dolomite, and ferruginous clay. The core index indicates that the lower half of the drilled interval is more competent than the upper half. Borehole geophysical logs were run by the Birdwell Division of Seismograph Service Corporation for geologic correlations and lithologic characterizations. The logs include: caliper, density, resistivity, spontaneous potential, Vibroseis, 3-D velocity, neutron, and gamma-ray logs.

2088 (USGS-OFR--79-1212) SEISMIC-REFRACTION SURVEY TO THE TOP OF SALT IN THE NORTH END OF THE SALT VALLEY ANTICLINE, GRAND COUNTY, UTAH. Achermann, H.D. (Geological Survey, Washington, DC (USA)). 1979. 31p. US Dept. of Interior, Geological Survey, Washington, DC.

A sesimic-refraction survey, consisting of three lines about 2700, 2760, and 5460 meters long, was made at the north end of the Salt valley anticline of the Paradox Basin in eastern Utah. The target was the crest of a diapiric salt mass and the overlying, deformed caprock. The interpretations reveal an undulating salt surface with as much as 80 meters of relief. The minimum depth of about 165 meters is near the location of three holes drilled by the US Department of Energy for the purpose of evaluating the Salt Valley anticline as a potential site for radioactive waste storage. Caprock properties were difficult to estimate because the contorted nature of these beds invalidated a goelogic interpretation in terms of velocity layers. However, laterally varying velocities of the critically refracted rays throughout the area suggest differences in the gross physical properties of the caprock.

2089 (USGS-OFR--79-1244) PRELIMINARY REPORT ON THE GEOLOGY AND GEOPHYSICS OF DRILL HOLE UE25A-1, YUCCA MOUNTAIN, NEVADA TEST SITE. Spengler, R.W.; Muller, D.C.; Livermore, R.B. (Geological Survey, Denver, CO (USA); Fenix and Scisson, Inc., Mercury, NV (USA)). 1979. Contract EW-78-I-08-1543. 80p. Dep. NTIS, PC A05/MF A01.

A subsurface geologic study in connection with the Nevada Nuclear Waste Storage Investigations has furnished detailed stratigraphic and structural information about tuffs underlying northeastern Yucca Mountain on the Nevada Test Site. Drill hole UE25a-1 penetrated thick sequences of nonwelded to densely welded ash-flow and bedded tuffs of Tertiary age. Stratigraphic units that were identified from the drill-hole data include the Tiva Canyon and Topopah Spring Members of the Paintbrush Tuff, tuffaceous beds of Calico Hills, and the Prow Pass and Bullfrog Members

of the Crater Flat Tuff. Structural analysis of the core indicated densely welded zones to be highly fractured. Many fractures show near-vertical inclinations and are commonly coated with secondary silica, manganese and iron oxides, and calcite. Five falt zones were recognized, most of which occurred in the Topopah Spring Member. Shear fractures commonly show oblique-slip movement and some suggest a sizable component of lateral compression. Graphic logs are included that show the correlation of lithology, structural properties, and geophysical logs. Many rock units have characteristic log responses but highly fractured zones, occurring principally in the Tiva Canyon and Topopah Spring Members restricted log coverage to the lower half of the drill hole.

2090 (USGS-OFR--79-1675) FLUID INCLUSIONS IN SALT FROM THE RAYBURN AND VACHERIE DOMES, LOUISIANA. Roedder, E.; Belkin, H.E. (Geological Survey, Washington, DC (USA)). 1979. 25p. NTIS, PC A02/MF A01.

Core samples from the Rayburn and Vacherie salt domes in Louisiana were examined for fluid inclusions, in connection with the possible use of such domes for nuclear waste storage sites. Three types of fluid inclusions were found: brine, compressed gas, and oil (in decreasing volume percent abundance). The total amount of such fluids is small, certainly < 0.01 vol % and probably in the range 0.1 to 0.001 volume %, but the inclusions are highly erratic in distribution. Unlike many bedded salt deposits, the brine inclusions in this salt contain fluids that are not far from simple NaCl-H_2O solutions, with very little of other ions. One of three possible explanations for such fluids is that fresh water penetrated the salt at some unknown time in the past and was trapped; if such entry of fresh water has occurred in the past, it might also occur again in the future.

2091 (USGS-OFR--80-126) BOREHOLE GEOPHYSICAL MEASUREMENTS FOR HOLE UE25A-3, NEVADA TEST SITE, NUCLEAR WASTE ISOLATION PROGRAM. Daniels, J.J.; Scott, J.H. (Geological Survey, Washington, DC (USA)). 1980. Contract EW-78-I-08-1543. 31p. Dep. NTIS, PC A03/MF A01.

Borehole geophysical measurements made in drill hole UE25a-3 with a US Geological Survey research well-logging truck are presented in this paper. The purpose of these logging measurements is to provide in-situ physical properties information that is not commercially available on drill hole UE25a-3. Well logs are presented in this paper for dual-detector density, normal resistivity, gamma-ray, neutron-neutron, induced polarization, and magnetic susceptibility measurements. These data are analyzed correlations with the core lithology. Hole-to-surface measurements made from drill hole UE25a-3 indicate the presence of two resistive bodies at depth. The deeper resistive anomaly may be related to a granitic intrusion.

2092 (USGS-OFR--80-466) RESISTIVITY SOUNDING INVESTIGATION BY THE SCHLUMBERGER METHOD IN THE SYNCLINE RIDGE AREA, NEVADA TEST SITE, NEVADA. Anderson, L.A.; Bisdorf, R.J.; Schoenthaler, D.R. (Geological Survey, Denver, CO (USA)). 1980. Contract EW-78-A-08-1543. 67p. NTIS, PC A04/MF A01.

A resistivity survey was made in the north-central sector of the Nevada Test Site (NTS) as part of an extensive search for suitable geologic environments to be used as repositories for radioactive waste products. The area of interest, identified herein as Syncline Ridge after a locally prominent structural feature, lies within the Tippipah Spring Quadrangle. The surficial geology generalized from Orkild (1963), mapped and inferred faults, resistivity sounding sites, borehole emplacements, and alinements of resistivity cross sections compiled from the interpreted sounding data are included. The intent of the survey was to determine the horizontal continuity and thickness of unit J of the Eleana Formation. Ten distinct lithologic units make up the Eleana Formation but only units G, H, I, and J of Mississippian age are found in the Syncline Ridge area. Because of its relative importance in this survey, unit J is shown as a separate entity, whereas the G, H, and I units have been grouped under the general heading of Eleana Formation.

2093 (USGS-OFR--80-929) PRELIMINARY INTERPRETATIONS OF GEOLOGIC RESULTS OBTAINED FROM BOREHOLES UE25A-4, -5, -6, AND -7, YUCCA MOUNTAIN, NEVADA TEST SITE. Spengler, R.W.; Rosenbaum, J.G. (Geological Survey, Reston, VA (USA)). 1980. Contract AI08-78ET44802. 39p. NTIS, PC A03/MF A01.

Since 1978, the USGS (US Geological Survey) has been providing technical assistance in characterizing suitable rock masses at or contiguous to the NTS (Nevada Test Site) for long-term storage of high-level nuclear waste. Current efforts have been focused on investigating Yucca Mountain, a volcanic highland situated along the western boundary of NTS in southern Nevada. Detailed stratigraphic and structural studies have been in progress along a northeastern segment of the highland in a wedge-shaped area bounded by Basin and Range faults, most of which trend north-northeast. A series of four locally steep-walled, nearly parallel, linear washes transect the northeastern half of the area of interest and display trends similar to major faults to the northeast. Prior to the present study, drill hole UE25a-1, located about 1600 feet southeast of the edge of the area of interest, was cored to a depth of 2500 feet. Subsurface information derived from the upper 500 feet of this drill hole is included in this report to compare with recently acquired data. Surface electrical surveys have been conducted by both the University of Utah and the USGS perpendicular to the trend of the washes in an attempt to better understand factors that have influenced the present drainage pattern. Preliminary data of both pole-dipole and dipole-dipole resistivity/IP electrical methods indicate numerous vertical and horizontal discontinuities between adjacent resistive bodies that strongly suggest a broad zone of faulting, fracturing, and (or) brecciation. To verify the existence of structural discontinuities suggested by the linear washes and electrical anomalies, a drilling program was initiated in June 1979, to obtain geologic information within the southernmost of four northwest-trending washes.

2094 (USGS-OFR--80-941) INTERPRETATION OF GEOPHYSICAL WELL-LOG MEASUREMENTS IN DRILL HOLE UE25A-1, NEVADA TEST SITE, RADIOACTIVE WASTE PROGRAM. Hagstrum, J.T.; Daniels, J.J.; Scott, J.H. (Geological Survey, Las Vegas, NV (USA)). 1980. Contract AI08-78ET44802. 36p. NTIS, PC A03/MF A01.

An exploratory hole (UE25a-1) was drilled at Nevada Test Site (NTS) to determine the suitability of pyroclastic deposits as storage sites for radioactive waste. Studies have been conducted to investigate the stratigraphy, structure, mineralogy, petrology, and physical properties of the tuff units encountered in the

drill hole. This report deals with the interpretation of physical properties for the tuff units from geophysical well-log measurements. The ash-flow and bedded tuff sequences at NTS comprise complex lithologies of variously welded tuffs with superimposed crystallization and altered zones. To characterize these units, resistivity, density, neutron, gamma-ray, induced polarization, and magnetic susceptibility geophysical well-log measurements were made. Although inherently subjective, a consistent interpretation of the well-log measurements was facilitated by a computer program designed to interpret well logs either individually or simultaneously. The broad features of the welded tuff units are readily distinguished by the geophysical well-log measurements. However, many details revealed by the logs indicate that more work is necessary to clarify the casual elements of well-log response in welded tuffs.

2095 (Y/OWI/SUB--78/22340/4) EXECUTIVE-STYLE BRIEFINGS ON SELECTED REPOSITORY DESIGN ISSUES. (Science Applications, Inc., Oak Ridge, TN (USA)). 2 Jun 1978. Contract W-7405-ENG-26. 45p. Dep. NTIS, PC A03/MF A01.

This document is a collection of executive-style briefings on selected repository design issues. Most of the briefings discuss differences between the US repository design bases presented in US Working Draft on Repository Physical Descriptions in a Salt Formation, prepared in support of INFCE discussions of May 1978 and the FRG-Netherlands design bases, presented in Design Study of a Radioactive Waste Repository to be Mined in a Medium-Size Salt Dome by Hamstra and Velzeboer, Netherlands Energy Research Foundation, January 1978. Advantages and disadvantages of the two sets of design bases are discussed, and the impacts of adopting either of these bases on the other's programs and positions are identified.

2096 (Y/OWI/TM--37) AREAL THERMAL LOADING RECOMMENDATIONS FOR NUCLEAR WASTE REPOSITORIES IN SALT. Russell, J.E. (Union Carbide Corp., Oak Ridge, TN (USA). Office of Waste Isolation). Jun 1979. Contract W-7405-ENG-26. 50p. Dep. NTIS, PC A03/MF A01.

This document gives a wider understanding of the history of the recommended thermal loadings in salt for both high-level waste (HLW) from fresh UO_2-fueled, light-water reactors (LWR) with no recycle and spent unreprocessed fuel (SURF) from LWRs. Aspects of the current recommendations that need further study are identified. Finally, an interim set of design thermal-loading recommendations are given that have a common rationale of satisfying performance limits within our current state of knowledge. These recommendations are made on a generic rather than a site-specific basis. 11 figures, 5 tables.

2097 (Y/OWI/TM--43/9) OFFICE OF WASTE ISOLATION PROGESS REPORT, JUNE 1978. Rhines, R.C. (ed.). (Union Carbide Corp., Oak Ridge, TN (USA). Office of Waste Isolation). 28 Jul 1978. Contract W-7405-ENG-26. 56p. Dep. NTIS, PC A04/MF A01.

This document is the last monthly progress report, as the Office of Waste Isolation has ceased operation on June 30, 1978. The material in this report is divided into technical projects, facility projects, planning and analysis, and regulatory affairs. Sundry other activities are reported in appendices. (DLC)

2098 (ZfK--340, pp 16-19) FACILITY FOR LIQUID WASTES AND AQUEOUS RADIOACTIVE WASTES OF AN α, BETA, γ-LABORATORY. Krause, F.; Nebel, D. (Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German Democratic Republic)); Guder, R. Sep 1977. (In German).

Annual report 1977.

LABORATORY EQUIPMENT;LIQUID WASTES; RADIOACTIVE WASTE DISPOSAL;RADIOACTIVE WASTE FACILITIES;RADIOACTIVE WASTE STORAGE

2099 LONG-TERM GEOLOGIC STORAGE OF SPENT FUEL. Rossin, A. (Commonw Edison Co, Chicago, Ill). Journal of the Structural Division, Proceedings of the American Society of Civil Engineers ; 106: No. 7, 1475-1479(Jul 1980).

Spent nuclear fuel can be disposed of safely in deep geological formations. In fact, technology exists sufficient to provide assurance that permanent high-level waste disposal is feasible. Opponents to nuclear power argue that future nuclear plant operation should be curtailed until a high-level waste disposal facility is in operation. This ignores the fact that more than eighty million gallons of separated high-level wastes already exist from the nuclear weapons program and must be placed in safe, permanent geologic storage. Some groups that are trying to block experiments and demonstrations of geologic disposal seem satisfied that spent fuel could be disposed of in a similar manner. Demonstration of nuclear waste disposal in the near future is essential to public acceptance of nuclear power.

2100 MICROAUTORADIOGRAPHIC STUDIES OF THE SORPTION OF U AND AM ON NATURAL ROCK SAMPLES. Smyth, J.R.; Thompson, J.; Wolfsberg, K. (Los Alamos Scientific Lab., NM). Radioactive Waste Management (New York) ; 1: No. 1, 13-24(May 1980).

Selective sorption of uranium and americium by specific minerals in complex geologic materials (granite, argillite, tuff, and alluvium) has been investigated by means of autoradiography on rock thin sections. A standard 30 μm uncovered polished thin section is contacted with a droplet of ground-water solution of uranium or americium. After washing, a thin photographic emulsion is adhered to the section; the emulsion is then exposed and developed to show the alpha-particle tracks. Results indicate that low-temperature, hydrous (commonly secondary) mineral phases are much better sorbers of uranium than primary, high-temperature, anhydrous phases. This suggests that one percent or less of secondary alteration phases may completely dominate the sorption properties of a rock. Results for americium are believed inconclusive because of possible colloid formation or complexing in the slightly basic solutions.

2101 SAFE HANDLING AND STORAGE OF HIGH LEVEL RADIOACTIVE WASTE. Ahlstroem, P.E.; Loefverberg, S.; Nilsson, L.B.; Papp, T. Radioactive Waste Management (New York) ; 1: No. 1, 57-103(May 1980).

This is a condensed version of the proposals of the Swedish Nuclear Fuel Safety Project (KBS). It consists of two parts; safe final storage of vitrified waste, and safe final storage of spent nuclear fuel. In this report are proposals which are detailed and comprehensive to permit a safety evaluation. These proposals specify concretely in which form the waste or spent fuel is to be stored,

how the storage facility is to be designed and how transportation is to be effected. For unreprocessed spent nuclear fuel, proposals indicate how and where an absolutely safe final storage can be effected. Various stages in the handling of the fuel on its way to final storage are fully described. Briefly summarized, the report stipulates that the high-level radioactive waste will be in the form of borosilicate glass cylinders containing 9% fission products. The cylinders will be surrounded by 10 cm of lead, which is further encased in a titanium canister. The canisters are placed in deposition holes drilled in the tunnel floor. The holes are backfilled with a sand-clay mixture. The fuel assemblies are dismantled and the rods are encased in copper containers with 20 cm thick walls. The cylindrical containers are deposited into holes drilled in the floor of a tunnel system. The spaces between the rock and copper canisters are filled with compacted bentonite clay.

2102 LEAD AS A MATERIAL FOR ATOMIC WASTE CONTAINERS. ANALYSIS OF LEAD CORROSION BEHAVIOR ON THE BASIS OF ARCHAEOLOGICAL FINDS. Krysko, W.W. Metall. Internazionale Zeitschrift fuer Technik und Wirtschaft ; 34: No. 5, 433-436(May 1980). (In German).

From archaeological finds it has been observed that grain size and shape is the factor governing the corrosion durability of lead. For longterm corrosion stability, the grain size should not exceed 0.5 mm grain diameter. On the basis of an investigation of 2 000 year old lead artefacts, conclusions are drawn and manufacturing conditions for lead containers for the burial of high-level atomic waste are recommended.

2103 REACTION OF GRAPHITE WITH WATER AND ITS IMPLICATIONS FOR RADIOACTIVE WASTE STORAGE. Gray, W.J. (Pacific Northwest Lab., Richland, WA). Contract EY-76-C-06-1830. Radioactive Waste Management (New York) ; 1: No. 1, 105-109(May 1980).

This letter describes initial results from measuring oxidation of graphite in liquid water and air. They indicate that the reaction rates are extremely low at temperatures of interest for waste storage. Leach (oxidation) tests were conducted using deionized water and powdered graphite with a surface area of 5.4 m^2/g as measured by iodine absorption from aqueous solutions. The graphite and water were sealed inside a Pyrex vessel with air filling the remaining space. After 24 h at 200 to 300°C in an autoclave, gas from the vessel was extracted through a breakseal and analyzed, using a gas chromatograph, for CO_2 and other gases. CO_2 concentrations of 0.3 to 10 vol % were measured, but H_2 concentrations never exceeded 1000 ppM and CO and CH_4 were usually not detected and never exceeded 100 ppM.

2104 ANALYSIS, CRITIQUE, AND REEVALUATION OF HIGH-LEVEL WASTE REPOSITORY WATER INTRUSION SCENARIO STUDIES. Cohen, B.L. (Univ. of Pittsburgh, PA). Nuclear Technology ; 48: No. 1, 63-69(Apr 1980).

The several water intrusion scenario studies in the recent literature are all quite similar and may be easily understood if used to estimate the total number of eventual cancers per unit of energy generated, including their sensitivity to input parameters. However, these studies are grossly overpessimistic in several aspects of the problem, especially in using leach rate data from highly unrealistic experimental situations, and in ignoring geochemical considerations in both leaching and in transport. It is concluded that it is reasonable to expect removal and transport for an atom of buried waste to be similar to that for an atom of average rock. Under that assumption, the leach rate can be estimated from the chemical compositions of rock and of groundwater, coupled with the water flow through aquifers. The result (excluding ^{238}U) is 0.0008 eventual cancer/GW(electric)-yr. This treatment would be invalidated if the waste were released through fractures in the rock induced by the emplacement operations or by heat. If such fractures cannot be discounted, total reliance must be on leach resistance.

2105 FINAL DISPOSAL OF RADIOACTIVE WASTES. Kroebel, R.; Krause, H. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). Glueckauf ; 116: No. 7, 336-339, 153-155(Apr 1980). (In German and English).

The paper discusses the possibilities of radioactive waste storage in West Germany and the related problems of waste treatment, disposal methods, and safety. Projected programmes of the neigbouring EC countries and the USA are mentioned. The authors state that present ways of final storage are sufficiently well known and safe but could be improved by further development. The remaining risk potential after 1000 years of storage of radioactive waste from reprocessing plants is lower than that of the known ore deposits.

2106 METHOD FOR LONG TIME STORAGE OF RADIOACTIVE MATERIAL IN THE BEDROCK. Hannerz, K. (to ASEA-ATOM AB, Vaesteraas (Sweden)). Swedish Patent 7,705,173-8/B/. Mar 1980. 7p. (In Swedish).

Between the body which contains radioactive materials and the rock an inner mass is introduced. The mass has a porous structure which is necessary for the penetration of water. The material must react with water while its volume is expanding. Outside the inner mass there is an outer mass made out of a material which can be plastically deformed. In this way the penetration of water into the outer parts of the inner mass via cracks or other holes in the outer mass renders the cracks and other holes in the other mass become packed by the inner mass due to its volume expansion. The penetration of the outer mass into any possible crack of the rock is attained so that the cracks are tightened. The volume expansion of the material must be larger than the pore volume of the inner mass. The material of the inner mass consists mainly of magnesium oxide, and the material of the outer mass consists mainly of bitumen or tar sands.

2107 ALL ABOARD THE RAINBOW WARRIOR. Walker, I. New Society (London) ; 51: No. 907, 388-389(21 Feb 1980).

An account is given of the attempt by Rainbow Warrior to intercept Pacific Swan at Cherbourg Harbour, to protest against the transport of spent nuclear fuel from England to France for reprocessing.

2108 NUCLEAR WASTE: A 5000 YEAR PROBLEM. Stevens, T. Architects Journal (London) ; 171: No. 8, 368-370(20 Feb 1980).

An account is given of the problem of disposal of radioactive waste from U.K. nuclear facilities. Specific reference is made to the UKAEA application for planning permission to undertake drilling of boreholes for the purpose of studying the properties and structures of the rocks [in the Loch Doon area] and movement of water in them. The place of this

application in the whole programme of test drilling, and the public attitude to proposals to search for suitable sites for underground disposal, are discussed.

2109 CEMETERIES SOUGHT FOR NUCLEAR WASTE. ANATOMY OF AN INQUIRY. Stevens, T. New Scientist ; 85: No. 1194, 491-493(14 Feb 1980).
The significance is discussed of the forthcoming public planning inquiry over proposals to drill in an area near Loch Doon in the Galloway Hills, Scotland. The UKAEA wishes to carry out the drilling to ascertain whether the hard granite in the area would provide a suitable underground store for nuclear waste. The terms of reference of the inquiry are considered and current government thinking on high level nuclear waste disposal is outlined.

2110 CEMETERIES SOUGHT FOR NUCLEAR WASTE. GEOLOGY OF A GRAVEYARD. Gibbs, A. (Bedford Coll., London (UK)). New Scientist ; 85: No. 1194, 488-491(14 Feb 1980).
Relevant geological criteria for safe long - term disposal of high level radioactive waste are listed. Having identified 127 sites throughout Britain, including both sedimentary and crystalline rock formations, 23 areas of crystalline rocks were short listed and it is hoped to carry out an extensive surveying and drilling program from which it will be possible to find the most suitable burial sites.

2111 GAS GENERATION BY SELF-RADIOLYSIS OF TRITIATED WASTE MATERIALS. Tadlock, W.E.; Abell, G.C.; Steinmeyer, R.H. (Monsanto Research Corp., Miamisburg, OH). Contract DE-AC-4-76-DP00053. Nuclear Technology ; 47: No. 2, 358-362(Feb 1980).
Studies simulating the effect of self-radiolysis in disposal packages containing tritiated waste materials show hydrogen to be the dominant gas-phase product. Pressure buildup and gas composition over various tritiated octane and tritiated water samples are designed to give worst case results. One effect of tritium fixation agents is to reduce pressure buildup. The results show that development of explosive gas mixtures is unlikely and that maximum pressure buildup in typical Mound Facility waste packages can be expected to be <0.25 MPa.

2112 BWIP - ANOTHER STEP ON THE WAY TO A WASTE REPOSITORY. Nuclear Engineering International ; 25: No. 295, 33-34(Feb 1980).
Of all the possible media for storing nuclear waste, basalt seems one of the most promising. The Basalt Waste Isolation Project at Hanford is investigating all aspects of using basalt for storing waste. The basic facility has now been excavated and work has just started on installing the instrumentation.

2113 WASTE DUMPING: WHY OPPOSE TEST BORES. Paulin, D. SCRAM (Scottish Campaign to Resist the Atomic Menace) Energy Bulletin ; No. 16, 5-6(Feb-Mar 1980).
BOREHOLES;HEARINGS;LICENSING;PUBLIC OPINION; GEOLOGIC DEPOSITS;RADIATION HAZARDS;RADIOACTIVE WASTE DISPOSAL;ROCK DRILLING;UKAEA;UNDERGROUND DISPOSAL;UNITED KINGDOM

2114 TEST BORES IRRELEVANT. Tolstoy, I. SCRAM (Scottish Campaign to Resist the Atomic Menace) Energy Bulletin ; No. 16, 7-8(Feb-Mar 1980).
AIR;CONTAMINATION;EARTHQUAKES;PUBLIC RELATIONS;RADIATION HAZARDS;RADIOACTIVE WASTE DISPOSAL;RADIOACTIVE WASTES;ROCKS;SHOCK WAVES; UNDERGROUND DISPOSAL;UNITED KINGDOM; VITRIFICATION;WATER;GEOLOGIC DEPOSITS

2115 (PNL-TR--408) BEHAVIOR OF RADIOACTIVE WASTES INCORPORATED IN CONCRETE AND STORED ON OPEN-AIR BED AT CAMEN. Beltiore, A.; Lo Moro, A.; Orsini, T.; Panciatici, G. Translated from Energia Nucleare (Milan) ; 27: No. 2, vp(Feb 1980). 8p. NTIS, PC A02/MF A01.
A study was performed on the state of preservation of some 400 concrete containers used to condition radioactive wastes, stored in the temporary open-air bed at Centro Applicazioni Militari Energia Nucleare (CAMEN). The investigation, whose results are reported in the present note, showed the effectiveness of the adopted method of storing the containers in the open.

2116 (PNL-TR--384) CEDRA INFORME: NATIONAL COOPERATIVE ASSOCIATION FOR THE STORAGE OF RADIOACTIVE WASTES. 31 Jan 1980. Translation of CEDRA Informe, No. 6/1979 November 34p. Dep. NTIS, PC A03/MF A01.
Activities of the CEDRA, a Swiss organization, in the field of radioactive waste storage are reported. Besides various international cooperative projects, an underground laboratory will be constructed at Grimsel. International news briefs are included. The Swiss program for nuclear waste management is discussed. (DLC)

2117 TECHNICAL NOTE: 1957-1958 SOVIET NUCLEAR ACCIDENT IN THE URALS. Trabalka, J.R. (Oak Ridge National Lab., TN); Auerbach, S.I.; Eyman, L.D. Nuclear Safety ; 21: No. 1, 94-99(Jan 1980).
The available but limited information concerning the major airborne release of fission wastes in the Soviet Union in 1957-58 is discussed. A theory that the release was the result of unusual localized fallout from a Soviet atmospheric weapons test is rejected. An earlier article by Stratton, et. al. is criticized. The authors suggest that evidence points to an accident involving the high-level radioactive waste storage of plutonium.

2118 OCEAN DUMPING OF HIGH-LEVEL WASTE: AN ACCEPTABLE SOLUTION WE CAN ''GUARANTEE''. Cohen, B. (Argonne National Lab., IL). Nuclear Technology ; 47: No. 1, 163-172(Jan 1980).
What is needed for high-level radioactive waste is not necessarily a program for final disposal, but rather an early clear demonstration that an acceptable method is available. This would be especially easy for ocean dumping, since the environment in the water just above the ocean floor is much more uniform, stable, predictable, and more easily reproduced in a laboratory than other environments being considered for waste storage. Other probable advantages of ocean dumping are improved capability for monitoring and retrievability and reduced cost and transport problems. It is assumed that the waste is incorporated into glass and dumped in oceans distributed throughout the world. Calculations of environmental impacts are given for various assuptions about leach rates and failures and for a 30,000-yr delay in onset of leaching achieved by surrounding the waste with a protective coating. With normal leaching, there would be 0.17 eventual human fatalities per GW(electric)-yr, and for the worst case of

immediate complete dissolution, this is increased by only 30%. This is 150 times less than the fatalities due to wastes from coal-fired plants.

2119 LABORATORY SIMULATION OF HIGH-LEVEL LIQUID WASTE EVAPORATION AND STORAGE. Anderson, P.A. (Exxon Nuclear Idaho Co., Idaho Falls). Nuclear Technology ; 47: No. 1, 173-180(Jan 1980).

Simulated high-level liquid waste (HLLW) slurries were prepared by combining a series of soluble stock solutions composed of commonly available chemical reagents. The properties simulated included acidity, nitrate concentration, quantities and composition of undissolved solids, density, and vicosity of HLLW at various degrees of evaporation. Limits of concentration by evaporation and stability during storage were studied. Steeling rates and particle sizes of the undissolved solids were estimated for stored HLLW. While considerable effort was expended to closely simulate actual reprocessing wastes, these data should be confirmed under actual process conditions.

2120 INHERENTLY SAFE AIRCOOLING FOR THE STORAGE OF SELF-HEATING CONFIGURATIONS OF RADIONUCLIDES. Hame, W.; Klein, D.; Pirk, H. (Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.)). Atomkernenergie/Kerntechnik ; 35: No. 2, 111-122(1980). (In German).

NUKEM developed a technical concept of a radionuclide storage facility based on aircooling, which provides that - the radionuclides, i.e. spent fuel elements, are tightly canned in steel canisters - the canned elements are put into individual cooling channels, which form the storage rack within the storage cell - the produced heat is removed from the surface of the canisters through free convection. This cooling concept shows the following advantages: - The cooling is inherently safe, as the driving force of the coolant is reliably supplied by the heat production of the system to be cooled. - The system is self-controlled and self-regulated because of the physically based correlation of heat production, heat transfer coefficients and air flow resistances.

2121 Compte rendu d'une reunion de travail sur l'utisation des materiaux argileux pour l'isolement des dechets radioactifs. (PROCEEDINGS OF THE WORKSHOP ON THE USE OF ARGILLACEOUS MATERIALS FOR THE ISOLATION OF RADIOACTIVE WASTE). Paris, France: OECD (1980). 281p. (In English and French).

From NEA Workshop on the use of argillaceous materials for the isolation of radioactive waste; Paris, France (10 - 12 Sep 1979).

Argillaceous materials are characterized by favourable properties for radioactive waste isolation. In particular their low permeability and high sorption capacity make them a very effective barrier. Approaches to the utilisation of argillaceous materials for waste isolation are emplacement of the waste in a shale or claystone formation on land or in argillaceous sediments under the ocean floor. It is also feasible to use clays or a mixture of clay and sand as an artificial barrier around waste containers placed in cavities excavated in a different geological formation. Finally, clays could be used in different ways ro reduce the permeability of other formations or for backfilling, plugging and sealing of cavities, shafts, boreholes and fractures. There are still some unknowns in relation to the use of argillaceous materials, particularly for the containment of heat generating wastes. Additional difficulties exist for the in situ measurement of permeability and radionuclides migration. These proceedings represent a record of the papers and discussions at this meeting organised by the NEA.

2122 DETERMINATION OF RADIOLYTIC HYDROGEN CONCENTRATION IN THE GAS PLENUM OF A CONTAINER FOR THE STORAGE OF LIQUID HAW IN THE WAK. Beaujean, H.W.; Specht, S.; Wiese, H. (Gesellschaft zur Wiederaufarbeitung von Kernbrennstoffen m.b.H., Eggenstein-Leopoldshafen (Germany, F.R.)). pp 263-266 of Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht. Sektion 3: Sicherheit kerntechnischer Anlagen. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980). (In German)

From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).

HIGH-LEVEL RADIOACTIVE WASTES;HYDROGEN; LIQUID WASTES;QUANTITATIVE CHEMICAL ANALYSIS; RADIOACTIVE WASTE STORAGE;RADIOLYSIS;SAFETY; TANKS;WAK

2123 UNSEALED STORAGE OF MAW/LAW IN SALT CAVERNS. Kraemer, R.; Koester, R.; Kroebel, R. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). pp 477-480 of Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht. Sektion 4: Brennstoffkreislauf und Spaltstoff-Flusskontrolle. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980). (In German)

From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).

INTERMEDIATE-LEVEL RADIOACTIVE WASTES;LOW-LEVEL RADIOACTIVE WASTES;RADIOACTIVE WASTE DISPOSAL;RADIOACTIVE WASTE STORAGE;SALT DEPOSITS;SOLIDIFICATION;UNDERGROUND STORAGE

2124 STORAGE TEMPERATURES FOR VITRIFIED HAW. Simon, R. (Commission of the European Communities, Brussels (Belgium)). pp 481-484 of Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht. Sektion 4: Brennstoffkreislauf und Spaltstoff-Flusskontrolle. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980). (In German)

From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).

AFTER-HEAT;GEOLOGIC DEPOSITS;GLASS;HIGH-LEVEL RADIOACTIVE WASTES;RADIOACTIVE WASTE STORAGE;TEMPERATURE DISTRIBUTION;SOLID WASTES; TEMPERATURE DEPENDENCE;THERMAL CONDUCTIVITY

2125 DEVELOPMENT OF REGULATORY PROCEDURES FOR THE DISPOSAL OF SOLID RADIOACTIVE WASTE IN DEEP, CONTINENTAL FORMATIONS. Vienna, Austria; IAEA (1980). 26p.

For the disposal of radioactive waste, and in particular, of the high-level and alpha-bearing waste from the nuclear fuel cycle, the most favoured solution in most countries is disposal in deep, continental geological formations. Commitment to this disposal method involves a number of issues related to the various stages of the disposal programme which must be addressed through some reasoned decision-making process. Most countries are opting for regulating such a programme through licensing actions by a body whose purpose is to review, certify and ensure the safety of all the stages of the disposal programme. This regulatory body may either be one single national authority or a system of authorities

designated by the government. The key to such regulation is the set of procedures, determined in advance, for the actions of the implementing organization, the review by the regulatory body and the involvement of other parties. This document concerns itself with the procedures which could logically be followed in reaching a set of rational decisions by the regulatory body. Care in the preparation and application of such procedures is an important element in the acceptability of the concept, the site and the other aspects of the disposal programme. The intention of this document is to give guidance as to what issues should be addressed in the licensing review, what decision points are important, and what guidance should be given to the applicant by the regulatory body in the course of the licensing actions. The procedures are keyed to be designed according to the logical steps involved in the development and operation of the repository. However, the document does not pretend to give guidance regarding the optimal interactions between the implementing organization and the regulatory body. This document is oriented to the disposal of solid radioactive waste in deep, continental geological formations using mining techniques.

2126 HAZARDOUS HIGH-LEVEL RADIOACTIVE WASTE DISPOSAL IN GEOLOGIC FORMATIONS. Neiheisel, J.; Holcomb, W.F. (Environmental Protection Agency, Washington, DC). pp 183-202 of Toxic and hazardous waste disposal. Volume 3. Impact of legislation and implementation on disposal management practices. Pojasek, R.B. (ed.). Ann Arbor, MI: Ann Arbor Science Publishers, Inc. (1980).

From 177. national meeting of the American Chemical Society; Honolulu, HI, USA (1 Apr 1979).

An overview is presented of the characteristics of the major candidate lithologies for high-level radioactive waste disposal in deep geologic formations. Salt (domes or bedded strata), basalt, granite and shale are candidate lithologies for the first high-level radioactive waste continental repository in the US, which is estimated to be constructed sometime between 1988 and 1995 in a deep geologic formation. The site selection will undoubtedly be inland from the west coast global plate boundary and within tectonically stable regions free of volcanic or excess earthquake activity, and avoiding regions apt to experience secular changes within the next million years. The lithologic candidates vary widely in intrinsic properties, although low permeability to avoid groundwater transport of radionuclides from the repository is similarily minimal for all potential lithologies. The inherent dryness of thick, massive salt domes in the most stable portion of the North American continent and the high plasticity, high thermal conductivities, and strain hardening capabilities of the salt domes are attractive features for a repository. Basalt and granite are the candidate lithologies which have greater mechanical strength and higher sorption capabilities than salt, but are otherwise of lower thermal conductivity, poorer plasticity, and higher mining costs. They are also fracture prone and have no self-sealing properties. Shale is widespread on the continent and combines properties of high plasticity and high sorption as attractive features for the repository. However, the effects of thermal loading are not understood, and some of the clay minerals (montmorillonite) release loosely bound waters at relatively low temperatures (100°C); the resulting fracturing could increase permeability.

2127 (ORNL-tr--4673) GEOLOGICAL ASPECTS OF WEAK SPOT ANALYSIS FOR THE FEDERAL REPOSITORY FOR RADIOACTIVE WASTES AT THE GORLEBEN SITE. Rischbieter, F.; Hintz, R.A.; Michelmann, K.; Schaepermeir, E. (Physikalisch-Technische Bundesanstalt, Braunschweig (Germany, F.R.)). 1980. Translation of BF-R-63.861-2, January 1980 112p. NTIS, PC A06/MF A01.

This study deals with the geological aspects of the final disposal of radioactive wastes in the planned federal repository in the Gorleben salt dome. Because of halite's excellent leaktightness properties, which due to its flowing power are retained even during high plastic deformation, the salt dome assumes the function of a barrier against the escape of radioactive materials from the final repository products to the biosphere. This barrier must remain functional over long periods of time due to the long life of the actinides. The study treats the effects of conceivable events which could disturb the integrity of the salt dome and thus lead to contact between the final repository and the groundwater. The conceivable events in this sense which were identified and investigated include: inherent dynamics of the salt dome (diapirism) and possible reactivation through epirogenous effects (lifting or sinking of underground areas); mining from deposits below the salt dome, and heating of the salt dome by the final repository; thermomechanical stress on halite by the heat evolution of the final repository; erosion; natural external mechanical effects (earthquakes, vulcanism, and meteorites); and boring into the salt dome. The mined cavity of the mined final repository is not the subject of these investigations. The investigations lead to the conclusion that the release of final repository products can be excluded with great probability.

2128 REVIEW OF THE CONTINUED SUITABILITY OF THE DUMPING SITE FOR RADIOACTIVE WASTE IN THE NORTH-EAST ATLANTIC. Paris, France: OECD (1980). 107p.

The group of experts which reviewed the North-East Atlantic dumping site concluded that: (1) the physical, chemical, and biological properties of the site comply with the requirements for a site considered suitable for dumping packaged radioactive waste at sea as laid down by IAEA recommendations; (2) there is no scientific evidence to support that conditions at this site would lead to doses per unit rate of release of specific radionuclides significantly greater than those which could be calculated using the generic models described by the IAEA; (3) the calculated dose rates to the most exposed critical group due to recent average rates of dumping are no more than 0.1% of the relevant ICRP dose limits; (4) the actual doses received will probably be lower than those so calculated; (5) there is a need to develop a site-specific model of the transfer of radionuclides, from the dump area to human populations; (6) it is recommended that a review of the scientific basis for making the assessment and of the growing body of knowledge about radionuclide transport processes in the North-East Atlantic be undertaken before the normal 5 years; (6) the site would be suitable for the receipt of packaged radioactive wastes during the next 5 years at annual rates comparable to those reached in the past. (DP)

2129 GEOLOGICAL DISPOSAL AND THE TAXPAYER: THE PROBLEM OF THE EXPERTS. Mawson, C.A. (Atomic Energy of Canada Ltd., Ottawa, Ontario). pp 109-114 of Management of environment. Patel, B. (ed.). New Delhi,

India; Wiley Eastern Ltd. (1980).
Geological disposal of high level wastes such as plutonium and uranium ore tailing is discussed. The author feels such disposal is a waste of the taxpayer's money and suggests technical experts should stick to their own field of expertise in making pronouncements about the hazards of radoactive wastes. (DAD)

2130 ENCAPSULATING SPENT NUCLEAR FUEL. Fleischer, L.R.; Gunasekaran, M. (to Westinghouse Electric Corp., Pittsburgh, PA (USA)). British Patent 2,023,056/A/. 28 Dec 1979. 11p.
A system is described for encapsulating spent nuclear fuel discharged from nuclear reactors in the form of rods or multi-rod assemblies. The rods are completely and contiguously enclosed in concrete in which metallic fibres are incorporated to increase thermal conductivity and polymers to decrease fluid permeability. This technique provides the advantage of acceptable long-term stability for storage over the conventional underwater storage method. Examples are given of suitable concrete compositions.

2131 (PNL-TR--378) STATEMENT BY DR. ERNST ALBRECHT ON THE PROVINCIAL GOVERNMENT'S POSITION REGARDING THE PLANNED NUCLEAR WASTE DISPOSAL FACILITY (NEZ) IN GORLEBEN. PART II. POSITION TAKEN BY THE FEDERAL GOVERNMENT REGARDING THE POLICY STATEMENT BY THE NIEDERSACHSEN PROVINCIAL GOVERNMENT ON THE PLANNED NUCLEAR WASTE DISPOSAL FACILITY IN GORLEBEN. (Battelle Pacific Northwest Labs., Richland, WA (USA)). 6 Dec 1979. Translation source information not available 15p. Dep. NTIS, PC A02/MF A01.
Questions regarding the safety and policy aspects of the proposed DWK waste disposal center in Gorleben are discussed. The position of the Niedersachsen provincial government is that the center should not be built; instead, the salt formations should be tested and interim fuel storage facilities provided. The response of the Federal government to the Niedersachsen statement is also listed.

2132 UNDERGROUND WASTE DISPOSAL; THE TIME TO GO AHEAD. Fitzpatrick, J. (Electrowatt Engineering Services Ltd., London (UK)). Nuclear Engineering International ; 24: No. 293, 13-15(Dec 1979).
The findings and status of several national and international research programmes were recently reported at an International Symposium on the Underground Disposal of Radioactive Wastes. A brief review is presented of the situation. Attention is drawn to the flexibility in design emerging to allow for differences in fuel cycle policy, and to the bias of countries towards research into geologic host formations available within their own borders. International co-operation in this field is good. Collaborative work in the nine Community countries is divided between them by geologic type. Disposal of low and medium active waste is discussed. Research into salt domes, crystalline rods, and argillaceous sediments is briefly summarised. Aspects of underground disposal of high-level waste and radionuclide migration are also considered.

2133 RADIONUCLIDE REDISTRIBUTION MECHANISMS AT THE 2800-M ATLANTIC NUCLEAR WASTE DISPOSAL SITE. Dayal, R.; Okubo, A.; Duedall, I.W.; Ramamoorthy, A. (State Univ of NY, Stony Brook). Deep-Sea Research, Part A: Oceanographic Research papers ; 26: No. 12A, 1329-1345(Dec 1979).
As part of an investigation of the abandoned 2800-m Atlantic nuclear waste disposal site, several box cores were taken at the site in August, 1976. In addition, a submersible was used to locate and examine waste canisters and to sample surrounding sediment. Results show that both /sup 137/Cs and /sup 314/Cs were present in significant concentrations in sediment sampled close to a waste canister. The presence, concentration levels, and distribution patterns of the cesium isotopes indicate that the waste canister is the source of the observed radionuclides and that these elevated radionuclide concentration levels are highly localized around the canister. Considering the fine-fraction mineralogy and exchange capacity of sediment and the adsorption characteristics of the cesium ion, it appears that sediment at the study site serves as a barrier to radionuclide migration. Refs.

2134 MEASURING THE HYDROLYTIC RESISTANCE OF SOLIDIFICATION PRODUCTS. Santarova, M.; Vojtech, O.; Halova, J. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Nukleon ; No. 4, 10-20(Dec 1979). (In Czech).
Hydrolytic resistance was determined using standard methods known in the glass and ceramics industries. Selective nuclide leaching was determined using the method recommended by the IAEA. Studied were the phosphate system (fission products - corrosion products - phosphoric acid) and the same system with $NaNO_3$ added in a wide range of starting materials concentrations and chemicals used. The rates are given of fixation product dissolution and of the depth of corrosion (cm/week) corresponding to the selective extract of Fe, Na, Cs, Sr, Mo for samples prepared at different fixation temperatures (900, 1100, 1200 degC). The concentration of elements in the extract was measured by atomic absorption spectroscopy. The results show that selective leaching of selected elements is affected by sample macro- and microinhomogeneities while the measurement of the total mass reduction may only be affected by the presence of macroinhomogeneities. Time dependences are shown of Cs and Sr leaching from phosphate glass as are the relations used for the calculation of the element leached fraction. The results of a mathematical analysis showed that the use of mathematical relations based on the principal mechanisms of the dissolution of more complex structures was justified.

2135 GEOCHEMISTRY OF RADIOACTIVE WASTE DISPOSAL. Bird, G.W. (Atomic Energy of Canada Ltd., Pinawa, Manitoba. Whiteshell Nuclear Research Establishment). Geoscience Canada ; 6: No. 4, 199-204(Dec 1979).
Safe, permanent disposal of radioactive wastes requires isolation of a number of elements including Se, Tc, I, Sr, Cs, Pd, U, Np, Pu and Cm from the environment for a long period of time. The aquatic chemistry of these elements ranges from simple anionic (I^-,IO_3^-) and cationic (Cs^+,Sr^{++}) forms to multivalent hydrolyzed complexes which can be anionic or cationic ($Pu(OH)_2^+$,$Pu(OH)_3^+$, $PuO_2(CO_3)(OH)^-$,PuO_2Cl^-,etc.) depending on the chemical environment. The parameters which can affect repository safety are rate of access and composition of groundwater, stability of the waste container, stability of the waste form, rock-water-waste interactons, and dilution and dispersion as the waste moves away from the repository site. Our overall research program on radioactive waste disposal includes

corrosion studies of containment systems, hydrothermal stability of various waste forms, and geochemical behaviour of various nuclides including solubilities, redox equilibria, hydrolysis, colloid fomation and transport ion exchange equilibria and adsorption on mineral surfaces and irreversible precipitation reactions. This paper discusses the geochemistry of I, Se, Tc, Cs, Sr and the actinide elements and potential mechanisms by which the mobility could be retarded if necessary.

2136 USE OF GEOPHYSICS IN THE CANADIAN RADIOACTVE WASTE DISPOSAL PROGRAM, WITH EXAMPLES FROM THE CHALK RIVER RESEARCH AREA. Dence, M.R. (Department of Energy, Mines and Resources, Ottawa, Ontario (Canada). Earth Physics Branch); Scott, W.J. (Geological Survey of Canada, Ottawa, Ontario). Geoscience Canada ; 6: No. 4, 190-194(Dec 1979).

A program of integrated geophysical surveys has been developed within the Department of Energy, Mines and Resources in response to requests from Atomic Energy of Canada Ltd. for assistance in verifying the concept of deep underground storage of radioactive waste and in selecting suitable sites for a disposal vault. Both well established and innovative airborne, ground and borehole techniques are being tested for their usefulness in determining overall structure, lithological variations, rock quality, the character of specific fracture systems and long term stability of selected areas. Preliminary results from the Chalk River Nuclear Laboratories property illustrate the use of electrical, seismic and other methods in analysing complex fracture systems.

2137 PTB PROJECTS FOR THE SAFEGUARDING AND FINAL STORAGE OF RADIOACTIVE WASTE. Viehl, E. (Physikalisch-Technische Bundesanstalt, Braunschweig (Germany, F.R.)). Bergbau ; 30: No. 12, 692-696(Dec 1979). (In German).

In the Federal Republic of Germany, Physikalisch-Technische Bundesanstalt (PTB) is responsible for the state-owned facilities for safeguarding and ultimate storage of radioactive waste. The planning concept incorporates not only the final storage site in a salt dome, but also storage facilities for vitrified high-activity waste and krypton and a facility where tritium-containing water is to be pressed into suitable geological formations. The site-independent plans for the final storage facility (shaft systems, storage techniques, ventilation, above-ground installations) are briefly described, and the state of the work on site exploration (Gorleben analysis programme, deep drilling) is reviewed. According to the present time schedule, it is expected that storage of low- and medium-activity waste can be started by about 1994.

2138 (UCRL-Trans--11550) FLOW PROPERTIES OF ROCK SALT: STUDY ON THE EXTRAPOLATION OF TEST RESULTS TO LONG TIME PERIODS. Hunsche, U. (Bundesanstalt fuer Geowissenschaften und Rohstoffe, Hannover (Germany, F.R.)). Dec 1979. Translation of 2nd interim report on research project SR 138, February 16, 1979 45p. Dep. NTIS, PC A03/MF A01.

This report reviews the status of knowledge on temperature-dependent flow properties of polycrystalline rock salt as now represented on the basis of theoretical and experimental studies. Various deformation mechanisms are active in steady-state creep. One of those mechanisms dominates in each of the different stress regions and thus largely determines the flow properties. Consequently, different deformation laws apply under different stress conditions (epsilon., sigma, T). Dislocation slip is active at high differential stresses above ca. 160 bar, but is not significant for long-duration flow. The most important mechanism in this regard is dislocation climb, which dominates at differential stresses of ca. 5 bar to ca. 160 bar. Theoretical and experimental studies in this region lead to a deformation law of the form: epsilon./sub s/ = A . exp (Q/sub eff//RT) . sigma/sup n/. Below ca. 5 bar, diffusion creep and grain-boundary slip with constants which depend on grain size and temperature may be the governing deformation mechanisms. All studies indicate that the magnitude of the hydrostatic pressure has only a slight influence on the deformation rate.

2139 DIAPHRAGM WALLS TO HOLD WINDSCALE LEAK. Hayward, D. New Civil Engineer ; No. 372, 23-25(29 Nov 1979).

A description is given of the concrete storage silo at the Windscale fuel reprocessing plant of British Nuclear Fuels Limited. The silos are used for the underwater storage of strips of swarf from the magnesium alloy casing of spent magnox fuel elements. The original silo has been leaking radioactive liquid: attempts to plug the leak and plans to contain it by building diaphragm walls are discussed. Improved designs for new silos are described.

2140 INTERNATIONAL RESEARCH PROGRAMME FOR DISPOSAL OF RADIOACTIVE WASTE. Schweizerische Bauzeitung ; 97: No. 46, 943-944(15 Nov 1979). (In German).

A worked out iron ore mine in Stripa (Sweden), 350 m deep in granite, is being investigated as a suitable place for storage of radioactive waste. Exhaustive measurements are in progress to determine the effect on the granite, including determination of the mechanical stresses caused by the heat generated, and the consequences of any water which may seep through the granite. Plans are drawn up for the installation of an underground laboratory in the rock of the Grimsel pass (Switzerland). Drilling will commence in January 1980.

2141 PROCESS FOR DISPOSAL OF AQUEOUS SOLUTIONS CONTAINING RADIOACTIVE ISOTOPES. Colombo, P.; Neilson, R.M. Jr.; Becker, W.W. (to Dept. of Energy). US Patent 4,174,293. 13 Nov 1979. Filed date 12 Oct 1977. 8p.

A process for disposing of radioactive aqueous waste solutions whereby the waste solution is utilized as the water of hydration to hydrate densified powdered portland cement in a leakproof container; said waste solution being dispersed without mechanical inter-mixing in situ in said bulk cement, thereafter the hydrated cement body is impregnated with a mixture of a monomer and polymerization catalyst to form polymer throughout the cement body. The entire process being carried out while maintaining the temperature of the components during the process at a temperature below 99°C. The container containing the solid polymer-impregnated body is thereafter stored at a radioactive waste storage dump such as an underground storage dump. (3 figures)

2142 INVESTIGATION OF UNDERGROUND CAVERNS. Nolte, E.; Lichter, D. (to Prakla-Seismos G.m.b.H., Hannover (Germany, F.R.)). German(FRG) Patent 2,807,551/A/. 8 Nov 1979. 22p. (In German).

By means of a probe the condition of the

boundary surfaces, other parameters, or the contents of the caverns, e.g. in salt rock may be investigated for ultimate storage of radioactive waste. The probe is hanging on a measuring cable designed as a suspending wire leading to a driving and remote-control mechanism and to evaluation units standing on the surface. At the lower end of the probe an extension arm is hinged as supporting arm for the testing equipment. The supporting arm can be rotated about the probe axis. As testing equipment e.g. ultrasonic probes, lasers, temperature and moisture sensors may be used.

2143 NEED TO EVALUATE WASTE DISPOSAL OPTIONS. Nuclear Engineering International ; 24: No. 292, 25-26(Nov 1979).

A summary is presented of a review of the British Government's White Paper (Command 884) on the control of radioactive wastes which was published in 1959. The review, by an Expert Group of independent scientists and representatives of the nuclear industry was initiated in 1976 to see which principles in the management of waste from nuclear power plants and its associated fuel cycle needed changing in the light of new knowledge and new technology. Amongst the conclusions drawn it is considered that exposure of the population to radiation from nuclear waste should be reduced to levels as low as reasonably achievable, although existing standard limits are satisfactory, and that more work is urgently required on geologic and sea-bed disposal to meet the demand in the next years when there will be waste from decommissioned plants in addition to that from the fuel cycle.

2144 UNDERGROUND DISPOSAL OF RADIOACTIVE WASTES. Knight, M.J. (Univ of New South Wales, Australia). Search. Science, Technology and Society ; 10: No. 11, 388-393(Nov 1979).

Methods proposed for the underground disposal of radioactive wastes are outlined. R and D programs conducted to determine proper rock type, geological barriers, and repository designs for high level radioactive waste disposal are surveyed. Standards that are being developed to guide the selection of radioactive waste disposal sites are considered. Findings of the 1979 Helsinki symposium on radioactive waste disposal methods are reviewed. (2 diagrams, 1 map, 1 photo, 5 references, 5 tables)

2145 ATOMIC WASTE DISPOSAL - THE SWISS WAY. ENVIRONMENTAL AND LANDSCAPE PROTECTION ARE MANDATORY. Weber, R. VDI (Verein Deutscher Ingenieure) Nachrichten ; 33: No. 46, 4(Nov 1979). (In German).

For two decades, preparative work has been done on the problem of radioactive waste disposal in Switzerland. In May last year, the Swiss citizens agreed on the amendment to their atomic energy law. According to this amendment, procedures of atomic waste must prove until December 31, 1985, that they can store their waste safely. Otherwise, the licences for operation of the five Swiss nuclear power plants would become invalid. Therefore, nuclear waste producers - including the Federal government itself - have alloted funds of 200 million sfr to an extensive research programme on a technically mature final storage project.

2146 WHAT TO DO WITH THE RADIOACTIVE WASTE.. Johansson, T.B. (Univ. of Lund, Sweden); Steen, P. Bulletin; 38-42(Nov 1979).

Before anymore nuclear reactors can be loaded with fuel in Sweden, the "Stipulation Act" states that the reactor operator must: (1) present a contract which provides for the reporcessing of spent fuel and show how and where radioactive wastes from processing will be deposited, and (2.) Show how and where the spent fuel can be finally stored with safety. The method of compliance of the nuclear industry in Sweden to these regulations are presented.

2147 RADIOACTIVE WASTE BACKUP THREATENS RESEARCH. Marshall, E. Science ; 206: 431-433(26 Oct 1979).

Problems in the disposal of low-level radioactive wastes are discussed. Due to the closing of the disposal site at Hanford, Washington, radioactive wastes from medical research at various universities and medical centers around the country have begun to stockpile. The reason given for the closing is that the wastes had been carelessly packaged.

2148 ARE PORTIONS OF THE URALS REALLY CONTAMINATED. Stratton, W. (Los Alamos Scientific Lab., NM); Stillman, D.; Barr, S.; Agnew, H. Science ; 206: 423-425(26 Oct 1979).

Rumors that radiation was released by accident in the Ural Mountain area received supporting testimony from Soviet refugee and biologist Zhores Medvedev, who reported that a large area was contaminated and many persons injured. The biologist's search of Soviet open literature for clues of soil and water contamination pinpointed the affected areas on the eastern slope of the Urals at the site of early military plutonium production reactors. The nature of the contamination led him to place the source of contamination as buried radioactive waste material which exploded or erupted. The authors challenge Medvedev's interpretation and suggest the contamination resulted, instead, from the localized fallout of Soviet atmospheric weapons tests. They cite the lack of plutonium contamination, weather and wind patterns, and the literature on atmospheric testing to support their conclusion. 10 references. (DCK)

2149 URANIUM WASTE AS FERTILIZER. Chemical Week ; 125: No. 17, 43-44(24 Oct 1979).

To determine if the ammonium nitrate byproduct of nuclear fuel production can be used safely in agriculture, cattle are being grazed on land treated with liquid waste (raffinate) from Kerr-McGee Nuclear Corp.'s Sequoyah, Okla., uranium enrichment facility. The cattle will be slaughtered some time in November 1979, and tissue, blood, and other specimens from the animals will be tested for traces of radium and heavy metals. If Kerr-McGee cannot gain permission to use treated raffinate in agriculture, other waste disposal alternatives will have to be considered. (1 photo)

2150 COAXIAL CAVITY FOR MEASURING LEVEL OF LIQUID IN A CONTAINER. Booman, G.L.; Phelps, F.R. (to Dept. of Energy). US Patent 4,170,135. 9 Oct 1979. Filed date 26 Sep 1978. 8p.

PAT-APPL-945,926.

A method and means for measuring the level of a liquid in a container are described. A coaxial cavity having a perforated outer conductor is partially submerged in the liquid in the container wherein the liquid enters and terminates the annular region of the coaxial cavity. The fundamental resonant frequency of

the portion of the coaxial cavity which does not contain liquid is determined experimentally and is used to calculate the length of the liquid-free portion of the coaxial cavity and thereby the level of liquid in the container. 15 claims.

2151 BURYING BRITAIN'S RADIOACTIVE WASTE. THE GEOLOGICAL AREAS UNDER INVESTIGATION. Mather, J.D.; Greenwood, D.A.; Greenwood, P.B. (Institute of Geological Sciences, London (UK)). Nature (London) ; 281: No. 5730, 332-334(4 Oct 1979).

A review is given of the major research effort being undertaken in the United Kingdom into the feasibility of the disposal of solidified, highly-radioactive heat-emitting wastes to geological formations. The present phase of the programme relates to the exploration of sites within the 127 different areas containing potentially suitable host rocks which have been identified by the application of relevant geological criteria. A map indicating these areas is presented. During this phase no radioactive wastes will be used. It is felt that the feasibility of the disposal of high-level radioactive wastes within the geological framework of the United Kingdom still remains to be demonstrated. The immediate need is for comprehensive site-specific field data from a range of potentially appropriate geological environments both to test the criteria on which these environments were chosen and to provide a data base from which potential disposal sites may be identified.

2152 RADIOACTIVE WASTE: A TECHNICAL SOLUTION. Abbotts, J. Bulletin of the Atomic Scientists ; 35: No. 8, 12-18(Oct 1979).

Commentary:Management of nuclear wastes has become much more than a problem of technology. Difficulties with institutional problems, political insensitivity to citizen participation in the nuclear waste disposal issue, and other non-technical issues have served to cancel nuclear waste projects long before any technological solution can be demonstrated. Federal governments' abortive efforts to establish a waste storage policy are chronicled. Increased citizen involvement in nuclear waste facility siting is recommended. (1 drawing, 23 references)

2153 IMMOBILIZATION OF KRYPTON BY INCORPORATION INTO A METALLIC MATRIX BY COMBINED ION IMPLANTATION AND SPUTTERING. Whitmell, D.S.; Nelson, R.S.; Williamson, R.; Smith, M.J.S. (UKAEA, Harwell. Atomic Energy Research Establishment). Nuclear Energy (Formerly Nuclear Energy Engineer) ; 18: No. 5, 349-352(Oct 1979).

A brief review of the technique of immobilizing krypton in a metallic matrix by combined ion implantation and sputtering is given. The principles of the process are discussed together with a description of the plant envisaged for the immobilization of radioactive krypton arising from the reprocessing of nuclear fuel. Preliminary results of the immobilization of inactive krypton in a copper matrix, obtained with a laboratory scale module, are described, together with a summary of the current work programme which includes the construction of a half-scale inactive pilot plant.

2154 INTERIM STORAGE DEVICE FOR SELF-HEATING, HIGHLY DANGEROUS MATERIALS. Schmidt, K. PTB Mitteilungen. Amts- und Mitteilungsblatt der Physikalisch-Technischen Bundesanstalt ; 89: No. 5, 341-343(Oct 1979). (In German).

For interim storage of irradiated fuel elements or vitrified high active wastes there are at present different concepts in discussion. These concepts are explained in a survey.

2155 FINAL DISPOSAL OF RADIOACTIVE WASTES. Merz, E. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.)). Naturwissenschaften ; 66: No. 10, 517-518(Oct 1979). (In German).

RADIATION HAZARDS;RADIATION PROTECTION; RADIOACTIVE WASTE DISPOSAL;RADIOACTIVE WASTE STORAGE;RADIOACTIVE WASTES;RADIOECOLOGY;SAFETY; UNDERGROUND DISPOSAL

2156 NUCLEAR WASTE: A PROBLEM THAT MUST BE SOLVED. Glenn, J.H. Jr. (U.S. Senate). Public Utilities Fortnightly ; 104: No. 7, 23-25(27 Sep 1979).

Sen. Glenn briefly appraises the problem of the disposal of nuclear wastes generated from power production. It has been assumed that the waste problem would be solved, but after 30 years of nuclear research and development, serious gaps exist in our scientific capabilities to dispose of these highly toxic and long-lived materials. Sen. Glenn sees at least three hurdles to be overcome: the scientific feasibility of deep geologic storage has yet to be demonstrated; there is at present no national plan for the disposal of radioactive wastes; and provision must be made for an integrated Federal effort with state, local, and public participation. Glenn and Sen. Charles H. Percy introduced the Nuclear Waste Management Reorganization Act of 1979 (S 742) to deal with the organizational aspects of the nuclear waste problem. The bill proposes to create a Nuclear Waste Coordinating Committee consisting of representatives that have jurisdiction over various segments of the nuclear waste management process. It also establishes a Nuclear Waste Management Planning Council composed of state and local elected officials and members of the public; and the third thrust of the bill pertains to Federal-state interaction and the process by which permanent nuclear waste repositories is sited and constructed. (MCW)

2157 SITUATION AT WEST VALLEY. Cohen, B.L. (Univ. of Pittsburgh, PA). Public Utilities Fortnightly ; 104: No. 7, 26-32(27 Sep 1979).

Spent fuel from nuclear reactors can be subjected to reprocessing - which means that it is put through chemical processes which remove such usables as uranium and plutonium, leaving some unusable high-level radioactive wastes. The only privately owned reprocessing plant in the United States, located in a rural area in western New York state, operated from 1966 until 1972. After that time the project became uneconomical, due to regulatory and other developments described in this article. While the project was abandoned by its owners, it remains the center of vigorous controversy and debate. This is because of the continuing presence of radioactive wastes, both high and low level, and heavy radioactive contamination of the plant itself. The article reviews the origins of this problem and the alternatives for its ultimate disposition. The author stresses that a solution is a national and not a strictly local obligation.

2158 STORE FOR NUCLEAR REACTOR FUEL ELEMENTS. Peehs, M. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.)); Deutsches

Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,823,376/B/. 13 Sep 1979. 8p. (In German).

The spent fuel elements are preserved in a pond or dry store. The removal of post-fission heat is carried out via heat removal pipes, which are connected to natural draught chimneys through the concrete wall of the pond or dry store. There is a good conducting connection of the heat removal pipes and the storage boxes, which is improved by filling the space between the fuel elements and the storage box with granular carbon.

2159 HIGHLY COMPACTED SODIUM BENTONITE FOR ISOLATING ROCK-DEPOSITED RADIOACTIVE WASTE PRODUCTS. Pusch, R. (Univ. of Lulea, Sweden). Nuclear Technology ; 45: No. 2, 153-157(Sep 1979).

Sodium saturated bentonite clay compacted to a high density is a very efficient isolation for preventing radiotoxic nuclides from deeply buried canisters with radioactive wastes from reaching the biosphere. The main function of the bentonite, which is applied in the form of blocks between the rock and the canisters in large boreholes, is to provide a practically impervious barrier. The bentonite blocks take up water and swell so that they completely fill the space between rock and canisters. The swelling potential, which is permanent, makes the bentonite self-sealing. This means that rock joints, which may be opened, are sealed by extruding bentonite.

2160 REDUCTION OF RADON FLUX FROM URANIUM TAILINGS. Overmyer, R.F.; Rogers, V.C.; Jensen, C.M. (Ford, Bacon and Davis Utah Inc). Mining Congress Journal ; 65: No. 9, 21-25(Sep 1979).

Because the inhalation of radon daughters from uranium tailings causes an increased risk of lung cancer, NRC has issued performance objectives for uranium mill tailings treatment. The performance objectives mandate a reduction of the radon flux from the tailings to twice the background flux in the surrounding environs. Experiments designed to measure the effectiveness of various tailing cover materials in reducing radon diffusion are described. A cost optimization study on a site-specific basis is required to select the most overall cost-effective method of flux reduction. (3 diagrams, 3 graphs, 2 references, 1 table)

2161 CHARACTERIZATION OF POLLUCITE AS A MATERIAL FOR LONG-TERM STORAGE OF CESIUM-137. Strachan, D.M.; Schulz, W.W. (Rockwell Hanford Operations, Richland, WA). American Ceramic Society Bulletin ; 58: No. 9, 865-868(Sep 1979).

From 30. Pacific Coast regional meeting of the Amercian Ceramic Society; Los Angeles, CA, USA (1 Nov 1977).

Pollucite ($Cs_2O.Al_2O_3.4SiO_2$) may be an acceptable material for the long-term storage of purified $^{137}CsCl$. Pollucite is made at near theoretical yields when CsCl (or any cesium salt) reacts at approx. = 970°K with a montmorillonite-containing clay. Pollucite dissolves in deionized water at rates < 2 x 10^{-7} kg/(m^2 d) based on cesium. Microstructural analyses showed that cesium reacts with montmorillonite clay to form ill-defined pollucite crystals containing low concentrations of the impurities found in the clay. Although further work needs to be done, pollucite is considered to be an excellent materials for the long-term storage of ^{137}Cs.

2162 HIGH-LEVEL ACTIVE WASTE DISPOSAL. Heseltine, M. (Department of the Environment, London (UK)). Atom (London) ; No. 275, 240-241(Sep 1979).

A statement made by Mr. Michael Heseltine, Secretary of State for the Environment, on 24 July 1979 setting out the Government's views on research into the disposal of high-level radioactive waste is reproduced. The statement dealt specifically with the geological research programme involving the drilling of test boreholes in some areas of the UK. The main elements in the responsibilities assumed by the Secretaries of State for the Environment, for Scotland and for Wales in this matter are set out and the role of the Radioactive Waste Management Advisory Committee mentioned.

2163 FINDING A SITE TO STORE SPENT FUEL IN THE PACIFIC BASIN. Selvaduray, G.S.; Goldstein, M.K.; Anderson, R.N. (San Jose State Univ., CA (USA)). Nuclear Engineering International ; 24: No. 290, 44-47(Sep 1979).

How can one decide on a site to store spent LWR fuel, after the Presidential embargo on reprocessing. Palmyra Island is identified as the best site for the nations bordering the Pacific to store spent fuel. The quantitative methods used to reach this decision are outlined.

2164 STORAGE TIME EVALUATION FOR ACTIVE SOLID WASTE PRODUCED IN HOSPITALS. Reggio, M. (Istituti Ospitalieri, Verona (Italy). Servizio Fisica Sanitaria). Health Physics ; 37: No. 3, 412-414(Sep 1979).

The use of radioisotopes in hospitals gives rise to solid radioactive waste consisting of objects such as gloves, and syringes that are contaminated to different extents and with many different isotopes. The activity level of such wastes is reduced to prescribed levels by storage before disposal into the environment. A method is given for calculating the necessary storage time. It is based on the types and activities of the radionuclides used and the maximum permissible concentration in the dispersion medium and/or the maximum disposable activity in a year for each nuclide. An example is given of the use of the method, where disposal is by incineration.

2165 DEFORMATION OF A JOINTED ROCK MASS. Stephansson, O.; Baeckblom, G. (Tekniska Hoegskolan, Luleaa (Sweden)); Groth, T.; Jonasson, P. (Kungliga Tekniska Hoegskolan, Stockholm (Sweden)). Geologiska Foereningens i Stockholm Foerhandlingar ; 100: No. 3, 287-294(Sep 1979).

The finite-element method and the discrete-block method have been used to study the deformational behaviour of a jointed rock mass subjected to simple shear displacement. Blocks in models with large sizes of block make contact at few points which cause large openings of joints and high stress concentrations in the blocks and surrounding joints. The introduction of more joints into the models evens out the forces, reduces the stresses and causes a gentle type of deformation. From this study, we draw the practical conclusion that joints in rock plinths are eligible for the storage of radio-active waste, if we take into account the effect of simple shear displacement from faulting.

2166 SAFETY ABOVE EVERYTHING. Rometsch, R. Electro-Revue ; 71: No. 34, 876-879(29 Aug

1979). (In French, German).
The great majority of waste products from a nuclear reactor have an ephemeral life, about one third have half-lives of between one hour and thirty years, and some e.g. plutonium 239 with a half-life of 24000 years, are active for a long time. In particular, disposal or storage of waste with long half-lives is a problem, and the worries and doubts of the population and of scientific sceptics concerning this are to be seriously considered. The author considers that in Switzerland radioactive waste can be stored in such a way that its effect on present and future generations will be negligible. (G.P.).

2167 LEAKAGE DETECTION SYSTEM FOR RADIOACTIVE WASTE STORAGE TANKS. Woods, W.W.; Eul, W.A. (to The Boeing Co.). US Patent 4,166,244. 28 Aug 1979. Filed date 19 Nov 1976. 12p.
The patent describes a combination of elements for detecting leakage of electrically conductive fluids from tanks, including a reference electrode, an AC generator connected between the tank and the reference electrode, and one or more sensing electrodes positioned between the tank and the reference electrode. The storage tank and reference electrode are in contact with the ground. When the AC generator is energized, current flows in the circuit, and creates an electric field in the ground between the tank and the reference electrode. The sensing electrodes are positioned so that they are within the electric field when the AC generator is energized. An electric potential measuring device, such as a voltmeter, is used to measure the electric potential at the sensing electrodes relative to the tank. A significant change in the electric potential at any one or more of the sensing electrodes is an indication that a leak has occurred in the tank.

2168 PROCESS FOR INTRODUCING RADIOACTIVE ARTICLES INTO A TRANSPORT AND/OR STORAGE CONTAINER AND TRANSPORTING AND/OR STORING THE CONTAINER AND LATER EXTRACTION OF THE ARTICLE FROM THE CONTAINER, AND CONTAINER FOR TRANSPORTING AND/OR STORING RADIOACTIVE ARTICLES. Vox, A.J. (to Vox lumatic G.m.b.H., Ostfildern (Germany, F.R.); Amtrust A.G., Luzern (Switzerland)). German(FRG) Patent 2,806,353/A/. 16 Aug 1979. 27p. (In German).
The articles, for example fuel elements, are introduced into the container and the remaining space inside the container is filled with lead, a salt or a mixture of salts of eutectic composition, which freezes at ambient temperature. This makes dry transport possible. To extract the fuel elements, it is sufficient to heat the container, which softens the protective and shielding material. The salt or mixture of salts is suitable for thermal conduction.

2169 DEVICE FOR THE ULTIMATE STORAGE OF RADIOACTIVE WASTE MATERIALS OF VARYING ACTIVITIES. Baatz, H.; Rittscher, D. (to STEAG Kernenergie G.m.b.H., Essen (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,631,769/B/. 2 Aug 1979. 4p. (In German).
The end storage container has a standard shape. Merely the dimensions of the enclosed auxiliary containers to take up the waste are adapted to the various activities, so that there is a space between these and the end storage container in which one can place shielding materials. Furthermore, it is possible to arrange auxiliary aggregates in the form of heating rods and spacers in the intermediate space.

2170 SWEDES DEVELOP NEW SYSTEM FOR NUCLEAR WASTE STORAGE. South African Mining and Engineering Journal ; 90: No. 4153, 18(Aug 1979).
RADIOACTIVE WASTE STORAGE;UNDERGROUND STORAGE;WASTE DISPOSAL;RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL;RADIOACTIVE WASTE MANAGEMENT;SWEDEN

2171 REMARKS TO GORLEBEN. Borsch, P. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Programmgruppe Kernenergie und Umwelt). Naturwissenschaften ; 66: No. 8, 416-417(Aug 1979). (In German).
The author describes the problem of nuclear waste disposed by the example of the nuclear waste disposal center Gorleben, the final storage of radioactive waste from a technical view and also mentions the political aspects like governmental decisions and the criticism of the opponents of nuclear energy.

2172 DISPOSAL OF RADIONUCLIDES IN THE SEA. Van As, D.; Forster, Wm.O. (International Atomic Energy Agency, Vienna (Austria). Div. of Nuclear Safety and Environmental Protection). International Atomic Energy Agency Bulletin ; 21: No. 4, 24-31(Aug 1979).
The route to the sea according to the nature of the wastes is given. The need for acceptable international standards and regulations for preventing pollution of the sea is stressed. Finally, revised definitions and recommendations on this subject are summarized.

2173 PROCESS FOR TRANSPORTING AND/OR STORING OF RADIOACTIVE ARTICLES OR SUBSTANCES AND TRANSPORTABLE TRANSPORT AND/OR STORAGE CONTAINER, IN PARTICULAR FOR CARRYING OUT THE PROCESS. Vox, A.J. (to Vox Lumatic G.m.b.H., Ostfildern (Germany, F.R.); Amtrust A.G., Luzern (Switzerland); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,801,946/A/. 19 Jul 1979. 35p. (In German).
Radioactive articles are stored in the inner container of a double-walled vessel with outer cooling fins. The inside of the vessel, when articles are contained in it, is filled with liquid salt or salt mixture, which has a melting point of about 150°C. Electrodes are installed with the articles, by which, if the salt solidifies due to cooling, the salt can be melted at the destination. The intermediate space of the double vessel is filled with a salt of high melting point, concrete or shielding materials, such as lead, for example.

2174 RADIOACTIVE WASTE MANAGEMENT AT THE HANFORD RESERVATION. Nuclear Safety ; 20: No. 4, 434-445(Jul 1979).
During some 30 years of plutonium production, the Hanford Reservation has accumulated large quantities of low- and high-level radioactive wastes. The high-level wastes have been stored in underground tanks, and the low-level wastes have been percolated into the soil. In recent years some programs for solidification and separation of the high-level wastes have been initiated. The Hanford waste-management system was studied by a panel of the Committee on Radioactive Waste Management of the National Academy of Sciences. The panel concluded that Hanford waste-management practices were adequate at present and for the immediate future but recommended increased research and development programs related to

long-term isolation of the wastes. The panel also considered some alternatives for on-site disposal of the wastes. The Hanford Reservation was originally established for the production of plutonium for military purposes. During more than 30 years of operation, large volumes of high- and low-level radioactive wastes have been accumulated and contained at the site. The Management of these wastes has been the subject of controversy and criticism. To obtain a true technical evaluation of the Hanford waste situation, the Energy Research and Development Administration (now part of the Department of Energy) issued a contract to the National Academy of Sciences and the National Research Councilto conduct an independent review and evaluation of the Hanford waste-management practices and plans. A panel of the Committee on Radioactive Waste Management (CRWM) of the National Academy of Sciences conducted this study between the summer of 1976 and the summer of 1977. This article is a summary of the final report of that panel.

2175 ENVIRONMENTAL MONITORING AND DISPOSAL OF RADIOACTIVE WASTE FROM NAVAL NUCLEAR VESSELS AND SUPPORT FACILITIES IN 1978. Miles, M.E.; Sjoblom, G.L.; Eagles, J.D. (Dept. of the Navy, Washington, DC). Nuclear Safety ; 20: No. 4, 446-458(Jul 1979).

The environmental effect of disposal of radioactive wastes originating from the US Navy's nuclear propulsion plants and their support facilities is assessed. The total gamma radioactivity in liquids, less tritium, discharged to all ports and harbors from the more than 100 naval nuclear-powered ships and supporting tenders and from naval bases and shipyards was less than 0.002 Ci in 1978. The total amount of tritium released to all ports and harbors was less than 1 Ci in 1978. This article confirms that the procedures used by the US Navy to control releases of radioactivity from its nuclear-powered ships and their support facilities are effective in protecting the environment and the health and safety of the general public.

2176 NUCLEAR WASTE--DOES BURYING IT BURY THE PROBLEM. Thomas, R.A. Engineering and Mining Journal ; 180: No. 7, 131-134(Jul 1979).

This article discusses the Department of Energy (DOE)'s undergrounsd nuclear waste repository which is scheduled for startup in 1981 in New Mexico, and tries to explain why this project is being plagued by delays and uncertainties. The facility, known as the Waste Isolation Pilot Plant (WIPP), faces such problems as the question of the geologic security of the tentative site, citizens' objections about the location, as well as some licensing problems and concerns about overland transport of the large amounts of highly radioactive wastes that will fill the repository.

2177 SOLVING THE NUCLEAR WASTE DISPOSAL PROBLEM. deBoisblanc, D.R.; Grant, T.J. (Ebasco Serv, Inc). Combustion ; 51: No. 1, 38-42(Jul 1979).

The issue of nuclear waste disposal can be divided into two areas of concern--the more immediate, short-term part of the problem and the permanent long-term storage question. Solving the short-term problem now will necessarily give us more time to thoroughly investigate solutions to long-time storage. This discussion offers an approach to both the short- and long-term storage problems of nuclear waste and, at the same time, considers the attitudes of the public toward nuclear energy, and the roles of the government and the industry in the solution of these problems.

2178 REVIEW OF THE ENVIRONMENTAL PROBLEMS ASSOCIATED WITH THE DISPOSAL OF URANIUM TAILINGS. Bearman, P.J. (Imperial Coll. of Science and Technology, London (UK)). Minerals and the Environment ; 1: No. 2, 64-74(Jul 1979).

The major environmental problems of uranium tailings disposal are that the tailings release radioactive material to the air as radon gas and as airborne particulates, and to waterways as radionuclides leached out by precipitation, surface run-off, and from the waste solutions. A weak gamma irradiation field is created in the immediate vicinity of the tailings. Chemical pollutants including various heavy metals, sulphate and sulphuric acid, may also be leached from the tailings and pollute surface or subsurface waters. If the radionuclides and the radium could be extracted from the tailings by some method which is economically and technically acceptable, the concentrated radioactive waste and the tailings could be disposed of as normal mine tailings. The pollution control technology used to minimise pollution from tailings waste disposal systems is satisfactory provided that it is properly implemented. The initiation of a full scale monitoring programme to assess the efficiency of the tailings retention system should result in a reduction of the environmental problems. On abandonment of the impoundment it is necessary to continue to control and maintain the system and, if feasible, to establish vegetation on the exposed surfaces.

2179 ESTIMATION OF THE RADIATION EFFECT OF MEDIUM-ACTIVE ION-EXCHANGE RESINS WITH FINAL STORAGE AS RADIOACTIVE WASTES. Koerner, W.; Noack, W. (Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin (German Democratic Republic)). Kernenergie ; 22: No. 6, 208-209(Jun 1979). (In German).

Absorbed dose, temperature increase, and the formation of hydrogen resulting from radiolysis have been estimated as a function of storage time. It is concluded that only the development of dangerous hydrogen concentrations in the air has to be observed in the separate storage of ion-exchange resins in closed caves.

2180 STATUS OF THE NATIONAL WASTE TERMINAL STORAGE PROGRAM. Heath, C. (Dept. of Energy, Washington, DC). Transactions of the American Nuclear Society ; 32: 100(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

RADIOACTIVE WASTE DISPOSAL;RADIOACTIVE WASTE MANAGEMENT;UNDERGROUND DISPOSAL;SALT DEPOSITS; GEOLOGIC DEPOSITS

2181 OVERVIEW OF THE NRC HIGH-LEVEL WASTE MANAGEMENT PROGRAM. Malaro, J.C. (Nuclear Regulatory Commission, Washington, DC). Transactions of the American Nuclear Society ; 32: 104(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

RADIOACTIVE WASTE MANAGEMENT;HIGH-LEVEL RADIOACTIVE WASTES;RADIOACTIVE WASTE DISPOSAL; GEOLOGIC DEPOSITS;UNDERGROUND DISPOSAL

2182 EVALUATION METHODS FOR HYDROGEOLOGIC CONDITIONS AT RADIOACTIVE WASTE BURIAL SITES.

Fritz, C.P.; Gale, J.E.; Gillham, R.W. (Univ. of Waterloo, Ontario). Transactions of the American Nuclear Society ; 32: 117-119(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
RADIOACTIVE WASTES;UNDERGROUND STORAGE; UNDERGROUND DISPOSAL;COMPARATIVE EVALUATIONS; SITE SELECTION;RADIOACTIVE WASTE DISPOSAL; RADIONUCLIDE MIGRATION;HYDROLOGY;GEOLOGY; MEASURING METHODS;MATHEMATICAL MODELS

2183 FRAMEWORK FOR GEOLOGIC REPOSITORY SITING. Davis, R.J. (NUS Corp., Rockville, MD); DiNunno, J.J.; Waite, D.A. Transactions of the American Nuclear Society ; 32: 127-128(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
RADIOACTIVE WASTE FACILITIES;SITE SELECTION; ENVIRONMENTAL IMPACTS;DECISION MAKING;SOCIO-ECONOMIC FACTORS;NUCLEAR ENERGY;GEOLOGY;HEALTH HAZARDS;SAFETY;RADIOACTIVE WASTE DISPOSAL

2184 RELATIVE POTENTIAL HAZARDS OF RADIOACTIVE WASTE IN VARIOUS WATER SYSTEMS. Duffy, J.J.; Mealy, G.L. (Analytic Sciences Corp., Reading, MA). Transactions of the American Nuclear Society ; 32: 131-133(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
RADIOACTIVE WASTES;HEALTH HAZARDS;WATER POLLUTION;CONTAMINATION;RADIOACTIVE WASTE DISPOSAL;RADIONUCLIDE MIGRATION;LAKES;RIVERS; ESTUARIES;SEAS;SEDIMENTS;IRRIGATION;SOILS; SIMULATION;SPENT FUELS;ENVIRONMENTAL IMPACTS; SITE SELECTION

2185 EFFECTIVE PROGRAM TO REDUCE TRITIUM CONCENTRATION IN AQUIFER. Styron, C.E.; Meyer, H.E. (Monsanto Research Corp., Miamisburg, OH). Transactions of the American Nuclear Society ; 32: 148(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
MOUND LABORATORY;RADIOACTIVE WASTES;TRITIUM; RADIOACTIVE WASTE DISPOSAL

2186 METHODS USED TO ESTIMATE GEOCHEMICAL ASPECTS OF RADIONUCLIDE MIGRATION FROM WASTE REPOSITORIES. Serne, R.J.; Bradley, D.J. (Battelle Northwest Labs., Richland, WA). Transactions of the American Nuclear Society ; 32: 161-162(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
RADIONUCLIDE MIGRATION;RADIOACTIVE WASTE DISPOSAL;GEOLOGIC DEPOSITS;GROUND WATER; LEACHING;ADSORPTION;DESORPTION;RADIOISOTOPES; RADIOACTIVE WASTES

2187 SWEDISH NUCLEAR FUEL SAFETY PROJECT FOR LONG-TERM DISPOSAL OF HIGH-LEVEL WASTE. Allard, B. (Oak Ridge National Lab., TN). Transactions of the American Nuclear Society ; 32: 162-164(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
RADIOACTIVE WASTE DISPOSAL;HIGH-LEVEL RADIOACTIVE WASTES;SWEDEN;UNDERGROUND DISPOSAL; GEOLOGIC DEPOSITS

2188 CHEMICAL FACTORS CONTROLLING ACTINIDE SORPTION IN THE ENVIRONMENT. Beall, G.W.; Allard, B. (Oak Ridge National Lab., TN). Transactions of the American Nuclear Society ; 32: 164-165(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
ACTINIDES;ADSORPTION;HIGH-LEVEL RADIOACTIVE WASTES;GROUND WATER;IGNEOUS ROCKS;RADIONUCLIDE MIGRATION;ROCK-FLUID INTERACTIONS;CHEMICAL STATE;RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL

2189 OXIDATYON OF PLUTONIUM TO HIGHER STATES BY RADIATION. Cohen, D.; Fried, S.; Friedman, A.M.; Schreiner, F.; Sjoblom, R.; Sullivan, J.C. (Argonne National Lab., IL). Transactions of the American Nuclear Society ; 32: 165-166(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL;GROUND WATER;LEACHING;PLUTONIUM; OXIDATION;RADIONUCLIDE MIGRATION;CHEMICAL RADIATION EFFECTS

2190 INTERACTION OF ACTINIDES AND HUMIC ACID. Choppin, G.R. (Florida State Univ., Tallahassee). Transactions of the American Nuclear Society ; 32: 166-167(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
HUMIC ACIDS;ACTINIDES;ADSORPTION;SORPTIVE PROPERTIES;RADIOACTIVE WASTE DISPOSAL; UNDERGROUND DISPOSAL;RADIONUCLIDE MIGRATION

2191 SORPTION OF AMERICIUM ON MAJOR ROCK-FORMING MINERALS. Allard, B. (Oak Ridge National Lab., TN); Beall, G.W.; Krajewski, T.; Peterson, J.R. Transactions of the American Nuclear Society ; 32: 167-168(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
AMERICIUM;ADSORPTION;MINERALS;QUARTZ; FELDSPARS;IGNEOUS ROCKS;RADIONUCLIDE MIGRATION; RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL; GEOLOGIC DEPOSITS;MICA;AMPHIBOLE;OLIVINE; PYROXENES;SORPTIVE PROPERTIES

2192 MINERAL-CONTRIBUTED ANION EFFECTS ON THE RETENTION OF TRIVALENT ACTINIDES IN THE ENVIRONMENT. Krajewski, T. (Univ. of Tennessee, Knoxville); Beall, G.W.; Allard, B.; Peterson, J.R. Transactions of the American Nuclear Society ; 32: 168-169(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
ACTINIDES;ADSORPTION;MINERALS;DOLOMITE; ANHYDRITE;APATITES;QUARTZ;MARBLE;ANIONS; RADIONUCLIDE MIGRATION;RADIOACTIVE WASTE DISPOSAL;GROUND WATER;UNDERGROUND DISPOSAL; GEOLOGIC DEPOSITS;SORPTIVE PROPERTIES

2193 MIGRATION OF CESIUM IN DOLOMITE FROM THE LOS MEDANOS AREA IN SOUTHEASTERN NEW MEXICO. Lynch, A.W.; Dosch, R.G. (Sandia Labs., Albuquerque, NM). Transactions of the American Nuclear Society ; 32: 169-170(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
CESIUM;AQUIFERS;RADIONUCLIDE MIGRATION; RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL; NEW MEXICO;GEOLOGIC DEPOSITS;DIFFUSION;DOLOMITE; RADIOACTIVE WASTE FACILITIES

2194 LOGISTICS OF LOW-LEVEL RADIOACTIVE WASTE TRANSPORT AND DISPOSAL. Mallory, C.W.; Koh, B. (Hittman Nuclear and Development Corp., Columbia, MD). Transactions of the American Nuclear Society ; 32: 694-695(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
Effects of hauling distance, overweight shipments, volume reduction, increased activity levels are evaluated. RADIOACTIVE WASTE DISPOSAL;LOW-LEVEL RADIOACTIVE WASTES;TRANSPORT; PACKAGING;VOLUME

2195 BENEFIT-COST ANALYSIS FOR THE COMMERCIAL DISPOSAL OF LOW-LEVEL RADIOACTIVE SOLID WASTES. Frostenson, J.C. (Rockwell Hanford Co., Richland, WA). Transactions of the American Nuclear Society ; 32: 696(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
RADIOACTIVE WASTE DISPOSAL;LOW-LEVEL RADIOACTIVE WASTES;COST BENEFIT ANALYSIS;SOLID WASTES;RADIATION HAZARDS

2196 DESCRIPTION OF THE ONWI PROGRAM. Batch, J.M. (Battelle Columbus Lab., OH). Transactions of the American Nuclear Society ; 32: 366-367(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
RADIOACTIVE WASTE DISPOSAL;GEOLOGIC DEPOSITS; HIGH-LEVEL RADIOACTIVE WASTES;UNDERGROUND DISPOSAL;RESEARCH PROGRAMS

2197 STATUS REPORT ON THE WASTE ISOLATION PILOT PLANT. Weart, W.D. (Sandia Labs., Albuquerque, NM). Transactions of the American Nuclear Society ; 32: 367-368(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
RADIOACTIVE WASTE DISPOSAL;SALT DEPOSITS;NEW MEXICO;RADIOACTIVE WASTE FACILITIES;PILOT PLANTS;HIGH-LEVEL RADIOACTIVE WASTES; UNDERGROUND DISPOSAL

2198 EVALUATION OF BASALT FLOWS AS A WASTE ISOLATION MEDIUM. Deju, R.A. (Rockwell Hanford Co., Richland, WA). Transactions of the American Nuclear Society ; 32: 368-369(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
BASALT;EVALUATION;RADIOACTIVE WASTE DISPOSAL; GEOLOGIC DEPOSITS;RADIOACTIVE WASTE FACILITIES

2199 NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS. Lincoln, R.C.; Sinnock, S.; Stephens, H.P.; Stephenson, A.E. (Sandia Labs., Albuquerque, NM). Transactions of the American Nuclear Society ; 32: 369-370(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
NEVADA TEST SITE;RADIOACTIVE WASTE DISPOSAL; GEOLOGIC DEPOSITS;UNDERGROUND DISPOSAL;SITE SELECTION;EVALUATION

2200 US GEOLOGICAL SURVEY PROGRAM. Schneider, R.; Stewart, D.B. (Geological Survey, Reston, VA). Transactions of the American Nuclear Society ; 32: 370-371(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
RADIOACTIVE WASTE DISPOSAL;GEOLOGIC DEPOSITS; HIGH-LEVEL RADIOACTIVE WASTES;UNDERGROUND DISPOSAL;GRANITES;SHALES;SALT DEPOSITS;TUFF; GEOLOGY

2201 INVESTIGATIONS IN GRANITE AT STRIPA, SWEDEN FOR NUCLEAR WASTE STORAGE. Witherspoon, P.A. (Univ. of California, Berkeley); Gale, J.E.; Cook, N.G.W. Transactions of the American Nuclear Society ; 32: 371-372(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
RADIOACTIVE WASTE DISPOSAL;GEOLOGIC DEPOSITS; SWEDEN;GRANITES;UNDERGROUND DISPOSAL; TEMPERATURE EFFECTS;HEATERS

2202 EARTH SCIENCE TECHNICAL PLAN FOR MINED GEOLOGIC DISPOSAL OF RADIOACTIVE WASTE. Duguid, J.O. (Battelle Columbus Labs, OH); Schneider, R. Transactions of the American Nuclear Society ; 32: 372-373(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
RADIOACTIVE WASTE DISPOSAL;GEOLOGIC DEPOSITS; SITE SELECTION;EVALUATION;RADIOACTIVE WASTE FACILITIES;DESIGN;OPERATION

2203 CRITERIA FOR RADIOACTIVE WASTE: A TIME FOR REASON. Cramer, E.N. (Southern California Edison, Rosemead); Grebel, T.L. Transactions of the American Nuclear Society ; 32: 381-382(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
RADIOACTIVE WASTE DISPOSAL;SPECIFICATIONS; TOXICITY;RADIOACTIVE WASTES

2204 WASTE CHARACTERISTICS THAT MAY REQUIRE SPECIFICATION IN WASTE ACCEPTANCE CRITERIA. Christensen, R.N. (Ohio State Univ., Columbus); Kulacki, F.A.; Miller, N.E.; O'Hara, F.A. Transactions of the American Nuclear Society ; 32: 383-385(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
RADIOACTIVE WASTES;PACKAGING;SPECIFICATIONS; RADIOACTIVE WASTE DISPOSAL

2205 METHODOLOGY FOR ANALYZING DECISIONS REGARDING NUCLEAR WASTE DISPOSAL. McNamee, P.C.; Quinn, D.J. (SRI International, Menlo Park, CA). Transactions of the American Nuclear Society ; 32: 386-387(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
RADIOACTIVE WASTE DISPOSAL;DECISION MAKING; COST;RISK ASSESSMENT

2206 SURVEY METHODS FOR ASSESSMENT OF RADIOLOGICAL RELEASE FROM GEOLOGIC REPOSITORIES. Feinstein, J.G.; Naft, B.N.; Nathan, S. (NUS Corp., Rockville, MD). Transactions of the American Nuclear Society ; 32: 387-389(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
RADIOACTIVE WASTE DISPOSAL;RADIOACTIVE WASTE FACILITIES;RADIONUCLIDE MIGRATION;HIGH-LEVEL RADIOACTIVE WASTES;ENVIRONMENTAL EXPOSURE PATHWAY;GEOLOGIC DEPOSITS;UNDERGROUND DISPOSAL; SALT DEPOSITS;AQUIFERS;GROUND WATER

2207 TRANSMUTATION OF WASTE ACTINIDES IN THERMAL REACTORS. Gorrell, T.C. (Savannah River Lab., Aiken, SC). Transactions of the American Nuclear Society ; 32: 392-393(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
ACTINIDES;TRANSMUTATION;RADIOACTIVE WASTE DISPOSAL;TRANSURANIUM ELEMENTS

2208 CORROSION OF MILD STEEL WASTE FORM CONTAINERS. Neilson, R.M. Jr.; Colombo, P.; Vyas, B. (Brookhaven National Lab., Upton, NY). Transactions of the American Nuclear Society ; 32: 396-397(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
STEELS;CORROSION;CONTAINERS;RADIOACTIVE WASTE DISPOSAL;CARBON STEELS;PORTLAND CEMENT; UREA;FORMALDEHYDE;RESINS

2209 EFFECTS OF TEMPERATURE AND LEACHING MEDIA ON THE LEACH RATES OF NUCLEAR WASTE MATERIALS. Flynn, K.F.; Barletta, R.E.; Jardine, L.J.; Steindler, M.J. (Argonne National Lab., IL). Transactions of the American Nuclear Society ; 32: 394-396(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
RADIOACTIVE WASTES;LEACHING;TEMPERATURE EFFECTS;RADIOACTIVE WASTE DISPOSAL;FISSION PRODUCTS;WATER;BRINES;GLASS

2210 ADSORPTION OF IODATE BY HEMATITE (FE_2O_3). Couture, R.A.; Seitz, M.G.; Steindler, M.J. (Argonne National Lab., IL). Transactions of the American Nuclear Society ; 32: 397-398(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
IODATES;ADSORPTION;HEMATITE;IODINE 129; RADIOACTIVE WASTE DISPOSAL;SORPTIVE PROPERTIES

2211 ECONOMICS OF URANIUM TAILINGS MANAGEMENT. Sandquist, G.M.; Turley, R.E. (Univ. of Utah, Salt Lake City). Transactions of the American Nuclear Society ; 32: 398(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
MILL TAILINGS;RADIOACTIVE WASTE MANAGEMENT; ECONOMICS;FEED MATERIALS PLANTS

2212 RADIOACTIVE WASTES: PUBLIC ATTITUDES TOWARD DISPOSAL FACILITIES. Lindell, M.K. (Battelle Human Affairs Research Centers, Seattle, WA). Transactions of the American Nuclear Society ; 32: 543-545(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
PUBLIC OPINION;RADIOACTIVE WASTE DISPOSAL; RADIOACTIVE WASTE FACILITIES

2213 NUCLEAR WASTE: A PROBLEM OF PERSPECTIVE. Williams, I.G.K. (Organization for Economic Co-Operation and Development, 75 - Paris (France)). Archiv fuer Energiewirtschaft ; 33: No. 6, 501-511(Jun 1979). (In German).
In the light of the suspicion to be felt in the public towards the problem of nuclear waste management, the author in his article attempts to correct the impression created by somewhat sensational reports in the daily press by giving a more accurate description of nuclear waste management. He points out that responsible and fruitful research work has been done and should be made known to the public.

2214 DYNAMIC PROPERTIES OF ION EXCHANGE OF CESIUM INTO ZEOLITES. Mimura, H.; Kanno, T. (Tohoku Univ., Sendai (Japan). Research Inst. of Mineral Dressing and Metallurgy); Fukumori, M.; Otani, T. Tohoku Daigaku Senko Seiren Kenkyusho Iho (Bulletin of the Research Inst. of Mineral Dressing and Metallurgy, Tohoku University) ; 35: No. 1, 19-26(Jun 1979). (In Japanese).
The distribution of cesium ion and the properties of ion exchange was studied in various kinds of zeolites, i.e. synthetic mordenite, natural mordenites and clinoptilolites. The distribution coefficients of cesium ($K_{sub(cs)}$) exceeded 10^3 even in acidic region (pH -- 1), though the $K_{sub(cs)}$ values somewhat decreased with increasing acidity. The dynamic properties of ion exchange were examined by zeolite-column process and the break-through curves were obtained at different flow conditions. The break-through capacity, the total capacity and the column utilization increased with the increase in column temperature and with the decrease in the flow rate. Heat treatment resulted in an increase in the strength of zeolites, which was desirable for handling them. The zeolites heated at 300°C and 500°C increased in their total capacity of ion exchange of Cs and the granulated zeolites heated at 500°C improved in its exchange rate and column utilization.

2215 GEOLOGIC DISPOSAL OF NUCLEAR WASTES: SALT'S LEAD IS CHALLENGED. Kerr, R.A. Science ; 204: 603-606(11 May 1979).
The types of radioactive waste disposal sites available are outlined. The use of salt deposits and their advantages are discussed. The reasons for the selection of the present site for the Waste Isolation Pilot Plant are presented. The possibilities of using salt domes along the Gulf Coast and not-salt rocks as nuclear waste repositories are also discussed. The sea bed characteristics are described and advantages of this type of site selection are presented.

2216 MINING ASPECTS OF NUCLEAR WASTE DISPOSAL IN SALT DOMES. Velzeboer, P.Th. (Technische Hogeschool Delft (Netherlands)). Ingenieur (The Hague) ; 91: No. 19, 244-248(10 May 1979). (In Dutch).
The design of a storage place for nuclear waste depends upon the demands made upon it, now and in the future, as regards disposal. The quality will be dependent on the following observations. The disposal of nuclear waste requires that contamination of the biosphere be prevented. This means that water, as a transport medium, may come into contact with the nuclear waste. These demands are best approximated by large salt domes, where the rock-salt, NaCl, lends itself admirably to the purpose of disposal. Other salts, such as those of potassium and magnesium, have less favourable properties than rock-salt. The disposal of the waste in salt domes demands that there is the greatest possible certainty that these salt domes will not be eroded for a very long time, for example, a few thousand years. The mining aspects of such a storage place are described.

2217 FINAL STORAGE VESSEL FOR RADIOACTIVE

WASTE. Hofmann, J.; Iffland, N.; Wagner, G. (to Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,748,774/A/. 3 May 1979. 7p. (In German).

An insert made of separate workshop waste pieces welded together is introduced into the corrugated drum so that it is fixed in the drum by clamps and hooks. Contaminated waste can be used as the waste. The drum is then brought into the sloping position, rotated and filled via a dosing spiral with bitumen or concrete or with radioactive waste slurry e.g. concentrated waste from a BWR, via a bucket wheel elevator. In order to prevent overflowing of the paste during mixing, a collar must be fixed on the drum.

2218 HEATING OF RADIOACTIVE WASTE PROCESSING TANK. Noda, M. (to Ishikawajima-Harima Heavy Industries Co. Ltd., Tokyo (Japan)). Japanese Patent 1954-55,300/A/. 2 May 1979. 3p. (In Japanese).

Purpose: To prevent crystallization from in the condensed liquid waste by arranging a heated fluid flow on the exterior surfaces of a tank which receives the liquid waste from a nuclear power station. Constitution: On the exterior surfaces of a tank there is provided a space which is surrounded by insulators. Preheated fluid such as water or air is flowed in the space to heat the outside surfaces of the tank. The crystallization of Na_2SO_4 is prevented because the condensed waste liquid in the tank is heated above the crystallization temperature. Uniform temperature distribution throughout the tank body prevents the occurrence of local temperature gradient, thus enabling the use of lining materials having low heat-resisting temperature.

2219 METHOD FOR CALCINING RADIOACTIVE WASTES. Bjorklund, W.J.; McElroy, J.L.; Mendel, J.E. (to Exxon Nuclear Co., Inc.). US Patent 4,152,287. 1 May 1979. Filed date 10 Nov 1976. 6p.

A method for the preparation of radioactive wastes in a low leachability form involves calcining the radioactive waste on a fluidized bed of glass frit, removing the calcined waste to melter to form a homogeneous melt of the glass and the calcined waste, and then solidifying the melt to encapsulate the radioactive calcine in a glass matrix.

2220 RADIOACTIVE WASTE DISPOSAL. Wilkinson, D. (Department of the Environment, London (UK)). Atom (London) ; No. 271, 123(May 1979).

BOREHOLES;ENVIRONMENT;GOVERNMENT POLICIES; HIGH-LEVEL RADIOACTIVE WASTES;MARINE DISPOSAL; PLANNING;RADIOACTIVE WASTE DISPOSAL;RESEARCH PROGRAMS;UNDERGROUND DISPOSAL;UNITED KINGDOM

2221 PRESENT STATE AND MOOT POINTS IN JAPAN. LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT. Sakata, S. (JGC Corp., Tokyo (Japan)). Kogai To Taisaku (Journal of Environmental Pollution Control) ; 15: No. 5, 634-642(May 1979). (In Japanese).

The management of low-level radioactive wastes in Japan is described, especially for those resulting from the utilizations of radioisotopes, as follows: the nature of the management, the countermeasures to wastes and waste types; the present situation in the laws and regulations, management practices, and future outlook; and overseas trends in the radioactive waste management in West Germany, the US, the UK, France, etc. In Japan, the efforts have been expanded from the treatment toward both upstream, i.e. the sources, and downstream, i.e. disposal. For radioactive waste management, there are The Law Concerning Prevention from Radiation Injuries Due to Radioisotopes, Etc. for RI utilizations and The Law Concerning the Regulations of Nuclear Source Materials, Nuclear Fuel Materials and Reactors for nuclear power generation. At present, those wastes from the former are collected from RI users and treated by a special enterprise, and subsequently stored in the Japan Atomic Energy Research Institute. In the future, with rapidly rising quantities of radioactive wastes, the cooperation between private and government circles in this field is essential. (J.P.N.).

2222 CHARACTERIZATION OF BOROSILICATE GLASSES CONTAINING SIMULATED HIGH-LEVEL RADIOACTIVE WASTES. Terai, R.; Eguchi, K.; Yamanaka, H.; Wakabayashi, H.; Hara, S. (Government Industrial Research Inst., Osaka, I. (Japan)). Nippon Genshiryoku Gakkaishi (Journal of the Atomic Energy Society of Japan) ; 21: No. 5, 424-433(May 1979). (In Japanese).

In connection with the development of vitrified solidification processes of high-level liquid wastes at Power Reactor and Nuclear Fuel Development Corp. (PNC), the characterization of the various borosilicate glasses containing the simulated high-level radioactive wastes have been carried out at Government Industrial Research Institute, Osaka. The volatility, the viscosity and the electrical conductivity of glasses in molten states have been measured, and the thermal conductivity, the elastic modulus, the chemical durability and the crystallization behavior in solid states have been also investigated. These data seem to be useful in the construction and operation of the engineering scale facility at PNC. The low-melting temperature glasses have large volatilization rates, low viscosities in molten states, low crystallization temperatures and less durabilities with water in solid states. Therefore, the high-melting temperature glasses seem to be suitable for storage of wastes from the view point of safety evaluation, although in this case it is necessary to improve the melting technique to avoid violent evaporation.

2223 LOW-LEVEL RADIOACTIVE WASTES MANAGEMENTS IN UNIVERSITIES, INSTITUTES AND HOSPITALS. ON RADIOPHARMACEUTICAL WASTE DISPOSAL. Kato, S. (Japan Radioisotope Association, Tokyo). Kogai To Taisaku (Journal of Environmental Pollution Control) ; 15: No. 5, 667-676(May 1979). (In Japanese).

Japan Radioisotope Association, which is distributing radioisotopes, also is collecting radioactive wastes from hospitals and other establishments using radioisotopes across the country. These wastes are then transferred to Japan Atomic Energy Research Institute for treatment. However, the capacity of JAERI is currently insufficient for the quantities transferred from JRA. A main cause for such difficulty as above is the increase in medical isotopes, i.e. radiopharmaceuticals, which are used in vivo and in vitro. From the RI consumptions thus far, the future demands and waste quantities are estimated for the purpose of establishing an overall joint treatment system. The following matters are described; the present situation of waste management in JRA and JAERI; current transitional phase; and radiopharmaceutical wastes (radiopharmaceuticals, their consumptions and future demands, and resultant waste RIs).

2224 DISPOSAL OF LOW-LEVEL RADIOACTIVE WASTE INTO THE SEA. Saruhashi, K. (Meteorological Research Inst., Tokyo (Japan)). Kogai To Taisaku (Journal of Environmental Pollution Control) ; 15: No. 5, 690-695(May 1979). (In Japanese).

Disposal of low-level radioactive wastes is made both on land and in sea. Though the land disposal has been already carried out in the U.S.A. and the U.S.S.R., it is impossible in the narrow land of Japan. In the United States, the wastes solidified with cement in drums were previously abandoned in deep seas of the Pacific and the Atlantic. This is no longer done. Instead, the land disposal is employed due to its lower costs. In European countries, sea disposal is performed under OECDNEA. There was trial disposal in 1961 and full-scale disposal since 1967 in the Atlantic. Meanwhile in Japan, test sea disposal will be carried out in the near future in deep sea of the northern Pacific, which in an important sea area for fisheries. International trends of deep sea disposal of low-level wastes and the its corresponding trend in Japan in the past years are described.

2225 DEVICE TO ABSORB SOLID RADIOACTIVE WASTE SUSPENDED IN WATER. Kucherer, H.D. (to Westinghouse Electric Corp., Pittsburgh, PA (USA); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,001,936/B/. 12 Apr 1979. 4p. (In German).

A double reversable container is suggested in which the space between the inner and outer wall is filled with dry, powdered material (mixture of building cement and vermiculite) which hardens when water is added. The container can take up radioactive suspensions without previous drainage. One obtains a radiation safe package as the inner space is entirely surrounded by hydraulic hardening material. Equipment with vacuum filling device is described.

2226 LEACH RATES OF HIGH ACTIVITY WASTE FROM BOROSILICATE GLASS. Wiley, J.R. (E.I. du Pont de Nemours and Co., Aiken, SC). Nuclear Technology ; 43: No. 2, 268-272(Apr 1979).

Borosilicate glasses containing actual high-level Savannah River Plant waste were leached in static, distilled water. Leach rates based on ^{90}Sr, ^{137}Cs, and plutonium analyses were similar: 10^{-5} to 10^{-6} g of glass/(cm^2.day) initially, 10^{-7} to 10^{-8} g/(cm^2.day) after two weeks, and 10^{-8} to 10^{-9} g/(cm^2.day) after 100 days. The leach rates were not directly correlated with waste composition, but were qualitatively related to the tendency of the glass to devitrify that could be caused by certain combinations of waste components. According to a proposed model, leach rates were diffusion-controlled during the entire 100-day test. 5 figures, 4 tables.

2227 RECOMMENDED OPERATIONAL PROCEDURES FOR SEA DUMPING OF RADIOACTIVE WASTE. Paris, France; OECD (Apr 1979). 15p.

The purpose of this document is to establish procedures for the organisation and control of radioactive waste sea dumping operations carried out under the NEA Mechanism. These procedures are designed to ensure the safe disposal of the radioactive waste in such a way that any radiation exposure is kept as low as reasonably achievable within designated dose limits, and that other risks are also adequately controlled.

2228 GUIDELINES FOR SEA DUMPING PACKAGES OF RADIOACTIVE WASTE. Paris, France; OECD (Apr 1979). 32p.

The purpose of these Guidelines is to establish general requirements and provide practical information for the design and manufacture of packages for sea dumping of radioactive waste, in accordance with the terms of the OECD Council Decision establishing a Multilateral Consultation and Surveillance Mechanism for Sea Dumping of Radioactive Waste. These Guidelines are in compliance with the IAEA Revised Definition and Recommendations of 1978, for applying the London Dumping Convention to radioactive waste, and are intended for application under the responsibility of the appropriate national authorities of countries participating in the NEA Mechanism.

2229 ENGINEERED STORAGE FACILITY FOR RADIOACTIVE KRYPTON. Yamamoto, Y.; Sawada, Y.; Tsuda, K. (Kobe Steel Ltd. (Japan)). 29: No. 2, 29-32(Apr 1979). (In Japanese).

In this paper, a conceptual design for an engineered storage facility for radioactive Krypton recovered from reprocessing, is described. Long term reliability and safety are obtained with this new process, which utilizes a double cylinder and activated charcoal. The facility is composed of two operation systems: one is the system which fills the double cylinders with Krypton, and the other is that which stores the double cylinders; they are both remote controlled to protect workers from radiation exposure.

2230 SHARP DROP AND A LONG TAIL. THE FUTURE FOR NUCLEAR WASTE DISPOSAL. Crossley, D. Ascent ; 1: No. 1, 13-15, 23(Spr 1979).

Research has been carried out in Canada since 1953 on nuclear waste disposal. Underground disposal has been chosen, and a list of around 100 suitable locations in the Canadian Shield is being drawn up. Surrounding communities will be involved in the final decision on disposal sites. Plans for transportation and processing of wastes are described. A disposal site will not be needed until the beginning of the next century, and will be able to handle all wastes produced over 50 years.

2231 HIGH LEVEL NUCLEAR WASTE - CONSEQUENCE ANALYSIS FOR DISPOSAL IN BEDROCK. Nielsen, P. O. (Scandpower A/S, Oslo (Norway)). Teknisk Ukeblad ; 126: No. 11, 33-34(1 Mar 1979). (In Norwegian).

The consequence analysis performed in the Swedish K B S (Nuclear Fuel Safety project) is summarised and discussed in this short article. The basic assumptions are that the vitrified high level waste is placed in a stainless steel container provided with a lead jacket and an outer shell of titanium. These containers are placed in individual holes in bedrock at a depth of 500m and the holes and access tunnels are filled with a mixture of bentonite and quartz sand. It is assumed that the ground water will eventually come into contact with, and erode the waste. The time scale for this is estimated to be in the range 1000 years for contact and 30,000 years for complete destruction of the glass. The transport time for the ground water to the surface is found to be 400 years. Delay times in the rock for various components are given. In the final instance this is found to lead to an increase in radiation dose of 13 mrem/year in the worst instance. This is presumed to satisfy the

conditions imposed by Swedish law and the only criticism in the hearings was that the rock boring programme was not adequate.

2232 ADVANCE PAYMENTS ON THE COST OF THE FEDERAL REPOSITORY FOR RADIOACTIVE WASTE. Strassburg, W. (Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen m.b.H. (DWK), Hannover (Germany, F.R.)). Atomwritschaft, Atomtechnik ; 24: No. 3, 130-132(Mar 1979). (In German).

The costs for the final storage of radioactive waste will be charged to those obliged to deliver their radioactive waste. The Federal Government intends to cover, by advance payments, the costs of preparation, planning, and investment. However, legal examination reveals that, at least before an operating permit has been granted, no such obligation to pay charges exists for the operating company of the reprocessing centre, or for the utilities operating nuclear power plants, such obligation cannot be enforced either by an amendment of the Act.

2233 INTERNATIONAL SYMPOSIUM OF THE IAEA/NEA ON THE DECOMMISSIONING OF NUCLEAR FACILITIES. A COMMENT FROM THE OPERATOR'S POINT OF VIEW. Watzel, G.V.P. Brennstoff-Waerme-Kraft ; 31: No. 3, 105-111(Mar 1979). (In German).

The report comments on the symposium papers from the point of view of the operator of nuclear facilities. In particular, it deals with decommissioning procedures, licensing aspects, wast storage and disposal or recycling. Several decommissioning studies are compared with regard to their findings (amount of waste, radiation exposure, costs).

2234 REVISED DEFINITION OF HIGH-LEVEL RADIOACTIVE WASTES UNSUITABLE FOR DUMPING AT SEA. Morley, F. (National Radiological Protection Board, Harwell (UK)). Radiological Protection Bulletin ; No. 27, 3-6(Mar 1979).

The IAEA is responsible for defining these wastes, and makes recommendations to be used as a basis for the issue of special permits for the dumping at sea of those radioactive materials not defined as 'unsuitable'. Two IAEA information Circulars list in detail the Provisional (INF CIRC/205/Add. 1. Vienna, IAEA (January 1975)) and Revised (INF/ CIRC/205/Add. 1/Rev. 1. Vienna, IAEA (August 1978)) Definitions with annex material. These two definitions are set out for comparison purposes. The definitions were based on oceanographic and radiological evidence, and a summary is given of the procedures followed during their preparation.

2235 MEASUREMENT OF RADIOLYTIC HYDROGEN AT THE HIGH LEVEL WASTE STORAGE FACILITY OF WIEDERAUFARBEITUNGSANLAGE KARLSRUHE (WAK). Beaulean, H.W.; Tillessen, U. (Gesellschaft zur Wiederaufarbeitung von Kernbrennstoffen m.b.H., Eggenstein-Leopoldshafen (Germany, F.R.)); Burkhardt, H.G. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Heisse Chemie). Atomwritschaft, Atomtechnik ; 24: No. 3, 135-136(Mar 1979). (In German).

HYDROGEN;RADIOACTIVE WASTE FACILITIES; CHEMICAL REACTION YIELD;GASES;RADIOACTIVE WASTE STORAGE;RADIOLYSIS;WAK

2236 NUCLEAR WASTES AND PUBLIC ACCEPTANCE. Hammond, R.P. (Univ of California, Los Angeles). American Scientist ; 67: No. 2, 146-150(Mar-Apr 1979).

Storage and disposal of nuclear wastes is the foremost problem blocking public acceptance of nuclear power use. Although proponents of nuclear energy insist that technology is available to store nuclear wastes safely, no concrete programs for effective storage have materialized. Improvements in nuclear waste storage techniques are presented. Any concept for near-term nuclear storage must account for both the solid and liquid wastes that now exist. Previous errors in judgment by nuclear technicians that led to the waste disposal problem included an overabundance of knowledge about radiation, not enough knowledge about geology, and an acute ignorance of dealing with the public. Criteria for waste disposal schemes should include provisions for containment endurance, container maintenance, storage isolation, longevity of the storage facility, and interchangability for processed waste and spent fuel elements. A plan for an underground storage facility to meet the above standards is presented. (2 diagrams, 10 references)

2237 GORLEBEN-RAMBOW SALT DOME IS NOT SUITED FOR THE FINAL STORAGE OF RADIOACTIVE WASTE. Grimmel, E. (Hamburg Univ. (Germany, F.R.). Inst. fuer Geographie und Wirtschaftsgeographie). Umschau in Wissenschaft und Technik ; 79: No. 6, 168-171(Mar 1979). (In German).

The Gorleben salt dome does not fulfill the safety requirements for a nuclear waste disposal site. The dome is situated in a fault zone, which is an extension of the Rhinegraben.

2238 RESPONSIBILITY WITHOUT A PARALLEL. Herrmann, A.G. (Goettingen Univ. (Germany, F.R.). Geochemisches Inst.). Umschau in Wissenschaft und Technik ; 79: No. 6, 176-178(Mar 1979). (In German).

The feasibility of the 'evaporite concept' for the disposal of high-level waste from nuclear reactors has to be based on understanding of the origin and metamorphism of marine salt deposits. (orig.).

2239 SOME QUESTIONS CAN ONLY BE ANSWERED BY DRILLING. Jaritz, W. (Bundesanstalt fuer Geowissenschaften und Rohstoffe, Hannover (Germany, F.R.)). Umschau in Wissenschaft und Technik ; 79: No. 6, 179-182(Mar 1979). (In German).

Some geological questions, which are of interest in connection with the disposal of high level radioactive waste, are discussed. A repository located in a salt dome is regarded as a good solution to the final disposal problem. The result of the projected investigations will show whether the Gorleben salt dome is suitable for the repository or not.

2240 OBJECTIONS TO GORLEBEN FROM THE GEOMORPHOLOGICAL POINT OF VIEW. Semmel, A. (Frankfurt Univ. (Germany, F.R.). Geographisches Inst.). Umschau in Wissenschaft und Technik ; 79: No. 6, 174-175(Mar 1979). (In German).

Grimmel's objections concerning the geological suitability of the Gorleben salt plug do not seem to be completly unjustified. They should, however, be checked by field studies. It remains to be seen which arguments will be presented by Venzlaff, who in his article did not deal with these problems in detail.

2241 WASTE STORAGE GLASS STANDS UP TO THE TEST. Nuclear Engineering International ; 24:

No. 281, 52(Feb 1979).
GLASS;LEACHING;MATERIALS TESTING;PLUTONIUM; RADIOACTIVE WASTE DISPOSAL;RADIOACTIVE WASTES; VITRIFICATION;RADIOACTIVE WASTE STORAGE

2242 MANAGEMENT OF RADIONUCLIDES FROM REPROCESSING PLANT GASEOUS EFFLUENTS. Zabaluev, Y.V. (International Atomic Energy Agency, Vienna (Austria). Div. of Nuclear Safety and Environmental Protection). International Atomic Energy Agency Bulletin ; 21: No. 1, 23-31(Feb 1979).
Available technology and techniques for removal and storage of long-lived isotopes are considered, with emphasis on krypton-85, carbon-14, tritium and iodine-129.

2243 INVESTIGATIONS OF TEMPERATURE DEVELOPMENT IN THE ULTIMATE STORAGE OF RADIOACTIVE WASTE. PT. 1. CALCULATION OF TIME- AND SITE-DEPENDENT TEMPERATURE FIELDS. Ploumen, P.; Strickmann, G.; Winske, P. (Technische Hochschule Aachen (Germany, F.R.). Lehrstuhl und Inst. fuer Elektrische Anlagen und Energiewirtschaft). Atomwritschaft, Atomtechnik ; 24: No. 2, 85-91(Feb 1979). (In German).
For the envisaged deep storage of vitrified high-activity waste in salt rock formations, knowledge of temperature build-up and distribution is an important parameter to determine the storage geometry. To determine the temperature distribution, calculation methods have been developed that enable detailed calculation of instationary temperature fields for the ultimate storage of high-activity waste in a geological ultimate storage site. These methods are explained in the article.

2244 STUDIES OF THE TEMPERATURE BEHAVIOR ASSOCIATED WITH THE ULTIMATE STORAGE OF HIGH LEVEL RADIOACTIVE WASTE. Ploumen, P.; Stickman, G.; Winske, P.; Durr, K.; Korthaus, E.; Donath, P. (Institut fur Elektrische Anlagen und Energiewirtschaft Achen, W. Germany). Atomwritschaft, Atomtechnik ; 24: No. 2, 85-94(Feb 1979).
A W. German methodology for storing high level radioactive waste is outlined. Waste produced in fuel reprocessing will be converted into a solid (e.g., borosilicate glass), then permanently stored in a geological salt formation. The heat dissipation associated with the ultimate storage of this waste is examined. Temperature fields are calculated as a function of time and position. Computation techniques and computer programs developed for this purpose are described. Simulation experiments with various geometries and heat outputs at the Asse mine are also presented. A comparison of test and computed results verifies the accuracy with which the computer programs can predict the temperatures. (in German) (6 diagrams, 11 graphs, 5 references, 4 tables)

2245 SEA DISPOSAL TEST OF RADIOACTIVE WASTES INTO THE PACIFIC: NATIONAL SITUATION. Emura, S. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). Genshiryoku Kogyo (Nuclear Engineering) ; 25: No. 2, 17-23(Feb 1979). (In Japanese).
In association with the revision of the laws on the regulation of reactors, etc. and on radiation injury protection in July 1978, the technology standard on the sea disposal of low-level radioactive solid wastes was greatly improved. This led to a large step forward in the test sea disposal of such wastes. Studies in this field are being made strenously in various organizations. First, review is made on the background and the studies made since about 1960 by the Atomic Energy Commission of Japan concerning the sea disposal of low-level radioactive wastes. The descriptions are made on the courses of the technology development and safety evaluation on sea-disposal packages started almost simultaneously. The results on cement packages intended for test sea disposal, in particular, are given as follows: the physical integrity of cement solid packages, the leachability of radionuclides from cement packages, etc. Finally, the technology standard is explained.

2246 NEW TECHNICAL STANDARDS FOR RADIOACTIVE WASTE MANAGEMENT IN JAPAN. Sakata, S. (JGC Corp., Tokyo (Japan)). Nippon Genshiryoku Gakkaishi (Journal of the Atomic Energy Society of Japan) ; 21: No. 2, 142-146(Feb 1979). (In Japanese).
The technical standards for radioactive waste disposal, prepared by the ad hoc committee and reported to the Atomic Energy Commission of Japan, and approved by the latter, are explained. The feature of the new standards is to divide the disposal of radioactive wastes into that in the factories and enterprises concerned and that outside organizations; for the latter, sea disposal of radioactive wastes is stipulated. Thereby, the long-range points of view concerning the management are introduced. In the sea disposal, the international standards are extensively incorporated. In the management on the sites of factories and enterprises, radioactive wastes are grouped in gas, liquid and solid ones; and the respective techniques of disposal are specified. In the disposal outside organizations, storage on the sites and sea disposal are performed. For sea disposal, radioactive wastes are contained in vessels, or otherwise, they are solidified within metallic vessels using hydraulic cement. (J.P.N.).

2247 URANIUM TAILINGS. A HOT ISSUE IN NORTH AMERICA - BUT WHAT OF SA. Robertson, A. South African Mining and Engineering Journal ; 90: No. 4147, 41-43, 47(Feb 1979).
The hazards presented by the radioactivity in tailings from uranium bearing ores has become a sensitive issue in North America. South Africa has the advantage of following in the footsteps of North America, and with foresight may be able to avoid some costly mistakes. The author discusses the issues as they have developed in America and how they relate to the South African situation.

2248 A FLOOD OF HOT WASTE. Gwynne, P.; Cook, W.J.; Copeland, J.B.; Mitchelmore, C.; Begley, S. Newsweek ; 93: No. 3, 83-85(15 Jan 1979).
Nearly 5200 tons of nuclear waste are temporarily stockpiled in the U.S. today. Total tonnage may rise to 37,900 by 1990. The problem of permanent disposal is growing urgent. DOE's budget allowance for disposal technology is $449 million this year, compared with $28 million in 1970. Disposal methods are needed for both the spent fuel rods of nuclear reactors and the radioactive wastes from weapons production. DOE's present plan for fuel rod disposal is to bury the rods in a geologically stable area; the first site chosen is a salt bed formation near Carlsbad, N. Mex. International research on vitrification, compaction, and ceramification disposal techniques for wastes from weapons production is being reviewed. (3 photos)

2249 NO TECHNICAL BARRIERS TO WASTE DISPOSAL. Knox, R. Nuclear Engineering International ; 24: No. 280, 22-23(Jan 1979).

In a report to the President by the Interagency Review Group on Nuclear Waste Management the most important conclusion is that an acceptable solution to the waste disposal problem is possible. Many of the findings of the report were discussed at a recent AIF Study Group on waste management and at the ANS Winter Meeting. These discussions are reported.

2250 UNCONVENTIONAL FURNACE FOR SPECIAL WASTE. Ahearne, J. Atom-US: 16: No. 1, 10-15(Jan-Feb 1979).

The construction of a Treatment Development Facility was undertaken by U.S. Los Alamos Lab. to meet the problem of waste disposal at nuclear installations. The facility uses the process of controlled air incineration to reduce the volume of solid wastes. The incineration and cleaning processes are described. The incinerator is a commercially purchased conventional device that was altered to handle radioactive materials. The total expense for the construction was $1.65 million. Success in the experiments has led designers of the facility to project widespread use of controlled air incineration for the disposal of radioactive and toxic wastes. (9 photos)

2251 NUCLEAR WASTE DISPOSAL. Costello, J.M. (Australian Atomic Energy Commission Research Establishment, Lucas Heights). Atomic Energy in Australia ; 2: No. 1, 11-19(Jan 1979).

The disposal of high level waste or spent fuel is discussed with particular attention being paid to solidification in glass and ceramic materials. The long-term stability of these materials is discussed, as is the suitability of deep geologic formations for final disposal.

2252 HELIUM FORMATION FROM α-DECAY AND ITS SIGNIFICANCE FOR RADIOACTIVE WASTE GLASSES. Malow, G.; Andresen, H. (Hahn-Meitner-Institut fuer Kernforschung, Berlin, Germany). pp 109-115 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY: Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

To produce high radiation damage and excessive helium concentrations, the $^{10}B(n,\alpha)^{7}Li$ nuclear reaction was applied to a zinc-borosilicate glass. The number of displaced atoms could be estimated by using a collision model. The fraction of displaced atoms in glasses containing actinide elements was calculated to be orders of magnitude larger from α-decay than from β,γ-decay and spontaneous fission. Helium diffusion was measured between approx. 120 and approx. 650° and was found to be dependent upon the α-dose up to 500°C. The activation enthalpy increased from 79 to 111 kJ/mole when the α-dose rose from 10^{17} to 10^{19} per cm^3. The activation enthalpy as a function of the number of displacements per atom (dpa) revealed a saturation at about 0.1 dpa. At higher temperatures the diffusion dependency upon the α-dose disappeared and the activation enthalpy was 45 kJ/mole. With respect to the long-term situation, the above results gave evidence that helium will remain in the waste glass and a saturation of radiation damage will only be reached after some ten thousand years.

2253 CHEMISTRY OF NUCLEAR WASTE GLASS REACTIONS: PROBLEMS AND POTENTIAL OF PREDICTION. Adams, P.B. (Corning Glass Works, NY). pp 123-129 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY: Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

Many commonly accepted principles of glass corrosion testing can lead to false conclusions if they are accepted as generalities. It is essential to recognize the effects of changing chemistry in test solutions, of temperature on reaction rates, of cycling conditions and of anomalous reactions. One then concludes that simulation modeling is essential, that better standard tests are needed, that wet site disposal may be a good choice and that anomalous failure can be avoided by proper glass design.

2254 CHARACTERIZATION OF LEACHED SURFACE LAYERS ON SIMULATED HIGH-LEVEL WASTE GLASSES BY SPUTTER-INDUCED OPTICAL EMISSION. Houser, C.; Tsong, I.S.T.; White, W.B. (Pennsylvania State Univ., University Park, PA). pp 131-139 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY: Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

The leaching process in simulated waste encapsulant glasses was studied by measuring the compositional depth-profiles of H (from water), the glass framework formers Si and B, the alkalis Na and Cs, the alkaline earths Ca and Sr, the transition metals Mo and Fe, the rare-earths La, Ce, and Nd, using the technique of sputter-induced optical emission. The leaching process of these glasses is highly complex. In addition to alkali/hydrogen exchange, there is breakdown of the glass framework, build-up of barrier layers on the surface, and formation of layered reaction zones of distinctly different chemistry all within the outer micrometer of the glass.

2255 LEACH RATE CHARACTERIZATION OF SOLID RADIOACTIVE WASTE FORMS. Flynn, K.F.; Barletta, R.E.; Jardine, L.J.; Steindler, M.J. (Argonne National Lab., IL). pp 149-155 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY: Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

Leach rates for a number of proposed radioactive waste forms have been measured. A neutron activation analysis technique has been used exclusively for these measurements. Leach rates as low as $10^{-9}g/cm^2d$ were easily determined. Problems associated with surface area determination, sample preparation and data interpretation are discussed.

2256 CALCULATIONS OF RADIOACTIVITY RELEASE DUE TO LEACHING OF VITRIFIED HIGH LEVEL WASTE. Ewest, E. (Hahn-Meitner-Institut fuer Kernforschung, Berlin, Germany). pp 161-168 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY: Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

A model is presented for the calculation of radioactivity release from vitrified waste. The calculation is demonstrated for a borosilicate glass block which has been assumed to be exposed to water for 1,000,000 years. How far this model can be used in safety studies on the final disposal of vitrified waste in a geologic

repository is discussed.

2257 POLLUCITE AND ITS ALTERATION IN GEOLOGICAL OCCURRENCES AND IN DEEP-BURIAL RADIOACTIVE WASTE DISPOSAL. Cerny, P. (Univ. of Manitoba, Winnipeg). pp 231-236 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

The properties, occurrences, and alterations of natural pollucite are reviewed. Four general conclusions may be derived from the geological history of pollucite, and from the scanty experimental work, which may help to predict the behavior of the synthetic ^{137}Cs-based pollucite in deep-burial waste storage: natural pollucite phases show a wide range of Cs/Na ratios, and laboratory synthesis produced isomorphous compounds with substantial K, Rb, Ca, Sr, and several other cations. The rarity, specialized paragenesis, and limited conditions of formation of natural pollucite and cesian analcime are caused much more by geochemical scarity and migration pattern of Cs rather than by their restricted stability. The wide variety of alteration products replacing natural pollucite indicates easy breakdown under diverse conditions. Natural alteration of pollucite invariably leads to efficient dispersal of the released Cs.

2258 SCIENTIFIC BASIS FOR, AND EXPERIENCE WITH, UNDERGROUND STORAGE OF LIQUID RADIOACTIVE WASTES IN THE USSR. Spitsyn, V.I.; Balukova, V.D. (Inst. of Physical Chemistry, Moscow, USSR). pp 237-248 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

Factors considered in the selection of deep absorbing horizons (strata collectors) for underground storage of liquid wastes are given. The pretreatment of wastes and processes occurring in the strata collector are discussed. All the aspects discussed have been verified in actual underground storage installations. The methodology for prediction of sorption and migration behavior of radionuclides, for evaluation of the heat field in the stratum and for radiolysis processes and their influence on the storage of liquid wastes in strata collectors was confirmed.

2259 INFLUENCE OF RADIATION ON THE SYSTEM LIQUID RADIOACTIVE WASTES: GEOLOGIC FORMATION. Spitsyn, V.I.; Balukova, V.D.; Kabakchi, S.A.; Medvedeva, M.L. (Institute of Physical Chemistry, Moscow, USSR). pp 249-255 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

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Introduction of liquid radioactive wastes into deep strata-collectors results in a number of physical-chemical processes: precipitation, dissolution, complex formation, sorption, etc. The area occupied by the injected waste and changes in the nature of the liquid phase depend primarily on radiolysis processes in the heterogeneous system of liquid waste-stratal material occurring at elevated temperatures and pressures. Experiments that simulate actual conditions of temperature, pressure and high radiation levels on this system have been performed. Results are presented for radiolytic gas formation and for changes in the liquid phase and sorption capacity of stratal minerals. It is shown that the temperature increase in the stratum-collector significantly enhances waste decomposition processes, promotes sorption of radionuclides and decreases the mobility of the waste in the formation.

2260 ROCK-MELT APPROACH TO NUCLEAR WASTE DISPOSAL IN GEOLOGICAL MEDIA. Cohen, J.L.; Steinborn, T.L. (Lawrence Livermore Lab., CA). pp 261-264 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

An unconventional method for geologic disposal of nuclear waste has been proposed which uses decay heat for beneficial purposes. This is the rock-melt concept which calls for the direct addition of high-level waste either in solution or slurry form into a deep mined cavity in silicate rock. Following the period of waste addition, the cavity is allowed to boil dry. Subsequently, the decay heat melts the waste and the surrounding rock. The molten rock dissolves the waste and the molten mixture grows, reaching its maximum radius in times typically estimated at tens to hundreds of years. When the rate of conductive heat loss from the system exceeds that of heat input from radioactive decay, the system begins to cool and solidify. Total resolidification could require several centuries. During that period, fission products will have essentially decayed away, leaving the actinide components. The ultimate result would be the encapsulation of this radioactive material in a relatively insoluble rock matrix deep underground.

2261 INTERACTION OF A GLASS-BASED NUCLEAR WASTE SIMULANT AND NATURAL ROCK. Hlava, P.F.; Chambers, W.F. (Sandia Labs., Albuquerque, NM). pp 265-270 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

The basic experiment consisted of inserting a simulant glass containing stable isotopes in a hole bored into a 0.9 m x 0.9 m x 1.4 m block of microgabbro. Electron microprobe analysis provided significant information about the convection behavior and waste-rock interactions that occurred during the experiment. Results of this investigation are summarized.

2262 CORROSION RESISTANCE OF CANISTERS FOR FINAL DISPOSAL OF SPENT NUCLEAR FUEL. Mattsson, E. (Swedish Corrosion Inst., Stockholm). pp 271-281 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

A group of Swedish scientists has evaluated from the corrosion point of view three alternative canister types for final disposal of waste from nuclear reactors in boreholes in rock 500 m below ground. Titanium canisters with a wall-thickness of 6 mm and 100 mm thick lead lining have been estimated to have a life of at least thousands of years, and probably tens of thousands of years. Copper canisters with 200-mm-thick walls would last for hundreds of thousands of years. The third type, α-alumina sintered under isostatic pressure, is a very promising canister material.

2263 PRELIMINARY CORROSION TEST OF A GLASS-CERAMIC CANDIDATE FOR A NUCLEAR WASTE CANISTER.

Sundquist, J.D. (Corning Glass Works, NY). pp 289-296 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

Preliminary corrosion studies of Corning Glass Works glass-ceramic Code 9617 as a storage canister for spent nuclear fuel rods indicates a corrosion rate of 0.013 cm/1000 y when stored in a granite repository at an initial temperature of 110°C. This is well within the targeted rate of 0.1 cm/1000 y.

2264 APPLICATION OF PHYSICAL CHEMISTRY OF FLUIDS IN ROCK SALT AT ELEVATED TEMPERATURE AND PRESSURE TO REPOSITORIES FOR RADIOACTIVE WASTE. Stewart, D.B. (Geological Survey, Reston, VA); Potter, R.W. pp 297-311 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

The compositions of natural brines are described; some limits are set on their compositions and physical properties under repository conditions; and the nature and implications of the freezing-point depressions in polycomponent systems such as are likely to occur in salt repositories are discussed.

2265 APPLICATION OF STUDIES OF FLUID INCLUSIONS IN PERMIAN SALADO SALT, NEW MEXICO, TO PROBLEMS OF SITING THE WASTE ISOLATION PILOT PLANT. Roedder, E.; Belkin, H.E. (Geological Survey, Reston, VA). pp 313-321 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

The data obtained when inclusions in cores from the proposed WIPP site were examined pettrographically, and with microscope freezing, heating, and crushing stages are summarized. Fluid now present in the samples studied ranges widely from < 0.1 to 1.7 wt %; the total in situ fluid content of the rock is certainly greater. The inclusion fluid is not just saturated NaCl solution but a variable and extremely saline bittern containing some noncondensable gases under pressure. The inclusions move in thermal gradients and react quickly to uniaxial stress, but decrepitation is estimated to be a more important mechanism of fluid release under thermal loading. Subsequent movement of the released fluids is not considered.

2266 P-T-X RELATIONS OF ANHYDRITE AND BRINE AND THEIR IMPLICATIONS FOR THE SUITABILITY OF ANHYDRITE AS A NUCLEAR WASTE REPOSITORY MEDIUM. Clynne, M.A.; Potter, R.W. II. (Geological Survey, Menlo Park, CA). pp 323-328 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

The solubility properties of anhydrite indicate that it could serve as a suitable repository medium. The solubility of $CaSO_4$ has been confirmed to remain low despite the high activity of chloride ions. At 200°C the solubility of anhydrite in saturated NaCl solutions (0.0205 molal) is approximately 3.9 x 10^2 times less soluble than Nacl. (8.014 molal). In addition, the solubility of anhydrite in NaCl-saturated water exhibits a negative temperature coefficient up to 235 +- 20°C. We have shown that the solubility of anhydrite in NBT-6, a synthetic bittern, is significantly less than in NaCl-saturated water, and that its negative temperature coefficient persists to higher temperatures (250 +- 20°C). Consequently, fluid inclusions will migrate down a thermal gradient, i.e., away from radioactive waste containers. The suitability of anhydrite as a repository medium is further enhanced by its thermal conductivity; its favorable occurrence in evaporite basins; and its generally low fluid inclusion content (commonly lower than halite). Anhydrite could also be employed as an overpack in a salt repository to help protect the canisters from the brines mobilized by the thermal pulse.

2267 HYDROTHERMAL REACTIVITY OF SIMULATED NUCLEAR WASTE FORMS AND WATER-CATALYSED WASTE-ROCK INTERACTIONS. McCarthy, G.J.; Komarneni, S.; Scheetz, B.E.; White, W.B. (Pennsylvania State Univ., University Park, PA). pp 329-340 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

Hydrothermal interactions of three waste forms (spent fuel, a glass, and a crystalline ceramic) and three repository rock types (basalt, shale, and salt) are considered. The results presented illustrate three types of hydrothermal waste-rock interactions experimentation: reactivity of waste forms in the presence of aqueous solutions; reactivity among waste, rock, and water; and mechanistic studies of potentially important radionuclide fixation reactions. It was shown that if pressurized water should contact nuclear waste during the thermal period of a geologic repository, alteration of the waste and waste-rock interactions can occur. Prototype waste materials react to various degrees in the presence of groundwater. At 300°C glass is altered and devitrified with some elements being extracted into solution. The synthetic minerals of crystalline ceramics show little reaction. The UO_2 matrix of spent fuel shows very little reaction but some fission products can be dissolved. All three waste forms are very reactive with bittern brines. It should be emphasized that alteration of the more reactive waste forms does not necessarily lead to massive releases of radioactivity away form the repository. With certain classes of repository rocks, waste-rock interactions could lead to the formation of new mineral-like phases that could be far more stable in the long term than was the original waste form.

2268 HYDROTHERMAL GLASS REACTIONS IN SALT BRINE. Westsik, J.H. Jr.; Turcotte, R.P. (Battelle Pacific Northwest Labs., Richland, WA). pp 341-344 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

A simulated high-level waste glass was exposed to high-temperature salt brine and deionized water. The glass undergoes partial crystallization, depending on the conditions, and yields $NaFeSi_2O_6$ as the primary alteration product. At the extreme temperature of these tests, cesium, rubidium, strontium and molybdenum show moderate-to-high solubilities in salt brine. Solubility in deionized water is an order of magnitude lower than in salt brine, but the glass alteration rate is higher. In a similar salt brine test, a supercalcine showed similar cesium and strontium releases when compared to the glass.

2269 RADIATION DAMAGE STUDIES ON NATURAL AND SYNTHETIC ROCK SALT FOR WASTE DISPOSAL APPLICATIONS. Swyler, K.J.; Klaffky, R.W.; Levy, P.W. (Brookhaven National Lab., Upton, NY). pp 349-354 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

Natural rock salt and synthetic NaCl develop negative ion defects (F centers) when irradiated between 20 and 300°C. Both form high concentrations of sodium metal colloid particles when irradiated in the 125 to 200°C region. Based on the current data, it is estimated that the exposures expected from high-level waste disposal canister will cause 0.01 to 0.1 mole percent of the sodium in the surrounding rock salt to be converted to sodium metal colloid particles. Defect formation is dependent on temperature, crystal strain, dose, dose rate, origin of crystals and possibly other factors.

2270 THERMODYNAMIC CONSIDERATIONS UNDERLYING THE MIGRATION OF RADIONUCLIDES IN GEOMEDIA: OKLO AND OTHER EXAMPLES. Brookins, D.G. (Univ. of New Mexico, Albuquerque). pp 355-366 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

The prediction of migration or retention of radionuclides in geomedia is one of the major problems associated with radioactive waste disposal. Use of Eh-pH diagrams based on sound thermodynamic data has proven useful for both the Oklo Natural Reactor and for sedimentary uranium deposits. Appropriate diagrams for temperatures in the range from 25 to 200°C allow predictions to be made which are entirely consistent with available measurements. For geomedia where organics are present and for brines, experimental data must be employed to supplement any predictions made on a purely inorganic thermodynamic data base.

2271 MEASUREMENTS OF PARAMETERS ESSENTIAL TO PREDICTING NUCLIDE MIGRATION. Fried, S.; Friedman, A.; Schreiner, F.; Sjoblom, R.; Hines, J.; Strickert, R.; Rickert, P. (Argonne National Lab., IL). pp 367-377 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

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In order to determine the gross rate of migration of radionuclides in rocks the movement of radioactive traces through hornblende schists and through Bandelier tuff was studied. The results of the measurements of tracer mobilities in tuff and hornblende schist demonstrate that the gross flow rate is not a simple parameter. In addition to the measurement of migration rates, experiments were begun to determine the long-term stable valence states of actinide elements. The valence state is a significant parameter governing the chemical interaction of migrating species with the environment. In the case of nuclides such as uranium, plutonium, and neptunium, which can exist in oxidation states varying from 3 to 6, the most stable configuration will be determined by the redox potential of the surrounding medium. In order to predict the behavior of these nuclides it is necessary not only to predict the behavior of these that will ultimately be stable but also the rates of conversion from other oxidation states. Optical spectroscopy was chosen as a convenient means for monitoring the valence states. Preparation of the spectroscopic samples is discussed.

2272 INTERACTION OF WASTE RADIONUCLIDES WITH GEOMEDIA; PROGRAM APPROACH AND PROGRESS. Relyea, J.F.; Rai, D.; Serne, R.J. (Battelle Pacific Northwest Labs., Richland, WA). pp 379-394 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

The Waste Isolation Safety Assessment Program (WISAP) approach is discussed. The data for formation-dissolution of solid phases of the radionuclides and adsorption and exchange of radionuclides by the geomedia are needed for determining radionuclide-geomedia interactions. In order to evaluate the effect of formation and dissolution of minerals and precipitates on solution composition and concentration, the available thermodynamic data were summarized. From these data, solid phase and solution species diagrams were developed to predict the most stable solid and solution phases and the radionuclide concentrations at equilibrium with them in different environments. Computer codes are being developed or modified to handle the thermodynamic data to (i) avoid repetitive calculations by hand and (ii) allow easy modification or inclusion of new data. Solubility isotherms of different elements for a few selected minerals will also be generated. Kinetic effects are ignored in thermodynamic calculations. If the reaction kinetics can be ignored, these calculations should be valid for the required isolation period. Some of the problems that have been encountered in carrying out this problem are discussed. Data analysis and validation techniques are covered.

2273 RADIONUCLIDE MIGRATION STUDIES ASSOCIATED WITH THE WIPP SITE IN SOUTHERN NEW MEXICO. Dosch, R.G. (Sandia Labs., Albuquerque, NM). pp 395-398 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

Sorption coefficients (K_d's) were determined by batch contacting less than or equal to 74 μm particles of rock or non-halite minerals or a 350 to 840 μm particle range of halite minerals with solutions doped at 1 μCi/ml or less with ^{137}Cs, ^{85}Sr, ^{131}I, ^{144}Ce, ^{125}Sb, ^{99}Tc, ^{152}Eu, ^{153}Gd, ^{106}Ru, ^{243}Am, ^{244}Cm, or ^{238}Pu. Samples of the liquid phase were taken through 0.8 μm filters after periods of 14 to 20 days and 30 to 35 days for the fission products and 170 days for the actinides. A general summation of the Kd results in brine simulants is as follows. Anionic species, pertechnetate and isodide, showed little or no tendency to sorb on any of the samples ($K_d < 1$), with the possible exception of a clay from a halite stratum ($K_d < 5$); cesium and strontium K_d's were also generally less than 1, but values in the range of 10 to 20 were observed on several minerals; ruthenium K_d's were in the range 2540 > 1000, depending on the brine and the geomedia; the actinide and lanthanide K_d's were typically > 1000, with only polyhalite showing significantly lower sorption; in the ground water simulant, pertechnetate and iodine showed the same behavior; and the K_d's of the other nuclides were slightly higher, particularly those of cesium and strontium.

2274 VARIABLES AFFECTING SORPTION AND TRANSPORT OF RADIONUCLIDES IN HANFORD SUBSOILS. Barney, G.S. (Rockwell Hanford Operations, Richland, WA). pp 435-438 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).
From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).
Factors initially considered to control radionuclide sorption on Hanford sediments are: waste composition, groundwater components, sediment characteristics, chemical species of radionuclides, temperature, and time. Ten variables selected for study in the screening experiments were: Na^+, K^+, Ca^{2+}, Mg^{2+}, NO_3^-, NO_2^-, SO_4^{2-}, humic acid concentrations, sediment particle size, and source. The radionuuclides chosen for study were ^{137}Cs, ^{85}Sr, ^{99}Tc, ^{60}Cs, and ^{106}Ru. Sediments were obtained from four different well cores. Variables which were found to significantly affect sorption of ^{137}Cs are K^+, Na^+, humic acid, and sediment source. For ^{85}Sr the variables are Ca^{2+}, Na^+, humic acid, and Mg^+; for ^{60}Co they are NO_2^-, humic acid, and K^+; and for ^{106}Ru they are NO_2^-, humic acid, and Ca^{2+}. None of the variables had a detectable effect on ^{99}Tc sorption.

2275 PERMEABILITY MEASUREMENTS ON CEMENTITIOUS MATERIAL FOR NUCLEAR WASTE ISOLATION. White, E.L.; Scheetz, B.E.; Roy, D.M.; Zimmerman, K.G.; Grutzeck, M.W. (Pennsylvania State Univ., University Park). pp 471-478 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).
From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).
Gas and liquid permeability measurement methods have been developed and utilized for characterization of cement composites and rocks for application to nuclear waste geologic repository problems. Permeabilities in the millidarcy to tens of nanodarcys range have been measured reproducibly and are related to problems of borehole plugging and shaft sealing.

2276 COMPARISON OF SOME GEOLOGIC AND OCEAN DISPOSAL CONCEPTS REGARDING REALISTIC MODELING THAT ALLOWS OBJECTIVE RISK ASSESSMENT TO BE MADE. Nielsen, S.O. (Symplexor Engineering Consultants, Inc., Holte, Denmark). pp 549-554 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).
From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).
The following disposal concepts are compared: spent fuel or non-partitioned high-level waste (HLW) in geologic formation; partitioned HLW in geologic formation; non-partitioned HLW in submarine geologic formation; and partitioned, vitrified HLW, isolated by engineered containment, and emplaced on the deep ocean floor. Assuming that biofouling can be neglected, the last disposed concept is the most desirable.

2277 RECOMMENDED OPERATIONAL PROCEDURES FOR SEA DUMPING OF RADIOACTIVE WASTE. Paris, France; Organisation for Economic Co-operation and Development (1979). 18p.
The purpose of this document is to establish procedures for the organization and control of radioactive waste sea dumping operations carried out under the Nuclear Energy Agency Mechanism. These procedures are designed to insure the safe disposal of the radioactive waste in such a way that any radiation exposure is kept as low as reasonably achievable within designated dose limits, and that other risks are also adequately controlled. Phases included are advance preparation of the operation, ship loading phase, navigational phase, dumping conditions, and ship monitoring after disposal is completed.

2278 GUIDELINES FOR SEA DUMPING PACKAGES OF RADIOACTIVE WASTE. Paris, France; Organisation for Economic Co-operation and Development (1979). 35p.
The purpose of these Guidelines is to establish general requirements for the design and manufacture of packages for sea dumping of radioactive waste. These Guidelines refer only to packing of those radioactive wastes which fall outside the IAEA's Revised Definition of 1978 for high-level radioactive waste or other high-level radioactive matter considered to be unsuitable for dumping at sea under the London Dumping Convention. The design basis for packages is outlined, as are radiological safety considerations, manufacture and assembly. 10 figures.

2279 ASEA IS PRODUCING FULL-SCALE CANISTERS FOR NUCLEAR WASTE. ASEA (Allmaenna Svenska Elektriska Aktiebolaget) Journal ; 52: No. 1, 19(1979).
ASEA has successfully fabricated the first full-scale containers for nuclear waste. The first containers in an experimental series have been produced in the high-pressure plant constructed in record time at Robertsfors in the north of Sweden. This full scale experiment is an important milestone in the work on demonstrating a fully safe method for the containment of spent nuclear fuel for direct disposal. A container has sufficient space for nearly 150 fuel rods.

2280 MONITORING FOR THE DISPERSION OF DISCHARGED TRITIUM IN SEA-WATER AROUND THE TOKAI-MURA FUEL REPROCESSING PLANT. Nomura, T.; Kishimoto, Y.; Hirayama, A.; Fukuda, S.; Iwasaki, K. (Power Reactor and Nuclear Fuel Development Corp., Tokai, Ibaraki (Japan). Tokai Works). pp 257-269 of Behaviour of tritium in the environment. Vienna; International Atomic Energy Agency (1979).
From Symposium on the behavior of tritium in the environment; San Francisco, CA, USA (16 Oct 1978).
Low-level liquid waste effluent has been released batchwise into the Pacific Ocean from the fuel reprocessing plant of PNC sited in Tokai-mura since September 1977. The liquid effluent is discharged from the nozzle located about 17 m below the surface of the sea and is dispersed by the ambient cross stream. Approximately 800 Ci of tritium were released into the sea from October 1977 to June 1978. Tritium concentrations in sea-water were measured in accordance with a special monitoring programme to examine the dilution and dispersion of effluent in sea-water. The results of the tritium measurement showed that the effluent was diluted by two or three orders of magnitude by mechanical jet mixing immediately after the discharge from the nozzle, and was further diluted by one or two orders of magnitude by travelling several hundred metres along the current. It was observed that the concentration of tritium in surface water was raised temporarily after the discharge of more than several tens of curies, but returned to the background level within a day or so.

2281 PRODUCTION AND EMISSION OF TRITIUM FROM NUCLEAR FACILITIES, AND THE RESULTING PROBLEMS. Bonka, H. (Technische Hochschule Aachen (Germany, F.R.)). pp 105-122 of Behaviour of tritium in the environment. Vienna; International Atomic Energy Agency (1979).

From Symposium on the behavior of tritium in the environment; San Francisco, CA, USA (16 Oct 1978).

The production rate of ^3H by various nuclear reactions is calculated for the various parts of nuclear power reactors. The ^3H-production per MW(e) and year for boiling-water reactors, pressurized-water reactors, MAGNOX, AGR, high-temperature reactors, heavy-water reactors and fast breeders is: 20 Ci, 19 Ci, 26 Ci, 18 Ci, 15 Ci, 170 and 32 Ci respectively. If the total ^3H of a large reprocessing plant is released through a 100-m high stack, the maximum radiation exposure exceeds the permissible total body dose of 30 mrem/a in the Federal Republic of Germany. By increasing the height of the stack, only the maximum radiation exposure can be reduced, not the collective dose. The collective dose over the first pass exposure is approximately 0.017 man.rem/Ci and after global distribution $9x10^{-4}$ man.rem/Ci. From the radiation protection point of view, between 80 and 90% of ^3H should be retained in reprocessing plants. At the moment it is advisable to mix the tritium with ocean water. From this mixed tritium the radiation exposure of the total body will be lower than 0.1 mrem yearly in the next century. For the disposal of tritium in the ocean an international agreement is required.

2282 DISPOSAL OF RADIOACTIVE WASTES. CHAPTER 11. Skitt, J. pp 122-125 of Waste disposal management and practice. Skitt, J. (Staffordshire County Council (UK)). London, England; Charles Knight (1979).

An account is given of the history and present position of legislation in the United Kingdom on the disposal of radioactive wastes. The sections are headed: introduction and definitions; history; the Radioactive Substances Act 1960; disposal of solid radioactive wastes through Local Authority services; function of Local Authorities; exemptions; national radioactive waste disposal service; incidents involving radioactivity.

2283 EVALUATION OF SYSTEMS INCORPORATING TRANSMUTATION FOR THE REDUCTION OF THE LONG TERM TOXICITY OF HIGH-LEVEL WASTE. Davidson, J.W. Austin, TX; University of Texas (1979). 412p. University Microfilms Order No. 79-20,101.

Thesis (Ph. D.).

One of the alternative high-level nuclear waste (HLW) management/disposal concepts proposed involves the separation from HLW of the elements with isotopes which dominate the radiotoxicity and the transmutation of these nuclides to shortlived or stable products. The waste management system required for transmutation employs chemical processing of HLW to recover waste nuclides for irradiation with neutrons in a transmutation device. The transmuter periodically requires replenishment of the target nuclides and chemical processing to remove the transmutation products. The waste streams from HLW processing and product recovery together comprise the discharge from the system. An imploding liner fusion reactor (ILFR) is assumed for the transmuter with the waste nuclides dissolved in a molten lead-lithium alloy blanket. The potential transmutation candidates are defined as the elements with toxicities per unit volume (toxicity indexes) in solidified HLW at 1000 years which are greater than that for 0.2% uranium ore (carnotite). The candidates which require separation for transmutation are the actinides; Np, Pu, Am, and Cu and the fission products; I and Tc. Certain assumptions were made for the parameters for the ILFR and its operating conditions, and a system evaluation was done. System evaluations indicate that blanket waste loadings on the order of several percent of the total concentration result in attractive performance in terms of high transmutation capacities and low blanket processing requirments. It appears that transmutation system goals in terms of toxicity reduction are achievable with a modest number of transmuters. In addition, requirements for transmuter performance, chemical processing capacity and chemical separation efficiency appear to be within projected values for this technology.

2284 (BNL-tr--691) INVESTIGATION OF RADIATION RESISTANCE OF NATURAL ROCK SALT. Spitsyn, V.I.; Barsova, L.I.; Kabakchi, S.A.; Zyazyulya, I.I.; Lebedeva, I.E. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow). 1979. Translation of Preprint IAEA-SM--243/109 17p. Dep. NTIS, PC A02/MF A01.

The physicochemical processes in samples of rock salt of different deposits, which occur as a result of the action of γ radiation in a wide dose range, are investigated. The nature and kinetics of accumulation of electron and hole centers are investigated relative to the impurity content, absorbed dose, and temperature. The formation of F, M, and V centers is demonstrated and the processes of thermal and radiation coagulation of these centers to colloidal sodium and chlorine gas are studied. The dose absorbed by the crystal can be determined from the number of produced F centers. The efficiency of liberating gaseous products, mainly molecular chlorine, depends on the impurity content. The molecular hydrogen and hydrogen peroxide are produced as a result of dissolving irradiated samples of rock salt. There is a linear correlation between the quantity of produced hydrogen and the concentration of F centers in the sample. A method of determining the energy stored by the crystal from the amount of liberated hydrogen is proposed. The variation of microhardness and brittleness of the rock salt samples of different deposits, which were irradiated in a wide dose range (to 8000 Mrad), is investigated. It is shown that the kinetics of variation of microhardness and maximum radiation hardening of crystals depend on the radiation-induced defects and on impurities.

2285 TRANSPORT THROUGH A TRENCH COVER OF GASEOUS TRITIATED COMPOUNDS FROM BURIED RADIOACTIVE WASTES. Lu, A.H.; Matuszek, J.M. (New York State Dept. of Health, Albany (USA)). pp 655-669 of Behaviour of tritium in the environment. Vienna, Austria; International Atomic Energy Agency (1979).

From Symposium on the behavior of tritium in the environment; San Francisco, CA, USA (16 Oct 1978).

The wastes in commercial radioactive-waste land burial sites produce anaerobic decomposition products such as CH_4, CO, CO_2, NH_3 and H_2S which permit migration of ^3H and ^{14}C to the atmosphere. In the low-level radioactive-waste trenches at West Valley, New York, the most abundant radioactive gas was $^3HCH_3$ (as high as $2nCi/cm^3$ in some samples). A new empirical method has been developed to determine the bulk permeability of the trench cover and to estimate rates of gas production

and gas release. The pressure differential between trench gas and atmosphere is measured with a sensitive, electrically operated transducer. At West Valley the trench covers were found to be highly permeable to pressure-induced flow of gases and air. Interconnected fractures apparently penetrate through the trench cap and determine the rate of flow of $^{3}HCH_{3}$ and other radioactive gases from the trenches. The pressure of gas in the trench has been reproduced with an empirical model, GASFLO, using pressure differentials measured in the field and parameters chosen to obtain the best fit to the experimentally observed pressures. The amount of $^{3}HCH_{3}$ released to the environment was estimated at approximately 1 to 8Ci annually from various trenches.

2286 RADIOACTIVE WASTE DISPOSAL-A COMPARISON OF ALTERNATIVE NUCLEAR FUEL CYCLES. Krugmann, H.H.L. Princeton, NJ; Princeton Univ (1979). 319p. University Microfilms Order No. 79-10,121.

Thesis (Ph. D.).

The bearing of issues relating to radioactive waste disposal on policy choices between alternative nuclear fuel cycles is examined. Two principal choices are discussed. One is between retaining the current once-through fuel cycle and establishing a more uranium efficient fission economy involving the recycle of plutonium produced by neutron absorption in the nonchain-reacting uranium isotope ^{238}U. The other is between introducing this plutonium economy and embarking on an alternative uranium efficient fission economy which would involve the recycle of the artificial isotope ^{233}U produced by neutron bombardment of thorium. Two major policy questions relevant to choices between fission economies are explored: (i) what are the consequences for radioactive waste disposal of switching from one nuclear fuel cycle to another and how significant are these consequences relative to other concerns. The effects of changing to another fuel cycle on the radioactive waste disposal problem are discussed in terms of waste properties; (ii) what is the influence of choice of fuel cycle on the amount and concentration of fissile plutonium in nuclear wastes and the possible diversion of this plutonium to weapons uses. Fissile plutonium inventories in wastes from alternative fuel cycles are compared and the nature and commercial attractiveness of spent fuel repositories as plutonium mines is discussed.

2287 HANDLING AND STORAGE OF HIGH-LEVEL RADIOACTIVE LIQUID WASTES REQUIRING COOLING. Vienna; IAEA (1979). 115p.

The technology of high-level liquid wastes storage and experience in this field gained over the past 25 years are reviewed in this report. It considers the design requirements for storage facilities, describes the systems currently in use, together with essential accessories such as the transfer and off-gas cleaning systems, and examines the safety and environmental factors.

2288 SHALE AS A RADIOACTIVE WASTE REPOSITORY: THE IMPORTANCE OF VERMICULITE. Komarneni, S.; Roy, D.M. ;Pennsylvania State Univ., University Park ;USA). Materials Research Labs.). Journal of Inorganic and Nuclear Chemistry ; 41: No. 12, 1793-1796(1979).

Cesium sorption and fixation properties of thirty shale minerals and shales were investigated in search of a criterion for the suitability of shales for a radioactive waste repository. Shales and illites containing vermiculite fixed the largest proportion of total Cs sorbed (up to 91%) against displacement with 0.1 N KCl. For example, a slate sample fixed 33% of the total Cs sorbed while its weathered counterpart in which chlorite had altered to vermiculite fixed 89% of the total Cs sorbed. Since Cs is one of the most soluble and hazardous radioactive ions, its containment is of great importance in safe radioactive waste disposal. Presence of vermiculite in a shale body may therefore, serve as one criterion in the selection of a suitable shale for radioactive waste disposal if and when shales in geologically stable areas are selected for repositories.

2289 Sicherheit und Umweltschutz bei der nuklearen Entsorgung. (SAFETY AND ENVIRONMENTAL PROTECTION IN NUCLEAR WASTE MANAGEMENT). Baumgaertner, F. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Heisse Chemie). Bonn, Germany, F.R.; BMFT (1979). 77p. (In German).

With the salt domes of North-West Germany Federal Germany, has nearly ideal conditions for a safe final storage of nuclear waste. The practical results show that all technical safety requirements in nuclear waste management can be met at the present state of the art. This assures technical and scientific experts of the fact that there will be only conventional risks in the nuclear waste management centre. The risk may be even lower than what we have learned to accept in our daily life.

2290 HOW TO STORE WASTES. Gruhier, Fabien. Sciences et Avenir ; No. 27, 44, 46, 48-51(1979). (In French).

The different solutions to store radioactive wastes are exposed, as no technical solution is satisfactory for their elimination. Liquid wastes temporary storage in tanks, vitrification, storage in suitable geological formations, reprocessing problems are evoked.

2291 Der Gorleben-Report. Ungewissheit und Gefahren der nuklearen Entsorgung. Auszuege aus den Gutachten und dem Hearing der niedersaechischen Landesregierung. (GORLEBEN REPORT. INSECURITY AND DANGERS OF NUCLEAR WASTE MANAGEMENT. EXCERPTS FROM THE EXPERT'S REPORTS AND THE HEAVING HELD BY THE LOWER SAXONY GOVERNMENT). Hatzfeld, H. Graf; Hirsch, H.; Kollert, R. (eds.). Frankfurt am Main, Germany, F.R.; Fischer (1979). 207p. (In German).

The building of the reprocessing plant in Gorleben was declared 'politcally not feasible'. This means: the socio-political and the safety-political objections of a broad publicity against an entrance into the plutonium-society which seems unavoidable make a consensus impossible. This has given the public discussion about nuclear energy a new dimension. By commenting the Gorleben-hearing, the editors of this book show the most important reasons of this development. For the first time, a large technical project and its long-term consequences over generations were discussed in public which at the same time formed a model for interest-independent debates about other topics.

2292 LOW-FLOW, LOW-PERMEABILITY MEASUREMENTS IN LARGELY IMPERMEABLE ROCKS. PROCEEDINGS OF THE NEA/AIEA WORKSHOP, PARIS, 19-21 MAR 1979. Paris, France; OECD (1979). 306p.

From Workshop on low-flow, low-permeability measurements in largely impermeable rocks; Paris, France (19 - 21 Mar 1979).

Geological formations considered as potential candidates for the siting of radioactive waste repositories must contain no or little circulating ground water since, over the long term, ground water could transport particular radionuclides over long distances and even back to the biosphere. It is therefore essential that every candidate disposal formation be carefully evaluated in relation to its potential for transmitting fluids. Since suitable formations are necessarily characterized by negligible fluid flows, the above requirement implies some capability of measuring extremely low permeabilities in situ. The types of rocks that have been frequently considered as potential host materials for radioactive waste are rock salt, argillaceous sediments and crystalline rocks. Some countries with geologic disposal programmes are conducting or planning field experiments of various kinds. They are all confronted with the problem of how to measure very low permeabilities in situ. The OECD Nuclear Energy Agency in cooperation with the International Atomic Energy Agency organized this meeting. These proceedings constitute a record of the papers presented and the discussions held during the workshop.

2293 GEOCHEMICAL CONSIDERATIONS IN THE CHOICE OF A HOST ROCK FOR THE DISPOSAL OF HIGH-LEVEL RADIOACTIVE WASTES. Chapman, N.A. London; HMSO (1979). 41p.

The disposal of the long lived and highly active ('high-level') radioactive wastes resulting from the reprocessing of nuclear fuels is a complex international problem. Entombment at depth in an engineered 'repository' in a suitable rock body is presently under investigation. Such disposal calls for a considerable broadly based research effort, not least in the fields of hydrogeology, rock mechanics and geochemistry. The present report is a preliminary appraisal of the most pertinent factors affecting choice of rock type and disposal management in one of these fields, geochemistry. As such it dwells largely on one single aspect of the problem, that of the thermal effects of the emplaced wastes (which emit heat for up to 600 years after their burial) on the various rock types advanced as possible hosts for a repository. The study is basically a compilation of available data on the behaviour of the constituent minerals of granites, argillaceous rocks and evaporites under the physico-chemical conditions likely to occur in an active repository at depth. These data are combined to provide guidelines and geochemical constraints on choice of rock types and their maximum admissible thermal loadings.

2294 TRANSURANIC WASTE DEGRADATION UNDER WASTE ISOLATION PILOT PLANT (WIPP) CONDITIONS. Kosiewicz, S.T.; Zerwekh, A. (Los Alamos Scientific Lab., NM). Transactions of the American Nuclear Society ; 33: 426(1979). (CONF-791103--).

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

RADIOACTIVE WASTE FACILITIES;PILOT PLANTS; RADIOACTIVE WASTE DISPOSAL;GEOLOGIC DEPOSITS; UNDERGROUND DISPOSAL;THERMAL DEGRADATION; RADIOLYSIS;TRANSURANIUM ELEMENTS;RADIOACTIVE WASTES;ENVIRONMENTAL EXPOSURE PATHWAY

2295 EVALUATION OF ALTERNATIVES FOR LOW-LEVEL WASTE DISPOSAL. Macbeth, P.J.; Sutherland, A.A. (Ford, Bacon and Davis Utah, Inc., Salt Lake City). Transactions of the American Nuclear Society ; 33: 427-428(1979). (CONF-791103--).

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

Shallow land burial, improved shallow land burial, deep burial, new and existing mines, above-grade structures and ocean disposal.

RADIOACTIVE WASTE DISPOSAL;LOW-LEVEL RADIOACTIVE WASTES;MARINE DISPOSAL;UNDERGROUND DISPOSAL;COMPARATIVE EVALUATIONS

2296 CRITICALITY CONSIDERATIONS FOR GEOLOGICAL DISPOSAL OF SPENT FUEL. Vreeland, J.A.; Ramesh, J. (California State Univ., Sacramento). Transactions of the American Nuclear Society ; 33: 435-436(1979). (CONF-791103--).

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

RADIOACTIVE WASTE DISPOSAL;GEOLOGIC DEPOSITS; CRITICALITY;SPENT FUELS

2297 WASTES MIXES AND FORMS FOR SPACE DISPOSAL OF NUCLEAR WASTE. Yates, K.R. (Battelle Columbus Labs., OH). Transactions of the American Nuclear Society ; 33: 436-437(1979). (CONF-791103--).

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

RADIOACTIVE WASTE DISPOSAL;SPACE;HIGH-LEVEL RADIOACTIVE WASTES;SPENT FUELS;URANIUM; PLUTONIUM;RARE EARTHS;AMERICIUM;CURIUM; NEPTUNIUM;TECHNETIUM;IODINE;CARBON

2298 FINAL ENVIRONMENTAL IMPACT STATEMENT. HANDLING AND STORAGE OF SPENT LIGHT WATER POWER REACTOR FUEL. Washington, DC; Nuclear Regulatory Commission (1979). v, 3 volumesp. (NUREG--0575). Information Resources Press, 2100 M Street, NW, Suite 316, Washington, DC. (MF or HC) Order No. 79-1153.

Alternative methods for storage of light water reactor spent fuel through the year 2000 are proposed. At-reactor (AR) and away-from-reactor (AFR) storage techniques or termination of the generation of spent fuel through the shutdown of nuclear power plants and the replacement with coal-fired units are considered. A cumulative total of 82,000 metric tons of heavy metal spent fuel is projected for the year 2000, and storage capacity of reactor storage pools at existing plants or those under construction would be inadequate. The preferred course of action would provide for increased AR storage through compact storage in the fuel pools to furnish immediate relief of the capacity problem; when present AR capacity is exhausted, discharged spent fuel would be shipped immediately to AFR facilities for perpetual storage.

2299 La migration des radionucleides a vie longue dans la geosphere. Compte rendu. (MIGRATION OF LONG-LIVED RADIONUCLIDES IN THE GEOSPHERE. PROCEEDINGS). Paris, France; OECD (1979). 337p. (In English and French).

From Workshop on the migration of long-lived radionuclides in the geosphere; Brussels, Belgium (29 - 31 Jan 1979).

The most promising solution for the disposal of long-lived radioactive wastes is the emplacement into suitable, deep geological formations. Safety analyses normally assume that over the long term ground water may come into contact with radioactive waste as a consequence of the failure of the various barriers. The assessment of the possible consequences of this breach of containment

requires a good understanding of the physico-chemical mechanisms that control the migration of radionuclides through the disposal formation and the geologic materials that intervene between the disposal formation and the surface. Research programmes are being pursued in several countries to investigate the migration of radionuclides in geological formations. Recognizing that scientists working in this field need to meet periodically in order to discuss their respective experiences and coordinate future work, the Commission of the European Communities and the OECD Nuclear Energy Agency decided to organize this workshop. These proceedings represent a record of the papers and the discussions at the meeting.

2300 CANADIAN PROGRAM FOR NUCLEAR FUEL WASTE DISPOSAL. Hatcher, S.R. (Whiteshell Nuclear Research Establishment, Pinawa, Manitoba). Transactions of the American Nuclear Society ; 33: 136(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
CANADA;RADIOACTIVE WASTE DISPOSAL; UNDERGROUND DISPOSAL;NUCLEAR FUELS;GEOLOGIC DEPOSITS;IGNEOUS ROCKS;HIGH-LEVEL RADIOACTIVE WASTES

2301 DEVELOPMENT AND APPLICATION OF CRITERIA FOR SITING. Waite, D.A.; Newcomb, W.E. (Battelle Project Management Division, Columbus, OH). Transactions of the American Nuclear Society ; 33: 136-137(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADIOACTIVE WASTE STORAGE;SITE SELECTION; DATA COMPILATION;RADIOACTIVE WASTE DISPOSAL; HIGH-LEVEL RADIOACTIVE WASTES

2302 GEOLOGIC STUDIES FOR WASTE REPOSITORY SITING IN THE PARADOX BASIN. Rogers, T.H.; Conwell, F.R. (Woodward-Clyde Consultants, San Francisco, CA). Transactions of the American Nuclear Society ; 33: 137-138(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADIOACTIVE WASTE DISPOSAL;SITE SELECTION; UTAH;COLORADO;GEOLOGY;HIGH-LEVEL RADIOACTIVE WASTES;SCREENING

2303 STOCHASTIC ASPECTS OF MIGRATION FROM REPOSITORY SITES. Kiremidjian, A.S.; Kruger, P. (Stanford Univ., CA). Transactions of the American Nuclear Society ; 33: 138-139(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADIONUCLIDE MIGRATION;STOCHASTIC PROCESSES; RADIOACTIVE WASTE DISPOSAL;SITE SELECTION;HIGH-LEVEL RADIOACTIVE WASTES;RADIOACTIVE WASTE FACILITIES

2304 STATUS OF SITING FOR THE WASTE ISOLATION PILOT PLANT. Powers, D.W.; Weart, W.D. (Sandia Labs., Albuquerque, NM). Transactions of the American Nuclear Society ; 33: 141-142(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL;SITE SELECTION;NEW MEXICO;GEOLOGY; RADIOACTIVE WASTE FACILITIES;PILOT PLANTS;SALT DEPOSITS;HIGH-LEVEL RADIOACTIVE WASTES

2305 NNWSI SITE EVALUATION ACTIVITY. Stephens, H.P. (Sandia Labs., Albuquerque, NM). Transactions of the American Nuclear Society ; 33: 142-143(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
NEVADA TEST SITE;RADIOACTIVE WASTE DISPOSAL; SITE SELECTION;UNDERGROUND DISPOSAL;GEOLOGY; HYDROLOGY;GROUND WATER;HIGH-LEVEL RADIOACTIVE WASTES;EVALUATION

2306 MICROBIAL PRODUCTION OF TRITIATED AND CARBON-14 METHANE FROM RADIOACTIVE WASTES. Francis, A.J.; Dobbs, S.; Doering, R.F.; Colombo, P. (Brookhaven National Lab., Upton, NY). Transactions of the American Nuclear Society ; 33: 156-157(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
LOW-LEVEL RADIOACTIVE WASTES;UNDERGROUND DISPOSAL;METHANOGENIC BACTERIA;TRITIUM COMPOUNDS;CARBON 14 COMPOUNDS;LEACHING; RADIOACTIVE EFFLUENTS;ENVIRONMENTAL EXPOSURE PATHWAY;RADIONUCLIDE MIGRATION;RADIOACTIVE WASTE DISPOSAL;BIOSYNTHESIS;METABOLISM;METHANE

2307 NONRADIOLOGICAL HAZARDS OF LOW-LEVEL WASTE BURIAL GROUNDS. Ausmus, B.S.; Rogers, S.E.; Means, J.L. (Battelle Columbus Labs., OH). Transactions of the American Nuclear Society ; 33: 157-158(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL;HEALTH HAZARDS;HAZARDOUS MATERIALS; ELEMENTS;ORGANIC COMPOUNDS;ENVIRONMENTAL TRANSPORT;LEACHING;BIODEGRADATION;CORROSION;LOW-LEVEL RADIOACTIVE WASTES

2308 CHEMICAL TOXICITY ISSUES IN HIGH-LEVEL WASTE DISPOSAL. Rogers, S.E.; Ausmus, B.S.; Means, J.L. (Battelle Columbus Labs., OH). Transactions of the American Nuclear Society ; 33: 158(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADIOACTIVE WASTE DISPOSAL;HAZARDOUS MATERIALS;TOXICITY;CONTAINERS;PACKAGING;WASTE MANAGEMENT;HIGH-LEVEL RADIOACTIVE WASTES

2309 RADIOACTIVE WASTE/SOIL INTERACTIONS-MIGRATION POTENTIAL OF RADIONUCLIDES THROUGH FOUR SOILS. Fowler, E.B.; Essington, E.H.; Polzer, W.L. (Los Alamos Scientific Lab., NM). Transactions of the American Nuclear Society ; 33: 164-165(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADIOACTIVE WASTES;RADIONUCLIDE MIGRATION; SOILS;COMPARATIVE EVALUATIONS;PLUTONIUM ISOTOPES;AMERICIUM ISOTOPES;URANIUM ISOTOPES; CESIUM ISOTOPES;SORPTIVE PROPERTIES; ENVIRONMENTAL TRANSPORT;CHEMICAL REACTIONS; RADIOACTIVE WASTE DISPOSAL

2310 MIGRATION OF TRANSURANIC NUCLIDES IN EARTHEN BURIAL TRENCHES AT THE SAVANNAH RIVER PLANT. Johnson, D.R.; Wilhite, E.L. (Savannah River Lab., Aiken, SC). Transactions of the American Nuclear Society ; 33: 167-168(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
SAVANNAH RIVER PLANT;TRANSURANIUM ELEMENTS; RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL;

PLUTONIUM;RADIONUCLIDE MIGRATION;SAMPLING;SOILS; LEACHING;ENVIRONMENTAL TRANSPORT

2311 RADIOACTIVE WASTE-FORM AND ROCK INTERACTIONS: A DISCUSSION. Ewing, R.C. (Univ. of New Mexico, Albuquerque); Krumhansl, J.L. Transactions of the American Nuclear Society ; 33: 280(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
HIGH-LEVEL RADIOACTIVE WASTES;STABILITY; GLASS;CERAMICS;SALT DEPOSITS;GRANITES;TUFF; BASALT;SHALES;SEDIMENTS;CHEMICAL REACTIONS;SEA BED;KINETICS;RADIOACTIVE WASTE DISPOSAL; UNDERGROUND DISPOSAL;MARINE DISPOSAL

2312 RETRIEVAL METHODS AND EQUIPMENT FOR WIPP HIGH-LEVEL WASTE EXPERIMENT AREA. Dennis, A.W.; Stinebaugh, R.E. (Sandia Labs., Albuquerque, NM). Transactions of the American Nuclear Society ; 33: 944-946(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RETRIEVAL SYSTEMS;RADIOACTIVE WASTE FACILITIES;NEW MEXICO;PILOT PLANTS;SALT DEPOSITS;RADIOACTIVE WASTE DISPOSAL;EQUIPMENT; HIGH-LEVEL RADIOACTIVE WASTES;MATERIALS HANDLING

2313 EXPERIMENTAL PROCEDURE FOR PROPOSED ANS STANDARD ON LOW-LEVEL WASTE LEACHABILITY. Neilson, R.M. Jr. (Brookhaven National Lab., Upton, NY). Transactions of the American Nuclear Society ; 33: 203-205(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
LOW-LEVEL RADIOACTIVE WASTES;LEACHING;SOLID WASTES;STANDARDS;RADIOACTIVE WASTE DISPOSAL; SAFETY

2314 FIGURE-OF-MERIT DETERMINED FROM THE ANS LEACHABILITY STANDARD. Godbee, H.W.; Compere, E.L. (Oak Ridge National Lab., TN). Transactions of the American Nuclear Society ; 33: 205-206(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
STANDARDS;RADIOACTIVE WASTE DISPOSAL;LOW-LEVEL RADIOACTIVE WASTES;LEACHING;SOLID WASTES; SAFETY

2315 INTERRELATION OF SHORT-TERM LEACH TESTS AND LONG-TERM LEACHING. Compere, E.L.; Godbee, H.W. (Oak Ridge National Lab., TN). Transactions of the American Nuclear Society ; 33: 207-208(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
LOW-LEVEL RADIOACTIVE WASTES;LEACHING; RADIOACTIVE WASTE DISPOSAL;STANDARDS;SAFETY; SOLID WASTES

2316 MATERIAL PARAMETER DEFINED BY ANS STANDARD ON LOW-LEVEL WASTE LEACHING. Anders, O.U. (Dow Chemical Co., Midland, MI). Transactions of the American Nuclear Society ; 33: 208-209(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
STANDARDS;LOW-LEVEL RADIOACTIVE WASTES; LEACHING;SAFETY;RADIOACTIVE WASTE DISPOSAL; SOLID WASTES

2317 DECOMMISSIONING OF THE SURFACE FACILITIES ASSOCIATED WITH REPOSITORIES FOR THE DEEP GEOLOGICAL DISPOSAL OF HIGH-LEVEL NUCLEAR WASTE. Heckman, R.A. (California Univ., Livermore (USA). Lawrence Livermore Lab.). pp 105-119 of Decommissioning of nuclear facilities. Proceedings of an international symposium jointly organized by the IAEA and the OECD NEA and held in Vienna, 13-17 November 1978. Vienna: IAEA (1979).
From International symposium on the decommissioning of nuclear facilities: Vienna, Austria (13 Nov 1978).
A methodology is presented in this paper to evaluate the decommissioning of the surface facilities associated with repositories for the deep geological disposal of high-level nuclear wastes. A cost/risk index (figure of merit), expressed as man.rem, is proposed as an evaluation criterion. On the basis of this cost/risk index, we gain insight into the advisability of adapting certain decontamination design options into the original facility. Three modes are considered: protective storage, entombment, and dismantlement. Cost estimates are made for the direct labour involved in each of the alternative modes for a baseline design case. Similarly, occupational radiation exposures are estimated, with a larger degree of uncertainty, for each of the modes. Combination of these estimates produces the cost/risk index. To illustrate the methodology, an example using a preliminary baseline repository design is discussed.

2318 DISPOSAL OF WASTE RESULTING FROM THE DISMANTLING OF NUCLEAR FACILITIES. Lavie, J.M.; Giraud, R.G. (CEA, 75 - Paris (France)); Bardet, G.B.; Pouteaux, M.P. (Societe INFRATOME, 75 - Paris (France)); Charamathieu, A.C. (Societe de travaux en milieux ionisants, Paris, France). pp 337-352 of Decommissioning of nuclear facilities. Proceedings of an international symposium jointly organized by the IAEA and the OECD NEA and held in Vienna, 13-17 November 1978. Vienna: IAEA (1979). (In French)
From International symposium on the decommissioning of nuclear facilities: Vienna, Austria (13 Nov 1978).
The decommissioning of nuclear facilities will raise the problem of ultimate disposal of materials and equipment contaminated by a wide range of natural and artificial radioactive products. Classification of the waste stemming from the dismantling of nuclear facilities is based on the nature and half-life of the contaminating radionuclides. The presence of large quantities of noble metals and alloys among such waste is an incentive to devise decontamination procedures which would allow them to be reused. The problem has been solved as far as the storage and disposal of waste contaminated by activation products and fission products are concerned; the approach is described and illustrated by its application at the La Manche storage site in France. With regard to alpha-contaminated waste where the decay times are very long, the aim is to find and develop effective decontamination procedures for treating the waste and concentrating the alpha radioactivity. Furthermore, in the international organizations the representatives of the countries concerned are seeking to promote a consistent policy in seeking solutions to the problem of final storage of waste contaminated by transuranium elements. Studies have already begun, and will be continued, aimed at thorough decontamination of metal waste with a view to eliminating the 'extrinsic' radioactivity. The limits accessible by chemical and mechanical processes are inadequate and a research programme is now under way to ascertain how effective the fusion

decontamination process may be.

2319 DISPOSAL OF IODINE-129. Morgan, M.T.; Moore, J.G.; Devaney, H.E.; Rogers, G.C.; Williams, C.; Newman, E. (Oak Ridge National Lab., TN). Contract W-7405-ENG-26. pp 453-459 of Scientific basis for nuclear waste management. Volume 1. McCarthy, G.J. (ed.). New York, NY; Plenum Publishing Corporation (1979).

One of the problems to be solved in the nuclear waste management field is the disposal of radioactive iodine-129. This nuclide is one of the more volatile and long-lived fission products. Studies at ORNL have shown that fission products can be fixed in concrete for permanent disposal. Current studies have demonstrated that practical cementitious grouts may contain up to 18% iodine as barium iodate. The waste disposal criterion is based on the fact that harmful effects to present or future generations can be avoided by isolation and/or dilution. Long-term isolation is effective in deep, dry repositories; however, since penetration by water is possible, although unlikely, release was calculated based on leach rates into water. Further considerations have indicated that sea disposal on or in the ocean floor may be a more acceptable alternative.

2320 SELECTING SITES FOR URANIUM MILL WASTE DISPOSAL FACILITIES. Robinette, M.; Williams, R.E. (Univ of Idaho, Moscow). pp 244-265 of Uranium resource/technology seminar 2, 1979. Golden, CO; Colorado School of Mines (1979).

From Uranium resource technology seminar; Golden, CO, USA (12 Mar 1979).

This paper deals only with dsite selection properly interpreted geophysical well logs reduce drillings costs by guiding the location, proper drilling and construction of test holes, production or disposal wells. Geophysical well logs can provide information about water quality, fluid movement and lithology. These parameters are important for evaluation of a site where ground-water pollution may be a factor. 13 refs.

2321 PILOT HEATER TEST OF THE SWEDISH NUCLEAR FUEL SAFETY PROGRAM. Carlsson, H.; Stephanson, O.; Leijon, B. (Univ of Lulea, Swed). pp 85-90 of Fourth international congress on rock mechanics. Vol. 1. Salem, NH; A.A. Balkema (1979).

From 4. international congress on rock mechanics; Montreux, Switzerland (2 Sep 1979).

In the Stripa mine in Sweden, a pilot heater test has been carried out at 348 m level in a jointed granite. A central main heater was placed at the bottom of a 10 m deep borehole. At different distances from the heater, stress and temperature changes were monitored. Measurements of movements along major fractures on the surface and changes of water inflow in boreholes were also carried out. 6 refs.

2322 INFLUENCE OF THE TEMPERATURE ON GROUNDWATER MOVEMENTS IN JOINTED ROCK MASSES WITH APPLICATIONS TO RADIOACTIVE WASTE DISPOSAL. Lindblom, U.E. (Hagconsult, Goteborg, Swed). pp 229-236 of Fourth international congress on rock mechanics. Vol. 1. Salem, NH; A.A. Balkema (1979).

From 4. international congress on rock mechanics; Montreux, Switzerland (2 Sep 1979).

In the Swedish radioactive waste repository concept, influences of temperatures on groundwater flow are indirect on hydraulic conductivity and direct on thermally induced flow. The latter does not lead to the formation of convective cells but causes a slight upheaval of the regional flow above the repository. The effect on instrinsic permeability and viscosity is more pronounced which is demonstrated. 7 refs.

2323 FINAL STORAGE CONTAINER FOR RADIOACTIVE WASTE. Hempelmann, W.; Schuchardt, M.; Schilling, F. (to Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,726,335/A/. 21 Dec 1978. 12p. (In German).

The final storage container system makes it possible to store materials with high tritium or nuclear fuel activity in an underground storage location. The materials are placed in a container with cast steel shielding, which fits into an iron-hooped barrel. The intermediate space in the barrel is filled with concrete or bitumen, and the iron-hooped barrel is closed with a double lid system. The iron-hooped barrel is, in turn, accommodated in concrete shielding. The container and the iron-hooped barrel are sealed so as to be gastight.

2324 TVA TO BE FIRST AT CLEANING UP OLD URANIUM SITE. Koster, J. (South Dakota Resources Coalition). High Country News; 10: No. 23, 1-3(1 Dec 1978).

Scores of western towns share the problem of defunct uranium mills and millions of tons of mill tailings. People who live in these towns may run a higher risk of contracting cancer and birth defects, and may have a generally decreased life expectancy due to radiation from tailings piles. Remedial action has begun in Edgemont, S.D. Its uranium mill will probably be the first in the country to be decommissioned and have its tailings buried. The population could be exposed to radiation from the mill site in five possible ways: inhaled radon gas and radon ''''daughters''''; gamma radiation from the tailings and contaminated mill structures; inhalation and ingestion of alpha radiation from radium and thorium in the windblown tailings; contaminated water; and internal radiation due to uptake of radioactive elements by plants and animals. Plans for decommissioning the mill site are discussed. (2 maps, 2 photos)

2325 PROBLEMS OF RADIOACTIVE WASTE DISPOSAL IN A NUCLEAR MEDICINE DEPARTMENT. Havlik, E.; Bergmann, H.; Hoefer, R. (Vienna Univ. (Austria). 2. Medizinische Klinik). Radiobiologia, Radiotherapia ; 19: No. 6, 803-809(Dec 1978). (In German).

According to the increasing application of unsealed radioactive materials in nuclear medicine facilities the radiation exposure of medical and allied health personnel aggravates at the same rate. The main groups of radioactive wastes originate from diagnostic and therapeutic procedures, from test preparations as well as from excretions of patients treated with radiopharmaceuticals. The waste disposal methods differ according to the nature of the wastes (solid, liquid, gaseous) and to the half-life of the radionuclides used. As to the the disposal of radioactive excretions, measuring results of bedlinen and dishes contaminated with ^{131}I are discussed.

2326 WASTE MANAGEMENT. Nuclear News (La Grange Park, Illinois) ; 21: No. 15, 67-69(Dec 1978).

After an exceptionally smooth test period, the high-level waste vitrification plant at Marcoule, France, (initially a demonstration

plant) now operates on a routine industrial basis. At the plant, backlogged military waste is solidified, and natural uranium fuel is reprocessed. Boro-silicate glass was selected as the preferred solidification route. The pilot plant at Marcoule opened in 1969 and produced some 12 tons of glass containing five MCi of fission product activity. W. Germany, Belgium, and Japan are showing interest in the Vitrification de Marcoule (AVM) process. (2 diagrams, 2 photos)

2327 RADIOACTIVITY LEACH TESTS UNDER HIGH HYDROSTATIC PRESSURE ON FULL SIZE MONOLITHIC CEMENT PACKAGES OF LWR WASTES FOR SEA DUMPING. Seki, S.; Ouchi, K.; H., Isamu; Ito, A. (Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Nippon Genshiryoku Gakkaishi (Journal of the Atomic Energy Society of Japan) ; 20: No. 12, 887-896(Dec 1978). (In Japanese).

Monolithic cement-solidified products of simulated evaporator concentrates from LWR packaged in 200 l drums have been subjected to leach tests of radionuclides. The leach tests were crrried out under the condition which simulates hydrostatic pressure, temperature and flow velocity on the sea bed of 5,000 m depth. The principal results are obtained as follows: (1) No radioactivity in the leachant could be detected during the test extended to 675 hr on a cement-solidified product with asphalt capping. Water ingress through the asphalt capping layer was not perceived. (2) Solidified packages with intentionally prepared bare surface were tested to find out leaching coefficients(apparent diffusion coefficients) F sub(1). Values of F sub(1) were found to be 1.6 x 10^{-4} for ^{137}Cs and 1.2 x 10^{-9} cm^2/day for ^{60}Co, in case of the blast furnace slag cement (C-class) solidified product of simulated waste from BWR. As to the Portland cement-solidified product of simulated PWR waste, F sub(1) was 1.5 x 10^{-3} cm^2/day for ^{137}Cs. (3) By using these leaching coefficients, a long-term estimation of the amounts leached out was attempted considering the decay of radionuclides.

2328 CONTROL AND MONITORING SYSTEM OF RADIOACTIVE EFFLUENTS IN RADIOISOTOPE FACILITIES. Yamaguchi, K.; Matsuno, K.; Inagaki, S.; Maekawa, Y. (Fuji Electric Co. Ltd., Kawasaki, Kanagawa (Japan)). Fuji Jiho (The Fuji Electric Journal) ; 51: No. 12, 691-696(Dec 1978). (In Japanese).

This paper is described on the control and monitoring system for low-level radioactive effluents in radioisotope facilities. At first, this paper presents general description of the methods for radioactive effluent treatment. The methods are storing the effluent in tanks, dilution, and concentration. The effluents are usually stored in storage tanks, then transferred into dilution tanks. After dilution, the effluents are discharged. Intensity of radioactivity is measured before and during discharge. A system for the control and monitoring of radioactive effluents was designed and constructed for the use of Tohoku University. The system consists of three storage tanks and a dilution tank. The transfer of effluents is made by valve control. The control can be done automatically. When the level of activity is lower than the pre-set valve, the effluent is discharged. Another system was designed and constructed for the use of Hokkaido University. The system consists of a cesspool, two draining tanks, eight storage tanks and a dilution tank. The transfer of effluents is made by a tandem method. The operation can be made automatically. When the radioactive concentration is larger than the permissible valve, the dilution of effluents is made automatically.

2329 BUILDING FOR TREATMENT OR STORAGE OF TOXIC OR RADIOACTIVE MATERIAL. Stoll, W.; Hagenberg, W. (to Alpha Chemie und Metallurgie G.m.b.H. (ALKEM), Hanau (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,620,585/B/. 16 Nov 1978. 3p. (In German).

In order to shield a building, in which toxic or radioactive material is stored, with relatively small effort there is proposed to place it in a water pool. According to the invention the roof shall be so far below the water surface that the water volume above is at least equal to the inner volume of the house. Other subclaims of the patent refer to the access to the building, the ventilation system, the cleaning of the water and the cover of the water surface.

2330 GEOLOGICAL CONDITIONS OF THE USE OF THE SALIFERON STRATA OF THE UKRAINIAN SSR FOR WASTE DISPOSAL. Lepkij, S.D.; Khrushchov, D.P. Visnik Akademii Nauk Ukrains'koi RSR ; No. 11, 78-81(Nov 1978). (In Ucrainian).

Analyzed are geological peculiarities of the saliferon formations of the Ukrainian-Dnepropetrovsk-Donetsk hollow, of the north-west Donas, Prikarpatija and Zakarpatian cavity to find out the suitable places for the burial of highly toxical and radioactive wastes. The solid and liquid wastes should be transformed to the pasty state before the burial with the further pumping into the underground cavities.

2331 TECHNICAL STANDARD ON DISPOSAL OF RADIOACTIVE WASTES. Genshiryoku Iinkai Geppo (Journal of Atomic Energy Commission) ; 23: No. 8, 2-5(Nov 1978). (In Japanese).

The technical standard on the disposal of radioactive wastes submitted to the Atomic Energy Commission of Japan by the subcommittee on radioactive waste management techniques is presented. Disposal of radioactive wastes is made on the sites of enterprises concerned and in areas outside the sites (including the sea). Appropriate measures must be taken in both cases, according to the nature of wastes (gas, liquid and solid) and to the method of the disposal (discharge, storage, and open abandonment). In the disposal of radioactive wastes on the site of a factory or enterprise, direct release, tank containment, incineration, etc. are used. In the disposal in areas outside the sites, and appropriate storage facility of sea disposal is used. In the latter case, the sealing in vessels or the solidification within metallic vessels using hydraulic cement is used.

2332 METHOD OF TAKING SLUDGES OUT OF RADIOACTIVE LIQUID WASTES STORAGE VESSEL. Tokuda, T. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 1953-122,099/A/. 25 Oct 1978. 2p. (In Japanese).

Purpose: To facilitate the exhaustion of sludges and prevent the increase in the concentration of radioactivity within the vessel. Method: A bucket is inserted into the liquid wastes within a radioactive waste storage vessel, and the quantity of sludges in the liquid wastes accumulated in the bucket is detected. According to the results of detection, when a predetermined quantity of sludges has been accumulated in the bucket, the bucket is taken out of the storage vessel and the sludges are treated in other facilities.

2333 METHOD AND DEVICE FOR MARINE DISPOSAL OF RADIOACTIVE WASTES. Tsuda, S. (to Utoku Express Co., Yokohama (Japan)). Japanese Patent 1953-122,100/A/. 25 Oct 1978. 6p. (In Japanese).

Purpose: To provide the subject method and device wherein a unit throw-away can body formed by firmly tying a several drum vessels is thrown away in seawater thereby carrying out a throw-away operation rapidly, safely and highly efficiently. Method: In the hatch is stacked in multistage a unit throw-away can body formed by firmly tying four drums. A self-travelling suspended bedplate with a thrown away rail device runs on rails, and is fixed to a necessary position. An accomodation and throwing away operation control chamber applied with radiation protection is attached to this self-travelling suspended bedplate to perform surveillance of the interior of the chamber, and accommodation and throwing away operation is carried out by a picture image sent from a television camera and safe and accurate operations.

2334 RADIO-ACTIVE WASTE DISPOSAL AND DEEP-SEA BIOLOGY. Rice, A.L. (Institute of Oceanographic Sciences, Wormley, Godalming, Surrey (U.K.)). Oceanologica Acta ; 1: No. 4, 483-491(Oct 1978).

The deep-sea has been widely thought of as a remote, sparsely populated, and biologically inactive environment, well suited to receive the noxious products of nuclear fission processes. Much of what is known of abyssal biology tends to support this view, but there are a few disquieting contra-indications. The realisation, in recent years, that many animal groups show a previously unsuspected high species diversity in the deep-sea emphasized the paucity of our knowledge of this environment. More dramatically, the discovery of a large, active, and highly mobile abysso-bentho-pelagic fauna changed the whole concept of abyssal life. Finally, while there is little evidence for the existence of vertical migration patterns linking the deep-sea bottom communities with those of the overlying water layers, there are similarly too few negative results for the possibility of such transport mechanisms to be dismissed. In summary, biological knowledge of the abyss is insufficient to answer the questions raised in connection with deep-sea dumping, but in the absence of adequate answers it might be dangerous to ignore the questions.

2335 SORPTION AND MIGRATION STUDIES OF FISSION PRODUCTS FOR GROUND WASTE DISPOSAL. Lee, S.H.; Chun, K.S. (Korea Atomic Energy Research Inst., Seoul (Republic of Korea)); Yoon, Y.K. (Korea Inst. of Science and Technology, Seoul (Korea)). Journal of the Korean Nuclear Society ; 10: No. 3, 153-164(Sep 1978).

The problems of solid waste disposal into the ground in connection with environmental aspects in the vicinity of a site would be very significant, though ground disposal for solid waste is a safe and economical method. Studies of the waste-movement and migration of radionuclides (Sr-90 and Cs-137) for the disposal into the ground were performed under laboratory and field conditions. Affinity of the soils for radionuclide solution was higher than that in the acid solution. The sorption of radionuclides by the soils showed a time-dependent reaction. The migration rates of radiostrontium and radiocesium were a range of 3.73×10^{-3} to 10.9×10^{-3} cm/day. The nuclides in the soil migrate much more slowly than the water, probably due to its high exchange capacity. The observed distribution of tritium was compared with that calculated by a mathematical model based on diffusivity. This study suggests that the tritiated water can be used to trace the movement of ground water.

2336 DISPOSAL O RADIOACTIVE WASTES FROM FISSION REACTORS. Cohen, B.L. (Pittsburgh Univ., PA (USA). Nuclear Physics Lab.). Uspekhi Fizicheskikh Nauk ; 126: No. 1, 101-121(Sep 1978). (In Russian).

The properties of radioactive wastes formed during the operation of nuclear reactors are presented in a popular form, and their possible effects on human health and environment is studied. The plans of their disposal in safe underground waste storages are discussed. A variant of the disposal of radioactive wastes at the depth of 600 meters in salt stratum is considered. Annual wastes of all nuclear power plants of the USA (after the complete transition to nuclear energetics) would occupy less than a half of a square kilometer, taking account of heat evolution of containers with borosilicate glass. The possibility of waste leakage from a storage is considered; a conclusion is made that this results in 0.4 lethal cases for the first mullion years plus 4 more cases for next 100 million years. Thus, from the point of view of long prospects, nuclear energetics provides the means for cleaning the Earth from natural radioactivity, which causes about 50 lethal cases for each million years.

2337 HANDLING OF SPENT NUCLEAR FUEL AND FINAL STORAGE OF VITRIFIED HIGH LEVEL REPROCESSING WASTE. NUCLEAR FUEL SAFETY PROJECT. Neue Technik ; 20: No. 9, 443-447(Sep 1978).

From 5. International fair and technical meetings of nuclear industries; Basel, Switzerland (3 - 7 Oct 1978).

In April 1977 the Swedish Parliament passed a Law, which stipulates that new nuclear power units can not be put into operation unless the owner is able to show that the waste problem has been solved in a completely safe way. The task of investigating how radioactive waste from a nuclear power plant should be handled and stored was previously the responsibility of the National Council for Radioactive Waste Management (PRAV). This Council was formed in November 1975 as the result of a proposal made by the Government Committee on Radioactive Waste (AKA Committee). In response to the Government bill proposing the Law, the power industry decided in December 1976 to give top priority to the investigation of the waste problem in order to meet the requirements of the Law. Therefore, the Nuclear Fuel Safety Project (KBS) was organized. The first report from the KBS project entitled 'Handling of spent nuclear fuel and final storage of vitrified high level reprocessing waste' was submitted in December 1977.

2338 SHAFT CONVEYOR. Nolte, K.H.; Simmich, K.; Verhoeven, J.; Sondermann, W.; Frotscher, H.; Schuchardt, M.; Wolf, R.; Kolditz, H.; Schwaegermann, H.F. (to Siemag Transplan G.m.b.H., Netphen (Germany, F.R.)); Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.); Gesellschaft fuer Strahlen- und Umweltforschung m.b.H., Muenchen (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,703,279/A/. 10 Aug 1978. 15p. (In German).

This device for the conveyance along shafts of radioactive waste usually enclosed in metal

barrels is based on a single mechanism which has proved successful in mining. The rope-hauled conveying vessel runs on 4 rollers above and below between guide rails on a vertical shaft and in its highest position is above ground in front of a loading device. A motor driven rolling table moves a standing barrel with the material being conveyed to in front of the loading opening of the conveying vessel, where a lever prevents further movement until the conveying vessel is in exactly the right position. After retraction of the interlocking lever, the rolling table moves the material being conveyed on the further rollers in a framework in the conveying vessel. This roller framework with its slightly transverse position leans the transport barrel against the vessel rear wall during transport. In the deep position of the conveying vessel the barrel moving downwards runs off the roller framework due to a slight tilting movement and falls into the cavern. Levers which can rotate around vertical axes grip the barrel in the conveying vessel and secure its position during transport. In the loading and unloading positions, i.e. in the highest and lowest position of the conveying vessel in the shaft, projecting rollers run on the back of the conveying basket on solid control curve paths. Rods connected to the rollers move the stop lever in the conveying vessel back against spring tensions. A barrel can be tipped out below or a new barrel can be loaded above. The tipping of he roller framework (at the lower end of the shaft) is controlled in the same way. The rolling table of the loading device automatically matches its height to the roller framework in the conveying vessel. A moving arm with contact shoe follows the standing barrel in the conveying vessel and checks its correct position. It takes over its task if the rolling table fails.

2339 MANUFACTURING HIGH-INTEGRITY STAINLESS-STEEL WASTE STORAGE TANKS. Gifford, A.F.; Mitra, S.; Holmes, M. Nuclear Engineering International ; 23: No. 275, 47-49(Aug 1978).

The construction and testing of storage tanks for handling highly active liquid wastes from British Nuclear Fuels' reprocessing operations are described. The tanks, 20 ft dia. 20 ft high, 18/13/1 Nb stainless steel, are housed in thick-walled concrete cells and are cooled to remove fission product decay heat. The internal fittings, also of the same steel, include cooling coils and various small vessels. To reduce site work to a minimum the tank is split into three sections, the welding and testing of which are discussed. The cooling coil assembly is split into three works fabricated and tested units in order to reduce the number of site welds. The standards for site work are as exacting as those employed at the works. The controls which are exercised for quality assurance are outlined.

2340 NATIONAL AND INTERNATIONAL ACTIVITIES IN THE FIELD OF UNDERGROUND DISPOSAL OF RADIOACTIVE WASTES. Richter, D.K. (International Atomic Energy Agency, Vienna (Austria). Div. of Nuclear Safety and Environmental Protection). International Atomic Energy Agency Bulletin ; 20: No. 4, 30-41(Aug 1978).

The paper underscores the importance of the safe disposal of radioactive waste originating from nuclear power plants. In many countries the continued industrial development of nuclear power has been made dependent on acceptable solutions to the problems of radioactive waste disposal. A brief summary is given of the work done in this area by fifteen Member States of the IAEA as well as an outline of the assistance and coordination that has been provided to this research effort by four international organizations including the IAEA.

2341 RADIOACTIVE WASTE. Blaylock, B.G. (Oak Ridge National Lab., TN). Journal of the Water Pollution Control Federation ; 1286-1291(Jun 1978).

42 papers dealing with high-level and long-lived radioactive wastes are reviewed. Many of these are general review papers covering a large body of literature. Different methods of waste disposal, i.e., disposal in geologic formations, ice sheet disposal, ocean disposal, and land burial and storage, are assessed as to their effects on human health through water pollution by the leached radioactivity. (BLM)

2342 INDUSTRIAL WASTES: RADIOACTIVE WASTE. Blaylock, B.G. (ORNL). Journal of the Water Pollution Control Federation ; 50: No. 6, 1286-1291(Jun 1978).

To render high level radioactive waste nontoxic, isolation from humans and their environment is necessary for 500,000-1,000,000 years. A consensus is that only geological formations will maintain integrity this long. Numerous methods have been proposed. Literature on radioactive waste disposal is reviewed. Ice sheet disposal, ocean disposal, routine release of low level waste, treatment, land burial and storage, mathematic models for transport of dissolved radionuclides, and transuranics are surveyed. (42 references)

2343 SHIELDING THICKNESS CALCULATIONS FOR LINE GAMMA-RAY SOURCES IN REGULAR GEOMETRICAL ARRAY. Lee, C.C.; Ro, S.G. (Korea Nuclear Fuel Development Inst., Taejon (Republic of Korea)). Bangason Bango Hakhoe Chi ; 3: No. 1, 29-32(Jun 1978).

A shielding calculation has carried out for a storage vault of 5292(42x42x3) waste drums in which the mixed radioactive gamma-emitters of fission products are contained. The required ordinary concrete shielding thickness seems to be approximately 50cm. The results in terms of dose rate for polyenergy gammas appear to be considerably higher than those of the averaged energy gamma.

2344 METHOD TO CLOSE ROCK CAVITIES. Holman, R.R. (to Westinghouse Electric Corp., East Pittsburgh, PA (USA); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,749,110/A/. 18 May 1978. 14p. (In German).

There is described a device allowing to close openings in rock (e.g. in case of storage facilities for radioactive waste in salt beds) by means of molten rock of the same composition in such a way that there will be possible almost equivalent values of density and lower permeabilities than in the solid rock. An elongated tubular shell is introduced into the cavity to be closed and through an inner tube running inside it gravel is supplied under pressure. A heating facility arranged between the tubes is heating up the gravel and the surrounding rock until gravel as well as rock will melt and restore the original ground formation. The device is described in detail.

2345 PREPARATIONS FOR SEA DISPOSAL OF LOW LEVEL RADIOACTIVE WASTES. Tsuchiya, M. (Waste Management Center (Japan)). Nippon Genshiryoku Gakkaishi (Journal of the Atomic Energy Society of Japan) ; 20: No. 5, 319-

322(May 1978). (In Japanese).
The establishment of processing and disposal systems for radioactive wastes is one of the most important things in the promotion of nuclear power development. Among these, those for low level wastes are urgent because of their large quantities. Concerning the trial sea disposal of such wastes being planned, the following matters are described: survey of candidate sea areas, safety assessment of sea disposal, solidification of waste, and a disposal ship.

2346 EFFECT OF DIMENSION OF SPECIMEN ON AMOUNTS OF CESIUM-137, STRONTIUM-90, AND COBALT-60 LEACHED FROM MATRIX OF HARDENED CEMENT GROUT. Matsuzuru, H.; Ito, A. (Japan Atomic Energy Research Inst). Journal of Nuclear Science and Technology (Tokyo) ; 15: No. 4, 296-301(Apr 1978).
The relationship between the fraction leached and the ratio of surface area and volume of a specimen is examined to assess the safety of a cement composite for disposal. For strontium-90, cesium-137, and cobalt-60, the amount leached is directly proportional to the surface area-volume ratio. (3 graphs, 16 references, 2 tables)

2347 DURABILITY OF CONTAINERS FOR STORING SOLIDIFIED RADIOACTIVE WASTES. Angerman, C.L.; Rankin, W.N. (Savannah River Lab., Aiken, SC). Contract AT(07-2)-1. Materials Performance ; 17: No. 4, 9-18(Apr 1978).
Details are given of an analysis designed to identify materials suitable for storage of radioactive wastes incorporated into concrete or glass in above ground ambient air. Materials evaluated were carbon and low alloy steels, 304L steel, and Inconels 600 and 625. Wall thicknesses required for waste canisters were estimated from considerations of oxidation of the external surface, reaction with the waste-bearing concrete or glass, and strength to withstand the high internal pressures possible during thermal accidents. No material is expected to suffer excessive general, intergranular or pitting attack or any deterioration sufficient to disqualify it for the anticipated 100 year service life. The most desirable material from the standpoint of both properties and cost was 1020 carbon steel. For the glass waste form, can walls 1.27 cm (0.5 in.) would be required. For the concrete waste form, can walls 25.4 cm (10 in.) would be required if fire survival was chosen as a design-basis accident.

2348 UNDERGROUND STORAGE OF NUCLEAR INDUSTRY WASTES. de Marsily, G.; Ledoux, E. (Ecole Nationale Superieure des Mines, 75 - Paris (France)); Margat, J. (Bureau de Recherches Geologiques et Minieres (BRGM), 75 - Paris (France)); Barbreau, A. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette . Annales des Mines ; 184: No. 4, 35-52(Apr 1978). (In French).
The nature of nuclear cycle wastes and the various solutions for their elimination are briefly described. The part played by the geological barrier in the radioactivity containment is considered. Some radionuclides have a long life at a geological scale. So, it seems that waste disposal safety could not be based on a low probability of incident occurrence but rather on the proof that even in the case of a geological accident a relative containment of wastes could be assured. The element migration due to ground water has been modeled. This model has been applied to various theoretical geological formations in order to determine the most important parameters.

2349 (ORNL-tr--4672) PREPARATIONS FOR SEA DISPOSAL OF LOW-LEVEL RADIOACTIVE WASTE. Tsuchiya, M. Translated from Nippon Genshiryoku Gakkaishi (Journal of the Atomic Energy Society of Japan) ; 20: 319-322(7 Mar 1978). 8p. NTIS, PC A02/MF A01.
Establishment of a radioactive waste disposal system is one of the most important items in nuclear energy development. Among the wastes, low-level radioactive waste is produced in large quantities; thus a system for its disposal has to be established as soon as possible. The preparation for sea disposal tests which will be carried out in the near future in order to establish a sea disposal system, safety evaluation of sea disposal based on the results of investigation of the proposed sea site, the conditions which are necessary for waste disposal, and ships which may be used for the operation are discussed.

2350 WILL VITRIFIED HIGH ACTIVE REACTOR WASTE BE DEPOSITED ON THE SEABED. Koksvik, R.M. Ingenioer-nytt ; 14: No. 16, 6-7(24 Feb 1978). (In Norwegian).
The NRPB in the UK has carried out a preliminary study on the consequences of the disposal of high active waste on the ocean bed at great depths. This is reported in 'Assessment of the radiological protection aspects of disposal of high level waste on the ocean floor', by P.D. Grimswood and G.A.M. Webb (NRPB-R 48). This report is here briefly summarised and commented on. It deals with the radiological consequences to man of the erosion and corrosion of glassified (vitrified) radioactive waste, in the deep (>4000m) ocean, radionuclide migration and path ways to man. The conclusion is that considerations of radiological protection do not preclude the disposal of specially treated radioactive waste on the ocean bed.

2351 DISPOSAL OF NUCLEAR WASTE. Lorentzen, J. Teknisk Ukeblad ; 125: No. 9, 42(23 Feb 1978). (In Norwegian).
In reviewing Noyes Data Corporation's new book 'Radioactive waste disposal' the reviewer criticises the omission of the Swedish proposal to deposit vitrified waste clad in stainless steel in 500m deep shafts in bedrock. This in spite of a claim that the most advanced typographical methods have been used to ensure up-to-dateness. It is also pointed out that the chapter on fusion reactors presents outdated material. Otherwise the reviewer praises the thoroughness and completeness of the book, which has altogether 200 literature references.

2352 ARRANGEMENT FOR STORAGE OF RADIOACTIVE WASTE MATERIALS. (to STEAG Kernenergie G.m.b.H., Essen (Germany, F.R.)). Netherlands Patent 7,800,628/A/. 18 Jan 1978. 7p. (In Dutch).
The arrangement for the storage of radioactive wastes, and esp. that of radioactive products from nuclear power stations, with a storage reservoir with a standardised screening protection function, which is manufactured from a screening material in which is contained a collection space for the waste materials, characterised by in that the collection space for the waste materials includes a smaller insertable container is associated with an external collection reservoir and a number of auxiliary reservoirs of different sizes which may be selected, whilst the inner space between the inner wall

of the terminal wall reservoir and the auxiliary reservoir is subsequently filled with a screenining substance.

2353 STORAGE AND DISPOSAL OF NUCLEAR WASTES: PROSPECTS FOR THE NEXT 25 YEARS. Lyons, W.C. (Sci Appl, Inc, Hydro and Geoeng Div). Proceedings, Intersociety Energy Conversion Engineering Conference ; 2: 1290-1294(1978). (CONF-780801--P2).

From 13. intersociety energy conversion engineering conference; San Diego, CA, USA (20 Aug 1978).

This paper discusses the processing, handling, storage, and disposal options available for both commercial high-level radioactive wastes and defense radioactive wastes. A review is made of the past performance of government in finding solutions for these pressing problems. The present inventory of commercial and defense waste is discussed and the inventory for the near future projected. The relationships between storage and disposal technologies and the commercial and defense wastes are discussed. It is suggested that the commercial fuel cycle will be delayed as long as defense and commercial wastes disposal technologies are not demonstrated. An assessment is made as to which technologies and techniques appear to be the most useful for accomplishing the critical near term task of isolating the defense wastes. A discussion is then made as to how these technologies and techniques will be used for the commercial fuel cycle.

2354 STABILIZATION OF URANIUM MILL TAILINGS. Tibbs, N.H. (Southeast Missouri State Univ., Cape Girardeau); Rath, D.L.; Otto, E.E.; Alsup, L.F. pp 219-232 of Fifth annual UMR-DNR conference on energy. Morgan, J.D. (ed.). Rolla, MO: Univ. of Missouri (1978).

From 5. conference on energy; Rolla, MO, USA (Oct 1978).

Large volumes of uranium mill tailings are being generated, requiring comprehensive long-term management programs to reduce health and environmental risks. Management programs are available which provide adequate secure long-term storage, but research on innovative concepts is necessary to develop improved, more efficient methods.

2355 (ANL-Trans--1181) HANDLING HIGH-LEVEL RADIOACTIVE WASTES. Heimerl, W. Translated from Chemie in Unserer Zeit ; 12: No. 3, 82-88(1978). 21p. Dep. NTIS, PC A02/MF A01.

High-activity waste (HAW) solutions which result from the reprocessing of irradiated reactor fuels is a problem because of the long-lived radioactivity. Tank storage is only an intermediate solution. Solidification of HAW solutions is a better solution, particularly vitrification. The German PAMELA process is described in detail; it involves producing the glass in the form of beads in a heavy metal matrix. Plans to store the solidified HAW in salt domes are discussed. From the technical standpoint, a large facility can be built by the 1990's for disposing of the waste from an industrial reprocessing plant. 9 figures, 2 tables. (DLC)

2356 INVESTIGATION OF GAS FORMATION ON A LOW-LEVEL RADIOACTIVE WASTE DISPOSAL SITE. Eng, J.; Giardina, P.A. (Environmental Protection Agency, New York, NY). pp 519-524 of Energy and the environment. Proceedings of the fifth national conference. Nichols, D.G.; Rolinski, E.J.; Servais, R.A.; Theodore, L.; Buonicore, A.J. (eds.). Dayton, OH: American Institute of Chemical Engineers (1978).

From 5. national conference on energy and the environment; Cincinnati, OH, USA (31 Oct 1977).

The results of work at low-level radioactive waste disposal sites will assist EPA in fulfilling its responsibility to establish requirements for protection of the environment and public health. Two workshops have already been held to discuss public policy. It is expected that low-level standards will follow in late 1981.

2357 RELEVANCE OF NATURAL RETENTION EXPERIENCE TO NUCLEAR WASTE MANAGEMENT. Leachman, R.B.; Bishop, W.P. (Nuclear Regulatory Commission, Washington, DC (USA)). pp 700-707 of Les reacteurs de fission naturels. Vienna, Austria: International Atomic Energy Agency (1978).

A current need exists for providing the public and its representatives with enough information to judge the effectiveness and safety of nuclear waste disposal. This need might be largely fulfilled by careful and understandable presentations of relevant information from the experiences of retaining Oklo wastes and other radioactive materials in inadvertent repositories in geological media. This information would be particularly helpful during the interim while deliberate repositories for wastes are being designed, licensed, built and proven. Experiences with natural and inadvertent repositories give information on a broad range of factors. Factors of interest include time-spans of demonstrations, nature of the solidified waste form, geological surroundings of the wastes, and the different radioactive elements involved.

2358 FAR FIELD HEATING EFFECTS OF A RADIOACTIVE WASTE DEPOSITORY IN HARD ROCK. Hodgkinson, D.P.; Bourke, P.J. (UKAEA, Harwell. Atomic Energy Research Establishment). pp 237-249 of In situ heating experiments in geological formations. Seminar, Ludvika, Sweden, 13-15 Sep 1978. Proceedings. Paris, France: OECD (1978).

Fission product heating of the rock surrounding a depository for high level radioactive waste, will result in high temperatures and high thermal gradients over distances of several hundred metres for many centuries. The consequent thermal expansion of the rock leads to stresses which could alter the fracture pattern and therefore the permeability of the rock. These problems are assessed by considering an idealised model of a depository for which analytic solutions to the temperature and stress fields are derived. A related problem is that any water present in the fissures will tend to rise because of its decrease in density on heating. If the water had previously leached away some of the radionuclides in the waste, then this convective transport constitutes a possible leakage path back to the biosphere. For the low permeabilities expected at a depository site, it is possible to linearise the resulting equations and derive analytic solutions for the flow velocities. This procedure has been carried out for the idealised depository model, in order to estimate the magnitude of these effects.

2359 Experiences de degagement de chaleur in situ dans les formations geologiques. Compte rendu. (IN SITU HEATING EXPERIMENTS IN GEOLOGICAL FORMATIONS. PROCEEDINGS). Paris,

France; OECD (1978). 282p. (In English and French).

From Seminar on in situ heating experiments in geological formations; Ludvika, Sweden (13 - 15 Sep 1978).

Emplacement into appropriate deep geological formations is considered the most promising solution for the disposal of long-lived radioactive wastes. Certain types of waste generate significant amounts of decay heat and, after emplacement in the disposal formation, may be responsible for complex chemical and physical changes. Practically all countries with geologic disposal programmes are involved in the study of the behavior of potential disposal rocks when exposed to heat sources. These investigations are conducted in the laboratory and in the field, both at shallow depths and in mines hundreds of metres underground. Deep experiments are obviously the most interesting since they approach actual disposal conditions. The Swedish Nuclear Fuel Supply Company (SKBF), which has been responsible for a very intense programme of research and development in the field of geologic disposal in crystalline rocks has been conducting the experimental programme at the Stripa mine. These proceedings represent a record of the papers and the discussions at the meeting and reflect the state of the art in this important field.

2360 Experiences de degagement de chaleur in situ dans les formations geologigues. (IN SITU HEATING EXPERIMENTS IN GEOLOGICAL FORMATIONS). Paris, France; OECD (1978). vp. (In French). (CONF-7809154--).

From OECD seminar on in situ heating experiments in geological formations; Ludvika, Sweden (Sep 1978).

Separate abstracts are prepared for individual items.

2361 THERMAL EFFECTS IN DISPOSAL OF RADIOACTIVE WASTE IN HARD ROCK. Bourke, P.J.; Hodgkinson, D.P. (UKAEA, Harwell. Atomic Energy Research Establishment); Batchelor, A.S. (Camborne School of Mines, Pool, Cornwall, England). pp 109-117 of Experiences de degagement de chaleur in situ dans les formations geologigues. Paris, France; OECD (1978).

From OECD seminar on in situ heating experiments in geological formations; Ludvika, Sweden (Sep 1978).

The first objective of the UKAEA programme of field heating experiments is to study any variations in thermal conductivity of granite over long (10 - 100m) distances heated to high (100's°C) temperatures for about a year. A description is given of the first tests with an 18 kW heater at 50 m depth and 72 thermocouples in the surrounding 25m radius sphere of rock. The reasons for choice of this scale of experiment are presented and the problems encountered and initial results are described. The further objectives of these experiments are to investigate thermal stresses and any cracking of the granite so that thermally induced movement of water through rock with both its natural and any increased permeability can be quantified. Measurements to be made of the mechanical and permeable properties as the rock heats are described.

2362 PILOT HEATER TEST IN THE STRIPA GRANITE. Carlsson, H.; Stephansson, O. (Division of Rock Mechanics, University of Lulea, Lulea, Sweden). pp 177-189 of Experiences de degagement de chaleur in situ dans les formations geologiques. Paris, France; OECD (1978).

From OECD seminar on in situ heating experiments in geological formations; Ludvika, Sweden (Sep 1978).

In the Stripa mine, situated in the central part of Sweden, a pilot heater test has been carried out at 348 m level. The type of rock is a granite with a rather high frequency of fractures. A central main heater with a length of 3 m, a diameter of 30 cm and a total power of 6 kW was placed at the bottom of a 10 m deep borehole. At different distances, varying from .85 up to 2.95 m from the heater, stress and temperature changes were monitored. Additional measurements of movements along major fractures on the surface and changes of water inflow in boreholes were carried out. To some extent these measurements have been found adequate for the acquisition of full-scale testing.

2363 APPLICATION OF LABORATORY HYDROTHERMAL STUDIES TO HEATING EXPERIMENTS. Chapman, N.A. (Institute of Geological Sciences, London (UK)). pp 229-235 of Experiences de degagement de chaleur in situ dans les formations geologiques. Paris, France; OECD (1978).

From OECD seminar on in situ heating experiments in geological formations; Ludvika, Sweden (Sep 1978).

One of the anticipated effects of emplacing high-level radioactive waste in a mined repository will be the generation of widespread hydrothermal reactions involving the rock, the waste and any fluid phase present. No rock unit is entirely free of fluid as it can exist both as groundwater and physically and chemically bound species. The resultant reactions could cause severe damage to the rock and change its ability to contain the waste. Laboratory studies of these reactions at high pressure and temperature are described and the need for related geochemical studies during the course of large scale heating experiments is emphasized. The type of co-operative research envisaged between those involved in field heating and laboratory studies is discussed.

2364 HYDROGEOLOGICAL INVESTIGATIONS IN TWO BOREHOLES IN THE STRIPA TEST STATION. Hansson, K.; Almen, K.E.; Ekman, L. (Geological Survey of Sweden, Uppsala). pp 133-143 of Experiences de degagement de chaleur in situ dans les formations geologiques. Paris, France; OECD (1978).

From OECD seminar on in situ heating experiments in geological formations; Ludvika, Sweden (Sep 1978).

The investigations included the following: water injection tests in a horizontal core-borehole, Dbh 2; hydrostatic pressure tests in Dbh2; determination of permeability in a vertical core-borehole, Dbh VI. The results of the water injection tests gave very little information due to the fact, that an air cushion was trapped in the borehole. The hydrostatic pressure tests in Dbh 2 were made in that part of the borehole, which is situated beyond the drift (45 - 97 m). Most of the pressure curves were difficult to interpret. The hydrostatic pressure in the section 89 - 97 m (end of the hole) was calculated to 1.67 Mpa. Near the end of the drift (46.00 - 49.71 m) the pressure was 0.22 Mpa. The permeability tests in Dbh VI were performed by measuring the water-flow and hydrostatic pressure in different levels. The calculated average permeability was 6.5×10^{-10} m/s.

2365 BEHAVIOR OF CLAY EXPOSED TO HEATING. Heremans, R.; Buyens, M.; Manfroy, P. (Centre d'Etude de l'Energie Nucleaire, Mol (Belgium)).

pp 13-30 of Experiences de degagement de chaleur in situ dans les formations geologiques. Paris, France; OECD (1978). (In French)

From OECD seminar on in situ heating experiments in geological formations; Ludvika, Sweden (Sep 1978).

In the frame of their R and D program on geological burial of solidified radioactive waste, the C.E.N./S.C.K. undertook experimental and theoretical work on the behavior of the Boom clay against heat. The work is performed under contract with the Commission of European Communities. In a first phase a series of chemical and physical properties were determined on clay samples taken at various depths during the core boring performed on the C.E.N./S.C.K. site in 1975. In a second phase, a simulated high level waste heat source was developed and tested in view of representative heat transfer experiments into the geological formation. In parallel to the experimental work, computerized theoretical studies were undertaken aiming an evaluation of heat effect of a vitrified high level waste repository on an underground structure in clay.

2366 STATUS OF THE SIMULATION EXPERIMENTS IN CASED BOREHOLES TO BE RUN IN THE ASSE SALT MINE. Hofmann, B.H.W. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). pp 83-93 of Experiences de degagement de chaleur in situ dans les formations geologiques. Paris, France; OECD (1978).

From OECD seminar on in situ heating experiments in geological formations; Ludvika, Sweden (Sep 1978).

The investigation of the rock mechanical behavior of cased boreholes in salt after the insertion of heat sources is a main subject of the joint experimental program being performed by the Gesellschaft fuer Strahlen- und Umweltforschung (GSF) and Kernforschungszentrum Karlsruhe (KfK) groups in the Asse Salt Mine. The experiments will provide rock mechanical data, e.g., stress distribution and strain within an inhomogeneous temperature field, for comparison with theoretical calculations. Technical data will be obtained for the construction of a tubing granting the retrievability of HLW-canisters over a period of 10-20 years.

2367 EXPERIENCE OF DIAMOND-COREDRILLING IN STRIPA. Hugo-Persson, T. (Hagby Bruk AB, Sweden). pp 221-225 of Experiences de degagement de chaleur in situ dans les formations geologiques. Paris, France; OECD (1978).

From OECD seminar on in situ heating experiments in geological formations; Ludvika, Sweden (Sep 1978).

The subsurface drilling operation was carried out in the full scale, time scale, extensometer and ventilation drifts. Over 150 boreholes ranging in diameter from 38 mm to 406 mm and varying in depth from 4.5m to 14.5m were diamond drilled using Toram, Diamec and XF 60/90 H drill machines. All boreholes were cored and all core from boreholes larger than 56 mm was oriented.

2368 GEOTHERMAL IN SITU EXPERIMENTS IN THE ASSE SALT-MINE. Kopietz, J.; Jung, R. (Bundesanstalt fuer Geowissenschaften und Rohstoffe, Hannover (Germany, F.R.)). pp 45-59 of Experiences de degagement de chaleur in situ dans les formations geologiques. Paris, France; OECD (1978).

From OECD seminar on in situ heating experiments in geological formations; Ludvika, Sweden (Sep 1978).

The paper presents design and results of in situ experiments carried out by the Bundesanstat fuer Geowissenschaften und Rohstoffe (Federal Institute for Geosciences and Natural Resources, F.R. of Germany) in the Asse salt-mine. With reference to model calculations of the temperature field which is produced in salt formations by radioactive waste, temperature measurements in the area of electrical heating elements and in situ measurements of thermal conductivity have been performed. The measured temperatures are in good accordance with the theoretical prediction. Preliminary results of the thermal conductivity measurements correspond with the data of single NaCl crystals published by Birch and Clark. At present a heating experiment is being conducted in the Asse mine to investigate thermo-mechanical effects of a cylindrical heat source upon the surrounding rock salt. Possible thermal induced fractures monitored by permeability changes and seismoacoustical phenomena are the main objects of this experiment.

2369 LARGE SCALE PERMEABILITY TESTS IN THE GRANITE OF THE STRIPA MINE, SWEDEN. Lindblom, U.E.; Lundstroem, L.; Stille, H. (Hagconsult AB, Sweden). pp 207-220 of Experiences de degagement de chaleur in situ dans les formations geologiques. Paris, France; OECD (1978).

From OECD seminar on in situ heating experiments in geological formations; Ludvika, Sweden (Sep 1978).

The granitic rock at depth in the Stripa mine was investigated with regard to its permeability on a relatively large scale. At two test sites, 16 peripheral injection holes were drilled to a depth of 10 m in a circle of 3 m diameter and with a large-diameter withdrawal hole in the centre. By applicaton of a constant water pressure in all peripheral holes the flow of water from the centre hole under stable conditions was recorded at ambient (abt +10°C) and at increased bed rock temperature (abt +35°C). For the two cases, average permeability values of 4 to 5 . exp.-11 m/s and about 2 . exp.-11 m/s, respectively, were recorded.

2370 GEOLOGICAL DOCUMENTATION OF THE STRIPA TEST STATION. Olkiewicz, A. (Geological Survey of Sweden, Uppsala, Sweden). pp 119-132 of Experiences de degagement de chaleur in situ dans les formations geologiques. Paris, France; OECD (1978).

From OECD seminar on in situ heating experiments in geological formations; Ludvika, Sweden (Sep 1978).

The four mapped areas are wholly dominated by a reddish, medium grained, massively formed monzogranite, but show different grades of tectonic activity. When one compares the dips and strikes of the fractures one finds a high degree of conformity between all four areas. The greater majority of fractures are closed and often infilled with chlorite and occasionally with calcite. The water leakage which occur in the surveyed tunnels consist only of damp surfaces or slow dripping. The mapping of the drillcore shows that it is dominated by reddish, medium-grained, massive monzogranite. The frequency of joints and joints sets is relatively high and unevenly distributed. The joints are usually lined with chlorite, occasionally with calcite.

2371 INVESTIGATIONS ON THE BOREHOLE CLIMATE IN AN IN-SITU SIMULATION EXPERIMENT IN THE ASSE

SALT MINE. A PRESENTATION OF THE CONCEPT AND PRELIMINARY WORKS. Rothfuchs, T. (Gesellschaft fuer Strahlen- und Umweltforschung m.b.H., Neuherberg (Germany, F.R.)). pp 61-70 of Experiences de degagement de chaleur in situ dans les formations geologiques. Paris, France; OECD (1978).

From OECD seminar on in situ heating experiments in geological formations; Ludvika, Sweden (Sep 1978).

Natural rock salt contains a certain amount of water which is enclosed in the salt in the form of small brine droplets. It could be observed, that the brine droplets tend to migrate up a temperature gradient induced by a heating source inside a borehole. This fact causes an undesirable inflow of water into nuclear waste crypts. A simulation experiment with electric heaters shall be performed in the Asse salt mine in order to investigate the resulting climate (temperature, humidity and gas pressure) inside a sealed borehole.

2372 MECHANICAL PROPERTIES OF STRIPA GRANITE. Stephansson, O.; Swan, G.; Leijon, B. (Division of Rock Mechanics, University of Lulea, Lulea, Sweden). pp 191-204 of Experiences de degagement de chaleur in situ dans les formations geologiques. Paris, France; OECD (1978).

From OECD seminar on in situ heating experiments in geological formations; Ludvika, Sweden (Sep 1978).

For the determination of the mechanical properties of Stripa Granite samples were taken from the boreholes in the vicinity of the test site. The granite type taken from these different sources is of variable character. For the purpose of numerical calculations performed in projects related to the waste storage research program the following parameters have been determined: Young's modulus, Poisson's ratio, compressive fracture stress and expansion coefficient as a function of temperature 20<T<200C; Young's modulus and compressive fracture stress as a function of confining pressure; Brazilian tensile fracture stress; residual shear stress as a function of normal stress; anisotropy ratio for Young's modulus and compressive fracture stress; dilatational wave velocity and deduced dynamic Young's modulus. A brief description of the test methods and the results for each test are presented.

2373 PROGRESS REPORT ON THE CANADIAN UNDERGROUND HEATER EXPERIMENT. Tammemagi, H.Y. (Atomic Energy of Canada Ltd., Ottawa, Ontario); Larocque, G. (Department of Energy, Mines and Resources, Ottawa, Ontario (Canada)). pp 227 of Experiences de degagement de chaleur in situ dans les formations geologiques. Paris, France; OECD (1978).

From OECD seminar on in situ heating experiments in geological formations; Ludvika, Sweden (Sep 1978).

BOREHOLES;GEOLOGIC DEPOSITS;HEATERS;ROCKS; TEMPERATURE EFFECTS;CANADA;HEATING;RADIOACTIVE WASTE DISPOSAL;RADIOACTIVE WASTE STORAGE;ROCK DRILLING;TESTING;UNDERGROUND DISPOSAL

2374 Chemie der nuklearen Entsorgung. T. 1. (CHEMISTRY OF RADIOACTIVE WASTE DISPOSAL. PT. 1). Baumgaertner, F. (ed.). Muenchen, Germany, F.R.; Thiemig (1978). 252p. (In German).

The specialists lectures held at a closed meeting seminar in Gerlos (Tyrol) on the subject of disposal are summarized in two volumes to a status report. It deals with the entire manifold problem complex from electricity supply, fuel element production, safety technical designs, reprocessing upto safe storage of radioactive wastes. The problems of head ends, purex process and of the treatment and storage of different radioactive wastes are discussed in volume 2. (HPH).

2375 Chemie der nuklearen Entsorgung. T. 2. (CHEMISTRY OF RADIOACTIVE WASTE DISPOSAL. PT. 2). Baumgaertner, F. (ed.). Muenchen, Germany, F.R.; Thiemig (1978). 391p. (In German).

The specialists' lectures held at a closed meeting seminar in Gerlos (Tyrol) on the subject of disposal are summarized in two volumes to a status report. It deals with the entire manifold problem complex from electricity supply, fuel element production, safety technical designs, reprocessing upto safe ultimate storage of radioactive wastes. The problems of head ends, purex process and of the treatment and storage of different radioactive wastes are discussed in volume 2. (HPH).

2376 IN SITU HEATING EXPERIMENTS IN HARD ROCK: THEIR OBJECTIVES AND DESIGN. Cook, N.G.W.; Witherspoon, P.A. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.; California Univ., Berkeley (USA). Dept. of Materials Science and Engineering). pp 97-108 of Experiences de degagement de chaleur in situ dans les formations geologiques. Paris, France; OECD (1978).

From OECD seminar on in situ heating experiments in geological formations; Ludvika, Sweden (Sep 1978).

Of the many alternatives that are being considered for the disposal of nuclear wastes, deep underground burial is favored. The wealth of experience concerning the design and construction of underground excavations does not include the unique effects of heating excavations by radioactive decay, nor the issue of long-term isolation. The effects of heating are important in establishing the feasibility of this method of disposal and are essential for the design of an underground repository. Near-field phenomena around individual canisters can be studied by full-scale experiments, using electrical heaters. The thermal diffusivity of rock is so low that information concerning the interaction between full-scale heaters and of the effects of heating a large volume of rock cannot be measured in full-scale experiments lasting less than a few decades. To overcome this difficulty, a time-scaled heating experiment has been developed in which a reduction in linear scale is accompanied by an acceleration of the time scale to the second power. In this experiment, the linear scale is about a third, so that the time scale is about ten fold.

2377 FULL-SCALE AND TIME-SCALE HEATING EXPERIMENTS AT STRIPA: PRELIMINARY RESULTS. Cook, N.G.W.; Hood, M. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.; California Univ., Berkeley (USA). Dept. of Materials Science and Engineering). pp 147-159 of Experiences de degagement de chaleur in situ dans les formations geologiques. Paris, France; OECD (1978).

From OECD seminar on in situ heating experiments in geological formations; Ludvika, Sweden (Sep 1978).

Two full-scale heating experiments and a time-scale heating experiment have recently been started in granite 340 meters below surface. The purpose of the full-scale heating experiments is to assess the near-field effects

of thermal loading for the design of an underground repository of nuclear wastes. That of the time-scale heating experiments is to obtain field data of the interaction between heaters and its effect on the rock mass during a period of about two years, which corresponds to about twenty years of full-scale operation. Geological features of the rock around each experiment have been mapped carefully, and temperatures, stresses and displacements induced in the rock by heating have been calculated in advance of the experiments. Some 800 different measurements are recorded at frequent intervals by a computer system situated underground. These data can be compared at any time with predictions made earlier on video display units underground.

2378 APPROACH TO THE FRACTURE HYDROLOGY AT STRIPA: PRELIMINARY RESULTS. Gale, J.E. (Waterloo Univ., Ontario (Canada)); Witherspoon, P.A. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.; California Univ., Berkeley (USA). Dept. of Materials Science and Engineering). pp 161-176 of Experiences de degagement de chaleur in situ dans les formations geologiques. Paris, France; OECD (1978).

From OECD seminar on in situ heating experiments in geological formations; Ludvika, Sweden (Sep 1978).

There are two main problems associated with the concept of geologic storage of radioactive waste in fractured crystalline rock. These problems are the thermomechanical effects of the heat generated by the waste and the potential for transport of radioactive materials by the groundwater system. In both problems, fractures play a dominant role. An assessment of the hydraulic and mechanical characteristics of fractured rocks requires a careful series of laboratory and field investigations. A good example of the complexity of the problem is illustrated by the field studies in a fractured granite that are currently underway in an abandoned iron-ore mine at Stripa, Sweden. Much information is being gathered from an extensive series of boreholes and fracture maps. The approach being taken to integrate these data into an analysis of the fracture hydrology is reviewed and preliminary results from the hydrology program are presented.

2379 DESIGN, INSTALLATION, AND OPERATION OF HEATER TESTS IN DOME SALT. van Sambeek, L.L. (RE/SPEC, Inc., Rapid City, SD (USA)); Heck, J.L. (Oak Ridge National Lab., TN (USA)). pp 71-82 of Experiences de degagement de chaleur in situ dans les formations geologiques. Paris, France; OECD (1978).

From OECD seminar on in situ heating experiments in geological formations; Ludvika, Sweden (Sep 1978).

Three in situ heater tests are currently in the heating phase in the Avery Island dome salt mine. Three power levels are being used for the three heater tests. The three heater tests include the use of protective steel sleeves, wherein the heater resides at depth. Data being gathered includes both scientific and engineering data concerning salt properties determination, corrosion potential, retrievability, and data for comparison of measured and predicted responses. The heating phase is only some 100 days into its duration, thus only limited data can be presented.

2380 PROSPECTS OF NEW METHODS OF NUCLEAR WASTE DISPOSED. Nohel, P. Trend, Prognosticke Informace ; 10: No. 4, 19-20(1978). (In Czech).

The questions of radioactive waste disposal mainly in deep layers of the earth crust are discussed in respect of possible radioactivity release into the environment. The amounts of radioactive wastes in the near future are forecast as are the methods of the fixation of waste containing long-lived radioisotopes. Attention is paid to possible chemical reactions of some radioisotopes in transport through geological formations. The geochemical and geophysical properties of geologic formations affect the rate of radioactivity transport following the decay of the metal container and the glass matrix containing the radioactive waste. This time may be 200 years and more.

2381 Chemie der Nuklearen Entsorgung. T. 1. (CHEMISTRY OF RADIOACTIVE WASTE DISPOSAL. PT. 1). Baumgaertner, F. (ed.). Muenchen, Germany, F.R.; Thiemig (1978). 252p. (In German).

The specialists' lectures held at a closed meeting seminar in Gerlos (Tyrol) on the subject of disposal are summarized in two volumes to a status report. It deals with the entire manifold problem complex from electricity supply, fuel element production, safety technical designs, reprocessing up to safe ultimate storage of radioactive wastes. The problems of head ends, purex process and of the treatment and storage of different radioactive wastes are discussed in volume 2. (HPH).

2382 DOE PROGRAM FOR THE MANAGEMENT OF RADIOACTIVE WASTE AND SPENT REACTOR FUEL. Cooley, C.R. (US DOE, Washington, DC). Thermal Power Conference Proceedings ; 165-181(1978). (CONF-7811153--).

From Thermal power conference; Pullman, WA, USA (8 Nov 1978).

The development of nuclear energy is seen by the Administration and the Department of Energy (DOE) as one of the important sources of energy for the country. Nuclear energy now provides a major fraction of the electrical power generation in some parts of the United States. In the northwest, with a wealth of hydroelectric power, nuclear power is expected to provide an increasing share of the total electrical energy. However, a great deal of public concern is being expressed about waste management associated with nuclear power. On current Research and Development programs, this paper considers several of the key activities which include work on disposal of spent fuel. 2 refs.

2383 APPARATUS FOR SEALING ACCESS HOLES TO CAVITIES WITHIN THE EARTH WITH ROCK GLASS. (to Westinghouse Electric Corp., Pittsburgh, PA (USA)). British Patent 1,553,339/A/. 4 Nov 1977. 4p.

An apparatus is described for sealing access holes to cavities within the earth which may be used for the disposal of radioactive waste. The method provides a fused seal integral with the rock formation.

2384 GREAT BRITAIN PREPARES PERMANENT STORAGE OF RADIOACTIVE WASTE. Ingenioer-nytt ; 13: No. 80, 23(7 Oct 1977). (In Norwegian).

A brief outline is presented of the background and reasearch programme for the disposal of vitrified radioactive wastes in granite formations in the United Kingdom. This programme is coordinated with those of other member countries of EC, financed by EC, in

which Germany, Italy, Belgium and Holland study formations such as clay and salt, while the UK and France study hard crystalline rocks, such as granite. The UK studies are concentrated on Newton Stewart in Scotland where the granite at great depths is thought to be free from cracks, in the North of England and in Cornwall. Heat transfer studies are to be done in Cornwall where the rock is so cracked as to be otherwise unuseable. A public meeting with representatives from local authorities and Parliament has been held in Newton Stewart to inform on the project.

2385 DISPOSAL OF RADIOACTIVE WASTE. PROMISING PROJECT IDENTIFIES PROSPECTIVE SEA ZONES. Lein, M. Teknisk Ukeblad ; 124: No. 38, 4-5(15 Sep 1977). (In Norwegian).

The conclusions reached by the ERDA Seabed Emplacement Program as a result of a three-year study of the disposal of radioactive waste in the seabed are presented. After vitrification the radioactive waste is placed in titanium-zirconium containers and buried in sedimentary layers in the deep ocean bed at the centre of circulating ocean currents. The glassified structure is expected to be thermally decomposed by decay heat in about 1000 years, while the container is expected to be resistant for some thousands of years. Tests have shown that diffusion through sedimentary clays by fission products is restricted to a zone of 100m diameter for chlorine and 30m diameter for strontium and cesium, per million years. It is also feasible to deposit the waste containers in holes drilled in lithified sediments or crustal rock (basalt).

2386 METHOD FOR CONTINUOUS RECOVERY OF FINE-GRAINED RADIOACTIVE RAW MATERIALS FROM WASTE SLUDGES. Sefl, K. Czech Patent 169,997/B/. 15 Jun 1977. 3p. (In Czech).

Waste sludge is thickened and flocculated by gradually adding 2 to 5% zinc sulfate solution and 0.1% polyacrylamide solution. The sludge is transported by gravity to vacuum filtration. The sludge concentrate obtained can not only be transported but is also suitable for hydrometallurgical processing in view of the 15 to 20% water content. The zinc sulfate consumption is about 60 g/m^3, polyacrylamide consumption about 3 g/m^3 of processed sludge.

2387 UNDERGROUND DISPOSAL OF CANADA'S NUCLEAR WASTE. Tammemagi, H.Y. (Atomic Energy of Canada Ltd., Pinawa, Manitoba. Whiteshell Nuclear Research Establishment); Gale, J.E.; Sanford, B.V. (Geological Survey of Canada, Ottawa, Ontario). Geoscience Canada ; 4: No. 2, 71-76(Jun 1977).

The Canadian program for geological disposal of vitrified (or otherwise solidified) high-level wastes is outlined. Three alternatives were being considered: disposal in igneous batholiths, salt deposits or (less probably) serpentinite. Batholiths, although stable, have the disadvantage that they contain cracks and fissures, through which groundwater, after leaching radioactive materials, may search the surface. Salt beds may underly or overly productive aquifers, or valuable reserves of oil, gas, or potash. Various other criteria for a decision are outlined. The time-table calls for selection of the site by 1981, construction of a demonstration repository by 1986, and availability of a commercial repository by 2000. During the period of demonstration and testing, all wastes will remain retrievable.

2388 DEVICE TO STORE RADIOACTIVE WASTES AND RECOVERY OF HEAT LIBERATED BY THESE WASTES. Girard, Edmond. (to Messier-Hispano-Bugatti, 92 - Montrouge (France)). French Patent 2,388,380/A/. 22 Apr 1977. 12p. (In French).

Storage unit for radioactive waste, comprising an initial closed spherical shell containing the waste and placed inside a second closed shell, generally spherical in shape and bristling with outward pointing spikes, fluid encouraging the transfer of heat from the cooling of the waste from the first to the second shell whose spikes act as radiators with respect to the outside environment.

2389 RADIOACTIVE WASTE STORAGE. Boldt, A.L. (to Energy Research and Development Administration, Washington, DC (USA)). Canadian Patent 1,006,631/A/. 8 Mar 1977. 9p.

The present invention provides a storage cask for solid, high-level radioactive wastes consisting of a thick-walled unitary carbon steel cask including a plug sealed in place with a deep penetration weld, the cask wall thickness being sufficient to reduce radiation levels to a tolerable level and permit cask storage in the open where natural convection of air over the cask removes the decay heat. After about 150 years the cask can be removed to a hard rock mine since the thermal conductivity of rock is sufficient that excessive temperature increases in the wastes will not occur. If the waste is solely from plutonium-recycle pressurized-water reactors, the high neutron dose rate around the cask must be reduced by surrounding the cask in its storage position with crushed graphite or placing cooling fins on the cask and employing neutron shielding material such as polyethylene between the fins.

2390 CALIBRATOR FOR LEVEL INDICATOR OF LIQUID WASTE IN A STORAGE TANK. Imaizumi, S. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 1953-10,2497/A/. 18 Feb 1977. 3p. (In Japanese).

Purpose: To enable safety calibration for diaphragm seal type detectors for the contained liquid for use with a power plant without accessing the administration area at high radioactive level. Constitution: An electromagnetic valve is disposed between a sludge storage tank and a seal pot containing radioactive contaminated liquid at the primary side and displacing liquid at the secondary side and it is adapted to be switched by a turn over switch provided in a low radioactive level area, and a pressure pipe way whose junction to a calibrator opens in the low radioactive level area is connected. By switching the electromagnetic valve in the high radioactive level area by way of the turn over switch and closing the tank side and opening the conduit side. After confirming the above opening and closure by a pilot lamp, a calibrator tool is connected to the calibrator to monitor and calibrate the detector while applying a pressure to the diaphragm in the seal pot.

2391 PARTICLE SIZE DISTRIBUTION ANALYSIS AND CESIUM SORPTION CAPACITY OF SOME BENTONITES. Abdel-Gawad, A.S.; Sayyah, T.; Mizak, N.Z.; Shafik, A. Arab Journal of Nuclear Sciences and Applications ; 10: No. 2, 168-183(1977).

The particle size distribution and the cesium sorption capacity for some bentonites were studied. The equivalent diameter of particles for any given fraction of the four bentonites was determined. The effect of the

presence of Na^+ and K^+ ions on cesium sorption was investigated. It was found that both Na^+ and K^+ ions exhibit a competing ion effect on the sorption of cesium. The presence of Na^+ ions caused a gradual decrease in the capacity of the mineral investigated, while the presence of the K^+ ions resulted in an abrupt decrease followed by a constant capacity value all over the range of k^+ ion concentration studied.

2392 RESPONSE OF SALT MIGRATION TO DISSOLUTION IN SALT DOMES AND HOW IT AFFECTS A RADIOACTIVE WASTE ISOLATION FACILITY DESIGN. Hamstra, J. (Netherlands Energy Research Foundation, Petten, Netherlands). pp 76-92 of Salt dome utilization and environmental considerations. Martinez, J.D.; Thoms, R.L. (eds.). Baton Rouge, LA; Louisiana State University (1977).

From Symposium on salt dome utilization and environmental considerations; Baton Rouge, LA, USA (22 Nov 1976).

Both in the United States and Europe salt domes are being considered as structures in which radioactive waste isolation facilities for a long-term isolation. The major potential failure mechanism for this long-term isolation is that ground-water will contract the rock salt containment shield and a pathway for the buried radionuclides to reenter the biosphere. When dealing with assessment models for a containment breach, the assumption is commonly made that the ground-water will find its way through the containment wall into the waste burial area. This paper provides evidence that a salt dome which is still in contact with its mother salt layer will, under certain conditions, respond to a continuous ground-water attack by a salt migration towards the surface area where the dissolving action takes place. The driving force behind this salt migration will be the buoyant force of the sediments overlying and surrounding the dome structure. Several parameters that contribute to promote salt flow will increase with the depth and the extent of this mass transport oof rock salt in the solid state will increase accordingly as the dissolving action takes place at a greater depth. The mass transport of dissolved rock salt into an aquifer will decrease with the depth, because the permeability of that aquifer will decrease with the depth. There will be a break-even point in depth beyond which a salt dome will maintain its piercement shape despite the continuing dissolving actions. A model approach indicates that it is realistic to assume that this break-even point will be situated at an attainable. depth. Model calculations also indicate that the salt migration, as a response to dissolving actions, should be considered as one of starting points for the radioactive waste isolation facility design, such that if this salt migration should prove to be a containment failure mechanism, it only will affect the facility to a limited extent and after a very long period of time.

2393 HIGH PECISION MEASUREMENT OF HORIZONTAL AND VERTICAL MOVEMENT OVER SALT DOMES. Huggett, G.R. pp 352-365 of Salt dome utilization and environmental considerations. Martinez, J.D.; Thoms, R.L. (eds.). Baton Rouge, LA; Louisiana State University (1977).

From Symposium on salt dome utilization and environmental considerations; Baton Rouge, LA, USA (22 Nov 1976).

It has been suggested that radioactive wastes might be stored in salt domes. However, the domes would have to be relatively stable. Since these domes move vertically during their formation, any present-day movement must be accurately determined before they can be selected as repositories of radioactive waste. The most accurate way to measure such movement would be the complementary use of a multiwavelength distance measuring (MWDM) instrument and a two-fluid tiltmeter. The MWDM instrument, which measures distance through the atmosphere without the usual meteorological observations and corrections, is capable of making consecutive distance determinations with a standard deviation from the man as small as 4 parts in 10^8. Its long-term stability and precision are better than 1 part in 10^7 over distances up to 15 km. The two-fluid tiltmeter is designed to measure relative vertical movement between two distant piers. This instrument is not affected (to the frst order) by local tilting, which grossly contaminates the data taken with short baseline instruments. Nor is it affected by thermal gradients, which are the bain of single-fluid tiltmeters. This instrument could measure vertical displacement over long baselines to a precision of about 10^5 and regional tilt to a precision of about 10^{-8}. The complementary measurements of the horizontal distance across the dome and the vertical displacement of the surface over the dome should be good indicators of any relative upward salt dome movement.

2394 LEGAL PROBLEMS IN THE UTILIZATION OF SALT DOMES. Harrell, T.A. pp 397-423 of Salt dome utilization and environmental considerations. Martinez, J.D.; Thoms, R.L. (eds.). Baton Rouge, LA; Louisiana State University (1977).

From Symposium on salt dome utilization and environmental considerations; Baton Rouge, LA, USA (22 Nov 1976).

This paper will consider the legal problems which may be encountered in the use of salt domes for such purposes as the storage of hydrocarbons or industrial or nuclear waste products. From the view point of the lawyer such activities appear to present few difficult or unique problems, and with one exception those problems which are present seem to be easily resolvable within the framework of existing legal principles. The one exception relates to the proposed storage of nuclear or other highly toxic or dangerous wastes with extremely long lies and portending considerable danger to the public if the integrity of the project is not maintained for a period which, within our civilization's frame of reference, may be said to be one of perpetuity. The majority of the salt domes which are being considered for storage of hydrocarbons lie within the states of Texas and Louisiana. The present discussion will be primarily concerned with the laws of Louisiana although note will be made of those instances where the laws of Texas might materially differ. For purposes of analysis it may be convenient to divide the problems into three general categories: firstly, those relating to the acquisition of the right to conduct the activity in question; secondly, those arising from public or regulatory requirements which might limit, regulate, or interfere with the free conduct of the activity; and thirdly, those relating to the liability of the person using the dome for the unintended and adverse consequences to other property owners or the public generally arising out of his activities.

2395 POTENTIAL OF GULF COAST SALT DOMES FOR ISOLATION OF RADIOACTIVE WASTES. Martinez, J.D. pp 127-144 of Salt dome utilization and environmental considerations. Martinez, J.D.; Thoms, R.L. (eds.). Baton Rouge, LA; Louisiana State University (1977).

From Symposium on salt dome utilization and environmental considerations; Baton Rouge, LA, USA (22 Nov 1976).

Salt deposits have been recognized for a number of years as a particularly suitable rock type for the isolation of radioactive wastes. These deposits are common in sedimentary basins in the US and elsewhere and salt has physical properties which are advantageous for this purpose. Natural occurrences of rock salt are generally categorized morphologically as either bedded or domal types. Early studies of the potential use of salt for the isolation of radioactive wastes were focused on bedded salt. In the last several years attention has been directed to possible utility of Gulf Coast salt domes for this purpose. The toxicity of plutonium, a component of the waste, and its long decay period, 24,360 years half-life, requires special care in evaluating the degree of isolation provided by salt domes or other rock types. Feasibility studies have applied geologic, hydrologic and engineering disciplines to an assessment of the tectonic and hydrologic stability of Guld Coast salt domes. These studies range in perspective from an evaluation of evidence provided by older geologic formations to current monitoring by various geophysical techniques. The scientific studies coupled with an analysis of cultural setting have narrowed the possibilities from more than 400 domes in the Gulf Coast to a few promising study areas. So far, 3 areas have been selected for further study in both the North Louisiana Salt Dome Basin and the Northeast Texas Salt Dome Basin. New field work is expected to provide firmer conclusions regarding the suitability of these domes for radioactive waste isolation.

2396 TIMES AND RATES OF SALT MOVEMENT IN NORTH LOUISIANA. Kupfer, D.H. pp 145-170 of Salt dome utilization and environmental considerations. Martinez, J.D.; Thoms, R.L. (eds.). Baton Rouge, LA; Louisiana State University (1977).

From Symposium on salt dome utilization and environmental considerations; Baton Rouge, LA, USA (22 Nov 1976).

This report concerns the salt dome basin in the west-central part of northern Louisiana, herein called the North Louisiana Basin. The study centers on the Vacherie salt dome in the Vacherie sub-basin of the northern or Minden Trough. Observed changes in the character of the isopach maps of this basin are used to approximate the rates of salt movement from under the basin and into the domes. Individual parameters show a high degree of variability when compared with each other, and times vary by over 100 million years. But average values for each group of parameters show greater consistancy. Each suggest that salt movement ceased some time in the past. A crude average of the above values is 29 million years ago. All of these figures need to be checked by further studies and more statistical analyses applied to them. This is just a progress report on a continuing project. The variability of all of these measures is such as to indicate caution, but the weight of the evidence appears to indicate that movement has ceased; probably about 30 million years ago or sometime in the Miocene. This appears to agree very well with the geological record.

2397 MONITORING CURRENT RATES OF SALT DOME MOVEMENT. Thoms, R.L.; Manning, T.A. pp 171-187 of Salt dome utilization and environmental considerations. Martinez, J.D.; Thoms, R.L. (eds.). Baton Rouge, LA; Louisiana State University (1977).

From Symposium on salt dome utilization and environmental considerations; Baton Rouge, LA, USA (22 Nov 1976).

The tectonic stability of salt domes is a major concern for long-term domal storage of noxious wastes. A necessary phase of the many faceted dome storage study includes obtaining a measure of current vertical movement of any potential storage dome. This information then can be combined with data obtained from studies involving geologic time scales so as to provide a history of dome movement that includes present time. A system of instrumentation for monitoring current rates of dome movement is described. Complimentary finite element modelling of plausible dome movement also is presented. The proposed instrumentation system includes tiltmeters, precise levelling, laser ranging, and monitoring of microseisms. Thus, components of rotation and vertical and horizontal movements at the ground surface over a dome can be monitored. In addition, a measure of dome movement also may be obtained acoustically. The finite element modelling furnishes an aid for: (1) locating instrument sites over a dome so as to maximize instrument sensitivity, and (2) interpreting data obtained from the instrumentation system. An example of tiltmeter installation and operation over a dome in northwest Louisiana is included. Typical tiltmeter output is presented and discussed.

2398 HYDROLOGIC STABILITY OF SALT DOMES. Smith, C.G. Jr. pp 188-198 of Salt dome utilization and environmental considerations. Martinez, J.D.; Thoms, R.L. (eds.). Baton Rouge, LA; Louisiana State University (1977).

From Symposium on salt dome utilization and environmental considerations; Baton Rouge, LA, USA (22 Nov 1976).

The potential storage or disposal of high-level radioactive wastes in Gulf Coast salt domes requires that the storage cavities be free from ground-water dissolution for a period of 250,000 years. The investigation of the salinity variations of groundwater near selected domes is a preliminary step toward selecting a salt dome that will prove satisfactorily isolated from circulating round water. Saline ground-water anomalies (saline plumes) in aquifers peirced or uplifted by the dome may be the result of salt solution by groundwater. Other factors being equal, a salt dome without a saline ground-water plume is judged more hydrologically stable than a dome with a saline ground-water plume. In the Northeast Texas salt dome basin electric logs of oil and gas wells have been used to estimate ground water salinities in aquifers near selected domes. Generally, salinity determinations were limited to shallow (less than 600 meters), Tertiary age Wilcox sands. Thus far, the analyses have revealed saline ground water anomalies aroung 4 of the 9 domes studies. Estimates of the rate of dissolution from domes associated with saline ground water plumes indicate that less than 30 meters of salt will be removed from the upper surfaces of the dome in 250,000 years. Thus, these preliminary studies show that even apparently unstable domes may be sufficiently stable to serve as waste disposal sites. Prior to the selection of a specific storage site additional field investigations will be required to more accurately define hydrologic stability.

2399 SALT DOME UTILIZATION AND ENVIRONMENTAL CONSIDERATIONS. Martinez, J.D.; Thoms, R.L. (eds.). Baton Rouge, LA; Louisiana State University (1977). 433p. (CONF-761175--).

From Symposium on salt dome utilization and

environmental considerations; Baton Rouge, LA, USA (22 Nov 1976).
New developments in salt dome technology were reviewed. The current status of environmental protection required in connection with modern utilization of Gulf Coast domes was discussed. Legal considerations in the use of salt domes were also discussed. Separate abstracts were prepared for individual items. (DC)

2400 LONG TERM CHEMICAL AND PHYSICAL INTEGRITY AND STABILITY OF CONDENSED PHASES OF ACTINIDES. Nevitt, M.V. (Argonne National Lab., IL (USA)). pp 81-90 of 2. International conference on the electronic structure of the actinides. Mulak, J.; Suski, W.; Troc, R. (eds.). Wroclaw, Poland; Zaklad Narodowy Imienia Ossolinskich (1977).
From 2. international conference on the electronic structures on the actinides; Wroclaw, Poland (13 Sep 1976).
A preliminary review is made of the crystalline materials that will probably serve as long-term repositories for actinide and fission-product wastes from nuclear power plants. Their occurrence, crystal chemistry and defect characteristics have been briefly considered in terms of the modest amount of information now in the literature, relating this information to actinide electronic structure and ionic-size effects. Questions are asked in order to point up the need to enlarge the present state of knowledge.

2401 DISPOSAL OF HIGH LEVEL NUCLEAR WASTE IN THE OCEANS. Vilks, G. (Environmental Marine Geology, Atlantic Geoscience Centre, Bedford Institute of Oceanography, Dartmouth, Nova Scotia (Canada)). Geoscience Canada ; 3: No. 4, 295-298(Nov 1976).
A report is given on a meeting held at Woods Hole, Massachusetts to consider the feasibility of using the sea bed as a disposal site for highly radioactive nuclear waste. Some disadvantages are explained, the chief being that ocean water alone, regardless of depth, is a poor barrier. Some delegates discussed emplacement of vitrified waste on the ocean floor, and others its burial in rock or sediment below the floor. The most suitable sites are the mid-plate/mid-gyse localities of abyssal hills. Some engineering work on submarine burial has been done by Sandia Labs., in the U.S.A. Ocean disposal is particularly interesting to Britain and Japan. Data on biological transport rates are needed.

2402 STATE OF RESEARCH AND DEVELOPMENT WORK ON FINAL STORAGE. Kuehn, K. (Gesellschaft fuer Strahlen- und Umweltforschung m.b.H., Clausthal-Zellerfeld (Germany, F.R.). Inst. fuer Tieflagerung). pp 32-33 of Die Problematik des radioaktiven Abfalls in der Kernenergietechnik. Steinmetz, E. (ed.). Essen, Germany, F.R.; Vulkan-Verl. (Ind]). (In German)
From Conference on the problems of radioactive wastes in nuclear technology; Essen, F.R. Germany (20 Oct 1977).
The German R and D program for the storage of intermediate-level radioactive waste in the salt mine Asse and the participation in the European R and D work on high-level waste disposal. FEDERAL REPUBLIC OF GERMANY;SALT DEPOSITS;INTERNATIONAL COOPERATION;RADIOACTIVE WASTE STORAGE;RESEARCH PROGRAMS;SAFETY; INTERMEDIATE-LEVEL RADIOACTIVE WASTES;HIGH-LEVEL RADIOACTIVE WASTES

2403 RADIOACTIVE WASTE DUMPING AT SEA: CAUSES FOR CONCERN. Alton, D.; Atkinson, N.; Barrett, H.A. London; Greenpeace Ltd. (Ind]). 3p.
The dumping of various low-level radioactive wastes at sea has been carried out for many years and has been accepted as a satisfactory means of disposal by national and international regulatory authorities. There are, however, grounds for concern from an environmental standpoint which centre around two particular issues: the likely extent of mobilisation of an increasing radioactive inventory over time and the likely effects of such radioactivity if and when it should make contact with living organisms. The subject is discussed under the headings: mobilisation; effects on the marine environment; physical and biological considerations; future exploitation of the oceans (for food, minerals); and the effects of radiation.

2404 MATERIAL FOR RADIOACTIVE PROTECTION. Taylor, R.S.; Boyer, N.W. US Patent Application 003,840. Ind]. 13p.
A boron containing burn resistant, low-level radiation protection material useful, for example, as a liner for radioactive waste disposal and storage, a component for neutron absorber, and a shield for a neutron source is described. The material is basically composed of borax in the range of 25 to 50%, coal tar in the range of 25 to 37.5%, with the remainder being an epoxy resin mix. A preferred composition is 50% borax, 25% coal tar and 25% epoxy resin. The material is not susceptible to burning and is about 1/5 the cost of existing radiation protection material utilized in similar applications.

2405 (RFP-Trans--286) MANAGEMENT AND DISPOSAL OF WASTES CONTAMINATED BY ALPHA EMITTERS. (Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). Ind]. Translation of IAEA-SM--246/58 10p. NTIS, PC A02/MF A01.
With the development of the French nuclear reactor program, the Public Authorities intensified their efforts toward disposal of wastes by establishing a central organization, ANDRA, on November 7, 1979. ANDRA has the responsibility for: assuring management of long-term storage centers; designing, laying out and constructing new long-term storage centers, and carrying out all the studies necessary for that purpose; promoting, together with the waste producers, specifications for fixation and storage of radioactive wastes before they are evacuated to the long-term storage centers; and contributing to the research, study and work concerning long-term storage of radioactive wastes as well as the future of such wastes. Through these processes of cooperation and exchanges, ANDRA regulates all the problems of wastes, and particularly the questions posed by alpha wastes. This paper goes on to elaborate on the following topics: definition of alpha waste; storage policy; regulations; specifications; inspection; methods of storage of alpha wastes; delivery provisions; management strategy; and economic aspects.

2406 SUBMERGIBLE BARGE RETRIEVABLE STORAGE AND PERMANENT DISPOSAL SYSTEM FOR RADIOACTIVE WASTE. (to Dept. of Energy). US Patent Application 106,203. Ind]. 17p.
A submergible barge and process for submerging and storing radioactive waste material along a seabed are described. A submergible barge receives individual packages of radwaste within segregated cells. The cells

are formed integrally within the barge, preferably surrounded by reinforced concrete. The cells are individually sealed by a concrete decking and by concrete hatch covers. Seawater may be vented into the cells for cooling, through an integral vent arrangement. The vent ducts may be attached to pumps when the barge is bouyant. The ducts are also arranged to promote passive ventilation of the cells when the barge is submerged. Packages of the radwaste are loaded into individual cells within the barge. The cells are then sealed and the barge is towed to the designated disposal-storage site. There, the individual cells are flooded and the barge will begin descent controlled by a powered submarine control device to the seabed storage site. The submerged barge will rest on the seabed permanently or until recovered by a submarine control device.

Environmental Aspects

2407 (AAEC/E--467) ENVIRONMENTAL SURVEY AT THE AAEC RESEARCH ESTABLISHMENT LUCAS HEIGHTS, RESULTS FOR 1975, 1976 AND 1977. Hespe, E.D. (Australian Atomic Energy Commission Research Establishment, Lucas Heights). Jan 1979. 67p. Dep. NTIS (US Sales Only), PC A05/MF A01.

An environmental survey program has been in operation since 1959 at the Australian Atomic Energy Commission's Research Establishment at Lucas Heights, N.S.W. The results for 1975, 1976 and 1977 show that the amounts of radionuclides of AAECRE origin are not greater than the amounts found in earlier years. The possible annual radiation dose to the most highly exposed member of the public, as calculated from the results, represents about one ten-thousandth of that considered acceptable by the NSW Health Commission and the National Health and Medical Research Council of Australia.

2408 (ALO--0789-T14) MATERIAL PROPERTIES OF ELEANA ARGILLITE: EXTRAPOLATION TO OTHER ARGILLACEOUS ROCKS, AND IMPLICATIONS FOR WASTE MANAGEMENT. Lappin, A.R.; Olsson, W.A. (Sandia Labs., Albuquerque, NM (USA)). Oct 1979. Contract EY-76-C-04-0789. 15p. Dep. NTIS, PC A02/MF A01.

Results of a near-surface heater test in the Eleana argillite suggest the possibility that the high-temperature (> 100°C) thermomechanical response of argillite to waste emplacement may be dominated by behavior of expandable clays. Enough expandable clay is probably present in most argillaceous rocks to cause a similar response. In-situ thermal conductivities may be markedly reduced by even small amounts of clay contraction which results in opening of pre-existing joints. A simple model predicts that such behavior may continue to operate to considerable depths, though several factors affecting determination of this depth remain poorly defined at present.

2409 (ANL--79-30) STUDIES OF NUCLEAR-WASTE MIGRATION IN GEOLOGIC MEDIA. ANNUAL REPORT, OCTOBER 1977-SEPTEMBER 1978. Seitz, M.G.; Rickert, P.G.; Fried, S.M.; Friedman, A.M.; Steindler, M.J. (Argonne National Lab., IL (USA)). Jul 1979. Contract W-31-109-ENG-38. 70p. Dep. NTIS, PC A04/MF A01.

The first phenomenon studied is incomplete water-nuclide-rock reaction because of slow reaction kinetics. A kinetic factor derived from the experimental results for strontium migration through glauconite (a hydrous silicate) was expressed in terms of the linear flow rate of solution and can be used to predict migration due to solution flow at rates of 0 to about 12 cm/min (60 km/y). Continuous-flow infiltration experiments with americium in fissures gave results that are predicted by a migration model that includes kinetic factors measured in experiments with static fluids. The results suggest that kinetic factors are as important as equilibrium adsorption parameters in predicting nuclide migration. The second phenomenon studied was the amount of adsorbed nuclide not being proportional to the nuclide concentration in solution (nonlinear adsorption isotherm). For cesium adsorption on limestone, a nonlinear isotherm was found to occur in the range of initial cesium concentrations from about 10^{-3} to 10^{-9}M. This adsorption property was confirmed by results of column-infiltration experiments in which cesium migration through oolitic limestone was found to be sensitive to the amount of cesium in solution. The existence of a nonlinear isotherm precludes the use of a single partition value (K/sub D/) to describe cesium migration in limestone at cesium concentrations above about 10^{-9}M. Therefore, the effects of nonlinear isotherms are germane to nuclide migration. 24 figures, 6 tables.

2410 (ANL/ES--79) ENVIRONMENTAL ANALYSIS OF A FORMERLY UTILIZED MED/AEC SITE: SITE A AND PLOT M, PALOS FOREST PRESERVE, PALOS PARK, ILLINOIS. (Argonne National Lab., IL (USA)). Sep 1979. Contract W-31-109-ENG-38. 107p. Dep. NTIS, PC A06/MF A01.

This environmental analysis report describes the existing site environment and evaluates the environmental impacts of 8 options for remedial action, including allowing buried waste to remain undisturbed. Conformity or conflict with governmental statutes, regulations and standards was determined, especially with regard to compliance with contamination criteria and guidelines. The program of measurements, documentation, and control to demonstrate compliance with these criteria and guidelines was identified.

2411 (ARH--1733) LEACH AND SOIL COLUMN TESTS WITH STORED REDOX SLUDGE. Schulz, W.W.; Ritter, G.L. (Atlantic Richfield Hanford Co., Richland, WA (USA)). May 1970. Contract EY-77-C-06-1030. 26p. NTIS, PC A03/MF A01.

The leachabilities of ^{90}Sr, ^{239}Pu, and ^{137}Cs from solids in Tank 108-SX were determined. Through 21 leach cycles covering a 3.5 day period, 63 volumes of leachate removed 1.4, 4.6, and 19.2% of the ^{239}Pu, ^{90}Sr, and ^{137}Cs, respectively, from the 108-SX solids. With the exception of the first few leachates, the ^{239}Pu concentrations in the leachates were less than maximum permissible concentration in drinking water for 168-h/wk exposure. A composite of the TK-108-SX leachate was passed through a column containing typical Hanford soil. Column distribution coefficients with 108-SX leachate of 14, 24, and 20 were obtained for ^{239}Pu, ^{90}Sr, and ^{137}Cs, respectively, indicating appreciable sorption of all these radionuclides by the soil. The radionuclides were not readily removed from the loaded soil columns with 12 column volumes of dilute leachate solution. Laboratory results with the 108-SX sludge were carefully evaluated to determine their significance to the overall analysis of the safety of long-term storage of Redox sludge in existing underground tanks. The primary deterrent to movement of the radionuclides from such solids to the water table is the absence of moving water in the storage zone. Incident precipitation does not migrate to the storage depth. The leaching characteristics of the

solids and the ion exchange properties of the soil are secondary factors in preventing dispersion of the radionuclides to the environment. Based upon leaching and soil column results with 108-SX sludge, very large volumes of water would be required to move small amounts of radionuclides from the Redox sludge in the tanks to the deep water table.

2412 (BARC--1032) DEVELOPMENT OF IMPROVED LEACHING TECHNIQUES FOR VITRIFIED RADIOACTIVE WASTE PRODUCTS. Vaswani, G.A.; Yeotikar, R.G.; Rastogi, R.C.; Sunder Rajan, N.S. (Bhabha Atomic Research Centre, Bombay (India)). 1979. 36p. NTIS (US Sales Only), PC A03/MF A01.

A critical review of the current techniques for evaluating the leach resistance of vitrified radioactive wastes has been made. Inadequacy of the available leaching techniques, with respect to their adoption as standard technique on an international scale, has been brought out for the three broad categories of aqueous attack viz., (i) simple contact with leachant at a particular temperature, (ii) once-through or recirculatory flow of leachant at variable temperatures and flow rates, and (iii) contact with freshly distilled hot water in soxhelet type of extractor. In an effort to evolve a standard leaching technique in the latter two categories of aqueous attack, development of two leaching units viz., 'Dynamic Leaching Unit' and 'Modified Soxhlet Unit' is described. Both these units offer good control and wide flexibility on the important parameters affecting leaching such as leachant temperature, flow rate of residence time of leachant and ratio of leachant volume to sample surface area. The dynamic leaching units also offers a good control and flexibility on the two additional parameters viz., the composition and pH of the leachant. In the modified soxhlet unit the composition and pH of the leachant remains near to that of distilled water. The leach rate results have been found to be reproducible. A need for framing the set of standard conditions for adoption of these units in evolution of standard leaching techniques has been indicated.

2413 (BM-RI--8396) ABSORPTION OF RADIUM AND THORIUM FROM WYOMING AND UTAH URANIUM MILL TAILINGS SOLUTIONS. Beard, H.R.; Nichols, I.L.; Seidel, D.C. (Bureau of Mines, Salt Lake City, UT (USA). Salt Lake City Metallurgy Research Center). 1979. 18p. Bureau of Mines, Washington, DC.

An investigation was made of the absorption of radium and thorium from waste uranium leach liquor by clays and other materials. Tailings and soil samples from Wyoming and Utah were contacted with tailings liquors to determine the degree of absorption. Absorption ranged from 0 to 99% for radium and from 0 to 31% for thorium. Some samples, which readily absorbed radium, were contacted with various salt solutions that could be present in tailings solutions to determine their effectiveness as desorbents. The desorption of radium ranged from 0.06 to 100%. An alpha-spectrometric method was used to determine the radium and thorium concentrations in the solutions and the solids.

2414 (CONF-780506--(Vol.2), pp 537-539) RADIOLOGICAL SURVEYS OF RADIOACTIVE SHIPMENTS: ARE THEY ADEQUATE. Nichols, C.E. (Allied Chemical Corp., Idaho Falls, ID). 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

The Idaho Chemical Processing Plant (ICPP) is one of the largest receivers of high-enriched irradiated reactor fuels in the world. The fuel shipments comprise approximately 50% of the two thousand shipments handled per year and present the greatest potential for serious contamination problems. However, new developments in radiological survey techniques and three years of experience in using these techniques indicate that the limit's for removable and non-removable radioactive contamination may be excessive. The paper describes these new techniques and their impact on radiological surveys. Sensitive radiological surveys have lowered radioactive contamination limits on every item leaving our plant. It is not reasonable to consider shipments with allowable contamination levels which would require control measures in most plants in the industry to be allowed in warehouses, loading docks, etc. where no control measures are required. Not only are radiological surveys adequate, but perhaps it's time to reevaluate contamination levels that are now allowed, consistent with the improvements made for surveying shipments.

2415 (DOE/EV--0005/20) FORMERLY UTILIZED MED/AEC SITES REMEDIAL ACTION PROGRAM. RADIOLOGICAL SURVEY OF THE MIDDLESEX MUNICIPAL LANDFILL, MIDDLESEX, NEW JERSEY. FINAL REPORT. Leggett, R.W.; Cottrell, W.D.; Goldsmith, W.A.; Christian, D.J.; Haywood, F.F.; Wagner, E.B.; Crawford, D.J.; Doane, R.W.; Shinpaugh, W.H. (Oak Ridge National Lab., TN (USA)). Apr 1980. Contract W-7405-ENG-26. 98p. NTIS, PC A05/MF A01.

A radiological survey was conducted at the Middlesex Municipal Landfill in Middlesex, New Jersey. In 1948, dirt contaminated with pitchblende ores was brought to this site from a former ore sampling plant in Middlesex. This survey was conducted in order to characterize the present radiological condition of the site and to determine the extent to which contamination is being transported from the site by natural means such as by drainage. The survey included measurement of (1) radionuclide concentrations in surface and subsurface soil on the site; (2) radionuclide concentrations in surface and subsurface water on the site and in Bound Brook; (3) beta-gamma dose rates and external gamma radiation levels on and near the site; and (4) the rate of ^{222}Rn emanation from the soil on the site. It was found that most of the contamination on the site is in the top 14 ft of soil; however, there is little contamination of surface soil on the site. Average radon emanation rates, average external gamma radiation levels, and average beta-gamma dose rates on the site do not appear to be significantly higher than background levels. Furthermore, radionuclide concentrations in water taken from Bound Brook near the site were far below guide values stated in federal guidelines.

2416 (DOE/EV--0046(Vol.2)) PROCEEDINGS OF THE US DEPARTMENT OF ENERGY ENVIRONMENTAL CONTROL SYMPOSIUM. VOLUME 2. NUCLEAR ENERGY AND TRANSPORTATION. (Department of Energy, Washington, DC (USA). Div. of Environmental Control Technology; Argonne National Lab., IL (USA)). Sep 1979. Contract W-31-109-ENG-38. 617p. (CONF-781109--(Vol.2)). Dep. NTIS, PC A99/MF A01.

From Environmental control symposium; Washington, DC, USA (28 Nov 1978).

Volume 2 contains papers from the following sessions: environmental control of fission/fusion power; nuclear waste disposal;

decontamination and decommissioning; environmental control aspects of transportation; and hazardous materials transportation. Individual papers were processed.

2417 (DOE/EV--0060) ANNUAL STATUS REPORT ON THE INACTIVE URANIUM MILL TAILINGS SITES REMEDIAL ACTION PROGRAM. (Department of Energy, Washington, DC (USA). Div. of Environmental Control Technology). Dec 1979. 202p. Dep. NTIS, PC A10/MF A01.

Assessments of inactive uranium mill tailings sites in the United States led to the designation of 25 processing sites for remedial action under the provisions of Section 102(a) Public Law 95-604. The Department of Energy assessed the potential health effects to the public from the residual radioactive materials on or near the 25 sites; and, with the advice of the Environmental Protection Agency, the Secretary established priorities for performing remedial action. In designating the 25 sites and establishing the priorities for performing remedial action, the Department of Energy consulted with the Environmental Protection Agency, Nuclear Regulatory Commission, Department of the Interior, governors of the affected States, Navajo Nation, and appropriate property owners. Public participation in this process was encouraged. During Fiscal Year 1980, Department of Energy will be conducting surveys to verify the radiological characterization at the designated processing sites; developing cooperative agreements with the affected States; and initiating the appropriate National Environmental Policy Act documentation prior to conducting specific remedial actions.

2418 (ENICO--1022) CONTINUOUS TRITIUM MONITOR FOR NUCLEAR FACILITY OFF-GAS STREAMS. Fernandez, S.J.; Pierce, G.D.; Motes, B.G. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Jan 1980. Contract AC07-79ID01675. 36p. Dep. NTIS, PC A03/MF A01.

The development of a continuous tritium monitor for nuclear fuel reprocessing plants and waste solidification facilities, such as the Waste Calcination Facility (WCF) at the Idaho Chemical Processing Plant (ICPP), is described. The laboratory and in-plant evaluations of the monitor is also reported.

2419 (ENICO--1054) CONTINUOUS PLUTONIUM MONITOR FOR NUCLEAR FACILITY OFF-GAS STREAMS. McDonald, F.N.; Fernandez, S.J.; Motes, B.G. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Oct 1980. Contract AC07-79ID01675. 40p. NTIS, PC A03/MF A01.

This document is the final report of the project to develop a continuous, real-line monitor for ICPP plutonium emissions in the presence of naturally occurring radon daughters. The developed monitor collects the plutonium sample on a glass fiber filter followed by in-situ x-ray spectroscopy. The monitor was developed in two phases; laboratory testing and on-line demonstration. The major conclusions were the following: A Low-Energy Photon Spectrometer (LEPS) had sufficient sensitivity and resolution to detect the 40 hour occupational plutonium limit of 2 x 10^{-6} pCi/cc in 24 hours. There were no detectable biases or inaccuracies due to unattended operation of the monitor. Therefore, the continuous plutonium monitor was deemed to be suitable for ICPP off-gas streams.

2420 (EUR--6088) RADIOACTIVE EFFLUENTS FROM NUCLEAR POWER STATIONS AND NUCLEAR FUEL REPROCESSING PLANTS IN THE EUROPEAN COMMUNITY. DISCHARGE DATA 1972-1976 RADIOLOGICAL ASPECTS. Luykx, F.; Fraser, G. (Commission of the European Communities, Brussels (Belgium)). Apr 1978. vp. Dep. NTIS (US Sales Only), PC A06/MF A01.

The report presents the available data on radioactive gaseous and liquid effluents discharged by nuclear power stations and nuclear fuel reprocessing plants in the European Community from 1972 to 1976. Discharges are expressed both in absolute terms and relative to the net production of electricity from the fuel. On the basis of the discharges recorded for 1976 the resulting maximum exposure of members of the population is quantified and compared with the dose limits prescribed by Euratom radiological protection standards and with the exposure resulting from natural radioactivity. It is concluded that there is no case in which a discharge could have given rise to an exposure exceeding the relevant prescribed limit. Not only did the possible maximum exposures incurred by individuals leave an appreciable safety margin relative to that limit but, for the vast majority of installations, they were comparable with or were considerably lower than the geographical and temporal variations in exposures resulting from natural radioactivity. Where environmental levels have been detectable the measured results have of course been used but, with few exceptions, the levels have remained less than the very low limits of detection currently possible. In general, where theoretical models are used to evaluate exposure, they are designed to give conservative results and hence it is likely that the true exposures are even less than those calculated.

2421 (GJBX--170(79), pp 28p, Paper 6) ENVIRONMENTAL IMPLICATIONS OF DEVELOPMENT OF THE CHATTANOOGA SHALE AS A FUTURE SOURCE OF URANIUM. Nov 1979.

From Chattanooga shale conference; Oak Ridge, TN, USA (14 Nov 1978).

A preliminary environmental feasibility analysis must address itself to some fixed prototype project description that encompasses a realistic spectrum of potential impacts. The analysis discussed has been based upon a synthesis of typical project designs that utilize large raw shale ore throughputs, and site-specific parameters tailored to the constraints introduced by the physical characteristics of the shale environment. The study has concentrated upon identifying the potential environmental impacts of one mining and processing complex. Elements of the environment that have emerged as those most sensitive to exploitation of the Chattanooga Shale resource are: water resources, air, and socioeconomic structure. The nature and extent of the impacts which may be exerted upon these elements by Chattanooga Shale development are described.

2422 (IAEA--212, pp 139-149) MARINE EXAMPLE OF A SITE PROTECTION STUDY. Coulon, R. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Dept. de Protection). 1978.

From IAEA regional seminar on the application of environmental impact analysis to the nulcear power industry; Buenos Aires, Argentina (29 Aug 1977).

The paper describes the application of critical pathway analysis to a marine site: i.e. the La Hague reprocessing plant. The behaviour of radionuclides in water is first assessed through dispersion, retention and

transfer processes. An assessment of man exposure is also made in the particular case of a marine study. A detailed description of the work performed in the La Hague environment is also presented. The critical population is defined and some details are given on the monitoring programme.

2423 (IAEA--212, pp 87-91) LIMITS TO RADIOACTIVE EFFLUENTS AND COUNTERMEASURES IN ACCIDENTAL SITUATIONS. Nowotny, G.; Gonzalez, A. (Comision Nacional de Energia Atomica, Buenos Aires (Argentina). Gerencia de Proteccion Radiologica y Seguridad). 1978. (In Spanish).
From IAEA regional seminar on the application of environmental impact analysis to the nulcear power industry; Buenos Aires, Argentina (29 Aug 1977).
The paper discusses the criteria used by the Argentine Atomic Energy Commission, as competent authority, to set limits to radioactive effluents from nuclear installations. It also discusses the selection of action levels for carrying out countermeasures in accidental situations.

2424 (IAEA--212, pp 37-55) IMPLEMENTATION OF RADIATION PROTECTION REQUIREMENTS IN THE LIMITATION OF THE RELEASE OF RADIOACTIVE EFFLUENTS. Beninson, D. (United Nations Scientific Committee on the Effects of Atomic Radiation). 1978.
From IAEA regional seminar on the application of environmental impact analysis to the nulcear power industry; Buenos Aires, Argentina (29 Aug 1977).
The paper describes procedures of implementation of the radiation protection requirements referring to the control of radioactive effluents. Derived limits are introduced on the basis of environmental models of the concentration factor type. Optimization of control is discussed for the case where decision between several levels of protection is required, an example being presented. A procedure for restricting future exposures by limiting the dose commitment per unit practice is discussed. An appendix summarizes assessments of collective dose commitments from environmental releases in the nuclear fuel cycle.

2425 (INIS-mf--4551, pp 233-238) AIR RADIOACTIVITY IN THE NRI AND ITS SURROUNDINGS DURING 1974. Bazant, Z.; Horyna, J.; Prazakova, H. 1976. (In Czech).
From Scientific and technical conference commemorating the 20. anniversary of the Nuclear Research Institute's foundation; Rez, Czechoslovakia (10 Jun 1975).
Methods of measuring the radioactivity of the air in the ambient area of the Nuclear Research Institute, emissions in the forced ventilation and in the installations of the Institute are described. The average volume activity of radioactive aerosols in the environment did not exceed 1% of the value for ^{90}Sr. The average volume radioactivity of radioactive aerosols and radioiodine in the emissions is lower than the maximal permissible volume activity for long-term inhalation by the population for ^{239}Pu, ^{90}Sr and ^{131}I. The determined signal levels for radioactive gaseous emissions were not exceeded in any one case.

2426 (INIS-mf--4637, pp 39) RADIOACTIVE EFFLUENT CONTROL FOR NUCLEAR RESEARCH INSTITUTE, REZ. Horyna, J.; Hajek, P.; Keller, M. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Jun 1976. (In Czech).
From 4. national symposium on ionizing radiation dosimetry; Marianake Lazne, Czechoslovakia (8 Nov 1976).
GASEOUS WASTES;RADIATION MONITORING; RADIATION MONITORS;RADIOACTIVE EFFLUENTS;UJV

2427 (INIS-mf--4637, pp 78) MODELLING AND COMPUTING RADIATION HAZARDS OF POPULATION DUE TO NUCLEAR FACILITY OPERATION. Namestek, L.; Sevc, J.; Kunz, E. (Institut Hygieny a Epidemiologie, Prague (Czechoslovakia). Ustav Hygieny Zareni); Chorvat, D.; Mizov, J. (Vyskumny Ustav Hygieny Prace a Chorob z Povolania, Bratislava (Czechoslovakia)). Jun 1976. (In Czech).
From 4. national symposium on ionizing radiation dosimetry; Marianake Lazne, Czechoslovakia (8 Nov 1976).
AGE GROUPS;D CODES;DOSE EQUIVALENTS; ENVIRONMENT;ENVIRONMENTAL EXPOSURE PATHWAY; EXTERNAL IRRADIATION;HUMAN POPULATIONS; MATHEMATICAL MODELS;NUCLEAR FACILITIES; RADIATION DOSES;RADIATION HAZARDS;RADIOACTIVE EFFLUENTS;COMPUTER CODES;RADIONUCLIDE KINETICS

2428 (INIS-mf--4637, pp 37) CONTRIBUTION OF RADIOACTIVE EFFLUENTS TO EXPOSURE OF POPULATION LIVING NEAR NUCLEAR RESEARCH INSTITUTE, REZ. Horyna, J. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Jun 1976. (In Czech).
From 4. national symposium on ionizing radiation dosimetry; Marianake Lazne, Czechoslovakia (8 Nov 1976).
ENVIRONMENTAL IMPACTS;EXTERNAL IRRADIATION; GASEOUS WASTES;HUMAN POPULATIONS;INTERNAL IRRADIATION;RADIATION DOSES;RADIOACTIVE EFFLUENTS;UJV;ENVIRONMENTAL TRANSPORT

2429 (INIS-mf--5194) ANNUAL REPORT ON RADIOACTIVE DISCHARGES AND MONITORING OF THE ENVIRONMENT, 1977. Atherton, R.S. (British Nuclear Fuels Ltd., Risley). Oct 1978. 64p. Dep. NTIS (US Sales Only), PC A04/MF A01.
The principal activity of British Nuclear Fuels Limited (BNFL) is the provision of nuclear fuel cycle services, i.e. the purification and processing or uranium ore concentrates, the enrichment of uranium, the manufacture of uranium and plutonium based fuels and the reprocessing of irradiated fuel. The Company also owns and operates two Magnox type nuclear power stations Chapelcross and Calder Hall. This report identifies and quantifies the discharges of radioactive isotopes to the environment and the monitoring of their environmental impact. The data refer to the sites on which the Company's Works are situated. Where a site also encompasses laboratories of the United Kingdom Atomic Energy Authority (UKAEA), reference is made to the significance of the discharge from the latter. The report includes assessments of maximum radiological exposures to individual members of the general public expressed in terms of Dose Limits recommended by the International Commission on Radiological Protection (ICRP). For this purpose the ICRP primary and secondary standards, applicable at time of the discharges, were used, ie prior to the most recent ICRP primary standards and the yet unpublished secondary standards. This report is the first in which information on radioactive discharges and environmental monitoring is given for all the Company's Works and Sites, i.e. the Windscale and Calder Works and the Drigg Storage and Disposal Sites; Chapelcross Works; Springfields Works and the Ulnes Walton Disposal Site; and the Capenhurst Works. Copies of certificates for

authorisation for the disposal of radioactive waste are given in an Appendix.

2430 (INIS-mf--5572, pp 24-28) EXPRESS-METHOD FOR CONTROL OF RADIONUCLIDES MIGRATION OF THE STRATUM-COLLECTOR OF UNDERGROUND BURIAL SITE FOR LIQUID RADIOACTIVE WASTES. Pimenov, M.K.; Rybal'chenko, A.I. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Express-methods are described for determination of radionuclides diffusion in geological formations during underground storage of liquid radioactive wastes. Control of radionuclides diffusion in stratums is performed:: by means of hydrodynamic investigations, - flow rate and pressure monitoring of the wastes pumped, investigation of the field of the stratum pressures at the area of the stratum-collector; by means of conducting hydrogeochemical investigations, - sampling of liquids from observation boreholes with subsequent radiochemical analysis ore express determination of radioactive nuclides; by means of geophysical investigations, - express determination of radionuclides directly in observation boreholes and examination of geothermal field changes caused by the wastes pumped. As the methods for express determination of nuclides in samples, beta-radiometric measurments of samples and also gamma and beta well-logging of observation boreholes were used. The results are given of application of express-methods of analysis in safety control of underground burial site for liquid radioactive wastes.

2431 (JAERI-M--7962) ^{14}C BEHAVIOR IN HTR FUEL REPROCESSING AND PRELIMINARY EVALUATION OF ITS RELEASE REDUCTION PROCESS. Maeda, M.; Tsujino, T. (Japan Atomic Energy Research Inst., Tokyo). Nov 1978. 41p. (In Japanese). Dep. NTIS (US Sales Only), PC A03/MF A01.

On the basis of a literature survey of ^{14}C behavior in HTR and the fuel reprocessing, and evaluation methods of the radiation doses, the formation of ^{14}C, its distribution in the fuel reprocessing and the annual VHTR which is being environmental doses are calculated for developed in JAERI; the necessary decontamination factor of ^{14}C is then indicated. Through these results, the processes of reducing the environmental release of ^{14}C are preliminarily evaluated.

2432 (KFK--2750, pp 4800-10-4800-12) INVESTIGATION OF THE PHYSICAL AND CHEMICAL ENVIRONMENTAL BEHAVIOUR OF RADIONUCLIDES CHARACTERIZED BY A PARTICULAR BIOLOGICAL EFFECTIVENESS - PU, AM, CM. Schuettelkopf, H.; Pimpl, M. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Hauptabteilung Sicherheit - Bereich 1). Oct 1979. (In German).

Semiannual report 1978/2.

Using the developed analytical method for Pu, a technician is able to perform 4 analyses per day. Chemical yield: 70-80%, Lower detection limit: < 0,1 fCi/g. The monthly determined releases of plutonium in the gaseous effluents of Karlsruhe reprocessing plant range over several orders of magnitude. The released Pu-238 and Pu-239+240 remains below the releases of gross alpha activity. The plutonium concentrations in liquid effluents range in the average between 0,1-1 pCi Pu/l. Concentrations of Pu were measured in: soil, plants, sediments, air, animals and water.

2433 (KY--690) UF_6 RELEASE EXPERIENCE AND PREVENTION IN UNITED STATES GASEOUS DIFFUSION PLANTS. Hull, G.T. (Paducah Gaseous Diffusion Plant, KY (USA)). 27 Jun 1978. Contract W-7405-ENG-26. 16p. (CONF-780669--2). Dep. NTIS, PC A02/MF A01.

From Specialist meeting; Boekelo, Netherlands (27 Jun 1978).

The three United States gaseous diffusion plants in operation at Oak Ridge, Tennessee, Paducah, Kentucky, and Portsmouth, Ohio have been in operation for a combined total of over 80 years, and in that period have produced or processed many thousands of tonnes of UF_6. Releases of UF_6 are reviewed. Release frequency has decreased sharply since the early period of plant operation. The impact and consequences of these releases are assessed. It is significant that there has never been a serious injury caused by UF_6 exposure from a gaseous diffusion plant, and no release has caused a serious disruption of plant operations.

2434 (L--7893-PR) LABORATORY STUDIES OF RADIONUCLIDE DISTRIBUTIONS BETWEEN SELECTED GROUNDWATERS AND GEOLOGIC MEDIA. PROGESS REPORT, APRIL 1-JUNE 30, 1979. Erdal, B.R. (comp.). (Los Alamos Scientific Lab., NM (USA)). Nov 1979. Contract W-7405-ENG-36. 56p. Dep. NTIS, PC A04/MF A01.

The Los Alamos Scientific Laboratory contribution to the Waste Isolation Safety Assessment Program, Task 4, for the third quarter of FY-79 involved plutonium, americium, and uranium(VI) batch sorption studies. The technetium sorption ratio on tuff was not found to be dependent on technetium concentration. Studies of the behavior of plutonium and americium in aqueous solutions at pH approx. = 8 were continued. Studies of the sorption of strontium, cesium, barium, cerium, europium, uranium, and americium on salt dome materials were made under atmospheric and controlled atmosphere conditions. The first experiments to assess the dependence of sorption ratio on groundwater composition were started. Migration rate studies using crushed rock columns and fractured cores were continued. Additional chemical analyses were made, as were some studies of the sorption of plutonium and neptunium using a microautoradiographic technique.

2435 (LA--8309-PR) RESEARCH AND DEVELOPMENT RELATED TO THE NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS. PROGRESS REPORT, OCTOBER 1-DECEMBER 31, 1979. Crowe, B.M. (comp.). (Los Alamos Scientific Lab., NM (USA)). Apr 1980. Contract W-7405-ENG-36. 22p. NTIS, PC A02/MF A01.

Batch sorption measurements in air with Sr, Cs, Ba, Ce, and Eu were conducted with four additional tuff samples. Additional results for sorption of Pu and Am are presented. Results for sorption of Tc, Sr, Cs, Ba, Ce, Eu, and U(VI) are given and compared with results in air. Migration rate studies with crushed tuff are continuing, and, in some cases, uniform peakless elution is being observed. Methods for studying the migration rate of uranium (VI) are being developed. Nuclides are being infiltrated into various types of solid cores for study after sectioning. Microautoradiographic examination of crushed tuff samples used in the batch determinations indicate that large species of americium are sorbed. Methods for determination of iron(II) in both rocks and waters are described. The probability of disruption of a repository site at Yucca

Mountain by future volcanic activity is bracketed by the range 10^{-8} to 10^{-10}/y. Partitioning functions for selected elements in plagioclase and olivine phenocrysts were examined for estimates of near-liquidus temperatures of representative melt compositions of the basalts of Crater Flat. Higher temperature estimates were calculated for glomeroperphyritic clots in the oldest basalts of Crater Flat.

2436 (LA--8539-PR) FISSION PRODUCT RELEASE. PROGRESS REPORT, APRIL 1-JUNE 30, 1980. Norris, A.E. (comp.). (Los Alamos Scientific Lab., NM (USA)). Sep 1980. Contract W-7405-ENG-36. 23p. (ONWI/Sub--80/E511-01200-7). NTIS, PC A02/MF A01.

The analysis of data collected from nuclear waste leaching experiments is under way to determine what differences are important when one spent fuel element wafer is leached under aqueous reducing conditions while the other is leached under oxidizing conditions. The concentrations of radioactive species in the leachant solutions are being investigated in terms of dissolution congruent with that of the UO_2 matrix and, for the lanthanide and actinide elements, in terms of precipitation reactions that result in limiting the concentrations of the species in solution. The concentrations of uranium and plutonium is solution under reducing conditions, however, are much higher than would be expected from the oxygen fugacity of the leachant derived from the measured Eh value. It is inferred that the actual reducing conditions in this pH 4 solution were much more oxidizing than desired for the experiment. The solubility of pure uraninite measured in deionized water was used in conjunction with thermodynamic calculations to infer that the oxygen fugacity in the apparatus, which differed from that used for the spentfuel leaching, was approx. 10^{-50} bars and that CO_2 was either absent or present in such low concentrations that the UO_2 solubility was not appreciably affected. 14 figures.

2437 (NTIS/PS--79/0139) URANIUM MINING AND MILLING ENVIRONMENTAL STUDIES (CITATIONS FROM THE NTIS DATA BASE). REPORT FOR 1964-JANUARY 1979. Hundemann, A.S. (National Technical Information Service, Springfield, VA (USA)). Mar 1979. 211p. NTIS, PC N01/MF N01.

Pollution, public and occupational health, and waste management associated with uranium ore recovery and processing are cited. The monitoring and control of contamination in air and effluents in the mining vicinities are discussed in this collection of Federally-funded research. (This updated bibliography contains 203 abstracts, 78 of which are new entries to the previous edition.)

2438 (NTIS/PS--79/0140) URANIUM MINING AND MILLING ENVIRONMENTAL STUDIES (CITATIONS FROM THE ENGINEERING INDEX DATA BASE). REPORT FOR 1970-JANUARY 1979. Hundemann, A.S. (National Technical Information Service, Springfield, VA (USA)). Mar 1979. 90p. NTIS, PC N01/MF N01.

Worldwide research is cited on uranium mining waste management and effluent control. Studies on mining practices, radon monitoring, health hazards, and land reclamation are covered. Government policies and regulations concerning present and long term waste handling are included. (This updated bibliography contains 86 abstracts, 15 of which are new entries to the previous edition.)

2439 (NUREG/CR--1081) CHARACTERIZATION OF URANIUM TAILINGS COVER MATERIALS FOR RADON FLUX REDUCTION. Rogers, V.C.; Overmyer, R.F.; Putzig, K.M.; Jensen, C.M.; Nielson, K.K.; Sermon, B.W. (Argonne National Lab., IL (USA); Ford, Bacon and Davis Utah, Inc., Salt Lake City (USA)). Mar 1980. Contract W-31-109-ENG-38. 163p. (FBDU--218-2). Dep. NTIS, PC A08/MF A01.

The attenuation of radon through uranium tailings cover material is usually described with diffusion theory expressions. One of the main parameters characterizing the diffusion is the diffusion coefficient. Measured values of the diffusion coefficient for several Wyoming and New Mexico soils are presented. An interpretation of various approximations to the diffusion equation is also given. Finally, the diffusion coefficient dependence on moisture is presented and the data are represented by a simple correlation.

2440 (ONWI--11(AECL-6325)) MODEL FOR THE TRANSPORT OF RADIONUCLIDES AND THEIR DECAY PRODUCTS THROUGH GEOLOGIC MEDIA. Burkholder, H.C.; Rosinger, E.L.J. (Battelle Memorial Inst., Columbus, OH (USA); Atomic Energy of Canada Ltd., Ottawa, Ontario). Sep 1979. Contract EY-76-C-06-1830. 31p. Dep. NTIS, PC A03/MF A01.

The one-dimensional transport of radionuclides and their decay products from an underground nuclear waste isolation site through the surrounding geologic media to a surface environment is modeled. An ambiguity in the application of the previously reported mathematical solution for this problem has been clarified. The results of applying the solution described here compare favorably with the results of applying the former solution, but the present solution is computationally more efficient and less subject to numerical errors. Thus, this solution is presently being used by the authors and others to evaluate the sensitivity of potential radioactivity releases into the environment to the characteristics of various nuclear waste isolation systems. The model is expected to be used in the future as an analytical standard to which the accuracy of numerical codes can be compared.

2441 (ONWI--88, pp 186-196) PSE: RELEASE SCENARIO ANALYSIS. Storck, R. (Technische Universitaet, Berlin, Germany). 1979.

From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).

The Project Safetystudies Entsorgung (PSE) is concerned with risk type analysis of engineered and geological systems. A generalized method has been developed which is applicable to both. The essential element of this method is the so-called release tree. This paper presents a short description of the general method and shows its application to the final repository. During execution of the analysis, many difficulties arose, especially in the understanding of some physical processes. These difficulties are mentioned and will be subject to detailed investigation in the future.

2442 (ONWI--88, pp 197-212) GENERAL MODELING, CONSIDERATIONS AND DATA REQUIREMENTS FOR CONSEQUENCE ANALYSIS. Memmert, G. (Technische Universitaet, Berlin, Germany). 1979.

From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).

Within the PSE (Safety-Studies-Entsorgung),

theoretical hydrological investigations are being conducted of the flow of ground water above and around a salt dome and of the transport of contaminants by the water. (DLC)

2443 (ONWI--88, pp 213-225) RELEASE CONSEQUENCE ANALYSIS. Pahwa, S. (Intera Environmental Consultants Inc., Houston, TX). 1979.

From US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing; Berlin, F.R. Germany (1 Oct 1979).

This paper outlines the steps involved in hydrology and contaminant transport modeling, approaches within various waste management programs, modeling strategies, data needs, strength/limitations of model types, model development needs, and validation an crosschecking. (DLC)

2444 (ORNL--5447) ASSESSMENT OF THE RADIOLOGICAL IMPACT OF THE INACTIVE URANIUM-MILL TAILINGS AT SHIPROCK, NEW MEXICO. Haywood, F.F.; Goldsmith, W.A.; Lantz, P.M.; Fox, W.F.; Shinpaugh, W.H.; Hubbard, H.M. Jr. (Oak Ridge National Lab., TN (USA)). Dec 1979. Contract W-7405-ENG-26. 94p. Dep. NTIS, PC A05/MF A01.

Uranium-mill tailings at an inactive site near Shiprock, New Mexico, contain an estimated 950 curies (Ci) of ^{226}Ra together with its radioactive daughters. A radiological survey was conducted at this site in February 1976. Decontamination work and tailings stabilization performed at the site since that time have greatly changed conditions there and little effort was applied to quantification of potential health effects in comparison to the earlier consideration of the site at Salt Lake City. The present report delineates the radiological conditions that existed at the time of the survey including information on the surface and below-surface distribution of ^{226}Ra. The data presented support the conclusion that diffusion of radon and inhalation of radon daughters is the principal mode of exposure of offsite population groups.

2445 (ORNL--5449) ASSESSMENT OF THE RADIOLOGICAL IMPACT OF THE INACTIVE URANIUM-MILL TAILINGS AT MONUMENT VALLEY, ARIZONA. Haywood, F.F.; Goldsmith, W.A.; Hubbard, H.M. Jr.; Fox, W.F.; Shinpaugh, W.H. (Oak Ridge National Lab., TN (USA)). Dec 1979. Contract W-7405-ENG-26. 74p. Dep. NTIS, PC A04/MF A01.

Results of a radiological survey that was conducted at the inactive uranium-mill site at Monument Valley, Arizona, in March 1976, in cooperation with a team from Ford, Bacon and Davis Utah Inc., are presented. Consideration of these data and of previously published information on radiological conditions at the site lead to the conclusion that potential health effects from exposure to radionuclides in the mill tailings are relatively small. The occupants of three residences within 0.8 km (0.5 mile) of the tailings constitute the principal population at risk, but direct gamma-exposure rate measurements near the two residences closest to the tailings and calculations of radon dispersion indicate that the tailings do not raise either pathway of radiation exposure significantly above the background level. Data are not available to evaluate fully other possible exposure pathways, but the available information indicates that it is unlikely that doses through these pathways will add significantly to the total population dose. The low estimates of potential health effects from exposure to direct radiation and to exposure to radionuclides in the Monument Valley tailings piles are ascribed to the low ^{226}Ra inventory, to almost complete absence of small particles that are readily moved by wind and water, and to a small population in the vicinity of the tailings.

2446 (ORNL--5567) FEMWATER: A FINITE-ELEMENT MODEL OF WATER FLOW THROUGH SATURATED-UNSATURATED POROUS MEDIA. Yeh, G.T.; Ward, D.S. (Oak Ridge National Lab., TN (USA)). Oct 1980. Contract W-7405-ENG-26. 162p. NTIS, PC A08/MF A01.

Upon examining the Water Movement Through Saturated-Unsaturated Porous Media: A Finite-Element Galerkin Model, it was felt that the model should be modified and expanded. The modification is made in calculating the flow field in a manner consistent with the finite element approach, in evaluating the moisture-content increasing rate within the region of interest, and in numerically computing the nonlinear terms. With these modifications, the flow field is continuous everywhere in the flow regime, including element boundaries and nodal points, and the mass loss through boundaries is much reduced. Expansion is made to include four additional numerical schemes which would be more appropriate for many situations. Also, to save computer storage, all arrays pertaining to the boundary condition information are compressed to smaller dimension, and to ease the treatment of different problems, all arrays are variably dimensioned in all subroutines. This report is intended to document these efforts. In addition, in the derivation of finite-element equations, matrix component representation is used, which is believed more readable than the matrix representation in its entirety. Two identical sample problems are simulated to show the difference between the original and revised models.

2447 (PB--299754) CONTINUED CARE OF URANIUM MILL SITES: SOME ECONOMIC CONSIDERATIONS. Harrington, W.; Sawyer, J.W. Jr. (Resources for the Future, Inc., Washington, DC (USA)). Jan 1978. Contract NSF-AER75-16163. 28p. NTIS, PC A03/MF A01.

A critique of recently enacted legislation authorizing the New Mexico Environmental Improvement Agency to regulate uranium mills in the state is presented. Under this new legislation, the Agency is authorized to require payment of up to 10 cents per pound of yellowcake from each licensed mill in the state until a total of $1 million has been deposited by that mill. The continued care fund thus created will provide for maintenance in perpetuity of mill sites after being decommissioned. Arguments are presented, based on calculations for a typical 5,000 ton per day mill, that even the maximum amount is not likely to generate sufficient income to support an adequate maintenance program. The matter is further aggravated by the rate of inflation which will increase costs beyond the coverage provided by a fixed funding system. To correct this situation, it is proposed that (1) the fund should generate an income stream sufficient to meet all maintenance costs based on currently available information on costs, interest, and inflation rates, and (2) the terms of the continued care contribution should be readily alterable as new information becomes available. The latter condition should be coupled with removal of the upper statutory limit now established for the fund.

2448 (PNCT--841-78-49) MEASUREMENT OF ^{85}KR

CONCENTRATION IN THE ENVIRONMENTAL AIR DURING THE HOT-TEST OPERATION OF TOKAI REPROCESSING PLANT. Hirayama, A.; Kishimoto, Y.; Kurosu, G.; Sudou, M.; Fujioka, A. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). Aug 1978. 49p. (In Japanese). Dep. NTIS (US Sales Only), PC A04/MF A01.

^{85}Kr concentration in air in the vicinity of the reprocessing plant was measured when it was released from the plant stack during the hot-test operation using PWR spent fuels. Charcoal absorption method was devised for this experiment as a rapid, simple and inexpensive technique for the measurement of ^{85}Kr concentration at about 10^{-9} $\mu Ci/cm^3$. Special air samplers were located at few kilometers distant from the stack and the air was collected for an hour at a flow-rate of 1.5 liters per minute. About thirty air samples were taken and analyzed for ^{85}Kr concentration successfully. The performance of sampling and analytical methods employed was good, although some improvements were found to be necessary. An example is that an air-collection bag should be made of ''saran'' so that the leakage be minimized. Usually in the atmospheric diffusion study sulfur hexafluoride gas is used as an air-tracer, and analytical procedure for the gas concentration down to 10^{-3} ppb is well established. In this experiment SF_6 gas was injected into the stack during the discharge of ^{85}Kr and the concentration in sampled air was also determined. The results show a good correlation between ^{85}Kr and SF_6 concentration in sampled air.

2449 (PNL--2286) DESCRIPTIONS OF REFERENCE LWR FACILITIES FOR ANALYSIS OF NUCLEAR FUEL CYCLES. Schneider, K.J.; Kabele, T.J. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Sep 1979. Contract EY-76-C-06-1830. 528p. Dep. NTIS, PC A28/MF A01.

To contribute to the Department of Energy's identification of needs for improved environmental controls in nuclear fuel cycles, a study was made of a light water reactor system. A reference LWR fuel cycle was defined, and each step in this cycle was characterized by facility description and mainline and effluent treatment process performance. The reference fuel cycle uses fresh uranium in light water reactors. Final treatment and ultimate disposition of waste from the fuel cycle steps were not included, and the waste is assumed to be disposed of by approved but currently undefined means. The characterization of the reference fuel cycle system is intended as basic information for further evaluation of alternative effluent control systems.

2450 (PNL--2287) SURVEY OF LWR ENVIRONMENTAL CONTROL TECHNOLOGY PERFORMANCE AND COST. Heeb, C.M.; Aaberg, R.L.; Cole, B.M.; Engel, R.L.; Kennedy, W.E. Jr.; Lewallen, M.A. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Mar 1980. Contract EY-76-C-06-1830. 194p. Dep. NTIS, PC A09/MF A01.

This study attempts to establish a ranking for species that are routinely released to the environment for a projected nuclear power growth scenario. Unlike comparisons made to existing standards, which are subject to frequent revision, the ranking of releases can be used to form a more logical basis for identifying the areas where further development of control technology could be required. This report describes projections of releases for several fuel cycle scenarios, identifies areas where alternative control technologies may be implemented, and discusses the available alternative control technologies. The release factors were used in a computer code system called ENFORM, which calculates the annual release of any species from any part of the LWR nuclear fuel cycle given a projection of installed nuclear generation capacity. This survey of fuel cycle releases was performed for three reprocessing scenarios (stowaway, reprocessing without recycle of Pu and reprocessing with full recycle of U and Pu) for a 100-year period beginning in 1977. The radioactivity releases were ranked on the basis of a relative ranking factor. The relative ranking factor is based on the 100-year summation of the 50-year population dose commitment from an annual release of radioactive effluents. The nonradioactive releases were ranked on the basis of dilution factor. The twenty highest ranking radioactive releases were identified and each of these was analyzed in terms of the basis for calculating the release and a description of the currently employed control method. Alternative control technology is then discussed, along with the available capital and operating cost figures for alternative control methods.

2451 (PNL--2652) WASTE ISOLATION SAFETY ASSESSMENT PROGRAM. A BRIEF DESCRIPTION OF THE THREE-DIMENSIONAL FINITE ELEMENT GROUND-WATER FLOW MODEL ADAPTED FOR WASTE ISOLATION SAFETY ASSESSMENTS. Cole, C.R.; Gupta, S.K. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Aug 1979. Contract EY-76-C-06-1830. 57p. Dep. NTIS, PC A04/MF A01.

Four levels of hydrologic models have been categorized to handle varying complexities and degrees of available input parameters. The first level is for the simplest one-dimensional models having analytical solutions; the second level includes idealized analytic or hybrid analytic models for single aquifer systems with scanty input data; the third level deals with more complex single or quasi-multilayered systems; and the fourth level is for complex multilayered systems. The three-dimensional finite element ground-water model described in this report falls under the fourth level of hydrologic models. This model is capable of simulating single-layered systems having variable thickness or multilayered systems where not only thickness can be varied, but the number of layers can be changed to agree with the vertical geologic section. Supporting programs have been developed to plot grid values, contour maps and three-dimensional graphics of the input data used in simulation as well as the results obtained. At present, the model considers only confined aquifers. The capabilities of the model were demonstrated by using a test case consisting of the multilayered ground-water system beneath Long Island, New York.

2452 (PNL--2774) CHARACTERIZATION OF THE HANFORD 300 AREA BURIAL GROUNDS. TASK IV. BIOLOGICAL TRANSPORT. Fitzner, R.E.; Gano, K.A.; Rickard, W.H.; Rogers, L.E. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Oct 1979. Contract EY-76-C-06-1830. 86p. Dep. NTIS, PC A05/MF A01.

The characteristics of radioactive waste burial sites at the 300 area burial grounds on the Department of Energy's Hanford Site, southeastern Washington were studied. The potential vectors of radionuclide transport studied were vegetation and animals. The overall results showed a low potential for uptake and transport of radionuclides from the 300 area sites. However, additional methods to control physical and biological mechanisms may contribute to the effectiveness of waste burial practices. From the results, the Biological

Transport task recommended field studies which include reduction of soil erosion and addition of biobarriers to plants and animals. Vegetation plays a major role in reducing soil erosion, and thereby maintaining the backfill over the burial sites. Of the several species found on the 300 area sites, cheatgrass (Bromus tectorum) appears to be the most desirable as a cover. Besides retarding erosion, it has a shallow root system (does not easily penetrate buried material); it has a low affinity for radionuclide uptake; and its tissues are not easily blown away. Small mammals (specifically, mice) appear to have the most potential for radionuclide exposure and uptake. Small mammals were live-trapped within 10 x 10-meter trap grids. Each animal trapped was surgically implanted with a thermoluminescent dosimeter. When the animal was recaptured, the dosimeter was removed and read for exposure. Exposures were reported in milli-Roentgens. The most consistently trapped small mammals were the Great Basin pocket mouse (Perognathus parvus) and the deer mouse (Peromyscus maniculatus). Results from the dosimeter readings showed that some of those animals had higher than background exposures. Biobarriers to animals could be considered as a mechanism to reduce the potential for radionuclide transport.

2453 (PNL--2970) GETOUT: A COMPUTER PROGRAM FOR PREDICTING RADIONUCLIDE DECAY CHAIN TRANSPORT THROUGH GEOLOGIC MEDIA. DeMier, W.V.; Cloninger, M.O.; Burkholder, H.C.; Liddell, P.J. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Aug 1979. Contract EY-76-C-06-1830. 342p. Dep. NTIS, PC A15/MF A01.

A guide to the use of the GETOUT code is presented. The code models the migration of radionuclides from an underground source to a surface body of water. Output from the code comprises: (1) a nuclide discharge summary file in a format suitable for input to an existing biosphere model, and (2) printed reports showing discharge profiles for selected nuclides by four release modes. The guide provides a general description of the GETOUT system, program listings, sample output, and instructions, with examples for executing the code.

2454 (PNL--3129) ENVIRONMENTAL CONTROL ASPECTS FOR FABRICATION, REPROCESSING AND WASTE DISPOSAL OF ALTERNATIVE LWR AND LMFBR FUELS. Nolan, A.M.; Lewallen, M.A.; McNair, G.W. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Nov 1979. Contract EY-76-C-06-1830. 94p. Dep. NTIS, PC A05/MF A01.

Environmental control aspects of alternative fuel cycles have been analyzed by evaluating fabrication, reprocessing, and waste disposal operations. Various indices have been used to assess potential environmental control requirements. For the fabrication and reprocessing operations, 50-year dose commitments were used. Waste disposal was evaluated by comparing projected nuclide concentrations in ground water at various time periods with maximum permissible concentrations (MPCs). Three different fabrication plants were analyzed: a fuel fabrication plant (FFP) to produce low-activity uranium and uranium-thorium fuel rods; a plutonium fuel refabrication plant (PFRFP) to produce plutonium-uranium and plutonium-thorium fuel rods; and a uranium fuel refabrication plant (UFRFP) to produce fuel rods containing the high-activity isotopes ^{232}U and ^{233}U. Each plant's dose commitments are discussed separately. Source terms for the analysis of effluents from the fuel reprocessing plant (FRP) were calculated using the fuel burnup codes LEOPARD, CINDER and ORIGEN. Effluent quantities are estimated for each fuel type. Bedded salt was chosen for the waste repository analysis. The repository site is modeled on the Waste Isolation Pilot Program site in New Mexico. Wastes assumed to be stored in the repository include high-level vitrified waste from the FRP, packaged fuel residue from the FRP, and transuranic (TRU) contaminated wastes from the FFP, PFRFP, and UFRFP. The potential environmental significance was determined by estimating the ground-water concentrations of the various nuclides over a time span of a million years. The MPC for each nuclide was used along with the estimated ground-water concentration to generate a biohazard index for the comparison among fuel compositions.

2455 (PNL--3253) ENVIRONMENTAL CONTROL TECHNOLOGY FOR MINING, MILLING, AND REFINING THORIUM. Weakley, S.A.; Blahnik, D.E.; Young, J.K.; Bloomster, C.H. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Feb 1980. Contract AC06-76RL01830. 253p. NTIS, PC A12/MF A01.

The purpose of this report is to evaluate, in terms of cost and effectiveness, the various environmental control technologies that would be used to control the radioactive wastes generated in the mining, milling, and refining of thorium from domestic resources. The technologies, in order to be considered for study, had to reduce the radioactivity in the waste streams to meet Atomic Energy Commission (10 CFR 20) standards for natural thorium's maximum permissible concentration (MPC) in air and water. Further regulatory standards or licensing requirements, either federal, state, or local, were not examined. The availability and cost of producing thorium from domestic resources is addressed in a companion volume. The objectives of this study were: (1) to identify the major waste streams generated during the mining, milling, and refining of reactor-grade thorium oxide from domestic resources; and (2) to determine the cost and levels of control of existing and advanced environmental control technologies for these waste streams. Six potential domestic deposits of thorium oxide, in addition to stockpiled thorium sludges, are discussed in this report. A summary of the location and characteristics of the potential domestic thorium resources and the mining, milling, and refining processes that will be needed to produce reactor-grade thorium oxide is presented in Section 2. The wastes from existing and potential domestic thorium oxide mines, mills, and refineries are identified in Section 3. Section 3 also presents the state-of-the-art technology and the costs associated with controlling the wastes from the mines, mills, and refineries. In Section 4, the available environmental control technologies for mines, mills, and refineries are assessed. Section 5 presents the cost and effectiveness estimates for the various environmental control technologies applicable to the mine, mill, and refinery for each domestic resource.

2456 (PNL--3300(Pt.5), pp 43-49) ANALYSIS OF NUCLEAR FUEL CYCLES. Feb 1980.

Pacific Northwest Laboratory annual report for 1979 to the DOE Assistant Secretary for Environment. Part 5. Environmental assessment, control, health, and safety.

The operation of nuclear fuel cycle facilities will introduce noxious materials, both radiological and chemical, into the environment through routine discharges of both liquid and airborne effluents. The

environmental control implications of continuing to develop existing nuclear fuel cycles and implementing new fuel cycles must be systematically determined so technologies that control or eliminate the discharge of noxious materials to the environment can be quickly developed and demonstrated. The objective of this program is to identify areas in developing nuclear fuel cycles where (1) inadequate consideration is being given to environmental controls, (2) inconsistencies and conflicts exist in environmental policy, and (3) environmental control improvements can be justified on a cost/risk/benefit basis to ensure that funds are not expended for control in instances where neither the potential effects nor public concerns warrant such expenditures.

2457 (PNL--3304) MONITORING AND PHYSICAL CHARACTERIZATION OF UNSATURATED ZONE TRANSPORT. LABORATORY ANALYSIS. Gee, G.W.; Campbell, A.C. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Mar 1980. Contract EY-76-C-06-1830. 67p. Dep. NTIS, PC A04/MF A01.

Batch Kd screening tests on Hanford sediments indicated that anionic radionuclide mobility is dependent upon specie and concentration. Technetium, as TcO_4^-, is not sorbed to any extent and will move as rapidly as water. Iodine, as I^-, will also move at high concentrations (>5 ppB) but is retarded at very low concentrations (<1 ppB). Neutral species such as tritium and complexed nuclides such as cobalt-60 (EDTA) are only slightly retarded while uncomplexed cobalt-60 is strongly bound to the sediments under the conditions studied. Strontium sorption is controlled by ion exchange-like reactions and sorption is predictable from a knowledge of soil and solution characteristics. Cesium is strongly bound to the Hanford sediments under typical conditions and appears to be sorbed independent of salt concentration for the synthetic ground waters tested. The sorption of relatively mobile nuclides such as tritium, cobalt-EDTA, and technetium could be measured with greater precision using the unsaturated column tests than with batch methods. Little or no difference in sorption was observed when the flow rates were changed by more than an order of magnitude (2 to 50 cm/day). Changes in saturation percentage of the soil, from 56 to 31%, also had only a minor effect on nuclide sorption. For layered sediments, the effective sorption of a layered sequence is controlled by the sorption characteristics of the most sorbing layer.

2458 (PNL-SA--7245) PRELIMINARY RESULTS ON COMPARISON OF ADSORPTION-DESORPTION METHODS AND STATISTICAL TECHNIQUES TO GENERATE KD PREDICTOR EQUATIONS. Serne, R.J.; Rai, D.; Relyea, J.F. (Battelle Pacific Northwest Labs., Richland, WA (USA)). 1979. Contract EY-76-C-06-1830. 12p. Dep. NTIS, PC A02/MF A01.

The radioactive waste isolation safety assessment program (WISAP) is being performed for the United States Department of Energy. A large bank of data have been collected under this program. A part of the program is devoted to the evaluation of radionuclide-geomedia interactions in order to determine the behavior of different elements in the environment. This paper introduces and briefly summarizes data collected thus far on methods of determining adsorption coefficients, thermodynamic predictions of stable solid and solution species, Kd data, and studies for determining adsorption mechanisms.

2459 (PNL-SA--7352(Vol.1), pp 331-403) CHROMATOGRAPHIC K/SUB D/ VALUES OF RADIONUCLIDES AND THE EFFECT OF REDOX POTENTIALS ON SORPTION OF RADIONUCLIDES BY GEOLOGIC MEDIA. Francis, C.W.; Reeves, M. III; Bondietti, E.A.; Smith, B.A. (Oak Ridge National Lab., TN). 1978.

From 2. contractor information meeting; Seattle, WA, USA (1 Oct 1978).

Distribution and selectivity coefficients for ^{85}Sr and ^{63}Ni were determined in the presence of various Ca concentrations in channel chromatographs packed with Conasauga shale. These coefficients were obtained using a coupled-equations model consisting of (1) moisture transport in a partially saturated media, (2) mass transport of the calcium and radionuclide species contained in the influent, and (3) ion exchange between the ionic species in the solution phase and those sorbed on the solid matrix. A normalization procedure was developed so that profile data from one column or channel could be compared to data from other channels. Dispersivity measurements in the channel chromatographs were found to be the largest source of error in determining K/sub d/ values. Values for ^{85}Sr ranged from 2.4 to 3.6 and for ^{63}Ni from 5.3 to 8.6, and compared closely to those determined by a batch equilibrium method, 2.4 for ^{85}Sr and 6.5 for ^{63}Ni. Redox measurements of igneous rock suspensions in anoxic stirred cells predicted that the species of TcO_4^- and NpO_2^+ would not be the stable forms of these elements. Adding T/sub c/O_4^- and NpO_2^+ to similar anoxic suspensions revealed that the species are reduced to less soluble states. Thus, current risk assessments, which consider the oxidized forms (TcO_4^- and NpO_2^+) as potentially migrating from high-level radioactive waste repositories, may be overestimating their potential hazard to the public.

2460 (PNL-SA--7468) WORKSHOP ON TRANSPORT MODELING FOR NUCLEAR WASTE REPOSITORIES. Raymond, J.R. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jul 1977. Contract EY-76-C-06-1830. 18p. Dep. NTIS, PC A02/MF A01.

The Transport Modeling task includes developing methods to describe the transport and impact of radiocontaminants accidentally released from waste repositories; demonstrating the use of these methods; and making the methods and techniques available to the repository managers for application at specific sites. The workshop on Transfer Modeling for the Waste Isolation Safety Assessment Program was held at the Battelle Seattle Research Center on 25 and 26 July 1977. The objectives of the workshop were to: 1) discuss needs and criteria for the models, 2) obtain critiques of proposed model systems from experts in the field, and 3) obtain ideas for making models more useful to the safety assessment program. The proceedings of the workshop were presented.

2461 (PNL-SA--7875) NUMERICAL ANALYSIS OF RADIONUCLIDE MOVEMENT FROM A HYPOTHETICAL NUCLEAR WASTE REPOSITORY. Raymond, J.R.; Segol, G. (Battelle Pacific Northwest Labs., Richland, WA (USA); Bechtel National, Inc., San Francisco, CA (USA)). 1979. Contract EY-76-C-06-1830. 27p. Dep. NTIS, PC A03/MF A01.

A numerical analysis of the consequences of radionuclide release from a hypothetical nuclear waste repository located in bedded salt and of their subsequent transport by ground water has been performed. The study was based on available geologic and hydrologic information for the reference location. The

initial run was based on a best estimate of geologic and hydrologic parameters for this reference location. Its results indicate that those isotopes which reach the natural discharge point remain below MPC levels for uncontrolled water use. The initial run was followed by a parametric study to evaluate the sensitivity of the model to the values of input parameters. This analysis shows that the model is sensitive to the assumed values of hydraulic conductivity, dispersivity and retardation factor, as expected. But this analysis also emphasizes that there exist complex interactions between such parameters which are less intuitively evident. The influence of waste leach rates is being investigated.

2462 (PNL-SA--8571(Vol.2)) WASTE ISOLATION SAFETY ASSESSMENT PROGRAM. TASK 4. THIRD CONTRACTOR INFORMATION MEETING . (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jun 1980. Contract AC06-76RL01830. 392p. (CONF-7910160--(Vol.2)). NTIS, PC A17/MF A01.

From 3. contractor information meeting on waste isolation safety assessment program task 4; Seattle, WA, USA (14 Oct 1979).

The study subject of this meeting was the adsorption and desorption of radionuclides on geologic media under repository conditions. This volume contans eight papers. Separate abstracts were prepared for all eight papers. (DLC)

2463 (PNL-SA--8571(Vol.2), pp 1-79) SYSTEMATIC STUDY OF NUCLIDE ADSORPTION ON SELECTED GEOLOGIC MEDIA. ANNUAL PROGRESS REPORT, OCTOBER 1, 1978-SEPTEMBER 17, 1979. Meyer, R.E. (comp.). (Oak Ridge National Lab., TN). Jun 1980.

From 3. contractor information meeting on waste isolation safety assessment program task 4; Seattle, WA, USA (14 Oct 1979).

This report summarizes the past year's work concerning the adsorption of nuclides of interest to nuclear waste on clays, hydrous oxides, and other geologic media as a function of the pertinent variables of salt concentration, pH, and loading. Most of the adsorbent-adsorbate systems were investigated in the pH range 5 to 10 and the salt concentration range from 0.01 to 5 M NaCl in order to cover the most probable compositions of groundwaters in the region of waste repositories located in bedded salt formations or salt domes. A batch method was generally used to obtain the data, but for some special conditions, the axial filter was used. For adsorption on clay minerals at pH values of about 5 where hydrolysis reactions are not likely to occur, a strong salt dependence was observed, and the data could be fairly well described by ideal ion exchange equations. As the pH was increased, for some of the systems, e.g. for Eu(III) adsorption on montmorillonite, distribution coefficients increased significantly with pH and the salt dependence decreased or disappeared entirely. For adsorption of Sr(II) and Eu(III) on hydrous oxides, usually a form of Al_2O_3, significant increases in distribution coefficients with pH were observed and the salt dependence was very small, but often increasing somewhat as the pH was increased. Distribution coefficients for adsorption of I^- on a large variety of minerals and rocks were almost always very small, generally almost zero, and only for a few adsorbents under special conditions were distribution coefficients as high as 10 liters/kilogram observed. These results demonstrate that a large number of experiments are required for a complete and systematic investigation of a single nuclide-adsorbent system but also show that the dependence of the distribution coefficient on the variables show regularities which may be used to interpolate and extrapolate the data to nontested conditions.

2464 (PNL-SA--8571(Vol.2), pp 235-260) WASTE/ROCK INTERACTION TECHNOLOGY. SOLUBILITY OF PLUTONIUM COMPOUNDS AND THEIR BEHAVIOR IN SOILS. Rai, D.; Serne, R.J.; Moore, D.A. (Pacific Northwest Labs., Richland, WA). 1 Feb 1980.

From 3. contractor information meeting on waste isolation safety assessment program task 4; Seattle, WA, USA (14 Oct 1979).

The solubilities of $^{239}PuO_2(c)$ and $^{239}Pu(OH)_4(am)$ under natural environmental conditions were determined. These data were then used to predict the (1) nature of the solid phases present in contaminated soils, and (2) total concentration of Pu that can be expected in soil solutions when these Pu solids are present. Based upon solubility measurements, an estimated value of the log K/sup c/ for the dissolution of $^{239}PuO_2(c)$ [$PuO_2(c)$ reversible $PuO_2 + e^-$] was found to be -14.8. The estimated value of the log K/sup c/ for the dissolution of $^{239}Pu(OH)_4(am)$ [$Pu(OH)_4(am)$ reversible $PuO_2 + 2\ H_2O + e^-$] was found to be -12.8. Comparison of Pu concentration in equilibrium solutions of contaminated Hanford soils with the $PuO_2(c)$ and $Pu(OH)_4(am)$ solubility lines suggested that $Pu(OH)_4(am)$ was absent from all the samples and that two of the samples contained $PuO_2(c)$. The presence of $PuO_2(c)$ was also confirmed by X-ray diffraction of Pu particles isolated from one of the samples.

2465 (PNL-SA--8571(Vol.2), pp 213-234) WASTE/ROCK INTERACTIONS TECHNOLOGY. INTERACTIONS OF PLUTONYL (VI) WITH SOIL MINERALS. Rai, D.; Serne, R.J.; Moore, D.A. (Pacific Northwest Labs., Richland, WA). Feb 1980.

From 3. contractor information meeting on waste isolation safety assessment program task 4; Seattle, WA, USA (14 Oct 1979).

Plutonium-239 adsorption by differnt minerals from aerated 0.005 M $CaCl_2$ solutions containing 7.3×10^{-9} M Pu(VI) was studied. At pH 4, adsorption by the selected minerals differed significantly, with adsorption increasing in the following order: gibbsite < kaolinite < montmorillonite < nontronite approx. = hematite < vermiculite approx. = biotite. At pH 7, the adsorption on these minerals did not differ significantly and exceeded 93% in all cases. Several mechanisms that contributed to Pu adsorption were identified: ion exchange, specific adsorption, reduction of Pu(VI), and Pu(VI) hydrolysis. Vermiculite, biotite, and hematite, containing structural Fe(II), were found to reduce Pu(VI) even in the well aerated suspensions. Although the initial ^{239}Pu concentration added to the mineral suspensions was 22 times the MPC of ^{239}Pu in unregulated water, the concentration in equilibrated solutions at pH 7 were near or lower than the MPC. This was also true for vermiculite, biotite, and hematite at pH 4. A very small percentage of the adsorbed Pu was released when the minerals were contacted with 1 M NaCl. These results indicate that Pu in general and Pu(VI) specifically would be relatively immobile in geomedia that do not contain significant quantities of complexing ligands.

2466 (PNL-SA--8571(Vol.2), pp 81-133) SORPTION-DESORPTION OF LONG-LIVED RADIONUCLIDE SPECIES ON GEOLOGIC MEDIA. ANNUAL REPORT.

Francis, C.W.; Bondietti, E.A. (Oak Ridge National Lab., TN). 1 Oct 1979.
From 3. contractor information meeting on waste isolation safety assessment program task 4; Seattle, WA, USA (14 Oct 1979).
Influence of time, temperature, pH, Eh, Fe^{+2}, and Tc concentrations on sorption-desorption of Tc on basalt, granite, and shale was investigated. Loss of TcO^{-}_{4} from solution appears not to be due to sorption, but rather due to the reduction to a lower oxidation state, probably TcO_2 which is insoluble. Loss of TcO^{-}_{4} increased with time. Increasing the temperature enhanced the initial reduction rate, but the rate exponentially decayed at high temperatures (72 vs 22°C). Basalt reduced TcO^{-}_{4} faster and in greater quantities than the granite or shale samples. 10^6 more Tc-99 was retained on anoxic basalt columns than Tc-95m; however, the Sorption Concentration Ratios (0.64 and 3.54 ml/9) were not appreciably different. The additions of Fe^{+2} prior to TcO^{-}_{4} additions did not affect TcO^{-}_{4} reduction; but, additions of Fe^{+2} to Tc-rock suspensions reduced TcO^{-}_{4}. The reduced form of Tc is slowly oxidized to the TcO^{-}_{4} under oxic conditions. In Eh-pH monitored stirred suspensions, the sngle most important variable influencing the loss of TcO^{-}_{4} was Eh of the suspension. Losses of TcO^{-}_{4} from basalt suspensions occurred at measured Eh's 0.240 volts higher than theoretically required for the formation of the water-insoluble TcO_2. Pertechnetate (μM) was observed to be stable in the presence of 100 μM Fe^{+2}, pH 5, and Eh approx. +0.400 volts; even at Fe^{+2}/TcO^{-}_{4} ratios > 10^6, the pertechnetate was observed to be stable at pH's between 4.5 and 5.5. As the pH was increased to 6.5 and greater the loss of TcO^{-}_{4} from solution was directly proportional to the loss of Fe^{+2}. TcO^{-}_{4} was reduced by Fe^{+2} as the pH was increased, and Tc^{+4} was isomorphically substituted into the lattice of $Fe(OH)_3$ because of the similarity in ionic radii (0.65 A) of Tc^{+4} and Fe^{+3}.

2467 (PNL-SA--8571(Vol.2), pp 135-158)
LABORATORY STUDIES OF PU-237 SORPTION ON SELECTED MINERALS UNDER ANOXIC CONDITIONS. Relyea, J.F.; Serne, R.J.; Fulton, R.W.; Washburne, C.D.; Martin, W.J. (Pacific Northwest Lab., Richland, WA). 1 Oct 1979.
From 3. contractor information meeting on waste isolation safety assessment program task 4; Seattle, WA, USA (14 Oct 1979).
Corrections have been made for measured Kd values for plutonium under anoxic conditions after 30 days of shaking. Values for Kd(Pu) were highest for the phyllosilicate minerals illite, montmorillonite, vermiculite and biotite. Corrected Kd/sub a/(Pu) values were generally higher under anoxic than ambient atmospheric conditions in both 5.13 N NaCl and 0.03 N $CaCl_2$. Lower values for Kd/sub a/(Pu) were observed in 0.03 N $NaHCO_3$ under anoxic than under ambient conditions. There were no statistically significant differences in Kd/sub a/(Pu) for the two oxygen conditions for the 0.03 N NaCl solution. Thermodynamic data suggest that Pu sorption would be greater under anoxic conditions as shown in two of the four solutions used. There is no explanation for the apparent lack of agreement of the other two solutions. In general Pu adsorption by the minerals was high with the lowest mean value for corrected data being Kd/sub a/(Pu) = 92 for quartz under anoxic conditions. Of the 96 permutations (12 minerals x 4 solutions x 2 oxygen conditions) in only 14 instances did the Kd/sub a/(Pu) fall below 1000 ml/g and in only 5 instances did Kd/sub a/(Pu) fall below 500 ml/g.

2468 (PNL-SA--8571(Vol.2), pp 261-315)
KINETICS AND REVERSIBILITY OF RADIONUCLIDE SORPTION REACTIONS WITH ROCKS. PROGRESS REPORT FOR FISCAL YEAR 1979. Barney, G.S.; Brown, G.E. (Rockwell International, Richland, WA). Sep 1979.
From 3. contractor information meeting on waste isolation safety assessment program task 4; Seattle, WA, USA (14 Oct 1979).
Sorption-desorption reactions of cesium, strontium, neptunium, americium, and plutonium on basalt, granite, and argillite were observed for 218 days. Equilibrium in batch experiments was not reached for most radionuclides even after this long time. Reactions of the crushed rock with ground waters (dissolution, hydrolysis, precipitation, etc.) also did not reach equilibrium after 150 days. The dissolution of basalt is accompanied by the formation of colloidal particles which contain Si, Fe, Ca, and Al. These colloids sorb Cs, Sr, Am, and Pu during equilibration. Some of the colloids pass through 0.3-μm filters, are not retained even on 0.01-μm filters and, therefore, cause calculated K/sub d/ values to be too low. Samples of crushed basalt, granite, and argillite were artificially weathered by continuous leaching with distilled water for 6 months both in air and in an oxygen-free stream of nitrogen gas. The weathered rock was then characterized for surface area, surface structure, cation exchange capacity, and composition of weathered surface on the rock. Comparisons were made of radionuclide sorption (after 14 days) on fresh rock, rock weathered in air, and rock weathered in N_2. Sorption on rocks weathered in N_2 generally is less than on rock weathered in air. This is possibly due to the lack of an $Fe(OH)_3$ coating on the rock weathered in N_2. The $Fe(OH)_3$ is known to scavenge cations and silica from solution. Sorption of Cs, Si, Am, and Pu is strongly affected by weathering basalt and argillite. However, the cation exchange capacity is changed very little, suggesting that ion exchange plays a minor role in sorption of these radionuclides.

2469 (PNL-SA--8571(Vol.2), pp 159-171)
EFFECTS OF HYDROGEN PEROXIDE PRETREATMENT OF CLAY MINERALS ON THE ADSORPTION OF SR-85 AND TC-95M UNDER ANOXIC CONDITIONS. Relyea, J.F.; Washburne, C.D. (Pacific Northwest Lab., Richland, WA). Jul 1979.
From 3. contractor information meeting on waste isolation safety assessment program task 4; Seattle, WA, USA (14 Oct 1979).
Treatment of three clay minerals with hydrogen peroxide affects the observed adsorption behavior of technetium relative to untreated clay under anoxic conditions. A possible adsorption mechanism of Tc is the reduction of TcO^{-}_{4} to a more positively charged or better adsorbed species. Oxidation of the clay by H_2O_2 would hinder the reduction of TcO^{-}_{4} by buffering the clay-water system at a higher Eh value, although a difference in measured Eh value may go undetected. Sorption of strontium by the clays under the same conditions is not affected by a pretreatment with H_2O_2. The behavior of strontium follows that expected from ion exchange theory. 13 tables.

2470 (PNL-SA--8571(Vol.2), pp 173-211)
SORPTION BEHAVIOR OF ^{85}SR, ^{137}CS AND /SUP 95M/ TC UNDER NORMAL ATMOSPHERIC AND REDUCED OXYGEN LEVELS. Relyea, J.F.; Washburne, C.D.; Fulton, R.W. (Pacific Northwest Lab., Richland, WA). Jul 1979.
From 3. contractor information meeting on waste isolation safety assessment program task

4; Seattle, WA, USA (14 Oct 1979).
Identical mineral samples and simulated groundwaters were used in a study of the sorption of technetium, strontium and cesium under anoxic conditions. Results from these experiments show that the anoxic sorption of strontium and cesium is generally unchanged or lower than sorption under ambient atmospheric conditions. The sorption of both Cs and Sr is inhibited by the presence of high NaCl concentrations (brines), and Sr sorption is reduced by the presence of Ca^{2+} in solution. Values for Kd(Cs) and Kd(Sr) often change with time, as both the mineral properties and solution chemical composition change due to weathering of the minerals. In these instances equilibrium has not been attained; differences between ambient and anoxic Kd values found at short contact times may disappear at equilibrium. Both Kd values and their variability were increased for technetium under anoxic conditions. Technetium adsorption is greatest on the hard rock minerals (tektosilicates and inosilicates) which may be influenced by small chunks of metal from the apparatus used to grind the minerals to power form. 21 tables.

2471 (RHO-BWI-C--65) CHARACTERIZATION OF THE PHYSICAL PARAMETERS AND SAMPLING PROCEDURE OF A MODIFIED ROCKING AUTOCLAVE APPARATUS. Scheetz, B.E. (Pennsylvania State Univ., University Park (USA)). Apr 1980. Contract AC06-77RL01030. 18p. NTIS, PC A02/MF A01.
Purpose of the apparatus is to investigate the stability of several candidate radwaste forms under simulated deep geological disposal. (DLC)

2472 (RPDE--79-023) PNEUMATIC TRANSPORT SYSTEM DEVELOPMENT: RESIDUALS AND RELEASES PROGRAM AT WESTINGHOUSE CHESWICK SITE. Larouere, P.J.; Shoulders, J.L. (Westinghouse Electric Corp., Pittsburgh, PA (USA). Nuclear Fuel Div.). Jan 1979. Contract EN-77-C-06-1058-002. 71p. Dep. NTIS, PC A04/MF A01.
Plutonium oxide and uranium oxide powders are processed within glove boxes or within confinement systems during the fabrication of mixed oxide (MOX) pellets for recycle fuel. The release of these powders to the glove box or to the confinement results in some airborne material that is deposited in the enclosure or is carried in the air streams to the effluent air filtration system. Release tests on simulated leaks in pneumatic transport equipment and release tests on simulated failures with powder blending equipment were conducted. A task to develop pneumatic transport for the movement of powders within an MOX fabrication plant has been underway at the Westinghouse Research Laboratories. While testing and evaluating selected pneumatic transport components on a full scale were in progress, it was deemed necessary that final verification of the technology would have to be performed with plutonium-bearing powders because of the marked differences in certain properties of plutonium from those of uranium oxides. A smaller was designed and constructed for the planned installation in glove boxes at the Westinghouse Plutonium Fuel Development Laboratory. However, prior to use with plutonium it was agreed that this system be set up and tested with uranium oxide powder. The test program conducted at the Westinghouse Cheswick site was divided into two major parts. The first of these examined the residuals left as a result of the pneumatic transport of nuclear fuel powders and verified the operability of this one-third scale system. The second part of the program studied the amount of powder released to the air when off-standard process procedures or maintenance operations were conducted on the pneumatic transport system. Air samplers located within the walk-in box housing the transport loop were used to measure the solids concentration in the air. From this information, the total amount of airborne powder was determined.

2473 (SAND--79-0896C) SENSITIVITY STUDIES OF THE SWIFT RADIONUCLIDE TRANSPORT MODEL. Campbell, J.E.; Langkopf, B.S.; Iman, R.L. (Sandia Labs., Albuquerque, NM (USA); INTERA Environmental Consultants, Inc., Houston, TX (USA)). 1979. Contract EY-76-C-04-0789. Pp. (CONF-791112--22). Dep. NTIS, PC A02/MF A01.
From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).
There are large uncertainties in the input waste depository. The aim of the sensitivity studies was to identify these uncertainties and to reduce the number of SWIFT transport calculations. The sensitivity analysis was applied to a hypothetical problem consisting of both a reference site containing a nuclear waste depository and a disruptive-event scenario for the possible release of radioactive materials to the biosphere. Results are presented for the total radionuclide discharge to a river in the 10^6-year time period following depository closure. (DLC)

2474 (SAND--79-0900C) BRINE CHEMISTRY EFFECTS ON THE DURABILITY OF A SIMULATED NUCLEAR WASTE GLASS. Braithwaite, J.W. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 8p. (CONF-791112--16). Dep. NTIS, PC A02/MF A01.
From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).
The effects of various solution chemistry parameters on the alteration and leaching characteristics of a copper borosilicate simulated waste glass have been determined under hydrothermal conditions. Results are presented which demonstrate that leachant salinity, volume/glass surface area ratio, pH, cation content, and dissolved SiO_2 concentration effects are important. A brief explanation of these results is given which is based on ion exchange and solution saturation equilibria.

2475 (SAND--79-0955C) DEVELOPMENT OF SCENARIOS FOR LONG-TERM RELEASE OF RADIONUCLIDES FROM THE PROPOSED WASTE ISOLATION PILOT PLANT IN SOUTHEASTERN NEW MEXICO. Bingham, F.W.; Barr, G.E. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 7p. (CONF-791112--7). Dep. NTIS, PC A02/MF A01.
From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).
As fault-tree analysis had its faults, the WIPP group switched its attention to the construction of event trees and of scenarios from the cut sets of these event trees. The scenarios were grouped into three classes for computer modeling: those that expose waste directly to the biosphere, those that begin with water flow between two aquifers at the site, and those that begin with water flow from only one aquifer. Each of the scenarios can be modeled by one of four general models. The current analyses of the long-term effects of the WIPP repository are derived from these models. Predicted doses from these hypothetical releases fall far below those from natural background radiation. (DLC)

2476 (SAND--79-1016C) RADIONUCLIDE TRANSPORT IN A DOLOMITE AQUIFER. Dosch, R.G.; Lynch, A.W. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 8p. (CONF-791112--15). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

The most probable paths for radionuclide transport between the biosphere and the proposed bedded salt repository (WIPP) in Southeastern New Mexico are through dolomite formations which are the only currently water-bearing units overlying the repository horizon. This paper describes some of the experimental work performed to determine the potential for radionuclide migration in these formations. Included are the results of radionuclide sorption studies on natural dolomites (Magenta and Culebra) and on synthetic dolomite (protodolomite). Sorption on natural dolomites was evaluated with respect to core sample location, groundwater composition, nuclide concentration, and water volume to rock mass ratios used in making the measurements. Results show that a discrete value such as a distribution coefficient (Kd) assigned to a given radionuclide does not accurately describe its interactions with site-specific geological formation.

2477 (SAND--79-1665C) THERMAL CONDUCTIVITY OF ROCKSALT AND OTHER GEOLOGIC MATERIALS FROM THE SITE OF THE PROPOSED WASTE ISOLATION PILOT PLANT. Sweet, J.N.; McCreight, J.E. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 25p. (CONF-791134--7). Dep. NTIS, PC A02/MF A01.

From 16. international thermal conductivity conference; Chicago, IL, USA (7 Nov 1979).

The measurements first reported by Acton on the thermal conductivity of samples taken from a borehole at the site of the proposed nuclear waste isolation pilot plant (WIPP) near Carlsbad, NM, have been extended to include additional samples and higher temperature measurements. Samples for our measurements were taken from several depths of three wells, including the well AEC 8 from which Acton obtained his samples. These samples ranged from relatively pure rocksalt (NaCl) with small amounts of interstitial anhydrite to essentially nonsalt samples composed of gypsum or clay. The measurements in this latest series were conducted at Sandia using the longitudinal heat flow apparatus described by Acton, at the Los Alamos Scientific Laboratory (LASL) using a transient line source technique, and at Dynatech Corp., Cambridge, MA using a linear heat flow comparative technique. On the basis of these experiments, we have concluded that the thermal conductivity of materials found at the site can be predicted to an accuracy approx. +- 30% from knowledge of the composition and grain size of these materials.

2478 (SAND--80-7107) METEOROLOGICAL AND AIR QUALITY DATA QUARTERLY REPORT. WIPP SITE: EDDY COUNTY, NEW MEXICO. SUMMER QUARTER, JUNE 1977-AUGUST 1977. Pocalujka, L.P.; Babij, E.; Catizone, P.A.; Church, H.W. (TRC Environmental Consultants, Wethersfield, CT (USA); Sandia National Labs., Albuquerque, NM (USA)). Jun 1980. Contract AC04-76DP00789. 26p. NTIS, PC E02/MF $3.50.

The purpose of the WIPP meteorological, air quality, and radiological measurements program was to support the environmental effort for the evaluation of the site suitability. This data report is the latest in a series of seasonal quarterly data summaries to be issued for the southeastern New Mexico site.

2479 (STUDSVIK-K2--79/92) DOSE AND DOSE COMMITMENT FROM RADIOACTIVE SUBSTANCES CARRIED BY GROUNDWATER FROM A NUCLEAR FUEL REPOSITORY. Bergman, R.; Bergstroem, U.; Evans, S. (Aktiebolaget Atomenergi, Studsvik (Sweden)). Feb 1979. 103p. (In Swedish). (KBS--100). Dep. NTIS (US Sales Only), PC A06/MF A01.

The turnover of radioactive matter entering the biosphere with the groundwater has been studied with regard to exposure and doses for critical groups and populations. The main alternatives considered for the outflow of radioactive effluents to the biosphere are: outflow in a valley containing wells and to a nearby lake, outflow to a freshwater lake and to the downstream lake system, outflow in a coastal region of the Baltic Sea. Mathematical models of a set of coupled ecosystems on, regional, intermediate and global levels have been used for calculations of doses. The intermediate system refers to the Baltic Sea. The mathematical analysis, based on first order kinetics for the exchange or matter in a system according to compartment principles, also includes products in decay chains, i.e. daughter nuclides generated by decay of nuclides during ecological cycling. The time-dependent exposures have been studied for certain long-lived nuclides of radiological interest in waste from disposed fuel. Dose and dose commitment have been calculated for different episodes for outflow to the biosphere. The source strength is equal to the outflow at the boundary between geosphere and biosphere calculated by use of a geospheric model.

2480 (UCID--18136) WASTE PIPE CALCULUS EXTENSIONS. O'Connell, W.J. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 8 Nov 1979. Contract W-7405-ENG-48. 20p. Dep. NTIS, PC A02/MF A01.

The waste pipe calculus provides a rapid method, using Laplace transforms, to calculate the transport of a pollutant such as nuclear waste, by a network of one-dimensional flow paths. The present note extends previous work as follows: (1) It provides an alternate approximation to the time-domain function (inverse Laplace transform) for the resulting transport. This algebraic approximation may be viewed as a simpler and more approximate model of the transport process. (2) It identifies two scalar quantities which may be used as summary consequence measures of the waste transport (or inversely, waste retention) system, and provides algebraic expressions for them. (3) It includes the effects of radioactive decay on the scalar quantity results, and further provides simplifying approximations for the cases of medium and long half-lives. This algebraic method can be used for quick approximate analyses of expected results, uncertainty and sensitivity, in evaluating selection and design choices for nuclear waste disposal systems.

2481 (UCRL--15102) EFFECTS OF BRINE MIGRATION ON WASTE STORAGE SYSTEMS. FINAL REPORT. Gaffney, E.S.; Nickell, R.E. (Pacifica Technology, Del Mar, CA (USA)). 15 May 1979. Contract W-7405-ENG-48. 51p. Dep. NTIS, PC A04/MF A01.

Processes which can lead to mobilization of brine adjacent to spent fuel or nuclear waste canisters and some of the thermomechanical consequences have been investigated. Velocities as high as 4×10^{-7} m s^{-1} (13 m y^{-1}) are calculated at the salt/canister boundary. As

much as 40 liters of pure NaCl brine could accumulate around each canister during a 10-year storage period. Accumulations of bittern brines would probably be less, in the range of 2 to 5 liters. With 0.5% water, NaCl brine accumulation over a 10-year storage cycle around a spent fuel canister producing 0.6 kW of heat is expected to be less than 1 liter for centimeter-size inclusions and less than 0.5 liter for millimeter-size inclusions. For bittern brines, about 25 years would be required to accumulate 0.4 liter. The most serious mechanical consequence of brine migration would be the increased mobility of the waste canister due to pressure solution. In pressure solution enhanced deformation, the existence of a thin film of fluid either between grains or between media (such as between a canister and the salt) provides a pathway by which the salt can be redistributed leading to a marked increase in strain rates in wet rock relative to dry rock. In salt, intergranular water will probably form discontinuous layers rather than films so that they would dominate pressure solution. A mathematical model of pressure solution indicates that pressure solution will not lead to appreciable canister motions except possibly in fine grained rocks (less than 10^{-4} m). In fine grained salts, details of the contact surface between the canister and the salt bed may lead to large pressure solution motions. A numerical model indicates that heat transfer in the brine layer surrounding a spent fuel canister is not conduction dominated but has a significant convective component.

2482 (UCRL--15150) NUTRAN: A COMPUTER MODEL OF LONG-TERM HAZARDS FROM WASTE REPOSITORIES. Ross, B.; Koplik, C.M.; Giuffre, M.S.; Hodgin, S.P.; Duffy, J.J. (Analytic Sciences Corp., Reading, MA (USA)). 7 Dec 1979. Contract W-7405-ENG-48. 118p. (TR--1797-7). Dep. NTIS, PC A06/MF A01.

The NUTRAN package of computer programs calculates doses to humans from radioactivity carried out of deep geologic waste repositories by groundwater. It consists of four codes: ORIGEN (developed by Oak Ridge National Laboratory), which treats the formation and decay of radionuclides, WASTE, which computes the transport of radionuclides in ground water, BIODOSE, which calculates radionuclide transport in surface waters and ecosystems and human exposures, and WPPLOT, which combines the results of WASTE and BIODOSE into usefully formatted outputs. This report describes what the WASTE, BIODOSE, and WPPLOT codes do. The equations they compute are presented in detail and their meaning is explained. Auxiliary programs which facilitate input and data management operations are also described.

2483 (UCRL--81147(Pt.2)) LEACHING CHARACTERISTICS OF ACTINIDES FROM SIMULATED REACTOR WASTE, PART 2. Weed, H.C.; Coles, D.G.; Bradley, D.J.; Mensing, R.W.; Schweiger, J.S.; Rego, J.H. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 5 Oct 1979. Contract W-7405-ENG-48. 9p. (CONF-791112--10(Pt.2)). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

Leach rates for ^{237}Np and ^{239}Pu are investigated with a single-pass leaching system. The factorial experimental design uses several combinations of solution composition and flow rate, and two temperatures, 25 and 75°C. The 25°C results are compared with those from a modified IAEA procedure. At 25°C, leach rates decrease with time. Agreement between results from the single-pass and modified IAEA methods is fair with WIPP brine leachant, good with $NaHCO_3$, and good with distilled H_2O. Leach rates are approximately independent of flow rates at room temperature, but increase with flow rates at high temperature. Rates for ^{237}Np increase with temperature, but those for ^{239}Pu either decrease or do not change with temperature. 7 figures.

2484 (UCRL--82228) MODELING OF BRINE MIGRATION IN HALITE. Cheung, H.; Fuller, M.E.; Gaffney, E.S. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 19 Oct 1979. Contract W-7405-ENG-48. 11p. (CONF-791112--9). Dep. NTIS, PC A02/MF A01.

From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).

Four different models of the migration process have been reviewed to determine their suitability as a working model. While there are several common factors in the models additional factors are included to account for several possible effects. The detail of each model leads to a certain degree of difficulty in applying the model to the problem at hand. One model predicts that inclusions smaller than 0.1 mm dimension probably will not migrate. The other models do not consider size as a factor. Thermal diffusion (Soret effect) is considered insignificant in three models, while in the fourth model it is added to the concentration diffusion term. The following conclusions are made: (1) Temperature is the most significant parameter in all models and must be known as a function of time, and distance from the canister. (2) All four models predict about the same migration velocity for a given set of conditions. For 100°C and 1°C/cm thermal gradient, the individual values are 3.0, 4.8, 5.6 and 6.4 mm/y. (3) The diffusion of ions through the brine inclusions is the rate controlling mechanism. (4) The difference between the thermal gradients in the liquid and in the solid should always be considered, and is a function of droplet shape. (5) The model based upon work by Nernst is easiest to use since all necessary parameters are readily available in the literature. However, of the four models is predicts the lowest migration rate. (6) The maximum volume of pure brine accumulated at the canister surface would be less than 20-40 liters in 50 years, for a canister initial thermal power of 3.5 kW. Bitterns would migrate proportionately less volume. A compuber code, BRINE, was developed to make these calculations by means of any of the four models.

2485 TECHNETIUM: A TOXIC WASTE PRODUCT OF THE NUCLEAR FUEL CYCLE: EFFECTS ON SOYBEAN GROWTH AND DEVELOPMENT. Berlyn, G.P.; Dhillon, S.S.; Koslow, E.E. (Yale Univ, New Haven, Conn). Environmental Management ; 4: No. 2, 149-156(Mar 1980).

The effects of technetium on soybeans were studied in relation to cytochemical events in the apical meristems of germinating seedlings; growth responses to 0, 0.04, 0.2, 1.0, 5.0, and 20.0 ppm Tc; growth responses to varying levels of Tc after a prior 5-day germination on Tc-free media, and response to Tc in the presence of added manganese. By 20 days, reductions in growth were evident at all levels of Tc except 0.04 ppm. Root growth was most severely affected, and seedling abnormality at 20 ppm was fivefold greater than that of the controls. Observation of mitotic figures did not reveal any chromosome aberrations, micronuclei, or chromosome bridges. The lowest level of Tc showing toxicity was 0.2 ppm which resulted in a 31% reduction in growth at 20 days. It is quite probable that the growth effects are due

to chemical toxicity possibly due to nutrient competition and/or substitution in uptake or metabolism. Refs.

2486 RADIONUCLIDE TRANSPORT THROUGH HETEOGENEOUS MEDIA. Hadermann, J. (Swiss Federal Int. for Reactor Research, Wuerenlingen, Switzerland). Nuclear Technology ; 47: No. 2, 312-323(Feb 1980).

One-dimensional radionuclide migration for conevective water transport with sorption and longitudinal dispersion is investigated. A semianalytic solution for layered media with piecewise constant parametes can be written when taking into account mass conservation and approximate flux conservation at interlayer boundaries. The solution is analytic in the first layer and allows for a recursive calculation in the following layers. Scaling laws for the relevant parameters can be formulated. Numerical examples exhibit the importance of at least a single highly sorbing layer. Small values of dispersivity may not lead to a conservative estimate of conservation at the geological column's end.

2487 LIMITATION OF THE RELEASE OF RADIOACTIVE EFFLUENTS. Beninson, D. (Comision Nacional de Energia Atomica, Buenos Aires, Argentina). pp 115-124 of Management of environment. Patel, B. (ed.). New Delhi, India; Wiley Eastern Ltd. (1980).

The basic principles of radiation protection require that the following criteria be met when setting release limits to the environment: (1) control of the release must be optimized; (2) dose limits for individual members of the public must not be exceeded; release limits must take into account the presence of other sources of radiation exposure, the continuing operation of all these sources in the future, and the eventual installation of new sources. (DAD)

2488 INTERLABORATORY COMPARISON OF ARSENIC, MOLYBDENUM AND SELENIUM ANALYSES FROM URANIUM MILL TAILINGS. Dreesen, D.R.; Gladney, E.S.; Owens, J.W. (Los Alamos Scientific Lab., NM). Journal of the Water Pollution Control Federation ; 51: No. 10, 2447-2456(Oct 1979).

In order to evaluate the analytical results coming from various laboratories on water samples analyzed for leached elements from uranium mill tailings piles or ponds, groundwater samples were collected from wells on top of and hydrologically downgradient from tailings piles produced by a uranium mill using a carbonate leach process. These samples were spiked with As, Mo, and Se at levels of 500 µg/l, 250 µg/l, and 500 µg/l, respectively, and submitted to various laboratories for analysis. The various methods used by the different laboratories for the analyses were broadly categorized as follows: flameless atomic absorption, flame atomic absorption, hydride generation flame atomic absorption, spectrophotometric-calorimetric, instrumental neutron activation analysis, neutron activation analysis with radiochemical separation, x-ray fluorescence spectroscopy, and fluorimetry. For comparison, the results of the different analyses for each element are tabulated. It was concluded that the wide spectrum of laboratories provide questionable data for trace elements in complex matrixes. It was felt that much improvement of methods and better understanding of the complexities of the matrixes are necessary before results of analyses are available on which to base judgments concerning the environmental pollution by these elements, particularly Se. (BLM)

2489 ENVIRONMENTAL ASPECTS OF TRITIUM. Quisenberry, D.R. (Mercer Univ). Environmental Pollution (London) ; 20: No. 1, 33-42(Sep 1979).

Potential radiological implications of environmental tritium releases must be determined to develop a program for dealing with the tritium inventory predicted for the nuclear power industry; development of predicted fusion power capacity will create a potential source for large releases of gaseous tritium. At present, about 90% of the tritium produced enters the environment through gaseous and liquid effluents. Tritium can be assimilated by plants and animals and organically bound, regardless of the exposure pathway. However, the body burden for humans and animals is dependent on the exposure pathway. Tissue-bound fractions in humans are primarily the result of organically bound tritium in food. (2 graphs, 27 references)

2490 MEASUREMENT OF RADON DIFFUSION AND EXHALATION FROM URANIUM MILL TAILINGS PILES. Silker, W.B.; Wogman, N.A.; Thomas, C.W.; Carr, D.B.; Heasler, P.C. (Pac Northwest Lab, Richland, Wash). Environmental Science and Technology ; 13: No. 8, 962-964(Aug 1979).

The concentrations of ;sup 226;Ra and ;sup 222;Rn (;sup 214;Pb) were measured as a function of depth within a uranium mill tailings pile by in situ ;gamma;-ray spectrometry. Radon diffusion and exhalation rates were determined from the concentration gradients by employing an integral solution of the diffusion equation that accomodates a nonuniform depth distribution of the parent radium. Radon diffusion coefficients of 0.0002 and 0.0017 cm;sup 2;s;sup -1; and exhalation rates of 60--275 atoms cm;sup -2;s;sup -1; were determined for two locations with differing soil moisture content. 12 refs.

2491 LET THEM MINE YELLOWCAKETHE IMPACT OF URANIUM MINING ON NEW MEXICANS. Robinson, G.; Feldman, D. Env. Action; 11: No. 1, 3-9(Jun 1979).

Feature article:According to the Council of Energy Resource Tribes, 75-80% of U.S. uranium reserves are on Indian lands. Uranium mining in New Mexico and Wyoming has lowered local water tables, has polluted acres of land with mine stream wastes, has disrupted land with access roads and mines and mills, and has polluted the air with dangerous radon gas and radioactive dust. Tailings from yellowcake refining are a major waste disposal problem. Navajos are suing six government agencies for allowing companies to drill for uranium on government land without preparing the required environmental impact statements. In Marquez, N. Mex., a land grant community 37 mi from Albuquerque, the villagers' health and traditional way of life are threatened by uranium mining by Bokum Resources, Inc. Bokum's uranium will supply two Long Island Lighting Co. nuclear plants that are now under construction. (1 map, 10 photos)

2492 ENVIRONMENTAL FACTORS RELATED TO THE DEVELOPMENT OF A NEW URANIUM REFINERY. Jarrell, J.P.; Chambers, D.B. (MacLaren (James F.) Ltd., Willowdale, Ontario (Canada)). CIM (Canadian Institute of Mining and Metallurgy) Bulletin ; 72: No. 806, 157-161(Jun 1979).

This paper examines the experience gained in Eldorado Nuclear's proposed expansion of refining capacity as viewed by an environmental engineering consultant. The history of the

project and the relationship to process design functions in the two-year period prior to the Port Granby environmental hearings are reviewed. During the Port Granby public hearing, there was a consensus that normal operation of the proposed refinery could be successfully integrated with the site's natural environmental constraints. Moreover, the radiological impact from plant operations was demonstrated to be inconsequential. However, concerns were raised relating to plant upset and accident situations. These concerns are summarized. Process data requirements identified during the environmental hearings are discussed. Finally, the concerns for on-site burial of radioactive waste are reviewed. These concerns focussed on long-term stability of the waste in the presence of groundwater transport, erosion and glaciers. The AECB's position on waste management with regard to this project is reviewed in light of the implications for design.

2493 PHOTON SPECTRA OF GAMMA-RAYS BACK-SCATTERED BY INFINITE AIR. PART I: AREA-SKYLINE. Swarup, J. (Bhabha Atomic Research Centre, Bombay (India). Health Physics Div.). 17: No. 6, 381-384(Jun 1979).

Counts-spectra of gamma-rays of different energies originating from the area used for burying radioactive wastes (dose 0.5 mR/hr) and back-scattered by infinite air above ground (area-skyshine), have been measured at different locations with a 5 cm dia x 5 cm long NaI(Tl) detector collimated in the vertical direction. Gold's iterative technique has been used to unfold these spectra. It is found that the photon-spectra show peaks at energies 55, 72, 110, 160 and 210 keV. Out of these peaks, the one at 72 keV is the highest. A valley, indicating absence of photons, is also seen around 140 keV energy.

2494 FIXATION OF RADIOACTIVE IONS IN POROUS MEDIA WITH ION EXCHANGE GELS. Mercer, B.W. Jr.; Godfrey, W.L. (to Dept. of Energy). US Patent 4,156,658. 29 May 1979. Filed date 28 Jun 1974. 4p.

PAT-APPL-484,011.

A method is provided for fixing radioactive ions in porous media by injecting into the porous media water-soluble organic monomers which are polymerizable to gel structures with ion exchange sites and polymerizing the monomers to form ion exchange gels. The ions and the particles of the porous media are thereby physically fixed in place by the gel structure and, in addition, the ions are chemically fixed by the ion exchange properties of the resulting gel.

2495 WHAT DO YOU DO WITH LAND THAT CAN NEVER BE RECLAIMED. Dunnington, J.F. Landscape Architecture ; 69: No. 3, 292-299(May 1979).

Land that is used for production and storage of nuclear materials cannot be reclaimed by any known technology. The maximum useful life of nuclear reactors is estimated to be about 40 yr; the spent plant must decay some of its radioactivity for about 100 yr before decommissioning can be achieved. Dismantling costs for presently existing nuclear facilities are in the billions of dollars, yet high level wastes will remain for another 500,000 yr. Decommissioning technology is outlined; deficiencies are identified. Overall land use of nuclear facilities is difficult to assess since questions about waste disposal methods are unsolved. Land used in the U.S. for nuclear industry, nuclear medicine, nuclear weapons, nuclear accelerators, and terminal waste disposal is discussed. (2 diagrams, 1 map, 2 photos, 9 references)

2496 HARRISBURG FALLOUT. Financial Mail ; 72: No. 1, 24, 26(6 Apr 1979).

ACCIDENTS;COOLING;FALLOUT;PUMPS;RADIOACTIVE WASTES;SAFEGUARDS;SAFETY;THREE MILE ISLAND-2 REACTOR;RADIOACTIVE AEROSOLS;PENNSYLVANIA; RADIATION MONITORING;URANIUM

2497 RATE CONTROLLING PROCESSES IN THE RELEASE OF RADIUM-226 FROM URANIUM MILL TAILINGS--2. KINETIC STUDY. Nathwani, J.S.; Phillips, C.R. (Univ of Toronto, Ont). Water, Air, and Soil Pollution ; 11: No. 3, 309-317(Apr 1979).

A kinetic study to examine the leaching mechanisms and the rate controlling steps in the release of Ra from loose granular U mill tailings was undertaken. A batch procedure was chosen in which the kinetics of desorption of ; sup 226;Ra from tailings were determined by observing the increase in radioactivity in the solution with time. Intra-particle diffusion was found to be the rate controlling step for desorption periods >84 h; for leaching periods less than this, the desorption rate was described by a semi-logarithmic relationship involving either film diffusion or a chemical exchange mechanism as the rate controlling step. 11 refs.

2498 RATE CONTROLLING PROCESSES IN THE RELEASE OF RADIUM-226 FROM URANIUM MILL TAILINGS. I. LEACHING STUDY. Nathwani, J.S.; Phillips, C.R. (Toronto Univ., Ontario (Canada). Dept. of Chemical Engineering and Applied Chemistry). Water, Air, and Soil Pollution ; 11: No. 3, 301-308(Apr 1979).

Uranium mill tailings (a pyritic quartz conglomerate ore) obtained from a Canadian operation were leached according to a modification of the method recommended by I.A.E.A. for the leaching of radioactive ions from solidified wastes. A static leach test procedure was chosen to provide information to permit an assessment of hazard due to release of Ra-226 to the environment. Narrow range size fractions (53 to 75 μm) of both fresh material obtained directly from a tailings line and material weathered for approximately 10 to 15 yr in a tailings basin were leached for up to 70 days. Distilled water and an acidic synthetic effluent (pH 2.5) were chosen as leachants. Two sequential desorption processes were observed, one before and the other after a leaching period of approximately 10 to 15 days. In the later and more significant stage of desorption, the leaching behaviour could be described in terms of a diffusion mechanism. Significantly greater quantities of ^{226}Ra were leached over relatively short leaching periods by the acidic effluent; thus the quality of the effluent and percolating water in a tailings disposal area would markedly affect the leachability of Ra from tailings. It was also found that the quantities of ^{226}Ra leached were significantly influenced by the solid:liquid ratio at low leaching volumes.

2499 RATE CONTROLLING PROCESSES IN THE RELEASE OF RADIUM-226 FROM URANIUM MILL TAILINGS. II. KINETIC STUDY. Nathwani, J.S.; Phillips, C.R. (Toronto Univ., Ontario (Canada). Dept. of Chemical Engineering and Applied Chemistry). Water, Air, and Soil Pollution ; 11: No. 3, 309-317(Apr 1979).

A kinetic study to examine the leaching mechanisms and the rate controlling steps in the release of Ra from loose granular U mill

tailings was undertaken. A batch procedure was chosen in which the kinetics of desorption of ^{226}Ra from tailings were determined by observing the increase in radioactivity in the solution with time. Intra-particle diffusion was found to be the rate controlling step for desorption periods > 84 h; for leaching periods less than this, the desorption rate was described by a semi-logarithmic relationship involving either film diffusion or a chemical exchange mechanism as the rate controlling step. It is postulated that the intraparticle diffusion constant, B, correlates and defines the internal structure and hence the binding properties of ^{226}Ra within the tailings aggregate. Values of the intraparticle diffusion coefficient, Dsub(p), have been calculated and the effect of pH on Dsub(p) was studied. It was found that the diffusion coefficient at a specific pH does not significantly differ from 'fresh' or 'weathered' samples. However, a minimum value of Dsub(p) was obtained at a pH of about 7.6. Values of Dsub(p) were found to range from 2.5×10^{-13} to 20.0×10^{-13} cm^2 h^{-1}.

2500 TECHNETIUM: REDUCTION AND SORPTION IN GRANITIC BEDROCK. Allard, B.; Kigatsi, H.; Torstenfelt, B. (Chalmers Tekniska Hoegskola, Goeteborg (Sweden)). Radiochemical and Radioanalytical Letters ; 37: No. 4-5, 223-229(22 Feb 1979).

The reduction of technetium in aqueous solution from TcO_4^- ion to $TcO_2(s)$ may be accomplished in some natural ground waters. The retention of technetium by granite is at least 50 times higher for tetravalent species than for TcO_4^-. Thus, the long-term biological hazard from technetium released from a depository for high-level radioactive waste in deep granitic bedrock will be lower than previous estimations from sorption measurements in non-reducing systems.

2501 ENVIRONMENTAL PROBLEMS RELATING TO URANIUM MINING AND MILLING. Friedman, F.B. (Arco Chemical Co., Philadelphia, PA). Public Land and Resources Law Digest, The ; 16: No. 1, 95-121(1979).

The regulations of the mining and milling of uranium as they relate to the environment are discussed. The industry is primarily under the jurisdiction of the federal government and administered by the Nuclear Regulatory Commission (NRC). This authority can in some instances be relegated to the states. Certain areas of jurisdiction have been given over to Environmental Protection Agency (EPA) by the courts. The Safe Drinking Water Act is discussed as it relates to in situ leach mining. The role of the Department of Interior in the regulating of uranium mining, as described in the Federal Land Policy Management Act of 1976, is discussed. The requirement for environmental impact statements prior to licensing by the NRC or the individual states is also discussed. Air quality and radioactive waste disposal as they relate to uranium mining are also discussed. (DMC)

2502 COMPUTER-CONTROLLED REMOTE GAMMA-RAY SPECTROMETER. Nieschmidt, E.B.; Coates, R.A.; Johnson, L.O.; Killian, E.W. (Idaho National Engineering Lab., Idaho Falls). pp 698-707 of Computers in activation analysis and gamma-ray spectroscopy. Carpenter, B.S.; D'Agostino, M.D.; Yule, H.P. (eds.). Washington, DC; Department of Energy (1979).

From Conference on computers in activation analysis and gamma-ray spectroscopy; Mayaguez, Puerto Rico (30 Apr 1978).

The nuclear-power industry must monitor various effluents of power plants as well as plant operations. Programs under way at INEL to meet these objectives require the use of several remote, real-time, gamma-ray-spectrometer systems. Measurements performed by these systems include radioactive-effluent monitoring, irradiated reactor-fuel scanning, fission-product analysis for fuel condition, and monitoring of plant operations. It was decided to develop a standardized data-accumulation system having significant flexibility to meet all objectives and allowing development and training costs to be shared by the various programs. The development of such a standardized system requires a reliable method of data accumulation remote from a control computer system which has the responsibility for verification, analysis, and interpretation of the data. In the designing of such a system, three goals were established: (1) the data accumulation and transfer of data must be completely automated and under control of a central processor, (2) the remote system must be able to monitor and verify its own operation, and (3) the remote system must be able to control external devices. The development of a remote analyzer system that would meet all required goals was carried out in three phases: (1) implementation of a commercial hard-wired analyzer that could be controlled remotely via commands received from a central computer; (2) implementation of a minicomputer as the controlling device for the analyzer system in which the computer receives and interprets commands from the central computer and performs the required functions; (3) incorporation of all functions developed for phase 2 in a microcomputer-controlled system (currently in progress).

2503 IN SITU DATA ON VARIOUS SITES OF RADIOACTIVE RELEASES INTO THE MARINE ENVIRONMENT. pp 126-184 of Marine radioecology. A study of the fate of radionuclides released into the marine environment and applications to radiation protection. Ancellin, J.; Gueguenlat, P.; Germain, P. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Dept. de Protection). Paris, France; Eyrolles (1979). (In French)

In situ data on various sites of radioactive releases (La Hague (FR), Windscale (GB), Bradwell (GB) Columbia River (USA)).

2504 FINAL ENVIRONMENTAL IMPACT STATEMENT. PLATEAU RESOURCES LIMITED SHOOTERING CANYON URANIUM PROJECT, GARFIELD COUNTY, UTAH. Washington, DC; Nuclear Regulatory Commission (1979). 256p. Information Resources Press, 2100 M Street, NW, Suite 316, Washington, DC. (MF or HC) Order No. 79-1144.

Construction and operation of the Shoottering Canyon uranium mill project on roughly 350 acres in Garfield County, Utah is proposed. The mill would use the conventional acid-leaching, solvent-extraction process to produce uranium oxide; ore would be obtained from an ore-buying station and nearby applicant-owned mines. Tailings would be stored on site as slurry in a tailings impoundment. The project would have an estimated lifetime of 10 to 15 years, based on known ore deposits.

2505 EMISSION AND CONTROL OF RADON AT ACTIVE URANIUM MINES AND MILLS. Roberts, C.J. (Argonne National Lab., IL). Transactions of the American Nuclear Society ; 33: 154-155(1979). (CONF-791103--).

From American Nuclear Society meeting; San

Francisco, CA, USA (12 Nov 1979).
RADON ISOTOPES;URANIUM MINES;FEED MATERIALS PLANTS;RADIOACTIVE EFFLUENTS;RADIATION DOSES

2506 TRANSURANIC DISTRIBUTION BENEATH A RETIRED UNDERGROUND DISPOSAL FACILITY AT THE HANFORD SITE. Kasper, R.B.; Price, S.M.; Additon, M.K.; Smith, R.M.; Last, G.V.; Wagenaar, G.L. (Rockwell Hanford Operations, Richland, WA). Transactions of the American Nuclear Society ; 33: 165-166(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
HANFORD RESERVATION;PLUTONIUM ISOTOPES; AMERICIUM ISOTOPES;UNDERGROUND DISPOSAL; RADIOACTIVE WASTE DISPOSAL;RADIONUCLIDE MIGRATION;SPATIAL DISTRIBUTION;SEDIMENTS; ENVIRONMENTAL TRANSPORT

2507 PLUTONIUM IN SOIL ADJACENT TO ROCKY FLATS PLANT. Hume, M.W.; Illsley, C.T. (Rockwell International, Golden, CO). Transactions of the American Nuclear Society ; 33: 166-167(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
ROCKY FLATS PLANT;PLUTONIUM;SOILS;SPATIAL DISTRIBUTION;CONTAMINATION;LAND USE;SAMPLING; RADIATION DOSES;RADIOACTIVE EFFLUENTS

2508 SUBSURFACE MIGRATION STUDIES AT THE RADIOACTIVE WASTE MANAGEMENT COMPLEX, IDAHO. Humphrey, T.G. (EG and G Idaho, Inc., Idaho Falls). Transactions of the American Nuclear Society ; 33: 168-169(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
IDAHO;RADIOACTIVE WASTE FACILITIES; RADIONUCLIDE MIGRATION;UNDERGROUND DISPOSAL; RADIOACTIVE WASTE DISPOSAL;SAMPLING;SOILS; AQUIFERS

2509 LABORATORY MEASUREMENT OF DIFFUSION CONSTANTS FOR MILL TAILINGS COVERS AND ITS APPLICATION. Cohen, B.L. (Argonne National Lab., IL). Transactions of the American Nuclear Society ; 33: 173-174(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADON;RADIOACTIVE EFFLUENTS;SOILS;MILL TAILINGS;MEASURING METHODS;MATHEMATICAL MODELS; LABORATORY EQUIPMENT;DIFFUSION;RADIONUCLIDE MIGRATION

2510 MOISTURE EFFECTS ON RADON DIFFUSION. Rogers, V.C. (Ford, Bacon, and Davis, Utah, Inc., Salt Lake City); Overmyer, R.F.; Jensen, C.M.; Sandquist, G.M. Transactions of the American Nuclear Society ; 33: 174-175(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADON 222;MILL TAILINGS;RADIONUCLIDE MIGRATION;RADIOACTIVE EFFLUENTS;DIFFUSION; MOISTURE;RADIATION HAZARDS

2511 SOVIET SCIENCE. Medvedev, Zh.A. Oxford; University Press (1979). 274p.
In this brief history of science in the Soviet Union the emphasis is on the interaction between scientific and technological developments and the political objectives of the Soviet government. Reference is made to the development of nuclear energy for military and for peaceful purposes. In an appendix, a rather detailed account is given of a 'nuclear disaster in the South Urals area'; reference is made to ecological, genetic and population researches in the areas contaminated by long-lived products of radioactive waste (e.g. Sr-90 and Cs-137). Section headings are: lakes; mammals; population genetics and radiation genetics (covering plants, animals and soil activity).

2512 ASSESSMENT OF THERMALLY INDUCED WATER MOVEMENT AROUND A RADIOACTIVE WASTE DEPOSITORY IN HARD ROCK. Bourke, P.J.; Hodgkinson, D.P. (UKAEA Research Group, Harwell. Atomic Energy Research Establishment). pp 221-235 of Low flow, low-permeability measurements in largely impermeable rocks. Paris, France; OECD (1979).
From Workshop on Low-Flow Low permeability measurements in Langley Impermeable rocks; Paris, France (19 Mar 1979).
An assessment is made of the relative importance of thermally induced and naturally occurring water movement in the vicinity of a hard rock depository. The rock is treated as a uniformly permeable medium. Both simple approximations and more comprehensive analysis of the fluid mechanics lead to the conclusion that thermal movement could be the more important for several millenia.

2513 RADIOACTIVE WASTE DISPOSAL. Berci, K. (Eroemue es Halozattervezoe Vallalat Eroeterv, Budapest (Hungary)). Eroeterv Koezlemenyek ; 17: 100-106(1979). (In Hungarian).
During development work connected with the erection of the Paks Nuclear Power Plant, ERDETERV paid great attention to the problem of radioactive waste. As one of the relevent tasks a model describing the migration of isotopes in the soil has been elaborated. Apart from the description of this model, the necessary laboratory tests for application, and two examples of the model's use are also presented.

2514 RADIOECOLOGICAL IMPLICATIONS OF URANIUM MINING AND MILLING. Wicker, F.W. (Colo State Univ, Fort Collins). pp 309-325 of Uranium resource/technology seminar 2, 1979. Golden, CO; Colorado School of Mines (1979).
From Uranium resource technology seminar; Golden, CO, USA (12 Mar 1979).
This paper reviews concerns regarding environmental transport of radionuclides associated with uranium production, the apparent ecological and human health significance of such concerns, and the need for radioecological investigations. 19 refs.

2515 SOME ENVIRONMENTAL ASPECTS OF URANIUM MINING AND MILLING IN NORTHERN AUSTRALIA. Myhra, S. (Griffith Univ., Brisbane (Australia). School of Science). Search. Science, Technology and Society ; 9: No. 11, 400-409(Nov 1978).
A review of present knowledge and research efforts relating to environmental consequences of uranium mining and milling in the Northern Territory is given, with emphasis on establishing the basic scientific and technological parameters. The hazards arising from radioactive emissions and discharge of toxic materials are evaluated in relation to accepted safe levels. Particular attention is drawn to the potential hazards associated with long-term containment of tailings and contaminated water run-off from ore and waste-rock stockpiles.

2516 PLUTONIUM AS AN ENVIRONMENTAL PROBLEM. Stemerding, D. Wetenschap en Samenleving ; No. 7, 42-50(Oct 1978). (In Dutch).
Plutonium is a fission product which originates in reactor cores from the unfissionable ^{238}U. In a 'plutonium economy', large quantities of plutonium will be produced, processed, stored and transported as fissionable material for use in a growing number of reactors following an enhanced possibility of the proliferation of nuclear weapons. Such a development may lead to an increased dispersion of plutonium in the envioronment.

2517 WINDSCALE INQUIRY AND SAFETY ASSESSMENT. OXFORD REPORT NO. 4. Oxford; Political Ecology Research Froup (Aug 1978). 7p.
The procedure and general subject matter of the Windscale Inquiry are outlined. The evidence presented on major potential hazards and the treatment accorded this evidence is discussed. Some conclusions are drawn on decision making.

2518 EMANATING POWER AND DIFFUSION OF RADON THROUGH URANIUM MILL TAILINGS. Jensen, C.M.; Overmyer, R.F.; Macbeth, P.J.; Rogers, V.C.; Chatwin, T.D. (Ford, Bacon and Davis Utah, Inc., Salt Lake City (USA)). pp 35-49 of Management, Stabilization, and environmental impact of uranium mill tailings. Paris, France; OECD Nuclear Energy Agency (1978).
From Management, stabilization, and environmental impact of uranium mill trailings; Albuquerque, NM, USA (24 Jul 1978).
Radon emanation from uranium mill tailings particles, radon exhalation from tailings, and methods that could be used to reduce radon exhalation from tailings are discussed. Surface radon flux and soil gas concentrations were measured in experimental columns consisting of uranium tailings and various types and thicknesses of cover materials. The applicability of diffusion theory was examined and effective diffusion coefficients were determined for diffusion of radon gas through clay, soil, and sand covers over tailings.

2519 SOURCE TERMS FOR AIRBORNE RADIOACTIVITY ARISING FROM URANIUM MILL WASTES. O'Riordan, M.C. (National Radiological Protection Board, Harwell (UK)); Downing, A.L. (Binnie and Partners, London (UK)). pp 21-33 of Management, Stabilization, and environmental impact of uranium mill tailings. Paris, France; OECD Nuclear Energy Agency (1978).
From Management, stabilization, and environmental impact of uranium mill trailings; Albuquerque, NM, USA (24 Jul 1978).
One of the problems in assessing the radiological impact of uranium milling is to determine the rates of release to the air of material from the various sources of radioactivity. Such source terms are required for modelling the transport of radioactive material in the atmosphere. Activity arises from various point and area sources in the mill itself and from the mill tailings. The state of the tailings changes in time from slurry to solid. A layer of water may be maintained over the solids during the life of the mine, and the tailings may be covered with inert material on abandonment. Releases may be both gaseous and particulate. This paper indicates ways in which radon emanation and the suspension of long-lived particulate activity might be quantified, and areas requiring further exploration are identified.

2520 ENVIRONMENTAL PROBLEMS OF THE URANIUM MINING AND MILLING INDUSTRY. Savignac, N. (United Nuclear Corp., Albuquerque, NM). pp 122-132 of Uranium resource/technology update: front end of the nuclear fuel cycle. Morse, J.G. (ed.). Golden, CO; Colorao School of Mines (1978).
From Uranium resource/technology update - front end of the nuclear fuel cycle; Golden, CO, USA (14 Mar 1978).
The environmental impacts (resources committed, radioactive and nonactive effluents, radioactive sources for population exposures) are compared for oil, coal, and U, using 100-MW(e) plants operating at 75% capacity as basis. Results show that U as a source of energy costs less, uses less resources, and has less environmental impact than oil or coal. A general sampling and monitoring program is presented. 8 tables. (DLC)

2521 INFLUENCE OF URANIUM MILL TAILINGS ON TREE GROWTH AT ELLIOT LAKE. Murray, D.R. (Dep of Energy, Mines and Resour, Elliot Lake, Ont). Transactions - the Canadian Institute of Mining and Metallurgy and the Mining Society of Nova Scotia ; 81: 185-187(1978).
A four-year study was carried out to determine the ability of coniferous trees to aid in the reclamation of uranium tailings. Five species were planted: white cedar, white spruce, jack pine, scotch pine and red pine. More than 570 bare-root, two-year-old seedlings were planted on bare tailings and in areas of established grasses. A further division was made between areas of coarse and fine tailings. Over-all survival and growth of the trees has been far below expectations based on previous experience. The survival and growth of the coniferous trees have been related to species, environmental conditions and tailings properties. 2 refs.

Health and Safety

2522 (CEGB-RD/B/N--4440) INDIVIDUAL AND COLLECTIVE DOSES ASSOCIATED WITH THE TRANSPORT OF IRRADIATED MAGNOX FUEL WITHIN THE UK. Macdonald, H.F.; Mairs, J.H. (Central Electricity Generating Board, Berkeley (UK). Berkeley Nuclear Labs.). Dec 1978. 26p. Dep. NTIS (US Sales Only), PC A03/MF A01.
A method is described of evaluating the individual and collective doses arising during the transport of irradiated fuel from a system of nuclear power stations to a central reprocessing plant. The doses associated with irradiated Magnox fuel movements in the UK are estimated and compared with those resulting from other phases of the nuclear fuel cycle. In addition, the individual and collective doses implied by the accidental activity release limits contained within the 1973 IAEA Tranport Regulations are discussed.

2523 (CONF-800304--11) MIGRATION OF RADIONUCLIDES FOLLOWING SHALLOW LAND BURIAL. Sedlet, J.; Golchert, N.W. (Argonne National Lab., IL (USA)). 1980. Contract W-31-109-ENG-38. 5p. NTIS, PC A02/MF A01.
From 5. international congress of the International Radiation Protection Association; Jerusalem, Israel (8 Mar 1980).
A study of radionuclide migration was conducted at a facility used from 1944 to 1949 for the shallow land burial of radwaste produced during operations with two reactors and related nuclear research. It is situated in glacial drift 45 m thick. Underlying the drift is a generally level Silurian dolomite bedrock

60 m thick. The thickness of the drift decreases as the surface slopes downhill (north) until the dolomite reaches the surface and forms the bed of a river, 700 m to the north. This study was begun after tritiated water was detected in two picnic wells north of the facility, between the burial plot and the river. Surface and subsurface measurements indicate that tritium is migrating out of the burial site, but no other radionuclides have left the plot. The tritium concentrations decrease with distance from the plot. Tritium was found in the subsoil at all depths sampled, so the ground beneath and immediately around the plot contains tritium down to the dolomite aquifer. Time of travel of water from the burial plot to the nearest well is estimated to be 54 months. This would imply the peak concentration would reach the dolomite in about 35 years. By this time, 86% of the tritium would have disappeared by radioactive decay. The cyclical nature of the tritium content in the two wells implies that tritiated water is carried from the burial site by the spring rains when they recharge the groundwater supply.

524 (DOE/EV--0046(Vol.2), pp 273-292) ANALYSIS OF MIGRATION PATHWAYS FOR GEOLOGIC RADIOACTIVE WASTE REPOSITORIES. Shipler, D.B. (Battelle Memorial Inst., Columbus, OH); Raymond, J.R.; Gnirk, P.F. Sep 1979.
From Environmental control symposium; Washington, DC, USA (28 Nov 1978).
The major tasks of the National Waste Terminal Storage safety assessment programs are to: (1) develop modeling systems and data for predicting potential natural and man-induced release mechanisms; (2) determine release rates of various waste forms; (3) develop modeling systems to predict the transport of radioactive materials from repositories to the biosphere and to evaluate the potential radiation dose to humans; and (4) determine the various parametric values of rocks and rock formations necessary to carry out the modeling activities. This paper reviews the ongoing program for analyzing the significance of various suggested pathways by which radioactivity might migrate from deep geologic repositories. The analyses consider both the probability of the suggested cause occurring, and the probable impact of the occurrence. The pathways include those involved in sudden natural phenomena, such as earthquakes and vulcanism; pathways provided by slowly-evolving natural phenomena, such as erosion; pathways provided by phenomena due to the waste itself, such as stresses from radioactive decay heat or subsidence induced by incomplete back-filling of the repository; and pathways provided by human instrusion, such as drilling for mineral resources. A detailed analysis is provided for a natural faulting event that disrupts a spent fuel repository in a reference bedded salt regime. The analysis starts with the post faulting conditions and covers the transport of the waste to an aquifer and on through the aquifer to surface discharge. The results are given in concentrations of the waste in the discharge. The exercise was conducted to demonstrate the development of the transport modeling system and its potential use in repository design and site selection and qualification.

2525 (DOE/EV--0046(Vol.2), pp 529-545) RISK ASSESSMENT OF ENERGY MATERIAL TRANSPORTATION SYSTEMS. Rhoads, R.E.; Geffen, C.A. (Battelle Pacific Northwest Labs., Richland, WA). Sep 1979.
From Environmental control symposium; Washington, DC, USA (28 Nov 1978).
An assessment of the environmental impacts of energy systems should include an analysis of the transportation of required energy materials. Risk assessment techniques can help to define the potential environmental impacts and evaluate the safety of a transportation system. This paper presents the risk assessment methodology developed in Pacific Northwest Laboratory's Transportation Safety Studies Project, which was conducted for the Transportation Branch of DOE's Division of Environmental Control Technology and reviews the results of studies that have been completed to date. The risk methodology includes four basic components. A detailed system description is first obtained to provide projected industry characteristics, size and number of material shipments required, material characteristics, container types, transportation modes and routes, and weather and population zones. Fault tree analysis is then used to identify the sequences of events that could lead to a release of material from the transport vehicle. The probabilities of a particular release sequence occurring and the consequences of that release are evaluated next, using container failure data and mathematical models for dispersion and health effects. The environmental behavior characteristics and health effects of the material must be developed individually for each substance transported. Finally, the risks associated with each shipping route are calculated and summed to obtain total risk. The results of the risk assessment are analyzed to determine the primary contributors to the risk and to specify and evaluate alternatives that could reduce the system risk, if the current risk is judged by society to be unacceptable. Sensitivity studies are also carried out to test the effect on the system risk of assumptions and approximations that were made to develop key pieces of information. These studies may identify areas where further analysis is required.

2526 (DP-MS--79-21) ESCA STUDIES ON LEACHED GLASS FORMS. Dawkins, B.G. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant). 1979. Contract EY-76-C-09-0001. 11p. Dep. NTIS, PC A02/MF A01.
Electron Spectroscopy for Chemical Analysis (ESCA) results for frit, obsidian, NBS standard, and Savannah River Laboratory (SRL) glass forms that have been subjected to cumulative water leachings of 36 hours show that [Na] exhibits the largest and fastest change of all the elements observed. Leaching of surface Na occurred within minutes. Surface Na depletion increased with leach time. Continuous x-ray irradiation and argon ion milling induced Na mobility, precluding semiquantitative ESCA analysis at normal operating temperatures. However, the sample stage has been equipped with a liquid nitrogen supply and alkali mobility should be eliminated in future work.

2527 (IAEA--212, pp 23-33) ASSESSMENT OF DOSE TO THE CRITICAL GROUP AND THE WORLD POPULATION. Coulon, R. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Dept. de Protection). 1978.
From IAEA regional seminar on the application of environmental impact analysis to the nulcear power industry; Buenos Aires, Argentina (29 Aug 1977).
This paper reviews the basic principles of radiation protection and analyses the exposure of the public through radioactive transfers. The evaluation of the dose to the ''critical group'' is described and an application of the philosophy is proposed. A parallel study is

conducted in the case of the evaluation of the dose to the world population.

2528 (IEA-INF--062) SOME ASPECTS OF RADIOLOGICAL PROTECTION IN URANIUM MINES. Palacios, E.; Napolitano, C.M. (Instituto de Energia Atomica, Sao Paulo (Brazil). Centro de Protecao Radiologica e Dosimetria). Nov 1978. 10p. (In Portuguese). Dep. NTIS (US Sales Only), PC A02X/MF A01.
The basic principles of radiation protection recommended by the International Commission on Radiological Protection - ICRP are presented and the main radiological risks for the uranium mining workers are discussed. Finally some criteria for planning the radioactive waste management in uranium mines are given.

2529 (INIS-mf--5012) STATISTICAL INFORMATION 1971-76. FROM THE NATIONAL INSTITUTE OF RADIATION PROTECTION. (Statens Straalskyddsinstitut, Stockholm (Sweden)). 1978. 57p. (In Swedish). Dep. NTIS (US Sales Only), PC A04/MF A01.
This report includes statistical information about the work performed at the National Institute of Radiation Protection, Sweden, during the period 1971-1976, as well as about the different fields causing the intervention by the Institute.

2530 (INIS-mf--5319, pp 70) INTERNAL IRRADIATION OF ORGANISM WITH RADIOACTIVE RARE GASES. Wilhelmova, M.; Cejnar, F. (Ceskoslovenska Akademie Ved, Prague. Ustav Dozimetrie Zareni). [nd]. (In Czech).
From 8. meeting on radiation hygiene; Medlov, Czechoslovakia (31 Oct 1977).
ENVIRONMENTAL IMPACTS;HUMAN POPULATIONS; INTERNAL IRRADIATION;NUCLEAR FACILITIES; RADIATION DOSES;RADIATION HAZARDS;RADIOACTIVE WASTES;RADIONUCLIDE KINETICS;RARE GASES

2531 (INIS-mf--5372, pp 62-63) MINIMUM RISK BASED SELECTION OF WASTE FUEL DUMPING SITE. Sharma, D.D.; Chatterjee, D.; Sri Ram, K. (Indian Inst. of Tech., Kanpur). 1979.
From 6. Indian Association for Radiation Protection conference; Bombay, India (7 Mar 1979).
CANDU TYPE REACTORS;FISSION PRODUCTS; RADIATION PROTECTION;RADIOACTIVE WASTE STORAGE; RADIOACTIVITY;SITE SELECTION;SPENT FUEL STORAGE; WASTE TRANSPORTATION;RISK ASSESSMENT

2532 (KFK--2866) DOSE EXPOSURE OF THE ENVIRONMENTAL POPULATION BY NATURAL AND RELEASED RA-226 FROM A URANIUM MINE PROSPECT. RADIOECOLOGICAL RESEARCHES IN THE REGION OF FELDBERG. Schuettelkopf, H.; Kiefer, H. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Hauptabteilung Sicherheit). 1979. 86p. (In German). NTIS (US Sales Only), PC A05/MF A01.
The Ra-226 releases of an uranium prospect were measured. The Ra-226 concentrations in the environment and in foods of the southern Black Forest were determined. The dose exposure of Ra-226 of the population was calculated. Transfer factors for the most important transport processes of radium in the biosphere are given. (orig.).

2533 (NRPB-R--86) ANALYSIS OF THE EFFECT OF VARIATIONS IN PARAMETER VALUES ON THE PREDICTED RADIOLOGICAL CONSEQUENCES OF GEOLOGIC DISPOSAL OF HIGH-LEVEL WASTE. Hill, M.D. (National Radiological Protection Board, Harwell (UK)). Jun 1979. 81p. Dep. NTIS (US Sales Only), PC A05atMF A01.
A preliminary assessment of the radiological consequences of geologic disposal of high-level waste (Hill and Grimwood. NRPB-R69 (1978)) identified several areas where further research is required before this disposal option can be fully evaluated. This report is an analysis of the sensitivity of the results of the preliminary assessment to the assumptions made and the values of the parameters used. The parameters considered include the leach rate of the waste, the ground-water velocity, the length of the flow path from the repository to a source of drinking water and the sorption constants of the principle radionuclides. The results obtained by varying these parameters are used to examine the effects of assumptions such as the time at which leaching of the waste begins. The sensitivity analysis shows the relative importance of the waste canisters, the waste form and the geologic barrier to radionuclide migration in determining potential doses. These results are used to identify research priorities, establish preliminary design criteria and indicate developments needed in the mathematical modelling of the movement of radionuclides from a repository to the biosphere.

2534 (NUREG/CR--0635) EXCESS CANCER INCIDENCE IN MESA COUNTY, COLORADO. FINAL REPORT. Cunningham, M.C.; Ferguson, S.W.; Foreman, T. (Colorado Dept. of Health, Denver (USA). Disease Control and Epidemiology Div.). Jul 1979. 99p. NTIS.
The initial phase of this investigation has determined that there is a twofold excess of leukemia incidence for all ages in Mesa County, Colorado, for the period 1970 to 1976. The greatest excess was observed among residents over 65 years of age who developed leukemia 2-1/2 times the expected rate. No excess incidence of lung cancer has been identified. The second phase of the investigation has been case-control study of all adult leukemia deaths since 1960. No significant differences were found beween cases and controls with respect to: years of residence in Mesa Couty, general health status prior to diagnosis, and radiation exposure from tailings buildings. Only two cases and two controls had ever lived in houses with elevated gamma radiation from uranium mill tailings used in construction. Only one case and one control has a cumulative and average annual exposure significantly higher than the other subjects. Leukemia cases had higher socioeconomic levels and more positive family histories of leukemia than controls. No association between tailings structures and leukemia excess was observed.

2535 (NVO--0624-2) COMPARISON OF PREDICTED AND OBSERVED SUBSURFACE-SURFACE SEISMIC SPECTRAL RATIOS. O'Brien, L.J.; Saunier, J. (Computer Sciences Corp., Falls Church, VA (USA)). Mar 1980. Contract EY-76-C-08-0624. 91p. Dep. NTIS, PC A05/MF A01.
A mathematical model has been developed which describes the influence of depth on recorded seismic ground motion. Comparison of the predicted transfer functions obtained from the model with actual field measurements indicates that the model performs reasonably well under a wide variety of complex geological conditions with varying physical properties. The model has been tested at five distinct sites at the NTS with the subsurface depth ranging from 200 to 2200 feet. No discernible performance deviation was detected as the subsurface depth was increased over this region. Although the comparisons deal

exclusively with sites located within the NTS boundary, the results are equally applicable to other geographic regions being considered as potential waste isolation sites.

2536 (ORNL--5457) ASSESSMENT OF THE RADIOLOGICAL IMPACT OF THE INACTIVE URANIUM-MILL TAILINGS AT GRAND JUNCTION, COLORADO. Haywood, F.F.; Goldsmith, W.A.; Jacobs, D.G.; Perdue, P.T.; Ellis, B.S.; Hubbard, H.M. Jr.; Shinpaugh, W.H. (Oak Ridge National Lab., TN (USA)). Apr 1980. Contract W-7405-ENG-26. 92p. Dep. NTIS, PC A06/MF A01.

Results of a radiological survey of the inactive uranium-mill site at Grand Junction, Colorado, made in May and June 1976, are presented along with descriptions of techniques and equipment used to obtain the data and an assessment of increased risk of health effects attributable to radiation and radionuclides from the tailings. An estimate of potential health effects of exposure to gamma rays around a former mill building and to radon daughters produced by radon dispersed from the tailings has been made for occupants of the site.

2537 (ORNL/Sub--80/31048/1) ACTINIDE PARTITIONING-TRANSMUTATION PROGRAM FINAL REPORT. VI. SHORT-TERM RISK ANALYSIS OF REPROCESSING, REFABRICATION, AND TRANSPORTATION: APPENDIX. Fullwood, R.R.; Jackson, R. (Science Applications, Inc., Palo Alto, CA (USA)). Jan 1980. Contract W-7405-ENG-26. 355p. (SAI--099-78-PA). NTIS, PC A16/MF A01.

The Chemical Technology Division of the Oak Ridge National Laboratory has prepared a set of documents that evaluate a Partitioning-Transmutation (PT) fuel cycle relative to a Reference cycle employing conventional fuel-material recovery methods. The PT cycle uses enhanced recovery methods so that most of the long-lived actinides are recycled to nuclear power plants and transmuted to shorter-lived materials, thereby reducing the waste toxicity. This report compares the two fuel cycles on the basis of the short-term radiological and nonradiological risks they present to the public and to workers. The accidental radiological risk to the public is analyzed by estimating the probabilities of sets of accidents; the consequences are calculated using the CRAC code appropriately modified for the material composition. Routine radiological risks to the public are estimated from the calculated release amounts; the effects are calculated using the CRAC code. Radiological occupational risks are determined from prior experience, projected standards, and estimates of accident risk. Nonradiological risks are calculated from the number of personnel involved, historical experience, and epidemiological studies. The result of this analysis is that the short-term risk of PT is 2.9 times greater than that of the Reference cycle, primarily due to the larger amount of industry. This conclusion is strongly dominated by the nonradiological risk, which is about 150 times greater than the radiological risk. The absolute risk as estimated for the fuel cycle portions considered in this report is 0.91 fatalities/GWe-year for the PT cycle and 0.34 fatalities/GWe-year for the Reference cycle. This should be compared with Inhaber's estimate of 1.5 for nuclear and 150 for coal. All of the risks assumed here are associated with the production of one billion watts of electricity (GWe) per year.

2538 (PB--296947, pp 270-279) USE OF A RISK LIMIT AS AN ENVIRONMENTAL SAFETY STANDARD FOR RADIOACTIVE WASTE DISPOSAL SITES. Desrosiers, A.E. (Battelle Pacific Northwest Labs., Richland, WA); Njoku, E. May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

this paper demonstrates how the recommendations of ICRP Publication 26 may be applied to setting environmental radiation standards for radioactive waste disposal sites. Traditionally, such standards prescribe the allowable radiation dose to the maximally exposed offsite individual. Dose limits are usually established for the total body and for individual organs. In this paper, the risk factors recommended by ICRP for individual organs and the doses to those organs are combined to calculate the total risk per unit of ingested radioactivity. The allowable ingestion of radioactivity is then calculated from ICRP's individual risk limit. When these data are compared to normally derived ingestion limits, significant differences appear whenever a relatively insensitive organ receives the majority of the dose. Maximum allowable concentrations of radionuclides in water are derived from the ingestion limits and the concept of an effective water consumption rate. Using risk assessments in environmental standards for waste disposal sites would allow (1) a rapid and conservative (cautious) assessment of the potential health impact of a waste disposal facility, and (2) a simpler evaluation of the impact of ingesting several radionuclides even if each radionuclide affects different human organs.

2539 (PB--296947, pp 280-283) RADON: AN ENVIRONMENTAL POLLUTANT. Mills, W.A. (Environmental Protection Agency, Washington, DC). May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

Radiological concerns with the disposal and use of mining and milling residues have heightened to the point that federal agencies are asking or being asked to formulate new regulactions for controlling radon daughters from a variety of sources - radioactivity previously considered to be part of our natural environment. Based on information derived from epidemiologic studies of underground miners, particularly uranium miners, the health impact on the general public is being projected. Depending on the assumptions made, these projections vary widely. Because of these variations in health risks, decisions on control measures have even wider implications on economic and social considerations. Thus the question: is radon an environmental pollutant. While not fully answering the question, recognizing the uncertainties in assessing and controlling radon daughters can put the question in better perspective.

2540 (PB--296947, pp 329-336) DOSE MODELLING FOR RADON-PRODUCING ACTIVITIES IN HEAVILY POPULATED AREAS. Bettenhausen, L.; Burrows, V. (Environmental Protection Agency, Philadelphia, PA). May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

The Area Source Radiological Emission Analysis Code (AREAC) was used to estimate population and individual exposures resulting from radon effusion sources in two heavily populated areas. One situation results from disposal of radium and uranium processing wastes at a plant site over the past sixty years. The other situation occurs as a result

of mining operations. The mining operation results in radon contamination of the air near a metropolitan area. The source could affect 234,386 persons living within a ten-mile radius. Results of the AREAC model calculations for radon diffusion and subsequent population exposure using meteorology and demography for the region are presented. The waste disposal situation was modelled using measured concentrations of radium in soil and relating these concentrations to radon emanation rates and consequent area source strengths for radon. This provided input to the diffusion calculations employing regional meteorology and demography. The resulting radon concentrations at specific receptor sites and at sector centroids gave population exposure estimates. The disposal site is located in an area of many small population centers on the fringe of ametropolitan area, where 47,351 persons live within ten miles.

2541 (PB--296947, pp 400-419) MANAGING LOW-LEVEL RADIOACTIVE WASTES: BIOETHICAL CONCERNS. Maxey, M.N. (Univ. of Detroit, MI). May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

Equitable management of hazards having the potential for harmful health effects and social consequences is discussed. Three major problems are addressed: the adequacy of conceptual tools for assessing biohazards; the disagreement among scientific experts; and the origins of value-conflicts underlying expert disagreement. Principles to serve as guidance in the formulation of social policies for radiation health protection are recommended. (DC)

2542 (PNL--2851, pp II.1-II.19) PACIFIC NORTHWEST GEOMORPHOLOGY AND HYDROLOGY: RATES AND PROBABILITIES OF SELECTED PROCESSES AND EVENTS. Tubbs, D.W. (Univ. of Kansas, Lawrence). Nov 1979.

Summary of FY-1978 consultation input for Scenario Methodology Development.

This report presents results of one of the geomorphological and hydrological studies that have been conducted for the release scenario analysis of the Waste Isolation Safety Assessment Program (WISAP). Three general topics are considered: (1) determination of rates of denudation, (2) estimation of the probability of flooding due to each of several causes, and (3) evaluation of other surface processes that should be considered in the release scenario analysis. The third general topic was ultimately narrowed to the possible effects of landsliding. Rates of erosion are expressed as centimeters per 100 years, except that the original units are retained in figures taken from other sources. Probabilities are also expressed per 100 years.

2543 (PNL--2851, pp III.1-III.21) ANALYSIS OF THE SEISMIC HAZARD TO AN UNDERGROUND WASTE REPOSITORY. Wight, L.H. (Tera Corp., Berkeley, CA). Nov 1979.

Summary of FY-1978 consultation input for Scenario Methodology Development.

Conclusions are: The consequence associated with intense vibratory shaking of a well-designed repository is essentially negligible. The specification of an appropriate seismic vibratory design criteria could best be accomplished with a Bayesian seismic hazard assessment, using geologic slip rates as input. The consequence associated with fault displacement is very site specific and dependent on the host geologic media and its permeability changes in response to fault displacement. The probability of faulting through a repository in its million year design life is rather high, principally because of a high probability of primary or secondary faulting on undetected faults. The faulting probability can be minimized by deploying sophisticated site certification programs. High resolution microseismic surveillance seems to be most appropriate. The author's judgement is that the repository simulation program can neglect consequences associated with shaking of the repository, but that the probability of significant fault displacement through the repository during its design life should be conservatively taken as one.

2544 (PNL--2851, pp IV.1-IV.13) GLACIOLOGICAL PARAMETERS OF DISRUPTIVE EVENT ANALYSIS. Bull, C. (Ohio State Univ., Columbus). Nov 1979.

Summary of FY-1978 consultation input for Scenario Methodology Development.

The following disruptive events caused by ice sheets are considered: continental glaciation, erosion, loading and subsidence, deep ground water recharge, flood erosion, isostatic rebound rates, melting, and periodicity of ice ages. (DLC)

2545 (PNL--2851, pp V.1-V.8) GEOLOGIC FACTORS IN THE ISOLATION OF NUCLEAR WASTE: EVALUATION OF LONG-TERM GEOMORPHIC PROCESSES AND EVENTS. Mara, S.J. Nov 1979.

Summary of FY-1978 consultation input for Scenario Methodology Development.

In this report the rate, duration, and magnitude of changes from geomorphic processes and events in the Southwest and the Gulf Coast over the next million years are projected. The projections were made by reviewing the pertinent literature; evaluating the geomorphic history of each region, especially that during the Quaternary Period; identifying the geomorphic processes and events likely to be significant in the two regions of interest; and estimating the average and worst-case conditions expected over the next million years.

2546 (PNL--2851, pp VI.1-VI.15) LONG-TERM METEORITE HAZARDS TO BURIED NUCLEAR WASTE. REPORT 2. Hartmann, W.K. (Planetary Sciences Inst., Santa Clara, CA). Nov 1979.

Summary of FY-1978 consultation input for Scenario Methodology Development.

Part 1 presents new data on the relation between crater size and total impact energy, with equation (1) expressing the relation. Part 2 derives an equation which gives the rate of accumulation of area covered by craters larger than diameter D. A graphical relation between D and the depth of disturbance is given. This section concludes that the probability of a single site 600 m deep being disturbed in a million years is of the order 2.5×10^{-6}. Part 4 points out that meteorite impacts are also sources of seismic disturbance and should be factored into the seismic model for the hazard study. Another equation gives a methodology for including meteorite impacts in the seismic model. Part 5 and an equation give a methodology for dealing with repositories with extended surface area. Part 6 gives examples of applications.

2547 (PNL--2851, pp X.1-X.3) HYDROLOGIC EFFECTS OF NATURAL DISRUPTIVE EVENTS ON NUCLEAR REPOSITORIES. Davis, S.N. (Univ. of Arizona, Tucson). Nov 1979.

Summary of FY-1978 consultation input for Scenario Methodology Development.
This report describes some possible hydrogeologic effects of disruptive events which may affect repositories for nuclear waste. The report concentrates on the effects of natural events which are judged to be most probable.

2548 (PNL--2851, pp XIII.1-XIII.8) PROBABILITY OF EXPECTED CLIMATE STRESSES IN NORTH AMERICA IN THE NEXT ONE MY. Kukla, G. (Lamont-Doherty Geological Observatory, Palisades, NY). Nov 1979.
Summary of FY-1978 consultation input for Scenario Methodology Development.
Climates one million years ahead were predicted upon the assumption that the natural climate variability during the past My will continue. Response of environment and climate in the Basin and Range province of the western USA to global fluctuations was reconstructed; the most remarkable change was the filling of closed basins with large freshwater lakes. Probabilities of permanent ice cover and floods are discussed. It is believed that a site with minimal probability of climate-related breach can be selected. (DLC)

2549 (PNL--3180) ASSESSMENT OF EFFECTIVENESS OF GEOLOGIC ISOLATION SYSTEMS. ARRRG AND FOOD: COMPUTER PROGRAMS FOR CALCULATING RADIATION DOSE TO MAN FROM RADIONUCLIDES IN THE ENVIRONMENT. Napier, B.A.; Roswell, R.L.; Kennedy, W.E. Jr.; Strenge, D.L. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jun 1980. Contract AC06-76RL01830. 203p. NTIS, PC A10/MF A01.
The computer programs ARRRG and FOOD were written to facilitate the calculation of internal radiation doses to man from the radionuclides in the environment and external radiation doses from radionuclides in the environment. Using ARRRG, radiation doses to man may be calculated for radionuclides released to bodies of water from which people might obtain fish, other aquatic foods, or drinking water, and in which they might fish, swim or boat. With the FOOD program, radiation doses to man may be calculated from deposition on farm or garden soil and crops during either an atmospheric or water release of radionuclides. Deposition may be either directly from the air or from irrigation water. Fifteen crop or animal product pathways may be chosen. ARRAG and FOOD doses may be calculated for either a maximum-exposed individual or for a population group. Doses calculated are a one-year dose and a committed dose from one year of exposure. The exposure is usually considered as chronic; however, equations are included to calculate dose and dose commitment from acute (one-time) exposure. The equations for calculating internal dose and dose commitment are derived from those given by the International Commission on Radiological Protection (ICRP) for body burdens and Maximum Permissible Concentration (MPC) of each radionuclide. The radiation doses from external exposure to contaminated farm fields or shorelines are calculated assuming an infinite flat plane source of radionuclides. A factor of two is included for surface roughness. A modifying factor to compensate for finite extent is included in the shoreline calculations.

2550 (PNL--3340) ESTIMATED AIRBORNE RELEASE OF PLUTONIUM FROM THE EXXON NUCLEAR MIXED OXIDE FUEL PLANT AT RICHLAND, WASHINGTON AS A RESULT OF POSTULATED DAMAGE FROM SEVERE WIND AND EARTHQUAKE HAZARD. Mishima, J.; Schwendiman, L.C.; Ayer, J.E.; Owzarski, E.L. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Feb 1980. Contract AC06-76RL01830. 45p. NTIS, PC A03/MF A01.
The potential airborne releases of plutonium from postulated damage sustained by the Exxon Nuclear Company's Mixed Oxide Fabrication Plant at Richland, Washington, as a result of various levels of wind and earthquake hazard, are estimated. The releases are based on damage scenarios that range up to 250 mph for wind hazard and in excess of 1.0 g ground acceleration for seismic hazard, which were developed by other specialists. The approaches and factors used to estimate the releases (inventories of dispersible materials at risk, damage levels and ratios, fractional airborne releases of dispersible materials under stress, atmosphere exchange rates, and source term ranges) are discussed. Release estimates range from less than 10^{-7} g to greater than 14 g of plutonium over a four-day period.

2551 (PNL-SA--6523) CONSIDERATIONS IN THE TRANSPORTATION OF SPENT FUEL AND OTHER RADIOACTIVE MATERIALS BY SEA. Rhoads, R.E.; Heaberlin, S.W.; Brobst, W.A. (Battelle Pacific Northwest Labs., Richland, WA (USA)). May 1978. Contract EY-76-C-06-1830. 9p. (CONF-780506--43). Dep. NTIS, PC A02/MF A01.
From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).
A study was made of what would happen to casks and plutonium packages in the unlikely event of a serious sea accident involving shipments of spent fuel or plutonium, and what the radiological consequences might be to man through the marine food chain. Four postulated loss scenarios were considered: loss on the continental shelf and in the deep ocean of an undamaged package, and a package exposed to a severe fire. Conservative estimates of the maximum population doses are comparable to those expected from natural background sources. Areas where futher research is needed are identified. 3 tables. (DLC)

2552 (SAND--79-7107) WASTE ISOLATION PILOT PLANT TITLE I OPERATOR DOSE CALCULATIONS. FINAL REPORT, LATA REPORT NO. 90. Hughes, P.S.; Rigdon, L.D. (Los Alamos Technical Associates, Inc., NM (USA)). Feb 1980. Contract EY-76-C-04-0789. 115p. Dep. NTIS, PC A06/MF A01.
The radiation exposure dose was estimated for the Waste Isolation Pilot Plant (WIPP) operating personnel who do the unloading and transporting of the transuranic contact-handled waste. Estimates of the radiation source terms for typical TRU contact-handled waste were based on known composition and properties of the waste. The operations sequence for waste movement and storage in the repository was based upon the WIPP Title I data package. Previous calculations had been based on Conceptual Design Report data. A time and motion sequence was developed for personnel performing the waste handling operations both above and below ground. Radiation exposure calculations were then performed in several fixed geometries and folded with the time and motion studies for individual workers in order to determine worker exposure on an annual basis.

2553 (SAND--80-0794C) ALARA ASSESSMENT OF SPENT FUEL AND NUCLEAR WASTE TRANSPORTATION SYSTEMS. Sutherland, S.H. (Sandia National

Labs., Albuquerque, NM (USA)). 1980. Contract AC04-76DP00789. 21p. (CONF-801115--6). NTIS, PC A02/MF A01.

From 6. international symposium on packaging and transporting radioactive material; Berlin, F.R. Germany (10 Nov 1980).

The effects of ALARA (as low as reasonably achievable) on transportation system costs were evaluated for LWR spent fuel, high-level commercial and defense wastes, and remotely handled TRU waste. Three dose rate specifications were used: 10 mrem/h at 2m, 5 mrem/h, and 2 mrem/h. The evaluation was done for wastes and LWR spent fuel 1, 3, 5, and 10 years old. Gamma shield materials were depleted uranium, lead, and steel; the neutron shield material was water. Results for a 7-element PWR cask show that uranium shielding is the lightest, and that the increased weight of the low dose rate casks results in 1 to 2 million dollars increase in lifetime transportation costs. 6 figures, 3 tables. (DLC)

2554 (SGAE--2889) ABSORPTION DOSE RATE IN GREAT BITUMEN BLOCKS. EXPERIMENTAL DETECTION. Patek, P. (Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna). Feb 1978. 12p. (In German). (CH--228/78). NTIS (US Sales Only), PC A02/MF A01.

By mixing together glass dosemeters with a big amount of coated particles and irradiating these dosemeters for a certain time, it is possible to measure the dose rate inside this active material. These values are helpful in the decision on results of research work on bitumen-waste-mixtures for better interpretation, as well as for the determination of exact dose rate values by conditioning real waste. An arithmetic evaluation shows good agreement with the measured results.

2555 (SGAE--3023) BURNING TEST ON A STORAGE DRUM FILLED WITH A MIXTURE OF SODIUM NITRATE AND BITUMEN. Knotik, K.; Leichter, P.; Spalek, K. (Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna). Jan 1979. 15p. (In German). (CH--245/79). Dep. NTIS (US Sales Only), PC A03/MF A01.

A burning test on a common storage drum filled with a mixture of sodium nitrate and bitumen was carried out to show the incinerability of said mixture. A 50 l mild steel drum was filled with 80,7 kg sodum nitrate/bitumen-mixture. The drum was packed in a 200 l mild steel drum, the remaining space was filled with enough sand to cover the top of the inner drum with 15 cm of sand. The sand packing was then soaked with 70 l of light distillate fuel and ignited. The fuel burned until self-extinguishing occurred. 30 % (22,2 l) of the fuel was burned. 0,7 % of the energy potential was absorbed in the sand layer. The highest measured temperature was 34°C at the top of the test drum. It can be concluded, that even under severe external actions the ignition temperature of 400°C for bitumen/waste mixtures cannot be reached, providing correct technical storage conditions, which means that the void space in the cavities is filled with unburnable absorbing material like sand or salt.

2556 (SR--0980-10) WET AND DRY DEPOSITION AND RESUSPENSION OF AFCT/TFCT FUEL PROCESSING RADIONUCLIDES. FINAL REPORT. Slinn, W.G.N.; Katen, P.C.; Wolf, M.A.; Loveland, W.D.; Radke, L.F.; Miller, E.L.; Ghannam, L.J.; Reynolds, B.W.; Vickers, D. (Oregon State Univ., Corvallis (USA)). Sep 1979. Contract EY-77-S-09-0980. 529p. Dep. NTIS, PC A23/MF A01.

After short summary and introductory chapters, Chapter IV contains a critical analysis of available parameterizations for resuspension and for wet and dry removal processes and recommends interim parameterizations for use in radiation dose calculations. Chapter V describes methods and experimental results from field studies of in-cloud vs below-cloud scavenging, precipitation efficiency, and modifications of aerosols by clouds. In Chapter VI are contained descriptions of methods and results from four different approaches to the problem of measuring the dry deposition velocities of submicron aerosol particles depositing on vegetation. Chapter VII describes experimental results from a study of resuspension and weathering of tracer aerosol particles deposited on soil, grass and gravel; typical resuspension rates were found to be of the order of 10^{-8} s^{-1} and it is recommended that the concept of weathering be reassessed. In Chapter VIII, National Weather Service data are used to obtain Lagrangian statistics for use in a regional-scale study of wet and dry removal. Chapter IX develops new concepts in reservoir models for application at regional to global scales. In the final chapter are some comments about the results found in this study and recommendations for future research.

2557 (STUDSVIK/K1/4--78/9) HANDLING OF ALPHA ACTIVE MATERIAL. Berggren, G. (Aktiebolaget Atomenergi, Studsvik (Sweden)). Oct 1978. 22p. (In Swedish). Dep. NTIS (US Sales Only), PC A03/MF A01.

The handling of alpha active material involves many problems. Some of these are discussed in this report particularly those concerning monitoring and ventilation. The report summarizes the experiences from the handling of Pu in boxes at Studsvik, Sweden.

2558 (UCID--17930) METEOROLOGY AND DEMOGRAPHY MODELS FOR RISK ASSESSMENTS OF ACCIDENTAL ATMOSPHERIC RELEASES OF NUCLEAR WASTE. PHASE 2 METHODOLOGY. Peterson, K.R.; Harvey, T.F. (California Univ., Livermore (USA). Lawrence Livermore Lab.). Sep 1980. Contract W-7405-ENG-48. 20p. NTIS, PC A02/MF A01.

Models are derived for determining the risk of release to the atmosphere of radioactive materials during nuclear waste handling. Such releases might occur in three phases of the nuclear waste handling cycle: (1) at fuel reprocessing plants during handling and interim storage, (2) during transportation to a permanent storage area, or (3) at the permanent disposal area (federal waste repository). Gaussian diffusion equations for both plume- and puff-type releases are used with demographic models to assess relative integrated population doses. Given a unit release and assuming an equal accident probability, we conclude that the largest risk would be from a transportation accident in a metropolitan area. The effect of a release during transportation in a rural area or at a fuel reprocessing plant would be one to two orders of magnitude less, while at a federal waste repository the population dose would be three or more orders of magnitude less than for the metropolitan transportation accident.

2559 (UCRL--15121) RELATIVE POTENTIAL HAZARDS OF RADIOACTIVE WASTE IN VARIOUS WATER SYSTEMS. Duffy, J.J.; Mealy, G.L. (Analytic Sciences Corp., Reading, MA (USA)). 15 Jun 1979. Contract W-7405-ENG-48. 74p. Dep.

NTIS, PC A04/MF A01.

The potential hazard to man arising from the hypothetical release of radioactive spent fuel waste into various water systems has been evaluated. Radionuclide transport and human exposure were simulated for six water systems: a large Northwestern river, a small Northeastern river, a small Northwestern river, a large Central Region river, a lake with no outflow in an arid region, and an aquifer discharging directly into an ocean.

2560 (UCRL--82236) REPOSITORY POST-SEALING RISK ANALYSIS USING MACRO. Kaufman, A.M.; Edwards, L.L.; O'Connell, W.J. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 14 Feb 1980. Contract W-7405-ENG-48. 18p. (CONF-800313--4). Dep. NTIS, PC A02/MF A01.

From Waste management conference; Tucson, AZ, USA (10 Mar 1980).

MACRO, a code to propagate probability distributions through a set of linked models, is currently under development at Lawrence Livermore Laboratory. An early version of this code, MACRO1, has been used to assess post-sealing dose to man for simple repository and site models based on actual site data.

2561 POST-KEMENY NUCLEAR INDUSTRY IN THE UNITED STATES. Dodd, B. (Oregon State Univ., Corvallis (USA). Dept. of Nuclear Engineering). Nuclear Engineering Incorporating Nuclear Power ; 21: No. 3, 78-80(May-Jun 1980).

An account is given of the nuclear industry in the USA as it tries to come to terms with the findings of the Kemeny enquiry which reported on the incident at the Three Mile Island - 2 Reactor. The major points raised by the enquiry are reviewed and the areas currently receiving most attention; the Nuclear Regulatory Commission itself, operator training, emergency planning, licensing, waste disposal, and transportation, discussed.

2562 PROBABILITY ANALYSIS OF GEOLOGICAL PROCESSES: A USEFUL TOOL FOR THE SAFETY ASSESSMENT OF RADIOACTIVE WASTE DISPOSAL. D'Alessandro, M.; Murray, C.N.; Bertozzi, G.; Girardi, F. (Commission of the European Communities, Ispra, Italy). Radioactive Waste Management (New York) ; 1: No. 1, 25-42(May 1980).

In the development of methods for the assessment of the risk associated with the disposal of radioactive wastes over periods up to 10^6 years, much discussion has occurred on the use of probability analysis for geological processes. The applicability and limitations of this concept are related to the proper use of the geological data-base and the critical interpretation of probability distributions. The interpretation of geological phenomena in terms of probability is discussed and an example of application to the determination of faulting probability is illustrated. The method has been used for the determination of failure probability of geological segregation of a waste repository in a clay formation.

2563 NUCLEAR ENERGY: PRODUCTION AND PROBLEMS. Berlyn, G.P.; Dhillon, S.S.; Koslow, E.E. (Yale Univ, New Haven, Conn). Environmental Management ; 4: No. 2, 95-102(Mar 1980).

It is possible that nuclear energy may be a necessary interim solution to energy problems, but the risks and hazards of nuclear energy such as that posed by technetium-99 should be openly studied and discussed so that the citizens who will be taking the risks are given an appropriate voice in the hard decisions that must be made regarding the use of nuclear energy. A major problem of present nuclear reactors is the generation of toxic and radioactive wastes. Another major problem with nuclear power plants is that a nuclear reactor has the capacity to heat up and melt down or even to explode; and under either of these conditions, the toxic wastes may be spewed out into the environment. The article discusses the fission process, nuclear fuel cycle, types of reactors, and biological effects. Refs.

2564 RADIATION PROTECTION AND SAFETY IN CONNECTION WITH RADIOACTIVE WASTE. REPORT ABOUT THE 7TH IRPA REGIONAL CONGRESS AND 13TH ANNUAL MEETING OF FS AT COLOGNE. Pfeffer, W. (Gesellschaft fuer Reaktorsicherheit m.b.H. (GRS), Koeln (Germany, F.R.)). Atomwritschaft, Atomtechnik ; No. 2, 79-80(Feb 1980). (In German).

INTERMEDIATE-LEVEL RADIOACTIVE WASTES;LOW-LEVEL RADIOACTIVE WASTES;MEETINGS;RADIATION PROTECTION;RADIOACTIVE WASTE DISPOSAL;REVIEWS; SAFETY

2565 SEISMIC RISK AND TOXIC WASTE DISPOSAL. A DISCUSSION. Berry, M.J.; Hasegawa, H.S. (Department of Energy, Mines and Resources, Ottawa, Ontario (Canada). Earth Physics Branch). Geoscience Canada ; 6: No. 4, 195-198(Dec 1979).

Earthquakes, whether natural or induced, pose a significant risk to the disposal of toxic wastes by burial or fluid injection in the crust. Methodology exists for assessing the ambient seismic risk at moderately low levels of probability, but for greater degrees of conservatism the assessment is essentially deterministic. Such estimates are considered appropriate for periods comparable to that of the available seismic history but an improved understanding of the nature of currently active seismic zones is required for the estimates to be applied with confidence to periods of time measured in thousands of years. The potential hazards associated with this natural seismic risk can be mitigated by appropriate engineering design and practce. Induced seismicity associated with mining excavations thermally induced stresses or fluid injection can be controlled by appropriate engineering design and operational procedure.

2566 RELEASES OF RADIOACTIVE SUBSTANCES FROM REPROCESSING PLANTS IN THE EC IN 1972-1976. Atomwritschaft, Atomtechnik ; 24: No. 12, 612-613(Dec 1979). (In German).

In its latest, fourth issue of the report on the release of radioactive substances from nuclear power plants, covering the period from 1972 to 1976, the EC commission for the first time presented data including the releases from reprocessing plants in the EC. Thus this latest report considers, the two main sections of the nuclear fuel cycle involving the possibility of radioactivity release.

2567 ENERGY; WHAT ABOUT THE WASTE.. Goldman, M.I. (NUS Corp, Rockville, Md). Chemical Engineering Progress ; 75: No. 11, 65-70(Nov 1979).

It is noteworthy that the comparisons of health effects that have been made between coal and nuclear power have usually included the projected consequences associated with the handling and disposal of high-level radioactive wastes. They have not, however, considered the potential problems associated with coal plant operations. This article compares the toxicity

of nuclear high-level waste with the toxicity of the waste from burning coal to produce an equivalent amount of energy. In addition, some comparisons are presented of radon gas emanated from coal ash and from uranium mill tailings. A detailed discussion of health hazards involved in nuclear waste and coal ash, which is waste from coal-firing power plant, is followed by a conclusion which states that coal ash has an equal or greater inherent hazard than an energy equivalent amount of uranium ore. Further, since the constituents in coal ash do not decay with time, this toxicity index extends undiminished for an infinite time into the future.

2568 NUCLEAR DISASTER IN THE URALS. Medvedev, Z. (National Inst. for Medical Research, London (UK)). New Scientist ; 84: No. 1176, 115-117(11 Oct 1979).

In this article, extracted from 'Nuclear Disaster in the Urals' written by the present author, mechanisms are considered that could have been responsible for the explosion which occurred in the Urals in late 1957 or early 1958, causing a great many casualties and contaminating a vast territory, resulting from the improper storage of reactor products. Possibilities reviewed include; (1) an explosion due to thermal heating of selectively adsorbed residual plutonium, resulting from a chain reaction begun by the moderating action of water on the plutonium (2) an explosion in a storage tank that was insufficiently cooled, (3) an explosion in a geological formation into which high level wastes had been pumped under pressure.

2569 METHODS FOR PREDICTING THE EFFECTIVENESS OF URANIUM MILL TAILINGS COVERS. Cohen, B.L. (Argonne National Lab., IL (USA)). Nuclear Instruments amp Methods ; 164: No. 3, 595-599(1 Sep 1979).

The theory for diffusion of radon through uranium mill tailings piles and covers placed over them is developed in a simple but reasonably accurate form. The results depend on a knowledge of diffusion constants. Methods for measuring these in a laboratory are considered and a much simpler method than those in use is developed and recommended.

2570 REDUCTION OF RADON FLUX FROM URANIUM TAILINGS. Overmyer, R.F.; Rogers, V.C.; Jensen, C.M. (Ford, Bacon and Davis, Utah, Inc). Mining Congress Journal ; 65: No. 9, 21-25(Sep 1979).

The article pertains to experiments designed to measure the effectiveness of various tailings cover materials in reducing radon flux, the theoretical analysis of radon diffusion, and experiment results. 2 refs.

2571 INFLUENCE OF THE MODE OF UPTAKE ON THE ELIMINATION OF COBALT 60 BY A PHANEROGAM, A MOLLUSC, A CRUSTACEAN AND A FRESHWATER TELEOST. Amiard-Triquet, C. (Centre National de la Recherche Scientifique, 44 - Nantes (France). Lab. de Biologie Marine). Environmental Pollution (London) ; 20: No. 1, 65-78(Sep 1979). (In French).

^{60}Co enters the environment with radioactive wastes from nuclear power reactors and fuel reprocessing plants as well as a component of fallout from nuclear tests. A study of ^{60}Co in freshwater organisms has been carried out in order to compare the influence of different modes of uptake (immersion in contaminated water, ingestion of radioactive food, contamination by both food and water) upon the subsequent elimination. The loss of ^{60}Co by Canadian pondweed Elodea canadensis is monophasic. For animal species, this phenomenon is biphasic, independently of the mode of uptake. On the other hand, the biological half-life changes in relation to the vector of contamination. The same result is observed for the relative importance of the different compartments. This is easily explained because the mode of uptake determines the distribution of ^{60}Co in the organisms. The turnover of ^{60}Co in the organisms is slow and the physical half-life of this radionuclide is relatively important (Tsub(p) = 5.27 years). Thus, the possible consequences of the release of this pollutant on freshwater life must not be neglected.

2572 CONTAMINATION IN AN OFFICE AND EXPOSURE OF OFFICE WORKERS. Hughes, J.S. (National Radiological Protection Board, Leeds (UK)). Radiological Protection Bulletin ; No. 29, 27-28(Jul 1979).

It has been estimated that doses ranging from 5 to 23 mSv perquarter were received over periods of several years by three office workers. Several thousand small radium-luminized metal discs had been removed from the display panels of several hundred items of control equipment and stored for at least eight years in four lead canisters on the floor on an office. The discs had been handled initially in bulk, without regard to radiological hazards and precautions. A considerable level of removable α contamination was found on the surface of the canisters, but the most significant radiological hazard was external γ radiation from the canisters. The incident emphasizes that radioactive material should be disposed of promptly and appropriately when no longer required.

2573 URINARY ^{90}SR CONCENTRATION IN OCCUPATIONALLY EXPOSED AND NONEXPOSED PERSONS IN AUSTRIA. Irlweck, K.; Streit, S. (Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Seibersdorf. Forschungszentrum). Health Physics ; 37: No. 1, 163-165(Jul 1979).

Personnel monitoring at Seibersdorf Research Centre includes analysis of ^{90}Sr in urine of employees who handle low-level radioactive wastes. Results for the two year period 1976-77 are reported. ^{90}Sr concentrations were mainly between 0.5 and 5.0pCi/l, except in the cases of two employees who incorporated ^{90}Sr as a result of an accident. Urine samples from 21 non-exposed persons not employed at Seibersdorf all gave results below 2pCi/l. These results agree with a ^{90}Sr concentration of 0.2-2.0pCi/l of urine estimated from global fallout data. If individual differences, e.g. in metabolism, diet etc. are taken into account, it is concluded that a ^{90}Sr incorporation above fallout level should be assumed with certainty only if the ^{90}Sr concentration exceeds 5pCi/l of urine. (author).

2574 COMPUTER MODEL OF LONG-TERM HAZARDS FROM WASTE REPOSITORIES. Ross, B.; Koplik, C.M.; Giuffre, M.S.; Hodgin, S.P. (Analytic Sciences Corp., Reading, MA). Transactions of the American Nuclear Society ; 32: 380-381(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

COMPUTER CODES;N CODES;RADIATION HAZARDS; RADIOACTIVE WASTE FACILITIES;RADIATION DOSES; MAN;GROUND WATER;RADIONUCLIDE MIGRATION; RADIOACTIVE WASTE DISPOSAL;GEOLOGIC DEPOSITS; UNDERGROUND DISPOSAL

2575 LEACH-MIGRATION EXPERIMENTS TO DETERMINE THE MOBILITY OF RADIONULIDES IN GEOLOGIC MEDIA. Seitz, M.G.; Couture, R.A.; Steindler, M.J. (Argonne National Lab., IL). Transactions of the American Nuclear Society ; 32: 385-386(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
RADIOACTIVE WASTE DISPOSAL;GEOLOGIC DEPOSITS; HIGH-LEVEL RADIOACTIVE WASTES;LEACHING;GROUND WATER;RADIONUCLIDE MIGRATION;UNDERGROUND DISPOSAL;MOBILITY

2576 MODEL FOR EVALUATION OF THYROID DOSE FROM SPENT FUEL ON POSTULATED LOSS OF FUEL POOL COOLING SYSTEM. Acharya, S. (Nuclear Regulatory Commission, Washington, DC); Willoughby, N.B. Transactions of the American Nuclear Society ; 32: 651-653(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
THYROID;RADIATION DOSES;IODINE 131;SPENT FUEL STORAGE;REPROCESSING;HEALTH HAZARDS;FUEL POOLS;AFTER-HEAT;INHALATION

2577 LEUKEMIA DUE TO NUCLEAR POWER PLANTS. Trott, K. (Muenchen Univ. (Germany, F.R.). Strahlenbiologisches Inst.). Muenchener Medizinische Wochenschrift ; 121: No. 5, 152(Feb 1979). (In German).
CHILDREN;ENVIRONMENT;FISSION PRODUCTS;HUMAN POPULATIONS;LEUKEMOGENESIS;MORTALITY;NUCLEAR POWER PLANTS;HEALTH HAZARDS;RADIATION HAZARDS; RADIOACTIVE WASTES

2578 PRELIMINARY EXAMINATION OF HAZARDS ARISING FROM HYPOTHETICAL FAILURE OF A LONG-TERM DISPOSAL FACILITY FOR HIGH LEVEL RADIOACTIVE WASTES FROM THERMAL REACTORS. Bell, G.D. (UKAEA, Harwell. Atomic Energy Research Establishment); Fryer, L.S. Nuclear Energy (Formerly Nuclear Energy Engineer) ; 18: No. 1, 47-51(Feb 1979).
The return to the biosphere of buried highly active vitrified wastes by some unknown cataclysm at a time following decay of most of the fission product activity, that is 500 years from irradiation is postulated. The various ways in which people could receive radiation doses are considered and compared. External radiation is shown to be the most important if the hazard is undetected; the extent of the hazard is shown to be limited to a relatively small area. It is concluded that there would be no risk to continuing life in the country concerned or to life on the planet as a whole, even in the extremely unlikely and hypothetical circumstances postulated.

2579 ASSEMBLY OF LABORATORY LINE FOR NUCLEAR FUEL REPROCESSING. Fidler, J.; Chotivka, V. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Nukleon ; No. 4/78, 13-15(Jan 1979). (In Czech).
The dismantling of a laboratory line for spent fuel reprocessing after the termination of the research programme and the procedures for hot and semi-hot cell decontamination are described. The equipment was mostly disassembled in smaller parts which were then decontaminated by wiping them with cotton wool soaked in detergent and citric acid, varnished with two-component epoxi varnish, wrapped into multiple polyethylene foils, sealed in PVC bags and thus ready for transport.

2580 PRINCIPLES OF SAFETY CRITERIA FOR NUCLEAR FUEL FACILITIES. Genshiryoku Iinkai Geppo (Journal of Atomic Energy Commission) ; 23: No. 9, 208-213(Jan 1979). (In Japanese).
This report was prepared by the "Committee for the Investigation of Nuclear Fuel Cycle Safety Criteria" and was submitted to the Director of Nuclear Safety Bureau. It summarizes the basic idea of safety regulation for the following facilities: uranium and plutonium fuel fabrication facilities; reprocessing and spent fuel storage facilities; facilities which deal with a large amount of plutonium and hot laboratories dealing with a large amount of spent fuel. Fundamental concepts for securing the safety of these facilities are considered and discussed for the following areas: the conditions of location such as the distance from public residential areas; control and monitoring of radiation; criticality management; maintenance, inspection, shielding, instrumentation, and many other measures for preventing accidents. Explanations of the technical terms used in this document are also made.

2581 NUCLIDE TRANSPORT BY GROUNDWATER IN SWEDISH BEDROCK. Allard, B.; Kipatsi, H.; Torstenfelt, B.; Rydberg, J. (Chalmers Univ. of Tech., Goeteborh, Sweden). pp 403-410 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).
From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).
The sorption of 14 different elements (Cs, Sr, Ra, Zr, Tc, I, Nd, Ce, Eu, Th, U, Np, Pu and Am) has been measured on granite and on a bentonite/quartz mixture (10:90) under environmental conditions. Retention factors have been calculated. The investigation was performed within the Swedish Nuclear Fuel Safety Project.

2582 ANALYSIS OF PU-RELEASE CONSEQUENCES ON THE ENVIRONMENTAL GEOCHEMISTRY. Jakubick, A.T. (Kernforschungszentrum, Karlsruhe, Germany). pp 427-434 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).
From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).
The fallout plutonium depth distribution in soil was estimated at seven undisturbed sites. The mobility of plutonium in these natural soils was derived as 0.2 to 2 cm/y. By relating the flow velocity of soil water to the migration rate, the retardation factor was thereby obtained. The typical magnitude of plutonium transfer response to the partially saturated water flow is 10^{-3}. A linear relationship exists between the fallout plutonium retardation factor and three soil parameters: surface exchange capacity, porosity and pH. Also, in the course of the investigations the Pu-base-line was established for SW-Germany. Thus, any local deviation can be identified by using a log-probability plot with these background data. By means of the relationship derived, realistic predictions concerning persistence and dispersion of Pu-anomalies can be made for any site chosen.

2583 PRELIMINARY SAFETY ASSESSMENT OF THE WIPP FACILITY. Balestri, R.J. (BDM Corp., Albuquerque, NM); Torres, B.W.; Pahwa, S.B.; Brannen, J.P. pp 513-520 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).
From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

The efforts to perform a safety assessment of the WIPP facility being proposed for southeastern New Mexico are summarized. This preliminary safety assessment of the WIPP facility is limited to a consequence assessment in terms of the dose to a maximally exposed individual as a result of introducing the radionuclides into the biosphere. No attempt has been made to extend the consequences to population dose or to weight the dose with probability of the events. The general methodology, geosphere transport, and biosphere transport are described. The consequences of the various models developed to represent the loss of containment are summarized.

2584 COMPUTER ENHANCED RELEASE SCENARIO ANALYSIS FOR A NUCLEAR WASTE REPOSITORY. Stottlemyre, J.A.; Petrie, G.M.; Mullen, M.F. (Battelle Pacific Northwest Labs.). pp 521-531 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

An interactive (user-oriented) computer tool is being developed at PNL to assist in the analysis of release scenarios for long-term safety assessment of a continental geologic nuclear waste repository. Emphasis is on characterizing the various ways the geologic and hydrologic system surrounding a repository might vary over the 10^6 to 10^7 years subsequent to final closure of the cavern. The potential disruptive phenomena are categorized as natural geologic and man-caused and tend to be synergistic in nature. The computer tool is designed to permit simulation of the system response as a function of the ongoing disruptive phenomena and time. It is designed to be operated in a determinatic manner, i.e., user selection of the desired scenarios and associated rate, magnitude, and lag time data; or in a stochastic mode. The stochastic mode involves establishing distributions for individual phenomena occurrence probabilities, rates, magnitudes, and phase relationships. A Monte-Carlo technique is then employed to generate a multitude of disruptive event scenarios, scan for breaches of the repository isolation, and develop input to the release consequence analysis task. To date, only a simplified one-dimensional version of the code has been completed. Significant modification and development is required to expand its dimensionality and apply the tool to any specific site.

2585 RELEASE OF RADIONUCLIDES FROM HIGH-LEVEL WASTE DURING TRANSPORTATION FIRES. Ensminger, D.A. (Analytic Sciences Corp., Reading, MA); Sutherland, A.A.; Oston, S.G.; Van Konynenburg, R.A. pp 541-548 of Scientific basis for nuclear waste management. McCarthy, G.J. (ed.). New York, NY; Plenum Press (1979).

From Annual meeting of Materials Research Society; Boston, MA, USA (28 Nov 1978).

An analysis is performed to determine doses to humans that result from fire accidents in rail or truck transportation of solidified high-level nuclear waste. Four waste forms are analyzed: spray calcine, fluidized-bed calcine, borosilicate glass, and a special multibarrier waste form. It is possible to establish discrete containment failure temperatures for each waste form. Using probabilistic models for fire accidents in truck and rail transportation modes, the expected value of population dose for each of the four waste forms is computed.

2586 Strahlenexposition im Jahr 1976 durch kerntechnische Anlagen in der Bundesrepublik Deutschland. (RADIATION EXPOSURE DUE TO NUCLEAR FACILITIES IN WEST GERMANY IN 1976). Huber, O.; Gans, I.; Haubelt, R. Berlin, Germany, F.R.; Reimer (1979). 22p. (In German).

Apart from the calculated results of radiation exposure for 1976, this report contains data on the discharge rates from nuclear installations, their radionuclide composition as well as the applied calculation procedures input data. It may be concluded that the maximum exposure values of individuals, calculated for various pathways, from the discharge of radioactive substances with gaseous and liquid effluents from nuclear installations did not exceed the dose limits established in the Radiation Protection Ordinance. In 1976, the contribution of nuclear installations to whole population exposure was again below 1 mrem/a.

2587 OVERVIEW OF WASTE ISOLATION SAFETY ASSESSMENT METHODS. Bartlett, J.W. (Analytic Science Corp., Reading, MA). Transactions of the American Nuclear Society ; 33: 380(1979). (CONF-791103--).

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

RADIOACTIVE WASTE DISPOSAL;GEOLOGIC DEPOSITS; RISK ASSESSMENT;SAFETY;UNDERGROUND DISPOSAL

2588 WASTE ISOLATION PERFORMANCE ASSESSMENT PROGRAM. Burkholder, H.C. (Battle Project Management Division, Columbus, OH). Transactions of the American Nuclear Society ; 33: 380-382(1979). (CONF-791103--).

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

RADIOACTIVE WASTE DISPOSAL;RISK ASSESSMENT; MATHEMATICAL MODELS;GEOLOGIC DEPOSITS; PERFORMANCE;SIMULATION;ENVIRONMENTAL TRANSPORT; ENVIRONMENTAL EXPOSURE PATHWAY;RADIONUCLIDE MIGRATION

2589 OVERVIEW OF THE US NUCLEAR REGULATORY COMMISSION HIGH-LEVEL WASTE MANAGEMENT REPOSITORY ASSESSMENT METHODS AND ANALYSIS MODELS. Schreurs, S. (Nuclear Regulatory Commission, Washington, DC). Transactions of the American Nuclear Society ; 33: 382-383(1979). (CONF-791103--).

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

US NRC;HIGH-LEVEL RADIOACTIVE WASTES; RADIOACTIVE WASTE MANAGEMENT;RADIOACTIVE WASTE FACILITIES;RISK ASSESSMENT;SALT DEPOSITS; GEOLOGIC DEPOSITS;RADIOACTIVE WASTE DISPOSAL; ENVIRONMENTAL EXPOSURE PATHWAY;HYDROLOGY; RADIONUCLIDE MIGRATION;SIMULATION

2590 ASSESSING THE LONG-TERM INTEGRITY OF NUCLEAR WASTE REPOSITORIES. Hadlock, C.R.; Mattison, P.D. (Arthur D. Little Inc., Cambridge, MA). Transactions of the American Nuclear Society ; 33: 383(1979). (CONF-791103--).

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

RADIOACTIVE WASTE DISPOSAL;HIGH-LEVEL RADIOACTIVE WASTES;ENVIRONMENTAL TRANSPORT; ENVIRONMENTAL EXPOSURE PATHWAY;GEOLOGIC DEPOSITS;UNDERGROUND DISPOSAL;RADIONUCLIDE MIGRATION;SALT DEPOSITS;GRANITES;BASALT;SHALES; MATHEMATICAL MODELS;RADIOACTIVE WASTE FACILITIES;RISK ASSESSMENT

2591 EFFECT OF SOURCE BOUNDARY CONDITIONS IN PREDICTING THE MIGRATION OF RADIONUCLIDES

THROUGH GEOLOGIC MEDIA. Harada, M.; Iwamoto, F.; Pigford, T.H. (Univ. of California, Berkeley). Transactions of the American Nuclear Society ; 33: 383-384(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
GEOLOGIC DEPOSITS;RADIONUCLIDE MIGRATION; MATHEMATICAL MODELS;RADIOACTIVE WASTE DISPOSAL; UNDERGROUND DISPOSAL;BOUNDARY CONDITIONS; RADIOISOTOPES;ENVIRONMENTAL TRANSPORT

2592 SUPERPOSITION SOLUTION OF THE TRANSPORT OF A RADIONUCLIDE CHAIN THROUGH A SORBING MEDIUM. Foglia, M.; Iwamoto, F.; Harada, M.; Chambre, P.L.; Pigford, T.H. (Univ. of California, Berkeley). Transactions of the American Nuclear Society ; 33: 384-386(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADIONUCLIDE MIGRATION;RADIOACTIVE WASTE DISPOSAL;GEOLOGIC DEPOSITS;MATHEMATICAL MODELS; GROUND WATER;SORPTIVE PROPERTIES;SPATIAL DISTRIBUTION;EVALUATION

2593 MIGRATION BEHAVIOR OF THE $^{234}U \rightarrow ^{230}TH \rightarrow ^{226}RA \rightarrow$ DECAY CHAIN. Higashi, K.; Harada, M.; Iwamoto, F.; Pigford, T.H. (Univ. of California, Berkeley). Transactions of the American Nuclear Society ; 33: 386-387(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADIONUCLIDE MIGRATION;URANIUM 234;THORIUM 230;RADIUM 226;ENVIRONMENTAL TRANSPORT; RADIOACTIVE WASTE DISPOSAL;GEOLOGIC DEPOSITS; UNDERGROUND DISPOSAL;ABSORPTION;SORPTIVE PROPERTIES;GROUND WATER;MATHEMATICAL MODELS

2594 PRELIMINARY TEST PROGRAM FOR IMPACT RESISTANCE OF SOLID WASTE FORMS. Mecham, W.J.; Jardine, L.J.; Steindler, M.J. (Argonne National Lab., IL). Transactions of the American Nuclear Society ; 33: 419-421(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
GLASS;CERAMICS;SOLID WASTES;HIGH-LEVEL RADIOACTIVE WASTES;IMPACT STRENGTH;DEFORMATION; RADIOACTIVE WASTE PROCESSING;SOLIDIFICATION

2595 LEACH STUDIES OF PLUTONIUM-CONTAMINATED INCINERATOR ASH INCORPORATED IN CEMENT. Nicolosi, S.L.; Neilson, R.M. Jr.; Colombo, P.; Bradley, D.J. (Brookhaven National Lab., Upton, NY). Transactions of the American Nuclear Society ; 33: 421-422(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
LEACHING;ASHES;CEMENTS;SOLID WASTES; TRANSURANIUM ELEMENTS;RADIOACTIVE WASTES; PLUTONIUM 239;URANIUM 235;NEPTUNIUM 237; AMERICIUM 241;CESIUM 137;STRONTIUM 90

2596 DETERMINATION OF NUCLEAR WASTE-FORM LEACH RATES BY ACTIVATION ANALYSIS. Schumann, R.P. (Exxon Nuclear Idaho, Idaho Falls). Transactions of the American Nuclear Society ; 33: 422-423(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADIOACTIVE WASTE PROCESSING;CALCINATION; SOLIDIFICATION;HIGH-LEVEL RADIOACTIVE WASTES; FISSION PRODUCTS;LEACHING;SOLID WASTES; RADIOACTIVE WASTES;FISSION PRODUCTS;ACTIVATION ANALYSIS

2597 PREDICTION OF MIGRATION VELOCITIES FROM PARTITION COEFFICIENTS: CESIUM IN BASALT. Williams, J.; Rickert, P.; Seitz, M.G. (Argonne National Lab., IL). Transactions of the American Nuclear Society ; 33: 425-426(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
BASALT;RADIONUCLIDE MIGRATION;CESIUM; RADIOACTIVE WASTE DISPOSAL;GEOLOGIC DEPOSITS; GROUND WATER;ENVIRONMENTAL TRANSPORT; UNDERGROUND DISPOSAL;VELOCITY

2598 RADON: CHARACTERISTICS, NATURAL OCCURRENCE, TECHNOLOGICAL ENHANCEMENT, AND HEALTH EFFECTS. Cohen, B.L. (Pittsburgh Univ., PA (USA)). Progress in Nuclear Energy ; 4: No. 1, 1-24(1979).
An extensive review is presented on radon, with the purpose of examining its effects on human health. First the occurrence, nuclear and other properties are surveyed. Techniques are described for measuring the concentration of radon and its daughters, and the use of the working level (WL) unit widely accepted for specifying such concentrations, is explained. The behaviour of radon in both soil and in the atmosphere is discussed. The effect of inhalation of radon is then examined, particularly the data relating to lung cancer amongst uranium miners, and exposure received by the average person in normal environments. The effect of the nuclear industry on radon concentrations is considered. The principal contribution is from the waste (tailings) from uranium ore processing mills, and doses and health effects are examined in some detail together with discussion on reduction of radon emissions. Finally enhancement of radiation exposures due to non-nuclear activities, especially combustion of coal, mining of phosphates, the use of natural gas and of potable water, is considered.

2599 DEVELOPMENT AND TESTING OF LONG-TERM SAFETY ASSESSMENT METHODOLOGY FOR GEOLOGIC WASTE REPOSITORIES. Brandstetter, A. (Battelle Pacific Northwest Labs., Richland, WA). Transactions of the American Nuclear Society ; 33: 140(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADIOACTIVE WASTE STORAGE;UNDERGROUND DISPOSAL;SAFETY;RISK ASSESSMENT;RADIOACTIVE WASTE DISPOSAL;GEOLOGIC DEPOSITS;ENVIRONMENTAL EXPOSURE PATHWAY;RADIOACTIVE WASTE FACILITIES; HIGH-LEVEL RADIOACTIVE WASTES

2600 POPULATION DOSE FROM LWR FUEL REPROCESSING. Schubert, J.F.; Cooper, R.E.; Watts, J.R.; Bailey, C.E. (Savannah River Lab., Aiken, SC). Transactions of the American Nuclear Society ; 33: 161-162(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
REPROCESSING;RADIATION DOSES;HUMAN POPULATIONS;DOSE COMMITMENTS;INHALATION; INGESTION;PWR TYPE REACTORS;THEORETICAL DATA; TABLES;FUEL REPROCESSING PLANTS;BWR TYPE REACTORS;RADIOACTIVE EFFLUENTS

2601 RADIOLOGICAL EVALUATION OF A URANIUM MINES EXPANSION: A CASE STUDY. Lowe, L.M.; Chambers, D.B. (James F. MacLaren Ltd., Toronto, Ontario). Transactions of the American Nuclear Society ; 33: 170(1979). (CONF-791103--).
From American Nuclear Society meeting; San

Francisco, CA, USA (12 Nov 1979).
ELLIOT LAKE;ONTARIO;URANIUM MINES;RADIATION DOSES;MODIFICATIONS;MILL TAILINGS;RADIATION HAZARDS;HUMAN POPULATIONS

2602 UTILIZATION OF B AND W CRITICAL FACILITY IN SUPPORT OF SPENT-FUEL STORAGE. Hoovler, G.S.; Baldwin, M.N.; Eng, R.L. (Babcock and Wilcox Co., Lynchburg, VA). Transactions of the American Nuclear Society ; 33: 364-366(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
SPENT FUEL STORAGE;CRITICALITY;FUEL POOLS; CRITICAL SIZE

2603 CRITICAL EXPERIMENTS SUPPORTING CLOSE-PACKED WATER STORAGE OF POWER REACTOR FUEL. Hoovler, G.S.; Baldwin, M.N.; Eng, R.L. (Babcock and Wilcox Co., Lynchburg, VA). Transactions of the American Nuclear Society ; 33: 374-376(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
SPENT FUEL STORAGE;CRITICAL SIZE;FUEL POOLS; PWR TYPE REACTORS;BWR TYPE REACTORS;BENCHMARKS; BORON CARBIDES;CONFIGURATION

2604 K/SUB α/ METER FOR SPENT NUCLEAR FUEL STORAGE POOLS. Levine, S.H.; Schultz, M.A.; Chang, D. (Pennsylvania State Univ., University Park). Transactions of the American Nuclear Society ; 33: 378-379(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
SPENT FUEL STORAGE;FUEL POOLS;PWR TYPE REACTORS;BWR TYPE REACTORS;FUEL RACKS; CRITICALITY

2605 CRITICALITY SAFETY DETERMINATION OF SPENT FUEL STORAGE VAULT. Yook, C.C. (Hanyang Univ., Seoul (Republic of Korea) Coll. of Engineering). Bangason Bango Hakhoe Chi ; 4: No. 1, 1-4(1979). (In Korean).
Effective multiplication factor has been calculated for one PWR fresh fuel assembly immersed in a spent fuel storage vault on the basis of the neutron transport theory. A numerical calculation has been carried out by means of Sn approximation. The method employed in this study is that the energy domain is broken into 16 groups, the angular variable is divided into four discrete direction, i.e., S_4, and the spatial variable which is divided into fine meshes at the interface between different materials is discretized into 27 mesh points. The calculated Ksub(eff) value of 0.6145 seems to be far smaller in comparison with the value obtained by other author for an infinite array of fuel assemblies. (author).

2606 METHODS FOR ESTIMATING POPULATION DETRIMENT AND THEIR APPLICATION IN SETTING ENVIRONMENTAL DISCHARGE LIMITS. Clarke, R.H.; Webb, G.A.M. (National Radiological Protection Board, Harwell (UK)). pp 127-144 of Biological implications of radionuclides released from nuclear industries. Vol. 2. Vienna, Austria; IAEA (1979).
From International symposium on biological implications of radionuclides released from nuclear industries; Vienna, Austria (26 Mar 1979).
The relative emphasis in the objectives of radiological protection has changed with the system of dose limitation recommended in the latest recommendations of the ICRP. There is now a requirement to carry out optimization of protection using the techniques of cost benefit analysis. The paper is not concerned with the formal techniques of the differential cost benefit analysis, but rather with the assessment of the detriment that is to be used in the optimization procedure, in particular for effluents released in the nuclear industry. We consider the calculation of detriment and discuss to what extent the existing defined dosimetric quantities, such as Committed Effective Dose Equivalent or Collective Effective Dose Equivalent Commitment, may be used in its assessment. We also indicate the procedure to be followed for the most realistic estimates of the total health effects. Having derived the dosimetric quantities to be used in assessing detriment, we outline the environmental models that need to be developed to complete the calculation of detriment from environmental releases. Finally, we have identified research and investigation needs, both in the biological and environmental fields, to fulfil the objective of realistic estimation of detriment.

2607 UPDATE ON EPA URANIUM FUEL CYCLE STANDARDS. Smith, P.B. (US EPA, Denver, Colo). pp 344-366 of Uranium resource/ technology seminar 2, 1979. Golden, CO; Colorado School of Mines (1979).
From Uranium resource technology seminar; Golden, CO, USA (12 Mar 1979).
EPA's role in setting radiation protection standards is reviewed. Emphasis is given to EPA's uranium fuel cycle standards program, and the implication for industry. 9 refs.

2608 RADIOLOGICAL SAFETY ASSESSMENT FOR A LOW-LEVEL RADIOACTIVE SOLID WASTE STORAGE FACILITY: PRELIMINARY RISK EVALUATION BY RELIABILITY TECHNIQUES. Morisawa, S.; Inoue, Y. (Kyoto Univ. (Japan). Faculty of Engineering); Wadachi, Y.; Kato, K. Health Physics ; 35: No. 6, 817-834(Dec 1978).
The applicability of reliability techniques was examined to the determination of quantitative risks presented by a low-level radioactive solid waste storage facility. Fault trees and event trees were defined based on many relevant assumptions to obtain the average occurrence rate of rare accidents which could lead to potential hazards to the general public. The amount of radioactivity which would be transported into the environment from a storage facility was calculated using assumptions and/or estimates of the magnitude of each accident, together with estimates of probability of occurrence, and was used as an index for measuring the potential risks. Some valuable results were obtained in this study under the limits considered. These are as follows: (1) Reliability techniques are effective and promising for assessing the quantitative risks due to storing radioactive wastes in a waste package storage facility for long periods; (2) The main failures associated with an accident are summarized and listed; (3) The advantages and disadvantages of two types of waste package storage room and the amounts of radioactivity which would be released accidentally from them are also summarized and listed; and (4) The improvements to a storage facility that are desirable from a radiological safety aspect are proposed.

2609 SHUTDOWN OF THE EUROCHEMIC PLANTS: PROGRAM, EVOLUTION AND TEACHINGS. Detilleux, E. (Societe Europeenne pour le Traitement Chimique des Combustibles Irradies (EUROCHEMIC), Mol (Belgium)). Revue Generale Nucleaire ; No. 3, 177-186(Jun-Jul 1978). (In

French).
The work carried out at Eurochemic since the shutdown of the reprocessing plant is described. The results of this work show that the decommissioning of nuclear plants can be made perfectly well using conventional means.

2610 FIELD APPLICATIONS OF A RADON BARRIER TO REDUCE INDOOR AIRBORNE PROGENY. Culot, M.V.J. (Westinghouse Electric Corp., Monroeville, PA (USA). Nuclear Energy Systems); Olson, H.G.; Schiager, K.J. Health Physics ; 34: No. 5, 498-501(May 1978).
The use of uranium mill tailings in the foundations of dwellings has resulted in indoor radon progeny concentrations and gamma exposures in excess of levels presently allowed for the general public. An account is given of the applications of an epoxy coating on the indoor faces of the concrete foundations of three buildings in Grand Junction, Colorado. Epoxy barriers were shown to be effective for preventing radon influx into structures. Gamma exposure rates must be analyzed to ensure that buildup behind the barrier will not introduce an unacceptable gamma exposure level. The use of a sealant is especially economical in situations where structural integrity may be jeopardized by physical removal of uranium mill tailings.

2611 RADIATION PROTECTION FEATURES OF THE NEW WASTE CALCINING FACILITY. Bingham, G.E.; Wheeler, B.R. (Allied Chemical Corp., Idaho Falls, ID (USA)). pp 135-142 of Radiation protection in nuclear power plants and the fuel cycle. Volume 1. London, England: British Nuclear Energy Society (1978).
From Conference on radiation protection in nuclear power plants and the fuel cycle; Bristol, UK (27 Nov 1978).
A new Waste Calcining Facility is being built at the Idaho Chemical Processing Plant to replace the existing Waste Calcining Facility which was built to demonstrate fluidized-bed solidification of highly radioactive liquid wastes. The new facility will include significant features and provisions for effecting major reductions in the annual personnel radiation exposures being experienced at the Idaho Chemical Processing Plant. Past Chemical Processing Plant personnel radiation exposure histories are described along with corrective actions being taken in the new facility to reduce exposures and the anticipated results of these actions. (author).

2612 MEASUREMENTS OF RADON DAUGHTER CONCENTRATIONS IN STRUCTURES BUILT ON OR NEAR URANIUM MINE TAILINGS. Haywood, F.F.; Kerr, G.D.; Goldsmith, W.A. (Oak Ridge National Lab., TN (USA)). pp 219-229 of Personal dosimetry and area monitoring suitable for radon and daughter products. Paris, France: OECD (1977).
From Specialist meeting on personal dosimetry and area monitoring suitable for radon and daughter products; Ontario, Canada (4 Oct 1976).
A technique is discussed that has been used to measure air concentrations of short-lived daughters of ^{222}Rn in residential and commercial structures built on or near uuranium mill tailings in the western part of the United States. In this technique, the concentrations of RaA, RaB and RaC are calculated from one integral count of the RaA and two integral counts of the RaC' alpha-particle activity collected on a filter with an air sampling device. A computer program is available to calculate the concentrations of RaA, RaB and RaC in air and to estimate the accuracy in these calculated concentrations. This program is written in the BASIC language. Also discussed in this paper are the alpha-particle spectrometer used to count activity on the air filters and the results of our radon daughter measurements in Colorado, Utah, and New Mexico. Results of these and other measurements are now being used in a comprehensive study of potential radiation exposures to the public from uranium mill tailing piles.

Regulations

2613 (PB--296947, pp 284-292) PROPOSED FEDERAL RADIATION GUIDANCE FOR RADIOACTIVE WASTES. Martin, J.E.; Pettengill, H.J.; Lichtman, S. (Environmental Protection Agency, Washington, DC). May 1979.
From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).
The Administrator of EPA, in his role of providing federal radiation guidance, will soon forward radiation protection guidance for radioactive wastes to the President for approval. The recommended guidance addresses: (1) the types of materials to be categorized as radioactive wastes and considered for control; (2) the use of institutional functions, engineered controls, and naural barriers to isolate wastes; (3) the potential health risks associated with wastes, and the factors involved in determining them; (4) factors which determine the unacceptability of various levels of risk; and (5) other considerations such as retrievability, site locations, and communication to succeeding generations to assure continued isolation. When approved by the President, the recommendations will guide federal agencies in making policy, programmatic, operational, and standard-setting decisions in providing radiation protection for radioactive wastes.

Accountability and Safeguards

2614 (BARC--986) PASSIVE GAMMA SCANNER FOR ESTIMATION OF PLUTONIUM IN FABRICATION WASTE. Venkatesan, P.P.; Burte, P.P.; Manohar, S.B.; Satya Prakash; Ramaniah, M.V. (Bhabha Atomic Research Centre, Bombay (India)). 1978. 11p. Dep. NTIS (US Sales Only), PC A03/MF A01.
The solid plutonium wastes arising from plutonium handling laboratories and fuel fabrication facilities by their very nature (heterogeneous) are not amenable to proper sampling and hence to the standard techniques of estimation. For the proper accounting of nuclear materials a non-destructive method of waste assay is essential. A passive gamma-ray scanner developed in the Radiochemistry Division is described in the present report. The scanner detects the 384 KeV gamma complex of plutonium in a ($3^{1/4}$ x $3^{1/2}$) NaI(Tl) detector. The rotation-collimation technique is used to achieve the flat response with respect to the plutonium distribution inside the waste can. The sensitivity of the scanner is 200 mg of Pu per can at 2 sigma level and 20% accuracy for a total scan time of 2000 sec. The assay results of typical waste cans and comparison of a few of these with chemical assay results are presented. This non-destructive method is fast, simple and has satisfactory accuracy.

2615 (BNL--27660) LASER SURVEILLANCE SYSTEM FOR SPENT FUEL. Fiarman, S.; Zucker, M.S.;

Bieber, A.M. Jr. (Brookhaven National Lab., Upton, NY (USA)). 1980. Contract EY-76-C-02-0016. 22p. (CONF-800315--20). NTIS, PC A02/MF A01.
From 2. symposium of the European Safeguards Research and Development Association; Edinburgh, UK (26 Mar 1980).
A laser surveillance system installed at spent fuel storage pools (SFSP's) will provide the safeguard inspector with specific knowledge of spent fuel movement that cannot be obtained with current surveillance systems. The laser system will allow for the division of the pool's spent fuel inventory into two populations - those assemblies which have been moved and those which haven't - which is essential for maximizing the efficiency and effectiveness of the inspection effort. We have designed, constructed, and tested a full size laser system operating in air and have used an array of 6 zircaloy BWR tubes to simulate an assembly. The reflective signal from the zircaloy rods is a strong function of position of the assembly, but in all cases is easily discernable from the reference scan of the background with no assembly. A design for a SFSP laser surveillance system incorporating laser ranging is discussed. 10 figures.

2616 (BNL--28054) LASER SURVEILLANCE SYSTEM FOR SPENT FUEL. Fiarman, S.; Zucker, M.S.; Bieber, A.M. Jr. (Brookhaven National Lab., Upton, NY (USA)). 1980. Contract AC02-76CH00016. 13p. (CONF-800655--29). NTIS, PC A02/MF A01.
From 21. annual meeting of the Institute of Nuclear Materials Management; Palm Beach, FL, USA (30 Jun 1980).
A laser surveillance system installed at spent fuel storage pools will provide the safeguard inspector with specific knowledge of spent fuel movement that cannot be obtained with current surveillance systems. The laser system will allow for the division of the pool's spent fuel inventory into two populations - those assemblies which have been moved and those which haven't - which is essential for maximizing the efficiency and effectiveness of the inspection effort. We have designed, constructed, and tested a laser system and have used it with a simulated BWR assembly. The reflected signal from the zircaloy rods depends on the position of the assembly, but in all cases is easily discernable from the reference scan of background with no assembly.

2617 (CONF-800943--(Summ.), pp 145-146) NONDESTRUCTIVE MEASUREMENTS ON SPENT FUEL FOR AWAY-FROM-REACTOR STORAGE FACILITIES. Phillips, J.R.; Cobb, D.D. (Los Alamos, scientific Lab., NM). 1980.
From National topical meeting of fuel cycles for the 80's; Gatlinburg, TN, USA (29 Sep 1980).
NONDESTRUCTIVE ANALYSIS;SPENT FUELS;AWAY-FROM-REACTOR STORAGE;RADIOACTIVE WASTE FACILITIES;SAFEGUARDS;STORAGE FACILITIES; NEUTRON DETECTORS

2618 (CONF-801107--13) CRITICALITY AND SAFEGUARDS AT THE IDAHO CHEMICAL PROCESSING PLANT. Kodman, G.P.; Wilson, R.E. (EG and G Idaho, Inc., Idaho Falls (USA)). 1980. Contract AC07-79ID01675. 7p. NTIS, PC A02/MF A01.
From ANS international conference; Washington, DC, USA (17 Nov 1980).
Reprocessing of high enriched irradiated reactor fuel at the Idaho Chemical Processing Plant (ICPP) presents significant potential problems to the Criticality Safety (CS) and Safeguards and Security (S and S) Sections. Two major interactions between these sections occurs when irradiated fuel is stored and fuel is dissolved. S and S is assigned the responsibility of maintaining a centralized records and reporting system which provides detailed, timely knowledge of the location, quantity and measurement uncertainties associated with accountable nuclear material, including uranium and plutonium. The Criticality Safety Section uses this information in providing criticality safety evaluations with support analyses, inspection, field surveillance and audits to ensure criticality safety implementation. The interactions of these sections has minimized operational constraints and maximized criticality safeguards controls.

2619 (DOE/NE--0001(Vol.2)) NUCLEAR PROLIFERATION AND CIVILIAN NUCLEAR POWER: REPORT OF THE NONPROLIFERATION ALTERNATIVE SYSTEMS ASSESSMENT PROGRAM. VOLUME II. PROLIFERATION RESISTANCE. (Department of Energy, Washington, DC (USA)). Dec 1979. 192p. Dep. NTIS, PC A09/MF A01.
Volume II assesses proliferation resistance. Chapters are devoted to: assessment of civilian nuclear systems (once-through fuel-cycle systems, closed fuel cycle systems, research reactors and critical facilities); assessment of associated sensitive materials and facilities (enrichment, problems with storage of spent fuel and plutonium content, and reprocessing and refabrication facilities); and safeguards for alternative fuel cycles.

2620 (DOE/NE--0001(Vol.9)) NUCLEAR PROLIFERATION AND CIVILIAN NUCLEAR POWER: REPORT OF THE NONPROLIFERATION ALTERNATIVE SYSTEMS ASSESSMENT PROGRAM. VOLUME IX. REACTOR AND FUEL CYCLE DESCRIPTIONS. (Department of Energy, Washington, DC (USA)). Dec 1979. 612p. Dep. NTIS, PC A99/MF A01.
The Nonproliferation Alternative Systems Assessment Program (NASAP) has characterized and assessed various reactor/fuel-cycle systems. Volume IX provides, in summary form, the technical descriptions of the reactor/fuel-cycle systems studied. This includes the status of the system technology, as well as a discussion of the safety, environmental, and licensing needs from a technical perspective. This information was then used in developing the research, development, and demonstration (RD and D) program, including its cost and time frame, to advance the existing technology to the level needed for commercial use. Wherever possible, the cost data are given as ranges to reflect the uncertainties in the estimates. Volume IX is divided into three sections: Chapter 1, Reactor Systems; Chapter 2, Fuel-Cycle Systems; and the Appendixes. Chapter 1 contains the characterizations of the following 12 reactor types: light-water reactor; heavy-water reactor; water-cooled breeder reactor; high-temperature gas-cooled reactor; gas-cooled fast reactor; liquid-metal fast breeder reactor; spectral-shift-controlled reactor; accelerator-driven reactor; molten-salt reactor; gaseous-core reactor; tokamak fusion-fisson hybrid reactor; and fast mixed-spectrum reactor. Chapter 2 contains similar information developed for fuel-cycle facilities in the following categories: mining and milling; conversion and enrichment; fuel fabrication; spent fuel reprocessing; waste handling and disposal; and transportation of nuclear materials.

2621 (INIS-mf--5130, pp 20-28) NPT AND THE ROLE OF THE INTERNATIONAL ATOMIC ENERGY AGENCY IN SAFEGUARDS. Rometsch, R. (International Atomic Energy Agency, Vienna (Austria)). 1977.

From Symposium on the proliferation and the safeguarding of the peaceful application of nuclear power; The Hague, Netherlands (8 Dec 1976).

The safeguards agreements in the NPT framework are compared. Up to now 139 safeguards agreements have been concluded. All these safeguards requests have been developed in a consistent way by the Agency in a safeguards system laid down in the document INFCIRC/66, and its revisions in the form of guidelines for conclusion of safeguards agreements. Today 100 states have ratified the NPT Treaty. 63 have negotiated the concluded safeguards agreements in connection with the Treaty, out of which 45 have entered into force. 76 safeguards agreements have so far been concluded with states not party to NPT. Due to expiration or suspension in favour of a safeguards agreement in connection with NPT, the Agency is now applying safeguards pursuant to 43 agreements outside NPT. Plutonium management under IAEA auspices are discussed. During the next two decades the spread of plutonium in spent fuel or separated form, represents the greatest potential dissemination of the capacity to make nuclear explosives. A comprehensive non-proliferation regime around the Treaty on the Non-Proliferation of Nuclear Weapons is supported by a series of measures. Except for the export policy the IAEA plays a role in all of them and has a particular mandate to implement international safeguards.

2622 (LA--7838-MS) IRRADIATED FUEL MONITORING BY CERENKOV GLOW INTENSITY MEASUREMENTS. Dowdy, E.J.; Nicholson, N.; Caldwell, J.T. (Los Alamos Scientific Lab., NM (USA)). Sep 1979. Contract W-7405-ENG-36. 14p. Dep. NTIS, PC A02/MF A01.

Attribute measurement techniques for confirmation of declared irradiated fuel inventories at nuclear installations under safeguards surveillance are being investigated. High-gain measurements of the intensity of the Cerenkov glow from exposed assemblies in water-filled storage ponds are promising for this purpose. Such measurements have been made of Materials Testing Reactor plate-type fuel assemblies and Pressurized Water Reactor pin-type fuel assemblies. The measured intensities depend on cooling times as calculations predict.

2623 (LA--8103-M) SAVANNAH RIVER PLANT CALIFORNIUM-252 SHUFFLER ELECTRONICS MANUAL. Bourret, S.C.; Crane, T.W.; Eccleston, G.W.; Gallegos, E.A.; Garcia, D.L. (Los Alamos Scientific Lab., NM (USA)). Mar 1980. Contract W-7405-ENG-36. 32p. Dep. NTIS, PC A03/MF A01.

Detailed information is presented in this report, an electronics manual for the Savannah River Plant Shuffler, about the electronics associated with the various control and data acquisition functions of the Shuffler subsystems. Circuit diagrams, interconnection information, and details about computer control and programming are included.

2624 (LA-UR--79-3218) MONTE CARLO CALCULATIONAL DESIGN OF AN NDA INSTRUMENT FOR THE ASSAY OF WASTE PRODUCTS FROM HIGH ENRICHED URANIUM SPENT FUELS. Eccleston, G.W.; Schrandt, R.G.; MacDonald, J.L.; Cverna, F.H. (Los Alamos Scientific Lab., NM (USA)). 1979. Contract W-7405-ENG-36. 25p. (CONF-791117--4). Dep. NTIS, PC A02/MF A01.

From ANS topical conference; Kiawah Island, SC, USA (26 Nov 1979).

The Monte Carlo design of the waste assay region of a dual assay system, to be installed at the Fluorinal and Storage Facility, is described. The instrument will be used by the facility operator to assay high-enriched spent fuel packages and waste solids produced from dissolution of the fuels. The fissile content discharged in the waste is expected to vary between 0 and 400 g of ^{235}U. Material accountability measurements of the waste must be obtained in the presence of large neutron (0.5×10^6 n/s) and gamma (50,000 R/hr) backgrounds. The assay system employs fast-neutron irradiation of the sample, using a 5 mg ^{252}Cf source, followed by delayed neutron counting after the source is transferred to storage. Calculations indicate a +-4-g (2 sigma) assay for a waste canister containing 300 g of ^{235}U is achievable with an end-of-life (1 mg) ^{252}Cf source and a background rate of 0.5×10^6 n/s.

2625 (LA-UR--80-689) NONINTRUSIVE IRRADIATED FUEL INVENTORY CONFIRMATION TECHNIQUE. Dowdy, E.J.; Nicholson, N.; Caldwell, J.T. (Los Alamos Scientific Lab., NM (USA)). 1980. Contract W-7405-ENG-36. 6p. (CONF-800315--14). Dep. NTIS, PC A02/MF A01.

From 2. symposium of the European Safeguards Research and Development Association; Edinburgh, UK (26 Mar 1980).

Successful tests showing correlation between the intensity of the Cerenkov glow surrounding irradiated fuel assemblies in water-filled spent fuel storage ponds and the exposure and cooling times of assemblies have been concluded. Fieldable instruments used in subsequent tests confirmed that such measurements can be made easily and rapidly, without fuel assembly movement or the introduction of apparatus into the storage ponds.

2626 (LA-UR--80-1797) SCINTILLATOR SPENT FUEL MONITOR. Moss, C.E.; Nixon, K.V.; Bernard, W. (Los Alamos Scientific Lab., NM (USA)). 1980. Contract W-7405-ENG-36. 10p. (CONF-800655--7). NTIS, PC A02/MF A01.

From 21. annual meeting of the Institute of Nuclear Materials Management; Palm Beach, FL, USA (30 Jun 1980).

A monitor for rapidly measuring the gross gamma-ray flux immediately above spent fuel assemblies in underwater storage racks has been developed. It consists of a plastic scintillator, photomultiplier, collimator, and a small battery-powered electronics package. The crosstalk from an isolated fuel assembly to an adjacent void is only about 2%. The mean difference between the measured gamma-ray flux and the flux estimated from the declared burnup and cooling time with a simple formula is 22%.

2627 (MLM--2755(OP)) METHOD FOR CALIBRATION OF PLUTONIUM NDA. Lemming, J.F.; Campbell, A.R.; Rodenburg, W.W. (Mound Facility, Miamisburg, OH (USA)). 1980. Contract AC04-76DP00053. 5p. (CONF-790928--2). NTIS, PC A02/MF A01.

From International meeting on monitoring of Pu-contaminated waste; Ispra, Italy (25 Sep 1979).

Calibration materials characterized by calorimetric assay can be a practical alternative to synthetic standards for the calibration of plutonium nondestructive assay.

Calorimetric assay is an effective measurement system for the characterization because: it can give an absolute assay from first principles when the isotopic composition is known, it is insensitive to most matrix effects, and its traceability to international measurement systems has been demonstrated.

2628 (PB--296947, pp 492-496) RESPONSE TO A WIDESPREAD, UNAUTHORIZED DISPERSAL OF RADIOACTIVE WASTE IN THE PUBLIC DOMAIN. Wenslawski, F.A.; North, H.S. (Nuclear Regulatory Commission, Walnut Creek, CA). May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

In March 1976 State of Nevada radiological health officials became aware that radioactive items destined for disposal at a radioactive waste burial facility near Beatty, Nevada had instead been distributed to wide segments of the public domain. Because the facility was jointly licensed by the State of Nevada and the Federal Nuclear Regulatory Commission, both agencies quickly responded. It was learned that over a period of several years a practice existed at the disposal facility of opening containers, removing contents and allowing employees to take items of worth or fancy. Numerous items such as hand tools, electric motors, laboratory instruments, shipping containers, etc., had received widespread and uncontrolled distribution in the town of Beatty as well as lesser distributions to other locations. Because the situation might have had the potential for a significant health and safety impact, a comprehensive recovery operation was conducted. During the course of seven days of intense effort, thirty-five individuals became involved in a comprehensive door by door survey and search of the town. Aerial surveys were performed using a helicopter equipped with sensitive radiation detectors, while ground level scans were conducted using a van containing similar instrumentation. Aerial reconnaissance photographs were taken, a special town meeting was held and numerous persons were interviewed. The recovery effort resulted in a retrieval of an estimated 20 to 25 pickup truck loads of radioactively contaminated equipment as well as several loads of large items returned on a 40-foot flatbed trailer.

2629 (PB--296947, pp 497-503) HEALTH AND SAFETY IMPLICATION OF A WIDESPREAD, UNAUTHORIZED DISPERSAL OF RADIOACTIVE WASTE IN THE PUBLIC DOMAIN. North, H.S. Jr.; Wenslawski, F.A. (Nuclear Regulatory Commission, Walnut Creek, CA). May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

As a result of the distribution of contaminated and potentially contaminated articles and containers in the public domain, assessment of the possible threat to public health and safety was required. An extensive effort was made to identify radioisotopes and assess the hazard associated with the large number of items recovered during surveys. Exposure by direct radiation appeared minimal, and the majority of effort was devoted toward identifying potential internal exposures. Many of the recovered articles were intact obsolete military equipment with luminous radium facings. Other typical items included a plutonium contaminated balance scale and weights, a strontium-90 contaminated stainless steel plate, a centrifuge with carbon-14 and cobalt-60 contamination and a hoist assembly with plutonium contamination. A large number of specially fabricated waste containers which had previously been used to ship significant quantities of americium, plutonium and other nuclides were found in use for grain storage, water supply tanks and other applications. Sensitive gamma radiation surveys and smear and water samples identified no significant contamination in those tanks which had been located. Based on available information of isotopic identification and quantification, and location and use of contaminated items individuals with the highest potential for internal deposition were identified for whole body counting and bioassay. The results of whole body counting, including phoswich counts for plutonium and bioassays for tritium, carbon-14, strontium 89-90 and plutonium-238 and 239 did not yield any evidence of internal deposition. Two employees of the waste disposal facility indicated higher than usual tritium urine levels which returned to normal on resampling. Based on consideration of all factors, this uncontrolled release of contaminated waste in the public domain had no identifiable effect on the exposed population.

2630 ANALYSIS OF THE CONCENTRATE OF LIQUID HAW IN THE WAK. Berndt, J.; Berg, R.; Damerow, H.; Henn, K.H.; Schaarschmidt, U.; Weiler, W. (Gesellschaft zur Wiederaufarbeitung von Kernbrennstoffen m.b.H., Eggenstein-Leopoldshafen (Germany, F.R.)). pp 425-428 of Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht. Sektion 4: Brennstoffkreislauf und Spaltstoff-Flusskontrolle. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980). (In German)

From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).

ABSORPTION SPECTROSCOPY;ACTINIDES;ALPHA SPECTROSCOPY;BETA SPECTROMETERS;BURNUP;COMPUTER CODES;SCINTILLATION COUNTING;EMISSION SPECTROSCOPY;FISSION PRODUCTS;GAMMA SPECTROSCOPY;HIGH-LEVEL RADIOACTIVE WASTES; ISOTOPE DILUTION;LIQUID SCINTILLATION DETECTORS; MASS SPECTROSCOPY;QUANTITATIVE CHEMICAL ANALYSIS;REPROCESSING;SPENT FUELS;CHEMICAL ANALYSIS

2631 DETECTION OF FREE LIQUID IN DRUMS OF RADIOACTIVE WASTE. (to Dept. of Energy). US Patent Application 085,370. 16 Oct 1979. 20p.

A nondestructive thermal imaging method for detecting the presence of a liquid such as water within a sealed container is described. The process includes application of a low amplitude heat pulse to an exterior surface area of the container, terminating the heat input and quickly mapping the resulting surface temperatures. The various mapped temperature values can be compared with those known to be normal for the container material and substances in contact. The mapped temperature values show up in different shades of light or darkness that denote different physical substances. The different substances can be determined by direct observation or by comparison with known standards. The method is particularly applicable to the detection of liquids above solidified radioactive wastes stored in sealed containers.

2632 DIFFICULTY OF CLANDESTINELY BUILDING AN ATOMIC BOMB. Closs, K.D. Bild der Wissenschaft ; 16: No. 7, 68-75(Jul 1979). (In German).

Wherever breeder reactors and reprocessing are discussed there is a problem of serious

impact: the risk of proliferation, which means the spreading of nuclear weapons. But not only in the case of these two components of a future fuel cycle are there proliferation paths, points at which fissionable material might possibly be diverted. They exist from the uranium ore mine up to the depositing of burnt out fuel elements. However, the path from possessing uranium to the finished bomb is a long one, and it is paved with very great technical difficulties.

2633 STUDY OF GAMMA-RAY SPECTROSCOPY FOR SPENT-FUEL VERIFICATION AT THE BRUCE CANDU REACTORS. Lipsett, J.J.; Irvine, J.C.; Williams, W.J. (Atomic Energy of Canada, Ltd., Ontario). Transactions of the American Nuclear Society, Supplement ; 33: No. 1, 36(1979).
CANDU TYPE REACTORS;SPENT FUELS;GAMMA SPECTROSCOPY;SAFEGUARDS;SPENT FUEL STORAGE

2634 GAMMA SPECTROMETRIC MEASUREMENTS OF LWR POWER REACTOR SPENT FUEL. Kupryashkin, V. (International Atomic Energy Agency, Vienna, Austria); Haginoya, T.; Poroykov, V.; Dragnev, T.; Damjanov, B. Transactions of the American Nuclear Society, Supplement ; 33: No. 1, 38-40(1979).
WATER COOLED REACTORS;SPENT FUELS;GAMMA SPECTROSCOPY;ISOTOPE RATIO;BURNUP;PLUTONIUM; URANIUM;CESIUM 134;CESIUM 137;COOLING TIME; SPENT FUEL STORAGE;SAFEGUARDS

2635 URANIUM AND PLUTONIUM ASSAY OF CRATED WASTE BY GAMMA-RAY, SINGLES-NEUTRON, AND SLOW-NEUTRON COINCIDENCE COUNTING. Harlan, R.A. (Rockwell International, Golden, CO). Transactions of the American Nuclear Society, Supplement ; 33: No. 1, 50(1979).
URANIUM;PLUTONIUM;NUCLEAR REACTION ANALYSIS; RADIOACTIVE WASTES;SAFEGUARDS;COINCIDENCE SPECTROMETRY;NEUTRON DETECTORS;GAMMA DETECTION; NONDESTRUCTIVE ANALYSIS

2636 SAFEGUARDS SYSTEM OF BACK-END FACILITIES WITH EMPHASIS ON WASTE MANAGEMENT. Akimoto, Y. (Mitsubishi Metal Corp., Tokyo, Japan); Ishii, T.; Yamagami, S.; Shibata, T. Transactions of the American Nuclear Society, Supplement ; 33: No. 1, 60-61(1979).
SAFEGUARDS;ACCOUNTING;PLUTONIUM RECYCLE; RADIOACTIVE WASTE FACILITIES;FUEL REPROCESSING PLANTS;FUEL FABRICATION PLANTS

2637 CONTROL AND ACCOUNTABILITY OF SPECIAL NUCLEAR MATERIAL WASTE AND SCRAP BY GAMMA-SCAN ASSAY. East, L.V.; Gatti, R.; Wawrowski, S. (Canberra Nuclear Systems Division, Meriden, CT). pp 430-440 of Computers in activation analysis and gamma-ray spectroscopy. Carpenter, B.S.; D'Agostino, M.D.; Yule, H.P. (eds.). Washington, DC; Department of Energy (1979).
From Conference on computers in activation analysis and gamma-ray spectroscopy; Mayaguez, Puerto Rico (30 Apr 1978).
A commercially available system developed for rapid quantitative measurement of low- to medium-density waste material in small and large containers is described. Typical containers vary from 1 liter to 55 gal in capacity. The assay performed utilizes the transmission-corrected segmented gamma-ray technique. An overall description of the system and its capabilities is presented. 5 figures.

2638 DEVELOPMENT OF EDUCATIONAL MODULES FOR SAFEGUARDS AND NUCLEAR WASTE MANAGEMENT. O'Hara, F.A.; Wurm, K.J. (Battelle Columbus Lab., OH). Transactions of the American Nuclear Society ; 33: 122-123(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
SAFEGUARDS;RADIOACTIVE WASTE MANAGEMENT; EDUCATIONAL TOOLS;ACCOUNTING;PHYSICAL PROTECTION;NUCLEAR MATERIALS MANAGEMENT; RADIOACTIVE WASTE STORAGE;RADIOACTIVE WASTE DISPOSAL;HIGH-LEVEL RADIOACTIVE WASTES;LOW-LEVEL RADIOACTIVE WASTES

2639 CHAPTER 10. MULTINATIONAL AND INTERNATIONAL CONTROLS. PAPER 18. NUCLEAR PROLIFERATION: ARRANGEMENTS FOR INTERNATIONAL CONTROL. Rotblat, J. pp 271-286 of Nuclear energy and nuclear weapon proliferation. London; Taylor and Francis (1979).
From Stockholm International Peace Research Institute symposium; Stockholm, Sweden (12 Oct 1978).
In the context of nuclear proliferation, the role of Third World countries is crucial since they constitute the great majority of nations, but only a few of them have as yet decided on their future energy programmes. Both the IAEA and the nuclear energy industries are urging them to opt for nuclear power. This is undesirable, because nuclear energy is an unsuitable energy source for most of these countries; it would create a new economic dependence on industrialized countries and would greatly increase the dangers of a nuclear war. To counteract this, measures are needed (a) to encourage Third World countries to meet their energy need from sources other than nuclear ones; (b) to reduce pressures on countries to acquire nuclear reactors; and (c) to eliminate the threat of new hegemonies to countries that already have nuclear power. To achieve this, it is proposed that two new international organizations be set up. One, a World Energy Organization (WEO), would be a specialized agency of the United Nations, with functions similar to those of WHO or FAO but with sufficient funds to make loans to individual countries which accept WEO's advice about their energy programmes. The second, an International Nuclear Fuel Agency (INFA), would be the sole authority to operate enrichment, fuel fabrication, reprocessing and waste disposal plants. Organizationally, it could be part of the IAEA, but the latter would have to separate its promotional and safeguarding activities. An amendment to the NPT would be needed to oblige all countries both nuclear and non-nuclear weapon states, equally to accept INFA controls.

2640 PROCEEDINGS OF 20TH ANNUAL MEETING OF INSTITUTE OF NUCLEAR MATERIALS MANAGEMENT, 1979. (Inst of Nucl Mater Manage, Piketon, Ohio). Nuclear Materials Management ; 8: vp(1979).
The proceedings contain 83 papers, of which 72 are indexed separately. In general, papers deal with the field of nuclear materials management. Various aspects of safeguard systems are presented and new instrumentation and surveillance systems are discussed.

2641 SAFEGUARDS ASSESSMENT OF SPENT FUEL DISPOSAL ALTERNATIVES. Lessler, R.M.; Ahluwalia, A.S. (Bechtel Natl Inc, San Francisco, Calif). Nuclear Materials Management ; 8: 790-806(1979).
A study has been performed for Battelle's Office of Nuclear Waste Isolation (ONWI) to compare three spent fuel disposal alternatives

with the disposal of high level waste from spent fuel reprocessing. Assessments of these four cases have been made in several areas, including domestic safeguards. The study examines each case as a system, starting with spent fuel discharge from the reactor and ending with geologic disposal of wastes. 7 refs.

2642 UNITED STATES NUCLEAR REGULATORY COMMISSION AND THE AGREEMENT STATES: LICENSING STATISTICS AND OTHER DATA, JULY TO DECEMBER 1978. Washington, DC; Nuclear Regulatory Commission (1978). 30p. (NP--23904). The Publisher, Washington, DC.

Information and data are presented on the following topics: NRC materials licenses (December 1978); NRC materials licensees (December 1978); agreement states licenses (December 1978); agreement state licensees (December 1978); NRC and agreement state inspection data (July 1, 1978 to December 31, 1978); incidents and over-exposures (July 1, 1978 to December 31, 1978); leaking sources (July 1, 1978 to December 31, 1978); and waste disposal licensees (July 1, 1978 to December 31, 1978). (JGB)

Administrative and Regulatory

2643 (CONF-780506--(Vol.2), pp 797-803) EVOLUTION IN STRUCTURAL DESIGN METHODS FOR LARGE QUANTITY PACKAGES. Waymire, G.R. (Exxon Nuclear Co., Inc., Bellevue, WA). 1978.

From 5. symposium on packaging and transportation of radioactive materials; Las Vegas, NV, USA (7 May 1978).

The Nuclear Regulatory Commission (NRC) imposes formal criteria on the design of shipping containers through the regulations published in 10 CFR 71. These criteria include a series of normal and accident conditions which form key inputs to the structural design of large quantity packages, such as spent fuel transporters. This paper describes the key structural design areas which are of particular importance to a new spent fuel transporter design and highlights areas of uncertainty which may still exist in interpreting the regulations. Further definition in these areas of uncertainty through consensus standards or NRC Regulatory Guides would be of value to package designers and would improve package licensing schedules. The paper reviews previously acceptable methods for demonstrating the structural integrity of spent fuel transporters in which dynamic loads were evaluated using quasi-static methods and large safety factors. Existing criteria and guidelines are then reviewed following a discussion of several key issues which require definition and evaluation. Among these are a more complete definition of containment integrity, a cohesive set of requirements concerning codes and standards, a more complete definition of normal conditions of transport, better materials data for dynamic analysis and more fully defined and realistic load combinations. The paper also reviews existing R and D efforts by government and industry and finally concludes that the most cost-effective way to resolve and define the methods and guidance needed for regulatory purposes would be by joint industry-government participation which would be coordinated through a central program office. Through continued industry/government cooperation many of the regulatory problems posed above can be defined with sound technical bases - in a minimum time.

2644 (DOE/NE--0007(Supp.1)) PROPOSED RULEMAKING ON THE STORAGE AND DISPOSAL OF NUCLEAR WASTE. CROSS-STATEMENT OF THE UNITED STATES DEPARTMENT OF ENERGY. (Department of Energy, Washington, DC (USA)). 5 Sep 1980. 298p. NTIS, PC A13/MF A01.

The US DOE cross-statement in the matter of proposed rulemaking in the storage and disposal of nuclear wastes is presented. It is concluded from evidence contained in the document that: (1) spent fuel can be disposed of in a manner that is safe and environmentally acceptable; (2) present plans for establishing geological repositories are an effective and reasonable means of disposal; (3) spent nuclear fuel from licensed facilities can be stored in a safe and environmentally acceptable manner on-site or off-site until disposal facilities are ready; (4) sufficient additional storage capacity for spent fuel will be established; and (5) the disposal and interim storage systems for spent nuclear fuel will be integrated into an acceptable operating system. It was recommended that the commission should promulgate a rule providing that the safety and environmental implications of spent nuclear fuel remaining on site after the anticipated expiration of the facility licenses involved need not be considered in individual facility licensing proceedings. A prompt finding of confidence in the nuclear waste disposal and storage area by the commission is also recommeded. (DMC)

2645 (ER--77-2, pp 35-39) CONTROL: THE CAPABILITY AND COMMITMENT. Prince, A.T. (Atomic Energy Control Board, Ottawa, Ontario (Canada)). [nd].

Nuclear option for Canada. The renewable energy resources.

The activities of the Atomic Energy Control Board are described in such fields as licencing, security, safeguards, uranium resource management, radioactive waste management, radioactive contamination, nuclear liability, nuclear regulatory R and D, and planning for the future.

2646 (ORNL/TM--7262) OPERATING SAFETY REQUIREMENTS FOR THE INTERMEDIATE LEVEL LIQUID WASTE SYSTEM. (Oak Ridge National Lab., TN (USA)). Jul 1980. Contract W-7405-ENG-26. 38p. NTIS, PC A03/MF A01.

The operation of the Intermediate Level Liquid Waste (ILW) System, which is described in the Final Safety Analysis, consists of two types of operations, namely: (1) the operation of a tank farm which involves the storage and transportation through pipelines of various radioactive liquids; and (2) concentration of the radioactive liquids by evaporation including rejection of the decontaminated condensate to the Waste Treatment Plant and retention of the concentrate. The following safety requirements in regard to these operations are presented: safety limits and limiting control settings; limiting conditions for operation; and surveillance requirements. Staffing requirements, reporting requirements, and steps to be taken in the event of an abnormal occurrence are also described. (DC)

2647 (PB--299080) LICENSED FUEL FACILITY STATUS REPORT. VOLUME 1, NUMBER 3. DATA FOR DECISIONS, FUEL CYCLE OPERATIONS. STATUS SUMMARY REPORT. (Nuclear Regulatory Commission, Washington, DC (USA). Office of Inspection and Enforcement). Jul 1979. 77p. NTIS PC A05.

The Licensed Fuel Facility Status Report (NUREG-0430) is a periodic report routinely

providing information on licensed fuel facilities. This report identifies the licensee and the plant status, along with NRC inspection results and summaries through Dec. 31, 1978. The report includes licensee performance data as identified: (1) Licensee event reports as required by 10 CFR Parts 20, 40, 50, 70, 71 and 73 and by license conditions; (2) The quantities of radioactive materials released to the environment via gaseous or liquid effluent as required to be reported by 10 CFR 40.65 and 70.59; and (3) Inventory difference data, commonly referred to as 'MUF' (Material Unaccounted For), for those fuel cycle facilities which possess significant quantities of strategic special nuclear material or low enriched uranium. The time period covered by the data in this report is July 1, 1978 - December 31, 1978.

2648 (SAND--78-1332) STATE POLICIES AND REQUIREMENTS FOR MANAGEMENT OF URANIUM MINING AND MILLING IN NEW MEXICO. VOLUME III. ADVERSE EFFECTS OF URANIUM MINING AND MILLING ON THE PHYSICAL ENVIRONMENT. Tierney, M.S.; Vandevender, S.G. (Sandia National Labs., Albuquerque, NM (USA)). Aug 1979. Contract AC04-76DP00789. 173p. NTIS, PC A08/MF A01.

This volume contains two parts. The first part is a summary of issues. It complements the second part which is a program plan proposed by the New Mexico Environmental Improvement Division (NMEID) for the study and mitigation of environmental effects of uranium mining and milling. The NMEID program plan was begun when the lack of an adequate data base upon which the NMEID could base recommendations for new environmental laws and regulations applying to the uranium mining and milling industry was perceived. The NMEID planning document notes that, in the absence of adequate scientific data, State decisions regarding the regulation of the uranium industry may prove to be overly restrictive or not as restrictive as is necessary to assure protection of the public and the environment. To counter these tendencies, certain plans for cooperative studies involving Federal and State agencies are proposed. In particular, there is the need to improve the data base for determining population radiation exposure in affected areas and to evaluate the data needs for developing an ambient radon standard. It is concluded that the DOE's mission of energy development would be advanced by the provision of technical assistance and, in some cases, funds for certain State programs that demonstrably contribute to the State's ability to deal with Federal regulatory agencies as an informed, independent agent in regard to problems of uranium development.

2649 (UCID--18709) EARLY IDENTIFICATION OF TECHNICAL ISSUES: A SENSITIVITY STUDY TO CHECK LISTRA1A INTERNAL CONSISTENCY AND STRUCTURE. Harvey, T.F.; Maninger, R.C.; Rabsatt, S. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 13 Dec 1979. Contract W-7405-ENG-48. 22p. NTIS, PC A02/MF A01.

This report describes a sensitivity study using LISTRA1A, a model for use in the development of a long-range, time-dependent plan for licensing nuclear waste repositories. The objectives of the model are: (1) to provide information concerning the impact of various licensing strategies on the ability to dispose of nuclear waste effectively; and (2) to provide long-range budget forecasts for differing strategies of the Nuclear Regulatory Commission (NRC) and the Department of Energy (DOE). The model is designed to analyze the interaction between NRC regulatory policy and DOE technical programs. A sensitivity study is reported for a single parameter in a hypothetical review process.

2650 SITE-SPECIFIC EIS ORDERED BUT INJUNCTIVE RELIEF DEINED IN NUCLEAR WASTE STORAGE CASE. Barnhart y Chavez, S. Natural Resources Journal ; 20: No. 1, 173-177(Jan 1980).

The Energy Research and Development Administration (ERDA) received appropriations in 1976-77 to construct 22 tanks for storage of high level radioactive wastes generated by its nuclear weapons materials production program. The tanks were to replace older, leaking tanks at the Hanford Reservation in Richland, Washington and the Savannah River Plant in Aiken, South Carolina. The Natural Resources Defense Council (NRDC) had unsuccessfully requested that ERDA obtain a construction permit from the Nuclear Regulatory Commission (NRC). NRDC also petitioned NRC to exercise its licensing authority over the tanks under Section 202(4) of the Energy Reorganization Act of 1974. In response to the NRDC request, ERDA claimed the tanks were only for short-term storage and therefore a license was unnecessary. NRC claimed it lacked jurisdiction over the tanks. NRDC filed suit in United States District Court for the District of Columbia, alleging that ERDA had violated Section 102(2)(C) of the National Environmental Policy Act, and that both ERDA and NRC had violated Section 202(4) of the Energy Reorganization Act. NRDC requested an injunction against further construction of the tanks. Although ERDA did not have to obtain an NRC construction permit for the nuclear waste storage tanks at Hanford Reservation and Savannah River Plant, the programmatic Environmental Impact Statement submitted was insufficient and site-specific statements must be prepared. Injunctive relief pending the statements was denied for the social and economic costs of delaying the tanks project. NRC decisions even remotely connected to its licensing power should be contested in federal courts of appeals, not district courts. The court gave NRDC a hollow victory by ordering a more specific EIS, but denying an injunction.

2651 LICENSING AND REGULATION OF NUCLEAR WASTE. Shapar, H.K. (National Research Council, Washington, DC (USA)). No. 23, 78-90(Jun 1979). (In English, French).

This analysis of the licensing and regulation of nuclear waste in the US is confined mainly to the regulatory role of the Nuclear Regulatory Commission (NRC) regarding nuclear waste, including interactions with other Federal Agencies and States. It focusses on existing statutory authority and current proposals for licensing and regulation of radioactive waste. The NRC's authority derives from the amended 1954 Atomic Energy Act, the National Environmental Policy Act and the 1974 Energy Reorganization Act, and more recently, from the 1978 Uranium Mill Tailings Radiation Control Act. The Department of Energy (DOE), and the Environmental Protection Agency (EPA) have responsibility for radioactive waste storage and disposal together with the NRC; other Federal Agencies are also involved to some extent.

2652 WASTE ISOLATION PILOT PLANT. Washington, DC: US Government Printing Office (1979). 42p.

Testimony from DOE witnesses relating to the Waste Isolation Pilot Plant near Carlsbad, NM, is recorded. Topics covered include: the power of the State of New Mexico to stop construction

or operation of the project at any stage; the DOE authorization bill, and licensing of the project by the DOE and the NRC. (DC)

2653 ""URANIUM MILL REGULATION FOR COLORADO--RATIONALE AND EFFECTIVENESS"". Montgomery, J.L. (Colo Dep of Health, Denver). pp 367-373 of Uranium resource/technology seminar 2, 1979. Golden, CO; Colorado School of Mines (1979).
From Uranium resource technology seminar; Golden, CO, USA (12 Mar 1979).
This paper discusses the current laws, regulations and policies governing uranium mills in Colorado. A brief review of public heaslth and environmental impacts is presented followeid by a description of the mill aipplication review process.

2654 NUCLEAR WASTE AND NUCLEAR REGULATORY COMMISSION LICENSING. Smith, A.L. Natural Resources Journal ; 18: No. 1, 217-220(Jan 1978).
The Nuclear Regulatory Commission (NRC) must consider the environmental effects of nuclear wastes before issuing operating licenses to nuclear power plants. The NRC must address the problem either in individual licensing proceedings or in generic administrative proceedings in which the NRC makes decisions or rules concerning the future issuance of licenses. Any decision or rule so made must be supported by an administrative record that indicates the issue of nuclear waste disposal has been thoroughly ventilated. Natural Resources Defense Council v. US Nuclear Regulatory Commission, 547 F.2d 633 (D.D.C. 1976), cert. granted, 429 US 1090 (1977).

2655 NEAR-SURFACE HEATER EXPERIMENTS IN ARGILLACEOUS ROCKS. Tyler, L.D.; Cuderman, J.F.; Krumhansl, J.L.; Lappin, A. (Sandia Labs., Albuquerque, NM (USA)). pp 31-43 of In situ heating experiments in geological formations. Seminar, Ludvika, Sweden, 13-15 Sep 1978. Proceedings. Paris, France; OECD (1978).
Full-scale near-surface heater experiments are presently being conducted by Sandia Laboratories in the Conasauga Formation at Oak Ridge, Tennessee, and in the Eleana Formation on the Nevada Test Site, Nevada. The purposes of these experiments are: 1) to determine if argillaceous media can withstand thermal loads characteristic of high level waste; 2) to provide data for improvement of thermomechanical modeling of argillaceous rocks; 3) to identify instrumentation development needed for further in situ testing; and 4) to identify unexpected general types of behavior, if any. The basic instrumentation of these tests consists of a heater in a central hole, surrounded by arrays of holes containing various instrumentation. Temperatures, thermal profiles, vertical displacements, volatile pressurization, and changes in in situ stresses are measured in each experiment as a function of time, and compared with pretest modeling results. Results to date, though in general agreement with modeling results assuming conductive heat transfer within the rock, indicate that the presence of even small amounts of water can drastically affect heat transfer within the heater hole itself and that small amounts of upward convection of water may be occurring in the higher temperature areas of the Conasauga experiments.

2656 REGULATIONS CONCERNING THE REPROCESSING BUSINESS OF SPENT FUELS. pp 45/45/63/3-45/45/63/35 of Genshiryoku kankei hokishu. V. 1(Pt.2). Tokyo, Japan; Taisei (1978). (In Japanese)
In compliance with ""The law for the regulations of nuclear source material, nuclear fuel material and reactors"" these regulations prescribe concerning reprocessing facilities: The procedures to apply for the approval of the design and method of construction and the approval of the change thereof; as well as the procedure to apply for the inspection of the facilities, and details of the inspection (in sections 2-6). After that, the regulations require the enterpriser of reprocessing business to keep necessary records and take necessary measures for safety concerning the facilities, operation of reprocessing equipments, and transportation, storage on disposal of used fuel, materials separated therefrom or materials contaminated by either of them (in sections 8-16). Further, the regulations prescribe the procedure to apply for the approval of the safety rule required to the enterpriser of reprocessing business by above mentioned law and specifies items which should be included into the rule (section 17). Moreover, the regulations require the enterpriser to submit reports of each use of the internationally controllled material and specifies the items which should be included into these reports (section 19).

FUSION FUELS

Processing

Reprocessing

2657 REMOVAL OF TRITIUM AND TRITIUM-CONTAINING COMPOUNDS FROM A GASEOUS STREAM. Collins, M.F.; Michalek, R. (to Engelhard Minerals and Chemicals Corp.). US Patent 4,178,350. 11 Dec 1979. Filed date 27 Aug 1973. 8p.
Tritiated species, e.g., tritium, tritiated water, and/or tritiated hydrocarbons, are removed from gas streams containing these by reacting the same over a precious metal ca^{3}alyst with sufficient air or oxygen to insure conversion of all tritiated species to tritiated water and, if hydrocarbons are present in the gaseous feedstock, carbon dioxide. The tritiated water and any other moisture that might be present in the reaction effluent are next adsorbed by a desiccant dryer, preferably to a level of less than one part per million. Most desirably, the desiccant dryer effluent is then diluted with non-radioactive water such that the tritiated water is diluted by a factor of at least about 1,000 to 1; the resulting water mixture can be adsorbed from the diluted effluent by a second desiccant dryer to provide a value in the ultimate effluent gas of less than about one-half parts per billion tritiated water.

Health and Safety

2658 (ORNL--5308, pp 56-64) ENVIRONMENTAL HEALTH STUDIES. Easterly, C.E.; Shank, K.E. Jul 1978.
Health physics division annual progress report for period ending June 30, 1977.
The two major thrusts of the environmental health studies have been in the areas of health physics aspects of fusion power and methodology for assessing health effects related to nuclear facilities. Researchers were unable to discern

a dose-response relationship or to find adverse health effects in the local population around nuclear facilities which might be related to radiation exposure. A second study analyzed the trends in incidence of cancer, congenital malformation, and fetal and infant mortality for Oak Ridge, Anderson County, and Roane County relative to Tennessee. Finally, a more in-depth study on congenital malformations and fetal mortality trends for nine East Tennessee counties surrounding Oak Ridge was completed. The objective of the Health Physics Aspects of Fusion Power Program is to provide, on a timely basis, scientific information and technical evaluations on the potential impacts of fusion power to occupational workers and to members of the public. The primary areas of study in this program during the past year have been (1) factors affecting calculations of dose resulting from a release of tritium, (2) an assessment of the potential for reducing occupational risk from exposures to tritium, and (3) experimental studies of tritium conversion from molecular hydrogen to tritiated water.

Waste Management

2659 (BNL--27784) HYPERFUSE: A NOVEL INERTIAL CONFINEMENT SYSTEM UTILIZING HYPERVELOCITY PROJECTILES FOR FUSION ENERGY PRODUCTION AND FISSION WASTE TRANSMUTATION. Makowitz, H.; Powell, J.R.; Wiswall, R. (Brookhaven National Lab., Upton, NY (USA)). 1980. Contract AC02-76-CH00016. 14p. (CONF-800446--4). NTIS, PC A02/MF A01.

From 2. international conference on emerging nuclear energy systems; Lausanne, Switzerland (8 Apr 1980).

Parametric system studies of an inertial confinement fusion (ICF) reactor system to transmute fission products from an LWR economy have been carried out. The ICF reactors would produce net power in addition to transmuting fission products. The particular ICF concept examined is an impact fusion approach termed HYPERFUSE, in which hypervelocity pellets, traveling on the order of 100 to 300 km/sec, collide with each other or a target block in a reactor chamber and initiate a thermonuclear reaction. The DT fusion fuel is contained in a shell of the material to be transmuted, e.g., ^{137}Cs or ^{90}Sr. The 14-MeV fusion neutrons released during the pellet burn cause transmutation reactions (e.g., (n, 2n), (n, α), etc.) that convert the long lived fission products (FP's) either to stable products or to species that decay with a short half-life to a stable product.

2660 (BNL--28067) HYPERFUSE: A HYPERVELOCITY INERTIAL CONFINEMENT SYSTEM FOR FUSION ENERGY PRODUCTION AND FISSION WASTE TRANSMUTATION. Makowitz, H.; Powell, J.R.; Wiswall, R. (Brookhaven National Lab., Upton, NY (USA)). 1980. Contract AC02-76CH00016. 19p. (CONF-800743--7). NTIS, PC A02/MF A01.

From International conference on nuclear waste transmutation; Austin, TX, USA (22 Jul 1980).

Parametric system studies of an inertial confinement fusion (ICF) reactor system to transmute fission products from an LWR economy have been carried out. The ICF reactors would produce net power in addition to transmuting fission products. The particular ICF concept examined is an impact fusion approach termed HYPERFUSE, in which hypervelocity pellets, traveling on the order of 100 to 300 km/sec, collide with each other or a target block in a reactor chamber and initiate a thermonuclear reaction. The DT fusion fuel is contained in a shell of the material to be transmuted, e.g., ^{137}Cs, ^{90}Sr, ^{129}I, ^{99}Tc, etc. The 14-MeV fusion neutrons released during the pellet burn cause transmutation reactions (e.g., (n,2n), (n,α), (n,γ), etc.) that convert the long-lived fission products (FP's) either to stable products or to species that decay with a short half-life to a stable product. The transmutation parametric studies conclude that the design of the hypervelocity projectiles should emphasize the achievement of high densities in the transmutation regions (greater than the DT fusion fuel density), as well as the DT ignition and burn criterion (rho R=1.0 to 3.0) requirements.

2661 (UCRL--82969) BURNING NUCLEAR WASTES IN FUSION REACTORS. Meldner, H.W.; Howard, W.M. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 20 Feb 1980. Contract W-7405-ENG-48. 5p. (CONF-791058--66). Dep. NTIS, PC A02/MF A01.

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

We have studied actinide burn-up in ICF reactor pellets; i.e., 14 MeV neutron fission of the very long-lived actinides that pose storage problems. A major advantage of pellet fuel region burn-up is safety: only milligrams of highly toxic and active material need to be present in the fusion chamber, whereas blanket burn-up requires the continued presence of tons of actinides in a small volume. The actinide data tables required for Monte Carlo calculations of the burn-up of ^{241}Am and ^{243}Am are discussed in connection with a study of the sensitivity to cross section uncertainties. More accurate and complete cross sections are required for realistic quantitative calculations.

2662 ZIRCONOLITE - A FLUORITE-RELATED SUPERSTRUCTURE. Rossell, H.J. (Commonwealth Scientific and Industrial Research Organization, Melbourne (Australia)). Nature (London) : 283: No. 5744, 282-283(17 Jan 1980).

CALCIUM OXIDES;CRYSTAL STRUCTURE; MONOCRYSTALS;ORDER PARAMETERS;POWDERS; RADIOACTIVE WASTE PROCESSING;SOLID SOLUTIONS; SUPERLATTICES;TITANIUM OXIDES;X-RAY DIFFRACTION; ZIRCONIUM OXIDES

2663 HANDBOOK OF HAZARDOUS WASTE MANAGEMENT. Metry, A.A. Westport, CT; Technomic Publishing Company, Inc. (1980). 451p.

The contents of this work are arranged so as to give the reader a detailed understanding of the elements of hazardous waste management. Generalized management concepts are covered in Chapters 1 through 5 which are entitled: Introduction, Regulations Affecting Hazardous Waste Management, Comprehensive Hazardous Waste Management, Control of Hazardous Waste Transportation, and Emergency Hazardous Waste Management. Chapters 6 through 11 deal with treatment concepts and are entitled: General Considerations for Hazardous Waste Management Facilities, Physical Treatment of Hazardous Wastes, Chemical Treatment of Hazardous Wastes, Biological Treatment of Hazardous Wastes, Incineration of Hazardous Wastes, and Hazardous Waste Management of Selected Industries. Chapters 12 through 15 are devoted to ultimate disposal concepts and are entitled: Land Disposal Facilities, Ocean Dumping of Hazardous Wastes, Disposal of Extremely Hazardous Wastes, and Generalized Criteria for Hazardous Waste Management Facilities. (BLM)

NUCLEAR POWER PLANTS

2664 (EMD--80-67) EXISTING NUCLEAR SITES CAN BE USED FOR NEW POWERPLANTS AND NUCLEAR WASTE STORAGE. Staats, E.B. (General Accounting Office, Washington, DC (USA)). 1 Apr 1980. 32p. General Accounting Office, Washington, DC.

Locating future nuclear powerplants at existing sites offers important advantages which warrant consideration by the Nuclear Regulatory Commission. The number of locations committed to long-term restricted use and periodic surveillance and maintenance could be limited. The burden of long-term care and final disposition of retired nuclear powerplants could be eased. Overall environmental impacts from the construction and operation of the powerplants could be reduced. Time and money in completing licensing proceedings could be saved. GAO also found that low-level wastes can be stored at nuclear powerplant sites, but such storage only postpones the inevitable need for disposal. Finally, permanent waste disposal at powerplant sites should only be permitted when sites conform to the national low-level waste disposal plan being prepared by the Department of Energy.

2665 (ER--77-2, pp 30-34) NUCLEAR POWER OPTION - PROBLEMS AND CONSTRAINTS. Wynne-Edwards, H.R. (British Columbia Univ., Vancouver (Canada). Dept. of Geological Sciences). [nd].

Nuclear option for Canada. The renewable energy resources.

Some ethical and public perception problems related to nuclear power and radioactive waste disposal are dealt with.

2666 (INIS-mf--4620) CURRENT CHALLENGES TO U.S. NUCLEAR FUEL CYCLE POLICIES: ARGUMENTS AND TACTICS. Freeman, G.C. Jr. (Hunton and Williams, Richmond, VA (USA)). 1978. 23p. (CONF-780584--19). Dep. NTIS (US Sales Only), PC A03/MF A01.

From International conference on regulating nuclear energy; Brussels, Belgium (16 May 1978).

The nuclear debate has become virulent in the United States in recent years. Opponents of nuclear power have developed the debate in Congress, in Federal Courts and Federal Agencies which are the principal forums. They use mass media, elaborate strategies, adopt arguments and tactics of a political, economic and technical nature. This paper examines several aspects of their intervention in the nuclear decision-making process of the authorities.

2667 (INIS-mf--5198) ENERGY FOR TOMORROW - PLANNING OF TODAY. NO. 1. Goergmaier, D.; Scholz, L.; Bayer, A.; Schmidtner, F.X.; Gottschlich, H.; Reiter, K.; Birkhofer, A.; Mansfeld, G.; Hofrichter, E.; Renn, O. (Bayerische Landeszentrale fuer Politische Bildungsarbeit, Muenchen (Germany, F.R.)). 1978. vp. (In German). Dep. NTIS (US Sales Only), PC A09/MF A01.

The present book, which has many maps and coloured illustrations, shows the many facets of the Federal Republic of Germany and EC energy policy. Apart from the fundamental problem of economic growth and future energy demand, present alternatives to nuclear power are presented and the limitations of primary energy carriers are pointed out. A team of twelve authors from science research, industry, and administrative authorities introduces the reader to all problems of nuclear power, from the basics of reactor functioning to reactor types, siting, and reactor technology. Problems of environmental protection (immission protection, avoiding water pollution and heat-up, local climate, etc.) are discussed in detail in the context of power generation from coal and nuclear energy.

2668 (NP--25098) ILLINOIS AND NUCLEAR ENERGY. Etchison, D. (Illinois State House Republican Committee, Springfield (USA)). Jun 1978. 51p. TIC.

Information is presented concerning a historical perspective of nuclear energy in Illinois; and the Illinois nuclear scene in 1977-1978.

2669 WORLD NUCLEAR ENERGY PATHS. Connolly, T.J.; Hansen, U.; Jaek, W.; Beckurts, K.H. New York, NY; International Consultative Group on Nuclear Energy (1979). 195p. The Rockefeller Foundation, P.O. Box 1265, Radio City Station, New York, NY 10019.

In examing the world nuclear energy paths, the following assumptions were adopted: the world economy will grow somewhat more slowly than in the past, leading to reductions in electricity demand growth rates; national and international political impediments to the deployment of nuclear power will gradually disappear over the next few years; further development of nuclear power will proceed steadily, without serious interruption but with realistic lead times for the introduction of advanced technologies. Given these assumptions, this paper attempts a study of possible world nuclear energy developments, disaggregated on a regional and national basis. The scenario technique was used and a few alternative fuel-cycle scenarios were developed. Each is an internally consistent model of technically and economically feasible paths to the further development of nuclear power in an aggregate of individual countries and regions of the world. The main purpose of this modeling exercise was to gain some insight into the probable international locations of reactors and other nuclear facilities, the future requirements for uranium and for fuel-cycle services, and the problems of spent-fuel storage and waste management. The study also presents an assessment of the role that nuclear power might actually play in meeting future world energy demand. (MCW)

2670 Atomnaya ehnergetika. (NUCLEAR ENERGY. INTRODUCTION TO THE CONCEPTS, SYSTEMS, AND APPLICATIONS OF NUCLEAR PROCESSES). Murray, R.L. (North Carolina State Univ., Raleigh ; USA). Dept. of Nuclear Engineering). Moscow; Ehnergiya (1979). 280p. (In Russian).

The summary of some problems of nuclear science, technology, power and medicine is presented in a popular form. The first part of the book is devoted to the basis of nuclear physics. Structure of atoms and nuclei, radioactivity, effect of radiation of materials, physical properties of fission processes and nuclei fusion are considered in this part. The second part is devoted to nuclear devices. The accelerators of elementary particles, systems of isotope separation, radiation monitoring devices, fusion and fission reactors are considered. The effect of radiation on living organisms, radiation protection and safety with the use of nuclear devices are described in detail in the third part. The conclusion is made that the

application of nuclear energy in various branches is justified in spite of the possible danger.

2671 EFFECTS OF PROPOSED CHANGES IN REGULATIONS ON LOW-LEVEL RADWASTE SHIPMENTS. Mallory, C.W. (Hittman Nuclear and Development Corp., Columbia, MD). Transactions of the American Nuclear Society ; 33: 765-766(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
NUCLEAR POWER PLANTS;RADIOACTIVE WASTES; SPENT FUEL CASKS;CONTAINERS;SPECIFICATIONS; REGULATIONS;ACTIVITY LEVELS

Power Reactors, Non-Breeding, Light-Water Moderated, Boiling Water Cooled

2672 (BLG--524) ANNUAL SCIENTIFIC REPORT 1977. Proost, J.; Billiau, R.; Kirk, F. (eds.). (Centre d'Etude de l'Energie Nucleaire, Mol (Belgium)). 1978. vp. Dep. NTIS (US Sales Only), PC A09/MF A01.
This report of the Centre d'Etude de l'Energie Nucleaire - Studiecentrum voor Kernenergie gives a survey of the scientific and technical work done in 1977. The research areas are: 1. The sodium cooled fast reactors and namely the mixed oxide fuels, the carbide fuel, the materials development, the reprocessing, the fast reactor physics, the safety and instrumentation and the sodium technology. 2. The gas cooled reactors as gas cooled fast and high temperature reactors. 3. The light water reactors namely the BR3 reactor, the light water reactor fuels and the plutonium recycling. 4. The applied nuclear research, waste conditioning and disposal as the safeguards, the fusion research and the lithium technology. 5. The basic and exploraty research namely the materials science and the nuclear physics and finally 6. Non-nuclear reseach and development such as the air pollution, the pollution abatement and waste handling, the fuel cells and applied electrochemistry.

2673 (DNS-D--1-016(Vol.7)) TECHNICAL STUDY FOR THE CHEMICAL CLEANING OF DRESDEN-1 DNS-D1-016. VOLUME VII. APPENDICES IX THRU XIV. (Dow Chemical Co., Midland, MI (USA)). 15 Jun 1977. Contract AC02-76ET34205. 130p. NTIS, PC A07/MF A01.
Portions of document are illegible.
Appendices are presented which contain information concerning the decontamination of Dresden-1; consultant's opinions; proceedings of the American Power Conference, Volume 37, 1975; health physics reports; toxicological properties and industrial handling hazards of Dow solvent NS-1; and expected radiation dose rates in the new Dresden station radioactive waste processing building.

2674 (DP-MS--80-24) ECONOMICS OF SPENT LWR FUEL STORAGE. Clark, H.J.; O'Neill, G.F. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract AC09-76SR00001. 6p. (CONF-800901--1). NTIS, PC A02/MF A01.
From Symposium on intermediate range atmospheric transport processes and technology assessment; Gatlinburg, TN, USA (29 Sep 1980).
A power reactor operator, confronted with rising spent fuel inventories that would soon exceed his storage capacity, has to decide what to do with this fuel if he wants to continue reactor operations. A low cost option would be to ship excess fuel from the overburdened reactor to another reactor in the utility's system that has available space. The only cost would be for cask leasing and shipping. Three other alternatives all require considerable capital expenditures: reracking, new at-reactor (AR) basins for storage, and away-from-reactor (AFR) basins for storage. Economic considerations for each of the alternatives are compared.

2675 (INIS-mf--5666) QUARTERLY REPORT FROM THE SWEDISH NUCLEAR POWER INSPECTORATE JUL - SEP 1979. (Statens Kaernkraftinspektion, Stockholm (Sweden)). 1979. 20p. (In Swedish). NTIS (US Sales Only), PC A02/MF A01.
Thesis.
Brief reports of the operation of the six nuclear power plants in service in Sweden together with basic operating statistics are given. The Swedish research reactors (two), the fuel fabrication plant, transport of radioactive materials and radioactive waste storage are also covered.

2676 (PNL-SA--7381) IMPACT OF LWR DECONTAMINATION ON RADWASTE SYSTEMS. Perrigo, L.D.; Divine, J.R. (Battelle Pacific Northwest Labs., Richland, WA (USA)). 1979. Contract EY-76-C-06-1830. 13p. (CONF-790313--5). Dep. NTIS, PC A02/MF A01.
From NACE/Corrosion 1979 meeting; Atlanta, GA, USA (12 Mar 1979).
Increased radiation levels around certain reactors in the United States and accompanying increases in personnel exposures are causing a reexamination of options available to utilities to continue operation. One of the options is decontamination of the primary system to reduce radiation levels. The Battelle-Northwest study of decontamination and its impact on radwaste systems has been directed towards existing reactors and allied systems as they are employed during their operational lifetimes. Decommissioning and cleanup during such work are not within the scope of this project although certain processes and waste systems might be similar. Rupture debris cleanup represents a special situation that requires different design features and concepts and it is not a part of this study.

2677 (PNL-SA--7535) IMPACT OF DECONTAMINATION ON LWR RADIOACTIVE WASTE TREATMENT SYSTEMS. Hoenes, G.R.; Perrigo, L.D.; Divine, J.R.; Faust, L.G. (Battelle Pacific Northwest Labs., Richland, WA (USA)). 1979. Contract EY-76-C-06-1830. 34p. (CONF-790923--10). Dep. NTIS, PC A03/MF A01.
From Decontamination and decommissioning of nuclear facilities conference; Sun Valley, ID, USA (16 Sep 1979).
Only at N-Reactor is there a means to accommodate radwaste produced during decontamination. The Dresden system is expected to be ready to accommodate such solutions by the summer of 1979. Solidification of the processed decontamination waste may be a significant problem. There is doubt that the materials in current radwaste treatment systems can handle chemicals from a concentrated process. The total storage volume, for concentrated decontamination, is not sufficient in existing radwaste treatment systems. Greater attention should be placed on designing reactors and radwaste treatment systems for decontamination. A means of handling waste material resulting from leaks in the primary system during the decontamination must be

developed. On-site storage of solidified decontamination wastes may be a viable option, but license amendments will be necessary.

2678 (UCRL--15186) SPENT FUEL DATA BASE: COMMERCIAL LIGHT WATER REACTORS. Hauf, M.J.; Kniazewycz, B.G. (TERA Corp., Berkeley, CA (USA)). Dec 1979. Contract W-7405-ENG-48. 309p. Dep. NTIS, PC A14/MF A01.
As a consequence of this country's non-proliferation policy, the reprocessing of spent nuclear fuel has been delayed indefinitely. This has resulted in spent light water reactor (LWR) fuel being considered as a potential waste form for disposal. Since the Nuclear Regulatory Commission (NRC) is currently developing methodologies for use in the regulation of the management and disposal of high-level and transuranic wastes, a comprehensive data base describing LWR fuel technology must be compiled. This document provides that technology baseline and, as such, will support the development of those evaluation standards and criteria applicable to spent nuclear fuel.

2679 PUBLICATION BY THE STATE MINISTER FOR AREA DEVELOPMENT AND ENVIRONMENT AFFAIRS OF THE PROJECT OF RHEINISCH-WESTFAELISCHES ELEKTRIZITAETSWERK AG, BAYERNWERK AG, KERNKRAFTWERK GUNDREMMINGEN VERWALTUNGSGESELLSCHAFT MBH, GUNDREMMINGEN, KRAFTWERK UNION AG, FRANKFURT, AND HOCHTIEF AG, FRANKFURT, TO INCREASE THE STORAGE CAPACITY FOR SPENT FUEL ELEMENT CLUSTERS AT KERNKRAFTWERK GUNDREMMINGEN II BY INSTALLING COMPACT STORAGE RACKS. DATED APRIL 15, 1980. Bundesanzeiger ; 32: No. 76, 7(Apr 1980). (In German).
FUEL POOLS;GUNDREMMINGEN-2 REACTOR;LICENSING; SPENT FUEL STORAGE

2680 OPTIMUM FUEL LOADING AND OPERATION PLANNING FOR LIGHT WATER REACTOR POWER STATIONS. PART II: BOILING WATER REACTOR CASE STUDY. Hoshino, T. (Kyoto Univ., Gokanosho, Japan). Nuclear Technology ; 47: No. 3, 421-435(Mar 1980).
An extended application of the FAPMAN planning model has been made to typical boiling water reactor (BWR) fuel loading and generation planning problems. The additional constraint on reactive fuel loading pertinent to BWRs was implemented, together with some improvements on the back-end fuel cycle economic model and the gradient projection method of searching for better generation plans. The flexibility of the FAPMAN planning tool has been demonstrated in numerical studies made in several degrees of optimization, for disposal or reprocessing options in the back end of the fuel cycle and for the bounded or free refueling cycle length.

2681 PUBLICATION OF THE 5TH PARTIAL LICENSE TO INCREASE THE STORAGE CAPACITY OF THE FUEL STORAGE POOL OF KERNKRAFTWERK ISAR. Bundesanzeiger ; 32: No. 57, 2(Mar 1980). (In German).
FUEL POOLS;ISAR REACTOR;LICENSING;OPERATING LICENSES;OPTIMIZATION;SPENT FUEL STORAGE

2682 ACTIVE CARBON FILTERS FOR WASTE GAS DECONTAMINATION IN NUCLEAR POWER STATIONS, AND EXCHANGE OF CONTAMINATED CARBON. Looser, W. (Brown, Boveri and Co. Ltd., Baden (Switzerland)). Neue Technik ; 22: No. 3, 34-35(Mar 1980). (In German).
Active carbon filters for removing noble gas fission products from waste gases of boiling water reactors are described. It is stated that a 1000 MW nuclear power station may require 60 to 80 tons of filter carbon, distributed in five cascade-connected conical filter containers. Up to 20 Kg of radioactive carbon may have to be removed at a time, and the precautions necessary in handling this material are described in detail. The filters themselves are normally run under slight vacuum. Storage of used carbon for some weeks or months, in concrete vats, is recommended and it is suggested that exposure of personnel during carbon change is of the order of 3 mrem per 200 liter waste container.

2683 FISSION GAS RELEASE IN LWR FUEL RODS EXHIBITING VERY HIGH BURN-UP. Carlsen, H. (Risoe National Lab. (Denmark). Metallurgy Dept). Nuclear Engineering and Design ; 56: No. 1, 183-187(Feb 1980).
From IAEA specialists' meeting on fuel element performance computer modelling; Blackpool, UK (13 - 17 Mar 1978).
Two UO_2-Zr BWR type test fuel rods were irradiated to a burn-up of about 3800 MWd/tUO_2. After non-destructive characterization, the fission gas released to the internal free volume was extracted and analysed. The irradiation was simulated by means of the Danish fuel performance code WAFER-2, which uses an empirical gas release model combined with a strongly burn-up dependent correction term, developed by the US Nuclear Regulatory Commission. The paper presents the experimental results and the code calculations. It is concluded that the model predictions are in reasonable agreement (within 15%) with the experimental results. No similar agreement could be obtained without the burn-up dependency of the release model.

2684 MECHANISTIC PREDICTION OF TRANSIENT FISSION-GAS RELEASE FROM LWR FUEL. Rest, J.; Gehl, S.M. (Argonne National Lab., IL (USA). Materials Science Div.). Nuclear Engineering and Design ; 56: No. 1, 233-256(Feb 1980).
From IAEA specialists' meeting on fuel element performance computer modelling; Blackpool, UK (13 - 17 Mar 1978).
The steady-state and transient gas release and swelling subroutine (GRASS-SST) is a mechanistic computer code for the prediction of fission-gas behavior in UO_2-base fuels. GRASS-SST treats fission-gas release and fuel swelling on an equal basis and simultaneously treats all major mechanisms that influence fission-gas behavior. The GRASS-SST transient analysis has evolved through comparisons of code predictions with the fission-gas release and physical phenomena that occur during reactor operation and transient direct-electrical heating (DEH) testing of irradiated light-water reactor fuel. The GRASS-SST steady-state analysis has undergone verification for end-of-life fission-gas release and intragranular bubble-size distributions. The results of GRASS-SST predictions for transient fission-gas release during DEH tests are in good agreement with experimental data. Comparisons of GRASS-SST predictions of gas release and bubble-size distributions with the results of DEH transient tests indicate that (1) coalescing bubbles do not have sufficient time to grow to equilibrium size during most transient conditions, (2) mobilities of fission-gas bubbles in UO_2 are enhanced nonequilibrium conditions if the excess pressure in the bubble is sufficient to generate an equivalent stress greater or equal to the yield stress of the surrounding matrix, and (3) channel formation on grain surfaces and coalescence of the channels with each other and with the tunnels of gas along the grain edges can contribute to

grain-boundary separation and/or the rapid, long-range interconnection of porosity. The phenomena of grain-boundary separation and/or long-range interconnection of porosity provides an important release mechanism for fission gas that has moved out of the grains of irradiated fuel.

2685 TREATMENT OF NUCLEAR DRAIN WASTES WITH AN ELECTRO MAGNETIC FILTER AND ULTRAFILTRATION SYSTEM. Kurihara, Y.; Oda, M.; Okugawa, K.; Sunaoka, Y.; Kleper, M.H.; Markind, J.; Goldsmith, R.L.; Ryan, J.M. (Jpn At Power Co, Tokyo). Industrial Water Engineering ; 17: No. 1, 14-19(Jan-Feb 1980).
The system design and its initial operation at the nuclear power plant in Japan are discussed.

2686 KERNKRAFTWERK ISAR: LEAKAGE OF A SMALL AMOUNT OF CONTAMINATED AUXILIARY FEEDWATER INTO THE RAINWATER DUCT. GRS (Gesellschaft fuer Reaktorsicherheit) Kurz-Information, Reihe B ; No. 1, 1(Jan 1980). (In German).
FAILURES;FEEDWATER;ISAR REACTOR;RADIOACTIVE EFFLUENTS;RADIOACTIVITY

2687 ON-SITE MANAGEMENT OF POWER REACTOR WASTES. REPORT ON THE INTERNATIONAL SYMPOSIUM HELD AT ZUERICH FROM 26 TO 30 MARCH 1979. Morozov, V.A. (International Atomic Energy Agency, Vienna (Austria)). Atomic Energy Review ; 17: No. 3, 789-792(Sep 1979).
In response to the growing interest in the topic of waste management problems at nuclear power plants, resulting from the increasing use of nuclear power in both developed and developing countries, a symposium was held dealing specifically with this subject. It was jointly organized by the IAEA and OECD/NEA, in co-operation with the Swiss Office for Science and Research. The Symposium was attended by 182 participants from 26 countries and one international organization. Thirty-four papers were presented in seven sessions. The main topics discussed during the Symposium were: radioactive waste management practices at nuclear power plants; waste arisings and operating experience; coolant and liquid waste treatment; solidification methods; volume reduction methods; and solid waste containment.

2688 PUBLICATION CONCERNING THE PLANNED INCLUSION AND OPERATION OF COMPACT STORAGE DEVICES FOR SPENT FUEL ELEMENTS IN THE PHILIPPSBURG-1 REACTOR. DATED 17TH JULY, 1979. Grawe (Ministerium fuer Wirtschaft, Mittelstand und Verkehr Baden-Wuerttemberg, Stuttgart (Germany, F.R.)). Bundesanzeiger ; 31: No. 136, 6(25 Jul 1979). (In German).
FUEL POOLS;PHILIPPSBURG-1 REACTOR;PLANNING; SPENT FUEL STORAGE;FUEL RACKS

2689 DEVICE FOR PURIFYING WATER STORED IN PRESSURE SUPPRESSION CHAMBER. Kimura, K. (to Toshiba Corp., Kawasaki, Kanagawa (Japan)). Japanese Patent 54-84,196/A/. 4 Jul 1979. 3p. (In Japanese).
Purpose: To arrange tubes so that water stored in a pressure suppression chamber is purified by a filtration desalting device and to maintain the quality of stored water excellently thereby to lighten the burden of a radioactive waste processing system. Constitution: A fuel storage pool cooling system provided with a filtration desalting device is communicated with a pressure suppression chamber by means of a pump, valves and pipes, and water stored in the pressure suppression chamber is purifiable by the filtration desalting device.

2690 LA CROSSE BWR SPENT-FUEL STORAGE MODIFICATION AND REFUELING EXPERIENCE. Parkyn, J.D. (Dairyland Power Cooperative, Stoddard, WI). Transactions of the American Nuclear Society ; 32: 672(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting: Atlanta, GA, USA (3 Jun 1979).
LACBWR REACTOR;SPENT FUEL STORAGE;SPENT FUEL ELEMENTS;FUEL RACKS

2691 AIRBORNE ^{131}I RELEASES FROM OPERATING BWRS. Bradley, E.W. (General Electric Co., San Jose, CA); Marrero, T.R.; Horton, N.R.; Wilkinson, C.D. Transactions of the American Nuclear Society ; 32: 654-656(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting: Atlanta, GA, USA (3 Jun 1979).
BWR TYPE REACTORS;FISSION PRODUCT RELEASE; IODINE 131;RADIOACTIVE EFFLUENTS;DOSE RATES

2692 CRUD REDUCTION STUDY OF PRIMARY COOLANT SYSTEM AT TSURUGA NUCLEAR POWER STATION. Nagayama, S. (Japan Atomic Power Co., Tsuruga, Fukui. Tsuruga Power Station); Kurihara, Y.; Meguro, Y. Karyoku Genshiryoku Hatsuden (Thermal and Nuclear Power) ; 30: No. 6, 563-572(Jun 1979). (In Japanese).
With accumulation of the operational experiences in BWR nuclear power stations, some technical problems have been revealed. In spite of the severe control of water quality and the consideration for selecting proper materials so far, existence of the trace amount of metal impurities (iron crud, cobalt and other corrosion products) in the primary cooling system caused the problems of increasing radiation dose rate and of waste management due to the increase of loads in various purification systems. This paper is described on the present status in corrosion products and radiation dose rate in Tsuruga Nuclear Power Station and explains the countermeasures for crud reduction. As the countermeasures, the production of protecting film on the inner surfaces of feed water and condensate pipings during operation and its maintenance even in shut-down, flushing these systems prior to start-up, improvement of condensate demineralizer performance to include crud removal, upgrading feed water quality, improvement of sampling system, etc. have been carried out. These measures resulted in the reduction of iron concentration in feed and reactor water to 1/10 of that in the past or less, down to 1 to 3 ppb and 10 ppb, respectively. The concentrations of Co-60 and Mn-54 in reactor coolant were also reduced to 1/10 of the values so far. Back washing frequency in every purification system was decreased to 1/2 of that in the past or less, and this is expected to result in 20 mCi/year or less, a half of the activity thus far or lower in cleaning and liquid waste system.

2693 DEVICE FOR COOLING AND CLEANING FUEL POOL. Inoue, A. (Toshiba Corp., Kawasaki, Kanagawa (Japan)); Hara, H. (to Toshiba Corp., Kawasaki, Kanagawa (Japan); Nippon Atomic Industry Group Co. Ltd., Tokyo). Japanese Patent 54-67,895/A/. 31 May 1979. 6p. (In Japanese).
A method is described of providing the subject device wherein when the temperature of water in the pool is high, water is cooled by heat exchangers and thereafter passed through

cleanup devices, whereas when the temperature of the water is low, water is cleaned by cleaning devices, and thereafter passed through heat exchangers, thereby improving the safety of not only the equipment but the entire system and reducing radioactive contamination. When the temperature of pool water is low, pool water is circulated through a pump, valve, cleaning device, valve, heat exchanger, valve, and fuel storage pool, in the indicated order. When the temperature of pool water becomes high because of an accident, the valve is closed and the bias valve is opened, and pool water is circulated through a pump, bias valve, cleaning device, bias valve and fuel storage pool, in the indicated order. As a result, since the cleaning device is positioned downstream of the heat exchanger and the low-temperature water passes therethrough, it is not undergo damaged by heat.

2694 Messung fluessiger radioaktiver Stoffe zur Ueberwachung der radioaktiven Ableitungen. Sicherheitstechnische Anforderungen. (MEASUREMENT OF LIQUID RADIOACTIVE MATERIALS FOR THE MONITORING OF RADIOACTIVE EMISSIONS. UTA SAFETY REGULATION). Berlin, Germany, F.R.; Beuth (Mar 1979). 14p. (In German). (DIN--25465).

The rule pertains to systems for the measurement of liquid radioactive materials for monitoring the radioactive effluents of stationary nuclear plants with LWR or HTR during normal operation and in case of accidents. In particular, the measures and demands are presented which are to be made on 1) the measurement necessary to decide on the permissibility of liquid radioactive effluents, 2) the methods to determine the amount of radioactive materials contained in the effluents, 3) the balancing of radionuclides or radionuclide groups, 4) the setting of limiting values for the automatic release of signals required for safety measures and 5) the tests to be carried out on the measuring equipment.

2695 Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. (PROCEEDINGS OF THE SYMPOSIUM ON THE ON-SITE MANAGEMENT OF POWER REACTOR WASTES). Paris, France; OECD (1979). 551p. (In English, French).

From Symposium on the on-site management of power reactor wastes; Zurich, Switzerland (26 - 30 Mar 1979).

This symposium represents a synthesis of some current practices and research and development work in the field of radioactive waste management at nuclear power plants. It includes the following sessions: radioactive waste management practices at nuclear power plants; waste production and operating experiences; coolant and liquid waste processing; solidification methods; volume reduction methods; solid waste containment.

2696 CONSIDERATION IN UPGRADING A NUCLEAR POWR PLANT. Kettler, T. (Nuclear Energy Services, Inc., Danbury, CT). Transactions of the American Nuclear Society ; 33: 620-622(1979). (CONF-791103--).

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

POWER GENERATION;EQUIPMENT;MODIFICATIONS;BWR TYPE REACTORS;DESIGN;LICENSING;RELIABILITY; SERVICE LIFE;SPENT FUEL STORAGE;REACTOR COMPONENTS;DESIGN;COST;EFFICIENCY;REACTOR SAFETY

2697 RADIOACTIVITY RELEASES IN BOILING WATER REACTORS REPORTED IN THE LER FILE. Azarm, M.A.; Dickey, J.M.; Hall, R.E. (Brookhaven National Lab., Upton, NY). Transactions of the American Nuclear Society ; 33: 754-756(1979). (CONF-791103--).

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

BWR TYPE REACTORS;REACTOR OPERATION; RADIOACTIVE EFFLUENTS;DATA COMPILATION

2698 WASTES ARISING FROM NUCLEAR POWER PLANTS. Rometsch, R. (National Cooperative for the Storage of Radioactive Waste, Head Office, Baden (Switzerland)). pp 21-30 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 Mars 1979. Paris, France; OECD (1979).

From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).

The origin of radioactive wastes arising during normal operation of nuclear power plants is described. Average quantities per year are given for light water reactors and compared with those of other reactor types. Waste classification and waste composition are briefly discussed.

2699 MANAGEMENT OF RADIOACTIVE WASTES AT POWER REACTOR SITES IN INDIA. Amalraj, R.V.; Balu, K. (Bhabha Atomic Research Centre, Bombay (India)). pp 69-81 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 Mars 1979. Paris, France; OECD (1979).

From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).

Indian Nuclear Power Programme, at the present stage, is based on natural uranium fuelled heavy water moderated CANDU type reactors except for the first nuclear power station consisting of two units of enriched uranium fuelled, light water moderated, BWR type of reactors. Some of the salient aspects of radioactive waste management at power reactor sites in India are discussed. Brief reviews are presented on treatment of wastes, their disposal and environmental aspects. Indian experience in power reactor waste management is also summarized identifying some of the areas needing further work.

2700 REACTOR WASTE MANAGEMENT PRACTICES IN THE FEDERAL REPUBLIC OF GERMANY. Ambros, R. (Rheinisch-Westfaelisches Elektrizitaetswerk A.G., Biblis (Germany, F.R.). Betriebsverwaltung); Baatz, H.; Rittscher, D. (Gesellschaft fuer Nuclear-Service mbH, Essen (Germany, F.R.)); Hepp, H. (Preussenelektra, Hannover (Germany, F.R.)). pp 31-51 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 Mars 1979. Paris, France; OECD (1979).

From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).

The paper discusses the systems for the treatment and preconcentration of radioactive elements and other radioactive waste generated during the operation of large boiling water and pressurized water reactors. The actual waste generation is compared with the corresponding design data. The in situ conditioning and packaging and the final disposal of the preconcentrated liquid waste and other waste products based on mobile equipment is

described.

2701 Anlagen zur Behandlung von radioaktiv kontaminiertem Wasser in Kernkraftwerken. Sicherheitstechnische Anforderungen. Entwurf. (TREATMENT OF RADIOACTIVE CONTAMINATED WATER IN NUCLEAR POWER PLANTS. SAFETY REQUIREMENTS. DRAFT). Berlin, Germany, F.R.; Beuth (Dec 1978). 17p. (In German). (DIN--25416(Pt.1)).

This rule is to be applied to the design, construction, and operation of facilities for treatment of water contaminated with radioactive material in stationary nuclear power plants with LWRs and HTRs. According to the requirements of the rule these facilities are to be designed, constructed, and operated in such a way that a) uncontrolled discharge of water contaminated with radioactive material is avoided, b) the activity discharged with water is as low as possible, c) water contaminated with radioactive material will not reach the ground, d) the radiation exposure as a consequence of direct radiation, contamination, and inhalation of the persons occupied in the facilities is as low as possible and as a maximum corresponds to the values laid down in the radiation protection regulation or to the values of the operating license. This rule is not to be applied to facilities for coolant and storage pit clean-up as well as facilities for the treatment of concentrates produced during the contamination of the water.

2702 EXPERIENCE IN OPERATION OF NUCLEAR POWER PLANT. POSITIVE RESULTS FOR BARDEBAECK. Hansson, Aa. (Sydsvenska Kraft AB, Malmoe (Sweden)). Ingenioer-nytt ; 14: No. 92, 2-5(17 Nov 1978). (In Norwegian).

From Nuclear power seminar; Oslo, Norway (23 - 24 Oct 1978).

Following a brief description of the structure, financing and generating plant of Sydkraft, the Barsebaeck plant is briefly described. The construction schedule and personnel are outlined as are the investment and operating costs, which are compared with the utility's oil-fired generating costs. The causes of outages are briefly presented and discussed. The wastes from generating the same amount of power as Barsebaeck in 1977 using oil fuel are compared with the radioactive waste for that year. (JIW).

2703 OPERATING EXPERIENCE WITH WEST EUROPEAN LIGHT-WATER REACTORS. Leicman, J. Jaderna Energie ; 24: No. 11, 426-431(Nov 1978). (In Czech).

Experience is summed up gained with the operation of western European nuclear power plants with light water reactors commissioned before 1st January, 1973 and having a nominal output of more than 100 MWe. Tabulated are non-availability factors depending on causes, the numbers of removed leaking fuel elements, the numbers of personnel in operation, maintenance, radiation protection, administration, etc., the numbers of reactor shutdown, the annual values of stack disposal, release of liquid and solid radioactive wastes, integral doses received by personnel and outside workers, and additional investment.

2704 METHOD AND DEVICE FOR STORING IRRADIATED RESPECTIVELY SPENT FUEL ASSEMBLIES FROM PRESSURIZED AND BOILING WATER REACTORS. Pirk, H.; Klein, D. (to Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.)); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,711,405/A/. 21 Sep 1978. 10p. (In German).

The storage compartment for the fuel elements from the PWR and the BWR consists of a concrete chamber containing at least one grating serving for vertical holding of supporting boxes e.g. of boron steel for the fuel assemblies. Further, the non-used openings of the supporting grid may be closed by means of lids so that to the space above it an underpressure may be applied for safety reasons. In the lower part of the concrete chamber there open out supply and exhaust air shafts guided in the same duct but separately from one another towards respectively away from the concrete chamber. The supply air shafts open out below or sideways from the boxes while the exhaust air shafts discharge below the upper most grid. The critical distance between the boxes or the fuel assemblies retained.

2705 MODIFICATION OF REACTOR INSTALLATION FOR THE FUKUSHIMA FIRST NUCLEAR POWER STATION OF TOKYO ELECTRIC POWER COMPANY (MODIFICATION OF NO. 1, NO. 2, NO. 3 AND NO. 6 REACTOR FACILITIES). Genshiryoku Iinkai Geppo (Journal of Atomic Energy Commission) ; 22: No. 12, 26-27(Apr 1978). (In Japanese).

Investigations based on the application for the above items have concluded on Dec. 3, 1977 that their safety concerning the modification will be sufficiently secured. Details of the modification include the changes for (1) containment vessels (No. 1, No. 2 and No. 3 reactors), (2) disposing facility of solid wastes (No. 3 reactor), (3) thermal limit values (No. 6 reactor), and (4) recirculation flow rate control system (No. 6 reactor). The first item is to install the flammable gas concentration control system in consideration of the radiolysis of emergency coolant in a loss of coolant accident. The second item is to install underground storage tanks, one for spent resin and one for waste sludge, adjacent to the No. 3 reactor building. Their capacities are approximately 140 m^3 and 300 m^3, respectively. The third item means that the analysis results of thermohydrodynamics and transient phenomena have been investigated, and the property of thermal limit values has been confirmed, because the thermal limit values by using minimum critical power ratio was adopted in lieu of conventional minimum critical heat flux ratio as a new core thermal characteristics evaluation method. The fourth item is to change the recirculation flow rate control system from flow rate control valve scheme to speed control of the recirculating pump.

2706 RACK FOR STORING FUEL ELEMENTS. Schabert, H.P.; Weber, R.; Schwabe, I. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.)); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,629,938/A/. 5 Jan 1978. 15p. (In German).

In order to increase the storage capacity for the fuel element pond in LWR's, a storage rack is introduced, where the use of absorber sheets made of boron-aluminium permits the moving closer together of the insertion openings.

2707 NEUTRON ANALYSIS OF SPENT FUEL POOLS. Caro, R.; Cano, J.M.; Donoso, E.; Esteban, A.; Martinez-Val, J.M.; Pereyra, J. (Junta de Energia Nuclear, Madrid (Spain)). pp 291-309 of Compte rendu du seminaire de l'AEN sur le stockage des elements combustibles irradies. Paris, France; OECD (1978).

From Seminar on the storage of spent fuel

elements; Madrid, Spain (Jun 1978).

The nuclear energy industry in Spain, as everywhere in the world, is facing the problem of increasing the capacity of the existing pools for storing spent fuel elements. At JEN the problems related with this circumstance are being analyzed. In this work part of the corresponding research is included, and it is expected to publish in the very near future a more detailed comprehensive work including neutronics, thermal-hydraulic and shielding aspects of the spent fuel pool design.

2708 NORMAL AND COMPACT SPENT FUEL STORAGE IN LIGHT WATER REACTOR POWER PLANTS. Kuehnel, R.R. (Kraftwerk Union A.G., Offenbach am Main (Germany, F.R.)). pp 255-267 of Compte rendu du seminaire de l'AEN sur le stockage des elements combustibles irradies. Paris, France; OECD (1978).

From Seminar on the storage of spent fuel elements; Madrid, Spain (Jun 1978).

The compact storage of light water reactor spent fuel is a safe, cheap and reliable contribution towards overcoming the momentarily existing shortage in spent fuel reprocessing. The technical concept is described and physical behavior discussed. The introduction of compact storage racks in nuclear power plants increases the capacity from 100 to about 240%. The increase in decay heat is not more than about 14%, the increase in activity inventory and hazard potential does not exceed 20%. In most cases the existing power plant equipment fulfils the new requirements.

2709 BEHAVIOR OF SPENT LWR FUEL ASSEMBLIES. Peehs, M.; Petri, W.; Fuchs, H.P.; Schlemmer, F. (Kraftwerk Union A.G., Erlangen (Germany, F.R.)). pp 223-233 of Compte rendu du seminaire de l'AEN sur le stockage des elements combustibles irradies. Paris, France; OECD (1978).

From Seminar on the storage of spent fuel elements; Madrid, Spain (Jun 1978).

Fuel assemblies are stored under water at T=40°C. The inner pressure loading on the cladding amounts to only 10% of the yield point. Cladding tube degradation from corrosion can be neglected, as well as corrosion of the stainless steel and Inconel structural parts of the fuel assembly. Both the micro- and macro-hydrogen distribution in the claddings are sufficiently stable. Experiments to investigate water hydrolysis by stored fuel elements have been started. Also, investigations have been initiated to determine the fission product release from defective fuel rods.

2710 MONITORING OF RADIOACTIVE RELEASES AT THE GARIGLIANO NUCLEAR POWER STATION OF THE ENTE NAZIONALE PER L'ENERGIA ELETTRICA (ENEL), ITALY. Antonucci, L. pp 64-81 of Monitoring of airborne and liquid radioactive releases from nuclear facilities to the environment. Vienna, Austria; International Atomic Energy Agency (1978).

This article deals with the radioactive effluent treatment, sampling points and techniques, measurement techniques and the results of the monitoring of radioactive releases at the Garigliano Nuclear Power Station of the Ente Nazionale per l'Energia Elettrica (ENEL), Italy.

2711 NON-DESTRUCTIVE GAMMA SCANNING MEASUREMENT ON DISCHARGED FUEL BUNDLES FROM TARAPUR REACTORS. Deniz, V.C.; Dhodapkar, S.D.; Gubbi, G.K.; Arora, K.K.; Jindal, R.N.; Mistry, A.H. (Bhabha Atomic Research Centre, Bombay (India)). pp 434-437 of Reactor physics. Bombay, India; Department of Atomic Energy (1978).

From Symposium on reactor physics; Bombay, India (1 Mar 1976).

Gamma scanning measurements were carried out on discharged fuel bundles in the storage pool of the Tarapur reactors. These measurements, made on bundles in the range 2000 to 6000 MWD/ST, were carried out to measure the axial distributions of burnup for comparison with code predictions. Gamma spectra were measured in the range 600 Kev to 800 Kev using a Ge(Li) detector, and the axial distributions of ^{137}Cs and of the ratio $^{134}Cs/^{137}Cs$ were measured. The experimental procedure and the results obtained are presented.

2712 SPENT FUEL STORAGE - PHILOSOPHIES AND EXPERIENCE. Huppert, K.L. (Gesellschaft zur Wiederaufarbeitung von Kernbrennstoffen m.b.H., Eggenstein-Leopoldshafen (Germany, F.R.)). pp 19-29 of Compte rendu du seminaire de l'AEN sur le stockage des elements combustibles irradies. Madrid, 20-23 Juin 1978. Paris, France; OECD (1978).

From Seminar on the storage of spent fuel elements; Madrid, Spain (Jun 1978).

In the past, spent fuel storage was considered as standard practice and an interim step in the nuclear fuel cycle, hardly worth mentioning. This part of the fuel cycle has gained actual interest because the establishment of reprocessing capacity has not taken place as planned in some states or because the recovery of fissile material has been deferred. Independent of the differing policies, interim storage is indispensable after discharge of fuel elements from the reactor. Experience shows that high burn-up oxide fuel with corrosion resistant cladding may be stored under water over several decades, provided that favourable pool water conditions can be maintained. Dry storage of element bundles which is discussed for final disposal of fuel, is under development in the U.S., but not yet exercised.

2713 CONTROL OF RADIOACTIVE POLLUTANTS IN LIQUID EFFLUENTS FROM LARGE NUCLEAR POWER PLANTS. Bhat, I.S.; Gurg, R.P.; Kamath, P.R. (Bhabha Atomic Research Centre, Bombay (India). Health Physics Div.). pp 315-321 of Operating experience of nuclear reactors and power plants. Bombay; Department of Atomic Energy (1977).

From Symposium on operating experience of nuclear reactors and power plants; Bombay, India (7 Feb 1977).

Control of radioactive pollutants in liquid effluents from Tarapur Atomic Power Plant has been described. The experience gained by studying the problems already faced by similar BWR type reactors abroad are enumerated. The modifications done to suit the local environmental conditions as well as the exceptions to zero discharge which had to be adopted are also enumerated.

2714 RADWASTE PROCESS SYSTEM EXPERIENCE AT TARAPUR. Srinivasan, V.S.; Kulkarni, P.C.; George, V.C. (Tarapur Atomic Power Station (India)). pp 347-352 of Operating experience of nuclear reactors and power plants. Bombay; Department of Atomic Energy (1977).

From Symposium on operating experience of nuclear reactors and power plants; Bombay, India (7 Feb 1977).

Experience in handling the solid, liquid and gaseous radioactive wastes at the Tarapur Atomic Power Station, India is described in

detail. A functional description of the waste handling system is presented with special reference to each kind of waste. Also, the problems faced in these processes and the corrective action taken are reported.

2715 MANAGEMENT OF RADIOACTIVE WASTE FROM TARAPUR ATOMIC POWER STATION. Balu, K.; Ramachandran, S.; Gandhi, P.M.; Chander, M. (Bhabha Atomic Research Centre, Bombay (India)). pp 353-357 of Operating experience of nuclear reactors and power plants. Bombay, India; Department of Atomic Energy (1977).
From Symposium on operating experience of nuclear reactors and power plants; Bombay, India (7 Feb 1977).
The procedure adopted for radioactive waste management at the Tarapur Atomic Power Station is explained. The radwaste augmentation plant put up for the purpose is described. The gross activity figures for Cs^{137}, Cs^{134} and Co^{60} are reported. The performance of this plant, with due allowance for Iodine decay, over a period of 5 months is discussed. The installation of a spent-resin storage tank, which is expected to bring down the man-rem expenditure, is also described.

2716 BASKET FOR STORING NUCLEAR FUELS IN A COOLING POOL. (to Ateliers de Chaudronnerie, de Tolerie Industrielle, de Mecanique et d'Electricite (ACTIME), 28 - Dreux (France)). French Patent 2,358,733/A/. 16 Jul 1976. 8p. (In French).
The fuel bundles from PWR or BWR nuclear power stations, after they have been used in nuclear reactor cores, are processed in order to remove the fission products, (cutting up followed by the dissolving of the bundle pieces in a solvent). Prior to being cut up and treated in the solvent, they are generally stored in a cooling pool. The basket for storing the fuel includes, under the invention, a nest of parallel vertical wells. Each well is appreciably rectangular in shape and formed by a pair of vertical metal sheets bent to a U shape and place at right angles to each other. These wells are kept in position by several (generally two) horizontal plates provided with openings in which the ends of the wells are inserted. Each pair of vertical metal sheets forming a well is stiffened and joined by a series of horizontal tags welded between two plates. Additionnally, each nest of wells forming the storage basket is circled by a number of buffers (preferably three) fabricated in shaped steel sheeting welded to the vertical sheet metal sides of the wells on the outer edges of the nest. In accordance with a preferential design mode of the invention, the metal components forming the basket are in low carbon stainless steel withstanding well the action of the pool demineralised water.

Power Reactors, Non-Breeding, Light-Water Moderated, Non-Boiling Water Cooled

2717 (CONF-791118--6) MEASUREMENTS OF RADIONUCLIDE CONCENTRATIONS IN LIQUID AND GASEOUS STREAMS IN PWR'S. Mandler, J.W.; Motes, B.G. (EG and G Idaho, Inc., Idaho Falls (USA); Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). 1979. Contract EY-76-C-07-1570. 27p. Dep. NTIS, PC A03/MF A01.
From 7. water reactor safety research information meeting; Gaithersburg, MD, USA (5 Nov 1979).
Measurements of radionuclide concentrations in liquid and gaseous streams in pressurized water reactors (PWR's) were performed as part of the In-Plant Source Term Measurement Study which is being carried out under NRC sponsorship. Some of the measurement results obtained together with brief descriptions of the measurement program and the methods used in the study are presented.

2718 (CONF-800802--13) FLOWSHEET DEVELOPMENT STUDIES FOR THE DECONTAMINATION OF HIGH-ACTIVITY-LEVEL WATER AT THREE MILE ISLAND UNIT 2. Collins, E.D.; Bigelow, J.E.; Campbell, D.O.; King, L.J.; Knauer, J.B. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 33p. NTIS, PC A03/MF A01.
From 89. annual meeting of the American Institute of Chemical Engineers; Portland, OR, USA (17 Aug 1980).
Several chemical processing flowsheets were considered for the decontamination of high-activity-level water at the Three Mile Island (TMI) Unit 2. A zeolite ion exchange process was evaluated and recommended for absorption of the bulk of the highly radioactive cesium and strontium. Standard organic ion-exchange resins were selected to remove the remaining traces of radioactive nuclides (except tritium which cannot be removed by any practical process). Process conditions were evaluated using both synthetic, tracer-level solutions and samples of actual, high-activity level water from TMI Unit 2.

2719 (CS-INIS--258, pp 16-22) RADIONUCLIDES FROM NUCLEAR POWER FACILITIES OPERATION IN HYDROSPHERE. Mayer, J. (Vyzkumny Ustav Vodniho Hospodarstvi, Bratislava (Czechoslovakia)). Sep 1978. (In Slovak).
From 9. national conference on radionuclides and ionizing radiation in water management; Liberec, Czechoslovakia (28 Sep 1978).
The problem is discussed of the contamination of the hydrosphere with fission products from nuclear reactors, especially WWER type reactors. Liquid wastes are the major threat for water management; they are produced in a limited area, they contain a relatively small amount of fission and corrosion products, the treated water is recycled. The amount of discharged fission products is thus reduced, the fission products are solidified and stored on a suitable storage site. The techniques are briefly described of waste water processing in WWER nuclear power plants. It is envisaged that in future, operating conditions in waste water treatment plants will improve, the radiation stability of ion exchangers will increase and their efficient regeneration will be introduced. The problem which still remains to be solved is tritium removal from waste waters and, in Czechoslovaki, the definite selection of a storage site for solidified wastes.

2720 (INIS-mf--4770) SAFETY ASPECTS OF THE DESIGN OF A PWR GASEOUS RADWASTE TREATMENT SYSTEM USING HYDROGEN RECOMBINERS. Glibert, R.; Nuyt, G.; Herin, S.; Fossion, P. (Societe Belge pour l'Industrie Nucleaire, Brussels). 1978. 12p. Dep. NTIS (US Sales Only), PC A02/MF A01.
PWR Gaseous radwaste treatment system is essential for the reduction of impact on environment of the nuclear power plants. Decay tank system has been used for the retention of the radioactive gaseous fission products generated in the primary coolant. The use of a system combining decay tanks and hydrogen recombiner units is described. Accent is put on the safety aspects of this gaseous radwaste treatment facility studied by BN for a Belgian Power Plant.

2721 (INIS-mf--5464) RADIOECOLOGICAL EXPERTS' OPINIONS ON WASTE WATER OF ESENSHAM NUCLEAR POWER PLANT. FINAL REPORT OF A PART OF THE PROJECT: POLLUTION AT THE PLACE OF WORK AND IN THE LOWER WESER INDUSTRIALIZED REGION. Bliefert, M.; Marks, R.; Meier, A.; Wallenschus, M. (Bremen Univ. (Germany, F.R.)). Jul 1978. vpp. (In German). NTIS (US Sales Only), PC A04/MF A01.

In December 1977, there was a public hearing by the Oldenburg administrative court where, among others, evidence was heard on whether the experts' opinions on the discharge of liquid radioactive waste into the river Weser, for which licence has already been granted, contain some major errors so that the licences already granted would have to be revoked. This part of the long and tedious administrative lawsuit is reported.

2722 (Juel--1586) IMPROVEMENT OF CHEMICAL AND PHYSICAL PROCESSES TO TREAT THE WASTE WATER FROM NUCLEAR POWER PLANTS. Oschmann, W. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Chemische Technologie; Technische Hochschule Aachen (Germany, F.R.)). May 1979. 98p. (In German). Dep. NTIS (US Sales Only), PC A06/MF A01.

The author presents a flocculation precipitation process for radioactive waste water from PWRs. It eliminates especially Sb^{124}. This process makes it possible to obtain the legally prescribed waste water minimum values of $5x10^{-4}$ Ci/m^3 of total α-activity. As for the purification of the radioactive waste water by means of evaporators, special emphases is placed on the separation of aerosols from the steam phase. Up to now columns with perforated bottoms or bubble trays have been used for this purpose. The author describes a considerably more effective method for the decontamination of the steam phase, the separation of the aerosols being done by means of an electrostatic filter. First test results with a model evaporator are described.

2723 (ORNL/TM--7081) POST-ACCIDENT CLEANUP OF RADIOACTIVITY AT THE THREE MILE ISLAND NUCLEAR POWER STATION. Brooksbank, R.E.; Armento, W.J. (comps.). (Oak Ridge National Lab., TN (USA)). Feb 1980. Contract W-7405-ENG-26. 67p. Dep. NTIS, PC A04/MF A01.

The technical staff of the President's Commission on the Accident at Three Mile Island (TMI) requested that Oak Ridge National Laboratory (ORNL) prepare documentation concerned with the cleanup of radioactivity on the Three Mile Island site following the March 28, 1979 accident. The objective of this report is to provide information in a summarized form, which will be of direct usefulness to the commissioners. The information contained herein includes discussion of on-site assistance and accomplishments following the accident, flowsheet development for the TMI recovery team (by the Technical Advisory Group), and the numerous reports already generated on the TMI cleanup and recovery.

2724 (PB--295036) EVALUATION OF TRITIUM RECYCLE AND BUILDUP IN A PRESSURIZED WATER REACTOR. TECHNICAL NOTE. Smith, C.B. (Office of Radiation Programs, Washington, DC (USA). Technology Assessment Div.). Mar 1977. 46p. NTIS PC A03/MF A01.

Recycling radioactive liquid wastes at light-water cooled nuclear power reactors is becoming a popular method of limiting release levels to as low as practicable. As a result of recycling the liquid wastes the tritium in the liquid waste streams is not removed. Combined with its relatively long half life (12.33 years), recycling results in a buildup of large volumes of tritium contaminated liquids. To evaluate the magnitude of the potential tritium handling problem and to develop recommendations for solutions, a computerized model of tritium buildup in a PWR was developed. The results from this model will be used to assess the potential environmental impact of tritium recycle for the entire nuclear power reactor industry and will be instrumental in developing standards or guidance concerning tritium recycle.

2725 (VEIKI--15.98-041-2) INVESTIGATION OF GENERATION OF LIQUID RADIOACTIVE WASTES AND POSSIBILITIES TO REDUCE THEIR VOLUME IN NPP PAKS PT. 2. COMPUTER PROGRAM FOR THE SIMULATION OF RADIOACTIVE WATER SYSTEMS CONTAMINATION. Horvath, L.G. (Villamosenergiaipari Kutato Intezet, Budapest (Hungary)). Dec 1978. 53p. (In Hungarian). Library of Institute for Electrical Power Research, 1368 Budapest, P.O.B. 233, Hungary.

A numerical computer model (RADTRAN) has been developed to simulate the contamination of radioactive water systems, the generation of liquid radioactive wastes in the technological equipment in a PWR type NPP, taking into account the water systems' working regimes, using graph theory methods. The program is able to simulate a number of different working regimes during the burn-up cycle, in water systems of different construction. As a result the program gives the amounts of water, inactive components and activity in tanks and on the filters. The aims of investigations are: to determine the factors influencing the generation of activity and radioactive wastes, to minimise the plant's operation costs and to ease the plant's operation.

2726 PUBLICATION OF ONE PARTIAL LICENSE EACH FOR AN INCREASE OF THE SPENT FUEL STORAGE CAPACITY FROM FIVE THIRDS OF A CORE CHARGE TO NINE THIRDS OF A CORE CHARGE IN THE BIBLIS A AND B UNITS. Bundesanzeiger ; 32: No. 57, 2(Mar 1980). (In German).

BIBLIS-A REACTOR;BIBLIS-B REACTOR;FUEL POOLS; LICENSING;OPERATING LICENSES;OPTIMIZATION;SPENT FUEL STORAGE

2727 RADIOACTIVE WASTE AT BIBLIS NUCLEAR POWER PLANT. Ambros, R.; Schroeder, H.J. (Rheinisch-Westfaelisches Elektrizitaetswerk A.G., Biblis (Germany, F.R.). Betriebsverwaltung). VGB Kraftwerkstechnik ; 59: No. 12, 990-994(Dec 1979). (In German).

The type and amount of radioactive waste from Biblis A und B (until end of 1978) that was sent to the Asse mine for final storage are described. Radioactive emissions with waste air and absorber are left out of account. The conditioning and disposal of the radioactive waste (radioactive metal parts from the core excluded) went according to routine until the end of 1978 (Asse was closed down at the beginning of 1979). Per year and unit, there was an average of 400 drums of low-activity waste, about 20 drums of waste with higher dose rates, and 70 to 80 m^3 of concentrates and sludges.

2728 PUBLICATION CONCERNING THE PLANNED INCLUSION AND OPERATION OF COMPACT STORAGE DEVICES FOR SPENT FUEL ELEMENTS IN THE NECKAR

REACTOR. DATED 17TH JULY, 1979. Grawe (Ministerium fuer Wirtschaft, Mittelstand und Verkehr Baden-Wuerttemberg, Stuttgart (Germany, F.R.)). Bundesanzeiger ; 31: No. 136, 6(25 Jul 1979). (In German).
FUEL POOLS;NECKAR REACTOR;PLANNING;SPENT FUEL STORAGE;FUEL RACKS

2729 WATERFILLED STORAGE POND. Weber, R.; Gallwas, J. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,758,670/A/. 5 Jul 1979. 12p. (In German).
The storage pond for spent fuel elements is part of a concrete building, which is adjacent to the steel safety containment of a PWR. The lower part contains a storage rack, into which the fuel elements are set vertically by means of a fuel element grab. To increase the capacity of the storage pond, steel consoles are arranged in the concrete walls above this storage frame, on which a supporting floor is laid. On this support there is room for a further storage frame, which is also situated below the water level (of the pond).

2730 MEASURING AND MONITORING OF GASEOUS RELEASES AND AEROSOL-BOUND RADIOACTIVE MATERIAL. PT. 1. MEASURING AND MONITORING OF RADIOACTIVE MATERIAL RELEASED TOGETHER WITH THE STACK EXHAUST AIR IN REGULAR OPERATION. KTA SAFETY REGULATION. Bundesanzeiger Beilage ; No. 27, 3-13(Jul 1979). (In German).
This part of the standard is to be applied to devices for stationary nuclear power plants with LWR's and HTR's during regular operation. Their duties are a) balancing of the radioactive material released with the stack exhaust air as a basis for the assessment of the radiological consequences. b) automatic release of signals if limits are exceeded c) contributing to meeting the requirements of paragraph 46, section 1, number 3 of the radiation protection regulation.

2731 TRITIUM IN PWRS: A RATIONAL PERSPECTIVE. Iacovino, J.M. Jr. (Westinghouse Electric Corp., Pittsburgh, PA). Transactions of the American Nuclear Society ; 32: 144-146(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
PWR TYPE REACTORS;TRITIUM;TRITIUM METERS; RADIOACTIVE EFFLUENTS;PRIMARY COOLANT CIRCUITS

2732 EXPERIENCE WITH INTRASTATION AND INTERSTATION TRANSFER OF SPENT FUEL. Frech, D.F. (Duke Power Co., Charlotte, NC). Transactions of the American Nuclear Society ; 32: 675-676(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
OCONEE-1 REACTOR;OCONEE-2 REACTOR;OCONEE-3 REACTOR;MC GUIRE-1 REACTOR;MC GUIRE-2 REACTOR; CATAWBA-1 REACTOR;CATAWBA-2 REACTOR;SPENT FUEL STORAGE;FUEL RACKS;SPENT FUEL CASKS

2733 REPLACEMENT OF HIGH-DENSITY RACKS WITH POISONED RACKS AT POINT BEACH NUCLEAR PLANT. Newton, R. (Wisconsin Electric Power Co., Milwaukee, WI). Transactions of the American Nuclear Society ; 32: 676(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
POINT BEACH-1 REACTOR;POINT BEACH-2 REACTOR; SPENT FUEL STORAGE;FUEL RACKS;MODIFICATIONS

2734 ATOMIC WASTE FOREVER. Damveld, H. Wetenschap en Samenleving ; 79: No. 5, 68-74(Jun-Jul 1979). (In Dutch).
Recent developments in the problem area of radioactive waste are reported. A new working contract between the French firm Cogema in la Hague and the nuclear centre Borssele for the treatment of fission product waste is critically discussed and a few fundamental doubts raised. A new report concerning the storage of atomic waste in salt domes in the Netherlands is commented upon. The author wants the government to prevent the treatment contract, to close the nuclear plants at Borssele and Dodewaard, to stop the dumping of atomic waste in the sea and to finish all examinations into the storage of atomic waste.

2735 METHOD FOR CLEANING LIQUID WASTES CONTAMINATED WITH RADIOACTIVE MATERIAL. Brendl, R.; Fischer, G.; Martin, J.; Puthawala, A. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,745,544/A/. 12 Apr 1979. 5p. (In German).
In order to improve the decontamination rate in decontamination evaporators for e.g. the liquid wastes from PWR's a well soluble carrier substance, containing the non-radioactive isotopes of the contaminating elements, is added to the washing liquid. The carrier substance consists of salts, e.g. KI for separating ^{131}I, and is added to the washing liquid in a concentration of 1-10g/m^3. (DG).

2736 FRAMEWORK FOR STORING LONG FUEL ELEMENTS. Langhammer, K.H.; Weber, R. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,742,735/A/. 5 Apr 1979. 12p. (In German).
The fuel elements of polygonal cross section for the PWR are surrounded by boron steel sheaths. The fuel elements are fixed at the upper end at the framework and are lined up at the lower and relative to the framework or the sheaths by a centring device. The centring devices are spherical and grip the corners of the sheaths. Both devices can be fixed to one another by fixing screws and the fuel element can be supported in the sheath so that no lateral forces are exerted on the sheaths. One of the spherical devices is supported on the framework and the other surrounds the fuel element. Austenitic steel sheets can be welded to the upper and lower ends of the sheaths, which can be mechanically connected to the framework.

2737 PUBLICATION OF THE PROJECT OF RHEINISCH-WESTFAELISCHE ELEKTRIZITAETSWERK AG, ESSEN, TO INCREASE THE CAPACITY OF THE FUEL STORAGE POOL OF UNITS A AND B OF BIBLIS NUCLEAR POWER PLANT FROM FIVE THIRDS OF ONE CORE CHARGE EACH TO NINE THIRDS OF ONE CORE CHARGE EACH. Bundesanzeiger ; 31: No. 73, 7(Apr 1979). (In German).
BIBLIS-A REACTOR;BIBLIS-B REACTOR;FUEL POOLS; HEARINGS;LICENSING;SPENT FUEL STORAGE; MODIFICATIONS

2738 PUBLICATION OF THE PROJECT OF BAYERNWERK AG, MUNICH, AND KRAFTWERK UNION AG, FRANKFURT, TO RAISE THE CAPACITY OF THE SPENT FUEL PIT AT GRAFENRHEINFELD NUCLEAR POWER PLANT BY INSTALLING COMPACT STORAGE RACKS.

Bundesanzeiger ; 31: No. 33, 4(Feb 1979). (In German).
Applications for a licence according to article 7, paragraph 1 of the Atomic Energy Act for the installation and operation of fuel storage racks in the spent fuel pit of Grafenrheinfeld nuclear power plant in order to increase the storage capacity from about 4/3 nuclear charges to about 11/3 nuclear charges.

2739 FUEL ELEMENT STORAGE POND FOR NUCLEAR INSTALLATIONS. Schneider, W. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,731,035/A/. 25 Jan 1979. 7p. (In German).
The water level in the concrete storage pond for the rod-shaped fuel elements of a PWR (1300 MWe) is lowered below the edge of the pond during operation. To reduce irradiation, in the pond area, a strip along the pond walls is covered with shielding (50mm of steel or lead) in the shape of a shielding plate projecting horizontally above the water. It has a continuation vertical to the water surface at its free edge. A horizontal pipe with flat beam nozzles is fixed at the continuation below this shielding. Using these nozzles, the edge of the basin can be cleared of contaminated particles using a cleaning liquid (e.g. water).

2740 PUBLIC HEARING ON COMPACT STORAGE RACKS IN THE OHU AND GRAFENRHEINFELD POWER PLANTS. GRS (Gesellschaft fuer Reaktorsicherheit) Kurz-Information, Reihe E ; No. 3, 1-2(1979). (In German).
FUEL POOLS;GRAFENRHEINFELD REACTOR;HEARINGS; ISAR REACTOR;LICENSING;SPENT FUEL STORAGE;FUEL RACKS

2741 IRRADIATED FUEL INSPECTION STATION. Bernacki, T.R.; Brookins, R.H. (Combustion Engineering, Inc., Windsor, CT). Transactions of the American Nuclear Society ; 33: 889(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
PWR. PWR TYPE REACTORS;FUEL POOLS;INSPECTION; SPENT FUEL STORAGE;MECHANICAL STRUCTURES

2742 REMOTELY OPERATED ULTRASONIC DECONTAMINATION SYSTEM FOR FUEL TRANSFER POOL. Okamoto, H. (Central Research Inst. of Electric Power Industry, Tokyo, Japan); Yoshimura, S.; Fukumoto, H.; Sakurada, O. pp 129-135 of Proceedings of the 27th conference on remote systems technology. Wallin, D.R. (ed.). La Grange Park, IL; American Nuclear Society, Inc. (1979).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
A decontamination method using ultrasonic waves was developed for use in decontaminating the fuel transfer pool wall of the light water reactor. From the results of on-site basic experiments, a remotely operated ultrasonic decontamination installation was designed and fabricated, and on-site operational experiments with it were carried out. The results of basic experiments, the remotely operated ultrasonic decontamination system, and the results of on-site operational experiments with the system are described.

2743 NOTIFICATION CONCERNING PLANS FOR THE INSTALLATION AND OPERATION OF COMPACT-TYPE FUEL STORAGES IN UNTERWESER NUCLEAR POWER PLANT. GRS (Gesellschaft fuer Reaktorsicherheit) Kurz-Information, Reihe E ; No. 23, 1-2(1979). (In German).
FUEL POOLS;SPENT FUEL STORAGE;UNTERWESER REACTOR

2744 ELECTROMAGNETIC FILTRATION OF CRUDS IN PRIMARY CIRCUITS OF PRESSURIZED WATER NUCLEAR REACTORS. Darras, R.; Dolle, L.; Chenouard, J. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Service d'Analyses et d'Etudes en Chimie Nucleaire et Isotopique); Dubourg, M. (Societe Franco-Americaine de Constructions Atomiques (FRAMATOME), 92 - Courbevoie (France)). pp 241-259 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France; OECD (1979). (In French)
From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).
High temperature electromagnetic filtration can be applied to relatively high water flow rates; in this way, the harmful contamination of primary circuits components, resulting mainly from neutron activation of the metallic oxides during their long stay as deposits in the reactor core, is prevented in a large extent. The fraction of the total flow rate to be filtered in this purpose is estimated. The nature, composition and concentration level of cruds to be removed are specified; then the principle of an electromagnetic filter is outlined and its main practical characteristics are reviewed. The feasibility of on-line hot flushing this type of filter is emphasized, such providing a valuable in-service flexibility. The performances obtained during testing by means of out-of-pile or in-pile loops at CEN/Saclay are shown. Moreover, a demonstration experiment is under way on the prototype reactor CAP at CEN/Cadarache. Studies now in progress are directed towards the design of an optimized industrial filter. The conditions and benefits of the application for a power reactor are considered.

2745 RADIOACTIVE CONTAMINATION OF THE ATMOSPHERE AND ITS EFFECTS ON POPULATION IN THE NEIGHBOURHOOD. Berczi, K.; Liptak, L.; Pajer, I. (Eroemue es Halozattervezoe Vallalat Eroeterv, Budapest (Hungary)). Eroeterv Koezlemenyek ; 17: 106-110(1979). (In Hungarian).
A briefing is given of the technological development work concerned with calculating the effects of atmospherical releases, carried out in connection with the environmental analyses of nuclear power stations. The article follows the route of propagation of gaseous radioactive waste starting from the power plant air chimney through atmospheric dilution to the determination of components in the dosage rate reaching the population.

2746 SOME ASPECTS OF DESIGN, CONSTRUCTION AND OPERATION IN ORDER TO MINIMIZE THE BUILD-UP OF RADIOACTIVE WASTE - REFLECTIONS AND EXPERIENCE FROM LOVIISA 1 NPS. Jaernstroem, R.T. (Loviisa Nuclear Power Plant (Finland)). pp 145-151 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 Mars 1979. Paris, France; OECD (1979).
From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).
When minimizing the build-up of radioactive waste in a nuclear power plant with respect to fission and corrosion products there are some

well-known factors as choice of materials, plant operation, fuel performance, chemistry and purification systems and especially the chemistry surveillance, which are of great importance. Experience gathered from Loviisa 1 operation during the first two fuel cycles will shortly be described in this paper.

2747 WASTE MANAGEMENT AT THE ARDENNES POWER PLANT. Abraham, J.P. (Societe d'Energie Nucleaire Franco-Belge des Ardennes, 08 - Chooz-lez-Givet (France)). pp 395-404 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 Mars 1979. Paris, France; OECD (1979). (In French)

From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).

In 1976, the SENA (with the participation of EDF, CEA and CEC in the framework of a research program on the management and storage of radioactive wastes) has developed an industrial pilot plant for the encapsulation of wastes in thermosetting polyester resins. The industrial putting in operation of the plant will enable most of the wastes from the nuclear station to be processed. The quality of products will be improved and the volume and processing cost reduced.

2748 SOLIDIFICATON OF EVAPORATOR CONCENTRATES BY HYDRAULIC BINDING AGENTS. Bernard, A.; Nomine, J.C. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Service des Elements Combustibles et Structures). pp 361-371 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 Mars 1979. Paris, France; OECD (1979). (In French)

From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).

The CEN-SACLAY Concretes and Coating Materials Laboratory specialised in the research and development of special high-performance concretes in the field of biological protection particularly, has been investigating formulae based on hydraulic binding agents to solidify liquid radioactive wastes, especially evaporator concentrates from P.W.R. stations. The development of the materials and the operational technology, tried on inactive then on active samples, were applied next on an industrial scale. The main transposition difficulties, now solved, are due to possible variations in the physico-chemical properties of the mortar components (water content of the granulates in particular). The concentrate solidification method finally developed, taking place in concrete shells at the station itself is fast, versatile and inexpensive.

2749 FUTURE OUTLOOK OF WASTE PACKAGING AT ELECTRICITE DE FRANCE. Beunardeau, M.B. (Electricite de France, 75 - Paris). pp 513-523 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 Mars 1979. Paris, France; OECD (1979). (In French)

From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).

Electricite de France intends, for its nuclear power plants in the future, to pack the wastes in metal drums instead of concrete blocks. Cost of treatment is expected to be reduced by 50%. This target can be reached under two conditions: 1. Construction of transportation vessels well fitted to the activity of the wastes (optimisation of the thickness of the biological protections); 2. easiness of the operation (reduced time of handling).

2750 RECOVERY OF BROKEN FUEL PIN AND THE INVESTIGATION ON THE SAFETY OF RE-OPERATION OF THE MIHAMA UNIT 1 PLANT, KANSAI ELECTRIC POWER CO. Genshiryoku Iinkai Geppo (Journal of Atomic Energy Commission) ; 23: No. 7, 16-19(Sep 1978). (In Japanese).

Japanese ministries (Science and Technology and International Trade and Industry) have ordered the Kansai Electric Power Co. to investigate the cause of the fuel pin failure and to establish the safety of re-operation of the Mihama Unit 1 nuclear power plant. This report was prepared by the two ministries as the announcement that they think the plant is now ready for re-operation. In the first part, brief information is provided on the fuel pin failure, such as the amount of broken pellets (1,206 g) and cladding material (217 g). The methods of identification and recovery of these lost materials are explained in the second part together with the results of these activities. The amount of recovered materials is reported. In the third part, the locations of the unrecovered materials are considered. The safety problems concerning the re-operation of the plant are analyzed in the fourth part. The fifth part briefly shows several conditions that the utility must observe to secure the safety of the plant re-operation.

2751 MEASUREMENT OF TRITIUM AND TRITIATED WATER VAPOUR IN NUCLEAR POWER INSTALLATIONS. I. TRITIUM FORMATION AND TRANSPORT IN NUCLEAR POWER INSTALLATIONS. Gilar, O.; Kubalek, J.; Sedakov, V. (Tesla, Premysleni (Czechoslovakia). Vyzkumny Ustav Pristroju Jaderne Techniky). Jaderna Energie ; 24: No. 8, 290-296(Aug 1978). (In Russian).

The formation of tritium is described in heavy water-cooled, WWER-type and LMFBR-type reactors. In heavy water reactors tritium results, among others, as the product of reaction D(n,γ)T and its amount depends on the reactor output and the duration of D_2O irradiation. In a reactor with a mean neutron flux density of 10^{13} $cm^{-2}s^{-1}$ after one year of operation in 1 kg D_2O about 1.85×10^{10} s^{-1} tritium is formed, this in the form of gas or oxides. In WWER type reactors tritium results from uranium fission in fuel elements and neutron capture by boron. It has the form of HTO or tritiated water vapours. In a power unit fitted with two WWER reactors with an output of 2x500 MWsub(th), the amount of tritium in the primary circuit is stabilized at 3.7×10^{10} $s^{-1}m^{-3}$ and in the reactor water regime at 7.4×10^{9} $s^{-1}m^{-3}$. In LMFBR reactors tritium is formed also from actinide fission and by neutron capture in boron and lithium. Tritium activity is in fast reactors higher than in PWR's and its transport depends on the content of tritium in the primary circuit and in the coolant cover atmosphere. Tritium formation is also described in research reactors, reprocessing facilities, in radiochemical and radiological laboratories, and in particle accelerator laboratories.

2752 NUCLEAR REACTOR PLANT. Weber, R.; Kaetscher, E. (to Siemens A.G., Berlin (Germany, F.R.); Siemens A.G., Muenchen (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,253,232/8/. 24 May 1978. 8p. (In

German).

Next to the fuel element storage pond in a pressurised water reactor a lowering shaft for the fuel element transport container is arranged. The shaft and container act like a piston and cylinder, so that the hydraulic braking prevents a bump on setting down the fuel element endangering it.

2753 RADIOCHROMATOGRAPHIC SYSTEM FOR OFF-GAS DECONTAMINATION AT THE WWER NUCLEAR POWER PLANTS. Nakhutin, I.E.; Ochkin, D.V.; Pis'man, B.Ya.; Babenko, E.A.; Krasikov, A.N.; Tret'yak, S.A.; Khlyustova, T.M. Atomnaya Energiya ; 44: No. 3, 251-252(Mar 1978). (In Russian).

DECONTAMINATION;GASEOUS WASTES;NUCLEAR POWER PLANTS;OFF-GAS SYSTEMS;PERFORMANCE;RADIOACTIVE WASTES;RADIOCHROMATOGRAPHY;WWER TYPE REACTORS; RADIOACTIVE WASTE PROCESSING

2754 MEASURES OF REDUCING ACCUMULATION OF RADIOACTIVITY IN PRIMARY COOLING SYSTEM OF PRESSURIZED WATER REACTORS. Kuwashima, K. (N.T.S. Co. Ltd. (Japan)); Maii, I. pp 103-131 of Keisuiro ichiji reikyakukei no hoshano chikuseki yokusei taisaku to josen. Koyama, H. (Central Research Inst. of Electric Power Industry, Tokyo (Japan)); Iimura, H.; Ikegame, R.; Hashimoto, T.; Hamazaki, K. Tokyo, Japan; I.S.U. Co. (1978). (In Japanese)

The flow sheets for the primary cooling system, the chemical and volume control system, the decay heat removal system and the waste disposal system in PWR plants are shown. The special features of PWRs regarding the reactor cooling system are explained, for example, water quality control, accumulation of radioactivity and radiation level in the primary system, and radiation dose rate at the time of working. The average cumulative radiation dose rate in primary system pipes is estimated at about 200 - 300 mR/h except special local high level points. The radiation dose rate on the surfaces of primary system pipes at the time of periodic inspection of a PWR was 300 - 900 mR/h immediately after shut down, and about 150 - 500 mR/h 10 - 15 days after shut down. output of 1100 MWe is about 11,500 - 12,400 Ci/year. The utilization of ^{7}Li, the control of dissolved oxygen, the purification of the primary coolant, etc, are explained as the above described countermeasures.

2755 NUCLEAR REACTOR POWER STATION WITH TWO DIFFERENT POOLS. (to Societe Franco-Americaine de Constructions Atomiques (FRAMATOME), 92 - Courbevoie (France)). French Patent 2,405,540/A/. 4 Oct 1977. 10p. (In French).

The nuclear reactor power station described includes a building containing a nuclear reactor capped by a first pool for handling fuel assemblies under water; an ancillary building with a second pool for transferring fuel assemblies and for storing and cooling spent assemblies; a horizontal tube for transferring the assemblies between the two pools.

2756 ALTERATION OF REACTOR INSTALLATION (UNIT 2) IN GENKAI NUCLEAR POWER STATION OF KYUSHU ELECTRIC POWER CO., INC. Genshiryoku Iinkai Geppo (Journal of Atomic Energy Commission) ; 22: No. 6, 32-33(Sep 1977). (In Japanese).

The report of the Committee on Examination of Reactor Safety to the Atomic Energy Commission of Japan concerning the alteration is given, which is attached to the reply from the commission to the prime minister, and its safety was confirmed. The alterations are change to magnetic-jack drive for a control-rod cluster to regulate the power distribution; change to concentration type control of waste hydrogen gas treatment system; and change to drum asphalt solidification of waste concentrate.

2757 STUDIES ON THE TREATMENT OF RADIOACTIVE WASTE WATER FORMED FROM THE STEAM GENERATOR OF PWR TYPE REACTOR USING ION EXCHANGE RESINS. Lee, S.H.; Park, S.H. (Korea Atomic Energy Research Inst., Seoul (Republic of Korea)). Bangason Bango Hakhoe Chi ; 2: No. 1, 24-30(Jul 1977). (In French).

To establish an efficient treatment of waste water from PWR reactor, decontamination experiments of radionuclides were carried out using ion exchange resin columns under alkaline pH. A serial connection of anionic and cationic exchange resin column was quite efficient showing higher values of decontamination factors for ^{137}Cs and ^{90}Sr. (author).

Power Reactors, Non-Breeding, Graphite Moderated

2758 (CEGB-RD/B/N--4231) RADIOACTIVE INVENTORY OF A DECOMMISSIONED MAGNOX POWER STATION STRUCTURE. 1. MEASUREMENTS OF NEUTRON INDUCED ACTIVITY IN SAMPLES FROM THE REACTOR ISLAND. Woollam, P.B. (Central Electricity Generating Board, Berkeley (UK). Berkeley Nuclear Labs.). Sep 1978. 51p. Dep. NTIS (US Sales Only), PC A04/MF A01.

This report is the first of a series which, together, aim to produce an accurate assessment of neutron induced activation levels in the fixed structural components of a reactor of the steel pressure vessel Magnox type. It describes the measurements made of induced activation, necessary in order to establish credibility in the complex calculations described in the subsequent reports. The report also attempts systematically to assess the potential contributions to the dose and disposal problem from all isotopes with a half-life in excess of 5 years. This is necessary in order to ensure that no isotope has been overlooked which could limit any part of the plan for the decommissioning of a Magnox reactor. In addition the report aims to determine concentrations, in each major material type, of trace elements which lead to the isotopes limiting in decommissioning.

2759 (INFCE/DEP/WG--7/3) WASTE ARISINGS FROM A HIGH-TEMPERATURE REACTOR WITH A URANIUM-THORIUM FUEL CYCLE. (INFCE (USA)). Sep 1979. 8p. NTIS (US Sales Only), PC A02/MF A01.

This paper presents an equilibrium-recycle condition flow sheet for a high-temperature gas-cooled reactor (HTR) fuel cycle which uses thorium and high-enriched uranium (93% U-235) as makeup fuel. INFCE Working Group 7 defined percentage losses to various waste streams are used to adjust the heavy-element mass flows per gigawatt-year of electricity generated. Thorium and bred U-233 are recycled following Thorex reprocessing. Fissile U-235 is recycled one time following Purex reprocessing and then is discarded to waste. Plutonium and other transuranics are discarded to waste. Included are estimates of volume, radioactivity, and heavy-element content of wastes arising from HTR fuel element fabrication; HTR operation, maintenance, and decommissioning; and reprocessing spent fuel where the waste is unique to the HTR fuel cycle.

2760 (INIS-mf--4697) STOCK-TAKING OF THE SAFETY DESIGN OF THE NUCLEAR POWER PLANT WITH HTR 1160 AND THE RADIATION EXPOSURE CONNECTED WITH ITS OPERATION. PHASE 1. Drescher, H.P.; Geiser, H.; Roedder, P.; Dagbjartsson, S.; Ernst, H.; Ledermann, H.; van Hecke, R. (Bonnenberg und Drescher Ingenieurgesellschaft m.b.H., Aldenhoven (Germany, F.R.); Fichtner, Beratende Ingenieure fuer Energie- und Waermewirtschaft G.m.b.H. und Co. K.G., Stuttgart (Germany, F.R.)). Jun 1976. vp. (In German). Dep. NTIS (US Sales Only), PC A11/MF A01.

The study comprises: 1) environmental pollution due to radioactive emissions; 2) personnel exposure during operation, maintenance, inspection, and repair; 3) environmental pollution due to the closing of the fuel cycle; 4) safety requirements; 5) state of the art of safety design; 6) reliability analyses; 7) the importance of the testability of systems and components relevant for safety. (HP) 891 HP.

2761 (INIS-mf--5319, pp 6) GASEOUS AND LIQUID RADIOACTIVE LEAKS FROM A-1 NUCLEAR POWER PLANT. Carach, J. (Krajska Hygienicka Stanica, Bratislava (Czechoslovakia)); Chorvat, D. (Komenskeho Univ., Bratislava (Czechoslovakia). Prirodovedecka Fakulta); Feik, K. (Atomova Elektraren Bohunice, Jaslovske Bohunice (Czechoslovakia)). [nd]. (In Slovak).

From 8. meeting on radiation hygiene; Medlov, Czechoslovakia (31 Oct 1977).

BOHUNICE A-1 REACTOR;LEAKS;CESIUM 137; GASEOUS WASTES;HUMAN POPULATIONS;LIQUID WASTES; MAXIMUM PERMISSIBLE EXPOSURE;PERSONNEL; RADIATION DOSES;RADIATION HAZARDS;RADIATION MONITORING;RADIOACTIVE EFFLUENTS; RADIOECOLOGICAL CONCENTRATION;RELEASE LIMITS; TRITIUM

2762 (JAERI-M--8063) USE OF LOW ENRICHED URANIUM FUEL CYCLE IN HIGH TEMPERATURE GAS-COOLED REACTORS. (Japan Atomic Energy Research Inst., Tokyo). Jan 1979. 60p. NTIS (US Sales Only), PC A04/MF A01.

In Japan, research and development of the experimental multipurpose VHTR (Very High Temperature gas-cooled Reactor) have been carried out with aiming at application of the reactor to process heat. The reactor employs the LEU fuel cycle because the cycle is compatible with the LWR-FBR line calling for Pu recycle in Japan. On the basis of the experience gained from these works and the above philosophy of fuel cycle, core models are constructed for commercial high temperature gas-cooled reactors (HTGR) with thermal output of 3000 MW, and the material balances of the reactor and the fuel cycle system are studied. Two core models are assumed for comparison; one is a VHTR with an outlet temperature of 1000°C for process heat application and the other a steam cycle HTGR with an outlet temperature of 750°C. Material balances are estimated for each model, which are uranium requirements during the life of 30 years, separative work, plutonium productions, generations of fission products (including ^{3}H and ^{14}C). The results are compared with each other and with LWR data. The comparison indicates that the savings of separative work and uranium requirements are larger in VHTR than in HTGR and that uranium requirements and plutonium productions per unit electric output are smaller in these HTR's than in LWR's. should be recycled to LWR's or FBR's, the integrated system of the fuel cycle consisting of fabrication of fuels, reprocessing and waste management are studied. In addition, the status and R and D requirements of each process are surveyed and some processes are also assessed from the viewpoints of proliferation resistance and environmental impact.

2763 (Juel--1603) INVESTIGATIONS ON THE GENERATION OF ACTINIDES IN THE HIGH TEMPERATURE REACTOR. Mirza, N. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung; Technische Hochschule Aachen (Germany, F.R.)). Jul 1979. 111p. (In German). NTIS (US Sales Only), PC A07/MF A01.

Thesis.

The actinides, especially the long lived α-emitters, generated in a fuel cycle, demand a safe storage of the nuclear waste due to their high contribution to the total radioactivity. In this work it has been investigated whether a possible limitation of actinide production can be achieved in the inner fuel cycle by means of proper arrangements and strategies. Concerning this problem a mathematical comparison of different HTR fuel cycles indicates that the Th-U cycle is the most suitable since it has relatively good conversion rate. A special feature of the Th-cycle is that an almost negligible small fraction of 100 ppm of Th-230 in Th-232 produces a considerable amount of U-232. This serves as the mother substance of further α-emitters like Th-228 and Ra-224 leading to a high level of γ-radiation. A combined HTR system of a conventional reactor and a near breeder has been investigated mathematically regarding its radioactive waste. The elements Pa, Np, Am and Cm as well as a 1% loss of Th, U and Pu pass into the waste during fuel reprocessing. However, due to the simultaneous operation of both reactors such an α-waste presents only a moderately higher level of radioactivity than that of the natural uranium used for this purpose. Furthermore, calculations have shown that in case nuclear energy is exclusively applied to meet the demand of the world population, by the help of described strategy the permanently growing nuclear waste would never reach the present level of radioactivity caused by all the natural uranium reserves.

2764 (UJV--4666-CH) PROCESSING OF SPENT NUCLEAR FUEL FROM HTGR REACTORS. REVIEW OF CURRENT STATE OF ART. Sraier, V. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Jan 1979. 26p. (In Czech). Dep. NTIS (US Sales Only), PC A03/MF A01.

A review is presented of problems connected with the regeneration of irradiated HTGR fuel and of the present status of regeneration process and equipment development. In addition to irradiated fuel regeneration and waste management, attention is paid to possible fuel cycles (the most significant is the Th-^{233}U fuel cycle).

2765 WYLFA DRY STORE. Maxwell, E.O.; Deacon, D. Nuclear Energy (Formerly Nuclear Energy Engineer) ; 19: No. 1, 41-51(Feb 1980).

The world's first air-cooled dry store for irradiated Magnox fuel elements has been built and commissioned at Wylfa nuclear power station. A second identical store is in its construction phase. Each new store has a capacity of 350 t of uranium. Irradiated fuel discharged from the reactors is stored in the existing CO_2 cooled dry store cells for a period of 150 days before it is transferred for storage in an air-cooled store. Safety

philosophy and design principles are discussed. Details are given of plant layout, design and operation development work and is described.

2766 REACTOR PHYSICAL INVESTIGATIONS OF ACTINIDE PRODUCTION AND TRANSMUTATION IN HTR REACTORS. Schaal, H.; Filges, D.; Neef, R.D. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung); Vidovszky, I. (Kozponti Fizikai Kutato Intezet (Hungary)). pp 27-30 of Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht. Sektion 1: Reaktorphysik. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980). (In German)
From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).
BURNUP;FUEL CYCLE;0 CODES;PEBBLE BED REACTORS;PROCESS HEAT REACTORS;PRODUCTION;R CODES;RADIOACTIVE WASTE DISPOSAL;TRANSMUTATION; TRANSURANIUM ELEMENTS;HTGR TYPE REACTORS; ACTINIDES

2767 SPENT-FUEL MANAGEMENT IN THE AVR AND INVESTIGATIONS ON SPENT FUEL ELEMENTS FOR DRY INTERMEDIATE STORAGE. Brinkmann, U.; Duwe, R.; Engelstaedter, R.; Storch, S. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.)); Wimmers, M. (Arbeitsgemeinschaft Versuchs-Reaktor G.m.b.H., Juelich (Germany, F.R.)). pp 497-500 of Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht. Sektion 4: Brennstoffkreislauf und Spaltstoff-Flusskontrolle. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980). (In German)
From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).
AFTER-HEAT;AIR;AVR REACTOR;COATED FUEL PARTICLES;KRYPTON 85;SPENT FUEL ELEMENTS;SPENT FUEL STORAGE;FUEL MANAGEMENT;TRITIUM

2768 ACCELERATOR MOLTEN-SALT BREEDER REACTOR. Furukawa, K.; Kuroi, H.; Kato, Y.; Oomichi, T. (to Japan Atomic Energy Research Inst., Tokyo). Japanese Patent 1954-120,399/A/. 18 Sep 1979. 3p. (In Japanese).
Purpose: To obtain fission products and to transmute transuranium elements and other radioactive wastes by the use of Accelerator Molten-Salt Breeder Reactor. Constitution: Beams from an accelerator pipe at one end of a target vessel is injected through a window into target molten salts filled inside of the target vessel. The target molten salts are subjected to pump recycling or spontaneous convection while forcively cooled by blanket molten salts in an outer vessel. Then, energy is recovered from the blanket molten salts or the target molten salts at high temperatures through electric power generation or the like. Those salts containing such as thorium 232 and uranium 238 are used as the blanket molten salts so that fission products may be produced by neutrons generated in the target molten salts. $PbCl_2$-PbF_2 and LiF-BeF_2-ThF_4 can be used as the target molten salts and as the blanket molten salts respectively.

2769 DEVICE FOR THE STORAGE OF IRRADIATED OR SPENT FUEL ELEMENTS FROM HIGH TEMPERATURE NUCLEAR REACTORS. Klein, D.; Pirk, H. (to Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,730,729/A/. 25 Jan 1979. 7p. (In German).
The intermediate storage space for the fuel elements of the THTR consists of a concrete chamber, in which there is a storage framework on a baseplate provided with ventilation ducts, which is made as a pipework framework, and which contains the fuel element containers. The walls of the concrete chamber are surrounded by an intermediate space on the outside, which has ambient air flowing through it with natural draught. The ambient air is led in and out through inlet and outlet ducts respectiveley for cooling the concrete the chamber and therefore the fuel elements. The concrete chamber itself is surrounded by further concrete shielding.

2770 ENCAPSULATION OF MAGNOX TYPE FUEL ELEMENTS FOR EXTENDED STORAGE IN COOLING PONDS. Baker, D.W.C.; Burt, G.A. (Central Electricity Generating Board, London (UK)). pp 269-289 of Compte rendu du seminaire de l'AEN sur le stockage des elements combustibles irradies. Paris, France; OECD (1978).
From Seminar on the storage of spent fuel elements; Madrid, Spain (Jun 1978).
A method of encapsulating spent fuel elements in a protective plastics medium to enable them to be stored for protracted periods under water, without risk of further significant corrosion, has been developed. It is visualised that the elements after discharge from the reactor would be allowed to cool under water for a period of at least 100 days and would then be encapsulated while remaining immersed. A suitable two pack system based on a solvent free epoxy resin cured with an aromatic amine adduct has been identified. The equipment and processes which have been developed for handling, conditioning and encapsulating the fuel are described.

2771 RADIOLOGICAL ASPECTS OF THE DESIGN OF A FACILITY TO SOLIDIFY RADIOACTIVE SLUDGE. Smitton, C. (Central Electricity Generating Board, Manchester (UK). Scientific Services Dept.); Williams, W.M. (Central Electricity Generating Board, Gwynedd (UK). Trawsfynydd Power Station). pp 143-150 of Radiation protection in nuclear power plants and the fuel cycle. Volume 1. London, England; British Nuclear Energy Society (1978).
From Conference on radiation protection in nuclear power plants and the fuel cycle; Bristol, UK (27 Nov 1978).
Corrosion of irradiated magnox fuel in the cooling ponds at Trawsfynydd Power Station led to an accumulation of radioactive sludge. It was necessary to solidify this sludge in a concrete matrix prior to transport and disposal off-site. The radiological aspects of the design philosophy of the solidification plant are described together with relevant aspects of the design, construction, commissioning, safety assessments and anticipated mode of operation.

2772 Stockage des elements combustibles irradies. (STORAGE OF SPENT FUEL ELEMENTS). Paris, France; OECD (1977). vp. (In French). (CONF-780658--).
From Seminar on the storage of spent fuel elements; Madrid, Spain (Jun 1978).
Separate abstracts have been prepared for items within the scope of the energy data base. (FS)

Power Reactors, Non-Breeding, Otherwise Moderated or Unmoderated

2773 (AECL--6534) DEVELOPMENT OF TECHNIQUES FOR RADWASTE SYSTEMS IN CANDU POWER STATIONS.

Bourns, W.T.; Buckley, L.P.; Burrill, K.A. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Apr 1979. 26p. (CONF-790374--2). Dep. NTIS (US Sales Only), PC A03/MF A01.

From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).

Techniques to reduce the volume of CANDU reactor wastes and to bituminize them are being developed at Chalk River Nuclear Laboratories (CRNL). Reverse osmosis is suitable for initial purification of dilute radioactive aqueous wastes. Tubular membranes are used to concentrate wastes to 5 wt % solids, and while the membranes do foul, they may be cleaned mechanically, chemically, or with fresh feed. A wiped-film evaporator then concentrates the retentate to a 20 wt % slurry. A twin screw extruder-evaporator has been used to bituminize this slurry, and it will also handle ion exchange resin and dry incinerator ash. Work on a wiped-film evaporator as a bituminizer for various feeds is in progress. More experience in handling solid feeds is needed before work can proceed to the demonstration phase.

2774 (CS-INIS--206, pp 6) FISSION PRODUCT DETERMINATION IN A-1 NUCLEAR POWER PLANT WASTE WATERS. Prochazka, H.; Kabelova, B. (Vyzkumny Ustav Veterinarniho Lekarstvi, Brno-Medlanky (Czechoslovakia)). [nd]. (In Czech).

From 4. colloquium on low level radioactivities; Salasky, Czechoslovakia (13 Sep 1977).

FISSION PRODUCTS;GEIGER-MUELLER COUNTERS;LI-DRIFTED GE DETECTORS;LIQUID CONTAMINATION MONITORS;LIQUID WASTES;RADIOACTIVE EFFLUENTS; BOHUNICE A-1 REACTOR;SOLID SCINTILLATION DETECTORS

2775 (IAEA-R--1710-F) COLLECTION OF GAMMA SPECTRA DATA AND CORRELATED ISOTOPIC DATA OF IRRADIATED MIXED OXIDE FUEL AND STUDY OF THE APPLICABILITY FOR SAFEGUARDS. FINAL REPORT FOR THE PERIOD 1 DECEMBER 1975 - 31 MARCH 1979. Natsume, H. (International Atomic Energy Agency, Vienna (Austria)). Jan 1980. 45p. NTIS (US Sales Only), PC A03/MF A01.

Gamma-ray spectrum data were obtained by means of non-destructive measurements with a Ge(Li) detector and associated equipment set up in a spent fuel storage pool at JPDR on a PuO_2 - UO_2 fuel rod taken out of an instrumented fuel assembly, IFA-159, which had been irradiated in the Halden Boiling Water Reactor (HBWR). Calibration of the non-destructive measurement was made based on the results of the destructive chemical analysis carried out on the ten samples. The chemical analysis results about uranium, neptunium, plutonium, americium, curium, neodymium and the gamma-ray emitting fission products are presented, as well as the values of burnup determined from those results. Procedures of the chemical analysis are also described in details.

2776 (IAEA-R--1733-F) INVESTIGATION OF TECHNIQUES FOR THE APPLICATION OF SAFEGUARDS TO A CONTINUOUSLY FUELLED REACTOR. FINAL REPORT FOR THE PERIOD 1 DECEMBER 1975 - 30 SEPTEMBER 1977. Hodgkinson, J.G.; Head, D.A. (International Atomic Energy Agency, Vienna (Austria)). Mar 1978. 10p. NTIS (US Sales Only), PC A02/atMF A01.

The following three areas of prime safeguards concern are analyzed: 1) at the reactor face, where spent fuel is first removed from the channel, 2) along the system for transporting spent fuel from the reactor to the storage bay, and 3) in the spent fuel storage bay. The program is designed to develop techniques and instruments to safeguard these areas.

2777 (N--79-22876) GAS CORE REACTORS FOR ACTINIDE TRANSMUTATION. ANNUAL REPORT. Clement, J.D.; Rust, J.H.; Wan, P.T.; Chow, S. (Georgia Inst. of Tech., Atlanta (USA). School of Nuclear Engineering). 1 Apr 1979. 75p. NTIS PC A04/MF A01.

The preliminary design of a uranium hexafluoride actinide transmutation reactor to convert long-lived actinide wastes to shorter-lived fission product wastes was analyzed. It is shown that externally moderated gas core reactors are ideal radiators. They provide an abundant supply of thermal neutrons and are insensitive to composition changes in the blanket. For the present reactor, an initial load of 6 metric tons of actinides is loaded. This is equivalent to the quantity produced by 300 LWR-years of operation. At the beginning, the core produces 2000 MWt while the blanket generates only 239 MWt. After four years of irradiation, the actinide mass is reduced to 3.9 metric tonnes. During this time, the blanket is becoming more fissile and its power rapidly approaches 1600 MWt. At the end of four years, continuous refueling of actinides is carried out and the actinide mass is held constant. Equilibrium is essentially achieved at the end of eight years. At equilibrium, the core is producing 1400 MWt and the blanket 1600 MWt. At this power level, the actinide destruction rate is equal to the production rate from 32 LWRs.

2778 REPORT OF THE TECHNOLOGICAL STUDY WORKING GROUP OF THE AEC COMMITTEE ON DEVELOPMENT OF ADVANCED POWER REACTORS. No. 110, 30-79(May 1979). (In Japanese).

Emphasis in the studies of the technological study working group of the AEC Committee on Development of Advanced Power Reactors was placed on the appreciation of current state of affairs in the technology of the advanced thermal reactor of Japan, CANDU reactors of Canada, and Pu utilization in LWRs, and on the exposure of problems in their usage for the nuclear power generation in Japan. The differences in the development stage and progress, the reactor types (D_2O, and light water), and the safety aspect were taken into consideration. The following matters are described: fundamental points of view; the advanced thermal reactor of Japan (development program, development of the demonstration reactor, the technological features of the demonstration reactor, and the developments in associated fields); CANDU reactors of Canada (600 MW standard-design reactors, technological features, compatibility with Japanese standards, and the developments in associated fields); Pu utilization in LWRs (significance, technology, and research/development); and conclusions.

2779 ENVIRONMENTAL ASPECTS OF TRITIUM FROM CANDU STATION RELEASES. Gorman, D.J.; Wong, K.Y. (Ontario Hydro, Toronto (Canada)). pp 623-633 of Behaviour of tritium in the environment. Vienna: International Atomic Energy Agency (1979).

From Symposium on the behavior of tritium in the environment; San Francisco, CA, USA (16 Oct 1978).

The sources, production and releases of tritium in gaseous and liquid effluents from CANDU stations as well as applicable regulatory and derived emission standards are discussed. To assess the environmental impact of these

releases, Ontario Hydro has been carrying out an environmental monitoring programme at all nuclear generating sites since 1971. The programme monitors critical and potentially important pathways and consists of monitoring tritium in air, precipitation, milk, drinking water and vegetation. Tritium releases from stations are of the order of 0.1% of the derived release limits leading to doses to individuals in the vicinity of the stations of about 1 mrem/a^{-1}. The environmental impact from an expanded CANDU programme is discussed. The effects on the Great Lakes basin are of particular importance since it is expected that the bulk of Ontario Hydro's future nuclear sites will be located along the shores of the Great Lakes. The implication of the recently promulgated International Joint Commission water quality objective is examined.

2780 SAFEGUARDS SCHEME FOR 600-MW CANDU GENERATING STATIONS. Tolchenkov, D.; Honami, M.; Jung, D. (International Atomic Energy Agency, Vienna (Austria)); Smith, R.M.; Vodrazka, P. (Atomic Energy of Canada Ltd., Mississauga, Ontario); Head, D.A. (Atomic Energy Control Board, Ottawa, Ontario (Canada)). pp 407-423 of Nuclear safeguards technology 1978. Vol. 1. Vienna, Austria; International Atomic Energy Agency (1979).

From IAEA symposium on nuclear material safeguards; Vienna, Austria (2 Oct 1978).

The on-power fuelling of CANDU reactors results in the continual discharge of spent fuel and input of fresh fuel, a feature which poses some unique safeguarding problems. This paper presents one possible safeguards approach for the CANDU 600-MW PHWR, developed by Atomic Energy of Canada Limited (AECL), Atomic Energy Control Board (AECB) and the International Atomic Energy Agency (IAEA). The safeguards approach suggested in this paper is based on the use of item accounting of fuel bundles and containment/surveillance measures. It enables the IAEA to meet its objective of the timely detection of the diversion of significant quantities of nuclear material. An inspection scenario, including the frequency of inspection and the inspection activities which could be used, is presented to indicate the function of various items of safeguards equipment in the scheme, although other frequencies and procedures can be equally valid.

2781 CONTAINMENT VESSEL, ITS AUXILIARY SYSTEM AND PLANT AIR CONDITIONING SYSTEM OF ADVANCED THERMAL REACTOR FUGEN. Kon-ya, K. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)); Usui, K. Doryokuro Giho (Power Reactor Technology (Tokyo)) ; No. 28, 41-98(Nov 1978). (In Japanese).

The functional requirement for, the design and the construction of, and the functional test on the containment vessel, its auxiliary system, the plant air conditioning and ventilation system of the advanced thermal reactor, Fugen, are described in detail. The main specifications of the containment vessel are as follows: The type enclosed cylinder, the maximum operating pressure 1.35 kg/cm^2g, the maximum operating temperature 100 deg C, the leak rate 0.4%/day, the inner diameter 36 m. The height 64 m, the volume 40,900 m^3, and the material JIS G3118, SGV-49. The containment vessel is provided with an hatch of 5 m diameter for carrying equipments in two air locks, many high and low voltage cable penetrations, pipe penetrations, a transfer shoot and isolation values. The functions and the specifications of the containment vessel and its auxiliary equipments are explained. The relating auxiliary systems are composed of the containment vessel spray system, the pool facility for steam blow-down, the recirculation system for the air in the vessel, the annulus evacuation system and its pressure control devices, the pressure measuring instruments and pressure relief valves and the temperature measuring devices for the containment vessel, and the object, function, layout and installation of these systems are explained. Concerning the air conditioning system, each main building has the special subsystem, and they are introduced. The progress stage of construction works and the procedure and results of the functional test at the site are described. (Nakai, Y.).

2782 CANDU STORY. Pon, G.A. (Atomic Energy of Canada Ltd., Sheridan Park, Ontario. Power Projects). In-Site ; 1: No. 10, 48-50(Oct 1978).

Some history of the CANDU reactor program is presented along with considerable emphasis on present and future construction and export programs. Radioactive waste disposal programs and fuel cycle studies are very briefly touched upon.

2783 PRE-COMMISSIONING OF HEAVY WATER REACTOR 'FUGEN'. Ando, T.; Moriyama, T. (Fuji Electric Co. Ltd., Kawasaki, Kanagawa (Japan)); Mizushima, T. FAPIG (Tokyo) ; No. 90, 2-10(Oct 1978). (In Japanese).

The advanced thermal prototype reactor ''Fugen'' is a heavy water-moderated, boiling light water-cooled reactor constructed by Power Reactor and Nuclear Fuel Development Corp. in Tsuruga City, and it was developed for the first time independently in Japan. The electric power output is 165 MW, and its features are good neutron economy, diversity of usable fuel and small amount of required uranium, and easy replacement of fuel. It is intended to develop toward the design and construction of a next larger reactor by accumulating operational experiences and technologies regarding heavy water moderated reactors. The main installations, of which FAPIG has taken charge, are the fuel-handling and storage facility, the technological safety protection facility, the radioactive waste treatment facility, the radiation monitoring system, and the broken fuel detection system. The object of precommissioning test is to prove the overall performance of the plant so that it is sufficiently safe to load the core with fuel by carrying out the function-proving test of each facility or system and the system combination test. The ranking, basic plan, execution plan, organization and the content of the precommissioning test on the main facilities ordered from FAPIG are described. Various problems arose during the test, but they were solved satisfactorily, and the test of raising the output power is in progress now.

2784 PRE-COMMISSIONING TEST OF HEAVY WATER REACTOR ''FUGEN''. Andoh, T.; Moriyama, T. (Fuji Electric Co. Ltd., Kawasaki, Kanagawa (Japan)); Kushima, T. Fuji Jiho (The Fuji Electric Journal) ; 51: No. 9, 474-481(Sep 1978). (In Japanese).

The advanced thermal prototype reactor ''Fugen'' is a power-generating reactor of heavy water moderated, boiling light water cooled, pressure tube type, and is constructed in Tsuruga City by Power Reactor and Nuclear Fuel Development Corporation. It has been developed independently in Japan, and the electric power output is rated at 165 MW. The features of Fugen are good neutron economy, the diversity of usable fuel, the small amount of

required uranium as compared with LWRs, and the construction of easy fuel exchange. The design and construction of the demonstration reactor are expected after accumulating the operational experience and obtaining the technological data. The object of pre-commissioning test is to confirm the overall performance of the plant so that it is sufficiently safe to charge the core with fuel. The basic and practical plans of the pre-commissioning test and the contents of the test are explained. Fuji Electric Co., Ltd. carried out the tests on fuel-handling equipments, waste treatment facilities, technological safety and protection equipments, radiation-monitoring equipments and broken fuel detection equipment. Good results were obtained in the tests carried out so far. Several problems occurred during the tests, but they were solved satisfactorily. The power-up test is under way, and all tests will be completed in March, 1979.

2785 IMPACTS OF REACTOR-INDUCED DEFECTS ON SPENT FUEL STORAGE. Johnson, A.B. Jr. (Battelle Pacific Northwest Labs., Richland, WA (USA)). pp 235-253 of Compte rendu du seminaire de l'AEN sur le stockage des elements combustibles irradies. Paris, France; OECD (1978).

From Seminar on the storage of spent fuel elements; Madrid, Spain (Jun 1978).

Defects arise in the fuel cladding on a small fraction of fuel rods during irradiation in water-cooled power reactors. Defects from mechanical damage in fuel handling and shipping have been almost negligible. No commercial water reactor fuel has yet been observed to develop defects while stored in spent fuel pools. In some pools, defective fuel is placed in closed canisters as it is removed from the reactor. However, hundreds of defective fuel bundles are stored in numerous pools on the same basis as intact fuel. Radioactive species carried into the pool from the reactor coolant must be dealt with by the pool purification system. However, additional radiation releases from the defective fuel during storage appear to be minimal, with the possible exception of fuel discharged while the reactor is operating (CANDU fuel). Over approximately two decades, defective commercial fuel has been handled, stored, shipped and reprocessed.

2786 MONITORING OF GASEOUS EFFLUENTS IN ONTARIO HYDRO. Kabat, M.J. pp 45-53 of Monitoring of airborne and liquid radioactive releases from nuclear facilities to the environment. Vienna, Austria; International Atomic Energy Agency (1978).

A method for generating hypoiodous acid was developed for the purpose of ventilation filter testing. A selective iodine species sampler was also developed and used for the selective sampling of iodine species in Candu power station areas. It is now possible to perform an analysis of iodine species in gaseous effluents when a significant iodine release occurs.

2787 NUCLEAR ENERGY IN OUR TIME. Jervis, R.E.; Hewitt, J.S. (Toronto Univ., Ontario (Canada)). pp 101-131 of Our energy options. Seven important aspects of electric power planning examined by well-known authorities. Toronto, Canada; Royal Commission on Electric Power Planning (1978).

A layman's guide to nuclear power is presented, with particular emphasis on the history and characteristics of the Canadian nuclear program.

2788 MANAGEMENT OF RADIOACTIVE WASTE FROM RAJASTHAN ATOMIC POWER STATION. Balu, K.; Bhatia, S.C.; Ali, S.S. (Bhabha Atomic Research Centre, Bombay (India)). pp 358-362 of Operating experience of nuclear reactors and power plants. Bombay, India; Department of Atomic Energy (1977).

From Symposium on operating experience of nuclear reactors and power plants; Bombay, India (7 Feb 1977).

Handling of radioactive waste from the Rajasthan Atomic Power Station, India, over the last 4.5 years is explained. The experiences encountered are rather unique and serious since RAPP is an inland station, where the criteria for environmental discharges are more stringent. The wastes are handled either as primary systems waste or as waste from secondary service facilities. The present waste management practices followed in either case are described in detail. The volume of waste handled and the gross activity level are reported. Problems likely to be encountered in future especially in the spent resin/filter cakes generated from the SFSB, moderator or the PHT system are also discussed, along with the remedial actions planned.

2789 RADIOACTIVE SOLID WASTE MANAGEMENT AT TROMBAY. Jayaraman, A.P.; Balu, K. pp 363-370 of Operating experience of nuclear reactors and power plants. Bombay, India; Department of Atomic Energy (1977).

From Symposium on operating experience of nuclear reactors and power plants; Bombay, India (7 Feb 1977).

The Radioactive solid waste management programme at BARC, India during 1965-1975 is described in detail. The operational experience, which includes the handling treatment and disposal of these solid wastes is reported alongwith the special problems faced in the case of large volume low hazard potential wastes from the nuclear fuel cycle.

2790 CANADIAN NUCLEAR POWER PROGRAM. Foster, J.S. (Atomic Energy of Canada Ltd., Ottawa, Ontario). Canadian Electrical Engineering Journal ; 1: No. 1, 3-14(Jan 1976).

Nuclear-electric generating stations, predominantly the 2000 MWe Pickering station near Toronto, currently produce 5 per cent of Canada's electric energy. By the year 2000 nuclear plants will probably supply more than 40 per cent of the country's electricity. The CANDU system, featuring pressure tube reactors, heavy water moderator and natural uranium fuel, is the preferred type and will remain so for many years to come. Envisaged is the evolutionary development of the CANDU fuel cycle to embrace the use of thorium and thereby extend nuclear fuel resources by a matter of centuries. The history of the Canadian nuclear power program, its present status and future outlook are reviewed, as are the safety and environmental aspects of nuclear power.

Power Reactors, Breeding

2791 (BNL--50991, pp 287-295) REACTOR APPLICATION OF ACTINIDE CROSS SECTION DATA. Beaman, S.L.; Cowan, C.L. (General Electric Co., Sunnyvale, CA). May 1979.

From Conference on the nuclear data of higher plutonium and americium isotopes for reactor applications; Upton, NY, USA (20 Nov 1978).

Uncertainties in the cross section data for the higher plutonium and americium isotopes

have been investigated to determine their impact on the important LMFBR design parameters. The results of this investigation have indicated that the design calculations are sensitive to the uncertainties in the capture and fission data for ^{240}Pu and ^{241}Pu, and for long-term design applications these uncertainties should be reduced to less than about 10%. The uncertainties in the data for ^{242}Pu and for the americium isotopes have only a small impact on the fast reactor design studies but may be important in the development of schemes for the management of actinide waste discharge and for plutonium burnout.

2792 (SAND--78-2317) DEVELOPMENT OF BORON CARBIDE-COPPER CERMETS. STATUS REPORT. (Sandia Labs., Albuquerque, NM (USA)). Sep 1979. Contract EY-76-C-04-0789. 58p. Dep. NTIS, PC A04/MF A01.

The status of a program to develop a B_4C-Cu cermet for Breeder Reactor spent-fuel shipping cask neutron shields is presented. It is shown that inspectable 6 to 7 cm thick 60 to 70 volume percent B_4C cermets can be fabricated using hot isostatic powder processing procedures. An alternative manufacturing method, rheocasting, also appears to be a promising, perhaps more cost-effective method for producing these cermets. Recommendations for further development of these manufacturing processes are given.

2793 (SAND--79-1366) THERMAL EVALUATION FACILITY FOR LMFBR SPENT FUEL TRANSPORT. Wesley, D.A. (Sandia Labs., Albuquerque, NM (USA)). Apr 1980. Contract AC04-76DP00789. 107p. NTIS, PC A06/MF A01.

A full-scale mock-up of a 217 pin breeder reactor fuel assembly in a cylindrical pipe was initially designed and constructed by Oak Ridge National Laboratory (ORNL). It was transferred to Sandia where it was extensively redesigned and modified. The 217 pin hexagonal core assembly was installed in a smaller diameter stainless steel pipe which more closely represents the diameter of a shipping canister or shipping cask basket wall. Two-hundred four of the tubes are electrically heated over an active length of 4-feet and the remaining thirteen are instrumented with multiple junction thermocouples which can be traversed axially. Thermocouples and heat-flux gauges are located on the hex core and canister perimeters at several axial locations.

2794 FUEL CYCLE IN FAST NEUTRON REACTORS. Guillet, M. (CEA Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-les-Durance (France). Service de Developpement et d'Essais d'Elements Combustibles). Revue Generale Nucleaire ; No. 6, 647-658(Nov-Dec 1979). (In French).

After discussing the overall fuel in fast neutron reactors, the author successively examines questions relating to the properties and use of plutonium in breeder reactors, fuel materials and transport, handling and storage of radioactive material. He then analyzes re-processing and work presently being done in this field.

2795 POWER PRODUCTION AND ACTINIDE ELIMINATION BY FAST REACTOR RECYCLE. Murphy, D.J. Jr.; Farr, W.M.; Ganapol, B.D. (Univ. of Arizona, Tucson). Nuclear Technology ; 45: No. 3, 299-306(Oct 1979).

Elimination of long-lived transplutonium actinides by fissioning in a generic actinide burner reactor (a reactor fueled solely with waste actinides) was investigated. The results showed that actinide elimination by fissioning is enhanced by increasing the average energy of the neutron flux spectrum. In addition, the reactivity worths and the fission-to-capture rate ratios of the individual actinide nuclides increased with increasing flux spectrum energy. This suggests that specially designed fast reactors of relatively small size and having metal alloy fuel may effectively dispose of the waste actinides produced by several large light water reactors in a mixed reactor community. The fuel value of waste actinides was studied, and the replacement of at least some conventional mixed-oxide fast reactor fuel by waste actinides (to conserve a fuel resource) was proposed. It is calculated that the time required to reach equilibrium actinide concentrations in the reactor core, after many refueling periods, is shorter for reactors having higher neutron flux energies. Also, increasing the specific power density within the reactor core both decreases the equilibrium actinide concentrations in the core and increases the time required for equilibrium conditions.

2796 CONTRIBUTION OF DOUNREAY TO THE DEVELOPMENT OF FAST REACTORS. Blumfield, C.W. (UKAEA Dounreay Nuclear Power Development Establishment). Nuclear Energy (Formerly Nuclear Energy Engineer) ; 18: No. 5, 311-326(Oct 1979).

A review is presented of the fast reactor work performed at Dounreay on fuel and core materials, the reactor system, and fuel reprocessing. The following topics are discussed:-Dounreay's role in the development work on ceramic fuels leading to a specification for PFR fuel; irradiation behaviour of materials, eg., quantification of effects of irradiation in mechanical properties, irradiation creep of stainless steels and work on void swelling; monitoring or reactor components and coolant; investigation of the performance of highly rated fuel under adverse conditions; and testing of oxide fuel elements in PFR. The determination of the behaviour of PFR boiler tubes and the study of the features large leaks, including the sodium-water reaction have been investigated in the large Super-NoaH rig at Dounreay are described. Finally development work for PFR fuel reprocessing is discussed. This includes the dismantling of fuel assemblies, fuel dissolution, volume reduction and segregation of contaminated waste, and treatment of radioactive waste.

2797 FUEL TRANSPORTING DEVICE. Shiratori, H. (to Toshiba Corp., Kawasaki, Kanagawa (Japan)). Japanese Patent 54-99,894/A/. 7 Aug 1979. 2p. (In Japanese).

For a liquid-metal cooled reactor, a method is described of reducing the waiting time of fuel handling apparatuses and shorten the fuel exchange time. A fuel transporting machine is arranged between a reactor vessel and an out-pile storage tank, thereby dividing the transportation line of the pot for contracting fuel and transporting the same. By assuming such a construction, the flow of fuel transportation which has heretofore been carried out through fuel transportation pipes is not limited to one direction but the take-out of fuels from the reactor and the take-in thereof from the storage tank can be carried out constantly, and much time is not required for fuel exchange.

2798 SOME PROBLEMS OF THE RADIATION SAFETY OF

FAST REACTOR FUEL CYCLE. Bakumenko, O.D.; Ikhlov, E.M.; Kulakovskij, M.Ya. Atomnaya Energiya ; 46: No. 6, 378-381(Jun 1979). (In Russian).

Investigated is the main physical parameters of fuel in fast power reactors which determine the radiation situation when handling fuel at various stages of the external fuel cycle, in particular when fuel is fabricated from reprocessed material and spent fuel is transported from a nuclear power plant to a chemical reprocessing plant. Results of calculations can serve as the initial data when designing technological circuits for fabricating fast-reactor fuel from reprocessed material and when transporting spent fuel.

2799 FUEL ASSEMBLIES. Nakatsuka, M. (to Toshiba Corp., Kawasaki, Kanagawa (Japan)). Japanese Patent 54-30,396/A/. 6 Mar 1979. 3p. (In Japanese).

Purpose: To prevent scattering of gaseous fission products released from fuel assemblies stored in an FBR type reactor. Constitution: A cap provided with means capable of storing gas is adapted to amount to the assembly handling head, for example, by way of threading in a storage rack of spent fuel assemblies consisting of a bottom plate, a top plate and an assembly support mechanism. By previously eliminating the gas inside of the assembly and the cap in the storage rack, gaseous fission products upon loading, if released from fuel rods during storage, are stored in the cap and do not scatter in the storage rack. (Horiuchi, T.).

2800 VESSEL FOR SPENT FUEL STORAGE. Nakatsuka, M. (to Toshiba Corp., Kawasaki, Kanagawa (Japan)). Japanese Patent 1954-8294/A/. 22 Jan 1979. 3p. (In Japanese).

Purpose: To safely store fuel rods used in a fbr type reactor and generating internal pressure by fission products and the like after irradiation without failure thereof. Constitution: The spent fuel storage is of a pressure vessel type. Water is used as a pressure medium, and an inert gas such as argon or the like is sealed in a part of said vessel or only the gaseous body is used as a pressure medium. The vessel constituted as above described can retain the pressure up to a value of 20 kg/cm^2. Accordingly, the stress generated in the cladding tube can be made into zero by balance adjusting and controlling the same with the internal pressure within the cladding tube, thereby preventing the failure of the cladding tube in storage.

2801 CASE STUDY TWO. THE FAST BREEDER REACTOR. pp 12-24 of Assessment of technical decisions. Case studies. Braun, E.; Collingridge, D.; Hinton, K. London; Butterworths (1979).

Short descriptions are given of the Magnox type thermal reactor and the sodium cooled fast breeder reactor. The arguments in favour of a UK breeder programme are summarized. The objections are set out at greater length, under the headings: doubts about the energy gap, uranium supplies, reactor safety, reactor siting, protection of radioactive substances (in particular, Pu), waste disposal, proliferation of nuclear weapons, research and development expenditure.

2802 STATUS OF THE SAFEGUARDS SYSTEM DEVELOPED FOR THE LMFBR PROTOTYPE POWER PLANT SNR-300 (KKW KALKAR). Krinninger, H. (Internationale Natrium-Brutreaktor-Bau G.m.b.H., Bergisch Gladbach (Germany, F.R.)); Brueckner, C. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)); Quandt, U.; Ruppert, E. (Internationale Atomreaktorbau G.m.b.H. (INTERATOM), Bergisch Gladbach (Germany, F.R.)); Tschampel, H. (Dr. Seufert GmbH, Karlsruhe, Germany, F.R.); Hulst, P. van der (Schnell-Brueter-Kernkraftwerksgesellschaft m.b.H. (SBK), Essen (Germany, F.R.)). pp 483-506 of Nuclear safeguards technology 1978. Vol. 1. Vienna, Austria: International Atomic Energy Agency (1979).

From IAEA symposium on nuclear material safeguards; Vienna, Austria (2 Oct 1978).

In this report the features of the safeguards system developed for the LMFBR Prototype Power Plant SNR-300 (KKW Kalkar) are described. Due to the fact that LMFBR fuel assemblies are mostly handled in a sodium or inert gas environment, visual control and counting of the assemblies containing nuclear material, as routinely used in a LWR power plant, cannot be applied for LMFBRs. Consequently, for safeguarding the Kalkar Nuclear Power Station, an automatic and continuous monitoring of the fissile material inventory is the main objective of special instrumentation, the "Inaccessible Inventory Instrumentation System" (IIIS). For a qualitative distinction between the various types of assembly the detection of the emitted neutron and gamma radiation turned out to be most adequate. Based upon this conclusion and taking into account its tasks, the IIIS is composed of an activity measurement system, a position-sensing system and a micro-computer system (MCS). The high reliability, high fraud resistance and low maintenance requirements have had an important influence on the IIIS design. Access to IIIS data is protected by special hardware and software measures. To protect the system against the results of power failures the IIIS possesses an automatic restart facility and a battery-buffered power supply for the RAM-unit of the microprocessor system used for data acquisition and evaluation.

2803 SEALED CONNECTION BETWEEN FISSION GAS OUTLET DUCTS. Jung, W.; Peehs, M.; Rau, P.; Krug, W.; Stechemesser, H. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,633,192/C/. 21 Sep 1978. 6p. (In German).

The fuel element of the gas cooled (e.g. helium cooled) fast breeder reactor is conical at the transition to the core support plate and sits in a cone of the core support plate. There is a standard leakage position at this transition point. Through this, a fission gas flow is taken from the fuel element by part of the main coolant gas flow through a duct in the core support plate. The standard leakage position is accommodated in a sealed connection. The connection consists mainly of a capsule. In this there is an annulus with a central hole, which is connected to the duct in the core support plate and the fuel element. The annulus is pressed tightly to the core in the support plate by a compression spring. The play in the annulus is limited by a central pin. A radial hole in the annulus acts as the standard leakage position, which is situated in the connection between the central hole in the annulus and the main coolant gas flow.

2804 OUTLINE OF THE PRELIMINARY WORKING DESIGN (1) OF PROTOTYPE FBR "MONJU". Doryokuro Giho (Power Reactor Technology

(Tokyo)) ; No. 27, 78-104(Aug 1978). (In Japanese).

Following the conceptual design, the preliminary working design (1) of the prototype fast breeder reactor "Monju" has been completed by five industrial firms. The design connects the conceptual design to the actual working design. In this design, therefore, the designs were detailed in coordination of machinery, pipings, wirings, etc. with building structures. Prior to the design, recheck was made on the basis of the results of design studies and research and development, and the specifications were partially modified. It serves also for the purpose of governmental safeguard inspection. The features of the prototype FBR Monju are heat output of 714 MW, electric output of 300 MW, fuel of PuO_2-UO_2, breeding ratio of 1.2, and coolant of sodium. The following matters are described: reactor core, reactor construction, fuel handling system, heat transfer system, steam generating system, turbo-generator system, plant operation mode, electric, instrumentation and control equipments, radioactive waste treatment facility, layout, buildings and containment, etc..

Regulation and Licensing

2805 (INIS-mf--4767) OPERATIONAL SAFETY EXPERIENCE REPORTING IN THE UNITED STATES. Hartfield, R.A. (Nuclear Regulatory Commission, Washington, DC (USA)). 1978. 10p. (CONF-781022--68). Dep. NTIS (US Sales Only), PC A02/MF A01.

From Meeting on nuclear power reactor safety; Brussels, Belgium (16 Oct 1978).

Licensees of nuclear power plants in the United States have many reporting requirements included in their technical specifications and the code of federal regulations, title 10. The Nuclear Regulatory Commisson receives these reports and utilizes them in its regulatory program. Part of this usage includes collecting and publishing this operating experience data in various reports and storing information in various data systems. This paper discusses the data systems and reports on operating experience published and used by the NRC. In addition, some observations on operating experience are made. Subjects included are the Licensee Event Report (LER) Data File, the Operating Unit Status Report (Gray Book), Radiation Exposure Reports, Effluents Reports, the Nuclear Plant Reliability Data System, Current Events, Bulletin Wrapups and Annual Summaries. Some of the uses of the reports and systems will be discussed. The Abnormal Occurence Report to the US Congress is described and discussed.

2806 (NUREG/CP--0008) STATE WORKSHOPS FOR REVIEW OF THE NUCLEAR REGULATORY COMMISSION'S DECOMMISSIONING POLICY. (Nuclear Regulatory Commission, Washington, DC (USA). Office of Standards Development). Dec 1979. 520p. (CONF-7909106--; CONF-7909107--). NTIS.

From State workshop of review of the Nuclear Regulatory Commission's decommissioning policy; Seattle, WA, USA (25 Sep 1979).

Separate abstracts are included for each presentation concerning the US NRC policies on the decommissioning of nuclear power plants, fuel fabrication plants, fuel reprocessing plants, and radioactive waste burial sites.

2807 (NUREG/CP--0008, pp 375-399) SUGGESTED POLICY AND RULE CHANGES. Calkins, G.D. Dec 1979.

From State workshop of review of the Nuclear Regulatory Commission's decommissioning policy; Seattle, WA, USA (25 Sep 1979).

Preliminary thoughts on regulatory changes for decommissioning are presented. The technical reports from Battelle, Pacific Northwest Laboratory, the preliminary staff studies on financial assurance and radioactive residues, and the preliminary draft generic environmental impact statement of Carl Feldman are the sources of information.

2808 (NUREG/CP--0008, pp 137-157) BOILING WATER REACTOR. Smith, R.I. Dec 1979.

From State workshop of review of the Nuclear Regulatory Commission's decommissioning policy; Seattle, WA, USA (25 Sep 1979).

The preliminary results are presented from the boiling water reactor analyses which are still going on. The questions that are presented in the addendum to the original pressurized water study are discussed.

2809 (NUREG/CP--0008, pp 164-194) PRESSURIZED WATER REACTOR ADDENDUM. Smith, R.I. Dec 1979.

From State workshop of review of the Nuclear Regulatory Commission's decommissioning policy; Seattle, WA, USA (25 Sep 1979).

The Trojan plant located near Portland, Oregon, a 1175 megawatt machine with a four-loop Westinghouse nuclear steam supply system, is analyzed in terms of decommissioning.

2810 (NUREG/CP--0008, pp 268-306) RESIDUAL RADIOACTIVITY. Battist, L. Dec 1979.

From State workshop of review of the Nuclear Regulatory Commission's decommissioning policy; Seattle, WA, USA (25 Sep 1979).

The establishment of a standard concerning the acceptable residual radioactivity for a decommissioned nuclear facility is described. The nuclear facilities discussed include nuclear power plants, fuel fabrication plants, fuel reprocessing plants, and radioactive waste burial grounds.

2811 (NUREG/CP--0008, pp 314-371) GENERIC ENVIRONMENTAL IMPACT STATEMENT. Feldman, C. Dec 1979.

From State workshop of review of the Nuclear Regulatory Commission's decommissioning policy; Seattle, WA, USA (25 Sep 1979).

NRC is reexamining its policy and rule-making concerning decommissioning, and that can have a major impact on the quality of the environment, and, therefore, an environmental impact statement is required. The technical alternatives, and the major environmental impacts are discussed.

2812 (STI/PUB--500) DECOMMISSIONING OF NUCLEAR FACILITIES. (International Atomic Energy Agency, Vienna (Austria)). Jul 1979. 706p. (CONF-781180--). IAEA.

From International symposium on the decommissioning of nuclear facilities; Vienna, Austria (13 Nov 1978).

Information on the decommissioning of nuclear facilities is presented under the following main topics: policy and standards development; engineering considerations to decommissioning; radiological release considerations and waste classification; decommissioning experience; and decontamination and remote operations.

2813 PARTICIPATION OF THE PUBLIC IN THE

LICENSING PROCEDURE UNDER SECTION 6 OF THE ATOMIC ENERGY ACT. LICENSING PROCEDURE FOR INTERMEDIATE STORAGE. Strassburg, W. (Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen m.b.H. (DWK), Hannover (Germany, F.R.)). Atomwirtschaft, Atomtechnik ; 25: No. 5, 254-258(May 1980). (In German).

The licensing procedure under Section 6 of the German Atomic Energy Act, which must be carried out also for temporary storage facilities for spent nuclear fuels, does not provide for a participation by the public. However, political demands want a broad public involvement in this procedure to be established. This political demand would mean a loss of the simplicity of the licensing procedure under Section 6 and the flexibility attached to it. In a positive vein, this could be regarded as an accelerating factor, it it helped to avoid legal disputes at some later date, as is the case with Section 7 of the Atomic Energy Act. However, despite the participation of the public in a procedure under Section 6 as applied to the temporary spent fuel storage facility, nobody would be prevented from raising objections in the current procedure which he could have submitted in writing during the phase of public display.

2814 STATUS OF SPENT-FUEL STORAGE POOL APPLICATIONS. Carter, T.J. (Nuclear Regulatory Commission, Washington, DC). Transactions of the American Nuclear Society ; 32: 677-678(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

NUCLEAR POWER PLANTS;BWR TYPE REACTORS;PWR TYPE REACTORS;SPENT FUEL STORAGE;FUEL POOLS; FUEL RACKS;LEGAL ASPECTS;US NRC

2815 EXPERIENCE WITH LOCAL/STATE INTERVENTIONS FOR RERACKING TROJAN SPENT-FUEL POOL. Frewing, J.L.; Owens, J.T. (Portland GE, OR). Transactions of the American Nuclear Society ; 32: 678(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

TROJAN REACTOR;SPENT FUEL STORAGE;FUEL RACKS; MODIFICATIONS;LEGAL ASPECTS

2816 DECOMMISSIONING NUCLEAR POWER PLANTS: WHAT ARE THE PROBLEMS THAT NEED TO BE OVERCOME. Martin, A. (Associated Nuclear Services, London (UK)). Nuclear Engineering International ; 24: No. 286, 37-42(Jun 1979).

Increasing attention is being given nationally and internationally to the treatment of redundant nuclear power stations. Useful, if limited, practical experience has been gained in decommissioning research reactors, and development programmes are being undertaken well in advance of actual need into the problems of decommissioning commercial plants. This broad survey of the main issues involved looks at the radioactive inventory, costs, waste disposal, site considerations, time scales, regulatory requirements and plant design. It concludes that on balance the preferred choice may be to defer final dismantling of the reactor except in special cases.

2817 RADIOACTIVE MATERIALS IN CALIFORNIA. Johnson, H.D. Sacramento, CA: Resources Agency (1979). 599p. (NP--24441).

The Task Force has focused on four broad issue areas. In each case an effort has been made to identify the State and Federal agencies with jurisdictional responsibilities, and to determine the nature of current regulatory programs. These issue areas are: state regulation of users of radioactive materials; environmental surveillance and radiation monitoring; decontamination and decommissioning of facilities (including nuclear power plants) at which radioactive materials are used; and transportation of radioactive materials. The Task Force has also conducted a cursory examination of a number of issues relevant to nuclear power plants. These issues are: nuclear power plant emergency plans; low-level radioactive waste disposal; high-level radioactive waste disposal; spent fuel storage; and reactor safety.

2818 RADIOACTIVE MATERIALS IN CALIFORNIA. Sacramento, CA; Resources Agency (1979). 149p. (NP--24441(Exec.Summ.)).

Information on the State of California regulations related to radioactive materials is presented concerning radioactive materials at nonpower facilities; nuclear power plants and radioactive wastes; environmental surveillance and radiation monitoring; decommissioning and decontamination of radioactive facilities; and transportation of radioactive materials.

2819 APPLICATION FOR A LICENSE FOR COMPACT STORAGE OF SPENT FUEL ELEMENTS IN BLOCK 1 OF PHILIPPSBURG NUCLEAR POWER PLANT AND GK NECKAR NUCLEAR POWER PLANT. GRS (Gesellschaft fuer Reaktorsicherheit) Kurz-Information, Reihe E ; No. 22, 1(1979). (In German).

FUEL POOLS;LICENSING;NECKAR REACTOR; PHILIPPSBURG-1 REACTOR;SPENT FUEL STORAGE

2820 MATERIALS ON ATOMIC ENERGY PROBLEMS. Kollert, R. Frankfurter Hefte. Zeitschrift fuer Kultur und Politik ; 34: No. 3, 10-12(1979). (In German).

The author cites and comments legal opinions on problems of atomic energy, i.e. the decision of the Federal Constitutional Court concerning kalkar and the plutonium economy; Judges of the Federal Constitutional Court on technology and hazards; the 'atomic state'; plutonium at Gorleben; a new safty philosphy after Harrisburg; salt domes unsuitable for atomic waste.

2821 ALTERATION OF REACTOR INSTALLATIONS (UNIT 1 AND 2 REACTOR FACILITIES AND SPENT FUEL DISPOSAL) IN HAMAOKA NUCLEAR POWER STATION OF THE CHUBU ELECTRIC POWER CO., LTD. Genshiryoku Iinkai Geppo (Journal of Atomic Energy Commission) ; 23: No. 7, 2-5(Sep 1978). (In Japanese).

A report of the Committee on Examination of Reactor Safety to the Atomic Energy Commission of Japan concerning the alterations of reactor installations in Hamaoka Nuclear Power Station of The Chubu Electric Power Co., Ltd. is presented. Their safety was confirmed. The alterations are as follows. For disposal of radioactive solid wastes (from both Unit 1 and 2): the capacity of the solid waste storage is increased; tanks storing powder resin in condensate system are installed; a miscellaneous solid waste storage is installed; an incinerator burning miscellaneous combustible solid wastes is installed; and a site bunker for storing spent in-core structures is installed. In the condensate desalting equipment (for Unit 2), a filtration desalting system is installed. In the reactor containment facility (Unit 1), a system for controlling inflammable gas concentration is installed.

2822 ALTERATION OF REACTOR INSTALLATION (UNIT 1 REACTOR FACILITY) IN FUKUSHIMA NUCLEAR POWER STATION NO. 2 OF THE TOKYO ELECTRIC POWER COMPANY, INC. Genshiryoku Iinkai Geppo (Journal of Atomic Energy Commission) ; 23: No. 7, 5-6(Sep 1978). (In Japanese).

A report of the Committee on Examination of Reactor Safety to the Atomic Energy Commission of Japan concerning the alteration of reactor installation in Fukushima Nuclear Power Station No. 2 of The Tokyo Electric Power Company, Inc. is presented. Its safety was confirmed. The alteration is as follows. Capacity of the spent fuel storage is increased to about 230% as much as the amount of reactor core from the previous capacity of about 140%. Instead of the conventional type, the control rods each with a stainless steel follower are used. For flow control in coolant recirculation, the means of controlling the speed of recirculation pumps is used instead of flow control valves. Of the systems controlling gas concentration in containment vessels, an inert gas system is abolished.

2823 ALTERATION OF REACTOR INSTALLATION (ADDITION OF UNIT 2) IN THE FUKUSHIMA NUCLEAR POWER STATION NO. 2 OF THE TOKYO ELECTRIC POWER COMPANY, INC. Genshiryoku Iinkai Geppo (Journal of Atomic Energy Commission) ; 23: No. 6, 3-43(Aug 1978). (In Japanese).

A report of the Committee on Examination of Reactor Safety to the Atomic Energy Commission of Japan concerning the alteration of reactor installation is presented. Its safety was confirmed. The alteration of reactor installation in Fukushima Nuclear Power Station No. 2, The Tokyo Electric Power Company, Inc., is addition of Unit 2 as follows. Adjoining to Unit 1 now under construction, the power plant Unit 2 is installed, which is the same type and power output as Unit 1, i.e. a BWR type with enriched uranium fuel, light water moderated and cooled, having heat output of 3,300 MW and electric output of 1,100 MW. It consists of reactor proper, reactor cooling system facility, reactor containment facility, nuclear fuel material handling and storage facilities, instrumentation/control system facilities, radioactive waste disposal facility and radiation control facility.

2824 REPORT ON INSTALLATION OF REACTOR IN THE SENDAI NUCLEAR POWER PLANT OF KYUSHU ELECTRIC COMPANY. Genshiryoku Iinkai Geppo (Journal of Atomic Energy Commission) ; 22: No. 12, 27-66(Apr 1978). (In Japanese).

The report of the above title was presented from the chairman of Japan Atomic Energy Commission to the Prime Minister about the authorization of installing a reactor and the conformity to the regulating act of nuclear reactors. The report from the chairman of the Reactor Safety Committee to the chairman of the Japan Atomic Energy Commission was presented as the separately attached paper. These reports are concerned with the safety evaluation of this plant, and the evaluated result confirmed the safety. As the contents of the application, the siting of this plant, seismic history, atmospheric phenomena, water supply and social environment, and the structures and facilities of the reactor plant including reactor proper, cooling system, instrument and control systems, waste disposal system, radiation monitoring facility and other facilities are outlined. As the contents of the examination, the basic policy and procedure of examination, the siting condition, the safety evaluation of reactor facility including aseismic design, core design, dynamic analysis, reactor shutdown system, reactor control system, safety protection system, reactor cooling system, decay heat removal system, containment vessel, refueling and waste disposal systems, exposure dose for public, estimation of released radioactive material, analysis of abnormal transient condition in several cases, analysis of accidents, disaster evaluation in serious accident and hypothetical accident, and the members of this committee are described.

2825 ALTERATION OF REACTOR INSTALLATION (UNIT 1) IN FUKUSHIMA NUCLEAR POWER STATION II OF THE TOKYO ELECTRIC POWER COMPANY, INCORPORATED. Genshiryoku Iinkai Geppo (Journal of Atomic Energy Commission) ; 22: No. 7, 11-15(Sep 1977). (In Japanese).

The report of the Committee on Examination of Reactor Safety to the Atomic Energy Commission of Japan concerning the alteration is given, and its safety was confirmed. The alterations are the change to 8 x 8 type fuel assembly from 7 x 7 type; adoption of MCPR as thermal limiting value; installation of an inflammable gas concentration control system in the reactor containment vessel; installation of a leakage suppression system to the main steam isolation valve, etc.

Economics

2826 (INIS-mf--5129) COSTS OF NUCLEAR POWER IN THE NETHERLANDS. (Koninklijk Inst. van Ingenieurs, The Hague (Netherlands)). 1978. 64p. (In Dutch). Dep. NTIS (US Sales Only), PC A04/MF A01.

A study on the costs of nuclear power generation in the Netherlands is presented. Light water cooled reactors are chosen as nuclear power plants and no difference is made in calculating the costs between a PWR type reactor and a BWR type reactor. The power plants have an output of 1000 MWe. From each part of the whole fuel cycle the costs are determined, taking into account interest, investments, time of construction, labor costs, insurances etc. Also are determined from each part of the fuel cycle the energy costs; the costs per kWh. Finally a comparison is made in costs between a 1000 MWe power plant and a 600 MWe power plant.

2827 (INIS-mf--5131) SUMMARY OF 'THE COSTS OF ENERGY FROM COAL' AND 'COSTS OF NUCLEAR POWER IN THE NETHERLANDS'. (Koninklijk Inst. van Ingenieurs, The Hague (Netherlands)). Mar 1978. 14p. (In Dutch). Dep. NTIS (US Sales Only), PC A02/MF A01.

The results of the reports 'The costs of energy from coal' and 'The costs of nuclear power in the Netherlands' are presented in this summary. A comparison is made between the costs of generating electricity by coal fired power plants and nuclear power plants. The size of the power plants taken into account are 600 MWe for the coal fired plant and 1000 MWe for the nuclear power plant. For calculation of the price per kWh, a comparison has been made between investment costs, fuel costs and exploitation costs. The comparison leads to the conclusion that in case of nuclear power generation the price per kWh generation costs is not directly affected by changes in price of the used natural uranium. Secondly, the costs of nuclear waste treatment is of underlying importance. In case of coal fired electric power generation the costs per generated kWh electricity are very much affected by changes in fuel costs. Thirdly the costs of flue gas

desulfurization means an increase of 20 percent of the generation costs.

2828 (PNL--2429) ENFORM II: A CALCULATIONAL SYSTEM FOR LIGHT WATER REACTOR LOGISTICS AND EFFLUENT ANALYSIS. Heeb, C.M.; Lewallen, M.A.; Purcell, W.L.; Cole, B.M. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Sep 1979. Contract EY-76-C-06-1830. 133p. Dep. NTIS, PC A07/MF A01.
ENFORM is a computer-based information system that addresses the material logistics, environmental releases and economics of light water reactor (LWR) operation. The most important system inputs consist of electric energy generation requirements, details of plant construction scheduling, unit costs, and environmental release factors. From these inputs the ENFORM system computes the mass balances and generates the environmental release information for noxious chemicals and radionuclides from various fuel cycle facilities (except waste disposal). Fuel cycle costs and electric power costs are also computed. All code development subsequent to 1977 is summarized. Programming instructions are provided for the modules that are comprised in the ENFORM system. ENGEN, a code that uses a generation schedule specified by the user and isotopic data generated by ORIGEN, has been developed to produce a scenario-specific data base. Other codes (ENMAT, ENRAD, etc) have been developed to use data base information to estimate radioactive and nonradioactive release information.

2829 ATOMIC POWER IS 'ONLY ANSWER'. Mining Week ; 1: No. 10, 12(27 Jun 1979).
Research into wind, wave, tidal and solar power has produced depressing results. The cost of producing power from these sources has been shown to be unacceptably high, Sir John Hill, chairman of the United Kingdom Atomic Energy Authority said recently. Speaking at a Strathclyde University symposium 'Power for the 90's', Sir John said nuclear power was the sensible choice for electricity generation in Scotland. Hydro-electric power was being exploited to the maximum reasonable available extent and the real choice lay between coal and nuclear power. However, geological conditions in the Scottish coalfields were often difficult and coal had an important role to play as an oil substitute for steam raising in factories, central heating and district heating schemes. For electricity generation, nuclear power was the entirely sensible choice.

2830 DECOMMISSIONING NUCLEAR FACILITIES. Brosche, D. (Bayernwerk A.G., Muenchen (Germany, F.R.)); Klein, K. (Badenwerk A.G., Karlsruhe (Germany, F.R.)); Vollradt, J. (Vereinigte Elektrizitaetswerke Westfalen A.G. (VEW), Dortmund (Germany, F.R.)). Atomwritschaft, Atomtechnik ; 24: No. 4, 170-173(Apr 1979). (In German).
As the number of nuclear power plants commissioned is increasing worldwide, both the responsible goverment agencies and the public are more and more concerned about decommissioning nuclear facilities after they have been shut down for good. IAEA organized a symposium on November 13-17, 1978 which dealt with problems of decommissioning, covering national objectives, technical processes, radiological questions, experience in plant decommissioning, decontamination techniques and remote handling procedures. It turned out that sufficient practical experience and highly developed decommissioning concepts and techniques are now available. Experts feel that also in the future no insoluble technical problems or problems must be expected which could only be solved at inordinately high technical expenditure. The article contains a survey of the present staus of problem solutions. Current work is being dedicated to the dose rates accumulated by decommissioning personnel and to the costs of decommissioning.

2831 NUCLEAR AND THERMAL POWER PLANTS AND THE ENVIRONMENT. Mejstrik, V. (Ceskoslovenska Akademie Ved, Pruhonice. Ustav Krajinne Ekologie). Radioaktivita a Zivotne Prostredie ; No. 4, 1-35(1978). (In Czech).
The growth is briefly outlined of world daily power consumption and the possibilities are discussed of meeting this demand. Coal and nuclear power are of primary importance as energy resources for the present and the near future. Production costs per 1 kWh of electric power in nuclear power plants are already lower than in fossil fuel power plants and both types of power plants have an environmental impact. Activities are presented of radioisotopes resulting from nuclear reactor operation and their release and environmental impact are discussed. An analysis is made of emissions from combustion processes and of wastes from fossil-fuel power plant operation. The environmental impacts of nuclear and fossil fuel power plants are compared.

Construction and Operation

2832 (DOE/TIC--10259) UPDATE: NUCLEAR POWER PROGRAM INFORMATION AND DATA, JULY-AUGUST 1979. (Department of Energy, Washington, DC (USA). Div. of Nuclear Power Development). 1979. 151p. Dep. NTIS, PC A08/MF A01.
UPDATE is published every two months by the Division of Nuclear Power Development to provide a quick reference source on the current status of nuclear power plant construction and operation in the United States, and for information on the economics, fuel requirements and performance of nuclear generating units. Similar information is included on other means of electric generation as they relate to nuclear power.

2833 RESULTS OF GERMAN NUCLEAR POWER PLANT OPERATION IN 1978. PT. 1. INDUSTRIAL NUCLEAR POWER STATIONS. DATA FROM THE ANNUAL REPORT BY THE ABE COMMITTEE. Atomwritschaft, Atomtechnik ; 24: No. 8/9, 437-447(Aug-Sep 1979). (In German).
According to the annual report by the ABE Committee of the Deutsches Atomforum, nuclear power plants in the Federal Republic of Germany, which had increased their electricity generation by 46% over the previous year's level in 1977, were not able to achieve further increases in their electricity production in 1978. However, their generation of 35.9 TWh (1977: 36.0 TWh) represents 10.2% (1977: 10.8%) of the total electricity generation in the Federal Republic of 353 TWh (1977: 335 TWh). The KKI (907 MWe) and KKU (1300 MWe) plants generated electricity for the first time in 1978. However, KWL and KRB were down for the whole year. Unplanned outages and revision periods were encountered in 1978 also by some other plants which had been in operation for years. The report informs about the results of plant operation of each nuclear power station, giving plant diagrams and presenting surveys of the releases of radioactive substances etc. (orig.).

2834 NUCLEAR ENERGY IN CANADA: POTENTIAL AND PROBLEMS. Perry, T.L. Nature Canada ; 3: No. 2, 3-13(1974).
Survey report:the extraordinary performance of the four new reactors at pickering, ontario, canada, has triggered what may soon become a full-scale transition to a nuclear age in that country. pickering's total capacity of 2060 mw makes it the largest nuclear station in the world supplying one-seventh of ontario's electrical energy at a cost competitive with fossil fuel plants. the operation of candu reactors is discussed, emphasizing its advantageous safety features over other reactor models. management of radioactive wastes, the basis for radiation protection standards, and problems in the nuclear fuel cycle are also discussed. (6 diagrams, 1 graph, 1 photo, 44 references, 4 tables)

Fuel Cycle

2835 (ANL--80-40, pp 192-279) PART 5. FUEL CYCLE OPTIONS. Lineberry, M.J.; McFarlane, H.F.; Amundson, P.I.; Goin, R.W.; Webster, D.S. Jul 1980.
Fast Breeder Reactor studies.
The results of the FBR fuel cycle study that supported US contributions to the INFCE are presented. Fuel cycle technology is reviewed from both generic and historical standpoints. Technology requirements are developed within the framework of three deployment scenarios: the reference international, the secured area, and the integral cycle. Reprocessing, fabrication, waste handling, transportation, and safeguards are discussed for each deployment scenario. Fuel cycle modifications designed to increase proliferation defenses are described and assessed for effectiveness and technology feasibility. The present status of fuel cycle technology is reviewed and key issues that require resolution are identified.

2836 (ANL--80-40, pp 280-304) PART 6. INTERNATIONALIZATION AND COLLOCATION OF FBR FUEL CYCLE FACILITIES. Stevenson, M.G. (Los Alamos Scientific Lab., NM); Abramson, P.B.; LeSage, L.G. Jul 1980.
Fast Breeder Reactor studies.
This report examines some of the non-proliferation, technical, and institutional aspects of internationalization and/or collocation of major facilities of the Fast Breeder Reactor (FBR) fuel cycle. The national incentives and disincentives for establishment of FBR Fuel Cycle Centers are enumerated. The technical, legal, and administrative considerations in determining the feasibility of FBR Fuel Cycle Centers are addressed by making comparisons with Light Water Reactor (LWR) centers which have been studied in detail by the IAEA and UNSRC.

2837 (CONF-800943--(Summ.), pp 155-158) BACK-END FUEL CYCLE COSTS FOR ALTERNATIVE FUELS. Rainey, R.H.(Oak Ridge Assoc. Univ., TN); Burch, W.D.; Haire, M.J.; Unger, W.E. 1980.
From National topical meeting of fuel cycles for the 80's; Gatlinburg, TN, USA (29 Sep 1980).
FUEL CYCLE;PROLIFERATION;COST;REPROCESSING; RECYCLING;RADIOACTIVE WASTE PROCESSING; RADIOACTIVE WASTE DISPOSAL;TRANSPORT;THORIUM CYCLE;URANIUM;SPENT FUELS;SPENT FUEL STORAGE; AWAY-FROM-REACTOR STORAGE;ECONOMIC ANALYSIS

2838 (DOE/EIA/8589--2) SPENT NUCLEAR FUEL STORAGE PROGRAM USER'S GUIDE. (Orkand Corp., Silver Spring, MD (USA)). 5 Sep 1978. Contract EM-77-C-01-8589. 47p. Dep. NTIS, PC A03/MF A01.
The purpose of this manual is to present procedures to execute the Spent Nuclear Fuel Storage Model (SNFSM) program. This manual includes an overview of the model, operating environment, input and output specifications and user procedures. An example of the execution of the program is included to assist potential users.

2839 (DOE/NE--0003/7) FUEL-CYCLE FACILITIES: PRELIMINARY SAFETY AND ENVIRONMENTAL INFORMATION DOCUMENT. VOLUME VII. (Department of Energy, Washington, DC (USA)). Jan 1980. Contract W-31-109-ENG-38;W-7405-ENG-26. 223p. Dep. NTIS, PC A10/MF A01.
Information is presented concerning the mining and milling of uranium and thorium; uranium hexafluoride conversion; enrichment; fuel fabrication; reprocessing; storage options; waste disposal options; transportation; heavy-water-production facilities; and international fuel service centers.

2840 EX-REACTOR FUEL CYCLE NUCLEAR SAFETY. Valentine, A.M.; Smith, D.R. (Los Alamos Scientific Lab., NM). Transactions of the American Nuclear Society ; 32: 3-4(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
PWR TYPE REACTORS;BWR TYPE REACTORS;FUEL CYCLE;NUCLEAR FUELS;URANIUM ORES;MINING;ISOTOPE SEPARATION;REPROCESSING;RADIOACTIVE WASTE DISPOSAL

2841 SPENT-FUEL DISPOSITION: EUROPEAN STRATEGIES. von Osten, W. Energy Technology (Washington, D.C.) ; 6: 862-870(Apr 1979). (CONF-790213--).
From 6. energy technology conference and exposition; Washington, DC, USA (26 Feb 1979).
The view of West European countries on spent-fuel disposition and the efforts being made to close the nuclear fuel cycle is generally uniform in the accepted definitions because of the shared economic, environmental, and energy situations. The countries vary, however, in their emphasis. The approach taken is based on the recovery and recycling of reusable material and the transfer of radioactive wastes to stable geologic formations. National and international factors entering into the discussions of safe management and disposal are reviewed and five strategy categories are outlined in this context. The decision to reprocess spent fuels is justified on both environmental and resource-conservation grounds. (DCK)

2842 CHAPTER 3. REPROCESSING. PAPER 5. PROLIFERATION RISKS ASSOCIATED WITH DIFFERENT BACK-END FUEL CYCLES FOR LIGHT WATER REACTORS. Hannerz, K.; Segerberg, F. (ASEA-ATOM AB, Vaesteraas (Sweden)). pp 91-103 of Nuclear energy and nuclear weapon proliferation. London; Taylor and Francis (1979).
From Stockholm International Peace Research Institute symposium; Stockholm, Sweden (12 Oct 1978).
This paper contains a comparison of the proliferation risks associated with two alternatives for the back-end of the light water reactor fuel cycle. One employs reprocessing of spent fuel in a foreign plant and re-use of recovered uranium and plutonium

in domestic light water reactors. The other alternative represents a once-through fuel cycle, in which the spent fuel is regarded as waste for final geological disposal following long-term (20- to 40-year) pool storage. Conclusions are presented.

Process Heat Reactors

2843 DISTRICT HEATING. PT. 9. NUCLEAR POWER FOR CHP GENERATION. Diamant, R.M.E. Heating and Ventilating Review ; 20: No. 3, 42-43(Jan 1980).

This is the first part of a paper on nuclear power for CHP generation. A brief introduction surveys alternative energy sources and concludes that it will be necessary to utilise nuclear power if we are to avoid running out of energy. The basis of nuclear power (nuclear fission, nuclear fusion) is outlined. Some estimates are made of the years of fuel supply on certain economic and other assumptions, for thermal and fast breeder reactors, and a programme of building large breeder reactors is advocated. Two main objections to such a programme are discussed and felt not to stand up to clear reasoning: danger of terrorists making their own bombs; and radioactive waste materials, produced during nuclear fission, having a very high radiation intensity.

NUCLEAR REACTOR TECHNOLOGY

2844 (K/ET--5007) REMOVAL OF NOBLE GASES BY SELECTIVE ABSORPTION. Merriman, J.R.; Stephenson, M.J.; Kanak, B.E.; Little, D.K. (Oak Ridge National Lab., TN (USA)). Jan 1980. Contract W-7405-ENG-26. 20p. (CONF-800211--3). Dep. NTIS, PC A02/MF A01.

From International symposium on management of gaseous wastes from nuclear facilities; Vienna, Austria (18 Feb 1980).

Process performance and reliability have been demonstrated on an engineering scale with 10 years of pilot plant operation, including extended testing with ^{85}Kr, ^{133}Xe, and ^{131}I. The selective absorption process is based on exploitation of solubility differences which exist among the noble gases and other gas-phase constituents in a fluorcarbon solvent. Much information now exists on the solubilities of various components in CCl_2F_2, which is the reference solvent, and on other aspects of this fluorocarbon system. The effects of carrier gas coabsorption and solvent vaporization/condensation on noble gas mass transfer inside the absorption and stripping zones have been determined. The effects of column size on mass transfer have also been measured and rigorous engineering models have been derived for the process hardware. Many improvements and simplifications have been made to the original version of the process, and depending upon the separation task, a variety of system configurations is possible. The selective absorption process is applicable to essentially all types of nuclear facilities, and several gas cleanup tasks have been considered. One of these, post-accident reactor cleanup, is described.

2845 Donen Ju-nenshi. (TEN YEARS' HISTORY OF POWER REACTOR AND NUCLEAR FUEL DEVELOPMENT CORPORATION). Tokyo, Japan: Power Reactor and Nuclear Fuel Development Corp. (Dec 1978). 636p. (In Japanese).

Power Reactor and Nuclear Fuel Development Corporation (PNC) has advanced steadily for ten years since its establishment along the policy lines of Japan's own nuclear energy development. Brilliant results thus include: the world's fifth nation of possessing an experimental fast reactor, completion of a (prototype) heavy-water power reactor, establishment of uranium ores prospecting and refining technology, successful approach to uranium enrichment, and fuel reprocessing and waste management leading to Japan's nuclear fuel cycle. Intended for further efforts by PNC personnel and for report to the those people concerned, the present volume of PNC's ten years' history is in chapters of power reactors development, nuclear fuel development, safety management, general administration, and safeguards and nuclear materials control.

Theory and Calculation

2846 (ASO/R--3) GAMMA RAY MEASUREMENT OF SPENT HIFAR FUEL ELEMENTS FOR SAFEGUARDS VERIFICATION. 2. THEORETICAL EVALUATION OF METHOD. Hanna, G.L. (Australian Safeguards Office, Sydney). Jul 1978. 19p. Dep. NTIS (US Sales Only), PC A02/MF A01.

An empirical method of estimating burnup and cooling times of irradiated MTR fuel elements from gamma ray measurements of fission product ratios was developed by the IAEA for safeguards applications. Experimental evaluation of the method was discussed in Part 1 of this report and showed the method to be too imprecise as presently applied. A theoretical evaluation is reported here which shows that neutron flux density during irradiation will have an important influence on experimental results and suggests that failure to take due account of this could have lead to inherent imprecision in the empirical method.

2847 DECAY HEAT. Tobias, A. (Central Electricity Generating Board, Berkeley (UK). Berkeley Nuclear Labs.). *Progress in Nuclear Energy* ; 5: No. 1, 3-93(1980).

Many aspects of the nuclear fuel cycle require accurate and detailed knowledge of the energy release rate from the decay of radioactive nuclides produced in an operating reactor. In addition to the safety assessment of nuclear power plant, decay heat estimates are needed for the evaluation of shielding requirements on fuel discharge and transport routes and for the safe management of radioactive waste products extracted from spent fuel during reprocessing. The decay heat estimates may be derived by either summation calculations or Standard equations. The development of these evaluation methods is revised and their evolution since the first studies of the 1940s is traced. In contrast to many of the previous reviews of this subject, both actinide and fission product evaluation methods are reviewed in parallel. Data requirements for summation calculations are examined and a summary given of available codes and their data libraries. The capabilities of present day summation methods are illustrated through comparisons with available experimental results. Uncertainties in summation results are examined in terms of those in the basic nuclear data, irradiation details and method of calculation. The evolution of decay heat Standards is described and a brief examination made of their reliability and ability to provide suitably conservative decay heat estimates. Finally, to illustrate the use of present summation methods, comparisons are given of both the actinide and fission product decay heat levels from typical fuel samples in a variety of reactor systems.

Components and Accessories

2848 (HEDL-TC--1283) DATA PACKAGE FOR THE TURKEY POINT MATERIAL INTERACTION TEST CAPSULES. Krogness, J.C.; Davis, R.B. (Hanford Engineering Development Lab., Richland, WA (USA)). Jan 1979. Contract EY-76-C-14-2170. 94p. Dep. NTIS, PC A05/MF A01.

Objective of the Materials Interaction Test (MIT) is to obtain interaction information on candidate package storage materials and geologies under prototypic temperatures in gamma and low level neutron fields. Compatibility, structural properties, and chemical transformations will be studied. The multiple test samples are contained within test capsules connected end-to-end to form a test train. Only passive instrumentation has been used to monitor temperatures and record neutron fluence. The test train contains seven capsules: three to test compatibility, two for structural tests, and two for chemical transformation studies. The materials tested are potential candidates for the spent fuel package canister and repository geologies.

2849 (UCRL--15185) SEISMIC SAFETY MARGINS RESEARCH PROGRAM (PHASE I). PROJECT IV. STRUCTURAL BUILDING RESPONSE; STRUCTURAL BUILDING RESPONSE REVIEW. Healey, J.J.; Wu, S.T.; Murga, M. (Ebasco Services, Inc., New York (USA)). Feb 1980. Contract W-7405-ENG-48. 181p. Dep. NTIS, PC A09/MF A01.

As part of the Phase I effort of the Seismic Safety Margins Research Program (SSMRP) being performed by the University of California Lawrence Livermore Laboratory for the US Nuclear Regulatory Commission, the basic objective of Subtask IV.1 (Structural Building Response Review) is to review and summarize current methods and data pertaining to seismic response calculations particularly as they relate to the objectives of the SSMRP. This material forms one component in the development of the overall computational methodology involving state of the art computations including explicit consideration of uncertainty and aimed at ultimately deriving estimates of the probability of radioactive releases due to seismic effects on nuclear power plant facilities.

2850 DRUM FOR STORING NUCLEAR REACTOR FUEL ELEMENTS. Batjukov, V.I.; Schapkin, A.F.; Fadeev, A.I.; Schchian, C.G.; Sumatochin, V.A. (to Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,800,686/A/. 12 Jul 1979. 17p. (In German).

The drum is used for accommodating spent fuel elements, e.g., during refuelling. It consists chiefly of a coverplate, a floor plate and spacers between the two. The fuel elements of circular or multi-lateral crossection are suspended in pipes, whose length is shorter than the fuel element, and which stand on the floor plate. The length of the pipes is such that the bending of the fuel element is taken into account, i.e. the bent part of the fuel element lies outside the pipe.

2851 METHOD OF DECONTAMINATING RADIOACTIVE SUBSTANCES. Hori, T. (to Mitsubishi Heavy Industries Ltd., Tokyo (Japan)). Japanese Patent 54-47,100/A/. 13 Apr 1979. 2p. (In Japanese).

The purpose is to obtain sufficient decontamination effects by use of a small quantity of a decontamination agent, and to render the disposal quantity of the decontamination agent after the decontamination is reduced as less as possible thereby to facilitate the processing. A contaminated object to be decontaminated such as a manifold is dipped in a decontamination solution in a decontamination tank and, at the same time, a sealed body such as a polyethylene bag filled with air is put in the tank in an overlapped state, and the apparent volume of the decontamination agent is increased to clean the manifold. The sealed body can be easily crushed and compressed, and the actual disposal quantity of the decontamination agent is extremely small.

2852 FRAMEWORK FOR STORING FUEL ELEMENTS. Weber, R. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,742,736/A/. 5 Apr 1979. 10p. (In German).

The sheaths for the PWR fuel elements are the supporting parts of the storage framework. A supporting sheath of square cross section made of stainless steel is provided. Absorber sheets made of boron steel are mechanically fixed to the supporting sheaths in the active zone of the fuel elements. Angle pieces, clamps, countersunk flat headed screws or rivets are suitable for fixing. If the absorber sheets project beyond the ends of the supporting sheaths, then they can be latched together or mutually supported by bars.

2853 CHARGING DEVICE FOR FILTER MATERIALS. Revell, A. (to American Air Filter Co., Inc., Louisville, KY; Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,822,282/A/. 8 Feb 1979. 33p. (In German).

The proposal relates to a filtering device designed to remove radioactive pollutants from gas streams in nuclear reactor facilities, especially to the loading device used to remove charcoal and fill fresh charcoal. The charcoal is contained in cells open at the top, above which there is an oblong feeder duct through which the charcoal is fed. The invention relates to the design details of this duct (23 claims, 11 diagrams).

2854 BEHAVIOR OF B_4C MATERIALS IN SPENT-FUEL STORAGE POOLS. Macmillan, N.H. (Pennsylvania State Univ., University Park); Naum, R.G.; Shaffer, P.T.B. Transactions of the American Nuclear Society ; 33: 288-290(1979).

SPENT FUEL STORAGE;FUEL RACKS;NEUTRON ABSORBERS;BORON CARBIDES;PHYSICAL RADIATION EFFECTS;MECHANICAL PROPERTIES

2855 NUCLEAR POWER PLANT. Nonaka, A.; Hayashi, K.; Endo, T.; Kuribayashi, Y.; Motomiya, K. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 53-143,899/A/. 14 Dec 1978. 4p. (In Japanese).

Discharge of liquid wastes to the surrounding atmosphere are completely eliminated by collecting floor drains, a part of processing water for the regeneration of liquid wastes, non-radioactive steam drains and laundry drains conventionally discharged so far out of the system, processing them in a concentrator, a desalter or the like into water of a high purity and extremely low radioactive concentration, storing the water in an exclusive storage tank and supplying it as a steam or supplementing water to each portion in the plant that requires water of such high purity and extremely low radioactivity.

2856 ARRANGEMENT FOR THE PREVENTION OF CONTAMINATION OF A FUEL ELEMENT STORAGE POOL. Peehs, M.; Petri, W. (to Kraftwerk Union A.G.; Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,722,870/A/. 23 Nov 1978. 8p. (In German).

Fuel elements are stored in metal casings with caps in fuel element storage pools filled with water. In case that any gaseous fission products or radiolysis hydrogen escapes from a failed fuel element, they are lead over the casing caps into a bell-shaped hood above the cap. This hood acts as a floating gasometer-bell. Its position can be observed. The gas in the gasometer-bell is pumped out through a hose, may be also with a valve. The gasometer-bell may have a lifting handle as well.

2857 FACILITY FOR AVOIDING CONTAMINATION OF A FUEL STORAGE POOL. Dyck, H.P.; Kuehnel, R. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,718,305/A/. 2 Nov 1978. 13p. (In German).

For intermediate storage the fuel assemblies are inserted into transport casks made of metal with B-, Cd-, or Gd-alloying and into storage pools filled with water. These transport casks are either closed or have got at the botton an opening with a hold-up device for solid particles. In both cases they are filled with water flowing in through the bottom opening or being specially filled in. Additionally the transport casks can be centered in the storage rack by means of external ribs.

2858 RADIOACTIVITY REDUCING DEVICE. Nonaka, A. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 1953-93,299/A/. 16 Aug 1978. 4p. (In Japanese).

Purpose: To provide a radioactivity reducing device in a nuclear power plant, which prevents the discharge of radioactive substances into a building. Constitution: Drains and vent gases exhausted from main machinery and tools of a nuclear power plant are introduced into a sump tank and a vent tank, respectively, and treated in a radioactivity processing device comprising an iodine removing device, a rare gas removing device and the like. In this case, the sump tank, vent tank and various tanks in the radioactive waste processing device are all of enclosed structure, vent gases exhausted from these tanks are collected in the vent tank, and discharged into the atmosphere through the radioactivity processing device.

2859 RADIATION MONITORING SYSTEM OF NUCLEAR POWER STATION. Filipiak, B.; Mlicki, K.; Siwicki, R. (Institute of Nuclear Research, Warsaw (Poland)). Nukleonika ; 23: No. 6, 767-775(Jun-Jul 1978). (In Russian).

The radiation monitoring system of nuclear station is defined, as well as the main functions of it. The main sources of radiation danger are: the primary cooling circuit, the secondary steam - water circuit, solid and liquid wastes, the ventillation system. Further, the radiation monitoring system is described, consisting of the installed one, of the portable personnel and laboratory instruments and of environmental monitoring equipment. For each measuring channel and instrument, the required ranges are given.

2860 CONTAINER FOR THE TRANSPORT AND DOSABLE REMOVAL OF RADIOACTIVE AND FOR TOXIC MEDIA. Dillmann, H.G.; Gerlach, K.; Wilhelm, J. (to Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,649,295/A/. 3 May 1978. 10p. (In German).

The transport container can be used, e.g., to move organically bound or elemental iodine to nuclear ventilation systems where the gases are to be fed into these systems as test agents. The container accomodating the first of which, which comes next to the gas container, is designed as a shield. For this purpose, the space between the gas container and the shielding vessel is filled with lead shot. The shielding vessel is surrounded by the second protection vessel at some distance; the interior of the second vessel can be evacuated or scavenged with gas, respectively. The instruments are installed in the two protection vessels. Since the transport volume is relatively large, autoradiolysis of the test gas can be reduced. In addition, the protection vessels can be kept in a transport crate together with a wheelframe. (DG) 901 RW.

2861 PROBLEMS ASSOCIATED WITH THE PLACEMENT OF FIXED AREA MONITORS AROUND IRRADIATED FUEL STORAGE POOLS. McKean, D.W. (Ontario Hydro Research Lab., Toronto (Canada)). pp 59-64 of Radiation protection in nuclear power plants and the fuel cycle. Vol. 2. London, England; British Nuclear Energy Society (1978).

From Conference on radiation protection in nuclear power plants and the fuel cycle; Bristol, UK (27 Nov 1978).

Area monitoring design considerations which are unique to underwater storage of irradiated fuel are described. A methodology for fixed area monitor location based on the comparison of various radiation transport codes with measurement is presented.

2862 METHOD AND APPARATUS FOR THE DECONTAMINATION AND COOLING OF NUCLEAR POWER PLANT. Sanada, T. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 1953-83,000/A/. 28 Dec 1976. 6p. (In Japanese).

Purpose: To prevent radioactive contamination area from prevailing, as well as radioactive wastes from increasing by injecting purified coolants into a nuclear power plant and removing deposits on the inner walls and the inner structures of the power plant. Method: At a reactor operation and shutdown, coolants are injected through a by-pass, jetted out from injection device to wash out impurities deposited on the inner wall surface of a pressure vessel, the surface of the inner structures and of the reactor core causing the impurities to float in the coolants. The coolants used are then cooled in a non-regenerative heat exchanger, purified, and returned to the by-pass to thereby conduct decontamination for the nuclear power plant. During separated high temperature stand-by running of the nuclear power plant, the coolants taken out from the nuclear power plant are cooled in the regenerative heat exchanger and the non-regenerative heat exchanger, purified thereafter to be removed with impurties and then recycled to the nuclear power plant.

2863 METHOD OF REMOVING ACCUMULATED SLUDGE WITHIN REACTOR CONTAINER BOTTOM HOUSING. Tashiro, H. (to Central Research Inst. of Electric Power Industry, Tokyo (Japan)). Japanese Patent 1953-56,492/A/. 2 Nov 1976. 3p. (In Japanese).

Purpose: To permit effective discharge of sludge, particularly radioactive sludge, accumulated in a housing, which accommodates a control rod drive mechanism provided at the bottom of the container of a reactor such as a light-water nuclear reactor. Constitution: A water jet port is provided in a bottom portion of a gap between a housing accommodating control rod drive mechanism or the like and the object inside the housing such that a cyclon stream is produced in the gap. Water issuring from the jet port into the bottom portion of the gap forms a cyclon stream rising through the annular gap and is circulated through the entire gap. In this way, it is possible to efficiently discharge the sludge accumulated within the gap to the outside of the housing.

Fuel Elements

2864 (LA--8389-PR) FISSION PRODUCT RELEASE. PROGRESS REPORT, JANUARY 1-MARCH 31, 1980. Norris, A.E. (comp.). (Los Alamos Scientific Lab., NM (USA)). Jun 1980. Contract W-7405-ENG-36;AC06-76RL01830. 18p. NTIS, PC A02/MF A01.

Iron foil was used this quarter to help produce reducing conditions in a basic aqueous environment that resulted in only 0.02 ppB uranium in solution from the dissolution of sintered UO_2, after one week's contact time. This concentration of uranium is the lower limit of detection in our analytical procedure. Additional work with powdered UO_2 to understand the conditions that result in low solubilities of uranium in aqueous solution has resulted in measured uranium concentrations of 8 ppB when hydrogen is used with palladium-black as the reducing agent. Calculations for this system show that CO_2 in solution is not affecting the results at pH 6 or lower. Electron microprobe analyses of a spent fuel segment have been completed. Plutonium concentrations were higher in the outer 500 μm of the fuel element than in the interior. Strontium, antimony, and cesium did not display any radial trends in concentrations.

2865 (PB--291013) AN ASSESSMENT OF THE LONG-TERM STORAGE OF ZIRCALOY FUEL RODS IN WATER. FINAL REPORT. Munir, Z.A. (California Univ., Davis (USA). Dept. of Mechanical Engineering). 15 Oct 1978. 29p. NTIS, PC A03/MF A01.

The corrosion mechanisms which might affect Zircaloy-clad nuclear fuel rods during long periods of underwater storage prior to reprocessing are discussed in this report. A literature search was made to evaluate the current knowledge about possible long term degradation of Zircaloy-2 and Zircaloy-4. No potential degradation problems result from the general corrosion of Zircaloy stored in pool water for prolonged periods (10-20 years). Also, at pool temperatures of less than 50C, the diffusion of hydrogen in Zircaloy is too slow to contribute to degradation during the expected storage times. However, degradation during storage may result from the earlier thermal, chemical, or radiological histories of the cladding material. Further tests are recommended to determine the effect on Zircaloy cladding considering: (a) the degree of residual stress in the rods; (b) fission product uptake and the degree of prior embrittlement; (c) galvanic coupling with other metals of the fuel rod storage assembly; and (d) the nature and concentration levels of contaminants accumulated in surface layers during its use in the reactor.

2866 (SGAE--2971) STUDY OF THE SENSITIVITY AND INFLUENCE OF THE DESIGN PARAMETERS OF A HIGH DENSITY SPENT FUEL RACK IN REGARD OF THE SAFETY AGAINST CRITICALITY. Suda, M.; Woloch, F.; Sdouz, G. (Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna). Sep 1978. 48p. (In German). (RS--137/78; PH--255/78). Dep. NTIS (US Sales Only), PC A04/MF A01.

In this report the influence of variations in the boron concentration, boron plate thickness and water gap thickness on the k infinity value of the high density spent fuel rack is discussed. At the same time the influence of the choice of number of fast neutron groups is investigated in the calculation of the k_{oo} value. With the help of the results conclusions can be drawn about the significance of the considered design and fabrication parameters.

2867 (STUDSVIK-K4--78/12) STRESS CORROSION CRACK GROWTH IN UNIRRADIATED ZIRCALOY. Pettersson, K. (Aktiebolaget Atomenergi, Studsvik (Sweden)). Oct 1978. 22p. Dep. NTIS (US Sales Only), PC A03/MF A01.

Experimental techniques suitable for the determination of stress corrosion crack growth rates in irradiated Zircaloy tube have been developed. The techniques have been tested on unirradiated. Zircaloy and it was found that the results were in good agreement with the results of other investigations. Some of the results were obtained at very low stress intensities and the crack growth rates observed, gave no indication of the existance of a K sub(ISCC) for iodine induced stress corrosion cracking in Zircaloy. This is of importance both for fuel rod behavior after a power ramp and for long term storage of spent Zircaloy-clad fuel.

2868 MICROSTRUCTURE-DEPENDENT MODEL FOR FISSION PRODUCT GAS RELEASE AND SWELLING IN UO_2 FUEL. Notley, M.J.F.; Hastings, I.J. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Nuclear Engineering and Design ; 56: No. 1, 163-175(Feb 1980).

From IAEA specialists' meeting on fuel element performance computer modelling; Blackpool, UK (13 - 17 Mar 1978).

A model for the release of fission gas from irradiated UO_2 fuel is presented. It incorporates the relevant physical processes: fission gas diffusion, bubble and grain boundary movement, intergranular bubble formation and interlinkage. In addition, the model allows estimates of the extent of structural change and fuel swelling. In the latter, contributions of thermal expansion, densification solid fission products, and gas bubbles are considered. When included in the ELESIM fuel performance code, the model yields predictions which are in good agreement with data from UO_2 fuel elements irradiated over a range of water-cooled reactor conditions: linear power outputs between 40 and 120 kW m^{-1}, burnups between 10 and 300 MW h(kg U)$^{-1}$, and power histories including constant, high-to-low and low-to-high power periods. The predictions of the model are shown to be most sensitive to fuel power (temperature), the choice of diffusion coefficient for fission gas in UO_2, and burnup. The predictions are less sensitive to variables such as fuel restraint, initial grain size and the rate of grain growth.

2869 NUCLEAR FUEL STORAGE. Bevilacqua, F. (to Combustion Engineering Inc.). US Patent

4,177,385. 4 Dec 1979. Filed date 19 Sep 1977. 4p.

A method and apparatus for the storage of fuel in a stainless steel egg crate structure within a storage pool are described. Fuel is initially stored in a checkerboard pattern or in each opening if the fuel is of low enrichment. Additional fuel (or fuel of higher enrichment) is later stored by adding stainless steel angled plates within each opening, thereby forming flux traps between the openings. Still higher enrichment fuel is later stored by adding poison plates either with or without the stainless steel angles. 8 claims.

2870 DYNAMIC INTRAGRANULAR FISSION GAS BEHAVIOR MODEL. Griesmeyer, J.M.; Ghoniem, N.M.; Okrent, D. (California Univ., Los Angeles (USA). Dept. of Chemical, Nuclear, and Thermal Engineering). Nuclear Engineering and Design ; 55: No. 1, 69-95(Dec 1979).

A model for the non-equilibrium behavior of intragranular fission gas in uranium oxide fuel is developed to study the fundamental phenomena that determine fission gas effects. The dynamic behavior of point defects and the variations in stoichiometry are explicitly represented in the model. The principle of distribution moment invariance is used to allow approximations that significantly reduce computational expense without sacrifcing accuracy. A dynamic intragranular gas release and swelling (DIGRAS) computer code, that is based on the non-equilibrium model, was developed for both steady-state and transient applications. The code utilizes implicit multistep numerical integration methods, and is designed to give detailed information on all the physical processes that contribute to fission gas behavior. Simulations of steady-state irradiations indicate that the gas bubble re-solution process is very significant and results in very few large bubbles. The assumptions of equilibrium bubble size for normal steady-state irradiations in fast reactors appears to be adequate. On the contrary, a fully dynamic fission gas and point defect treatment was found necessary for transient simulations. The fuel stoichiometry was found to play an important role in determining bubble kinetics. This is mainly due to the strong dependence of point defect populations on stoichiometry. In fast transients, bubbles were found to be highly overpressurized, which suggests that a mechanistic plastic growth model is also needed.

2871 DEVICE AND PROCESS FOR STORING GROUPS OF FISSION ELEMENTS. Wachter, W.J.; Robbins, T.R. German(FRG) Patent 2,905,951/A/. 29 Nov 1979. 23p. (In German).

The storage device consists of square storage cells, which are arranged like a chess board. The cell walls consist of neutron absorbing material and the store is filled with water. To simplify storage of fuel rods, the storage cells are provided with hoods alternately, which act as guide elements. The hoods can be removed and fixed to the other storage cells, so that the previously empty storage cells can be filled.

2872 DEVICE FOR THE STORAGE OF LONG NUCLEAR REACTOR FUEL ELEMENTS IN A WATER-FILLED POND. Dose, G.F. (to Babcock - Brown Boveri Reaktor G.m.b.H., Mannheim (Germany, F.R.)). German(FRG) Patent 2,814,887/A/. 11 Oct 1979. 8p. (In German).

A single level storage rack with guide rails at the upper edge rests on the floor of the pond. Individual small storage racks for fuel elements can be moved on these guide rails, where transverse lanes are left free. The single level storage rack can be filled and emptied via these transverse lanes, without dropping below the water covering level which is laid down.

2873 COOLING SYSTEM FOR COOLING A SET OF FUEL ELEMENTS IN NUCLEAR REACTOR CONTAINMENTS. Ljubivyj, A.G.; Batjukov, V.I.; Schchijan, C.G.; Fadeev, A.I. (to Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,720,434/B/. 23 Aug 1979. 3p. (In German).

The used fuel elements are accommodated in a drum, which is in turn arranged in a housing. The sodium coolant covers the fuel elements. Sodium is brought in by a pipeline which enters the containment at the sodium level and extends to its bottom. In order to prevent the sodium from escaping from the containment through the pipeline, if there is an external pipeline failure, there is an opening in the pipe wall near the level of the coolant. If the level drops to the opening, gas is introduced into the pipeline and stops the loss of coolant. Cooling of the fuel elements is then provided by the natural circulation of the sodium.

2874 NUCLEAR FUEL RACK LATERAL SUPPORT AND PRELOAD DEVICE. Knight, C.B. (to Westinghouse Electric Corp.). US Patent 4,165,255. 21 Aug 1979. Filed date 22 Apr 1977. 6p.

A lateral support device for a nuclear fuel rack is described. It is vertically positioned within a walled enclosure which provides a preload to maintain effective support. The device includes a scissors-jack which is mounted so that the drive screw is vertical. Upon rotation of the drive screw the jack expands horizontally, seating a load pad against a vertical wall. The load pad is affixed to the jack by an arm having a stack of spring washers which compress between the pad and the jack, thereby applying a selected preload.

2875 PROCESS FOR EXTRACTING AND PREPARING FUEL ELEMENTS FROM A REACTOR FOR TRANSPORT AND DEVICE FOR CARRYING OUT THE PROCESS. Vox, A.J. (to Vox Lumatic G.m.b.H., Ostfildern (Germany, F.R.); Amtrust A.G., Luzern (Switzerland); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,801,944/A/. 19 Jul 1979. 21p. (In German).

The fuel element is lifted from the reactor using the lifting device of a bridge crane, is taken over the opening of a transport container, and is lowered into this. During transfer the fuel element is situated in a shielding hood at the end of the crane chain. The transport container contains liquid salt or a slate mixture, which solidifies after one or several fuel elements are inserted in it.

2876 SWIVEL BASE FOR FUEL ASSEMBLY STORAGE. (to Westinghouse Electric Corp., Pittsburgh, PA (USA)). British Patent 1,547,152/A/. 6 Jun 1979. 5p.

An invention is described the principal object of which is to provide a nuclear fuel assembly storage rack capable of supporting spent fuel assemblies without generating stresses in the fuel assemblies. The storage rack consists of a lower and upper support for supporting and retaining the spent fuel assemblies in their vertical positions. Relief

from any stresses in the fuel assembly during storage is obtained by the provision of a swivel base in the lower support.

2877 PROBLEMS ENCOUNTERED DURING UNDERWATER REPLACEMENT OF STORAGE RACKS IN ACTIVE SPENT-FUEL POOLS. Weissburg, J.A. (Wachter Association, Gibsonia, PA). Transactions of the American Nuclear Society ; 32: 672-674(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
SPENT FUEL ELEMENTS;SPENT FUEL STORAGE;FUEL RACKS;MODIFICATIONS;REMOTE HANDLING EQUIPMENT; REACTOR MAINTENANCE

2878 CLAD REMOVING DEVICE IN REACTOR. Ishii, Y.; Yoshida, T.; Saito, T.; Ichie, K. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 54-30,398/A/. 6 Mar 1979. 6p. (In Japanese).
Purpose: To remove radioactive substances deposited in a thermal sleeve or on ISI pads by semiautomatic remote handling in water by the provision of a device for cleaning, removing and recovering claddings on the wall of reactor container. Method: A clad removing device is engaged to stud bolts for mounting the upper cap plate using an overhead crane. A clad recovery vessel of the cleanining device is contacted at an adequate position on the inner wall of the pressure vessel by the vertical movement of a lance and pressurized water from a pressurized water feed pipe is jetted out from a nozzle to remove claddings. The claddings thus removed are sucked together with reactor water in the recovery vessel by way of a pump, filtered and returned to the pressure vessel.

2879 METHOD OF STORING FUEL ASSEMBLIES. Tada, Y. (to Mitsubishi Heavy Industries Ltd., Tokyo (Japan)). Japanese Patent 54-28,996/A/. 3 Mar 1979. 3p. (In Japanese).
Purpose: To decrease the storing space required for collective storage of fuel assemblies. Method: After inserting neutron absorbers in guide tubes such as control rod clusters provided to the fuel assembly, fuel assemblies are stored collectively. The neutron absorbers consist of boron carbide or the like and are contained in stainless steel pipes. Since neutrons produced from the fuel assemblies are absorbed in the above absorbers, attainment to the criticality can be avoided if the inter-assembly space is narrow.

2880 COOLING SYSTEM FOR COOLING A SET OF FUEL ELEMENTS IN NUCLEAR REACTOR CONTAINMENT VESSELS. Liubivyi, A.G.; Batiukov, V.I.; Schchiian, C.G.; Fadeev, A.I. (to Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,720,434/A/. 16 Nov 1978. 10p. (In German).
Used fuel elements stored in a drum are cooled with sodium. The inlet cooling pipes are such that the coolant enters near the floor of the drum, but reaches to nearly beneath the required coolant level. There is an opeing there through which gas can flow from the drum into the coolant inlet pipe if a fracture or similar accident prevents further entry of coolant. This gurantees a minimum level of coolant, so that sodium circulation guarantees cooling until the fuel element is removed. A drop in pressure and running out of the coolant is prevented.

2881 DEVICE FOR STORING NUCLEAR FUEL ELEMENTS. Kaminski, D.J.; Boyd, C.H. (to Westinghouse Electric Corp., Pittsburgh, PA (USA); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,808,989/A/. 21 Sep 1978. 15p. (In German).
Some frameworks of rectangular construction are accommodated in a pit with concrete or metal cladding, where the frameworks are used for storing used fuel elements. The frameworks are supported and the pit is filled with boronated water. A number of horizontally arranged piston-cylinder damping units accept differential thermal expansion or movement in case of earthquakes. They are supported on the pit walls and the sides of the frameworks turned towards these. Each damping unit consists of the cylinder fixed to the framework wall and the piston which is pressed against the pit wall by a spring. Piston and cylinder can be held relative to each other by a pin. The damping can be increased by the boronated water, which can flow into and out of the cylinder and thus acts as a damping medium.

2882 TREATMENT OF IRRADIATED NUCLEAR FUEL MATERIAL. Astill, M.; Waine, M.G. (to British Nuclear Fuels Ltd., Risley). British Patent 2,022,912/A/. 5 Jun 1978. 8p.
A method is described to facilitate the removal of corrosion products from magnesium alloy clad spent fuel elements while stored under water in skips prior to reprocessing.

2883 SIDE SUPPORT FOR A NUCLEAR FUEL STORAGE RACK AND PRE-LOADING DEVICE. Knight, C.B. (to Westinghouse Electric Corp., Pittsburgh, PA (USA)). French Patent 2,388,377/A/. 19 Apr 1978. 12p. (In French).
Nuclear fuel storage racks comprising a side support and pre-loading system to absorb their relative movement and maintain an anti-seismic support between these racks and their containment vessel.

2884 STORAGE RACK FOR TAKING USED FUEL ELEMENTS FOR NUCLEAR POWER STATIONS. Krieger, F. (to Noell (G.) und Co., Wuerzburg (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,629,363/A/. 5 Jan 1978. 11p. (In German).
The wall plates of a storage chamber are made as a double skin in a storage rack for burnt-up fuel elements, in order to reduce thermal stresses. The outer skin is made of two equilateral side sheets and the inner skin is made from a closed square tube.

2885 EXPANSION OF CAPACITY OF SPENT FUEL POOLS AND ASSOCIATED PROBLEMS. de Francisco, J.L.; Lopez-Cotarelo, J.; Ramos, J.M. (Bechtel Espana, Madrid). pp 197-210 of Compte rendu du seminaire de l'AEN sur le stockage des elements combustibles irradies. Paris, France; OECD (1978).
From Seminar on the storage of spent fuel elements; Madrid, Spain (Jun 1978).
Expanding the spent fuel storage pool capacity is a good solution for utilities facing the current shortage in fuel reprocessing capacity. This paper reviews the problems more likely to be found when expanding a spent fuel storage facility by using high density storage racks. Basically three types of problem arise: problems related with the characteristics of the new facility, problems related with the works of expansion, and problems related with the long term storage of large quantities of spent fuel.

2886 DESIGN BASES FOR U.S. DEPARTMENT OF ENERGY STORAGE BASIN. King, F.D. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). pp 211-219 of Compte rendu du seminaire de l'AEN sur le stockage des elements combustibles irradies. Paris, France; OECD (1978).

From Seminar on the storage of spent fuel elements; Madrid, Spain (Jun 1978).

Bases were developed for the conceptual design of a water basin to store 5000 MT of irradiated light water reactor fuel. The basin, which could be operational by 1983, is designed to receive over 2000 MT per year of spent fuel and to provide interim storage of U.S. and some foreign fuel in support of U.S. policy of receiving and taking title to spent fuel rather than reprocessing this fuel. The bases for various design decisions are discussed.

2887 DEVICE FOR HANDLING AND EXAMINING REMOVABLE PENCILS OF FUEL ASSEMBLIES. (to Societe Franco-Americaine de Constructions Atomiques (FRAMATOME), 92 - Courbevoie (France)). French Patent 2,395,571/A/. 23 Jun 1977. 16p. (In French).

A device is described for handling and examining removable pins of fuel assemblies in the cooling pond of a nuclear reactor. It features a vertical knock-down and transportable tubular structure, resting when in use on the bottom of the cooling pond, at least one examination station carried by the tubular structure, a system for extracting, inserting and handling removable pins, gear for moving and guiding the extraction apparatus, facilities for the automatic control of the positioning of the extraction system.

2888 IMPROVEMENTS IN AND RELATING TO DRUMS FOR STORING FUEL ASSEMBLIES OF NUCLEAR REACTORS. Artemiev, L.N.; Batjukov, V.I.; Fadeev, A.I. British Patent 1,553,013/A/. 13 May 1977. 5p.

A specification is given for an improved design of drums used for storing nuclear reactor fuel assemblies. It is claimed that this new design reduces wear, increases reliability and enables the recharging operation to be speeded up.

Control Systems

2889 RECENT IMPROVEMENT OF TOSHIBA BWR INSTRUMENTATION AND CONTROL SYSTEM. Hashimoto, H.; Ito, M.; Ike, M.; Ikekita, I. (Toshiba Corp., Kawasaki, Kanagawa (Japan)). Toshiba Rebyu (Toshiba Review) ; 33: No. 12, 1003-1008(Dec 1978). (In Japanese).

The instrumentation and control system, being a part with direct contact with the personnel engaged in the operation and supervision of nuclear power plants, gives immediate effects to plant operation. Outlined here are the central control room as it ought to be, a new control system utilizing the current electronics for improving the reliability and availability of plants, and radiation measurement systems.

2890 FUEL, BREEDER, OR ABSORBER ELEMENT WITH ELEMENTS FOR FISSION GAS REMOVAL. Bestenreiner, G.; Duenner, P.; Dreyer, G.; Schmitz, K.J. (to Internationale Atomreaktorbau G.m.b.H. (INTERATOM), Bergisch Gladbach (Germany, F.R.)); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,649,434/A/. 3 May 1978. 10p. (In German).

The assembly consists of rods filled with fissile, fertile (UO_2) or absorber (B_4C) materials arranged in a hexagonal matrix within a shroud tube. The fission gas generated flows into a common bottom expansion chamber (or into one top and one bottom subchamber) which is filled up to a certain level with coolant introduced from the outside. This coolant is displaced by the fission gas through a blowdown tube from the expansion chamber into the reactor plenum; the blowdown tube extends into the expansion chamber (diving bell principle). It is connected with the reactor plenum through the center of the assembly. In addition, it can be designed also as a structural rod. After having displaced the coolant from the expansion chamber and having released the bottom opening of the blowdown and riser tube, respectively, the fission gas directly enters the reactor plenum.

Environmental Aspects

2891 (EPA--520/6-78-009) ENVIRONMENTAL IMPLICATIONS OF THORIUM USE IN SELECTED NUCLEAR FUEL CYCLES. FINAL. Buckley, D.W.; Simmons, G.L.; Ziskind, R.A. (Science Applications, Inc., La Jolla, CA (USA)). 31 Oct 1978. 35p. (SAI--78-943-LJ). NTIS.

The objective of this study was to assess the environmental implications of the nuclear fuel cycle associated with the highly enriched uranium concept of the High Temperature Gas Cooled Reactor. Model fuel cycles were constructed for the HTGR and a reference light water reactor (LWR) cycle. Mass flows were developed, control technology cases proposed and costed, effluents determined, and population doses calculated. Emphasis was given to the intercomparison of the fuel cycles to delineate areas which show pronounced departure. The dose commitment received by the population both within and outside a radius of 50 miles of each facility was determined. The 100 year population dose commitments due to a single year's plant operation was selected to facilitate intercomparison among fuel cycle components. No account was taken for long term waste sources associated with the fuel cycle such as mill tailing piles or terminal waste storage (study groundrule). The resource utilization and radionuclide activity of various fuel cycle options for using thorium in a Pressurized Water Reactor were studied. These data were contrasted with similar results obtained for a uranium fuel PWR.

2892 (INTAT--78.147) FAST BREEDERS AND ENVIRONMENT. Hoerning, H. (Internationale Atomreaktorbau G.m.b.H. (INTERATOM), Bergisch Gladbach (Germany, F.R.)). Dec 1978. 28p. (In German). (CONF-7809171--1; INKA-Conf--78-271-003). Dep. NTIS (US Sales Only), PC A03/MF A01.

From Conference on the role of the fast breeder reactor; Essen, F.R. Germany (27 Sep 1978).

The waste heat of a fust breeder has a thermal effricency of 40%. This is the same as in conventional power plants, i.e. not typical of nuclear power plants. Wet and dry cooling towers are built with increasing frequency in order to protect rivers. The potential danger due to high radioactivity inventaries in all fuel cycle stages is not the same as its actual danger. Radioactivity sources in fast breeders are listed and compared with those of LWR reactors. Activity sources and inventaris are similar. Exposure pathways are listed which might endanger the popululion in the vicinity

of fast breeders and other nuclear facilities in case of radioactivity release. In addition to the rated values stated in the Radiation Protection Ordinance for normal operation and accidents the very low radiation doses calculated for the SNR-300 are given. This is also proved by a comparison with natural and man-made radiation and theis variation in West Germany. Fuel element reprocessing, experience so for, and waste conditioning are dealt with. The toxicity of high-activity waste of fast breeders and LWR reacters is compared, and its reduction on storage is shown. The West German concept for final storage is outlined.

2893 (Juel--1573) APPLIED SYSTEMS ANALYSIS NO. 11: INTRODUCTION OF NUCLEAR LONG-DISTANCE ENERGY. ENVIRONMENTAL IMPACT AND ITS ASSESSMENT. Bartholdi, J. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Programmgruppe Systemforschung und Technologische Entwicklung; Technische Hochschule Aachen (Germany, F.R.)). Jan 1979. 155p. (In German). Dep. NTIS (US Sales Only), PC A08/MF A01.
Thesis.
The process of planning for the introduction of new energy technologies requires, together with economic and technical analyses, the quantification and evaluation of the environmental effects of their introduction. It is the goal of this work to determine the environmental impact of individual components of the energy system 'nuclear long distance energy' and to investigate the possible protection of the environment which the energy technology can offer on a regional basis. Results for four areas of environmental damage in North Rhine-Westphalia, Hessen and Rhineland-Pfalz show that nuclear long distance energy can yield a positive benefit to the environment.

2894 (NUREG/CR--1247) STABLY STRATIFIED BUILDING WAKES. Kothari, K.M.; Peterka, J.A.; Meroney, R.N. (Colorado State Univ., Fort Collins (USA). Fluid Dynamics and Diffusion Lab.; Colorado State Univ., Fort Collins (USA). Dept. of Civil Engineering). Jan 1980. 158p. NTIS.
The velocity and temperature wake behind an isolated building placed in a stably stratified turbulent boundary layer has been investigated utilizing wind tunnel tests and mathematical analysis. The mean velocity and mean temperature decrease but turbulence intensity and temperature fluctuation intensity increase as a result of the momentum wake. However, the vortex wake increases mean velocity and mean temperature, and decreases turbulence intensity and temperature fluctuation intensity along the centerline of the wake.

2895 (NUREG/CR--1286) RANCHO SECO BUILDING WAKE EFFECTS ON ATMOSPHERIC DIFFUSION: SIMULATION IN A METEOROLOGICAL WIND TUNNEL. Allwine, K.J.; Meroney, R.N.; Peterka, J.A. (Colorado State Univ., Fort Collins (USA). Dept. of Civil Engineering). Feb 1980. 189p. NTIS.
Wind tunnel diffusion tests were conducted on 1:500 scale models of the Rancho Seco Nuclear Power Station, California; surrounding buildings, hyperbolic cooling towers, and terrain were similarly modeled in the Meteorological Wind Tunnel at Colorado State University. The purpose was to quantify the effects on diffusion of buildings perturbing the mean flow. The test program consisted of three gaseous tracer releases of gases having no appreciable plume rise from ground, building, and containment vessel top heights. The program was repeated for eight wind directions and cases of unstable, neutral, and stable atmospheric stratification conditions. Results show that the buildings significantly perturb the dispersion patterns from the flat terrain isolated source release case, hence buildings, hyperbolic towers, and terrain in the immediate vicinity of the release have a major effect.

2896 (PNL--3276) SIMULATION OF ATMOSPHERIC TURBULENCE. Cliff, W.C.; Hall, D.L. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jan 1980. Contract EY-76-C-06-1830. 29p. Dep. NTIS, PC A03/MF A01.
A method is described for constructing an artificial temporal sequence of velocity values for simulating atmospheric turbulence. The method develops the conditional probability density distribution of velocity given that the previous value of velocity is known. A value is randomly selected from the conditional probability density which then serves as a known value for the next conditional probability density function. Continuing this procedure provides the desired simulated sequence of velocity values. Based upon this simulation method a program is developed for the Hewlett-Packard HP-29C hand-held calculator for simulating the longitudinal component of atmospheric turbulence during neutra. or strong wind conditions.

2897 RISK RELATIVITIES. Fremlin, J.H. (Birmingham Univ. (UK). Dept. of Physics). Atom (London) ; No. 283, 128-131(May 1980).
A discussion is presented on the quantitative significance of the radiation exposure of members of the public resulting from the operations of the nuclear industry. The effects of such exposure are compared with those due to other activities. Consideration is given in particular to the probability of deaths from cancer from ingestion of plutonium and from other causes. The radiation effects arising from the long-term disposal of radioactive wastes are also discussed.

2898 PUBLICATION OF THE SAFETY REGULATION KTA 3603 OF THE COMMITTEE FOR NUCLEAR TECHNOLOGY (KTA). FROM MARCH 12, 1980. Bundesanzeiger ; 32: No. 96, 1-4(May 1980). (In German).
The regulation applies to the planning, construction, and operation of plants for the treatment of radioactive, contaminated water from stationary nuclear power plants with LWR- and HTR-type reactors. According to the regulation, plants for the treatment of contaminated nature are to be planned, constructed, and operated in such a way that - uncontrolled discharge of contaminated water will be avoided (article 46, paragraph 1, no. 1 StrlSchV), - the activity discharged with water is as low as possible (article 46, paragraph 1, no. 2 StrlSchV), - radioactive contaminated water will not be discharged into the ground, - personnel exposure due to direct radiation, contamination, and inhalation will be as low as possible even below the limiting values fixed in the Radiation Protection Ordinance (article 28, paragraph 1 StrlSchV). Furthermore, discharge of liquid waste into bodies of water requires special permission (articles 2, 3, 7 WHG).

2899 RADIOACTIVE PLUME FROM THE THREE MILE ISLAND ACCIDENT: XENON-133 IN AIR AT A DISTANCE OF 375 KILOMETERS. Wahlen, M.; Kunz, C.O.; Matuszek, J.M.; Mahoney, W.E.; Thompson,

R.C. (New York State Dept. of Health, Albany). Science ; 207: 639-640(8 Feb 1980).
The transit of an air mass containing radioactive gas released from the Three Mile Island reactor was recorded in Albany, New York, by measuring xenon-133. These measurements provide an evaluation of Three Mile Island effluents to distances greater than 100 kilometers. Two independent techniques identified xenon-133 in ambient air at concentrations as high as 3900 picocuries per cubic meter. The local γ-ray whole-body dose from the passing radioactivity amounted to 0.004 millirem, or 0.004% of the annual dose from natural sources.

2900 NUCLEAR POWER PLANTS AND ENVIRONMENT PROTECTION. Chambolle, T.; Gaillot, J.C. (Ministere de l'Environnement et du Cadre de Vie, 75 - Paris (France)). Revue Generale Nucleaire ; No. 1, 19-22(Jan-Feb 1980). (In French).
Descriptions are presented concerning the way environmental problems are taken into account at the different stages of the building of a nuclear plant. Included are descriptions of preliminary studies, environment protection during the project stage, inspection programs.

2901 ORGANIZATION OF NUCLEAR PLANTS ENVIRONMENTAL STUDIES. Le Marechal, M. (Electricite de France, 75 - Paris. Direction de l'Equipement). Revue Generale Nucleaire ; No. 1, 23-30(Jan-Feb 1980). (In French).
The objectives of environmental studies are defined and the scope and organization of sites studies are described along with biological and radioecological general studies. The available means that are used for such studies and the different offices responsible for their achievement are given.

2902 RELEASES OF RADIOACTIVE SUBSTANCES FROM NUCLEAR POWER PLANTS IN THE EUROPEAN COMMUNITIES IN 1972-1976. Atomwritschaft, Atomtechnik ; 24: No. 12, 606-611(Dec 1979). (In German).
In its latest report on the releases of radioactive substances from nuclear power plants, the EC commission presents a survey of the years 1972-1976. In this period, too, releases in the EC member states have been below the various official maximum permissible values, in most cases even far below these limits. The maximum releases of radioactive substances from nuclear power plants are, now as before, less than 5% of the natural radiation exposure to the population and are within the local variations of exposure values.

2903 UPDATING RADWASTE PROCESSING, STORAGE. Oyen, L.C.; Tucker, R.F. (Sargent and Lundy). Power ; 123: No. 10, 81-87(Oct 1979).
Since 1970, nuclear power plant designs have been modified to improve their capability for handling low level radioactive wastes. Design alterations have stressed greater capacity, safety, and reliability. Volume reduction methods are used extensively to minimize overall disposal costs for both liquid and solid wastes. Also discussed are: gaseous waste design improvements; liquid segregation; evaporator processes; filter performances; and water management strategies. Volume reduction methods considered include: dehydration, evaporation, crystallization, compaction, and incineration. Ways of controlling operating costs are reviewed. The merits and problems of waste burial vs. storage are examined. (13 diagrams, 1 table)

2904 ENVIRONMENTAL EFFECTS OF NUCLEAR POWER STATIONS. Viragh, E. (Budapesti Muszaki Egyetem (Hungary). Egyetemi Reaktor). Meres es Automatika ; 27: No. 2, 41-47(1979). (In Hungarian).
The increasing power demand will not be satisfied by the traditional fuels, therefore more nuclear power stations have to be built until 2000. The most frequently used types of nuclear power stations are summarized and their environmental effects are investigated under working conditions and emergency situations. The problem of eliminating radioactive wastes is dealt with. The system of measurements for the protection of population in the immediate vicinity of reactors is illustrated by an example.

2905 Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 Mars 1979. (PROCEEDINGS OF THE SYMPOSIUM ON THE ON-SITE MANAGEMENT OF POWER REACTOR WASTES. ZURICH, 26-30 MARCH 1979). Paris, France; OECD (1979). vp. (CONF-790374--).
From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).
Separate abstracts have been prepared for items within the scope of the energy data base.

2906 METEOROLOGICAL ASPECTS OF ENVIRONMENTAL HEALTH AND SAFETY PLANNING IN NUCLEAR POWER PLANT SITES. Shirvaikar, V.V.; Sitaraman, V. (Bhabha Atomic Research Centre, Bombay (India). Health Physics Div.). Bulletin of Radiation Protection ; 1: No. 3, 3-8(Jul-Sep 1978).
Micrometeorological data, i.e., those dealing with the properties of atmosphere in the first 100 meters or so above the earth's surface are required in planning and control of environmental impact of gaseous effluent releases from a nuclear power plant. Data of various types to be collected during the stages of site survey, site evaluation, normal operation of the plant and accident contingency planning are described. Atmospheric dispersion models in general and one suggested by Pasquill in particular are outlined. These models relate the dispersion parameters to the meteorological observables and are used in evaluating environmental dose. Cautions to be exercised while applying these models to the real situation are mentioned. The use of meteorological data for accident analysis while evaluating plant design parameters is discussed.

2907 MONITORING OF THE RELEASE OF RADIOACTIVE SUBSTANCES FROM NUCLEAR FACILITIES INTO SURFACE WATERS. Schwibach, J. pp 59-63 of Monitoring of airborne and liquid radioactive releases from nuclear facilities to the environment. Vienna, Austria; International Atomic Energy Agency (1978).
The first part of the article deals with the conditions for discharge, the second with the related radioactivity measurements.

2908 PROBLEMS LINKED TO THE LONG-TERM DEVELOPMENT OF ELECTRICITY PRODUCTION. PT.2. NUCLEAR AND CLASSICAL POWER PLANTS. pp 119-155 of Rapport sur les relations entre le secteur de l'energie et l'environnement dans une perspective a long terme. Paris, France; Documentation Francaise (1974). (In French)
Energy demands lead to the forecasting of

thermal power plants to be built before the year 2000. The review falls under the following headings; type and size of reactors, cooling possibilities, reprocessing, radioactive wastes, environmental impact, site selection, possibilities of electricity production by classical origin at the turn of the century.

2909 Les centrales nucleaires. (NUCLEAR POWER PLANTS). Jauffret, C. Lille, France; Universite des Sciences et Techniques (Ind]). v.2 p.166-280p. (In French).
The fourth part of the manual deals with ecological problems: ionizing radiations, thermal and chlorine effects.

Siting

2910 (INIS-mf--4778) RISK BENEFIT ANALYSIS OF SITE ALTERNATIVES FOR A NUCLEAR POWER PLANT PRODUCING BOTH ELECTRICITY AND DISTRICT HEAT. Savolainen, I.; Vuori, S. (Valtion Teknillinen Tutkimuskeskus, Helsinki (Finland)). 1978. 11p. (CONF-781022--76). Dep. NTIS (US Sales Only), PC A02/MF A01.
From Meeting on nuclear power reactor safety; Brussels, Belgium (16 Oct 1978).
The environmental impacts due to radioactive releases in normal operation and accidents are primarily assessed for each site as also the district heat transmission costs. Secondarily the risk components are converted to a compatible form, expressed in monetary units, and compared directly to district heat transmission costs. Annual savings from the shortening of the district heat transmission line are clearly larger than the monetary value given to the expectation of the increased risk.

2911 (ORAU/IEA--80-3(P), pp 57-60) POLICY BASED ON EXPANSION OF EXISTING SITES. Burwell, C.C. Mar 1980.
Acceptable future nuclear energy system. Gatlinburg II condensed workshop proceedings, December 10-12, 1979, Gatlinburg, Tennessee.
NUCLEAR POWER PLANTS;REACTOR SITES;SITE SELECTION;PLANNING;REACTOR DECOMMISSIONING; NUCLEAR PARKS;SPENT FUEL STORAGE

2912 SOVIET NUCLEAR PROGRAMME IN SITE OF DIFFICULTY. Moss, J. Electrical Review (London) ; 206: No. 2, 16-17(11 Jan 1980).
The Soviet Union nuclear power programme is discussed, with particular emphasis on the problems of siting new plants or nuclear complexes containing a group of power stations, fabrication, reprocessing and waste treatment plants, and waste burial sites. (U.K.).

2913 THERMO- AND FLUIDDYNAMIC INFLUENCES OF NUCLEAR POWER PLANTS ON THE ENVIRONMENT. Brosche, D. (Bayernwerk A.G., Muenchen (Germany, F.R.)). Atomkernenergie/Kerntechnik ; 35: No. 2, 145-147(1980). (In German).
Both topics treated in this seminary, aerodynamics, in connection with buildings and hydraulics, are very important for the planning of nuclear power plants. Aerodynamic investigations have been performed only in the last few years in order to understand the effects of the plant on the diffusion of radioactive materials in the near environment and to modify these effects. In both topics it is not possible to describe the complex flow processes mathematically in a satisfactory manner, so that only experimental investigations with a wind tunnel or with a hydraulic model, respectively, can be used to get useful solutions of the problems. In both cases the investigations must be performed already during the planning phase of the plant. Individual technical solutions must be found because stadardizing is not possible.

2914 SITING POLICY FOR AN ACCEPTABLE NUCLEAR FUTURE. Burwell, C.C. (Inst. for Energy Analysis, Oak Ridge, TN); Ohanian, M.J.; Weinberg, A.M. Science ; 204: 1043-1051(8 Jun 1979).
This article is an outgrowth of studies aimed at devising an acceptable nuclear energy system for the United States. It is argued that a nuclear siting policy leading to a few, large concentrated sites is preferable in the long run to the present policy which could lead to many dispersed sites. Such a policy could be implemented incrementally if requirements for new nuclear generating capacity were met by adding reactors to the existing 100-odd sites. Such a concentrated nuclear siting policy would, to some extent, isolate nuclear activities while augmenting the strengths of the institutions responsible for managing them. Additionally, it would confer an element of permanence on the sites and thereby open new options for managing low level wastes and reactor decommissioning. These actions may improve the public acceptability of nuclear energy in the United States as well as lead to a more rational contained nuclear system in the long run. 3 figures, 3 tables. (DP)

2915 NEW TEST SET UP FOR THE IN SITU DETERMINATION OF PERCOLATION PARAMETERS IN ROCK. Schneider, H.J. (Federal Institute of Geosciences and Natural Resources, Hannover (Germany)). pp 59-68 of Low flow, low-permeability measurements in largely impermeable rocks. Proceedings of the NEA/AIEA workshop, Paris, 19-21 Mar 1979. Paris, France; OECD (1979).
From Workshop on Low-Flow Low permeability measurements in Langley Impermeable rocks; Paris, France (19 Mar 1979).
In a study on the underground siting of nuclear power plants in rock caverns, the protective effect of the overlaying rock is determined for a hypothetical nuclear accident in which contaminated water from the reactor cavern is pressed into the surrounding rock. A test set-up has been developed for the experimental analysis of these percolation processes in the rock, with which the spatial and temporal expansion of the percolation temperature fields and contamination can be observed. The test arrangement is a modified water injection test. A salt tracer is pumped into a central borehole into the rock. The percolation processes are observed in neighboring boreholes. Initial results are reported.

2916 NUCLEAR POWER PLANTS IN NORWAY - SITING AND EFFECT ON SURROUNDINGS. Haga, I (Norges Vassdrags- og Elektrisitetsvesen, Oslo). Ingenioer-nytt ; 14: No. 94, 10-11,24(24 Nov 1978). (In Norwegian).
From Nuclear power seminar; Oslo, Norway (23 - 24 Oct 1978).
The factors affecting site selection for a nuclear power plant are first presented. Thereafter the effects on the surrounding district of the construction phase are discussed. It is probable that the first plant in Norway would be sited by the Oslofjord, where it is found that the effects are acceptable. The effects of releases of radioactive substances during routine operation, and of thermal pollution are then

discussed and it is concluded that there would be no significant adverse effects. Finally the radiation hazards from a reactor accident and its consequences are briefly discussed.

Radioactive Effluents

2917 (AECL--6544) RECOVERY OF TRITIUM FROM CANDU REACTORS, ITS STORAGE AND MONITORING OF ITS MIGRATION IN THE ENVIRONMENT. Holtslander, W.J.; Osborne, R.V.; Drolet, T.S. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Jul 1979. 18p. NTIS (US Sales Only), PC A02/MF A01.

Tritium is produced in CANDU heavy water reactors mainly by neutron activation of deuterium. The typical production rate is 2.4 kCi per megawatt-year (89 TBq. per megawatt-year. In Pickering Generating Station the average concentration of tritium in the moderators has reached 16 $Ci.kg^{-1}$ (0.6 $TBq.kg^{-1}$) and in coolants, 0.5 $Ci.kg^{-1}$ (0.02 $TBq.kg^{-1}$). Concentrations will continue to increase towards an equilibrium determined by the production rate, the tritium decay rate and heavy water replacement. Tritium removal methods that are being considered for a pilot plant design are catalytic exchange of DTO with D_2 and electrolysis of D_2O/DTO to provide feed for cryogenic distillation of D_2/DT/T_2. Storage methods for the removed tritium -- as elemental gas, as metal hydrides and in cements - are also being investigated. Transport of tritiated wastes should not be a particularly difficult problem in light of extensive experience in transporting tritiated heavy water. Methods for determining the presence of tritium in the environment of any tritium handling facility are well established and have the capability of measuring concentrations of tritium down to current ambient values. (author).

2918 (BNL--26970) CRITIQUE OF SOURCE TERM AND ENVIRONMENTAL MEASUREMENT AT THREE MILE ISLAND. Hull, A.P. (Brookhaven National Lab., Upton, NY (USA)). 1979. Contract EY-76-C-02-0016. 20p. (CONF-791037--14). Dep. NTIS, PC A02/MF A01.

From IEEE nuclear science/nuclear power systems symposium; San Francisco, CA, USA (17 Oct 1979).

The most serious malfunction to date at an operating power reactor in the US occurred at Unit 2 of the Three Mile Island Nuclear Power Station (TMI) at 0400 est on March 28, 1979. Subsequently, between 3X and 10 x 10^6 Ci of radiogases (principally ^{133}Xe) were released to the atmosphere from the plant vent in decreasing concentrations over the next few weeks, accompanied by abut 10 Ci of ^{131}I. During this period, the plant's typical effluent monitors and field radiation monitoring program were unable to supply prompt and reliable radiological information. In order to provide a sufficient radioanalytical capability for the large number of in-plant and environmental samples (air, water, soil, vegetation and milk) which were obtained, the existing on-site facilities were augmented by mobile laboratories. The laboratory facilities of the Bureau of Radiological Health (BRH-PA) of the Pennsylvania Department of Environmental Conservation were supplemented by a nearby temporary facility for gamma analysis set up by the Department of Energy (DOE). Many environmental samples, principally of milk, were also transported to more remotely established radioanalytical laboratories of state and federal agencies.

2919 (CONF-800403--13) ESTIMATES OF DOSE TO THE POPULATION WITHIN FIFTY MILES DUE TO NOBLE GAS RELEASES FROM THE THREE MILE ISLAND INCIDENT. Miller, C.W.; Cotter, S.J.; Moore, R.E.; Little, C.A. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 8p. Dep. NTIS, PC A02/MF A01.

From ANS thermal reactor safety meeting; Knoxville, TN, USA (8 Apr 1980).

Estimates have been made of the dose to the population within 80 km (50 miles) due to noble gas releases from the Three Mile Island Unit 2 incident for the period March 28 to April 15, 1979. Source term, meteorological, and monitoring data used in these estimates were supplied by the Task Group on Health Physics and Dosimetry of the President's Commission on the Accident at Three Mile Island. The 22.5° sector-averaged form of the Gaussian plume atmospheric dispersion model was used to calculate doses due to immersion in air and inhalation. The best estimate of the population dose to the total body is 15 person-sieverts (1500 person-rem).

2920 (CONF-800607--9) MEASURED PERFORMANCE OF FOUR PWR LIQUID RADIOACTIVE WASTE TREATMENT SYSTEMS. McIsaac, C.V.; Mandler, J.W.; Stalker, A.C. (EG and G Idaho, Inc., Idaho Falls (USA)). 1980. Contract EY-76-C-07-1570. 6p. Dep. NTIS, PC A02/MF A01.

From American Nuclear Society annual meeting; Las Vegas, NV, USA (8 Jun 1980).

This paper presents results of a study of the liquid radwaste treatment and boron recovery systems of four operating PWR power plants. The performance of a given system was determined from measurements of radionuclide inventories in samples drawn from demineralizers, evaporators, filters, and gaseous cleanup systems. The plants at which measurements were made are Fort Calhoun, Zion 1 and 2, Turkey Point 3 and 4, and Rancho Seco.

2921 (CONF-800802--14) UNIT OPERATIONS USED TO TREAT PROCESS AND/OR WASTE STREAMS AT NUCLEAR POWER PLANTS. Godbee, H.W.; Kibbey, A.H. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 47p. NTIS, PC A03/MF A01.

From 89. annual meeting of the American Institute of Chemical Engineers; Portland, OR, USA (17 Aug 1980).

Estimates are given of the annual amounts of each generic type of LLW [i.e., Government and commerical (fuel cycle and non-fuel cycle)] that is generated at LWR plants. Many different chemical engineering unit operations used to treat process and/or waste streams at LWR plants include adsorption, evaporation, calcination, centrifugation, compaction, crystallization, drying, filtration, incineration, reverse osmosis, and solidification of waste residues. The treatment of these various streams and the secondary wet solid wastes thus generated is described. The various treatment options for concentrates or solid wet wastes, and for dry wastes are discussed. Among the dry waste treatment methods are compaction, baling, and incineration, as well as chopping, cutting and shredding. Organic materials [liquids (e.g., oils or solvents) and/or solids], could be incinerated in most cases. The filter sludges, spent resins, and concentrated liquids (e.g., evaporator concentrates) are usually solidified in cement, or urea-formaldehyde or unsaturated polyester resins prior to burial. Incinerator ashes can also be incorporated in these binding agents. Asphalt has not yet been used. This

paper presents a brief survey of operational experience at LWRs with various unit operations, including a short discussion of problems and some observations on recent trends.

2922 (EPRI-NP--1269) IODINE SPECIES IN REACTOR EFFLUENTS AND IN THE ENVIRONMENT. FINAL REPORT. Voilleque, P.G. (Science Applications, Inc., Rockville, MD (USA). Nuclear Environmental Services Div.). Dec 1979. 204p. Dep. NTIS, PC A10/MF A01.

The air-to-vegetation transfer velocity, an important parameter in evaluating dose to man from I-131 in the environment, has been used to establish an environmental reactivity ranking for the radioiodine species. In these terms, the hierarchy of reactivities is I_2 > particulate > HOI > organic iodides. Previous measurements showing that the least reactive forms, HOI and organic iodides, comprise 50% or more of the total I-131 release from boiling water reactors were confirmed in this study. Measurements of the chemical forms of I-131 and stable iodine in the environment were made using radioiodine species sampler media and a stable iodine species sampler. The compound HOI-131 was observed in the environment 1.5 km from the plant release point. Organic forms were prevalent in environmental samples. Organic iodide residence times calculated using the measured variability of ambient concentrations are > 80 days.

2923 (EPRI-NP--1380) BUILDING EFFECTS ON EFFLUENT DISPERSION FROM ROOF VENTS AT NUCLEAR POWER PLANTS. FINAL REPORT. Thuillier, R.H.; Mancuso, R.L. (SRI International, Menlo Park, CA (USA)). Apr 1980. 232p. NTIS, PC A11/MF A01.

During the summer of 1978, a series of dispersion tests was conducted by SRI International using gas tracer and lidar techniques. Tests were conducted at a specially selected nuclear power facility in the Midwest and were designed to diagnose the effect of nuclear power plant structures on the three-dimensional characteristics of effluent plumes within 1 kilometer of the release point. For the purpose of the tests, sulfur hexafluoride (SF_6) gas and zinc oxide smoke were released simultaneously from one of the three release points at different heights on a plant structure and one of two ground-level locations removed from the influence of the structural wake.

2924 (EPRI-NP--1389) ^{131}I STUDIES AT TMI UNIT 2. FINAL REPORT. Cline, J.E.; Voilleque, P.G.; Pelletier, C.A.; Thomas, C.D. (Nuclear Environmental Services, Rockville, MD (USA)). Apr 1980. 100p. NTIS, PC A05/MF A01.

Subsequent to the accident at TMI-2 on March 28, 1979, a program of measurements was set up to: (1) identify sources of radioiodine release to the environment, (2) measure retention efficiencies of charcoal adsorbers in the plant's ventilation exhaust system, and (3) measure protection factors for respirators using charcoal canisters. Measurements of radioiodine sources showed that, when normalized for reactor coolant concentrations, radioiodine releases were approximately the same at TMI-2 as at other PWRs.

2925 (IAEA--212, pp 97-119) TRANSFER PARAMETERS OF FISSION AND ACTIVATION PRODUCTS PRESENT IN EFFLUENTS OF NUCLEAR POWER REACTORS. Cancio, D.; Menossi, C.A.; Ciallella, N.R. (Comision Nacional de Energia Atomica, Buenos Aires (Argentina). Gerencia de Proteccion Radiologica y Seguridad). 1978. (In Spanish).

From IAEA regional seminar on the application of environmental impact analysis to the nulcear power industry; Buenos Aires, Argentina (29 Aug 1977).

The paper presents results of research carried out in Argentina on transfer parameters of fission and activation products which may be present in the effluents of nuclear power reactors. For some nuclides, as Sr-90, Co-137 and I-131, the parameters were obtained by studies of the fallout, from measurements of integrated levels in the environment and in the food chains. Other values are concentration factors derived from laboratory and field experiments. They refer to fish, molluscs, crustaces and fresh water plants, for several fission and activation nuclides. Transfer parameters obtained have been of significant importance for environmental assessments, relating to nuclear installations in Argentina.

2926 (IAEA--212, pp 1-17) RADIATION PROTECTION REQUIREMENTS IN THE LIMITATION OF THE RELEASE OF RADIOACTIVE EFFLUENTS. Beninson, D. (United Nations Scientific Committee on the Effects of Atomic Radiation). 1978.

From IAEA regional seminar on the application of environmental impact analysis to the nulcear power industry; Buenos Aires, Argentina (29 Aug 1977).

The paper summarizes the requirements of radiation protection, as presented in the new ICRP recommendation, in relation to the limitation of the release of radioactive effluents. The concepts of effective dose equivalent and collective dose equivalent are used in the presentation of the optimization procedures and the dose limitation to individuals. The dose commitment is used for the procedures applied to control future exposures. An appendix describes the basic concepts and quantities used in assessments of human exposures and risks.

2927 (INIS-mf--4637, pp 120) ISOTOPE COMPOSITION OF IODINE IN GASEOUS EFFLUENTS OF NUCLEAR FACILITIES AND IODINE FILTER EFFICIENCY. Tomasek, M. (Ceskoslovenska Akademie Ved, Prague. Laborator Radiologicke Dozimetrie). Jun 1976. (In Czech).

From 4. national symposium on ionizing radiation dosimetry; Marianake Lazne, Czechoslovakia (8 Nov 1976).

ACTIVATED CARBON;ADSORPTION;AIR FILTERS; EFFICIENCY;GASEOUS WASTES;HUMIDITY;IMPREGNATION; IODINE COMPOUNDS;IODINE 131;ISOTOPE RATIO; NUCLEAR POWER PLANTS;RADIOACTIVE EFFLUENTS

2928 (INIS-mf--4698) STOCK-TAKING OF THE SAFETY DESIGN OF THE NUCLEAR POWER PLANT WITH PWR TYPE BIBLIS B AND THE RADIATION EXPOSURE CONNECTED WITH ITS OPERATION. PHASE 1. Orescher, H.P.; Geiser, H.; Roedder, P.; Dagbjartsson, S.; Ernst, H.; Ledermann, H.; van Hecke, R. (Bonnenberg und Drescher Ingenieurgesellschaft m.b.H., Aldenhoven (Germany, F.R.); Fichtner, Beratende Ingenieure fuer Energie- und Waermewirtschaft G.m.b.H. und Co. K.G., Stuttgart (Germany, F.R.)). Jun 1976. vp. (In German). Dep. NTIS (US Sales Only), PC A11/MF A01.

The study comprises: 1) Environmental pollution due to radioactive emissions; 2) personnel exposure during operation, maintenance, inspection, and repair; 3) environmental pollution due to the closing of

the fuel cycle; 4) safety requirements; 5) state of the art of safety design; 6) reliability analysis; 7) the importance of the testability of systems and components relevant for safety. (HP) 891 HP.

2929 (INIS-mf--4957) DETERMINATION OF THE SOURCES OF THE AIRBORNE PHYSICO-CHEMICAL ^{131}I SPECIES IN A PWR POWER PLANT. Deuber, H.; Wilhelm, J.G. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Lab. fuer Aerosolphysik und Filtertechnik 1). 1978. 10p. Dep. NTIS (US Sales Only), PC A02/MF A01.

In a 1300 MWE PWR power plant the sources of the airborne ^{131}I species were determined over a period of 5 months. During power operation the main source of the radiologically decisive elemental ^{131}I was the exhaust from the hoods in which samples from the primary coolant are taken and processed. During refueling outage elemental ^{131}I was mainly contributed by the containment purge air. By efficient filtration of these exhausts, a reduction of the ingestion dose, caused by the total ^{131}I stack release, by a factor of nearly 4 during power operation and of possibly 10 during refueling outage can be accomplished.

2930 (INIS-mf--5570, pp 83-86) AUTOMATIC INSTALLATIONS WITH EVAPORATORS AND ION EXCHANGE FILTERS FOR PROCESSING TRAPPED WATERS AND BORON CONTAINING SOLUTIONS WITH REGENERATION OF BORIC ACID FROM THEM CONFORMABLY TO THE NUCLEAR POWER PLANT WITH WWR-1000 REACTOR PROJECT. Matskevich, G.V.; Matkovskii, L.V.; Shevtsova, A.G. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Installation is described for processing of trapped and washing waters, desactivation of liquid discharges, reprocessing of technological boric acid solution. This installation is intended for nuclear power plant with WWR type reactors. There are two independent devices in the installation. One is for processing of liquid wastes and the second is especially intended for boric acid solution reprocessing. But in the case of necessity these devices can replace each other in processing either radioactive effluents or boric acid solution. Main method for processing of highly mineralizated liquid wastes at nuclear power plant is evaporation. Liquid wastes of high activity prior evaporation are subject to preliminary purification by means of ion exchange filters. Installation has automatic systems for starting and shutdown and maintaning of the normal technological regime.

2931 (INIS-mf--5570, pp 117-124) TECHNOLOGICAL SYSTEM FOR RECEPTION AND STORAGE OF LIQUID RADIOACTIVE CONCENTRATED WASTES AND SPENT SORBENTS FOR THE FINISH NUCLEAR POWER PLANT LOVIISA AND SERIAL NUCLEAR POWER PLANT BLOCKS WITH WWR-440 TYPE REACTORS (SYSTEM TW). Matskevich, G.V.; Novikov, V.D. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Technological system for reception and storage of concentrated liquid radioactive wastes from nuclear power plant is described. The system includes: subsystem for purification of the primary coolant circuit water; subsystem for processing of drained coolant; subsystem for trapped waters processing; subsystem for processing of boron containing solutions; subsystem for purification of water from storage and reloading pools; subsystem for purification of scavenging water from steam generators; special sewage subsystem; decontamination subsystem; subsystem for liquid wastes storage; subsystem for gases processing and subsystem for radioactive wastes solidification. Parameters are given for equipment used and wastes coming into the system. Water and chemical conditions for liquid radioactive wastes storage are considered.

2932 (INIS-mf--5570, pp 45-49) PURIFICATION OF RADIOACTIVE SEWAGE CONTAINING LARGE QUANTITIES OF DETERGENTS. Pawlik, O.; Fridrich, V.; Reti, D. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

It is proved that from the economical and technical points of view there is no reason to build devices for purification of small amounts of radioactive sewage in the points of their origin. Great amounts of liquid wastes with different composition in respect with type of waste and concentration of nuclides is originated at nuclear power plants and isotope laboratories. These liquid wastes is expedient to purify at the place of their origin. It is practical to collect and process liquid radioactive wastes separatelly depending on their type. Problems of purification of great amounts of sewage from the atomic power plant laundry are discussed. These sewage contain great amounts of detergents and little salts and radionuclides. Main processes of the sewage processing include precipitation, filtration, concentration of slurries by centrifugation, solidification of slurries and solid wastes burial. Normally, precipitation and coagulation are the chemical processing methods for radioactive sewage. Presence of detergents in sewage makes difficulties for the precipitation and coagulation processes. Satisfactory results of the radioactive sewage purification, when these sewage contain different detergents, can be obtained by means of combination of different chemical and physical an chemical methods. Results of laboratory investigations on different methods of purification of radioactive sewage with high concentration of detergents are given.

2933 (INIS-mf--5570, pp 96-99) OPERATION EXPERIENCE ON INDUSTRIAL ELECTRODIALYSIS PLANT EDU-50 USED IN THE SEWAGE PURIFICATION LINE AT THE CENTRAL STATION OF RADIATION SAFETY (CSRS). Sobolev, I.A.; Kuleshov, N.F.; Khomchik, L.M.; Panteleev, V.I.; Golubchik, R.S. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Results of testing serial model of electrodialysis device EOU NIIPM-25 type in industrial line for purification of liquid radioactive wastes are stated. Composition of liquid wastes and scheme of purification and also results of desalination, concentration and purification of sewage on industrial installation EDU-50 are given. It is shown that content of basic radionuclides in sewage, strontium-90 and cesium-137 was reduced, in everage, in 1,5 times. Influence of the electrodialysis desalination of sewage with subsequent radionuclides separation by ion exchange method is discussed. Some economic estimations of the discussed process of wastes

purification are given.

2934 (INKA-Conf--79-187-001) RADIOLOGICAL IMPACT FROM MODEL COAL-FIRED POWER PLANTS AND FROM NUCLEAR SYSTEMS. Braeutigam, K.R.; Halbritter, G. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Abt. fuer Angewandte Systemanalyse). (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Abt. fuer Angewandte Systemanalyse). 1979. 9p. (CONF-7905119--2). Dep. NTIS (US Sales Only), PC A02/MF A01.

From Annual meeting of the task group on water chemistry of the Gesellschaft Deutscher Chemiker; Bad Pyrmont, F.R. Germany (21 May 1979).

The radiation dose rate from airborne releases of radionuclides are compared for model 1000 MW(e) coal-fired and 1000 MW(e) LWR power plants including reprocessing.

2935 (JEN--423) REY: A COMPUTER CODE FOR THE DETERMINATION OF THE RADIONUCLIDES ACTIVITIES FROM THE GAMMA-RAY SPECTRUM DATA. Palomares, J.; Perez, A.; Travesi, A. (Junta de Energia Nuclear, Madrid (Spain)). 1978. 27p. (In Spanish). Dep. NTIS (US Sales Only), PC A04/MF A01.

The Fortran IV computer Code, REY (REsolution and Identification), has been developed for the automatic resolution of the gamma-ray spectra from high resolution Ge-Li detectors. The Code searches the full energy peaks in the spectra background as the base line under the peak and calculates the energy of the statistically significant peaks. Also the Code assigns each peak to the most probable isotope and makes a selection of all the possible radioisotopes of the spectra, according the relative intensities of all the peaks in the whole spectra. Finally, it obtains the activities, in microcuries of each isotope, according the geometry used in the measurement. Although the Code is a general purpose one, the actual library of nuclear data is adapted for the analysis of liquid effluents from nuclear power plants. A computer with a 16 core memory and a hard disk are sufficient for this code.

2936 (NUREG--0396) PLANNING BASIS FOR THE DEVELOPMENT OF STATE AND LOCAL GOVERNMENT RADIOLOGICAL EMERGENCY RESPONSE PLANS IN SUPPORT OF LIGHT WATER NUCLEAR POWER PLANTS. Collins, H.E.; Grimes, B.K.; Galpin, F. (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation; Environmental Protection Agency, Washington, DC (USA). Office of Radiation Programs). Dec 1978. 126p. (EPA--520/1-78-016). NTIS.

Information on radiological emergency response plans for light water reactors is presented concerning the recommended planning basis; planning needs; and accident considerations.

2937 (NUREG--0543) METHODS FOR DEMONSTRATING LWR COMPLIANCE WITH THE EPA URANIUM FUEL CYCLE STANDARD: 40 CFR PART 190. Congel, F.J. (Nuclear Regulatory Commission, Washington, DC (USA). Div. of Site Safety and Environmental Analysis). Feb 1980. 16p. NTIS.

The purpose of this document is to: (1) present the specifications that implement 40 CFR Part 190 and Appendix I to 10 CFR Part 50, (2) explain the rationale for using Appendix I to demonstrate compliance with 40 CFR Part 190 for sites with four or less nuclear power reactors, and (3) describe acceptable methods for demonstrating compliance with 40 CFR Part 190 for sites whose radioactive effluents exceed the Appendix I portion of the specifications.

2938 (NUREG/CR--0789) EVALUATION OF EMPIRICAL ATMOSPHERIC DIFFUSION DATA. Horst, T.W.; Doran, J.C.; Nickola, P.W. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Oct 1979. Contract EY-76-C-06-1830. 151p. (PNL--2599). Dep. NTIS, PC A08/MF A01.

A study has been made of atmospheric diffusion over level, homogeneous terrain of contaminants released from non-buoyant point sources up to 100 m in height. Current theories of diffusion are compared to empirical diffusion data, and specific dispersion estimation techniques are recommended which can be implemented with the on-site meteorological instrumentation required by the Nuclear Regulatory Commission. A comparison of both the recommended diffusion model and the NRC diffusion model with the empirical data demonstrates that the predictions of the recommended model have both smaller scatter and less bias, particularly for groundlevel sources.

2939 (ORNL--5529) RECOMMENDATIONS CONCERNING MODELS AND PARAMETERS BEST SUITED TO BREEDER REACTOR ENVIRONMENTAL RADIOLOGICAL ASSESSMENTS. Miller, C.W.; Baes, C.F. III; Dunning, D.E. Jr. (Oak Ridge National Lab., TN (USA)). May 1980. Contract W-7405-ENG-26. 162p. NTIS, PC A08/MF A01.

Recommendations are presented concerning the models and parameters best suited for assessing the impact of radionuclide releases to the environment by breeder reactor facilities. These recommendations are based on the model and parameter evaluations performed during this project to date. Seven different areas are covered in separate sections.

2940 (P--300-80-006) POTENTIAL IMPACT OF RADIOCARBON RELEASES BY THE NUCLEAR POWER INDUSTRY. CONSULTANT REPORT. Fairhall, A.W. (Washington Univ., Seattle (USA). Dept. of Chemistry). Feb 1980. 40p. California Energy Commission, Sacramento.

Reactors and especially reprocessing plants will potentially release large amounts of $^{14}CO_2$ to the environment. Enhanced levels of ^{14}C in the atmosphere and vegetation surrounding such facilities suggest siting them in nonagricultural areas. The buildup of this manmade ^{14}C in the atmosphere and biosphere is not expected to affect global ^{14}C levels significantly until the turn of the century. Control equipment at reprocessing plants and reactors could be installed to capture the gaseous ^{14}C and solidify and isolate it from the environment. The health consequences of ^{14}C are not fully understood. As a source of β radiation, reactor produced ^{14}C would be a relatively minor contributor to radiation dose compared with natural radiation sources. Because of carbon's key role in our genetic structure, the transmutation of decaying ^{14}C into nitrogen could potentially produce more cellular damage and health risk than ^{14}C would solely as a source of radiation. If such is the case, the hazards of ^{14}C and the need to control it would be greatly increased, but this requires further study.

2941 (PB--290215) RADIATION PROTECTION ACTIVITIES - 1977. ANNUAL REPORT. (Environmental Protection Agency, Washington, DC (USA). Office of Radiation Programs). Aug 1978. 142p. NTIS PC A07/MF A01.

The report is designed to survey in some detail the activities of several Federal agencies involved in radiation protection-such as controlling medical x-ray exposures, managing nuclear power plant effluents, protecting workers exposed to radiation, and monitoring fallout. In addition some of the less obvious activities are referred to, to give readers a sense of scope of Federal involvement. The division of responsibilities within the Federal government is defined, and some relevant congressional and judicial actions are summarized in the introduction. A list of pertinent 1977 Federal publications is provided.

2942 (PB--295054) PUBLIC HEALTH CONSIDERATIONS OF CARBON-14 DISCHARGES FROM THE LIGHT-WATER-COOLED NUCLEAR POWER REACTOR INDUSTRY. TECHNICAL NOTE. Fowler, T.W.; Clark, R.L.; Gruhlke, J.M.; Russell, J.L. (Office of Radiation Programs, Washington, DC (USA). Technology Assessment Div.). Jul 1976. 64p. NTIS PC A04/MF A01.

The paper includes estimates of carbon-14 production in reactors and analyses of carbon-14 behavior in various waste treatment systems at both reactors and spent fuel reprocessing plants. Environmental transport models and carbon-14 dosimetric models are briefly reviewed to ascertain some probably errors in estimating the impact of carbon-14 on man and the environment. To the extent possible, this report provides an analysis of current findings and projects what work must be performed to provide answers to questions concerning the need for the control of nuclear power sources of this environmental contaminant.

2943 (PB--295100) SUMMARY OF RADIOACTIVITY RELEASED IN EFFLUENTS FROM NUCLEAR POWER PLANTS FROM 1973 THRU 1976. Phillips, J.W.; Gruhlke, J. (Office of Radiation Programs, Washington, DC (USA). Technology Assessment Div.). Nov 1977. 129p. NTIS, PC A07/MF A01.

This is the second in a series of annual summaries of radioactive waste being released from, or shipped off-site by, nuclear power plants in the United States. The report provides a consolidated source of data. This report covers only those long lived isotopes which are generally released in sufficient quantities to be environmentally significant over extended periods of time in the biosphere.

2944 (PB--296289) SUMMARY OF RADIOACTIVITY RELEASED IN EFFLUENTS FROM NUCLEAR POWER PLANTS FROM 1972 THRU 1975. Phillips, J.W.; Gruhlke, J.; Gaul, G.A. (Office of Radiation Programs, Washington, DC (USA). Technology Assessment Div.). May 1977. 122p. NTIS, PC A06/MF A01.

This is the first in a series of annual summaries of radioactive waste being released from, or shipped off-site by, nuclear power plants in the United States. The report provides a consolidated source of data. This report covers only those long lived isotopes which are generally released in sufficient quantities to be environmentally significant over extended periods of time in the biosphere. This report includes those plants which reached commercial operation, or had measurable releases prior to commercial operation, as of December 1975, and includes only those isotopes of environmental and radiological significance. All of the information in this report was taken from the individual plant semi-annual or annual operating reports filed by the responsible utility with the Nuclear Regulatory Commission unless otherwise noted.

2945 (PNL--2286(App.)) DESCRIPTIONS OF REFERENCE LWR FACILITIES FOR ANALYSIS OF NUCLEAR FUEL CYCLES. APPENDIXES. Schneider, K.J.; Kabele, T.J. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Sep 1979. Contract EY-76-C-06-1830. 232p. Dep. NTIS, PC A11/MF A01.

The appendixes present the calculations that were used to derive the release factors discussed for each fuel cycle facility in Volume I. Appendix A presents release factor calculations for a surface mine, underground mine, milling facility, conversion facility, diffusion enrichment facility, fuel fabrication facility, PWR, BWR, and reprocessing facility. Appendix B contains additional release factors calculated for a BWR, PWR, and a reprocessing facility. Appendix C presents release factors for a UO_2 fuel fabrication facility.

2946 (RISO-M--1972) COMPARISON OF NORDIC DOSE MODELS. Thykier-Nielsen, S. (Risoe National Lab., Roskilde (Denmark)). Apr 1978. 199p. Dep. NTIS (US Sales Only), PC A10/MF A01; Also available from Risoe Library, DK-4000 Roskilde, Denmark.

A comparison is made between the models used in the four Nordic countries, Finland, Norway, Sweden and Denmark, for calculation of concentrations and doses from releases of radioactive material to the atmosphere. The comparison is limited to the near-zone models, i.e. the models for calculation of concentrations and doses within 50 km from the release point, and it comprises the following types of calculation: a. Concentrations of airborne material, b. External gamma doses from a plume, c. External gamma doses from radioactive material deposited on the ground. All models are based on the gaussian dispersion model (the gaussian plume model). Unit releases of specific isotopes under specific meteorological conditions are assumed. On the basis of the calculation results from the models, it is concluded that there are no essential differences. The difference between the calculation results only exceeds a factor of 3 in special cases. It thus lies within the known limits of uncertainty for the gaussian plume model.

2947 (SAND--80-0366) OBSERVATIONS ON THE USE OF THE CONSEQUENCE MODEL CRAC FOR SMALL NONREACTOR ATMOSPHERIC RELEASES. Ericson, D.M. Jr. (Sandia National Labs., Albuquerque, NM (USA)). May 1980. Contract AC04-76DP00789. 26p. NTIS, PC A03/MF A01.

As part of the Reactor Safety Study, a consequence model, CRAC, was developed to examine the public consequences of accidental releases of radioactive material from nuclear power plants. Since the development of the model, several studies have been conducted to examine the sensitivity of the model to factors such as plume rise, wind shear, rain, and population evacuation. All of these studies were performed assuming one or more of the potentially large accidental releases from reactor sites. At the same time, CRAC has been used to examine the consequences of sabotage-caused releases from spent fuel during transport. In the most recent study, the consequence estimates obtained with CRAC were compared with those obtained using METRAN, the consequence model developed for the Urban Study.

2948 (STUDSVIK/K2--79/79) REGULAR CONTROL OF MONITORS FOR EFFLUENTS FROM NUCLEAR POWER

PLANT STACKS. Stroem, L. (Studsvik Energiteknik AB, Nykoeping (Sweden)). Jan 1979. 13p. (In Swedish). Dep. NTIS (US Sales Only), PC A02/MF A01.

The report describes a test procedure for emission monitoring devices for nuclear power plants. The following procedures are described, inspection, determination of the air flow through the stack, measurement and adjustment of the flow in the stack loop, measurement and adjustment of flow and density in the measuring loop, calibration of the gas detector, efficiency of sampling of methyliodide and aerosol.

2949 (UCID--18243) ARCHIVING THE PAPER FALLOUT FROM THREE MILE ISLAND. Fisher, H.L.; Caswell, V.D. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 10 Aug 1979. Contract W-7405-ENG-48. 7p. Dep. NTIS, PC A02/MF A01.

During the Three Mile Island incident, the Atmospheric Release Advisory Capability (ARAC) Center at the Lawrence Livermore Laboratory supplied a continuous flow of meteorological and radioactive plume transport and diffusion data to agencies of the Department of Energy and Nuclear Regulatory Commission from March 28 to April 18, 1979. By then a vast amount of data had accumulated in the ARAC Center. This paper describes the scheme devised for archiving this material and suggests how it might be extrapolated to archive responses to future incidents of a more complex nature or longer duration.

2950 (UCID--18783) PRELIMINARY COMPARISONS BETWEEN MEASUREMENTS AND MODEL CALCULATIONS FOR THE TMI VENTING OF ^{85}KR. Dickerson, M.H. (California Univ., Livermore (USA). Lawrence Livermore National Lab.). Aug 1980. Contract W-7405-ENG-48. 21p. NTIS, PC A02/MF A01.

ARAC was on-line calculating hourly concentration values during the TMI-2 venting of ^{85}Kr gas from June 28 to July 11, 1980. During this time hourly isopleths of normalized instantaneous concentration were calculated and transmitted to EPA in Middletown, PA. These isopleths were used to help locate the EPA and Penn State mobile air samplers and they were used for comparison to the EPA fixed 24 hr sampler measurements and the DOE helicopter measurements. This report summarizes preliminary comparisons for the EPA fixed samplers and the DOE helicopters.

2951 (UCRL-Trans--11608) CALCULATION MODEL FOR EVALUATION OF DOSES DUE TO EFFLUENTS FROM THE OPERATION OF NUCLEAR INSTALLATIONS. Boeri, G.C.; Brofferio, C.; Caracciolo, R.; Fiorenza, R. (Comitato Nazionale per l'Energia Nucleare, Rome (Italy)). Jul 1980. Translation source information not available 10p. NTIS, PC A02/MF A01.

A summarizing description is given for a compartment model for the evaluation, under equilibrium conditions, of the effects of operating effluents from nuclear installations. On the basis of this model two calculation codes were developed (DEAR and DELIR) for gaseous and liquid effluents. The methods of use of these codes are described along with possible processing methods. To perform an evaluation of the environmental impact of effluents from nuclear power plants, a mathematical model was developed. This model, based on the interaction between compartments, in particular expresses predictions under equilibrium conditions. The numerical processing is then handed over to two codes written in Fortran IV, DEAR and DELIR, for gaseous and liquid effluents, respectively.

2952 ASSESSMENT OF ENVIRONMENTAL RADIATION HAZARDS FROM THE KOEBERG NUCLEAR POWER STATION. Basson, J.K. (Atomic Energy Board, Pelindaba, Pretoria (South Africa). Isotopes and Radiation Div.); Winkler, B.C. (Atomic Energy Board, Pelindaba, Pretoria (South Africa). Licensing Branch); Walmsley, J. (Electricity Supply Commission, Johannesburg (South Africa)). Civil Engineer in South Africa ; 22: No. 4, 91-95(Apr 1980).

Escom's decision to build the 2 x 922 MW (e) Koeberg nuclear power station on the coastal Duynefontein site, 28 km north of Cape Town is explained. After describing the internationally accepted basis of radiation protection, the philosophy of nuclear-installation licensing, as applied by the AEB Licensing Branch, is outlined. Preoperational environmental investigations that have provided acceptable release rates of radioactive effluent to the sea and the atmosphere are discussed. Accidental releases are described and the sound basis of such studies is compared with normal industrial undertakings.

2953 KOEBERG RADIATION HAZARDS. INVITED REVIEW AND DISCUSSION. Hall, A.V. Civil Engineer in South Africa ; 22: No. 4, 95-96(Apr 1980).

A discussion is presented of the article by J.K. Basson, B.C. Winkler, and J. Walmsley on the assessment of environmental radiation hazards from the Koeberg nuclear power station. The safety of the Koeberg nuclear power station is evaluated and an alternative reactor site is suggested.

2954 TREATMENT OF RADIOACTIVE EFFLUENT WATER IN NUCLEAR POWER STATIONS. Roofthooft, R. (Laboratoire Belge de l'Industrie Electrique (LABORELEC), Rhode-St. Genese). VGB Kraftwerkstechnik ; 60: No. 2, 124-126(Feb 1980). (In German).

The treatment of radioactive effluents can lead to problems because of the presence of detergents. The principal radioactive pollutants are in general Cs-134 and Cs-437. Treatment with copper ferro-cyanide is envisaged. The decontamination factors for various isotopes are quoted and coagulation equipment is planned. The treatment of mixed radioactive effluents is investigated under various conditions. The proposed process is simple and leads to activity concentrations markedly below 5 x 10^{-5} Ci/m^3 at a cost of about DM 1.20/m^3. A total concentration factor of 800 is possible.

2955 RADIOACTIVITY RELEASE TO THE ENVIRONMENT BY THERMAL POWER STATIONS USING COAL AS A FUEL. Mishra, U.C.; Lalit, B.Y.; Ramachandran, T.V. (Bhabha Research Centre, Bombay). Science of the Total Environment ; 14: No. 1, 77-83(Jan 1980).

Radioactive emissions from coal and flyash samples at four thermal power stations that use coal as a fuel in India were measured and compared with radioactive emissions resulting from the operation of BWR's and hot water reactors at nuclear power stations. Experimental samples and methods are described. Although the chemical, physical, and biological properties of radioactive emissions from coal-fired power plants are different from those of emissions from nuclear power plants, exposure of the general population to ionizing radiation originating from thermal power stations burning

coal is as hazardous as exposure to radioactive emissions from nuclear power stations operating with BWR's and HWR's. (14 references, 4 tables)

2956 FORT ST. VRAIN NUCLEAR GENERATING STATION ENVIRONMENTAL SURVEILLANCE PROGRAM. SUMMARY REPORT, JULY 1, 1979-DECEMBER 31, 1979. Fort Collins, CO; Colorado State University (1980). 147p. (NP--24350). Colorado State Univ., Fort Collins.

The environmental sampling and analysis program was essentially identical to that used in the previous reporting period. A few minor changes in sampling locations occurred and these are presented. Essentially all radioactivity data measured on this project are near background levels and more importantly near the minimum detectable activity (MDA) levels for each radionuclide and sample type.

2957 TECHNOLOGY OF TWO-STAGE WASTE WATER EVAPORATION WITH MIXING CONDENSER. Feyerbacher, D.; Schwarz, F. (Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.)); Walter, K.H. (Gemeinschaftskernkraftwerk Neckar G.m.b.H., Neckarwestheim (Germany, F.R.)). pp 509-511 of Jahrestagung Kerntechnik '80 - Reaktortagung 1980. Tagungsbericht. Sektion 4: Brennstoffkreislauf und Spaltstoff-Flusskontrolle. Eggenstein-Leopoldshafen, Germany, F.R.; Fachinformationszentrum Energie, Physik, Mathematik (1980). (In German)

From Annual meeting on nuclear technology; Berlin, F.R. Germany (25 Mar 1980).

ANTIMONY 124;COBALT 58;COBALT 60; DECONTAMINATION;EFFICIENCY;EVAPORATION;LIQUID WASTES;MANGANESE 54;NECKAR REACTOR; RADIOACTIVITY;REPROCESSING;VAPOR CONDENSERS; BIBLIS-A REACTOR;BIBLIS-B REACTOR;BIBLIS-3 REACTOR;BIBLIS-4 REACTOR;WASTE WATER; RADIOACTIVE WASTE PROCESSING;WATER TREATMENT

2958 AVR'S APPLICATION FOR RELEASE OF TRITIUM AND CARBON-14 APPROVED. GRS (Gesellschaft fuer Reaktorsicherheit) Kurz-Information, Reihe E ; 13: No. 9, 1(1980). (In German).

The relaese limits that have now been approved by the authorities, concerning stack disposal of tritium and carbon-14, are 50 Ci of T per quarter (maximum 100 Ci of T per annum) and 5 Ci of C-14 per quarter (maximum 10 Ci of C-14 per annum). Based upon conservation estimations, the release of 100 Ci/a of T and 10 Ci/a of C-14 will lead to a whole-body radiation exposure of 1.42 mrem/a at the most unfavourable location and taking into account all relevant exposure pathways.

2959 ON-LINE METEOROLOGICAL INFORMATION SYSTEM FOR RESPONSE TO ACCIDENTAL RELEASES OF RADIOACTIVITY INTO THE ATMOSPHERE. Thomas, H.P. (Kernforschungszentrum Karlsruhe, Germany). Nuclear Technology ; 46: No. 2, 241-247(Dec 1979).

A meteorological information system is operated at the Kernforschungszentrum Karlsruhe (KfK). It consists of a tower equipped with instruments and a data processing system. An essential feature of software is the real-time computation of the local and temporal distribution of near-ground activity concentrations in the environment of KfK. After accidental activity releases, the display of concentration distribution serves to initiate concerted intervention.

2960 RADIOLOGICAL CONSEQUENCES OF RADIOACTIVE EFFLUENTS. Clarke, R.H. (National Radiological Protection Board, Harwell (UK)). Radiological Protection Bulletin ; No. 31, 3-5(Nov 1979).

A study of the differential radiological impact of the nuclear fuel cycle with and without plutonium recycle is being undertaken jointly by the National Radiological Protection Board and the Commissariat a l'Energie Atomique (CEA). A summary is given of the development of the methodology detailed in their first report to the Commission of the European Communities (CEC) (NRPB/CEA, A methodology for evaluating the radiological consequences of radioactive effluents released in normal operations. Luxembourg, CEC Doc. V/3011/75 EN (1979)). The Collective Effective Dose Equivalent Commitment was used in an attempt to assess the total health detriment. The application of the methodology within particular member states of the European Community has been discussed at seminars. Sensitivity analysis can identify the more important parameters for improving the accuracy of the assessment.

2961 LIQUID EFFLUENT TREATMENT IN NUCLEAR POWER PLANTS WITH LIGHT WATER REACTORS. Kongsted, T. (Brown, Boveri and Co. Ltd., Baden (Switzerland)). Brown Boveri Review ; 66: No. 8, 526-530(Aug 1979).

In nuclear power plants radioactively contaminated liquid effluents are purified in radioactive waste treatment systems. Efficient purification processes ensure that the major part of the effluent can be re-used in the power plant. The filter residues and evaporator concentrates arising during purification can be solidified with bitumen or cement in the solid radwaste system for final storage.

2962 RADIOACTIVE EFFLUENTS FROM NUCLEAR POWER STATIONS AND FUEL REPROCESSING PLANTS IN EUROPE, 1972 TO 1976. Davis, W. Jr. (Oak Ridge National Lab., TN). Nuclear Safety ; 20: No. 4, 468-475(Jul 1979).

Data on the radioactive gasborne and liquid effluents from 58 nuclear power stations and 7 fuel reprocessing plants in the European Community for the years 1972 to 1976 are presented. There are wide variations in releases from both reactor stations and fuel reprocessing plants because of differences in reactor type, plant size, power levels, and effluent treatment levels. Data covering specific isotopes of particular interest are summarized. In nearly all cases, releases of radioactivity were below maximum applicable values or the treatments used were considered to satisfy the requirement that the best practicable means be used to minimize the amount of radioactivity discharged.

2963 RADIOACTIVE MATERIALS RELEASED FROM NUCLEAR POWER PLANTS IN 1977. Decker, T.R. (Nuclear Regulatory Commission, Washington, DC). Nuclear Safety ; 20: No. 4, 476-482(Jul 1979).

Releases of radioactive materials in airborne and liquid effluents from commercial light-water reactors during 1977, as well as data on solid-waste shipments, have been compiled and reported. This report supplements earlier ones issued by the former Atomic Energy Commission and the Nuclear Regulatory Commission. The 1977 release data are compared with the releases of previous years in tabular form. Data covering specific radionuclides are summarized.

2964 BETA DOSE IN SKIN FROM GASEOUS

RADIOACTIVE REACTOR EFFLUENTS. Schadt, W.W. (Howard Univ., Washington, DC); Thiess, P.E. Transactions of the American Nuclear Society ; 32: 629-631(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
BWR TYPE REACTORS;RADIOACTIVE EFFLUENTS; GASEOUS WASTES;STACK DISPOSAL;KRYPTON 85; RUBIDIUM 88;BETA DOSIMETRY;MAN;SKIN;DEPTH DOSE DISTRIBUTIONS;MATHEMATICAL MODELS

2965 NUCLEAR ENERGY. Lotter, A.C. IMIESA (Institution of Municipal Engineers of Southern Africa) ; 4: No. 6, 5, 7, 9, 12(Jun 1979). (In English and Afrikaans).
The recent, terrifying threat of a major calamity at Pennsylvania's Three Mile Island power plant near Harrisburg reverberated across practically the whole of the civilised world. An almost incredible sequence of human and mechanical failures at this installation had stopped just short of disaster and had brought the unthinkable perilously close to happening. The accident had sprayed radioactive waste into the air and had led to the large scale evacuation of people from the endangered area, disrupted hundreds of thousands of lives and caused a crippling setback to the nuclear industry. In this article the author discusses the impact the Harrisburg incident has had on the nuclear industry.

2966 APPARATUS AND PROCESS FOR HANDLING DANGEROUS FLUENT MATERIAL. Stock, A.J.; Christofer, D.E.; Brinza, J.E. (to Stock Equipment Co., Cleveland, OH (USA)). Canadian Patent 1,045,727/A/. 2 Jan 1979. 68p.
The invention provides apparatus for handling radioactive fluent material capable of emitting radioactivity, comprising a rigid shield wall of material and thickness sufficient to reduce substantially passage of radioactivity through the shield wall to a level that is not harmful to a human operator; operable handling means located at the side of the shield wall that is exposed to radioactivity from the fluent material for handling the fluent material, the handling means including means to introduce the fluent material into a container at the side of the shield wall and means for applying closure means to the container to close it after introduction therein of the fluent material, and means for controlling flow of the fluent material; power means for operating the handling means located on the other side of the shield wall that is not exposed to radioactivity from the fluent material; and movable mechanical means for driving the handling means extending through the shield wall to operate the handling means from the power means without such harmful passage of radioactivity through the shield wall.

2967 SUMMARY AND DISCUSSION OF FINDINGS FROM: POPULATION DOSE AND HEALTH IMPACT OF THE ACCIDENT AT THE THREE MILE ISLAND NUCLEAR STATION (A PRELIMINARY ASSESSMENT FOR THE PERIOD MARCH 28-APRIL 7, 1979). Rockville, MD; Bureau of Radiological Health (1979). 7p. (NP--24440).
This report was prepared by technical staff members of the Nuclear Regulatory Commission (NRC), the Department of Health, Education and Welfare (HEW), and the Environmental Protection Agency (EPA), who constitute an Ad Hoc Population Dose Assessment Group. It is an assessment of the health impact on the approximately 2 million offsite residents within 50 miles of the Three Mile Island Nuclear Station from the dose received by the entire population (collective dose). The Ad Hoc Group has examined in detail the available data for the period up to and including April 7, 1979. The report also addresses several areas of concern about the types of radionuclides released, about the contribution to population exposure due to beta radiation (which does not penetrate the clothing and skin) emitted from the released radionuclides, about the degree of coverage afforded by available radiation measurements, and about the range of health effects that may result from the estimated collective dose.

2968 TREATMENT OF LIQUID AND SOLID WASTE IN THE POWER STATION AREA. Liptak, L.; Takacs, F. (Eroemue es Halozattervezoe Vallalat Eroeterv, Budapest (Hungary)). Eroeterv Koezlemenyek ; 17: 98-100(1979). (In Hungarian).
The types and quantities of liquid radioactive waste of the Paks Nuclear Power Station, the waste water treatment procedures, the waste solidification procedures, the quantities and types of solid radioactive waste, the possible solidification procedures and the use of evaporation below boiling-point are discussed.

2969 DEVELOPMENTS IN THE MANAGEMENT OF LIQUID AND SOLID RADIOACTIVE WASTES FROM THE IRRADIATED FUEL COOLING POND AT TRAWSFYNYDD POWER STATION. Broadbent, D.; Haighton, A.P.; Scanlon, F.B.F.; Smitton, C. (Central Electricity Generating Board, Bristol (UK)). pp 97-112 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France; OECD (1979).
From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).
The Central Electricity Generating Board operates a 390 MW(E) twin gas-cooled reactor power station at Trawsfynydd in North Wales. The reactors are fuelled with natural uranium metal clad in a magnesium alloy (Magnox). Spent irradiated fuel is stored underwater in a cooling pond. The cooling pond and its associated pond water and radioactive liquid effluent treatment plants have proved to be the most significant sources of liquid and solid radioactive wastes arising during normal station operation. This paper describes the developments which have taken place in the management and treatment of these radioactive wastes.

2970 SOLIDIFICATION OF LIQUID WASTES FROM NUCLEAR POWER PLANTS BY MOBILE SOLIDIFICATION UNITS. Christ, B.G. (Transnuklear G.m.b.H., Hanau (Germany, F.R.)); Brunner, H.; Kohlpoth, W. (Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.)). pp 349-359 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France; OECD (1979).
From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).
According to current regulations liquid nuclear wastes from power plants have to be solidified before being finally stored, preferably in geological salt formations. Solidification is necessary in order to provide a safeguard in addition to the geological barrier. Thus the pollution of the biosphere by radioactive wastes shall be prevented. In the

following the on-site solidification of liquid nuclear wastes in mobile cementation units is presented as an alternative to the transport of liquid wastes to remote conditioning plants or to the solidification of these wastes in a stationary unit of the power plant. Then an account will be rendered on the experiences gained from the operation of the mobile DEWA solidification unit which has been in use for one year.

2971 CEMENT SOLIDIFICATION OF BWR AND PWR RADIOACTIVE WASTE AT THE RINGHALS NUCLEAR POWER PLANT. Christensen, H. (ASEA-ATOM AB, Vaesteraas (Sweden)). pp 333-347 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France: OECD (1979).
From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).
A summary is given of the operational experience gained during four years of cement solidification at the Ringhals nuclear power plant in Sweden. The solidification system was originally designed to handle waste from a BWR only but has been modified to handle also boric acid containing mixed bed resins from a PWR.

2972 ON-SITE MANAGEMENT OF REACTOR WASTES BY A CANADIAN POWER UTILITY. Drolet, T.S. (Ontario Hydro, Toronto (Canada)). pp 53-66 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France: OECD (1979).
From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).
The quantity of Reactor Wastes from the Ontario Hydro Nuclear Program will increase from approximately 1200 m^3 (before processing) in 1978 to 8000 m^3/year in 1990. The principles for management of station radioactive wastes (shorter half-life, low level of radioactivity relative to irradiated fuel/waste) include: process for volume reduction, where appropriate, i.e., incineration, compaction; immobilize by solidification in a low solubility form; use of engineered storage structures with multiple means of confinement; monitoring of the storage containment so that leaks can be detected. Initially, all generating station wastes will be stored retrievably, as solids, in above-ground or in-ground storage facilities. A development program is underway which is intended to establish conditioning techniques for long term storage or disposal.

2973 CHARACTERISATION, HANDLING AND TREATMENT OF WASTE ARISINGS FROM THE WINFRITH SGHWR. Ferrett, D.J.; Symons, W.J. (UKAEA Atomic Energy Establishment, Winfrith). pp 169-184 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France: OECD (1979).
From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).
The waste arisings from the 100 MW(E) SGHWR at Winfrith have been carefully characterised over its 10 year period of operation with special reference to the variation between operational and maintenance periods and the particular effect of the once-yearly circuit decontamination on liquid effluent levels. In addition to determining the pattern of gamma-nuclide discharges, special surveys are reported on discharge levels of beta-emitters, ie, T, ^{32}P, ^{35}S, ^{63}Ni and ^{14}C. A survey of laundry effluents reflects the pattern of operations. The volume of solid waste generated varies with a factor of 3:1 between shut-down and operations. Sludge and resin wastes from coolant clean-up and pond water clean-up plant together with residues from decontamination operations are stored in sludge tanks and techniques for the characterisation of these wastes and their treatment and immobilisation by acid digestion and incorporation in cement/vermiculite matrices are being investigated.

2974 DOW PROCESS FOR THE SOLIDIFICATION OF LOW-LEVEL RADIOACTIVE WASTES FROM NUCLEAR POWER PLANTS. Filter, H.E. (Dow Chemical Co., Midland, MI (USA)). pp 379-393 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France: OECD (1979).
From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).
This report summarizes the laboratory test program, pilot plant runs and field operating experience for solidification of low-level radioactive wastes from nuclear power plants with the Dow solidification process. Simulated wastes and radioactive wastes were converted into homogeneous, liquid-free monoliths. Pilot plant runs and field operating experience demonstrated that data generated in the laboratory could be extrapolated to 210 liter (55-gallon) drums and 1.4 m^3 (50 ft.3) containers. Simulated waste and radioactive wastes produced in the operation of nuclear power plants were solidified and produced homogeneous, liquid-free monoliths which fulfill U.S. regulatory and Dow requirements. The advantages the Dow process offers the nuclear power industry are summarized. Several utilities in the United States have confirmed these advantages and are installing the Dow process in their plants.

2975 PRE-TREATMENT OF EVAPORATOR CONCENTRATES AND SPENT ION-EXCHANGERS BEFORE THEIR SOLIDIFICATION IN ORGANIC BINDERS. Golinski, M.; Cholerzynski, A.; Tomczak, W. (Institute of Nuclear Research, Warsaw (Poland)); Chmielewski, A. (Politechnika Warszawska (Poland)). pp 215-226 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France: OECD (1979).
From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).
The paper presents results of laboratory experiments on the concentration of evaporator concentrates, dewatering and drying of spent ion-exchange resins before their solidification in bitumen or plastic materials. The process of concentration has been based on distillation with tetrachloromethane acting as transporting agent. The fundamental parameters of this process have been established and scheme of pilot installation has been presented. Dewatering of ion-exchangers has been performed by means of vacuum filtration and drying in a stream of heated air. Efficiency of both methods has been established. Also a semi-industrial scale installation is presented.

2976 SOLIDIFICATION OF LOW AND MEDIUM LEVEL WASTES IN BITUMEN AT BARSEBECK NUCLEAR POWER STATION. Harfors, C. (Southern Sweden Power Supply, Barsebeck (Sweden)). pp 449-463 of

Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France; OECD (1979).
From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).
Operating experience is presented from 4 years of bitumen solidification of wastes coming from two boiling water reactors. Methods used to sample, analyse and document the wastes are described. Transport and storage methods without remote handling have been adopted. The risk of fire is discussed and a description is given of the measures taken for fire protection.

2977 MEMBRANE FILTER APPLICATIONS FOR CRUD SEPARATION FROM RADIOACTIVE WASTE WATER GENERATED IN LWR POWER PLANTS. Hayashi, M. (Tokyo Electric Power Co., Inc. (Japan)); Yamaguchi, T.; Moriya, Y.; Koshiba, Y. (JGC Corp., Tokyo (Japan)); Ohta, Y. (Nomura Microscience Co., Tokyo). pp 229-239 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France; OECD (1979).
From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).
For radioactive waste processing facilities of the BWR type plants in service in Japan, precoat type filters are prevalently used. Meanwhile, the amount of filter sludge produced as a result of their operation is much larger than initially anticipated and this is presenting a serious problem concerning the waste disposal of these solids. In this connection, JGC has been studying the use of the nuclepore Membrane Filter, which does not require precoating material, for reducing the amount of such secondary radioactive solid waste. As a result, it has been proved that this type of filter can be used for long periods without clogging and the prospects of its practical application are very promising. Actually, this filter is already in commercial use in some Radwaste plants in Japan.

2978 RADIOACTIVE WASTE TREATMENT EXPERIENCES AT TARAPUR. Kulkarni, P.C. (Department of Atomic Energy, Tarapur Atomic Station, Maharashtra (India)). pp 199-213 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France; OECD (1979).
From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).
This paper describes the experiences of Tarapur Atomic Power Station in treatment of radioactive wastes since plant commissioning in 1969. The station as constructed had certain built in restraints. These restraints were dealt with under two separate categories; by changing the method of processing involved and correcting the deficiencies of the equipment. System modifications and procedural changes helped to tide over the processing difficulties with some indirect saving in liquid discharges. Construction of large capacity delay tanks and chemical treatment of wastes helped in reducing liquid waste discharge.

2979 INCINERATION OF COMBUSTIBLE WASTE AT A REACTOR SITE. Laser, M.; Mallek, H. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Abt. Dekontamination); Metscher, K. (Kraftanlagen A.G., Heidelberg (Germany, F.R.)). pp 439-448 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France; OECD (1979).
From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).
For the incineration of combustible reactor waste a 100-kg/h-plant has been developed. The plant is automated to a high degree and is very easy to operate and to control by normal staff of the power reactor station. A 100-kg/h-pilot plant is in operation with very good results at the Nuclear Research Centre in Juelich. Compared with compaction of waste the incineration is economical at a two-block reactor station with about 1,000 m^3 combustible waste per year.

2980 DEVELOPMENT OF INCORPORATION OF EVAPORATOR CONCENTRATE FROM PRESSURIZED WATER NUCLEAR POWER REACTORS INTO ASPHALT. Lee, S.H.; Chun, K.S. (Korea Atomic Energy Research Inst., Seoul (Republic of Korea)). pp 481-493 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France; OECD (1979).
From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).
The paper presents a summary of recent progress in the bituminization technique of evaporator concentrate from a pressurized light-water reactor. The research and development work has been carried out for the past three years at Korea Atomic Energy Research Institute. A new approach to incorporation of the concentrate into the mixed asphalt of a straight asphalt and a blown asphalt has been studied. Before feeding the concentrate into a thin-film evaporator, it is neutralized with sodium hydroxide in the range of pH 7.5 to 8.0. Compared with cement and vermiculite process used at Kori unit 1 (600 MWe, PWR), the bituminization process of the concentrate suggests that there is a gain in volume of minimum five.

2981 TREATMENT OF RADIOACTIVE WASTES AT THE CZECHOSLOVAK NUCLEAR POWER STATION. Malasek, E.; Tittlova, E. (Ceskoslovenska Komise pro Atomovou Energii, Prague). pp 185-197 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France; OECD (1979).
From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).
The paper reviews briefly the system for the treatment of solid, liquid and gaseous radioactive wastes in the Czechoslovak nuclear power station A-1 and the modifications which have been made in the course of the station's operation, and analyses the quantity and the character of the expected and the actual wastes. It also compares the discharge limits for the gaseous and liquid wastes with the actually discharged radioactivity. The solid wastes, and the concentrates produced by the treatment of liquid wastes, are stored temporarily on the power station site, to be transferred, later on, to the regional depository.

2982 CRUD REMOVAL EQUIPMENT USING A CENTRIFUGAL CLARIFIER. Nakao, K.; Kaneda, H. (Chubu Electric Power Co. Inc., Nagoya (Japan)); Nakayama, Y.; Ohigashi, Y.; Nagayama, K.

(Nippon Atomic Industry Group Co. Ltd., Kawasaki, Kanagawa. Nuclear Research Lab.); Kani, J.; Takahara, T. . pp 261-279 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France; OECD (1979).

From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).

Centrifugal clarifiers have been applied for the treatment of the radioactive liquid wastes in BWR nuclear power stations to reduce the amount of secondary waste, such as filter aid materials generated by pressure precoat filters. Two steps of the R and D programs have been performed before the full-scale operation of the centrifugal clarifiers installed in the Hamaoka NPS 2 radwaste system: one, a cold test at the laboratory, and the other, a pilot plant test at Hamaoka NPS 1. This paper describes the pilot plant test results and the experience gathered from the actual full-scale equipment operation, that is: concentration of the insoluble impurities of the treated liquid wastes has been kept to less than 0.5 ppm, while that of the fluent increased to approximately 100 ppm; sludge volume reduction by the equipment is approximately one tenth of that made by the pressure precoat filters.

2983 CONTAINERS USED IN PACKAGING REACTOR WASTE. Raemoe, E.G. (Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)). pp 497-511 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France; OECD (1979).

From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).

A survey was carried out in order to gather information on the containers used in packaging power reactor wastes. A questionnaire was sent to every operating nuclear power plant in the world and the answering percentage was 38%. In addition some information was gleaned from literature. Both technical and economical aspects are reviewed. The main types of containers are steel drums of different sizes, steel drums with concrete lining, large steel containers, disposable concrete containers and wooden boxes. In addition to technical and cost data the distribution of the container types versus different types of waste and waste treatment methods is presented. No special trends towards certain containers can be ascertained on the basis of this study.

2984 OPERATIVE EXPERIENCE IN RADIOACTIVE WASTE TREATMENT IN ATUCHA NUCLEAR POWER PLANT. Recalde, J.A. (Comision Nacional de Energia Atomica, Buenos Aires (Argentina)). pp 153-167 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France; OECD (1979).

From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).

The following report briefly describes the various treatment used in radioactive waste material management in Atucha Nuclear Power Plant, as well as the problems arised during its processing. It also presents the emission values of radionuclides to the environment and the production of solid waste materials.

2985 PROSPECTS FOR LIQUID, GASEOUS AND SOLID WASTE TREATMENT SYSTEMS FOR ENEL'S REFERENCE POWER STATION BWR AND PWR. Russino, G.; Buono, A.; Calabresi, F.; Campolo, D.; Marzullo, T.; Tripputi, I. (Ente Nazionale per l'Energia Elettrica, Rome (Italy)). pp 83-95 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France; OECD (1979).

From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).

After a survey of the engineering arrangements chosen by ENEL, in its reference design for the construction of future nuclear power stations, the paper illustrates the choices dictated by the release limits and operating requirements. The evolution of effluent treatment systems in the latest power stations and the increasingly stringent limitations on permissible releases are discussed. The radioactive release during normal operation, evaluated by means of GALE codes, and the doses to the population, estimated on the basis of parameters relating to a coastal site (Montalto) and a fluvial site (Caorso), were found to be very low.

2986 ON-SITE PERMANENT FACILITIES FOR PROCESSING AND DISPOSAL OF RADIOACTIVE WASTE FROM NUCLEAR POWER PLANTS OF KRAFTWERK UNION. Stuenkel, H.; Faust, H.J.; Puthawala, A. (Kraftwerk Union A.G., Erlangen (Germany, F.R.)). pp 465-479 of Compte rendu du colloque sur la gestion des dechets en provenance des reacteurs de puissance sur le site de la centrale. Zurich, 26-30 mars 1979. Paris, France; OECD (1979).

From AECD-IAEA symposium on the on-site management of power reactor; Zurich, Switzerland (26 Mar 1979).

This paper describes the development of a screw extruder bituminization plant, which can solidify all low and medium active wastes generating in KWU Nuclear Power Plants. The system meets the final storage requirements for the Asse salt mine. The commissioning and start-up tests of the first KWU plant in the NPP Goesgen/Switzerland showed that the concentrate and resins can be solidified without operational difficulties. The report gives a view to the safety aspects of bituminization and the properties of the products.

2987 NUCLEAR REACTOR GASEOUS RADIOACTIVE WASTES. Sivintsev, Yu.V. Atomnaya Tekhnika za Rubezhom ; No. 8, 9-17(1979). (In Russian).

The data are analysed on continuous radiation monitoring of gaseous radioactive wastes of nuclear power stations depending on reactor type. Taking into consideration the predominant character of water-moderated, water-cooled reactor in present power engineering, the main attention is given to foreign publications on PWR and BWR wastes. The information is given for nuclear power plants with GGR or HWR reactors. Four groups of gaseous radioactive wastes are considered: radioactive noble gases; iodine radioisotopes; long-lived isotopes ^{3}H and ^{14}C; radioactive aerosols. The experimental data (power of the surge of gaseous radioactive substances) and working data (irradiation doze) indicate practical radiation safety of present nuclear power stations for the environment. In the worst cases of the discharge of radioactive noble gases from BWR, the irradiation dose in the neighbouring area does not exceed 1% of the natural radioactivity background dose.

2988 ESTABLISHMENT OF ACTIVITY LIMITS FOR ITEMS TO BE RELEASED FOR UNRESTRICTED USE.

Pettersson, B.G. (Statens Straalskyddsinstitut, Stockholm (Sweden)). pp 251-262 of Decommissioning of nuclear facilities. Vienna, Austria; IAEA (1979).

From International symposium on the decommissioning of nuclear facilities; Vienna, Austria (13 Nov 1978).

Materials, equipment and premises considered for release for unrestricted use in the course of decommissioning operations of nuclear facilities must be cleared from the radiation protection point of view prior to actual release. Activity limits to be applied must be based on characteristics of the future possible uses of the various items and their activity content. The objective of activity limits is to maintain radiation doses resulting from such uses within acceptable limits; i.e. activity limits must be based on appropriately established dose limits. The ICRP recommended System of Dose Limitation provides a suitable framework on which to base decisions on such dose limits. This paper discusses the application of the ICRP System of Dose Limitation on the particular component of decommissioning operations where items are considered for release for unrestricted use. In particular, the principles involved in deriving activity limits based on the System are discussed.

2989 METHODOLOGY FOR DETERMINING ACCEPTABLE RESIDUAL RADIOACTIVE CONTAMINATION LEVELS AT DECOMMISSIONED NUCLEAR FACILITIES/SITES. Watson, E.C.; Kennedy, W.E. Jr.; Hoenes, G.R.; Waite, D.A. (Battelle Pacific Northwest Labs., Richland, WA (USA)). pp 263-282 of Decommissioning of nuclear facilities. Vienna, Austria; IAEA (1979).

From International symposium on the decommissioning of nuclear facilities; Vienna, Austria (13 Nov 1978).

The ultimate disposition of decommissioned nuclear facilities and their surrrounding sites depends upon the degree and type of residual contamination. Examination of existing guidelines and regulations has led to the conclusion that there is a need for a general method to derive residual radioactive contamination levels that are acceptable for public use of any decommissioned nuclear facility or site. This paper describes a methodology for determining acceptable residual radioactive contamination levels based on the concept of limiting the annual dose to members of the public. It is not the purpose of this paper to recommend or even propose dose limits for the exposure of the public to residual radioactive contamination left at decommissioned nuclear facilities or sites.

2990 ANNUAL SURVEY OF RADIOACTIVE DISCHARGES IN GREAT BRITAIN 1977. London; Department of the Environment (Aug 1978). 42p.

Historical and legal aspects of the control over the discharges of radioactive wastes from installations in Great Britain are summarized. The results of the survey then follow, under the headings: UK Atomic Energy Authority establishments, the Radiochemical Centre Limited, British Nuclear Fuels Limited, Central Electricity Generating Board and South of Scotland Electricity Board nuclear power stations, Ministry of Defence. In each case the authorisation is stated, with the actual discharges or disposals, and comments.

2991 NATIONAL AND INTERNATIONAL ACTIVITIES IN THE FIELD OF UNDERGROUND DISPOSAL OF RADIOACTIVE WASTES. Richter, D.K. International Atomic Energy Agency Bulletin ; 20: No. 4, 30-41(Aug 1978).

Technical feature: the underground disposal of nuclear wastes may be done at shallow depths, in rock caverns at various depths, and in deep continental rocks. National activities, waste disposal issues, and international activities and cooperation are discussed. Land burial of low and intermediate level radioactive wastes has been done for decades in many countries, including France, the U.S., the USSR, India, Canada, and Britain. International RandD and deep injection projects are reviewed. The U.S. Dept. of Energy Nat'l Waste Terminal Storage Program is assessed. IAEA plans to issue guidelines on safe underground disposal encompassing five areas: regulations; siting; waste acceptance criteria; design and construction; and operation and shutdown of depositories. (1 drawing, 4 photos)

2992 THE SOLIDIFICATION OF HIGH-LEVEL RADIOACTIVE WASTES. Grover, J.R. International Atomic Energy Agency Bulletin ; 20: No. 4, 23-29(Aug 1978).

Technical feature: an IAEA report on techniques for the solidification of high level radioactive wastes is summarized. The goal of all solidification techniques is to convert the waste solution into a product that is less mobile, requires less surveillance, maintains mechanical integrity, and possesses good irradiative resistance and adequate thermal conductivity. Evaporation, calcination, and denitration are used to form glass or ceramic materials. During the past twenty years, about 30 processes have been developed; these are grouped into four categories: processes that have been demonstrated but are no longer in operation; processes in active operation; processes in advanced stages of development; and processes in the early development stage. Waste solidification processes are reviewed by group classification. (3 diagrams)

2993 Messung und ueberwachung gasfoermiger und aerosolgebundener radioaktiver ableitungen. t. 1. Messung und ueberwachung der ableitungen radioaktiver stoffe mit der kaminabluft bei bestimmungsgemessem betrieb. Entwurf. (MEASUREMENT AND MONITORING OF GASEOUS AND AEROSOL-BOUND RADIOACTIVE DISCHARGES. 1. MEASUREMENT AND MONITORING OF RADIOACTIVE SUBSTANCE RELEASES VIA THE VENT STACK DURING ROUTINE OPERATION. DRAFT). Cologne, Germany; Heymanns (1978). 42p.

The draft rule concerns stationary LWRs and HTRs. The measuring and monitoring methods are to distinguish between noble gases, aerosols, ; sup 129;I and ;sup 131;I, ^{3}H, ;sup 90;Sr, ;sup 14;C, and alpha sources.

2994 MONITORING OF GASEOUS AND LIQUID EFFLUENTS AT FRENCH NUCLEAR POWER PLANTS. Fitoussi, L. pp 81-100 of Monitoring of airborne and liquid radioactive releases from nuclear facilities to the environment. Vienna, Austria; International Atomic Energy Agency (1978).

Uniform sampling and measuring methods are used in monitoring waste at the nuclear power plants operated by Electricite de France. In the following, a brief description of the different power plants is given; diagrams of ventilation and liquid effluent discharge circuits are attached. Some general information is given about the releases from the power plants and also the composition of the liquid effluents. Lastly, the sampling methods and measurement techniques are described.

2995 MONITORING OF RELEASES FROM AN IRRADIATED FUEL REPROCESSING PLANT. Fitoussi, L. pp 101-105 of Monitoring of airborne and liquid radioactive releases from nuclear facilities to the environment. Vienna, Austria; International Atomic Energy Agency (1978).

At its UP 2 plant, the La Hague facility reprocesses irradiated fuel by the PUREX process. The fuel stems from graphite/gas, natural-uranium reactors and pressurized or boiling water enriched-uranium reactors. The gaseous effluents are collected and purified by high-efficiency washing and filtration. After purification the gas stream is discharged into the atmosphere by a single stack, 100m high and 6m in diameter, located at a high point on the site (184m). The radionuclides released into the air are: krypton-85, iodine-129 and -131, and tritium. The liquid effluents are collected by drainage systems, which transfer them to the effluent treatment station in the case of active or suspect solutions. Active solutions undergo treatment by chemical and physical processes. After purification the waste water is released into the sea by an underwater drainage system 5km long, which brings the outlet point into the middle of a tidal current 2km offshore. The radionuclides contained in the purified waste water are fission products originating from irradiated fuels in only slightly variable proportions, in which ruthenium-rhodium-106 predominates. Traces of the transuranium elements are also found in these solutions.

2996 MONITORING EQUIPMENT FOR LIQUID EFFLUENTS. Gans, I. pp 41-45 of Monitoring of airborne and liquid radioactive releases from nuclear facilities to the environment. Vienna, Austria; International Atomic Energy Agency (1978).

Liquid effluents that are possibly contaminated by radioactive substances may only be discharged in batches from discharge tanks designed for this purpose. According to administrative orders, discharge monitoring involves the following five steps: Sampling and measurement before discharge; sampling for storage; composite sampling for specific radionuclide analysis; continuous gamma counting in the discharge pipe from the discharge tank and in the cooling-water outlet; continuous sampling in the cooling-water outlet and inlet and analysis of specific radionuclides in composite samples. The two last monitoring steps are intended to detect unplanned releases.

2997 MONITORING OF RADIOIODINE IN GASEOUS EFFLUENTS AT THE BHABHA ATOMIC RESEARCH CENTRE, INDIA. Krishnamony, S. pp 34-38 of Monitoring of airborne and liquid radioactive releases from nuclear facilities to the environment. Vienna, Austria; International Atomic Energy Agency (1978).

For some time, at Bhabha Atomic Research Centre, radioiodine in the gaseous effluents of nuclear reactors and radiochemical plants has been monitored with cartridges containing activated charcoal. Recently, a modified version of a device which is popularly known as the May Pack has been in use for monitoring radioiodine aerosols which are likely to exist in different chemical and physical forms.

2998 MONITORING METHODS FOR RADIOACTIVE NOBLE GASES IN AIRBORNE EFFLUENTS FROM NUCLEAR POWER PLANTS. Winkelmann, I. pp 29-34 of Monitoring of airborne and liquid radioactive releases from nuclear facilities to the environment. Vienna, Austria; International Atomic Energy Agency (1978).

The following two monitoring and measuring methods which are applicable for radioactive noble gases at the stack of nuclear power plants are described: Continuous measurement of emitted amounts of radioactive noble gases; measurement of individual nuclides of radioactive noble gases, with respect to calculating radiation exposure of the public in the vicinity of nuclear power plants.

2999 ENVIRONMENTAL PROTECTION OF NUCLEAR POWER STATIONS. Deme, S. (Kozponti Fizikai Kutato Intezet, Budapest (Hungary)). Meres es Automatika ; 27: No. 2, 51-55(1978). (In Hungarian).

Nuclear power stations as sources of radioactive pollution of the environment are considered. The principle of technological systems retaining environmental pollution at WWER-440 type power stations being built in Paks is referred to as well. By analysing the potential pathways of radioactive contaminants into the environment and the human body the principles of monitoring and supervising of the nuclear power stations are determined.

3000 INSTANTANEOUS AND CONTINUOUS SAMPLING STATION FOR MONITORING THE RADIOACTIVITY OF SEWAGE. Kovats, M.; Borbely, Gy. (Pollack Mihaly Muszaki Foiskola, Pecs (Hungary)). Acta Acad. Polytech. Pollack Mihaly Pecs.; 105-113(1978). (In Hungarian).

The design and performance of a radiation protection control station for monitoring the radioactivity of sewage are described. The main functions of the station are: continuous measurement and registration of beta and gamma activity, automatic sampling and warning in case of exceeding prescribed levels, continuous measurement of flowing mass and mass proportional sampling.

3001 SUBSTANTIATION OF THE SCOPE OF RADIATION MONITORING IN THE REGION OF ATOMIC POWER STATION LOCATION. Zykova, A.S.; Zhakov, Yu.A.; Yambrovskii, Ya.M. Gigiena i Sanitariya (U.S.S.R.) Issued in English Translation as Hygiene and Sanitation ; No. 12, 48-51(Dec 1977). (In Russian).

Basing on observation on working APS discharges it has been established, that the discharges can be monitored at a distance up to 5-7 km from the station. A number of sample analyses of environment main objects must permit to determine for certain their content of radioactive materials due to global fall-outs and the APS discharges.

3002 PROCESS FOR DECONTAMINATING RADIOACTIVE EFFLUENTS, PRINCIPALLY IN ANTIMONY AND RUTHENIUM. Berton, Y.; Chauvet, P. (to CEA, 75 - Paris (France)). French Patent 2,346,817/A/. 31 Mar 1976. 14p. (In French).

This invention concerns a process for decontaminating radioactive effluents that not only permits a good decontamination of the effluent to be treated as to various radioactive elements but also provides satisfactory elimination of the antimony contained in this effluent as well as improved decontamination of the ruthenium. Under this process a precipitate of a hydroxide of an element in column IVa of the periodic table classification of the elements is formed in the effluent to be processed, and the sludge thus obtained is filtered. To be more precise, the precipitates are formed by the successive addition to the effluent of sulfuric acid, the

salt of an element of column IVa of the periodic classification of the elements, nickel ferrocyanide, soda, ammonium sulfur, cobalt nitrate and baryum nitrate.

Chemical and Thermal Effluents

3003 REVIEW OF THE ENVIRONMENTAL IMPACT OF NUCLEAR ENERGY. El-Hinnawi, E.E. (UN Env Programme, Nairobi). International Atomic Energy Agency Bulletin ; 20: No. 2, 32-42(Apr 1978).

The radioactivity released from the products of nuclear fission is the main focus of public concern about the expansion in the use of nuclear power despite stringent control measures and precautions taken. Environmental impacts associated with all the steps in the nuclear fuel cycle are examined. Discussed are: uranium mining and milling, manufacture of fuel elements for the reactor, transport and reprocessing of irradiated fuel, reactor operation, and management of wastes produced in the cycle. Environmental impacts of a coal-fired power plant are compared with impacts of three nuclear plants with the same generating capacities. Impacts compared are thermal heat waste, effluent radioactivity, air pollution, radioactive and ash waste products, and land used for the plant. The environmental advantages of the nuclear reactors occur in the categories of air pollutant effluents and land used for plants. (45 references, 3 tables)

Research, Test, and Experimental Reactors

3004 (CONF-800607--20) RADIOACTIVE GAS AND HYDROGEN REMOVAL AFTER A LOCE AT THE LOFT FACILITY. McCormick-Barger, J.W.; Sumpter, K.C. (EG and G Idaho, Inc., Idaho Falls (USA)). 17 Dec 1979. Contract EY-76-C-07-1570. 5p. Dep. NTIS, PC A02/MF A01.

From American Nuclear Society annual meeting; Las Vegas, NV, USA (8 Jun 1980).

The use of a silver-zeolite halogen adsorber placed in series with a hydrogen catalytic recombiner and a cryogenic noble gas adsorber assembly constitutes a waste gas processing system (WGPS) capable of handling hydrogen and fission product gases following a Loss-of-Coolant Experiment (LOCE). This paper describes: the types and quantities of gases expected to be found at the facility after a failed-fuel LOCE; the purpose of the WGPS; and the general configuration and expected decontamination factors associated with the LOFT WGPS.

3005 (DOE/ER/01953--T1) OREGON STATE UNIVERSITY TRIGA REACTOR ANNUAL REPORT. Anderson, T.V.; Johnson, A.G.; Bennett, S.L.; Ringle, J.C. (Oregon State Univ., Corvallis (USA). Radiation Center). 31 Aug 1979. Contract EY-76-C-06-1953. 118p. (RLO--1953). Dep. NTIS, PC A06/MF A01.

The use of the Oregon State University TRIGA Reactor during the year ending June 30, 1979, is summarized. Environmental and radiation protection data related to reactor operation and effluents are included.

3006 (EGG--2059) DECONTAMINATION AND DECOMMISSIONING OF THE ORGANIC MODERATED REACTOR EXPERIMENT FACILITY (OMRE). Hine, R.E. (Idaho National Engineering Lab., Idaho Falls (USA)). Sep 1980. Contract AC07-76ID01570. 98p. NTIS, PC A05/MF A01.

This report describes the decontamination and decommissioning (D and D) of the Organic Moderated Reactor Experiment (OMRE) facility performed from October 1977 through September 1979. This D and D project included removal of all the facilities and as much contaminated soil and rock as practical. Removal of the reactor pressure vessel was an unusually difficult problem, and an extraordinary, unexpected amount of activated rock and soil was removed. After removal of all significantly contaminated material, the site consisted of a 20-ft deep excavation surrounded by backfill material. Before this excavation was backfilled, it and the backfill material were radiologically surveyed and detailed records made of these surveys. After the excavation was backfilled and graded, the site surface was surveyed again and found to be essentially uncontaminated.

3007 (EGG/LTR--112-7) OFFSITE EXPOSURE FROM RUPTURE WASTE GAS DECAY TANK. Dinneen, G.A. (Aerojet Nuclear Co., Idaho Falls, ID (USA)). 25 Apr 1972. Contract EY-76-C-07-1570. 6p. Dep. NTIS, PC A02/MF A01.

The offsite exposure resulting in the rupture of the waste gas decay (storage) tank has been calculated. The tank rupture is assumed to occur following a 20% fuel pin perforation blowdown experiment from which the gaseous fission products have been transferred to the waste gas decay tank. Because of the unpredictable nature of the tank rupture, several cases have been considered to scope the rupture situation. The resulting exposures from the cases considered are all within the AEC guidelines (10 CFR-100).

3008 (HEDL-SA--1878-FP) PACKAGING AND SHIPMENT OF U.S. BREEDER REACTOR EXPERIMENTS. Berger, J.D. (Hanford Engineering Development Lab., Richland, WA (USA)). 1980. Contract AC14-76FF02170. 7p. (CONF-800592--1). NTIS, PC A02/MF A01.

From International conference on postirradiation examination; The Lake District, UK (13 May 1980).

Irradiation testing of fuels and materials in the Fast Test Reactor (FTR) required development of a shipping cask (designated T-3) and associated hardware for loading and shipping of these experiments to postirradiation examination facilities. The T-3 shipping-cask program included design, fabrication, and testing of internal cask packages to protect the experiments during loading, shipping, and unloading. The cask was designed for loading in both the vertical and horizontal attitudes.

3009 (LA--7949-MS) NONDESTRUCTIVE VERIFICATION OF RELATIVE BURNUP VALUES AND COOLING TIMES OF IRRADIATED MTR FUEL ELEMENTS. Phillips, J.R.; Bement, T.R.; Kaieda, K.; Medina, E.G. (Los Alamos Scientific Lab., NM (USA)). Aug 1979. Contract W-7405-ENG-36. 39p. Dep. NTIS, PC A03/MF A01.

Sixteen irradiated MTR fuel elements have been examined using nondestructive gamma-ray and neutron techniques. The consistency of declared burnup values and cooling times has been measured. Measured parameters have been identified that best predict the burnup and cooling time values of individual elements and their relative importances have been quantified using established statistical methods of analysis. Various detector systems, including germanium, cadmium telluride, and Be(γ,n) detector, and fission chamber have been used to measure the axial activity profiles.

3010 (RHO-CD--864) FUNCTIONAL DESIGN CRITERIA FOR EBR-II - SPENT FUEL CASK. Moose, J.M. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Mar 1980. Contract AC-06-77RL01030. 9p. NTIS, PC A02/MF A01.

Irradiated Uranium, Plutonium mixed oxide experimental fuel pins from EBR-II have been examined in Hanford Engineering Development Laboratories (HEDL) hot cells and steadily accumulated to the extent that the storage capacity at HEDL is saturated. A large quantity of excess fuel must be transferred from the hot cells for storing at the 200 Area to accommodate handling discharged pins from the Fast Flux Test Facility (FFTF). The spent fuel will be consolidated in six (6) HEDL Spent Fuel Packages. The HEDL Packages are 5.625 in diameter x 41 inches in length and are composed of 28 inner tubes packaged in two welded outer containers.

3011 MEASUREMENT OF AIRBORNE RODON DAUGHTER CONCENTRATIONS IN THE ATMOSPHERE. Ha, C.W.; Lee, J.K.; Moon, P.S. (Korea Atomic Energy Research Inst., Seoul (Republic of Korea)). Radioprotection ; 4: No. 1, vp(Jul 1979).

A simple method for determining the airborne concentration of radon daughter products has been developed, which is based on gross alpha counting of the air filter collections at several time intervals after completion of air sampling. The concentration of each nuclide is then obtained from an equation involving the alpha disintegrations, the sampling time, and the known numerical coefficients. The state of radioactive disequilibrium is also inventigated. The atmosphere sampled in the TRIGA Mark-III reactor room was largely in disequilibrium. The extent of radioactive disequilibrium between radon daughter

3012 FUEL STORAGE AND HANDLING SYSTEM OF 'JOYO' SPENT FUEL FACILITY. Ishiguro, J. (Fuji Electric Co. Ltd., Kawasaki, Kanagawa (Japan)). FAPIG (Tokyo) ; No. 92, 32-36(Jul 1979). (In Japanese).

The fast experimental reactor ''Joyo'' has continued the normal operation at 50 MW-th since July, 1977, while carrying out various tests. The second stage output of 75 MW-th is realized in 1979, and after the new core will be constructed, the Mark-2 project will be carried out, in which the reactor will be used for the irradiation of fuel materials for fast reactors at 100 MW-th output. In order to prepare for the expected increase of spent fuel, it was decided to construct newly the spent fuel storage facility in addition to the existing one. The delivery of the whole installations of this facility was completed in July, 1979. This facility has the storing capacity of 600 assemblies. The plan of transferring spent fuel is shown. It is necessary to store two kinds of cans for Joyo and for reprocessing in storing racks. Accordingly, cell type was adopted for the storing racks, and the cans of different shapes can be stored by exchanging the guide tubes of cells. The storing racks are installed at the bottom of a cooling pool. They are composed of six rack frames, each accommodates 25 cells. The fuel-transferring machine grabs a can in water, lifts, transfers horizontally, and lowers it. The new fuel storage facility is also installed in the spent fuel storage facility, in which new fuel is stored in argon atmosphere.

3013 TRITIUM MONITORING METHODOLOGY USING A DESICCANT AND APPLICATION TO A RESEARCH REACTOR FACILITY. Langhorst, S.M.; Morris, J.S.; Bull, S.R. (Univ. of Missouri, Columbia). Transactions of the American Nuclear Society ; 32: 143-144(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

MURR REACTOR;RADIOACTIVE EFFLUENTS;TRITIUM METERS;PERFORMANCE

3014 LABORATORY COMPUTER SYSTEM FOR ROUTINE, PLANT, AND ENVIRONMENTAL RADIATION-MONITORING APPLICATIONS. Myers, W.R.; English, G.O.; Morneau, R.A. (Idaho National Engineering Lab., Idaho Falls, ID). pp 216-222 of Computers in activation analysis and gamma-ray spectroscopy. Carpenter, B.S.; D'Agostino, M.D.; Yule, H.P. (eds.). Washington, DC; Department of Energy (1979).

From Conference on computers in activation analysis and gamma-ray spectroscopy; Mayaguez, Puerto Rico (30 Apr 1978).

This paper describes a PDP-15 computer system used to support the varied activities of the Radiation Measurements Laboratory located in the Test Reactors Area at the Idaho National Engineering Laboratory (INEL). These activities include providing technical assistance to the test reactors and to various groups in counting laboratories, maintaining radiation measurement standards, measuring flux distributions, gamma heating, and other in-pile parameters in the test reactors and associated loop experiments, and developing measurement techniques required in support of test reactor programs. It also describes the implementation of remotely controlled gamma-ray spectrometers and the necessary communications network to provide on a routine basis effluent monitoring for reactor facilities at INEL.

3015 R-5 PROJECT - AN EXAMPLE OF EXPERIENCE FEEDBACK. Sundaram, S.M. (Bhabha Atomic Research Centre, Bombay (India)). pp 95-103 of Operating experience of nuclear reactors and power plants. Bombay, India; Department of Atomic Energy (1979).

From Symposium on operating experience of nuclear reactors and power plants; Bombay, India (7 Feb 1977).

The basic objectives of building R-5 reactor are two-fold, namely, (i) to augment the experimental facilities already available at Trombay in the reactors CIRUS, APSARA, ZERLINA and PURNIMA and (ii) to provide new experimental facilities like large size engineering loop facilities capable of irradiating prototype 500 MW(e) PHWR fuel bundles under near similar power reactor operating conditions, hot and cold neutron sources, horizontal neutron beam tube through the core, provisions for extending the neutron beam into an experimental area outside the containment building etc. Apart from incorporating the latest technological developments and innovations in conventional as well as nuclear fields, the detailed design of the systems and equipment has been influenced greatly by the first hand experience in construction, commissioning and operation of the reactors at Trombay. Also, the commissioning and operating experience of other Indian nuclear power plants has been usefully applied in the design. Spare capacities available in existing facilities have been made use of to the extent possible with suitable modifications, instead of building new facilities, thus resulting in saving in capital cost.

3016 APPLICATION OF ACTIVATION ANALYSIS IN

RADIOECOLOGICAL INVESTIGATIONS. Anovski, T. (Skoplje Univ. (Yugoslavia). Tehnolosko-Metalurski Fakultet); Draskovic, R.; Kirkov, P. (Institut za Nuklearne Nauke Boris Kidric, Belgrade (Yugoslavia)). pp 391-402 of Utilization of nuclear reactors in Yugoslavia. Beograd; Institut za Nuklearne Nauke Boris Kidric (May 1978). (In Serbian)

From Conference on utilization of nuclear reactors in Yugoslavia; Belgrade, Yugoslavia (May 1978).

Intensive building of nuclear power plant ower the world, which also causes increase of radioactive waste materials in the human environment, the problem of radioecology and environmental protection is constantly gaining in importance and scientific attention. Neutron activation analysis was used for observing distribution of metals, such as Sb,Hg,Fe,Zn,etc, in the samples of water, suspended materials of the Vardar river (where the building of nuclear power plant in Macedonia is planned), as well as in the environmental soil samples in the rivers bassin. The samples of water, suspended and bad materials, soils and standards were irradiated for 3 days, after corresponding preparation, by the thermal neutron flux $1{,}5 \times 10^{13}$ n/cm^{2}xsec in the RA - reactor at Vinca. Concentrations of investigated elements were calculated on the basis of relative comparative measurements of irradiated samples and standards. Our preliminary results demonstrate the possibility of utilization of NAA in ecological and radioecological investigations of continental water systems. These data are especially important for determination of distribution of radionuclides in the case of eventual nuclear power plant accidents.

3017 ESTIMATION OF PHOTO AND FISSION NEUTRON SOURCE STRENGTHS IN THE FUEL HANDLING FLASK OF THE R-5 REACTOR CONTAINING AN IRRADIATED FUEL ROD. Kanchhi Singh; Sankaranarayanan, S. (Bhabha Atomic Research Centre, Bombay (India)). pp 334-338 of Reactor physics. Bombay, India; Department of Atomic Energy (1978).

From Symposium on reactor physics; Bombay, India (1 Mar 1976).

Irradiated fuel rods of the R-5 reactor have heavy water cooling while being removed in the fuel handling flask. Consequently the estimation of the source strengths of photo neutrons and fission neutrons from fissions induced by slowed down photo neutrons in the fuel is essential for the neutron shielding design of the flask. The results of certain analyses carried out in this connection are summarised. While the estimation of the photo neutrons is based on available experimental data from ZEEP reactor, a one neutron group calculation is done for the fission neutrons with the photo neutrons slowed down below approximately lev as the source term.

Plutonium and Isotope Production Reactors

3018 (AAEC/PR--44S) NUCLEAR SCIENCE AND TECHNOLOGY BRANCH REPORT 1977. RESEARCH ESTABLISHMENT SITE MANAGEMENT. Cawsey, W.E.T. (Australian Atomic Energy Commission Research Establishment, Lucas Heights). Dec 1977. 77p. Dep. NTIS (US Sales Only), PC A05/MF A01.

This report records the technical service provided in support of research programs at the Research Establishment. Such services include HIFAR reactor operations, engineering services, information services, safety services and services provided research divisions themselves. Radioisotope production and other commercial activities are also included.

3019 (ASO/R--2) GAMMA RAY MEASUREMENT OF SPENT HIFAR FUEL ELEMENTS FOR SAFEGUARDS VERIFICATION. 1. EXPERIMENTAL EVALUATION OF METHOD. Hanna, G.L. (Australian Safeguards Office, Sydney). Jul 1978. 22p. Dep. NTIS (US Sales Only), PC A03/MF A01.

Since 1970, IAEA safeguards inspectors have used gamma ray measurements of fission product activities to verify operator's data on burnup, cooling time, and integrity of fuel elements after irradiation in the HIFAR reactor. Experimental measurements were made in order to assess independently the value of the method as a safeguards technique for verifying burnup and cooling time. Result show that the precision of the method must be improved if useful information is to be obtained but a proper evaluation must include consideration of the theoretical basis of the method. This is presented in Part 2 of the report.

3020 (UNI-SA--77) FIFTEEN YEARS EXPERIENCE FILTERING N REACTOR GASEOUS WASTES. Fowler, K.L. (UNC Nuclear Industries, Inc., Richland, WA (USA)). 14 Jan 1980. Contract EY-76-C-06-1857. 19p. (CONF-800211--1). Dep. NTIS, PC A02/MF A01.

From International symposium on management of gaseous wastes from nuclear facilities; Vienna, Austria (18 Feb 1980).

The N Reactor exhaust gas filtering system consists of roughing filters, particulate filters, and charcoal filters, in that order. The basic particulate and charcoal filters consist of 0.46 m^3/s, 60 cm x 60 cm x 30 cm filter canisters installed four canisters wide by ten canisters high in removable filter frames. The roughing filter canisters are about twice as wide and high as the other canisters but fit into similar frames of the same size. There are two side by side frames of each type of filter in each cell for a total design flow of 37 m^3/s. The reactor and primary pipe space air has two cells for normal operation and one cell reserved for the accident case. One cell without roughing filters is used for the first buffer zone air around the reactor.

3021 EXPERIMENTAL PROGRAMS AT THE HANFORD N REACTOR IN SUPPORT OF SPENT-FUEL STORAGE. Toffer, H. (UNC Nuclear Industries, Inc., Richland, WA). Transactions of the American Nuclear Society ; 33: 366-367(1979). (CONF-791103--).

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

N-REACTOR;SPENT FUEL ELEMENTS;SPENT FUEL STORAGE;CRITICALITY

Propulsion Reactors

3022 (GKSS--79/E/24) RADIOLOGICAL DATA CONCERNING THE NUCLEAR MERCHANTSHIP OTTO HAHN. A REVIEW AFTER TEN YEARS OF OPERATION. Henning, K.D. (Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht-Tesperhude (Germany, F.R.). Abt. Strahlenschutz). 1979. 14p. NTIS (US Sales Only), PC A02/MF A01.

A review is given of the data necessary to judge the influence to men and environment resulting from a ten years operation of the German nuclear merchant ship OTTO HAHN. Especially values are reported concerning personal dose during normal operation and maintenance, waste disposal to the sea,

radioactivity levels and radioisotopes involved. The gamma- and neutron dose rates during full power reactor operation on board and outside the ships hull are summarized.

3023 (PB--300378) AN ANALYSIS OF CORROSION PRODUCT ACTIVATION FOR THE PROPOSED NUCLEAR ULTRA-LARGE CRUDE CARRIER. KINGS POINT SCHOLARS SERIES REPORT. Barton, I.L. (National Maritime Research Center, Kings Point, NY (USA)). Dec 1978. 89p. NTIS, PC A05/MF A01.

The purpose of this study was to determine the type of monitoring system which should be installed on the proposed Ultra-Large Crude Carrier (ULCC). To determine the solution to the problem, a broad picture is presented. The ULCC is described in detail, with particular attention given to its monitoring systems. For comparison, the previous experience of the NS Savannah and the present experience of the U.S. Navy are brough forth. Land-based power plants are also discussed. Then, the equipment itself is assessed through actual experimental work on the type of monitoring equipment that is proposed for the nuclear ULCC.

Reactor Safety

3024 (AGNS--35900-1.5-79) SCOPING STUDIES OF THE ALTERNATIVE OPTIONS FOR DEFUELING, PACKAGING, SHIPPING, AND DISPOSING OF THE TMI-2 SPENT FUEL CORE. (Allied-General Nuclear Services, Barnwell, SC (USA)). Sep 1980. Contract AC09-78ET35900. 217p. NTIS, PC A10/MF A01.

A portion of this fuel will be shipped to nuclear facilities to perform detailed physical examinations. Removal of this fuel from the TMI-2 core is also a significant step in the eventual cleanup of this facility. The report presents a scoping study of the technical operations required for defueling and canning. The TMI fuel when canned could be stored in the spent fuel storage pool. After a period of on-site storage, it is expected that the bulk of the fuel will be shipped off-site for either storage or reprocessing. Evaluation is made of the technical, economic, and institutional factors associated with alternate approaches to disposition of this fuel. Recommendations are presented concerning future generic development tasks needed for the defueling, packaging, on-site shipping of this fuel.

3025 (CONF-791049--26) PLENARY LECTURE - A SPECIAL RADIOELEMENT PROBLEM: ORNL ASSISTANCE TO THREE MILE ISLAND IN HANDLING CONTAMINATED AIR AND WATER. Brooksbank, R.E. (Oak Ridge National Lab., TN (USA)). 1979. Contract W-7405-ENG-26. 44p. NTIS, PC A03/MF A01.

From 23. conference on analytical chemistry in energy technology; Gatlinburg, TN, USA (9 Oct 1979).

As the investigative work concerning the post-accident period comes to light, it is apparent that ORNL has played a significant role in the recovery of TMI. Work in the area of waste handling, analytical service, flowsheet development, and decontamination are all regarded as significant. Efforts in this specific area of assistance to TMI are really the results of the close working relationship between chemical engineers and analytical chemists. The two major areas of involvement, and the subject of this discussion, are contaminated air and water handling which resulted from the accident.

3026 (CONF-800403--(Vol.2), pp 1266-1272) APPLICATION OF PARTIAL FAILURE ANALYSIS TO AN ACCIDENT INVOLVING LOSS OF COOLING IN A SPENT FUEL STORAGE POOL. Lofgren, E.(Science Applications, Inc., McLean, VA); Denning, R.S.; Cudnik, R.A.; Hall, R.E. Jun 1980.

From ANS thermal reactor safety meeting; Knoxville, TN, USA (8 Apr 1980).

A method is described for extending event tree methodology to the evaluation of systems which are better represented by a spectrum of operational modes than by two discrete modes. The methods are applied to the analysis of the risk to the public from failure of the decay heat removal system in a spent fuel storage pool.

3027 (CONF-800403--(Vol.2), pp 1314-1321) LIQUID PATHWAYS GENERIC STUDIES; RESULTS, INTERPRETATION, AND DESIGN IMPLICATIONS. Walker, D.H.; Nutant, J.A. (Offshore Power Systems, Jacksonville, FL). Jun 1980.

From ANS thermal reactor safety meeting; Knoxville, TN, USA (8 Apr 1980).

Offshore Power Systems and the Nuclear Regulatory Commission have evaluated dose consequences resulting from a release of radioactivity to liquid pathways following a postulated core-melt accident. The objective of these studies was to compare the risks from postulated core-melt accidents for the Floating Nuclear Plant with those for a typical land-based nuclear plant. Offshore Power Systems concluded that the differences in liquid pathway risks between plant types are not significant when compared with the air pathways risks. Air pathways risk is similar to or significantly larger than liquid pathways risk depending on the accident scenario. The Nuclear Regulatory Commission judged the liquid pathways risks from the Floating Nuclear Plant to be significantly greater than the liquid pathway risks for the typical land-based plant. Although OPS disagrees with the NRC judgment, design changes dictated by the NRC are being implemented by OPS.

3028 (CONF-800403--(Vol.2), pp 1328-1335) NATURAL REMOVAL OF PARTICULATE RADIOACTIVITY IN AN LWR-CONTAINMENT DURING CORE MELTDOWN ACCIDENTS. Bunz, H.; Schoeck, W. (Lab. for Aerosol Physics and Filter Tech., Kernforschungszentrum, Karlsruhe, Germany). Jun 1980.

From ANS thermal reactor safety meeting; Knoxville, TN, USA (8 Apr 1980).

During core meltdown accidents in LWRs, large quantities of fission products and core material are vaporized and released to the containment in particulate form. The behavior and the natural removal of this aerosol is calculated with the computer code NAUA. Airborne aerosol mass in the containment and leaked masses are calculated for a typical accident sequence in the German PWR. Additionally, the influence of a containment failure on the total environmental impact is evaluated as a function of time. It is demonstrated that a period of three days of containment integrity is required to minimize the aerosol mass which escapes from the containment.

3029 (CONF-800434--5) APPLICATION OF AEROSOL TECHNOLOGY IN LMFBR DESIGN. Strawbridge, L.E.; Hemmerle, E.H. (Westinghouse Electric Corp., Madison, PA (USA). Advanced Reactors Div.). 1980. Contract AC15-76CL02395. 17p. NTIS, PC A02/MF A01.

From CSNI specialist meeting on nuclear

aerosols in reactor safety; Gatlinburg, TN, USA (15 Apr 1980).

Aerosol technology is applied in several areas in the safety assessment of liquid metal fast breeder reactors. This paper discusses the application of this technology in the assessment of the Clinch River Breeder Reactor Plant. The importance of considering aerosol effects is discussed for sodium fires, the assessment of site suitability and the assessment of the consequences of accidents beyond the design base such as hypothetical core disruptive accidents. Areas in which further development work could have the most impact are indicated.

3030 (CONF-800607--60) EMERGENCY ACTIONS CONCERNED WITH EFFLUENT CONTROL AT TMI. Brooksbank, R.E.; Campbell, D.O.; Snider, J.W.; Yarbro, O.O. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 34p. NTIS, PC A03/MF A01.

From American Nuclear Society annual meeting; Las Vegas, NV, USA (8 Jun 1980).

Information is presented concerning the critical emergency requirements; gaseous effluent status and control; liquid effluent status and control; and water treatment processes.

3031 (CONF-800802--10) RECENT CHEMICAL ENGINEERING REQUIREMENTS AS THE RESULT OF TMI ON-SITE EXPERIENCE. Brooksbank, R.E. Sr. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 24p. NTIS, PC A02/MF A01.

From 89. annual meeting of the American Institute of Chemical Engineers; Portland, OR, USA (17 Aug 1980).

From the experiences gained from the on-site experience at TMI, it is apparent that the role of chemical engineers should increase in order for the nuclear option to proceed in a safe and efficient fashion. It is also obvious that as the results of the reports investigating the causes and effects of the accident come to light and attempts to backfit system designs to prevent a recurrence are studied, more technical demands will be placed on the profession.

3032 (DOE/TIC--11023) POST-ACCIDENT CLEANUP OF RADIOACTIVITY AT THREE MILE ISLAND. Brooksbank, R.E. (Oak Ridge National Lab., TN (USA)). 1979. Contract W-7405-ENG-26. 27p. Dep. NTIS, PC A03/MF A01.

Plant schematics, equipment modifications, radioactivity water processing procedures, and radioactivity levels at the Three Mile Island-2 reactor are presented.

3033 (EGG-FM--5078) WATER LOSS IN FAST PROJECT INTERIM FUEL STORAGE RACK. Kelsey, P.V. Jr. (Department of Energy, Idaho Falls, ID (USA). Idaho Operations Office). Jan 1980. Contract EY-76-C-07-1570. 24p. Dep. NTIS, PC A02/MF A01.

Water loss calculations for the concrete FAST interim fuel storage rack were performed at the request of Exxon Nuclear. Because water in concrete, whether chemically combined or in a free state, is a critical component for neutron attenuation and radiation shielding, loss of water within a concrete structure designed to contain various forms of nuclear material could present a criticality problem within the structure. Although a definitive optimum water content has not been presented at this time, it appears that 4 weight % is a minimum content for efficient attenuation. Although other elements in concrete contribute to neutron attenuation, hydrogen with its large cross section is the dominant attenuating element. The results of calculations indicate that the present design of the fuel rack is inadequate for the proposed total fluence and that the minimum safe water content would be reached within one year's operation.

3034 (ESG-DOE--13294) REACTOR SAFETY. ANNUAL TECHNICAL PROGRESS REPORT, GOVERNMENT FISCAL YEAR 1979. (Rockwell International Corp., Canoga Park, CA (USA). Energy Systems Group). 15 Apr 1980. Contract AT03-76SF74028. 46p. Dep. NTIS, PC A03/MF A01.

Information is presented on LMFBR reactor safety concerning the energetics effects of sodium spray fires; sodium drop and spray burning; core debris accommodation; attenuation in containment; and attenuation in the environment.

3035 (HEDL-SA--2017-FP) EVALUATION MODELS AND THEIR INFLUENCE ON RADIOLOGICAL CONSEQUENCES OF HYPOTHETICAL ACCIDENTS IN FFTF. Stepnewski, D.D.; Hale, J.P.; Martin, H.C.; Peak, R.D.; Franz, G.R. (Hanford Engineering Development Lab., Richland, WA (USA)). Apr 1980. Contract AC14-76FF02170. 23p. (CONF-800434--8). NTIS, PC A02/MF A01.

From CSNI specialist meeting on nuclear aerosols in reactor safety; Gatlinburg, TN, USA (15 Apr 1980).

The influence of radiological evaluation models and assumptions on the off-site consequences of hypothetical core disruptive accidents is examined. The effects of initial source term, time of containment venting, meteorology, biological dose model, and aerosol fallout have been included. The analyses were based on two postulated scenarios of a severe hypothetical reactor vessel melt-through accident for 400 MW(t) fast reactor. Within each accident scenario, the results show that, although other variables are significant, radiological consequences are strongly affected by the amount of aerosol fallout computed to occur in the incident.

3036 (INIS-mf--4862) SAFETY STUDY. THE CLINCH RIVER BREEDER REACTOR PLANT. Piper, H.B.; Leaver, D.E.; Wood, P.J. (Project Management Corp., Oak Ridge, TN (USA)). 1978. 9p. (CONF-781022--84). Dep. NTIS (US Sales Only), PC A02/MF A01.

From Meeting on nuclear power reactor safety; Brussels, Belgium (16 Oct 1978).

A risk assessment has been performed to provide a realistic evaluation of the risk to the public from the Clinch River Breeder Reactor Plant (CRBRP), to place that risk in perspective relative to other societal risks, and to provide a basis for assessing the comparability of the risk from the CRBRP with risks associated with previously licensed US reactors. The assessment formally and systematically evaluated the CRBRP risk and showed that the risk associated with postulated accidents of the CRBRP is small when compared with non-nuclear risks to which the local population is already exposed, and that CRBRP risks are comparable to those from light-water reactors (LWR's) of the current generation as characterized in the Rasmussen Study.

3037 (INIS-mf--5181) COMPACT STORAGE OF SPENT FUEL ELEMENTS IN NUCLEAR POWER PLANTS WITH LWR REACTORS. (Kraftwerk Union A.G., Erlangen (Germany, F.R.)). Sep 1978. 13p. (In German). Dep. NTIS (US Sales Only), PC

A02/MF A01.
The storage of burnt fuel elements in NPPs is part of the principle design of such plants. The increasing of the storage capacity of the cooling ponds in the NPPs by replacing normal supports by compact supports is a measure which is technically realizable and represents a positive contribution to the total range of problems of waste management. The technical realisation of compact supports was demonstrated both by the theoretical works carried out up today and the practical carrying out of such compact supports. Furthermore, there are positive comments of experts on the compact supports.

3038 (INIS-mf--5302, pp 41-42) SOME IMPORTANT SAFETY EXPERIENCES MADE DURING OPERATION OF THE AVR REACTOR. Lindackers, K.H. 1979. (In German).
Experience from safety checks of HTR concepts.
AVR REACTOR;ENVIRONMENT;FAILURES;PERFORMANCE; RADIOACTIVE WASTE DISPOSAL;REACTOR OPERATION; REACTOR SAFETY

3039 (LA-UR--79-2946) EVALUATION OF THE THREE MILE ISLAND ACCIDENT IN THE CONTEXT OF WASH-1400. Burns, R.D. III. (Los Alamos Scientific Lab., NM (USA)). 1980. Contract W-7405-ENG-36. 6p. (CONF-800403--3). Dep. NTIS, PC A02/MF A01.
From ANS thermal reactor safety meeting; Knoxville, TN, USA (8 Apr 1980).
The accident at unit 2 of the Three Mile Island nuclear station (TMI-2) on March 28, 1979, occurred after approximately 400 reactor years (RY) of commercial nuclear reactor operation in the US. The purpose of work summarized here was to evaluate the probability statements in the WASH-1400 reactor safety study (RSS) in view of the TMI-2 event and to estimate the likely public impact of TMI-2. The RSS probability estimate for such a release was found to be consistent with the fact that the TMI-2 accident occurred. The expected health effects are consistent with those for a low-level category of radioactivity release as described in the RSS and they are immeasurably small. However, the public perception of the health effects of the release is likely to be much more severe than the estimated health effects.

3040 (NP--25109) REPORTS OF THE PUBLIC HEALTH AND SAFETY TASK FORCE ON PUBLIC HEALTH AND SAFETY SUMMARY; HEALTH PHYSICS AND DOSIMETRY; RADIATION HEALTH EFFECTS; BEHAVIORAL EFFECTS; AND PUBLIC HEALTH AND EPIDEMIOLOGY. (President's Commission on the Accident at Three Mile Island, Washington, DC (USA)). Oct 1979. 428p. GPO.
The general objectives of the Health Physics and Dosimetry Task Group included: (1) to determine the radiation dose to the people living within the area of 50 miles around the Three Mile Island Nuclear Station during the period of March 28 to April 15, 1979; (2) to determine the radiation dose to the workers at the nuclear power plant during the period of March 28 to June 30, 1979 - the cutoff date necessitated by the deadline of the Commission's report; and (3) to evaluate federal, state, and utility company programs concerned with the protection of human populations and their environment from the possible hazards of ionizing radiation, and the efficacy of these radiation protection programs during the nuclear accident at TMI.

3041 (ORNL/TM--7044) INVOLVEMENT OF THE ORNL CHEMICAL TECHNOLOGY DIVISION IN CONTAMINATED AIR AND WATER HANDLING AT THE THREE MILE ISLAND NUCLEAR POWER STATION. Brooksbank, R.E.; King, L.J. (comps.). (Oak Ridge National Lab., TN (USA)). Aug 1979. Contract W-7405-ENG-26. 61p. NTIS, PC A04/MF A01.
The President's Commission on the Accident at Three Mile Island requested that Oak Ridge National Laboratory (ORNL) generate documents concerning two areas in which ORNL personnel provided on-site assistance following the accident on March 28, 1979. These are: instrumentation diagnostics, and the treatment of radioactive wastes and liquid effluents stemming from the accident. This report describes the involvement of the ORNL Chemical Technology Division (CTD) in contaminated air and water handling at Three Mile Island (TMI).

3042 (PB--296197) POPULATION DOSE AND HEALTH IMPACT OF THE ACCIDENT AT THE THREE MILE ISLAND NUCLEAR STATION. FINAL REPORT, 28 MARCH-7 APRIL 1978. (Ad Hoc Population Dose Assessment Group, Washington, DC (USA)). 10 May 1979. 106p. NTIS, PC A06/MF A01.
The report was prepared by technical staff members of the Nuclear Regulatory Commission (NRC), the Department of Health, Education, and Welfare (HEW), and the Environmental Protection Agency (EPA), who consitute an Ad Hoc Population Dose Assessment Group. It is an assessment of the health impact on the approximately 2 million offsite residents within 50 miles of the Three Mile Island Nuclear Station from the dose received by the entire population (collective dose). The Ad Hoc Group has examined in detail the available data for the period up to and including April 7, 1979. Based on a preliminary review of data from periods beyond April 7, it appears that the collective dose will not be significantly increased by extending the period past April 7.

3043 (PB--801269) ACCIDENT RISKS IN NUCLEAR FACILITIES (A BIBLIOGRAPHY WITH ABSTRACTS). REPORT FOR 1964-NOVEMBER 1979. Kenton, E. (National Technical Information Service, Springfield, VA (USA)). Dec 1979. 337p. NTIS, PC A N01/MF N01.
The bibliography presents risk analysis and hazards evaluation of the design, construction, and operation of nuclear facilities, including the risk and hazards of transporting radioactive materials to and from these facilities. Radiological calculations for environmental effects of nuclear accidents are also included. (This updated bibliography contains 331 abstracts, 69 of which are new entries to the previous edition.)

3044 (PNL-SA--8143) DEMONSTRATION OF ALTERNATIVE DECONTAMINATION TECHNIQUES AT THREE MILE ISLAND. Arrowsmith, H.W.; Allen, R.P. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Nov 1979. Contract AC06-76RL01830. 41p. (CONF-7911104--1). NTIS, PC A03/MF A01.
From DOE/EPRI symposium on Three Mile Island Reactor problems; Harrisburg, PA, USA (11 Nov 1979).
This paper discusses the following decontamination techniques: immersion electropolishing, in-situ electropolishing, barrel electropolishing, vibratory finishing, high-pressure freon spray, centrifugation, acid adsorption, and solidification. (DLC)

3045 (RISLEY-Trans--3352) ORGANISATION OF

NUCLEAR SAFETY IN FRANCE. (UKAEA Risley Nuclear Power Development Labs.). 1978. 46p. British Library Lending Division, Boston Spa.

The subject is covered in sections, as follows: organization of public authorities responsible for nuclear safety in France; the principles of safety (reactors, fuel reprocessing plants, other nuclear installations; the risks - list of accidents and consequences; radioactive wastes, including discharges to the environment; decommissioning of nuclear installations); regulations (including licensing, commissioning, radioactive discharges, monitoring nuclear installations, radiation protection of workers); annexes (position in USA, position in Federal Republic of Germany, list of basic nuclear installations in France, bibliography).

3046 (UCID--18315) ARAC FEASIBILITY STUDY FOR THE NRC PHASE I: FINAL REPORT. Rosen, L.C.; Orphan, R.C. (California Univ., Livermore (USA). Lawrence Livermore Lab.). Nov 1979. Contract W-7405-ENG-48. 56p. Dep. NTIS, PC A04/MF A01.

The feasibility of implementing ARAC (Atmospheric Release Advisory Capability) services in a particular nuclear power plant is examined. The criteria for selecting Rancho Seco are discussed and the physical, meteorological and procedural factors related to the plant are assessed. The potential benefits and limitations of implementing ARAC at Rancho Seco are analyzed. The costs of employing the system at the nuclear power plant are given for alternative plans. A training and familiarization program is outlined.

3047 (UCRL--83489) ATMOSPHERIC RELEASE ADVISORY CAPABILITY (ARAC) RESPONSE TO THE THREE MILE ISLAND ACCIDENT. Dickerson, M.H.; Gudiksen, P.H. (California Univ., Livermore (USA). Lawrence Livermore Lab.). Oct 1979. Contract W-7405-ENG-48. 5p. (CONF-791037--3). Dep. NTIS, PC A02/MF A01.

From IEEE nuclear science/nuclear power systems symposium; San Francisco, CA, USA (17 Oct 1979).

This paper discusses the three general classes of support provided by the Atmospheric Release Advisory Capability (ARAC) and describes the role played by ARAC in support of DOE during the Three Mile Island accident in March and April of 1979.

3048 TMI CLEANUP TO COST MORE, LAST UNTIL 1985. Electric Light and Power ; 58: No. 9, 1-2(Sep 1980).

Cleanup operations at Three Mile island will last two years longer and cost at least $360 million more than the original estimates. The revised plan calls for a $760 million program to be completed by mid-1983. This does not include the cost of restoring the plant to operation, a decision which will be made later. A logical cleanup has been limited by the need to set regulatory criteria, obtain public approval, and resolve waste disposal problems. (DCK)

3049 DECOMMISSIONING OF NUCLEAR POWER PLANTS. Ingenioer-nytt ; 16: No. 24, 18-19,27(21 May 1980). (In Norwegian).

The general aspects of the decommissioning of power reactors are discussed. The three stages of decommissioning, stage 1 (protective storage, or mothballing), stage 2 (entombment) and stage 3 (complete dismantling, or green-field) are each briefly discussed, and practical experience referred to. The amounts and types of waste and their disposal is also touched upon. It is estimated that decommissioning costs will be about 10 percent of the original construction costs.

3050 PHYSICS CONTRIBUTIONS TO RADIATION PROTECTION IN NUCLEAR POWER PLANTS. Krueger, F.W. (Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin (German Democratic Republic)). Kernenergie ; 23: No. 3, 97-105(Mar 1980). (In German).

Physical research and physical methods can essentially contribute to radiation protection in nuclear power plants. With their aid, properties of radiation sources can be determined, and calculations of radiation shields can be performed. In the present paper, such tasks are analyzed, the state of the art of their solution is evaluated, and trends of further work are shown. Focal points of the present study are the calculation of properties of radiation sources outside the reactor (fission products, activated corrosion products, decontamination facilities for contaminated media), exact and engineering methods for calculating radiation fields also in inhomogeneous shields, and classification of concretes for gamma-ray shielding. Objectives, possibilities, and problems of standardization of such activities are discussed.

3051 ATMOSPHERIC RELEASE ADVISORY CAPABILITY (ARAC) RESPONSE TO THE THREE MILE ISLAND ACCIDENT. Dickerson, M.H.; Gudiksen, P.H. (Lawrence Livermore Lab, Calif). IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science (Formerly IRE (Institute of Radio Engineers) Transactions on Nuclear Science) ; NS-27: No. 1, 927-930(Feb 1980). (CONF-791037--).

From IEEE nuclear science/nuclear power systems symposium; San Francisco, CA, USA (17 Oct 1979).

A discussion is presented of the three general classes of support provided by the Atmospheric Release Advisory Capability (ARAC) and describes the role played by ARAC in support of DOE during the Three Mile Island accident in March and April of 1979. 6 refs.

3052 EUROPEAN JOINT ENERGY RESEARCH STRESSES NUCLEAR SAFETY. Traill, S. Energy International ; 17: No. 1, 18-20(Jan 1980).

The 1977-1978 European Economic Community's (EEC) annual report outlines a four-year plan to emphasize nuclear safety research, including safety problems associated with each stage of the fuel cycle and waste management. EEC's Joint Research Centre (JRC) has concentrated on refining data for the assessment and licensing requirements of the widely used light water reactors (LWR) and on validation of design concepts for the liquid metal fast breeder reactors (LMFBR), which have a potential for widespread use. Brief summaries are given of major projects: Loop Blowdown investigations; LMFBR work in subassembly thermohydraulics, molten salt-water interactions, post-accident heat removal, thermophysical properties, structural loading and failure detection, and a European accident code; research on plutonium fuels and actinides; and a method for long-term radioactive waste disposal, with the possibility of chemical separation and transmutation of actinides with a long half-life. (DCK)

3053 COMMON SENSE IN NUCLEAR ENERGY. Hoyle, F.; Hoyle, G. London; Heinemann Educational

Books (1980). 88p.
The subject is covered in chapters, entitled: the ultimate price of an energy collapse; desecration of the environment (by activities other than nuclear power); nuclear reactors cannot explode, but other things can (examples of chemical explosions); death sentences (coal mine explosions); radioactivity (activity from all sources compared); how damaging is radioactivity (effects of radiation in various doses); nuclear accidents; the day the dam broke; how stands solar; natural gas; coal; storing one's own nuclear waste; [was there] a nuclear accident in the U.S.S.R.; breeder reactors and the U.S. Non-proliferation Act; who is doing the proliferating; it has all happened before. (U.K.).

3054 WHAT CAN BE DONE WITH OLD NUCLEAR POWER PLANTS. Bild der Wissenschaft ; 16: No. 12, 54-101(Dec 1979). (In German).
Nuclear power plants do not live for ever; at present their life-span is calculated to be about 40 years. What happens then. Are the technological methods already developed for demolishing the radio-active ruins. The technologists are convinced that this is so; an interview with the safety experts of the West German Ministry of the Interior gives rise to doubts, at least when it comes down to details. On-the-spot visits on this subject were made to the two nuclear power stations in the Federal Republic of Germany which have already been closed. This theme is concluded by the President of the German Research Society, Professor Maier-Leibnitz, reviewing 23 years of nuclear engineering and nuclear energy. (orig.) 891 GL/orig. 892 HIS.

3055 NUCLEAR POWER AND SAFETY - SUMMARY AND CONCLUSIONS OF THE REPORT OF THE NUCLEAR POWER COMMISSION. 2. ROUTINE OPERATION. Wethe, P.I. (Institutt for Atomenergi, Kjeller (Norway)). Ingenioer-nytt ; 15: No. 92, 14-15(16 Nov 1979). (In Norwegian).
The radiation hazards to the general public and to occupationally exposed persons due to routine operation of nuclear power plants are discussed. Radiation dose estimates are presented, and discussed. It is stated, quoting data from studies of the Hanford employee statistics, that there is great uncertainty and dispute as to the health effects of these low doses.

3056 NUCLEAR POWER AND SAFETY - SUMMARY AND CONCLUSIONS OF THE REPORT OF THE NUCLEAR POWER COMMISSION. 1. GENERAL VIEWS, ASSUMPTIONS AND MAIN CONCLUSION. Wethe, P.I. (Institutt for Atomenergi, Kjeller (Norway)). Ingenioer-nytt ; 15: No. 90, 16-17,27(9 Nov 1979). (In Norwegian).
In this first of a series of six articles a general discussion of the radiation hazards represented by natural radioactivity, medical irradiation, radioactive substances in everyday articles, fallout, nuclear power plants and radioactive wastes is presented. The assumptions and requirements for safe nuclear power are stated and the main conclusion of the Commission is quoted.

3057 GUIDELINE FOR EMISSION AND IMMISSION MONITORING IN NUCLEAR FACILITIES. Gemeinsames Ministerialblatt, A ; 30: No. 32, 669-683(Nov 1979). (In German).
Emission monitoring according to articles 46, paragraph 1, and 48 of the Radiation Protection Ordinance is necessary to determine emission rates during normal operation and in case of accidents. The necessary measurements must be carried out according to KTA rules no. 1503, part I, and no. 1504. Regulations concerning measurements of the discharge of radioactive substances in the stack air during accidents and measurements of the radioactive substances not discharged with the stack air will be published as soon as the further parts of KTA rule no. 1503 will have been agreed upon. The measurements carried out by the operators of nuclear power plants have to be validated by measurements made by officially authorized experts. (orig./HP).

3058 ECOLOGICAL PROBLEMS OF NUCLEAR POWER DEVELOPMENT. Hermansky, B. Jaderna Energie ; 25: No. 10, 393-399(Oct 1979). (In Czech).
The environmental impacts are assessed of nuclear power plants. The individual safety aspects are discussed of nuclear fuel handling, from uranium ore mining to radioactive waste disposal.

3059 EMERGENCY AND/OR POST-SHUTDOWN COOLING OF A NUCLEAR REACTOR. Boehm, B.; Ritzmann, H. (to Siemens A.G., Berlin (Germany, F.R.); Siemens A.G., Muenchen (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,448,591/B/. 16 Aug 1979. 6p. (In German).
There is a fuel element pond with its own pond pump inside the protective containment of the PWR. The pump for the emergency and/or post-shutdown cooling system is switched in parallel with this pond pump. There is a post-shutdown cooler in the common post shutdown line on the pressure side of both pumps. The suction lines of both pumps can be connected together via a valve in an emergency, and the pressure side of the pond pump can be taken via a shut off valve to the post shutdown cooler.

3060 NUCLEAR REACTOR SAFETY. Head, J.L.; Goddard, A.J.H.; Grant, P.J. Physics Reports. A Review Section of Physics Letters (Section C) ; 53: No. 4, 249-339(Jul 1979).
An account is given of the basic physics and engineering underlying the design of nuclear reactors, descriptions of the types of reactor currently operating, the principles of reactor fault detection and control, safety analysis and hazards assessment. The more serious hypothetical accidents are reviewed for water cooled and gas cooled reactors and for the liquid metal cooled fast breeder reactor. Safety criteria and the siting of nuclear power stations are discussed and illustrated by reference to procedures in the U.K. and a short examination is made of the environmental effects of nuclear power, spent fuel re-processing and the storage of highly radiactive waste.

3061 CONSEQUENCE MODEL OF THE GERMAN REACTOR SAFETY STUDY. Bayer, A.; Aldrich, D.; Burkart, K.; Horsch, F.; Huebschmann, W.; Schueckler, M.; Vogt, S. (Kernforschungszentrum Karlsruhe, Germany). Transactions of the American Nuclear Society ; 32: 478-479(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
FEDERAL REPUBLIC OF GERMANY;NUCLEAR POWER PLANTS;RELIABILITY;RISK ASSESSMENT;REACTOR ACCIDENTS;ENVIRONMENTAL IMPACTS;RADIOACTIVE EFFLUENTS;RADIATION HAZARDS;MATHEMATICAL MODELS

3062 WEEK THEY ALMOST LOST PENNSYLVANIA.

Torrey, L. New Scientist ; 82: No. 1151, 174-178(19 Apr 1979).
A tentative sequence of events has been constructed following the failure of a feedwater pump in the secondary cooling system of the Three Mile Island nuclear reactor on 28 March, which tripped the plant's turbine and resulted in a loss-of-coolant accident. The debate surrounding some of the actions taken by the operators at the time of the emergency and come of the conflicting statements made at the time are reported. Measures taken locally to protect the population following the reported venting of high levels of ^{133}Xe and the public reaction to the news that there could be no immediate cold shutdown due to the presence of a non-condensable gas bubble inside the reactor vessel are considered. Present figures however indicate low contamination for both workers and general population. There is mounting criticism following recurrent malfunctions at other similar plants and although the immediate crisis now appears over there are the long term problems of clearing up to be faced.

3063 NUCLEAR ACCIDENT. Mathews, T.; Agrest, S.; Borger, G.; Lord, M.; Marbach, W.D.; Cook, W.J.; Sheils, M. Newsweek ; 93: No. 15, 24-36(9 Apr 1979).
A malfunctioning valve at the Three Mile Island power plant in Pennsylvania was the prelude to the worst nuclear accident in U.S. history. Despite assurances that radiation leaked from the plant posed no immediate threat, the population around the plant dwindled as unforced weekend evacuations grew common. Radiation at the power plant site reached 30 mrem/hr on March 30. While officials of the Metropolitan Edison Co., the plant's operator, consistently downplayed the seriousness of the situation, uncontrolled releases of radioactive steam continued. The planning and previous operation of the three-month-old plant are reviewed, and explanations for the system malfunction are provided. The accident further complicates the tenuous position of the nuclear power industry in the U.S. Because of safety worries and licensing delays, few electric utilities are ordering new nuclear plants. Previous U.S. nuclear accidents are listed. Long-term effects of radiation exposure are assessed.

3064 TORNESS: PROPOSED NUCLEAR POWER STATION. SCRAM (Scottish Campaign to Resist the Atomic Menace) Energy Bulletin ; No. 11, 8-9(Apr-May 1979).
The need for and desirability of nuclear power, and in particular the proposed nuclear power station at Torness in Scotland, are questioned. Questions are asked, and answered, on the following topics: position, appearance and cost of the proposed Torness plant, and whether necessary; present availability of electricity, and forecast of future needs, in Scotland; energy conservation and alternative energy sources; radiation hazards from nuclear power stations (outside, inside, and in case of an accident); transport of spent fuel from Torness to Windscale; radioactive waste management; possibility of terrorists making a bomb with radioactive fuel from a nuclear power station; cost of electricity from nuclear power; how to stop Torness.

3065 REVIEW OF THE AMERICAN NUCLEAR SOCIETY SYMPOSIUM ON THE PROBABILISTIC ANALYSIS OF NUCLEAR REACTOR SAFETY. Shaw, J. (Queen Mary Coll., London (UK). Dept. of Nuclear Engineering). Annals of Nuclear Energy ; 6: No. 1, 19-24(1979).
In this review the conference held at Los Angeles, May 1978, is summarized and the main issues are identified. The application of probabilistic methods in reactor licensing, safety assessment, risk criteria and design, waste disposal, and risk benefit were discussed. Computer codes for evaluation of fault trees, and fault tree probability analysis, and data systems were also considered.

3066 SAFETY ASSESSMENT PRINCIPLES FOR NUCLEAR POWER REACTORS. London; Health and Safety Executive (1979). 46p.
The document is in sections, entitled: introduction; fundamental requirements and policy; basic principles (radiological principles, radioactive waste, principles in the evaluation of fault conditions and protective systems); engineering principles (general principles, reactor core and fuel, primary coolant circuits, reactor heat transport systems, protection systems, essential services, containment systems, fuel and absorber handling, radiological protection engineering; radioactive waste management engineering, the analysis of the plant faults, transients and abnormal conditions, operating conditions, reliability analysis, layout, external hazards, decommissioning, quality assurance).

3067 REPORT OF THE PRESIDENT'S COMMISSION ON THE ACCIDENT AT THREE MILE ISLAND. Washington, DC; President's Commission (1979). 207p. (NP--24200). GPO $5.00.
On March 28, 1979, the United States experienced the worst accident in the history of commercial nuclear power generation. Two weeks later, the President of the United States established a Presidential Commission. The purpose of the Commission was to conduct a comprehensive study and investigation of the recent accident involving the nuclear power facility on Three Mile Island in Pennsylvania. Results and conclusions of the investigation are presented.

3068 NUCLEAR SAFETY AND RADIOACTIVE WASTES. Gey, A. (France AEC). Radioprotection ; 14: No. 3, 161-182(1979).
The fundamental principles and the risk assessment methods of nuclear safety are often unknown to workers in the field. Presented are guidelines to inform workers in the nuclear industry about safety principles and methods that apply to the operations of a nuclear plant; radioactive waste handling; and ways to deal with radioactive releases. The guidelines are presented in the form of simple words and schematic explanations.

3069 ACCIDENT AT THREE MILE ISLAND. COMMENTS BY THE HEALTH AND SAFETY EXECUTIVE. London; Health and Safety Executive (1979). 11p.
Using the report of the President's Commission - the Kemeny Report -as a framework, the principal issues raised by the accident on Nuclear Power Plant No.2 at Three Mile Island, USA which caused considerable damage to the reactor core but minimal release of radioactivity have been reviewed by the Health and Safety Executive. The general conclusions reached are: (1) The accident did not arise from any serious inherent weakness in the concept or design of the PWR. (2) No fundamental revisions of the organisational arrangements for licensing, constructing and operating power reactors in this country are

needed. (3) It is desirable for the Executive to establish and publicise more thoroughly co-ordinated emergency arrangements at the national level. (4) Additional emphasis is needed of detailed points concerning; the performance of instruments in emergency conditions, the presentation of information to operators in reactor control rooms, and communications in general in the period immediately following an accident. The report outlines the accident and presents with comments the following issues raised by the Kemeny report: (1) Regulatory arrangements. (2) The power producing industry and its suppliers. (3) Operator training. (4) Technical assessment. (5) Worker and public health and safety. (6) Emergency planning and response. In an Appendix a commentary on the main recommendations of the Kemeny report prepared by HM Nuclear Installations Inspectorate is presented.

3070 CAN WE FIX NUCLEAR ENERGY. Weinberg, A.M. (Oak Ridge Associated Universities, Inc., TN ;USA). Inst. for Energy Analysis). Annals of Nuclear Energy ; 6: No. 9-10, 473-482(1979).

The status of nuclear energy is examined from the safety aspect. Attitudes to siting and the performance of existing safety barriers for protection against radioactivity released from power stations are discussed. Amongst the problems associated with the operation of a nuclear reactor, mine tailings are considered a greater hazard than either waste disposal or proliferation. The effect of the Three Mile island accident on the estimation of the probability of serious malfunctioning of a reactor is examined. An acceptable nuclear energy system is identified in terms of the following characteristics:-greater isolation of sites, development of a safer reactor type, the separation of nuclear electricity generation from its distribution; more professionlization of staff for nuclear plants, greater security, and education of the public about the hazards of radiation. A brief examination of alternative energy sources suggests that solar energy is worth pursuing. This, however, will be a long-term project and exponents of nuclear energy must provide new and convincing initiatives in order to gain public approval for nuclear power.

3071 RADIOACTIVE RELEASE FOLLOWING A LOCA WITH AN INITIALLY BREACHED CONTAINMENT. Kenigsberg, A. (Israel Atomic Energy Commission, Tel Aviv); Hasan, D.; Elias, E. Transactions of the American Nuclear Society ; 33: 503-504(1979). (CONF-791103--).

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

PWR;BWR. PWR TYPE REACTORS;BWR TYPE REACTORS; REACTOR SAFETY;LOSS OF COOLANT;CONTAINMENT SYSTEMS;FAILURES;FISSION PRODUCT RELEASE; COMPUTER CALCULATIONS;RADIOACTIVE EFFLUENTS

3072 ASSESSMENT OF THE KOSICE NUCLEAR POWER PLANT PROJECT WITH REGARD TO RADIATION BURDEN OF THE POPULATION IN THE SERVED KOSICE INDUSTRIAL AND DWELLING AREA. Marko, L. (Ustav Radioekologie a Vyuzitia Jadrovej Techniky, Kosice (Czechoslovakia)). Radioaktivita a Zivotne Prostredie ; No. 1, 53-73(1979). (In Slovak).

The theoretical study ''Analysis of the Nuclear Power Plant impact on Kosice'' which has been worked out by Energoprojekt Praha, is evaluated with the aim of determining the possible radiation impact on the inhabitants living in the centre of the Kosice District. The evaluation is based on data of individual dose equivalents and safety coefficients as well as on population dose equivalents to a distance of r=100 km from the nuclear power station with a working reactor of the VORONEZ 2x440 MWe - type with a 100 m high ventilation chimney, having a filter outlet of 100% for inert gases, 0.1% for elementary iodine, 10% for alkyliodide and 0.005% for other substances under different weather conditions.

3073 NUCLEAR SAFETY AND RADIOACTIVE WASTES. Gey, A. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Dept. de Surete des Matieres Nucleaires). Radioprotection ; 14: No. 3, 161-182(1979). (In French).

From Preventive and social medicine meeting; Dinard, France (14 Sep 1978).

The fundamental principles of nuclear safety and the risk assessment methods are often unknown to people concerned by this field. The following lines have been written to inform them using if possible usual words and simple, sometimes schematic, explanations. Safety principles and methods are applied to nuclear plants of course; but they are also applied to their radioactive releases and wastes. This article is a tentative to give an idea of the importance of solid radioactive wastes and of their fate.

3074 RESULTS OF AN ANALYSIS OF THE QUANTITIES OF RADIOACTIVE WASTES DEVELOPING DURING THE DECOMMISSIONING OF NUCLEAR POWER PLANTS. Gasch, A.; Loercher, G.; Lukacs, G. (Nuklear-Ingenieur Service G.m.b.H., Frankfurt am Main (Germany, F.R.)). pp 299-306 of Decommissioning of nuclear facilities. Proceedings of an international symposium jointly organized by the IAEA and the OECD NEA and held in Vienna, 13-17 November 1978. Vienna; IAEA (1979).

From International symposium on the decommissioning of nuclear facilities; Vienna, Austria (13 Nov 1978).

The Federal Ministry for Research and Technology of the Federal Republic of Germany has issued a contract to NIS, Nuklear-Ingenieur-Service GmbH, to study the radioactive wastes resulting from the decommissioning of light-water reactors currently existing and planned in the FRG. In this study, the existing masses of radioactive waste which must be placed in protective storage, as well as their radioactivity, were estimated for individual reference plants. On the basis of these individual reference plants and probable commissioning dates, the development of the masses of waste and their radioactivity with respect to time was then determined. This study is based on 31 nuclear power plants. It was found that the total mass of waste which must be placed in protective storage is about 290,000Mg with a maximum radioactivity of about 3.7×10^{18}Bq (1×10^{8}Ci) without fuel assemblies, which were not considered in the study.

3075 DEVELOPMENT OF UNITED STATES POLICY AND STANDARDS FOR DECOMMISSIONING NUCLEAR FACILITIES. Bernero, R.M.; Conti, E.F. (Nuclear Regulatory Commission, Washington, DC (USA)). pp 11-27 of Decommissioning of nuclear facilities. Proceedings of an international symposium jointly organized by the IAEA and the OECD NEA and held in Vienna, 13-17 November 1978. Vienna; IAEA (1979).

From International symposium on the decommissioning of nuclear facilities; Vienna, Austria (13 Nov 1978).

The United States Nuclear Regulatory

Commission (NRC), responsible for commercial nuclear licensing, is reevaluating its policy on decommissioning of all types of nuclear facilities. Battelle Pacific Northwest Laboratories (PNL) is being used as a major contractor in this effort. Present NRC regulations and guidance for decommissioning are reviewed. Decommissioning experience in the United States of America is reviewed. Detailed studies are being made of the alternatives and costs for decommissioning of a number of different facilities, including a pressurized water reactor, a boiling water reactor, a fuel reprocessing plant, a mixed-oxide fuel fabrication plant, a uranium oxide fuel fabrication plant, a uranium mill, a UF_6 conversion plant and a low level waste burial ground. Studies are also being made of methods to facilitate decommissioning. The principal issues in decommissioning policy are discussed, including residual radioactivity limits, financial assurance, and generic applicability. The mechanics of policy development, including discussion with the States, are described. Regulation enactment procedures are explained.

3076 CRITERIA FOR THE MANAGEMENT OF REDUNDANT NUCLEAR FACILITIES. Martin, A. (Associated Nuclear Services, Epsom, Surrey, United Kingdom); Tildsley, F.C.J.; Clark, L. (Health and Safety Executive, London (UK). Nuclear Installations Inspectorate). pp 319-335 of Decommissioning of nuclear facilities. Vienna, Austria; IAEA (1979).

From International symposium on the decommissioning of nuclear facilities; Vienna, Austria (13 Nov 1978).

In the paper, various aspects of the management of redundant nuclear facilities are examined, with particular reference to the establishment of criteria. Comparisons are made of the likely residual radioactive inventories in reactors, reprocessing plants and mixed oxide fuel fabrication plants and the implications for decommissioning and dismantling are discussed. Site selection may be influenced by considerations of decommissioning and in turn the approach and timescale of a decommissioning programme will reflect aspects of a site. These are discussed briefly. The need to take account at the design stage of the eventual problems of decommissioning and dismantling are emphasized, and the means by which such a requirement would be met in practice are illustrative. In reactors, features incorporated for the purpose of in-service inspection will ease future dismantling, whilst in fuel plants, many features which are required for the safe and reliable operation and maintenance of the plants would also be advantageous in their decommissioning. Operational practices can have a significant influence on the radiological environment of a plant, and hence on the difficulties of access and on the generation of radioactive wastes. This is particularly true of fuel plants because of the nature of the processes and the process materials. Waste management is a key area of concern, and illustrativecomparisons are made of the waste arising from normal operation and from dismantling of the different types of plants. Disposal routes are still under consideration in most countries and the approaches adopted will greatly affect the cost and the radiological impact of the removal of redundant facilities.

3077 SUMMARY OF A DECOMMISSIONING HANDBOOK FOR NUCLEAR FACILITIES. Manion, W.J. (Nuclear Energy Services, Inc., Danbury, CT, USA). pp 203-216 of Decommissioning of nuclear facilities. Vienna, Austria; IAEA (1979).

From International symposium on the decommissioning of nuclear facilities; Vienna, Austria (13 Nov 1978).

This paper summarizes the information compiled to date for a handbook on decommissioning of surplus nuclear facilities being prepared by Nuclear Energy Services for the United States Department of Energy. Particular attention is focussed on the available technology applicable to those decommissioning activities which have not been accomplished before, such as remote segmenting and handling the highly activated 1100 MW(e) light water reactor vessel internals and thick-walled reactor vessels. Mechanical and torch cutting techniques will be described, including recent developments in 'arc saw' technology. Applicability of the methods as a function of material composition, thickness and configuration is discussed, cutting rates defined, and equipment and procedures described. Other pertinent factors covered include in-air and underwater applications, contamination control and personnel protection. Similar information is presented for the fracturing, segmenting and rebar-cutting of thick concrete sections and for the removal of contaminated piping systems. A summary of available information associated with the planning and estimating of a decommissioning programme is also presented. In particular, the methodologies associated with the calculation and measurement of activated material inventory, distribution and surface dose level; system contamination inventory and distribution; and workarea dose levels are summarized. Cost estimating techniques are also presented and the manner in which to account for variations in labour costs as impacting the labour-intensive work activities is explained.

3078 NEUTRON INDUCED ACTIVATION, WASTE DISPOSAL AND RADIATION LEVELS FOR THE REACTOR ISLAND STRUCTURE OF A DECOMMISSIONED MAGNOX POWER STATION. Woollam, P.B. (Central Electricity Generating Board, Berkeley (UK). Berkeley Nuclear Labs.); Pugh, I.G. (Central Electricity Generating Board, Barnwood (UK). Generation Development and Construction Div.). pp 353-377 of Decommissioning of nuclear facilities. Vienna, Austria; IAEA (1979).

From International symposium on the decommissioning of nuclear facilities; Vienna, Austria (13 Nov 1978).

A programme of theoretical and experimental work has been completed with the aim of providing a best estimate of the radioactive inventory in the structure of a Magnox reactor at 10 and 100 years after a planned retirement. The inventory includes up to 13 isotopes in 80 different reactor components; an analysis of all long-lived isotopes shows that no unidentified nuclide could be present in the structure which would significantly affect the results. The inventory is used to assess the major radiological consequences of decommissioning a Magnox reactor: waste disposal and radiation exposure to occupationally exposed personnel during dismantling operations. Calculations of whole-body dose equivalent rates show that, although unlimited access to core areas will not be possible, limited access after a 100 year decay period is likely for times sufficient for setting-up or maintenance of semi-automatic machinery. After a 100 year decay period airborne problems from concrete or graphite dust will be limited by conventional hazards rather than radioactivity control.

3079 DECOMMISSIONING OF THE CANDU-PHW

REACTOR. Unsworth, G.N. (Atomic Energy of Canada Ltd., Pinawa, Manitoba. Whiteshell Nuclear Research Establishment). pp 73-86 of Decommissioning of nuclear facilities. Vienna, Austria: IAEA (1979).

From International symposium on the decommissioning of nuclear facilities: Vienna, Austria (13 Nov 1978).

A generic study has been completed in Canada to assess decommissioning of a typical 600 MW(e) CANDU-PHW reactor and to obtain estimates of the costs, environmental impact, quantities of radioactive wastes and man.rem exposure associated with each of the three decommissioning stages. The CANDU reactor is designed to facilitate decommissioning. The vessel and other highly radioactive components are comparatively light weight, provision is made for replacement of the pressure tubes and access is provided into the top of the vault that will facilitate the cutting-up and dismantling of the reactor vessel. In addition to the experience and knowledge gained from decommissioning of one reactor in the United States of America (Elk River), the rehabilitation of the NRX and NRU vessels at Chalk River, and the replacement of some pressure tubes in the Pickering reactor have provided confidence that the proposed decommissioning of a large CANDU-PHW reactor is practical. Also, it is expected that research associated with existing programmes for management of radioactive waste in Canada will provide sufficient data and the methodology for determining permissible Residual Activity Levels for a decommissioned site to be released for unrestricted use. The radioactive waste resulting from decommissioning will be of relatively low specific activity. The disposal facilities and techniques presently being developed in Canada for power reactor wastes will be used to cope with the wastes from decommissioning. Decommissioning costs are not high when compared to the total value of a nuclear generating station and there is little incentive to provide funding now to handle future decommissioning costs.

3080 Genshiryoku anzensei kenkyu no genjo. (PRESENT STATUS OF NUCLEAR POWER SAFETY STUDIES IN JAERI). Tokyo, Japan: Japan Atomic Energy Research Inst. (Dec 1978). 92p. (In Japanese).

The status of nuclear power safety research in 1978 in JAERI is described. Safety research broadly is in two areas of nuclear reactor and environment. The nuclear reactor safety research concerns (1) reliability and integrity of the reactor core and reactor pressure boundary, (2) credible accidents such as loss-of-coolant and reactivity, and (3) evaluation and analysis of the phenomena attendant on the accidents. The environment safety research concerns (1) evaluation and analysis of environmental radioactivities, (2) treatment and disposal of radioactive wastes, and (2) others related. As major facilities in nuclear power safety research, there are ROSA (Rig of Safety Assessment) and NSRR (Nuclear Safety Research Reactor). In the ROSA project, performance of the emergency core cooling system (ECCS) and the influence of cooling system rupture conditions upon the ECCS are studied. NSRR of a TRIGA-ACPR type is used for reactivity accidents research concerning fuel behavior and damage.

3081 AIR CONDITIONING AND VENTILATION IN ATOMIC ENERGY FACILITIES. Amemiya, N. (Shin Nippon Air Conditioning Co. Ltd., Tokyo). Kuki Chowa To Reito (Air Conditioning and Refrigeration) ; 19: No. 1, 103-106(Dec 1978). (In Japanese).

Atomic energy facilities comprise very diverse facilities, and are classified roughly into the facilities concerning a series of nuclear fuel cycle aiming at nuclear power generation, basic research facilities, the demonstration facilities for developing new types of reactors, RI-utilizing facilities, and nuclear powered ships. The air conditioning and ventilation in these facilities aim at the protection of workers in and people around these facilities from radiation exposure, and in addition, heat removal and temperature control. For the protection of workers, the air flow of once-through type is adopted, and reverse flow is prevented. For the protection of people, exhaust air quantity is reduced, sufficient filtration is carried out, and diffusion and dilution are planned by the exhaust from high places. Considerably efficient filters are adopted at the intakes of outside air, and since these facilities are mostly in coastal areas, the countermeasures to salt injury and sand are taken. The equipments for the treatment of outside air and those for exhaust are outlined. As the typical examples, the air conditioning and ventilation in a spent fuel-storing facility, a practical fuel testing facility, an irradiated fuel testing facility, and a spent fuel reprocessing facility are described. Hereafter, materials, method of construction, quality control and aseismatic safety must be studied about the air conditioning and ventilation installations.

3082 STORAGE RACK FOR FUEL ELEMENT SETS. Wachter, W.J.: Robbins, T.R. (to Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,724,301/A/. 30 Nov 1978. 16p. (In German).

The water-filled storage rack for spent fuel elements consists of a modular construction with many storage cells, which contain the fuel element sets as well as many decontamination boxes. These are designed as neutron absorbers because they contain water and their walls are made of B, Al-B, Cd or Gd. The storage cells are arranged in relation to the decontamination boxes in such a way the each decontamination box lies near one storage cell at least. This way the clearances between the fuel element sets become considerably smaller. By means of the narrow arrangement of the storage cells, a friction absorption is generated in case of earthquakes.

3083 ENERGY SOURCES: THE POTENTIAL HAZARDS. PT. 2. Hull, T. Safety Surveyor ; 6: No. 4, 19-23(Nov 1978).

A brief account is presented of nuclear energy and the fission of uranium 235: thermal and fast reactors: the various stages in the production of nuclear power from the mining of uranium to the disposal of radioactive wastes (with special reference to safety considerations): and the protection of workers (including a comparison of the fatal accident rate in the main energy-producing industries).

3084 ALTERATION OF REACTOR INSTALLATION (REACTOR FACILITIES) IN TSURUGA NUCLEAR POWER STATION OF THE JAPAN ATOMIC POWER COMPANY. Genshiryoku Iinkai Geppo (Journal of Atomic Energy Commission) ; 23: No. 8, 5-6(Nov 1978). (In Japanese).

A report to the Atomic Energy Commission of Japan by the Committee on Examination of Reactor Safety concerning the alteration of the reactor installation in Tsuruga Nuclear Power Station of The Japan Atomic Power Company is presented. Its safety was confirmed. The

alterations are as follows. Alteration of the radioactive solid waste disposal facility: The solid waste storage building B (storage area of about 4,400 m^2) is installed so that the storage capacity is increased to about 35,000 drums from the present capacity of about 15,000. Alteration of the reactor containment facility: An inflammable gas concentration control system was installed, in order to control the concentration of inflammable gases produced in zirconium-water reaction and water radiolysis occurring within the reactor containment vessel following a loss-of-coolant accident.

3085 ALTERATION OF REACTOR INSTALLATION (REACTOR FACILITIES) IN SHIMANE NUCLEAR POWER STATION OF THE CHUGOKU ELECTRIC POWER CO., INC. Genshiryoku Iinkai Geppo (Journal of Atomic Energy Commission) ; 23: No. 8, 7-10(Nov 1978). (In Japanese).

A report to the Atomic Energy Commission of Japan by the Committee on Examination of Reactor Safety concerning the alteration of reactor installation in Shimane Nuclear Power Station of the Chugoku Electric Power Co., Inc. is presented. Its safety was confirmed. The alterations are as follows. Alteration of the fuel assemblies: In the sixth fuel replacement, together with the conventional 8 x 8 type fuel assemblies (type 1 fuel assembly), altered 8 x 8 type fuel assemblies (type 2 fuel assembly) of up to eight are used. Type 1 and 2 fuel assemblies differ in U^{235} enrichment (2.6 and 2.0 wt%, respectively), outer diameter of fuel rods (1.3 and 1.2 cm) and number of fuel rods per assembly (63 and 62). Alteration of the reactor containment facility: The inflammable gas concentration control system by nitrogen gas injection was installed. Alteration of the spent fuel storage facility: Spent fuel storage capacity is increased to 290% of the amount in the core from 190%.

3086 SAFETY OF NUCLEAR ENERGY. Binner, W. (Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna). Oesterreichische Ingenieur-Zeitschrift ; 21: No. 10, 302-308(Oct 1978). (In German).

The safety aspects of nuclear power generation are discussed considering the known and possible hazards involved. Based on the available information on the safety record of the nuclear power industry, including analyses of the reported incidents, a conclusion is reached that the nuclear power generation is the safest form of technological activity of today.

3087 PROGRESS REPORT CONCERNING SAFETY RESEARCH FOR NUCLEAR REACTOR FACILITIES. Genshiryoku Iinkai Geppo (Journal of Atomic Energy Commission) ; 22: No. 12, 14-25(Apr 1978). (In Japanese).

Examination and evaluation of safety research results for nuclear reactor facilities have been performed, as more than a year has elapsed since the plan had been initiated in April, 1976, by the special sub-committee for the safety of nuclear reactor facilities. The research is carried out by being divided roughly into 7 items, and seems to be steadily proceeding, though it does not yet reach the target. The above 7 items include researches for (1) criticality accident, (2) loss of coolant accident, (3) safety for light water reactor fuel, (4) construction safety for reactor facilities, (5) reduction of release of radioactive material, (6) safety evaluation based on the probability theory for reactor facilities, and (7) aseismatic measures for reactor facilities. With discussions on the progress and the results of the research this time, research on the behaviour on fuel in abnormal transients including in-core and out-core experiments has been added to the third item, deleting the power-cooling mismatch experiment in Nuclear Safety Research Reactor of JAERI. Also it has been decided to add two research to the seventh item, namely measured data collection, classification and analysis, and probability assessment of failures due to an earthquake. For these 7 items, the report describes the concrete contents of research to be performed in fiscal years of 1977 and 1978, by discussing on most rational and suitable contents conceivable at present.

3088 PROBABILISTIC APPROACH TO DESIGN OF THE SPENT FUEL CASK HANDLING SYSTEM OF A NUCLEAR PLANT. Gachot, B.; Barbet, J.F. (Electricite de France, 75 - Paris). pp 4/10/1-4/10/23 of First national conference on reliability. Part 2. Culcheth, Warrington, England: United Kingdom Atomic Energy Authority (1978).

From National conference on reliability: Nottingham, UK (21 Sep 1977).

The safety in handling containers of spent fuel assemblies, using a travelling bridge crane, during transfer to the deactivation pool and other handling operations within the fuel building, is under consideration. Probability studies of the causes of container falls which are ascribable to cranes were carried out. An analysis of the operation of the various components was followed by a determination of the frequency of such components to failure or breakdown. Available data and data collected from those industries using equipment with the same functions ie overhead travelling bridges carrying heavy loads, were qualified by analysis based on failure trees. Results and conclusions were applied to the design of a new crane and the same type of analysis was undergone. The probability of the containers then dropping proved to be below the safety standard required.

3089 DESIGN FOR SAFETY OF NUCLEAR POWER PLANTS. A CODE OF PRACTICE. Vienna: IAEA (1978). 43p.

This Code of Practice is a compilation of nuclear safety principles aimed at defining minimum requirements for structures, systems and components important to safety in nuclear power plants embodying thermal neutron reactors, with emphasis on what safety requirements shall be met rather than specifying how these requirements can be met. The Code of Practice describes design requirements for structures, systems and components that shall be met in order to prevent or mitigate the consequences of events, considered credible, which could jeopardize safety. The Code of Practice does not deal with non-radiological effects of the nuclear power plant on the environment. It should be recognized that these requirements will continue to evolve and will be subject to revision in the light of future experience.

3090 TIME INTEGRATED SPENT FUEL STORAGE BIOLOGICAL DOSES. Strahl, J.F. (NUS Corp., Rockville, MD (USA)). pp 151-158 of Radiation protection in nuclear power plants and the fuel cycle. Vol. 1. London, England: British Nuclear Energy Society (1978).

From Conference on radiation protection in nuclear power plants and the fuel cycle: Bristol, UK (27 Nov 1978).

Following the President's Energy Message of April, 1977, it became apparent that interim

spent fuel storage may be required for longer periods of time than originally anticipated; either at centralized facilities or in further modification of existing pools. Studies show that, relative to partial increases already achieved at several U.S. facilities (from 4/3 to 7/3 cores), total integrated personnel exposures will double with 35 years of spent fuel accumulation.

3091 INELASTIC RESPONSE OF METALLIC IMPACT LIMITERS. Biffle, J.H.; Sagartz, M.J.; Weingarten, L.I. (Sandia Labs., Albuquerque, NM (USA)). pp J6/10 1-12 of Structural mechanics in reactor technology. Vol. J, Pt. b. Jaeger, T.A.; Boley, B.A. (eds.). Amsterdam, Netherlands; North-Holland (1977).

From 4. international conference on structural mechanics in reactor technology; San Francisco, CA, USA (15 Aug 1977).

Energy mitigators on some light water reactor (LWR) spent fuel shipping casks and conceptual designs for liquid metal fast breeder reactor (LMFBR) spent fuel shipping casks rely on the inelastic behaviour of metallic plate-like structures. A program was undertaken to investigate the response of mitigators to hypothetical shipping accidents with parallel experimental and theoretical studies. The theoretical studies consist of performing large deformation three dimensional transient dynamic analysis on several metal fin designs and correlating the results with the experimental results. The newly developed computer program WULFF was used. Testing of scale model fin specimens was performed at SLA's drop table facility. The test specimens are mounted on a force transducer and this assembly is bolted to the stationary bottom table. Extra weights are added to the drop table so that the total energy at impact is sufficient to cause large plastic deformation in the specimens. Accelerometers mounted on the drop table and the data from the force transducer are used to compute the energy absorbed during the test. Also framing camera coverage was used to observe the specimen deformation as it develops. The results of the theoretical analysis and experimental program can be used by designers responsible for impact limiters on spent fuel shipping casks. Without data to design impact limiters the integrity of the cask under accident conditions can be questionable.

3092 NUMERICAL ANALYSIS OF IMPACT-PENETRATION PROBLEMS FOR NUCLEAR REACTOR SAFETY. Dubois, J.J.; Chedmail, J.F.; Bianchini, J.C. (Engineering System International S.A., 20 rue Saarinen, F-94150 Rungis-Silic, France). pp J7/1 1-11 of Structural mechanics in reactor technology. Vol. J, Pt. B. Jaeger, T.A.; Boley, B.A. (eds.). Amsterdam, Netherlands; North-Holland (1977).

From 4. international conference on structural mechanics in reactor technology; San Francisco, CA, USA (15 Aug 1977).

This paper discusses the Finite Element and Finite Difference analysis of two impact-penetration problems, namely a fuel cask drop on a foundation slab and a missile penetration into a reinforced concrete structure.

Accident Liability

3093 NUCLEAR POWER PLANT SAFETY TODAY. Hartkopf, G. (Bundesministerium des Innern, Bonn (Germany, F.R.)). Atomwritschaft, Atomtechnik ; 25: No. 1, 18-27(Jan 1980). (In German).

From 6. german symposium on nuclear law; Muenster, Germany, F.R. (8 - 9 Oct 1979).

The Undersecretary of State responsible for reactor safety with the Federal Ministry of the Interior read a keynote paper at the 6th German Atomic Energy Law Symposium in which he presented a critical review on the basis of today's atomic energy law and stated priorities, on the part of the federal supervisory agencies, in controlling the peaceful uses of nuclear power as well as the intentions and views of his Ministry with respect to the further development of reactor safety, radiation protection, waste management, liability etc. It is one of the most important requirements that the safety of reactors be further improved and that safety and the necessary radiological protection have absolute priority over economic considerations. Some other aspects covered in the paper are the human factor within the framework of the hazard potential represented by a nuclear power plant, the role of the experts, some first conclusions drawn from the German Risk Study, a comment on the underground construction of nuclear power plants, the role of public action groups, and some key problems of waste management. Also the abolition of limits of liability in reactor accidents is discussed.

ENERGY PLANNING AND POLICY

Energy Analysis and Modeling

3094 (INIS-mf--5244) ANNUAL REPORT 1978. (Stichting Energieonderzoek Centrum Nederland, The Hague). Jun 1979. 80p. (In Dutch). Dep. NTIS (US Sales Only), PC A05/MF A01.

The activities of ECN in 1978 give first the general analysis of the Dutch energy economy carried out by the Energy Study Centre (ESC). Studies on energy modelling and energy conservation in buildings are briefly discussed.

Economics and Sociology

3095 PACIFIC NORTHWEST: PARADISE LOST. Thomas, W.V. Editorial Research Reports (Washington, D.C.) ; 1: No. 15, 287-304(18 Apr 1980).

An influx of new residents to the Pacific Northwest is changing social patterns and is endangering the region's valued wilderness and resources. A growing population and a feeling that the national govenment is more exploitive than conserving of its resources combines with a political tension between progressive populism and conservative Mormon influences to make residents wary of either newcomers or new prosperity. The abundant hydro power is threatened as power demand increases and utilities, industries, and the state and local governments compete for their fair share. A plan to restructure the Bonneville Power Administration (BPA) has been introduced in Congress to give it a single appointed administrator with the authority to decide how power will be distributed and which new power sources to develop. Concern about the two national nuclear waste repositories at Hanford and Idaho Falls led to a six-month moratorium at Hanford to warn the government that the site was not intended to be a permanent solution. A legislative proposal to set up regional nuclear parks will not relieve the Pacific Northwest's problems for some time. Leaders blame the policymakers for looking on the area as too remote and underpopulated to worry about. 18

references (DCK)

3096 POLITICS OF ENERGY. O'Keefe, B.J. (EG and G, Boston, MA). Oak Ridge National Laboratory Review ; 12: No. 4, 13-21(Fal 1979).
Bernard J. O'Keefe, president and board chairman of Edgerton Germeshausen, and Grier (EG and G), made several points in a speech concerning the problems of politics and the energy situation. He sees the problems of the nuclear power industry centered around politics and finances - not technology. The difficulties of financing a typical 1000-MW plant by the utilities are briefly discussed. He sees the problems of waste disposal no longer as a technical problem but as a political one. He suggests that a location for disposal should be chosen first and the technology worked out for that site. In the event that alternative sources of energy become meaningful in the overall energy picture, the formidable question of backup energy supplies with their high fixed costs will add another dimension to the economic impact of the alternate sources. Mr. O'Keefe stated that the new energy sources would be expensive, that the public would resist those costs, and the politicians who face the problems squarely will be voted out of office. (SAC)

3097 WINDSCALE INQUIRY AND ITS IMPLICATIONS. Fremlin, J.H. (Birmingham Univ. (UK). Dept. of Physics). Physics Education ; 13: No. 6, 333-336(Sep 1978).
The widely publicised controversy concerning the development of nuclear power for civilian use which the author considers one of the most curious and perhaps the most important of modern times, is discussed. The possible risks incurred in the production of power both by conventional and by nuclear methods are examined. Worries concerning the Windscale plant, storage of radioactive wastes and genetic radiation effects are considered and answered. It is concluded that the most important implication of the controversy is that if we wish to maintain both democracy and a high level of technology, the technologists must make increasing efforts to explain openly, clearly, continuously and effectively what they are doing.

3098 NUCLEAR POWER FOR BEGINNERS. Croall, S.; Sempler, K. London; Beginners Books (1978). 168p.
A 'comic strip' account of nuclear power, covering weapons and weapons proliferation, reactor accidents involving human errors, radiation hazards, radioactive waste management and the fuel cycle, fast breeder reactors and plutonium, security, public relations and sociological aspects, energy consumption patterns, energy conservation and alternative energy sources, environmental aspects and anti-nuclear activities.

Environment, Health, and Safety

3099 (DOE/TIC--10114/1) REGIONAL ENVIRONMENT-ENERGY DATA BOOK: ROCKY MOUNTAIN REGION. (Los Alamos Scientific Lab., NM (USA)). Dec 1978. Contract W-7405-ENG-36. 902p. Dep. NTIS, PC A99/MF A01.
Regional data relating to the energy, environmental, socioeconomic, and institutional characteristics of the Rocky Mountains are compiled. Intended uses are to provide data for policy analysis and generic impact assessments; assist the labs in developing relevant data to be used in analyses and studies; provide a reference book that can be used by local groups and institutions; and identify the gaps in regional data bases so that the Department of Energy (DOE) may be better able to allocate resources for data and program development. The document is divided into four chapters. Chapter I includes current and historic data on energy supply, demand, and production; sector fuel demands, fuel consumption, transmission, and transportation; location of energy production and conversion; and energy prices by sector and state. Chapter II shows a variety of natural and preternatural characteristics including water quality and quantity; air quality and air quality control areas; natural and induced climatic conditions; waste disposal; land and coast conditions, use, and management; managed and endangered species; demographic and socioeconomic conditions; and health and mortality data. Included in Chapter III are a variety of organizational, legislative, and regulatory data. Chapter IV provides energy equivalents, metric conversions, an index, and a glossary.

3100 (LA--8172-MS) OVERVIEW OF SOLID WASTE GENERATION IN THE UNITED STATES. Lacombe, D.M. (Los Alamos Scientific Lab., NM (USA)). Dec 1979. Contract W-7405-ENG-36. 20p. Dep. NTIS, PC A02/MF A01.
Over 5 billion metric tons of solid waste was generated in the United States in 1977. Quantities, composition, and disposal techniques are discussed for the major waste categories: agricultural, mining and milling, industrial, municipal, energy production, and radioactive waste. Continued research and development of adequate disposal methods and resource recovery and recycling processes is needed.

3101 (ORNL--5595, pp 85-89) OFFICE OF INTEGRATED ASSESSMENT AND POLICY ANALYSIS. Parzyck, D.C. Jan 1980.
Health and Safety Research Division progress report, May 1, 1978-September 30, 1979.
The mission of the Office of Integrated Assessments and Policy Analysis (OIAPA) is to examine current and future policies related to the development and use of energy technologies. The principal ongoing research activity to date has focused on the impacts of several energy sources, including coal, oil shale, solar, and geothermal, from the standpoint of the Resource Conservation and Recovery Act. An additional project has recently been initiated on an evaluation of impacts associated with the implementation of the Toxic Substances Control Act. The impacts of the Resource Conservation and Recovery Act and the Toxic Substances Control Act on energy supply constitute the principal research focus of OIAPA for the near term. From these studies a research approach will be developed to identify certain common elements in the regulatory evaluation cycle as a means of evaluating subsequent environmental, health, and socioeconomic impact. It is planned that an integrated assessment team examine studies completed or underway on the following aspects of major regulations: health, risk assessment, testing protocols, environment control cost/benefits, institutional structures, and facility siting. This examination would assess the methodologies used, determine the general applicability of such studies, and present in a logical form information that appears to have broad general application. A suggested action plan for the State of Tennessee on radioactive and hazardous waste management is outlined.

3102 (SAND--80-0021C) WORST-CASE SCENARIO SYNDROME. Wilmot, E.L.; Luna, R.E. (Sandia Labs., Albuquerque, NM (USA)). 1980. Contract EY-76-C-04-0789. 8p. (CONF-800334--10). Dep. NTIS, PC A02/MF A01.
From 2. DOE environmental control symposium; Reston, VA, USA (17 Mar 1980).
Worst-case scenario impacts which must be included in an environmental impact statement (EIS) are discussed. The author presents arguments against their inclusion in the EIS. The low-probability-high-risk scenarios are recalled by the public in far more cases than the realistically expected impacts. The techniques used in creating worst-case scenarios are discussed. An example is given from the EIS of the Waste Isolation Pilot Plant concerning a transportation accident. (DC)

3103 SACRIFICING THE WEST FOR POWER: UTILITIES RISK REGION'S RUIN FOR NUKES AND COAL. Bird, E. Power Line ; 6: No. 2, 5, 7(Sep 1980).
Uranium and coal development in the western states is progressing at a rate which ignores the socio-economic and environmental impacts of desertification of the West in exchange for reducing oil imports. Westerners are organizing to save their homelands by challenging the large utilities, particularly the Tennessee Valley Authority. Water is the central issue, with residents claiming that agriculture replenishes ground water, but mining and energy production do not. Uranium ore tailings are another area of concern for those left to deal and live with the radioactive wastes. Environmentalists oppose the water contamination associated with TVA's in-situ mine projects and its aggressive uranium development. At least 26 energy companies have development plans involving power generation for midwest cities and the West Coast. (DCK)

3104 PUBLIC HEALTH HAZARDS FROM ELECTRICITY-PRODUCING PLANTS. Neyman, J. (Univ. of California, Berkeley). Science ; 195: No. 4280, 754-758(25 Feb 1977).
When a new electricity-producing plant is to be built in a given locality it is natural to take into account the public health consequences of the normal operation of each type of plant contemplated. Here, the fossil-burning plants and nuclear facilities come under consideration. The author attempts to show that, in spite of the many important studies performed, there is currently no reliable methodology to estimate how many more cancer cases, and how many more heart attacks and other diseases have to be anticipated as a consequence of the normal operation of this or that type of electric generator. In part, this is because the currently available estimates of radiation effects on humans are based on extrapolations from studies of two kinds. Those of one kind may be exemplified by studies of atomic bomb casualties in Hiroshima and Nagasaki. The other kind are laboratory experiments with lower animals, frequently mice. The unreliability of both kinds of extrapolations is connected with the following circumstances: (1) The omnipresent troublesome phenomenon of competing risks. (2) The dependence of health effects of a given noxious agent on the preexisting local pollution. (3) The dependence of health effects not only on the dose of an agent, but also on the rate at which the agent is administered. (4) The noted difficulties of making extrapolations from one mammal to another. 17 references.

Natural Resources

3105 OCEAN ENERGY: FORMS AND PROSPECTS. Isaacs, J.D.; Schmitt, W.R. (Scripps Institution of Oceanography, La Jolla, CA). Science ; 207: No. 4428, 265-273(18 Jan 1980).
The nature and distribution of power sources of the sea other than petroleum are discussed. These include waves, tides, currents, salinity and temperature gradients, submarine geothermal sources, salt domes, ice, and other marine-associated concentrations. Opportunities to employ these marine power resources directly rather than for contributions to power grids or power-intensive products are considered.

Research, Development, Demonstration, and Commercialization

3106 (DOE/CR--0010) U.S. DEPARTMENT OF ENERGY PROJECT BOOK. (Department of Energy, Washington, DC (USA)). Jan 1980. 86p. Dep. NTIS, PC A05/MF A01.
This book covers representative projects in each program within the Department of Energy. The projects included were selected to provide an insight into the wide spectrum of projects authorized and under way in the Department. The projects described do not cover all projects authorized - they are merely representative. Descriptions, goals, and status are given for 29 energy projects, 4 scientific projects, and 5 defense projects. (RWR)

3107 (DOE/ER--0035) REVIEW OF THE MANAGEMENT OF MATERIALS RESEARCH AND DEVELOPMENT IN THE DEPARTMENT OF ENERGY. FINAL REPORT. (Department of Energy, Washington, DC (USA). Office of Energy Research). Dec 1979. 134p. Dep. NTIS, PC A07/MF A01.
The Materials Working Group of DOE findings and recommendations of a management nature to improve the handling of materials R and D within DOE are presented. The special role of materials in the development of new energy technologies is provided. (FS)

Nuclear Energy

3108 (CONF-790202--, pp 13-17) NUCLEAR WASTES. Graham, J. (American Nuclear Society, Washington, DC). Jul 1979.
From 6. annual energy conference and exibition energy and the public; Knoxville, TN, USA (21 Feb 1979).
The imprecise terminology used to describe and define nuclear wastes has caused distortions and confusion in the public mind. High-level defense wastes are the major problem, one which many engineers feel has technically feasible solutions and which must be dealt with irrespective of the nuclear power problem. The engineers, however, are unable to reach a consensus on how wastes should be handled because of the varied orientations of their engineering backgrounds. They disagree on whether there is time to explore a range of waste-disposal options and on the cost and risk implications of these options. They question the need for the government to license itself to handle its own defense wastes. Plutonium poisoning from high-level wastes is a myth because the plutonium has been separated from high-level wastes and because, as a heavy metal, it is not readily ingested or digested.

3109 (EMD--79-29) CLEANING UP COMMINGLED URANIUM MILL TAILINGS: IS FEDERAL ASSISTANCE NECESSARY. (General Accounting Office, Washington, DC (USA)). 5 Feb 1979. 29p. General Accounting Office, 441 G St., NW, Washington, DC.

GAO was asked to determine whether Federal assistance should be given to operating mill owners that have processed uranium for sale to both government and industry and, thus, generated residual radioactive wastes. The wastes generated for both government and commercial use are called commingled uranium mill tailings. GAO recommends that the Congress provide assistance to active mill owners to share in the cost of cleaning up that portion of the tailings which were produced under Federal contract. Further, GAO believes that the Congress should also consider having the Federal government assist those mills who acted in good faith in meeting all legal requirements pertaining to controlling the mill tailings that were generated for commercial purposes and for which the Federal government is now requiring retroactive remedial action. At the same time, the Congress should make sure that this action establishes no precedent for the Federal government assuming the financial responsibility of cleaning up other non-Federal nuclear facilities and wastes, including those mill tailings generated after the date when the Federal government notified industry that the failings should be controlled.

3110 (INIS-mf--5514) NUCLEAR ENERGY AND THE NUCLEAR INDUSTRY. NOTES PREPARED TO PROVIDE INFORMATION AND TO ANSWER QUESTIONS. (Department of Energy, London (UK)). 11 Dec 1979. 19 p.p. NTIS (US Sales Only), PC A02/MF A01.

These notes have been prepared by the Department of Energy to provide information and to answer questions often raised about nuclear energy and the nuclear industry and in the hope that they will contribute to the public debate about the future of nuclear energy in the UK. The subject is dealt with under the headings: contribution of nuclear power, energy forecasts, nuclear fuels and reactor types, cost, thermal reactor strategy, planning margin, safety, nuclear licensing, unlike an atomic bomb, radiation, waste disposal, transport of nuclear materials, emergency arrangements at nuclear sites, siting of nuclear stations, security of nuclear installations, world nuclear programmes, international regulation and non-proliferation, IAEA safeguards arrangements in the UK, INFCE, and uranium supplies.

3111 (INIS-mf--5693) POWER GENERATION COSTS. COAL - NUCLEAR POWER. COMPARING INVESTMENT AND OPERATING COSTS OF COAL-FIRED AND NUCLEAR POWER PLANTS. SUPPLEMENT VOLUME. (Battelle-Institut e.V., Frankfurt am Main (Germany, F.R.)). 1979. 224p. (In German). NTIS (US Sales Only), PC A10/MF A01.

This supplement volume contains 17 separate chapters investigating the parameters which determine power generation costs on the basis of coal and nuclear power and a comparison of these. A detailed calculation model is given. The complex nature of this type of cost comparison is shown by a review of selected parameter constellation for coal-fired and nuclear power plants. The most favourable method of power generation can only be determined if all parameters are viewed together. One quite important parameter is the load factor, or rather the hours of operation. (UA) 891 UA/UA 892 AMO.

3112 (KFK--2707) CONSEQUENCES OF LARGE-SCALE IMPLEMENTATION OF NUCLEAR ENERGY IN THE FEDERAL REPUBLIC OF GERMANY. SUMMARY REPORT. Paschen, H.; Coenen, R.; Avenhaus, R.; Conrad, F.; Fischer, P.M.; Frederichs, G.; Halbritter, G.; Wintzer, D. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Abt. fuer Angewandte Systemanalyse). Jun 1979. 172p. (In German). (ASA/ZE--16/78). Dep. NTIS (US Sales Only), PC A09/MF A01.

This report is a summary presentation of the main results of the study on the 'Consequences of Large-scale Implementation of Nuclear Energy in the Federal Republic of Germany' which consists of six separate volumes. The questions dealt with are: - nuclear fuel demand and possible problems of supply, - problems of waste management and reprocessing, - economic aspects of nuclear energy implementation, - environmental impacts of nuclear energy generating plants and plants of the nuclear fuel cycle, - public acceptance of nuclear energy, - nuclear material control. The study is intended as a contribution to an overall assessment of the social, economic, and ecological implications of large-scale implementation of nuclear energy in the Federal Republic of Germany.

3113 NUCLEAR-WASTE PROBLEMS STILL AWAIT SOLUTIONS. Electrical World ; 194: No. 2, 19-21(15 Jul 1980).

Congress and the Administration are trying to resolve the problems of nuclear wastes, but legislators and agency officials disagree on whether enough study has been done. Critics who feel the subject has been over-studied think it is time to build the hardware and get started with permanent disposal sites. The key elements of disagreement about full-scale nuclear waste repositories revolve around the level of Federal, state, and local involvement, site reviews, military wastes, commercial low-level wastes, and inter-agency cooperation. Of the several disposal methods proposed for high-level wastes, storage in salt domes is the most promising. Low-level wastes are felt to be more of a mechnaical than a biological problem. (DCK)

3114 HELPING THE PUBLIC DECIDE: THE CASE OF RADIOACTIVE WASTE MANAGEMENT. Abrams, N.E.; Primack, J.R. Environment ; 22: No. 3, 14-20, 39-40(Apr 1980).

The participation of an educated and informed public in government decisions adds legitimacy to policies and can result in better balanced decisions. Public discussion on the nuclear-waste question may have been frustrated by asking the wrong questions. Public suspicion of the government's ability and intentions in regard to nuclear waste disposal should be addressed by presenting a complete tentative plan for discussion at government-funded forums to which expert comment and analysis can be contributed by interested members of the public. Examples from past hearings illustrate how public confusion has been perpetuated and the big picture has been lost. A set of criteria is set out which must satisfy the public before nuclear waste management will be accepted. Much of the present confusion is due to the separation of issues instead of recognizing the interconnections of decisions. (DCK)

3115 NUCLEAR POWER - THE GRAND ILLUSION. Bunyard, P. Ecologist ; 10: No. 4, 116-129(Apr-May 1980).

The following matters are discussed: the French nuclear programme, uranium availability, the fast breeder reactor, reprocessing, radiation hazards, plutonium, high-level waste, uranium mining, routine emissions of radioactive wastes, accidents at nuclear installations, capital costs, operating costs, public hostility.

3116 NUCLEAR TOWER. THE PROMISE AND THE THREAT. Moss, N. Illustrated London News ; 268: No. 6981, 31-38(Apr 1980).

Reference is made to the planned nuclear power programmes in the UK and other countries. The principles of a nuclear power plant are described, with reference to Magnox, AGR, PWR and fast breeder reactors. Uranium mining, isotope enrichment, fuel reprocessing and disposal of radioactive waste are covered briefly. The opposition to nuclear power is discussed, with particular reference to radiation hazards and to the possibility of diversion of plutonium from civil programmes to weapons. Some information is given on anti-nuclear movements in the UK and elsewhere.

3117 MOVING TO THE NUCLEAR AGE. Donovan, P. Civil Engineering (London) ; 14-15, 19-20(Feb 1980).

The potential of various energy sources is considered, the advantages of nuclear power in this context discussed and the UK Government nuclear energy policies and program examined. Having discussed the underlying principles of nuclear reactor operation, the working parameters of a number of types of power reactors are given. Aspects of safety, security, siting and waste disposal are discussed.

3118 RISK AND FEAR. Lerch, I. New Scientist ; 85: 8-11(3 Jan 1980).

Examples of industrial dangers compound daily but the public attitude remains uniformly indifferent or, at most, is exercised locally for short periods. Basically, quantified risks are far less important on a personal level than perceived risks. Perceived risk is highly personal, impervious to objective measures or external judgment. The long-smoldering debade about nuclear radiation risks from nuclear power flared in the wake of the Three Mile Island accident. The debate over commercial use of nuclear power and fear of radiation effects has spilled over into questioning the medical uses of radiation. This article analyzes the process of fear emotionalism and delineates some of the benefits associated with radiation. (SAC)

3119 WHAT HAPPENED TO NUCLEAR: THE ACTION'S AT THE NRC. Hobart, L. Public Power ; 38: No. 1, 31, 33, 35(Jan 1980).

Little nuclear-energy-related legislation was enacted by Congress during 1979, although both houses rejected constraining proposals and a series of congressional investigations were made of the Three Mile Island (TMI) accident. The Nuclear Regulatory Commission (NRC) toughened regulations by raising the penalty ceiling and was charged by the Senate to issue new safety rules and evacuation requirements, and to stiffen licensing requirements. A number of bills were passed to continue funding the breeder reactor program at a reduced level, with efforts continuing to shift funding from the Clinch River project to a new conceptual study and to nuclear waste management schemes, especially an away-from-reactor (AFR) facility. Responses to TMI included the framework for training utility personnel and assessing safety problems and insurance needs. President Carter emphasized the need for nuclear power as a way to reduce dependence on Middle East oil. Carter also outlined steps to reorganize and strengthen the NRC while urging a rapid conclusion to NRC's studies in order to resume issuing new licenses within six months. (DCK)

3120 TOPICAL PROBLEMS OF NUCLEAR LAW FROM AN INTERNATIONAL VIEW-POINT. Ziegler, E. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). Atomwritschaft, Atomtechnik ; 25: No. 1, 38(Jan 1980). (In German).

From Conference: Nuclear inter jura '79; Buenos Aires, Argentina (21 - 25 Oct 1979).

Report on the topical issues discussed at the congress, as e.g. topics relating to nuclear law in general and to legal problems in connection with technology transfer and non-proliferation policy, as well as problems of waste management, insurance, coverage and liability, and questions arising from the licensing of nuclear power plants.

3121 NUCLEAR INTER JURA '79. Energiewirtschaftliche Tagesfragen ; 30: No. 1, 43-44(Jan 1980). (In German).

From Conference: Nuclear inter jura '79; Buenos Aires, Argentina (21 - 25 Oct 1979).

LEGAL ASPECTS;NUCLEAR ENERGY;LIABILITIES; MEETINGS;NON-PROLIFERATION TREATY;NUCLEAR INSURANCE;NUCLEAR TRADE;PROLIFERATION; RADIOACTIVE WASTES;REACTOR LICENSING;REVIEWS; SAFEGUARDS

3122 NUCLEAR WASTE MANAGEMENT. Frankel, D.R. Ecology Law Quarterly ; 8: No. 4, 790-800(1980).

Several recent congressional and executive proposals address the political problem posed by nuclear wastes. The proposals are divided into three categories on the basis of the degree of authority granted to state officials in siting decisions: those granting states a veto power, those providing for consultation with state officials during planning, and those leaving plenary authority in the hands of the Federal goverment. Legislative proposals are discussed under these categories. The most-balanced approach provides a formal role for state officials without granting the states an absolute veto. This solution provides a political outlet for local concern and ensures a wider range of views. It also avoids the problem, inherent in the state veto, of sacrificing the national interest in selecting the safest possible disposal site. 69 references.

3123 URANIUM MILL TAILINGS RADIATION CONTROL ACT OF 1978. Magee, J. Ecology Law Quarterly ; 8: No. 4, 801-809(1980).

The long-term environmental effects of the Uranium Mill Tailings Radiation Control Act of 1978 address the public health hazards of radioactive wastes and recognize the significance of this issue to public acceptance of nuclear energy. Title I of the Act deals with stabilizing and controlling mill tailings at inactive sites and classifies the sites by priority. It represents a major Federal commitment. Title II changes and strengthens Nuclear Regulatory Commission authority, but it will have little overall impact. It is not possible to assess the Act's effect because there is no way to know if current technology will be adequate for the length of time required. 76 references. (DCK)

3124 NUCLEAR POWER: STILL THE ULTIMATE FUEL. Duryee, L.M. Energy International ; 16: No. 12, 30-32(Dec 1979).

Mr. Duryee says the message that nuclear power is safe, economical, and reliable must first penetrate the public's misconception that commercial nuclear power cannot be separated from nuclear warfare. He further states that the media have contributed to the misunderstanding by exploiting bomb fears; this was especially noticeable during the Three Mile Island episode. Irresponsible reporting and overreaction on the part of utilities and government agencies as well as the public have intensified doubts about plant safety and waste disposal. Some nuclear power critics are more confident about disposal after studying the South African site where a spontaneous uranium reaction took place. The hazards of coal-fired power plants and the costs and logistics of coal waste disposal have been shown to be substantially greater than those of nuclear power. The risks are also minor in comparison with possible dam breakage or oil supply disruptions. Mr. Duryee notes that over 40 nations, many with no feasible alternatives, are benefitting from nuclear energy. (DCK)

3125 ENERGY POLICY AND THE PUBLIC HEALTH. THE SAFETY OF NUCLEAR POWER. Wade, B. (UKAEA, Harwell. Atomic Energy Research Establishment. Environmental and Medical Sciences Division). Royal Society of Health Journal ; 99: No. 6, 239-243(Dec 1979).

The various aspects of the nuclear fuel cycle and its effect on public health are described. For the U.K., it is shown that the maximum doses to an individual of the general public are well below the ICRP standards. For nuclear workers, the standard mortality ratio rate for UKAEA and BNFL workers is less than the national average and considerably less than that for miners, quarrymen and other industrial employees. The radiological risk to the general public from nuclear plant accidents is very small compared to the general hazards of life. In conclusion, the hazards involved in nuclear technology are no different in kind or in scale to those of existing technologies and indeed the radiological effects on health are better understood than the health risks associated with other technologies.

3126 PRESIDENTIAL ADDRESS BEFORE THE ANNUAL GENERAL MEETING OF THE VSE OF 31 AUGUST 1979 IN ZOFINGEN. von Schulthess, H. Bulletin de l'Association Suisse des Electricians ; 70: No. 20, 1114-1123(20 Oct 1979). (In German, French).

From Annual general meeting of the Verbandes Schweizerischer Elektrizitaetswerke; Zofingen, Switzerland (31 Aug 1979).

This address dealt on broad lines with the main problems arising out of the present and future supply of energy and electricity in Switzerland. Among the topics discussed were the intervention of the Swiss Federal Government in the affairs of suppliers of electricity and the possibility of a new energy law and taxation of energy consumption, developments in electricity consumption, recent public discussion and referendums on nuclear generation, the price and availability of oil and use of alternative energy sources, the rationale of the choice of nuclear generation for the future and the disposal of radioactive wastes.

3127 NUCLEAR POWER: THE DOUBTS REMAIN. Price, B. (Friends of the Earth, Bristol (UK)). International Environment and Safety ; 27(Oct 1979).

ENERGY CONSERVATION;ENERGY CONSUMPTION; ENERGY POLICY;ENERGY SOURCES;GOVERNMENT POLICIES;HAZARDS;NUCLEAR MATERIALS DIVERSION; NUCLEAR POWER;PLUTONIUM;RADIOACTIVE WASTES; REACTOR SAFETY

3128 TWILIGHT OF NUCLEAR EXPORTS. Gall, N. Ecologist ; 9: No. 7, 230-235(Oct-Nov 1979).

The future of nuclear trade is discussed. In particular, the ability of developing countries to use or pay for imported nuclear power plants is questioned. Contracts and negotiations between United States, German and French suppliers, and Brazil and Iran, are discussed in detail. Economics, environment, public relations, earthquakes, energy demand forecasting, alternative energy sources, litigation, radioactive waste disposal, and general technological problems are among the various aspects examined. (U.K.).

3129 PUBLIC'S CONFUSION ON NUCLEAR SEEN NO SURPRISE; KEY ISSUES REMAIN UNANSWERED: NRC COMMISSIONER. Electric Light and Power ; 57: No. 9, 48, 53(Sep 1979).

John F. Ahearne disagrees with fellow members of the Nuclear Regulatory Commission (NRC) on whether the public's lack of technical understanding and know-how is the deciding factor in nuclear issues. He finds the public's confusion over matters of safety and waste disposal to be legitimate and notes that getting a clear picture of nuclear power or straight answers is almost impossible for the citizen. He cites the lack of agreement about low-level-radiation risks and appropriate waste management and the conflicting statements made after the Three Mile Island (TMI) accident. He criticizes the relationships and the odd management structure of the NRC, especially the lack of a single person in control during a time of crisis. His comments covered the lack of an inflation clause in the Price-Anderson Act, his disbelief that regulators and the Federal regulation process need reform, and the problems of control room technology as demonstrated at TMI.

3130 DEVELOPMENT OF NUCLEAR POWER UTILIZATION IN THE GERMAN DEMOCRATIC REPUBLIC. Mitzinger, W. (Ministerium fuer Kohle und Energie, Berlin (German Democratic Republic)). Kernenergie ; 22: No. 9, 293-298(Sep 1979). (In German).

In the GDR lignite will continue to be the most important primary source of energy up to the year 2000 and beyond. Due to the restricted reserves of lignite, nuclear power utilization was started at an early stage as an integral part of the country's energy policy. This was done in close cooperation with the USSR. Experience gained from operating the Rheinsberg and the Greifswald nuclear power plants has confirmed this policy. Delivery of fresh nuclear fuel and redelivery of spent fuel has been agreed upon by long-term contracts with the USSR, whereas treated low- and intermediate-level wastes are stored in an abandoned rock-salt mine on the territory of the GDR, which has been developed to a final repository of radioactive wastes. The GDR actively participates in scientific research and development works in the field of nuclear power organized between the CMEA member states.

3131 CARTER ANTI-PLUTONIUM POLICY. Power, P.F. (Cincinnati Univ., OH (USA)). Energy Policy ; 7: No. 3, 215-231(Sep 1979).

The US Administration has embarked on an

ambitious effort to rescue civil nuclear energy from perceived dangers, notably the further spread of plutonium separation technology. The Carter policy is focused on the critical activities of spent fuel reprocessing and plutonium fuel recycle, and aims to limit them to as few countries as possible. The Nuclear Non-Proliferation Act of 1978 gives US anti-plutonium policy a comprehensive legislative mandate. It also extends the policy into the field of international diplomacy. This article examines the premises and origins of the US policy, its general intent and direction, the main features of the 1978 Act, the diplomatic record to date, and the implications of the Carter initiatives.

3132 REALITY OF NUCLEAR POWER. Murphy, D. Blackwood's Magazine ; 326: No. 1967, 193-211(Sep 1979).

The following matters are discussed in relation to the nuclear power programes in USA and elsewhere: siting of nuclear power plants in relation to a major geological fault; public attitudes to nuclear power; plutonium, radioactive wastes and transfrontier contamination; radiation and other hazards; economics of nuclear power; uranium supply; fast breeder reactors; insurance of nuclear facilities; diversion of nuclear materials and weapons proliferation; possibility of manufacture of nuclear weapons by developing countries; possibility of accidents on nuclear power plants in developing countries; radiation hazards from use of uranium ore tailings; sociological alternative to use of nuclear power.

3133 NUCLEAR WASTES AND TRAFFIC SAFETY MAIN COMMUNITY HEALTH CONCERNS. Canadian Medical Association Journal, The ; 121: No. 1, 112, 115, 116(7 Jul 1979).

Highlights of a debate at the annual meeting of the Canadian Medical Associaton are reported. Although one or two definitely antinuclear resolutions were rejected or referred back, the General Council of the Association did recommend the following: studies are urgently needed into methods of permanent nuclear waste disposal; reprocessing should be opposed until it is shown to be safe; practising physicians advising the Atomic Energy Control Board should be independent of government and the nuclear industry; the attention of the public should be drawn to health hazards of the production of electrical energy. Traffic safety was also discussed.

3134 TECHNICAL LIMITS OF A CONTROL SYSTEM. van der Meijden, D.; Nienhuys, K. (Rijksuniversiteit Groningen (Netherlands)). Intermediair ; 15: No. 27, 11,13,15,17(6 Jul 1979). (In Dutch).

The most important task for the IAEA at the moment is the security of the nuclear installations and of the fissionable material of the countries who form the Agency. The historical relationship between the Non-Proliferation Treaty and the subjection of the lands under control from the IAEA is described. Within the Treaty (NPT), the IAEA were commissioned with controlling the fulfilment of the NPT. It is expected that the storage of radioactive wastes will generate a discussion over the guarantees which one is bound by and which will expand the ineffectiveness of the IAEA control. The way in which control is executed will bring to light the failures of such a system.

3135 NUCLEAR OPTION: A LONG TERM INVESTMENT. Hoog, H. (Stichting Energieonderzoek Centrum Nederland, Petten). Energiespectrum ; 3: No. 7-8, 182-194(Jul-Aug 1979).

Factors causing delays in the nuclear development are indicated and the extent and certain features of the regression in which nuclear energy appears to find itself are analysed. The most significant elements in international nuclear debate are outlined and the relationship between economic growth and energy demand growth discussed. The author feels that the energy-household in the years after 2000 could not manage without relying on all available energy options including nuclear fission.

3136 FACING THE CHALLENGE OF NUCLEAR WASTE. DeLaughter, J. Tennessee Valley Perspective ; 10: No. 4, 5-9(Sum 1979).

The Tennessee Valley Authority (TVA) is going ahead with plans to safely store hazardous wastes from its nuclear power plants while national policies are developed for permanent storage. TVA had planned to use temporary open pool storage at the plant site and recycle uranium and plutonium until the reprocessing moratorium was imposed. The storage space has since been redesigned to handle larger volumes. TVA now intends to provide on-site storage for the 40-year life of each plant. Low-level wastes have been buried at Barnswell, SC. TVA director, S. David Freeman, sees the Three Mile Island accident as proof that nuclear plants must be treated differently, with safety given first consideration. TVA's new policy of on-site storage will eliminate the transportation hazards until mined geologic repositories are prepared. New technology will improve spent fuel rod storage, making it more compact. (DCK)

3137 FATE OF NUCLEAR HANGS IN THE BALANCE. Energy (Stamford, Connecticut) ; 21-23(Jun 1979).

In the United States, ninety-two reactors have construction permits, 4 have limited work authorizations, and 30 are on order, according to the Atomic Industrial Forum. The 72 with operating permits are capable of generating 52,396 MWe, and in 1978 they accounted for 12.6% of U.S. electric output. If all the additional plants are completed, total nuclear generating capacity will reach 192,738 MWe. In addition to public and Government reaction to the recent Three Mile Island incident, the long-standing and still-unsolved problem of nuclear waste disposal threatens nuclear energy as a major source of electric power in the United States. Although the Department of Energy has plans for a waste-isolation pilot plant in deep salt beds, a number of states have passed legislation barring nuclear waste repositories within their borders. Other states--Maine, Iowa, Wisconsin, and California--enacted laws that would prohibit construction of nuclear facilities until the development of safe nuclear waste disposal technology. Another problem facing the industry is the 12 to 15 years required to bring a nuclear plant from site selection to commercial operation.

3138 PUBLIC COMMUNICATION HIGHLIGHTS KEY ISSUES. Locke, D.H. (UKAEA, Springfields. Nuclear Power Development Labs.). Nuclear Engineering International ; 24: No. 285, 51-52(May 1979).

The experiences in public communication of a group of working scientists at the UKAEA's Springfields Laboratories are described. Areas where there is considerable lack of public

knowledge are discussed and the genuine demand for objective factual information is stressed. Particularly there is a demand for reassurance on ultimate disposal of radioactive waste, the safety of reactors and the hazards of plutonium breeding and proliferation. problems of presentation are discussed. Finally a five point framework is offered as advice to other sections of the industry involved in public acceptability work.

3139 'YES' TO THE PARTIAL REVISION OF THE LAW ON ATOMIC ENERGY. Bulletin de l'Association Suisse des Electricians ; 70: No. 8, 394-396(28 Apr 1979). (In German and French).

The Swiss Atomic Energy Law, dated 23 December 1959, has been reviewed by a National Council and it was agreed on 6 October 1978 that it should be partially revised, with a full revision to be made by the end of 1983. Station construction authorisations previously made for Muehleberg, Beznau I, II, Goesgen and Leibstadt are to be followed in a simplified fashion for Kaiseraugst, Groben and Verbois. Safety precautions, however, must be shown to be met, and this includes storage facilities for spent fuel. Final decision on a new station must be approved by democratic means. The final paragraph of the article states that the economics of nuclear power appear to be favourable and that there is no other apparently acceptable alternative.

3140 SCOTS SEEK SOFT PATH. Webb, T. Undercurrents (London) ; No. 32, 18-19(Feb-Mar 1979).

Energy policy is discussed, with particular reference to Scotland. The plans for nuclear power are analyzed in comparison with developments in coal mining, use of oil and gas and other possible energy sources such as wind and wave power. Arguments against the development of nuclear power are raised on grounds of economics, employment potential, and problems of waste disposal.

3141 US DEFINES NUCLEAR FUEL STORAGE COSTS. Greenhalgh, G. Energy International ; 16: No. 2, 22-23(Feb 1979).

Sticking firmly to its no-reprocessing, non-proliferation policy towards the nuclear fuel cycle, the US DOE has drawn up a scheme for the long-term storage of spent nuclear fuel. Though aimed primarily at satisfying the needs of US utilities, the facility will be offered to foreign utilities who have no urgent need of a fast reactor program that would require them to seek the services of European reprocessing plants. The first stage of the storage and disposal program is for interim storage in AFR (away from reactor) water storage basins. The first of these is planned to be available to receive fuel in 1983. AFR storage will be followed by further storage and ultimately disposal in a deep geological repository. Two potential sites are to be identified, probably in salt formations that have been studied since the late 1950s. Charges for these services are discussed. (MCW)

3142 NUCLEAR CONTROVERSY WITH MANY UNDERCURRENTS. Lingjaerde, R.O. (Norsk Atomenergiforening, Oslo). Ingenioer-nytt ; 15: No. 5, 26,28(16 Jan 1979). (In Norwegian).

The president of the Norwegian Atomic Energy Society presents, in the form of an interview his opinions on the nature of the nuclear controversy in Norway. He is very critical of the emotional and uninformed nature of much of the criticism of nuclear power, and emphasises that nuclear power must be regarded as an alternative to other, less favourable forms of thermal power, as a supplement to hydroelectric power, or to electricity rationing. While a society using less energy is quite feasible, it would hardly be acceptable. The waste disposal controversy is quite artifical, as perfectly safe methods of disposal are available. Finally he regrets that it is the conclusions only in the Nuclear Power Commission's report which have attracted attention, and mainly the comments of the dissident minority.

3143 REFLECTIONS ON NUCLEX '78. Edwards, J. Journal of the Institution of Nuclear Engineers ; 20: No. 1, 18-19(Jan-Feb 1979).

Brief review. AGR TYPE REACTORS;ENVIRONMENT; FBR TYPE REACTORS;INTERNATIONAL COOPERATION; NUCLEAR INDUSTRY;NUCLEAR POWER;NUCLEAR POWER PLANTS;RADIATION PROTECTION;RADIOACTIVE WASTE PROCESSING;REACTOR OPERATION;REPROCESSING; TECHNOLOGY TRANSFER;MEETINGS

3144 NUCLEAR RESEARCH IN THE FEDERAL REPUBLIC OF GERMANY. Paschen, H. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Abt. fuer Angewandte Systemanalyse); Barnert, H.; Baumgaertel, G.; Coenen, R.; Horsch, F.; Hueper, R.; Klein, S.; Kroebel, R.; Scheer, H.; Zajonc, H. pp 155-209 of Energy/Nuclear Energy. Hamburg, Germany, F.R.; Spiegel-Verl. (Jan 1979). (In German)

After a survey of the targets and extent of nuclear research in West Germany, the 3 project lines are discussed which are the fields of emphasis of nuclear research policy: Fast breeder reactor, HTR reactor, and reprocessing. The states of technology and their development in connection with schedule planning are dealt with. Finally, some economic problems of the industrial application of nuclear power in West Germany are discussed.

3145 LEGAL ASPECTS OF RADIOACTIVE HIGH-LEVEL WASTE MANAGEMENT. Jaksetic, E. (Georgetown Univ., Washington, DC). Environmental Law ; 9: No. 2, 347-406(Win 1979).

The need to dispose of radioactive wastes exits regardless of how the political and legal debates now raging are resolved. The author provides technical background information before discussing current and proposed disposal methods, which he finds to be reasonable and manageable. He examines the statuatory basis for radioactive waste regulation in terms of the administrative responsibilities of the regulating agencies and the conflict which has developed between state and federal agencies over jurisdiction. He concludes that federal regulations have not wholly pre-empted the states in the area of waste disposal and suggests that political and legal factors pose more serious problems than technical factors.

3146 SOCIALLY RESPONSIBLE ENERGY FUTURES. Starr, C. (Electric Power Research Inst., Palo Alto, CA). Electric Perspectives ; No. 3, 1-7(1979).

After examining briefly the usual positions of nuclear critics and nuclear proponents, Dr. Starr says that the proponents (of whom he is one) have a broader case for nuclear power not thus far effectively advanced - a case based chiefly on a visible concern with social values and the future welfare of humanity. Such a broader case for nuclear power has always existed - a case based on motivations that initially spurred development of this energy

resource over the past several decades, but one that has tended to be neglected in the public debate. A concern to avoid worldwide catastrophe is central to this broader case for nuclear power. The threat is perceived as resulting directly from the pending unavailability of petroleum and natural gas at a reasonable cost. This unavailability could lead to global tensions and political instabilities, economic crises, and, ultimately, to military conflicts based on need to obtain and control liquid-fuel resources. It is felt that past history and current events substantiate the threat inherent in the international struggle for raw materials. The broader - and more compelling - case for nuclear power lies in its potential for removing a major threat to the peace, stability, and welfare of the world that is inherent in the growing scarcity of petroleum and natural gas resources and in the limited geographical availability of coal. The catastrophe that could be avoided is at least as threatening as the one projected by those who oppose the use of nuclear power, and, Dr. Starr argues, more realistic in its potential for world-shattering impacts.

3147 UNRAVELING THE NUCLEAR ENERGY DEBATE. Wolfe, B. (General Electric Co., San Jose, CA). Electric Forum ; 5: No. 2, 3-5(1979).

Dr. Wolfe feels that public concerns about the risks of nuclear power tend to lead to meaningless debate because the central core of the nuclear issue is that philosophical differences are being argued in technical terms, many of which are misunderstood. He points out that the debate over nuclear waste, for example, is centered on the benefit, not the risk, of an acceptable disposal method. He identifies three major themes that recur in discussions among the anti-nuclear groups: (1) the harm that society suffers from cheap, abundant energy; (2) the need to force society to reduce its energy use; and (3) a desire to change the social and economic structure of society. Nuclear advocates, on the other hand, generally endorse the development of alternate energy supplies in order to minimize societal changes. They see energy as the key to solving societal problems and recognize the associated risks as necessary tradeoffs.

3148 NUCLEAR POWER PLANT LICENSING PROCEDURES IN THE UNITED KINGDOM. Haire, T.P. (Central Electricity Generating Board, London (UK)); Shaw, J. (Queen Mary Coll., London (UK). Dept. of Nuclear Engineering). Progress in Nuclear Energy ; 4: No. 2, 161-182(1979).

This article summarizes the principle legislation in the UK which controls the design, construction and operation of nuclear reactors, and describes the way in which the requirements of this legislation are met by the two public corporations which own and operate nuclear power plants. The development of siting policies and site selection criteria are described. Reference is also made to the way in which these criteria are used to assess the likely radiological risk to the surrounding population.

3149 Der unsichtbare Tod. Die Angst der Buergers vorm Atom. (INVISIBLE DEATH. CITIZENS' FEARS OF THE ATOM). Barthel, W.; Jaenecke, H.; Thomsen, P. Hamburg, Germany, F.R.; Gruner und Jahr (1979). 254p. (In German).

Contents in key-words: The devils' pact. A story from the a-bomb up to the fast breeder. The bomb/the resistance is being formed/the euphoria in the industry/the resistance of the citizens/the doubts of the scientists/are the lights really being turned off in the industrial society. Drilling Place Gorleben or the radiating giant. Are we living on a time bomb.- The expertises: Reprocession of atomic waste and the final waste management/What is reprocession. What is plutonium. What are the alternatives of reprocession. International group of scientists is discussing the plutonium reactor on the heath. The escape from Harrisburg or when the pile was boiling. Is the FRG going to be an atom country. Do we need nuclear energy at all. How dangerous is radioactivity in the normal case./How dangerous in disturbances : explosions, terror acts, war./ Can radioactivity cause cancer. Who protects the citizens from governmental protective measures or do we need an atom restitution. Annex: Nuclear power plants in the Federal Republic/Nuclear power plant accidents in the Federal Republic/Experts in the Gorleben-hearing in Hannover.

3150 IS NUCLEAR POWER SAFE ENOUGH. Andresen, A.F. (Institutt for Atomenergi, Kjeller (Norway)). Fra Fysikkens Verden ; 41: No. 1, 3-5(1979). (In Norwegian).

The lecture formed a commentary on the report of the Norwegian Government's Commission on Nuclear power Safety which was published in October 1978. It was introductorily pointed out that 'safe' and 'safety' are not in themselves meaningful terms and that the probability of an occurrence is the real measure. The main items in the Commission's report have been core meltdown, releases during reprocessing, waste disposal, plutonium diversion and environmental impacts. The 21 members of the Commission were unanimous in 7 of the 8 chapters. In chapter 2, 'Summary and Conclusions', 3 members dissented from the majority opinion, that, subject to certain conditions, nuclear power was a safe and acceptable source of energy.

3151 ENERGY AND HUMAN NEEDS. Curran, S.C. (Strathclyde Univ., Glasgow (UK)); Curran, J.S. (Commission of the European Communities, Ispra (Italy). Joint Research Centre). Edinburgh: Scottish Academic Press (1979). 340p.

The subject is dealt with in five parts, as follows: energy sources and converted forms; fossil fuels and their depletion; the nuclear option (fission and fusion phenomena; fission reactors; the economics of nuclear power; energy from fusion); the provision of energy (including - energy as electricity, transmission, the hydrogen economy, energy storage, heat pumps, energy conservation and energy from waste, energy analysis); social, environmental and international aspects (the environment - non radioactive pollution; nuclear power and safety, reprocessing and waste disposal; political aspects of the civil uses of nuclear power; proliferation and terrorism, summary and some thoughts for the future).

3152 NUCLEAR POWER AND OTHER THERMAL POWER. A COMPARATIVE EVALUATION OF SAFETY AND ENVIRONMENT. Bakke, J. (Norges Vassdrags- og Elektrisitetsvesen, Oslo). Ingenioer-nytt ; 14: No. 95, 3,9,20(28 Nov 1978). (In Norwegian).

From Nuclear power seminar; Oslo, Norway (23 - 24 Oct 1978).

Some philosophical aspects of mortality statistics are first briefly mentioned, then the environmental problems of, first, nuclear power plants, then fossil fuelled power plants are summarised. The effects of releases of

carbon dioxide, sulphur dioxide and nitrogen oxides are briefly discussed. The possible health effects of radiation from nuclear power plants and those of gaseous and particulate effluents from fossil fuel plants are also discussed. It is pointed out that in choosing between alternative evils the worst course is to make no choice at all, that is, failure to install thermal power plants will lead to isolated domestic burning of fossil fuels which is clearly the worst situation regarding pollution.

3153 NUCLEAR POWER: VERY SIGNIFICANT NORWEGIAN COMPETENCE. Firing, J. (Institutt for Atomenergi, Halden (Norway). OECD Halden Reaktor Prosjekt). Ingenioer-nytt ; 14: No. 94, 2-5,8,21(24 Nov 1978). (In Norwegian).
From Nuclear power seminar; Oslo, Norway (23 - 24 Oct 1978).
The history of nuclear energy research and development in Norway, and the development of the nuclear organizations is briefly presented. Active nuclear R and D mainly takes place now at the Halden Reactor Project, in the form of an international programme in which ten countries participate. This gives the Norwegian Institutt for Atomenergi direct contact with 35 leading nuclear organisations. The way in which Norwegian experience can be utilised in the projecting, design, construction and operation of a nuclear power plant is then discussed at length. Special competence is available in the fields of safety evaluation, reactor operation, fuel cycle administration and fuel technology and process control and instrumentation. It is estimated that about 50% of the construction work could be carried out by Norwegian firms. Experience is also available in the fields of spent fuel handling, reprocessing and waste treatment.

3154 MAIN CONCLUSIONS IN NUCLEAR POWER COMMISSION'S REPORT. Omholt, A. (Norges Almenvitenskapelig Forskningsraad, Oslo). Ingenioer-nytt ; 14: No. 90, 6,8,16-17,39(10 Nov 1978). (In Norwegian).
From Nuclear power seminar; Oslo, Norway (23 - 24 Oct 1978).
This paper is, in effect, a summary of the factual material considered by the Commission. It covers the following aspects:- releases of radioactive substances during routine operation of nuclear power plants and reprocessing facilities; the probability and consequences of major reactor accidents; underground siting of nuclear power plants; radioactive waste disposal, both high level and low and intermediate levels; decommissioning of nuclear power plants; proliferation of nuclear weapons; comparison with other types of thermal power plants. For each of these aspects the majority conclusion is summarised and dissenting opinions are stated. Finally a number of conditions which the majority find require to be fulfilled in order that the safety aspects shall be acceptable are cited, and the reservations of the minority are quoted.

3155 KEY ISSUES OF NUCLEAR POWER R AND D IN JAPAN. An, Shigehiro (Tokyo Univ. (Japan). Faculty of Engineering). Genshiryoku Kogyo (Nuclear Engineering) ; 24: No. 11, 41-46(Nov 1978). (In Japanese).
Nuclear power technology, spreading over a number of specialized areas, is so-to-speak an extreme technology requiring the cooperation of scientists and technologists in respective fields. Its research and development require tremendous amounts of funds and manpower, with long lead times from the basic research up to the practical use. The nuclear power technology exerts thus large influences both socially and economically. The research and development of nuclear power do not remain only in technology. It is a problem spreading over society, economy, politics and diplomacy and compatibility is required in an extensive national system containing nuclear power. On the research and development of nuclear power in Japan, the following matters are described: targets of nuclear power development and the reality; perfection in LWR technology; FBR development; establishment of the nuclear fuel cycle comprising uranium resources, uranium enrichment, downstream and spent fuel storage; and the funding and program of research and development, cooperation of respective orgaizations, etc.

3156 NUCLEAR NON-PROLIFERATION ACT OF 1978 AND THE NUCLEAR FUEL CYCLE REQUIREMENTS OF GERMAN NUCLEAR POWER PLANTS. Strassburg, W. Energiewirtschaftliche Tagesfragen ; 28: No. 11, 692-693(Nov 1978). (In German).
The article tries to show which effects result from the Nuclear-Non-Proliferation Act of 1978 for the solution of waste management in the German nuclear power plants and esp. for the waste management centre near Gorleben, for the fuel-element intermediate store near Ahaus, and for the Stone-I-reprocessing agreements concluded by the German nuclear power plant operators. The author stresses that it is a little early for his article and indicates that the law is in many cases - esp. regarding the criteria of 'timely warning' - very flexible and that this will be seen by applying it very often.

3157 LONG-RANGE PROGRAM OF ATOMIC ENERGY RESEARCH, DEVELOPMENT AND UTILIZATION IN JAPAN. No. 105, 1-33(Nov 1978). (In Japanese).
The research, development and utilization of atomic energy as a big science require tremendous human resources and funds, so it entails a firm administrative policy. On the other hand, the efforts are closely related to the interests of the people, both directly and indirectly. It is thus necessary to disclose the definite views for the future to the people. The long-range program for the next ten years of atomic energy research, development and utilization was presented to replace the previous one, because of the changes in the situation including the rise of importance of nuclear energy, the increase of problems to be overcome, and the international environments around atomic energy. The following matters are described: basic policy concerning the peaceful usage of atomic energy and Japan's own effort; nuclear power generation including LWRs, future reactor types and nuclear fuel cycle; nuclear fusion, etc.; promotion of research/development projects.

3158 NUCLEAR POWER IN 1977. Wethe, P.I. Ingenioer-nytt ; 14: No. 78, 11-13,23(29 Sep 1978). (In Norwegian).
A brief survey is given of the number of nuclear power plants operating, under construction and ordered in the world, and in the leading Western countries. The uncertainties introduced by the controversy on waste disposal and lack of national policies are briefly discussed. The situation regarding uranium reserves is discussed, and it is mentioned that the financing of prospecting by the utilities or national anthorities, with consequent reservation in supplies, will hinder the operation of a natural market in the future. Enrichment services are briefly

surveyed. The availability of reprocessing facilities is discussed rather more fully, especially the French and UK facilities. The vitrification of high-level wastes is briefly described and various projects for final disposal are briefly presented, with special emphasis on Swedish plans. Finally the INFCE is briefly presented.

3159 LONG-TERM ATOMIC ENERGY RESEARCH, DEVELOPMENT AND UTILIZATION PROGRAM FORMULATED. Atoms in Japan ; 22: No. 9, 5-19(Sep 1978).

Japan Atomic Energy Commission has submitted the report on the new "Long-term Atomic Energy Research, Development and Utilization Program" to the Government. It reflects recent severe circumstances represented by the oil crisis, opposition to nuclear power, and the nuclear non-proliferation issue. Although it covers very wide range of atomic energy industry, the basis of this report can be summarized as follows. (1) To improve the reliability and availability of LWRs, and implement standardization. (2) Commercialization of FBR by the year 2000. (3) Practical application of nuclear fusion at the earliest possible date in the 21st Century. Time schedule and necessary funds are estimated for each specific item of research and development projects.

3160 USE OF FISSION REACTORS FOR THE GENERATION OF ELECTRICITY IN THE UK CIVIL PROGRAMME. Journal of the Institution of Nuclear Engineers ; 19: No. 5, 163-165(Sep-Oct 1978).

This is a statement issued by the Institution of Nuclear Engineers, London, U.K., with the object of informing the public of the basic facts concerning nuclear power, including ethics and safety. It concentrates on the use of fission reactors and considers society's needs in the immediate future.

3161 NUCLEAR POWER ACTIVITY IN FRANCE. Wethe, P.I. (Institutt for Atomenergi, Kjeller (Norway)). Ingenioer-nytt ; 14: No. 66, 14-15,30(18 Aug 1978). (In Norwegian).

The overall nuclear power programme in France is surveyed. It is stated that by 1985 it is planned that 70% of the electrical power will be generated at nuclear plants, and that 94% of power plants under construction and planned are nuclear. A brief survey of the previous GCR type, the present PWRs and the future FBR plants is given. The fuel cycle projects, from uranium prospecting to mining, enrichment, fuel fabrication and reprocessing and waste treatment and disposal, are also outlined.

3162 ELECTRONUCLEAR PROGRAM OF THE FEDERAL REPUBLIC OF GERMANY. Mandel, H. (Rheinisch-Westfaelisches Elektrizitaetswerk A.G., Essen (Germany, F.R.)). Annales des Mines ; 184: No. 5-6, 199-206(May-Jun 1978). (In French).

The preoccupation of the Federal Republic is to lessen its energy dependency on petroleum (now 52%) particularly by developing nuclear power which could in the year 2,000 meet 27% of its primary energy needs, equally with oil. At the end of 1977, West Germany had 6 industrial reactors operating representing a total power of 5,500 MW., 12 reactors under construction (of which 8 units of 1,300 MW.) for a total power of 13,000 MW., 9 reactors under investigation (11,300 MW.), and 2 reactors 2,700 M. whose construction had been postponed for political reasons. A centre for fuel reprocessing and waste storage is also being investigated.

3163 CHOOSE NUCLEAR POWER. Breien, B. Polytek. Revy.; No. 1, 2-3(Jan 1978). (In Norwegian).

The opinion is expressed that politicians have shown excessive caution in the nuclear question. Opinion surveys show that only in Sweden, among the principle nuclear power nations, is there a majority opinion against nuclear power. Energy conservation can only delay the demand increase for a few years, and in Norway the possibilities for energy conservation are less than in many other countries. A comparison between coal firing and nuclear power as a supplement to hydroelectric power favours nuclear power, both from reasons of public health and waste disposal. In conclusion a clear recommendation is given - choose nuclear power.

3164 HOW MANY HUMAN LIVES AND HOW MUCH ENVIRONMENTAL DAMAGE WILL BE RISKED TO AVOID NUCLEAR POWER. Doederlein, J.M. (Institutt for Atomenergi, Kjeller (Norway)). Polytek. Revy.; No. 1, 6-7(Jan 1978). (In Norwegian).

In this interview the opinion is expressed that while all forms of electric power production involve health hazards and environmental damage, nuclear power involves less undesireble effects than fossil fuel power. The principle pollutant from fossil fuels is sulphur and present sulphur removing processes are expensive, inefficient and unreliable. It is also stated that newly developed processes for the disposal of radioactive wastes are fully satisfactory while pollutants from fossil fuel plants are spread without coutrol. Diversion of fissile material for nuclear weapon manufacture from nuclear power plants is unlikely as more effective methods are available to those with such ambitions. Finally it is maintained that it is essential that nuclear power be accepted in Norway.

3165 OUTLOOK OF NUCLEAR POWER GENERATION AND INTERNATIONAL SITUATION. Ekulund, S. (International Atomic Energy Agency, Vienna (Austria)). Gensan Nenji Taikai Gijiroku (Proceedings of Japan Atomic Industrial Forum, Incorporated) ; No. 11, 13-23, 91-94(1978). (In Japanese).

Nuclear power generation is advancing at rapid rate over the world, without any major accident. For the base load of electric power, when choice is made between nuclear energy and petroleum, Nuclear energy has larger economic advantages over petroleum as compared with the days before the oil crisis. The costs of its fuel and fuel cycle technology are reasonable. However, nuclear power generation currently has a number of problems. What causes this uncertainty is not technological, but political, i.e. governmental policy changes, and this is based on the apprehension about nuclear proliferation. What is necessary is to strengthen the existing international framework of nuclear nonproliferation. In this respect, IAEA through comprehensive safeguards will make contributions largely to reduction of the political uncertainty. It is important that the new initiatives toward international nuclear cooperation should eliminate the current trends of restraint and denial.

3166 SITUATION OF NUCLEAR POWER GENERATION IN SWEDEN. Sandstroem, S. (Swedish Atomic Forum). Gensan Nenji Taikai Gijiroku (Proceedings of Japan Atomic Industrial Forum, Incorporated) ; No. 11, 249-257, 286-288(1978).

(In Japanese).

In Sweden, nuclear power generation was received initially favorably. In the end of 1960s, however, nuclear power generation got involved in the activities of environment preservation. Then, political parties became opposed to nuclear power generation, and now, the need of nuclear power generation itself is regarded as questionable. In the general election in 1976, the Government opposing the nuclear power generation won. As the result, the conditional nuclear power development law and the energy committee were set up. The committee composed of parliament members, experts, and representatives of enterprises and trade unions is to submit its report so that the parliament can prepare a new energy program in the fall of 1978. Meanwhile, the nuclear fuel safety project formed newly has studied to satisfy the conditions of the law. In Sweden, which has developed nuclear reactors independently from the technology of USA, the oppositions are on the decrease, however. It is awaited what decision will be made by the Government in this fall.

3167 Guide international de l'energie nucleaire. (INTERNATIONAL NUCLEAR ENERGY GUIDE). Paris, France; O. Lesourd (1978). 730p. (In French and English).

The aim of this French-English bilingual Guide is to present a synthesis embracing all the aspects and all the implications of the development of nuclear energy by situating it both within the French administrative and professional framework and in the world context. Special attention has been paid to the protection of man and the environment and to safety and security problems; most of the other questions -technological, economic, industrial- which arise at all points in the nuclear cycle. Teaching and research are outlined and a special appendix is devoted to nuclear information.

3168 NRC ANALYSIS OF THE ENVIRONMENTAL IMPACTS AND LICENSING POLICIES FOR EXPANDED SPENT FUEL STORAGE IN THE UNITED STATES. Smith, C.V. Jr. (Nuclear Regulatory Commission, Washington, DC (USA)). pp 63-73 of Compte rendu du seminaire de l'AEN sur le stockage des elements combustibles irradies. Madrid, 20-23 juin 1978. Paris, France; OECD (1978).

From Seminar on the storage of spent fuel elements; Madrid, Spain (Jun 1978).

This paper reviews the findings of the U.S. environmental impact studies on spent fuel storage to the year 2000, addresses design criteria for independent spent fuel storage installations and expresses the position of the NRC for licensing expanded spent fuel storage capabilities until such time as final solutions are established.

3169 PARADOXES AND POPULAR MISCONCEPTIONS OVER HARNESSED NUCLEAR ENERGY. Lewis, W.B. 15: 327-331(1977).

It is argued that the radioactive wastes generated by nuclear power development are tractable and trivial in scale in relation to natural environmental radioactivity.

3170 ATTITUDES OF NEW MEXICO RESIDENTS TOWARD THE NUCLEAR FUEL INDUSTRY. Bonem, G.; Sievers, J. Albuquerque, NM; Univ. of New Mexico (1977). 18p. (NP--25030).

The survey indicated that New Mexicans favor locating more of the nuclear power industry in the state. Also, New Mexicans approve further national development of the industry. There is widespread disapproval of storing waste materials in the state. A very large segment of the population has not yet formed an opinion on these issues because of lack of information.

Transport and Storage

3171 (PNL--2989) SELECTED LEGAL AND REGULATORY CONCERNS AFFECTING DOMESTIC ENERGY TRANSPORTATION SYSTEMS. Schuller, C.R. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jul 1979. Contract EY-76-C-06-1830. 86p. Dep. NTIS, PC A05/MF A01.

This report provides assessments of eight legal and regulatory concerns that may affect energy material transportation in the US during the rest of the century: state authority to regulate nuclear materials transport, divestiture of petroleum pipelines from major integrated oil companies, problems affecting the natural gas transportation system, capabilities of energy transportation systems during emergencies, Federal coal pipeline legislation, ability of Federal agencies to anticipate railroad difficulties, abandonment of uneconomic railroad lines, and impact of the Panama Canal treaty upon US energy transportation. (DLC)

3172 (PNL--3300(Pt.5), pp 19-20) ENERGY MATERIAL TRANSPORT, NOW THROUGH 2000. Feb 1980.

Pacific Northwest Laboratory annual report for 1979 to the DOE Assistant Secretary for Environment. Part 5. Environmental assessment, control, health, and safety.

The overall objectives of this project are to assess potential problems which may inhibit the safe and environmentally acceptable development of nuclear and fossil energy material transportation systems from now to the year 2000 and to recommend research, development, and other necessary action to mitigate the potential adverse impact of these problems. Effort in FY 1979 addressed the domestic transportation of petroleum, synfuels, nuclear fuel cycle materials, and legal and regulatory concerns. Results of the studies on petroleum, synfuels, and legal and regulatory concerns were published. Research continued on spent fuel cask productivity, coal sludge transportation, the Northern Tier Pipeline, and joint utility corridors.

Supply, Demand, and Forecasting

3173 L'energie. Le compte a rebours. (ENERGY. THE COUNTDOWN). de Montbrial, T. Paris, France; Lattes (1978). 318p. (In French).

After a brief history of the international oil industry the energy crisis (adaptation to oil price), is developed since 1973. Accent is put on the political aspect. Nuclear energy is discussed especially: nuclear controversy, safety, radioactive wastes, proliferation ... The energy problem is situated in the general context of international relations. Then the future is explored: substitution of oil, economical aspects and consequences of energy cost governing all the problems in the world.

Policy, Legislation, and Regulation

3174 (PB--294738) SCIENCE AND TECHNOLOGY ADVICE FOR THE EXECUTIVE THE MICHIGAN EXPERIENCE. Taylor, W.C.; Nern, C.F.;

Kellogg, J.C. (Michigan Office of Science and Technology, Lansing (USA)). Sep 1978. 30p. NTIS, PC A03/MF A01.

The Office of Science and Technology has provided an improved procedure by which information and advice on technical issues is presented to the Governor of Michigan for consideration in making state policy. Issues examined include a proposal to the Department of Defense to locate a massive communication antenna in Michigan, a chemical contaminating incident, a high-level nuclear waste disposal, low-level radioactive waste, and hazardous and toxic waste management. The report includes a description of the program's mode of operation and summaries of the above-mentioned issues. Principal findings center on a number of structural and procedural concepts. Descriptions of five areas in which significant experience was gained which may be transferable to other policy environments utilizing science advisory mechanisms are: a task force approach to substantive issues, participation in task force projects, public participation, output from task force studies, and independence for the science advisory mechanism. It is concluded that the program, as well as the administrative structure of the Office, has proven successful.

3175 (SAND--79-1095) 1979 NEW MEXICO LEGISLATIVE SESSION: ENERGY ISSUES AND LEGISLATION. Barsumian, L.; Vandevender, S.G. (New Mexico Univ., Albuquerque (USA); Sandia Labs., Albuquerque, NM (USA)). Oct 1979. Contract EY-76-C-04-0789. 121p. Dep. NTIS, PC A06/MF A01.

This report is an account of the energy legislation and associated issues considered during the 1979 session of the 34th New Mexico Legislature. The session's major issue was the federal study of a proposed nuclear Waste Isolation Pilot Plant (WIPP) in New Mexico. A large proportion of time and effort was spent on resolving the state's formal position toward the federal project. However, other energy concerns were also significant even though they were neither as controversial nor as visible as the primary issue. The two most important laws enacted were the Radioactive Waste Consultation Act and the Radioactive Waste Transportation Act. The Legislature considered 47 other energy-related bills, of which 17 were enacted.

3176 Roesta nej. En bok om alternativ till kaernkraft och olja. (VOTE NO. A BOOK ABOUT ALTERNATIVES TO NUCLEAR POWER AND OIL). Kjellstroem, B.; Kaageson, P. (Folkkampanjen Nej till kaernkraft, Stockholm (Sweden)). Stockholm, Sweden; LiberFoerlag (1979). 172p. (In Swedish).

This book presents the opinions and programs of the anti-nuclear side in the preparations for the Swedish referendum on nuclear power (to take place on March 23, 1980) It is argued that the nuclear power, now producing more than 20 per cent of the Swedish electricity, can be phased out during a ten years period without severe effects for the economy. The dependence on oil can still be reduced, due to a determined development of alternative energy sources (biomass, peat, wind and solar) and a conseuretion program. The investments for the non-nuclear plan are estimated to become about 21000 MSKR (5000 M) higher than the present, nuclear, program.

3177 Energiepolitik und Gemeinden. (ENERGY POLICY AND THE COMMUNITIES). Goettingen, Germany, F.R.; Otto Schwartz (1978). 139p. (In German).

Papers from this congress are presented which dealt mainly with information on energy policy in the Federal Republic of Germany. Most of the information referred to the state of development, safety and environmental protection in nuclear facilities and in the projected nuclear waste management centre. The statements made at this congress intend to make the communities more ready to contribute to the realisation of measures of the energy programme of the Federal Government.

Electric Power

3178 UNPAID COSTS OF ELECTRICAL ENERGY: HEALTH AND ENVIRONMENTAL IMPACTS FROM COAL AND NUCLEAR POWER. Ramsay, W. Baltimore, MD; Johns Hopkins University Press (1979). 180p. Resources for the Future, Inc., Washington, DC $4.95.

The umpaid costs and the types of uncertainties associated with coal-nuclear technologies are compared. A three-pronged strategy is prepared for the nation: (1) to continue a coal-nuclear mix in new plant construction; (2) to push forward on research in order to advance knowledge of the true magnitude of the impacts; and (3) to place a heavy emphasis on introducing control technologies that will mitigate the impacts which are thought to be dangerous. 20 figures, 2 tables.

Electric Power Generation

3179 (P--300-80-005) ENVIRONMENTAL IMPLICATIONS OF ELECTRIC-UTILITY SUPPLY PLANS, 1978-2000. (California Energy Commission, Sacramento (USA)). May 1980. 104p. California Energy Commission, Sacramento.

California utilities plan to meet their projected demands for electricity during the next 20 years by continuing to rely heavily on existing generation sources along with adding many new facilities. Environmental interest in these plans usually focuses on the effects of building and operating the planned new facilities. However, to get the complete picture of the environmental implications of prospective electric generation, the effects of the total system, including the contributions of existing facilities, must be considered. Of particular importance for air quality is the extent to which generation from older,inefficient power plants is displaced as new, cleaner plants go into operation. The utilities' most-recently-announced plans propose major expansion of their fossil-fuel-fired generating capacity during the next 12 years, including the state's first coal-burning plants. During this period, a significant increase in nuclear generation from plants already in construction or in advanced planning stages is also planned. Whichever supply strategy is selected, the utilities foresee a more than doubling of their installed generating capacity and electricity generated by the year 2000. Assessment of the utilities' generation plans, incorporating the scheduled capacity additions (with long-term emphasis on either coal or nuclear) into total-system operations, reveals major environmental implications associated with the plans' implementation. This report is devoted mostly to these implications (air quality, water resources and quality, land use, nuclear wastes, and coal plant ash and sludge). 43 references, 25 figures, 8 tables, and footnotes.

ENVIRONMENTAL SCIENCES, ATMOSPHERIC

Basic Studies

3180 (SAND--79-7109) METEOROLOGICAL AND AIR QUALITY DATA QUARTERLY REPORT. WIPP SITE: EDDY COUNTY, NEW MEXICO. SPRING QUARTER, MARCH-MAY 1977. Pocalujka, L.P.; Babij, E.; Catizone, P.A.; Church, H.W. (Sandia National Labs., Albuquerque, NM (USA); TRC, Inc., Wethersfield, CT (USA)). Mar 1980. Contract AC04-76DP00789. 244p. NTIS, PC A11/MF A01.

The purpose of the WIPP meteorological, air quality, and radiological measurements program was to support the environmental effort for the evaluation of the site suitability. This data report is the fourth of a series of seasonal quarterly data summaries to be issued for the southeastern New Mexico site.

Chemicals Monitoring and Transport

3181 (INIS-mf--5574, pp 92-96) DETERMINATION OF POLLUTION SPREADING AREAS FROM NUCLEAR POWER PLANTS BY MEANS OF THE POST-IRRADIATION ANALYSIS METHOD. Kalman, L.; Hirling, J. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Method for determination of pollution spreading in the earth atmosphere from a nuclear power plant is stated. The method is that a compound, the main element of which has high value of the neutron activation cross-section, under on the given meteorological conditions, is dispersed in the atmosphere. After this, in the preliminary determined points, samples of air are taken and the labeling substance contained in them is subjected to the neutron irradiation and subsequient determination of its activity is performed. On the basis of the data obtained, migration of the substance, its local concentrations and distribution of the concentrations are determined. The method for modeling of pollution spreading; choice of the labeling substance; method of production and dispersing of the labeling substance in the atmosphere; the methods of samples taking and samples preparation and analysis are given.

3182 (INIS-mf--5574, pp 85-91) ACCURACY ESTIMATION OF THE GAUSS MODEL FOR POLLUTION SPREADING ON DISCHARGE FROM ELEVATED SOURCE AND CLASSIFICATION OF THE ATMOSPHERE STATES FOR MODELING OF IMPURITIES SPREADING. Kaspshitski, A.; Adamska-Tykal, B. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

Comparisons are made of the existing methods for the classification of atmospheric steady-state conditions, and an attempt is made to estimate accuracy of the model of pollution diffusion depending on the classification. The method for estimating the accuracy of the determination is given and comparisons are made of the atmospheric steady-state classifications according to the different authors' criteria. Recommendations are given for application of the average values of the wind direction and speed for pollution spreading from an elevated source by means of the Gaussian model.

3183 (ORNL--5620, pp 21-31) EARTH SCIENCES. Tamura, T. Mar 1980.

Environmental Sciences Division. Annual progress report for period ending September 30, 1979.

Included in this Section are reports on projects which support programs in other divisions, research areas which are unique or are applicable to several programs, and projects which may lead to program status. One of the areas which is of growing interest and need is the development of disposal methods which minimize adverse impacts to the environment. The stored solids study was combined with several other projects and is reported under the Nonnuclear Solid Waste Technology section of this report. Another potential growth area of research is in atmospheric geochemistry. Several proposals were submitted to different agencies; the short report on mercury partitioning is part of a more comprehensive study of trace element biogeochemistry. Another potential growth area is physics-based mathematical model development and validation. The report in this section emphasizes a mathematical technique. Finally, a short report on the biological denitrification of high nitrate waste is provided; the unique aspect is the findings of a microbial culture of estuarine origin which can denitrify waste with much higher nitrate concentrations than previously possible with soil-cultured microbes.

3184 (UCRL--51444-79) PROGRAM REPORT FOR FY 1979: ATMOSPHERIC AND GEOPHYSICAL SCIENCES DIVISION OF THE PHYSICS DEPARTMENT. Knox, J.B.; Orphan, R.C. (eds.). (California Univ., Livermore (USA). Lawrence Livermore Lab.). Dec 1979. Contract W-7405-ENG-48. 81p. NTIS, PC A05/MF A01.

The Atmospheric and Geophysical Sciences (G) Division continues to develop and validate modeling techniques for air quality assessments. The data developed by G Division are used by government officials to help them plan and implement energy programs. Our research includes the following varied areas: regional and local effects of atmospheric releases of toxic or radioactive materials; global climatic effects of accumulated atmospheric carbon dioxide resulting mainly from the increased use of fossil fuels; behavior of pollutants in areas of complex terrain or complex meteorological processes; evaluation of hazards from LNG spills; impact of fossil-fuel emissions, particularly sulfates and acid rain. These studies help the DOE to fulfill its goal of meeting our energy needs while at the same time ensuring public health, safety, and an acceptable environment quality.

3185 USE OF THE INDICATOR ACTIVATION METHOD IN STUDIES OF THE PROPAGATION OF POLLUTANTS IN THE ATMOSPHERE. Alps, W.; Kuehn, W. (Gesellschaft fuer Strahlen- und Umweltforschung m.b.H., Hannover (Germany, F.R.). Inst. fuer Strahlenbotanik). Atomkernenergie/Kerntechnik ; 33: No. 2, 130-133(1979).

The pollution of the atmosphere near ground level with various noxious substances, originating in industrial irradiation centres and in connection with the generation of nuclear power, has recently prompted detailed investigations of the propagation of aerosols, taking into account the roughness of the terrain and the vegetation. For this purpose pyrotechnic aerosols have been developed. Labelled with an easily activated element, they can be released at any point in the atmosphere

in the form of pulsed, linear, or point sources for propagation investigations. The paper reports on experiments over terrain with various types of natural vegetation.

3186 COMPARATIVE BIOLOGICAL HAZARDS OF CHEMICAL POLLUTANTS AND RADIATION. Mukherjee, R.N. (International Atomic Energy Agency, Vienna (Austria). Div. of Life Sciences). International Atomic Energy Agency Bulletin ; 20: No. 3, 31-38(Jun 1978).

Chemical pollutants from conventional energy and industrial sources released to the environment presumably pose a hazard to man's health and environmental resources. Insufficient knowledge of their detailed mechanisms of interaction with the biological systems seems to provide the greatest drawback in current attempts for realistic assessment of the health risks of chemical pollutants in the short and long terms. Nevertheless, their detrimental health consequences are becoming more and more apparent as a result of recent epidemiological surveys of workers in conventional energy installations and of the chronically exposed general public. So far nuclear power has succeeded in achieving a remarkable health safety record. In view of its projected expansion, research on biological effects of low-level radiation and radionuclides should continue to re-evaluate the health safety consequences. However, a projection from past experiences together with continued efforts to improvements of health safety aspects seem to justify an expectation that the proposed expansions in the nuclear power programme should not have an unfavourable impact on the environment. The potential hazards and challenges from the associated radiation in man's environment have proved manageable. More attention now needs to be paid urgently to safeguard human health and environment against the chemical pollutants.

Radioactive Materials Monitoring and Transport

3187 (AECL--6309) EFFAIR: A COMPUTER PROGRAM FOR ESTIMATING THE DISPERSION OF ATMOSPHERIC EMISSIONS FROM A NUCLEAR SITE. Dormuth, K.W.; Lyon, R.B. (Atomic Energy of Canada Ltd., Pinawa, Manitoba. Whiteshell Nuclear Research Establishment). Nov 1978. 38p. Dep. NTIS (US Sales Only), PC A03/MF A01.

Analysis of the transport of material through the turbulent atmospheric boundary layer is an important part of environmental impact assessments for nuclear plants. Although this is a complex phenomenon, practical estimates of ground level concentrations downwind of release are usually obtained using a simple Gaussian formula whose coefficients are obtained from empirical correlations. Based on this formula, the computer program EFFAIR has been written to provide a flexible tool for atmospheric dispersion calculations. It is considered appropriate for calculating dilution factors at distances of 10^2 to 10^4 metres from an effluent source if reflection from the inversion lid is negligible in that range.

3188 (AECL--6319) BIBLIOGRAPHY OF AECL PUBLICATIONS ON ENVIRONMENTAL RESEARCH. Hawley, N.J. (Atomic Energy of Canada Ltd., Pinawa, Manitoba. Whiteshell Nuclear Research Establishment). Dec 1978. 40p. Dep. NTIS (US Sales Only), PC A03/MF A01.

Publications in the open literature on environmental research performed by AECL personnel are listed chronologically with the first entry dated 1951. It is intended that the bibliography should be brought up to date yearly.

3189 (AIAU--78306) COMPUTERPROGRAM FOR CALCULATING THE RADIOLOGICAL CONSEQUENCES OF SHORTTIME RADIOACTIVE RELEASES FROM NUCLEAR INSTALLATIONS. Boeck, H.; Strubegger, M. (Atominstitut der Oesterreichischen Universitaeten, Vienna). Sep 1978. 38p. (In German). Dep. NTIS (US Sales Only), PC A06/MF A01.

Modular computer program STRISK calculates individual and collective doses as well as expected consequences after release of radioactive nuclides into the atmosphere. The calculation of the individual dose is performed for maximal ten distances from the point of emission in four directions. These 40 points are used to calculate the collective doses in 27 annular space sectors, nine of them in main wind direction and 18 adjacent sectors left and right to the main direction. The method is based on the Pasquill-diffusion model and is modified for the following: duildingwake; plum rise; height dependent diffusionparameter; radioactive decay and build up of daughter nuclides; fallout; washout within any distance from the point of emission; multiple reflexion of the cloud at inversion layers and at the ground; possibility to take into account a change of the stability class and/or the windspeed and/or the height of the inversionlayer during the time of atmospheric transport and height dependent windspeed. The calculation of the doses is done for five types of body tissues: whole body; lungs; gastro-intestinal-tract; thyroid and bone-marrow taking into account the doses from resulting from gammasubmersion (calculated by integration over the actual cloud volume considering the geometry of the cloud, variations in attenuation between the source and the individual and scattering of gammarays from materials outside this direct path); inhalation of radioactive nuclides from the passing gloud; irradiation from contaminated ground (considering radioactive decay, movement of the radionuclides down into the soil and formation of daughter-nuclides); inhalation of resuspended radioactive particles. The calculation of the entire dose is done for short-time-exposure (dose received within one day after the emission) and long-term-exposure (dose received within any longer period).

3190 (BNL--51031) 1978 ENVIRONMENTAL MONITORING REPORT. Naidu, J.R. (ed.). (Brookhaven National Lab., Upton, NY (USA)). Apr 1979. Contract EY-76-C-02-0016. 100p. Dep. NTIS, PC A05/MF A01.

The environmental levels of radioactivity and other pollutants found in the vicinity of Brookhaven National Laboratory (BNL) during 1978 are summarized. As an aid in the interpretation of the data, the amounts of radioactivity and other pollutants released in airborne and liquid effluents from Laboratory facilities to the environment are also indicated. The environmental data includes external radiation levels; radioactive air particulates; tritium and iodine concentrations; the amounts and concentrations of radioactivity in and the water quality of the stream into which liquid effluents are released; the concentrations of radioactivity in sediments and biota from the stream; the concentrations of radioactivity in and the water quality of ground waters underlying the Laboratory; and concentrations of radioactivity in milk samples obtained in the vicinity of the Laboratory.

3191 (CONF-791009--39) POTENTIAL HEALTH EFFECTS OF RADON-222 TO THE GENERAL PUBLIC FROM URANIUM MILLING. Travis, C.C.; McDowell-Boyer, L.M. (Oak Ridge National Lab., TN (USA)). 1979. Contract W-7405-ENG-26. 4p. Dep. NTIS, PC A02/MF A01.
From International conference on energy use management; Los Angeles, CA, USA (22 Oct 1979).
This paper presents a discussion of the potential health risk that may result from present and future radon-222 releases at uranium mill tailings piles situated in the United States. These risks are contrasted with the health risk continually present as a consequence of background levels of radon-222 naturally present in the atmosphere. It is estimated that the current risk of lung cancer in the population due to uranium milling is less than 10^{-4} times the natural risk. In addition, it is estimated that future risks due to mill tailings will be approximately a factor of 10^5 lower than the natural radon-222 risk to the general public if stabilization of tailings piles is implemented. Thus, it appears the incremental population risk due to milling is insignificant with respect to the natural risk.

3192 (CONF-791103--107) IODINE-129 DOSE TO THE WORLD POPULATION FROM THE NUCLEAR POWER INDUSTRY. Kocher, D.C.; Till, J.E. (Oak Ridge National Lab., TN (USA)). 1979. Contract W-7405-ENG-26. 8p. Dep. NTIS, PC A02/MF A01.
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
Because of the 15.7 million-year half life for ^{129}I and the mobility of iodine in the environment, releases of ^{129}I result in potential radiological impacts on the entire world population essentially in perpetuity. This paper presents estimates of dose to the world population from releases of ^{129}I by the world nuclear power industry during the years 1975 to 2020.

3193 (CONF-800607--38) DOSE-RATE CONVERSION FACTORS FOR EXTERNAL EXPOSURE TO PHOTONS AND ELECTRONS. Kocher, D.C. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 5p. NTIS, PC A02/MF A01.
From American Nuclear Society annual meeting; Las Vegas, NV, USA (8 Jun 1980).
This paper describes recent modifications of the computer code DOSFACTER, which was developed for the purpose of estimating dose-rate conversion factors for external exposure to photons and electrons emitted by radionuclides dispersed in the environment. The modifications and additions which have been made to the calculations outlined above include the following: (1) calculation of electron dose-rate factors for radiosensitive portions of the skin; (2) incorporation of improved estimates of organ dose-rate factors for photons; and (3) calculation of dose-rate factors for additional radio nuclides and incorporation of updated radioactive decay data for all radionuclides. The revised dose-rate factors described in this paper are available upon request from the Radiation Shielding Information Center at Oak Ridge National Laboratory.

3194 (DOE/EDP--0056) ENVIRONMENTAL DEVELOPMENT PLAN FOR SPECIAL NUCLEAR MATERIALS PRODUCTION. (Department of Energy, Washington, DC (USA). Assistant Secretary for Environment). Jul 1980. 39p. NTIS, PC A03/MF A01.
The scope of this Environmental Development Plan (EDP) follows the Special Nuclear Materials (SNM) Production category of the Department of Energy budget. It includes the process steps and facilities necessary for the production of plutonium and tritium for Government needs and the production of some other radioactive materials that will be used for heat and radiation sources by domestic and international customers. Most of the SNM production is now carried out at the Savannah River Plant, but plutonium is still produced at Hanford. This EDP does not address the mining, milling, or enrichment of the uranium, but it does consider the reactor fuel (and target) fabrication facilities. The production reactors and the spent fuel processing plants and their effluents are discussed here, but the defense wastes from them are treated in a separate EDP. The scope does not include transportation, decontamination and decommissioning, safeguards and security, or use of the SNM products.

3195 (DOE/PNRO--0292-T1) 1978 ANNUAL ENVIRONMENTAL REPORT. VOLUME 2. RADIOLOGICAL. (Duquesne Light Co., Shippingport, PA (USA)). 1978. Contract EY-76-C-11-0292. 120p. Dep. NTIS, PC A06/MF A01.
The Radiological Environmental Monitoring Program conducted during 1978 in the vicinity of the Beaver Valley Power Station and the Shippingport Atomic Power Station is described. The program consists of on-site sampling of water and gaseous effluents and off-site monitoring of water, air, river sediments, food pathway samples, and radiation levels in the vicinity of the site. The results of this monitoring during 1978 are discussed. The environmental program outlined in the Beaver Valley Power Station Technical Specifications was followed throughout 1978. There were no radioactive liquid effluents released from the Shippingport Atomic Power Station, since radioactive liquids are processed and re-cycled within the plant systems. The results of this environmental monitoring program show that Shippingport Atomic Power Station and Beaver Valley Power Station operations have not adversely affected the surrounding environment.

3196 (DOE/TIC--11148) ENVIRONMENTAL REPORT FOR CALENDAR YEAR 1978 ON RADIOLOGICAL AND NONRADIOLOGICAL PARAMETERS. Evans, R.G.; Woodward, J.C. (Battelle Columbus Labs., OH (USA)). 1978. Contract W-7405-ENG-92. 64p. Dep. NTIS, PC A04/MF A01.
Radionuclide releases to the environment from Battelle's West Jefferson Nuclear Sciences and King Avenue Sites were monitored for CY 1978. This included air and water emissions from the West Jefferson and King Avenue Sites and water, grass, fish, food crop, sediment, and soil samples taken from the area surrounding the West Jefferson Site. Nonradioactive effluents in water discharged from the West Jefferson Site were also monitored.

3197 (DP--1551) REAL TIME QUALITY CONTROL OF METEOROLOGICAL DATA USED IN SRP'S EMERGENCY RESPONSE SYSTEM. Pendergast, M.M. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). May 1980. Contract AC09-76SR00001. 18p. NTIS, PC A02/MF A01.
The Savannah River Laboratory's WIND minicomputer system allows quick and accurate assessment of an accidental release at the Savannah River Plant using data from eight meteorological towers. The accuracy of the assessment is largely determined by the

accuracy of the meteorological data; therefore quality control is important in an emergency response system. Real-time quality control of this data will be added to the WIND system to automatically identify inaccurate data. Currently, the system averages the measurements from the towers to minimize the influence of inaccurate data being used in calculations. The computer code used in the real-time quality control has been previously used to identify inaccurate measurements from the archived tower data.

3198 (DP--1552) COMPUTER CODE TO ASSESS ACCIDENTAL POLLUTANT RELEASES. Pendergast, M.M.; Huang, J.C. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Jul 1980. Contract AC09-76SR00001. 22p. NTIS, PC A02/MF A01.

A computer code was developed to calculate the cumulative frequency distributions of relative concentrations of an air pollutant following an accidental release from a stack or from a building penetration such as a vent. The calculations of relative concentration are based on the Gaussian plume equations. The meteorological data used for the calculation are in the form of joint frequency distributions of wind and atmospheric stability.

3199 (EGG--1183-1726) AERIAL RADIOLOGICAL SURVEY OF THE AREA SURROUNDING THE EDWIN I. HATCH NUCLEAR PLANT, BAXLEY, GEORGIA. Hilton, L.K. (EG and G, Inc., Las Vegas, NV (USA). Energy Measurements Group). Nov 1978. Contract EY-76-C-08-1183. 18p. Dep. NTIS, PC A02/MF A01.

An airborne radiological survey of a 2146 km^2 area surrounding the Edwin I. Hatch Nuclear Plant was made 28-31 March 1977. Detected radioisotopes, and their associated gamma ray exposure rates, were consistent with that expected from the normal background emitters. Count rates observed at 152 m altitude are converted to equivalent exposure rates at 1 m above the ground, and are presented in the form of an isopleth map. Exposure rates measured with small portable instruments and soil sample analysis showed agreement with the airborne data.

3200 (EGG--1183-1747) AERIAL RADIOLOGICAL SURVEY OF THE AREA SURROUNDING THE CHEM-NUCLEAR DISPOSAL FACILITY AND ALLIED GENERAL NUCLEAR SERVICES FACILITY, BARNWELL, SOUTH CAROLINA. (EG and G, Inc., Las Vegas, NV (USA). Energy Measurements Group). Jun 1979. Contract AC08-76NV01183. 12p. NTIS, PC A02/MF A01.

An aerial radiological survey to measure terrestrial γ radiation was carried out over the Chem-Nuclear Disposal Facility and the Allied General Nuclear Services Facility located near Barnwell, South Carolina. At the time of the survey (November 1977) the nuclear fuel Facility had not begun operations and no radioactive materials were being processed. Gamma ray data were collected over an 8 km^2 area centered on the Facilities by flying east-west lines spaced 60 m apart. Processed data indicated that detected radioisotopes and their associated gamma ray exposure rates were consistent with those expected from normal background emitters, except at certain locations described in this report. Average exposure rates 1 m above the ground, as calculated from the aerial data, are presented in the form of an isopleth map. No ground sample data were taken at the time of the aerial survey.

3201 (EGG--1183-1759) AERIAL RADIATION SURVEYS. Jobst, J. (EG and G Idaho, Inc., Idaho Falls (USA)). 1980. Contract EY-76-C-08-1183. 11p. (CONF-800334--8). Dep. NTIS, PC A02/MF A01.

From 2. DOE environmental control symposium; Reston, VA, USA (17 Mar 1980).

A recent aerial radiation survey of the surroundings of the Vitro mill in Salt Lake City shows that uranium mill tailings have been removed to many locations outside their original boundary. To date, 52 remote sites have been discovered within a 100 square kilometer aerial survey perimeter surrounding the mill; 9 of these were discovered with the recent aerial survey map. Five additional sites, also discovered by aerial survey, contained uranium ore, milling equipment, or radioactive slag. Because of the success of this survey, plans are being made to extend the aerial survey program to other parts of the Salt Lake valley where diversions of Vitro tailings are also known to exist.

3202 (EGG--1183-1760) GRAPHIC OVERVIEW SYSTEM FOR DOE'S EFFLUENT AND ENVIRONMENTAL MONITORING PROGRAMS. Burson, Z.G.; Elle, D.R. (EG and G, Inc., Las Vegas, NV (USA). Energy Measurements Group). Mar 1980. Contract AC08-76NV01183. 33p. NTIS, PC A03/MF A01.

The Graphic Overview System is a compilation of photos, maps, overlays, and summary information of environmental programs and related data for each DOE site. The information consists of liquid and airborne effluent release points, on-site storage locations, monitoring locations, aerial survey results, population distributions, wind roses, and other related information. The relationships of different environmental programs are visualized through the use of colored overlays. Trends in monitoring data, effluent releases, and on-site storage data are also provided as a corollary to the graphic display of monitoring and release points. The results provide a working tool with which DOE management (headquarters and field offices) can place in proper perspective key aspects of all environmental programs and related data, and the resulting public impact of each DOE site.

3203 (EML--360) CALIBRATION OF A MODIFIED SIERRA MODEL 235 SLOTTED CASCADE IMPACTOR. Knuth, R.H. (Department of Energy, New York (USA). Environmental Measurements Lab.). Jul 1979. 24p. Dep. NTIS, PC A02/MF A01.

For measurements of ore dust in uranium concentrating mills, a Sierra Model 235 slotted cascade impactor was calibrated at a flow rate of .21 m^3/min, using solid monodisperse particles and an impaction surface of Whatman No. 41 filter paper soaked in mineral oil. The reduction from the impactor's design flow rate of 1.13 m^3/min (40 cfm) to 0.21 m^3/min (7.5 cfm) increased the stage cut-off diameters by an average factor of 2.3, a necessary adjustment because of the anticipated large particle sizes of ore dust. The underestimation of mass median diameters, often caused by the rebound and reentrainment of solid particles from dry impaction surfaces, was virtually eliminated by using the oiled Whatman No. 41 impaction surface. Observations of satisfactory performance in the laboratory were verified by tests of the impactor in ore mills.

3204 (EML--373) MEASURED HOURLY AND DAILY AVERAGE ^{85}KR CONCENTRATIONS WITHIN 10 KM OF THE SAVANNAH RIVER PLANT. Gogolak, C.V.; Beck, H.L.; Pendergast, M.M. (Department of Energy,

New York (USA). Environmental Measurements Lab.). Aug 1980. 130p. NTIS, PC A07/MF A01.

Mean hourly ground-level ^{85}Kr concentrations measured at six locations within 10 km of the Savannah River Plant chemical separations facilities during calendar year 1976 are presented in tabular form along with the mean daily concentrations for each site. These data, obtained with arrays of thin window G-M counters especially designed for this purpose, can be used to test point source atmospheric dispersion models.

3205 (EPA--520/1-79-009) AIRDOS-EPA: A COMPUTERIZED METHODOLOGY FOR ESTIMATING ENVIRONMENTAL CONCENTRATIONS AND DOSE TO MAN FROM AIRBORNE RELEASES OF RADIONUCLIDES. Moore, R.E.; Baes, C.F. III; McDowell-Boyer, L.M.; Watson, A.P.; Hoffman, F.O.; Pleasant, J.C.; Miller, C.W. (Environmental Protection Agency, Washington, DC (USA). Office of Radiation Programs). Dec 1979. 265p. Environmental Protection Agency, Washington, DC.

The AIRDOS-EPA computer code is a methodology, designed for use on IBM-360 computers, that estimates radionuclide concentrations in air; rates of deposition on ground surfaces; ground surface concentrations; intake rates via inhalation of air and ingestion of meat, milk, and fresh vegetables; and radiation doses to man from airborne releases of radionuclides. This report describes the atmospheric and terrestrial transport models used in the code, their computer implemetation, and the applicability of the code to the assessment of radiological impacts. A listing of the code and a demonstration run of the code are presented in the appendices.

3206 (EUR--5805) MEASUREMENT OF ENVIRONMENTAL RADIOACTIVITY. ISPRA 1976. Dominici, G. (Commission of the European Communities, Ispra (Italy). Joint Research Centre). 1977. 50p. (In Italian). Dep. NTIS (US Sales Only), PC A04/MF A01.

In this report there are briefly described the measurements of environmental radioactivity performed during 1976 by the site survey group of the Protection Division of the Euratom Joint Research Centre - Ispra Establisment. Data are given on the concentrations of ^{90}Sr, ^{137}Cs and other radionuclides in precipitation, air, waters, herbage milk and radioactive effluents. The environmental contamination is mainly world-wide fall out.

3207 (EUR--6180) MEASUREMENT OF ENVIRONMENTAL RADIOACTIVITY. ISPRA 1977. Dominici, G. (Commission of the European Communities, Ispra (Italy). Joint Research Centre). 1979. 50p. (In Italian). Dep. NTIS (US Sales Only), PC A04/MF A01.

The measurements of environmental radioactivity performed during 1977 by the site survey group of the Protection Division of the Euratom Joint Research Centre - Ispra Establishement are described. Data are given on the concentrations of ^{90}Sr, ^{137}Cs and other radionuclides in precipitation, air, waters, herbage, milk and radioactive effluents. The environmental contamination is mainly world-wide fall out.

3208 (IDO--12082(79)) 1979 ENVIRONMENTAL MONITORING PROGRAM REPORT FOR IDAHO NATIONAL ENGINEERING LABORATORY SITE. (Idaho National Engineering Lab., Idaho Falls (USA)). May 1980. Contract W-7405-ENG-82. 44p. Dep. NTIS, PC A03/MF A01.

The results of the 1979 environmental monitoring programs have shown the presence of natural radioactivity and worldwide fallout, but showed no INEL-produced radioactivity detected in the offsite environs. Concentrations and doses from radioactive materials discharged during Site operations were of no health consequence to the surrounding populations. Air, water, and foodstuff samples are routinely collected from around the INEL boundary and from locations distant from the INEL Site. This report describes the analyses and comparison of such samples to determine if there has been any contribution from INEL operations.

3209 (INIS-mf--4637, pp 132) ^{85}KR IN THE ATMOSPHERE AND ITS MEASUREMENT. Wilhelmova, L.; Cejnar, F. (Ceskoslovenska Akademie Ved, Prague. Laborator Radiologicke Dozimetrie). Jun 1976. (In Czech).

From 4. national symposium on ionizing radiation dosimetry; Marianake Lazne, Czechoslovakia (8 Nov 1976).

EARTH ATMOSPHERE;ENVIRONMENT;FISSION PRODUCTS;FUEL REPROCESSING PLANTS;KRYPTON 85; NUCLEAR POWER PLANTS;RADIATION MONITORING; RADIOACTIVE EFFLUENTS;RADIOACTIVITY;RADIATION PROTECTION

3210 (INIS-mf--4637, pp 50) TRITIUM AND ^{14}C CONCENTRATIONS IN AIR AND WATERS NEAR NUCLEAR POWER PLANT. Chudy, M.; Saro, S.; Povinec, P. (Komenskeho Univ., Bratislava (Czechoslovakia). Prirodovedecka Fakulta). Jun 1976. (In Slovak).

From 4. national symposium on ionizing radiation dosimetry; Marianake Lazne, Czechoslovakia (8 Nov 1976).

CARBON 14;CONTAMINATION;ENVIRONMENTAL IMPACTS;NUCLEAR POWER PLANTS;SURFACE AIR; SURFACE WATERS;TRITIUM;RADIOACTIVE EFFLUENTS; RADIOACTIVITY;RADIATION MONITORING; ENVIRONMENTAL TRANSPORT

3211 (INIS-mf--4637, pp 38) AIRBORNE RADIOACTIVITY MEASUREMENT AT NUCLEAR RESEARCH INSTITUTE. Horyna, J.; Prazakova, H. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Jun 1976. (In Czech).

From 4. national symposium on ionizing radiation dosimetry; Marianake Lazne, Czechoslovakia (8 Nov 1976).

CONTAMINATION;RADIATION MONITORING;RADIATION MONITORS;RADIOACTIVITY;UJV;RADIOACTIVE EFFLUENTS;AERIAL MONITORING;SURFACE AIR; SAMPLING

3212 (INIS-mf--5574, pp 40-45) UTILIZATION OF THE TEMPERATURE GRADIENTS MEASUREMENTS AND CLIMATOLOGICAL DATA IN DETERMINATION OF PERMISSIBLE LIMITS OF RADIOACTIVE GASES DISCHARGE AT NUCLEAR POWER PLANTS. Tykal, A.; Adamska-Tykal', B. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

On the basis of many years meteorological investigations relationships between the concentrations of discharge and gaseous radioactive substances around a nuclear power plant are determined. The mathematical model of radioactive substances diffusion into the earth atmosphere is given, taking into consideration the meteorological situation in the region of the nuclear power plant and the topography of the district. The meteorological dilution

coefficient of discharges from the nuclear power plant in the atmosphere depending on the azimuth and the distance from the chimney and also depending on the time of the coefficient determination are given.

3213 (INIS-mf--5574, pp 77-84) FORECAST OF AIR POLLUTION AROUND NUCLEAR INSTALLATIONS ON THE BASIS OF METEOROLOGICAL MEASUREMENTS. Tykal, A.; Adamska-Tykal, B. 1978. (In Russian).

From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).

A method is considered for estimation of the radiological hazard in the region of the Central Institute of nuclear research. This method is based on the results of measurements conducted at the nearest to the Institute meteorological station. Factors influencing conditions of gas and dust transport in the atmosphere were investigated. The data are gained on the specific activity distribution of radioactive gases around the Institute and in different seasons. The radius of the territory having maximum pollutions concentration and the maximum season activity have been determined.

3214 (IS--4734) ENVIRONMENTAL MONITORING AT AMES LABORATORY: CALENDAR YEAR 1979. Voss, M.D. (Ames Lab., IA (USA)). Apr 1980. Contract W-7405-ENG-82. 49p. NTIS, PC A03/MF A01.

The results and conclusions from the Ames Laboratory environmental monitoring programs for the Ames Laboratory Research Reactor (ALRR) are presented. The major areas of radiological monitoring were ALRR effluent air, environmental air, effluent water and environmental water. Analysis of air samples collected at the ALRR site showed detectable amounts of ^{60}Co. This isotope was 1.5×10^{-4}% of the concentration guide (1) and was probably due to ALRR operations. The radioisotope of significance in the ALRR stack effluent was tritium. The average yearly individual dose from ^{3}H at the exclusion fence was estimated to 0.0038 mRem and the estimated dose to the entire population within an 80 Km (50 mile) radius of the ALRR was 6.31 man-Rem. These values are 0.00076% and 0.0063%, respectively, of the doses derived from the concentration guides. In the radioactive liquid waste released to the City of Ames sewage system from the ALRR complex, ^{3}H was the predominant isotope. After dilution with other waste water from the ALRR complex, the potential dose was not more than 0.59% of the dose derived from the concentration guide.

3215 (Juel--1577) LIGA - A PROGRAM TO CALCULATE THE LOCAL INDIVIDUAL GAMMA SUBMERSION DOSE DUE TO WASTE AIR PLUMES OF NUCLEAR FACILITIES. Brenk, H.D.; Rohloff, F.; Brunen, E.; Geiss, H.; Vogt, K.J. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Zentralabteilung Strahlenschutz). Jan 1979. 77p. (In German). Dep. NTIS (US Sales Only), PC A05/MF A01.

An improved model to calculate the gamma submersion dose was developed which integrates over the dose contributions of the volume elements of the semi-space and takes absorption and scattering of gamma radiation in the air into consideration. Diffusion parameters were measured for all kinds of weather (diffusion categories) at an emission height of 50 or 100 m for a medium to high surface roughness. From the short-term diffusion factors, long-term diffusion factors have been calculated by superposition of single emissions on the basis of statistics of diffusion meteorology. These long-term diffusion factors describe the environmental burden due to continuously emitting sources in all sectors of a 12-sector wind rose. The contributions of sub-sectors are determined without impermissible neglection for the first time. The influence of important parameters, e.g. the gamma energy of radionuclides in the waste air plume, is investigated in sensitivity analyses. The problem is discussed which error has to be assumed if instead of an exact calculation using the three-dimensional diffusion statistics of a site the gamma submersion factor of a West German standard site is employed which would only have to be multiplied with the local wind direction frequency distribution of the site in the 12 sectors of the wind direction.

3216 (KEK--78-20) RADIOLOGICAL IMPACT OF HIGH-ENERGY ACCELERATORS ON THE ENVIRONMENT. Thomas, R.H. (National Lab. for High Energy Physics, Oho, Ibaraki (Japan)). Nov 1978. 67p. NTIS (US Sales Only), PC A05/MF A01.

The potential radiological impact of high-energy, high-intensity accelerators in the environment is discussed. It is shown that there are three sources of radiation exposure to the general public resulting from the operation of high-energy accelerators. In order of importance these are (a) the prompt radiation field, produced when the accelerator is operating; (b) the release of radionuclides and aerosols into the atmosphere; and (c) the production of radionuclides in the groundwater system around the accelerator. Of these three sources, (a) is dominant and typically exceeds (b) by about an order of magnitude. To date, experience at many accelerator laboratories has shown that the quantity of accelerator-produced radionuclides released to nearby groundwater systems (c) is either extremely small or immeasurable. The population dose equivalent resulting from the operation of several large high-energy facilities is compared.

3217 (KFK--2750, pp 4800-13-4800-21) ANALYTICAL AND EXPERIMENTAL INVESTIGATION OF THE ATMOSPHERIC DISPERSION OF RADIOACTIVE GASES IN THE LOCAL RANGE (UP TO 15 KM DISTANCE, EMISSION HEIGHT =< 100 M). Becker, M.; Hiller, J.; Huebschmann, W.; Nester, K.; Schuettelkopf, H.; Thomas, P.; Vogt, S. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Hauptabteilung Sicherheit - Bereich 1). Oct 1979. (In German).

Semiannual report 1978/2.

The diffusion parameters evaluated from the single experiments have been combined into parameter sets for sigmasub(y) and sigmasub(z) respectively. The sigma curves depend from the source distance and the diffusion category. The curve families have been smoothened and centered in order to refer to the most frequent turbulence intensity in each diffusion category.

3218 (KFK--2750, pp 4800-28-4800-32) INVESTIGATION OF THE ATMOSPHERIC DISPERSION OF RADIOACTIVE GASES AND AEROSOLS IN THE LOCAL RANGE (UP TO 15 KM DISTANCE) AT EMISSION HEIGHTS ABOVE 100 M. Becker, M.; Hiller, J.; Nester, K.; Schuettelkopf, H.; Thomas, P.; Vater, S.; Vogt, S. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Hauptabteilung Sicherheit - Bereich 1). Oct 1979. (In German).

Semiannual report 1978/2.

On the basis of the tracer experiments a preliminary curve family of the diffusion parameters sigmasub(y) and sigmasub(z) for emission heights > 130 m has been compiled. Further experiments are necessary to confirm this curve family. The sigmasub(phi) frequency distribution of the Spoeck data has been compared to those of the KfK (100 m height at the meteorological tower). As could be expected, much smaller sigmasub(phi) data have been measured at unstable, somewhat smaller at neutral, and about the same at stable situations.

3219 (KFK--2750, pp 4800-22-4800-28) INVESTIGATION OF THE ATMOSPHERIC DISPERSION OF RADIOACTIVE GASES AND AEROSOLS IN THE MESOSCALE (MORE THAN 15 KM DISTANCE). Thomas, P.; Vogt, S. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Hauptabteilung Sicherheit - Bereich 1). Oct 1979. (In German).
Semiannual report 1978/2.
The tetroon tracks have been evaluated with respect to atmospheric parameters. It is shown that the time constant of the vertical oscillations as well as the horizontal diffusion parameter sigmasub(y), derived from several consecutive tetroon flights, fall within the expected range.

3220 (LA--8200-ENV) ENVIRONMENTAL SURVEILLANCE AT LOS ALAMOS DURING 1979. (Los Alamos Scientific Lab., NM (USA)). Apr 1980. Contract W-7405-ENG-36. 149p. Dep. NTIS, PC A07/MF A01.
This report documents the environmental surveillance program conducted by the Los Alamos Scientific Laboratory (LASL) in 1979. Routine monitoring for radiation and radioactive or chemical substances was conducted on the Laboratory site and in the surrounding region to determine compliance with appropriate standards and permit early identification of possible undesirable trends. Results and interpretation of the data for 1979 on penetrating radiation, chemical and radiochemical quality of ambient air, surface and ground water, municipal water supply, soils and sediments, food, and airborne and liquid effluents are included. Comparisons with appropriate standards and regulations or with background levels from natural or other non-LASL sources provide a basis for concluding that environmental effects attributable to LASL operations are minor and cannot be considered likely to result in any hazard to the population of the area. Results of several special studies provide documentation of some unique environmental conditions in the LASL environs.

3221 (LBL--1(Vol.3)) SURVEY OF INSTRUMENTATION FOR ENVIRONMENTAL MONITORING: MAJOR UPDATE. VOLUME 3. RADIATION. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Sep 1979. Contract W-7405-ENG-48. 448p. Dep. NTIS, PC A19/MF A01.
This is the third volume of a four-volume (seven-part) series, the culmination of a comprehensive survey of instrumentation for environmental monitoring. Consideration is given to instruments and techniques presently in use and to those developed for other purposes but having possible applications to radiation monitoring. The results of the survey are given as descriptions of the physical and operating characteristics of available instruments, critical comparisons among instrumentation methods, and recommendations of promising methodology and development of new instrumentation. Information is also given regarding the pollutants to be monitored, their characteristics and forms, their sources and pathways, their effects on the ecosystem, and the means of controlling them through process and regulatory controls. The discussion is presented under sections entitled radiation sources; instrumentation: by type of radiation or instrument type; and, instrumentation for specific radionuclides. (JGB)

3222 (MLM--2700) ANNUAL ENVIRONMENTAL MONITORING REPORT: CALENDAR YEAR 1979. Farmer, B.M.; Carfagno, D.G. (Mound Facility, Miamisburg, OH (USA)). 25 Apr 1980. Contract EY-76-C-04-0053. 49p. Dep. NTIS, PC A03/MF A01.
The local environment surrounding Mound Facility was monitored primarily for tritium and plutonium-238. The results are reported for CY-1979. The environmental parameters analyzed included air, water, vegetation, foodstuffs, and sediment. The average concentrations of plutonium-238 and tritium were within the applicable standards for radioactive species.

3223 (MLM--2703(OP)) DEVELOPMENT OF A RADON MONITORING PLAN FOR CANONSBURG, PENNSYLVANIA. Yates, W.G.; Jenkins, P.H. (Mound Facility, Miamisburg, OH (USA)). 1980. Contract EY-76-C-04-0053. 4p. (CONF-800334--9). NTIS, PC A02/MF A01.
From 2. DOE environmental control symposium; Reston, VA, USA (17 Mar 1980).
The site of the former Vitro Rare Metals Plant, now called the Canon Industrial Park, has been found to be contaminated with large quantities of radioactive wastes generated during former radium and uranium recovery operations. This report describes the development of a comprehensive radon monitoring program in the environment surrounding the site. (ACR)

3224 (MLM--2758) RADON MONITORING PROGRAM, FEBRUARY-APRIL 1980. Yates, W.G.; Hagee, G.R.; Jenkins, P.H. (Mound Facility, Miamisburg, OH (USA)). 21 Aug 1980. Contract AC04-76DP00053. 12p. NTIS, PC A02/MF A01.
The radon monitoring plan for Canonsburg, Pa., was implemented on 29 January 1980. Thirty-eight offsite locations were being monitored by the end of the quarter. Additional locations were planned to fulfill DOE Division of Environmental Control Technology requests. Overall distribution of the radon measurements has not yet been determined.

3225 (ND-R--52(W)) ASSESSMENT OF THE ACCEPTABILITY OF PERFORMANCE OF INSTALLED IODINE TRAPPING PLANT. Hyam, E.D.; Manley, A.J. (UKAEA Windscale Nuclear Power Development Labs.). Dec 1978. 18p. Dep. NTIS (US Sales Only), PC A02/MF A01.
Procedures have been developed for estimating, at a stated level of confidence, how long a trapping plant can be relied upon to perform its duties and for determining how this estimate depends on the values of the input parameters and their invariances. Analysis of the relationships involved has shown that the frequency with which plant has to be tested and the charcoal changed is reduced if: (a) the K-value of the charcoal in the as-received condition is high; (b) the bed stay-time is large; (c) provision is made for sampling the charcoal during service and measuring its K-value; and (d) the variances of the K-values for the charcoal of the bed stay-time are small. Attention is drawn to the advantages of continuously recording the gas flows through

the sorbent bed as a function of time and of maintaining by-pass leakage at as low a level as possible. It has been shown that, in order to avoid having to renew the charcoal at the time of the first re-test, the K-value of the fresh charcoal and the value of bed stay-time must exceed definable limits.

3226 (ND-R--53(W)) USER'S GUIDE TO THE PROGRAMS ITRAP-A, ITRAP-B, ITRAP-S AND ITRAP-L. Manley, A.J. (UKAEA Windscale Nuclear Power Development Labs.). Mar 1979. 37p. Dep. NTIS (US Sales Only), PC A03/MF A01.

The four programs ITRAP-A, ITRAP-B, ITRAP-S and ITRAP-L are designed to calculate parameters required for assessing the performance of iodine trapping plant installed in the ventilation systems of enclosures in which radioactive materials are handled. This guide sets out the input to and output from these programs for plant managers and gives sufficient program details to enable the users to assess the accuracy of the methods used.

3227 (NLCO--004EV) REVIEW OF RADON MONITORING AT THE DOE-NIAGARA FALLS STORAGE SITE. Humphrey, H.W. (National Lead Co. of Ohio, Cincinnati (USA)). 31 Mar 1980. Contract AC05-76OR01156. 85p. NTIS, PC A05/MF A01.

Radon-222 monitoring results over the period May 1978 to February 1980 are reviewed and summarized. Radon-222 levels in inhabited areas surrounding the storage site were all found to be no greater than 0.5 pCi/l compared to an average ambient air background for the region of 0.23 +- 0.01 pCi/l. Ambient air radon levels rapidly approach background within 0.5 to 1.0 mile from the storage site. Weekly surveillance information, averaged over a year, indicates that six of the eight fenceline ambient air monitoring stations showed concentrations well within the concentration guide limit of 3.0 pCi/l for uncontrolled areas. The remaining two adjacent stations (along the western boundary fence) showed elevated average radon levels of 4.28 and 5.68 pCi/l, respectively. The higher levels at the western boundary fence are attributed to the Spoil Pile area, which is within a hundred feet of the present boundary fence. Maxima were observed in both soil air and ambient air monthly radon levels, which correlate closely with meteorological parameters. A spoil pile radon flux survey is described which identifies radon source isopleths and quantifies yearly average pile emissions. Average offsite radon flux from soil was found to be 0.14 +- 0.07 pCi/m^2-s. Weighted average (yearly) radon flux from the spoil pile was found to be 407 pCi/m^2-s. The effects of applying asphaltic emulsion, or water, to reduce radon emissions are discussed. Application of asphaltic emulsion to residues in storage buildings resulted in an average reduction in radon emissions of 94%. Variables affecting radon emanation and measurement are discussed, including: instrumentation; meteorological conditions; and source distribution and magnitude. Recommendations are suggested to improve the existing radon monitoring program and future useful innovations are discussed.

3228 (NRPB-R--91) MODEL FOR SHORT AND MEDIUM RANGE DISPERSION OF RADIONUCLIDES RELEASED TO THE ATMOSPHERE. THE FIRST REPORT OF A WORKING GROUP ON ATMOSPHERIC DISPERSION. Clarke, R.H. (National Radiological Protection Board, Harwell (UK)). Sep 1979. 74p. NTIS (US Sales Only), PC A04/MF A01.

A Working Group was established to give practical guidance on the estimation of the dispersion of radioactive releases to the atmosphere. The dispersion is estimated in the short and medium range, that is from about 100 m to a few tens of kilometres from the source, and is based upon a Gaussian plume model. A scheme is presented for categorising atmospheric conditions and values of the associated dispersion parameters are given. Typical results are presented for releases in specific meteorological conditions and a scheme is included to allow for durations of release of up to 24 hours. Consideration has also been given to predicting longer term average concentrations, typically annual averages, and results are presented which facilitate site specific calculations. The results of the models are extended to 100 km from the source, but the increasing uncertainty with which results may be predicted beyond a few tens of kilometres from the source is emphasised. Three technical appendices provide some of the rationale behind the decisions made in adopting the various models in the proposed dispersion scheme.

3229 (ORNL--5452) RADIOLOGICAL SURVEY OF THE INACTIVE URANIUM-MILL TAILINGS AT SLICK ROCK, COLORADO. Haywood, F.F.; Perdue, P.T.; Chou, K.D.; Ellis, B.S. (Oak Ridge National Lab., TN (USA)). Jun 1980. Contract W-7405-ENG-26. 92p. NTIS, PC A05/MF A01.

Results of a radiological survey of two inactive mill sites near Slick Rock, Colorado, in April 1976 are presented. One mill, referred to in this report as North Continent (NC), was operated primarily for recovery of radium and vanadium and, only briefly, uranium. The Union Carbide Corporation (UCC) mill produced a uranium concentrate for processing elsewhere and, although low-level contamination with ^{226}Ra was widespread at this site, the concentration of this nuclide in tailings was much lower than at the NC site. The latter site also has an area with a high above-ground gamma dose rate (2700 μR/hr) and a high-surface ^{226}Ra concentration (5800 pCi/g). This area, which is believed to have been a liquid disposal location during plant operations, is contained within a fence. A solid disposal area outside the present fence contains miscellaneous contaminated debris. The estimated concentration of ^{226}Ra as a function of depth, based on gamma hole-logging data, is presented for 27 holes drilled at the two sites.

3230 (ORNL--5455) RADIOLOGICAL SURVEY OF THE INACTIVE URANIUM-MILL TAILINGS AT RIFLE, COLORADO. Haywood, F.F.; Jacobs, D.J.; Ellis, B.S.; Hubbard, H.M. Jr.; Shinpaugh, W.H. (Oak Ridge National Lab., TN (USA)). Jun 1980. Contract W-7405-ENG-26. 101p. NTIS, PC A06/MF A01.

Results of radiological surveys of two inactive uranium-mill sites near Rifle, Colorado, in May 1976 are presented. These sites are referred to as Old Rifle and New Rifle. The calculated ^{226}Ra inventory of the latter site is much higher than at the older mill location. Data on above-ground measurements of gamma exposure rates, surface and near-surface concentration of ^{226}Ra in soil and sediment samples, concentration of ^{226}Ra in water, calculated subsurface distribution of ^{226}Ra, and particulate radionuclide concentrations in air samples are given. The data serve to define the extent of contamination in the vicinity of the mill sites and their immediate surrounding areas with tailings particles. Results of these measurements were utilized as technical input for an engineering assessment of these two

sites.

3231 (ORNL--5458) RADIOLOGICAL SURVEY OF THE INACTIVE URANIUM-MILL TAILINGS AT AMBROSIA LAKE, NEW MEXICO. Haywood, F.F.; Christian, D.J.; Ellis, B.S.; Hubbard, H.M. Jr.; Lorenzo, D.; Shinpaugh, W.H. (Oak Ridge National Lab., TN (USA)). Jun 1980. Contract W-7405-ENG-26. 78p. NTIS, PC A05/MF A01.

The inactive uranium-mill tailings pile at Ambrosia Lake, New Mexico, contains approximately 1520 Ci of ^{226}Ra in 2.4 million metric tons of tailings covering an area of 43 hectares. All of the former mill buildings were intact and, at the time of this survey, several were in use. The tailings have not been stabilized, but the crusty surface is reported to be resistant to wind erosion. The average gamma-ray exposure rate 1 m above the tailings is 720 μR/h while the average rate in the former mill area is 150 μR/h. The adjacent area, between the mill site, ponds, and tailings pile, has an average exposure rate of 230 μR/h. Gamma radiation measurements outside these areas, as well as the results of analyses of surface or near-surface sediment and soil samples, show fairly wide dispersion of contamination around the site. The subsurface distribution of ^{226}Ra in 18 holes drilled at the site, calculated from gamma-ray monitoring data, is presented graphically and compared with measured concentrations in two holes.

3232 (ORNL--5595, pp 59-84) TECHNOLOGY ASSESSMENTS. Rohwer, P.S. Jan 1980.

Health and Safety Research Division progress report, May 1, 1978-September 30, 1979.

The primary objective of the Technology Assessments Section is assessment and interpretation of energy technology impacts on man. Assessment methods are developed and continuously updated and applied to meet this objective. Human impact assessment is a key component of any strategy to optimize the mix of technologies to be developed and deployed to meet the energy requirements of our country. Types of work accomplished in the section may be grouped into three areas: characterization of exposure; estimation of dose; and interpretation of impact. Any specific program may be totally in one of these areas or it may contain tasks representing multiple areas. Characterization of exposure includes off-site survey activities, development of models and concepts to simulate pollutant behavior in man and the environment, and radiation dosimetry intercomparison studies. Estimation of dose encompasses a wide array of applications of the section's expertise in quantifying impacts on man due to environmental releases of nuclear and nonnuclear pollutants. Interpretation of impact is the bottom line on an assessment where dose estimates are compared with applicable limits and guides. Task involvements in the latter area are a part of all assessment application activities, of many off-site survey activities, and of those methodological studies that support assessment criteria development. Varying mixes of work in these three areas constitute the projects highlighted in the descriptions which follow.

3233 (ORNL--5613) ANALYSIS OF THE 1957-58 SOVIET NUCLEAR ACCIDENT. Trabalka, J.R.; Eyman, L.D.; Auerbach, S.I. (Oak Ridge National Lab., TN (USA)). Dec 1979. Contract W-7405-ENG-26. 79p. Dep. NTIS, PC A05/MF A01.

The occurrence of a Soviet accident in the winter of 1957-58, involving the atmospheric release of reprocessed fission wastes (cooling time approximately 1-2 yrs.), appears to have been confirmed, primarily by an analysis of the USSR radioecology literature. Due to the high population density in the affected region (Cheliabinsk Province in the highly industrialized Urals Region) and the reported level of ^{90}Sr contamination, the event probably resulted in the evacuation and/or resettlement of the human population from a significant area (100-1000 km^2). The resulting contamination zone is estimated to have contained approximately 10^8 Ci of ^{90}Sr (reference radionuclide); a relatively small fraction of the total may have been dispersed as an aerosol. Although a plausible explanation for the incident exists (i.e., use of now-obsolete waste storage-^{137}Cs isotope separation techniques), it is not yet possible, based on the limited information presently available, to completely dismiss this phenomenon as a purely historical event. It seems imperative that we have a complete explanation of the causes and consequences of this incident. Soviet experience gained in application of corrective measures would be invaluable to the rest of the world nuclear community.

3234 (ORNL--5663) INDUSTRIAL SAFETY AND APPLIED HEALTH PHYSICS. ANNUAL REPORT, 1979. (Oak Ridge National Lab., TN (USA)). Sep 1980. Contract W-7405-ENG-26. 120p. NTIS, PC A06/MF A01.

In connection with personnel monitoring, there were no external or internal exposures to personnel which exceeded the standards for radiation protection as defined in DOE Manual Chapter 0524. Only 55 employees received whole-body dose equivalent of one rem or greater. The highest whole-body dose equivalent to an employee was 2.8 rem. The highest internal exposure was less than one-half of a maximum permissible dose for any calendar quarter. During 1979, 57 portable health physics instruments were added to the inventory and 75 retired. The total number in service on January 1, 1979, was 977. With regards to environmental monitoring, there were no releases of gaseous waste from the Laboratory which were of a level that required an incident report to DOE. There were no releases of liquid radioactive waste from the Laboratory which were of a level that required an incident report to DOE. Soil samples were collected at all perimeter and remote monitoring stations and analyzed for eleven radionuclides including plutonium and uranium. Plutonium-239 content ranged from 0.01 to 0.06 pCi/g, and the uranium-235 content ranged from 0.01 to 0.05 pCi/g. Grass samples were collected at all perimeter and remote monitoring stations and analyzed for twelve radionuclides including plutonium and uranium. Plutonium-239 content ranged from 0.001 to 0.010 pCi/g, and uranium-235 content ranged from 0.001 to 0.010 pCi/g. Two radiation incidents involving radioactive materials were recorded during 1979. This compares with 14 incidents in 1978. (ERB)

3235 (ORNL/TM--6751) ESTIMATION OF NORTH AMERICAN POPULATION DOSES RESULTING FROM RADON-222 RELEASE IN WESTERN UNITED STATES: METHODOLOGY. Fields, D.E.; Travis, C.C.; Watson, A.P.; McDowell-Boyer, L.M. (Oak Ridge National Lab., TN (USA)). Dec 1979. Contract W-7405-ENG-26. 57p. Dep. NTIS, PC A04/MF A01.

The report represents a compilation of computer codes used to estimate potential human exposures and inhalation doses due to unit releases of ^{222}Rn from uranium milling sites in western United States. The populations considered for potential exposure to risk from

^{222}Rn and associated daughters are the inhabitants of North America between 20° and 60° North latitude. The primary function of these codes is to integrate spatially atmospheric radionuclide concentrations with current population data for the geographic area under consideration. It is expected that these codes will be of assistance to anyone interested in assessing nuclear or nonnuclear population exposures over large geographic areas.

3236 (PB--80-101314) A STUDY OF RADIOACTIVE AIRBORNE EFFLUENTS FROM PARTICLE ACCELERATORS. TECHNICAL REPORT (FINAL). Cehn, J.I. (Teknekron, Inc., McLean, VA (USA)). Aug 1979. Contract EPA-68-01-4997. 115p. NTIS, PC A06/MF A01.

This report discusses radioactive gas production around non-Federally owned particle accelerators, and the release of such gases to the atmosphere. The estimated 1200 non-Federally owned accelerators in the United States are categorized by type and energy, and the potential for radiogas production is discussed for various types. The results of field monitoring around two machines (a cyclotron and a Van de Graaff) are also presented. Estimates of annual radiogas releases from generic accelerator facilities are made. The isotopes of interest are: tritium (target gas) from a generic Van de Graaff; nitrogen-13, oxygen-15, and carbon-11 from a generic cyclotron; and argon-41 from a generic linac. Finally, control technologies to reduce airborne releases of these isotopes are discussed.

3237 (PEL--270) ENVIRONMENTAL RADIOACTIVITY AT THE NATIONAL NUCLEAR RESEARCH CENTRE, PELINDABA. REPORT FOR THE YEAR 1978. Prinsloo, L.; Goodwin, B.; De Jesus, A.S.M. (Atomic Energy Board, Pelindaba, Pretoria (South Africa)). Jul 1979. 14p. NTIS (US Sales Only), PC A02/MF A01.

The revised environmental survey program introduced during 1970 with the emphasis on monitoring of the critical paths of exposure of the general public, was continued in 1978. Results of gamma-spectrometic ^{131}I and ^{90}Sr analyses of milk, the critical material for releases to the atmosphere, are presented. Results of determinations of both gross radioactivity and individual nuclides in samples of fish and water (which are critical materials for liquid-effluent releases) from the Hartbeespoort Dam and from the Crocodile River, are given and discussed. Results are also given of regular investigations of the composition of effluent releases which were below the permissible levels. Levels of deposited and airborne activity from nuclear-bomb tests are reported. No environmental radioactivity resulting from NNRC releases could be detected above the fallout levels.

3238 (PNCT--841-79-03) ATMOSPHERIC DISPERSION CALCULATION FOR POSTURATED ACCIDENT OF NUCLEAR FACILITIES AND THE COMPUTER CODE: PANDA. RELATIVE CONCENTRATION (X/Q) AND RELATIVE CLOUD-GAMMA DOSE (D/Q). Kitahara, Y.; Kishimoto, Y.; Narita, O.; Shinohara, K. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). Jan 1979. 65p. (In Japanese). NTIS (US Sales Only), PC A04/MF A01.

Several Calculation methods for relative concentration (X/Q) and relative cloud-gamma dose (D/Q) of the radioactive materials released from nuclear facilities by posturated accident are presented. The procedure has been formulated as a Computer program PANDA and the usage is explained.

3239 (PNL--3128) SUPPLEMENTAL REPORT ON POPULATION ESTIMATES FOR HANFORD HIGH-LEVEL DEFENSE WASTE DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT. Yandon, K.E.; Landstrom, D.K. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jun 1980. Contract AC06-76RL01830. 31p. NTIS, PC A03/MF A01.

Current and revised population projections based on those previously published in the document Population Distribution in 90-mile Radius of Hanford Meteorological Station and Projections to Year 2300 by Compass Sector and 10 Mile Radii are presented. In addition, there was a need to extend the population estimates out to 1000 and 10,000 years into the future to permit estimation of population radiation doses from accidents affecting the Hanford Facilities directly related to the defense high-level waste disposal alternatives. The methodology used in making the estimates is presented along with the detailed population matrix data required for performing the dose calculations. Although the near-term overall population projections are probably reasonably correct, no claim is made for the accuracy of the detailed data within each individual sector. Long-term estimates are made using reasonable assumptions about the growth potential and possibilities in the Hanford area. No claim of accuracy of these figures is made since they are so highly dependent on actions and conditions that are not predictable. For example, if a major climate change were to occur, the entire Hanford area might be uninhabited at 10,000 years in the future. To provide conservative dose estimates, it was assumed that the Hanford population will experience reasonable and continuous growth throughout the 10,000 year period.

3240 (PNL--3222) MASTER SCHEDULE FOR CY-1980 HANFORD ENVIRONMENTAL SURVEILLANCE ROUTINE PROGRAM. Blumer, P.J.; Houston, J.R.; Eddy, P.A. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Dec 1979. Contract EY-76-C-06-1830. 41p. Dep. NTIS, PC A03/MF A01.

The current schedule of data collection for the routine environmental surveillance program at the Hanford Site is presented. The enviromental surveillance program objectives are to evaluate the levels of radioactive and nonradioactive pollutants in the Hanford environs, as required in Manual Chapter 0513, and to monitor Hanford operations for compliance with applicable environmental criteria given in Manual Chapter 0524 and Washington State Water Quality Standards. Data are reported on the following topics: air; Columbia River; sanitary water; surface water; ground water; foodstuffs; wildlife; soil and vegetation; external radiation measurement; portable instrument surveys; and surveillance of waste disposal sites;

3241 (PNL--3283) ENVIRONMENTAL SURVEILLANCE AT HANFORD FOR CY-1979. Houston, J.R.; Blumer, P.J. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Apr 1980. Contract AC06-76RL01830. 72p. NTIS, PC A04/MF A01.

Environmental data were collected for most environmental media including air, Columbia River water, external radiation, foodstuffs (milk, beef, eggs, poultry, and produce) and wildlife (deer, fish, and game birds), as well as soil and vegetation samples. In general, offsite levels of radionuclides attributable to

Hanford operations during 1979 were indistinguishable from background levels. The data are summarized in the following highlights. Air quality measurements of NO_2 in the vicinity of the Hanford Site and releases of SO_2 onsite were well within the applicable federal and state standards. Particulate air concentrations exceed the standards primarily because of agricultural activities in the area. Discharges of waste water from Hanford facilities in the Columbia River under the National Pollution Discharge Elimination System (NPDES) permit were all within the parameter limits on the permit.

3242 (PNL--3284) ENVIRONMENTAL STATUS OF THE HANFORD SITE FOR CY 1979. Houston, J.R.; Blumer, P.J. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Aug 1980. Contract AC06-76RL01830. 80p. NTIS, PC A05/MF A01.

The Hanford environmental surveillance program provides for the measurement, interpretation, and evaluation of the radiological impact of Hanford operations on its onsite and offsite environs. The program is designed to evaluate all significant potential pathways for the release of radioactivity, especially those that may result in direct exposure of the public and those in which environmental reconcentration of radionuclides is likely to occur. Presented in this report are the results of effluent and environmental monitoring and sampling conducted to determine the onsite impact of ongoing operations.

3243 (PNL--3300(Pt.2), pp 147) WASTE ISOLATION SAFETY ASSESSMENT PROGRAM. Soldat, J.K.; Napier, B.A.; Strenge, D.L.; Watson, E.C. Feb 1980.

Pacific Northwest Laboratory annual report for 1979 to the DOE Assistant Secretary for Environment. Part 2. Ecological sciences.

Several computer codes available for calculation of aerial radiation doses to people were evaluated and those suitable for the WISAP project were modified and converted to the new DOE/RL 1100/44 computer. The codes were used to calculate potential doses from consumption of salt obtained by solution mining of a salt dome. The potential radiation doses were significantly high.

3244 (PNL--3300(Pt.5), pp 71) HANDBOOKS ON EFFLUENT AND ENVIRONMENTAL MONITORING. Feb 1980.

Pacific Northwest Laboratory annual report for 1979 to the DOE Assistant Secretary for Environment. Part 5. Environmental assessment, control, health, and safety.

Issue of the draft Guide for Effluent Monitoring at DOE Installations was postponed pending resolution of further regulatory requirements. Analysis and evaluation of CY-1978 annual environmental surveillance reports from Department of Energy (DOE) nuclear sites were approximately 50% completed. A draft Executive Summary of 1977 environmental impacts from all DOE nuclear sites was completed.

3245 (RHO-CD--79-35-4Q) RADIOACTIVITY IN GASEOUS WASTE DISCHARGED FROM THE SEPARATIONS FACILITIES DURING FOURTH QUARTER OF 1979. Sliger, G.J. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). 22 Feb 1980. Contract AC06-76RL01830. 41p. NTIS, PC A03/MF A01.

This document is issued quarterly for the purpose of summarizing the radioactive gaseous wastes that are discharged from the facilities of the Rockwell Hanford Operations (Rockwell). Data on alpha and beta emissions during 1979 are presented where relevant to the gaseous effluent. Emission data are not included on gaseous wastes produced within the 200 areas by other Hanford contractors.

3246 (SAND--80-0342) SANDIA NATIONAL LABORATORIES 1979 ENVIRONMENTAL MONITORING REPORT. Simmons, T.N. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1980. Contract AC04-76DP00789. 28p. NTIS, PC A03/MF A01.

Sandia National Laboratories in Albuquerque is located south of the city on two broad mesas. The local climate is arid continental. Radionuclides are released from five technical areas from the Laboratories' research activities. Sandia's environmental monitoring program searches for cesium-137, tritium, uranium, alpha emitters, and beta emitters in water, soil, air, and vegetation. No activity was found in public areas in excess of local background in 1979. The Albuquerque population receives only 0.076 person-rem (estimated) from airborne radioactive releases. While national security research is the laboratories' major responsibility, energy research is a major area of activity. Both these research areas cause radioactive releases.

3247 (SLAC--228) ANNUAL ENVIRONMENTAL MONITORING REPORT, JANUARY-DECEMBER 1979. (Stanford Linear Accelerator Center, CA (USA)). May 1980. Contract AC03-76SF00515. 30p. NTIS, PC A03/MF A01.

Environmental monitoring results continue to demonstrate that, except for penetrating radiation, environmental radiological impact due to SLAC operation is not distinguishable from natural environmental sources. During 1979, the maximum measured neutron dose near the site boundary was not distinguishable from the cosmic ray neutron background. There have been no measurable increases in radioactivity in ground water attributable to SLAC operations since 1966. Because of major new construction, well water samples were not collected and analyzed during 1979. Construction activities have also temporarily placed our sampling stations for the sanitary and storm sewers out of service. They will be reestablished as soon as construction activities permit (mid 1980). Airborne radioactivity released from SLAC continues to make only a negligible environmental impact, and results in a site boundary annual dose of less than 0.3 mrem; this represents less than 0.3% of the annual dose from the natural radiation environment, and about 0.06% of the technical standard.

3248 (STI/PUB--482) MONITORING OF AIRBORNE AND LIQUID RADIOACTIVE RELEASES FROM NUCLEAR FACILITIES TO THE ENVIRONMENT. SAFETY SERIES NO. 46: RECOMMENDATIONS. (International Atomic Energy Agency, Vienna (Austria)). 1978. 133p. IAEA.

This manual defines the objectives of effluent monitoring programmes, and to provide guidance on the design of adequate systems and on the choice of appropriate monitoring methods and instruments for different types of nuclear fuel cycle facilities. Examples of the methods and equipment used for measuring radioactive airborne and liquid releases and of comprehensive monitoring programmes and requirements, provided by members of the Advisory Group, are included in the manual as annexes to the main text.

3249 (UCRL--50027-79, pp 1-20)
ENVIRONMENTAL MONITORING AT THE LAWRENCE LIVERMORE LABORATORY. 1979 ANNUAL REPORT. 25 Apr 1980.

Environmental monitoring at the Lawrence Livermore Laboratory. 1979 annual report.

In 1979, the annual average airborne gross beta activity in Livermore Valley air samples was 2.6 x 10^{-14} µCi/ml, or less than half the average observed in 1978. There were no atmospheric nuclear shots in 1979; therefore, fission products seen in the January air filters are probably a result of residual activity from the December 14, 1978 nuclear test in China. Airborne ^{238}U concentrations at Site 300 were higher than those at Livermore because of the depleted uranium used in high-explosive tests at the Site. However, these concentrations were well below the standards set by DOE. The average annual beryllium concentrations were less than 1% of the appropriate standard at both the Laboratory perimeter and Site 300. Water samples collected in the Livermore Valley and at Site 300 exhibit gross beta and tritium activities within the ranges previously observed in these areas. Tritium analyses were made on well-water-samples collected near the Livermore Water Reclamation Plant (LWRP). As was found during the 1977 and 1978 surveys, the highest tritium values were detected in wells west of the plant near Arroyo Las Positas; however all concentrations were well below the standards set by DOE. As a means of evaluating the possible impact of Laboratory effluents on locally grown foodstuff, the tritium content of Livermore Valley wines was compared with values from other California and European wines. The tritium levels in Livermore Valley wines were found to be within the range in both European wines and surface waters throughout the world and somewhat higher than those in California wines. Assessments of the calculated radiation dose to an individual from the environmental concentrations listed demonstrates that the dose contribution from Laboratory operations in 1979 was small compared with the dose received locally from natural sources.

3250 (UCRL--52959) UTILIZATION OF THE ATMOSPHERIC RELEASE ADVISORY CAPABILITY (ARAC) SERVICES DURING AND AFTER THE THREE MILE ISLAND ACCIDENT. Knox, J.B.; Dickerson, M.H.; Greenly, G.D.; Gudiksen, P.H.; Sullivan, T.J. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 1 Jul 1980. Contract W-7405-ENG-48. 37p. NTIS, PC A03/MF A01.

At 0820 PST on 28 March 1979, the Department of Energy's Emergency Operations Center advised the Atmospheric Release Advisory Capability (ARAC) that the Three Mile Island nuclear power plant in Harrisburg, Pennsylvania, had experienced an accident some four hours earlier, resulting in the atmospheric release of xenon-133 and krypton-88. This report describes ARAC's response to the Three Mile Island accident, including the role ARAC played throughout the 20 days that real-time assessments were made available to the Department of Energy on-scene commander. It also describes the follow-up population-dose calculations performed for the President's Commission on Three Mile Island. At the request of the Nuclear Regulatory Commission, a questionnaire addressing the usefulness of ARAC products during the accident was sent to ARAC-product users. A summary of the findings from this questionnaire, along with recommendations for improving ARAC service, is also presented. The accident at Mississauga, Ontario, Canada, is discussed in the context of a well-planned emergency response by local and Federal officials.

3251 DOSE-RATE CONVERSION FACTORS FOR EXTERNAL EXPOSURE TO PHOTON AND ELECTRON RADIATION FROM RADIONUCLIDES OCCURRING IN ROUTINE RELEASES FROM NUCLEAR FUEL CYCLE FACILITIES. Kocher, D.C. (Oak Ridge National Lab., TN (USA)). Health Physics ; 38: No. 4, 543-621(Apr 1980).

Dose-rate conversion factors for external exposure to photon and electron radiation are calculated for 240 radionuclides of potential importance in routine releases from nuclear fuel cycle facilities. Exposure modes considered are immersion in contaminated air, immersion in contaminated water, and irradiation from a contaminated ground surface. For each exposure mode, dose-rate conversion factors for photons and electrons are calculated for tissue-equivalent material at the body surface of an exposed individual. Dose-rate conversion factors for photons only are calculated for 22 body organs.

3252 ENVIRONMENTAL RADIATION EXPOSURE DUE TO EXHAUST AIR OF THE REPROCESSING PLANT. Bonka, H. (Technische Hochschule Aachen (Germany, F.R.). Lehrstuhl fuer Reaktortechnik). Atomkernenergie/Kerntechnik ; 35: No. 2, 134-141(1980). (In German).

Nowadays the emissions of radioactive material in nuclear facilities are so low that the radiological impact on the population compared to the effect of the natural radiation exposure is negligibly low. For the planned reprocessing plant for higher emissions have to be taken into account. Due to the increase of the emission height of 100 to 200 m it becomes possible to lower the individual doses so far using conventional retention techniques that the data remain under the limits given by the radiation protection ordinance. The collective doses, however, do not change by this. Due to cost-benefit analysis and taking into account the expected doses in the future due to globally distributed long-lived radionuclides, H3 should be retained to 80-90%, C14 to approx. 90%, Kr 85 to approx. 95% and J129 to approx. 99,5% in the planned large reprocessing plant. For the aerosols a decontamination factor of approx. 10^9 should be aimed at.

3253 MODEL FOR CALCULATING THE MEAN GAMMA DOSE FROM A CONTINUOUSLY EMITTING SOURCE OF AIRBORNE RADIOACTIVITY. Sowa, W.; Krueger, F.W. (Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin (German Democratic Republic)). Kernenergie ; 22: No. 12, 429-432(Dec 1979). (In German).

From 11. winter school on radiation protection physics; Gaussig, German Democratic Republic (26 Feb - 2 Mar 1979).

A simple model for calculating the mean gamma dose rate from a continuously emitting source of airborne radioactivity has been developed. In this model the radioactive cloud is approximated by a disk-shaped source, the specific source strength being constant by height and inversely proportional to the distance from the point of emission. A comparison with the program METEOR II recommended for exposure calculations in the GDR shows good agreement for a wide range of distances.

3254 POLLUTION CONTROL IN ENGLAND AND WALES (PART 2). Bennett, G. (Univ of East Anglia, UK). Environmental Policy and Law ; 5: No. 4, 190-193(Oct 1979).

Methods currently used to control pollution in England and Wales are described. Areas of

radioactivity control discussed are wastes, discharges, construction of nuclear installations, nuclear information publication, and occupational exposure. The history of pollution regulation in England and features of the legislation are described. The history of nuclear development planning in England is outlined, and relevant legislation is discussed. The development of statuary regulation of pollution in England has been incremental, with little coordination or integration, resulting in administrative complications, control overlaps, and areas of no defined control.

3255 ENVIRONMENTAL ASPECTS OF TRITIUM. Quisenberry, D.R. (Mercer Univ., Macon, GA (USA). Dept. of Physics). Environmental Pollution (London) ; 20: No. 1, 33-43(Sep 1979).

The potential radiological implications of environmental tritium releases must be determined in order to develop a programme for dealing with the tritium inventory predicted for the nuclear power industry which, though still in its infancy, produces tritium in megacurie quantities annually. Should the development of fusion power generation become a reality, it will create a potential source for large releases of tritium, much of it in the gaseous state. At present about 90% of the tritium produced enters the environment through gaseous and liquid effluents and is deposited in the hydrosphere as tritiated water. Tritium can be assimilated by plants and animals and organically bound, regardless of the exposure pathway. However, there appears to be no concentration factor relative to hydrogen at any level of food chains analysed to date. The body burden, for man, is dependent on the exposure pathway and tissue-bound fractions are primarily the result of organically bound tritium in food.

3256 ANALYSIS OF NRC METHODS FOR ESTIMATING THE EFFECTS OF DRY DEPOSITION IN ENVIRONMENTAL RADIOLOGICAL ASSESSMENTS. Miller, C.W.; Hoffman, F.O. (Oak Ridge National Lab., TN). Nuclear Safety ; 20: No. 4, 458-467(Jul 1979).

The methods contained in Meteorology and Atomic Energy - 1968, which are commonly used for estimating the effects of dry deposition in radiological assessments, have been compared to the methods contained in Nuclear Regulatory Commission (NRC) Regulatory Guide 1.111. Although designed for use when determining compliance with Title 10, Code of Federal Regulations, Part 50, Appendix I for light-water-cooled reactors, the NRC guide has the potential of being used for other types of nuclear reactors and for nuclear facilities as well. This comparison has raised a number of concerns about the NRC approach: (1) deposition rate estimates are independent of the user's calculated air concentration; (2) deposition estimates for elevated releases seem too high close to the source; and (3) the plume depletion curves in the guide do not behave as expected relative to the commonly used plume depletion method. In view of these concerns, it is recommended that other, simpler approaches to these processes be considered for radiological assessment purposes.

3257 COST-EFFECTIVENESS OF THE FENCELINE COW. Eichholz, G.G.; Lando, A.V. (Georgia Inst. of Tech., Atlanta (USA). School of Nuclear Engineering). Health Physics ; 37: No. 1, 174-176(Jul 1979).

The grass-cow-milk pathway for ^{131}I is one of the main contributers to estimated population dose from BWR's and PWR's. Such estimates assume a cow at the fenceline grazing for 12 months of the year. Reductions in the population dose would require a trade-off, based on cost-effectiveness criteria, between additions to the effluent treatment system, expanding the exclusion area, or raising the stack height. It is suggested that a more practical and more cost-effective means may be provided by redistribution of nearby dairy cattle (or goats), and that the plant operator buy these animals and/or contract with the land owner(s) to use the land for alternative crops. Even a subsidy to compensate the farmer for any financial losses entailed in these changes might be less expensive than alternative technical installations to lower iodine effluent levels. Figures are provided to illustrate these points.

3258 ANNUAL REPORT ON RADIOACTIVE DISCHARGES AND MONITORING OF THE ENVIRONMENT 1978. Risley; British Nuclear Fuels Limited (Jul 1979). 64p.

In this annual report, information is given on radioactive discharges and environmental monitoring for all the Works and Sites belonging to British Nuclear Fuels Limited (BNFL) in the provision of nuclear fuel cycle services. The report covers the Windscale and Calder Works and the Drigg Storage and Disposal site; Chapelcross Works; Springfields Works and Ulnes Walton Disposal Site; and Capenhurst Works. The radioactive discharges and environmental monitoring associated with these Works were considered mainly in relation to liquid or airborne radioactive effluent and solid radioactive waste. An assessment of maximum radiological exposures to individual members of the public is given and expressed in terms of limits based on the recommendations of the International Commission on Radiological Protection (ICRP) as advised by the National Radiological Protection Board (NRPB). It is concluded that at no time during 1978 did discharges at any of the Works exceed those laid down in any of the Authorisations. Also, the environmental monitoring studies showed that the radiation exposure in 1978 of the most highly exposed groups of the general population was significantly lower than the limits recommended by the ICRP. (UK).

3259 POTENTIAL IMPORTANCE OF RESUSPENSION DURING CHRONIC RELEASES TO THE ATMOSPHERE. Kocher, D.C. (Oak Ridge National Lab., TN). Transactions of the American Nuclear Society ; 32: 105-106(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

Contribution of resuspension of radioisotopes to air concentrations and radiation exposures. NUCLEAR FACILITIES; RADIOACTIVE EFFLUENTS;SURFACE AIR;RADIOACTIVITY; PARTICLE RESUSPENSION;ENVIRONMENTAL TRANSPORT; RADIOISOTOPES;MATHEMATICAL MODELS;RADIATION DOSES

3260 APPLICATION OF THE FINITE ELEMENT METHOD TO THE CALCULATION OF ATMOSPHERIC TRANSPORT FROM LARGE AREA SOURCES. Yuan, Y.C. (Argonne National Lab., IL). Transactions of the American Nuclear Society ; 32: 108-109(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

MILL TAILINGS;RADON;EARTH ATMOSPHERE; ENVIRONMENTAL TRANSPORT;RADIONUCLIDE MIGRATION; MATHEMATICAL MODELS;COMPUTER CALCULATIONS; NUMERICAL SOLUTION;FINITE ELEMENT METHOD

3261 TRACE ELEMENT ANALYSIS OF RADIOLOGICAL EFFLUENTS FROM COAL-BURNING POWER PLANTS. Chenini, A.; Koslin, M.; Malaviya, B.K.; White, F.A. (Rensselaer Polytechnic Inst., Troy, NY). Transactions of the American Nuclear Society ; 32: 136-137(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

TRACE AMOUNTS;RADIOACTIVE EFFLUENTS;FOSSIL-FUEL POWER PLANTS;COAL;BOILER FUEL;COMBUSTION PRODUCTS;URANIUM;THORIUM;FISSION PRODUCTS;FUEL CYCLE;HEALTH HAZARDS;MEASURING METHODS; QUANTITATIVE CHEMICAL ANALYSIS

3262 RADIOACTIVITY OF FLY ASHES FROM COAL POWER PLANTS. Papastefanou, C.; Charalambous, S. (Aristotle Univ. of Thessaloniki (Greece). Dept. of Nuclear Physics). Zeitschrift fuer Naturforschung, Teil A: Physik, Physikalische Chemie, Kosmophysik ; 34: No. 5, 533-537(May 1979).

The radioactivity of Greek lignites and their ashes was studied. It was found that the radionuclides in them belong to the uranium series. Fly ashes are relatively rich in radioactivity. Concentrations up to 7 x 10^{-5}g/g and 12pCi/g were measured for ^{238}U and ^{226}Ra, respectively. The associated hazards from radioactivity escaping from stacks of thermopower plants or when fly ashes are used as subtitutes of cement in concrete are evaluated. (orig.).

3263 ATTENUATION OF RADON FLUX FROM URANIUM MILL TAILINGS BY CONSOLIDATION. Busigin, A.; Nathwani, J.S.; Phillips, C.R. (Toronto Univ., Ontario (Canada). Dept. of Chemical Engineering and Applied Chemistry). Health Physics ; 36: No. 3, 393-399(Mar 1979).

A method is developed for predicting the effectiveness of consolidation of uranium mill tailings in reducing the releases of radon derived from decay of radium. The method is based upon a model of the diffusion process in terms of emanation coefficients and diffusivities, and provides for easy experimental evaluation of these parameters. From the model, the minimum effective depth of consolidated tailings can be predicted.

3264 ENVIRONMENTAL RADIOLOGICAL SURVEILLANCE IN PERSPECTIVE: THE RELATIVE IMPORTANCE OF ENVIRONMENTAL MEDIA AS A FUNCTION OF EFFLUENT PATHWAY AND RADIONUCLIDES. Denham, D.H. (California Univ., Livermore (USA). Lawrence Livermore Lab.). Health Physics ; 36: No. 3, 273-281(Mar 1979).

Most published guides for environmental radiological surveillance emphasize the collection and analysis of specific media (e.g. air, water, milk, direct radiation), without indicating the absolute or relative importance of the media sampled or of the radio analyses performed. To determine the relative importance of medium/nuclide combinations in environmental surveillance, the experience at major DOE sites and at operating nuclear power plants was reviewed. Typical release rates for nuclide groupings (tritium, noble gases, radioiodine, mixed fission or activation products, and transuranics) in those effluent streams were obtained from the literature. Using these release rates, followed through various environmental pathways, radiation doses were calculated for individuals in the local environs of each type of site. Following these calculations, each medium was ranked for a given nuclide/effluent pathway combination providing the relative importance of sampling specific environmental media with emphasis on the radiation dose to a critical population group. Finally, the results of these environmental pathway studies are presented in tabular form to provide ready reference for environmental surveillance program design or evaluation.

3265 ISOLATION AND CHARACTERIZATION OF INDIVIDUAL PLUTONIUM-BEARING PARTICLES IN ATMOSPHERIC EFFLUENTS FROM A NUCLEAR PROCESSING PLANT. Sanders, S.M. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Health Physics ; 36: No. 3, 371-385(Mar 1979).

A method for isolating and characterizing individual particles containing fissionable materials is described. Membrane filters, used to collect the particles from atmospheric effluents from a nuclear processing plant, are cast into films composed of polycarbonate matrix containing the particles. Collected particles containing plutonium or other fissionable materials are identified by fission fragment tracks produced by irradiating the film with thermal neutrons. The nature of the fissionable material is identified by coating the film with nuclear track emulsion and measuring the ratio of alpha particle tracks in the emulsion to the fission fragment tracks in the polycarbonate film. Single particles are isolated by excising small squares from the film and are prepared for sizing and electron microbeam analysis by peeling the emulsion off the film square, placing the square on a beryllium sample-mounting block, and washing the polycarbonate away from the particle.

3266 RADIORUTHENIUM IN THE ENVIRONMENT. Iwashima, K. (Institute of Public Health, Tokyo (Japan)); Morita, S. Radioisotopes (Tokyo) ; 28: No. 3, 184-193(Mar 1979). (In Japanese).

A change in the amount of radioruthenium in the environment (due to nuclear tests and drainage from atomic energy plants) and the exposure dose are discussed. The level of ^{106}Ru in the environment due to radioactive fallout, changes in the level, and the characteristics of these changes are reported. Pollution caused by ^{106}Ru in drainage from atomic energy plants, especially from the Windscale reprocessing factory in the United Kingdom (which release Ru in the greatest amount), changes in the amount of Ru released and in the levels of environmental pollution, and the movement of Ru in the environment are considered. The intake of Ru into the human body by consumption of food produced in polluted areas and by inspiration of Ru present in the air is estimated. (Tsunoda, M.).

3267 RADIOLOGICAL ENVIRONMENTAL IMPACT OF HIGH-ENERGY ACCELERATORS. Thomas, R.H.; Rindi, A. (Univ of California, Berkeley; Univ of Pisa, Italy). CRC Critical Reviews in Environmental Control ; 9: No. 1, 51-95(Feb 1979).

The degree of radiation from high energy accelerators that filters into the environment and its possible effects on humans are discussed. Four possible impacts of radiation from high energy accelerators are: the production of radiation fields in the immediate area of accelerator operation; the production of radionuclides and noxious chemicals in the accelerator vault air and their subsequent release; the production of radionuclides in soil and groundwater near the accelerator; and the induction of long-lived radionuclides in accelerator components, such as copper, brass,

iron, or aluminum, that may eventually be recycled. Studies conducted to date to investigate the problem of radiation contamination from high energy accelerators indicate that no significant population exposure from the accelerators is expected at present energies and intensities. (3 diagrams, 13 graphs, 8 photos, 108 references, 15 tables)

3268 RADIOACTIVITY FROM FOSSIL-FUEL POWER PLANT AND ITS EFFECTS. Okamoto, K. (New South Wales Univ., Kensington (Australia). School of Mathematics). Genshiryoku Kogyo (Nuclear Engineering) ; 25: No. 2, 65-72(Feb 1979). (In Japanese).

Thermal power plants burning fossil fuel are now producing air pollution beyond almost tolerable level. Apart from demand/supply situation of fuels, in this connection, nuclear energy is the foremost one of available sources. Though hardly believable, thermal power plants, especially those burning coal, are emitting the appreciable quantity of radioactivity. This is due to the radioactive impurity elements contained in coal and petroleum, such as U, Th and their daughter nuclides, and these are continuously released to the atmosphere through stacks. The radioactivity from thermal power plants, in comparison with that from nuclear power plants, presents significant problems. That is, several of the radionuclides emitted have high possibility of biological concentration, and also extremely long half-lives. The radioactivity problem of thermal power plants, burning coal in particular, is described in comparison with that of nuclear power plants. (J.P.N.).

3269 RADIOACTIVE WASTE MANAGEMENT AND EXPOSURE SITUATION FOR PEOPLE ENGAGING IN NUCLEAR POWER PLANT FACILITIES. Genshiryoku Iinkai Geppo (Journal of Atomic Energy Commission) ; 23: No. 9, 188-204(Jan 1979). (In Japanese).

The radiowaste management and the exposure situation for the people employed in nuclear power plant facilities were investigated, and the results were reported by the Nuclear Safety Department of the Science and Technology Agency. As for the radiowaste management, the operational situation of power reactor facilities and the actual state of the radiowaste release from nuclear power plant facilities in 1977 fiscal year are tabulated for each type of GCR, BWR and PWR. These data in each latest fiscal year are also given. The plant utilization factors were about 68%, 4-56% and 0-77% for GCR, BWR and PWR, respectively. The maximum release rates of radioactive rare gas were about 8000 Ci, 7000 Ci (four plants in total) and 400 Ci (three plants in total) during one year for GCR, BWR and PWR, and under the conditions written above, the release rates were about 0 Ci, 10^{-1} Ci and 10^{-3} Ci of radioactive iodine gas, 0.1 Ci, 0.2 Ci and 0.01 Ci of radioactive liquid, and about 600 drums, 10000 drums and 2000 drums of solid wastes. These release rates did not much fluctuated in each latest fiscal year. The release rates of tritium in the liquid waste from PWR were much more than that from BWR. As for the situation of radiation exposure management for the workers, the actual exposure data were compared to the regularly allowable value, three rem in three months. The actual average exposure values were about 0.1 rem, 0-0.7 rem and 0-0.2 rem during 1977 fiscal year for GCR, BWR and PWR, respectively, and no one was exposed to more than three rem in three months. These measured values were sufficiently lower than the allowable value. The data show a tendency that the actual exposure values for the contractor workers were much more than that for the staffs of electric power companies, and these values per year did not much increase during the latest eight years.

3270 ANNUAL RATE OF RELEASE OF RADON TO THE ATMOSPHERE AS A RESULT OF COAL COMBUSTION IN THE UNITED KINGDOM. Blackburn, R.; Gueran, J. (Salford Univ. (UK). Dept. of Chemistry and Applied Chemistry). Radiation Physics and Chemistry ; 13: No. 3-4, 145-147(1979).

Twenty-one samples of fly-ash have been analysed for uranium by a method based on thermal neutron fission of uranium-235 followed by detection of the short-lived delayed-neutron emitting fission products. The ash samples were obtained from power stations deriving their coal from important but widely separated coal-fields and the uranium analyses give a global average of about 10 ppm uranium in ash. This figure has been used to calculate the release of radon-222, a daughter product of uranium-238, assuming secular equilibrium in the (4n + 2) series and complete release of the inert gas on combustion. The uranium content of the total annual U.K. production of coal is estimated as 240 tonnes and the annual associated radon-222 release is therefore about 100 curies.

3271 CALCULATION OF THE DEPLETION OF A RADIOACTIVE PLUME IN THE ATMOSPHERE AND SUBSEQUENT EXPOSURE DUE TO DEPOSITED ACTIVITY. Strachan, S.J.; Goddard, A.J.H. (Imperial College of Science and Technology, London). Annals of Nuclear Energy ; 6: No. 2, 91-101(1979).

Presented is an efficient method for calculating the depletion, by dry deposition and washout to the ground, of a plume of fission products in the atmosphere, and for determining the isotopic composition of resulting gamma and beta activities in the ground deposit at any selected point downwind. By integration over the pattern of material on the ground, gamma and beta exposure rates may be derived as a function of the aging time of the deposit. Calculations performed for a notional Magnox depressurization accident with single channel meltdown illustrate the sensitivity of ground gamma spectra and exposure rate to the use of isotope-dependent deposition velocities. (1 diagram, 9 graphs, 49 references, 7 tables)

3272 IMPACT ON THE ENVIRONMENT OF TRITIUM RELEASES FROM THE KARLSRUHE NUCLEAR RESEARCH CENTER. Koenig, L.A. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Abt. Strahlenschutz und Sicherheit). pp 591-610 of Behaviour of tritium in the environment. Vienna, Austria; International Atomic Energy Agency (1979).

From Symposium on the behavior of tritium in the environment; San Francisco, CA, USA (16 Oct 1978).

Since 1969 tritium activities of $(1.2\text{-}2.1)\times10^{3}$ Ci/a have been released into the atmosphere from the Karlsruhe Nuclear Research Center. These releases have given rise to contamination which can be detected by means of the liquid scintillation measuring technique (detection limit attained about 0.15 pCi/ml) without enrichment. Estimates based on precipitation measurements have shown that a small portion of 5×10^{-4} of the tritium activity released is deposited within an area of 1 km radius around the FR 2 stack. In 1977 the tritium precipitation from fall-out was of the same order of magnitude (213 mCi/km^2). The

contamination of soil by tritium within the fenced area of the Karlsruhe Nuclear Research Center ranges from 10 to 1 pCi/ml of soil humidity, each value averaged over a depth of 0 to 80 cm. The highest values have been measured in the immediate neighbourhood of the sewage clarification plant of the Nuclear Research Center (ground level source) and of the heavy-water-moderated MZFR reactor (200 MW(th), 100-m high exhaust stack). Simultaneous measurements of the air humidity, precipitations, soil humidity and tissue water of plants show that the tritium concentration in plants follows the variation with time of the tritium contamination in the air humidity and of precipitations. These variations are caused by fluctuating release rates and meteorological conditions. The radiation exposure of persons from tritium remains below 1 mrem/a.

3273 FIFTEEN YEARS OF EXPERIENCE IN HANDLING TRITIUM PROBLEMS IN CONNECTION WITH LOW-ENERGY PARTICLE ACCELERATORS. Sauermann, P.F.; Friedrich, W.; Knieper, J.; Printz, H. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Chemie). pp 671-685 of Behaviour of tritium in the environment. Vienna, Austria; International Atomic Energy Agency (1979).

From Symposium on the behavior of tritium in the environment; San Francisco, CA, USA (16 Oct 1978).

The leakage of tritium to the environment in connection with transport, storage and installation of high-activity tritium targets was investigated. The release and distribution of tritium in the environment from target changing and during normal operation of the accelerator were also studied, as well as tritium hazards arising from the contamination of shipping containers, certain sections of the accelerator system, cooling water and pump oil. New procedures suitable for the conditioning of tritium such as those found in pump oils, scintillator solutions, cooling water, absorption cartridges and used targets, are discussed.

3274 LARGE-SCALE DISTRIBUTION OF TRITIUM IN A COMMERCIAL PRODUCT. Combs, F.; Doda, R.J. (Nuclear Regulatory Commission, Washington, DC (USA)). pp 93-99 of Behaviour of tritium in the environment. Vienna, Austria; International Atomic Energy Agency (1979).

From Symposium on the behavior of tritium in the environment; San Francisco, CA, USA (16 Oct 1978).

Tritium enters the environment from various sources including nuclear reactor operations, weapons testing, natural production, and from the manufacture, use and ultimate disposal of commercial products containing tritium. A recent commercial application of tritium in the United States of America involves the backlighting of liquid crystal displays (LCD) in digital electronic watches. These watches are distributed through normal commercial channels to the general public. One million curies (MCi) of tritium were distributed in 1977 in this product. This is a significant quantity of tritium compared with power reactor-produced tritium (3MCi yearly) or with naturally produced tritium (6MCi yearly). This is the single largest commercial application involving tritium to date. The final disposition of tritium from large quantities of this product, after its useful life, must be estimated by considering the means of disposal and the possibility of dispersal of tritium concurrent with disposal. The most likely method of final disposition of this product will be disposal in solid refuse; this includes burial in land fills and incineration. Burial in land fills will probably contain the tritium for its effective lifetime, whereas incineration will release all the tritium gas (as the oxide) to the atmosphere. The use and disposal of this product will be studied as part of an environmental study that is at present being prepared for the U.S. Nuclear Regulatory Commission.

3275 DISCHARGES OF TRITIUM TO THE ENVIRONMENT FROM UNRESTRICTED USE OF CONSUMER PRODUCTS CONTAINING THIS RADIONUCLIDE. Wehner, G. (Bundesministerium des Innern, Bonn (Germany, F.R.)). pp 79-91 of Behaviour of tritium in the environment. Vienna, Austria; International Atomic Energy Agency (1979).

From Symposium on the behavior of tritium in the environment; San Francisco, CA, USA (16 Oct 1978).

Not only nuclear installations but also consumer products containing tritium are an important source of man-made tritium discharge to the environment. In the Federal Republic of Germany about the same tritium activity is annually added to consumer products as is released each year from all nuclear installations. The total tritium activity distributed may rise considerably if devices with Gaseous Tritium Light Sources (GTLS) are permitted for large-scale unrestricted use and consequently also for large-scale uncontrolled disposal. The tritium added to consumer products and, at least partly, finally discharged to the environment is converted to HTO and participates in the normal water cycle of the earth. Therefore it would be very desirable to know how much tritium is used worldwide for such purposes, and it is proposed that the competent national authorities should report to an international organization the amount of tritium in consumer products permitted for unrestricted use and disposal. Finally a review of the normal waste management of tritium in the Federal Republic of Germany is given, and doses that could result from incineration and pyrolysis of waste contaminated with tritium are assessed.

3276 AIRBORNE PLUME DISPERSION FROM TWO-DIMENSIONAL COMPUTATIONAL HYDRODYNAMIC SIMULATIONS. Bennett, R.G.; Golay, M.W. (Massachusetts Inst. of Tech., Cambridge). Transactions of the American Nuclear Society ; 33: 179-180(1979). (CONF-791103--).

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

PLUMES;ATMOSPHERIC CHEMISTRY;MATHEMATICAL MODELS;THERMAL EFFLUENTS;RADIOACTIVE EFFLUENTS; HYDRODYNAMICS

3277 APPLICATIONS OF IN SITU GE(LI) SPECTROMETRY. Ishida, K. (Central Research Inst. of Electric Power Industry, Tokyo, Japan); Ohba, T.; Kobayashi, A.; Kitada, Y. Transactions of the American Nuclear Society ; 33: 181-182(1979). (CONF-791103--).

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

RADIOACTIVE EFFLUENTS;PLUMES;RADIATION DOSES; MONITORING;GAMMA SPECTROMETERS;NUCLEAR FACILITIES;VARIATIONS;RAIN

3278 ASSESSMENT OF NOBLE GAS RELEASES FROM THE THREE MILE ISLAND UNIT 2 ACCIDENT. Woodard, K.; Potter, T.E. (Pickard, Lowe and Garrick, Inc., Washington, DC). Transactions of the American Nuclear Society ; 33: 191-193(1979). (CONF-791103--).

From American Nuclear Society meeting; San

Francisco, CA, USA (12 Nov 1979).
THREE MILE ISLAND-2 REACTOR;ACCIDENTS; RADIOACTIVE EFFLUENTS;RARE GASES;RADIATION DOSES;MEASURING METHODS

3279 MODIFICATION OF THE REACTOR SAFETY STUDY CONSEQUENCES COMPUTER PROGRAM (CRAC) TO INCLUDE PLUME TRAJECTORIES. Woodard, K.; Potter, T.E. (Pickard, Lowe and Garrick, Inc., Washington, DC). Transactions of the American Nuclear Society ; 33: 193-194(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
C CODES;PLUMES;RADIOACTIVE EFFLUENTS; RADIATION DOSES;ENVIRONMENTAL TRANSPORT; COMPUTERIZED SIMULATION;ACCIDENTS

3280 REAL-TIME SIMULATION OF GAMMA EXPOSURE RATE BY PUFF MODEL. Ichikawa, Y. (Central Research Inst. of Electric Power Industry, Tokyo, Japan); Ohba, T.; Kobayashi, A.; Kitada, Y. Transactions of the American Nuclear Society ; 33: 194-195(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
NUCLEAR POWER PLANTS;RADIOACTIVE EFFLUENTS; PLUMES;RADIATION DOSES;MATHEMATICAL MODELS; DIFFUSION

3281 DISPERSION PARAMETERS: IMPACT ON CALCULATED REACTOR ACCIDENT CONSEQUENCES. Aldrich, D.C. (Sandia Labs., Albuquerque, NM). Transactions of the American Nuclear Society ; 33: 200-202(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
ACCIDENTS;RADIOACTIVE EFFLUENTS;DIFFUSION; MATHEMATICAL MODELS;COMPARATIVE EVALUATIONS; MORTALITY;HUMAN POPULATIONS

3282 REVISED METHOD TO CALCULATE THE CONCENTRATION TIME INTEGRAL OF ATMOSPHERIC POLLUTANTS. Voelz, E. (Preussische Elektrizitaets-A.G. (Preussenelektra), Hannover (Germany, F.R.)); Schultz, H. (Hannover Univ. (Germany, F.R.). Arbeitsgruppe fuer Technischen Strahlenschutz). Atomkernenergie/Kerntechnik ; 34: No. 3, 209-212(1979). (In German).
It is possible to calculate the spreading of a plume in the atmosphere under instationary and inhomogeneous conditions by introducing the 'particle-in-cell'-method. That has a systematical advantage over the steady state Gaussian plume model usually used. Especially the fixed-point concentration time integral is claculated realistically instead of the locally integrated concentration at a constant time as is done in the plume model in this way inaccuracies due to the computational techniques may be avoided for short-time emissions, because both integrals do not lead to the same results. (orig.).

3283 RADIATION SITUATION ON THE PREMISES OF THE INSTITUTE OF NUCLEAR RESEARCH IN REZ. Dlouhy, Z.; Safar, O.; Kropikova, S. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Nukleon ; No. 1, 19-21(1979). (In Czech).
Radiation situation at UJV and the way of measuring and evaluating exposure rates are described. It is shown that the radiation levels are below the limit specified by the Czechoslovak authorities, this even outside the buildings containing the biggest sources of ionizing radiation.

3284 US MEASURES COAL-FIRED RADIOACTIVE HAZARD. New Scientist ; 80: No. 1133, 831(14 Dec 1978).
Radioactive pollution from coal-fired power stations can be more serious than pollution from nuclear power stations if people living nearby eat locally-grown food contaminated with fly ash containing uranium and thorium. In this US study it was assumed that all the food consumed would be grown locally. It is pointed out that the health effects of the doses received are small.

3285 GUIDELINE CONCERNING THE MEASUREMENT OF EMITTED RADIOACTIVE SUBSTANCES IN LIGHT WATER POWER REACTOR FACILITIES. No. 106, 42-49(Dec 1978). (In Japanese).
In this guideline, the standard method is determined, by which the radioactivity of the radioactive substances in gaseous and liquid wastes released into the environment at the time of the normal operation of light water power reactor facilities is measured. The measuring method decided in this guideline is based on the measuring techniques and experiences at present, but it should be revised according to circumstances corresponding to the development of measuring techniques. Moreover, in case of measuring by the other method than that stipulated in this guideline, also that method is approved if the sufficient grounds are found. This guideline is applied to light water power reactor facilities, but it may be the reference for the method of measuring the nuclides in the other reactor facilities. As for the gaseous and liquid radioactive substances released from light water power reactor facilities, the nuclides to be measured, the lower limit of concentration to be measured, and the frequency of measurement are stipulated, considering the condition of release, the physical and chemical properties of the radioactive substances, the method of release control and so on. Sampling must be carried out by the method which can represent the concentration of released radioactive substances. The method of measuring radioactivity, the calculation of the amount of released radioactivity, and recording method are stipulated. (kako, I.).

3286 EXPLANATION OF GUIDELINE CONCERNING THE MEASUREMENT OF EMITTED RADIOACTIVE SUBSTANCES IN LIGHT WATER POWER REACTOR FACILITIES. No. 106, 50-139(Dec 1978). (In Japanese).
The Atomic Energy Commission of Japan established the ''Guideline concerning the target value of dose in the surroundings of light water power reactor facilities'' in May. 1975, and showed the target value of dose as the aim of endeavor for keeping low the exposure dose of public in surroundings by the release of radioactive substances into environment at the time of normal operation. In nuclear power stations, the release control is to be carried out by determining the target value for the release control on the basis of this guideline, and so as not to exceed that value. Based on these situations, in the new guideline, the standard method was decided in order to unify the measuring method concerning the amount of radioactivity of the radioactive substances released from light water power reactor facilities at the time of normal operation, when the measurement is carried out in connection with the target value for release control. Emphasis was placed on the measuring method for the radioactive nuclides determined in the target value for release control, and it is the basic approach to measure each radioactive nuclide corresponding to its

property, bacause released substances are composed of the nuclides with different physical and chemical properties. The nuclides to be measured, the lower limit of concentration to be measured and the frequency of measurement, the measuring method, the sampling method, the calibration of instruments, the calculation of the amount of released radioactivity and others are explained. (Kako, I.).

3287 ESTIMATION OF INHALATION DOSES FROM AIRBORNE RELEASES USING GROSS MONITORS. Goldstein, N.P. (Westinghouse Electric Corp., Pittsburgh, PA (USA). Research and Development Center). Health Physics ; 35: No. 5, 675-683(Nov 1978).

Monitoring programs at most nuclear facilities involve continuous gross measurements supplemented by periodic isotopic analyses of release samples. Isotopic measurements are required to accurately assess the potential dose from the various effluent streams, but in between these measurements, one depends on the gross monitors to provide approximate indications of the dose. The effluent streams release a variety of nuclides, each with its own dose factor. This means that the relationship between the counting rate in a gross monitor and the potential dose of the effluent being monitored will depend on the isotopic composition of this release. If this composition changes, then the dose indicated by the gross monitor (calibrated for the original group of isotopes) may be significantly in error. The problem of indicating inhalation doses from gross monitoring of airborne releases is considered. In order for this type of monitor to accurately indicate dose, regardless of the isotopic makeup of a release, the analysis shows that its response to each isotope should be proportional to the dose factor of that isotope. These ideas are applied to the monitoring of air particulates using gross beta and gross gamma monitors. The study shows that the former more closely satisfies this condition and as a result, satisfactorily indicates the actual dose from reactor effluents, as determined from detailed isotopic data published in the literature. On the other hand, the gross gamma monitor, with its poorer fit to the condition, provided less than satisfactory accuracy in its dose estimates. In addition, a variety of other mathematical response functions were considered but their dose estimation capabilities were not much better than the straight beta response. The study shows that reasonably accurate dose estimates can be made using properly selected gross monitors, but that significant errors can result with improper ones.

3288 DIFFUSION COEFFICIENTS OF AIRBORNE RADIOACTIVE IODINE AND METHYL IODIDE. Krzesniak, J.W.; Porstendoerfer, J. (Centralne Lab. Ochrony Radiologicznej, Warsaw (Poland)). Health Physics ; 35: No. 2, 417-421(Aug 1978).

Airborne ^{131}I from nuclear reactors is a mixture of gaseous elemental I_2, organic iodine compounds and iodine adsorbed on aerosols. A knowledge of the diffusion constants for both I_2 vapour and gaseous methyl iodide is important as they effect the dispersion, adsorption and deposition of radioiodine contamination in the atmosphere. Diffusion constants were determined by measuring the $^{131}I_2$ and $CH_3{}^{131}I$ penetration functions in a cylindrical tube through which air containing $^{131}I_2$ and $CH_3{}^{131}I$ was passed. Values of diffusion constants calculated from the results were Dsub(k) = 8.7 X 10^{-2} cm^2/sec for $CH_3{}^{131}I$ and Dsub(k) = 7.6 X 10^{-2} cm^2/sec for $^{131}I_2$. The size of the diffusion coefficient is close to that of the radon and thoron decay products. Therefore the I_2 activity size distribution, adsorbed by the atmospheric aerosol, is expected to be similar to that of radon progenies, in contrast to the adsorption velocity.

3289 GAS SCRUBBER, INSTALLATION AND PROCESS TO MAKE USE OF IT. (to British Nuclear Fuels Ltd., London). French Patent 2,387,677/A/. 19 Apr 1978. Priority date 21 Apr 1977, United Kingdom of Great Britain and Northern Ireland (UK), 10p. (In French).

Scrubbing of gases containing solids and, in particular, replacement of ventilation filters in dangerous environments, such as toxic or radioactive environments. To this effect, it comprises a containment divided internally into two communicating inlet and outlet compartments by a panel through which one or more holes are drilled, upon which are suitably placed one or more filters that the gas has to cross by passing from the inlet to the outlet compartment. A device enables the replacement filter to be introduced into the containment without the gas contained therein from passing into the surrouding atmosphere.

3290 METHOD AND EQUIPMENT TO EXCHANGE AND REMOVE THE WASTE FROM AEROSOL FILTER ELEMENTS FOR NUCLEAR PLANTS IN A SEALED CASING. Stiehl, H.H. (to Delbag-Luftfilter G.m.b.H., Berlin (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,637,559/A/. 23 Feb 1978. 53p. (In German).

An improvement for filter systems in nuclear plants is proposed consisting in using filter cartridges in cylindrical form as aerosol filter elements. They are arranged vertically in the housing and when exchanged are lowered according to the so-called protection bag technique directly into the waste container below. They are compressed by crushing; the container takes a number of cartridges and is then sealed tight and taken away. 18 claims explain technical details of the system.

3291 MONITORING OF THE DISCHARGE OF RADIOACTIVE MATERIALS IN GASEOUS EFFLUENTS AT THE STACK OF NUCLEAR POWER PLANTS WITH LIGHT-WATER-COOLED REACTORS. Schwibach, J. pp 55-59 of Monitoring of airborne and liquid radioactive releases from nuclear facilities to the environment. Vienna, Austria; International Atomic Energy Agency (1978).

Monitoring of the discharge of radioactive materials in gaseous effluents at the stack of nuclear power plants is done with the following aims: a) Determination of the activity of radioactive materials discharged into the atmosphere during regular operation in accordance with the specifications of the licensing conditions; the measurements have to be carried out in such a way that, if certain levels of activity discharge rate are reached, automatic safety measures can be initiated. b) Possibility of evaluating the environmental exposure and estimating the potential annual population exposure. The requirements of sampling and measuring procedures specified represent a minimum for the monitoring of the discharge of radioactive materials in gaseous effluents at the stack during regular operation.

3292 MONITORING OF AIRBORNE AND LIQUID RADIOACTIVE RELEASES FROM NUCLEAR FACILITIES TO THE ENVIRONMENT. Vienna: IAEA (1978). 121p.

The aim of this manual is to define the objectives of effluent monitoring programmes, and to provide guidance on the design of adequate systems and on the choice of appropriate monitoring methods and instruments for different types of nuclear fuel cycle facilities. Examples of the methods and equipment used for measuring radioactive airborne and liquid releases and of comprehensive monitoring programmes and requirements, provided by members of the Advisory Group, are included in the manual as annexes to the main text.

Site Resource and Use Studies

3293 (PB--291892) ESTIMATED AVERAGE ANNUAL RADON-222 CONCENTRATIONS AROUND THE FORMER URANIUM MILL SITE IN SHIPROCK, NEW MEXICO. FINAL TECHNICAL NOTE. Hans, J.M. Jr.; Horton, T.R.; Prochaska, D. (Environmental Protection Agency, Las Vegas, NV (USA). Office of Radiation Programs). Aug 1978. 42p. NTIS, PC A03/MF A01.

Uranium mills, as a part of the nuclear fuel cycle, produce large volumes of wastes which contain both the long and short-lived radionuclides from the naturally-occurring uranium decay chain. A relatively short-lived member of the chain, radon-222, is a noble gas and can diffuse from the wastes and be transported from its point of origin by prevailing winds. The airborne radon-222 decays into other short-lived radioactive progeny which may result in human inhalation exposures at considerable distances from the point of origin. Since the parent of radon-222 has a half-life of 1620 years, exposure to radon and its progeny will persist for thousands of years. This study was made to estimate the annual average radon-222 concentrations around the former Shiprock, New Mexico uranium mill site in order to identify areas which may require limited or restricted occupancy and to evaluate the effectiveness of the site decontamination activities in reducing the ambient airborne radon-222 concentrations. Using on- and off-site meteorological data and radon source term estimations, average annual radon-222 isoconcentration lines were determined by computer modeling for the mill site area. The lines were determined for both pre- and post-decontamination periods.

3294 (SAND--80-7121) METEOLOGICAL AND AIR QUALITY DATA, QUARTERLY REPORT. WIPP SITE: EDDY COUNTY, NEW MEXICO. AUTUMN QUARTER, SEPTEMBER 1977-NOVEMBER 1977. Pocalujka, L.P.; Babij, E.; Catizone, P.A.; Church, H.W. (TRC Environmental Consultants, Wethersfield, CT (USA); Sandia National Labs., Albuquerque, NM (USA)). Sep 1980. Contract AC04-76DP00789. 30p. NTIS, PC E02/MF $3.50.

Includes 6 sheets of 24X reduction microfiche.

The purpose of the WIPP meteorological, air quality, and radiological measurements program was to support the environmental effort for the evaluation of the site suitability. This data report is the latest in a series of seasonal quarterly data summaries to be issued for the southeastern New Mexico site.

Regulations

3295 (ORNL--5308, pp 305-306) ANALYTIC DOSIMETRY. Turner, J.E.; Holoway, C.F.; Loebl, A.S. Jul 1978.

Health physics division annual progress report for period ending June 30, 1977.

The Analytic Dosimetry Group completed work on the Guide to Radioactive Waste Management, which contains an analysis of 1000 selected documents on various aspects of the subject. Development of a file for health standards for energy production continued. A two-day workshop on dosimetry for radon and radon daughters was held in April and a number of experts from outside ORNL participated. The workshop concentrated on problems associated with the conversion of values measured in air-to-dose estimates and risk assessment. A state-of-the-art summary of the workshop findings is being prepared.

3296 (PB--80-107998) HANDBOOK OF KEY FEDERAL REGULATIONS AND CRITERIA FOR MULTIMEDIA ENVIRONMENTAL CONTROL. FINAL REPORT, SEPTEMBER 1978-JUNE 1979. Greenwood, D.R.; Kingsbury, G.L.; Cleland, J.G. (Research Triangle Inst., Research Triangle Park, NC (USA)). Aug 1979. Contract EPA-68-02-2612. 273p. NTIS, PC A12/MF A01.

The handbook summarizes major Federal environmental regulations and recommendations and the legislative acts that authorize them. It summarizes and tabulates quantitative control limits specified by Federal agencies. It compares the various regulations, standards, and criteria. It includes a selected bibliography addressing Federal environmental control activities.

3297 LIMITS FOR RADIOACTIVE MATERIAL RELEASES FROM NUCLEAR FUEL CYCLE FACILITIES. Ettenhuber, E.; Krueger, F.W.; Rumpf, J.; Zindler, H. (Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin (German Democratic Republic)). Kernenergie ; 23: No. 8, 290-296(Aug 1980). (In German).

The actually achieved levels of radioactive material releases from fuel cycle facilities are reviewed. In connection with this, the principles and methods used in various countries for the derivation and establishment of authorized limits are evaluated. Moreover, the trends of limitation practices are outlined.

ENVIRONMENTAL SCIENCES, TERRESTRIAL

Basic Studies

3298 (PNL--3300(Pt.2)) PACIFIC NORTHWEST LABORATORY ANNUAL REPORT FOR 1979 TO THE DOE ASSISTANT SECRETARY FOR ENVIRONMENT. PART 2. ECOLOGICAL SCIENCES. Vaughan, B.E. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Feb 1980. Contract EY-76-C-06-1830. 238p. Dep. NTIS, PC A11/MF A01.

Research in Environment, Health, and Safety conducted during fiscal year 1979 is reported. This volume consists of project reports from the Ecological Sciences research department. The reports are grouped under the following subject areas: National Environmental Research Park and land use; Alaskan resource research; shale oil; synfuels; nuclear waste; fission; marine research programs; statistical development of field research; nuclear fusion; pumped storage and hydroelectric development; pathways modelling, assessment and Hanford project support; electric field and microwave research; and energy research for other agencies. (ACR)

3299 (SAND--79-0368) REPORT OF BIOLOGICAL

INVESTIGATIONS AT THE LOS MEDANOS WASTE ISOLATION PILOT PLANT (WIPP) AREA OF NEW MEXICO DURING FY 1978. Best, T.L.; Neuhauser, S. (eds.). (Eastern New Mexico Univ., Portales (USA); Texas Tech Univ., Lubbock (USA); New Mexico State Univ., Las Cruces (USA); New Mexico Univ., Albuquerque (USA)). Mar 1980. Contract EY-76-C-04-0789. 524p. Dep. NTIS, PC A22/MF A01.

The US Department of Energy is considering the construction of a Waste Isolation Pilot Plant (WIPP) in Eddy County, NM. This location is approximately 40 km east of Carlsbad, NM. Biological studies during FY 1978 were concentrated within a 5-mi radius of drill hole ERDA 9. Additional study areas have been established at other sites in the vicinity, e.g., the Gnome site, the salt lakes and several stations along the Pecos River southward from Carlsbad, NM, to the dam at Red Bluff Reservoir in Texas. The precise locations of all study areas are presented and their biology discussed.

3300 (UCRL--52889) HAZARD INDEX FOR UNDERGROUND TOXIC MATERIAL. Smith, C.F.; Cohen, J.J.; McKone, T.E. (California Univ., Livermore (USA). Lawrence Livermore Lab.). Jun 1980. Contract W-7405-ENG-48. 151p. NTIS, PC A08/MF A01.

To adequately define the problem of waste management, quantitative measures of hazard must be used. This study reviews past work in the area of hazard indices and proposes a geotoxicity hazard index for use in characterizing the hazard of toxic material buried underground. Factors included in this index are: an intrinsic toxicity factor, formulated as the volume of water required for dilution to public drinking-water levels; a persistence factor to characterize the longevity of the material, ranging from unity for stable materials to smaller values for shorter-lived materials; an availability factor that relates the transport potential for the particular material to a reference value for its naturally occurring analog; and a correction factor to accommodate the buildup of decay progeny, resulting in increased toxicity.

3301 EMERGENCE AND GROWTH OF PLANT SPECIES IN COAL MINE SOIL. Day, A.D.; Mitchell, G.F.; Tucker, T.C.; Thames, J.L. (Univ. of Arizona, Tucson). Journal of Environmental Quality ; 8: No. 1, 110-114(Jan 1979).

Experiments were conducted in the laboratory and greenhouse in Arizona with the following objectives: to evaluate the chemical properties of undisturbed soil, surface-mined coal land (coal mine soil) on the Black Mesa Coal Mine, and Gila loam soil; and to study the emergence of seven plant species in the greenhouse in Gila loam soil and coal mine soil. The pH of coal mine soil (6.2) was lower than the pH of undisturbed soil (7.5) or Gila loam (7.6). The total soluble salts in coal mine soil (3241) and undisturbed soil (4592) were much higher than in Gila loam (378); however, coal mine soil was lower in total soluble salts than undisturbed soil. The nitrogen content of coal mine soil was higher than the nitrogen content of undisturbed soil or gila loam. Emergence percentages for seven plant species grown in coal mine soil were similar to emergence percentages for the same species grown in Gila loam. Alfalfa (Medicago sativa L.), barley (Hordeum vulgare L.), and wheat (Triticum aestivum L. em Thell.) had from 84 to 93% emergence in coal mine soil. Indian ricegrass (Oryzopsis hymenoides Roem. and Shult), fourwing saltbush (Atriplex canescens Pursh), yellow sweetclover (Melilotus officinalis Lam.), and winterfat (Euroti lanata Pursh.) emerged <35% in coal mine soil and Gila loam. Plant growth data from forage species grown in the greenhouse indicate that coal mine soil has a lower fertility level than does Gila loam soil. When supplied with optimum soil moisture and plant nutrients, coal mine soil produced approximately the same yields of forage from alfalfa, barley, and wheat as were produced in Gila loam under the same soil-moisture and fertility conditions.

Chemicals Monitoring and Transport

3302 ASSOCIATION OF TRACE ELEMENTS WITH IRON OXIDES DURING ROCK WEATHERING. Koons, R.D.; Helmke, P.A.; Jackson, M.L. (Univ. of Wisconsin, Madison). Contract EY-76-S-02-1515. Soil Science Society of America Journal ; 44: No. 1, 155-159(Jan 1980).

The association of trace elements with Fe oxides during the early stages of rock weathering was determined by analysis of fresh diabase and granite rocks, their associated whole and size-separated saprolites, and goethite by neutron activation and X-ray fluorescence. The same elements are found to be associated with Fe oxides when the results are interpreted by analysis of correlation, by the distribution of elements in the various size fractions by the effects of removing free Fe oxides, and by direct analysis of geothite from the saprolite. The elements Co, Cr, Mn, Sc, Th, U, Zn, and the heavy rare-earth elements during the weathering of diabase, and As, Co, Cr, Sc, Th, U, Zn, and the heavy rare-earth elements during the weathering of granite are associated with Fe oxides. The concentrations of Mn are too low in this system to separate the effects of Mn oxides from those of Fe oxides.

3303 BOREHOLE ASSAY FOR PLUTONIUM USING DELAYED-NEUTRON ACTIVATION ANALYSIS. Stokes, J. (IRT Corp., San Diego, CA); Steinman, D.K.; Adams, J.; Bruns, L.E.; Kay, M. Transactions of the American Nuclear Society ; 32: 135-136(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

DELAYED NEUTRON ANALYSIS;PLUTONIUM;RADIATION MONITORING;RADIONUCLIDE MIGRATION;RADIOACTIVE WASTE DISPOSAL;FEASIBILITY STUDIES;SOILS;ROCKS; BOREHOLES;NEUTRON-NEUTRON LOGGING;RADIOASSAY

Radioactive Materials Monitoring and Transport

3304 (ANL--80-29) ENVIRONMENTAL MONITORING AT ARGONNE NATIONAL LABORATORY. ANNUAL REPORT FOR 1979. Golchert, N.W.; Duffy, T.L.; Sedlet, J. (Argonne National Lab., IL (USA)). Mar 1980. Contract W-31-109-ENG-38. 99p. Dep. NTIS, PC A05/MF A01.

The results of the environmental monitoring program at Argonne National Laboratory for 1979 are presented and discussed. To evaluate the effect of Argonne operations on the environment, measurements were made for a variety of radionuclides in air, surface water, Argonne effluent water, soil, grass, bottom sediment, and foodstuffs; for a variety of chemical constituents in air, surface water, and Argonne effluent water; and of the environemetal penetrating radiation dose. Sample collections and measurements were made at the site boundary and off the Argonne site for comparison purposes. Some on-site measuremenets were made to aid in the interpretation of the boundary and off-site data. The results of the program are

interpreted in terms of the sources and origin of the radioactive and chemical substances and are compared with applicable environmental quality standards. The potential radiation dose to off-site population groups is also estimated.

3305 (INIS-mf--4978, pp 164-165) RADIOECOLOGY IN RESOLVING ENVIRONMENTAL HEALTH PROBLEMS. Kulikov, N.V. (AN SSSR, Sverdlovsk. Inst. Ehkologii Rastenij i Zhivotnykh). Oct 1978. (In Russian).
From 2. radiobiological conference of the socialistic countries; Varna, Bulgaria (9 Oct 1978).
FALLOUT;NUCLEAR POWER PLANTS;RADIATION PROTECTION;RADIOACTIVE WASTES;RADIOECOLOGY

3306 (INIS-mf--5531) EXPOSURE TO RADIATION FROM THE NATURAL RADIOACTIVITY IN BUILDING MATERIALS. (Nuclear Energy Agency, 75 - Paris (France)). May 1979. 34p. NTIS (US Sales Only), PC A03/MF A01.
Radiation exposure of members of the public can be increased appreciably by the use of building materials containing above-normal levels of natural radioactivity. This phenomenon has attracted attention in recent years, and in this review, an attempt is made to quantify exposures incurred under various circumstances. The second section of the review is a general survey of those building materials, mostly industrial wastes, that have aroused interest in Member countries. The probability that environmental pressures may cause such wastes to be used more and more by building industries may lead to similar situations in the future. Other review material of a relevant nature is described in the third section. Primordial radionuclides only are considered here. They are: potassium-40 (K-40); radium-226 (Ra-226) and its decay products; the series headed by thorium-232 (Th-232). The important radiological consequences of the natural radioactivity in building materials are two-fold, irradiation of the body by gamma rays and irradiation of the lung tissues by radon-222 (Rn-222) decay products or daughters. These consequences cannot be explored quantitatively except in relation to the specific activities of the nuclides of interest, and the approach adopted in this review is to assess the consequences in terms of the incremental radiation exposures that would be incurred by occupants of substantial dwellings entirely constructed of materials with various specific activities or combinations thereof. Gamma rays are dealt with in the fourth section and radon daughters in the fifth.

3307 (NUREG/CR--1109) MEASUREMENT OF RADON DIFFUSION FROM URANIUM MILL TAILING PILES. Silker, W.B.; Wogman, N.A.; Thomas, C.W.; Carr, D.B.; Heasler, P.C. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Oct 1979. Contract EY-76-C-06-1830. 16p. (PNL--3187). Dep. NTIS, PC A02/MF A01.
The concentrations of ^{226}Ra and ^{222}Rn (^{214}Pb) were measured as a function of depth within a uranium mill tailings pile by in-situ gamma-ray spectrometry. Radon diffusion and exhalation rates were determined from the concentration gradients by employing an integral solution of the diffusion equation that accommodates a nonuniform depth distribution of the parent radium. Radon diffusion coefficients of 0.0002 and 0.0017 cm^2/sec, and exhalation rates of 60 and 275 atoms/cm^2/sec were determined for two locations with differing soil moisture content.

3308 (PNL-SA--7497) POTENTIAL RADIOLOGICAL IMPACT OF A CONCEPTUAL HANFORD NUCLEAR ENERGY CENTER. Soldat, J.K. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Oct 1978. Contract EY-76-C-06-1830. 32p. (CONF-790728--6). Dep. NTIS, PC A03/MF A01.
From 24. annual meeting of the Health Physics Society; Philadelphia, PA, USA (7 Jul 1979).
The potential radiological impact of the siting of 20 light-water reactors and associated nuclear fuel cycle facilities on the Hanford reservation was evaluated by calculating the potential radiation doses received by individuals and populations in the vicinity of the reservation. The largest contributor to the potential radiation doses, to both the individual and the 50-mile population, were the effluents from the conceptual 1500 MT/yr fuel reprocessing plant. The effluents from the 20 reactors combined was the second largest contributor. The radiation dose contributions from the 300 MT/yr mixed oxide fuel fabrication plant were insignificant. The highest organ dose from all facilities combined was 24 mrem/yr to the child thyroid; followed by 8 mrem/yr to the adult thyroid. The 50-year collective dose commitment to the population within 50 miles was about 50 man-rem for most organs of reference, while the estimate for bone was 70 man-rem. With the exception of ^{85}Kr, the release rates of radionuclides were within the EPA guidelines. Removal of about 90% of the 4×10^5 Ci/yr per gigawatt-year of electricity of ^{85}Kr from the fuel reprocessing plant gaseous effluents would be required for compliance with the EPA guidelines.

3309 ENERGY: WHAT ABOUT WASTE. Goldman, M.I. (NUS Corp, Md). Chemical Engineering Progress ; 75: No. 11, 65-69(Nov 1979).
The toxicity of nuclear high level waste is compared with the toxicity of the waste from burning coal to produce an equivalent amount of energy. The amounts of radon gas emanated from coal ash and from uranium mill tailings are also compared. Experimental methods used to make these comparisons are described. The toxicity associated with coal ash wastes is equal to or greater than the toxicity from the energy equivalent amount of uranium ore. Radon emanations from coal ash piles appear to be of the same order as those from uranium mill tailings. (1 diagram, 2 graphs, 2 tables)

3310 STATISTICAL CONSIDERATIONS AND SURVEY OF PLUTONIUM CONCENTRATION VARIABILITY IN SOME TERRESTRIAL ECOSYSTEM COMPONENTS. White, G.C.; Hakonson, T.E. (Los Alamos Scientific Lab., NM). Contract W-7405-ENG-36. Journal of Environmental Quality ; 8: No. 2, 176-182(Apr 1979).
Statistical aspects of the use of the coefficient of variation (c) in the design of environmental plutonium studies are considered. Small sample properties of the estimate of c were studied for both normal and log-normal populations with Monte Carlo simulations. A minimum sample size of 50 is necessary to estimate c with much precision, and an estimate of c from a sample size of less than 5 is nearly worthless. The difficulty of achieving good estimates of c increases as the true value of c increases. In addition, some of the available data on the variability of plutonium concentrations in terrestrial ecosystem components is summarized. The data were pooled to achieve better estimates of the coefficient of variation than might be available from individual studies. Pooled estimates of c are:

soils, 1.35; vegetation, 0.70; and rodent tissues, 1.10. The estimates of c presented should be useful in designing a field sampling program for plutonium.

3311 DATA ON RADIOACTIVE CONTAMINATION OF THE BIOSPHERE. Szabo, A. (Gyor Megyei Elelmiszerellenorzo es Vegyvizsgalo Intezet, Hungary). Energia es Atomtechnika ; 32: No. 4, 165-168(Apr 1979).

A study was conducted to evaluate the influence of nuclear explosions and nuclear power plant emissions on the biosphere. Data on radioactive contamination of food and surface waters and on the quantity of radioactive emissions released by nuclear power plants are presented. The potential for the utilization of nuclear energy and the health implications of radioactive exposure are also considered. (35 references, 4 tables)

3312 CONTAMINATION OF THE GROUND NEAR BUILDING B 212 AT WINDSCALE WORKS, BNFL. Annals of Nuclear Energy ; 6: No. 9-10, 523-524(1979).

A summary is given of the work in progress to determine the source of the leakage of active liquors contaminating the ground near one of the highly active liquor transfer buildings of the fuel reprocessing plant at Windscale. Circumstances leading to the detection of the leak and subsequent events are outlined and the activities of the Nuclear Installations Inspectorate in the investigation are indicated. (U.K.).

3313 RADIONUCLIDE TRANSFER IN THE ENVIRONMENT AND MODALITY OF MAN CONTAMINATION. Uzzan, G. (Association Euratom-CEA, Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Niveaux de Contamination Radioactive du Milieu Ambiant et de la Chaine Alimentaire). Agriculture (Paris) ; No. 416, 52-54(Feb 1978). (In French).

The consequences for man and his environment of nuclear facilities development in the near future are evaluated. Dispersion of radioactive effluents from accidental and routine releases are envisaged. The following topics are emphasized: radionuclide transfer from atmospheric releases and modality of man contamination; radionuclide transfer from releases in surface waters and modality of man contamination; quantitative aspects of radionuclide transfers.

Soil

3314 (DOE/CEA/BMFT--8) CALCULATION OF POLLUTANT TRANSFER IN AN AQUIFER TRIDISOL A1, A2, AND 3 CODES. REPORT DSN NO. 270. Madoz-Escande, C. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Surete Nucleaire). Jan 1979. 37p. (In French). NTIS (US Sales Only), PC A03/MF A01.

This report describes the TRIDISOL A1, A2, and 3 codes which use a 3.D solution of the transfer equation to obtain for a given point the arrival time and the concentration of a radionuclide for a given release in the ground. More exactly, the TRIDISOL A1 and A2 codes are written to search automatically for some physical parameters of the aquifer and groundwater (diffusion coefficients) from results obtained with tracer tests. The TRIDISOL 3 can be used as a previsional calculation model for pollution transfer in the aquifer, the physical parameters of which were previously determined with TRIDISOL A1 and A2 codes. Examples of use of the code for various pollutant releases are given.

3315 (DOE/CEA/BMFT--9) METHOD FOR PREVISIONAL EVALUATION OF POLLUTANT TRANSFERS IN AN AQUIFER. FIRST RESULTS OBTAINED IN A SANDY ENVIRONMENT (AT THE BARP WORKINGS, GIRONDE). REPORT DSN NO. 261. Madoz-Escande, C.; Peyrus, J.C. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Surete Nucleaire). 1979. 17p. (In French). NTIS (US Sales Only), PC A02/MF A01.

The hydrogeological studies undertaken within the frame-work of the radiological safety of nuclear facilities aim, in particular, at quantitatively predicting the consequences of the accidental release of radioactive pollutants into an aquifer. Such a quantitative forecasting is arrived at through a mathematical model based on sequential emission, the use of which requires a knowledge of the physical parameters of the aquifer and an understanding of pollutant behavior in relation to the aquiferous environment. The physical parameters of a saturated porous environment are brought into light by means of radioactive tracer tests on mock-up as well in the field. The first results obtained in a sandy environment (BARP workings) are presented. The difficulty of extrapolating mock-up test results to actual field conditions has, more particularly, made it necessary to commission a mobile laboratory fitted for in situ studies.

3316 (DOE/ET/44206--1) POLLUTION OF GROUND WATER DUE TO INACTIVE URANIUM MILL TAILINGS. SUMMARY OF PROGRESS, OCTOBER 1, 1979-SEPTEMBER 30, 1981. (Colorado Univ., Denver (USA). Center for Environmental Studies). 1980. Contract AC02-76ET44206. 50p. NTIS, PC A03/MF A01.

An extensive program of characterization of several inactive uranium tailings piles has been carried out in the past year. The geotechnical engineering program conducted a drilling program at the Salt Lake City and Grand Junction sites. The locations of slimes and sands in these sites hve been characterized. In general, it was found that slimes exist in the impoundments in lower percentages than normally produced from mill tailings. Permeability tests were conducted yielding values ranging from 10^{-3} cm/sec to 10^{-8}cm/sec. The geochemical studies made considerable progress in the past year. Extensive sampling of several sites was conducted. Sampling programs have been completed for seven sites and are underway for nine other sites. The work to date has indicated the importance of salts in controlling the direction and rate of movement of contaminants. The work has also indicated that a number of non-radioactive elements such as As are of environmental importance. The work also indicates the importance of the fact that the tailings piles are out of chemical equilibrium with their environment. Computer software was developed and implemented for data storage and retrieval. Automation hardware was installed and tested for the Inductively Coupled Plasma Emission Spectrometer. A number of analytical protocols were developed for routine analyses. A comprehensive quality control program was implemented. More than 18,000 chemical analyses were performed.

3317 (DP--1557, pp 21-32) TERRESTRIAL STUDIES. Mar 1980.

Environmental Transport Division: 1979

report.

Tritium in the organic fraction of soil, separated as water by high temperature combustion, was 5 to 50 times higher in activity than water that was freeze-dried from the same samples. The 50-year dose commitment from ingestion of crops is not influenced significantly by the plutonium in the SRP environment. This plutonium is a result of more than 20 years of operating chemical separations facilities. Techniques were developed to detect as little as 0.02 pCi/m^2 of iodine-129 and 0.2 pg of technetium-99 in soil to evaluate environmental effects. A sensitive three-stage mass spectrometer was completed for use in environmental studies of transuranium elements. Results of monitoring particle size distribution of entrapped particles containing Pu-238, and Pu-239,240 are reported.

3318 (EGG--1183-1686) AERIAL RADIOLOGICAL SURVEY OF US DEPARTMENT OF ENERGY SITES IN AMES, IOWA. DATE OF SURVEY: MAY 1977. (EG and G Idaho, Inc., Idaho Falls (USA)). Jul 1979. Contract EY-76-C-08-1183. 14p. Dep. NTIS, PC A02/MF A01.

An aerial radiological survey to measure terrestrial gamma radiation was carried out over five areas totaling 10 km^2 within the town of Ames, Iowa. Gamma ray data were measured over Ames Laboratory, several sections of downtown Ames, and the surrounding area. This was accomplished by flying parallel east-west lines 61 m apart. Processed data indicated that three areas showed increased activity levels of at least twice average background: the reactor, the waste treatment area, and a small area near the airport runway.

3319 (EGG--1183-1751) AERIAL RADIOLOGICAL SURVEYS OF ROCKWELL INTERNATIONAL FACILITIES, CANOGA PARK, CALIFORNIA. DATES OF SURVEYS: JUNE AND JULY 1978. Jobst, J.E. (EG and G, Inc., Las Vegas, NV (USA). Energy Measurements Group). Oct 1979. Contract AC08-76NV01183. 31p. NTIS, PC A03/MF A01.

Aerial radiological surveys were conducted over two facilities. The first survey, conducted on 26 and 27 June 1978 at an altitude of 46 m, was over the Headquarters Facility in urban Canoga Park, California. The second, on 29 and 30 June and 5 to 8 July 1978, was flown at 61 m altitude over the Santa Susana Field Laboratories in the Santa Susana Mountains, about 15 km west-northwest of the Headquarters. Twenty sodium iodide detectors were mounted on a helicopter. Enhanced gamma exposure rate levels were observed during both surveys; these levels could be attributed to industrial operations at the survey sites.

3320 (EGG--2026) SUBSURFACE MIGRATION OF RADIONUCLIDES AT THE RADIOACTIVE WASTE MANAGEMENT COMPLEX: 1978. Humphrey, T.G. (Idaho National Engineering Lab., Idaho Falls (USA)). Jul 1980. Contract AC07-76ID01570. 51p. NTIS, PC A04/MF A01.

This report describes the 1978 core drilling campaign at the Radioactive Waste Management Complex of the Idaho National Engineering Laboratory. The campaign is part of a continuing program to define radionuclide migration from buried waste. Samples of subsurface materials were collected from core drilled wells and from sample trenches excavated beneath buried waste. The sample materials were radiochemically analyzed and results are discussed. It is concluded that radionuclide migration is not now a hazard to the Snake River Plain aquifer.

3321 (ESG--80-7) ENERGY SYSTEMS GROUP ENVIRONMENTAL MONITORING AND FACILITY EFFLUENT. ANNUAL REPORT 1979. Moore, J.D. (Rockwell International Corp., Canoga Park, CA (USA). Energy Systems Group). 25 Apr 1980. Contract EY-76-C-04-3533. 59p. NTIS, PC A04/MF A01.

Soil, vegetation, and surface water were routinely sampled for radioactivity to a distance of 10 miles from Energy Systems Group (ESG) sites. Continuous ambient air sampling and radiation monitoring by thermoluminescent dosimetry are performed on-site for measuring airborne radioactivity concentrations and site ambient radiation levels. Radioactivity in effluents discharged to the atmosphere from ESG facilities is continuously sampled and monitored to ensure that levels released to unrestricted areas are within appropriate limits, and to identify processes which may require additional engineering safeguards to minimize radioactivity levels in such effluents. In addition, selected nonradioactive constituent concentrations in surface water discharged to unrestrictted areas are determined. Monitoring results for 1979 are summarized and discussed. The random variations observed in the environmental monitoring data indicate that no local source of unnatural radioactive material exists in the environs. Additionally, the similarity between on-site and off-site results further indicat s that the contribution to general environmental radioactivity due to operations at the ESG is essentially nonexistent. The environmental radioactivity reported herein is attributed to natural sources and to fallout of radioactive material from foreign atmospheric testing of nuclear devices.

3322 (INIS-mf--5372, pp 86-87) SOME ASPECTS OF THE ACCUMULATION OF NATURAL RADIONUCLIDES IN AQUATIC PRODUCTS AND VEGETATION AROUND A URANIUM COMPLEX. Markose, P.M.; Eappen, K.P. (Environmental Survey Lab., Jaduguda (India)). 1979.

From 6. Indian Association for Radiation Protection conference; Bombay, India (7 Mar 1979).

BUILDUP;CONTAMINATION;FISHES;GRAMINEAE; NATURAL URANIUM;NUCLEAR FACILITIES;RADIOACTIVE EFFLUENTS;RADIOACTIVITY;RADIUM 226;SOILS; URANIUM MINES;NATURAL RADIOACTIVITY; RADIOECOLOGICAL CONCENTRATION;AQUATIC ECOSYSTEMS;TERRESTRIAL ECOSYSTEMS

3323 (JAERI-M--7642) STUDY ON SAFETY GROUND STORAGE AND DISPOSAL OF RADIOACTIVE WASTES. DISTRIBUTION AND MIGRATION OF ^{60}CO AND ^{137}CS IN A SAND LAYER. Takebe, S.; Matsuzuru, H.; Wadachi, Y. (Japan Atomic Energy Research Inst., Tokyo). Apr 1978. 15p. (In Japanese). Dep. NTIS (US Sales Only), PC A02/MF A01.

In evaluation of radionuclides migration through aerated zone, distribution ratio and migration rate of ^{60}Co and ^{137}Cs in a sand layer were examined under different conditions. Radioactive aqueous solutions ^{60}Co and ^{137}Cs were allowed to flow down to an aerated sand layer in a column. The distribution coefficient of both ^{60}Co and ^{137}Cs is large in acidic, and small in neutral and alkaline condition. Distribution ratios show ^{60}Co and ^{137}Cs deposit mostly at surface of the sand layer independent of the solution acidity. By the equation proposed by Inoue et al., migration rate of ^{60}Co and ^{137}Cs is large in both neutral and alkaline condition, but small compared with that of water.

3324 (LA--8023-PR, pp 43-54) DETERMINATION OF PLUTONIUM IN MAN. Sep 1979.
Biomedical and Environmental Research Program of the LASL Health Division. Progress report, January-December 1978.
Several ongoing research programs which deal with plutonium levels in man are summarized. The following are the topics of research: plutonium in the tissues of the general population, analysis of tissues from occupationally exposed workers, cooperation with the National Bureau of Standards for the preparation of a natural matrix tissue standard, analysis of tissues from an individual exposed during operation ''Big Bang'' (''Smokey''), medical surveillance of 26 early Los Alamos plutonium workers, epidemiologic studies of persons exposed to plutonium, limits for the burial of the Department of Energy transuranic wastes, and a preliminary study of radium contaminated soils.

3325 (LA--8147-MS) DETERMINATION OF HYDRAULIC CONDUCTIVITY IN CRUSHED BANDELIER TUFF. Abeele, W.V. (Los Alamos Scientific Lab., NM (USA)). Nov 1979. Contract W-7405-ENG-36. 7p. Dep. NTIS, PC A02/MF A01.
The unsaturated hydraulic conductivity in a sample of crushed Bandelier Tuff was evaluated using volumetric pressure plate extractors. The total impedance of the tuff sample is determined from the experimental outflow data for each pressure step applied. The determination of the membrane impedance is not compulsory and the varying contact impedances are taken into account at each different pressure step. The results show that predictions of saturation ratios can be made based on knowledge of matric potentials just as predictions of hydraulic conductivities can be made based on knowledge of either matric potentials or saturation ratios. They are highly significant at the equivalent of a matric potential lower than -10 kPa. These results are then compared to those obtained by means of the predictive methods promoted by Campbell and Millington-Quirk using moisture retention data.

3326 (LA--8183-T) RADIUM-226 IN VEGETATION AND SUBSTRATES AT INACTIVE URANIUM MILL SITES. Marple, M.L. (Los Alamos Scientific Lab., NM (USA)). Jan 1980. Contract W-7405-ENG-36. 75p. Dep. NTIS, PC A04/MF A01.
Thesis.
Results of a study of the content of radium-226 in plants growing on inactive uranium mill tailings sites in the Four Corners Region of the southwestern United States and in plants grown under greenhouse conditions with minimal surficial contamination are reported. Field plant samples and associated substrates were analyzed from two carbonate tailings sites in the Grants Mineral Belt of New Mexico. Radium activities in air-cleaned samples ranged from 5 to 368 pCi/g (dry weight) depending on species and location: activities in plants growing on local soils averaged 1.0 pCi/g. The talings and local soils contain 140 to 1400 pCi/g and 2.1 pCi/g, respectively. An evaluation of cleaning methods on selected samples showed that from 17 to 79% of the radium activity measured in air-cleaned samples was due to surficial contamination, which varied with species and location. A survey of 18 inactive uranium mill sites in the Four Corners Region was performed. Radium activity in plant tissues from nine species ranged from 2 to 210 pCi/g on bare tailings and from 0.3 to 30 pCi/g on covered tailings The radium content in most of the soil overburdens on the covered tailings piles was 10 to 17 pCi/g. An experiment was performed to measure radium-226 uptake by two species grown on tailings covered with a shallow (5 cm) soil layer. A grass, Sporobolus airoides (alkali sacaton) and a shrub, Atriplex canescens (four-wing saltbush), were studied. The tailings were a mixture of sands and slimes from a carbonate pile. The tailings treatments were plants grown in a soil cover over tailings; the controls were plants grown only in soil. Three soil types, dune sand, clay loam, and loam, were used. The radium activity of the plant tissue from the tailings treatment compared to that of the appropriate control was 1 to 19 times greater for the grass and 4 to 27 times greater for the shrub.

3327 (LA-UR--80-616) SOIL MONITORING INSTRUMENTATION. Umbarger, C.J. (Los Alamos Scientific Lab., NM (USA)). 1980. Contract W-7405-ENG-36. 11p. (CONF-791234--1). Dep. NTIS, PC A02/MF A01.
From Environmental decontamination workshop; Oak Ridge, TN, USA (4 Dec 1979).
The Los Alamos Scientific Laboratory (LASL) has an extensive program for the development of nondestructive assay instrumentation for the quantitative analysis of transuranic (TRU) materials found in bulk solid wastes generated by Department of Energy facilities and by the commercial nuclear power industry. Included are wastes generated in decontamination and decommissioning of outdated nuclear facilities as well as wastes from old waste burial ground exhumation programs. The assay instrumentation is designed to have detection limits below 10 nCi/g wherever practicable. Because of the topic of this workshop, only the assay instrumentation applied specifically to soil monitoring will be discussed here. Four types of soil monitors are described.

3328 (NUREG/CR--1155) INTERACTIONS OF RADIOACTIVE WASTES WITH SOILS. A REVIEW, OCTOBER 1976-MAY 1979. Fowler, E.B.; Essington, E.H.; Polzer, W.L. (Los Alamos Scientific Lab., NM (USA)). Dec 1979. Contract EY-76-C-04-0789. 42p. (LA-UR--79-2910). Dep. NTIS, PC A03/MF A01.
Retention of waste radionuclides by four soils of different types was determined using the batch and column methods. Raw and treated liquid wastes from a large laboratory complex were used. Three fractions identified in each waste were (1) insoluble, (2) soluble and sorbable by soil, and (3) soluble but nonsorbable by soil. The soluble fraction (< 0.05 μm) in raw and treated wastes increased with storage time but the increase did not directly relate to the amount retained by the soil. The degree of retention of each radionuclide is influenced by both soil type and waste composition. Ninety-five to one hundred percent of raw waste ^{137}Cs was retained by all soils. Plutonium isotopes and ^{241}Am were least retained by the soils; uranium isotope retention was intermediate. Reaction of a Fuquay soil with the insoluble fraction of the waste resulted in a net dissolution of Pu and Am. Two of the factors investigated that could influence the degree of retention by the soil were (1) charge on the radionuclide in solution, and (2) degree of calcium carbonate saturation. Retention of radionuclides by the soils occurs through ion exchange, occlusion in calcium carbonate precipitates, precipitation of aluminum, and filtration of particulates from the liquid wastes.

3329 (NVO--225) TATUM DOME PROJECT, LAMAR COUNTY, MISSISSIPPI. Fenske, P.R.; Humphrey,

T.M. Jr. (Department of Energy, Las Vegas, NV (USA). Nevada Operations Office). Aug 1980. 413p. NTIS, PC A18/MF A01.

The Tatum Dome site, near Hattiesburg, Mississippi, has been host to two nuclear detonations and two nonnuclear gas detonations. The top of the cavity formed by the detonations was 2660 feet below land surface and 1160 feet below the top of the salt dome. All detonations were totally contained within the salt dome in which they were fired. Activities at the site occurred between 1964 ad 1970. In 1978, NV was asked to provide proof that radiological contamination was not adversely affecting water quality in the aquifers over Tatum Dome. All except the Surficial Aquifer, which was known to be contaminated by tritium, were extensively tested to obtain hydrological data. Sufficient samples were taken to determine if contamination existed in the aquifer around the emplacement casing at surface ground zero (SGZ). Low tritium concentrations were found in the Local Aquifer, approximately 150 to 200 feet below land surface, during this project, but no radioactivity was found in any of the other aquifers above Tatum Dome. The Local Aquifer is the next aquifer below the Surficial Aquifer.

3330 (ORNL--5448) ASSESSMENT OF THE RADIOLOGICAL IMPACT OF THE INACTIVE URANIUM-MILL TAILINGS AT MEXICAN HAT, UTAH. Haywood, F.F.; Goldsmith, W.A.; Ellis, B.S.; Hubbard, H.M. Jr.; Fox, W.F.; Shinpaugh, W.H. (Oak Ridge National Lab., TN (USA)). Mar 1980. Contract W-7405-ENG-26. 95p. Dep. NTIS, PC A05/MF A01.

High surface soil concentrations of ^{226}Ra and high above-ground measurements of gamma-ray intensity in the vicinity of the inactive uranium-mill tailings at Mexican Hat show both wind and water erosion of the tailings. The former mill area, occupied by a trade school at the time of this survey, shows a comparatively high level of contamination, probably from unprocessed ore on the surface of the ore storage area near the location of the former mill buildings. However, the estimated health effect of exposure to gamma rays during a 2000-hr work year in the area represents an increase of 0.1% in the risk of death from cancer. Exposure of less than 600 persons within 1.6 km of the tailings to radon daughters results in an estimated 0.2%/year increase in risk of lung cancer.

3331 (ORNL--5450) RADIOLOGICAL SURVEY OF THE INACTIVE URANIUM-MILL TAILINGS AT TUBA CITY, ARIZONA. Haywood, F.F.; Jones, T.D.; Hubbard, H.M. Jr.; Ellis, B.S.; Shinpaugh, W.H. (Oak Ridge National Lab., TN (USA)). Jan 1980. Contract W-7405-ENG-26. 79p. Dep. NTIS, PC A05/MF A01.

Results of a radiological survey of the inactive uranium-mill site at Tuba City, Arizona, conducted in March 1976, are presented. Spread of tailings was detected in all directions by means of direct gamma measurements at 1 m above the ground and by determinations of the ^{226}Ra concentration in surface soil and sediment samples. In the direction toward which prevailing winds blow, the northeast, evidence of transportation of tailings was found at least 3.2 km from the tailings pile. Toward the north, south, and west, the spread was 300 to 400 m. Evidence of movement of tailings by water to offsite locations was also found. The concentration of ^{226}Ra in all water samples was well below the concentration guide for drinking water. The calculated subsoil distribution of ^{226}Ra in 14 holes, based on gamma monitoring data obtained by Ford, Bacon and Davis Utah Inc., is presented graphically and compared with available analytical data.

3332 (ORNL--5451) RADIOLOGICAL SURVEY OF THE INACTIVE URANIUM-MILL TAILINGS AT DURANGO, COLORADO. Haywood, F.F.; Perdue, P.T.; Shinpaugh, W.H.; Ellis, B.S.; Chou, K.D. (Oak Ridge National Lab., TN (USA)). Mar 1980. Contract W-7405-ENG-26. 93p. Dep. NTIS, PC A05/MF A01.

Results of a radiological survey of the inactive uranium-mill site at Durango, Colorado, conducted in April 1976, in cooperation with a team from Ford, Bacon and Davis Utah Inc., are presented together with descriptions of the instruments and techniques used to obtain the data. Direct above-ground gamma measurements and analysis of surface soil and sediment samples indicate movement of tailings from the piles toward Lightner Creek on the north and the Animas River on the east side of the piles. The concentration of ^{226}Ra in the former raffinate pond area is only slightly above the background level. Two structures in Durango were found to contain high concentrations of airborne radon daughters, where tailings are known to have been utilized in construction. Near-background concentrations of radon daughters were found in a well-ventilated building close to the tailings.

3333 (ORNL--5453) RADIOLOGICAL SURVEY OF THE INACTIVE URANIUM-MILL TAILINGS AT GUNNISON, COLORADO. Haywood, F.F.; Jacobs, D.G.; Hubbard, H.M. Jr.; Ellis, B.S.; Shinpaugh, W.H. (Oak Ridge National Lab., TN (USA)). Mar 1980. Contract W-7405-ENG-26. 79p. Dep. NTIS, PC A05/MF A01.

The findings of a radiological survey of the inactive uranium-mill site at Gunnison, Colorado, conducted in May 1976, are presented. Results of surface soil sample analyses and direct gamma radiation measurements indicate limited spread of tailings off the site. The only significant above background measurements off the site were obtained in an area previously covered by the tailings pile. There was little evidence of contamination of the surface or of unconfined groundwater in the vicinity of the tailings pile; however, the hydrologic conditions at the site indicate a potential for such contamination. The concentration of ^{226}Ra in all water samples except one from the tailings pile was well below the concentration guide for drinking water. The subsurface distribution of ^{226}Ra in 14 bore holes located on and around the tailings pile was calculated from gamma ray monitoring data obtained jointly with Ford, Bacon and Davis Utah Inc.

3334 (ORNL--5454) RADIOLOGICAL SURVEY OF THE INACTIVE URANIUM-MILL TAILINGS AT NATURITA, COLORADO. Haywood, F.F.; Jacobs, D.J.; Hubbard, H.M. Jr.; Ellis, B.S.; Shinpaugh, W.H. (Oak Ridge National Lab., TN (USA)). Mar 1980. Contract W-7405-ENG-26. 85p. Dep. NTIS, PC A05/MF A01.

Results of a radiological survey of the inactive uranium-mill site a Naturita, Colorado, conducted in May 1976, are presented. The spread of tailings was detected in the area surrounding the site by means of direct above ground gamma measurements and analysis of surface and subsurface soil samples. Radiochemical analyses of water samples in the vicinity of the tailings pile indicate local surface water contamination immediately downstream from the pile, although the ^{226}Ra

concentration in the water at that point as well below the concentration guide for drinking water. The calculated subsoil distribution of ^{226}Ra in onsite holes is presented graphically. The tailings at this site were removed and reprocessed at another location. This operation was completed and reclamation of the site was conducted in 1978. Consequently the information in this report documents radiological conditions that no longer exist.

3335 (ORNL--5456) RADIOLOGICAL SURVEY OF THE INACTIVE URANIUM-MILL TAILINGS AT MAYBELL, COLORADO. Haywood, F.F.; Perdue, P.T.; Ellis, B.S. (Oak Ridge National Lab., TN (USA)). Mar 1980. Contract W-7405-ENG-26. 70p. Dep. NTIS, PC A05/MF A01.

Results of a radiological survey of the inactive uranium-mill tailings near Maybell, Colorado are presented. Measurements of external gamma exposure rate at 1 m above the tailings ranged 16 to 340 μR/hr with an average value of 65 μR/hr. Radionuclide analysis of offsite soil and sediment samples, as well as above-ground gamma exposure rate measurements defined the spread of contamination around the tailings pile. This spread is greatest toward the east, in the direction of surface water runoff. Calculated concentrations of ^{226}Ra in all of the holes drilled in the tailngs, based on gamma monitoring data, showed maximum concentrations in the range 100 to 800 pCi/g.

3336 (ORNL--5457) ASSESSMENT OF THE RADIOLOGICAL IMPACT OF THE INACTIVE URANIUM-MILL TAILINGS AT GRAND JUNCTION, COLORADO. Haywood, F.F.; Goldsmith, W.A.; Jacobs, D.G.; Perdue, P.T.; Ellis, B.S.; Hubbard, H.M. Jr.; Shinpaugh, W.H. (Oak Ridge National Lab., TN (USA)). Apr 1980. Contract W-7405-ENG-26. 101p. Dep. NTIS, PC A06/MF A01.

Results of a radiological survey of the inactive uranium-mill site at Grand Junction, Colorado, made in May and June 1976, are presented along with descriptions of techniques and equipment used to obtain the data and an assessment of increased risk of health effects attributable to radiation and radionuclides from the tailings. The data obtained indicate that the tailings are adequately stabilized to prevent significant wind and water erosion. The average above-ground gamma-ray exposure rate measured over the tailings pile was 170 μR/hr and that around one of the former mill buildings was 100 μR/hr. Soil samples at a distance of 960 m to the east and west of the center of the tailings pile contained an above-background level of ^{226}Ra. An estimate of potential health effects of exposure to gamma rays around a former mill building and to radon daughters produced by radon dispersed from the tailings has been made for occupants of the site.

3337 (ORNL--5459) RADIOLOGICAL SURVEY OF THE INACTIVE URANIUM-MILL TAILINGS AT GREEN RIVER, UTAH. Haywood, F.F.; Christian, D.J.; Ellis, B.S.; Hubbard, H.M. Jr.; Lorenzo, D.; Shinpaugh, W.H. (Oak Ridge National Lab., TN (USA)). Mar 1980. Contract W-7405-ENG-26. 71p. Dep. NTIS, PC A04/MF A01.

The uranium-mill tailings at Green River, Utah, are relatively low in ^{226}Ra content and concentration (20 Ci and 140 pCi/g, respectively) because the mill was used to upgrade the uranium ore by separating the sand and slime fractions; most of the radium was transported along with the slimes to another mill site. Spread of tailings was observed in all directions, but near-background gamma exposure rates were reached at distances of 40 to 90 m from the edge of the pile. Water erosion of the tailings is evident and, since a significant fraction of the tailings pile lies in Brown's Wash, the potential exists for repetition of the loss of a large quantity of tailings such as occurred during a flood in 1959. In general, the level of surface contamination was low at this site, but some areas in the mill site, which were being used for nonuranium work, have gamma-ray exposure rates up to 143 μR/hr.

3338 (ORNL--5460) RADIOLOGICAL SURVEY OF THE INACTIVE URANIUM-MILL TAILINGS AT THE SPOOK SITE, CONVERSE COUNTY, WYOMING. Haywood, F.F.; Christian, D.J.; Chou, K.D.; Ellis, B.S.; Lorenzo, D.; Shinpaugh, W.H. (Oak Ridge National Lab., TN (USA)). May 1980. Contract W-7405-ENG-26. 74p. NTIS, PC A04/MF A01.

Results of a radiological survey performed at the Spook site in Converse County, Wyoming, in June 1976, are presented. The mill at this site was located a short distance from the open-pit mine where the ore was obtained and where part of the tailings was dumped into the mine. Several piles of overburden or low-grade ore in the vicinity were included in the measurements of above-ground gamma exposure rate. The average exposure rate over these piles varied from 14 μR/hr, the average background exposure rate for the area, to 140 μR/hr. The average exposure rate for the tailings and former mill area was 220 μR/hr. Movement of tailings particles down dry washes was evident. The calculated concentration of ^{226}Ra in ten holes as a function of depth is presented graphically.

3339 (ORNL--5461) RADIOLOGICAL SURVEY OF THE INACTIVE URANIUM-MILL TAILINGS AT RIVERTON, WYOMING. Haywood, F.F.; Lorenzo, D.; Christian, D.J.; Chou, K.D.; Ellis, B.S.; Shinpaugh, W.H. (Oak Ridge National Lab., TN (USA)). Mar 1980. Contract W-7405-ENG-26. 60p. Dep. NTIS, PC A04/MF A01.

Results of a radiological survey performed at the Riverton, Wyoming site in July 1976, are presented. The average external gamma exposure rate at 1 m over the tailings pile was 56 μR/hr. The corresponding rate for the former mill area was 97 μR/hr. Movement of tailings particles in a dry wash is evident; but it appears that, in general, the earth cover over the tailings pile has been effective in limiting both wind and water erosion of the tailings. The calculated concentration of ^{226}Ra as a function of depth in 15 augered holes is presented graphically. A survey of the Teton Division Lumber Company property in Riverton showed a maximum external gamma exposure rate of 270 μR/hr.

3340 (ORNL--5462) RADIOLOGICAL SURVEY OF THE INACTIVE URANIUM-MILL TAILINGS AT FALLS CITY, TEXAS. Haywood, F.F.; Christian, D.J.; Loy, E.T.; Lorenzo, D.; Ellis, B.S. (Oak Ridge National Lab., TN (USA)). Oct 1980. Contract W-7405-ENG-26. 75p. NTIS, PC A04/MF A01.

Results of a radiological survey conducted at the Falls City, Texas, site in July 1976 are presented. There are seven partial to fully stabilized tailings piles, and an overburden pile from an open-pit mine. Above ground gamma-ray exposure rate measurements show moderate levels of contamination throughout the area with a maximum exposure rate of 500 μR/hr above tailings pile 2. The average exposure rate over the different areas varied from 14 μR/hr over the southwest end of tailings pile 7 to 207 μR/

hr over the northeast end of the same pile. Analyses of surface soil and dry-wash sediment samples, as well as calculations of subsurface ^{226}Ra distribution, serve to define the spread of tailings around the area. Water erosion of the tailings is evident, but, because of abundant growth of vegetation on the tailings piles, wind erosion probably is not a major problem.

3341 (ORNL--5464) RADIOLOGICAL SURVEY OF THE INACTIVE URANIUM-MILL TAILINGS AT LAKEVIEW, OREGON. Haywood, F.F.; Burden, J.E.; Ellis, B.S.; Loy, E.T.; Shinpaugh, W.H. (Oak Ridge National Lab., TN (USA)). Jun 1980. Contract W-7405-ENG-26. 40p. NTIS, PC A03/MF A01.

The results of the radiological survey of the inactive uranium-mill site at Lakeview, Oregon, show that the average gamma-ray exposure rate 1 m above the tailings pile and the evaporation pond area (now dry) is close to the average background level for the area (11 μR/hr). The ^{226}Ra concentration in most of the surface soil and sediment samples is also at or below the average background value for surface soil samples in the area (0.8 pCi/g). Calculated ^{226}Ra concentrations, based on gamma radiation measurements in shallow (1-m-deep) holes, are in agreement with the results of surface soil and sediment analyses and with gamma-ray exposure rate measurements. The tailings at this site have been stabilized by the addition of 46 to 60 cm (18 to 24 in.) of soil that supports vigorous growth of vegetation. This treatment, coupled with a low-level inventory of ^{226}Ra in the tailings (50 Ci), has resulted in limited spread of tailings by wind and water.

3342 (ORNL--5465) RADIOLOGICAL SURVEY OF THE RADIOACTIVE SANDS AND RESIDUES AT LOWMAN, IDAHO. Haywood, F.F.; Burden, J.E.; Ellis, B.S.; Loy, E.T.; Shinpaugh, W.H. (Oak Ridge National Lab., TN (USA)). Aug 1980. Contract W-7405-ENG-26. 68p. NTIS, PC A04/MF A01.

No uranium ore milling was performed at the Lowman site, which is located approximately 0.8 km northeast of the town of Lowman, Idaho. Nevertheless, approximately 80,000 metric tons of radioactive sands and residues from upgrading of heavy minerals by physical processing methods remain on the site grounds. Measurements of external gamma radiation 1 m above the surface showed exposure rates up to 2.4 mR/hr on site, but the exposure rate off site quickly dropped to the background level in all directions. Analysis of surface soil and sediment samples for ^{226}Ra and ^{232}Th indicated a limited spread of radioactive material.

3343 (ORNL/MIT--299) ASSESSMENT OF TWO-FILTER TECHNIQUE FOR CORRELATING ACTINIUM-227 CONCENTRATIONS IN SOILS. Fraizer, W.K.; Patch, K.D.; Reynolds, B.A. (Oak Ridge National Lab., TN (USA)). Feb 1980. Contract W-7405-ENG-26. 45p. Dep. NTIS, PC A04/MF A01.

Concentrations of actinium-227 in soil samples from waste-disposal sites for uranium procession plants were successfully correlated with radon-219 measurements obtained by the two-filter technique, thus avoiding time-consuming and difficult radiochemical analyses. A flow-through sampling device and procedure were developed which determined actinium levels with a precision of 2 pCi/g +- 50%. Theoretical relations for the production of radon from actinium, the decay of radon, and the decay and diffusion of radon daughters in the two-filter apparatus were formulated. Measurements indicated that the emanation fraction for radon-219 was about 15%. Sampling filters collected radon daughters with a 93% efficiency while radon could be scrubbed from air samples by use of an activated-charcoal canister.

3344 (ORNL/TM--7004) RESULTS OF GROUND LEVEL RADIATION MEASUREMENTS IN SUPPORT OF THE 1978 AERIAL SURVEY OF THE LAKE ONTARIO ORDNANCE WORKS, LEWISTON, NEW YORK. Berven, B.A.; Doane, R.W.; Haywood, F.F.; Shinpaugh, W.H. (Oak Ridge National Lab., TN (USA)). Sep 1979. Contract W-7405-ENG-26. 86p. Dep. NTIS, PC A05/MF A01.

This report contains the results of a limited series of measurements at the Lake Ontario Ordnance Works site, three miles northeast of Lewiston, New York. The scope of this survey was not extensive, and the survey was conducted to support a concurrent aerial survey conducted by EG and G, Inc. Results of this survey indicate two souces of significant external gamma exposure on the site as well as several locations that retain low to intermediate levels of radioactivity in soil. Off-site soil radionuclide concentrations were well within background levels with one exception. Water radionuclide concentrations on the site in the Central Drainage Ditch are significantly above background levels but decrease with distance from the spoil pile, and are within restrictive concentration guides for off-site locations.

3345 (PNL--3498) POTENTIAL AIRBORNE RELEASE FROM SOIL-WORKING OPERATIONS IN A CONTAMINATED AREA. Sutter, S.L. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Aug 1980. Contract AC06-76RL01830. 30p. NTIS, PC A03/MF A01.

Experiments were performed to provide an indication of how much material could be made airborne during soil-working operations in a contaminated area. Approximately 50 kg of contaminated soil were collected, dried, and mixed, and particle size distribution and ^{137}Cs content were characterized. In four experiments performed in a 2 ft x 2 ft wind tunnel at the Radioactive Aerosol Release Test Facility, soil was pumped into an airstream moving at 3.2, 10.4, 15.2, and 20 mph. These experiments were designed to maximize airborne releases by fluidizing the soil as it was pumped into the wind tunnel. Thus the airborne releases should represent upper limit values for soil-working operations. Airborne concentration and particle size samples were collected and all of the material deposited downstream was collected to calculate a mass balance. The fraction airborne was calculated using these measurements.

3346 (UCRL--52832) PRELIMINARY STUDY OF THE MIGRATION OF TECHNETIUM IN SOIL UNDER HYDROUS CONDITIONS. Sisson, D.H.; MacLean, S.C.; Schulz, R.K.; Borg, R.J. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 11 Sep 1979. Contract W-7405-ENG-48. 19p. Dep. NTIS, PC A02/MF A01.

The sorption of technetium compared to sodium, cesium, and strontium by a common agricultural soil was measured using a column method. As expected, no sorption of Tc occurred under conditions that substantially removed Na^{+}, Cs^{+}, and Sr^{++}. High radioactivity levels were used to establish absorption profiles over six orders of magnitude of tracer concentration. Behavior of initially dry columns was compared with that of initially water-saturated columns; the results were not quantitatively different although there was a

qualitative difference in the appearance of the profiles. Technetium tracked the moisture content of the column and hence migrated at the veloccity of the aqueous medium.

3347 ADSORPTION OF RADIOSTRONTIUM BY SOIL TREATED WITH ALKALI METAL HYDROXIDES. Spalding, B.P. (Oak Ridge National Lab., TN). Soil Science Society of America Journal ; 44: No. 4, 703-709(Jul 1980).

Twelve soils from areas used for the disposal of low-level radioactive solid waste at the Oak Ridge National Laboratory were examined for their ability to adsorb trace levels of Sr. Radiostrontium adsorption, in the presence of normal soil Ca levels, was determined following the addition of LiOH, NaOH, KOH, NaCl, and Na-polyacrylate. With soils from C horizons, the average thermodynamic equilibrium constant for the Na-Ca(Sr) exchange reaction decreased from 0.063 to 0.00041 after treatment with 0.4 meq/g of NaOH, indicating a large increase in the selectivity for Ca(Sr) adsorption. With samples from A or B horizons, this effect was not observed due to the dissolution of soil organic matter; Na-polyacrylate interfered with the adsorption of Ca(Sr) in the same manner as the NaOH-solubilized soil organic matter. Selectivity differences between trace levels of Sr and the macroamounts of soil Ca were quite small (<5%) in both the treated and untreated soils. A multiple regression analysis indicated that three soil properties (percent organic matter, exchangeable Ca + Mg, and exchangeable acidity) explained 77% of the variation in Sr adsorption by alkali-treated soils. In untreated soils, the exchangeable Ca + Mg and exchangeable acidity explained 70% of the variation in the adsorption of Sr. The response of the soils to alkali treatment generally followed the lyotropic series: Li > Na > K.

3348 (SAND--79-6006) ADSORPTION AND CATION EXCHANGE DURING UNIDIRECTIONAL FLOW IN A SATURATED POROUS MEDIUM. Rochon, J. (B.R.G.M., Orleans, France). (Sandia Labs., Albuquerque, NM (USA)). Nov 1979. Translated from Reunion de travail sur l'utilisation des mineraux argileux pour le confinement des dechets radioactifs, September 10-12, 1979, Paris, France 20p. Dep. NTIS, PC A02/MF A01.

Translated by Cathy Flick.

Several models are proposed to simulate transport of an ionic substance interacting with a homogeneous porous matrix. The types of interaction studied are reversible adsorption, irreversible adsorption, and cation exchange; these are the predominant phenomena in clay media. These models were devised with regard for the simplification necessary for their further use in interpretation of soil data or in predictive calculations.

3349 PHYSICAL MIGRATION OF RADIONUCLIDES IN SOIL. Jarrett, A.R.; Jester, W.A.; Brenizer, J.S. (Pennsylvania State Univ., University Park). Transactions of the American Nuclear Society ; 32: 84-85(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL;TRITIUM;CESIUM 137;STRONTIUM 90; RADIOISOTOPES;LEACHING;GROUND WATER;SOILS; RADIONUCLIDE MIGRATION;ENVIRONMENTAL TRANSPORT; PARTICLE SIZE;ELECTROSTATICS;MIGRATION; ADSORPTION;SOLUBILITY

3350 CHEMICAL MIGRATION OF RADIONUCLIDES IN SOIL. Parker, F.L. (Vanderbilt Univ., Nashville, TN); Grant, J.L. Transactions of the American Nuclear Society ; 32: 85-86(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

LOW-LEVEL RADIOACTIVE WASTES;RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL;STRONTIUM ISOTOPES;CESIUM ISOTOPES;THORIUM ISOTOPES; URANIUM ISOTOPES;PLUTONIUM ISOTOPES;NEPTUNIUM ISOTOPES;AMERICIUM ISOTOPES;RADIOISOTOPES; LEACHING;GROUND WATER;SOILS;RADIONUCLIDE MIGRATION;ENVIRONMENTAL TRANSPORT;MIGRATION; CHEMICAL PROPERTIES;PH VALUE;FLUID FLOW

3351 SHALLOW LAND DISPOSAL OF LOW-LEVEL RADIOACTIVE WASTE: RADIONUCLIDE SORPTION. Pietrzak, R.F.; Galdi, G.; Weiss, A.; Colombo, P. (Brookhaven National Lab., Upton, NY). Transactions of the American Nuclear Society ; 32: 114-115(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

Determination of sorptive distribution coefficient (K/sub d/) for selected radionuclides in site specific soils at various water contents. LOW-LEVEL RADIOACTIVE WASTES; RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL; RADIOISOTOPES;LEACHING;AMERICIUM 241;PLUTONIUM 237;EUROPIUM 152;STRONTIUM 85;CESIUM 134;CESIUM 137;IRON 59;COBALT 60;ENVIRONMENTAL TRANSPORT; GROUND WATER;RADIONUCLIDE MIGRATION;SOILS; SORPTIVE PROPERTIES;ADSORPTION;ANOXIA

3352 ENVIRONMENTAL TRANSURANIC AND MOISTURE ASSAY BY PASSIVE ACTIVATION. Bruns, L.E. (Rockwell Hanford Co., Richland, WA). Transactions of the American Nuclear Society ; 32: 133(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

TRANSURANIUM ELEMENTS;MOISTURE;PLUTONIUM; ENVIRONMENTAL TRANSPORT;RADIONUCLIDE MIGRATION; NEUTRON FLUX;FOILS;COPPER;ZINC;INDIUM; MONITORING;RADIOASSAY;RADIOACTIVE WASTES

3353 RADIONUCLIDE MIGRATION RESULTING FROM SITE INTRUSION. Rogers, V.C. (Ford, Bacon and Davis, Salt Lake City, UT). Transactions of the American Nuclear Society ; 32: 86-87(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

LOW-LEVEL RADIOACTIVE WASTES;RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL;RADIOACTIVE WASTE FACILITIES;RADIOISOTOPES;INHALATION;ROOT ABSORPTION;INGESTION;MIGRATION;ENVIRONMENTAL TRANSPORT;ENVIRONMENTAL EXPOSURE PATHWAY;SOILS; GROUND WATER;SURFACE AIR;MAN;RADIONUCLIDE MIGRATION;RADIONUCLIDE KINETICS;PLANTS;RADON; RADIATION DOSES;DOSE RATES

3354 ENVIRONMENTAL TRITIUM IN TREES. Brown, R.M. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). pp 405-417 of Behaviour of tritium in the environment. Vienna; International Atomic Energy Agency (1979).

From Symposium on the behavior of tritium in the environment; San Francisco, CA, USA (16 Oct 1978).

The distribution of environmental tritium in the free water and organically bound hydrogen of trees growing in the vicinity of the Chalk River Nuclear Laboratories (CRNL) has been studied. The regional dispersal of HTO in the atmosphere has been observed by surveying the tritium content of leaf moisture. Measurement

of the distribution of organically bound tritium in the wood of tree ring sequences has given information on past concentrations of HTO taken up by trees growing in the CRNL Liquid Waste Disposal Area. For samples at background environmental levels, cellulose separation and analysis was done. The pattern of bomb tritium in precipitation of 1955-68 was observed to be preserved in the organically bound tritium of a tree ring sequence. Reactor tritium was discernible in a tree growing at a distance of 10 km from CRNL. These techniques provide convenient means of monitoring dispersal of HTO from nuclear facilities.

3355 ADSORPTION OF CO AND SELECTED ACTINIDES BY MN AND FE OXIDES IN SOILS AND SEDIMENTS. Means, J.L.; Crerar, D.A.; Borcsik, M.P. (Princeton Univ., NJ (USA). Dept. of Geology); Duguid, J.O. Geochimica et Cosmochimica Acta ; 42: No. 12, 1763-1773(Dec 1978).

Iron and Mn oxides and associated radionuclides in soils and sediments from the radioactive waste burial grounds at Oak Ridge National Laboratory have been selectively extracted using wet chemical techniques. Product-moment-correlation analyses have demonstrated that ^{60}Co and various actinides, principally ^{244}Cm, ^{241}AM and ^{239}Pu are dominantly associated with Mn oxides. Correlation coefficients between these radionuclides and Fe oxides and organic C are generally very low. The important role of Mn oxides in radionuclide adsorption is attributed to their unique surface and colloidal properties. The data illustrate the importance of the Mn oxide component of soils and sediments in controlling transition metal and actinide solubility. These results suggest two major implications for the disposal of radioactive waste. First, in order to minimize future ^{60}Co and actinide mobilization from disposal sites, a chemical environment in which Mn oxides are least soluble should be maintained. Second, the liberal use of Mn oxides in waste management operations might improve long-term retention of these radionuclides. Deep-sea Mn nodules, which may in the future be mined for their trace metal contents, could serve as a ready supply of Mn oxide for waste disposal applications.

3356 CONTAINMENT OF GASEOUS FISSION PRODUCTS IN CAVERNS. Takahashi, K.; Tamachi, T. (Kyoto Univ., Uji (Japan). Inst. of Atomic Energy); Kusuki, T. Kyoto Daigaku Genshi Enerugi Kenkyusho Iho (Bulletin of the Institute of Atomic Energy, Kyoto University) ; 2: 76-86(Mar 1978). (In Japanese).

Experimental study and computer code development have been made for the evaluation of the transport of gaseous fission products contained in a cavern into the environment. In the first part, the adsorption and desorption characteristics of iodine and methyl iodide in various samples of soil and sand were reported for various conditions. Descriptions of the test facilities and the variables chosen for the tests are presented together with the experimental results. In the second part, the computational model and the outline of the code for evaluating the transport of gas mixture in soil and sand are described. In the third part, computational evaluation is made for the F.P. containability of a cavern, assuming a loss of coolant accident in an underground LWR. One of the notable features found from this simulation study was that the energy of the high temperature steam from a reactor is quickly absorbed by the large capacity of the ground. Concentration profile of Kr gas, pressure profile in porous media and other typical variables are presented as functions of elapsed time and distance. (Aoki, K.

3357 MANAGEMENT, STABILISATION AND ENVIRONMENTAL IMPACT OF URANIUM MILL TAILINGS. Paris, France; OECD Nuclear Energy Agency (1978). 498p.

These proceedings deal with the sources of radioactivity arising from uranium mill wastes, the environmental aspects, the management and stabilisation of radioactive wastes and the policies and regulatory aspects.

Terrestrial Ecosystems and Food Chains

3358 (BNL--51066, pp 1-16) ENVIRONMENTAL PROTECTION. Hull, A.P. Oct 1979.

Safety and Environmental Protection Division. Progress report, January 1, 1976-December 31, 1978.

Environmental Studies and Internal Dosimetry projects include: Environmental Protection; 1977 Environmental Monitoring Report; Sewage Sludge Disposal on the Sanitary Landfill; Radiological Analyses of Marshall Islands Environmental Samples, 1974 to 1976; External Radiation Survey and Dose Predictions for Rongelap, Utirik, Rongerik, Ailuk, and Wotje Atolls; Marshall Islands - Diet and Life Style Study; Dose Reassessment for Populations on Rongelap and Utirik Following Exposure to Fallout from BRAVO Incident (March 1, 1954); Whole Body Counting Results from 1974 to 1979 for Bikini Island Residents; Dietary Radioactivity Intake from Bioassay Data, a Model Applied to ^{137}Cs Intake by Bikini Island Residents; and External Exposure Measurements at Bikini Atoll.

3359 (CEGB-RD/B/N--4291) PRELIMINARY ASSESSMENT OF THE WASTE DISPOSAL PROBLEM FOR MAGNOX STEELS. Nair, S. (Central Electricity Generating Board, Berkeley (UK). Berkeley Nuclear Labs.). May 1978. 78p. Dep. NTIS (US Sales Only), PC A05/MF A01.

A methodology has been described which can be used to assess the relative radiological toxicities of activation products over geological timescales. A computer code, STRUMP, was written to assist in this assessment. The methodology was applied to an evaluation of the radiological implications of the waste disposal problem for decommissioned fixed steel components in Magnox reactors. The study concluded that the radiotoxicity of the activated steels was dominated, to a varying extent, by the isotopes ^{63}Ni and ^{59}Ni for timescales up to 400,000 years. An attempt was made to estimate toxicity levels corresponding to the activity limit of $10^{-11}Ci\ gm^{-1}$ below which radioisotopes may be considered stable. The study indicated that steels activated in conditions typical of those encountered by large mass components in the core mid-plane of the core restraint structure became safe for unrestricted disposal only at about a million years.

3360 (CONF-7604154--, pp 18p, Paper 1) DETERMINATION OF SAFE RADIOACTIVE RELEASES TO THE ATMOSPHERE FROM THE NUCLEAR POWER SITE, DUYNEFONTEIN. 1976.

From Conference on air pollution; Pretoria, South Africa (26 Apr 1976).

The capacity of the environment to accept airborne radioactive effluent safely depends on various local factors such as dispersion conditions, the ecology, the habits of the local population and the accumulation, through

critical pathways, of pertinent radionuclides. Long-term average dilution factors at varying distances from a 100 m stack have been calculated from mesometeorological data. On the basis of available data, permissible release rates are derived for radioisotopes of the noble gases (critical pathway: external cloud exposure), ^{131}I (not inhalation but the pathway : atmosphere-deposition-pasture-cow-milk-human), ^{137}Cs (not uptake through milk but exposure from accumulated ground deposition, ^{106}Ru, ^{125}Sb, and ^{144}Ce (ground deposition) and tritium (inhalation). Although final confirmation of these values can only be obtained after operation, such a pre-operational survey - including the nuclear techniques for tracing airborne releases through the biosphere - may serve as an example to conventional industry.

3361 (DOE/EV/10305--1) RADIOECOLOGICAL INVESTIGATIONS OF URANIUM MILL TAILINGS SYSTEMS. PROGRESS REPORT, SEPTEMBER 1, 1979-SEPTEMBER 30, 1980. Whicker, F.W. (Colorado State Univ., Fort Collins (USA). Dept. of Radiology and Radiation Biology). 10 Oct 1980. Contract AC02-79EV10305. 7p. NTIS, PC A02/MF A01.

The initial 13 months of this program have been devoted to staffing, development of a radiochemistry capability, development of a mill tailings reclamation study, studies on hydraulic properties of soils, initiation of plant uptake studies, preparation for metabolic studies with deer and antelope, and sample collections. Through the addition of new personnel and equipment, we are rapidly developing analytical capabilities for ^{238}U, ^{230}Th, ^{226}Ra, ^{210}Pb and ^{210}Po in matrices such as soil, water, plant material, and animal tissues. A 4 acre study site was developed in cooperation with the Pathfinder Mines Corp. at the Shirley Basin Uranium Mine in Wyoming. The study site is designed for investigations on the influence of various kinds and thicknesses of mill tailings soil covers on the integrity of reclaimed tailings and inherent radionuclides. Studies on the hydraulic properties of various soil materials were conducted and data analysis is in progress. Plots and procedures for conducting plant uptake studies on uranium and progeny were established and long-term investigations have been initiated. A colony of tame mule deer and pronghorn antelope has been developed for studies on the uptake and retention of ^{210}Pb and ^{210}Po. Numerous collections of soil, vegetation and water from the Shirley Basin Uranium Mine environs were conducted and radiochemical assay is in progress.

3362 (DOE/SF/00701--T61) DETAILED WORKING PROCEDURE FOR TAKING CORE SAMPLES FROM RMDF LEACH FIELD. Harris, J.; Stelle, A.M. (Rockwell International Corp., Pasadena, CA (USA)). 17 Aug 1976. Contract AM03-76SF00701. 10p. (N--704DWP990020). NTIS, PC A02/MF A01.

This procedure describes the sampling plan for taking cylindrical cores and sampling the cores to determine the extent of radioactive contamination in the RMDF leach field and in the soil and vegetation surrounding the leach field.

3363 (IDO--12088, pp 8-9) RADIATION DOSIMETRY OF SMALL MAMMALS INHABITING A LIQUID RADIOACTIVE WASTE DISPOSAL AREA. Halford, D.K.; Markham, O.D. (Dept. of Energy, Idaho Falls, ID). Apr 1979.

From Symposium on the Idaho National Engineering Laboratory ecology programs; Grand Teton, WY, USA (10 Sep 1978).

Small mammals inhabiting radioactive waste disposal areas may receive chronic radiation exposure. The extent of such radiation exposure needs to be documented so that potential ecological impacts on resident animals can be determined. Therefore, a dosimetry study was conducted on three species of small mammals inhabiting the dry bed of a liquid radioactive waste disposal pond. This paper discusses: (1) the surgical implantation of lithium fluoride thermoluminescent dosimeter chips, and (2) the external chronic gamma radiation doses received by wild rodents residing on or near a liquid radioactive waste disposal area and the possible ecological implications of these doses. Radiation doses received by small mammals inhabiting the TRA leaching pond were estimated by surgically implanting lithium fluoride thermoluminescent dosimeters (TLD) chips subcutaneously.

3364 (IDO--12088, pp 10-11) RADIATION DOSES TO SMALL MAMMALS AT THE IDAHO NATIONAL ENGINEERING LABORATORY RADIOACTIVE WASTE MANAGEMENT COMPLEX. Arthur W.J. (Dept. of Energy, Idaho Falls, ID); Halford, D.K.; Markham, O.D.; Janke, D.H. Apr 1979.

From Symposium on the Idaho National Engineering Laboratory ecology programs; Grand Teton, WY, USA (10 Sep 1978).

A project to estimate radiation doses received by small mammals at the Subsurface Disposal Area of the INEL Radioactive Waste Management Complex (RWMC) was initiated in October 1977. The objectives are: (1) to provide information on radiation doses received by small mammals burrowing into pits and trenches containing radioactive materials and (2) to estimate what proportion of the small mammal population receive doses higher than ambient exposures. The second objective is part of a larger study to model the role of small mammals in radionuclide movement in the RWMC ecosystem. All radiation doses received by small mammals will be compared to area of capture to determine whether any area effects exist. Tissues are being collected from animals receiving higher than background doses in conjunction with a study to discern pathological abnormalities associated with high radiation doses (Evenson et al., this report). Radiation doses received by small mammals will be monitored through time to determine if seasonal differences exist.

3365 (IDO--12088, pp 28-29) ECOLOGY STUDIES AT THE IDAHO NATIONAL ENGINEERING LABORATORY RADIOACTIVE WASTE MANAGEMENT COMPLEX. Arthur, W.J.; Markham, O.D. (Dept. of Energy, Idaho Falls, ID). Apr 1979.

From Symposium on the Idaho National Engineering Laboratory ecology programs; Grand Teton, WY, USA (10 Sep 1978).

From 1954 to present, 7.02 x 10^6 curies of transuranic, mixed fission and mixed activation radioactive waste have been stored below ground in the Subsurface Disposal Area at the Idaho National Engineering Laboratory Radioactive Waste Management Complex (RWMC). In September 1977, studies were initiated to determine the impact of this operation on flora and fauna in the area, and any possible role of these ecosystem components in radionuclide uptake and transport. Animal species utilization of the area is being estimated by tri-weekly driving transects. Tissue samples are being collected from deer mice (Peromyscus maniculatus), Ord's kangaroo rat (Dipodomys ordii), mountain cottontail (Sylvilagus nutallii), pygmy rabbit (Sylvilagus idahoensis), horned lark

(Eremophila alpestris), and sage grouse (Centrocercus urophasianus) inhabiting the area. Samples are analyzed for mixed fission and mixed activation products, ^{210}Po, $^{239,240}Pu$, ^{238}Pu, and ^{241}Am. Data on invertebrate species will be collected with 25 pitfall collectors and samples analyzed for radionuclide concentrations. Searches are being conducted in lava ridges inhabited by predators near the waste storage area, and prey remains and fecal samples collected and analyzed to estimate any radionuclide transport in the food chain. A vegetation sampling program will be conducted to obtain data on floral species present, biomass, percent ground cover, and to determine whether plants play a role in uptake and movement of radionuclides in the ecosystem. Only plants growing within the SDA will be studied as these are the plants most likely contaminated with radionuclides.

3366 (IDO--12088, pp 30-31) SPECIES COMPOSITION AND LOCAL MOVEMENT OF SMALL MAMMALS ON THE RADIOACTIVE WASTE MANAGEMENT COMPLEX, IDAHO NATIONAL ENGINEERING LABORATORY SITE. Groves, C.R.; Keller, B.L. (Idaho State Univ., Pocatello). Apr 1979.

From Symposium on the Idaho National Engineering Laboratory ecology programs; Grand Teton, WY, USA (10 Sep 1978).

Little ecological information is available on small mammals residing on the INEL Site. In May 1978, a major investigation of rodent species composition, local movement, and density was initiated on the Subsurface Disposal Area (SDA) of the INEL Radioactive Waste Management Complex. Arthur et al., are presently investigating radiation doses to small mammals on the SDA. Information obtained on dose rates for individual animals will be related to movement data obtained on small mammals occupying specific areas. Density estimations will be of particular importance in considering the number of rodents which could potentially be affecting the distribution of interred wastes during their burrowing activites. Additionally, information on the surface area over which contamination might be spread by rodents in needed in order to assess the movement of uncontained, radioactive materials. A two week block of data was used to report preliminary movement information for the SDA. Average linear movement was calculated as the average distance between successive captures for rodents occupying the grids and rodents residing on the perimeter. Rodent density was estimated on each internal grid with a modification of the assessment line technique (O'Farrell, M.J., 1977, J. Mammal. 58: 575-582).

3367 (IDO--12088, pp 32-33) THEORETICAL PROBLEMS IN DEFINING DISPERSAL IN SMALL MAMMALS OCCUPYING THE SUBSURFACE DISPOSAL AREA, IDAHO NATIONAL ENGINEERING LABORATORY SITE. Keller, B.L.; Groves, C.R. (Idaho State Univ., Pocatello). Apr 1979.

From Symposium on the Idaho National Engineering Laboratory ecology programs; Grand Teton, WY, USA (10 Sep 1978).

The purpose of this paper is to review several factors which are important in the documentation of dispersal. Enumeration of dispersal is of importance due to the potential for small mammals to serve as a vector for movement of radioactive materials. Such materials may be trapped in the pelt, or enter the gut or lungs of rodents during burrowing. Three main factors of special significance to our research include: (1) The definition of a disperser. Since dispersal constitutes permanent movement from the place of origin, the definition necessitates a knowledge of the location of birth of each individual rodent and any movement away from this area. Such information can never be collected for a large number of animals distributed over a large surface unless a massive marking effort is initiated. We are currently attempting such an effort. The question now becomes, is the SDA prime habitat in which large numbers of demes are present and animals leave in saturation or pre-saturation dispersal during population expansion or is the SDA a mosaic of dispersal sinks. (2) Definition of a dispersal sink. A dispersal sink is an area of suitable to poor habitat where short-term survival is possible. If the SDA is a dispersal sink, we would expect to document, large spring and fall catches on the SDA perimeter, inward movement during winter, and massive loss of colonizers on the SDA during winter. If the SDA is prime habitat, we would expect emigration to the SDA perimeter and outward emigration in fall and spring. (3) Probability of capture. The probability of capturing an emigrating rodent depends on the size of the capturing matrix and the duration of the trapping effort.

3368 (IDO--12088, pp 38-39) ^{129}I DISTRIBUTION IN VEGETATION ON THE IDAHO NATIONAL ENGINEERING LABORATORY SITE. McGiff, T.J. (Colorado State Univ., Fort Collins); Fraley, L. Jr.; Markham, O.D. Apr 1979.

From Symposium on the Idaho National Engineering Laboratory ecology programs; Grand Teton, WY, USA (10 Sep 1978).

A study is in progress to determine the concentration of ^{129}I and the ratio of ^{129}I to ^{127}I (stable iodine) in vegetation at the Idaho National Engineering Laboratory Site and to assess the potential transfer through a food chain to man. Trace amounts of ^{129}I occur ubiquitously in the environment, as a result of natural production and nuclear weapons testing. Levels of 10^{-7} to 10^{-9} atoms ^{129}I/atom ^{127}I are representative of most areas. However, ratios as high as 10^{-4} atoms ^{129}I/atom ^{127}I have been found in iodine extracted from animal thyroids collected on the INEL Site. These increased levels are attributed to the operation of the Idaho Chemical Processing Plant (ICPP) which reprocesses spent nuclear fuel and solidifies the waste for storage. Recent measurements have confirmed that ^{129}I activity is present in the plant's gaseous effluent. During August 1978, samples of big sagebrush (Artemisia tridentata) and mixed grasses were collected for iodine analysis. These vegetation types were considered important in the diets of game and domestic animals in the area.

3369 (IDO--12088, pp 40) ^{129}I IN THYROIDS OF HERBIVORES ON THE IDAHO NATIONAL ENGINEERING LABORATORY SITE. Fraley, L. Jr. (Colorado State Univ., Fort Collins); Bowman, G.C.; Markham, O.D. Apr 1979.

From Symposium on the Idaho National Engineering Laboratory ecology programs; Grand Teton, WY, USA (10 Sep 1978).

The Idaho Chemical Processing Plant (ICPP) on the INEL has been releasing ^{129}I in its gaseous effluent for approximately 25 years. Although stack monitoring for ^{129}I has been conducted only since January 1978, it was estimated that an average of 0.1 Ci (4 GBq) of ^{129}I activity per year was released. Little information is available on the long-term behavior of ^{129}I in the environment and this study was initiated to estimate the ^{129}I concentration in herbivore thyroids and the respective thyroid doses.

3370 (INIS-mf--4978, pp 94-95) RADIOLOGICAL HEALTH AND SAFETY REQUIREMENTS WITH REGARD TO THE POPULATION IN ERECTING DISTRICT-HEATING ATOMIC PLANTS. Gusev, D.I.; Turkin, A.D.; Pavlovskii, O.A.; Stepanova, V.D. (Institut Biofiziki, Moscow (USSR)). Oct 1978. (In Russian).

From 2. radiobiological conference of the socialistic countries; Varna, Bulgaria (9 Oct 1978).

HUMAN POPULATIONS;NUCLEAR POWER PLANTS; RADIATION ACCIDENTS;RADIATION DOSES;RADIATION HAZARDS;RADIATION PROTECTION;RADIOACTIVE WASTE DISPOSAL;SITE SELECTION

3371 (INIS-mf--5349) APPLICATION OF ATOMIC ENERGY IN AGRICULTURE. ANNUAL REPORT 1978. (Association Euratom-ITAL, Wageningen (Netherlands)). 1979. 152p. Dep. NTIS (US Sales Only), PC A08/MF A01.

The work carried out in 1978 is reported as a series of papers. Research has been carried out in the areas of the contamination due to primary radiation effects and due to the behaviour of radioactive and non-radioactive pollutants in soils, sediments and plants, plant nutrition in soils, properties of crop plants, crop protection by genetic control and product treatment by disinfection and disinfestation. Internal matters, publications, lectures and internal reports are detailed.

3372 (JAERI-M--7757) SURVEY OF THE DISTRIBUTIONS OF POPULATION AND AGRICULTURAL PRODUCE, ETC. AND THE APPLICATION FOR POPULATION DOSE EVALUATION. SURVEY FOR ENVIRONMENTAL SAFETY RESEARCH INFORMATION. Iijima, T. (Japan Atomic Energy Research Inst., Tokyo). Jul 1978. 97p. (In Japanese). Dep. NTIS (US Sales Only), PC A06/MF A01.

The computer model CARIEN to calculate the population doses due to all LWRs in Japan needs the distributions of population and agricultural produce around the nuclear installations. These distributions were presumed to be obtainable from national censuses, and a case-study survey was carried out in 1976 for the area up to 1000 km from the JAERI Tokai Research Establishment. The present report describes the survey and its results, and then discusses applicability of the censuses for population dose evaluation. The national censuses of population and foodstuffs were found to be sufficient for determining these distributions and predicting the future population changes. Results indicated the following: a) the population and agricultural produce around little contribute to the population doses, b) the contributions of leafy vegetables and cow's milk are important compared with inhalation, and c) if such as rice, egg and pork concentrate radionuclides to the same extent as leafy vegetables or milk, these are also important.

3373 (KFK--2750, pp 4800-1-4800-9) INVESTIGATION OF THE RADIOECOLOGY OF IODINE 129. Schuettelkopf, H. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Hauptabteilung Sicherheit - Bereich 1). Oct 1979. (In German).

Semiannual report 1978/2.

Very sensitive analytical methods for I-129 were developed for different sample materials. - The behaviour of I-129 in the Karlsruhe reprocessing plant and its release was completely investigated. - A longterm risk for the population caused by I-129 is not excpected. An existing environmental contamination with I-129 is reduced by a half-life of 0,3 y. The exposure of the population via the pasture-cow-milk path until now was overstimated at least by a factor 45. - In the environmental air of Kiel, Stade, Karlsruhe, Gundremmingen and Munich elemental iodine and iodine aerosols were measured. In the environmental air of Karlsruhe $CH_3{}^{127}I$ was determined.

3374 (LA-UR--79-3045) UPTAKE OF TRACE ELEMENTS AND RADIONUCLIDES FROM URANIUM MILL TAILINGS BY FOUR-WING SALTBUSH (ATRIPLEX CANESCENS) AND ALKALI SACATON (SPOROBOLUS AIROIDES). Dreesen, D.R.; Marple, M.L. (Los Alamos Scientific Lab., NM (USA)). 1979. Contract W-7405-ENG-36. 18p. (CONF-791140--1). Dep. NTIS, PC A02/MF A01.

From 2. symposium on uranium mill tailings management; Fort Collins, CO, USA (19 Nov 1979).

A greenhouse experiment was performed to determine the uptake of trace elements and radionuclides from uranium mill tailings by native plant species. Four-wing saltbush and alkali sacaton were grown in alkaline tailings covered with soil and in soil alone as controls. The tailings material was highly enriched in Ra-226, Mo, U, Se, V, and As compared with three local soils. The shrub grown in tailings had elevated concentrations of Mo, Se, Ra-226, U, As, and Na compared with the controls. Alkali sacaton contained high concentrations of Mo, Se, Ra-226, and Ni when grown on tailings. Molybdenum and selenium concentrations in plants grown in tailings are above levels reported to be toxic to grazing animals. These results indicate that the bioavailability of Mo and Se in alkaline environments makes these elements among the most hazardous contaminants present in uranium mill wastes.

3375 (NUREG/CR--1004) STATISTICAL ANALYSIS OF SELECTED PARAMETERS FOR PREDICTING FOOD CHAIN TRANSPORT AND INTERNAL DOSE OF RADIONUCLIDES. FINAL REPORT. Hoffman, F.O.; Baes, C.F. III (eds.). (Oak Ridge National Lab., TN (USA)). Oct 1979. Contract W-7405-ENG-26. 201p. (ORNL/NUREG/TM--282). Dep. NTIS, PC A10/MF A01.

Compliance with environmental radiological standards promulgated to limit routine releases from nuclear facilities is usually determined through the use of mathematical models which are subject to considerable uncertainty. One way of estimating the uncertainty associated with model predictions is through an analysis of the statistical properties of their input parameters. Results of such analyses for parameters incorporated in US Nuclear Regulatory Commission (NRC) Regulatory Guide 1.109 are presented. The uncertainty in dose prediction resulting from a given concentration of $^{131}I_2$ in air transported over the pasture-cow-milk pathway is estimated. The NRC recommended generic default values are compared with the statistical distribution of the selected parameters, and the probability of the default values not being exceeded is estimated. The results provide an estimation of actual uncertainties to be expected under real-world conditions in lieu of validation experiments. The relevance of these results to the true uncertainties associated with the parameters and models analyzed in this report is limited because of the qualifying assumptions and the quality of data. However, methods of taking results from these analyses into account when determining compliance with regulatory statutes are discussed.

3376 (PNL--3300(Pt.2), pp 149) HANFORD HIGH-LEVEL WASTE. Soldat, J.K.; Strenge, D.L.; Napier, B.A.; Zimmerman, M.G.; Kennedy, W.E. Jr. Feb 1980.

Pacific Northwest Laboratory annual report for 1979 to the DOE Assistant Secretary for Environment. Part 2. Ecological sciences.

Methodology was developed for estimating the amount of land which might require control or decontamination because of contamination above specified limits following accidental releases of radionuclides at Hanford. Provisional limits were derived by calculating potential doses via food pathways and external exposure. The results of the calculations were published in a preliminary draft report. The report also included the results of calculations of potential doses from onsite and offsite transportation accidents.

3377 (PNL--3315) ENVIRONMENTAL CONSEQUENCES OF POSTULATED PLUTONIUM RELEASES FROM EXXON NUCLEAR MOFP, RICHLAND, WASHINGTON, AS A RESULT OF SEVERE NATURAL PHENOMENA. Jamison, J.D.; Watson, E.C. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Feb 1980. Contract AC06-76RL01830. 69p. NTIS, PC A04/MF A01.

Potential environmental consequences in terms of radiation dose to people are presented for postulated plutonium releases caused by severe natural phenomena at the Exxon Nuclear Company Mixed Oxide Fabrication Plant (MOFP), Richland, Washington. The severe natural phenomena considered are earthquakes, tornadoes, high straight-line winds, and floods. Maximum plutonium deposition values are given for significant locations around the site. All important potential exposure pathways are examined. The most likely 50-year committed dose equivalents are given for the maximum-exposed individual and the population within a 50-mile radius of the plant. The maximum plutonium deposition values most likely to occur offsite are also given.

3378 (RFP--3052) PLUTONIUM/AMERICIUM INVENTORY OF A POND ECOSYSTEM NEAR THE ROCKY FLATS FACILITY. Hurley, J.D.; Winsor, T.F. (Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). 1980. Contract EY-76-C-04-3533. 6p. (CONF-800607--10). Dep. NTIS, PC A02/MF A01.

From American Nuclear Society annual meeting; Las Vegas, NV, USA (8 Jun 1980).

The data indicate that concentrations of ^{239}Pu exceed fallout background levels in soil and sediment. However, the levels in soil and vegetation indicate substantial dilution at this location downwind from a previously studied area near the source. Radioecological data for ^{241}Am reported herein are the first at Rocky Flats. The measurement accuracy however, for ^{241}Am and ^{238}Pu is not yet well established at such low levels. Calculated inventories reveal that the greatest quantities of the three radioisotopes reside in soil and sediment. This information verifies the pattern of previously obtained data on radionuclide distributions at Rocky Flats in terrestrial and aquatic environments, but at concentration levels lower by one or more orders of magnitude. In the latter sense, the present data are unique and useful.

3379 PLUTONIUM IN THE LUNGS OF PRONGHORN ANTELOPE NEAR A NUCLEAR FUEL REPROCESSING PLANT. Markham, O.D.; Dickson, R.L. (Department of Energy, Idaho Falls, ID (USA). Idaho Operations Office); Autenrieth, R.E. Health Physics ; 37: No. 3, 398-400(Sep 1979).

The lungs of pronghorn antelope which are common on the Idaho National Engineering Laboratory (INEL) site were sampled as a bioindicator of plutonium in the environment near the Idaho Chemical Processing Plant which is located on the INEL site. Lungs were collected from September 1972 to December 1976 and analyzed for Pu. The source of Pu found in the lungs could be determined from a study of the $^{238}Pu/^{239-240}Pu$ ratio as there is a higher proportion of ^{238}Pu in the chemical plant releases than in world-wide fallout in the soils of Southeastern Idaho. Results indicate that ^{238}Pu from the chemical plant is being deposited in lungs and possibly other tissues of pronghorn. Only a proportion of the animals close to the plant had detectable quantities. Concentrations were near the detection limits and do not constitute a health hazard to the pronghorn. Meaningful comparisons can be made to radiation protection standards since pronghorn lungs are similar in size to man's.

3380 RADIOACTIVE MATERIALS AND ENVIRONMENT. Trivedi, R.N. (Fertilizer Association of India, New Delhi); Pandey, G.N. (Harcourt Butler Technological Inst., Kanpur (India)). Chemical Era ; 15: No. 6, 23-38(Jul 1979).

7 tables.

Radioactive materials are very widely used in medicine, industry, agriculture and scientific and industrial research besides their use as nuclear weapons. The radiation energy emitted from radioactive materials into the environment has severe hazards. Because of their unique characteristics, the contamination caused by them is not comparable to other commonly known pollutions. This paper deals with various salient features of the radioactive materials, their numerous applications, the degree of hazards due to contamination in the environment and the essential safety measures to be taken in handling and disposing of the radioactive materials.

3381 COMPARTMENT MODEL FOR ASSESSING CHRONIC RADIOACTIVE RELEASES. Koplik, C.M. (Analytic Sciences Corp., Reading, MA). Transactions of the American Nuclear Society ; 32: 110-111(Jun 1979). (CONF-790602--(Summ.)).

From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).

Use of BIODOSE program to compute biosphere transport parameters and doses to individuals and populations. HIGH-LEVEL RADIOACTIVE WASTES; RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL; RADIOISOTOPES;LEACHING;ENVIRONMENTAL TRANSPORT; ENVIRONMENTAL EXPOSURE PATHWAY;SOILS;SEDIMENTS; SURFACE WATERS;RADIONUCLIDE MIGRATION;FOOD CHAINS;MAN;HUMAN POPULATIONS;DOSE COMMITMENTS; MATHEMATICAL MODELS;COMPARTMENTS;COMPUTER CODES; B CODES

3382 CONTAMINATION OF SURROUNDINGS BY PATIENTS TREATED WITH ^{131}I. Mori, H. (Kanazawa Univ. (Japan). School of Medicine); Imashiro, H.; Yamada, M.; Matsudaira, M.; Matsumoto, S. Radioisotopes (Tokyo) ; 28: No. 4, 252-254(Apr 1979). (In Japanese).

CARCINOMAS;CONTAMINATION;ENVIRONMENT; EXCRETION;HYPERTHYROIDISM;HYPOTHYROIDISM;IODINE 131;PATIENTS;RADIOACTIVE WASTES;RADIONUCLIDE ADMINISTRATION;RADIONUCLIDE MIGRATION; RADIOTHERAPY;THYROID;TIME DEPENDENCE

3383 BEHAVIOUR OF TRITIUM IN THE ENVIRONMENT. REPORT ON THE INTERNATIONAL SYMPOSIUM HELD IN SAN FRANCISCO FROM 16 TO 20 OCTOBER 1978.

Farges, L. (International Atomic Energy Agency, Vienna (Austria)); Jacobs, D. (Oak Ridge National Lab., TN (USA)). Atomic Energy Review ; 17: No. 1, 213-217(Mar 1979).

Recent advances and the practical aspects of ^{3}H-utilization and monitoring are discussed. A reasonably complete picture exists of the behaviour of tritiated water (HTO) but information on tritiated gas and methane is less certain. The T/H ratio in water vapour over continental areas is about 3.5 to 4 times that over oceanic areas. ^{3}H can be used for developing chronological information in ice caps at the south pole. Watches with liquid crystal display use ^{3}H. Uncontrolled releases from fuel processing plants could contribute 35 to 60% of the maximum total ^{3}H body dose (>30mrem/year for a 100m stack). Global models for ^{3}H-concentration are highly dependent on the surface-water depth considered. T/H in the aquatic medium is discussed. In 1972, the oceanic inventory of ^{3}H was approximately 1640MCi (mostly in the Northern Hemisphere), with most of ^{3}H at a depth of less than 1000m. Terrestrially, rapid ^{3}H-loss is mainly due to evapotranspiration. When HTO penetrates more deeply into soil, the residence time increases. ^{3}H-retention in man can be characterized by a summation of 4 exponential terms, with successively increasing half-times.

3384 ^{90}SR AND ^{137}CS IN COYOTE SCATS FROM THE HANFORD RESERVATION. Springer, J.T. (Washington State Univ., Pullman (USA). Dept. of Zoology). Health Physics ; 36: No. 1, 31-33(Jan 1979).

Sixty scats (faeces) from coyotes (Canis latrans) were collected during the spring of 1976 from locations on the U.S. DOE Hanford Reservation in south central Washington. Only 5 of the 60 scats had detectable ^{137}Cs activity levels. All scats had measurable ^{90}Sr activity levels. Scats collected close to nuclear waste burial sites had the highest levels of radioactivity, and scats collected the greatest distance from the waste burial sites had the lowest levels. Coyotes are potential dispersers of radioactivity, and the data presented here suggest that surveillance of coyote scats can be useful adjunct to radiobiological monitoring procedures.

3385 RADIOCESIUM UPTAKE BY A POPULATION OF COTTON RATS (SIGMODON HISPIDUS) INHABITATING THE BANKS OF A RADIOACTIVE LIQUID WASTE POND. Garten, C.T. Jr. (Oak Ridge National Lab., TN (USA)). Health Physics ; 36: No. 1, 39-45(Jan 1979).

A mean population of 20 cotton rats inhabited the banks of a small radioactive liquid waste pond (approximately 0.39 ha) in Tennessee during the summer of 1977. Radiocesium concentrations in common shoreline plants (Eleocharis, Juncus, Typha, and Polygonum) ranged from 80pCi/dry g in Juncus to 35,800 pCi/dry g in Eleocharis. The mean (+-S.E.) ^{137}Cs concentration in cotton rat GI tracts was 2283 (+-591) pCi/dry g (N=14). The mean (+-S.E.) whole-body burden of ^{137}Cs in 14 rats sampled from June to September was 44467 (+-13,142) pCi. Mean ^{137}Cs body burdens in cotton rats increased from 32 pCi/g live weight in May to 208 pCi/g live weight in August and declined to 3 pCi/g live weight in December. The mean (+-S.D.) percent distribution of the whole-body contents among pelt, GI tract and carcass was 12(+-3), 28(+-12), and 60(+-9), respectively. The calculated mean (+-S.E.) ingestion rate of ^{137}Cs, assuming rats recaptured on the pond's banks for longer than 42 days were at equilibrium, was 1792(+-504) pCi/day. The concentration of ^{137}Cs in shoreline plants, rat GI tracts, and rat bodies indicated that cotton rats, which are herbivores, accumulated their body burdens by foraging along the contamination zone bordering the pond shoreline. A maximum mean estimate of the amount of ^{137}Cs annually exported by cotton rats from the pond is 8719 nCi or approximately 10^{-6}% of the total amount estimated to be present in the pond's sediments.

3386 LONG-TERM ACCUMULATION FACTORS FOR FISH AND SEDIMENTS IN THE BAVARIAN DANUBE AREA. Huebel, K.; Herrmann, H.; Ruf, M. (Bayerische Landesanstalt fuer Wasserforschung, Muenchen (Germany, F.R.)). pp 407-416 of Biological implications of radionuclides released from nuclear industries. Vol. 2. Vienna, Austria; IAEA (1979).

From International symposium on biological implications of radionuclides released from nuclear industries; Vienna, Austria (26 Mar 1979).

The legislation governing radiation protection in a great many countries stipulates the dose limits for human beings thereby restricting the permissible emission of radioactive waste products into the environment. For this purpose mathematical models are formulated which permit the corresponding dose from the emission rates of nuclear systems and facilities to be established. In these models the biological transfer factors are of prime importance. When observing the various exposure routes involved in waste disposal it will be seen that a considerable proportion of the resulting dose stems from eating fish and from exposure to the environment of dried-up river banks. The paper presents the accumulation factors for fish and sediments for a few of the most common elements occuring in nuclear power stations, obtained from many years of investigations in the Bavarian Danube area.

3387 FOODCHAIN TRANSPORT OF ^{210}PB RESULTING FROM URANIUM MILLING ACTIVITIES. McDowell-Boyer, L.M.; Watson, A.P.; Travis, C.C. (Oak Ridge National Lab., TN (USA)). pp 265-276 of Biological implications of radionuclides released from nuclear industries. Vol. 2. Vienna, Austria; IAEA (1979).

From International symposium on biological implications of radionuclides released from nuclear industries; Vienna, Austria (26 Mar 1979).

The milling of uranium ores in western United States has resulted in an enhanced release of ^{222}Rn from the residual tailings produced. The purpose of the present study was to evaluate the potential significance of ^{210}Pb deposited on soil as a result of radioactive decay of the atmospheric ^{222}Rn released. Environmental transport of ^{210}Pb, persisting in soils for 100 years following a unit release of ^{222}Rn from four generic mill sites in the western United States, was evaluated. Resulting dietary exposure and dose commitment for the US population were estimated with the use of derived environmental transport parameters, US dietary and demographic information, and appropriate dose conversion factors for Pb. Soil concentrations of Pb in US crop production areas were determined by the National Oceanic and Atmospheric Administration, using a regional-scale atmospheric dispersion and deposition model applied to the four designated release sites. A comparison between estimated dose commitment from Pb in soil, and that due to inhalation of Rn and short-lived daughters from a unit Rn release from each mill site was made. The results indicate that the Pb in soil is a potentially significant source of

radiation dose from uranium milling activities with respect to the Rn inhalation dose.

3388 BIOLOGICAL RESPONSES OF A TROPICAL COASTAL ECOSYSTEM TO RELEASES FROM ELECTRO-NUCLEAR INSTALLATIONS. Patel, B.; Patel, S.; Balani, M.C. (Bhabha Atomic Research Centre, Bombay (India). Health Physics Div.). pp 335-349 of Biological implications of radionuclides released from nuclear industries. Vol. 2. Vienna, Austria; IAEA (1979).

From International symposium on biological implications of radionuclides released from nuclear industries; Vienna, Austria (26 Mar 1979).

The implications of low-level radioactive waste discharges from electronuclear installations on the biological responses of the arcid clam Anadara granosa have been studied. The rate of feeding, measured in terms of clearance of dye suspension, was not affected by exposure to acute doses of up to 5 R. Exposure to higher doses (up to 40 R) increased the rate by 70%. On further irradiation (100-700 R), however, it dropped significantly. The changes in the feeding rates following bioaccumulation of the fission product nuclides have also been studied. The effect of ionizing radiations at the cellular level was evaluated by studying the electrophoretic mobility of clam erythrocytes. The electrokinetic behaviour of erythrocytes was not affected following irradiation at low doses (0.1 kR), but on exposure to higher doses (1-8 kR) the EPM showed oscillatory behaviour. The paper also discusses the biological half-life of caesium-137, its localization in subcellular fractions of various tissues of A. granosa and the effects of low-level discharges on the intertidal ecosystem.

3389 Umweltradioaktivitaet in Lebensmitteln. (ENVIRONMENTAL RADIOACTIVITY IN FOODS). Fischer, E.; Jakubick, V.; Kalus, W.; Mueller, H. (comps.). Eggenstein-Leopoldshafen, Germany, F.R.; ZAED (Dec 1978). vp. (In German and English).

This new volume of the bibliography series contains 142 citations mainly from the fields 'surveillance of nuclear installations' and 'Terrestrial ecosystems and food chains'.

3390 RADIATION BURDEN FROM RADIOACTIVE GAS EMISSIONS OF THE POPULATION IN THE IMMEDIATE NEIGHBOURHOOD OF THE NUCLEAR RESEARCH INSTITUTE. Horyna, J. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Jaderna Energie ; 24: No. 12, 456-458(Dec 1978). (In Russian).

The method suggested by Pasquill was used in calculating the radiation burden of population in the vicinity of UJV Rez. ^{13}+HlI is most significant from the radiation protection point. It may be directly inhaled and/or become part of the food chain. The calculation showed that the spread of gaseous radioactive wastes depends on the state of the atmosphere. In unfavourable atmospheric conditions the dose from a cloud of volatile fission products may be as much as 10^{-18} J.kg^{-1}.B^{-1}.m.s^{-1} and the dose resulting from iodine inhalation as much as 10^{-14} J.kg^{-1}.B^{-1}.m.s^{-1}. The accuracy of calculations was limited by the fact that literature data rather than experimental data were used.

3391 BIOINDICATION OF NUCLEAR FISSION AEROSOL PRODUCTS BY MEANS OF ORDINARY PINE NEEDLES. Piskunov, L.I.; Treiger, S.I. Atomnaya Energiya ; 45: No. 3, 223-225(Sep 1978). (In Russian).

Radioisotopes: ^{90}Sr, ^{144}Ce+^{144}Pr, ^{137}Cs. AGE DEPENDENCE;BIOLOGICAL INDICATORS;CONTAMINATION; FISSION PRODUCTS;PINES;POWER REACTORS; RADIOACTIVE WASTES;RADIOACTIVITY; RADIOECOLOGICAL CONCENTRATION;CERIUM 144; PRASEODYMIUM 144;CESIUM 137;RADIOISOTOPES; SPATIAL DISTRIBUTION;SURFACE AIR

Site Resource and Use Studies

3392 (DP--1526, pp 223-225) EARTHQUAKE DAMAGE TO UNDERGROUND FACILITIES. Stephenson, D.E.; Pratt, H.R. Nov 1979.

Savannah River Laboratory environmental transport and effects research. Annual report, 1978.

The damage to underground facilities caused by earthquakes was evaluated in order to determine potential seismic risk to an underground nuclear waste repository. Earthquake effects were delineated in terms of both displacements and accelerations. For underground facilities, displacements are considered more damaging than accelerations. An evaluation of the data was made in terms of acceleration, velocity, and displacement as a function of earthquake magnitude, distance, and depth. Damage decreases with distance from the source and with depth below the ground surface. However, extensive damage can occur if the facility is cut by a fault or fault fissure along which a slip can occur during an earthquake. Peak acceleration decreases with depth; however, peak displacements show much less reduction with depth.

3393 (ONWI--16) ENVIRONMENTAL CHARACTERIZATION OF BEDDED SALT FORMATIONS AND OVERLYING AREAS OF THE SALINA BASIN. (Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation). Sep 1979. Contract EY-76-C-06-1830. 379p. Dep. NTIS, PC A17/MF A01.

The suitability of the Salina Basin bedded salt region as a repository for underground disposal of radioactive wastes was reported. General information on the need for a repository, the technology development, the assessment process, a preliminary conceptual facility design, and anticipated impacts were included. The geology of the area including: stratigraphy, seismology, energy resources, and mineral resources was studied. The hydrology of the area was also studied as well as the climate. Socioeconomic studies of the area were also performed. Terrestrial and aquatic ecosystems were surveyed. (DMC)

3394 (PB--296712) LANDSAT PROJECT, STATE OF HAWAII. A PRELIMINARY REPORT. (Hawaii Ad Hoc Committee on Remote Sensing, Honolulu (USA)). Dec 1979. 41p. NTIS, PC A03/MF A01.

An inter-agency task force comprised of representatives from the State of Hawaii Departments of Agriculture, Land and Natural Resources, and Planning and Economic Development. The past, present and potential future application of satellite remote sensing technology is examined as a possible means for meeting growing land use and environment-related information needs of the State of Hawaii.

3395 (PB--296947, pp 356-365) ASSESSMENT OF RADON PROGENY INHALATION EXPOSURE FROM LOW-LEVEL WASTES OF PHOSPHATE MINING IN FLORIDA. Fisher, D.R. (Battelle Pacific Northwest Labs., Richland, WA); Roessler, C.E. May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

The redistribution of naturally-occurring uranium series radionuclides as a result of phosphate mining, processing, product use, and waste disposal presents several potential radiation pathways to man. Of particular importance is exposure to radon-222 progeny in structures built on reclaimed lands in Florida. Indoor radon daughter sampling data from Polk County were analyzed, and the data categorized by land and structure type. The average population-weighted concentration in about 4400 homes was determined to be about 0.009 working level (WL) in addition to a background of 0.0003 WL. It was also determined that the average annual cumulative indoor exposure on reclaimed land was approximately 0.02 working level months (WLM). A relatively small number of houses on high-activity overburden accounted for 38% of the total population exposure. A generally applicable model is proposed to relate lund cancer risk to the average annual exposure, the risk coefficient, the expected lung cancer mortality from all other causes, the duration of the exposure and the number of years for observation of the effects. Health risk estimates were performed for present levels and population size, and also for several scenarios anticipating new growth and construction - with and without imposed standards to limit indoor radon progeny levels. The model suggests that for an equilibrium condition, about one additional case of radiogenic lung cancer every two years in the Polk County population might be expected.

3396 (RLO-SA--79-1) PERSPECTIVE ON HANFORD SAFETY AND ENVIRONMENTAL PROTECTION. Fremling, A.G. (Department of Energy, Richland, WA (USA). Richland Operations Office). 25 Jul 1979. 30p. Dep. NTIS, PC A03/MF A01.

Hanford activities and operations past and present are reviewed, with emphasis on those that have potential for adverse safety or environmental impact. Safety and environmental protection requirements and responsibilities are summarized, and the current Hanford environmental surveillance program is outlined. It is concluded that the overall effects of Hanford's operations on people and the environment over the past 36 years have been small. It is perceived that the most difficult challenges are the management and ultimate disposal of the stored wastes. (JGB)

3397 (UCID--18706) SAFETY ANALYSIS (SA) OF THE HAZARDOUS WASTE DISPOSAL FACILITIES (BUILDINGS 514, 612, AND 614) AT THE LAWRENCE LIVERMORE LABORATORY. Odell, B.N.; Toy, A.J. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 13 Dec 1979. Contract W-7405-ENG-48. 64p. NTIS, PC A04/MF A01.

This safety analysis was performed for the Manager of Plant Operations at LLL and fulfills the requirements of DOE Order 5481.1. The analysis was based on field inspections, document review, computer calculations, and extensive input from Waste Management personnel. It was concluded that the quantities of materials handled do not pose undue risks on- or off-site, even in postulated severe accidents. Risks from the various hazards at these facilities vary from low to moderate as specified in DOE Order 5481.1. Recommendations are made for additional management and technical support of waste disposal operations.

3398 CATION EXCHANGE AND SELECTIVITY IN HEATED MINERALS. Komarneni, S. Soil Science Society of America Journal ; 43: No. 4, 790-793(Jul 1979).

Various minerals that are commonly present in shales were heated in air as well as hydrothermally and their cation exchange capacity (CEC) and cation exchange selectivity (CES) values were determined. The CEC values of all the heated minerals decreased because of partial or complete collapse of the layers. The CES (KX/Ca/sub 1/2/X) values of montmorillonites and micaceous vermiculites increased because of wedge site formation by partial collapse after heat treatment to 500 and 750°C in air. The CES values of coarse grained micas, however, decreased by dry heat treatment because of the collapse of frayed edges or wedge zones. Heated illites randomly interstratified with montmorillonite behaved like the specimen montmorillonites, while heated, well crystallized illites behaved similarly to the coarse grained micas. That the wedge zones are enormously selective for potassium was clearly proven here by the collapsed, heated minerals. The CES values of poorly crystalline illites interstratified with montmorillonite increased while those of well crystallized illites with discrete vermiculite impurity decreased upon hydrothermal treatment at 400°C and 500 bar (pressure). The decrease or increase in CES of the hydrothermally heated illite minerals can be explained by the loss or creation respectively of wedge zones just as in the case of air-heated minerals.

3399 UNCLEAR DECISION FOR GERMANY. Barnaby, F. (Stockholm International Peace Research Inst. (Sweden)). New Scientist ; 82: No. 1152, 266-267(26 Apr 1979).

The debate surrounding the proposal by the West German nuclear industry to build a reactor complex comprising a reprocessing plant, a reactor-fuel fabrication plant and a waste disposal facility is examined. Evidence is discussed for and against the nuclear centre on economic, safety, security and nuclear-weapon proliferation grounds.

3400 EFFECT OF SOIL AFFIXANTS ON GERMINATION, EMERGENCE, AND GROWTH OF CHEATGRASS AND RUSSIAN THISTLE. Cline, J.F. (Battelle Pacific Northwest Labs., Richland, WA (USA)); Holter, G. Health Physics ; 35: No. 2, 409-411(Aug 1978).

Shallow burial has been used successfully for the disposal of low-level radioactive wastes at Hanford. Soil affixants are used to control soil erosion by wind and to prevent plant roots or burrowing animals from entering the buried material. Growth chamber experiments were conducted to determine whether the affixants have any adverse effect on seed germination or plant growth. Layers of latex emulsions and asphalt emulsion mixtures applied to soil surfaces did not reduce seed germination significantly. There was no visible evidence of plant toxicity induced by the treatments. Asphalt emulsion and asphalt-neoprene reduced loss of soil water, but water utilization by plants growing in latex treated pots was nearly the same as for controls. Results suggest that these treatments can be used as soil stabilizers, to control the rate of moisture flow from soil and to help control wind erosion.

Regulations

3401 TOXIC AND HAZARDOUS WASTE DISPOSAL. VOLUME 3. IMPACT OF LEGISLATION AND

IMPLEMENTATION ON DISPOSAL MANAGEMENT PRACTICES. Pojasek, R.B. (ed.). Ann Arbor, MI; Ann Arbor Science Publishers, Inc. (1980). 212p. (CONF-790415--P6).
From 177. national meeting of the American Chemical Society; Honolulu, HI, USA (1 Apr 1979).
A continuation of the series Toxic and Hazardous Waste Disposal, Volume 3 is the first of two volumes covering contributions to the international hazardous waste disposal symposium. Volume 3 includes coverage of the United States regulatory program, related European experience, and Japanese technology. Thirteen of the sixteen papers were abstracted and indexed individually for EDB/ERA; no individual items were selected for Energy Abstracts for Policy Analysis (EAPA). (JGB)

3402 INCORPORATION OF PUNISHABLE OFFENCES AGAINST THE LAW ON PROTECTION OF THE ENVIRONMENT INTO THE PENAL CODE.
Moehrenschlager, M. Umwelt ; No. 6, 476-480(Dec 1979). (In German).
The government bill on the sixteenth act amending the penal legislation - act on the prevention of environmental offences - is presented, with comments being given on the most important stipulations. Paragraph 328 of the penal code deals with the unauthorized handling of nuclear fuels and represents an almost complete adoption of Paragraph 45 of the Atomic Energy law. The prohibition of the operation of nuclear facilities laid down in Paragraph 45, par. 1, No.4 of the Atomic Energy law, has been incorporated into the factural characteristics of illegal operation of facilities (Paragraph 327, par. 1,3 No. 1 of the penal code). The illegal handling of other radioactive substances has been dealt with in regard to some important cases: specifically for the case of illegal waste disposal (Paragraph 326, par. 1 No. 2, par. 2 of the penal code), and for the case of irregular transport leading to concrete danger or nuisance (Paragraph 330, par. 1 No. 4 of the penal code), as well as for the case of release of ionizing radiation having any such consequences (Paragraph 330, par. 1 No. 2, item c of the penal code). According to Paragraph 324 of the penal code, radioactive contamination of waters is a punishable offence. The rule of qualification of Paragraph 330 par. 1 of the penal code is to be applied to all these facts. (orig./HP) 891 HP/orig.-892 MB.

ENVIRONMENTAL SCIENCES, AQUATIC

Basic Studies

3403 (PNL--3160-2) ASSESSMENT OF EFFECTIVENESS OF GEOLOGIC ISOLATION SYSTEMS. VARIABLE THICKNESS TRANSIENT GROUND-WATER FLOW MODEL. VOLUME 2. USERS' MANUAL.
Reisenauer, A.E. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Dec 1979. Contract EY-76-C-06-1830. 157p. Dep. NTIS, PC A08/MF A01.
A system of computer codes to aid in the preparation and evaluation of ground-water model input, as well as in the computer codes and auxillary programs developed and adapted for use in modeling major ground-water aquifers is described. The ground-water model is interactive, rather than a batch-type model. Interactive models have been demonstrated to be superior to batch in the ground-water field. For example, looking through reams of numerical lists can be avoided with the much superior graphical output forms or summary type numerical output. The system of computer codes permits the flexibility to develop rapidly the model-required data files from engineering data and geologic maps, as well as efficiently manipulating the voluminous data generated. Central to these codes is the Ground-water Model, which given the boundary value problem, produces either the steady-state or transient time plane solutions. A sizeable part of the codes available provide rapid evaluation of the results. Besides contouring the new water potentials, the model allows graphical review of streamlines of flow, travel times, and detailed comparisons of surfaces or points at designated wells. Use of the graphics scopes provide immediate, but temporary displays which can be used for evaluation of input and output and which can be reproduced easily on hard copy devices, such as a line printer, Calcomp plotter and image photographs.

3404 (SKBF/KBS-TR--79-08) CALCULATION OF GROUND WATER MOVEMENTS IN THE STERNOE AREA IN BLEKINGE, SWEDEN. Stokes, J. (Kaernbraenslesaekerhet, Stockholm (Sweden); Svensk Kaernbraenslefoersoerjning AB, Stockholm). Feb 1979. 13p. (In Swedish). NTIS (US Sales Only), PC A02/MF A01.
The groundwater flow in the Sternoe region in Blekinge, Sweden was studied with the 2-D-analytical potential flow model which is presented in KBS report 47. Due to the topography, the cylinder-symmetrical alternative was used. Flowlines, gradients and flowtimes were computed for four different profiles representing typical examples of boundary conditions. The flowlines, gradients and flowtimes are presented in figures. (Author).

3405 (SKBF/KBS-TR--79-17) WATER PERCOLATION EFFECTS ON CLAY-POOR BENTONITE/QUARTZ BUFFER MATERIAL AT HIGH HYDRAULIC GRADIENTS. Pusch, R. (Svensk Kaernbraenslefoersoerjning AB, Stockholm; Kaernbraenslesaekerhet, Stockholm (Sweden)). May 1979. 13p. NTIS (US Sales Only), PC A02/MF A01.
A test senes was made in the laboratory to investigate the clay-transporting power of percolating water. Two buffer mass compositions were studied, one containing 4 percent Na bentonite and 96 percent quartz particles the other 8 percent bentonite and 92 percent quartz.

3406 (UCRL--15162) ESTIMATING LONG-TERM STATISTICS FOR ANNUAL PRECIPITATION FOR SIX REGIONS OF THE UNITED STATES FROM TREE-RING DATA. Fritts, H.C.; DeWitt, E.; Gordon, G.A.; Hunt, J.H.; Lofgren, G.R. (Arizona Univ., Tucson (USA). Lab. of Tree-Ring Research). Dec 1979. Contract W-7405-ENG-48. 99p. Dep. NTIS, PC A05/MF A01.
Spatial anomalies of seasonal precipitation for the United States and southwestern Canada have been reconstructed from 1602 through 1961 using dendrochronological and multivariate techniques on 65 arid-site tree-ring chronologies from western North America. Seasonal reconstructions are averaged to obtain mean annual precipitation values for six regions of importance to the Nuclear Regulatory Commission (NRC) Nuclear Waste Management Program (NWMP). Statistics calculated from the regionally averaged annual values for 25-year and longer intervals show annual precipitation in the seventeenth through nineteenth centuries to be lower than in the twentieth century for three regions in the American Southwest and higher for one region in the Northwest and two

regions in the East. The variability of precipitation generally was higher in the past three centuries than in the present century. Twenty-five-year intervals with noteworthy statistics are identified and important results are summarized and tabulated for use in the hydrologic modeling of the NWMP. Additional research is recommended to incorporate temperature and precipitation into a single hydrologic parameter.

3407 OCEAN MINING TECHNOLOGY AND ENVIRONMENTAL STUDIES. Halkyard, J.E. (Kennecott Copper Corp). Mining Congress Journal ; 65: No. 8, 25-28(Aug 1979).

A resource exists and numerous mines have been identified using sampling techniques developed over the past few decades. Mining systems have been demonstrated and unique technology developed. Ore transfer and transport have some problems that appear solvable. At least one economic process has been developed and demonstrated at a pilot scale. Mining effects on the ocean environment look minimal, while the question of process tailings disposal remains to be studied.

Chemicals Monitoring and Transport

3408 (COO--2185-12) TRANSPORT AND TRANSFER RATES IN THE WATERS OF THE CONTINENTAL SHELF. Biscaye, P.E. (Columbia Univ., Palisades, NY (USA). Lamont-Doherty Geological Observatory). Aug 1979. Contract EY-76-S-02-2185. 160p. Dep. NTIS, PC A08/MF A01.

Samples and data from previous cruises were analyzed with a view to understanding those biological, chemical, and physical processes which affect energy-related pollutants in the marine environment of the continental margin. Two cruises designed to expand the sample base, measure the time variability of several transfer processes, and to test specific hypotheses on the mechanisms for processes which effect exchange of continental margin with open ocean waters were carried out. Progress was made in understanding the relative roles of nutrients and light in controlling the productivity of important primary biomass (and hence, particle) producers. Progress was also made in understanding the influences of phytoplankton populations on distribution of inorganic nutrients, dissolved oxygen and particulate organic matter. In addition, preliminary results from field work support the hypothesis that most diatom production on the shelf sinks to the bottom where it enters benthic food chains or provides seed populations for subsequent blooms. Radionuclides were studied in water columns and in sediments to develop an understanding of processes associated with suspended solids and with sediments as sinks for radionuclides and other pollutants. Major progress was made on the analysis of hydrographic data from all previous cruises and to evolve a comprehensive picture of the stratification of the waters of the New York Bight. The Co_2-H_2O equilibration system required for the preparation of samples for oxygen isotope analysis was completed. Work has continued in the use of radon as a tracer of small scale water motions and mixing in the definition of the source function needed for modelling the data, in actual modelling of the data, and in defining the range of variability of the radon distributions. (JGB)

3409 (ORNL/TM--6328/V1, pp 187-260) BIOPROCESS DEVELOPMENT AND DEMONSTRATION. Pitt, W.W. Jr. Jun 1980.

Advanced Technology Section semiannual progress report, April 1-September 30, 1977. Volume 1. Biotechnology and environmental programs.

Bioprocess development and demonstration activites during this report period included the operation of bench-scale and pilot-plant ANFLOW (anaerobic upflow system for treatment of wastewater) units and long-term operation of a large fluidized-bed denitrification bioreactor. The ANFLOW demonstration pilot plant was operated essentially continuously at feed rates up to 15.1 m^3/day (4000 gal/day) with steadily improving performance. The bench-scale unit was also operated under conditions similar to the pilot plant, using raw sewage as feed. Results for the smaller unit compared closely with those from the large unit except for a much greater rate of methane production by the smaller unit. A preliminary cost estimate comparing ANFLOW with conventional waste treatment indicated that for waste treatment plants, 1 million gallon per day or less in size, the capital costs of ANFLOW would be less and consume much less energy than would conventional methods. Progress is also reported on research on the biological denitrification of various nitrate-containing waste streams associated with the nuclear industry, namely, evaluating the influence of radiation and the concentrations of sodium, calcium, nitrate, ammonium, and nickel on denitrification rates.

3410 (UCRL--83664) ON-LINE MONITORING OF TOXIC MATERIALS IN SEWAGE AT THE LAWRENCE LIVERMORE LABORATORY. Auyong, M.; Cate, J.L. Jr.; Rueppel, D.W. (California Univ., Livermore (USA). Lawrence Livermore Lab.). 21 Feb 1980. Contract W-7405-ENG-48. 9p. (CONF-800223--1). Dep. NTIS, PC A02/MF A01.

From 2. symposium on process measurements for environmental assessment; Atlanta, GA, USA (25 Feb 1980).

It is becoming increasingly important for industry to prevent releases of potentially toxic material to the environment. The Lawrence Livermore Laboratory has developed a system to monitor its sewage effluent on a continuous basis. A representative fraction of the total waste stream leaving the Plant is passed through a detection assembly consisting of an x-ray fluorescence unit which detects high levels of metals, sodium iodide crystal detectors that scan the sewage for the presence of elevated levels of radiation, and an industrial probe for pH monitoring. With the aid of a microprocessor, the data collected is reduced and analyzed to determine whether levels are approaching established environmental limits. Currently, if preset pH or radiation levels are exceeded, a sample of the suspect sewage is automatically collected for further analysis, and an alarm is sent to a station where personnel can be alerted to respond on a 24-hour basis. In the same manner, spectral data from the x-ray fluorescence unit will be routed through the 24-hour alarm system as soon as evaluation of the unit is complete. The design of the system and operational experience is discussed.

3411 INTERLABORATORY COMPARISON OF ARSENIC, MOLYBDENUM, AND SELENIUM ANALYSES FROM URANIUM MILL TAILINGS. Dreesen, D.R.; Gladney, E.S.; Owens, J.W. (Los Alamos Scientific Lab., NM). Journal of the Water Pollution Control Federation ; 51: No. 10, 2447-2456(Oct 1979).

An inter-laboratory analytical comparison was conducted to investigate analytical laboratories and techniques and to establish whether intensive analytical development is necessary to determine arsenic, molybdenum, and

selenium in complex groundwater collected at an inactive uranium mill tailings pile. A disparity in results indicates problems of trace analyses in complex matrixes. Regulations regarding wastewater discharge assume that accurate analysis can be achieved with standard techniques; such an assumption is suspect. 5 tables.

3412 MARINE POLLUTION - FACTS AND FICTION, THE SITUATION IN BRITAIN. Cole, H.A. Ocean Management ; 5: No. 3, 263-278(Oct 1979).
The widely-held impression that serious biological damage has been done to the marine environment and its resources by pollutants is not soundly based. There is no evidence that any offshore stock of fish or shellfish has suffered a reduction in annual recruitment to the exploitable stock as the result of pollution. The most damaging effects of pollution are reduction in available oxygen, increased turbidity due to suspended material and discolouration, and deposition of organic material on the bottom. Sewage and other organic effluents (such as food-processing wastes) with a high biological oxygen demand are the prime causes of these conditions. Potentially harmful metals and synthetic organic substances resistant to breakdown may accumulate in estuarine and coastal sediments, particularly muddy sands, silts and muds containing a high proportion of organic matter, and will continue to release potential pollutants long after shore discharge are controlled. There is no evidence that radioactive waste disposal by the UK in the sea has created any public health hazard or has had any discernible effect on organic production.

Radioactive Materials Monitoring and Transport

3413 (AECL--6586) PROGRESS REPORT, BIOLOGY AND HEALTH PHYSICS DIVISION, 1 APRIL TO 30 JUNE 1979. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Aug 1979. 67p. (PR-B--122). NTIS (US Sales Only), PC A04/MF A01.
Results are reported for research into the areas of dosimetry, monitoring, environmental radiation effects, waste management and tumour induction in mammals. (L.L.).

3414 (COO--3563-78) DETECTION AND MEASUREMENT OF CURIUM IN THE MARINE ENVIRONMENT. Schneider, D.L.; Livingston, H.D. (Woods Hole Oceanographic Institution, MA (USA)). 27 Oct 1978. Contract EY-76-C-02-3563. 36p. (CONF-7806174--1). Dep. NTIS, PC A03/MF A01.
From American Chemical Society symposium on analytical methods in oceanography; Boston, MA, USA (Jun 1978).
Transuranium elements have been introduced to the environment by a variety of ways including fallout from weapons testing, leakage from nuclear power reactors, waste effluent from nuclear fuel processing and leakage of radioactive waste from ocean dump sites. Several methods of curium detection and analysis in samples from marine ecosystems are contrasted and discussed in this paper.

3415 (FERMILAB--80/29) ENVIRONMENTAL MONITORING REPORT FOR CALENDAR YEAR 1979. Baker, S.I. (Fermi National Accelerator Lab., Batavia, IL (USA)). 1 May 1980. Contract AI08-76DP00474. 38p. NTIS, PC A03/MF A01.
The accelerator operated routinely at 400 GeV during CY-1979 with about the same number of protons accelerated during CY-1979 as in CY-1978. The total number of protons accelerated in 1979 was 2.5×10^{19}. Typical operation was at about 40 percent of the design intensity of 5×10^{13} protons per acceleration cycle. During CY-1979 there were no abnormal ocurrences. The perforated tile field at B0 was sealed off and a new resin regeneration system became operational. Precipitates from the effluent are disposed of as radioactive waste. There is no evidence for any off-site impact from previous releases of any pollutant. Operation of the Central Laboratory Sewage Treatment Plant was discontinued in June 1979, and sewage was diverted to the City of Batavia Sewage Treatment Plant. The maximum potential radiation exposure at the site boundary during CY-1979 was 2 mrem compared to 11 mrem last year. This dose rate was lower because the experimental areas produced fewer off-site muons this year. The total potential radiation exposure to the general off-site population from Fermilab operations during CY-1979 was 3 man-rem compared to 5 man-rem last year. Airborne radioactivity was released across the site boundary in small amounts throughout the year. The radioactive gas was primarily ^{11}C, total quantity released was 4 kCi, and the maximum dose at the site boundary was 1.0 mrem for 1979. The average concentration at site boundary based on measurements at the stack was 0.2% of the Concentration Guide. There was also a controlled release of tritium; the total amount released was 280 mCi. Tritium was released continuously from about June 1, 1979 (when the Meson Area resumed operations after a long shutdown) until the end of the year. The average concentration at the site boundary was about 0.00001% of the Concentration Guide, resulting in a negligible off-site exposure.

3416 (INIS-mf--5574) RESEARCH ON DEACTIVATION OF LIQUID, SOLID AND GASEOUS RADIOACTIVE WASTES AND DECONTAMINATION OF SURFACES. PART 5. INVESTIGATIONS ON METHODS AND MEANS FOR REMOVAL OF RADIOACTIVE AEROSOLS AND GASES FROM AIR DISCHARGES. (Sovet Ehkonomicheskoj Vzaimopomoshchi, Moscow (USSR). Postoyanniya Komissiya po Ispol'zovaniyu Atomnoj Ehnergii v Mirnykh Tselyakh). 1978. 119p. (In Russian). (CONF-761260--(Pt.5)). NTIS (US Sales Only), PC A06/MF A01.
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
Selected papers are processed separately.

3417 (INIS-mf--5574, pp 97-114) INVESTIGATION OF RADIATION SUBSTANCES MIGRATION IN THE SURFACE WATERS OF LAND, SEAS AND OCEANS FOR THE PURPOSE OF STUDY OF RADIATION SITUATION CHANGES IN THE FRESH AND SEA-WATERS IN CONNECTION WITH NUCLEAR POWER PLANTS AND NUCLEAR INDUSTRY ENTERPRISES ACTIVITY. Gedeonov, L.I.; Ivanova, L.M.; Rakov, N.A.; Blinov, B.A. 1978. (In Russian).
From 4. conference on processing and disposal of radioactive wastes and on decontamination of surfaces; Moscow, USSR (20 Dec 1976).
Review of the main results is given in research on the radioactive substances migration in the surface waters of the land, seas and oceans. The problem is considered of the methodology preparation for investigations and choice of the common criterias for the methods of radionuclides determination in environment. General problems are stated of accumulation and migration of strontium-90 and cesium-137 in the water medium. The data is given on radioactive contamination of the

Danube river; Baltic and North seas.

3418 (ORNL/TM--6893) RADIOACTIVE WASTE DISPOSAL AREAS AND ASSOCIATED ENVIRONMENTAL SURVEILLANCE DATA AT OAK RIDGE NATIONAL LABORATORY. Oakes, T.W.; Shank, K.E. (Oak Ridge National Lab., TN (USA)). Dec 1979. Contract W-7405-ENG-26. 34p. Dep. NTIS, PC A03/MF A01.

Environmental surveillance data have been collected around radioactive waste disposal areas for the past thirty years at Oak Ridge National Laboratory (ORNL). The wealth of data collected around the ORNL radioactive waste burial grounds is presented in this review. The purpose of this paper is to describe the solid waste burial grounds in detail along with the environmental monitoring data. The various monitoring systems are reviewed, and the liquid discharge trends are discussed. Monitoring at White Oak Dam, the last liquid control point for the Laboratory, was started in the late 1940's and is continuing. Presently, a network of five environmental monitoring stations is in operation to monitor the radionuclide content of surface waters in the White Oak Creek watershed. Facts observed during the lifetime of the disposal sites include: (1) a large amount of ^{106}Ru released during 1959 to 1964 due to the fact that Conasauga shale did not retain this element as well as it retained other radionuclides. (2) Large quantities of tritiated water have been released to the Clinch River in recent years, but, from a practical standpoint, little can be done to inhibit or control these releases. (3) A general downward trend in the number of curies released has been observed for all other radionuclides. A number of corrective measures that have been initiated at ORNL to reduce the radioactive liquid discharges are outlined in the paper.

3419 (PB--80-101959) EFFECT OF NUCLEAR POWER GENERATION ON WATER QUALITY IN THE GREAT LAKES. TECHNICAL REPORT. Sullivan, R.E.; Ellet, W.H. (Office of Radiation Programs, Washington, DC (USA). Div. of Criteria and Standards). Jul 1977. 82p. NTIS, PC A05/MF A01.

The 1972 Great Lakes Water Quality Agreement between the United States and Canada concerning improvement of the water quality of the Great Lakes has led to a study of the probable effects of nuclear power generation on radioactivity levels in the lakes. A simplified physical model of the Great Lakes system has been employed which assumes thorough annual mixing but allows for the perturbations in dilution volume required by the periodic establishment of thermoclines. Corrections are made, where necessary, for removal of radionuclides by sedimentation and equilibration. The results are given in terms of the concentration of radionuclides in each lake and the dose rates resulting from continuous, long-term ingestion of system waters. Dose calculations are performed using equations promulgated by the ICRP in Report 10. Using the model described, it is possible to obtain analytical solutions for the coupled differential equations describing these quantities. A Fortran computer program, GLA-1, has been employed to reduce calculational effort.

3420 RADIOACTIVE WASTE MANAGEMENT AND ITS IMPLICATIONS FOR ENVIRONMENTAL RESEARCH. Murray, C.N.; Girardi, F.; Bertozzi, G.; Myttenaere, C. (Commission of the European Communities Joint Research Centre, Varsese, Italy). pp 125-133 of Management of environment. Patel, B. (ed.). New Delhi, India; Wiley Eastern Ltd. (1980).

The methodology proposal in this article is based on the identification and mathematical modeling of barriers, natural and artifical, interposed between radioactive wastes and man. The development of terrestrial and aquatic ecological models is described. Management mechanisms established to assure a successful information transfer and proper coordination among different organizations will be briefly outlined. (DAD)

3421 DUMPING OF SOLID PACKAGED RADIOACTIVITY IN THE DEEP OCENAS. Forster, W.O.; Van As, D. (International Atomic Energy Agency, Vienna, Austria). pp 134-141 of Management of environment. Patel, B. (ed.). New Delhi, India; Wiley Eastern Ltd. (1980).

A discussion of radioactive wastes from industrial origins is presented. Provisions for deep sea dumping are listed. Requirements for dumping sites are given. IAEA recommendations are discussed. (DAD)

3422 WINDSCALE RADIOCAESIUM IN THE CLYDE SEA AREA. Baxter, M.S.; McKinley, I.G. (Glasgow Univ. (UK). Dept. of Chemistry); Mackenzie, A.B.; Jack, W. Marine Pollution Bulletin ; 10: No. 4, 116-120(Apr 1979).

Radiocaesium, introduced into coastal waters in the effluent from the B.N.F.L. nuclear fuel reprocessing plant at Windscale, is present at significant levels throughout the Clyde Sea Area. Concentrations reached maximum in April, 1977, and have recently declined. Around 30 % of Windscale radiocaesium output passes through the Clyde Sea Area but less than 0.3 % remains in sediments. There appears to be no major radiological safety hazard. The radiocaesium is, however, an excellent tracer species for both waters and sediments. The Irish Sea-derived component comprises over 90 % of Clyde seawater and may well introduce major inventories of pollutants. The average water residence time in the Clyde system is 4.5 months, although significantly longer entrainment is evident in northern sea lochs. Study of radiocaesium variations has enabled improved assessment of the Clyde's response to marine pollution.

3423 COMPARISON OF CALCULATED AND MEASURED RADIATION DOSES FROM CHRONIC AQUEOUS RELEASES. Watts, J.R. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Health Physics ; 36: No. 4, 519-521(Apr 1979).

This paper compares 70-yr dose commitment values for drinking water and fish consumption from environmental monitoring data at the Savannah River Plant (SRP) with predicted values obtained with the computer code CARDOCC (Chronic Aqueous Release Dose Commitment Code).

3424 METHODS OF RADIOACTIVE WASTEWATER TREATMENT. Schaaf, R. (Wolfatit Alkalmazasi Osztaly). Energia es Atomtechnika ; 32: No. 4, 169-171(Apr 1979).

Problems associated with radioactive waste disposal at high capacity nuclear power plants are considered. In particular, radioactive liquid waste disposal is described. Various ion exchange methods for concentrating and precipitating radioactive isotopes in water are discussed. Successful experiments that evaluated the performance of pulver form ion exchangers in decontaminating radioactive wastewater are reported. (11 references)

3425 GEOLOGIC MIGRATION POTENTIALS OF TECHNIUM-99 AND NEPTUNIUM-237. Bondietti, E.A.; Francis, C.W. (Oak Ridge National Lab., TN). Science ; 203: 1337-1340(30 Mar 1979).
Relatively mobile TcO_4^- and NpO_2^+ can be chemically reduced to less soluble oxidation states in the presence of igneous rocks, as predicted by oxidation-reduction measurements. Current risk assessments, which consider technetium and neptunium as potentially capable of migrating from high-level radioactive waste repositories, may be overestimating their potential hazard to the public since the Fe(II) content of many subsurface waters may maintain these elements in less soluble oxidation states.

3426 NUCLEAR WASTE DISPOSAL. Costello, J.M. (Australia AEC). Atomic Energy in Australia ; 22: No. 1, 11-19(Jan 1979).
For nuclear energy to become a viable means of meeting future world energy requirements, a method for the safe disposal of radioactive wastes must be developed. Three principles currently employed in radioactive waste disposal are: the concentration and containment of long-lived radioactive wastes; the dilution and dispersion of short-lived radioactive wastes; and the delay storage of short-lived radioactive wastes to permit their decay into nonradioactive species. The current status of each method in the various countries in which it is utilized is examined. The risk of death from radiation exposure was compared with the risk of death from other human activities, such as smoking, driving, and traveling by air. (2 diagrams, 2 graphs, 1 photo, 30 references)

3427 ELIMINATION OF RADIOACTIVE LIQUID WASTES IN HOSPITALS: A MATHEMATICAL MODEL FOR DESIGNING DECAY PONDS. Magrini, A. (Univ of Rome). Energia Nucleare (Milan) ; 25: No. 12, 573-578(Dec 1978).
Presented is a mathematical model that can be used to design decay pond systems for the elimination of liquid wastes contaminated with short half-life radioisotopes as found in hospitals. The operation of a decay pond system, with reference to an average flow of radioactive effluents assumed to be constant with time, is analyzed. Criteria for an optimal choice of design parameters characterizing system dimensions and discharge modalities are chosen. The suitability of the model for studying possible operation transients is briefly reviewed. (in Italian) (1 diagram, 2 graphs, 4 references)

3428 NEW OPPORTUNITIES FOR STATE PARTICIPATION IN THE CONTROL OF RADIOACTIVE POLLUTION. Fabrizio, J.F. Chicago-Kent Law Review; 52: No. 1, 157-168(1975).
State governments have expressed a strong desire to regulate the environmental aspects of atomic energy production, but have been prevented from assuming any role by the belief that the Atomic Energy Act of 1954 pre-empted the states' power in this area. Even though Congress has the power to preclude the states from exercising any control over atomic waste disposal, it has never expressly done so; rather, the courts have imputed this intent to Congress. Two developments which may open the door to state regulation are reviewed. The first is the passage of the 1972 Amendments to the Federal Water Pollution Control Act (FWPCA), which seemingly takes from the Atomic Energy Commission (AEC) and gives to the Environmental Protection Agency (EPA) the responsibility for control of certain radioactive materials; also under the FWPCA, the states are expressly authorized to impose stricter performance standards than the EPA. The second development is the court decision upholding the interpretation that the FWPCA conferred jurisdiction on the EPA to regulate the discharge of radioactive waste materials into navigable waters.It is concluded that there is a small possibility that the states may be allowed to play a role in atomic energy pollution control, but their role will depend upon further court and Congressional action.

3429 ARTIFICIAL RADIOACTIVITY IN THE SEA. CHAPTER 22. Preston, A. pp 817-836 of Sea. Ideas and observations on progress in the study of the sea. Vol. 5. Marine Chemistry. Goldberg, E.D. (ed.). London; Wiley (1974).
The subject is covered in sections, entitled: global inventory of artificially produced radionuclides (including fallout and controlled disposal of radioactive wastes from nuclear power production); radioactivity as a potential pollutant (including public health implications of discharges from selected sites); radiation dose commitment to marine organisms; spectrum of artificially-produced radionuclides in marine environments and their overall distribution; distribution of radionuclides in seawater; distribution of radionuclides in sediment; bioaccumulation.

3430 RADIOACTIVITY IN THE MARINE ENVIRONMENT. CHAPTER 15. Preston, A. pp 305-329 of Sea fisheries research. Harden Jones, F.R. (ed.). London; Elek Science (1974).
The subject is covered in sections, entitled: introduction; sources of radioactivity in the marine environment; control of radioactive waste discharges; human radiation exposure due to radionuclides introduced to United Kingdom coastal waters in effluents; radiological consequences of major accidents in coastal waters; field research and radioecology (distribution of radionuclides in (a) the water, (b) sediments, (c) biological materials; nuclear weapon test fallout); radiation dosimetry of plaice; experimental work in aquaria; the future.

Water

3431 (CEA-R--4952) SORPTION-DESORPTION PROCESSES OF RADIOISOTOPES WITH SOLID MATERIALS FROM LIQUID RELEASES AND ATMOSPHERE DEPOSITS. THE DISTRIBUTION COEFFICIENT (KSUB(D)), ITS USES, LIMITATIONS, AND PRACTICAL APPLICATIONS. Saas, A. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Dept. de Protection). Mar 1979. 80p. (In French). NTIS (US Sales Only), PC A05/MF A01.
The various sorption-desorption processes of radionuclides with environmental materials are presented. The parameters governing the distribution coefficient are reviewed in the light of various examples. The factors affecting equilibria between the different phases are: reaction time, concentration of the solid phase, water quality, salinity, competition between ions, concentration of radioisotopes or stable isotopes, pH of the mobile phase, particle diameter, chemical form of the radioisotopes, nature of the solid phase, temperature. The effects of the biological parameters on the distribution coefficient are discussed. Biological processes affect the main chemical transformations: mineralization, insolubilization, oxidation-reduction, complexation, ... The importance of these processes is demonstrated by a number of

examples in various media. Finally, the practical use of Ksub(d) in the assessment of the environmental impact of radioactive releases is developed, with special emphasis on the limits of its use in siting studies and its essential interest in specifying pathways and capacity of a river system.

3432 (CONF-800433--4) AUTORADIOGRAPHIC STUDIES OF ACTINIDE SORPTION IN GROUNDWATER SYSTEMS. O'Kelley, G.D.; Beall, G.W.; Allard, B. (Oak Ridge National Lab., TN (USA)). 1980. Contract W-7405-ENG-26. 9p. NTIS, PC A02/MF A01.

From 4. international conference on nuclear methods in environment and energy research; Columbia, MO, USA (14 Apr 1980).

Autoradiography is a convenient and sensitive technique for the study of spacial distributions of alpha radioactive nuclides on slabs of rock or on other planar surfaces. The autoradiographic camera contains an arrangement for placing in firm contact Polaroid sheet film, a plastic scintillator screen, and the radioactive face of the specimen. As an example of the use of the autoradiographic method, a series of sorption experiments were carried out in which synthetic groundwater solutions of americium, neptunium, uranium, and plutonium were contacted with Climax Stock granite under aerated and anoxic conditions at pH 8 to 9. The sorption observed at specific mineral sites was correlated with data on sorption of these actinides on pure minerals.

3433 (CS-INIS--258, pp 99-118) STUDY OF RADIUM STATE AND BEHAVIOUR IN SURFACE AND WASTE WATERS. Benes, P.; Sedlacek, J.; Sebesta, F. (Ceske Vysoke Uceni Technicke, Prague (Czechoslovakia). Fakulta Jaderna a Fysikalne Inzenyrska); Havlik, B. (Institut Hygieny a Epidemiologie, Prague (Czechoslovakia)). Sep 1978. (In Czech).

From 9. national conference on radionuclides and ionizing radiation in water management; Liberec, Czechoslovakia (28 Sep 1978).

A survey is given of the current state of research into the behaviour of radium in surface and waste waters. The methods are discussed for analyzing the state of radium in natural and waste waters. Attention was focused on the observation of the effects of the season, water acidity, amount of suspended matter, distance from source of pollution, barium concentration, concentration of sulphate anions which are the principal factors affecting the behaviour of radium in surface waters. Also observed were the interactions of radium with sediments. The problems are briefly outlined of the radium intake of aquatic organisms on which future research should be focused.

3434 (EUR--5636) MONITORING OF PLUTONIUM CONTAMINATED SOLID WASTE STREAMS. CHAPTER II: PRINCIPLES AND THEORY OF RADIOMETRIC ASSAY. Birkhoff, G.; Bondar, L.; Notea, A.; Segal, Y. (Commission of the European Communities, Ispra (Italy). Joint Research Centre). 1977. 70p. Dep. NTIS (US Sales Only), PC A04/MF A01.

The interpretation of a count rate distribution obtained from radiometric assay of a given waste items population in terms of source strength distribution is discussed. A model for the evaluation of errors, arising from non uniform source density distribution (Pu) within the item volume and heterogeneity of matrix materials, is presented. Points concerning calibration procedures and representativity of reference materials are dealt with. Qualification procedures for possible monitoring systems are outlined on the basis of comparison with reference systems. The latter are composed of reference monitors based on high resolution gamma spectrometry and passive and active neutron techniques. The importance of information upon the elemental composition and density distribution of matrix materials for the interpretation of radiometric assay of solid wastes is stressed.

3435 (FRL--14) RADIOACTIVITY IN SURFACE AND COASTAL WATERS OF THE BRITISH ISLES, 1976. PART 2. AREAS OTHER THAN THE IRISH SEA AND ITS ENVIRONS. Mitchell, N.T. (Ministry of Agriculture, Fisheries and Food, Lowestoft (UK). Fisheries Radiobiological Lab.). 1978. 21p. Dep. NTIS (US Sales Only), PC A03/MF A01.

The establishments from which discharges are made are listed: they comprise sites of the United Kingdom Atomic Energy Authority, the Radiochemical Centre and the Ministry of Defence, as well as nuclear power stations operated by the Central Electricity Generating Board and the South of Scotland Electricity Board. Much of the environmental data in this report is the direct result of the Fisheries Radiobiological Laboratory's (FRL) control monitoring activities in relation to these discharges - that is monitoring to show whether public radiation exposure from them remains within the prescribed limits laid down within national policy. As such it is independent of the often similar environmental monitoring done by the operators as a condition of their authorizations. It is supplemented by some of the results of the Laboratory's extensive programme of environmental research where summaries of those results can be useful in providing a more comprehensive account of the situations being described. Tables are presented showing the radioactivity in environmental materials around each site.

3436 (IDO--12088, pp 67) LIQUID WASTE DISPOSAL AT THE IDAHO NATIONAL ENGINEERING LABORATORY AND RESULTANT WASTE PLUMES IN THE SNAKE RIVER PLAIN AQUIFER. Barraclough, J.T. Apr 1979.

From Symposium on the Idaho National Engineering Laboratory ecology programs; Grand Teton, WY, USA (10 Sep 1978).

Plumes of several waste components in the aquifer have been monitored and mapped periodically from as early as 1958. Tritium has been dispersed over an area of about 72 km^2 of the aquifer and has migrated about 12 km downgradient. The ^{90}Sr plume is about 4 km^2 in area and extends about 2.5 km from the discharge site. ^{137}Cs has not been detected in the aquifer, and is believed to have been immobilized in sediments by ion exchange. A thermal plume covers about 5 km^2 of the aquifer, and Cl and Na plumes cover about 39 km^2 of the aquifer. ^{129}I has only recently been discovered and mapped as a waste fission product at INEL. Because of its very long half-life (1.6 x 10^{7}y), it is significant in long-range studies of radioactive waste management. ^{129}I is dispersed over about 8 km^2 of the aquifer and has migrated about 4 km downgradient from the discharge site.

3437 (INIS-mf--5319, pp 8) RADIOACTIVITY IN THE HYDROSPHERE DUE TO A-1 NUCLEAR POWER PLANT OPERATION. Csupka, S.; Petrasova, M. (Krajska Hygienicka Stanica, Bratislava (Czechoslovakia)). [nd]. (In Slovak).

From 8. meeting on radiation hygiene; Medlov, Czechoslovakia (31 Oct 1977).

AQUATIC ECOSYSTEMS;BOHUNICE A-1 REACTOR;

CESIUM 137;CONTAMINATION;ENVIRONMENTAL IMPACTS; HYDROSPHERE;LIQUID WASTES;RADIOACTIVE EFFLUENTS; RADIOECOLOGICAL CONCENTRATION;SURFACE WATERS

3438 (INIS-mf--5319, pp 73) SURFACE WATER CONTAMINATION WITH RADIONUCLIDES CAUSED BY NUCLEAR POWER ENGINEERING. Saro, S.; Chudy, M.; Usacev, S. (Komenskeho Univ., Bratislava (Czechoslovakia). Prirodovedecka Fakulta). [nd]. (In Slovak).
From 8. meeting on radiation hygiene; Medlov, Czechoslovakia (31 Oct 1977).
BOHUNICE A-1 REACTOR;CONTAMINATION; ENVIRONMENTAL IMPACTS;LIQUID WASTES;RADIOACTIVE EFFLUENTS;RADIOACTIVITY;SURFACE WATERS;TRITIUM

3439 (INIS-mf--5372, pp 93-94) SOME ASPECTS OF ACCUMULATION OF RADIONUCLIDES IN COASTAL SEDIMENTS. Day, N.N.; Matkar, V.; Mathew, E.; Pillai, K.C. (Bhabha Atomic Research Centre, Bombay (India). Health Physics Div.). 1979.
From 6. Indian Association for Radiation Protection conference; Bombay, India (7 Mar 1979).
BARC;BUILDUP;CERIUM 144;CESIUM 137; DISTRIBUTION;PARTICLE SIZE;PLUTONIUM 239; PLUTONIUM 240;RADIOACTIVE EFFLUENTS;RUTHENIUM 106;SEAWATER;SEDIMENTS;SHORES;SILT;STRONTIUM 90; RADIOECOLOGICAL CONCENTRATION;RADIONUCLIDE MIGRATION;UPTAKE

3440 (KFK--2892) PLUTONIUM CONTAMINATION OF THE 'ALTRHEIN'. THE CONTAMINATION OF THE SEDIMENTS. Pimpl, M.; Schuettelkopf, H.; Afsar, M. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Nukleare Sicherheit). Dec 1979. 51p. (In German). NTIS (US Sales Only), PC A04/MF A01.
The distribution of Pu-238 and Pu-239+240 in the sediments of the 'Altrhein', a former branch of the river Rhine which serves as a main canal for liquid effluents from the Nuclear Research Center, was measured. Transverse, longitudinal and depth profiles were taken. The transverse profiles are different: either the 'Altrhein' moves in a bend or he moves on a straight line in the middle of the river-bed. The sediments are homogeneously contaminated with plutonium up to the lowest layer which is in about 70 cm depth. The contamination of the longitudinal profiles depends on the straitening of the 'Altrhein', on the width of the river, and on the distance from the location of discharge of the waste water. In the 'Altrhein' 94% of plutonium, in total, emitted with the waste water, were refound.

3441 (PNL--3160-1) VARIABLE THICKNESS TRANSIENT GROUND-WATER FLOW MODEL. VOLUME 1. FORMULATION. Reisenauer, A.E. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Dec 1979. Contract EY-76-C-06-1830. 35p. Dep. NTIS, PC A03/MF A01.
Mathematical formulation for the variable thickness transient (VTT) model of an aquifer system is presented. The basic assumptions are described. Specific data requirements for the physical parameters are discussed. The boundary definitions and solution techniques of the numerical formulation of the system of equations are presented.

3442 (PNL--3346) RADIOLOGICAL STATUS OF THE GROUND WATER BENEATH THE HANFORD PROJECT, JANUARY-DECEMBER 1979. Eddy, P.A.; Wilbur, J.S. (Battelle Columbus Labs., OH (USA)). Apr 1980. Contract AC06-76RL01830. 114p. NTIS, PC A06/MF A01.
Operations on the Hanford Site since 1944 have resulted in discharge of large volumes of process cooling water and low-level liquid radioactive waste to the ground. Radioactivity and chemical substances have been carried with these discharges and have reached the Hanford ground water. For may years wells have been used as groundwater sampling structures to gather data on the distribution and movement of these discharges as they interact with the unconfined ground water beneath the site. During 1979, 317 wells were sampled on various frequencies from weekly to annually. This report is one of a series prepared annually to document the evaluation of the status of ground water on the Hanford Site. Data collected during 1979 describe the movement of radionuclide (Tritium and Beta) and nitrate plumes that respond to the influence of groundwater flow, ionic dispersion and radioactive decay.

3443 (UCID--18652) BIODOSE: A CODE FOR PREDICTING THE DOSE TO MAN FROM RADIONUCLIDES RELEASED FROM UNDERGROUND NUCLEAR WASTE REPOSITORIES. Bonner, N.A.; Ng, Y.C. (California Univ., Livermore (USA). Lawrence Livermore Lab.). Mar 1980. Contract W-7405-ENG-26. 127p. NTIS, PC A07/MF A01.
The BIODOSE computer program simulates the environmental transport of radionuclides released to surface water and predicts the resulting dosage to humans. This report describes the program and discusses its use in the evaluation of nuclear waste repositories. The methods used to estimate dose are examined critically, and the most important parameters in each stage of the calculations are identified as an aid in planning for measurements in the field. Dose predictions from releases of nuclear waste to a large northwestern river (the baseline river) are presented to point out the nuclides, compartments and pathways that contribute most to the hazard as a function of waste storage time. Predictions for five other water systems are presented to identify the most important system parameters that determine the concentrations of individual nuclides in compartments and the resultant dose. The uncertainties in the biological parameters for dose prediction are identified, and changes in current values are suggested. Various ways of reporting dose estimates for radiological safety assessments are discussed. Additional work needed to improve the dose predictions from BIODOSE and specific areas and steps to improve our capabilities to assess the environmental transport of nuclides released from nuclear waste repositories and the resultant dose to man are suggested.

3444 (UCRL--52000-80-10, pp 8-13) PLUTONIUM IN THE MARINE ENVIRONMENT OF THE MARSHALL ISLANDS. Oct 1980.
Energy and technology review.
Between 1946 and 1958, the United States conducted 66 nuclear tests in the Pacific atolls of Eniwetok and Bikini in the Marshall Islands. Since 1972, LLNL has conducted a variety of studies related to the cycling and transport of longer lived residual radionuclides in the marine environments of these atolls. The primary concern is to collect sufficient data to develop recommendations to minimize the transfer of man-made radionuclides to people returning to the atolls. However, an attempt has also been made to relate analytical findings to much wider fields of scientific endeavor and to develop models that are useful, first locally, and secondly in another aquatic environments receiving inputs from different

source terms. One such program deals with the behavior of plutonium radionuclides in the marine environment of Eniwetok and Bikini, the findings of which are reported. A summary of the concentration of ^{239}Pu plus ^{240}Pu in the Eniwetok and Bikini lagoons and in the North Equatorial Pacific Ocean is presented.

3445 SOLUTION SPECIES OF PLUTONIUM IN THE ENVIRONMENT. Rai, D.; Serne, R.J.; Swanson, J.L. (Batelle Pacific Northwest Lab., Richland, WA). Journal of Environmental Quality ; 9: No. 3, 417-420(Jul 1980).
Information regarding the oxidation states of Pu in environmental samples is needed for estimating its migration through the geologic media. Predictions based upon thermodynamic data indicate that in the Eh-pH range of natural aqueous environments, the dominant species of Pu is likely to be Pu[V] in relatively oxidizing environments and Pu[III] in reducing environments. Because of the lack of methods of determining Pu[V] in environmental samples containing trace concentrations of Pu, Pu[V] has not been previously identified in these samples. Plutonium [VI] has generally been assumed to be the dominant species in relatively oxidizing environments. However, the results presented show that solutions in equilibrium with $^{239}Pu[IV]$ hydroxide contain Pu[V]. The presence of Pu[V] in solutions contacting $^{239}PuO_2(s)$ is also inferred from the data.

3446 (SAND--79-6002) REPRESENTATION OF RADIOELEMENT MIGRATION IN FISSURED ROCKS BY A MATHEMATICAL MODEL. Goblet, P.; Ledoux, E.; de Marsily, G.; Barbreau, A. (Ecole des Mines de Paris, 75 (France). Centre d'Information Geologique Fontainebleau; CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Inst. de Protection et de Surete Nucleaire). Sep 1979. Translation of paper presented at the symposium on radionuclide migration, Brussels, January 29-31, 1979 (CONF-790161--1(Trans.)). 14p. Dep. NTIS, PC A02/MF A01.
From Symposium on radionuclide migration; Brussels, Belgium (29 Jan 1979).
The migration of elements in solution in fissured rocks is approached by a method in which the fissured medium is described by way of the equivalent continuous, heterogeneous, anisotropic medium. The retention of the substances is represented by limited adsorption mechanisms within the fissure planes. After an explanation of the principle on which this model is built, a sample interpretation is given for tracing experiments performed with a fissured granitic massif by the Bureau de Recherches Geologiques et Minieres (BRGM; Bureau of Geological and Mining Research) and by the Centre d'Etudes Nucleaires de Grenoble (CENG; Grenoble Center for Nuclear Studies). This work was carried out for the Commission of the European Economic Communities and the French Atomic Energy Commission under a cost-sharing contract regarding the indirect action program on Management and Storage of Radioactive Waste.

3447 GROUNDWATER MODELING IN SUBSURFACE NUCLEAR WASTE DIAGONAL. AN OVERVIEW. Narasimhan, T.N. (Univ. of California, Berkeley). Transactions of the American Nuclear Society ; 32: 116-117(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
GROUND WATER;MATHEMATICAL MODELS;RADIOACTIVE WASTE MANAGEMENT;REGIONAL ANALYSIS;BIOSPHERE; ENVIRONMENTAL TRANSPORT;RADIONUCLIDE MIGRATION; SIMULATION;RADIOISOTOPES;EQUATIONS; CONTAMINATION

3448 REVIEW OF HYDRODYNAMIC DISPERSION IN TRANSPORT MODELS . Tracy, J. (Geological Survey, Reston, VA). Transactions of the American Nuclear Society ; 32: 120(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL;RADIOISOTOPES;LEACHING;ENVIRONMENTAL TRANSPORT;GROUND WATER;RADIONUCLIDE MIGRATION; MATHEMATICAL MODELS;HYDRODYNAMICS

3449 ORGANIC COMPOUNDS IDENTIFIED IN TRENCH LEACHATES FROM LOW-LEVEL RADIOACTIVE WASTE DISPOSAL SITES. Francis, A.J. (Brookhaven National Lab., Upton, NY); Iden, C.; Nine, B.; Colombo, P. Transactions of the American Nuclear Society ; 32: 112-114(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
LOW-LEVEL RADIOACTIVE WASTES;RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL;LEACHING; ORGANIC ACIDS;ALCOHOLS;PHENOLS;OTHER ORGANIC COMPOUNDS;COMPLEXES;RADIOISOTOPES;CHEMICAL REACTIONS;ENVIRONMENTAL TRANSPORT;GROUND WATER; RADIONUCLIDE MIGRATION;HUMIC ACIDS; ORGANOMETALLIC COMPOUNDS;RADIOACTIVE WASTE FACILITIES;COMPARATIVE EVALUATIONS

3450 NUMERICAL ANALYSIS OF RADIONUCLIDE MOVEMENT FROM A HYPOTHETICAL NUCLEAR WASTE REPOSITORY. Segol, G. (Bechtel Power Corp., San Francisco, CA); Raymond, J.R. Transactions of the American Nuclear Society ; 32: 117(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
Ground-water mediated migration to river and subsequent population doses are modeled.
RADIOACTIVE WASTE FACILITIES;UNDERGROUND SPACE; EARTHQUAKES;RADIOISOTOPES;ENVIRONMENTAL TRANSPORT;GROUND WATER;RADIONUCLIDE MIGRATION; AQUIFERS;CONTAMINATION;FLUID FLOW;MASS TRANSFER; RADIATION DOSES;HUMAN POPULATIONS;MATHEMATICAL MODELS;RECHARGE;FINITE DIFFERENCE METHOD; GEOLOGY;HYDROLOGY;PERMEABILITY;ADSORPTION; POROSITY;LEACHING;IODINE 129

3451 PRELIMINARY GEOSPHERE TRANSPORT MODELING AT THE WIPP SITE. Pahwa, S.B. (INTERA Environmental Consultants, Houston, TX). Transactions of the American Nuclear Society ; 32: 119-120(Jun 1979). (CONF-790602--(Summ.)).
From ANS annual meeting; Atlanta, GA, USA (3 Jun 1979).
NEW MEXICO;RADIOACTIVE WASTE FACILITIES; UNDERGROUND SPACE;GROUND WATER;RADIONUCLIDE MIGRATION;RADIOISOTOPES;ENVIRONMENTAL TRANSPORT; HYDROLOGY;MATHEMATICAL MODELS;PERMEABILITY; LEACHING

3452 IN SITU MEASUREMENTS OF RADIOACTIVITIES AT A MEGALOPOLICE WASTE WATER TREATMENT PLANT. Chisaka, H.; Suzuki, T.; Okano, Y.; Inokoshi, Y.; Horiguchi, Y. (Tokyo Metropolitan Isotope Research Center (Japan)). Radioisotopes (Tokyo) ; 28: No. 6, 374-376(Jun 1979). (In Japanese).
Published in summary form only.
ACCURACY;GALLIUM 67;GAMMA SPECTROSCOPY; IODINE 131;LI-DRIFTED GE DETECTORS;LIQUID WASTES;RADIATION DETECTION;RADIOACTIVE WASTES; RADIOACTIVITY;TECHNETIUM 99;TIME DEPENDENCE; WASTE PROCESSING PLANTS;RADIATION MONITORING

3453 TRANSFER OF ACTINIDES FROM THE ENGLISH CHANNEL INTO THE SOUTHERN NORTH SEA. Murray, C.N.; Kautsky, H.; Eicke, H.F. (Deutsches Hydrographisches Inst. (DHI), Hamburg (Germany, F.R.)). Nature (London) ; 278: No. 5705, 617-620(12 Apr 1979).

Results are presented for ^{238}Pu, sup(239+240)Pu, ^{241}Pu, ^{241}Am, ^{242}Cm and ^{244}Cm in waters of the English Channel and southern North Sea. Based on actinide concentration ratios in these waters compared with expected fallout values, the activities measured are considered to be mainly due to releases of low-level waste from the La Hague fuel reprocessing plant. Measurements made on ^{242}Cm indicate that any support by ^{242}Am would be minimal.

3454 PROCESS AND INSTALLATION FOR THE DISPOSAL OF LIQUID RADIOACTIVE WASTE. Stuenkel, H. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,736,256/A/. 15 Feb 1979. 6p. (In German).

It is proposed to evaporate liquid radioactive waste from nuclear power plants in their cooling towers. Evaporation may be carried out intermittently, with washings with an inactive liquid (e.g. water, if necessary with cleaning additives) in between. (UWI) 891 HP/UWI 892 MBE.

3455 ASSESSMENT OF THE RADIOLOGICAL IMPACT OF TRITIUM RELEASED TO SEA FROM THE WINDSCALE FUEL ELEMENT REPROCESSING PLANT. Hetherington, J.A.; Robson, J.C. (Ministry of Agriculture, Fisheries and Food, Lowestoft (UK). Fisheries Radiobiological Lab.). pp 283-299 of Behaviour of tritium in the environment. Vienna; International Atomic Energy Agency (1979).

From Symposium on the behavior of tritium in the environment; San Francisco, CA, USA (16 Oct 1978).

Tritium is discharged routinely to the Irish Sea in low-level liquid wastes from the nuclear fuel reprocessing plant at Windscale, Cumbria. In the course of a programme of environmental research utilizing the tritium discharges, samples of sea-water have been collected regularly from the northern area of the Irish Sea during the period 1968-74. Electrolysis has been used to concentrate the tritium to achieve a limit of detection in sea-water of about 10 pCi/l. Results have been corrected for the background concentrations of tritium from both naturally occurring sources and nuclear weapons' testing. The corrected results show that under conditions of constant discharge there is a fairly uniform concentration of tritium in the vicinity of the discharge point which in numerical terms corresponds to about 5 pCi/l per Ci/d. The shape of the contours of concentration both close to Windscale and over the wider area of the northern area of the Irish Sea is discussed in relation to dispersal mechanisms and water turn-over times. Evidence is presented of marked reversals in the paths taken by activity after discharge from Windscale. Finally the radiological safety aspects of tritium discharges are discussed in terms of both dose to critical groups and collective dose. It is shown that the limiting discharge rate in terms of the need to keep individual doses within ICRP limits is something like $9x10^8$ Ci yearly. A simple, although conservative, assessment of collective dose shows that this is likely to be less restrictive than the dose to individuals.

3456 Radioecologie marine. Etude du devenir des radionucleides rejetes en milieu marin et applications a la radioprotection. (MARINE RADIOECOLOGY. A STUDY OF THE FATE OF RADIONUCLIDES RELEASED INTO THE MARINE ENVIRONMENT AND APPLICATIONS TO RADIATION PROTECTION). Ancellin, J.; Guegueniat, P.; Germain, P. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Dept. de Protection). Paris, France; Eyrolles (1979). 256p. (In French).

This book presents the state-of-the art of the knowledge gained in France and in foreign countries for some 20 years on the points concerning man from the sanitary point of view and radionuclides transfers in the ocean environment especially. The various data of physico-chemistry (viz. behaviour of trace elements), geochemistry, physiology, physical and biological oceanography are included. In situ data are included on various sites of radioactive releases after several years of monitoring. Particular attention is devoted to the problem of concentration factors necessary for impact assessment studies and regulatory provisions governing effluents.

3457 TESTS OF POROUS PERMEABLE MEDIUM HYPOTHESIS FOR FLOW OVER LONG DISTANCES IN FRACTURED DEEP HARD ROCK. Bourke, P.J.; Hodgkinson, D.P. (UKAEA Atomic Energy Research Establishment, Harwell); Gale, J.E. (Waterloo Univ., Ontario (Canada)); Witherspoon, P.A. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). pp 157-171 of Low flow, low-permeability measurements in largely impermeable rocks. Paris, France; OECD (1979).

From Workshop on Low-Flow Low permeability measurements in Langley Impermeable rocks; Paris, France (19 Mar 1979).

Experiments are proposed to test the hypothesis that water movement over long distance through fractures in deep, hard rock can be treated as flow through an effectively porous, permeable medium. Water flow rate into the rock from various lengths of an injection hole and pressure rises at various distances from this hole will be measured to determine the effective permeability and to test if it is constant. The movement of tracers with the water flow will be studied to determine the average and any variation of the porosity and will simulate accelerated leakage over appreciable distances from radioactive waste depositories. An experiment to measure the in-situ compressibility of the rock is also suggested. Existing data are analyzed to quantify the ranges of conditions in which these experiments may be practical.

3458 ASSESSMENT OF PLUTONIUM CHEMICAL FORMS IN GROUNDWATER. Saltelli, A.; Avogadro, A.; Bertozzi, G. (Commission of the European Communities, Ispra (Italy). Joint Research Centre). pp 147-164 of La migration des radionucleides a vie longue dans la geosphere. Compte rendu. Paris, France; OECD (1979).

From Symposium on radionuclide migration; Brussels, Belgium (29 Jan 1979).

The leaching of plutonium from vitrified high-level waste can result in very low plutonium concentrations, of the order of 10^{-8}M, in the groundwater, where plutonium is shared among different complexes of the ions Pu^{4+}, Pu^{3+}, PuO_2^+, PuO_2^{++} with the anionic components of the medium. Thermodynamic information is available in literature on some equilibrium constants, so that it is possible to describe quantitavely the plutonium distribution among different chemical forms,

for a given water composition. Pu (IV) complexes with carbonate ions are known to be very stable; however, the numerical value of 10^{47} which has been attributed to the stability constant appears to be too large by many orders of magnitude; a parametric study of that constant has been performed.

3459 ENGINEERING SAFEGUARD FOR ACCIDENTAL RELEASE OF RADIONUCLIDES FROM RADIOACTIVE WASTE GROUND DISPOSAL SITE, (1). FEASIBILITY OF CONTAMINATED GROUNDWATER ZONE CONTROL BY UNDERGROUND IMPERMEABLE WALL. Morisawa, S.; Inoue, Y. (Kyoto Univ. (Japan). Faculty of Engineering). Nippon Genshiryoku Gakkaishi (Journal of the Atomic Energy Society of Japan) ; 20: No. 9, 662-670(Sep 1978). (In Japanese).

Feasibility of an underground impermeable wall was discussed for controlling radioactively contaminated groundwater zone around a radioactive waste ground disposal site. Fundamental equations, which describe variation of groundwater table and a radionuclide (^{90}Sr) migration in the saturated zone, were analyzed and distribution of ^{90}Sr was estimated in case with and/or without an impermeable underground wall. The results obtained in this paper are as follows: (1) Underground impermeable wall might be feasible as an engineering safeguard for controlling radioactively contaminated groundwater. (2) Underground impermeable wall might be used more effectively when the geologic stratum is heterogeneous than when the stratum is uniform around a waste disposal site. (3) Underground impermeable wall of type E is most promising under considered conditions. The wall of type E is assumed to be built across the zone with higher flow rate of groundwater.

3460 METHOD TO DECONTAMINATE RADIOACTIVE WATER IN THE PRESENCE OF IMPURITY SUBSTANCES. Krause, H.; Hepp, H.; Kluger, W.; Geisel, R. (to Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 1,517,664/C/. 24 Aug 1978. 1p. (In German).

The method ensures the removal of radioactive substances from hard-to-decontaminate water. Before decontamination proper, ozone or chlorine is added to the water for demasking. The daughter products (oxidized radionuclides) of ozone are gaseous while the decay products of the chlorine remain in the water in the form of salts. In both cases, complex or chelate formation during the subsequent decontamination process is avoided.

3461 MEDICALLY USED RADIONUCLIDES IN SEWAGE SLUDGE. Erlandsson, B.; Mattsson, S. (Technical Department, Personnel Health Care, City of Malmoe, Malmoe, Sweden). Water, Air, and Soil Pollution ; 9: No. 2, 199-206(Feb 1978).

The concentration of medically used radionuclides has been studied in sludge from the sewage treatment plant serving the borough of Malmoe. In this area all nuclear medicine procedures are carried out in one hospital and almost all patients live in the borough. Therefore, the input of medically used radionuclides into the sewage system can be estimated with good accuracy. Samples of digested sludge have been taken once or twice a week during half a year. Iodine-131 (physical half life (T) = 8.05 d) was detected in all samples. The ^{131}I-activity concentration due to medical use varied between (0.03 +- 0.01) and (0.12 +- 0.02) nCi kg^{-1}. The ratio between the total output of ^{131}I via the sludge and an adherent input of the radionuclide into the sewage system was determined to (2.6 +- 0.6) X 10^{-3}, which is equivalent to a ratio of (2 +- 1) X 10^{-2} for stable I. Occasionally measurable activities of ^{198}Au (T = 2.7 d) and ^{201}Tl (T = 3.1 d) have been found. The radioactivity concentration of medically used radionuclides in the sludge is low and constitutes no health problems for the persons involved. The sludge however has proved to be a very sensitive and suitable integrator of radioactive material released from a large urban area.

3462 ASSESSMENT OF TECHNICAL RISKS. Jaeger, T.A. (Bundesanstalt fuer Materialpruefung, Berlin (Germany, F.R.)). Amts- und Mitteilungsblatt der Bundesanstalt fuer Materialpruefung ; 8: No. 3, 123-127(1978). (In German).

The safety of technical systems is so difficult to assess because the concept 'risk' contains technical-scientific factors as well as components of individual and social psychology. Immediate or short-term hazards of human life as i.e. caused by the operation of industrial plants and mediate and thus long-term hazards have to be distinguished. Characteristic for the second hazard groups is the great time-lag before the effect takes place. Thus a causal relationship can be recognized only late and not definitely. Even when the causes have been obviated the effects still show. The development of a systems-analytical model as a basis of decisive processes for the introduction of highly endangered large-scale technologies seems particularly difficult. A starting point for the quantification of the risk can still be seen in the product of the probability of realization and the extent of the damage. Public opinion, however, does not base its evaluations on an objective concept of risk but tends to have an attitude of aversion against great and disastrous accidents. On the other hand, plenty of slight accidents are accepted much more easily, even when the amount of deadly victims from accidents reaches dimensions beyond those of the rare large-scale accidents. Here, mostly the damage possible but not the probability of its occurence is seen, let alone the general use of the new technology. The value of the mathematical models for estimating risks is mainly due to the fact that they are able to clear up decisions.

3463 CONDITIONING HIGHLY RADIOACTIVE SOLIDIFIED WASTE. Hild, W.; Krause, H.; Scheffler, K.; Gusten, H.; Gilbert, E. (to Gesellschaft fuer Kernforschung m.b.H.). US Patent 3,971,717. [ndl. 7p.

Highly radioactive wastes, such as fisson-product solutions resulting from processing irradiated nuclear fuels, are converted to solid, stable and substantially water-insoluble products before they are transported to a final storage location in conformance with environmental protection requirements. Highly radioactive solidified waste, incorporated in molded bodies of glass, ceramic or a basaltic mass, is introduced into waste water and/or settling or precipitated sludge from community or industrial systems (in order to sterilize, improve the filterability of and condition (a) the waste water before it is introduced into a receiving stream and (b) the sludge before it is composted) and is left to remain there until the heat energy produced by the radioactive radiation has been reduced in its order of magnitude to one tenth of the amount available in the molded bodies upon their completion. The

molded bodies, which may be sheathed or coated, are alternatively introduced into raw water used for preparing drinking water in order to sterilize it and are left to remain therein until heat energy produced by the radioactive radiation has been reduced in its order of magnitude to one tenth of the amount available in the freshly prepared molded bodies. An object of the invention is to find a better way to utilize available ultimate storage locations in salt stocks and to reduce the cost of noncontaminating removal or final storage of highly radioactive waste.

Aquatic Ecosystems and Food Chains

3464 (ANL--78-65(Pt.3), pp 55-57) SOURCES OF PLUTONIUM TO THE GREAT MIAMI RIVER. Bartelt, G.E.; Kennedy, C.W.; Bobula, C.M. III. 1978.

Radiological and Environmental Research Division: ecology. Annual report, January-December 1978.

Progress is reported in the study of ^{238}Pu, in the Great Miami River watershed the contribution of various sources to the total ^{238}Pu transported by the river. Periodic discharges of industrial wastewater from Mound Laboratory from 1973 to 1975 have released approximately 20 mCi of ^{238}Pu each year to the Great Miami River. Changes in the wastewater treatment system in 1976 have reduced the annual discharge to less than 3 mCi/year. However, despite this sevenfold reduction of plutonium in the wastewater discharge, the annual flux of ^{238}Pu down the river has remained relatively constant and is approximately 10 times greater than can be accounted for by the reported effluent discharges. Therefore, other sources of the ^{238}Pu in the Great Miami River exist. A second possible source of plutonium is the resuspension of sediments enriched by earlier waste water releases and deposited in the river. However, since there appear to be few areas where large accumulations of sediment could occur, it seems improbable that resuspension of earlier sediment deposits would continue to be a significant contributor to the annual flux of plutonium. A much more likely source is the continuing erosion of soil from a canal and stream system contaminated with approx. 5 Ci of ^{238}Pu, ^{7} which connects directly to the river 6.9 km upstream from Franklin. Results from samples analyzed in 1978 show the average concentration of ^{238}Pu in suspended sediments from the canal to be approximately 10^3 times greater than suspended sediment concentrations in the river and waste water effluent.Thus the main contributor to the total amount of plutonium transported by the Great Miami River appears to be highly enriched sediment from the canal, which is eroded into the river where it is then diluted by uncontaminated sediments.

3465 (CONF-790562--2) EFFECTS OF CHRONIC LOW-LEVEL IRRADIATION ON GAMBUSIA AFFINIS. Blaylock, B.G.; Frank, M.L. (Oak Ridge National Lab., TN (USA)). 1979. Contract W-7405-ENG-26. 22p. Dep. NTIS, PC A02/MF A01.

From Radiation effects on aquatic organisms; Tokyo, Japan (May 1979).

Since 1944, White Oak Lake (WOL), located on the Oak Ridge Reservation, has served as a final settling basin for low-level radioactive effluents from the Oak Ridge National Laboratory. Organisms inhabiting the lake have been exposed for many generations to chronic low-level radiation significantly higher than background. During the past decade, studies on Gambusia affinis from WOL have been carried out to relate estimated radiation doses to effects on the fitness of the Gambusia population. Results of studies on fecundity, temperature tolerance, and embryonic mortality have led to the conclusion that the Gambusia population in White Oak Lake has an increased frequency of deleterious and recessive lethal genes which may be attributed to the radiation exposure history. The frequency of nonviable embryos from WOL Gambusia did not change significantly from 1966 to 1978; however, it was still significantly greater than that of a control population. In July 1977, Gambusia from a control population were stocked into a 0.45-ha pond which had served as a low-level waste settling basin. The beta and gamma dose rate in this pond averaged from 37 rad/yr at the water surface, 394 rad/yr at mid-depth, and 1150 rad/yr at the surface of the sediments. Preliminary results from samples taken in August 1978 showed that although the frequency of nonviable embryos increased, the frequency was not significantly greater than that of the control parent population. Additional sampling of future generations of Gambusia in this pond will determine whether the frequency of nonviable embryos increases as succeeding generations are exposed to dose rates that are higher than the dose rates in WOL.

3466 (CS-INIS--258, pp 92-98) EFFECT OF EMERGENCY DISCHARGE OF NUCLEAR FACILITIES EFFLUENTS ON HYDROSPHERE. Chytil, I. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Sep 1978. (In Czech).

From 9. national conference on radionuclides and ionizing radiation in water management; Liberec, Czechoslovakia (28 Sep 1978).

The EXPER and WATER mathematical models are described which have been developed at UJV, Rez for finding the effects of the discharge of radioactive wastes into the hydrosphere during accidents of nuclear installations. The EXPER model describes the pulse discharge of material at a certain point of the water course where the complete depth mixing of the discharged material with the water is assumed. The parameters of the water course are considered as being constant in the whole observed stretch. The WATER model is designed for observing the effect of a number of nuclear installations on the whole basin. The dose equivalent for set points may be determined which will affect the population consuming contaminated water. The population is divided into four age groups.

3467 (DOE/EV/70024--31) CHEMICAL AND GEOCHEMICAL STUDIES OFF THE COAST OF WASHINGTON. PROGRESS REPORT, SEPTEMBER 1978-AUGUST 1979. Carpenter, R. (comp.). (Washington Univ., Seattle (USA). Dept. of Oceanography). Aug 1979. Contract EY-76-S-06-2225-024. 11p. (RLO--2225-T24-31). Dep. NTIS, PC A02/MF A01.

Progress on a series of marine chemical and geochemical investigations involving both laboratory studies and field studies off the coast of Washington are summarized. Most of the field work has been on the Washington continental shelf, slope, and the submarine canyons indenting the shelf north of the Columbia River. The aim is to provide basic data required to characterize underlying chemical and physical processes and their rates which control the distributions, concentrations, and ultimate fate of some of the potentially hazardous agents associated with fossil fuel and nuclear power production or transportation. The studies have followed several main lines of investigation which are

in various stages of completion: (1) field studies of the uptake and transport by zooplankton fecal pellets of ^{210}Po, ^{210}Pb, and other trace inorganic and organic constituents in a well-studied part of Puget Sound; (2) studies of the behavior of ^{210}Po and ^{210}Pb in sediments off the coast of Washington and the application of the ^{210}Pb determinations in sediment cores to determine sediment accumulation rates for the past 100 years, the depth of the surface mixed layer, and a mixing coefficient for the surface sediments; and (3) investigations of aliphatic and aromatic hydrocarbons in some of the same samples of organisms and sediment cores whose accumulation histories for the past 100 years we have determined with the ^{210}Pb technique.

3468 (IDO--12088, pp 6-7) DOSIMETRY DEVELOPMENTS AND THEIR APPLICATION TO RADIOECOLOGY STUDIES AT THE IDAHO NATIONAL ENGINEERING LABORATORY SITE. Aoki, I.; Jones, D.E. (Dept. of Energy, Idaho Falls, ID). Apr 1979.

From Symposium on the Idaho National Engineering Laboratory ecology programs; Grand Teton, WY, USA (10 Sep 1978).

In order to determine the environmental impact of nuclear activities and waste, accurate measurements of radiation exposures at specific locations and radiation dose to wildlife species must be determined. Because of the varied studies at the INEL Site, radiation exposures and dose rate estimates must be available for both terrestrial and aquatic ecosystems. The purpose of this paper is to briefly introduce the various applications of dosimetry (the measurement of radiation doses and exposures) in INEL ecological studies and to present background information on thermoluminescent dosimeters used in these studies.

3469 (IDO--12088, pp 34-35) RADIONUCLIDE CONCENTRATIONS IN A BARN SWALLOW POPULATION NESTING NEAR RADIOACTIVE LEACHING PONDS. Millard, J.B. (Colorado State Univ., Fort Collins); Whicker, F.W.; Markham, O.D. Apr 1979.

From Symposium on the Idaho National Engineering Laboratory ecology programs; Grand Teton, WY, USA (10 Sep 1978).

Seasonal populations of barn swallows (Hirundo rustica) use a radioactive leaching pond adjacent to the Test Reactor Area (TRA) on the Idaho National Engineering Laboratory (INEL) Site. Most swallows nest at a sewage treatment facility building 200 m north of the ponds, and some birds nest within the TRA facility. Adults fly to the ponds where they feed on terrestrial and aquatic arthropods and, therefore, are capable of radionuclide uptake. Average concentrations for predominant radionuclides showed adults having the highest concentrations followed by > 10 g immatures and 0 to 10 g immatures. Chromium-51 exhibited the highest value detected for any nuclide with 520 pCi/g whole body. Sodium-24 had relatively high concentrations despite its 15 h physical half-life. Cesium-137 and K-40 were the only detectable nuclides in off site control swallows. Mean concentrations were assumed to be uniformly distributed and at equilibrium in swallow tissues and used to calculate internal whole body dose rates for the three developmental stages of birds. Internal dose rates increased by a factor of four from immatures to adults. Sodium-24 with its 1.4 MeV beta was the main dose rate contributor comprising 72% of the total. Cesium-137 and I-131 were the next major contributors. The beta component contributed 90% of the total internal dose rate for adult swallows. It was not possible to isolate exposure to radioactive materials as the causitive factor responsible for the observed difference in mean growth rates.

3470 (IDO--12088, pp 36-37) ACTIVATION AND FISSION RADIONUCLIDE CONCENTRATIONS AND RETENTION BY DUCKS USING RADIOACTIVE LEACHING PONDS. Halford, D.K. (Dept. of Energy, Idaho Falls, ID); Markham, O.D.; Millard, J.B. Apr 1979.

From Symposium on the Idaho National Engineering Laboratory ecology programs; Grand Teton, WY, USA (10 Sep 1978).

Several species of waterfowl use the Test Reactor Area (TRA) radioactive leaching pond as a resting area. Since the pond is used for liquid radioactive waste disposal, waterfowl could carry radioactive contamination from the area. Ducks are consumed by man who could receive an internal radiation dose commitment from waterfowl that previously used the TRA pond. Also, the radiation doses to waterfowl at the pond are needed to determine the environmental effects of disposal of low level liquid radioactive waste into leaching ponds. A study of waterfowl at the TRA radioactive leaching pond began in February 1974. The purposes of this study are to determine: (1) species and numbers of waterfowl using the TRA pond, (2) concentrations of gamma and transuranic radionuclides present in waterfowl tissues and body burdens that waterfowl can obtain and subsequently carry from the TRA environs, (3) effective and biological half-lives of activation and fission products in waterfowl, (4) radiation doses from gamma emitters concentrated by waterfowl while on the TRA pond, and (5) potential internal dose commitment to man from consuming contaminated waterfowl tissues. This paper discusses the experimental design and some preliminary data.

3471 (IDO--12088, pp 63-64) DISTRIBUTION AND AVIAN EXPORT OF GAMMA EMITTING RADIONUCLIDES AT THE TEST REACTOR AREA LEACHING PONDS. Millard, J.B. (Colorado State Univ., Fort Collins); Whicker, F.W.; Markham, O.D. Apr 1979.

From Symposium on the Idaho National Engineering Laboratory ecology programs; Grand Teton, WY, USA (10 Sep 1978).

The purpose of this study was to determine the seasonal distribution and ecological behavior of gamma emitting radionuclides and to estimate amounts of radioactive materials exported by the principle avian species utilizing the TRA ponds. The large number of detectable fission and activation products in the TRA pond ecosystem make this project unique. Ecological behavior of these radionuclides, such as ^{75}Se, have not been discussed in the literature. In addition, bioaccumulation data are currently needed for a number of radionuclides in order to help assess environmental impacts resulting from the discharge of radioactive liquid effluents.

3472 (IDO--12088, pp 65-66) CONCENTRATIONS OF THE TRANSURANIC RADIONUCLIDES ^{238}PU, ^{239} ^{240}PU, ^{241}AM, ^{242}CM, AND ^{244}CM IN ABIOTIC AND BIOTIC COMPONENTS OF THE TEST REACTOR AREA RADIOACTIVE LEACHING PONDS. Kuzo, G.B. (Colorado State Univ., Fort Collins); Fraley, L. Jr.; Markham, O.D. Apr 1979.

From Symposium on the Idaho National Engineering Laboratory ecology programs; Grand Teton, WY, USA (10 Sep 1978).

Sampling of the leaching pond environs was initiated to determine the concentration of

five transuranic nuclides, (^{238}Pu, ^{239,240}Pu, ^{241}Am, ^{242}Cm, ^{244}Cm), in selected components of this freshwater ecosystem. Greatest concentrations of all transuranic nuclides investigated were found in sediment, periphytic and planktonic components. The data obtained for arthropod species and waterfowl suggest an inverse relationship between concentrations of these nuclides in an organism and its trophic level. More samples are being gathered to provide information to calculate an inventory of these five transuranic nuclides within the TRA pond ecosystem.

3473 (IDO--12088, pp 12-14) SYSTEMIC EFFECTS OF RADIATION EXPOSURE ON RODENTS INHABITING LIQUID AND SOLID RADIOACTIVE WASTE STORAGE AREAS. Evenson, L.M. (Univ. of Idaho, Moscow); Olson, D.P.; Halford, D.K.; Markham, O.D. Apr 1979.

From Symposium on the Idaho National Engineering Laboratory ecology programs; Grand Teton, WY, USA (10 Sep 1978).

A study was begun in 1977 to investigate the potential effect of chronic radiation exposure on small mammals inhabiting a dry radioactive leaching pond at the Test Reactor Area (TRA) of the Idaho National Engineering Laboratory (INEL). The white-footed deer mouse (Peromyscus maniculatus), was studied since thermoluminescent dosimeter (TLD) data obtained in 1976 by Halford and Markham indicated that this species received significantly larger doses of radiation per day than other species present in the pond vicinity. In 1978, the study was expanded to include the effects of radiation on mice inhabiting a solid radioactive waste burial site located at the Radioactive Waste Management Complex (RWMC). The objectives of this study are: (1) to determine whether radiation exposure at the TRA and the RWMC study sites results in pathological changes in the hematopoietic systems of deer mice, (2) to examine vital and reproductive organs of mice for the presence of tumors and other pathologic lesions resulting from radiation exposure, and (3) to identify possible damage due to radiation exposure to chromosomes of mice lymphocytes. Hematological studies of animals from the TRA site, control site, and laboratory control colony revealed no significant differences between populations and, therefore, there were no pathologic changes to the hematopoietic system attributable to radiation exposure. Further, there were no significant differences in histopathologic lesions in the tissues between populations. Preliminary hematological studies on the mice from the RWMC indicated pathologic changes to the hematopoietic system due to radiation exposure. Significant differences were observed in all the hematologic parameters measured in 51 of the 109 samples examined when compared to the controls.

3474 (INIS-mf--4637, pp 12) ^{137}CS - CONTAMINATION INDICATOR OF WASTE WATER DISCHARGED FROM A-1 NUCLEAR POWER PLANT. Csupka, S.; Petrasova, M. (Krajska Hygienicka Stanica, Bratislava (Czechoslovakia)). Jun 1976. (In Slovak).

From 4. national symposium on ionizing radiation dosimetry; Marianake Lazne, Czechoslovakia (8 Nov 1976).

ADSORPTION;BOHUNICE A-1 REACTOR;CESIUM 137; CONTAMINATION;ENVIRONMENTAL IMPACTS;LIQUID WASTES;RADIOACTIVE EFFLUENTS;RADIONUCLIDE MIGRATION;RIVERS;SEDIMENTATION;WASTE WATER; ENVIRONMENTAL TRANSPORT

3475 (PB--296947, pp 471-484) USE OF HANFORD WASTE WATER PONDS BY WATERFOWL. Price, K.R.; Fitzner, R.E. (Battelle Pacific Northwest Labs., Richland, WA). May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

Census and environmental surveillance information on waterfowl that use the Hanford Site 200 Area waste water ponds are described and evaluated. Physical features of the ponds are discussed in relation to their use and suitability for waterfowl. Seasonal distributions observed for the years 1971 through 1974 indicate that the highest use by waterfowl occurs during the spring and fall migratory periods. Base population estimates are 300 to 400 resident waterfowl with a few tens of pairs nesting during the summer. Environmental surveillance data on ^{137}Cs in muscle tissue are presented for the years 1971 through 1977. Comparisons are made between Columbia River and waste water pond waterfowl, between waterfowl groups, and among ponds. Waterfowl collected from ponds frequently have easily detected levels of ^{137}Cs in muscle tissue. However, those waterfowl collected from the Columbia River seldom show a ^{137}Cs level above that expected from worldwide fallout. Waterfowl collected from the pond with the smallest ^{137}Cs inventory and the poorest waterfowl habitat contained the lowest levels of ^{137}Cs in muscle tissue.

3476 (PNL--3127) RADIOLOGICAL SURVEY OF EXPOSED SHORELINES AND ISLANDS OF THE COLUMBIA RIVER BETWEEN VERNITA AND THE SNAKE RIVER CONFLUENCE. Sula, M.J. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Apr 1980. Contract AC06-76RL01830. 163p. NTIS, PC A08/MF A01.

This document describes a radiological survey which was performed to evaluate the magnitude and distribution of radioactive contamination on the exposed shorelines of the Columbia River along and downstream of the Hanford Site. The area encompassed by the survey includes the low-lying exposed land on both sides of the river from the uppermost point of production reactor discharge into the river at 100-B Area to the confluence of the Snake and Columbia Rivers, almost 60 miles downstream of the starting point. External exposure rate measurements were made at nearly 30,000 locations during the survey - accounting for approximately 60% of the land in the study area. Measurable radioactive contamination, resulting from past Hanford operations was found to be present on the shorelines of the Columbia River along the study area. The absence of short-lived radionuclides in the shore sediments and the presence of contamination several meters above recent maximum river levels indicate that the material was deposited some years ago.

3477 (PNL--3300(Pt.2), pp 71-78) RADIOECOLOGY OF NUCLEAR FUEL CYCLES. Schreckhise, R.G.; Cadwell, L.L.; Emery, R.M. Feb 1980.

Pacific Northwest Laboratory annual report for 1979 to the DOE Assistant Secretary for Environment. Part 2. Ecological sciences.

Sites where radioactive wastes are found are solid waste burial grounds, soils below liquid stoage areas, surface ditches and ponds, and the terrestrial environment around chemical processing facilities that discharge airborne radioactive debris from stacks. This study provides information to help assess the environmental impacts and certain potentiall human hazards associated with nuclear fuel cycles. A data base is being developed to

define and quantify biological transport routes which will permit credible predictions and assessment of routine and potential large-scale releases of radionuclides and other toxic materials. These data, used in assessment models, will increase the accuracy of estimating radiation doses to man and other life forms. Information obtained from existing storage and disposal sites will provide a meaningful radioecological perspective with which to improve the effectiveness of waste management practices. Results will provide information to determine if waste management procedures on the Hanford Site have caused ecological perturbations, and if so, to determine the source, nature, and magnitude of such disturbances.

3478 (UCID--18267) PRELIMINARY EVALUATION OF THE BIODOSE COMPUTER PROGRAM. Bonner, N.A.; Ng, Y.C. (California Univ., Livermore (USA). Lawrence Livermore Lab.). Sep 1979. Contract W-7405-ENG-48. 14p. Dep. NTIS, PC A02/MF A01.

The BIODOSE computer program simulates the environmental transport of radionuclides released to surface water and predicts the dosage to humans. We have evaluated the program for its suitability to the needs of the Nuclear Regulatory Commission Waste Management Program. In particular, it is an evaluation to determine whether BIODOSE models account for the significant pathways and mechanisms resulting in radiological doses to man. In general, BIODOSE is a satisfactory code for converting radionuclide releases to the aqueous environment into doses to man.

3479 (UJV--4508-D,CH,A,E) WATER - A MATHEMATICAL MODEL FOR COMPUTING POPULATION DOSES IN A WATERSHED DUE TO CONTINUOUS RADIOACTIVE EFFLUENTS INTO WATER FLOWS. Chytil, I. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Apr 1978. 27p. (In Czech). Available from Ustav jaderneho vyzkumu CSKAE, Rez, Czechoslovakia.

A mathematical model is described for computing the spread of radioactive and other substances in a watershed from any arbitrary number of sources at continuous discharge. It is used for the computation of population doses from drinking water, water food, irrigation, recreation and water sports for individual profiles.

3480 NUCLEAR WASTE PONDS AND STREAMS ON THE HANFORD SITE: AN ECOLOGICAL SEARCH FOR RADIATION EFFECTS. Emery, R.M.; McShane, M.C. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Health Physics ; 38: No. 5, 787-809(May 1980).

Limnological and radiological parameters were investigated in ponds and streams on the Hanford Site to develop general radioecological profiles. All but one aquatic system receive low-level aqueous radioactive wastes from nuclear facilities. The remaining system is a pond formed by surfacing groundwater and contains radioactivity as a result of evaporative concentration of naturally occurring nuclides. Attempts were made to determine whether the amounts of radioactivity present in each aquatic system could be related to ecological variation occurring among them. Maximum dose from the sediments and nuclide concentrations in the water were used to differentiate these systems radiologically. These aquatic environments support populations of commonly occurring algae, macrophytes, invertebrates and in some cases, fish. Since these ponds and streams cannot be clearly differentiated from offsite systems or among themselves on the basis of a general ecological profile, this survey provides no conclusive evidence that the nuclear wastes discharged into Hanford ponds and streams have affected the colonization, diversity and activity of biota that appear in them.

3481 DISTRIBUTION OF ACTIVATION PRODUCTS FROM BARSEBAECK NUCLEAR POWER PLANT (SWEDEN) IN THE MARINE ENVIRONMENT. TEMPORAL AND SPATIAL VARIATIONS AS ESTABLISHED BY SEAWEED. Mattsson, S.; Finck, R.; Nilsson, M. (Lund Univ. (Sweden). Radiofysiska Institutionen). Environmental Pollution (Series B: Chemical and Physical) ; 1: No. 2, 105-115(Apr-Jun 1980).

The biophysical behaviour of the radioactive corrosion products ^{51}Cr, ^{54}Mn, ^{58}Co, ^{60}Co, ^{65}Zn and $^{110}Agsup(m)$ has been studied in the marine environment up to 150 km from a nuclear power station using the brown seaweeds Fucus vesiculosus and F. serratus as bioindicators. The activity concentration in Fucus per unit activity released from the nuclear power station is about equal for ^{54}Mn, ^{58}Co, ^{60}Co and ^{65}Zn but lower by a factor of 3 for $^{110}Agsup(m)$ and by a factor of 10 for ^{51}Cr. The biological half-time of radioactive cobalt in naturally growing F. vesiculosus was 60 +- 15 days during the summer. Approximately the same value was found for ^{54}Mn and ^{65}Zn. The results show that 85 to 90% of the activity released from the nuclear power plant follows the dominating north-bound water stream and 10 to 15% is transported southwards. For ^{54}Mn, ^{58}Co, ^{60}Co and ^{65}Zn the decrease in activity concentration C(z) with distance, z(km) north of the power plant can be described by a power function, $C(z) = \alpha.zsup(-1.4)$, where α is a constant.

3482 ENVIRONMENTAL MONITORING PROGRAMME TO ASSESS AND CONTROL THE EFFECTS OF LIQUID EFFLUENT DISCHARGES OF LOW RADIO-ACTIVITY TO AN INLAND LAKE. Smitton, C. (Central Electricity Generating Board, Manchester (UK). Scientific Services Dept.); Williams, W.M. (Central Electricity Generating Board, Gwynedd (UK). Trawsfynydd Power Station). Nuclear Energy (Formerly Nuclear Energy Engineer) ; 19: No. 2, 111-115(Apr 1980).

The 400 MW(e) twin gas-cooled reactor power station at Trawsfynydd in North Wales is unique in the UK in that it uses water extracted from an inland lake, Lake Trawsfynydd, for cooling the turbine-generator steam condensers. The radio-active liquid effluent is discharged into this lake with the returning cooling water flow. The lake is 200m above sea level and is fed from mountain streams in an area of relatively high rainfall. The principal outflow of lake water is to a small hydroelectric power plant which discharges its water into the sea. Consumption of trout taken from this lake provides the critical radiological pathway for exposure to the public. The critical radionuclide is caesium-137 which is concentrated in the flesh of the fish. The monitoring programme used to assess the impact of the low-level liquid effluent discharges on the lake environment is described. This involves sampling water, bed sediments, flora and fauna, not only from the lake but also from the outfall stream. The methods of sampling, sample preparation and counting for assay of the radionuclides of interest are described. The results from this programme are described and they demonstrate that the lake bed provides a varying adsorption term in the balance equation for radionuclides discharged into this environment. Furthermore, it is found that the effects of these discharges are critically dependent on

meteorological conditions and the management of the lake water volume.

3483 DISTRIBUTION OF COBALT 60 IN A MOLLUSC, A CRUSTACEAN AND A FRESHWATER TELEOST: VARIATIONS AS A FUNCTION OF THE SOURCE OF POLLUTION AND DURING ELIMINATION. Amiard, J.C.; Amiard-Triquet, C. (CEA, Saint-Paul-lez-Durance, Fr). Environmental Pollution (London) ; 20: No. 3, 199-213(Nov 1979).

Three experiments were carried out: starved animals were immersed in ^{60}CO-contaminated water; animals were immersed in contaminated water and received radioactive food; and animals were placed in fresh water without any pollutant but received contaminated food. Radiation doses were calculated for contamination via both food and water. 25 refs.

3484 EFFECT OF A LONG-TERM RELEASE OF PLUTONIUM AND AMERICIUM INTO AN ESTUARINE-COASTAL SEA ECOSYSTEM. 1. DEVELOPMENT OF AN ASSESSMENT METHODOLOGY. Murray, C.N.; Avogadro, A. (Commission of the European Communities, Ispra (Italy). Joint Research Centre). Health Physics ; 36: No. 5, 573-585(May 1979).

A method is developed for the assessment of the distribution and the associated hazard due to a long-term release of long-lived alpha-emitting radionuclides into surface waters of a marine ecosystem. The methodology is designed to identify various environmental compartments and the processes occurring within them, which are of importance in affecting the behaviour and thus the distribution of actinide elements in such systems. The compartment model system (box model) chosen is applied to an imaginary coastal area. Various processes in the environmental compartments are considered separately and then assembled to show their combined interactions. Using the concept of critical nuclide-pathway-group analysis, an attempt has been made to define a number of the most important pathways by which actinides released into the aquatic environment could return to man, and especially those related to the exploitation of aquatic food resources. The concentration levels for the example considered produce rather low dose rates to man of less than 3% of the maximum permissible intake. The low dose levels strongly depend upon the concentration factors of the various biological species, as well as upon source-term activities. The concentration factors used for the biological transfer of actinides relate to the water activity only. In the case where highly radioactive sediments or sedimentary-associated material were closely involved in the uptake pathway, actinide transfer to man could become more relevant. This study shows that sedimentation and bottom sediment absorption represent the major reconcentration processes for actinides released into surface waters.

3485 EVOLUTION OF GAMMA ARTIFICIAL RADIOACTIVITY IN COASTAL SEDIMENTS OF THE ENGLISH CHANNEL DURING THE YEARS 1976, 1977 AND 1978. Gueguéniat, P. (CEA Centre de la Hague, 50 - Cherbourg (France). Lab. de Radioecologie Marine); Auffret, J.-P.; Baron, Y. Oceanologica Acta ; 2: No. 2, 165-180(Apr 1979). (In French).

During 1976-1977, a state of equilibrium was found to prevail for ^{106}Ru and ^{144}Ce, especially in the North-West Cotentin and the Norman-Breton gulf, where reconcentration of both radionuclides was observed with preferential enrichment of the latter over the former. Levels of ^{125}Sb and ^{137}Cs were found to be low but were difficult to interpret, because of the particular physico-chemical behavior of ^{125}Sb and the long half-life of ^{137}Cs. The results obtained for ^{103}Ru, ^{141}Ce, ^{95}Zr may be explained entirely by the contribution of atmospheric fallout. ^{144}Ce and ^{106}Ru levels in the Norman-Breton gulf may be for the most part ascribed to La Hague disposals, radionuclide dispersal from the emissary being characterized by an eastward transfer of the soluble fraction and a westward transfer of the particulate fraction, with transit times which may last up to 2 years. The boundary between the areas submitted respectively to the twofold impact of fallout and industrial waste, and to fallout alone would appear to lie between the mouth of the Trieux river and Morlaix Bay. From a graphic representation of the relationship between radionuclides, empiric distribution laws for ^{106}Ru and ^{137}Cs were established from ^{144}Ce level parameters characteristic of the areas considered (years 1976-1977).

3486 EXCRETION OF ^{131}I BY FRESHWATER CATFISH (ICTALURUS PUNCTATUS) AND BLUEGILL (LEPOMIS MACROCHIRUS). Lyon, R.J.; Blanchard, R.L.; Moore, J.B. (Environmental Protection Agency, Montgomery, AL (USA). Eastern Environmental Radiation Lab.). Health Physics ; 36: No. 3, 444-447(Mar 1979).

Fish in waters to which wastes from nuclear power stations are discharged accumulate radionuclides for a short time during batch discharges and then eliminate them during the longer intervals between discharges. Hence, the elimination rates of radionuclides are of importance in computing radiation doses to humans who eat fish caught in these waters. The excretion rates of ^{131}I in two freshwater fish species were studied. Findings show that ^{131}I is excreted quite rapidly by both species. ^{131}I loss from fish muscle during deep frying was also measured and found to be 20 +- 4%. It is concluded that the practice of simply applying a concentration factor to convert the concentration in water to that in fish, without considering excretion, grossly overestimates the dose to the consumer, and that further studies should be made to identify other nuclides that behave similarly.

3487 TRITIATED WATER TREATMENT PROCESS. O'Brien, C.J. (to Aerojet-General Corp., El Monte, CA (USA)). Canadian Patent 1,046,242/A/ 16 Jan 1979. 7p.

The invention provides a method for removing tritium from water comprising the steps of: bringing the water into contact with a water insoluble hydrophilic material that is more basic than the water and contains labile hydrogen atoms to provide an isotope exchange of tritium from the water to said water insoluble material; bringing said water insoluble hydrophilic material into contact with a liquid that contains labile hydrogen atoms and is more basic than said water insoluble material to provide an isotope exchange of tritium from said water insoluble material to said liquid, said more basic property of said liquid causing a tritium concentration to form in said liquid that is greater than the tritium concentration in the water; and separating the tritium from said liquid.

3488 PANEL SUMMARY REPORT. pp 7-35 of Methodology for assessing impacts of radioactivity on aquatic ecosystems. Vienna, Austria; International Atomic Energy Authority (1979).

From Advisory group on methodology of

radiation effects experiments on aquatic organisms and ecosystems for evaluation; Vienna, Austria (21 Nov 1977).

Previous Advisory Group Meetings have led to IAEA Technical Reports No.15=5 (1974) on thermal discharge, 118 (1970) and 169 (1975) on sampling, storage and analysis methods for marine radioactivity studies, 167 (1975) on design of marine biological studies permitting comparative evaluation, and 172 (1976) on the effects of ionizing radiation on aquative organisms and eco-systems. The aim of the present report was a bringing into perspective not only problems designing radioecological experiments but to describe reliable experimental methodology suitable for a successful evaluation of radioactivity cycling, and of the effects of such radioactive additions to aquatic environments, as a result of nuclear activities. Specific examples are described. Individual studies presented to the Panel have been treated in detail, and constitute 19 separate INIS entries.

3489 ALPHA-EMITTING NUCLIDES IN COMMERCIAL FISH SPECIES CAUGHT IN THE VICINITY OF WINDSCALE, UNITED KINGDOM, AND THEIR RADIOLOGICAL SIGNIFICANCE TO MAN. Pentreath, R.J.; Lovett, M.B.; Harvey, B.R.; Ibbett, R.D. (Ministry of Agriculture, Fisheries and Food, Lowestoft (UK). Fisheries Radiobiological Lab.). pp 227-242 of Biological implications of radionuclides released from nuclear industries. Vol. 2. Vienna, Austria; IAEA (1979).

From International symposium on biological implications of radionuclides released from nuclear industries; Vienna, Austria (26 Mar 1979).

The concentrations of a number of alpha-emitting nuclides have been determined in the tissues of several commercial fish species caught in the vicinity of the fuel reprocessing plant at Windscale. All tissues analysed were found to contain ^{238}Pu, sup(239+240)Pu and ^{241}Am, but ^{242}Cm and ^{244}Cm could only be reliably detected in the liver samples of some fish. Fish of the same species, but taken from the North Sea, have also been analysed for some naturally occurring alpha-emitting nuclides. Whereas uranium (^{238}U) and thorium (^{232}Th) could be detected in bone samples of fish, neither could be reliably detected in samples of muscle: in contrast, ^{210}Po was readily detected in samples of liver, muscle and bone. Commercial fish fillets from the Irish Sea, including the Windscale area, are also routinely monitored for alpha-emitting nuclides, and their radiological significance to man is briefly discussed. Comments are also made on the significance of the naturally occurring nuclides.

3490 RADIOCESIUM EXCHANGE AMONG COMPONENTS OF A COASTAL PLAIN BOTTOMLAND STREAM ECOSYSTEM. Gladden, J.B. Atlanta, GA; Emory Univ. (1979). 205p. University Microfilms Order No. 79-16,053.

Thesis (Ph. D.).

The cycling of reactor effluent radiocesium was studied in a Coastal Plain bottomland stream ecosystem from 1972 to 1976. Changes in radiocesium burdens in major components of the stream margin community were examined to establish the patterns of variation both within and among years. The magnitudes and directions of radiocesium movement among stream channel, emergent vegetation zone and floodplain forest communities were also examined.

3491 POLLUTIONS ASSOCIATED WITH RADIOACTIVITY. Bittel, R. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Dept. de Protection). Agriculture (Paris) ; No. 416, 55-57(Feb 1978). (In French).

Excluding the thermal effluents of nuclear power plants, two types of effluents are envisaged: chemical and microbiological effluents; effluents with radiomimetic effects on environment organisms and on man. Correlations between the various types of pollutions are emphasized.

3492 PRELIMINARY RESULTS ON ACCUMULATION AND LOSS OF ARTIFICIAL RADIONUCLIDES IN MARINE BENTHIC ALGAE. Santos, P.L. dos; Santos Gouvea, R.C. (Universidade Federal Fluminense, Niteroi (Brazil). Inst. Biomedico); Gusmao Pedrini, A. (Universidade Santa Ursula, Rio de Janeiro). Rodriguesia ; 29: No. 44, 263-268(1978). (In Portuguese).

The acummulation and the loss of artificial radionuclides in three species of marine benthic algae of the state of Rio de Janeiro were studied under laboratory conditions, so that a selection of biological indicators for radioctive contamination of the marine environment could be made. Medium concentration factors were calculated, the most significant figures being those obtained for the algae Pterocladia Capillacea (Gmelin) Bornet et Thuret (132+-40) p/ sub(131) I and Sargassum vulgares J. Agardh (19+-5) p/ ^{51}Cr.

3493 FLUX OF CERTAIN RADIONUCLIDES IN THE BLOOD-CLAM ANADARA GRANOSA LINNAEUS UNDER ENVIRONMENTAL CONDITIONS. Patel, B.; Patel, S.; Balani, M.C.; Pawar, S. (Bhabha Atomic Research Center, India). Journal of Experimental Marine Biology and Ecology ; 35: No. 2, 177-195(1978).

The bioaccumulation of the radionuclides cesium-137, cerium-144, and ruthenium-106, and of the product nuclide cobalt-60, by arcid clams (Anadara granosa L.) in the Bombay, India, harbor was monitored from 1970-76. During the study period, the input of low level radioactive waste decreased by more than 20 times. The arcid clam showed an affinity for all three radionuclides and cobalt-60. On reaching maximum accumulation, the levels of the radionuclides decreased exponentially with time although the radioactivity was still present in sediments. The ecological half-life for cerium-144 and ruthenium-106 was 3-6 times longer, and that of cesium-137 significantly shorter, than their biological half-lives. Data on tissue distribution and rates of loss of radionuclides are presented. The bioaccumulation of the activation product cobalt-60 was independent of ambient concentration and temperature, unlike that of the three radionuclides. (7 graphs, 28 references, 7 tables)

3494 Iode-129. Compte rendu d'une reunion de specialistes de l'AEN. Paris, 13-16 juin 1977. (IODINE-129. PROCEEDINGS OF AN NEA SPECIALIST MEETING. PARIS, 13-16 JUNE 1977). Paris, France; OECD (1977). 113p. (In English, French).

From NEA specialist meeting on Iodine-129; Paris, France (13 - 16 Jun 1977).

In the framework of its programme on effluent releases from the nuclear fuel cycle and its radiological significance, the Committee on Radiation Protection and Public Health decided to organise meetings of specialists directly involved with research or regulatory aspects of effluent releases in order to note the status of present knowledge

in this field. A first meeting of this type on iodine 129 was organised by the OECD Nuclear Energy Agency. This publication reproduces papers presented at this meeting.

Site Resource and Use Studies

3495 (DP-MS--79-95) PRELIMINARY ASSESSMENT OF THE AQUATIC IMPACTS OF A PROPOSED DEFENSE WASTE PROCESSING FACILITY AT THE SAVANNAH RIVER PLANT. Mackey, H.E. Jr. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1979. Contract EY-76-C-09-0001. 138p. Dep. NTIS, PC A07/MF A01.

A review of the literature indicates that a significant body of descriptive information exists concerning the aquatic ecology of Upper Three Runs Creek and Four Mile Creek of the Savannah River Plant south of Aiken, South Carolina. This information is adequate for preparation of an environmental document evaluating these streams. These streams will be impacted by construction and operation of a proposed Defense Waste Processing Facility for solidification of high level defense waste. Potential impacts include (1) construction runoff, erosion, and siltation, (2) effluents from a chemical and industrial waste treatment facility, and (3) radionuclide releases. In order to better evaluate potential impacts, recommend mitigation methods, and comply with NEPA requirements, additional quantitative biological information should be obtained through implementation of an aquatic baseline program.

3496 (RHO-BWI-ST--6) SURFACE HYDROLOGIC INVESTIGATIONS OF THE COLUMBIA PLATEAU REGION, WASHINGTON. Leonhart, L.S. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Jul 1979. Contract EY-77-C-06-1030. 206p. Dep. NTIS, PC A10/MF A01.

The Washington State portion of the Columbia Plateau is divided into six hydrologic sub-basins on the basis of the principal surface drainage systems present, structural and topographic relationships, and political and other considerations. Baseline descriptions of the surface water systems and resources are presented for the Columbia Plateau with emphasis on the Pasco Sub-basin. A preliminary evaluation of the hydrologic budget for each sub-basin is derived. For each sub-basin, recharge/discharge relationships arising from precipitation/evapotranspiration/runoff, stream losses and gains, and artificial mechanisms are determined on the basis of available data. The net exchange between surface and groundwater systems is evaluated and relative estimates of the net groundwater flow into or out of the sub-basin are obtained. An evaluation is made of hydrologic risk factors arising from: (1) tributary flooding in eastern Washington; and, (2) major flooding of the Columbia River within the Pasco Sub-basin. Scenarios are presented for credible natural and man-generated catastrophic events.

HEALTH AND SAFETY

3497 (ORNL--5543) INDUSTRIAL SAFETY AND APPLIED HEALTH PHYSICS. ANNUAL REPORT FOR 1978. Auxier, J.A. (Oak Ridge National Lab., TN (USA)). Sep 1979. Contract W-7405-ENG-26. 104p. Dep. NTIS, PC A06/MF A01.

There were no external or internal exposures to personnel which exceeded the standards for radiation protection as defined in DOE Manual Chapter 0524. Only 39 employees received whole body dose equivalents of one rem or greater. The highest whole body dose equivalent to an employee was 3.3 rem. The highest internal exposure was less than 25% of a maximum permissible dose for any calendar quarter. During 1978, 23 portable instruments were added to the inventory and 228 retired. The total number in service on January 1, 1979, was 1023. There were no releases of gaseous waste or liquid radioactive waste from the laboratory which were of a level that required an incident report to DOE. The average background level at the PAM stations during 1978 was 9.3 μR/hr, or 81 mR/yr. Soil samples were collected at all perimeter and remote monitoring stations and analyzed for eleven radionuclides including plutonium and uranium. Grass samples were collected and analyzed for twelve radionuclides including plutonium and uranium. During 1978, the Radiation and Safety Surveys personnel continued to assist the operating groups in keeping contamination, air concentrations, and personnel exposure levels below the established maximum permissible levels. Fourteen radiation incidents involving radioactive materials were recorded during 1978. Of the 582,000 articles of wearing apparel and 192,000 articles, such as mops, laundry bags, towels, etc., monitored during 1978 about four percent were found to be contaminated. Three lost workday cases occurred at ORNL in 1978, a frequency rate of 0.07. The Serious Injury frequency rate for 1978 was 1.40, as based on the new OSHA system for recording injuries and illness (RII). A total of 55 days were lost or charged for the three lost workday cases in 1978.

3498 REACTOR SAFETY, SAFETY OF OTHER NUCLEAR FACILITY, RADIATION PROTECTION. INTERPRETATION OF ARTICLE 4, PARAGRAPH 4, 1ST SENTENCE, NO. 2E OF THE RADIATION PROTECTION ORDINANCE. Gemeinsames Ministerialblatt, A ; 30: No. 30, 631(Nov 1979). (In German).

Standard criteria for the disposal of radioactive waste in the handling of radioactive waste exempt from approval and subject to approval (waste with a specific activity of more than four times the maximum permissible activity per gramme).

3499 GENERAL CALCULATION BASIS FOR ASSESSING THE RADIATION EXPOSURE FROM RADIOACTIVE DISCHARGES VIA EXHAUST AIR OR INTO SURFACE WATER (REG. GUIDE RELATED TO PARAGRAPH 45 OF THE GERMAN RADIATION PROTECTION REGULATION). Gemeinsames Ministerialblatt, A ; 30: No. 21, 371-436(Aug 1979). (In German).

The present mathematical models and data tables are primarily reference data that are required for the design of facilities in order to judge if the dose limits given in paragraph 45 of the German Radiation Protection Regulation are met. Furthermore this mathematical model helps to establish the most important locations and programs for immission measurements in the individual case within the scope of monitoring the environment. The presentation distinctly shows the expert doing the analysis the complexity and the manifold parameters; it is a reference for assessing immission if emission is known. The calculation basis does not dispense the expert from examining and judging the individual case according to the relevant local characteristics and circumstances. (orig.).

3500 RADIOACTIVE MATERIALS AND ENVIRONMENT. Trivedi, R.N. (Fertilizer Association of India, New Delhi); Pandey, G.N. (Harcourt Butler Technological Inst., Kanpur (India)). Metals

and Minerals Review ; 18: No. 9, 28-38(Aug 1979).

Radioactive materials are very widely used in medicine, industry, agriculture and scientific and industrial research besides their use as nuclear weapons. The radiation energy emitted from radioactive materials into the environment has severe hazards. Because of their unique characteristics, the contamination caused by them is not comparable to other commonly known pollutions. This paper deals with various salient features of the radioactive materials, their frequent applications, the degree of hazards due to contamination in the environment and the essential safety measures to be taken in handling and disposing of the radioactive materials.

3501 Bericht und Analyse der bisher geheimgehaltenen Atomkatastrophe in der UdSSR. (REPORT AND ANALYSIS OF THE CONCEALED NUCLEAR CATASTROPHE IN THE USSR). Medwedjew, Z. Hamburg, Germany, F.R.: Hoffmann und Campe (1979). 270p. (In German).

Rumour has it that there was a nuclear catastrophe in the Tchelyabinsk district in the southern Ural mountains in late 1975 or early 1958. When a radioactive waste deposit exploded, hundreds of persons died; thousand had to be evacuated or treated in isolated hospital wards. Eye witnesses gave news of a ghost landscape without any vegetation. Even years later, vehicles could only pass with closed windows and at high speed. On the basis of radioactivity data of widely known Soviet publications, Medvedyev gives exact details of the extent and consequences of the nuclear contamination. His report is published in book form for the first time. Documents released for publication by the CIA - although some 'purified' -, with detailed witnesses' reports on the accident were given to the editors by the authors. They are printed in facsimile.

3502 Nuklearmedizinische Betriebe. Regeln fuer die Errichtung und Ausstattung. (INSTALLATIONS FOR NUCLEAR MEDICINE. REGULATIONS FOR CONSTRUCTION AND EQUIPMENT). Berlin, Germany, F.R.: Beuth (Dec 1978). 12p. (In German). (DIN--6844).

The rules are valid for medical installations using unsealed radioactive material in diagnostics, therapy, and research: Classification of rooms and sub-areas; General rules for design and construction; Condition of groups of rooms and functional units; Calculation of radiation shields and constructional drawings for radiation protection; General equipment of rooms and installation; Special equipment and condition of individual rooms; Disposal or radioactive wastes.

3503 THE TRANSPORT OF RADIOACTIVE MATERIALS. Swindell, G.E. (IAEA). International Atomic Energy Agency Bulletin ; 20: No. 5, 17-24(Oct 1978).

From 1971-75, 144 nuclear accidents involved packages of radioactive materials, and, in 36 cases, some release of contents was reported. In no case has any release been observed from a Type B package as result of an accident. Type B packages contain: sealed radioactive material for medical and industrial purposes; spent nuclear fuel; high level wastes; or highly radiotoxic materials. Spent fuel is probably most vulnerable to attack or theft during transport. The following measures can be taken to lessen risk during transit: minimize the total time nuclear materials are in transit; minimize the number of transfers; avoid regular movement schedules; predetermine the trustworthiness of all handlers; and give advance warning to receivers. (4 photos, 15 references, 5 tables)

3504 SAFETY CONCERNING THE ALTERATION IN FUEL MATERIAL USAGE (NEW INSTALLATION OF THE HIGH-LEVEL RADIOACTIVE MATERIAL RESEARCH FACILITY) IN TOKAI WORKS OF POWER REACTOR AND NUCLEAR FUEL DEVELOPMENT CORP. Genshiryoku Iinkai Geppo (Journal of Atomic Energy Commission) ; 23: No. 2, 20-27(Jul 1978). (In Japanese).

A report of the Committee on Examination of Nuclear Fuel Safety was presented to the Atomic Energy Commission of Japan, which is concerned with the safety in the alteration of fuel material usage (new installation of the high-level radioactive material research facility) at Tokai Works. Its safety was confirmed. The alteration, i.e. installation of the high-level radioactive material research facility, is as follows. Intended for research of the reprocessing technology for high burnup plutonium-enriched spent fuel and of the glassification treatment for high-level liquid waste from fuel-reprocessing, the high-level radioactive material research facility includes a research building of about 6,200 m^2 floor space, an administrative building of about 1,200 m^2 floor space, cells, glove boxes and hoods, storages and waste facilities. The contents of the examination are safety of the facilities, fire/ explosion prevention, criticality control, radiation control, waste treatment, effects on the surrounding environment, and accident evaluation.

3505 INTERNATIONAL GUIDELINES FOR FIRE PROTECTION AT NUCLEAR INSTALLATIONS INCLUDING NUCLEAR FUEL PLANTS, NUCLEAR FUEL STORES, TEACHING REACTORS, RESEARCH ESTABLISHMENTS. London: British Insurance (Atomic Energy) Committee ([nd]). 40p.

The guidelines are recommended to designers, constructors, operators and insurors of nuclear fuel plants and other facilities using significant quantities of radioactive materials including research and teaching reactor installations where the reactors generally operate at less than approximately 10 MW(th). Recommendations for elementary precautions against fire risk at nuclear installations are followed by appendices on more specific topics. These cover: fire protection management and organization; precautions against loss during construction alterations and maintenance; basic fire protection for nuclear fuel plants; storage and nuclear fuel; and basic fire protection for research and training establishments. There are numerous illustrations of facilities referred to in the text.

GEOSCIENCES

Geology and Hydrology

3506 (CONF-7906121--1) TWO-DIMENSIONAL FINITE ELEMENT SOLUTION FOR THE SIMULTANEOUS TRANSPORT OF WATER AND SOLUTES THROUGH A NONHOMOGENEOUS AQUIFER UNDER TRANSIENT SATURATED UNSATURATED FLOW CONDITIONS. Gureghian, A.B. (Argonne National Lab., IL (USA)). 1979. Contract W-31-109-ENG-38. 33p. Dep. NTIS, PC A03/MF A01.

From Permiability and groundwater containment transport symposium; Philadelphia, PA, USA (17 Jun 1979).

A mathematical model of ground water transport through an aquifer is presented. The solute of interest is a metal tracer or radioactive material which may undergo decay through a sorbing unconfined aquifer. The subject is developed under the following headings: flow equation, solute equation, boundary conditions, finite element formulation, element formulation, solution scheme (flow equation, solute equation), results and discussions, water movement in a ditch drained aquifer under transient state, water and solute movement in a homogeneous and unsaturated soil, transport of ^{226}Ra in nonhomogeneous aquifer, tailings pond lined, and tailings pond unlined. It is concluded that this mathematical model may have a wide variety of applications. The uranium milling industry may find it useful to evaluate the hydrogeological suitability of their disposal sites. It may prove suited for the design of clay disposal ponds destined to hold hazardous liquids. It may also provide a means of estimating the long-term impact of radionuclides or other pollutants on the quality of ground water. 31 references, 9 figures, 3 tables.

3507 (DP--1522) DEVELOPMENT AND VALIDATION OF GWHEAD, A THREE-DIMENSIONAL GROUNDWATER HEAD COMPUTER CODE. Beckmeyer, R.R.; Root, R.W.; Routt, K.R. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Mar 1980. Contract AC09-76SR00001. 26p. NTIS, PC A03/MF A01.

A computer code has been developed to solve the groundwater flow equation in three dimensions. The code has finite-difference approximations solved by the strongly implicit solution procedure. Input parameters to the code include hydraulic conductivity, specific storage, porosity, accretion (recharge), and initial hydralic head. These parameters may be input as varying spatially. The hydraulic conductivity may be input as isotropic or anisotropic. The boundaries either may permit flow across them or may be impermeable. The code has been used to model leaky confined groundwater conditions and spherical flow to a continuous point sink, both of which have exact analytical solutions. The results generated by the computer code compare well with those of the analytical solutions. The code was designed to be used to model groundwater flow beneath fuel reprocessing and waste storage areas at the Savannah River Plant.

3508 (KBS-TR--47, pp 1-61) GROUNDWATER FLOW DUE TO TOPOGRAPHICAL AND GEOLOGICAL EFFECTS. Stokes, J. (Tekniska Hoegskolan, Stockholm (Sweden)). May 1978.

Investigations of groundwater flow in rock around repositories for nuclear waste.

A first investigation of the principal aspects of groundwater flow when varying topography, hydraulic conductivity and geometry is presented. The groundwater table was assumed coincident with topography. The conductivity was assumed constant or exponentially decreasing with depth. The bottom was either fixed or infinite. Numerical examples containing equipotentials, streamlines, lines of equal flux and travel times are presented. Several profiles in the Forsmark area were analysed to show the effects of regional flow.

3509 (LBL--8764(Vol.1)) GEOHYDROLOGICAL STUDIES FOR NUCLEAR WASTE ISOLATION AT THE HANFORD RESERVATION. VOLUME I. EXECUTIVE SUMMARY. Apps, J.; Doe, T.; Doty, B. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Aug 1979. Contract W-7405-ENG-48. 31p. Dep. NTIS, PC A03/MF A01.

A study of the hydrology of the Pasco Basin near Richland, Washington, was initiated during FY 1978 as part of a long-term study on the feasibility of nuclear waste disposal in the Columbia River Basalt underlying the Hanford Reservation. This report summarizes the hydrology field program, Pasco Basin modeling, and groundwater chemistry program. Hanford well logs are also reviewed. (DLC)

3510 (LBL--8764(Vol.2)) GEOHYDROLOGICAL STUDIES FOR NUCLEAR WASTE ISOLATION AT THE HANFORD RESERVATION. VOLUME II. FINAL REPORT. Apps, J.; Doe, T.; Doty, B. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Aug 1979. Contract W-7405-ENG-48. 279p. Dep. NTIS, PC A13/MF A01.

A field testing program to provide data for mathematical modeling of ground water flow in the deep basalts of the Pasco Basin was initiated in FY 1978. Tests performed in DC-2 and water level responses in neighboring DC-1 suggest possible leakage between the three lower piezometers in DC-1 and indicate a downward gradient in the upper basalt layers down to 4000 ft, beneath which there may be an upward gradient. A sharp steepening of the downward gradient near the Umtanum Unit suggest that Umtanum may be acting as a barrier to vertical flow. Pressure testing in well DC-8 in the basalts above the Vantage sandstone at 1700 to 2700 ft indicate a downward gradient. Water level elevations were higher and downward gradients steeper than in wells DC-1/DC-2. Well DC-6 was artesian, with a production rate of about 17 gpm, with 75% of this flow coming from the depth interval 3650 to 3800 ft. Pressure tests between 2200 and 4300 ft indicate artesian conditions in every zone. Water level elevations in the Grande Ronde basalts in DC-6 were higher than in the same zones in DC-1/DC-2. As in DC-1/DC-2, there appears to be a local heat minimum within 600 ft below the bottom of the Umtanum with higher heads at greater depth. The Gable Mountain anticline may be a flow barrier separating Cold Creek Valley from the Columbia River Valley to the north and east. Recharge to the deep basalts in Cold Creek Valley appears small, with drainage occurring to the southeast, parallel to the Cold Creek syncline. The lowest head elevation in DC-2 was 360 ft, which indicates that the deep flow systems in this area may be discharging to the Columbia River, probably at or below the Tri-Cities area. Presence of tritium in DC-2 at 20% of the Columbia River value was still present after swabbing 64,000 gal of water from the packed-off zone. Recommendations are presented for a continued well drilling and testing program. (DLC)

3511 (LBL--9677-2/2) STUDY OF ROCK-WATER-NUCLEAR WASTE INTERACTIONS IN THE PASCO BASIN, WASHINGTON: PART II. PRELIMINARY EQUILIBRIUM-STEP SIMULATIONS OF BASALT DIAGENESIS. Benson, L.V.; Carnahan, C.L.; Che, M. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Aug 1980. Contract W-7405-ENG-48. 31p. NTIS, PC A03/MF A01.

Interactions between a large number of complex chemical and physical processes have resulted in significant changes in the Pasco Basin hydrochemical system since emplacement of the first basalt flow. In order to perform preliminary simulations of the chemical evolution of this system, certain simplifying assumptions and procedures were adopted and a computer model which operates on the principal of local equilibrium was used for the mass transfer calculations. Significant

uncertainties exist in both the thermodynamic and reaction rate data which were input to the computer model. In addition, the compositional characteristics of the evolving hydrochemical system remain largely unknown, especially as a function of distance along the flow path. Given these uncertainties, it remains difficult to assess the applicability of the equilibrium-step approach even though reasonable matches between observed and simulated hydrochemical data were obtained. Given the uncertainties mentioned, the predictive abilities of EQ6 are difficult, if not impossible to evaluate; our simulations produced, at best, only qualitative agreement with observed product mineral assemblages and sequences, and fluid compositions.

3512 (LBL--10686) EARTH SCIENCES DIVISION. ANNUAL REPORT 1979. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Jul 1980. Contract W-7405-ENG-48. 239p. NTIS, PC A11/MF A01.

This annual report contains articles describing the research programs conducted during the year. Major areas of interest include geothermal exploration technology, geothermal energy conversion technology, reservoir engineering, geothermal environmental research, basic geosciences studies, applied geosciences studies, nuclear waste isolation, and marine sciences. (ACR)

3513 (ONWI--21) GEOTHERMAL ALTERATION OF CLAY MINERALS AND SHALES: DIAGENESIS. Weaver, C.E. (Georgia Inst. of Tech., Atlanta (USA)). Jul 1979. Contract EY-76-C-06-1830. 192p. Dep. NTIS, PC A09/MF A01.

The objective of this report is to perform a critical review of the data on the mineral and chemical alterations that occur during diagenesis and low-grade metamorphism of shale and other clay-rich rocks - conditions similar to those expected from emplacement of heat-producing radioactive waste in a geologic repository. The conclusions drawn in this document are that the following type of alterations could occur: smectite alteration, ion mobilization, illitic shales, kaolinite reactions, chlorite reactions, organic reactions, paleotemperatures, low temperature shales, high temperature shales, and phase equilibrium changes.

3514 (PNL--2851, pp VII.1-VII.8) PRELIMINARY SUBSURFACE HYDROLOGIC CONSIDERATIONS: COLUMBIA RIVER PLATEAU PHYSIOGRAPHIC PROVINCE. Veatch, M.D. (Shannon and Wilson, Inc., Seattle, WA). Nov 1979.

Summary of FY-1978 consultation input for Scenario Methodology Development.

Subsurface hydrologic conditions in the Pacific Northwest are strongly controlled by the structural and stratigraphic framework of subregions. A significant portion of the Pacific Northwest is underlain by the Columbia River Plateau basalt sequence. This discussion is limited to hydrologic conditions as they relate to the Columbia River Plateau physiographic province and specifically to the Pasco Basin in the central part of the province.

3515 (PNL--2851, pp VIII.1-VIII.9) GENERAL SUBSURFACE GEOLOGY OF SOUTHEASTERN NEW MEXICO WITH SPECIAL REFERENCE TO ITS STRUCTURAL STABILITY. Hills, J. (Univ. of Texas, El Paso). Nov 1979.

Summary of FY-1978 consultation input for Scenario Methodology Development.

Southeastern New Mexico east of the Pecos River is a tectonically stable area with no major fault movements for the past 250 million years. No major tectonic adjustments are expected in the next million years. Minor tectonic adjustments during Triassic time (200 to 180 million years ago) and early Tertiary time (70 million years ago) have resulted in deepening and eastward tilting of the Delaware basin. These tectonic adjustments have resulted in the opening of joints and consequent solution of the upper part of the Salado salt. Compaction of Pennsylvanian and Lower Permian sediments has also contributed to the basin subsidence. This effect has been most severe on the west edge of the basin near the Pecos River and in the southeast edge of the basin adjoining Winkler County, Texas. Recent minor seismic activity is probably the result of petroleum secondary recovery operations. This seismic activity may result in the release of strain and may contribute to the long term tectonic stability of the area.

3516 (PNL--3198) DURABILITY OF METALS FROM ARCHAEOLOGICAL OBJECTS, METAL METEORITES, AND NATIVE METALS. Johnson, A.B. Jr.; Francis, B. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Jan 1980. Contract EY-76-C-06-1830. 117p. Dep. NTIS, PC A06/MF A01.

Metal durability is an important consideration in the multi-barrier nuclear waste storage concept. This study summarizes the ancient metals, the environments, and factors which appear to have contributed to metal longevity. Archaeological and radiochemical dating suggest that human use of metals began in the period 6000 to 7000 BC. Gold is clearly the most durable, but many objects fashioned from silver, copper, bronze, iron, lead, and tin have survived for several thousand years. Dry environments, such as tombs, appear to be optimum for metal preservation, but some metals have survived in shipwrecks for over a thousand years. The metal meteorites are Fe-base alloys with 5 to 60 wt% Ni and minor amounts of Co, I, and S. Some meteoritic masses with ages estimated to be 5,000 to 20,000 years have weathered very little, while other masses from the same meteorites are in advanced stages of weathering. Native metals are natural metallic ores. Approximately five million tonnes were mined from native copper deposits in Michigan. Copper masses from the Michigan deposits were transported by the Pleistocene glaciers. Areas on the copper surfaces which appear to represent glacial abrasion show minimal corrosion. Dry cooling tower technology has demonstrated that in pollution-free moist environments, metals fare better at temperatures above than below the dewpoint. Thus, in moderate temperature regimes, elevated temperatures may be useful rather than detrimental for exposures of metal to air. In liquid environments, relatively complex radiolysis reactions can occur, particularly where multiple species are present. A dry environment largely obviates radiolysis effects.

3517 (RHO-BWI-C--25) GEOLOGY OF THE SOUTHWESTERN PASCO BASIN. (Geoscience Research Consultants, Moscow, ID (USA)). Sep 1978. Contract EY-77-C-06-1030. 892p. Dep. NTIS, PC A99/MF A01.

The objective of this study was to define those aspects of the stratigraphic, structural, and tectonic setting which are important to the integrity of a deep-mined waste-isolation cavern in the Columbia River basalts. Three

principal structural features received the focus of the field effort in the 1,485-square-kilometer area. These are the northern end of the Horse Heaven uplift, the linear ridges of the Badger Mountain-Red Mountain trend, and the Rattlesnake uplift. The thickest sequence of basalt exposed in the study area is on the steep, northeastern slope of Rattlesnake Mountain; about 485 meters of stratigraphic section can be examined in the field area. Subsidence and weak deformation of the southwestern Pasco Basin area during Yakima time can be recognized in the disposition of flows and interbeds. In the southwestern Pasco Basin, most of the topographically expressed basalt bedrock mountains, ridges, hills, and knolls have developed since spreading of the Saddle Mountains flows. Deformation since Ice Harbor time (about 8 million years ago) has been by folding, faulting, and in some structures, by a combination of both. The doubly plunging anticlinal folds of Badger Mountain, Red Mountain, and easternmost Rattlesnake Hills have vertical structural amplitudes in the 80 to 200-meter range. The high-angle, possibly reverse Badger Mountain fault has offset up to 60 meters; offset is downward on the northeast. Rattlesnake Mountain is, in part, a tilted fault-block structure. The western end of the Rattlesnake uplift, Rattlesnake Hills, is principally a broad anticline with numerous minor folds and faults. Geomorphic relations suggest that the post-Ice Harbor structural movement in the study area is of one episode. 65 figures, 8 tables.

3518 (RHO-BWI-C--82) BIBLIOGRAPHY OF THE GEOLOGY OF THE COLUMBIA PLATEAU AND ADJACENT AREAS OF WASHINGTON. (Shannon and Wilson, Inc., Portland, OR (USA)). Aug 1980. Contract AC06-77RL01030. 30p. NTIS, PC A03/MF A01.

This bibliography is a supplement to Rockwell Hanford Operations Report RHO-BWI-C-59, July 1979, prepared by the Washington State Division of Geology and Earth Resources which is a compilation of all known published, unpublished, and open-file references dealing with geology and geophysics of the Columbia Basin of eastern Washington. This supplement covers 1979 and early 1980 publications, as well as some items published prior to 1979. Every effort was made, where possible, to avoid duplicating citations already listed in the basic bibliography. The principal sources for the citations in this bibliographic supplement were the GeoRef database (1979 through mid-1980) and the NTIS database (1977 through mid-1980). In addition, Conference Papers Index, Tulsa, Geoarchive, and Comprehensive Dissertations Index databases have been used selectively. To make this supplement as up-to-date as possible, the latest issues of New Publications of the Geological Survey, Washington Geologic Newsletter, GSA Abstracts with Programs, and other current listings of publications have also been scanned. (ACR)

3519 (RHO-BWI-SA--26) BASALT STRATIGRAPHY - PASCO BASIN. Waters, A.C.; Myers, C.W.; Brown, D.J.; Ledgerwood, R.K. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Oct 1979. Contract EY-77-C-06-1030. 11p. (CONF-791155--1). Dep. NTIS, PC A02/MF A01.

From Deccan volcanism and related basalt provinces in other parts of the world; Bombay, India (Nov 1979).

The geologic history of the Pasco Basin is sketched. Study of the stratigraphy of the area involved a number of techniques including major-element chemistry, paleomagnetic investigations, borehole logging, and other geophysical survey methods. Grande Ronde basalt accumulation in the Pasco Basin is described. An illustrative log response is shown. 1 figure. (RWR)

3520 (RHO-BWI-ST--6) SURFACE HYDROLOGIC INVESTIGATIONS OF THE COLUMBIA PLATEAU REGION, WASHINGTON. Leonhart, L.S. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). 23 Jul 1979. Contract EY-77-C-06-1030. 242p. Dep. NTIS, PC A11/MF A01.

The Washington State portion of the Columbia Plateau is divided into six hydrologic sub-basins on the basis of the principal surface drainage systems present, structural and topographic relationships, and political and other considerations. Baseline descriptions of the surface water systems and resources are presented for the Columbia Plateau with emphasis on the Pasco Sub-basin. A preliminary evaluation of the hydrologic budget for each sub-basin is derived. For each sub-basin, recharge/discharge relationships arising from precipitation/evapotranspiration/runoff, stream losses and gains, and artificial mechanisms are determined on the basis of available data. The net exchange between surface and ground-water systems is evaluated and relative estimates of the net ground-water flow into or out of the sub-basin are obtained. An evaluation is made of hydrologic risk factors arising from: (1) tributary flooding in eastern Washington; and (2) major flooding of the Columbia River within the Pasco Sub-basin. Scenarios are presented for credible natural and man-generated catastrophic events.

3521 (SAND--79-0276) BASIC DATA REPORT FOR DRILLHOLE WIPP 19 (WASTE ISOLATION PILOT PLANT-WIPP). (Sandia National Labs., Albuquerque, NM (USA); Geological Survey, Denver, CO (USA)). Mar 1980. Contract AC04-76DP00789. 76p. NTIS, PC A05/MF A01.

WIPP 19 is an exploratory borehole whose objective was to determine the nature of the near-surface formations after seismic information indicated a possible fault. The borehole is located in section 20, T.22S., R.31E., in eastern Eddy County, New Mexico, and was drilled between April 6 and May 4, 1978. The hole was drilled to a depth of 1038.2 feet and encountered, from top to bottom, surficial Holocene deposits (7'), including artificial fill for drill pad), the Mescalero caliche (7'), the Santa Rosa Sandstone (82'), the Dewey Lake Red Beds (494'), the Rustler Formation (315'), and the upper portion of the Salado Formation (143'). Cuttings were collected at 10-foot intervals. A suite of geophysical logs was run to measure acoustic velocities, density, and radioactivity. On the basis of comparison with other geologic sections drilled in the area, the WIPP 19 section is a normal stratigraphic sequence and it does not show structural disruption. The WIPP is to demonstrate (through limited operations) disposal technology for transuranic defense wastes. The WIPP will also provide facilities to research interactions between high-level waste and salt.

3522 (SAND--79-1519) LABORATORY STUDIES OF WATER TRANSPORT IN ROCK SALT. Hohlfelder, J.J.; Hadley, G.R. (Sandia Labs., Albuquerque, NM (USA)). Nov 1979. Contract EY-76-C-04-0789. 19p. Dep. NTIS, PC A02/MF A01.

The transport of water through rock salt as a result of heating is examined experimentally

and a new model proposed to explain the data. The experiment consists of the measurement of water loss rate as a function of time for three 1 kg blocks of Southeastern New Mexico rock salt. Each block was heated for approximately three days with maximum temperatures ranging from 165 to 250°C. The resulting data is qualitatively explained by a continuum model of Darcian flow of water vapor from a receding evaporation front. The model includes the prediction of thermal stresses which are calculated to crack the specimens during heater shutdown giving an anomalously high water loss spike in agreement with the data.

3523 (SKBF/KBS--79-05) COMPLEMENTARY INVESTIGATIONS OF THE BEDROCK IN THE FINNSJOE AND KARLSHAMN AREAS, SWEDEN. Olkiewicz, A.; Scherman, S.; Kornfaelt, K.A. (Kaernbraenslesaekerhet, Stockholm (Sweden); Svensk Kaernbraenslefoersoerjning AB, Stockholm). Feb 1979. 158p. (In Swedish). Dep. NTIS (US Sales Only), PC A08/MF A01.

In its statement of the 1978-10-05 the government decided that the KBS' reports I and II did not prove the existance of a''sufficiently large'' geological formation with the qualities which were required in the KBS risk analysis. The government therefore demanded further investigations. Complementary investigations were carried out in two areas, Finnsjoen in northwestern Uppland and Sternoe in southwestern Blekinge, Sweden. This report comprises mapping of the drillcores and extended geological mapping of the actual investigated areas. Measurements of borehole-deviation as well as surface-geophysical investigations from the Finnsjoen area are enclosed. The mapping of the four drill-cores in the Finnsjoe area shows that the cores are dominated by a slightly gneissic granodiorite. Of secondary importance occurs a young red homogenous granite. The frequency of fractures and fracture sets is high and evenly distributed. The tectonized parts are very often red coloured, foliated and containing many calcite healed fractures. The mapping also shows that mylonites and breccias are common in connection with more disturbed zones. Fractures are usually lined with calcite and chlorite. The mapping of these five new boreholes at Sternoe (one of the holes an extension of Ka 1 from earlier investigations) shows quite a complex picture of the bedrock. This is probably an effect of granitization of the coastal gneiss. Close to the surface coastal gneiss is dominating, in the deeper sections granitic material, gneissgranite and granite, are dominating. Pegmatites are common in the shallow sections of the area investigated. The frequency of fractures and fracture sets are very low. The only exception is one core, Ka 4, drilled in close connection with a thrust-zone in ''Munkahusviken''. Coatings of fracture surfaces are dominated by calcite and gypsum.

3524 (SKBF-KBS-TR--79-02) BEDROCK AND THE SOIL TYPES IN THE FINNSJOEAREA, SWEDEN. Almen, K.-E.; Ekman, L.; Olkiewicz, A. (Svensk Kaernbraenslefoersoerjning AB, Stockholm; Kaernbraenslesaekerhet, Stockholm (Sweden)). Nov 1978. 46p. (In Swedish). Dep. NTIS (US Sales Only), PC A04/MF A01.

This report is a part of a long-term project, started at the request of the Nuclear Fuel Safety Project, Sweden. The aim of the project is to claryfy the geohydrological situation of a drainage area close to Finnsjoen in northern Uppland, Sweden. The work comprised bedrock- and soil mapping as well as an investigation of existing literature about the geology of northern Uppland. The area is about 25 km² and is limited by its water-shed. The area is relatively flat, rich in outcrops - expecially in the western parts - and often swampy. Big areas of forests and agriculture have been drained by ditches.

3525 (SKBF/KBS-TR--79-06) COMPLEMENTARY MEASUREMENTS OF THE PERMEABILITY IN THE AREA AROUND KARLSHAMN, SWEDEN. Gidlund, G.; Hansson, K.; Thoregren, U. (Kaernbraenslesaekerhet, Stockholm (Sweden); Svensk Kaernbraenslefoersoerjning AB, Stockholm). Feb 1979. 29p. (In Swedish). Dep. NTIS (US Sales Only), PC A03/MF A01.

Water loss measurements have been carried out in four boreholes in the Karlshamn area, in the southeast parts of Sweden. All of the boreholes are inclined and drilled down to a vertical deep about 550 m, except one (Ka 1) which has a vertical depth of 780 m. Measurements have been carried out with double- and single packer tests. By the doublepacker tests a section of 3 meter have been used. Totally some 800 permeability tests have been brought out in the area. The major part the doublepacker testings shows sections with a permeability less than 10^{-9} m/s. The single-packer testings shows, especially towards the depth, large sections with permeabilities less than 10^{-11} m/s. Borehole Ka 1, which is situated in the central part of the investigation area presents many sections with a very low permeability. The surrounding boreholes in the area generally show higher permeabilities, and in these individual fracture zones have also been identified. Two of the boreholes (Ka 4 and Ka 5) are also measured by geophysical logging. The geophysical borehole measurements in Ka 5 shows a very low degree of fracturing and a concentration of fractures to a few zones with an almost non-fractured rock-mass in between. The borehole diameter are constant along the borehole indicating closed fractures. An exception from this general picture are results from borehole Ka 4 which is drilled close to a major fracture zone located in the northern part of the investigated area. The resistivity measurements from this borehole shows a high frequency of fractures and a high water content in the fractures. (author) Karlshamn, Sweden.

3526 (UCRL--15270) STATE-OF-THE-ART FOR EVALUATING THE POTENTIAL IMPACT OF FLOODING ON A RADIOACTIVE WASTE REPOSITORY. (Geotechnical Engineers, Inc., Winchester, MA (USA)). 16 Jul 1980. Contract W-7405-ENG-48. 68p. NTIS, PC A04/MF A01.

This report is a review of the state-of-the-art for evaluating the potential impact of flooding on a deep radioactive-waste repository, namely, for predicting the future occurrence of catastrophic flooding and for estimating the effect of such flooding on waste containment characteristics. Several detrimental effects are identified: flooding can increase groundwater seepage velocities through a repository within the framework of the existing hydrologic system and thus increase the rate of radioactive-waste leakage to the biosphere; flooding may alter repository hydrology by reversing flow gradients, relocating sources of groundwater recharge and discharge, or shortening seepage paths, thereby producing unpredictable leakage; saturation of a vadose-zone repository during flooding can increase groundwater seepage velocities by several orders of magnitude; and flooding can damage repository-media containment properties by inducing seismic or chemical instability or increasing fracture permeability in relatively shallow repository rock as a result of

redistributing in-situ stresses. Short-term flooding frequency and magnitude can be predicted statistically by analyzing historical records of flooding. However, long-term flooding events that could damage a permanent repository cannot be predicted with confidence because the geologic record is neither unique nor sufficienly complete for statistical analysis. It is more important to identify parameters characterizing containment properties (such as permeability, groundwater gradient, and shortest seepage path length to the biosphere) that could be affected by future flooding, estimate the maximum magnitude of flooding that could occur within the life of the repository by examining the geologic record, and determine the impact such flooding could have on the parameter values.

3527 (UCRL--82649) SIMPLIFIED GROUNDWATER FLOW MODELING: AN APPLICATION OF KALMAN FILTER BASED IDENTIFICATION. Pimentel, K.D.; Candy, J.V.; Azevedo, S.G.; Doerr, T.A. (California Univ., Livermore (USA). Lawrence Livermore Lab.). May 1980. Contract W-7405-ENG-48. 13p. (CONF-7909138--1). NTIS, PC A02/MF A01.

From International Federation of Information Processing working conference on simulation and the environment; Bangor, UK (18 Sep 1979).

The need exists for methods to simplify groundwater contaminant transport models. Reduced-order models are needed in risk assessments for licensing and regulating long-term nuclear waste repositories. Such models will be used in Monte Carlo simulations to generate probabilities of nuclear waste migration in aquifers at candidate repository sites in the United States. In this feasibility study we focused on groundwater flow rather than contaminant transport because the flow problem is more simple. A pump-drawdown test is modeled with a reduced-order set of ordinary differential equations obtained by differencing the partial differential equation. We determined the accuracy of the reduced model by comparing it with the analytic solution for the drawdown test. We established an accuracy requirement of 2% error at the single observation well and found that a model with only 21 states satisfied that criterion. That model was used in an extended Kalman filter with synthesized measurement data from one observation well to identify transmissivity within 1% error and storage coefficient within 10% error. We used several statistical tests to assess the performance of the estimator/identifier and found it to be satisfactory for this application.

3528 RECHARGE AND POLLUTION OF THE ENGLISH CHALK: SOME POSSIBLE MECHANISMS. Reeves, M.J. (Univ of Durham, Engl). Engineering Geology (Amsterdam) ; 14: No. 4, 231-240(Oct 1979).

The Chalk aquifer is currently the most important source of groundwater in the United Kingdom. Pore water in the Chalk is likely to remain essentially static under the influence of environmental forces with the exception of evapotranspiration. A process of piston displacement of water through networks of microfissures provides a possible mechanism for downward percolation through the unsaturated Chalk. Maintenance of continuous diffusion equilibrium between fissure and pore water throughout downward migration allows the explanation of the observed rates of movement for thermonuclear tritium in the unsaturated zone. Activation of increasingly large fissures with increasing infiltration rates explains observed rapid water-table response quality parameters in the saturated aquifer.

3529 LABORATORY STUDIES OF WATER TRANSPORT IN ROCK SALT. Hohlfelder, J.J.; Hadley, G.R. (Sandia Labs., Albuquerque, NM). Contract DE-AC04-76DP00789. Letters in Heat and Mass Transfer ; 6: No. 4, 271-279(Jul 1979).

The transport of water through rock salt as a result of heating is examined experimentally and a new model proposed to explain the data. The experiment consists of the measurement of water loss rate as a fuction of time for three 1 kg blocks of Southeastern New Mexico rock salt. Each block was heated for approximately three days with maximum temperatures ranging from 165 to 250°C. The resulting data are qualitatively explained by a continuum model of Darcian flow of water vapor from a receding evaporation front. The model includes the prediction of thermal stresses which are calculated to crack the specimens during heater shutdown giving an anomalously high water loss spike in agreement with the data.

3530 COMMENTS ON CARBON-14 DATING OF GROUNDWATERS IN CRYSTALLINE ENVIRONMENTS. Fritz, P.; Gale, J.E.; Reardon, E.J. (Waterloo Univ., Ontario (Canada)). Geoscience Canada ; 6: No. 1, 10-15(Mar 1979).

Groundwater age determinations based on carbon-14 are discussed on the basis of a definition of the age of a water and its significance in terms of groundwater flow. Such investigations are useful in evaluating potential subsurface disposal sites suitable for the long-term containment of toxic materials such as wastes from the nuclear fuel cycle. The geochemical inferences which may influence the carbon geochemistry and the carbon-14 budget in crystalline environments are discussed. It is concluded that carbon-14 dating of groundwaters is not easy to use unless the geochemical evolution of a groundwater follows processes whose influence on the carbon budget may be assessed.

3531 RESULTS OF A MULTIPLE BOREHOLE PUMPING TEST IN LOW PERMEABILITY GRANITE. Black, J.H. (Institute of Geological Sciences, Harwell (UK). Environmental Pollution Section). pp 183-197 of Low flow, low-permeability measurements in largely impermeable rocks. Paris, France; OECD (1979).

From Workshop on Low-Flow Low permeability measurements in Langley Impermeable rocks; Paris, France (19 Mar 1979).

A 21 day pumping test was carried out using four 300 m deep boreholes in granite. An average abstraction rate of 0.36 m^3/day was achieved by pumping periodically. The results of this test were compared with single borehole injection and slug tests. Both types of single borehole tests yielded values of hydraulic conductivity between 2 and 13 x 10^{-5} m/day with two boreholes giving values at the lower end of this range. The multiple borehole test yielded values ranging from 18 to 49 x 10^{-5} m/day for time-drawdown relationships, and 7 to 25 x 10^{-5} m/day for distance-drawdown relationships. Values of storativity from the multiple test varied between 3.5 and 25 x 10^{-4} compared to 0.5 to 5 x 10^{-4} for single borehole tests. Borehole logging indicated a total porosity of about 10^{-2} and an evenly distributed porosity taking part in flow of about 10^{-5}. The tests showed that a radial flow model was applicable in this particular granite environment and that inflow of water was virtually independent of depth.

3532 ANALYSIS OF GROUNDWATER FLOW AROUND A

HIGH-LEVEL WASTE REPOSITORY IN CRYSTALLINE ROCK. Burgess, A.S.; Charlwood, R.G.; Skiba, E.L. (Acres Consulting Services Ltd., Niagara Falls, Ontario (Canada)); Ratigan, J.L.; Gnirk, P.F. (RE/SPEC, Inc., Rapid City, SD (USA)); Stille, H.; Lindblom, P.F. (Hägconsult AB, Goteborg (Sweden)). pp 199-220 of Low flow, low-permeability measurements in largely impermeable rocks. Paris, France; OECD (1979).

From Workshop on Low-Flow Low permeability measurements in Langley Impermeable rocks; Paris, France (19 Mar 1979).

The paper discusses the geohydrological data base, conceptual models for fractured rock flow and limitations of existing field and laboratory techniques. The results of analyses of the groundwater regime expected during the various phases of a repository at a crystalline rock site are presented. These include. - Initial conditions: regional and local flows and assessments of effects of topographic variations, faults and anisotropy. - Construction emplacement and thermal periods: the effects of stress are assessed and convective flow analyses coupled with regional flows are shown to identify effects on transport paths and magnitudes of advective heat transfer. - Long-term flow: flow modifications following repository construction and sealing are shown. Flow paths and potential leakage plumes and velocities are suggested. These analyses used a set of rock mechanics, heat transfer and flow finite-element models in which significant coupling is identified and included.

3533 ESTIMATION OF HYDRAULIC CONDUCTIVITY IN SWEDISH PRECAMBRIAN CRYSTALLINE BEDROCK. Carlsson, L.; Gidlund, G.; Hansson, K.; Klockars, C.-E. (Geological Survey of Sweden, Uppsala). pp 97-115 of Low flow, low-permeability measurements in largely impermeable rocks. Paris, France; OECD (1979).

From Workshop on Low-Flow Low permeability measurements in Langley Impermeable rocks; Paris, France (19 Mar 1979).

The hydraulic conductivity of rock mass was determined from water pressure and flow measurements. Special equipment was constructed which made it possible to determine conductivity values of less than 10^{-11} m/s depending on the length of the investigated sections. The hydraulic conductivity of fissures was estimated from tracer tests. The combination of the two techniques, where transient formulas were used made it possible also to estimate the effective porosity and the storage coefficient.

3534 HYDROGEOLOGIC PROPERTIES AND PORE WATER ORIGIN AND AGE: CLAYEY TILL AND CLAY IN SOUTH CENTRAL CANADA. Cherry, J.A.; Desaulniers, D.E.; Frind, E.O.; Fritz, P.; Gevaert, D.M.; Gillham, R.W.; Lelievre, B. (Waterloo Univ., Ontario (Canada)). pp 31-47 of Low flow, low-permeability measurements in largely impermeable rocks. Paris, France; OECD (1979).

From Workshop on Low-Flow Low permeability measurements in Langley Impermeable rocks; Paris, France (19 Mar 1979).

This paper describes the hydrogeologic properties and origin of pore water in clayey glacial till and glaciolacustrine clay in six areas in south-central Canada, including four in southern Ontario, one in southern Manitoba, and one in south-central Saskatchewan. At each of the sites the water table is within the depth range of one to four metres. The results are appraised in light of a concept for long-term isolation of solid low-level radioactive wastes in large-diameter holes augered to depths of tens of metres below the water table. With the exception of one of the study sites, the sites are only research sites and are not under consideration for radioactive waste management. One of the sites is highly fractured, but at all other sites fractures were detected only in the surficial weathered zone. At all of the sites except one, a major component of Pleistocene-age groundwater was identified at depth. Mathematical analysis and the isotope data indicates that groundwater flow in these deposits is so slow that molecular diffusion rather than groundwater advection is the dominant process of solute migration below the weathering zone, even in zones where fractures are known to occur. Diffusion controlled subsurface regimes are the most favorable for waste disposal.

3535 FIELD PERMEABILITY AND HYDRAULIC POTENTIAL MEASUREMENTS IN CRYSTALLINE ROCK AND SOLUTE TRANSPORT THROUGH FINELY FRACTURED MEDIA. Davison, C.C.; Grisak, G.E. (Environment Canada Ground Water Division, National Hydrological Research Institute, Ottawa, Ontario); Williams, D.W. (Chicago Univ., IL (USA)). pp 139-155 of Low flow, low-permeability measurements in largely impermeable rocks. Paris, France; OECD (1979).

From Workshop on Low-Flow Low permeability measurements in Langley Impermeable rocks; Paris, France (19 Mar 1979).

Drill stem tests were performed to depths of 500 metres during borehole advancement in crystalline rock using a single packer system. Apparent equilibrium shut-in pressures were obtained to provide an estimate of the vertical hydraulic potentials. A downhole pneumatic piston was used to create an instantaneous pressure pulse in the isolated test section and the transient pressure decay was monitored. Equivalent single-fracture apertures and equivalent rock mass hydraulic conductivities, Kerm, were calculated from the transient pressure decay data. Equivalent single-fracture apertures are presented which range between 1 and 125 microns for tests performed in a 150 m deep borehole into a granitic rock mass. It can be shown from modeling studies that diffusion from a fracture into the adjacent matrix, fracture aperture and grounwater velocity through the fractures are the controlling transport parameters for non reactive solute transport through fractured media. Finite difference model results for a constant porosity system illustrating solute breakthrough curves and profiles along the length of a fracture indicate the importance of matrix diffusion in particular. If the average water velocity in a 300 μm fracture in a fractured clay or shale is 3m/d, the average velocity of a conservative solute under the simulated conditions is approximately 08m/d.

3536 PERMEABILITY OF GENERIC REPOSITORY ROCKS AT SIMULATED IN SITU CONDITIONS. Heard, H.C.; Trimmer, D.; Duba, A.; Bonner, B. (California Univ., Livermore (USA). Lawrence Livermore Lab.). pp 69-83 of Low flow, low-permeability measurements in largely impermeable rocks. Paris, France; OECD (1979).

From Workshop on Low-Flow Low permeability measurements in Langley Impermeable rocks; Paris, France (19 Mar 1979).

New laboratory data are reported on the effect of confining (lithostatic) pressure, pore-water pressure, and principal stress difference on permeability of Westerly granite and White Lake gneissic granite. Permeabilities

as low as 10^{-19} cm^2 (10^{-11} D) have been measured successfully, using a transient technique. Principal strains, electrical conductivity, and compressional velocity are determined simultaneously. Applied loads on the 15-cm diameter by 28-cm long test sample are controlled automatically and all data are taken by a micro-computer. Results on the gneissic indicate permeabilities of 10^{-18} to 10^{-19} cm^2 that appear to be unaffected either by effective pressure or by stress. The granite yields permeabilities of 4.10^{-18} cm^2 that decrease by a factor of two with pressure and vary by a factor of two with stress. When compared to the initial value, compressional velocities increase by 4% and conductivity decreases by 50% as pressure is increased to 50 MPa in the gneissic granite. In granite, these become 3% and 58%, respectively. At pressure, loading of the granite to 0.5 of failure stress increases conductivity by about 20%.

3537 GEOHYDROLOGIC INVESTIGATIONS OF BURIED METAMORPHIC ROCK AND MUDSTONE FOR THE STORAGE OF RADIOACTIVE WASTE. Marine, I.W. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). pp 49-56 of Low flow, low-permeability measurements in largely impermeable rocks. Paris, France; OECD (1979).

From Workshop on Low-Flow Low permeability measurements in Langley Impermeable rocks; Paris, France (19 Mar 1979).

From 1961 to 1972 a geohydrologic investigation of crystalline metamorphic rock and Triassic mudstone was carried on at the Savannah River Plant near Aiken, south Carolina, U.S.A., operated by the U. S. Department of Energy, for the purpose of evaluating the feasibility of storing radioactive waste in these host rocks. Although this investigation is no longer active, many of the concepts, testing methods, and results developed in this investigation are applicable to investigations currently being conducted at other locations fo geologic storage of radioactive waste.

Geophysics

Seismology and Tectonics

3538 (PNL--2851, pp XII.1-X11.13) EVIDENCE AND THEORY FOR THE PREDICTION OF TECTONIC ACTIVITY IN THE BASIN AND RANGE PROVINCE OF NEVADA AND UTAH FOR THE NEXT ONE MILLION YEARS. Lovejoy, E.M.P. Nov 1979.

Summary of FY-1978 consultation input for Scenario Methodology Development.

Major conclusions of the report are: Important seismic activity in the next one million years will be restricted to the Intermountain Seismic Belt. Minor seismic activity in the same period will be restricted to the Nevada Seismic Belt, Sierra Nevada front, and Reno-Yellowstone lineament. There will be seismic inactivity in the same period in the rest of the Basin and Range Province except locally along high mountain frontal fault zones. In these zones, isostatic unloading will produce slow, secular, mild seismic activity for many millions of years to come.

3539 (PNL--2851, pp XIV.1-XIV.10) ASSESSMENT OF TECTONIC HAZARDS TO WASTE STORAGE IN INTERIOR-BASIN SALT DOMES. Kehle, R. Nov 1979.

Summary of FY-1978 consultation input for Scenario Methodology Development.

Salt domes in the northern Gulf of Mexico may make ideal sites for storage of radioactive waste because the area is tectonically quiet. The stability of such salt domes and the tectonic activity are discussed. (DLC)

3540 (UCRL--15260) SEISMIC HAZARD ANALYSIS FOR THE NTS SPENT REACTOR FUEL TEST SITE. Campbell, K.W. (TERA Corp., Berkeley, CA (USA)). 2 May 1980. Contract W-7405-ENG-48. 63p. NTIS, PC A04/MF A01.

An experiment is being directed at the Nevada Test Site to test the feasibility for storage of spent fuel from nuclear reactors in geologic media. As part of this project, an analysis of the earthquake hazard was prepared. This report presents the results of this seismic hazard assessment. Two distinct components of the seismic hazard were addressed: vibratory ground motion and surface displacement. (ACR)

3541 (UCRL--15269) STATE-OF-THE-ART FOR EVALUATING THE POTENTIAL IMPACT OF TECTONISM AND VOLCANISM ON A RADIOACTIVE WASTE REPOSITORY. (Geotechnical Engineers, Inc., Winchester, MA (USA)). 16 Jul 1980. Contract W-7405-ENG-48. 83p. NTIS, PC A05/MF A01.

Most estimates of the time required for safe isolation of radioactive wastes from the biosphere range from 100,000 to 1,000,000 years. For such long time spans, it is necessary to assess the potential effects of geologic processes such as volcanism and tectonic activity on the integrity of geologic repositories. Predictions of geologic phenomena can be based on probabilistic models, which assume a random distribution of events. The necessary historic and geologic records are rarely available to provide an adequate data base for such predictions. The observed distribution of volcanic and tectonic activity is not random, and appears to be controlled by extremely complex deterministic processes. The advent of global plate tectonic theory in the past two decades has been a giant step toward understanding these processes. At each potential repository site, volcanic and tectonic processes should be evaluated to provide the most thorough possible understanding of those deterministic processes. Based on this knowledge, judgements will have to be made as to whether or not the volcanic and tectonic processes pose unacceptable risk to the integrity of the repository. This report describes the potential hazards associated with volcanism and tectonism, and the means for evaluating these processes.

Volcanology

3542 (LASL--80-42(Mini-Review)) VOLCANOLOGY AT THE LOS ALAMOS SCIENTIFIC LABORATORY. Heiken, G. (Los Alamos Scientific Lab., NM (USA)). Oct 1980. Contract W-7405-ENG-36. 4p. NTIS, PC A02/MF A01.

This mini-review briefly describes the research conducted at Los Alamos Scientific Laboratory (LASL) on various areas in volcanology. Areas of research include volcanic hazard analysis, the climatic effects of volcanic eruptions, young volcanic fields as heat sources, volcanic ash deposits and nuclear waste isolation, and basic research on the origin of volcanism. (ACR)

3543 (PNL--2882) DISRUPTIVE EVENT ANALYSIS:

VOLCANISM AND IGNEOUS INTRUSION. Crowe, B.M. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Aug 1980. Contract AC06-76RL01830. 46p. NTIS, PC A03/MF A01.

An evaluation is made of the disruptive effects of volcanic activity with respect to long term isolation of radioactive waste through deep geologic storage. Three major questions are considered. First, what is the range of disruption effects of a radioactive waste repository by volcanic activity. Second, is it possible, by selective siting of a repository, to reduce the risk of disruption by future volcanic activity. And third, can the probability of repository disruption by volcanic activity be quantified. The main variables involved in the evaluation of the consequences of repository disruption by volcanic activity are the geometry of the magma-repository intersection (partly controlled by depth of burial) and the nature of volcanism. Potential radionuclide dispersal by volcanic transport within the biosphere ranges in distance from several kilometers to global. Risk from the most catastrophic types of eruptions can be reduced by careful site selection to maximize lag time prior to the onset of activity. Certain areas or volcanic provinces within the western United States have been sites of significant volcanism and should be avoided as potential sites for a radioactive waste repository. Examples of projection of future sites of active volcanism are discussed for three areas of the western United States. Probability calculations require two types of data: a numerical rate or frequency of volcanic activity and a numerical evaluation of the areal extent of volcanic disruption for a designated region. The former is clearly beyond the current state of art in volcanology. The latter can be approximated with a reasonable degree of satisfaction. In this report, simplified probability calculations are attempted for areas of past volcanic activity.

Geophysical Survey Methods

3544 (UCRL--52961) GEOTOMOGRAPHY APPLIED AT THE STRIPA MINE IN SWEDEN. Okada, J.T.; Laine, E.F.; Lytle, R.J.; Daily,W.D. (California Univ., Livermore (USA). Lawrence Livermore National Lab.). 7 Apr 1980. Contract W-7405-ENG-48. 27p. NTIS, PC A03/MF A01.

LLNL made ultrahigh-frequency (450-MHz) electromagnetic borehole-to-borehole transmissions in the Stripa Mine near Guldsmedshyttan, Sweden, in April 1979. Transmission loss measurements were made between four sets of 76-mm boreholes 30 m long, located at the end of a drift. Distances between the boreholes varied from 2 to 22 m. More than 25,000 data points were taken. A geotomograph was constructed to show the variation of attenuation between boreholes. The observed spatial variation of electromagnetic attenuation may be related to the expected stress relief created by the mine. Transmission loss measurements were also made between two converging boreholes drilled from the surface to points near the mine. Data taken at 21 MHz show a nearly uniform attenuation within this sampled region. These experiments demonstrate that geotomographic data collection/interpretation provides high-resolution images of the underground environment and can provide useful input to those charged with providing the detailed site characterizations needed for both short- and long-term monitoring of underground nuclear waste repositories.

Mineralogy, Petrology, and Rock Mechanics

3545 (AECL--6423) STUDY OF SLOW CRACK GROWTH IN GRANITE AND ITS APPLICATON TO NUCLEAR WASTE DISPOSAL IN HARD ROCK. Wilkins, B.J.S. (Atomic Energy of Canada Ltd., Pinawa, Manitoba. Whiteshell Nuclear Research Establishment). Jun 1979. 27p. Dep. NTIS (US Sales Only), PC A03/MF A01.

Pathways analysis models are being developed and applied to estimate the possible rate of escape of nuclides from the vault to the biosphere. These models require as input details of the rock crack population, i.e., number, dimensions and spatial distribution of cracks. For the estimates of waste movement to be valid, the long-term parameters of the rock crack population must be known. The vault and the heat generated by the waste will disturb the stress pattern in the rock. This report discusses an approach to estimating how that stress disturbance will influence rock crack propagation in the long term. It shows how slow crack growth in rock may be quantified statistically by linear elastic fracture mechanics, and how the results can be used to define a volume surrounding the vault outside of which no significant crack growth will occur in the time of interest.

3546 (DP-MS--80-16) STUDIES OF THE SUBSURFACE EFFECTS OF EARTHQUAKES. Marine, I.W. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1980. Contract AC09-76SR00001. 37p. (CONF-800245--1). NTIS, PC A03/MF A01.

From Workshop on subsurface seismic studies; Seattle, WA, USA (20 Feb 1980).

As part of the National Terminal Waste Storage Program, the Savannah River Laboratory is conducting a series of studies on the subsurface effects of earthquakes. This report summarizes three subcontracted studies. (1) Earthquake damage to underground facilities: the purpose of this study was to document damage and nondamage caused by earthquakes to tunnels and shallow underground openings; to mines and other deep openings; and to wells, shafts, and other vertical facilities. (2) Earthquake related displacement fields near underground facilities: the study included an analysis of block motion, an analysis of the dependence of displacement on the orientation and distance of joints from the earthquake source, and displacement related to distance and depth near a causative fault as a result of various shapes, depths, and senses of movement on the causative fault. (3) Numerical simulation of earthquake effects on tunnels for generic nuclear waste repositories: the objective of this study was to use numerical modeling to determine under what conditions seismic waves might cause instability of an underground opening or create fracturing that would increase the permeability of the rock mass.

3547 (DS--1972-11) ANALYSIS OF THE STATE OF STRAIN AROUND DIFFERENT GEOMETRIES WITH RADIAL CRACKS IN AN INDEFINITE MEDIUM DUE TO EXPANSIVE FORCES. Duchterlony, F. (Stiftelsen Svensk Detonikforksning, Stockholm (Sweden)). Aug 1972. 149p. (In Swedish). Dep. NTIS (US Sales Only), PC A08/MF A01.

The break up of fragile materials due to internal expansive forces for instance at rock blasting is going on by the growth of radial cracks. This process has been studied in this report by an analysis of the state of strain around different geometries with radial cracks in an indefinite medium. Fracture properties

such as stress intensity factors, probable growing direction for the crack as well as the crack volume have been calculated. The results are given in graphs and tables.

3548 (LA--8139-MS) MINERALOGY AND PETROLOGY OF TUFF UNITS FROM A UE25A-1 DRILL SITE, YUCCA MOUNTAIN, NEVADA. Sykes, M.L.; Heiken, G.H.; Smyth, J.R. (Los Alamos Scientific Lab., NM (USA)). Nov 1979. Contract W-7405-ENG-36. 78p. Dep. NTIS, PC A05/MF A01.

Drill hole UE25a-1 has penetrated tuffs of Tertiary age which contain two major zeolitized horizons at depths below 380 m. These horizons are restricted to low-density, high-porosity nonwelded tuffs below the basal vitrophyre of the Topopah Springs Member of the Paintbrush Tuff (approximately 70 m above the current water table), and interfinger with more-densely-welded devitrified tuffs of granophyric mineralogy. Zeolites occur as glass pyroclast replacement, vug linings, and fracture fillings. Nonwelded units above the welded portion of the Topopah Springs Member are essentially unaltered, indicating that they have never been ground water-saturated for any significant length of time. Zeolite mineral assemblages appear to be characteristic of low temperature (<100°C) ground water alteration of glass in an open hydrologic system. The principal zeolite phase is high-Si clinoptilolite with Si/Al ratios of 4.7 to 6.0. Ca tends to be the dominant large-radius cation, but grains with dominant K or Na are not uncommon, particularly with increasing depth. Compositional variations in clinoptilolite may be due to ground water composition or original pyroclast composition. Minor amounts of mordenite, characterized by lower silica content (<55 wt %) and high alkali content (>10 wt % $Na_2O + K_2O$), occur as vug fillings at depths below 500 m. Presence of mordenite may indicate slightly elevated alteration temperatures, but more likely reflects enrichment of ground water in alkalis with depth. Mineralogical, compositional, and textural similarities of the zeolitized tuffs from UE25a-1 and J-13 are compatible with a single episode of crystallization. 16 figures.

3549 (LBL--8648) EARTH SCIENCES DIVISION. ANNUAL REPORT 1978. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). 1978. Contract W-7405-ENG-48. 258p. NTIS, PC A12/MF A01.

Progress is reported on geothermal energy development, geosciences, and underground nuclear waste management. Fifty-one energy-related projects are listed by title for EDB. (MHR)

3550 (LBL--8648, pp 229-231) NATURE AND DISTRIBUTION OF SECONDARY MINERALS IN THE BASALTS OF THE PASCO BASIN, WASHINGTON, AND THEIR RELATION TO THE DISPOSAL OF NUCLEAR WASTES. Benson, L.V.; Carnahan, C.L.; Apps, J.A.; Corrigan, D.J.; Frisch, C.J.; Mouton, C.A.; Teague, L.K. 1978.

Earth Sciences Division. Annual Report 1978.

BASALT;MINERALOGY;COLUMBIA RIVER BASIN;MASS TRANSFER;FRACTURES;DISSOLUTION;SPENT FUELS; RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL; SCANNING ELECTRON MICROSCOPY;X-RAY DIFFRACTION; ELECTRON MICROPROBE ANALYSIS;SIMULATION;DRILL CORES;WASHINGTON;GEOLOGIC DEPOSITS

3551 (LBL--8648, pp 232-241) HANFORD NEAR-SURFACE TEST FACILITY HEATER EXPERIMENTS. DuBois, A. 1978.

Earth Sciences Division. Annual Report 1978.

HANFORD RESERVATION;BASALT;RADIOACTIVE WASTE DISPOSAL;UNDERGROUND DISPOSAL;THERMODYNAMIC PROPERTIES;ROCK MECHANICS;TEMPERATURE EFFECTS; BOREHOLES;DRILL CORES;MATHEMATICAL MODELS;HEAT TRANSFER;DISPLACEMENT RATES;STRESSES;HEATERS; GEOLOGIC DEPOSITS

3552 (LBL--9425) FIELD MEASUREMENT TECHNIQUES: STATUS AND NEEDS. Cook, N.G.W. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Jun 1979. Contract W-7405-ENG-48. 11p. Dep. NTIS, PC A02/MF A01.

This paper discusses those field measurements which must be taken to enable the response of a rock mass to thermomechanical experiments to be determined. Measurements as a function of time are needed of: (1) rock temperatures including the initial values, (2) rock movements, (3) the state of strain or stress in the rock, including the initial values, and (4) fluid pressures in the rock, including initial values.

3553 (LBL--9557) VALIDITY OF CUBIC LAW FOR FLUID FLOW IN A DEFORMABLE ROCK FRACTURE. TECHNICAL INFORMATION REPORT NO. 23. Witherspoon, P.A.; Wang, J.S.Y.; Iwai, K.; Gale, J.E. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Oct 1979. Contract W-7405-ENG-48. 34p. Dep. NTIS, PC A03/MF A01.

The validity of the cubic law for laminar flow of fluids through open fractures consisting of parallel planar plates has been established by others over a wide range of conditions with apertures ranging down to a minimum of 0.2 μm. The law may be given in simplified form by $Q/\Delta h = C(2b)^3$, where Q is the flow rate, Δh is the difference in hydraulic head, C is a constant that depends on the flow geometry and fluid properties, and 2b is the fracture aperture. The validity of this law for flow in a closed fracture where the surfaces are in contact and the aperture is being decreased under stress has been investigated at room temperature using homogeneous samples of granite, basalt, and marble. Tension fractures were artificially induced and the laboratory setup used radial as well as straight flow geometries. Apertures ranged from 250 μm down to 4 μm. The cubic law was found to be valid whether the fracture surfaces were held open or were being closed under stress, and the results are not dependent on rock type. Permeability was uniquely defined by fracture aperture and was independent of the stress history used in these investigations. The effects of deviations from the ideal parallel plate concept only cause an apparent reduction in flow and may be incorporated into the cubic law by replacing C by C/f. The factor f varied from 1.04 to 1.65 in these investigations. The model of a fracture that is being closed under normal stress is visualized as being controlled by the strength of the asperities that are in contact. These contact areas are able to withstand significant stresses while maintaining space for fluids to continue to flow as the fracture aperture decreases. The controlling factor is the magnitude of the aperture and since flow depends on $(2b)^3$, a slight change in aperture evidently can easily dominate any other change in the geometry of the flow field.

3554 (LBL--9884) CHARACTERIZATION OF DISCONTINUITIES IN THE STRIPA GRANITE. Thorpe, R.K. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Oct 1979.

Contract W-7405-ENG-48. 11p. (CONF-791112--27). Dep. NTIS, PC A02/MF A01.
From Materials Research Society annual meeting; Boston, MA, USA (26 Nov 1979).
Characterization of the fracture system in a repository is important, and its purpose should dictate the scale over which measurements must be made. The results discussed pertain to nearfield behavior of a rock mass and represent a practical limit to the degree to which discrete subsurface discontinuities can be defined by surface mapping and cross-correlation of observational borehole data. Discontinuities on the scale of the rock mass being studied can dominate its response, and should therefore be described according to their influence on the stability of the opening and local groundwater regime. Alternatively, if the size or continuity of a feature is much less than the scale of the rock mass in question, there will be insufficient data with which to validate a discrete characterization, hence a statistical approach is required.

3555 (ONWI--95) REVIEW OF CURRENT CAPABILITIES FOR THE MEASUREMENT OF STRESS, DISPLACEMENT, AND IN SITU DEFORMATION MODULUS. Schrauf, T.W.; Pratt, H.R. (Terra Tek, Inc., Salt Lake City, UT (USA)). Dec 1979. Contract AC06-76RL01830. 88p. NTIS, PC A05/MF A01.
Current capabilities for the measurement of stress, displacement, and in situ deformation modulus in rock masses are reviewed as to their accuracy, sensitivity, advantages, and limitations. Consideration is given to both the instruments themselves and the measurement technique. Recommendations concerning adaptation of existing measurement techniques to repository monitoring are also discussed. These recommendations include: (1) development of a modified borehole deformation gage with improved long-term stability and reliability and reduced thermal sensitivity; (2) development of a downhole transducer type of extensometer; (3) development of a rigid inclusion type gage; (4) development of an improved vibrating wire stressmeter with greater accuracy and simplified calibration and installation requirements; and (5) modification of standard rod extensometers to improve their sensitivity.

3556 (ONWI--100) MECHANICAL BEHAVIOR OF AVERY ISLAND HALITE: A PRELIMINARY ANALYSIS. Carter, N.L.; Hansen, F.D. (RE/SPEC, Inc., Rapid City, SD (USA)). Jan 1980. Contract AC06-76RL01830. 37p. NTIS, PC A03/MF A01.
Nine specimens of dome salt from Avery Island were studied to obtain preliminary fabric, deformation mechanism, and mechanical data. The fabric study showed that this salt is comprised primarily of small strain-free halite grains. The salt is unusually clean. The fabric patterns are typical of dome salts. They have moderate a - axes concentrations parallel to the core axis that spread into girdles. Deformation mechanisms were studied using optical microscopy. At low temperatures (24°C to 70°C), cataclasis dominates the deformation while at higher temperatures (to 200°C), plastic flow is predominant. Results of constant stress-rate experiments show that strength increases with increasing stress rate and decreasing temperature. Data from creep tests are fit to several constitutive laws that prescribe deformation during transient and steady-state creep as functions of stress, temperature, and time.

3557 (ORNL/TM--7052) THERMAL CONDUCTIVITY OF THE ROCKS IN THE BUREAU OF MINES STANDARD ROCK SUITE. Morgan, M.T.; West, G.A. (Oak Ridge National Lab., TN (USA)). Jan 1980. Contract W-7405-ENG-26. 60p. Dep. NTIS, PC A04/MF A01.
Thermal conductivities of eight rocks from the Bureau of Mines Standard Rock Suite were measured in air over the temperature range 373 to 533°K (100 to 260°C). The thermal conductivities of these rocks were measured to furnish standards for future comparisons with host rock from prospective nuclear waste repository sites. The thermal conductivity at a given temperature decreased by as much as 9% after a specimen had been heated to the maximum temperature (533°K), but additional heating cycles had no further effect. This decrease was smallest in the igneous rocks and largest in the sedimentary types. Variations due to orientation were within the precision of measurements (+- 5%). In most cases the thermal conductivities were linear with the reciprocal of the temperature and were within 14% of published data obtained by other methods. Measurements were made by a cut-bar comparison method in which the sample was sandwiched between two reference or metering bars made of Pyroceram 9606 glass-ceramic. The apparatus consisted of a Dynatech Model TCFCM-N20 comparative thermal conductivity analyzer controlled by a Hewlett Packard Model 3052A data acquisition system. A program was written to increment and cycle the temperature in steps between predetermined initial and maximum values. At each step the thermal conductivity was measured after steady-state conditions were established. The rocks furnished by the Bureau of Mines were quarried in large and fairly homogeneous lots for use by researchers at various laboratories. To investigate any anisotropy, cores were taken from each rock cube perpendicular to each of the cube faces. Samples 2 in. in diameter and approx. 0.75 in. thick were prepared from the cores and were dried in a vacuum oven for at least one month prior to taking measurements.

3558 (PNL--2864) IDENTIFYING SUITABLE PIERCEMENT SALT DOMES FOR NUCLEAR WASTE STORAGE SITES. Kehle, R.J. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Aug 1980. Contract AC06-76RL01830. 46p. NTIS, PC A03/MF A01.
Piercement salt domes of the northern interior salt basins of the Gulf of Mexico are being considered as permanent storage sites for both nuclear and chemically toxic wastes. The suitable domes are stable and inactive, having reached their final evolutionary configuration at least 30 million years ago. They are buried to depths far below the level to which erosion will penetrate during the prescribed storage period and are not subject to possible future reactivation. The salt cores of these domes are themselves impermeable, permitting neither the entry nor exit of ground water or other unwanted materials. In part, a stable dome may be recognized by its present geometric configuration, but conclusive proof depends on establishing its evolutionary state. The evolutionary state of a dome is obtained by reconstructing the growth history of the dome as revealed by the configuration of sedimentary strata in a large area (commonly 3,000 square miles or more) surrounding the dome. A high quality, multifold CDP reflection seismic profile across a candidate dome will provide much of the necessary information when integrated with available subsurface control. Additional seismic profiles may be required to confirm an apparent configuration of the surrounding strata and an interpreted evolutionary history. High frequency seismic

data collected in the near vicinity of a dome are also needed as a supplement to the CDP data to permit accurate depiction of the configuration of shallow strata. Such data must be tied to shallow drill hole control to confirm the geologic age at which dome growth ceased. If it is determined that a dome reached a terminal configuration many millions of years ago, such a dome is incapable of reactivation and thus constitutes a stable storage site for nuclear wastes.

3559 (RHO-BWI-C--50) DETERMINATION OF BASALT PHYSICAL AND THERMAL PROPERTIES AT VARYING TEMPERATURES, PRESSURES, AND MOISTURE CONTENTS. FIRST PROGRESS REPORT, FISCAL YEAR 1979. Miller, R.J.; Bishop, R.C. (Colorado School of Mines, Golden (USA). Evacuation Engineering and Earth Mechanics Inst.). 26 Mar 1979. Contract EY-77-C-06-1030. 83p. Dep. NTIS, PC A05/MF A01.

This report is a summary of the rock mechanics testing done at the Earth Mechanics Institute of the Colorado School of Mines for Rockwell Hanford Operations under Subcontract SA-917. Cores were supplied from drill hole DC-6 on the Hanford Site, characterized geologically, and tested for thermal and physical properties for designing long-term underground storage of radioactive waste materials. This report presents the approved test procedures, results, and data analysis for this test series. Results indicated thermophysical properties similar to those of previously tested basalt cores from the Hanford area, but showed no significant trends; thus, generalizations are risky at this time. However, density was found to be a good guide to thermal and physical properties--higher density basalt cores showed significant improvements in physical and thermal properties.

3560 (RHO-BWI-C--54) DETERMINATION OF BASALT PHYSICAL AND THERMAL PROPERTIES AT VARYING TEMPERATURES, PRESSURES, AND MOISTURE CONTENTS. SECOND PROGRESS REPORT, FISCAL YEAR 1979. Miller, R.J. (Colorado School of Mines, Golden (USA). Evacuation Engineering and Earth Mechanics Inst.). 13 Aug 1979. Contract EY-77-C-06-1030. 80p. Dep. NTIS, PC A05/MF A01.

The rock mechanics testing performed at the Earth Mechanics Institute of the Colorado School of Mines for Rockwell Hanford Operations under Subcontract SA-917 is summarized. Cores were supplied from drill hole DC-8 on the Hanford Site, characterized geologically, and tested for thermal and physical properties for designing long-term underground storage of radioactive waste materials. This report presents the approved test procedures, results, and data analysis for this test series. Results indicate significantly lower strengths for drill hole DC-8 than determined for drill hole DC-6 or for the drill holes reported on in our fiscal year 1978 (FY 78) tests. Trends, however, were found to be similar between drill holes DC-6 and DC-8, and it is hoped more definitive conclusions can be found following completion of the final series of tests.

3561 (RHO-BWI-C--55) DETERMINATION OF BASALT PHYSICAL AND THERMAL PROPERTIES AT VARYING TEMPERATURES, PRESSURES, AND MOISTURE CONTENTS. THIRD PROGRESS REPORT, FISCAL YEAR 1979. Miller, R.J. (Colorado School of Mines, Golden (USA). Evacuation Engineering and Earth Mechanics Inst.). 31 Aug 1979. Contract EY-77-C-06-1030. 82p. Dep. NTIS, PC A05/MF A01.

The rock mechanics testing performed at the Earth Mechanics Institute of the Colorado School of Mines for Rockwell Hanford Operations under subcontract SA-917 is summarized. Cores were supplied from drill hole DC-4 on the Hanford Site, characterized geologically, and tested for thermal and physical properties for designing long-term underground storage of radioactive waste materials. The approved test procedures, results, and data analysis for this test series are presented. Uniaxial and triaxial results indicate strengths similar to drill hole DC-6, but significantly higher than drill hole DC-8. Trends with density, depth, confining pressure, and temperature, however, were similar for the three drill hole locations tested.

3562 (RHO-SA--93) COLUMBIA RIVER BASALT REFERENCE SAMPLE. Additon, M.K.; Seil, R.O. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Apr 1979. Contract EY-77-C-06-1030. 32p. (CONF-7904116--1). Dep. NTIS, PC A03/MF A01.

From Geological Society of America cordilleran section meeting; San Jose, CA, USA (10 Apr 1979).

A Columbia River Basalt reference sample, ARHCO-1, has been prepared for use as a standard in basalt research projects. Approximately 112 kg of basalt was collected from the Umatilla flow of the Columbia River Basalt Group at Finley Quarry, Washington (46°07'N, 119°02'W). The basalt sample was powdered, split, and randomly ordered. Analyses of major and minor oxides and trace elements were performed. Analysis of variance of the data shows that with few exceptions the sample is homogeneous at $F_{0.95}$.

3563 (SAND--79-1119) COMPRESSIBILITY OF GRANULATED ROCK SALT. Stinebaugh, R.E. (Sandia Labs., Albuquerque, NM (USA)). Aug 1979. Contract EY-76-C-04-0789. 75p. Dep. NTIS, PC A04/MF A01.

Crushed rock salt will be used extensively at the Waste Isolation Pilot Plant as a material for backfilling underground openings. This document addresses one of the characteristics of crushed salt which must be known to assess the consequences of its usage, namely, compressibility.

3564 (SAND--79-1546C) MATERIAL PROPERTIES OF ELEANA ARGILLITE: EXTRAPOLATION TO OTHER ARGILLACEOUS ROCKS, AND IMPLICATIONS FOR WASTE MANAGEMENT. Lappin, A.R.; Olsson, W.A. (Sandia Labs., Albuquerque, NM (USA)). 1979. Contract EY-76-C-04-0789. 36p. Dep. NTIS, PC A03/MF A01.

Results of a near-surface heater test in the Eleana argillite suggest the possibility that the high-temperature (> 100°C) thermomechanical response of argillaceous rocks to waste emplacement may be dominated by behavior of expandable clays. Enough expandable clay is probably present in most argillaceous rocks to cause a similar response. In situ thermal conductivities may be markedly reduced by even small amounts of clay contraction, compensated by opening of pre-existing joints. A simple model predicts that such opening behavior may continue to operate for disposal at considerable depths, though several factors affecting this depth remain poorly defined at present.

3565 (SAND--79-1773) PREDICTED TEMPERATURE/TIME HISTORIES RESULTING FROM THE BURIAL OF NUCLEAR WASTE CANISTERS IN BEDDED SALT.

George, O.L. Jr. (Sandia National Labs., Albuquerque, NM (USA)). Jul 1980. Contract AC04-76DP00789. 61p. NTIS, PC A04/MF A01.

This report provides computed thermal mappings for bedded salt surrounding canisters containing nuclear waste. This information can be used to study the possible migration of fluids within bedded salt under the influence of thermal gradients created by the heat-generating nuclear waste. The results presented were obtained from CINDA thermal models. Three different drift/canister configurations were modeled. The thermal conductivity of the salt was assumed to be temperature dependent while both the density and specific heat were assumed to be constant. Thermal power densities of 30, 75, and 150 kW/acre were examined with canister powers of 0.581 kW (51.6 canisters/acre), 3.5 kW (21.4 canisters/acre), and 3.5 kW (42.9 canisters/acre) at emplacement, respectively. These three cases resulted in maximum salt temperatures of 55°C, 117°C, and 176°C, respectively; and maximum thermal gradients of 15°C/m, -63°C/m, and -101°C/m, respectively. Computer-generated plots of temperature versus distance in horizontal planes at the top, midpoint, and bottom of the canister were made for several times after emplacement. Logarithmic or linear equations (whichever provided the better fit) were used to describe these curves. Derivatives of temperature with respect to distance were then taken and results of the form x(dT/dx) and dT/dx for the logarithmic and linear equations, respectively, were plotted against time. For the two cases where the waste thermal outputs decayed exponentially, it was found that x(dT/dx) and dT/dx were linear functions of time over a large period of years.

3566 (SAND--79-1853) CONSTITUTIVE MODEL FOR THE LOW TEMPERATURE CREEP OF SALT (WITH APPLICATION TO WIPP). Munson, D.E.; Dawson, P.R. (Sandia Labs., Albuquerque, NM (USA)). Oct 1979. Contract EY-76-C-04-0789. 47p. Dep. NTIS, PC A03/MF A01.

While numerous constitutive models have been proposed for the low temperature creep of salt, this work is the first to develop such a model within the framework of rate controlling mechanisms and the deformation-mechanism map. Use of this framework permitted unfolding of the rather complicated low temperature steady-state creep behavior into three simpler responses involving separate regimes with individual controlling mechanisms. The observed total creep rate obeys the rules of additive processes. The creep model incorporates primary (transient) creep as a simple two parameter modificaton to the steady-state creep equations. Application of the model is through a formulation into proper stress and strain measures for use in a large strain finite element code. Extensive analysis of available low-temperature triaxial creep data produced the appropriate material parameters, including activation energies and stress dependencies for the separate regimes. Material variations were observed to produce changes in absolute creep rate, without change in controlling mechanism. Numerous calculations demonstrate the adequacy of the model and numerical method to simulate the results of triaxial creep experiments on Southeastern New Mexico salt from the horizons proposed for the Waste Isolation Pilot Plant (WIPP).

3567 (SAND--79-2230) FAR-FIELD THERMOMECHANICAL RESPONSE OF ARGILLACEOUS ROCK TO EMPLACEMENT OF A NUCLEAR-WASTE REPOSITORY. McVey, D.F.; Thomas, R.K.; Lappin, A.R. (Sandia National Labs., Albuquerque, NM (USA)). Aug 1980. Contract AC04-76DP00789. 49p. NTIS, PC A03/MF A01.

Before heat-producing wastes can be emplaced safely in any argillaceous rock, it will be necessary to understand the far-field thermal and thermomechanical response of this rock to waste emplacement. This report presents the results of a first series of calculations aimed at estimating the far-field response of argillite to waste emplacement. Because the thermal and mechanical properties of argillite are affected by its content of expandable clay, its behavior is briefly compared and contrasted with that of a shale having the same matrix thermal properties, but containing no expandable clay. Under this assumption, modeled temperatures are the same for the two rock types at equivalent power densities and reflect the large dependence of in-situ temperatures on both initial power density and waste type. Thermomechanical calculations indicate that inclusion of contraction behavior of expandable clays in the assumed argillite thermal expansion behavior results, in some cases, in generation of a large zone in and near the repository that has undergone volumetric contraction but is surrounded by uniformly compressive stresses. Information available to date indicates that this contraction would likely result in locally increased fluid permeability and decreased in-situ thermal conductivity, but might well be advantageous as regards radionuclide retention, because of the increased surface area within the contracted zone. Assumption of continuous and positive expansion behavior for the shale eliminates the near-repository contraction and tensional zones, but results in near-surface tensional zones directly above the repository.

3568 (SAND--79-7030) CREEP BEHAVIOR OF BEDDED SALT FROM SOUTHEASTERN NEW MEXICO AT ELEVATED TEMPERATURE. Hansen, F.D.; Mellegard, K.D. (RE/SPEC, Inc., Rapid City, SD (USA)). Nov 1979. Contract EY-76-C-04-0789. 126p. Dep. NTIS, PC A07/MF A01.

Results of a series of triaxial creep experiments conducted on bedded salt specimens from ERDA Hole 9 in southeastern New Mexico are presented. The purpose of the experiments was to measure creep response of salt at temperatures of 24, 70, and 100°C under confinement pressures of 0, 1500, 2000, 2500, and 3000 psi and differential axial stress levles of 1500, 3000, 4500, and 6000 psi. Test durations ranged from 15 minutes to over 500 hours. The specimens, obtained by recording 4-in.-dia cores in the axial direction, were nominally two inches in diameter and four inches in length. The crystal size ranged from very small to one-half inch diameter; the specimens contained various amounts of clay impurities. A total of 19 specimens were prepared of which 14 were tested. The collected data included axial and lateral strain, axial and confinement stresses, time and temperature. Periodically, axial stress was adjusted to account for specimen strain in order to maintain a constant differential stress. Frequency of the stress correction was dependent on the rate of deformation; two or more corrections in a 24-hour period were typical. Data were automatically recorded with a printer, manually recoded from the print-out to punched cards and reduced by means of a computer. A preponderance of the data was collected in the transient creep regime. In some tests specimen rupture occurred, while in others an accelerating creep rate brought the specimen in contact with the pressure vessel wall. Aslo, a considerable amount of data was collected during stress application to creep stress level.

3569 (SAND--79-7045) TRIAXIAL QUASI-STATIC COMPRESSION AND CREEP BEHAVIOR OF BEDDED SALT FROM SOUTHEASTERN NEW MEXICO. Hansen, F.D. (RE/SPEC, Inc., Rapid City, SD (USA)). Nov 1979. Contract EY-76-C-04-0789. 131p. Dep. NTIS, PC A07/MF A01.

This report summarizes the results obtained from a series of triaxial quasi-static compression and creep tests on specimens of bedded salt recovered at depth intervals of 1953 to 1954 and 2711 to 2722 feet in AEC Hole No. 7 in southeastern New Mexico. The primary objective was the determination of the deformational characteristics of the salt for prescribed stress and temperature states under quasi-static and time-dependent conditions. The test conditions encompassed confining pressures of 500 and 2000 psi, differential axial stresses of 1500, 3000 and 4500 psi, temperatures of 23 and 100°C, and time durations of several hours to ten days. The data analysis was confined primarily to power law fits to the creep strain-time measurements and to an evaluation of the principal strain ratio behavior for the various test conditions and axial strain magnitudes.

3570 (SAND--80-0769) THERMAL CONDUCTIVITY OF SILICIC TUFFS: PREDICTIVE FORMALISM AND COMPARISON WITH PRELIMINARY EXPERIMENTAL RESULTS. Lappin, A. R. (Sandia Labs., Albuquerque, NM (USA)). Jul 1980. Contract AC04-76DP00789. 50p. NTIS, PC A04/MF A01.

Performance of both near- and far-field thermomechanical calculations to assess the feasibility of waste disposal in silicic tuffs requires a formalism for predicting thermal conductivity of a broad range of tuffs. This report summarizes the available thermal conductivity data for silicate phases that occur in tuffs and describes several grain-density and conductivity trends which may be expected to result from post-emplacement alteration. A bounding curve is drawn that predicts the minimum theoretical matrix (zero-porosity) conductivity for most tuffs as a function of grain density. Comparison of experimental results with this curve shows that experimental conductivities are consistently lower at any given grain density. Use of the lowered bounding curve and an effective gas conductivity of 0.12 W/m°C allows conservative prediction of conductivity for a broad range of tuff types. For the samples measured here, use of the predictive curve allows estimation of conductivity to within 15% or better, with one exception. Application and possible improvement of the formalism are also discussed.

3571 (UCRL--15117) GEOMECHANICS OF BEDDED SALT. Serata, S.; Milnor, S.W. (Serata Geomechanics, Inc., Berkeley, CA (USA)). 8 Jun 1979. Contract W-7405-ENG-48. 103p. Dep. NTIS, PC A06/MF A01.

Creep data from the literature search is reinterpreted by SGI, resulting in a better understanding of the temperature and stress state dependence of the octahedral creep rate and the octahedral shear strength. The concept of a transition strength between the elastic and the plastic states is in agreement with the data. The elastic and rheological properties of salt are described, and a set of constitutive equations is presented. The dependence of material properties on parameters such as temperature is considered. Findings on the permeability of salt are summarized, and the in-situ behavior of openings in bedded salt is described based on extensive engineering experience. A stress measuring system utilizing a finite element computer code is discussed. Geological factors affecting the stability of salt openings are considered, and the Stress Control Technique for designing stable openings in bedded salt formations is explained.

3572 (UCRL--15149) HYDROLOGIC PROPERTIES OF SHALE AND RELATED ARGILLACEOUS ROCKS. Moiseyev, A.N. (California State Univ., Hayward (USA). Dept. of Geological Sciences). 15 Nov 1979. Contract W-7405-ENG-48. 175p. Dep. NTIS, PC A08/MF A01.

This report is the result of a bibliographic study designed primarily to collect hydrologic data on American clay-rich rocks. The following information was also sought: stratigraphy, environment of deposition, mineralogic composition, and diagenetic changes. The collected numerical data are presented in tables which contain densities, porosities, and/or hydraulic conductivities of approximately 360 samples. Additional data include hydraulic diffusivities, resistivities, flow rates, and rock strengths. Geologic information suggests that large deposits of shale which may be suited for waste repository belong to all ages and were formed in both marine and continental environments. Of the studied units, the most promising are Paleozoic in the eastern half of the country, Mesozoic in the central part, and Cenozoic in the Gulf Coast area and the West. Less widespread units locally present some additional possibilities. Mineralogic investigations suggest that the smectite content in rocks shows a decrease in time (70% in Recent rocks; 35% in pre-Mesozoic rocks). Because of this predominance of smectite in younger rocks, the modeling of repositories in post-Paleozoic formations might require knowledge of additional and poorly known parameters. Results of investigations into the mathematical relationships between porosity and permeability (or hydralic conductivity) suggest that in situ permeabilities could be estimated from sonic logs and fluid pressure changes at depth. 16 figures, 8 tables.

3573 MECHANICAL BEHAVIOR OF NEW MEXICO ROCK SALT IN TRIAXIAL COMPRESSION UP TO 200 °C. Wawersik, W.R.; Hannum, D.W. (Sandia Laboratories, Albuquerque, New Mexico 87185). Journal of Geophysical Research ; 85: No. B2, 891-900(10 Feb 1980).

Experiments were conducted to determine the 'quasi-static' mechanical behavior of rock salt in support of the structural design of a waste isolation pilot plant. The salt studied was from the Salado formation in the Delaware Basin, southeastern New Mexico. Three groups of tests are discussed to identify the relative and site-specific importance of deviator stress, confining pressure (mean stress), temperature, time (loading rate), and stress path. The three groups of experiments consist of (1) hydrostatic loading, (2) triaxial compression tests ($\sigma_1 > \sigma_2 = \sigma_3 = \text{const}$), and (3) variables stress path tests including experients at approximately constant σ_1 and at constant mean stress. The range of parameters considered was $0 < p$ (hydrostatic pressure) ≤ 34.5 MPa, $0 < \sigma_2 = \sigma_3 \leq 20.7$ MPa, $0 < (\sigma_1 - \sigma_3) \leq 62$ MPa, $23 < T$ (temperature) ≤ 200 °C, and $1.7 < d(\sigma_1 - \sigma_3)/dt \leq 3.5$ kPa/s. All data were generated on 100-mm-diameter specimens. The rock salt exhibited nonlinear response under all loading conditions, a low initial elastic limit ($\sigma_1 - \sigma_3 \leq 0.7$ MPa, and an apparent inseparability of permanent deformations into time-independent and time-dependent components. Pressure and temperature did not alter the elastic constants

over the range 29.6< or =E< or =36.5 GPa and 0.17< or =ν< or =0.26, depending on core lithology. Pressure and temperature affected the principal strain ratio, the ratio of volumetric to shear strain, rock salt ductility, and the ultimate stress. In particular, low pressure and temperature permitted pronounced dilatancy and loss in load bearing ability. Under such conditions the volumetric strains reached sizeable fractions of the shear strains, vertical-barepsilon/ (epsilon$_1$-epsilon$_3$) vertical-bar> or =0.2.

3574 PROPOSED APPLICATIONS OF NQR TECHNIQUES TO THE GEOSCIENCES. Marino, R.A. (Hunter Coll., New York (USA). Dept. of Physics); Wenk, H.R. (California Univ., Berkeley (USA). Dept. of Geology and Geophysics); Apps, J.A.; Klainer, S.M. (California Univ., Berkely (USA). Geosciences Group). Journal of Molecular Structure ; 58: 445-457(Jan 1980).

Many energy-related areas such as nuclear waste isolation, continental drilling, fossil fuel recovery, and geothermal energy are directly associated with an in-depth understanding of the earth sciences. Of particular interest is the development of analytical techniques which can augment existing ones in developing a better understanding of mineralogy. Nuclear quadrupole resonance (NQR) spectroscopy offers the potential for being able to obtain accurate high resolution spectra. These can then be interpreted to give structural information which can be related to local electronic structure, atomic arrangement, order/disorder phenomena, and crystal phase transformation. In addition, molecular dynamics in the solid state can be studied. Furthermmore, since NQR data are sensitive to changes in temperature and pressure, there is the possibility of obtaining stress/ strain information. Given the role of aluminum in the architecture of the rock-forming minerals in the earth's crust, aluminum-27 (100% abundance, I = 5/2) is easily shown to be the most generally useful NQR probe nucleus. Initial studies will be performed on the plagioclase mineral suite, already well characterized by x-ray and by single crystal NMR studies. The anticipated instrumental difficulties and likely solutions to the problem of efficient detection of aluminum-27 NQR will be discussed.

3575 DETERMINATION OF THE LOCATION OF FRACTURES IN METAMORPHIC ROCK WITH IN-HOLE TRACERS. Marine, I.W. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). pp 85-96 of Low flow, low-permeability measurements in largely impermeable rocks. Paris, France; OECD (1979).

From Workshop on Low-Flow Low permeability measurements in Langley Impermeable rocks; Paris, France (19 Mar 1979).

A detailed investigation of the geohydrology of slightly fractured metamorphic rock by means of exploratory boreholes involves three steps; first, determining the exact location and character of the fractures penetrated by exploratory boreholes; second, determinating the nature and connectivity of fractures between boreholes; third, determining the hydraulic parameters. This paper describes methods of determining the first of these, including core inspection, geophysical logs, packer tests, in-hole tracer tests, and dry drilling. Emphasis is given to the in-hole tacer tests by using an example from an investigation of slightly fractured metamorphic rock at the Savannah River Plant near Aiken, South Carolina, U.S.A.

3576 PERMEABILITY CHRACTERIZATION OF NEARLY IMPERMEABLE ROCK MASSES FOR NUCLEAR WASTE REPOSITORY SITING. Wilson, C.R.; Doe, T.W.; Long, J.C.S.; Witherspoon, P.A. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). pp 13-29 of Low flow, low-permeability measurements in largely impermeable rocks. Paris, France; OECD (1979).

From Workshop on Low-Flow Low permeability measurements in Langley Impermeable rocks; Paris, France (19 Mar 1979).

Characterization of the deep geologic formations now being considered for disposal of long lived radioactive waste requires the development of a wide range of tools for measurement and interpretation of very low permeabilities. A methodology is presented in this paper for measuring such low permeabilities and interpreting the results in terms of the regional hydrology. Small-scale tests on single fractures are proposed to statistically identify the geometrical parameters required for risk analysis of repository safety. Large-scale tests over large volumes of rock containing many fractures should also be conducted to provide direct information on regional permeabilities and to provide a verification of permeabilities inferred from the small-scale tests.

3577 CRITICAL REVIEW OF THE METHODS OF DETERMINING THE THERMAL CONDUCTIVITY OF ROCKS. Patnaik, N.K.; Singh, R.D. (Indian Sch of Mines, Dhanbad). Journal of Mines, Metals and Fuels ; 26: No. 8, 274-282(Aug 1978).

This concluding part critically examines two field (in situ) methods of determining the thermal conductivity of rocks. These probe methods were developed by Hopper and Lepper and the U.S. Bureau of Mines. Associated equipment and instruments are also discussed. It is concluded that, although the field in situ methods give results which very closely correspond to the conductivity values of rocks in their in situ condition, there still remains a pressing need for laboratory determinations. This is particularly true in the case of unworked and virgin mining areas.

3578 NATURAL ZEOLITES: OCCURRENCE, PROPERTIES, AND USE. Sand, L.B.; Mumpton, F.A. (eds.). Elmsford, NY; Pergamon Press, Inc. (1978). 557p. (CONF-760626--(Exc.)).

From Zeolite conference; Tucson, AZ, USA (6 Jun 1976).

This volume consists of papers selected from those presented at ZEOLITE '76, an international conference on the occurrence, properties, and utilization of natural zeolites. The objective is to serve as a useful, basic reference in the field of natural zeolites. Topics covered include crystal structure and mineralogy, geology and occurrences, physical and chemical properties, and applications. (ACR)

Geochemistry

3579 ION-EXCHANGE EQUILIBRIA BETWEEN MONTMORILLONITE AND SOLUTIONS OF MODERATE-TO-HIGH IONIC STRENGTH. Shiao, S.Y. (Oak Ridge National Lab., TN); Rafferty, P.; Meyer, R.E.; Rogers, W.J. ACS (American Chemical Society) Symposium Series ; No. 100, 297-324(1979).

Prediction of the migration rates of ions in geologic formations is of extreme importance in the fields of nuclear waste disposal and enhanced oil recovery. In order to accumulate a systematic body of information pertinent to

interest on minerals typical of classes, from a wide range of aqueous solution compositions. Initially, montmorillonite was selected for attention because its high adsorptive capacity for ions may cause it to dominate the adsorptive proportion of the formation in which it is present. Reported here are distribution coefficients of alkali metal and alkaline earth ions, and of one rare earth, between montmorillonite predominantly in the sodium and calcium forms and aqueous solutions of controlled pH, at moderate to high salinities (> 0.01 M NaCl).

Oceanography

3580 (IOS-Rep--77) OCEANOGRAPHY RELATED TO DEEP SEA WASTE DISPOSAL. A SURVEY COMMISSIONED BY THE DEPARTMENT OF THE ENVIRONMENT. (Institute of Oceanograhic Sciences, Godalming (UK)). Sep 1978. 254p. NTIS (US Sales Only), PC A12/MF A01/ Available on loan from the British Library Lending Div., Boston Spa.

In connection with studies on the feasibility of the safe disposal of radioactive waste, from a large scale nuclear power programme, either on the bed of the deep ocean or within the deep ocean bed, preparation of the present document was commissioned by the (United Kingdom) Department of the Environment. It attempts (a) to summarize the present state of knowledge of the deep ocean environment relevant to the disposal options and assess the processes which could aid or hinder dispersal of material released from its container; (b) to identify areas of research in which more work is needed before the safety of disposal on, or beneath, the ocean bed can be assessed; and (c) to indicate which areas of research can or should be undertaken by British scientists. The programmes of international cooperation in this field are discussed. The report is divided into four chapters dealing respectively with geology and geophysics, geochemistry, physical oceanography and marine biology.

3581 (PNL--2851, pp IX.1-IX.8) SEA LEVEL REPORT. Schwartz, M.L. (Western Washington Univ., Bellingham). Nov 1979.

Summary of FY-1978 consultation input for Scenario Methodology Development.

Study of Cenozoic Era sea levels shows a continual lowering of sea level through the Tertiary Period. This overall drop in sea level accompanied the Pleistocene Epoch glacio-eustatic fluctuations. The considerable change of Pleistocene Epoch sea level is most directly attributable to the glacio-eustatic factor, with a time span of 10^5 years and an amplitude or range of approximately 200 m. The lowering of sea level since the end of the Cretaceous Period is attributed to subsidence and mid-ocean ridges. The maximum rate for sea level change is 4 cm/y. At present, mean sea level is rising at about 3 to 4 mm/y. Glacio-eustacy and tectono-eustacy are the parameters for predicting sea level changes in the next 1 my. Glacio-eustatic sea level changes may be projected on the basis of the Milankovitch Theory. Predictions about tectono-eustatic sea level changes, however, involve predictions about future tectonic activity and are therefore somewhat difficult to make. Coastal erosion and sedimentation are affected by changes in sea level. Erosion rates for soft sediments may be as much as 50 m/y. The maximum sedimentation accumulation rate is 20 m/100 y.

FUSION ENERGY

3582 (ASA-ZE--09/78) NUCLEAR PRIMARY ENERGY CARRIERS. PT. 2. ENERGY FROM NUCLEAR FUSION. (Arbeitsgemeinschaft der Grossforschungseinrichtungen, Koeln (Germany, F.R.). Programmleitung Angewandte Systemanalyse; Max-Planck-Institut fuer Plasmaphysik, Garching (Germany, F.R.)). Apr 1978. 269p. (In German). Dep. NTIS (US Sales Only), PC A13/MF A01.

A very brief presentation of the elementary fusion reactions, the energies delivered by them and the most basic energy balances leading to Lawson-type diagrams are given. The report estimates reserves and cost of lithium and deuterium, gives estimates of the total available for DT fusion and comments on production technology, availability and handling of the fuels. A survey is given of the different concepts of magnetic confinement (stellarators, tokamaks, toroidal pinches, mirror machines, two-component plasmas), of confinement by walls, gas blankets, and imploding liners and, finally, of the concepts of inertial confinement (laser fusion, beam fusion). The reactors designed or outlined on the basis of the tokamak, high-β, mirror, and laser fusion concepts are presented, which is followed by a discussion of the key problems of fusion power plants. The main requirements on superconducting magnet system for possible fusion reactors, particularly tokamak reactors, are discussed and compared with the present state of the superconducting magent technology. The present-day knowledge of the cost structure of fusion power plants and the sensitivity of this structure with respect to the physical and technical assumptions made is analyzed. Finally the aspects of safety and environment are treated. The problems discussed include the hazard potentials of different designs (radiological, toxicological, and with respect to stored energies), release of radioactivity, possible kinds of malfunctioning, and the environmental impact of waste heat, radiation and radioactive waste.

3583 (INIS-mf--5173) NUCLEAR FUSION. ANOTHER CHOICE FOR SOLVING THE ENERGY PROBLEM IN THE LONG RUN. AN ANALYSIS OF THERMONUCLEAR REACTOR CONCEPTS AND A NUMBER OF SELECTED FUSION EXPERIMENTS. Huber, H. (Mannheim Univ. (Germany, F.R.). Inst. fuer Physikalische and Chemische Technologie). 1978. 383p. (In German). Dep. NTIS (US Sales Only), PC A18/MF A01.

Diploma thesis.

A comprehensive survey is presented of the present state of knowledge in nuclear fusion research. In the first part, potential thermonuclear reactions, basic energy balances of the plasma (Lawson criterion), and the main criteria to be observed in the selection of appropriate thermonuclear reactions are dealt with. This is followed by a discussion of the problems encountered in plasma physics (plasma confinement and heating, transport processes, plasma impurities, plasma instabilities and plasma diagnostics) and by a consideration of the materials problems involved, such as material of the first wall, fuel inlet and outlet, magnetic field generation, as well as repair work and in-service inspections. Two main methods have been developed to tackle these problems: reactor concepts using the magnetic pinch (stellarator, Tokamak, High-Beta reactors, mirror machines) on the one hand, and the other concept using the inertial confinement (laser fusion reactor). These two approaches and their specific problems as well as past, present and future fusion experiments are treated in detail. The last part of the

work is devoted to safety and environmental aspects of the potential thermonuclear aspects of the potential thermonuclear reactor, discussing such problems as fusion-specific hazards, normal operation and potential hazards, reactor incidents, environmental pollution by thermal effluents, radiological pollution, radioactive wastes and their disposal, and siting problems.

Fusion Power Plant Technology

Tritium Processing, Environment and Safety

3584 (JAERI-M--7582) INDUCED ACTIVITIES OF FUSION REACTOR STRUCTURAL MATERIALS. Iida, H.; Seki, Y. (Japan Atomic Energy Research Inst., Tokyo). Mar 1978. 32p. (In Japanese). Dep. NTIS (US Sales Only), PC A03/MF A01.

Induced activity, biological hazard potential and decay heat of the JAERI Demonstration Fusion Reactor (JDFR) with molybdenum alloy as a blanket structural material and gamma-ray dose rates in and around the reactor after shutdown are calculated. Induced activities of other blanket materials, tantalum and tungsten used in molybdenum alloy, other fusion-reactor structural materials and impurities are also calculated to examine effects of the gamma-ray dose rates in reactor design. The quantities of radioactive wastes from JDFR and JAERI Experimental Fusion Reactor (JXFR) are estimated.

3585 REDUCTION IN THE TOXICITY OF FISSION PRODUCT WASTES THROUGH TRANSMUTATION WITH DEUTERIUM-TRITIUM FUSION NEUTRONS. Parish, T.A. (Texas A and M Univ., College, Station); Davidson, J.W. Nuclear Technology ; 47: No. 2, 324-342(Feb 1980).

A waste management concept that employs irradiation of fission products in fusion reactor blankets is evaluated. The purpose of the irradiation is to reduce the toxicity of the material to be committed to geologic disposal. Target isotopes included ^{90}Sr, ^{137}Cs, ^{129}I, ^{99}Tc, ^{135}Cs, and ^{93}Zr. The n,γ), n,2n), (n,3n), (n,p), (nα), (n,d), (n,t), and (n,nα) reactions were all considered to contribute to the transmutation process. Extensive chains were employed in the depletion calculations performed to quantify the toxicity of the products. A sharp reduction in the short-term toxicity by a factor of 100 or more appears achievable, but should not be pursued unless the toxicity of the actinide wastes can also be substantially reduced.

3586 THERMONUCLEAR REACTORS AND THEIR ENVIRONMENTAL IMPACT. Petr, I. (Ceske Vysoke Uceni Technicke, Prague (Czechoslovakia). Fakulta Jaderna a Fysikalne Inzenyrska). Radioisotopy ; 20: No. 3, 343-377(Jun 1979). (In Czech).

Some of the existing principles of fusion reaction control and their comparison, technical problems connected with the development of fusion reactors and estimated environmental impact of fusion reactors are discussed. Attention is paid to possible tritium leakage, the activation of structural materials and emergency situations in fusion reactors. Non-radiation effects due to the operation of fusion reactors are also discussed. A comparison of operation and environmental impacts of light-water reactors, fast breeder reactors and fusion reactors to the environment is given.

Inertial Confinement Technology

3587 (BNL--27118) HYPER FUSE: A NOVEL INERTIAL CONFINEMENT SYSTEM UTILIZING HYPERVELOCITY PROJECTILES FOR FUSION ENERGY PRODUCTION AND FISSION WASTE TRANSMUTATION. Makowitz, H.; Powell, J.R.; Wiswall, R. (Brookhaven National Lab., Upton, NY (USA)). 1979. Contract EY-76-C-02-0016. 16p. (CONF-791204--22). Dep. NTIS, PC A02/MF A01.

From 2. Miami international conference on alternative energy sources; Miami Beach, FL, USA (10 Dec 1979).

Parametric system studies of an inertial confinement fusion (ICF) reactor system to transmute fission products from an LWR economy have been carried out. The ICF reactors would produce net power in addition to transmuting fission products. The particular ICF concept examined is an impact fusion approach termed HYPERFUSE, in which hypervelocity pellets, traveling on the order of 100 to 300 km/sec, collide with a target in a reactor chamber and initiate a thermonuclear reaction. The DT fusion fuel is contained in a shell of the material to be transmuted, e.g., ^{137}Cs or ^{90}Sr. The 14 MeV fusion neutrons released during the pellet burn cause transmutation reactions [e.g., (n, 2n), (n, α), etc.] that convert the long lived fission products (FP's) either to stable products or to species that decay with a short half-life to a stable product.

OTHER

3588 (AAEC/PR--44D) NUCLEAR SCIENCE AND TECHNOLOGY BRANCH REPORT 1977. DIVISIONAL RESEARCH. (Australian Atomic Energy Commission Research Establishment, Lucas Heights). Dec 1977. 28p. Dep. NTIS (US Sales Only), PC A03/MF A01.

Research programs are reported for the following divisions: Physics, Chemical Technology, Materials, Engineering Research, Isotopes, Instrumentation and Control, Health Physics Research and Applied Maths and Computing. Staff responsible for each project are indicated.

3589 (AD-A--076168) THE U.S. ARMY RADON TEAM: ORGANIZATION, CAPABILITIES AND RESOURCES. FINAL REPORT. Rigotti, D.L. (Army Armament Research and Development Command, Aberdeen Proving Ground, MD (USA). Ballistics Research Lab.). Sep 1979. 131p. NTIS, PC A07/MF A01.

This report is intended to acquaint the reader with what the RADCON Teams are, how they operate, how they are presently constituted and their overall capabilities. Information on how the teams maintain the required readiness posture is also presented. Finally the various emergencies in which the RADCON Team has been involved over the past twenty years are described and the unique capabilities that the team possesses beyond that required by pertinent regulations are highlighted.

3590 (AERE-M--3063) ENHANCED DIFFUSION AND RELATED PHENOMENA IN SOLIDS CONTAINING ACTIVE SPECIES. Stoneham, A.M. (UKAEA Atomic Energy Research Establishment, Harwell. Theoretical Physics Div.). Jan 1980. 13p. NTIS (US Sales Only), PC A02/MF A01.

Much recent work on semiconductors has shown that diffusion and related processes can be vastly enhanced by the presence of free carriers (i.e. electrons and holes). In some

cases quite different mechanisms take over. This note discusses two possible effects of ionisation in waste-disposal glasses, namely (1) the enhanced motion of alkalis by changes of charge state and (2) enhanced segregation through ionisation-induced electric fields near surfaces and interfaces. Both appear to be unimportant for the activity levels expected for HARVEST glasses.

3591 (CEA-CONF--4493) CALCULATION OF GAMMA-RAYS AND FAST NEUTRONS FLUXES WITH THE PROGRAM MERCURE-4. Baur, A.; Dupont, C.; Totth, B. (CEA Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-les-Durance (France). Dept. des Reacteurs a Eau). 1978. 37p. (CONF-7811158--1). NTIS (US Sales Only), PC A03/MF A01.

From Ispra courses on radiation shielding methods; Varese, Italy (20 Nov 1978).

The program MERCURE-4 evaluates gamma ray or fast neutron attenuation, through laminated or bulky three-dimensionnal shields. The method used is that of line of sight point attenuation kernel, the scattered rays being taken into account by means of build-up factors for γ and removal cross sections for fast neutrons. The integration of the point kernel over the range of sources distributed in space and energy, is performed by the Monte-Carlo method, with an automatic adjustment of the importance functions. Since it is operationnal the program MERCURE-4 has been intensively used for many various problems, for example: - the calculation of gamma heating in reactor cores, control rods and shielding screens, as well as in experimental devices and irradiation loops; - the evaluation of fast neutron fluxes and corresponding damage in structural materials of reactors (vessel steels...); - the estimation of gamma dose rates on nuclear instrumentation in the reactors, around the reactor circuits and around spent fuel shipping casks.

3592 (CEGB-RD/B/N--4668) METHOD FOR ASSESSING THE ANNUAL DOSE TO THE MOST EXPOSED INDIVIDUAL FROM TRITIUM AND ^{14}C REACTOR DISCHARGES TO ATMOSPHERE. Nair, S. (Central Electricity Generating Board, Berkeley (UK). Berkeley Nuclear Labs.). Oct 1979. 67p. NTIS (US Sales Only), PC A04/MF A01.

A method is described for assessing the annual dose to the most exposed individual from routine releases of tritium and ^{14}C to the atmosphere during normal reactor operations. A detailed assessment has been made of the resulting equilibrium contamination levels in a range of foodstuffs typical of an average UK diet and of the annual doses resulting from a chronic intake of tritium and ^{14}C via inhalation, ingestion and, additionally, in the case of tritium, via skin absorption. Equilibrium annual doses from the global circulation of tritium and ^{14}C have also been calculated. Upper limits to the effective annual dose-equivalents to the most exposed individual were found to be 0.6 rem.yr^{-1} and 100 rem.yr^{-1} per Ci.yr^{-1} release of tritium and ^{14}C respectively, with the ingestion pathway contributing significantly to the overall exposure. The most exposed individual was found to be a Reference 10 year old child. The methods outlined for calculating the ingestion dose from tritium and ^{14}C releases hav been incorporated into the more generally applicable code FOODDOSE. The code may be used to make more realistic dose calculations to the individuals based on site-specific surveys of variables such as local meteorology, local diet and local land use for agriculture, which may lead to doses smaller than the upper limit values quoted by factors of 20 and 200 for tritium and ^{14}C respectively.

3593 (CEGB-RD/B/N--4686) USER'S GUIDE TO THE POPDOS2 PROGRAM FOR EVALUATING COLLECTIVE DOSES. Merlin, J.H.; Henning, M.J. (Central Electricity Generating Board, Berkeley (UK). Berkeley Nuclear Labs.). Aug 1979. 49p. NTIS (US Sales Only), PC A03/MF A01.

This report contains details for using the computer program POPDOS2, which will calculate collective doses to any specified area of England, Scotland and Wales, either to the total population or to any one of six age groups, due to an atmospheric release of radioactivity. Details are given of all the input data and job control language required for running POPDOS2, and also the program CONTOUR, which when run in conjunction with POPDOS2, produces a collective dose surface using the graph plotting facility. A complete test case is included, together with listings of the POPDOS2 subroutines and of the major variables used. POPDOS2 and CONTOUR are written in Fortran IV (level H) and compiled under OPT=2 using the IBM 370/168 compiler.

3594 (CONF-780110--, pp 329-362) THE MONITORING SYSTEM OF THE TRITIUM RESEARCH LABORATORY, SANDIA LABORATORIES, LIVERMORE, CALIFORNIA. Hafner, R.S.; Westfall, D.L.; Ristau, R.D. 1978.

From 11. symposium on radiation instrumentation; San Diego, CA, USA (17 Jan 1978).

Computerized tritium monitoring is now in use at the Tritium Research Laboratory (TRL). Betatec 100 tritium monitors, along with several Sandia designed accessories, have been combined with a PDP 11/40 computer to provide maximum personnel and environmental protection. Each individual monitoring system, in addition to a local display in the area of interest, has a visual/audible display in the control room. Each system is then channeled into the PDP 11/40 computer, providing immediate assessment of the status of the entire laboratory from a central location. Measurement capability ranges from uCi/m^3 levels for room air monitoring to KCi/m^3 levels for glove box and process system monitoring. The overall monitoring system and its capabilities will be presented.

3595 (CONF-780110--, pp 203-215) ATOMIC ENERGY OF CANADA LIMITED MONITORING TRITIATED WATER IN AIR AND WATER EFFLUENTS. Osborne, R.V.; Tepley, N.W. (Chalk River Nuclear Lab., Ontario). 1978.

From 11. symposium on radiation instrumentation; San Diego, CA, USA (17 Jan 1978).

Current on-line methods of monitoring effluents for tritium (as tritiated water, HTO) measure concentrations in air above 250 nCi/m^3 (approx. 10 kBq/m^3) and in water above 1 uCi/kg (approx. 40 kBq/kg). Some of the problems encountered in such monitoring are the presence of fission and activation products in the effluents and, particularly in water monitoring, the often dirty quality of the sample. In a new design of monitor, HTO is collected directly from air by a flow of liquid scintillator (LS). For water monitoring a flow of air continuously samples the water and transports HTO to the LS. The key features of the new design are that the high detection efficiency of LS is realizable, that the rate of use of LS is only approx. 2 mm^3/s, that the controlled evaporation and metering of air provides the low flow of HTO needed for mixing with LS, and that accurate metering of a dirty effluent is not needed. The sensitivities for

detecing tritium on-line are improved by at least an order of magnitude.

3596 (CONF-790923--8) DECOMMISIONING PLAN FOR PARTICLE ACCELERATORS. Opelka, J.H.; Kikta, M.J.; Marmer, G.J.; Mundis, R.L.; Peterson, J.M.; Siskind, B. (Argonne National Lab., IL (USA)). 1979. Contract W-31-109-ENG-38. 16p. Dep. NTIS, PC A02/MF A01.
From Decontamination and decommissioning of nuclear facilities conference; Sun Valley, ID, USA (16 Sep 1979).
An assessment of the magnitude of the problem presented by the decommissioning of particle accelerator facilities is given. The history of past decommissionings is reviewed with regard to technological, environmental, health, and economic aspects. Development of a generalized plan for accelerator decommissioning is discussed. (GHT)

3597 (CONF-790977--1) GENETIC RISKS FROM RADIATION: RECENT ASSESSMENTS BY THE BEIR AND UNSCEAR COMMITTEES AND SUGGESTIONS AS TO HOW FUTURE RESEARCH CAN IMPROVE SUCH ESTIMATES. Selby, P.B. (Oak Ridge National Lab., TN (USA)). 1979. Contract W-7405-ENG-26. 11p. Dep. NTIS, PC A02/MF A01.
From Conference on health effects of energy production; Ontario, Canada (12 Sep 1979).
Recently two widely-recognized committees, namely the UNSCEAR and BEIR Committees, have reevaluated their estimates of genetic risks from radiation. Their estimates for gene mutations are based on two different approaches, one being the doubling-dose approach and the other being a new direct approach based on an empirical determination of the amount of dominant induced damage in the skeletons of mice in the first generation following irradiation. The estimates made by these committees are in reasonably good agreement and suggest that the genetic risks from present exposures resulting from nuclear power production are small. There is room for much improvement in the reliability of the risk estimates. The relatively new approach of measuring the amount of induced damage to the mouse skeleton shows great promise of improving knowledge about how changes in the mutation frequency affect the incidence of genetic disorders. Such findings may have considerable influence on genetic risk estimates for radiation and on the development of risk estimates for other less-well-understood environmental mutagens.

3598 (CONF-800392--1) RADIOACTIVITY IN MAN: LEVELS, EFFECTS AND UNKNOWNS. Rundo, J. (Argonne National Lab., IL (USA)). 1980. Contract W-31-109-ENG-38. 16p. NTIS, PC A02/MF A01.
From Public meeting on federal research into biological effects of ionizing radiation; Bethesda, MD, USA (10 Mar 1980).
The report discusses the potential for significant human exposure to internal radiation. Sources of radiation considered include background radiation, fallout, reactor accidents, radioactive waste, and occupational exposure to various radioisotopes. (ACR)

3599 (CS-INIS--258, pp 119-124) TOXICITY OF WASTE WATER FROM URANIUM ORE MINING AND PROCESSING. Justyn, J. (Vyzkumny Ustav Vodohospodarsky, Prague (Czechoslovakia)). Sep 1978. (In Czech).
From 9. national conference on radionuclides and ionizing radiation in water management; Liberec, Czechoslovakia (28 Sep 1978).
Some results are given of the observations made of waste waters from uranium ore mining and processing. Cu, Fe, Pb, Al, Ni, Ba, Zn, NH_3 were found in decontaminated waste waters discharged into surface waters in concentrations toxic for various species of aquatic organisms. The maximum permissible concentration or uranium for surface waters in Czechoslovakia is 0.1 mg/l which practically excludes toxic effects on aquatic organisms. The radiation effects of uranium in such concentrations are negligible. The concentration was also studied of ^{226}Ra and ^{210}Po which in association with natural radionuclides in the water may accumulate radiation doses dangerous for aquatic organisms. This value was determined for both radioisotopes at 0.5 Bq/l. The obtained results are discussed against data published in foreign literature.

3600 (CS-INIS--258, pp 1-7) ASSESSMENT OF RADIONUCLIDES IN WATERS WITH RESPECT TO RADIATION PROTECTION OF POPULATION. Kunz, E. (Institut Hygieny a Epidemiologie, Prague (Czechoslovakia)). Sep 1978. (In Czech).
From 9. national conference on radionuclides and ionizing radiation in water management; Liberec, Czechoslovakia (28 Sep 1978).
Factors affecting dose reduction are discussed with respect to the ICRP 1977 recommendation on population radiation protection. The dose reduction system uses two principles, viz., all necessary exposures should be as low as is reasonably attainable from the economic and social points of view, and the dose equivalent in individuals should not exceed the limits set for the given exposure type. Attention is devoted to the assessment of radionuclides in waters. Two methods are pursued, ie., measures aimed at reducing radioactive material content in water, ie., waste water control prior to discharge, and measures aimed at radioactive material trapping or at choosing alternative sources with a lower radioactive material content.

3601 (DOE/EIS--0018) FINAL ENVIRONMENTAL IMPACT STATEMENT. LOS ALAMOS SCIENTIFIC LABORATORY SITE, LOS ALAMOS, NEW MEXICO. (Department of Energy, Washington, DC (USA)). Dec 1979. 627p. Dep. NTIS, PC A99/MF A01.
The statement assesses the potential cumulative environmental impacts associated with current, known future, and continuing activities at the Los Alamos Scientific Laboratory (LASL) site. This includes the adverse impacts from postulated accidents associated with the activities. Various effluents including radioactive ones are released to the environment. However, a continuing, comprehensive, monitoring program is carried out to assist in the control of hazardous effluents. Alternatives considered to current operation of LASL include: cessation or relocation of programs; continue activities as presently constituted; further limitation of adverse impacts by institutional or other improvements in various operations; and expansion of current activities.

3602 (DOE/EV--0046(Vol.2), pp 547-562) SCALE MODEL EXPERIMENTS OF ENERGY MATERIAL SHIPPING CONTAINERS. Burian, R.J. (Battelle's Columbus Labs., OH). Sep 1979.
From Environmental control symposium; Washington, DC, USA (28 Nov 1978).
An ongoing program is being conducted by Battelle's Columbus Laboratories as an integral part of an overall ECT program to overview and assess the adequacy of the public safety and

environmental protection provided by containers used in the shipment of spent fuel, high-level wastes, and other DOE energy materials. The efforts of this program are directed toward development of improved techniques for assessment of cask response to specific dynamic impact conditions. Initial phases of the program were directed to verify the applicability of scale modeling techniques utilizing lead shielded/stainless steel cask models. Cask models 1/8, 1/4, and 1/2 linear scale of a typical truck cask were tested. The results indicated that the elastic and plastic response of lead shielded casks can be predicted by tests of replica cask models. Tests conducted to produce only elastic strains in 1/8- and 1/4-scale models revealed that axial strains at four different locations agree with predictions from scaling theory within 20%; circumferential strains agreed within 40%. For tests of 1/8, 1/4, and 1/2 scale models in which plastic strains were produced, strains generally agreed with scaling theory. These tests also revealed the influence of other conditions such as impact angle, temperature, material properties, and impact target on the response of the cask models. These data are being used by LASL in computer code development for analytically predicting cask response.

3603 (DP--1536) RAIL TIEDOWN TESTS WITH HEAVY CASKS FOR RADIOACTIVE SHIPMENTS. Petry, S.F. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Aug 1980. Contract AC09-76SR00001. 56p. NTIS, PC A04/MF A01.

A rail tiedown test program was conducted at the Savannah River Plant in July and August 1978. For each test, a 40- or 70-ton cask was secured on a railcar. The railcar was pushed to speeds up to 11 mph and allowed to couple to parked railcars simulating ordinary railyard operations. The test car carrying the cask was heavily instrumented to measure the accelerations and forces generated at strategically selected places. Eighteen test runs were made with different combinations of railcars, couplers, casks, speeds, and tiedown configurations. The major objectives of the test program were to (1) provide test data as a basis to develop a tiedown standard for rail cask shipments of radioactive materials and (2) collect dynamic data to support analytical models of the railcar cask tiedown system. The optimum tiedown configuration demonstrated for heavy casks was a combination of welded, fixed stops to secure the cask longitudinally and flexible cables to restrain vertical and lateral cask movement. Cables alone were inadequate to secure a heavy cask to a standard railcar, and bolting was found disadvantageous in several respects. The use of cushioning coupler mechanisms dramatically reduced the tiedown requirements for the rail coupling operation. The test program and general conclusions are discussed.

3604 (DPSPU--79-30-14) COMPLETELY CONTAINED AND REMOTELY OPERATED DIGITAL DENSITY METER. Goergen, C.R. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant). Oct 1979. Contract EY-76-C-09-0001. 13p. (CONF-791103--34; CONF-791049--11). Dep. NTIS, PC A02/MF A01.

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

A completely contained and remotely operated density determination system having unique features was designed, fabricated, and installed at the Savannah River Plant. The system, based on a Mettler calculating digital density meter, provides more precise and accurate results than the falling drop technique for measuring densities. The system is fast, simple, easy to operate, and has demonstrated both reliability and durability.

3605 (FDA--78-8054) NINTH ANNUAL NATIONAL CONFERENCE ON RADIATION CONTROL. (Conference of Radiation Control Program Directors, Inc. (USA); Utah State Government, Salt Lake City (USA); Nuclear Regulatory Commission, Washington, DC (USA); Bureau of Radiological Health, Rockville, MD (USA)). Apr 1978. 426p. GPO.

This publication contains the proceedings of the Ninth Annual National Conference on Radiation Control - Meeting Today's Challenges, held June 19-23, 1977, in Seattle, Washington, Sponsors were the Conference of the Radiation Control Program Directors, Inc.; the Bureau of Radiological Health, FDA; the US Environmental Protection AGency; and the US Nuclear Regulatory Commission. Participants representing State and major local radiation control programs, as well as Federal agencies, discussed mutual radiation control programs. The formal presentations and the reports of the various task forces and workshops are included in these proceedings.

3606 (GEFR-SP--204) CONSIDERATIONS FOR DESIGNING A SPENT-FUEL SHIPPING SYSTEM FOR COMMERCIAL LMFBR PLANTS. Davis, C.R. (General Electric Co., Sunnyvale, CA (USA). Advanced Reactor Systems Dept.). 31 Jul 1980. Contract AT03-76SF70030. 28p. (CONF-801115--1). NTIS, PC A03/MF A01.

From 6. international symposium on packaging and transporting radioactive material; Berlin, F.R. Germany (10 Nov 1980).

Thesis.

This paper identifies many factors which influence the design of a spent-fuel shipping system for commercial Liquid Metal Fast Breeder Reactors (LMFBR's). Appropriate consideration of these factors will result in a cost effective shipping system that maximizes safety and reliability and minimizes shipping time and radiation exposure to personnel. Existing spent-fuel shipping equipment is not appropriate for servicing future commercial LMFBR's. This is due primarily to two present-day conditions: first, without reprocessing and recycle in the US, there are presently no economic incentives for rapid low-cost spent-fuel shipping; and second, the early LWR's and LMFBR's were designed, and many built, without a spent-fuel shipping system design. LMFBR facilities can be designed to eliminate the removal of a 100 ton shipping cask from its railroad transporter for loading and the contamination of the cask's exterior surfaces and the subsequent cleaning. Loading of the shipping cask can be accomplished remotely, which eliminates almost all personnel exposure to radiation. Shipping spent-fuel in sodium eliminates a sodium cleaning operation at the reactor, saves time in preparing spent-fuel for shipment and reduces the accumulation of radioactive liquid waste at the reactor. A cask and canister design that provides double containment of spent-fuel during transit enhances safety and satisfies regulatory requirements. Sealed sodium-filled canisters for individual fuel assemblies provide primary containment. The sealed shipping cask closure provides secondary containment and heat dissipation. Criteria for minimizing fuel inventory costs require that spent-fuel shipping be integrated into the overall refueling and fuel recycle schedules. Cost savings are obtained by rapid cash turn-around and shipping fuel and radial blanket assemblies together in the same cask.

3607 (HMI--296) SCIENTIFIC PROGRESS REPORT 1978. NUCLEAR CHEMISTRY AND REACTORS. (Hahn-Meitner-Institut fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.). Bereich Kernchemie und Reaktor). 1978. 106p. (In German). NTIS (US Sales Only), PC A06/MF A01.

This is a short description of the research work of the working groups on neutron scattering, radiation damage in solids, reactor chemistry, trace element research in biomedicine, and geochemistry as well as of the available infrastructure for the fields of reactors and radionuclide production. The description is followed by a bibliography of 1978 publications (some of them with abstracts) and papers read by HMI members. Also listed are papers by HMI guest scientists, lectures at Berlin universities, and dissertations and theses written at HMI.

3608 (INIS-mf--5598) ENERGY, HEALTH AND ENVIRONMENT. Hoegberg, L. (Energi-och miljoe kommitten, Jordbruksdepartementet, Stockholm (Sweden)). 1978. 30p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01.

The results of a study performed by the Energy and Environment Committee of the Dept. of Agriculture in Sweden are presented. The health and environmental effects during routine operation of hydroelectric power, coal-firing, oil-firing, natural gas and nuclear power are discussed in turn. The risk of major accidents for all these energy sources is considered in one section, while the final section discusses briefly these aspects of alternative energy sources.

3609 (JAERI-M--7979) HEALTH PHYSICS AND SAFETY IN JAERI, NO.20 (APRIL 1, 1977 - MARCH 31, 1978). (Japan Atomic Energy Research Inst., Tokyo). Jan 1979. 277p. (In Japanese). NTIS (US Sales Only), PC A14/MF A01.

In the annual report No. 20 (fiscal 1977) are described the activities of health physics and safety in the Tokyo Office, Tokai Research Establishment, Takasaki Radiation Chemistry Research Establishment, and Oarai Research Establishment.

3610 (LA-UR--80-1460) DECONTAMINATION OF CONCRETE SURFACES AT THE LOS ALAMOS SCIENTIFIC LABORATORY. Cox, E.J.; Garde, R. (Los Alamos Scientific Lab., NM (USA)). 1980. Contract W-7405-ENG-36. 17p. (CONF-800542--3). NTIS, PC A02/MF A01.

From Concrete decontamination workshop; Seattle, WA, USA (28 May 1980).

For the past two years the Los Alamos Scientific Laboratory has been engaged in decontaminating its former plutonium facility. The facility was in use for over 30 years for plutonium operations varying from dry metallurgical processes to wet (solution) recovery processes. To date approximately 3400 square meters of floor surface have been decontaminated to permit re-use for nonplutonium work. Approximately 330 square meters of concrete surfaces required scarifying the contamination after all other attempts such as detergents and acid solutions had proven ineffective. The uses of hand-held and floor type pneumatic scarifiers are described as well as an inexpensive but effective contamination containment chamber built at Los Alamos for use with the hand-held model. Contamination control, waste handling, manpower requirements, and cost are documented for the techniques used at LASL.

3611 (NTIS/PS--79/0080) COAL MINE WASTE (A BIBLIOGRAPHY WITH ABSTRACTS). REPORT FOR 1964-JANUARY 1979. Hundemann, A.S. (National Technical Information Service, Springfield, VA (USA)). Mar 1979. 163p. NTIS PC N01/MF N01.

Research topics cover coal mining refuse, refuse dumps, and spoil. Studies on disposal, utilization, environmental impacts, and testing of these wastes are included, as are reports on land reclamation and spoil bank safety. (This updated bibliography contains 157 abstracts, 19 of which are new entries to the previous edition.)

3612 (ORNL--5685, pp 1-30) MOLECULAR AND CELLULAR SCIENCES SECTION. Oct 1980.

Biology Division progress report, October 1, 1978-May 31, 1980.

A wide variety of scientific disciplines are represented within the Section. One central theme of much of the research is the study of gene structure and function. The reason for this is that the principal consequences of exposure of biological systems to radiation (from nuclear energy production) and to organic and inorganic chemicals (from natural and synthetic fuel production) result from their interactions with the cellular genome. Within this central theme are studies on the structure of DNA and chromatin, the interaction of nucleic acids with heavy metals and certain carcinogenic and mutagenic chemicals, replication and transcription of DNA and their regulation, mechanisms of repair of DNA damaged by radiation or chemicals, and molecular genetics. Some of the Section's major recent contributions in these fields that have also, but not coincidentally, contributed to a more comprehensive understanding of carcinogenesis and mutagenesis are described. Other disciplines within the Section are cryobiology, developmental biology, enzymology, membrane biology, protein biosynthesis, protein chemistry, and x-ray diffraction. Because of their diversity, research in these areas cannot be so easily categorized as having a central theme. However, the relationships of these activities to the Division's general mission to study adverse health and environmental effects of energy production are described. Notable recent achievements in these disciplines are discussed. (ERB)

3613 (PB--296947, pp 385-399) DOSIMETRIC AND RISK/BENEFIT IMPLICATIONS OF AM-241 IN SMOKE DETECTORS DISPOSED OF IN NORMAL WASTES. Wrenn, M.E.; Cohen, N. (New York Univ., NY). May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

The risks associated with ^{241}Am in residential-type smoke detectors have been assessed (using a linear dose-response model) by evaluating collective dose commitments (70 years) to the public delivered during normal detector use and disposal. The risk of radiation induced harm results mainly from external exposure, with only a small contribution from waste management practices. A reference case of 100 million detectors distributed in residences at a rate of 10 million per year leads to an external dose of 340 man-rems per year to the US population and a cancer risk of 0.07 cases per year. Collective background is 20 million man-rems per year. Lives saved by detectors from fires are estimated at 2400 cases per year, for a benefit (lives saved) per risk (potential

cancers induced) ratio of 34,000.

3614 (PB--296947, pp 485-491) CESIUM-137 IN COOTS (FULICA AMERICANA) ON HANFORD WASTE PONDS: CONTRIBUTION TO POPULATION DOSE AND OFFSITE TRANSPORT ESTIMATES. Cadwell, L.L.; Schreckhise, R.G.; Fitzner, R.E. (Battelle Pacific Northwest Labs., Richland, WA). May 1979.

From 12. Health Physics Society midyear topical symposium; Williamsburg, VA, USA (12 Feb 1979).

American coots (Fulica americana) were periodically collected from ponds receiving low-level radioactive waste on the Hanford Site and from ponds on a control area. Gut contents and selected tissues were removed and analyzed for ^{137}Cs, ^{90}Sr and gross Pu. The concentration of ^{137}Cs in coot flesh was the highest of the radioelements measured. Coots from the pond receiving the greatest quantity of fission products had the highest ^{137}Cs concentrations. One- and fifty-year ^{137}Cs total-body dose commitments to an individual from ingesting all edible tissues of one Gable Mountain Pond coot were calculated at 1.9 and 2.1 mrem, respectively. The 50-year population dose from the projected harvest of Gable Mountain Pond coots during one year was estimated to be 0.13 person-rem, which is likely high because the coots must leave the Site to be harvested. Total ^{137}Cs export from Hanford Site ponds via coots, having an average body burden of 0.092 μCi, was estimated to be 46 μCi per year.

3615 (PB--298585) NATIONAL ENVIRONMENTAL/ ENERGY WORKFORCE ASSESSMENT. RADIATION PROGRAMS. FINAL REPORT ON PHASE 3. (National Field Research Center, Inc., Iowa City, IA (USA)). Aug 1979. 40p. NTIS, PC A03/MF A01.

The report describes radiation education/ training programs which are currently being conducted in 23 states and one territory. In total there are 39 program entries included in this volume. Although the report attempts to concentrate mainly on radiation protection programs, aspects of technologies, engineering, and public health are included. The criteria for selection of a program included at least three (preferably more) radiation courses required for program completion. Overall, the following types of programs were included: health physics; radiation health and safety; radiological health; nuclear or radiological waste management; and, radiological technician.

3616 (PB--301163) ON BOARD CORROSION ANALYSIS OF A RECOVERED NUCLEAR WASTE CONTAINER. TECHNICAL NOTE. Dexter, S.C. (Delaware Univ., Newark (USA). Coll. of Marine Studies). Aug 1979. 29p. NTIS, PC A03/MF A01.

This report represents initial observations on extent of corrosion of an 80-gallon low-level radiactive waste container after immersion for more than fourteen years. This container was recovered during the 1976 survey of a deepsea radioactive waste dumpsite located at a depth of 2800 m in the Atlantic. During the two hour interval between the time the container first emerged from the ocean until it was encapsulated, the exterior condition of the metal drum, including the appearance of corrosion product films and attached biological organisms, was photographically documented. Representative photographs as well as results of limited chemical and biological analyses are presented. These results are then discussed with respect to previously published deep ocean corrosion data, and recommendations are given for improving shipboard sampling and analytical procedures.

3617 (PNL--1845-44) QUARTERLY REPORT ON THE STRONTIUM HEAT SOURCE DEVELOPMENT PROGRAM, ADVANCED NUCLEAR SYSTEMS AND PROJECTS DIVISION FOR JULY-SEPTEMBER 1979. Fullam, H.T. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Oct 1979. Contract EY-76-C-06-1830. 17p. Dep. NTIS, PC A02/MF A01.

Metallographic examination of the metal specimens exposed to $^{90}SrF_2$ for 20,000 h was completed, as was the examination of the specimens exposed to nonradioactive SrF_2 for 30,000 hours. Fabrication and welding of the prototype capsules to be used in the qualification testing program was completed.

3618 (RHO-SA--81) FACILITY FOR THE ANALYSIS OF RADIOACTIVE SAMPLES BY INDUCTIVELY COUPLED PLASMA SPECTROSCOPY. Homi, C.S.; Manabe, R.M. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Oct 1979. Contract EY-77-C-06-1030. 18p. (CONF-791049--21). Dep. NTIS, PC A02/MF A01.

From 23. conference on analytical chemistry in energy technology; Gatlinburg, TN, USA (9 Oct 1979).

A 29-channel polychromator and a scanning monochromator are used to determine over 60 elements by inductively coupled plasma (ICP) spectroscopy. The addition of a sample hood, special torch containment box, and an off-gas scrubber system will allow the analysis of low- to intermediate-level radioactive samples. The simultaneous multi-element analysis capabilities of the ICP reduces sample handling and total analysis time. Consequently, the potential for radiation exposure to personnel will be reduced.

3619 (SAND--78-1951) BENEFICIAL USES PROGRAM. PROGRESS REPORT FOR PERIOD ENDING JUNE 30, 1978. (Sandia Labs., Albuquerque, NM (USA)). Jan 1979. Contract EY-76-C-04-0789. 53p. Dep. NTIS, PC A04/MF A01.

The Beneficial Uses Program is a comprehensive program to develop the necessary technologies for cost-beneficial uses of existing and future surplus radioactive materials. The major portion of the work at Sandia is concentrated in two sub-programs: the Waste Resources Utilization Program and the Separation Technology and Source Development Program. Progress is reported on: (1) the Sandia Irradiator for Dried Sewage Solids; (2) bacteriology; (3) mycology; (4) virology; (5) animal feeds containing irradiated sewage solids; (6) use of irradiated sewage sludge as fertilizer; and (7) development of ^{137}Cs radiation sources obtained from radioactive wastes. (TFD)

3620 (SAND--79-2354C) EXPERIMENTAL STUDY OF THE STEADY NATURAL CONVECTION IN A HORIZONTAL ANNULUS WITH IRREGULAR BOUNDARIES. Boyd, R.D. (Sandia Labs., Livermore, CA (USA)). 1980. Contract EY-766-C-04-0789. 66p. (CONF-800723--1). NTIS, PC A04/MF A01.

From 19. national heat transfer conference; Orlando, FL, USA (27 Jul 1980).

The natural convective heat transfer across an annulus with irregular boundaries was studied using a Mach-Zehnder interferometer. The annulus was formed by an inner hexagonal cylinder and an outer concentric circular cylinder. This configuration models, in two dimensions, a liquid metal fast breeder reactor spent fuel subassembly inside a shipping container. During the test, the annulus was

filled with a single gas, either neon, air, argon, krypton, or xenon, at a pressure of about 0.5 MPa. From temperature measurements, both local and mean Nusselt numbers (Nu/sub Δ/) at the surface of the inner cylinder were evaluated, with the mean Rayleigh number (anti Ra/sub Δ/) varying from 4.54 x 10^4 to 0.915 x 10^6 (Δ is the local gas width). The data correlation for the mean Nusselt and Rayleigh numbers is given by anti Nu/sub Δ/ = 0.183 anti Ra/sub Δ/$^{0.310}$.

3621 (SAND--80-0543C) OVERVIEW OF BENEFICIAL USES OF NUCLEAR FISSION PRODUCTS. Sivinski, J.S. (Sandia Labs., Albuquerque, NM (USA)). 1980. Contract EY-76-C-04-0789. 6p. (CONF-800607--21). Dep. NTIS, PC A02/MF A01.

From American Nuclear Society annual meeting; Las Vegas, NV, USA (8 Jun 1980).

Recoverable or reprocessed nuclear wastes as conservable resources with significant potential benefits for use as heat sources, or as radiation sources for industrial, agricultural, and medical applications are reviewed. (LCL)

3622 (TID--3319-S8-P1) NUCLEAR MEDICINE: A BIBLIOGRAPHY. (Department of Energy, Oak Ridge, TN (USA). Technical Information Center). Sep 1978. 677p. NTIS, PC A99/MF A01.

References to 6208 publications related to nuclear medicine that have been added to the Department of Energy's information data base since July 1976 are contained in this bibliography. Documents dealing with therapeutic irradiation are included in the data base only if there is new information on the technique, if there is significant information on the effects on normal tissues, if evaluations are made of new radiation sources, e.g., pion beams, or if dose or dose distribution measurements are made. Information on uses of isotope tracers in medicine is included if a contribution is made to the technology of tracer usage. References to instrumentation used in nuclear medicine, such as that for detection of radiation or measurement of doses, are included. Extensive bibliographies or reviews are also included.

3623 (TID--3319-S8-P2) NUCLEAR MEDICINE: A BIBLIOGRAPHY. (Department of Energy, Oak Ridge, TN (USA). Technical Information Center). Sep 1978. 665p. NTIS, PC A99/MF A01.

References to 6208 publications related to nuclear medicine that have been added to the Department of Energy's information data base since July 1976 are contained in this bibliography. Documents dealing with therapeutic irradiation are included in the data base only if there is new information on the technique, if there is significant information on the effects on normal tissues, if evaluations are made of new radiation sources, e.g., pion beams, or if dose of dose distribution measurements are made. Information on uses of isotope tracers in medicine is included if a contribution is made to the technology of tracer usage. References to instrumentation used in nuclear medicine, such as that for detection of radiation or measurement of doses, are included. Extensive bibliographies or reviews are also included.

3624 METHOD FOR MANUFACTURE OF NEUTRON ABSORBING ARTICLES. Owens, D. (to Carborundum Co The). US Patent 4,213,883. 22 Jul 1980. Filed date 30 Dec 1977. vp.

A one-step curing method for the manufacture of a neutron absorbing article which comprises irreversibly curing, in desired article form, a form-retaining mixture of boron carbide particles, curable phenolic resin in solid state and in particula te form and a minor proportion of a liquid medium, which boils at a temperature below 200*c., at an elevated temperature so as to obtain bonding of the irreversibly cured phenolic polymer resulting to the boron carbide particles and production of the neutron absorbing article in desired form.

3625 PARAMETRIC DEFINITION OF RADIOCESIUM SOURCES. Kenna, B.T. (Sandia Labs., Albuquerque, NM (USA)). International Journal of Applied Radiation and Isotopes ; 31: No. 4, 233-239(Apr 1980).

The use of fissiogenic ^{137}Cs for beneficial uses is a real possibility, although its present availability only as the relatively soluble CsCl form could present difficulties. Other cesium-containing materials are known to posses solubilities much lower than CsCl, but their effectiveness as radiation sources are unknown. A means was developed to compare sources in terms of their radiation efficiencies utilizing absorption coefficients, source radius, and material characteristics. It is shown that cesium-containing sources such as aluminosilicates and glass could be used in place of CsCl. In some cases, these sources would require less ^{137}Cs to provide the same external energy per unit time as does a $^{137}CsCl$ source. This technique should be applicable for intercomparison of sources other than ^{137}Cs, e.g. neither spent fuel rods nor compressed calcined waste can be used in lieu of the previously mentioned ^{137}Cs sources.

3626 EPA SAYS COAL A HAZARD. Agres, T. Industrial Research/Development ; 22: No. 3, 47-48(Mar 1980).

Coal-fired power generating plants are up to 80 times riskier than nuclear power generating plants in terms of danger from radionuclides (certain radioactive atoms) emitted during normal operation, according to a preliminary government report. The figures derive from a study conducted by the Environmental Protection Agency. The report, "Radiological Impact Caused by Emissions of Radionuclides into Air in the United States," was prepared as a result of recent legislation that requires radionuclides to be included among other sources of air pollution. The findings suggest that there are greater risks to the public of developing cancer from radionuclides emitted by coal-fired power plants than by normally-operating nuclear plants.

3627 SOCIETY'S VALUATION OF LIFE SAVING IN RADIATION PROTECTION AND OTHER CONTEXTS. Cohen, B.L. (Pittsburgh Univ., PA (USA); Argonne National Lab., IL (USA)). Health Physics ; 38: No. 1, 33-51(Jan 1980).

Various situations are described in which societal action may be interpreted as a dollar value placed on averting a human fatality, and numerical values are derived in each case. Situations included are a variety of medical screening and medical care programs and of automobile and highway safety measures, food for overseas relief, air pollution control, fire prevention, industrial safety, and several radiation-related activities including standards for radium in drinking water, radwaste systems in nuclear plants, and defence and civilian high-level waste management. Values varying from a few thousand dollars to hundreds of million of dollars per fatality

averted are obtained. An attempt to derive data of this type from polling is described. The problem of discounting when money is spent now to save lives far in the future (as with nuclear waste) is discussed. It is concluded that nearly all of the vast variation in the results is unjustified and represents a need for educating the public, especially in the area of radiation protection.

3628 HYDROGEN PRODUCTION FROM NUCLEAR FISSION PRODUCT WASTE HEAT AND USE IN GAS TURBINES. Nelson, M.E.; Keating, E.L.; Govan, D.R.; Banchak, R.J.; Corpus, J.R. (Naval Academy, Annapolis, MD). International Journal of Hydrogen Energy ; 5: No. 4, 383-399(1980).

An analysis has been made on the feasibility of producing hydrogen using fission product waste heat and its subsequent combustion in gas turbines. The work has been performed in three distinct phases. In the first phase, a system using heat generated from radioactive wastes has been designed which produces saturated steam. This steam is sent through a turbogenerator to produce electricity. The electrical power output of this system has been calculated as a function of fission product decay time, solidified form of fission products, as well as numerous other parameters. In the second phase, the electrical energy produced is used to electrolyze water, which in turn produces hydrogen. The amount of hydrogen produced (lb/h) has been calculated for varying electrical inputs, electrolyzer efficiencies, and feedwater temperatures. This hydrogen is then assumed to be liquified and stored. Finally, the third phase considers the burning of this hydrogen in a standard marine gas turbine.

3629 COMPARISON OF GAMMA-SPECTROMETRIC TECHNIQUES FOR ENVIRONMENTAL MONITORING OF NUCLEAR INSTALLATIONS. Fietz, J.; Knobus, B. (Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German Democratic Republic)). Kernenergie ; 22: No. 12, 424-429(Dec 1979). (In German).

From 11. winter school on radiation protection physics; Gaussig, German Democratic Republic (26 Feb - 2 Mar 1979).

In environmental monitoring of nuclear installations gamma-spectrometric methods make use of both scintillation probes of large volume and Ge(Li) detectors of high resolution. Both types of detectors are compared with respect to their nuclide-specific lower limit of detection. On the basis of measured spectra their use for various measuring problems in environmental monitoring is discussed. Finally, the relationship between the lower limit of detection of a simple Ge(Li) spectrometer and the measurable discharges into the environment is studied for ^{131}J.

3630 NUCLEAR RESEARCH AND DEVELOPMENT IN THE EUROPEAN COMMUNITY. Atom (London) ; No. 278, 328-329(Dec 1979).

Research programmes undertaken by the European Atomic Energy Community and the European Economic Community are discussed. These programmes are carried out both at the Communities own Joint Research Centres (at Ispra, Karlsruhe, Geel and Petten) and also, although centrally managed by the Commission, at research organizations in the Member States. Such research projects include radioactive waste management and storage, decommissioning of nuclear power stations and nuclear fusion. Culham Laboratory is not only the centre for the UKAEA's research into controlled thermonuclear fusion but is also host to the Joint European Torus Joint Undertaking.

3631 IMPLEMENTATION OF THE RADIATION PROTECTION ORDINANCE. HERE: RADIATION PROTECTION GUIDELINES FOR THE USE OF RADIOACTIVE SUBSTANCES AND THE OPERATION OF APPARATUS FOR THE GENERATION OF IONIZING RADIATION AND OF IRRADIATION DEVICES WITH RADIOACTIVE SOURCES IN MEDICAL THERAPY (RADIATION PROTECTION GUIDELINE IN NUCLEAR MEDICINE). Gemeinsames Ministerialblatt, A ; 30: No. 31, 637-662(Nov 1979). (In German).

This guideline is meant to serve both the competent highest land authorities as well as the physician or other medical personnel involved in the application of radioactive substances for medical purposes as a means of explaining the licensing procedure and of defining the rights and duties to be observed, as one of the main goals being to improve coordination in the licensing procedure and to guarantee uniform application of the regulations given, and to facilitate supervision by land authorities in the field of nuclear medicine.

3632 PROGRAMMABLE TEMPERATURE REGULATOR OF VAO-1 FURNACE. Zahalka, F. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Nukleon ; No. 3, 15-21(Nov 1979). (In Czech).

A programmable temperature controller is described for a furnace for high-level waste processing. Furnace temperature is controlled by a program compiled from a combination of 3 parts with different linear increments or decrements of time dependent temperature and 2 parts with isothermal control for over a preset period. The equipment consists essentially of a programming unit, a programmed digital-to-analog converter and a power unit. The design is described in detail and its specifications are given. The maximum operating temperature of 1500 degC may be reached in the furnace charge section.

3633 CONTINUOUS DETECTION OF RADIOACTIVE EFFLUENTS IN LIQUID CHROMATOGRAPHY BY MEANS OF A HIGH EFFICIENCY TOROIDAL TYPE PROPORTIONAL COUNTER. Parker, W.C.; Perez-Alarcon, J.; Flores, D. (Instituto Venezolano de Investigaciones Cientificas, Caracas. Dept. de Quimica). Radiochemical and Radioanalytical Letters ; 40: No. 6, 365-372(17 Oct 1979).

A toroidal, or doughnut-type gas-flow proportional counter specially designed for scanning liquid chromatograph columns is described. The principal features include a well-defined annular window, a large radiation sensitive volume and a series of interchangeable split cores that permit the use of the detector with chromatograph column diameters of 1/8-3/4 inch. The minimum detectable activity for β- and γ-ray emitters was found to be 0.02 μCi for ^{36}Cl, E=0.7 MeV and 3.0 μCi for ^{110}Cd, E=0.08 MeV, respectively. The special geometry of the described detector results in the elimination of dead volume and affords excellent resolution of separating radioactive fractions.

3634 NUCLEAR FUEL TRANSPORTATION CONTAINERS. Smith, A.J. (to British Nuclear Fuels Ltd.). US Patent 4,171,002. 16 Oct 1979. Filed date 20 Oct 1977. 6p.

The invention discloses an inner container for a nuclear fuel transportation flask for irradiated fuel elements comprising a cylindrical shell having a dished end closure with a drainage sump and means for flushing out solid matter by way of the sump prior to

removing a cover.

3635 THEORETICAL COMPARISON OF THE ENHANCED VARIANCE AND TWIN-GATE METHODS FOR MONITORING PLUTONIUM IN WASTE. Deighton, M.O. (UKAEA Atomic Energy Research Establishment, Harwell). Nuclear Instruments amp Methods ; 165: No. 3, 589-605(15 Oct 1979).

Certain plutonium-monitoring systems, especially those used for checking and classifying drums of mixed waste, depend on detecting paired neutrons originating from spontaneous fissions of ^{240}Pu. Such neutrons can be detected with reasonable efficiency by suitable counters but, as they are usually accompanied by a high random background of other neutrons, the problem arises of separating the 'signal', i.e. pairs, from the 'noise' or random pulses. Various ways of doing this have been devised, e.g. variable dead-time counters, arrangements of coincidence gates for measurement of the pulse interval distribution. A recent suggestion for doing this was to look for deviation from a true Poisson distribution in the actual numbers of counts registered in a large number of equal time intervals. This paper is a theoretical analysis of the counting statistics to determine the nature and amount of the deviation and thus estimate the accuracy of fission-pair rate determinations in a few typical cases. As a yardstick for comparison, the authors have also analysed a simple form of twin-gate method, in which total counts accumulated via a time-gate triggered by some of the pulses, are compared with counts in another gate triggered after a suitable delay.

3636 LEUKAEMIA AND RADIATION. Schofield, G.G. (British Nuclear Fuels Ltd., Sellafield). Lancet, The ; 2: No. 8146, 802-803(13 Oct 1979).

CONTAMINATION;DOSE-RESPONSE RELATIONSHIPS; HUMAN POPULATIONS;LEUKEMOGENESIS;MORTALITY; RADIOACTIVE EFFLUENTS;RADIOSENSITIVITY;SEAFOOD; UNITED KINGDOM

3637 DESIGN AND EVALUATION OF CUSTOM ^{133}XE TRAPPING AND HOLDING SYSTEM FOR ANIMAL RESEARCH STUDIES. Miller, K.L.; Pennock, R.E.; Bowman, G.; Hernandez, M.J. (Pennsylvania State Univ., Hershey (USA). Milton S. Hershey Medical Center). Health Physics ; 37: No. 3, 414-417(Sep 1979).

A cell for the trapping and holding of ^{133}Xe by activated charcoal was designed and tested for use in animal experiments. The cell was made from copper tubing with end caps and nipples for attachment of tubing and valves. Results of test indicated that up to 4 animals per day could be studied with complete trapping of all activity in a single cell. 16 of such cells allow continuous studies to be made on 4 animals a day using a different cell each day. By the time each cell is re-used the trapped ^{132}Xe has decayed for at least 23 days thus greatly reducing any exhausted activity. The cells were arranged in a wall-mounted filter bank inside a shielded cabinet. The outlet of the filter bank was connected into the exhaust stream of a fume hood.

3638 LIMITS OF THE CONCEPT OF RADIATION MINIMISATION. Schattke, H. Deutsches Verwaltungsblatt mit Verwaltungsarchiv ; 94: No. 17/18, 652-658(Sep 1979). (In German).

The author discusses at length the basic concept of the Radiation Protection Ordinance, i.e. to keep population exposure and environmental radiation exposure as low as possible. To his opinion, this concept is limited by technical and economic aspects. If too much emphasis were laid on protection, the promotion of nuclear power as stated in the Atomic Energy Act would be hindered. The order in which the two legal goals are to be considered depends on the degree to which one of these goals is endangered.

3639 EXPERIMENTAL STUDY OF THE TRAPPING AND RELEASE OF KRYPTON IN NICKEL. Donnelly, S.E.; Ingram, D.C.; Armour, D.G. (Salford Univ. (UK). Dept. of Electrical Engineering). Radiation Effects ; 42: No. 3-4, 179-184(Sep 1979).

An experimental study is reported of the trapping and release of krypton implanted into nickel at low energies (< 3 keV). The experimental technique used was Thermal Evolution Mass Spectrometry. Various peaks have been observed in the release rate spectra at temperatures similar to those for the inert gases helium, neon and argon, indicating that the trapping and release behaviour of krypton in nickel is not significantly different from that of the other gases. In common with the other gases an important parameter which defines the overall form of the evolution spectrum was found to be implanted gas distribution. Saturation curves for Kr incident on Ni(111) and Ni (110) have been obtained and indicate that gas retention is greatest for higher energy implantation into the more transparent (110) surface. For 3 keV Kr^+ incident on Ni (110) the maximum quantity of gas retained in the target was found to be approximately 2.5×10^{15} ions cm^{-2}.

3640 IMPROVED ASSEMBLY FOR THE TRANSPORT OF FUEL ELEMENTS. Myers, G. (to UKAEA Headquarters, London). British Patent 1,554,605/A/. 25 Aug 1979. 6p.

An improved assembly is described for the transport and storage of radioactive fuel elements. The system consists of a transport flask in which the fuel element holder is placed in such a way that the elements may be submerged in liquid within the flask and the assembly used in one orientation for loading the fuel elements and in another orientation for transporting them. The assembly has a self-regulating loading system comprising reservoirs for containing liquid and pressurising gas, the arrangement for the reservoirs being such that in either orientation of the assembly liquid is maintained in all the reservoirs to prevent egress of the pressurised gas and to compensate for volume changes arising from temperature variations within the flask.

3641 STEEL CONTAINER FOR ACCOMMODATING SPENT FUEL ELEMENTS. Elbinger, H.; Klein, D.; Kroll, H.; Luthardt, G. (to Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,804,828/A/. 9 Aug 1979. 5p. (In German).

The steel containers which are used for intermediate storage of fuel elements are provided with an aluminium layer 0.5 to 2mm thick to connect T permeations on the outer and inner surface. The same thing applies for the lid of the container.

3642 SLUDGE DEWATERING BY BELT PROCESS. Soderberg, R.L.; Dorman, K.R. (USBM). Mining Congress Journal ; 65: No. 8, 29-32(Aug 1979).

The belt process is proposed as a possible disposal method for mill tailings, floatation tailings, and coal and phosphate wash plant

effluents. Test results from a belt process run on coal sludge at the Washington Irrigation and Development Co., Centralia, Wash., and from a series of tests performed on various mill minings by USBM at the Spokane Mining Research Center, Wash., are presented. Because the belt process produces a relatively dry solid cake and has low maintenance and operating costs, it shows good potential for eliminating tailings. (1 diagram, 3 graphs, 2 photos, 4 tables)

3643 ELECTRICITY GENERATOR OPERATED BY RADIATION ENERGY. Gravisse, P. (to Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,802,089/A/. 19 Jul 1979. 9p. (In German).

Kr 85, for example, or solid radioactive waste products are used as a radiation source in a steel cylinder which is surrounded by a spherical plastic matrix. The radiation emitted is absorbed by the PMMA, PVC, silicon, or an aromatic hydrocarbon of the plastic matrix. The thus produced long-wave secondary radiation in the range of 7000 to 8000 A is absorbed by photoelements which are arranged around the sphere and are connected in parallel or in series.

3644 DRY CONTAINMENT OF RADIOACTIVE MATERIALS. Williams, C.E. (to NL Industries, Inc., Hightstown NJ (USA)). British Patent 2,010,164/A/. 27 Jun 1979. 11p.

A cask for the dry containment of radioactive material, e.g. irradiated nuclear fuel elements has a cover which contains purge and drain passageways having valve connections. These passageways are sealed by after-purge cover seals which are clamped over them and to the outer surface of the cover. The cover seals are tested by providing them with a pair of concentric ring seal elements squeezed between the cover seal and the outer surface of the cover and by forcing a gas under pressure into the annular region between the seal elements via a T-connection and monitoring the pressure between the seal elements by means of a pressure gauge.

3645 THOUGHTS ON THE APPLICATION OF FISSION PRODUCT NUCLIDES FROM RADIOACTIVE WASTE. Chemiker-Zeitung ; 103: No. 6, 207-210(Jun 1979). (In German).

The utilization of the fission products of the fission of heavy atom nuclei, preferably of xenon, palladium and rhodium isotopes, as well as tritium, and the use of possible nuclides Pm 147, Cs137, Kr 85 and Sr90 as radiation sources are considered.

3646 TRANSPORT CONTAINER FOR SPENT NUCLEAR REACTOR FUEL ELEMENTS. Sieber, R.; Naumann, K.H. (to Gesellschaft zur Auslegung von Nuklear-Komponenten m.b.H. (GANUK), Goslar (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,749,690/A/. 10 May 1979. 11p. (In German).

The transport container consists of a hollow cylinder with container closures and outside cooling ribs. The main container is made in the form of a double steel jacket. The intermediate space is filled by radiation shielding material, which also favours of heat. It consists of individual cast steel rings laid on top of each other, whose contact surfaces are stepped. All gaps are filled with a lead-tin alloy so that there are no empty spaces.

3647 METHOD TO TRANSPORT AND STORE RADIOACTIVE RADIATING ARTICLES OR SUBSTANCES. SYSTEM TO PERFORM THIS METHOD AND TRANSPORTABLE TRANSPORT OR STORAGE CONTAINERS TO CARRY OUT THE METHOD AND FOR USE IN CONNECTION WITH SUCH A SYSTEM. Vox, A. (to Vox Lumatic G.m.b.H., Ostfildern (Germany, F.R.); Amtrust A.G., Luzern (Switzerland); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,747,080/A/. 26 Apr 1979. 33p. (In German).

A suggestion is made to fill radioactive articles, e.g. fuel elements, into transport containers and then to cover these with a salt melt (at least 41% salt) which solidifies at temperatures > 98°C, so that by hardening of the melt, one may transport or store these as solid blocks. If desired, one can remelt the salt melt by heating slightly and extract the articles. Insulating materials (such as, e.g., glass fibres) can be added to the salt mixture, the hardened melt can also be covered by bitumen, concrete etc. Apparatus to carry out this proposed method is presented in detail.

3648 FACILITY FOR THE DECONTAMINATION OF FUEL ELEMENT TRANSPORT CASKS. Gottwald, K. (to Kraftanlagen A.G., Heidelberg (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,745,626/A/. 19 Apr 1979. 11p. (In German).

Before transporting them to the reprocessing plant the transport casks containing fuel assemblies are cleaned on the outside. This is achieved by means of a tank which can be closed and into which the transport cask is inserted. Within the tank the cask is standing on a roller drive mechanism with the aid of which it can be revolved. In the bottom, shell, and cover region there are adjustable nozzles by means of which the transport cask can be sprayed with washing water all-round. After cleaning, drying is performed at subatmospheric pressure by means of stationary hot-air nozzles also arranged in the tank.

3649 FIRE RESISTANT NUCLEAR FUEL CASK. Heckman, R.C.; Moss, M. (to Dept. of Energy). US Patent 4,147,938. 3 Apr 1979. Filed date 7 Feb 1978. 6p.

PAT-APPL-875,821.

The disclosure is directed to a fire resistant nuclear fuel cask employing reversibly thermally expansible bands between adjacent cooling fins such that normal outward flow of heat is not interfered with, but abnormal inward flow of heat is impeded or blocked.

3650 METHOD FOR COOLING A FUEL ELEMENT TRANSPORT CASK. Fechner, B.; Hahn, H.; Mackert, P. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,747,601/B/. 15 Feb 1979. 4p. (In German).

The internal space of the transport cash is part of a cooling circuit with water as a coolant. The coolant injection rate is limited by the pressure within the transport cask. While being injected the water is evaporating. Subsequently the steam produced is removed by means of a condensation device in the form of a water jet pump and supplied to a gas plenum that is partly filled with coolant and has got a tangential separator. This one is connected with the water jet pump. During the cooling process the pressure in the transport cask lies below 10 bar. By means of controlled steam cooling cladding damages, e.g. by quenching effects, are avoided.

3651 FUEL ELEMENT TRANSPORT CONTAINER. Schaaf, W. (to Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,732,791/A/. 15 Feb 1979. 6p. (In German).

The proposal concerns the configuration of the lid of a fuel element transport container which is characterised by the fact that a circular protective lid penetrating into the loading opening covers the sealing surfaces when the transport container is open.

3652 DESIGNING INSTRUMENTS FOR MEASURING ACTIVITY OF LIQUIDS. Gilar, O.; Kula, J.; Novakova, O.; Slezak, V. (Tesla, Premysleni (Czechoslovakia). Vyzkumny Ustav Pristroju Jaderne Techniky). Jaderna Energie ; 25: No. 2, 60-64(Feb 1979). (In Czech).

The requirements are briefly outlined for equipment for radionuclide concentration measurement in liquids in different fields, such as checks of potable and service water for the population, utility water in uranium ore mining, in the operation of nuclear power facilities and radioisotope laboratories, in the application of tracer techniques in monitoring technological processes in industries. The analysis of the requirements offered possible configurations for continuous and discontinuous signal evaluation, mainly for scintillation detectors. Basic characteristics are compared of four selected detection units and the evaluation units are briefly described for continuous and discontinuous measurements.

3653 APPLICATION STATE OF RADIOISOTOPES FOR MEDICAL USE. Nakajima, T. (Japan Radioisotope Association, Tokyo). Eizo Joho, Medikaru ; 11: No. 2, 127-133(Feb 1979). (In Japanese).

Application of unsealed radioisotopes as radiopharmaceuticals has been increasing year by year with the development of nuclear medicine. As for the radioisotopes for in vivo use which are internally administered and are detected by external scanning, the consumption of Tc-99 m drugs has increased rapidly. The sales of radiopharmaceuticals for in vivo use including ^{131}I, etc. amounted to four billion Yen in 1977. The consumption of the isotopes used in vitro for radioimmunoassay has made more rapid increase, and the sales of radiopharmaceuticals for in vitro use amounted to seven billion Yen in 1977. Radiopharmaceuticals have been used in 1,134 institutes all over Japan in 1978. 534 among them have applied radiopharmaceuticals to both in vivo and in vitro uses. Radioactive wastes have been increasing with the application of these unsealed radiopharmaceuticals, and their disposal method should be examined as there is a limit in their storage.

3654 RADIOISOTOPE HEATING BLOCK. Wenk, E. (to Dornier-System G.m.b.H., Friedrichshafen (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,447,176/C/. 18 Jan 1979. 3p. (In German).

The waste decay heat that emanates from calcinated and glazed radioactive wastes is used with the help of heat transfer pipes for seawater-distillation in desalination plants. Therefore, the fission products and the heat transfer pipes are alternatively piled up to a homogeneous radioisotope heating block. The fission products arranged at the periphery are covered by heat transfer-pipes or -plates. Their dissipation side is connected with evaporators or with heat exchangers which are flowed about by seawater.

3655 NUCLEAR POWER AND THE ENVIRONMENT. Hill, J. (UKAEA). British Journal of Radiology ; 52: No. 613, 2-13(Jan 1979).

The lecture concentrated on the problems of harmful effects of low levels of radiation, and radioactive waste management. Doses to the U.K. population from natural background and from man-made environmental radiation from the use of radioactive materials and X-rays in industry and medicine, from fallout from nuclear weapons tests, and from the nuclear industry are compared, and the regulations which apply to radioactive wastes and emissions are described. The hazard from small doses of radiation, particularly the probability of carcinogenesis, is discussed in the light of statistics of mortality from different causes and in different occupations. Finally, the treatment and disposal of long-lived fission product wastes is reviewed. It is concluded that nuclear power can provide the U.K. with all the energy it requires with less impact upon the environment than that of alternative energy sources.

3656 RADIATION EXPOSURE IN THE VICINITY OF NUCLEAR POWER PLANTS. GRS (Ges. Reaktorsicherheit) Kurz-Inf., Reihe K.; 13: No. 1, 1(1979). (In German).

COAL;DOSE RATES;ENVIRONMENT;FOSSIL-FUEL POWER PLANTS;LEAD 210;LUNGS;NATURAL RADIOACTIVITY;POLONIUM 210;RADIATION DOSES; RADIOACTIVE WASTE DISPOSAL;RADIUM 226;RADIUM 228;SKELETON;STACK DISPOSAL;THORIUM 230;THORIUM 232;NUCLEAR POWER PLANTS

3657 RADIOLOGICAL SAFETY ASPECTS OF THE OPERATION OF ELECTRON LINEAR ACCELERATORS. Swanson, W.P. (Stanford Linear Accelerator Center, CA (USA)). Vienna; IAEA (1979). 327p.

This manual is intended as a guide for the planning and implementation of radiation protection programmes for all types of electron linear accelerators. Material is provided for guidance in the planning and installation stages, as well as for the implementation of radiation protection for continuing operations. Because of their rapidly growing importance, the problems of installation and radiation safety of standard medical and industrial accelerators are discussed in separate sections. Special discussions are devoted to the radiation protection problems unique to electron accelerators: thick-target bremsstrahlung, the electromagnetic cascade, the estimation of secondary-radiation yields from thick targets, and instrumental corrections for accelerator duty factor. In addition, an extensive review of neutron production is given which includes new calculations of neutron production in various materials. A recalculation of activation in a variety of materials has been done for this manual, and specific gamma-ray constants have been recalculated for a number of nuclides to take into account the contribution of K X-rays. The subjects of air and water activation, as well as toxic gas production in air have been specially reviewed. Betatrons and electron microtrons operating at the same energy produce essentially the same kind of secondary radiation as electron linacs and the material given in this manual is directly applicable to them.

3658 LABORATORY TRAINING MANUAL ON THE USE OF

NUCLEAR TECHNIQUES IN ANIMAL RESEARCH. Vienna; IAEA (1979). 299p.

The manual is designed to give the animal science researcher the basic terms and principles necessary for understanding radiation, its detection and measurement, its associated hazards, and some of the more common applications. Basic laboratory exercises to illustrate this purpose are included.

3659 DECONTAMINATION OF WASTE RADIOACTIVE POLLUTED SOLUTIONS IN RADIATION TREATMENT. Simova, G.; Boyadzhiev, A.; Mikhailov, M.G.; Shopov, N. (Meditsinska Akademiya, Sofia (Bulgaria). Nauchen Inst. po Rentgenologiya i Radiobiologiya). Rentgenologiya i Radiologiya ; 18: No. 1, 25-28(1979). (In Bulgarian).

The decontamination capacity of solutions of the trivial cleaning Bulgarian preparations ''Mipro'', ''Sana'', ''Synthek'' and ''Univer'' for different surfaces (steel, glass, PVC and linoleum) contaminated with cesium-134, strontium-85 or cerium-144 chlorides, was studied. Concentrations from 5 to 15 g/l of the solutions used in this study displayed a degree of cleaning over 90%. Higher concentration of the solution does not improve its cleaning capacity. For evaluation of foam formation by the solutions, the so called ''foam column stability coefficient'' has been adopted. This coefficient represents the ratio between the height of the foam column and the time of its half life, referred to the time for the foam column formation when blown through with a constant air current. On the basis of this index, solutions of the preparation ''Mipro'' proved to be the best ones for decontamination in the whole investigated concentration span, the foam column stability coefficient for the solutions of this preparation is with two orders lower than the respective coefficient of the other preparations. It was experimentally established that radiation treatment of radio-contaminated solutions reduces the foam column stability coefficient. Radiation treatment should be carried out in a gamma field, realizing at least one megarad within an acceptable for the liquid wastes time period.

3660 ADSORPTION OF TETRANITRONITROSYLRUTHENATE ON ACTIVATED CHARCOAL. Akatsu, E.; Yonezawa, C.; Motojima, K. (Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Annals of Nuclear Energy ; 6: No. 7-8, 399-404(1979).

Sodium tetranitronitrosylruthenate $Na_2[RuNO(NO_2)OH]2H_2O$, labelled with ^{106}Ru, was prepared and its properties and adsorption behavior on activated charcoal were studied. The ruthenate was well adsorbed on activated charcoal of Tsurumicoal HC-30 (8-28 mesh). The adsorbability was increased by addition of the organic cation of zephiramine or methylene blue at pH4-8. The adsorbability was lowered by the introduction of dodecylbenzenesulfonate or Emulgen 220, but raised by further addition of zephiramine. The adsorbed ruthenate was not easily desorbed with water.

3661 NUCLEAR POWER AND ENVIRONMENTAL RADIOACTIVITY. REGULATIONS. Medrano, G. (INTESCA, Madrid (Spain)). Energia Nuclear (Madrid) ; 23: No. 121, 329-338(1979). (In Spanish).

Regulations from different european countries and from USA are presented, defining limits for doses and radioactive effluents produced in the operation of nuclear installations.

3662 PREPARATION AND CONTROL OF RADIOPHARMACEUTICALS IN HOSPITALS. A GUIDEBOOK. Kristensen, K. (National Health Service, Copenhagen (Denmark)). Vienna; IAEA (1979). 119p.

This guidebook covers the work commonly organized as part of the work in the hospital. It does not cover the manufacture of radiopharmaceuticals on an industrial scale. The work is characterized by the small scale on which manufacture and preparation of radiopharmaceuticals take place.

3663 Radioaktive 'Niedrig'-Strahlung. Strahlenschaeden bei Kindern und Ungeborenen. (LOW LEVEL RADIATION. RADIATION INJURIES OF CHILDREN UND FETUSES). Sternglass, E.J. Berlin, Germany, F.R.; Oberbaum (1979). 163p. (In German).

In this book, Sternglass compiles data and facts to prove his hypothesis that even very small radiation doses can be of great danger for the human organism - especially for infants and fetuses -, and that there is no treshold value for the danger of radioactivity. He starts with the detection of radioactive fallout following nuclear weapons tests and its effects and then proceeds to the environmental pollution in the neighbourhood of nuclear power plants. (MG).

3664 DATA ON THE ACTIVATION AND DISMANTLING OF THE 155MEV SYNCHROCYCLOTRON OF THE INSTITUTE OF NUCLEAR PHYSICS AT ORSAY. Choquet, R. (Institut National de Physique Nucleaire et de Physique des Particules, 75 - Paris (France)); Clapier, F. (Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire). Radioprotection ; 14: No. 2, 81-87(1979). (In French).

From Information session on the decommissioning and the dismantling of nuclear installations; Paris, France (31 Mar 1977).

After twenty years of operation, the dismantling of a 155 MeV proton Synchrocyclotron led to define working conditions and to examine the final destination of materials affected by radioactivation by direct or indirect ionizing radiation. The dismantling operation and the separation of radioactive material after consideration of activation analysis data and indirect measuring methods adopted are described. Arising from this experience suggestions are made, for if personnel dose limitation is attained, it appears that solutions must still be found to process important amounts of metals of rather small specific activity; it should be possible to handle the treatment of waste much more satisfactorily in terms of cost and ecology.

3665 Offene radioaktive Stoffe. Umgang, Lagerung, Verwendung und Beseitigung in Krankenhaeusern und medizinischen Forschungseinrichtungen. (UNSEALED RADIOACTIVE MATERIALS. HANDLING, STORAGE, USE, AND DISPOSAL IN HOSPITALS AND MEDICAL RESEARCH INSTITUTIONS). Stuttgart, Germany, F.R.; Gustav Fischer Verl. (1979). 76p. (In German).

To supplement its general recommendations, the ICRP has also elaborated specific recommendations for the handling of unsealed radioactive substances in medicine and medical research. Although these recommendations are mainly addressed to authorities granting licenses for the handling of radioactive materials, they contain many practical hints which makes them indispensible to those working in nuclear medicine or doing medical research

with nuclear materials, i.e. physicians and researchers.

3666 INCIDENCE OF MYELOID LEUKAEMIA IN LANCASHIRE. Baverstock, K.F.; Papworth, D.G.; Vennart, J. (Medical Research Council, Harwell (UK). Radiobiological Research Unit). Lancet, The ; 2: No. 8156-7, 1362-1363(1979).
Calculations are made of the radiation dose required to produce the doubling of incidence of myeloid leukaemia reported in Lancashire during 1971-76. In order for radiation from the eating of fish contaminated with radioactive Cs to produce such a doubling, each member of the population would need to receive an average dose of about 2 rem per year between 1957 and 1968. Such doses are shown to be highly unlikely; indeed, it is shown that the average dose rate is likely to be 1000 times less than this dose. In conclusion, it is unlikely than any case of leukaemia registered in Lancashire has been the result of discharges of radioactive waste to the Irish Sea.

3667 SIGNIFICANCE OF IODINE RADIOACTIVE ISOTOPES IN THE PROBLEM OF RADIATION SAFETY OF NUCLEAR FUEL CYCLE. Malenchenko, A.F.; Mironov, V.P. Vestsi Akademii Navuk Belaruskai SSR, Seryya Fizika-Energetychnykh Navuk ; No. 4, 28-36(1979). (In Russian).
The data on actual wastes of nuclear-power plants, environmental distribution and biological effects of iodine radioactive isotopes have been analyzed. Dose-response relationship is estimated as well as its significance for struma maligna development under ionizing radiation and the contribution of iodine radionuclides resulted from nuclear power engineering to this process.

3668 SOLID NEUTRON SHIELD MATERIAL TESTS. Allen, G.C. Jr.; Pope, R.B.; Rack H.J. (Sandia Labs., Albuquerque, NM). Transactions of the American Nuclear Society ; 33: 456-457(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
SHIELDING MATERIALS;SPENT FUEL CASKS;NEUTRON TRANSPORT;PERFORMANCE TESTING;THERMAL TESTING; HIGH TEMPERATURE;MEDIUM TEMPERATURE;VERY HIGH TEMPERATURE

3669 REGULATORY HISTORY AND STATUS OF NUCLEAR CRITICALITY SAFETY RESEARCH. Odegaarden, R.H.; Solberg, D.E. (Nuclear Regulatory Commission, Washington, DC). Transactions of the American Nuclear Society ; 33: 357-358(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
FUEL FABRICATION PLANTS;FUEL REPROCESSING PLANTS;FUEL POOLS;SPENT FUEL STORAGE;SPENT FUEL CASKS;US NRC;CRITICALITY;RESEARCH PROGRAMS

3670 LEAK RATES OF PLUTONIA POWDER. Yesso, J.D.; Madia, W.J.; Schmidt, E.W. (Battelle Columbus Labs., OH). Transactions of the American Nuclear Society ; 33: 189-190(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
PLUTONIUM DIOXIDE;TRANSPORT;CONTAINERS; RADIOACTIVE EFFLUENTS;LEAK TESTING

3671 ROLE OF RADON ON COMPARISONS OF EFFECTS OF RADIOACTIVITY RELEASES FROM NUCLEAR POWER, COAL BURNING, AND PHOSPHATE MINING. Cohen, B.L. (Argonne National Lab., IL). Transactions of the American Nuclear Society ; 33: 155(1979). (CONF-791103--).
From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).
RADON;RADIOACTIVE EFFLUENTS;HEALTH HAZARDS; COMPARATIVE EVALUATIONS;COAL;PHOSPHATE ROCKS; NUCLEAR POWER;MINING;FOSSIL-FUEL POWER PLANTS; COMBUSTION

3672 RADIOLOGICAL SURVEILLANCE OF AIRBORNE CONTAMINANTS IN THE WORKING ENVIRONMENT. Vienna, Austria; IAEA (1979). 149p.
Contamination of the air of the working environment may result from incidental or accidental releases during the handling of radioactive materials. Representative sampling and measurement are complicated by a variety of factors, arising mainly from the physical and chemical properties of radioactive aerosols. The following topics are presented in detail: sources and types of airborne contaminants, sampling techniques and instruments, measurement techniques and instruments, interpretation of measurements, examples of air monitoring programmes.

3673 USAGE OF RADIOACTIVE WASTES FOR DISTRICT HEATING. Galaktionov, I.V.; Chernyaev, V.A.; Ivanov, G.V.; Turchin, A.V. (comp.). Atomnaya Tekhnika za Rubezhom ; No. 6, 20-23(1979). (In Russian).
Technical and economic problems of using radioactive waste heat of nuclear power industry for production of low pressure steam in nuclear waste boiler (NWB) are considered. The NWB design which provides safe and reliable storage of radioactive waste, besides heat generation is described. The NWB consists of: I. concrete zone of storing fresh fuel elements which arrived after waste processing, and spent fuel elements, which are transported for disposal later on; 2. water circulating cooling loop with heat exchangers. The comparison between organic fuel boiler and NWB shows the advantages of the latter when the fuel element cost is no more than 11 dollar/kg.

3674 DEVICE FOR FILTERING GASEOUS MEDIA. Benzel, M. (to Krantz (H.) Lufttechnik, Aachen (Germany, F.R.); Deutsches Patentamt, Muenchen (Germany, F.R.)). German(FRG) Patent 2,721,588/A/. 16 Nov 1978. 11p. (In German).
The air filter system for gaseous radioactive substances consists of a vertical chamber with filter material (charcoal, e.g. impregnated). On one side of the chamber there is an inlet compartment and an outlet compartment. On the other side a guiding compartment turns the gas flow coming from the natural-air side through the lower part of filter chamber to the upper part of the filter. The gas flow leaves the upper part through the outlet conpartment as cleaned-air flow. The filter material may be filled into the chamber from above and drawn off below. For better utilization of the filter material the filter chamber is separated by means of a wall between the inlet and outlet compartment. This partition wall consist of two sheets arranged one above the other provided with slots which may be superposed in alignment. In this case filter material is tickling from the upper part of the chamber into the lower part avoiding to form a crater in the filter bed.

3675 IMPROVEMENTS IN NUCLEAR FUEL TRANSPORTATION CONTAINERS. Smith, A.J. (to British Nuclear Fuels Ltd., Risley). British Patent 1,532,425/A/. 15 Nov 1978. 6p.

An inner container for use inside a transport flask for irradiated nuclear reactor fuel elements is described. The container comprises a cylindrical shell having a dished closure at one end and a detachable lid at the other end and a partitioning structure defining compartments in the shell each for receiving an elongated nuclear reactor fuel element disposed with axis parallel to the axis of the shell. Sealable ducts extend through the lid for injecting streams of flushing liquid along the axis of each compartment to the dished closure, the dished closure having a drainage sump and ducts arranged for discharging matter through the other end of the inner container.

3676 CALCULATION OF DISTRIBUTION RATIOS OF RARE EARTH ELEMENTS IN MULTISTAGE COUNTER CURRENT EXTRACTION WITH HDEHP. Nakamura, H.; Tachimori, S.; Sato, A. (Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Journal of Nuclear Science and Technology (Tokyo) ; 15: No. 11, 829-834(Nov 1978).

Extraction of rare earth elements with di(2-ethylhexyl)phosphoric acid (HDEHP)-tributyl-phosphate (TBP)-n-paraffin system was studied as functions of concentrations of the quantity of H^+ released into aqueous phase. The ratio of rare earth elements extracted into organic phase was found to depend on the initial composition of the aqueous solution. The ratios determined for various concentrations of rare earth elements and acid were shown as a linear function of the concentrations of acid in aqueous phase and that of rare earth elements in organic phase after extraction. The acid concentration in aqueous phase after extraction can be estimated from any initial concentrations of acid and rare earth elements in aqueous solution by this equation. Also a graphic process of experimental results could give approximate values of distribution ratio for various initial concentrations of rare earth elements and nitric acid. For calculation of the distribution ratio of each stage in multi-stage counter current extraction, a computation code was programmed on the basis of the graphical process. The calculated values agreed well with those obtained experimentally in multistage extraction.

3677 CONTROLLING THE USE OF HAZARDOUS MATERIALS IN RESEARCH AND DEVELOPMENT LABORATORIES. Reynolds, J.M. (General Electric Co., Schenectady, NY (USA). Research and Development Center). Journal of Hazardous Materials ; 2: No. 4, 299-308(Nov 1978).

A systematic approach for controlling the use of hazardous materials in a large industrial research and development complex is described. The basic concepts, although fundamental, require the pooling of several technical disciplines. Although, a system may be in place and is functioning effectively, new governmental restraints are constantly occurring, hence, the program is continually expanding.

3678 ECOLOGICAL PROBLEMS OF NUCLEAR POWER. Babaev, N.S.; Demin, V.F.; Kuz'min, I.I.; Stepanchikov, V.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). Priroda (Moscow) ; No. 10, 3-16(Oct 1978). (In Russian).

Modern power sources including nuclear one are characterized. Basic information on radiation protection of man and biosphere is presented. Problems of radiation effect of nuclear fuel cycle enterprises on population and environment are discussed. Comparative evaluation of nuclear and thermal power effect on biosphere is made. It is shown that nuclear power is the safest power source at the present development state. The conclusion is drawn that the use of nuclear energy controlled and limited by scientifically founded norms does not present radiation hazard for population and environment.

3679 DESIGN OF A MINIATURE DIRECTIONAL ANTENNA FOR GEOPHYSICAL PROBING FROM BOREHOLES. Lytle, R.J.; Laine, E.F. (Univ. of California, Livermore). Contract W-7405-ENG-48. IEEE (Institute of Electrical and Electronics Engineers) Transactions on Geoscience Electronics ; GE-16: No. 4, 304-307(Oct 1978).

A design for a miniaturized directional antenna for use in geophysical exploration from boreholes is described. Mathematical results are given which indicate the antenna characteristics. The concept involves an antenna eccentrically located within a high-dielectric-constant of high-permeability sheath.

3680 HEALTH PHYSICS CONSIDERATIONS IN INTRAINSTITUTIONAL MOBILE NUCLEAR MEDICINE. Murphy, P.H. (Baylor Univ., Houston, TX (USA). Coll. of Medicine). Health Physics ; 35: No. 4, 565-568(Oct 1978).

The use of a mobile scintillation camera within a hospital enables imaging procedures to be used on patients such as those in critical care units, who cannot be transported to the central nuclear medicine laboratory. Transport throughout the hospital of the radiopharmaceuticals for use with the mobile system and the associated radiation safety precautions are discussed. The nuclides most frequently used are sup(99m)Tc and ^{133}Xe. It is shown that radiation exposure to hospital personnel can be kept well below recognised guidelines when using sizeable quantities of radionuclides remote from the controlled environment of the central laboratory. Special care is needed in disposing of radioactive waste, particularly ^{133}Xe gas, which must be collected and returned to the laboratory. There is a need for education and reassurance of nurses concerning the use of ionizing radiation and hazards to them from patients containing radioactive material.

3681 SYSTEM FOR VENTILATING AIR CONTAMINATED WITH RADIOACTIVITY. Moriyama, N.; Sakairi, T. (to Hitachi Ltd., Tokyo (Japan)). Japanese Patent 1953-10,7598/A/. 19 Sep 1978. 4p. (In Japanese).

The purpose of the study was to provide a system wherein when the radioactive concentration of indoor air which has been contaminated with water vapor having radioactivity reaches a predetermined value, radioactive iodine in the exhaust air is removed, and thereafter the air is exhausted thereby to effectively reduce radioactive iodine contained in the air. The radioactive concentration of indoor air is detected from the temperature difference between air introduced in the chamber through an air supply duct and exhaust air exhausted through an exhaust duct. Only when the detected value exceeds a predetermined value, exhaust air is passed through a device for removing radioactive iodine, and exhausted through the exhaust duct. In any case other than the above described case exhaust air is exhausted directly through the duct.

3682 METHOD AND ARRANGEMENT FOR LOADING AND UNLOADING SPENT FUEL SHIPPING CASKS. Sieber, R. (to Gesellschaft zur Auslegung von Nuklear-Komponenten m.b.H. (GANUK), Goslar (Germany, F.R.)). German(FRG) Patent 2,706,042/A/. 17 Aug 1978. 15p. (In German).

The LWR fuel assemblies are loaded and unloaded from their shipping casks into a water pool without contamination of the surface of shipping cask. For this purpose it is deposited with sufficient safety clearance above the water level on an additional tube-shaped shield. This additional shield is standing on a storage rack. Within the shipping cask there is a cylindrical charging cage which together with the bottom of the shipping cask can be moved down through the additional shield by means of a crane hoist.

3683 EFFECTS OF THERMAL EFFLUENT ON BODY CONDITION OF LARGEMOUTH BASS. Gibbons, J.W. (Savannah River Ecology Lab., Aiken, SC (USA)); Bennett, D.H.; Esch, G.W.; Hazen, T.C. Nature (London) ; 274: No. 5670, 470-471(3 Aug 1978).

FISHES;LENGTH;METABOLISM;PRODUCTION REACTORS; RADIOACTIVE EFFLUENTS;THERMAL EFFLUENTS;THERMAL POLLUTION;WASTE HEAT;WATER POLLUTION;WATER RESERVOIRS;WEIGHT;BIOLOGICAL STRESS

3684 CORROSION RESISTANCE OF MAGNESIUM-BERYLLIUM ALLOYS IN POTASSIUM BICHROMATE AND CARBON DIOXIDE AQUEOUS SOLUTIONS AT DIFFERENT TEMPERATURES AND PRESSURES. Petlitsa, A.P.; Ermolaev, M.I.; Kapitanov, V.F.; Dugin, N.A. Atomnaya Energiya ; 45: No. 2, 136-137(Aug 1978). (In Russian).

AQUEOUS SOLUTIONS;BERYLLIUM ALLOYS;CARBON DIOXIDE;CHEMICAL REACTION KINETICS;CHROMATES; CORROSION;CORROSION RESISTANCE;FUEL CANS; MAGNESIUM ALLOYS;MEDIUM PRESSURE;MEDIUM TEMPERATURE;POTASSIUM COMPOUNDS;PRESSURE DEPENDENCE;SPENT FUEL STORAGE;TEMPERATURE DEPENDENCE

3685 DEVELOPMENT OF A RADON BARRIER. Culot, M.V.J. (Westinghouse Electric Corp., Monroeville, PA (USA). Nuclear Energy Systems); Schiager, K.J.; Olson, H.G. Health Physics ; 35: No. 2, 375-380(Aug 1978).

High radon progeny exposures exist in structures where uranium mill tailings have been improperly used as a concrete aggregate constituent and as a leveling or backfill material. The application of a radon barrier on the indoor face of these structures' foundations is considered a potential means to reduce the radon progeny exposure to the occupants. The methods used and the results obtained in the search for a material capable of inhibiting or entirely blocking diffusion of a noble radioactive gas such as radon are presented; a material which would simultaneously offer good durability and be practical. Demonstration of the method's applicability is shown by successful reduction of radon concentrations to subbackground levels in an experimental building built atop uranium mill tailings.

3686 ION-EXCHANGE PROPERTIES OF CESIUM AND STRONTIUM INTO ZEOLITES FROM SODIUM SALT SOLUTIONS. Kanno, T.; Hashimoto, H. (Tohoku Univ., Sendai (Japan). Research Inst. of Mineral Dressing and Metallurgy); Ohtani, T. Tohoku Daigaku Senko Seiren Kenkyusho Iho (Bulletin of the Research Inst. of Mineral Dressing and Metallurgy, Tohoku University) ; 34: No. 1, 53-57(Jun 1978). (In Japanese).

The ion-exchange properties of cesium and strontium into zeolite from sodium salt solution has been studied in zeolite A, zeolite X, zeolite Y, mordenite and clinoptilolite. The distribution of cesium into mordenite from about 1 -- 2 M sodium chloride and sodium hydroxide solutions is considerably larger than that into zeolite A. The distribution coefficient for 2 M solution of sodium salts was about 300. Therefore, the separation of cesium from sodium salt solution is possible by using mordenite. The distribution of strontium into zeolites form 1 -- 2 M solutions of sodium chloride and sodium nitrate were in the order of zeolite A>zeolite X>zeolite Y asymptoticaly equals mordenite. The distribution coefficient of 230 was obtained for 1 M solutions of sodium salts. The anion in solutions had no effect on the distribution of cesium and strontium into zeolite from sodium salt solution.

3687 DISTRIBUTION OF CO, CR AND FE INTO NA- AND H-TYPE ZEOLITES. Mimura, H.; Kanno, T. (Tohoku Univ., Sendai (Japan). Research Inst. of Mineral Dressing and Metallurgy). Tohoku Daigaku Senko Seiren Kenkyusho Iho (Bulletin of the Research Inst. of Mineral Dressing and Metallurgy, Tohoku University) ; 34: No. 1, 58-66(Jun 1978). (In Japanese).

The effect of pH on the distribution has been studied by the use of radioisotopes, ^{60}Co, ^{51}Cr and ^{59}Fe, with Na- and H-type zeolites, i.e., synthetic zeolites A, X and Y, synthetic mordenite, natural mordenite, and clinoptilolite. At tracer-level concentrations, distribution coefficients (K) into Na-type zeolites indicated curves with a maximum at a different equilibrium pH corresponding to the kind of zeolites. Lowering of K values in the acidic region is due to the selective adsorption of hydrogen ions. In the presence of carrier (10 ppm), the distribution coefficients into the zeolites showed similar curves with a maximum at the pH of about 7 and 6.2 for Co and Cr, respectively. The values of K were 10^4 or above for zeolite Y with the largest channel. For H-type zeolites, the values of K were less than 10^2 at pH 3 and decreased with increasing acidity.

3688 POSSIBILITIES OF PURIFICATION OF CHEMONUCLEAR SYNTHESIS PRODUCTS AND ESTIMATING COSTS OF SUCH OPERATIONS. Bessonov, V.A.; Borisov, E.A. Atomnaya Energiya ; 44: No. 4, 351(Apr 1978). (In Russian).

CHEMICAL PREPARATION;CHEMONUCLEAR REACTORS; COST BENEFIT ANALYSIS;DECONTAMINATION; DISTILLATION;FILTRATION;GLYCOLS;PURIFICATION; RADIOACTIVE WASTES

3689 MEASUREMENT OF CARBON-14 IN GASEOUS EFFLUENTS. Riedel, H. pp 38-41 of Monitoring of airborne and liquid radioactive releases from nuclear facilities to the environment. Vienna, Austria; International Atomic Energy Agency (1978).

Carbon-14 is a pure beta emitter with a maximum energy of 148keV. In general, the stack monitors will not detect the presence of gaseous ^{14}C compounds. For this, special sampling and measuring methods which are necessary for this are described.

3690 LATE RADIOBIOLOGICAL EFFECTS OF A-BOMBING IN JAPAN. A REPORT ON THE INTERNATIONAL INVESTIGATION CARRIED OUT IN JULY 1977. Sztanyik, L.B. (Orszagos Frederic Joliot-Curie Sugarbiologiai es Sugaregeszsegugyi Kutato Intezet, Budapest (Hungary)). pp 61-68 of Late biological effects of ionizing radiation. Vol. 1. Proceedings of the symposium held by

the IAEA in Vienna, 13-17 March 1978. Vienna, Austria; International Atomic Energy Authority (1978).

On the occasion of the 32nd anniversary of the A-bombing in Japan, an international investigation was held in Hiroshima and Nagasaki to review existing knowledge on the damage and the after-effects of atomic bombing. The investigation was carried out by an international team made up of Japanese and foreign scientists. A brief summary is given of the most important statements and conclusions of the natural science group of the international team with regard to the late biological effects of radiation on man. Particular attention is paid to the effects of residual radiation which were somewhat disregarded in previous surveys. The most carefully analysed late consequences are induction of leukaemia and other malignancies, but cataract formation cannot be neglected either. Some of the possible explanations why established long-term effects of radiation, such as increased mortality, malignancies after exposure in utero, and genetic defects are absent among survivors, are also mentioned.

3691 INTERNAL RECEPTACLE FOR A RADIOACTIVE MATERIAL TRANSPORT CASK AND DISCHARGE PROCESS OF THIS CASK. (to British Nuclear Fuels Ltd., London). French Patent 2,406,871/A/. 24 Oct 1977. 12p. (In French).

Internal receptacle for use inside a flask for transporting irradiated nuclear reactor fuel elements, comprising a generally cylindrical casing with an integral closure component at one end and a removable cover at the other, partitioning dividing the casing into compartments, each of which houses a long nuclear fuel element, so that its centre line is parallel with that of the casing, and pipes that can be hermetically shut intended for introducing jets of washing liquid into the internal receptacle, the characteristics being that the inside surface of the integral closure component of one end is convex and forms a drain-off collector, pipes being provided to discharge a material from this collector through the cover of the internal receptacle.

3692 CONTROL CONNECTION, PRIMARILY FOR RADIOACTIVE PRODUCTS FILTRATION EQUIPMENT. Svandelik, J.; Zajic, J. Czech Patent 169,493/B/. 15 May 1977. 3p. (In Czech).

The principle is described of a control circuit for an apparatus for filtering radioactive products, consisting of a scrubber circuit for the control and final treatment of the gas discharged into the environment. Connected to the circuit is a detection unit for generating a discrete signal whose pulse rate is proportional to the radioactivity of the medium flowing through the detection unit. The output of the detection unit is fed to the pulse ratemeter block whose output is connected to one of the two inputs of the comparator block. The other input is connected to the preselector of the measured intensity limit. The comparator block output is fed to the control block.

3693 IMPROVEMENTS IN PARTICLE-IN-GAS FILTERING. Catlin, J.R.; Strong, R.E.; Guest, W.R. (to British Nuclear Fuels Ltd., Risley). British Patent 1,557,857/A/. 21 Apr 1977. 6p.

An improved method of changing a filter assembly used for particle-in-gas filtration is described with especial reference to hazardous, toxic or radioactive environments.

3694 RADIATION HAZARD MONITORING IN ^{131}I THERAPY IN AND OUT CLINIC. Chomicki, O.; Gorowski, T. Postepy Fizyki ; 12: No. 2, 81-85(Apr-Jun 1977). (In Polish).

The work presents a statistical analysis of a technique of preparing ^{131}I doses used in the treatment of thyroid diseases (between 1965 and 1976). Radiation hazard to the personnel and that to the patients as well as the radioactive waste disposal are also discussed. The authors emphasize the need for a wider use of out clinic therapy and the application of ^{131}I capsules in therapy.

3695 CONTAINER FOR TRANSPORTING SPENT FUEL ELEMENTS. Blum, P. (to Transnucleaire, 75 - Paris (France)). French Patent 2,384,327/A/. 14 Mar 1977. 11p. (In French).

The description is given of a container for transporting fuel elements, in which the elimination of heat between the fuel elements and the gamma shielding is effected by thermal conduction and by radiation without the help of a liquid. It is so designed that the housing for a given fuel element or a given group of housings is separated from at least one neighbouring housing or from a group of neighbouring housings by a normally empty compartment of chosen thickness so that the neutrons are thermalized enough for criticality control when the container is filled with water. Neutron poison is provided between the given housing or group of housings and the empty compartment which, otherwise, communicates with the housing or group of housings.

3696 Strahlenschutzkurs fuer Aerzte. T. 3. Umgang mit offenen radioaktiven Stoffen. (RADIATION PROTECTION COURSE FOR PHYSICIANS. PT. 3. HANDLING OF UNSEALED RADIOACTIVE SOURCES). Kaul, A.; Stieve, F.E. (eds.). Berlin, Germany, F.R.; H. Hoffmann (1977). 255p. (In German).

This radiation protection course for nuclear diagnosis and therapy consists of a basic course for physicians on the basis of the present state of knowledge. The following subjects are treated by several authors who have held courses in radiation protection for more than 10 years: Application of radioactive materials in medicine; radiopharmaceuticals; patient exposure during diagnosis; technical radiation protection and radiation protection surveillance; contamination and incorporation monitoring; external personnel exposure during diagnosis and therapy; storage, transport and removal of radioactive substances; instruction and information; laws, ordinances, regulations, technical rules; measures in cases of accident; procedures and inspections by the responsible authorities; practical courses and calculation training.

3697 METHOD OF PREPARING A SORBENT. Rais, J.; Selucky, P. Czech Patent 165,751/B/. 15 Nov 1976. 2p. (In Czech).

The molybdophosphoric acid (0.001% w.w. to saturated) or tungstophosphoric acid solution in diluted HNO_3 and/or in a $NaNO_3$ aqueous solution is precipitated by a solution of the polyethylene glycol type polymer in water or an organic solvent (0.001% w.w. to saturated). The polymer of a molecular weight of 180 to 600 contains the -R-O- structural unit where R is methyl, ethyl, propyl or aryl with 6 carbon atoms. The precipitate is filtered and dried, preferably at room temperature. The sorbent is mainly selective to Ba, Ce, Cs and Sr.

3698 CLOSABLE CONTAINER WITH A SELF-LOCKING LID. Paressant, M.; Faucond, J.; Tellier, C. (to Ateliers et Chantiers de Bretagne (ACB), 44 - Nantes (France)). French Patent 2,350,279/A/ . 4 May 1976. 10p. (In French).

This invention concerns a closable container with a self-locking lid. The invention applies in particular in automated installations, for instance for the transport of dangerous substances and notably in the nuclear area for removing radioactive waste. The purpose of the invention is therefore to propose a closable container with a lid that can close and lock automatically on the receptacle whilst allowing for easy unlocking and opening by remote means. Under the invention the container comprises a receptacle and a self-locking lid closing it, the said container being such that the edge of the lid is shut down so as to cover that of the receptacle, these two edges cooperating by means of a hooking ramp and catch fitted respectively to each of them, this gear retracting when moving over the ramp in the lid closing direction and butting against it in the reverse direction. The container has unlocking gear to clear the catch from the ramp to free its passage in the lid opening direction.

3699 HYGIENE OF IONIZING RADIATIONS. Legare, I.M. (Servico de Radioprotecao e Higiene do Meio, Quebec); da Rocha, A.F.G. (Centro de Medicina Nuclear da Guanabara (Brazil)); da Conceicao Cunha, M. (Rio de Janeiro Univ. (Brazil). Inst. de Biologia). pp 91-107 of Medicina nuclear. da Rocha, A.F.G. (Centro de Medicina Nuclear da Guanabara (Brazil)). Rio de Janeiro, Brazil; Guanabara Koogan S.A. (1976). (In Portuguese)

The concepts of quality factor and rem are introduced and a table of biological effects of external ionizing radiation sources is presented. Natural exposures, with tables of background radiation sources and of doses due to cosmic rays on high altitude areas and their populations are treated, as well as medical exposures; artificial background; fallout; scientific, industrial and other sources. The maximum and limit doses for man are given and tables of maximum admissible doses of ionizing radiations for 16-18 year old workers professionaly exposed, for professionals eventually subjected to radiation in their work and for people eventually exposed. Professional protection is discussed and tables are given of half-value layer of water, concrete, iron and lead for radiations of different energies, as well as the classification of exposure zones to the radiations and of maximum acceptable contamination for surfaces. The basic safety standards for radiation protection are summarized; tables are given also with emergency references for internal irradiation. Procedures with patients which received radioisotopes are discussed. At last, consideration is given to the problem of radioactive wastes in connection with the medical use of radionuclides.

3700 METABOLISM AND BIOLOGICAL EFFECTS OF THE TRANSPLUTONIUM ELEMENTS. Durbin, P.W. Contract W-7405-ENG-48. pp 739-896 of Handbook of experimental pharmacology. Eichler, O.; Farah, A.; Herken, H.; Welch, A.D. (eds.). New York, NY; Springer-Verlag (1973).

The metabolism and toxicity of the transplutonium elements (americium, curium) are discussed with emphasis upon radionuclide kinetics within mice, dogs, and humans.

CORPORATE INDEX

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Each entry under a corporate heading gives the report title and the volume and abstract numbers. Report numbers, if applicable, are given in parentheses at the end of the entry.

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Basic data report for drillhole WIPP 29 (Waste Isolation Pilot Plant-WIPP), 1897 (SAND--79-0283)
Geohydrology of hole UE-17a, Syncline Ridge area, Nevada Test Site, 2086 (USGS--1543-4)
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Preliminary report on the geology and geophysics of drill hole UE25a-1, Yucca Mountain, Nevada Test Site, 2089 (USGS-OFR--79-1244)
Resistivity sounding investigation by the Schlumberger method in the Syncline Ridge area, Nevada Test Site, Nevada, 2092 (USGS-OFR--80-466)
Sensitivity study on the parameters of the regional hydrology model for the Nevada nuclear waste storage investigations, 1920 (SAND--79-1197C)
GEOLOGICAL SURVEY, DENVER, CO (USA). GEOLOGIC DIV.
Bibliography of reports by US Geological Survey personnel pertaining to underground nuclear testing and radioactive waste disposal at the Nevada Test Site, and radioactive waste disposal at the WIPP Site, New Mexico, January 1, 1979-December 31, 1979, 539 (USGS-OFR--80-817)
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GEOLOGICAL SURVEY, RESTON, VA (USA)
Preliminary interpretations of geologic results obtained from boreholes UE25a-4, -5, -6, and -7, Yucca Mountain, Nevada Test Site, 2093 (USGS-OFR--80-929)
GEOLOGICAL SURVEY, WASHINGTON, DC (USA)
Borehole geophysical measurements for Hole UE25a-3, Nevada Test Site, Nuclear Waste Isolation Program, 2091 (USGS-OFR--80-126)
Fluid inclusions in salt from the Rayburn and Vacherie domes, Louisiana, 2090 (USGS-OFR--79-1675)
Seismic-refraction survey to the top of salt in the north end of the Salt Valley anticline, Grand County, Utah, 2088 (USGS-OFR--79-1212)
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Gas core reactors for actinide transmutation. Annual report, 2777 (N--79-22876)
GEOSCIENCE RESEARCH CONSULTANTS, MOSCOW, ID (USA)
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Numerical modeling capabilities to predict repository performance, 2045 (UCRL--15176)
Regional flow and solute transport modeling for site suitability. Part I, 2050 (UCRL--15181)
Review of Y/OWI/TM-36: repository design performance in salt, granite, shale or basalt, 2046 (UCRL--15177)
GOLDER ASSOCIATES, INC., GRAND JUNCTION, CO (USA)
Numerical modeling of solute transport in groundwater, 2048 (UCRL--15179)

GOLDER ASSOCIATES, INC., KIRKLAND, WA (USA)
Derivation of parameters necessary for the evaluation of performance of sites for deep geological repositories with particular reference to bedded salt, Livermore, California. Volume I. Main text, 2041 (UCRL--15166(Vol.1))
Derivation of parameters necessary for the evaluation of performance of sites for deep geological repositories with particular reference to bedded salt, Livermore, California. Volume II. Appendices, 2042 (UCRL--15166(Vol.2))
Development of an inter-layer solute transport algorithm for SOLTR computer program. Part 1. The algorithm, 2049 (UCRL--15180)
Effects of resource activities upon repository siting and waste containment with reference to bedded salt, 2054 (UCRL--15205)
Geologic, stratigraphic, thermal, and mechanical factors which influence repository design in the bedded salt environment, 2052 (UCRL--15203)
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HAHN-MEITNER-INSTITUT FUER KERNFORSCHUNG BERLIN G.M.B.H. (GERMANY, F.R.). BEREICH KERNCHEMIE UND REAKTOR
Scientific progress report 1978. Nuclear chemistry and reactors, 3607 (HMI--296)
HALDI ASSOCIATES, INC., NEW YORK (USA)
Social decision-making for high consequence, low probability occurrences. Final report 1975-77, 1696 (PB--292735)
HANDELSMINISTERIET, COPENHAGEN (DENMARK)
Nuclear power. The nuclear fuel cycle. Appendix to ''Energy political review from the Ministry of Trade, ER79'', 1502 (INIS-mf--5209)
HANFORD ENGINEERING DEVELOPMENT LAB., RICHLAND, WA (USA)
Combustible radioactive waste treatment by incineration and chemical digestion, 777 (HEDL-SA--2064)
Data package for the Turkey Point material interaction test capsules, 1485 (HEDL-TC--1283(Rev.1))
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HARVARD UNIV., CAMBRIDGE, MA (USA)
Strategy for assessing the technical, environmental, and engineering feasibility of subseabed disposal, 1955 (SAND--79-2245)
HARVARD UNIV., CAMBRIDGE, MA (USA). CENTER FOR SCIENCE AND INTERNATIONAL AFFAIRS
Legal, political, and institutional implications of the sea-bed program for radioactive waste disposal. Annual technical progress report, 1442 (COO--4917-1)
HAWAII AD HOC COMMITTEE ON REMOTE SENSING, HONOLULU (USA)
Landsat project, State of Hawaii. A preliminary report, 3394 (PB--296712)
HOLMES AND NARVER, INC., ANAHEIM, CA (USA)
WIPP conceptual design report. Addendum C. Cost worksheets for Waste Isolation Pilot Plant (WIPP), 1878 (SAND--77-0274(Add.C))
WIPP conceptual design report. Addendum E. Electrical load summary for Waste Isolation Pilot Plant, 1880 (SAND--77-0274(Add.E))
WIPP conceptual design report. Addendum F. HVAC systems energy analysis for Waste Isolation Pilot Plant, 1881 (SAND--77-0274(Add.F))
HUNTON AND WILLIAMS, RICHMOND, VA (USA)
Current challenges to U.S. nuclear fuel cycle policies: arguments and tactics, 2666 (INIS-mf--4620)

I

IDAHO BUREAU OF MINES AND GEOLOGY, MOSCOW (USA). DEPT. OF
Additions and corrections to the bibliography of geologic studies, Columbia Plateau (Columbia River Basalt) and adjacent Areas, in Idaho, 1980, 1820 (RHO-BWI-C--68)
IDAHO NATIONAL ENGINEERING LAB., IDAHO FALLS (USA)
1979 environmental monitoring program report for Idaho National Engineering Laboratory Site, 3208 (IDO--12082(79))
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INSTITUTE OF OCEANOGRAHIC SCIENCES, GODALMING (UK)
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INSTITUTO DE ENERGIA ATOMICA, SAO PAULO (BRAZIL). CENTRO DE PROTECAO RADIOLOGICA E DOSIMETRIA
Some aspects of radiological protection in uranium mines, 2528 (IEA-INF--062)
INSTITUUT VOOR TOEPASSING VAN ATOOMENERGIE IN DE LANDBOUW, WAGENINGEN (NETHERLANDS)
Systems analysis approach to the disposal of high-level waste in deep ocean sediments, 1991 (SAND--80-0781C)
INTERA ENVIRONMENTAL CONSULTANTS, INC., HOUSTON, TX (USA)
Far field thermal calculations for the WIPP site in SENM, 1912 (SAND--79-1013C)
Sensitivity studies of the swift radionuclide transport

model, 2473 (SAND--79-0896C)
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Removal of radioiodine species from gaseous stream on inorganic absorbents. Final report for the period 1 November 1976 - 31 October 1977, 49 (IAEA-R--1841-F)
Work within the coordinated programme on environmental evaluation and hazard assessment of the separation of the actinides from the high-level waste from fuel reprocessing followed by either transmutation or separate disposal. Final report for the period 1 November 1976 - 31 October 1977, 449 (IAEA-R--1898-F)
INTERNATIONALE ATOMREAKTORBAU G.M.B.H. (INTERATOM), BERGISCH GLADBACH (GERMANY, F.R.)
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INTERNATIONAL ENERGY ASSOCIATES LTD., WASHINGTON, DC (USA)
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Conceptual design of retrieval systems for emplaced transuranic waste containers in a salt bed depository. Final report, 2057 (UCRL--15228)
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J

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LOCKHEED MISSILES AND SPACE CO., PALO ALTO, CA (USA)
Bibliography of marine radiation ecology prepared for the Seabed Program, 1965 (SAND--79-7102)
LOS ALAMOS SCIENTIFIC LAB., NM (USA)
A 1-nCi/g sensitivity transuranic waste assay system using pulsed neutron interrogation, 472 (LA-UR--80-1794)
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Laboratory studies of radionuclide distributions between selected groundwaters and geologic media. Quarterly technical progress report, April 1-June 30, 1980, 1559 (LA--8472-PR)
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Thermal, chemical, and mass-transport processes induced in abyssal sediments by the emplacement of nuclear waste: experimental and modeling results, 1954 (SAND--79-2244C)
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Hazardous materials transportation. part 2. radioactive materials and wastes (citations from the NTIS data base). Report for 1964-Apr 1979, 226 (NTIS/PS--79/0704)
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Preliminary thermal expansion screening data for tuffs, 1888 (SAND--78-1147)
Pretest thermal analysis of the Tuff Water Migration/In-Situ Heater Experiment, 1925 (SAND--79-1278)
Pre-WIPP in-situ experiments in salt. Part I. Executive summary. Part II. Program description, 1901 (SAND--79-0625)
Probabilistic aspects of faulting in anisotropic media, 1902 (SAND--79-0895C)
Proceedings of the fourth annual Seabed Working Group Meeting, Albuquerque, New Mexico USA, March 5-7, 1979, 1919 (SAND--79-1156)
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Sandia Borehole Plugging Program for the Waste Isolation Pilot Plant (WIPP), 1980 (SAND--80-0390C)
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Strategy for assessing the technical, environmental, and engineering feasibility of subseabed disposal, 1956 (SAND--79-2245C)
Strategy for investigation of fluid migration in evaporites (Waste Isolation Pilot Plant - WIPP), 1940 (SAND--79-1889)
Subseabed Disposal Program. Annual report, January-December 1978, 1933 (SAND--79-1618/1)
Subseabed disposal program annual report, January-December 1978. Volume II. Principal investigator progress reports, 1934 (SAND--79-1618(Vol.2))
Subseabed Disposal Program plan. Volume I. Overview, 1967 (SAND--80-0007/1)
Subseabed Disposal Program Plan. Volume II. FY80 budget and subtask work plans, 1968 (SAND--80-0007/2)
Summary of research and development activities in support of waste acceptance criteria for WIPP, 1926 (SAND--79-1305)
Summary of results and plans of the experimental program for the Waste Isolation Pilot Plant, 1942 (SAND--79-1950C)
Technical developments in the WIPP program, 2002 (SAND--80-1599C)
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Test plan: Potash Core Test. WIPP experimental program borehole plugging, 1927 (SAND--79-1306)
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Thermal aspects of waste emplacement in layered tuffs, 1911 (SAND--79-1000C)
Thermal, chemical, and mass-transport processes induced in abyssal sediments by the emplacement of nuclear waste: experimental and modeling results, 1954 (SAND--79-2244C)
Thermal conductivity of rocksalt and other geologic materials from the site of the proposed waste isolation pilot plant, 1936 (SAND--79-1665)
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WIPP conceptual design report. Addendum A. Design calculations for Waste Isolation Pilot Plant (WIPP), 1876 (SAND--77-0274(Add.A))
WIPP conceptual design report. Addendum B. Tailings disposal proposal, 1877 (SAND--77-0274(Add.B))
WIPP conceptual design report. Addendum C. Cost worksheets for Waste Isolation Pilot Plant (WIPP), 1878 (SAND--77-0274(Add.C))
WIPP conceptual design report. Addendum G. Accident analysis for Waste Isolation Pilot Plant, 1882 (SAND--77-0274(Add.G))
WIPP conceptual design report. Addendum H. Special equipment development program for Waste Isolation Pilot Plant (WIPP), 1883 (SAND--77-0274(Add.H))
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SANDIA LABS., LIVERMORE, CA (USA)
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Analytic solutions for thermal conduction from heat producing cylinders and spheres, 1969 (SAND--80-0039)
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Basic data report for drillhole WIPP 19 (Waste Isolation Pilot Plant-WIPP), 3521 (SAND--79-0276)
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Bell Canyon test and results, 2007 (SAND--80-2414C)
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Biological ramifications of the subseabed disposal of high-level nuclear waste, 1948 (SAND--79-2117)
Biological studies of the US Subseabed Disposal Program, 1947 (SAND--79-2073)
Borehole plugging test activities in southeastern New Mexico, 2008 (SAND--80-2462C)
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Computer thermal modeling for the Salt Rock II experiment, 1957 (SAND--79-2250)
Creep consolidation of nuclear depository backfill materials, 1951 (SAND--79-2212)
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Evaluation of tuff as a medium for a nucolear waste repository: interim status report on the properties of tuff, 1998 (SAND--80-1464)
Evaporative water loss from welded tuff, 1972 (SAND--80-0201)
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Meteological and air quality data, quarterly report. WIPP site: Eddy County, New Mexico. Autumn quarter, September 1977-November 1977, 3294 (SAND--80-7121)
Meteorological and air quality data quarterly report. WIPP site: Eddy County, New Mexico. Summer quarter, June 1977-August 1977, 2478 (SAND--80-7107)
Meteorological and air quality data quarterly report. WIPP site: Eddy County, New Mexico. Spring quarter, March-May 1977, 3180 (SAND--79-7109)
Mineralogical aspects of fluid migration in the Salt Block II experiment, 1961 (SAND--79-2423)
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Prediction of ground motion from underground nuclear weapons tests as it relates to siting of a nuclear waste storage facility at NTS and compatibility with the weapons test program, 1995 (SAND--80-1020/1)
Preliminary one-dimensional thermal analysis of waste emplacement in tuffs, 1923 (SAND--79-1265)
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Radiation hardening of rocksalt, 2000 (SAND--80-1566C)
Radionuclide sorption and migration studies of getters for backfill barriers, 1918 (SAND--79-1110)
Recommended analysis plan for the borehole plugging program potash core test, 1993 (SAND--80-0812)
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Sandia National Laboratories 1979 environmental monitoring report, 3246 (SAND--80-0342)
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State policies and requirements for management of uranium mining and milling in New Mexico. Volume III. Adverse effects of uranium mining and milling on the physical environment, 2648 (SAND--78-1332)
Status of SHAFT 78 with respect to modeling radioactive waste burial in Eleana argillite, including calculations to date, 1931 (SAND--79-1484)
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Strategy for assessing the technical, environmental, and engineering feasibility of subseabed disposal, 1955 (SAND--79-2245)
Strategy for evaluating the long-term stability of hole-plugging materials in their geological environments, 1979 (SAND--80-0359C)
Subseabed Radioactive Waste Disposal Feasibility Program: ocean engineering challenges for the 80's, 1973 (SAND--80-0304C)
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SANDIA NATIONAL LABS., LIVERMORE, CA (USA)
Safety analysis report for packaging a DOT 7A specification container for tritiated liquid wastes, 266 (SAND--80-8021)

SCIENCE APPLICATIONS, INC., LA JOLLA, CA (USA)
Environmental implications of thorium use in selected nuclear fuel cycles. Final, 2891 (EPA--520/6-78-009)

SCIENCE APPLICATIONS, INC., OAK RIDGE, TN (USA)
Executive-style briefings on selected repository design issues, 2095 (Y/OWI/SUB--78/22340/4)
Low level waste management: a compilation of models and monitoring techniques. Volume 1, 1668 (ORNL/Sub--79/13617/2)

SCIENCE APPLICATIONS, INC., PALO ALTO, CA (USA)
A generic assessment of barge transportation of spent nuclear fuel, 235 (PB--292599)
Actinide partitioning-transmutation program final report. VI. Short-term risk analysis of reprocessing, refabrication, and transportation: appendix, 2537 (ORNL/Sub--80/31048/1)

SCIENCE APPLICATIONS, INC., ROCKVILLE, MD (USA). NUCLEAR ENVIRONMENTAL SERVICES DIV.
Activity levels of transuranic nuclides in low-level solid wastse from US power reactors. Final report, 446 (EPRI-NP--1494)
Iodine species in reactor effluents and in the environment. Final report, 2922 (EPRI-NP--1269)

SCIENCE APPLICATIONS, INC., SAN DIEGO, CA (USA)
Identification of iodine-129 sources, concentrations, contaminant levels and radioiodine monitoring techniques in LWR reprocessing operations, 76 (SAI--00979-1)
R and D for an off-gas treatment system for a slagging pyrolysis radioactive waste incinerator. Final report for Phase III, 995 (SAI--132-79-764-LJ)
R and D for an off-gas treatment system for a slagging pyrolysis radioactive waste incinerator. Final report for Phase II, 994 (SAI--78-904-LJ)

SCIENCE APPLICATIONS, INC., SAN LEANDRO, CA (USA)
Thermomechanical response of WIPP repositories, 1966 (SAND--79-7111)

SCRIPPS INSTITUTION OF OCEANOGRAPHY, LA JOLLA, CA (USA)
Biological ramifications of the subseabed disposal of high-level nuclear waste, 1949 (SAND--79-2117C)
Biological studies of the US Subseabed Disposal Program, 1947 (SAND--79-2073)
Environmental studies data base: development and data synthesis activities of the US Subseabed Disposal Program, 2006 (SAND--80-2096C)

SERATA GEOMECHANICS, INC., BERKELEY, CA (USA)
Geomechanics of bedded salt, 3571 (UCRL--15117)

SHANNON AND WILSON, INC., PORTLAND, OR (USA)
Bibliography of the geology of the Columbia plateau and adjacent areas of Washington, 3518 (RHO-BWI-C--82)

SHANNON AND WILSON, INC., SEATTLE, WA (USA)
Preliminary subsurface hydrologic considerations: Columbia River Plateau Physiographic Province. Assessment of effectiveness of geologic isolation systems, 1736 (PNL--2859)

SOCIETE BELGE POUR L'INDUSTRIE NUCLEAIRE, BRUSSELS
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SOVET EHKONOMICHESKOJ VZAIMOPOMOSHCHI, MOSCOW (USSR). POSTOYANNIYA KOMISSIYA PO ISPOL'ZOVANIYU ATOMNOJ EHNERGII V MIRNYKH TSELYAKH
Research on deactivation of liquid, solid and gaseous

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Research on desactivation of liquid, solid and gaseous radioactive wastes and decontamination of surfaces. Part 1. Processing of liquid radioactive wastes of low and medium activity, 455 (INIS-mf--5570)
Research on desactivation of liquid, solid and gaseous radioactive wastes and decontamination of surfaces. Part 3, 1515 (INIS-mf--5572)
Research on desactivation of liquid, solid and gaseous radioactive wastes and decontamination of surfaces. Proceedings of the 4-th scientific and technical conference of CMEA. Moscow, 20 - 23 december 1976. Part 1. Processing of liquid radioactive wastes of low and medium activity, 802 (INIS-mf--5570)
Research on desactivation of liquid, solid and gaseous radioactive wastes and decontamination of surfaces. Part 3. Burial of all types of radioactive wastes in geological formations, 835 (INIS-mf--5572)
Research on desactivation of liquid, solid and gaseous radioactive wastes and decontamination of surfaces. Part 5, 841 (INIS-mf--5574)
Research on desactivation of liquid, solid and gaseous radioactive wastes and decontamination of surfaces. Proceedings of the 4th scientific and technical conference of CMEA. Moscow, 20-23 December 1976. Part 2. Improvement of methods and equipment for processing, solidification and burial of radioactive wastes, including high-activity wastes, 825 (INIS-mf--5571)
SRI INTERNATIONAL, MENLO PARK, CA (USA)
Building effects on effluent dispersion from roof vents at nuclear power plants. Final report, 2923 (EPRI-NP--1380)
Procedures for aggregating citizen preferences in the context of the nuclear waste management problem. Final report, 538 (UCRL--15214)
STANFORD LINEAR ACCELERATOR CENTER, CA (USA)
Annual environmental monitoring report, January-December 1979, 3247 (SLAC--228)
STATENS KAERNKRAFTINSPEKTION, STOCKHOLM (SWEDEN)
Quarterly report from the Swedish Nuclear Power Inspectorate Jul - Sep 1979, 2675 (INIS-mf--5666)
STATENS STRAALSKYDDSINSTITUT, STOCKHOLM (SWEDEN)
Statistical information 1971-76. From the National Institute of Radiation Protection, 2529 (INIS-mf--5012)
STATE UNIV. OF NEW YORK, STONY BROOK (USA)
Characterization of organics in leachates from low-level radioactive waste disposal sites, 1408 (BNL-NUREG--27235)
STATE UNIV. OF NEW YORK, STONY BROOK (USA). RESEARCH FOUNDATION
[Relative mobilities and transport mechanisms of trace elements during contact metamorphism of carbonate rocks]. Progress report, 1454 (DOE/ER/10412--2)
STICHTING ENERGIEONDERZOEK CENTRUM NEDERLAND, PETTEN
Comparison of temperature calculations for an arbitrary high-level waste disposal configuration in salt formations, 1474 (ECN--63)
STICHTING ENERGIEONDERZOEK CENTRUM NEDERLAND, THE HAGUE
Annual report 1978, 3094 (INIS-mf--5244)
STIFTELSEN SVENSK DETONIKFORKSNING, STOCKHOLM (SWEDEN)
Analysis of the state of strain around different geometries with radial cracks in an indefinite medium due to expansive forces, 3547 (DS--1972-11)
STUDSVIK ENERGITEKNIK AB, NYKOEPING (SWEDEN)
Calculations of the diffusion of nuclides through cracks in containers made of concrete, 2018 (STUDSVIK-K2--78/70)
Cleaning of stack gases from combustion of low level radioactive waste in Studsvik, Sweden, 1006 (STUDSVIK/K1/4--79/31)
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Regular control of monitors for effluents from nuclear power plant stacks, 2948 (STUDSVIK/K2--79/79)
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SUMMERS (W.K.) AND ASSOCIATES, INC., SOCORRO, NM (USA)
Spring inventory of the Rattlesnake Hills, 1813 (RHO-BWI-C--47)
SVENSK KAERNBRAENSLEFOERSOERJNING AB, STOCKHOLM
Bedrock and the soil types in the Finnsjoearea, Sweden, 3524 (SKBF-KBS-TR--79-02)
Calculation of ground water movements in the Sternoe area in Blekinge, Sweden, 3404 (SKBF/KBS-TR--79-08)
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Temperature and stress calculation for final disposal, 2012 (SKBF/KBS-TR--79-04)
Temperature loading and rocks mechanics at final storage of radioactive waste, 2011 (SKBF/KBS-TR--79-03)
Water percolation effects on clay-poor bentonite/quartz buffer material at high hydraulic gradients, 3405 (SKBF/KBS-TR--79-17)
SYSTEMS, SCIENCE AND SOFTWARE, LA JOLLA, CA (USA)
Downhole television (DHTV) applications in borehole plugging, 1984 (SAND--80-0459)

T

TECHNISCHE HOCHSCHULE AACHEN (GERMANY, F.R.)
Applied systems analysis No. 11: introduction of nuclear long-distance energy. Environmental impact and its assessment, 2893 (Juel--1573)
Contribution to the treatment of low level radioactive waste solutions from the fabrication or refabrication of nuclear fuel containing ammonium nitrate, 860 (Juel--1593)
Improvement of chemical and physical processes to treat the waste water from nuclear power plants, 2722 (Juel--1586)
Investigations on the generation of actinides in the high temperature reactor, 2763 (Juel--1603)
TECHNISCHE HOCHSCHULE DARMSTADT (GERMANY, F.R.). FACHBEREICH ANORGANISCHE CHEMIE UND KERNCHEMIE
Investigations on the extraction of Pu from MAW, 609 (AED-Conf--78-274-018)
TECHNISCHE UNIV., VIENNA (AUSTRIA)
Solidification of liquids by the use of microwaves, 787 (INIS-mf--5316)
TEKNEKRON, INC., BERKELEY, CA (USA)
Nuclear waste management issues: a multidisciplinary evaluation framework. TeKneKron B-52865-A-L, 512 (PNL--3078)
TEKNEKRON, INC., MCLEAN, VA (USA)
A study of radioactive airborne effluents from particle accelerators. Technical report (final), 3236 (P8--80-101314)
TENNESSEE TECHNOLOGICAL UNIV., COOKEVILLE (USA)
Iodine evolution from nuclear fuel dissolver solutions by air sparging, 39 (CONF-800802--18(Draft))
TENNESSEE UNIV., KNOXVILLE (USA)
Anion effects on the retention of selected actinides on geologic media, 1683 (ORO--4447-102)
TERA ADVANCED SERVICES CORP., BERKELEY, CA (USA)
Transuranic contaminated waste container characterization and data base. Revision I, 1008 (UCRL--15253)
TERA CORP., BERKELEY, CA (USA)
Assessment of effectiveness of geologic isolation systems: the feasibility of computer interrogation of experts for WISAP, 1737 (PNL--2862)
Seismic hazard analysis for the NTS spent reactor fuel test site, 3540 (UCRL--15260)
Spent fuel data base: commercial light water reactors, 2678 (UCRL--15186)
Transuranic contaminated waste functional definition and implementation, 2058 (UCRL--15229)
TERRA TEK, INC., SALT LAKE CITY, UT (USA)
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Rock properties and their effect on thermally-induced displacements and stresses, 1589 (LBL--10517)
Very deep hole concept: evaluation of an alternative for nuclear waste disposal, 1564 (LBL--7089)
TEXAS TECH UNIV., LUBBOCK (USA)
Report of biological investigations at the Los Medanos Waste Isolation Pilot Plant (WIPP) area of New Mexico during FY 1978, 3299 (SAND--79-0368)
Sensitivity study on the parameters of the regional hydrology model for the Nevada nuclear waste storage investigations, 1920 (SAND--79-1197C)
TEXAS UNIV., AUSTIN (USA)
Evaluation of systems incorporating transmutation for the reduction of the long term toxicity of high-level waste, 2283
Investigation of salt transport in vertical boreholes in brine invasion into freshwater aquifers. Technical report, 1634 (ONWI--77)
TEXAS UNIV., AUSTIN (USA). BUREAU OF ECONOMIC GEOLOGY
Locating field confirmation study areas for isolation of nuclear waste in the Texas Panhandle. Annual report, October 1, 1978-September 30, 1979, 1635 (ONWI--79/E511-00300-4)
TRC ENVIRONMENTAL CONSULTANTS, WETHERSFIELD, CT (USA)
Meteological and air quality data, quarterly report. WIPP site: Eddy County, New Mexico. Autumn quarter, September 1977-November 1977, 3294 (SAND--80-7121)
Meteorological and air quality data quarterly report. WIPP site: Eddy County, New Mexico. Summer quarter, June 1977-August 1977, 2478 (SAND--80-7107)

TRC, INC., WETHERSFIELD, CT (USA)
Meteorological and air quality data quarterly report WIPP site: Eddy County, New Mexico. Winter quarter, December 1976-February 1977, 1963 (SAND--79-7042)
Meteorological and air quality data quarterly report. WIPP site: Eddy County, New Mexico. Spring quarter, March-May 1977, 3180 (SAND--79-7109)

U

UKAEA ATOMIC ENERGY RESEARCH ESTABLISHMENT, HARWELL
Glasses and ceramics for immobilisation of radioactive wastes for disposal, 612 (AERE-R--9417)
Measurement system for use in the selection of plutonium contaminated waste for disposal, 1388 (AERE-R--8301)
Practical aspects of heat transfer in radioactive-waste repository design, 1389 (AERE-R--9343)
UKAEA ATOMIC ENERGY RESEARCH ESTABLISHMENT, HARWELL. CHEMICAL TECHNOLOGY DIV.
Development of a high level radioactive waste management strategy, 1392 (AERE-R--9548)
High-level waste solidification - why we chose glass, 613 (AERE-R--9432)
Predicted peak temperature-rises around a high-level radioactive waste canister emplaced in the deep ocean bed, 1391 (AERE-R--9518)
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Radioactive waste disposal by UKAEA establishments during 1978 and associated environmental monitoring results, 1390 (AERE-R--9445)
UKAEA ATOMIC ENERGY RESEARCH ESTABLISHMENT, HARWELL. MATERIALS DEVELOPMENT DIV.
Progress towards the use of disposable filters, 610 (AERE-M--3012)
UKAEA ATOMIC ENERGY RESEARCH ESTABLISHMENT, HARWELL. THEORETICAL PHYSICS DIV.
Enhanced diffusion and related phenomena in solids containing active species, 3590 (AERE-M--3063)
UKAEA AUTHORITY FUEL PROCESSING DIRECTORATE
Design study for a fission product fixation plant and storage at Windscale, 611 (AERE-R--9416)
UKAEA RISLEY NUCLEAR POWER DEVELOPMENT ESTABLISHMENT
Vitrification of nuclear waste, 993 (RISLEY-Trans--3373)
UKAEA RISLEY NUCLEAR POWER DEVELOPMENT LABS.
Organisation of nuclear safety in France, 3045 (RISLEY-Trans--3352)
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The title may be supplemented with additional words, or a phrase, if it appears additional information would be helpful. In cases for which the title contains little or no information related to the subject entry, it may be replaced entirely by the supplementary information. A qualifier is not always required, and in such cases the title will follow the unqualified subject descriptor.

The descriptors selected for use as subject terms are generally the names of specific materials, things, or processes. To the extent possible, a qualifier is selected to describe the properties of, or processes applied to, the subject term.

Index entries are selected to indicate the important ideas and concepts presented in the report, rather than words that may appear in the text. Within the available thesaurus terms, the most probable or logical place to look for typical information is selected. "See references" are included to guide users from synonymous terms or phrases to the descriptor selected as a subject heading for the concept. (e.g. Pipeline Quality Gas see HIGH BTU GAS). "See also references" are used to indicate where to find references to subject concepts that are narrower, broader, or related to a particular subject heading. to complete an exhaustive search of a given subject, all such headings should be reviewed.

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Environmental studies data base: development and data synthesis activities of the US Subseabed Disposal Program, 2006 (SAND--80-2096C)
Subseabed Disposal Program. Annual report, January-December 1978, 1933 (SAND--79-1618/1)
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AC06-RL7701030		Woodward-Clyde Consultants, San Francisco, CA (USA)
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	81:677	CONF-800607-79
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AC08-76NV01183		EG and G, Inc., Las Vegas, NV (USA). Energy Measurements Group
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AC08-80NV10061		Westinghouse Electric Corp., Mercury, NV (USA). Advanced Energy Systems Div.
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AC09-76SR00001		Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.
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AC09-79ET41900		Rockwell International Corp., Canoga Park, CA (USA). Energy Systems Group
	81:420	DOE/ET/41900-T2
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	81:701	DOE/ET/41900-T1
AC09-79ET47906		Nuclear Services Corp., Campbell, CA (USA)
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AC09-79ET47921		Allied-General Nuclear Services, Barnwell, SC (USA)
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	81:614	AGNS-47921-3026-TPR-2
AC09-DPSR00001		Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.
	81:738	DP-MS-80-39
AC090-76SR00001		Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.
	81:727	DP-MS-79-91
AC13-76GJ01664		Geological Survey, Denver, CO (USA). Geologic Div.
	81:539	USGS-OFR-80-817
AC14-76FF02170		Battelle Columbus Labs., OH (USA)
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	81:3035	HEDL-SA-2017-FP
AC15-76CL02395		Westinghouse Electric Corp., Madison, PA (USA). Advanced Reactors Div.
	81:3029	CONF-800434-5
AC97-79ET44614		Texas Univ., Austin (USA). Bureau of Economic Geology
	81:1635	ONWI-79/E511-00300-4
AI08-76DP00474		Fermi National Accelerator Lab., Batavia, IL (USA)
	81:3415	FERMILAB-80/29
AI08-78ET44802		Geological Survey, Reston, VA (USA)
	81:2093	USGS-OFR-80-929
	81:2094	USGS-OFR-80-941
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	81:3362	DOE/SF/00701-T61
AM03-76SF00893		General Electric Co., Sunnyvale, CA (USA). Advanced Reactor Systems Dept.
	81:774	GEFR-SP-215
AM06-76RL02130		Atlantic Richfield Hanford Co., Richland, WA (USA)
	81:618	ARH-SA-203
AT03-76SF70030		General Electric Co., Sunnyvale, CA (USA). Advanced Reactor Systems Dept.
	81:3606	GEFR-SP-204
AT03-76SF71053		General Atomic Co., San Diego, CA (USA)
	81:709	DOE/SF/71053-T1
AT03-76SF74028		Rockwell International Corp., Canoga Park, CA (USA). Energy Systems Group
	81:3034	ESG-DOE-13294
AT03-80SF10791		General Atomic Co., San Diego, CA (USA)
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EW-78-A-08-1543		Geological Survey, Denver, CO (USA)
	81:2092	USGS-OFR-80-466
EW-78-C-06-1076		Battelle Human Affairs Research Center, Seattle, WA (USA)
	81:379	B-HARC-411-021
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	81:2086	USGS-1543-4
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	81:2089	USGS-OFR-79-1244
	81:2091	USGS-OFR-80-126
EW-78-S-02-4917		Harvard Univ., Cambridge, MA (USA). Center for Science and International Affairs
	81:1442	COO-4917-1
EW-78-X-07-0115		Geological Survey, Boise, ID (USA). Water Resources Div.
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EY-76-C-02-0016		Brookhaven National Lab., Upton, NY (USA)
	81:482	NUREG/CR-1326
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EY-76-C-06-1953		Oregon State Univ., Corvallis (USA). Radiation Center
	81:3005	DOE/ER/01953-T1
EY-76-C-06-2130		Minnesota Univ., Minneapolis (USA). Mineral Resources Research Center
	81:1831	RHO-BWI-SA-20
EY-76-C-06-2195		Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations
	81:250	RHO-C-25(Vol.2)(Draft)
EY-76-C-07-1570		Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)
	81:37	CONF-800610-2
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	81:3199	EGG-1183-1726
	81:3201	EGG-1183-1759
	81:3318	EGG-1183-1686
EY-76-C-09-0001		Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.
	81:43	DP-1527
	81:44	DPSTD-AFCT-77-7
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EY-76-C-09-0968		Clemson Univ., SC (USA). Dept. of Chemistry and Geology
	81:710	DOE/SR/00968-6
EY-76-C-11-0292		Duquesne Light Co., Shippingport, PA (USA)
	81:3195	DOE/PNRO-0292-T1
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	81:1488	HEDL-TME-78-70
	81:2848	HEDL-TC-1283
EY-76-S-02-2185		Columbia Univ., Palisades, NY (USA). Lamont-Doherty Geological Observatory
	81:3408	COO-2185-12
EY-76-S-02-2510-092		Pennsylvania State Univ., University Park (USA). Materials Research Labs.
	81:691	COO-2510-15
EY-76-S-05-4447		Tennessee Univ., Knoxville (USA)
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EY-76-S-06-2225-024		Washington Univ., Seattle (USA). Dept. of Oceanography
	81:3467	DOE/EV/70024-31
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1	3414	See COO-3563-78
CONF-780740-		(Management, stabilization, and environmental impact of uranium mill trailings, Albuquerque, NM, USA, 24-28 Jul 1978)
	601	Paris, France: OECD Nuclear Energy Agency (1978).
CONF-780801-		(13. intersociety energy conversion engineering conference, San Diego,

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		CA, USA, 20-25 Aug 1978)
P2	2353	2: 1290-1294(1978)
CONF-780921-		(Conference on neutron physics and other applied purposes, Harwell, UK, 25-29 Sep 1978)
14	4	See KFK-2833
CONF-7809154-		(OECD seminar on in situ heating experiments in geological formations, Ludvika, Sweden, Sep 1978)
	2360	Paris, France: OECD (1978).
CONF-7809155-		(Symposium on the Idaho National Engineering Laboratory ecology programs, Grand Teton, WY, USA, 10-12 Sep 1978)
	3363	See IDO-12088
	3364	See IDO-12088
	3365	See IDO-12088
	3366	See IDO-12088
	3367	See IDO-12088
	3368	See IDO-12088
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	3471	See IDO-12088
	3472	See IDO-12088
	3473	See IDO-12088
CONF-7809171-		(Conference on the role of the fast breeder reactor, Essen, F.R. Germany, 27 Sep 1978)
1	2892	See INTAT-78.147
CONF-7809195-		(9. national conference on radionuclides and ionizing radiation in water management, Liberec, Czechoslovakia, 28-29 Sep 1978)
	692	See CS-INIS-258
	693	See CS-INIS-258
	694	See CS-INIS-258
	695	See CS-INIS-258
	696	See CS-INIS-258
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	3466	See CS-INIS-258
	3599	See CS-INIS-258
	3600	See CS-INIS-258
CONF-7809198-		(Meeting on migration of radionuclides in crystalline rocks, Studsvik, Sweden, 11-12 Sep 1978)
1	1763	See PNL-SA-7184
CONF-781022-		(Meeting on nuclear power reactor safety, Brussels, Belgium, 16-19 Oct 1978)
68	2805	See INIS-mf-4767
75	784	See INIS-mf-4771
76	2910	See INIS-mf-4778
84	3036	See INIS-mf-4862
CONF-7810177-		(Lecture meeting on principles and applications of nuclear-, radio-, and radiation chemistry, Lindau, F.R. Germany, 16-19 Oct 1978)
	31	See AED-Conf-78-274-000
26	609	See AED-Conf-78-274-018
CONF-7810227-		(2. contractor information meeting, Seattle, WA, USA, 1-5 Oct 1978)
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CONF-781109-		(Environmental control symposium, Washington, DC, USA, 28-30 Nov 1978)
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(Vol.2)	703	See DOE/EV-0046(Vol.2)
(Vol.2)	704	See DOE/EV-0046(Vol.2)
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(Vol.2)	2525	See DOE/EV-0046(Vol.2)
(Vol.2)	3602	See DOE/EV-0046(Vol.2)
CONF-781121-		(Annual meeting of Materials Research Society, Boston, MA, USA, 28 Nov-1 Dec 1978)
(Vol.1)	1222	Plenum Press, 227 West 17th Street, New York, NY
CONF-781174-		(Conference on the nuclear data of higher plutonium and americium isotopes for reactor applications, Upton, NY, USA, 20-22 Nov 1978)
	2791	See BNL-50991
CONF-781180-		(International symposium on the decommissioning of nuclear facilities, Vienna, Austria, 13-17 Nov 1978)
	2812	See STI/PUB-500
CONF-7811122-		(Chattanooga shale conference, Oak Ridge, TN, USA, 14 Nov 1978)
	2421	See GJBX-170(79)
CONF-7811153-		(Thermal power conference, Pullman, WA, USA, 8 Nov 1978)
	2382	165-181(1978)
CONF-7811158-		(Ispra courses on radiation shielding methods, Varese, Italy, 20-24 Nov 1978)
1	3591	See CEA-CONF-4493
CONF-781246-		(American Geophysical Union annual fall meeting, San Francisco, CA, USA, 4 Dec 1978)
2	1567	See LBL-8423
CONF-790111-		(International symposium on thermodynamics of nuclear materials, Julich, F.R. Germany, 29 Jan-2 Feb 1979)
14	853	See INKA-Conf-79-003-004
CONF-790161-		(Symposium on radionuclide migration, Brussels, Belgium, 29-31 Jan 1979)
1(Trans.)	3446	See SAND-79-6002
CONF-790181-		(SFRP session on safety in handling of low activity unsealed sources, Fontenay-aux-Roses, France, 17 Jan 1979)
5	626	See CEA-CONF-4677
CONF-790202-		(6. annual energy conference and exibition energy and the public, Knoxville, TN, USA, 21-23 Feb 1979)
	3108	Dep. NTIS, PC A13/MF A01
CONF-790204-		(Symposium on waste management and fuel cycles 1979, Tucson, AZ, USA, 28 Feb 1979)
11	956	See PNL-SA-7414
12	957	See PNL-SA-7499
CONF-790209-		(12. Health Physics Society midyear topical symposium, Williamsburg, VA, USA, 12-15 Feb 1979)
	501	See PB-296947
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CONF-790213-		(6. energy technology conference and exposition, Washington, DC, USA, 26-28 Feb 1979)
	2841	6: 862-870(Apr 1979)
CONF-790304-		(19. annual ASME symposium, geological disposal of nuclear waste, Albuquerque, NM, USA, 15-16 Mar 1979)
8	1578	See LBL-9424
9	520	See PNL-SA-7540
CONF-790313-		(NACE/Corrosion 1979 meeting, Atlanta, GA, USA, 12-16 Mar 1979)
5	2676	See PNL-SA-7381
CONF-790374-		(AECD-IAEA symposium on the on-site management of power reactor, Zurich, Switzerland, 26-30 Mar 1979)
	2905	Paris, France: OECD (1979).
2	2773	See AECL-6534
CONF-7903112-		(6. Indian Association for Radiation Protection conference, Bombay, India, 7-9 Mar 1979)
(Summ.)	3322	See INIS-mf-5372
(Summ.)	3439	See INIS-mf-5372
CONF-790415-		(177. national meeting of the American Chemical Society, Honolulu, HI, USA, 1-6 Apr 1979)
P5	82	Washington, DC: American Chemical Society (1980).
P6	3401	Ann Arbor, MI: Ann Arbor Science Publishers, Inc. (1980).
CONF-790420-		(International symposium on ceramics in nuclear waste management, Cincinnati, OH, USA, 30 Apr-2 May 1979)
	382	Dep. NTIS, PC A17/MF A01
	383	Dep. NTIS, PC A17/MF A01
	384	Dep. NTIS, PC A17/MF A01
	385	Dep. NTIS, PC A17/MF A01
	386	Dep. NTIS, PC A17/MF A01
	387	Dep. NTIS, PC A17/MF A01
	388	Dep. NTIS, PC A17/MF A01
	389	Dep. NTIS, PC A17/MF A01
	390	Dep. NTIS, PC A17/MF A01
	391	Dep. NTIS, PC A17/MF A01
	392	Dep. NTIS, PC A17/MF A01
	393	Dep. NTIS, PC A17/MF A01
	394	Dep. NTIS, PC A17/MF A01
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	405	Dep. NTIS, PC A17/MF A01
	406	Dep. NTIS, PC A17/MF A01
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	632	Dep. NTIS, PC A17/MF A01
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	634	Dep. NTIS, PC A17/MF A01
	635	Dep. NTIS, PC A17/MF A01
	636	Dep. NTIS, PC A17/MF A01
	637	Dep. NTIS, PC A17/MF A01
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	658	Dep. NTIS, PC A17/MF A01
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	660	Dep. NTIS, PC A17/MF A01
	661	Dep. NTIS, PC A17/MF A01
	662	Dep. NTIS, PC A17/MF A01
	663	Dep. NTIS, PC A17/MF A01
	664	Dep. NTIS, PC A17/MF A01
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	1420	Dep. NTIS, PC A17/MF A01
	1421	Dep. NTIS, PC A17/MF A01
	1422	Dep. NTIS, PC A17/MF A01
CONF-7904116-		(Geological Society of America cordilleran section meeting, San Jose, CA, USA, 10 Apr 1979)
1	3562	See RHO-SA-93
CONF-7904121-		(Nuclear materials transportation program development seminar, Albuquerque, NM, USA, 18-19 Apr 1979)
	259	See SAND-79-2262
CONF-790562-		(Radiation effects on aquatic organisms, Tokyo, Japan, May 1979)
2	3465	Dep. NTIS, PC A02/MF A01
CONF-7905119-		(Annual meeting of the task group on water chemistry of the Gesellschaft Deutscher Chemiker, Bad Pyrmont, F.R. Germany, 21-23 May 1979)
2	2934	See INKA-Conf-79-187-001
CONF-7905149-		(6. national conference on radionuclide applications in national economy, Valtice na Morave, Czechoslovakia, 21-25 May 1979)
(Absts.)	788	See INIS-mf-5320
CONF-790602-		(ANS annual meeting, Atlanta, GA, USA, 3-8 Jun 1979)
93	1408	See BNL-NUREG-27235
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CONF-790666-		(34. Northwest regional meeting of the American Chemical Society, Richland, WA, USA, 13-15 Jun 1979)
6	986	See RHO-SA-116
CONF-790683-		(ONWI-LLL workshop on thermomechanical modeling for a hard rock repository, Berkeley, CA, USA, 25-27 Jun 1979)
2	1832	See RHO-BWI-SA-21
3	1579	See LBL-9426
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CONF-7906121-		(Permiability and groundwater containment transport symposium, Philadelphia, PA, USA, 17-23 Jun 1979)
1	3506	Dep. NTIS, PC A03/MF A01
CONF-7906142-		(19. Canadian Nuclear Association annual international conference, Toronto, Canada, 10-13 Jun 1979)
2	125	See AECL-6577
CONF-790711-		(International symposium on underground disposal of radioactive wastes, Otaniemi, Finland, 2-6 Jul 1979)
4	1765	See PNL-SA-7243
5	1830	See RHO-BWI-SA-19
CONF-790728-		(24. annual meeting of the Health Physics Society, Philadelphia, PA, USA, 7-13 Jul 1979)
6	3308	See PNL-SA-7497
CONF-790822-		(87. AICHE national meeting, Boston, MA, USA, 19 Aug 1979)
12	131	See AGNS-35900-CONF-7
CONF-790825-		(Annual meeting of the American Statistical Association, Washington, DC, USA, 12-16 Aug 1979)
6	1868	See RHO-SA-117
CONF-790881-		(5. university conference on glass science: electrical, magnetic and optical properties of glass, Troy, NY, USA, 22-24 Aug 1979)
1	1423	Dep. NTIS, PC A02/MF A01
CONF-790923-		(Decontamination and decommissioning of nuclear facilities conference, Sun Valley, ID, USA, 16-19 Sep 1979)
8	3596	Dep. NTIS, PC A02/MF A01
10	2677	See PNL-SA-7535
13	958	See PNL-SA-8014
CONF-790928-		(International meeting on monitoring of Pu-contaminated waste, Ispra, Italy, 25-28 Sep 1979)
2	2627	See MLM-2755(OP)
CONF-790938-		(Workshop on the use of argillaceous materials for the isolation of radioactive wastes, Paris, France, 10-12 Sep 1979)
1	1930	See SAND-79-1475C
3	1929	See SAND-79-1474C
4	1938	See SAND-79-1746C
5	1424	Dep. NTIS, PC A02/MF A01
6	1425	Dep. NTIS, PC A02/MF A01
CONF-790944-		(4. international congress on rock mechanics, Montreux, Switzerland, 2-8 Sep 1979)
1	1831	See RHO-BWI-SA-20
CONF-790948-		(Annual meeting of the American Institute of Professional Geologists, Lafayette, LA, USA, 21 Sep 1979)
1	2074	See UCRL-83285
CONF-790949-		(Energy resources workshop, Oak Ridge, TN, USA, 24-26 Sep 1979)
2	2	Dep. NTIS, PC A04/MF A01
CONF-790957-		(International nuclear fuel cycle evaluation conference, Vienna, Austria, 17-21 Sep 1979)
1	532	See SAND-79-1886C
CONF-790977-		(Conference on health effects of energy production, Ontario, Canada, 12-14 Sep 1979)
1	3597	Dep. NTIS, PC A02/MF A01
CONF-790994-		(26. Pacific Northwest regional meeting of the American Geophysical Union, Bend, OR, USA, 17-18 Sep 1979)
1	1780	See PNL-SA-7897
CONF-7909102-		(Argonne specialists' workshop on basic research needs for nuclear waste management, Argonne, IL, USA, 5-6 Sep 1979)
2	1781	See PNL-SA-7953
CONF-7909106-		(State workshop of review of the Nuclear Regulatory Commission's decommissioning policy, Seattle, WA, USA, 25-27 Sep 1979)
	1601	See NUREG/CP-0008
	2806	See NUREG/CP-0008
	2807	See NUREG/CP-0008
	2808	See NUREG/CP-0008
	2809	See NUREG/CP-0008
	2810	See NUREG/CP-0008
	2811	See NUREG/CP-0008
CONF-7909107-		(State workshop for review of the Nuclear Regulatory Commission's decommissioning policy, Columbia, SC, USA, 11-14 Sep 1979)
	1601	See NUREG/CP-0008
	2806	See NUREG/CP-0008
	2807	See NUREG/CP-0008
	2808	See NUREG/CP-0008
	2809	See NUREG/CP-0008
	2810	See NUREG/CP-0008
	2811	See NUREG/CP-0008
CONF-7909110-		(Federation of Analytical Chemistry and Spectroscopy Societies conference, Philadelphia, PA, USA, 17-21 Sep 1979)
1	75	See RHO-SA-122
CONF-7909138-		(International Federation of Information Processing working conference on simulation and the environment, Bangor, UK, 18-20 Sep 1979)
1	3527	See UCRL-82649
CONF-791004-		(ASCE national meeting, Atlanta, GA, USA, Oct 1979)
2	246	See PNL-SA-7344
CONF-791009-		(International conference on energy use management, Los Angeles, CA, USA, 22-26 Oct 1979)
39	3191	Dep. NTIS, PC A02/MF A01
CONF-791016-		(1979 DOE statistical symposium, Gatlinburg, TN, USA, 24-26 Oct 1979)
3	1920	See SAND-79-1197C
CONF-791033-		(1. annual ONWI information meeting, Columbus, OH, USA, 30 Oct-1 Nov 1979)
	902	See ONWI-62
1	1935	See SAND-79-1634C
2	1833	See RHO-BWI-SA-25
3	1580	See LBL-9582
4	254	See RHO-SA-141
5	253	See RHO-SA-136
6	207	See HEDL-SA-1891-FP
7	1483	See HEDL-SA-1892-FP
8	206	See HEDL-SA-1890-FP
CONF-791037-		(IEEE nuclear science/nuclear power systems symposium, San Francisco, CA, USA, 17-19 Oct 1979)

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3	3047	See UCRL-83489
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CONF-791049-		(23. conference on analytical chemistry in energy technology, Gatlinburg, TN, USA, 9-11 Oct 1979)
3	2073	See UCRL-82798
11	3604	See DPSPU-79-30-14
21	3618	See RHO-SA-81
26	3025	NTIS, PC A03/MF A01
CONF-791050-		(3. Nuclear Energy Agency seminar on marine radioecology, Tokyo, Japan, 1-5 Oct 1979)
2	1798	See PNL-SA-8011
CONF-791058-		(International conference on nuclear cross sections for technology, Knoxville, TN, USA, 22-26 Oct 1979)
66	2661	See UCRL-82969
CONF-791061-		(American Ceramic Society fall meeting, Bedford, PA, USA, 10-12 Oct 1979)
1	724	See DP-MS-79-42
CONF-791072-		(2. symposium on biotechnology in energy production and conservation, Gatlinburg, TN, USA, 3-5 Oct 1979)
4	35	See CONF-791184-1
CONF-791087-		(US/FRG bilateral workshop on waste isolation performance assessment and in-situ testing, Berlin, F.R. Germany, 1-5 Oct 1979)
	1638	See ONWI-88
	1639	See ONWI-88
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1	1943	See SAND-79-1959C
CONF-7910108-		(Symposium on separation science and technology for energy applications, Gatlinburg, TN, USA, 30 Oct-2 Nov 1979)
4	72	See PNL-SA-7844
CONF-7910160-		(3. contractor information meeting on waste isolation safety assessment program task 4, Seattle, WA, USA, 14-17 Oct 1979)
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CONF-7910184-		(IAEA evaluation of solidified high level radioactive waste products workshop, Berlin, F.R. Germany, 15-19 Oct 1979)
1	959	See PNL-SA-8085
CONF-791103-		(American Nuclear Society meeting, San Francisco, CA, USA, 12-16 Nov 1979)
	6	33: 123-124(1979)
	105	33: 469-470(1979)
	106	33: 893-894(1979)
	107	33: 915-916(1979)
	338	33: 450(1979)
	339	33: 450-451(1979)
	340	33: 452-453(1979)
	341	33: 453-454(1979)
	342	33: 458-462(1979)
	586	33: 433-435(1979)
	1248	33: 387-388(1979)
	1249	33: 410(1979)
	1250	33: 411-412(1979)
	1251	33: 412-413(1979)
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	1253	33: 416-417(1979)
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	1260	33: 468(1979)
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	1262	33: 278-280(1979)
	1263	33: 947-948(1979)
	1264	33: 939-940(1979)
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	1266	33: 942-943(1979)
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	2294	33: 426(1979)
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	2312	33: 944-946(1979)
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	2314	33: 205-206(1979)
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	2316	33: 208-209(1979)
	2505	33: 154-155(1979)
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	2509	33: 173-174(1979)
	2510	33: 174-175(1979)
	2587	33: 390(1979)
	2588	33: 380-382(1979)
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	2596	33: 422-423(1979)
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	2600	33: 161-162(1979)
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	2602	33: 364-366(1979)
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	2671	33: 765-766(1979)
	2696	33: 620-622(1979)
	2697	33: 754-756(1979)
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31	723	See DP-MS-79-40
33	725	See DP-MS-79-53
34	3604	See DPSPU-79-30-14
36	436	See DPSPU-79-30-11
40	132	See AGNS-35900-CONF-41
42	1426	Dep. NTIS, PC A02/MF A01
51	434	See DP-MS-79-55
62	1869	See RHO-SA-131
72	973	See RFP-2972
98	1427	Dep. NTIS, PC A02/MF A01
107	3192	Dep. NTIS, PC A02/MF A01
CONF-791108-		(72. AICHE meeting, San Francisco, CA, USA, 25-29 Nov 1979)
3	201	See DP-MS-79-71
9	203	See DPSP-AFR-79-6-3
13	863	See K/ET-174
CONF-791112-		(Materials Research Society annual meeting, Boston, MA, USA, 26 Nov 1979,-29 Nov 1979/REPLACES CONF-791173)
2	1911	See SAND-79-1000C

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3	1915	See SAND-79-1047C
4	1914	See SAND-79-1036C
5	531	See SAND-79-1667C
6	1902	See SAND-79-0895C
7	2475	See SAND-79-0955C
8	1468	See DP-MS-79-31
9	2484	See UCRL-82228
10(Pt.2)	2483	See UCRL-81147(Pt.2)
11	1469	See DP-MS-79-37
12	726	See DP-MS-79-70
13	1466	See DP-MS-79-25
14	1912	See SAND-79-1013C
15	2476	See SAND-79-1016C
16	2474	See SAND-79-0900C
17	665	Dep. NTIS, PC A02/MF A01
18	1904	See SAND-79-0907C
19	1907	See SAND-79-0981C
20	258	See SAND-79-1929C
21	1905	See SAND-79-0911C
22	2473	See SAND-79-0896C
23	1560	See LA-UR-79-2992
24	1428	Dep. NTIS, PC A02/MF A01
25	2076	See UCRL-83488
26	1582	See LBL-9903
27	3554	See LBL-9884
28	1429	Dep. NTIS, PC A02/MF A01
29	1916	See SAND-79-1076C
30	1928	See SAND-79-1429C
31	1906	See SAND-79-0954C
32	1945	See SAND-79-2019C
33	1903	See SAND-79-0905C
34	1913	See SAND-79-1019C
35	721	See DP-MS-79-26
42	1910	See SAND-79-0990C
43	666	Dep. NTIS, PC A02/MF A01
44	1833	See RHO-BWI-SA-25
45	1430	Dep. NTIS, PC A02/MF A01
46	1467	See DP-MS-79-30
47	1909	See SAND-79-0989C
48	1908	See SAND-79-0988C
49	1431	Dep. NTIS, PC A02/MF A01
50	407	Dep. NTIS, PC A02/MF A01
51	1584	See LBL-9952
52	1432	Dep. NTIS, PC A02/MF A01
53	2072	See UCRL-82228(Rev.1)
57	667	Dep. NTIS, PC A02/MF A01
58	1433	Dep. NTIS, PC A02/MF A01
63	668	NTIS, PC A02/MF A01
64	669	Dep. NTIS, PC A02/MF A01
66	408	Dep. NTIS, PC A02/MF A01
67	71	See PNL-SA-7752
68	247	See PNL-SA-7734
69(Pt.2) (Rev.1)	2071	See UCRL-81147(Pt.2)(Rev.1)
CONF-791114-		(USDOE environmental control symposium, Washington, DC, USA, 29 Nov 1979)
1	984	See RHO-SA-91
CONF-791117-		(ANS topical conference, Kiawah Island, SC, USA, 26 Nov 1979,-19 Nov 1979/REPLACES CONF-791180)
4	2624	See LA-UR-79-3218
CONF-791118-		(7. water reactor safety research information meeting, Gaithersburg, MD, USA, 5-9 Nov 1979)
6	2717	Dep. NTIS, PC A03/MF A01
CONF-791134-		(16. international thermal conductivity conference, Chicago, IL, USA, 7-9 Nov 1979)
7	2477	See SAND-79-1665C
10	2078	See UCRL-83789
CONF-791140-		(2. symposium on uranium mill tailings management, Fort Collins, CO, USA, 19-20 Nov 1979)
1	3374	See LA-UR-79-3045
CONF-791144-		(Annual MRS meeting, Boston, MA, USA, 27 Nov 1979,-30 Nov 1979/REPLACED BY CONF-791112)
1	864	See K/ET-5010
CONF-791155-		(Deccan volcanism and related basalt provinces in other parts of the world, Bombay, India, Nov 1979)
1	3519	See RHO-BWI-SA-26
CONF-791182-		(4. international ozone conference, Houston, TX, USA, 26-29 Nov 1979)
1	985	See RHO-SA-98
CONF-791184-		(9. annual hydrometallurgical meeting, Toronto, Canada, 11-13 Nov 1979)
1	35	NTIS, PC A02/MF A01
CONF-791185-		(ANS student chapter seminar, College Station, TX, USA, 5-9 Nov 1979)
1	670	Dep. NTIS, PC A03/MF A01
2	409	Dep. NTIS, PC A03/MF A01

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CONF-791196-		(Symposium on evaluation of existing concrete structures, Washington, DC, USA, 1 Nov 1979)
1	1867	See RHO-SA-108
CONF-7911104-		(DOE/EPRI symposium on Three Mile Island Reactor problems, Harrisburg, PA, USA, 11-29 Nov 1979)
1	3044	See PNL-SA-8143
CONF-791204-		(2. Miami international conference on alternative energy sources, Miami Beach, FL, USA, 10-13 Dec 1979)
22	3587	See BNL-27118
CONF-791205-		(ASME winter annual meeting, New York, NY, USA, 2-7 Dec 1979)
10	1922	See SAND-79-1259C
CONF-791207-		(Winter simulation conference, San Diego, CA, USA, 3-5 Dec 1979)
1	220	See K/DP-268
CONF-791234-		(Environmental decontamination workshop, Oak Ridge, TN, USA, 4-5 Dec 1979)
1	3327	See LA-UR-80-616
7	671	NTIS, PC A03/MF A01
CONF-800117-		(American Nuclear Society conference, Tulsa, OK, USA, 15 Jan 1980)
1	410	Dep. NTIS, PC A03/MF A01
CONF-800204-		(Energy-sources technology conference, New Orleans, LA, USA, 3-7 Feb 1980)
10	1589	See LBL-10517
CONF-800211-		(International symposium on management of gaseous wastes from nuclear facilities, Vienna, Austria, 18-21 Feb 1980)
1	3020	See UNI-SA-77
2(Draft)	672	Dep. NTIS, PC A03/MF A01
3	2844	See K/ET-5007
CONF-800223-		(2. symposium on process measurements for environmental assessment, Atlanta, GA, USA, 25 Feb 1980)
1	3410	See UCRL-83664
CONF-800244-		(ASME, IEEE, and Society of Professional Engineer Joint meeting, New London, CT, USA, 19 Feb 1980)
1	735	See DP-MS-80-25
CONF-800245-		(Workshop on subsurface seismic studies, Seattle, WA, USA, 20 Feb 1980)
1	3546	See DP-MS-80-16
CONF-800303-		(179. national meeting of the American Chemical Society, Houston, TX, USA, 23-28 Mar 1980)
11	729	See DP-MS-79-94
12	879	See LA-UR-80-835
CONF-800304-		(5. international congress of the International Radiation Protection Association, Jerusalem, Israel, 8-14 Mar 1980)
11	2523	NTIS, PC A02/MF A01
CONF-800305-		(Corrosion/80 NACE meeting, Chicago, IL, USA, 6-10 Mar 1980)
1	1467	See DP-MS-79-30
3	722	See DP-MS-79-39
4	673	Dep. NTIS, PC A03/MF A01
5	1946	See SAND-79-2023C
7	1521	See IS-M-273
CONF-800313-		(Waste management conference, Tucson, AZ, USA, 10 Mar 1980)
1	1434	Dep. NTIS, PC A03/MF A01
2	674	Dep. NTIS, PC A02/MF A01
3	675	Dep. NTIS, PC A02/MF A01
4	2560	See UCRL-82236
5	274	See UCRL-83976
6	878	See LA-UR-80-696
8	988	See RHO-SA-145
9	960	See PNL-SA-8414
CONF-800315-		(2. symposium of the European Safeguards Research and Development Association, Edinburgh, UK, 26 Mar 1980)
14	2625	See LA-UR-80-689
20	2615	See BNL-27660
CONF-800334-		(2. DOE environmental control symposium, Reston, VA, USA, 17-19 Mar 1980)
3	1435	Dep. NTIS, PC A02/MF A01

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5	877	See LA-UR-80-692
7	36	Dep. NTIS, PC A02/MF A01
8	3201	See EGG-1183-1759
9	3223	See MLM-2703(OP)
10	3102	See SAND-80-0021C
CONF-800342-		(76. annual meeting Cordilleran Section Geological Society of America, Corvallis, OR, USA, 19-21 Mar 1980)
1	1834	See RHO-BWI-SA-29
2	1836	See RHO-BWI-SA-32
3	1835	See RHO-BWI-SA-30
CONF-800344-		(3. invitational well testing symposium, Oakland, CA, USA, 26-28 Mar 1980)
2	1990	See SAND-80-0705C
CONF-800354-		(2. USDOE environmental control symposium, Washington, DC, USA, 17-19 Mar 1980)
1	533	See SAND-80-0023C
CONF-800359-		(NEA specialist meeting on decommissioning requirements in the design of nuclear facilities, Paris, France, 17-19 Mar 1980)
1	527	See RHO-SA-148
CONF-800377-		(Meeting on radioactive waste storage in mined caverns, Stockhol, Sweden, 4-6 Mar 1980)
1	1840	See RHO-BWI-SA-51
CONF-800392-		(Public meeting on federal research into biological effects of ionizing radiation, Bethesda, MD, USA, 10-11 Mar 1980)
1	3598	NTIS, PC A02/MF A01
CONF-800403-		(ANS thermal reactor safety meeting, Knoxville, TN, USA, 8-11 Apr 1980)
3	3039	See LA-UR-79-2946
13	2919	Dep. NTIS, PC A02/MF A01
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CONF-800416-		(UCC-ND and GAT waste management seminar program, Portsmouth, OH, USA, 22-23 Apr 1980)
1	1436	Dep. NTIS, PC A02/MF A01
2	1666	See ORNL/ENG/INF-80/1
3	412	Dep. NTIS, PC A02/MF A01
4	676	Dep. NTIS, PC A03/MF A01
CONF-800420-		(2. international ocean disposal symposium, Woods Hole, MA, USA, 15-18 Apr 1980)
1	1949	See SAND-79-2117C
2	1956	See SAND-79-2245C
3	1954	See SAND-79-2244C
4	1960	See SAND-79-2328C
CONF-800427-		(Tritium technology in fission, fusion, and isotopic applications, Dayton, OH, USA, 29 Apr-1 May 1980)
10	881	See LA-UR-80-1265
CONF-800433-		(4. international conference on nuclear methods in environment and energy research, Columbia, MO, USA, 14-17 Apr 1980)
4	3432	NTIS, PC A02/MF A01
CONF-800434-		(CSNI specialist meeting on nuclear aerosols in reactor safety, Gatlinburg, TN, USA, 15-17 Apr 1980)
5	3029	NTIS, PC A02/MF A01
8	3035	See HEDL-SA-2017-FP
CONF-800444-		(2. technical meeting on the nuclear transmutation of actinides, Ispra, Italy, 21-24 Apr 1980)
1	413	Dep. NTIS, PC A02/MF A01
CONF-800446-		(2. international conference on emerging nuclear energy systems, Lausanne, Switzerland, 8-11 Apr 1980)
4	2659	See BNL-27784
CONF-800447-		(Water Research Centre and University of Manchester Institute of Science and Technology conference, Manchester, UK, 15-17 Apr 1980)
1	414	Dep. NTIS, PC A02/MF A01
CONF-800460-		(82. annual American Ceramic Society meeting, Chicago, IL, USA, 27-30 Apr 1980)
1	728	See DP-MS-79-92
2	730	See DP-MS-79-103
4	727	See DP-MS-79-91
CONF-800507-		(Rock mechanics symposium, Rolla, MO, USA, 27-30 May 1980)
4	1959	See SAND-79-2254C
7(Rev.)	1585	See LBL-10193(Rev.)
CONF-800515-		(3. international conference on finite elements in water resources, Oxford, MS, USA, 19-23 May 1980)
1	1975	See SAND-80-0310C
CONF-800517-		(26. annual technical meeting of the Institute for Environmental Sciences, Philadelphia, PA, USA, 11-14 May 1980)
2	1977	See SAND-80-0323C
CONF-800527-		(International BHP symposium, Columbus, OH, USA, 7-9 May 1980)
1	1980	See SAND-80-0390C
2	1979	See SAND-80-0359C
3	1986	See SAND-80-0502C
5	1978	See SAND-80-0358C
6	1839	See RHO-BWI-SA-50
7	1838	See RHO-BWI-SA-49
CONF-800535-		(ASME Idaho section symposium, Idaho Falls, ID, USA, 29 May 1980)
1	738	See DP-MS-80-39
2	1874	See RHO-SA-170
3	415	NTIS, PC A02/MF A01
CONF-800542-		(Concrete decontamination workshop, Seattle, WA, USA, 28-29 May 1980)
1	275	See UNI-SA-74
3	3610	See LA-UR-80-1460
CONF-800556-		(Annual spring meeting of the American Geophysical Union, Toronto, Ontario, Canada, 22-24 May 1980)
1	1472	See DP-MS-80-7
CONF-800565-		(TIMS/ORSA national meeting, Washington, DC, USA, 4-7 May 1980)
1	1870	See RHO-SA-142
CONF-800577-		(6. Canadian symposium on remote sensing, Halifax, Canada, 21-23 May 1980)
1	1837	See RHO-BWI-SA-43
CONF-800584-		(Fish and wildlife service workshop, Ft Collins, CO, USA, 28 May 1980)
1	1996	See SAND-80-1319C
CONF-800592-		(International conference on postirradiation examination, The Lake District, UK, 13-15 May 1980)
1	3008	See HEDL-SA-1878-FP
CONF-8005105-		(35. annual technical conference, San Francisco, CA, USA, 11-13 May 1980)
1	1987	See SAND-80-0531C
CONF-8005107-		(Alternate waste form information workshop, Gatlinburg, TN, USA, 13-15 May 1980)
1	209	See HEDL-SA-2138
CONF-800603-		(Rapid excavation and tunneling conference, Littleton, CO, USA, Jun 1980)
1	1464	See DP-MS-78-92
CONF-800607-		(American Nuclear Society annual meeting, Las Vegas, NV, USA, 8-13 Jun 1980)
6	1437	Dep. NTIS, PC A02/MF A01
9	2920	Dep. NTIS, PC A02/MF A01
10	3378	See RFP-3052
20	3004	Dep. NTIS, PC A02/MF A01
21	3621	See SAND-80-0543C
27	416	Dep. NTIS, PC A02/MF A01
30	983	See RHO-SA-51
31	1872	See RHO-SA-155
38	3193	NTIS, PC A02/MF A01
53	882	See LA-UR-80-1408
54	2077	See UCRL-83728
60	3030	NTIS, PC A03/MF A01
64	208	See HEDL-SA-2054-FP
66	776	See HEDL-SA-2009-FP
78	1484	See HEDL-SA-2055
79	677	NTIS, PC A03/MF A01
80	1438	NTIS, PC A03/MF A01
CONF-800609-		(10. international symposium on effects of radiation on materials, Savannah, GA, USA, 3-5 Jun 1980)
5	736	See DP-MS-80-27

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CONF-800610-		(American Institute of Chemical Engineering conference, Philadelphia, PA, USA, 8-12 Jun 1980)
2	37	Dep. NTIS, PC A03/MF A01
CONF-800611-		(International symposium on the management of alpha-contaminated wastes, Vienna, Austria, 2-6 Jun 1980)
1	1439	Dep. NTIS, PC A02/MF A01
2	1952	See SAND-79-2216A
3	470	See LA-UR-80-1274
4	471	See LA-UR-80-1289
5	880	See LA-UR-80-1168
6	473	See LA-UR-807145
7	975	See RFP-3030
8	883	See LA-UR-80-1428
9	775	See HEDL-SA-1967
CONF-800645-		(Special session on nuclear waste disposal, Stockholm, Sweden, 23-27 Jun 1980)
1	1592	See LBL-10849
2	1586	See LBL-10358
CONF-800655-		(21. annual meeting of the Institute of Nuclear Materials Management, Palm Beach, FL, USA, 30 Jun-2 Jul 1980)
6	472	See LA-UR-80-1794
7	2626	See LA-UR-80-1797
29	2616	See BNL-28054
30	435	See DP-MS-80-73
CONF-800723-		(19. national heat transfer conference, Orlando, FL, USA, 27-30 Jul 1980)
1	3620	See SAND-79-2354C
5	261	See SAND-80-0062C
14	1471	See DP-MS-80-4
23	260	See SAND-80-0061C
CONF-800743-		(International conference on nuclear waste transmutation, Austin, TX, USA, 22-24 Jul 1980)
1	38	NTIS, PC A03/MF A01
2	774	See GEFR-SP-215
3	1009	See UCRL-84356
5	678	NTIS, PC A02/MF A01
7	2660	See BNL-28067
8	623	See BNL-NCS-28103
9	990	See RHO-SA-174
10	1010	See UCRL-84405
11	622	See BNL-28282
12	679	NTIS, PC A02/MF A01
13	621	See BNL-28193
CONF-800751-		(Workshop on thermomechanical-hydrochemical modeling for hardrock waste repository, Bereley, CA, USA, 29-31 Jul 1980)
1	2001	See SAND-80-1592C
2	2083	See UCRL-84643
3	2082	See UCRL-84613
CONF-800802-		(89. annual meeting of the American Institute of Chemical Engineers, Portland, OR, USA, 17-20 Aug 1980)
2	733	See DP-MS-80-2
10	3031	NTIS, PC A02/MF A01
11	680	NTIS, PC A02/MF A01
13	2718	NTIS, PC A03/MF A01
14	2921	NTIS, PC A03/MF A01
16	777	See HEDL-SA-2064
18(Draft)	39	NTIS, PC A03/MF A01
CONF-800814-		(180. American Chemical Society meeting/2. chemical congress of the North American Continent, Las Vegas, NV, USA, 24-29 Aug 1980)
5	737	See DP-MS-80-35
12	681	NTIS, PC A03/MF A01
CONF-800837-		(Rocky Mountain conference, Denver, CO, USA, 11-14 Aug 1980)
1	734	See DP-MS-80-17
CONF-800901-		(Symposium on intermediate range atmospheric transport processes and technology assessment, Gatlinburg, TN, USA, 29 Sep-2 Oct 1980)
1	2674	See DP-MS-80-24
2	133	See AGNS-35900-CONF-63
CONF-800904-		(American Society of Civil Engineers specialty conference: civil engineering and nuclear power, Knoxville, TN, USA, 15-17 Sep 1980)
2	2084	See UCRL-84918

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CONF-800914-		(IEEE meeting, Cincinnati, OH, USA, 29 Sep 1980)
1	731	See DP-MS-79-108
3	682	NTIS, PC A02/MF A01
CONF-800918-		(International solvent extraction conference, Liege, Belgium, 6-12 Sep 1980)
2	976	See RFP-3079
3	1440	NTIS, PC A02/MF A01
4	987	See RHO-SA-123
CONF-800919-		(7. world conference on earthquake engineering, Istanbul, Turkey, 8-13 Sep 1980)
5	3	See K-BD-904
CONF-800921-		(IEEE/Oceans '80 conference, Seattle, WA, USA, 8-10 Sep 1980)
1	1973	See SAND-80-0304C
3	1974	See SAND-80-0307C
CONF-800943-		(National topical meeting of fuel cycles for the 80's, Gatlinburg, TN, USA, 29 Sep-2 Oct 1980)
9	202	See DP-MS-80-31
(Summ.)	40	NTIS, PC A08/MF A01
(Summ.)	41	NTIS, PC A08/MF A01
(Summ.)	181	NTIS, PC A08/MF A01
(Summ.)	182	NTIS, PC A08/MF A01
(Summ.)	183	NTIS, PC A08/MF A01
(Summ.)	184	NTIS, PC A08/MF A01
(Summ.)	185	NTIS, PC A08/MF A01
(Summ.)	186	NTIS, PC A08/MF A01
(Summ.)	417	NTIS, PC A08/MF A01
(Summ.)	683	NTIS, PC A08/MF A01
(Summ.)	684	NTIS, PC A08/MF A01
(Summ.)	2617	NTIS, PC A08/MF A01
(Summ.)	2837	NTIS, PC A08/MF A01
CONF-800987-		(Workshop on comparative leaching behavior of radioactive waste forms, Argonne, IL, USA, 3-4 Sep 1980)
1	1441	NTIS, PC A02/MF A01
2	418	NTIS, PC A02/MF A01
CONF-801020-		(Marine technology conference, Washington, DC, USA, 6-8 Oct 1980)
1	1999	See SAND-80-1533C
2	1976	See SAND-80-0312C
3	2003	See SAND-80-1606C
5	2005	See SAND-80-2035C
CONF-801034-		(33. ACS Pacific Coast meeting, San Francisco, CA, USA, 28 Oct 1980)
2	741	See DP-MS-80-50
3	989	See RHO-SA-173
4	740	See DP-MS-80-49
6	739	See DP-MS-80-48
CONF-801038-		(16. DOE nuclear air cleaning conference, San Diego, CA, USA, 20-23 Oct 1980)
1(Draft)	685	NTIS, PC A03/MF A01
2	898	See MLM-2775(OP)
4	686	NTIS, PC A03/MF A01
6	687	NTIS, PC A02/MF A01
7	688	NTIS, PC A02/MF A01
CONF-801063-		(International symposium on the impacts of radionuclide releases into the marine environment, Vienna, Austria, 6-10 Oct 1980)
2	1991	See SAND-80-0781C
3	2006	See SAND-80-2096C
CONF-801077-		(Association of Engineering Geologists annual meeting, Dallas, TX, USA, 20-25 Oct 1980)
1	2002	See SAND-80-1599C
CONF-8010116-		(American Ceramic Society meeting, Bedford, PA, USA, 8-10 Oct 1980)
1	743	See DP-MS-80-61
CONF-801102-		(ASME winter annual meeting, Chicago, IL, USA, 16-21 Nov 1980)
9	1982	See SAND-80-0426C
14	2081	See UCRL-84153
17	1593	See LBL-10876
21	2004	See SAND-80-1616C
28	1873	See RHO-SA-160
CONF-801106-		(American Institute for Decision Sciences conference, Las Vegas, NV, USA, 5-7 Nov 1980)
1	1841	See RHO-BWI-SA-66
CONF-801107-		(ANS international conference, Washington, DC, USA, 17-21 Nov 1980)
10	265	See SAND-80-1633C
13	2618	NTIS, PC A02/MF A01
CONF-801115-		(6. international symposium on

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		packaging and transporting radioactive material, Berlin, F.R. Germany, 10 Nov 1980)
1	3606	See GEFR-SP-204
2	263	See SAND-80-0761C
3	262	See SAND-80-0085C
5(Draft)	187	NTIS, PC A02/MF A01
6	2553	See SAND-80-0794C
CONF-801124-		(3. annual meeting of the Materials Research Society, Boston, MA, USA, 17-20 Nov 1980)
3	2007	See SAND-80-2414C
4	997	See SAND-80-1376C
5	742	See DP-MS-80-60
7	2000	See SAND-80-1566C
8	2079	See UCRL-83995
9	689	NTIS, PC A02/MF A01
CONF-801206-		(ORNL conference on the leachability of radioactive solids, Gatinburg, TN, USA, 9-12 Dec 1980)
2	690	NTIS, PC A02/MF A01
CONF-801209-		(2. annual National Waste Terminal Storage (NWTS) information meeting, Columbus, OH, USA, 9-11 Dec 1980)
4	2008	See SAND-80-2462C
COO-		
2185-12	3408	Dep. NTIS, PC A08/MF A01
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3563-78	3414	Dep. NTIS, PC A03/MF A01
4917-1	1442	Dep. NTIS, PC A02/MF A01
CS-INIS-		
206	2774	Prirodovedecka Fakulta University Komenskeho, Bratislava, Czechoslovakia
258	692	Dum techniky DVTS, Liberec, Czechoslovakia
258	693	Dum techniky DVTS, Liberec, Czechoslovakia
258	694	Dum techniky DVTS, Liberec, Czechoslovakia
258	695	Dum techniky DVTS, Liberec, Czechoslovakia
258	696	Dum techniky DVTS, Liberec, Czechoslovakia
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258	698	Dum techniky DVTS, Liberec, Czechoslovakia
258	1443	Dum techniky DVTS, Liberec, Czechoslovakia
258	2719	Dum techniky DVTS, Liberec, Czechoslovakia
258	3466	Dum techniky CVTS, Liverec, Czechoslovakia
258	3599	Dum techniky DVTS, Liberec, Czechoslovakia
258	3600	Dum techniky DVTS, Liberec, Czechoslovakia
DIN-		
6844	3502	Berlin, Germany, F.R.; Beuth (Dec 1978).
25416(Pt.1)	2701	Berlin, Germany, F.R.; Beuth (Dec 1978).
25465	2694	Berlin, Germany, F.R.; Beuth (Mar 1979).
DNS-D-		
1-016(Vol.7)	2673	NTIS, PC A07/MF A01
DOE/AL/TRU-		
8003	699	NTIS, PC A05/MF A01
DOE/CEA/BMFT-		
8	3314	NTIS (US Sales Only), PC A03/MF A01
9	3315	NTIS (US Sales Only), PC A02/MF A01
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0056	3194	NTIS, PC A03/MF A01
0063	1444	NTIS, PC A06/MF A01
DOE/EIA/8589-		
2	2838	Dep. NTIS, PC A03/MF A01
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DOE/ER/04972-		
2	1453	Dep. NTIS, PC A04/MF A01
DOE/ER/10412-		
2	1454	NTIS, PC A02/MF A01
DOE/ET-		
0081 (Revised)	419	Dep. NTIS, PC A09/MF A01
DOE/ET/34036-		
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DOE/ET/41900-		
1	700	Dep. NTIS, PC A02/MF A01
T1	701	Dep. NTIS, PC A02/MF A01
T2	420	NTIS, PC A03/MF A01
DOE/ET/44206-		
1	3316	NTIS, PC A03/MF A01
DOE/ET/47906-		
2	188	Dep. NTIS, PC A04/MF A01
DOE/EV-		
0005/20	2415	NTIS, PC A05/MF A01
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1	3361	NTIS, PC A02/MF A01
DOE/EV/70024-		
31	3467	Dep. NTIS, PC A02/MF A01
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DOE/RL/C-		
14	1459	NTIS, PC A05/MF A01
DOE/SF/00701-		
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0004(Vol.2)	196	NTIS, PC A05/MF A01
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6	710	Dep. NTIS, PC A04/MF A01
DOE/SR-SF-		
2002(Rev.1)	197	Dep. NTIS, PC A02/MF A01
2003	198	Dep. NTIS, PC A02/MF A01
2004(Rev.1)	1460	NTIS, PC A02/MF A01
2005-9	199	NTIS, PC A06/MF A01
20005-5	200	NTIS, PC A04/MF A01
DOE/SR-WM-		

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DPE-		
3519	1473	NTIS, PC A24/MF A01
3584	744	Dep. NTIS, PC A06/MF A01
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79-6-3	203	Dep. NTIS, PC A02/MF A01
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79-30-11	436	Dep. NTIS, PC A02/MF A01
79-30-14	3604	Dep. NTIS, PC A02/MF A01
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76-303	437	Dep. NTIS, PC A04/MF A01
77-458	204	Dep. NTIS, PC A04/MF A01
78-150-1	438	NTIS, PC A02/MF A01
79-294	745	Dep. NTIS, PC A04/MF A01
DPSTD-		
77-13-3	746	NTIS, PC A99/MF A01
79-34	747	NTIS, PC A05/MF A01
DPSTD-AFCT-		
77-7	44	Dep. NTIS, PC A09/MF A01
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1972-11	3547	Dep. NTIS (US Sales Only), PC A08/MF A01
ECN-		
63	1474	Dep. NTIS (US Sales Only), PC A03/MF A01
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1183-1686	3318	Dep. NTIS, PC A02/MF A01
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5041	749	Dep. NTIS, PC A03/MF A01
5078	3033	Dep. NTIS, PC A02/MF A01
5241	750	NTIS, PC A07/MF A01
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5076	751	Dep. NTIS, PC A04/MF A01
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78-034	441	Dep. NTIS, PC A02/MF A01
79-005	753	Dep. NTIS, PC A02/MF A01
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5168	754	NTIS, PC A03/MF A01
EGG-WM-		
5103	755	Dep. NTIS, PC A06/MF A01
5116	756	Dep. NTIS, PC A09/MF A01
5233	442	NTIS, PC A03/MF A01
EMD-		
79-29	3109	General Accounting Office, 441 G St., NW, Washington, DC
80-67	2664	General Accounting Office, Washington, DC
EML-		
360	3203	Dep. NTIS, PC A02/MF A01
373	3204	NTIS, PC A07/MF A01
ENICO-		
1003	45	Dep. NTIS, PC A03/MF A01
1005	757	Dep. NTIS, PC A03/MF A01
1006	758	Dep. NTIS, PC A04/MF A01
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1016	760	Dep. NTIS, PC A06/MF A01
1022	2418	Dep. NTIS, PC A03/MF A01
1026	761	NTIS, PC A02/MF A01
1031	1475	NTIS, PC A05/MF A01
1032	762	Dep. NTIS, PC A03/MF A01
1033	445	Dep. NTIS, PC A08/MF A01
1034	46	NTIS, PC A06/MF A01
1035	763	NTIS, PC A04/MF A01
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EPA-		
520/1-78-016	2936	See NUREG-0396
520/1-79-009	3205	Environmental Protection Agency, Washington, DC
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520/3-79-02	2540	See PB-296947
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1197	1478	Dep. NTIS, PC A09/MF A01
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5636	3434	Dep. NTIS (US Sales Only), PC A04/MF A01
5750e	1540	See KFK-2552
5785	772	Dep. NTIS (US Sales Only), PC A03/MF A01
5805	3206	Dep. NTIS (US Sales Only), PC A04/MF A01
5947	1479	Dep. NTIS (US Sales Only), PC A03/MF A01
6027	447	Dep. NTIS (US Sales Only), PC A05/MF A01
6088	2420	Dep. NTIS (US Sales Only), PC A06/MF A01
6128	1480	Dep. NTIS (US Sales Only), PC A11/MF A01
6180	3207	Dep. NTIS (US Sales Only), PC A04/MF A01
6213	773	Dep. NTIS (US Sales Only), PC A03/MF A01

Report No.	Abstract No.	Availability
FBDU-		
218-2	2439	See NUREG/CR-1081
289-01	1481	Dep. NTIS, PC A08/MF A01
FDA-		
78-8054	3605	GPO
FERMILAB-		
80/29	3415	NTIS, PC A03/MF A01
FRL-		
14	3435	Dep. NTIS (US Sales Only), PC A03/MF A01
GA-A-		
15828	205	NTIS, PC A09/MF A01
GEFR-SP-		
204	3606	NTIS, PC A03/MF A01
215	774	NTIS, PC A03/MF A01
GJBX-		
122(80)	1482	NTIS, PC A03/MF A01
170(79)	2421	Dep. NTIS, PC A07/MF A01
GKSS-		
79/E/24	3022	NTIS (US Sales Only), PC A02/MF A01
HEDL-SA-		
1878-FP	3008	NTIS, PC A02/MF A01
1890-FP	206	Dep. NTIS, PC A02/MF A01
1891-FP	207	Dep. NTIS, PC A03/MF A01
1892-FP	1483	Dep. NTIS, PC A03/MF A01
1967	775	NTIS, PC A02/MF A01
2009-FP	776	NTIS, PC A02/MF A01
2017-FP	3035	NTIS, PC A02/MF A01
2054-FP	208	NTIS, PC A02/MF A01
2055	1484	NTIS, PC A02/MF A01
2064	777	NTIS, PC A04/MF A01
2138	209	NTIS, PC A02/MF A01
HEDL-TC-		
1283	2848	Dep. NTIS, PC A05/MF A01
1283(Rev.1)	1485	Dep. NTIS, PC A05/MF A01
1331	210	Dep. NTIS, PC A02/MF A01
1331(Rev.1)	1486	Dep. NTIS, PC A02/MF A01
1334(Rev.1)	211	Dep. NTIS, PC A02/MF A01
1384(Rev.1)	1487	Dep. NTIS, PC A04/MF A01
HEDL-TME-		
78-58	212	Dep. NTIS, PC A04/MF A01
78-70	1488	Dep. NTIS, PC A05/MF A01
79-15	448	Dep. NTIS, PC A05/MF A01
79-20	213	NTIS, PC A06/MF A01
HMI-		
296	3607	NTIS (US Sales Only), PC A06/MF A01
IAEA-		
210	1489	Dep. NTIS (US Sales Only), PC A04/MF A01
211	1490	Dep. NTIS (US Sales Only), PC A04/MF A01
212	2422	Dep. NTIS (US Sales Only), PC A15/MF A01
212	2423	Dep. NTIS (US Sales Only), PC A15/MF A01
212	2424	Dep. NTIS (US Sales Only), PC A15/MF A01
212	2527	Dep. NTIS (US Sales Only), PC A15/MF A01
212	2925	Dep. NTIS (US Sales Only), PC A15/MF A01
212	2926	Dep. NTIS (US Sales Only), PC A15/MF A01
IAEA-R-		
1710-F	2775	NTIS (US Sales Only), PC A03/MF A01
1733-F	2776	NTIS (US Sales Only), PC A02/MF A01
1841-F	49	Dep. NTIS (US Sales Only), PC A02/MF A01
1898-F	449	NTIS (US Sales Only), PC A02/MF A01
IAEA-SM-		
236/5	853	See INKA-Conf-79-003-004
236/23	854	See INKA-Conf-79-003-015
243/35	1765	See PNL-SA-7243
243/36	1830	See RHO-BWI-SA-19
246/67	471	See LA-UR-80-1289
248/115	1991	See SAND-80-0781C
248/142	2006	See SAND-80-2096C
IDO-		
10068(77-1)	778	Dep. NTIS, PC A03/MF A01
10074(Rev.1)	1491	NTIS, PC A03/MF A01
10085	1492	Dep. NTIS, PC A23/MF A01

Report No.	Abstract No.	Availability
12082(79)	3208	Dep. NTIS, PC A03/MF A01
12088	3363	Dep. NTIS, PC A04/MF A01
12088	3364	Dep. NTIS, PC A04/MF A01
12088	3365	Dep. NTIS, PC A04/MF A01
12088	3366	Dep. NTIS, PC A04/MF A01
12088	3367	Dep. NTIS, PC A04/MF A01
12088	3368	Dep. NTIS, PC A04/MF A01
12088	3369	Dep. NTIS, PC A04/MF A01
12088	3436	Dep. NTIS, PC A04/MF A01
12088	3468	Dep. NTIS, PC A04/MF A01
12088	3469	Dep. NTIS, PC A04/MF A01
12088	3470	Dep. NTIS, PC A04/MF A01
12088	3471	Dep. NTIS, PC A04/MF A01
12088	3472	Dep. NTIS, PC A04/MF A01
12088	3473	Dep. NTIS, PC A04/MF A01
22027-USGS	1493	Dep. NTIS, PC A05/MF A01
IEA-INF-062	2528	Dep. NTIS (US Sales Only), PC A02X/MF A01
INFCE/DEP/WG-7/3	2759	NTIS (US Sales Only), PC A02/MF A01
7/4	779	NTIS (US Sales Only), PC A03/MF A01
7/5	214	NTIS (US Sales Only), PC A02/MF A01
7/7	780	NTIS (US Sales Only), PC A02/MF A01
7/10	1494	NTIS (US Sales Only), PC A02/MF A01
7/13	1495	NTIS (US Sales Only), PC A02/MF A01
7/15	450	NTIS (US Sales Only), PC A05/MF A01
7/16	1496	NTIS (US Sales Only), PC A09/MF A01
7/22	451	NTIS (US Sales Only), PC A02/MF A01
7/23	1497	NTIS (US Sales Only), PC A02/MF A01
INIS-mf-4620	2666	Dep. NTIS (US Sales Only), PC A03/MF A01
4637	783	Dep. NTIS (US Sales Only), PC A08/MF A01
4637	2927	Dep. NTIS (US Sales Only), PC A08/MF A01
4637	3209	Dep. NTIS (US Sales Only), PC A08/MF A01
4697	2760	Dep. NTIS (US Sales Only), PC A11/MF A01
4698	2928	Dep. NTIS (US Sales Only), PC A11/MF A01
4765	215	Dep. NTIS (US Sales Only), PC A06/MF A01
4767	2805	Dep. NTIS (US Sales Only), PC A02/MF A01
4770	2720	Dep. NTIS (US Sales Only), PC A02/MF A01
4771	784	Dep. NTIS (US Sales Only), PC A02/MF A01
4778	2910	Dep. NTIS (US Sales Only), PC A02/MF A01
4782	50	Dep. NTIS (US Sales Only), PC A12/MF A01
4782	1498	Dep. NTIS (US Sales Only), PC A12/MF A01
4782	1499	Dep. NTIS (US Sales Only), PC A12/MF A01
4862	3036	Dep. NTIS (US Sales Only), PC A02/MF A01
4921	1500	Dep. NTIS (US Sales Only), PC A02/MF A01
4957	2929	Dep. NTIS (US Sales Only), PC A02/MF A01
5010	216	Dep. NTIS (US Sales Only), PC A15/MF A01
5012	2529	Dep. NTIS (US Sales Only), PC A04/MF A01
5013	786	Dep. NTIS (US Sales Only), PC A04/MF A01
5101	1501	Dep. NTIS (US Sales Only), PC A02/MF A01
5129	2826	Dep. NTIS (US Sales Only), PC A04/MF A01
5130	2621	Dep. NTIS (US Sales Only), PC A04/MF A01
5131	2827	Dep. NTIS (US Sales Only), PC A02/MF A01
5173	3583	Dep. NTIS (US Sales Only), PC A18/MF A01
5181	3037	Dep. NTIS (US Sales Only), PC A02/MF A01
5194	2429	Dep. NTIS (US Sales Only), PC A04/MF A01
5198	2667	Dep. NTIS (US Sales Only), PC A09/MF A01
5209	1502	Dep. NTIS (US Sales Only), PC A03/MF A01
5211	1503	Dep. NTIS (US Sales Only), PC A04/MF A01
5244	3094	Dep. NTIS (US Sales Only), PC A05/MF A01
5298	1504	Dep. NTIS (US Sales Only), PC A11/MF A01
5299	1505	Dep. NTIS (US Sales Only), PC A03/MF A01
5302	3038	Dep. NTIS (US Sales Only), PC A02/MF A01
5303	453	Dep. NTIS (US Sales Only), PC A03/MF A01
5316	787	Dep. NTIS (US Sales Only), PC A06/MF A01
5319	2761	Dep. NTIS (US Sales Only), PC A05/MF A01
5319	3437	Dep. NTIS (US Sales Only), PC A05/MF A01
5320	788	NTIS (US Sales Only), PC A04/MF A01
5349	3371	Dep. NTIS (US Sales Only), PC A08/MF A01
5372	3322	NTIS (US Sales Only), PC A07/MF A01
5372	3439	NTIS (US Sales Only), PC A07/MF A01
5464	2721	NTIS (US Sales Only), PC A04/MF A01
5514	3110	NTIS (US Sales Only), PC A02/MF A01
5531	3306	NTIS (US Sales Only), PC A03/MF A01
5549	1506	NTIS (US Sales Only), PC A02/MF A01
5567	57	NTIS (US Sales Only), PC A16/MF A01
5567	797	NTIS (US Sales Only), PC A16/MF A01
5570	455	NTIS (US Sales Only), PC A07/MF A01
5570	456	NTIS (US Sales Only), PC A07/MF A01
5570	802	NTIS (US Sales Only), PC A07/MF A01
5570	803	NTIS (US Sales Only), PC A07/MF A01
5570	804	NTIS (US Sales Only), PC A07/MF A01
5570	805	NTIS (US Sales Only), PC A07/MF A01
5570	806	NTIS (US Sales Only), PC A07/MF A01
5570	807	NTIS (US Sales Only), PC A07/MF A01
5570	808	NTIS (US Sales Only), PC A07/MF A01
5570	809	NTIS (US Sales Only), PC A07/MF A01
5570	810	NTIS (US Sales Only), PC A07/MF A01
5570	811	NTIS (US Sales Only), PC A07/MF A01
5570	812	NTIS (US Sales Only), PC A07/MF A01
5570	813	NTIS (US Sales Only), PC A07/MF A01
5570	814	NTIS (US Sales Only), PC A07/MF A01
5570	815	NTIS (US Sales Only), PC A07/MF A01
5570	816	NTIS (US Sales Only), PC A07/MF A01
5570	817	NTIS (US Sales Only), PC A07/MF A01
5570	818	NTIS (US Sales Only), PC A07/MF A01
5570	1507	NTIS (US Sales Only), PC A07/MF A01
5570	1508	NTIS (US Sales Only), PC A07/MF A01
5570	2930	NTIS (US Sales Only), PC A07/MF A01
5570	2931	NTIS (US Sales Only), PC A07/MF A01
5570	2932	NTIS (US Sales Only), PC A07/MF A01
5570	2933	NTIS (US Sales Only), PC A07/MF A01
5571	825	NTIS (US Sales Only), PC A08/MF A01
5572	835	NTIS (US Sales Only), PC A04/MF A01
5572	1515	NTIS (US Sales Only), PC A04/MF A01
5572	1516	NTIS (US Sales Only), PC A04/MF A01
5572	1517	NTIS (US Sales Only), PC A04/MF A01
5572	1518	NTIS (US Sales Only), PC A04/MF A01
5572	1519	NTIS (US Sales Only), PC A04/MF A01
5572	1520	NTIS (US Sales Only), PC A04/MF A01
5572	2430	NTIS (US Sales Only), PC A04/MF A01
5573	836	NTIS (US Sales Only), PC A04/MF A01

Report No.	Abstract No.	Availability
5574	841	NTIS (US Sales Only), PC A06/MF A01
5574	3181	NTIS (US Sales Only), PC A06/MF A01
5574	3182	NTIS (US Sales Only), PC A06/MF A01
5574	3212	NTIS (US Sales Only), PC A06/MF A01
5574	3213	NTIS (US Sales Only), PC A06/MF A01
5574	3416	NTIS (US Sales Only), PC A06/MF A01
5574	3417	NTIS (US Sales Only), PC A06/MF A01
5598	3608	NTIS (US Sales Only), PC A03/MF A01
5666	2675	NTIS (US Sales Only), PC A02/MF A01
5693	3111	NTIS (US Sales Only), PC A10/MF A01
INKA-Conf-		
78-156-000	851	Dep. NTIS (US Sales Only), PC A03/MF A01
78-156-008	851	See INKA-Conf-78-156-000
78-271-003	2892	See INTAT-78.147
78-396-000	852	Fachinformationszentrum, Karlsruhe, Germany
78-396-022	852	See INKA-Conf-78-396-000
79-003-004	853	Fachinformationszentrum, Karlsruhe, Germany
79-003-015	854	Dep. NTIS (US Sales Only), PC A02/MF A01
79-187-001	2934	Dep. NTIS (US Sales Only), PC A02/MF A01
INR-		
1740/13/C/A	855	Dep. NTIS (US Sales Only), PC A03/MF A01
INTAT-		
78.147	2892	Dep. NTIS (US Sales Only), PC A03/MF A01
IOS-Rep-		
77	3580	NTIS (US Sales Only), PC A12/MF A01/ Available on loan from the British Library Lending Div., Boston Spa
IS-		
4734	3214	NTIS, PC A03/MF A01
IS-M-		
273	1521	Dep. NTIS, PC A03/MF A01
JAB-		
00099-128	1522	Dep. NTIS, PC A04/MF A01
JAERI-M-		
7582	3584	Dep. NTIS (US Sales Only), PC A03/MF A01
7642	3323	Dep. NTIS (US Sales Only), PC A02/MF A01
7757	3372	Dep. NTIS (US Sales Only), PC A06/MF A01
7780	1523	Dep. NTIS (US Sales Only), PC A04/MF A01
7852	856	Dep. NTIS (US Sales Only), PC A03/MF A01
7936	1524	Dep. NTIS (US Sales Only), PC A03/MF A01
7962	2431	Dep. NTIS (US Sales Only), PC A03/MF A01
7979	3609	NTIS (US Sales Only), PC A14/MF A01
8044	1525	Dep. NTIS (US Sales Only), PC A03/MF A01
8063	2762	NTIS (US Sales Only), PC A04/MF A01
8158	857	NTIS (US Sales Only), PC A02/MF A01
8240	858	NTIS (US Sales Only), PC A05/MF A01
8339	859	NTIS (US Sales Only), PC A05/MF A01
JEN-		
423	2935	Dep. NTIS (US Sales Only), PC A04/MF A01
Juel-		
1573	2893	Dep. NTIS (US Sales Only), PC A08/MF A01
1577	3215	Dep. NTIS (US Sales Only), PC A05/MF A01
1581	1526	NTIS (US Sales Only), PC A03/MF A01
1586	2722	Dep. NTIS (US Sales Only), PC A06/MF A01
1593	860	Dep. NTIS (US Sales Only), PC A06/MF A01
1603	2763	NTIS (US Sales Only), PC A07/MF A01
K-		
2007	861	Dep. NTIS, PC A09/MF A01
K-BD-		
904	3	NTIS, PC A02/MF A01
K/C-		
1383	862	Dep. NTIS, PC A02/MF A01
K/ET-		
174	863	Dep. NTIS, PC A03/MF A01
5007	2844	Dep. NTIS, PC A02/MF A01
5010	864	Dep. NTIS, PC A02/MF A01
5017	865	NTIS, PC A02/MF A01
K-L-		
2397	866	NTIS, PC A02/MF A01
K/OP-		
248	461	NTIS, PC A05/MF A01
268	220	Dep. NTIS, PC A02/MF A01
KBS-		
100	2479	See STUDSVIK-K2-79/92
KBS-TR-		
39	867	Dep. NTIS (US Sales Only), PC A08/MF A01
49	1529	Dep. NTIS (US Sales Only), PC A03/MF A01
108	221	Dep. NTIS (US Sales Only), PC A05/MF A01
109	1530	Dep. NTIS (US Sales Only), PC A03/MF A01
110	1531	Dep. NTIS (US Sales Only), PC A03/MF A01
111	868	Dep. NTIS (US Sales Only), PC A07/MF A01
113	465	Dep. NTIS (US Sales Only), PC A08/MF A01
114	1536	Dep. NTIS (US Sales Only), PC A03/MF A01
119	1537	Dep. NTIS (US Sales Only), PC A04X/MF A01
120	1538	Dep. NTIS (US Sales Only), PC A03/MF A01
120	1539	Dep. NTIS (US Sales Only), PC A03/MF A01
KEK-		
78-20	3216	NTIS (US Sales Only), PC A05/MF A01
78-21	869	NTIS (US Sales Only), PC A02/MF A01
KFK-		
2519	466	Dep. NTIS (US Sales Only), PC A08/MF A01
2552	1540	Dep. NTIS (US Sales Only), PC A03/MF A01
2707	3112	Dep. NTIS (US Sales Only), PC A09/MF A01
2721	871	NTIS (US Sales Only), PC A03/MF A01
2750	872	NTIS (US Sales Only)
2750	1541	NTIS (US Sales Only)
2750	1542	NTIS (US Sales Only)
2750	2432	NTIS (US Sales Only)
2750	3217	NTIS (US Sales Only)
2750	3218	NTIS (US Sales Only)
2750	3219	NTIS (US Sales Only)
2750	3373	NTIS (US Sales Only)
2765	873	Dep. NTIS (US Sales Only), PC A04/MF A01
2796	874	Dep. NTIS (US Sales Only), PC A03/MF A01
2798	1543	Dep. NTIS (US Sales Only), PC A03/MF A01
2833	4	Dep. NTIS (US Sales Only), PC A03/MF A01
2842	875	NTIS (US Sales Only), PC A03/MF A01
2857	1544	NTIS (US Sales Only), PC A03/MF A01
2866	2532	NTIS (US Sales Only), PC A05/MF A01
2892	3440	NTIS (US Sales Only), PC A04/MF A01
KY-		
690	2433	Dep. NTIS, PC A02/MF A01
L-		
7893-PR	2434	Dep. NTIS, PC A04/MF A01
LA-		
7838-MS	2622	Dep. NTIS, PC A02/MF A01
7857	467	Dep. NTIS, PC A02/MF A01
7921-PR	468	Dep. NTIS, PC A04/MF A01
7931-PR	1545	Dep. NTIS, PC A03/MF A01
7949-MS	3009	Dep. NTIS, PC A03/MF A01
7969-PR	222	Dep. NTIS, PC A02/MF A01
7974-PR	1546	Dep. NTIS, PC A02/MF A01
8023-PR	3324	Dep. NTIS, PC A09/MF A01
8049-MS	1547	Dep. NTIS, PC A04/MF A01

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8052-MS	876	Dep. NTIS, PC A03/MF A01
8088-PR	1548	Dep. NTIS, PC A05/MF A01
8103-M	2623	Dep. NTIS, PC A03/MF A01
8110-MS	1549	Dep. NTIS, PC A04/MF A01
8139-MS	3548	Dep. NTIS, PC A05/MF A01
8147-MS	3325	Dep. NTIS, PC A02/MF A01
8152-PR	1550	Dep. NTIS, PC A02/MF A01
8172-MS	3100	Dep. NTIS, PC A02/MF A01
8177	1551	NTIS, PC A02/MF A01
8183-T	3326	Dep. NTIS, PC A04/MF A01
8200-ENV	3220	Dep. NTIS, PC A07/MF A01
8210-PR	1552	Dep. NTIS, PC A03/MF A01
8224-PR	1553	Dep. NTIS, PC A02/MF A01
8230-MS	1554	Dep. NTIS, PC A02/MF A01
8237-PR	223	NTIS, PC A03/MF A01
8272-PR	62	Dep. NTIS, PC A02/MF A01
8294-MS	469	NTIS, PC A05/MF A01
8297-PR	1555	NTIS, PC A03/MF A01
8309-PR	2435	NTIS, PC A02/MF A01
8339-PR	1556	NTIS, PC A04/MF A01
8345-PR	1557	NTIS, PC A02/MF A01
8389-PR	2864	NTIS, PC A02/MF A01
8422-MS	1558	NTIS, PC A02/MF A01
8463-MS	224	NTIS, PC A02/MF A01
8472-PR	1559	NTIS, PC A03/MF A01
8539-PR	2436	NTIS, PC A02/MF A01
LA-tr-		
80-17	1020	NTIS, PC A03/MF A01
LA-UR-		
79-2910	3328	See NUREG/CR-1155
79-2946	3039	Dep. NTIS, PC A02/MF A01
79-2992	1560	Dep. NTIS, PC A02/MF A01
79-3045	3374	Dep. NTIS, PC A02/MF A01
79-3218	2624	Dep. NTIS, PC A02/MF A01
80-437	1561	Dep. NTIS, PC A05/MF A01
80-616	3327	Dep. NTIS, PC A02/MF A01
80-689	2625	Dep. NTIS, PC A02/MF A01
80-692	877	Dep. NTIS, PC A02/MF A01
80-696	878	Dep. NTIS, PC A02/MF A01
80-835	879	Dep. NTIS, PC A02/MF A01
80-1168	880	NTIS, PC A03/MF A01
80-1265	881	NTIS, PC A02/MF A01
80-1274	470	NTIS, PC A02/MF A01
80-1289	471	NTIS, PC A02/MF A01
80-1408	882	NTIS, PC A02/MF A01
80-1428	883	NTIS, PC A02/MF A01
80-1460	3610	NTIS, PC A02/MF A01
80-1794	472	NTIS, PC A02/MF A01
80-1797	2626	NTIS, PC A02/MF A01
807145	473	Dep. NTIS, PC A03/MF A01
LASL-		
80-42(Mini-Review)	3542	NTIS, PC A02/MF A01
LBL-		
1(Vol.3)	3221	Dep. NTIS, PC A19/MF A01
7061	1562	NTIS, PC A07/MF A01
7083	1563	Dep. NTIS, PC A06/MF A01
7089	1564	Dep. NTIS, PC A04/MF A01
8271(Rev.)	1565	Dep. NTIS, PC A04/MF A01
8313	1566	NTIS, PC A09/MF A01
8423	1567	Dep. NTIS, PC A03/MF A01
8648	1568	NTIS, PC A12/MF A01
8648	1569	NTIS, PC A12/MF A01
8648	1570	NTIS, PC A12/MF A01
8648	1571	NTIS, PC A12/MF A01
8648	1572	NTIS, PC A12/MF A01
8648	1573	NTIS, PC A12/MF A01
8648	3549	NTIS, PC A12/MF A01
8648	3550	NTIS, PC A12/MF A01
8648	3551	NTIS, PC A12/MF A01
8764(Vol.1)	3509	Dep. NTIS, PC A03/MF A01
8764(Vol.2)	3510	Dep. NTIS, PC A13/MF A01
8907	1574	Dep. NTIS, PC A08/MF A01
9392	1575	NTIS, PC A03/MF A01
9392	1576	NTIS, PC A03/MF A01
9392	1577	NTIS, PC A03/MF A01
9424	1578	Dep. NTIS, PC A02/MF A01
9425	3552	Dep. NTIS, PC A02/MF A01
9426	1579	Dep. NTIS, PC A02/MF A01
9557	3553	Dep. NTIS, PC A03/MF A01
9582	1580	Dep. NTIS, PC A02/MF A01
9677	1581	NTIS, PC A08/MF A01
9677-2/2	3511	NTIS, PC A03/MF A01
9884	3554	Dep. NTIS, PC A02/MF A01
9903	1582	Dep. NTIS, PC A02/MF A01
9945	1583	Dep. NTIS, PC A06/MF A01
9952	1584	Dep. NTIS, PC A02/MF A01
10000	474	NTIS, PC A24/MF A01
10193(Rev.)	1585	NTIS, PC A02/MF A01
10358	1586	NTIS, PC A02/MF A01
10387	1587	NTIS, PC A03/MF A01
10483	1588	Dep. NTIS, PC A02/MF A01
10517	1589	NTIS, PC A02/MF A01
10541	1590	NTIS, PC A04/MF A01
10559	1591	NTIS, PC A04/MF A01
10686	3512	NTIS, PC A11/MF A01
10849	1592	NTIS, PC A02/MF A01
10876	1593	NTIS, PC A03/MF A01
MAFF-FL-		
17	1594	NTIS (US Sales Only), PC A02/MF A01
ME-		
126/77	998	See SGAE-2864
133/78	999	See SGAE-2932
151/78	1001	See SGAE-3012
MLM-		
2644	884	Dep. NTIS, PC A03/MF A01
2646	885	Dep. NTIS, PC A02/MF A01
2663(TR)	1076	Dep. NTIS, PC A02/MF A01
2667	886	Dep. NTIS, PC A02/MF A01
2669	475	NTIS, PC A03/MF A01
2670	887	Dep. NTIS, PC A02/MF A01
2672	888	Dep. NTIS, PC A02/MF A01
2684	889	Dep. NTIS, PC A04/MF A01
2692	890	NTIS, PC A03/MF A01
2697	891	Dep. NTIS, PC A02/MF A01
2700	3222	Dep. NTIS, PC A03/MF A01
2703(OP)	3223	NTIS, PC A02/MF A01
2713	892	NTIS, PC A02/MF A01
2714	476	NTIS, PC A02/MF A01
2716	893	NTIS, PC A02/MF A01
2717	894	NTIS, PC A02/MF A01
2731	895	NTIS, PC A02/MF A01
2735	896	NTIS, PC A02/MF A01
2755(OP)	2627	NTIS, PC A02/MF A01
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2774	897	NTIS, PC A02/MF A01
2775(OP)	898	NTIS, PC A02/MF A01
MTR-		
7718	1595	Mitre Corp., McLean, VA
7719	496	See ORP/CSD-79-2
N-		
79-22876	2777	NTIS PCA04/MF A01
79-25869	1596	NTIS, PC A03/MF A01
79-27193	1597	NTIS, PC A04/MF A01
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7917	268	See SRO-1051-3
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ND-R-		
52(W)	3225	Dep. NTIS (US Sales Only), PC A02/MF A01
53(W)	3226	Dep. NTIS (US Sales Only), PC A03/MF A01
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NEDG-		
21889	225	Dep. NTIS, PC A05/MF A01
24749	1598	NTIS, PC A12/MF A01
NIRS-R-		
7	1599	NTIS (US Sales Only)
NLCO-		
004EV	3227	NTIS, PC A05/MF A01
NP-		
23904	2642	The Publisher, Washington, DC
23948	606	Executive Office of the Governor, Energy Resources Administration, Santa Fe, New Mexico
24060	117	California Energy Commission, Sacramento, CA
24158(Vol.1)	101	California Energy Commission, 1111 Howe Ave., Sacramento, CA, 95825
24158(Vol.2)	102	California Energy Commission, 1111 Howe Ave., Sacramento, CA, 95825
24200	3067	GPO$5.00
24350	2956	Colorado State Univ., Fort Collins
24440	2967	Rockville, MD; Bureau of Radiological Health (1979).
24441	2817	Sacramento, CA; Resources Agency (1979).
24441 (Exec.Summ.)	2818	Sacramento, CA; Resources Agency (1979).
25030	3170	Albuquerque, NM; Univ. of New Mexico (1977).
25098	2668	TIC
25109	3040	GPO
25149	1348	Colorado Energy Research Inst., 2221 East Street, Golden, CO
NRPB-R-		
86	2533	Dep. NTIS (US Sales Only), PC A05/MF A01
91	3228	NTIS (US Sales Only), PC A04/MF A01

Report No.	Abstract No.	Availability
NTIS/PS-		
79/0080	3611	NTIS PCN01/MF N01
79/0139	2437	NTIS, PC N01/MF N01
79/0140	2438	NTIS, PC N01/MF N01
79/0704	226	NTIS PCN01/MF N01
NUREG-		
0396	2936	NTIS
0527	477	NTIS
0527(Summ.)	1600	NTIS
0543	2937	NTIS
0575	2298	Information Resources Press, 2100 M Street, NW, Suite 316, Washington, DC. (MF or HC) Order No. 79-1153
0643	899	Dep. NTIS, PC A99/MF A01
0644	478	Dep. NTIS, PC A99/MF A01
0656	479	NTIS
NUREG/CP-		
0008	1601	NTIS
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0008	2807	NTIS
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0612	1602	Dep. NTIS, PC A09/MF A01
0619	1603	Dep. NTIS, PC A08/MF A01
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0685	480	Dep. NTIS, PC A04/MF A01
0789	2938	Dep. NTIS, PC A08/MF A01
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0795	1605	NTIS
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0912(Vol.1)	1608	Dep. NTIS, PC A15/MF A01
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1004	3375	Dep. NTIS, PC A10/MF A01
1005(Vol.1)	1610	NTIS
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1109	3307	Dep. NTIS, PC A02/MF A01
1137	481	NTIS
1155	3328	Dep. NTIS, PC A03/MF A01
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1326	482	Dep. NTIS, PC A03/MF A01
NUS-		
3158	381	See CAEC-007(Vol.2)
3183	624	See CAEC-007(Vol.3)
3245	900	California Energy Commission, 1111 Howe Ave., Sacramento, CA 95825
3383	483	California Energy Commission, 1111 Howe Ave., Sacramento, CA 95825
NVO-		
185(Rev.1)	484	Dep. NTIS, PC A03/MF A01
196-11	1614	Dep. NTIS, PC A04/MF A01
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196-13	1616	Dep. NTIS, PC A06/MF A01
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NYSGS-		
79-2403	1604	See NUREG/CR-0794
79-2406	1605	See NUREG/CR-0795
ONWI-		
9(2)	1621	Dep. NTIS, PC A16/MF A01
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11(AECL-6325)	2440	Dep. NTIS, PC A03/MF A01
16	3393	Dep. NTIS, PC A17/MF A01
19(Rev.1)	1624	Dep. NTIS, PC A07/MF A01
20-NUS-3314	901	Dep. NTIS, PC A18/MF A01
21	3513	Dep. NTIS, PC A09/MF A01
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77	1634	NTIS, PC A05/MF A01
79/E511-00300-4	1635	Dep. NTIS, PC A06/MF A01
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85	1637	Dep. NTIS, PC A04/MF A01
87	487	Dep. NTIS, PC A08/MF A01
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100	3556	NTIS, PC A03/MF A01
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78/E511-01000-8	1404	See BNL-26455
79/E511-01000-11	1406	See BNL-26931
78/E511-01000-17	1407	See BNL-27841
79/E511-01200-12	222	See LA-7969-PR
79-E-511-03700	1935	See SAND-79-1634C
80/E511-01200-7	2436	See LA-8539-PR
ORAU/IEA-		
80-3(P)	2911	Dep. NTIS, PC A11/MF A01
ORNL-		
5308	2658	Dep. NTIS, PC A16/MF A01
5308	3295	Dep. NTIS, PC A16/MF A01
5447	2444	Dep. NTIS, PC A05/MF A01
5448	3330	Dep. NTIS, PC A05/MF A01
5449	2445	Dep. NTIS, PC A04/MF A01
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5453	3333	Dep. NTIS, PC A05/MF A01
5454	3334	Dep. NTIS, PC A05/MF A01
5455	3230	NTIS, PC A06/MF A01
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5457	2536	Dep. NTIS, PC A06/MF A01
5457	3336	Dep. NTIS, PC A06/MF A01
5458	3231	NTIS, PC A05/MF A01
5459	3337	Dep. NTIS, PC A04/MF A01
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5465	3342	NTIS, PC A04/MF A01
5485	1659	Dep. NTIS, PC A11/MF A01
5529	2939	NTIS, PC A08/MF A01
5543	3497	Dep. NTIS, PC A06/MF A01
5562	903	Dep. NTIS, PC A04/MF A01
5566	63	NTIS, PC A08/MF A01
5567	2446	NTIS, PC A08/MF A01
5578	1660	Dep. NTIS, PC A06/MF A01
5595	3101	Dep. NTIS, PC A08/MF A01
5595	3232	Dep. NTIS, PC A08/MF A01
5607	1661	Dep. NTIS, PC A05/MF A01
5613	3233	Dep. NTIS, PC A05/MF A01
5617	1662	NTIS, PC A03/MF A01
5618	904	Dep. NTIS, PC A03/MF A01
5620	1663	Dep. NTIS, PC A10/MF A01
5620	3183	Dep. NTIS, PC A10/MF A01
5663	3234	NTIS, PC A06/MF A01
5665	488	NTIS, PC A10/MF A01
5685	3612	NTIS, PC A09/MF A01
5687	905	NTIS, PC A05/MF A01
ORNL/CSD/TM-		
84	1664	Dep. NTIS, PC A03/MF A01
ORNL/EIS-		
133/V2	906	NTIS, PC A14/MF A01
154/V1	907	NTIS, PC A20/MF A01
156/V1	1665	NTIS, PC A20/MF A01
ORNL/ENG/INF-		
80/1	1666	Dep. NTIS, PC A02/MF A01
ORNL/MIT-		

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299	3343	Dep. NTIS, PC A04/MF A01
300	908	NTIS, PC A03/MF A01
ORNL/NUREG/TM-		
282	3375	See NUREG/CR-1004
ORNL/DIAPA-		
13	489	Dep. NTIS, PC A04/MF A01
14	490	Dep. NTIS, PC A03/MF A01
ORNL/SUB-		
75/87989	1667	NTIS, PC A03/MF A01
79/13617/2	1668	NTIS, PC A99/MF A01
79/13837/1	1669	Dep. NTIS, PC A06/MF A01
79/13837/2	1670	Dep. NTIS, PC A12/MF A01
79/13866/1	231	NTIS, PC A07/MF A01
79/31056/1/A3	64	NTIS, PC A18/MF A01
79/31056/1/A4	65	NTIS, PC A12/MF A01
80/13619/1	1671	Dep. NTIS, PC A09/MF A01
80/13837/3	491	NTIS, PC A07/MF A01
80/31038/1	909	NTIS, PC A99/MF A01
80/31048/1	2537	NTIS, PC A16/MF A01
ORNL/TM-		
6328/V1	3409	NTIS, PC A13/MF A01
6445	910	Dep. NTIS, PC A06/MF A01
6473	1672	NTIS, PC A04/MF A01
6488	18	Dep. NTIS, PC A03/MF A01
6751	3235	Dep. NTIS, PC A04/MF A01
6802	911	NTIS, PC A04/MF A01
6882	1673	Dep. NTIS, PC A02/MF A01
6893	3418	Dep. NTIS, PC A03/MF A01
6983	912	NTIS, PC A04/MF A01
6984	66	NTIS, PC A05/MF A01
6987	1674	NTIS, PC A07/MF A01
7004	3344	Dep. NTIS, PC A05/MF A01
7024	232	Dep. NTIS, PC A03/MF A01
7044	3041	NTIS, PC A04/MF A01
7052	3557	Dep. NTIS, PC A04/MF A01
7065	913	Dep. NTIS, PC A04/MF A01
7081	2723	Dep. NTIS, PC A04/MF A01
7092	1675	Dep. NTIS, PC A02/MF A01
7102	914	NTIS, PC A02/MF A01
7106	1676	Dep. NTIS, PC A03/MF A01
7112	1677	Dep. NTIS, PC A04/MF A01
7125	1678	Dep. NTIS, PC A05/MF A01
7130	915	NTIS, PC A04/MF A01
7170	233	NTIS, PC A05/MF A01
7179	234	NTIS, PC A10/MF A01
7201	1679	NTIS, PC A10/MF A01
7253	492	Dep. NTIS, PC A04/MF A01
7262	2646	NTIS, PC A03/MF A01
7310	1680	NTIS, PC A05/MF A01
7371	916	NTIS, PC A03/MF A01
7385/V1	493	NTIS, PC A09/MF A01
7385/V2	494	NTIS, PC A18/MF A01
7421	1681	NTIS, PC A06/MF A01
7427	917	NTIS, PC A08/MF A01
7476	918	NTIS, PC A03/MF A01
7497	1682	NTIS, PC A03/MF A01
ORNL-tr-		
4672	2349	NTIS, PC A02/MF A01
4673	2127	NTIS, PC A06/MF A01
ORO-		
777	919	NTIS, PC A05/MF A01
778	495	NTIS, PC A05/MF A01
4447-102	1683	Dep. NTIS, PC A04/MF A01
5366-T1 (Vol.1)	1684	NTIS, PC A10/MF A01
5366-T1 (Vol.2)	1685	NTIS, MF A01
5366-T2	1686	NTIS, PC A08/MF A01
5366-T3	1687	NTIS, MF A01
5366-T4	1688	NTIS, PC A07/MF A01
5366-T5	1689	NTIS, PC A05/MF A01
5366-T6	1690	NTIS, MF A01
5366-T7	1691	NTIS, PC A02/MF A01
5366-T8	1692	NTIS, PC A08/MF A01
ORP/CSD-		
79-2	496	Environmental Protection Agency, Washington, DC
P-		
300-80-005	3179	California Energy Commission, Sacramento
300-80-006	2940	California Energy Commission, Sacramento
PATENTS-AU-		(Australian: Commissioner of Patents, Patents Office, Woden, A.C.T. 2606, Australia, 50 cents per copy)
A 492,850/B/	1320	
A 77/28,001/A/	1356	
PATENTS-CA-		(Canadian: Commissioner of Patents, Ottawa, Canada, K1A 0E1: $1.00 per copy)
1,006,631/A/	2389	
1,045,727/A/	2966	
1,046,242/A/	3487	
1,053,912/A/	1158	
1,057,947/A/	1126	
1,059,307/A/	1109	
PATENTS-CS-		(Czechoslovakian: Dr. Karel Neumann, Advokatni poradna c. 10, Zitna 25, Prague I, Czechoslovakia, Kes. 10 per copy)
165,751/B/	3697	
167,412/B/	26	
168,687/B/	1365	
169,493/B/	3692	
169,880/B/	1361	
169,997/B/	2386	
PATENTS-DE-		(German (F.R.): Deutsches Patentamt, Zweibruck En Strasse 12-, 800 Muenchen, F.R. Germany, DM 3.- per copy, plus postage)
1,517,664/C/	3460	
1,667,851/C/	1354	
2,001,936/B/	2225	
2,109,146/B/	1120	
2,131,507/C/	1036	
2,243,136/B/	1117	
2,253,232/B/	2752	
2,253,232/C/	329	
2,400,123/C/	1214	
2,447,176/C/	3654	
2,448,591/B/	3059	
2,531,056/B/	1084	
2,559,724/A/	1351	
2,559,724/B/	1121	
2,600,790/A/	1359	
2,603,116/A/	1357	
2,603,916/A/	1358	
2,609,299/A/	1353	
2,611,689/C/	1213	
2,612,510/B/	1333	
2,612,893/A/	120	
2,617,968/A/	1350	
2,617,968/B/	1089	
2,618,232/B/	1078	
2,620,585/B/	2329	
2,624,936/B/	1172	
2,625,275/C/	1191	
2,629,363/A/	2884	
2,629,938/A/	2706	
2,631,769/B/	2169	
2,633,192/C/	2803	
2,637,559/A/	3290	
2,637,879/B/	294	
2,648,263/A/	1310	
2,649,295/A/	2860	
2,649,434/A/	2890	
2,652,858/A/	1362	
2,655,403/A/	367	
2,659,691/A/	1295	

Report No.	Abstract No.	Availability
2,700,334/A/	23	
2,703,279/A/	2338	
2,704,147/A/	1314	
2,705,470/B/	1324	
2,706,042/A/	3682	
2,709,602/A/	350	
2,711,373/A/	1311	
2,711,374/A/	1312	
2,711,405/A/	2704	
2,718,305/A/	2857	
2,720,342/B/	1097	
2,720,434/A/	2880	
2,720,434/B/	2873	
2,721,588/A/	3674	
2,722,870/A/	2856	
2,723,681/A/	345	
2,723,849/A/	343	
2,724,301/A/	3082	
2,726,087/C/	1283	
2,726,335/A/	2323	
2,728,469/A/	1215	
2,729,326/A/	99	
2,730,331/A/	328	
2,730,729/A/	2769	
2,730,850/A/	331	
2,731,035/A/	2739	
2,731,274/A/	330	
2,731,307/A/	327	
2,731,548/A/	1208	
2,732,031/A/	1205	
2,732,791/A/	3651	
2,732,796/A/	325	
2,732,810/A/	324	
2,732,815/A/	326	
2,734,973/A/	1203	
2,735,107/A/	1202	
2,736,256/A/	3454	
2,739,232/A/	322	
2,740,490/A/	1190	
2,740,933/B/	332	
2,742,724/A/	315	
2,742,735/A/	2736	
2,742,736/A/	2852	
2,742,739/A/	566	
2,743,453/A/	320	
2,745,175/A/	1173	
2,745,544/A/	2735	
2,745,626/A/	3648	
2,747,080/A/	3647	
2,747,601/B/	3650	
2,748,098/A/	1157	
2,748,774/A/	2217	
2,749,110/A/	2344	
2,749,690/A/	3646	
2,758,670/A/	2729	
2,759,185/A/	88	
2,800,686/A/	2850	
2,801,744/A/	112	
2,801,944/A/	2875	
2,801,946/A/	2173	
2,802,089/A/	3643	
2,804,828/A/	3641	
2,806,353/A/	2168	
2,807,324/A/	1099	
2,807,551/A/	2142	
2,808,989/A/	2881	
2,814,887/A/	2872	
2,819,085/A/	1074	
2,821,780/A/	290	
2,822,282/A/	2853	
2,823,376/B/	2158	
2,839,010/A/	1187	
2,842,050/A/	1176	
2,855,821/A/	1122	
2,856,489/A/	562	
2,900,912/A/	1063	
2,905,951/A/	2871	
2,922,382/A/	289	

PATENTS-DK- (Danish: Direktoratet for Patents-og Varemaerkevaesnet, Nyropagade 45, 1602 Copenhagen V, Denmark, 4.00 Kr. per copy)

1,468/78/A/	1325

PATENTS-FR- (French: Service d'Edition et de Vente des Publications Officielles, 39 rue de la Convention, Paris 15, France, 2.50 F per copy, plus 1.80 F postage for 1 copy)

2,333,329/A/	1370
2,346,817/A/	3002
2,349,194/A/	1377
2,350,279/A/	3698
2,350,668/A/	1363
2,353,117/A/	1376
2,358,733/A/	2716
2,366,674/A/	366
2,368,123/A/	370
2,371,046/A/	1352
2,379,141/A/	1366
2,384,327/A/	3695
2,386,889/A/	1328
2,387,677/A/	3289
2,388,377/A/	2883
2,388,379/E/	1364
2,388,380/A/	2388
2,395,062/A/	1318
2,395,571/A/	2887
2,395,573/A/	1360

Report No.	Abstract No.	Availability
2,405,540/A/	2755	
2,405,541/E/	119	
2,406,871/A/	3691	
2,423,035/A/	1066	
2,431,167/A/	1029	
PATENTS-GB-		(GB: Comptroller-General, The Patent Office (Sale Branch), St. Mary Cray, Orpington, Kent, BR 53rd, UK, 0.25 pounds per copy)
1,532,425/A/	3675	
1,539,999/A/	1204	
1,544,233/A/	314	
1,547,152/A/	2876	
1,552,956/A/	1085	
1,553,013/A/	2888	
1,553,339/A/	2383	
1,554,605/A/	3640	
1,557,857/A/	3693	
1,557,889/A/	368	
2,004,857/A/	1174	
2,009,486/A/	1135	
2,010,164/A/	3644	
2,011,696/A/	1123	
2,011,697/A/	1124	
2,014,482/A/	1201	
2,022,912/A/	2882	
2,023,056/A/	2130	
2,024,498/A/	1037	
2,025,268/A/	1035	
2,027,257/A/	1028	
PATENTS-JP-		(Japanese: Hatsumei-Kyokai (Invention Association), 17 Shiba, Nishikubo-Akefune Cho, Minato-Ku, Tokyo, Japan, $.20 per page, plus postage)
54-1799/A/	98	
54-7,099/A/	1211	
54-8,299/A/	1209	
54-8,300/A/	1210	
53-90,597/A/	352	
54-19,100/A/	1200	
54-23,900/A/	1199	
54-28,996/A/	2879	
54-29,000/A/	1193	
54-30,396/A/	2799	
54-30,398/A/	2878	
54-30,399/A/	1192	
54-31,898/A/	323	
54-41,000/A/	1186	
54-45,499/A/	1175	
54-47,100/A/	2851	
54-50,798/A/	1171	
54-67,895/A/	2693	
54-69,700/A/	1138	
54-71,300/A/	1137	
54-74,100/A/	1136	
54-75,000/A/	1134	
54-84,196/A/	2689	
54-93,800/A/	1111	
54-96,698/A/	293	
54-99,894/A/	2797	
1954-5200/A/	1212	
1954-8294/A/	2800	
53-126,497/A/	1301	
53-129,800/A/	1298	
53-131,399/A/	1297	
53-131,400/A/	1296	
53-136,200/A/	1294	
53-137,400/A/	1293	
53-143,899/A/	2855	
53-143,900/A/	1286	
53-146,100/A/	1285	
53-147,200/A/	1284	
54-125,400/A/	1083	
54-130,798/A/	1077	
54-149,000/A/	1064	
1953-56,492/A/	2863	
1953-56,500/A/	1375	
1953-60,499/A/	1374	
1953-62,100/A/	1373	
1953-64,200/A/	1372	
1953-65,600/A/	1371	
1953-83,000/A/	2862	
1953-85,300/A/	1368	
1953-88,500/A/	1367	
1953-93,299/A/	2858	
1954-36,482/A/	321	
1954-53,799/A/	19	
1954-55,297/A/	1159	
1954-55,300/A/	2218	
1954-74999/A/	1133	
1954-81499/A/	1132	
1954-87400/A/	1125	
1954-89199/A/	1119	
1953-10,249T/A/	2390	
1953-10,7598/A/	3681	
1953-120,100/A/	1304	
1953-122,099/A/	2332	
1953-122,100/A/	2333	
1953-123,800/A/	1303	
1953-125,599/A/	1302	
1953-126,498/A/	1299	
1953-126,500/A/	1300	
1954-101,100/A/	1101	
1954-109,600/A/	1098	
1954-114,700/A/	1090	
1954-117,900/A/	1087	
1954-120,399/A/	2768	
PATENTS-NL-		(Netherlands: The Patent Office (Octrooiraad),, Patentslaan 2, Rijswijk 2. H patents, Netherlands, F. 3.00 per copy)

Report No.	Abstract No.	Availability
7,800,628/A/	2352	
PATENTS-SE-		(Swedish: Patentverkets bibliotek, Box 5055, S-102, 42 Stockholm 5:, Sweden, Kr 5.- per copy)
7,614,375-9/B/	1178	
7,614,376-7/B/	1177	
7,704,487-3/B/	1081	
7,704,488-1/B/	1062	
7,705,173-8/B/	2106	
PATENTS-SU-		(SU: The abstracts are obtained from Otkrytiya, Izobreteniya, Promyshlennye Obraztye Znaki in which abstracts only are published, Moscow, USSR)
556,665/A/	1378	
PATENTS-US-		(US: Commissioner of Patents, Washington, D.C. 20231, USA, $.50 per copy. Government Patent Applications available from NTIS)
A 003,840	2404	
A 043,855	1379	
A 058,420	1380	
A 068,359	372	
A 070,548	371	
A 085,370	2631	
A 106,203	2406	
3,971,717	3463	
4,129,425	1287	
4,147,938	3649	
4,152,287	2219	
4,156,646	1156	
4,156,658	2494	
4,161,447	1118	
4,162,206	1115	
4,162,230	1114	
4,162,231	1112	
4,162,298	1113	
4,164,479	1100	
4,165,255	2874	
4,166,244	2167	
4,167,491	1088	
4,168,243	1086	
4,170,135	2150	
4,171,002	3634	
4,172,807	1075	
4,173,546	1068	
4,173,620	1067	
4,174,293	1065	
4,174,293	2141	
4,177,241	1060	
4,177,385	2869	
4,178,350	2657	
4,213,883	3624	
PATENTS-ZA-		(South African: The Patent Office, P. O. Box 429, Pretoria, South Africa, R 0.10 per page, plus postage)
1978/1,888/A/	1326	
PB-		
80-101314	3236	NTIS, PC A06/MF A01
80-101959	3419	NTIS, PC A05/MF A01
80-105042	497	NTIS, PC A12/MF A01
80-107998	3296	NTIS, PC A12/MF A01
80-122740	920	NTIS, PC A02/MF A01
80-138993	1693	NTIS, PC A07/MF A01
80-147754	1694	NTIS, PC A06/MF A01
80-801772	1695	NTIS PCN01/MF N01
105083	498	NTIS, PC AA05/MF A01
290215	2941	NTIS PCA07/MF A01
290865	921	NTIS, PC A03/MF A01
291013	2865	NTIS, PC A03/MF A01
291892	3293	NTIS, PC A03/MF A01
292599	235	NTIS, PC A13/MF A01
292735	1696	NTIS PCA10/MF A01
293401	1697	NTIS, PC AA06/MF A01
293402	1698	NTIS, PC AA07/MF A01
293403	1699	NTIS, PC AA07/MF A01
293404	1700	NTIS, PC AA16/MF A01
293405	1701	NTIS, PC AA05/MF A01
293406	1702	NTIS, PC AA05/MF A01
293407	1703	NTIS, PC AA03/MF A01
294738	3174	NTIS, PC A03/MF A01
294947	922	NTIS, PC A07/MF A01
295036	2724	NTIS PCA03/MF A01
295038	1704	NTIS PCA03/MF A01
295054	2942	NTIS PCA04/MF A01
295100	2943	NTIS, PC A07/MF A01
295214	923	NTIS PCA05/MF A01
295360	499	NTIS PCA05/MF A01
295408	500	NTIS PCA06/MF A01
296164	924	NTIS PCA03/MF A01
296197	3042	NTIS, PC A06/MF A01
296289	2944	NTIS, PC A06/MF A01
296642	925	NTIS, PC A10/MF A01
296712	3394	NTIS, PC A03/MF A01
296947	501	NTIS, PC A99/MF A01
296947	502	NTIS, PC A99/MF A01
296947	503	NTIS, PC A99/MF A01
296947	504	NTIS, PC A99/MF A01
296947	505	NTIS, PC A99/MF A01
296947	506	NTIS, PC A99/MF A01
296947	926	NTIS, PC A99/MF A01
296947	927	NTIS, PC A99/MF A01
296947	928	NTIS, PC A99/MF A01
296947	929	NTIS, PC A99/MF A01
296947	1705	NTIS, PC A99/MF A01
296947	1706	NTIS, PC A99/MF A01
296947	1707	NTIS, PC A99/MF A01
296947	1708	NTIS, PC A99/MF A01
296947	1709	NTIS, PC A99/MF A01
296947	1710	NTIS, PC A99/MF A01
296947	1711	NTIS, PC A99/MF A01
296947	1712	NTIS, PC A99/MF A01
296947	1713	NTIS, PC A99/MF A01
296947	1714	NTIS, PC A99/MF A01
296947	1715	NTIS, PC A99/MF A01
296947	1716	NTIS, PC A99/MF A01
296947	1717	NTIS, PC A99/MF A01
296947	1718	NTIS, PC A99/MF A01
296947	1719	NTIS, PC A99/MF A01
296947	1720	NTIS, PC A99/MF A01
296947	1721	NTIS, PC A99/MF A01
296947	1722	NTIS, PC A99/MF A01
296947	1723	NTIS, PC A99/MF A01
296947	1724	NTIS, PC A99/MF A01
296947	1725	NTIS, PC A99/MF A01
296947	2538	NTIS, PC A99/MF A01
296947	2539	NTIS, PC A99/MF A01
296947	2540	NTIS, PC A99/MF A01
296947	2541	NTIS, PC A99/MF A01
296947	2613	NTIS, PC A99/MF A01
296947	2628	NTIS, PC A99/MF A01
296947	2629	NTIS, PC A99/MF A01
296947	3395	NTIS, PC A99/MF A01
296947	3475	NTIS, PC A99/MF A01
296947	3613	NTIS, PC A99/MF A01
296947	3614	NTIS, PC A99/MF A01
298585	3615	NTIS, PC A03/MF A01
299080	2647	NTIS PCA05
299754	2447	NTIS, PC A03/MF A01
300378	3023	NTIS, PC A05/MF A01
301163	3616	NTIS, PC A03/MF A01
801269	3043	NTIS, PC AN01/MF N01
PEL-		
270	3237	NTIS (US Sales Only), PC A02/MF A01
PH-		
255/78	2866	See SGAE-2971
PNCT-		
841-78-49	2448	Dep. NTIS (US Sales Only), PC A04/MF A01
841-78-60	67	NTIS (US Sales Only), PC A03/MF A01
841-78-69	1726	NTIS (US Sales Only), PC A07/MF A01
841-79-03	3238	NTIS (US Sales Only), PC A04/MF A01
PNL-		
1845-44	3617	Dep. NTIS, PC A02/MF A01
2286	2449	Dep. NTIS, PC A28/MF A01
2286(App.)	2945	Dep. NTIS, PC A11/MF A01
2287	2450	Dep. NTIS, PC A09/MF A01
2429	2828	Dep. NTIS, PC A07/MF A01
2557	1727	Dep. NTIS, PC A12/MF A01
2563	1728	NTIS, PC A03/MF A01
2599	2938	See NUREG/CR-0789
2622	930	NTIS, PC A05/MF A01
2652	2451	Dep. NTIS, PC A04/MF A01
2668-3	931	Dep. NTIS, PC A03/MF A01
2774	2452	Dep. NTIS, PC A05/MF A01
2776	1729	Dep. NTIS, PC A05/MF A01
2782	1730	Dep. NTIS, PC A05/MF A01
2786	932	Dep. NTIS, PC A04/MF A01
2851	1731	Dep. NTIS, PC A04/MF A01
2851	1732	Dep. NTIS, PC A09/MF A01
2851	1733	Dep. NTIS, PC A09/MF A01
2851	2542	Dep. NTIS, PC A09/MF A01
2851	2543	Dep. NTIS, PC A09/MF A01
2851	2544	Dep. NTIS, PC A09/MF A01
2851	2545	Dep. NTIS, PC A09/MF A01
2851	2546	Dep. NTIS, PC A09/MF A01
2851	2547	Dep. NTIS, PC A09/MF A01
2851	2548	Dep. NTIS, PC A09/MF A01
2851	3514	Dep. NTIS, PC A09/MF A01
2851	3515	Dep. NTIS, PC A09/MF A01
2851	3538	Dep. NTIS, PC A09/MF A01
2851	3539	Dep. NTIS, PC A09/MF A01
2851	3581	Dep. NTIS, PC A09/MF A01
2854	1734	Dep. NTIS, PC A04/MF A01
2858	1735	NTIS, PC A03/MF A01
2859	1736	NTIS, PC A03/MF A01
2862	1737	NTIS, PC A06/MF A01
2863	1738	Dep. NTIS, PC A04/MF A01
2864	3558	NTIS, PC A03/MF A01

Report No.	Abstract No.	Availability
2874	1739	NTIS, PC A15/MF A01
2882	3543	NTIS, PC A03/MF A01
2904	933	Dep. NTIS, PC A04/MF A01
2925	934	Dep. NTIS, PC A08/MF A01
2928	1740	NTIS, PC A06/MF A01
2939	1741	Dep. NTIS, PC A13/MF A01
2954	1742	Dep. NTIS, PC A03/MF A01
2970	2453	Dep. NTIS, PC A15/MF A01
2982	236	Dep. NTIS, PC A03/MF A01
2985	68	Dep. NTIS, PC A04/MF A01
2989	3171	Dep. NTIS, PC A05/MF A01
2999(Pts.1-4)	935	Dep. NTIS, PC A07/MF A01
3000-2	507	Dep. NTIS, PC A04/MF A01
3000-3	508	Dep. NTIS, PC A05/MF A01
3000-4	509	NTIS, PC A06/MF A01
3000-5	510	NTIS, PC A06/MF A01
3017	237	NTIS, PC A05/MF A01
3027	936	NTIS, PC A03/MF A01
3036	511	Dep. NTIS, PC A08/MF A01
3050-1	937	Dep. NTIS, PC A03/MF A01
3050-2	938	Dep. NTIS, PC A03/MF A01
3060	939	Dep. NTIS, PC A06/MF A01
3065	227	See NUREG/CR-0956
3070	1743	Dep. NTIS, PC A04/MF A01
3078	512	Dep. NTIS, PC A05/MF A01
3094	940	Dep. NTIS, PC A03/MF A01
3105	238	Dep. NTIS, PC A05/MF A01
3109	941	Dep. NTIS, PC A06/MF A01
3127	3476	NTIS, PC A08/MF A01
3128	3239	NTIS, PC A03/MF A01
3129	2454	Dep. NTIS, PC A05/MF A01
3137	942	Dep. NTIS, PC A03/MF A01
3139	1744	Dep. NTIS, PC A04/MF A01
3145	943	NTIS, PC A05/MF A01
3152	513	Dep. NTIS, PC A06/MF A01
3153	69	Dep. NTIS, PC A09/MF A01
3160-1	3441	Dep. NTIS, PC A03/MF A01
3160-2	3403	Dep. NTIS, PC A08/MF A01
3160-3	1745	Dep. NTIS, PC A11/MF A01
3161-1	1746	Dep. NTIS, PC A08/MF A01
3161-2	1747	Dep. NTIS, PC A13/MF A01
3161-3	1748	Dep. NTIS, PC A08/MF A01
3161-4	1749	11
3162	1750	NTIS, PC, $10.50/MF, $3.50
3166(Pt.1)	70	NTIS, PC A04/MF A01
3171	239	Dep. NTIS, PC A05/MF A01
3173	1751	NTIS, PC A04/MF A01
3176	514	Dep. NTIS, PC A07/MF A01
3179	1752	NTIS, PC A06/MF A01
3180	2549	NTIS, PC A10/MF A01
3181	944	Dep. NTIS, PC A03/MF A01
3186	945	Dep. NTIS, PC A03/MF A01
3187	3307	See NUREG/CR-1109
3198	3516	Dep. NTIS, PC A06/MF A01
3222	3240	Dep. NTIS, PC A03/MF A01
3226	1753	Dep. NTIS, PC A04/MF A01
3226(App.1)	1754	Dep. NTIS, PC A02/MF A01
3227	1755	Dep. NTIS, PC A05/MF A01
3244	946	NTIS, PC A23/MF A01
3253	2455	NTIS, PC A12/MF A01
3254	515	Dep. NTIS, PC A05/MF A01
3261	240	NTIS, PC A05/MF A01
3268	241	NTIS, PC A04/MF A01
3276	2896	Dep. NTIS, PC A03/MF A01
3283	3241	NTIS, PC A04/MF A01
3284	3242	NTIS, PC A05/MF A01
3290	947	NTIS, PC A05/MF A01
3300(Pt.2)	516	Dep. NTIS, PC A11/MF A01
3300(Pt.2)	3243	Dep. NTIS, PC A11/MF A01
3300(Pt.2)	3298	Dep. NTIS, PC A11/MF A01
3300(Pt.2)	3376	Dep. NTIS, PC A11/MF A01
3300(Pt.2)	3477	Dep. NTIS, PC A11/MF A01
3300(Pt.5)	2456	Dep. NTIS, PC A07/MF A01
3300(Pt.5)	3172	Dep. NTIS, PC A07/MF A01
3300(Pt.5)	3244	Dep. NTIS, PC A07/MF A01
3304	2457	Dep. NTIS, PC A04/MF A01
3315	3377	NTIS, PC A04/MF A01
3317-1	517	Dep. NTIS, PC A04/MF A01
3317-2	373	NTIS, PC A04/MF A01
3318	1756	Dep. NTIS, PC A06/MF A01
3326	1757	NTIS, PC A03/MF A01
3333	1758	Dep. NTIS, PC A06/MF A01
3340	2550	NTIS, PC A03/MF A01
3343	948	NTIS, PC A03/MF A01
3346	3442	NTIS, PC A06/MF A01
3349	1759	NTIS, PC A04/MF A01
3375	949	NTIS, PC A03/MF A01
3398	1760	NTIS, PC A04/MF A01
3405	950	NTIS, PC A04/MF A01
3406	951	NTIS, PC A08/MF A01
3425	518	NTIS, PC A03/MF A01
3477	952	NTIS, PC A10/MF A01
3484	1761	NTIS, PC A06/MF A01
3493	953	NTIS, PC A06/MF A01
3498	3345	NTIS, PC A03/MF A01
PNL-SA-		
6519	242	Dep. NTIS, PC A02/MF A01
6520	243	Dep. NTIS, PC A02/MF A01
6521	244	Dep. NTIS, PC A02/MF A01
6523	2551	Dep. NTIS, PC A02/MF A01
6526	245	Dep. NTIS, PC A02/MF A01
6698	1762	Dep. NTIS, PC A03/MF A01
6768	954	Dep. NTIS, PC A02/MF A01
7072/T1	519	NTIS, PC A03/MF A01
7184	1763	Dep. NTIS, PC A02/MF A01
7197	1764	Dep. NTIS, PC A03/MF A01
7243	1765	Dep. NTIS, PC A02/MF A01
7245	2458	Dep. NTIS, PC A02/MF A01
7292	955	Dep. NTIS, PC A02/MF A01
7344	246	Dep. NTIS, PC A02/MF A01
7352(Vol.1)	1766	Dep. NTIS, PC A22/MF A01
7352(Vol.1)	1767	Dep. NTIS, PC A22/MF A01
7352(Vol.1)	1768	Dep. NTIS, PC A22/MF A01
7352(Vol.1)	1769	Dep. NTIS, PC A22/MF A01
7352(Vol.1)	1770	Dep. NTIS, PC A22/MF A01
7352(Vol.1)	1771	Dep. NTIS, PC A22/MF A01
7352(Vol.1)	1772	Dep. NTIS, PC A22/MF A01
7352(Vol.1)	2459	Dep. NTIS, PC A22/MF A01
7352(Vol.2)	1773	Dep. NTIS, PC A21/MF A01
7352(Vol.2)	1774	Dep. NTIS, PC A21/MF A01
7352(Vol.2)	1775	Dep. NTIS, PC A21/MF A01
7352(Vol.2)	1776	Dep. NTIS, PC A21/MF A01
7352(Vol.2)	1777	Dep. NTIS, PC A21/MF A01
7352(Vol.2)	1778	Dep. NTIS, PC A21/MF A01
7352(Vol.2)	1779	Dep. NTIS, PC A21/MF A01
7381	2676	Dep. NTIS, PC A02/MF A01
7414	956	Dep. NTIS, PC A02/MF A01
7468	2460	Dep. NTIS, PC A02/MF A01
7497	3308	Dep. NTIS, PC A03/MF A01
7499	957	Dep. NTIS, PC A03/MF A01
7535	2677	Dep. NTIS, PC A03/MF A01
7540	520	Dep. NTIS, PC A02/MF A01
7734	247	NTIS, PC A03/MF A01
7752	71	NTIS, PC A02/MF A01
7844	72	NTIS, PC A02/MF A01
7875	2461	Dep. NTIS, PC A03/MF A01
7897	1780	Dep. NTIS, PC A02/MF A01
7953	1781	Dep. NTIS, PC A03/MF A01
7992	1782	Dep. NTIS, PC A11/MF A01
7992	1783	Dep. NTIS, PC A11/MF A01
7992	1784	Dep. NTIS, PC A11/MF A01
7992	1785	Dep. NTIS, PC A11/MF A01
7992	1786	Dep. NTIS, PC A11/MF A01
7992	1787	Dep. NTIS, PC A11/MF A01
7992	1788	Dep. NTIS, PC A11/MF A01
7992	1789	Dep. NTIS, PC A11/MF A01
7992	1790	Dep. NTIS, PC A11/MF A01
7992	1791	Dep. NTIS, PC A11/MF A01
7992	1792	Dep. NTIS, PC A11/MF A01
7992	1793	Dep. NTIS, PC A11/MF A01
7992	1794	Dep. NTIS, PC A11/MF A01
7992	1795	Dep. NTIS, PC A11/MF A01
7992	1796	Dep. NTIS, PC A11/MF A01
7992	1797	Dep. NTIS, PC A11/MF A01
8011	1798	Dep. NTIS, PC A02/MF A01
8014	958	NTIS, PC A02/MF A01
8085	959	NTIS, PC A03/MF A01
8143	3044	NTIS, PC A03/MF A01
8414	960	NTIS, PC A02/MF A01
8571(Vol.1)	1799	NTIS, PC A24/MF A01
8571(Vol.2)	2462	NTIS, PC A17/MF A01
8571(Vol.2)	2463	NTIS, PC A17/MF A01
8571(Vol.2)	2464	NTIS, PC A17/MF A01
8571(Vol.2)	2465	NTIS, PC A17/MF A01
8571(Vol.2)	2466	NTIS, PC A17/MF A01
8571(Vol.2)	2467	NTIS, PC A17/MF A01
8571(Vol.2)	2468	NTIS, PC A17/MF A01
8571(Vol.2)	2469	NTIS, PC A17/MF A01
8571(Vol.2)	2470	NTIS, PC A17/MF A01
PNL-TR-		
377	1038	Dep. NTIS, PC A04/MF A01
378	2131	Dep. NTIS, PC A02/MF A01
384	2116	Dep. NTIS, PC A03/MF A01
386	1030	Dep. NTIS, PC A04/MF A01
387	1039	Dep. NTIS, PC A03/MF A01
399	351	NTIS, PC A02/MF A01
408	2115	NTIS, PC A02/MF A01
409	79	NTIS, PC A06/MF A01
PP-		
704-990-002	705	See DOE/SF/00701-T52
PPGM-L-		
165-78	961	NTIS (US Sales Only), PC A03/MF A01
181-78	962	NTIS (US Sales Only), PC A02/MF A01
PR-8-		
122	3413	See AECL-6586
PRAV-		
1-21	521	NTIS (US Sales Only), PC A04/MF A01
1.22	963	NTIS (US Sales Only), PC A10/MF A01
1.22	964	NTIS (US Sales Only), PC A10/MF A01
1.32	965	NTIS (US Sales Only), PC A02/MF A01
3-19	966	NTIS (US Sales Only), PC A02/MF A01
PTB-SE-		
1	1800	NTIS (US Sales Only), PC A04/MF A01
2	1801	NTIS (US Sales Only), PC

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		A02/MF A01
PWA-		
18/79	875	See KFK-2842
43/77	466	See KFK-2519
81/78	4	See KFK-2833
90/78	1540	See KFK-2552
RFP-		
2798	967	Dep. NTIS, PC A02/MF A01
2862	248	Dep. NTIS, PC A05/MF A01
2870	968	Dep. NTIS, PC A03/MF A01
2907	969	Dep. NTIS, PC A02/MF A01
2945	970	NTIS, PC A02/MF A01
2952	971	Dep. NTIS, PC A03/MF A01
2969	972	NTIS, PC A03/MF A01
2972	973	Dep. NTIS, PC A02/MF A01
2982	249	NTIS, PC A04/MF A01
3013	974	NTIS, PC A02/MF A01
3030	975	NTIS, PC A02/MF A01
3052	3378	Dep. NTIS, PC A02/MF A01
3079	976	NTIS, PC A02/MF A01
3110	1802	NTIS, PC A03/MF A01
RFP-Trans-		
286	2405	NTIS, PC A02/MF A01
RHO-BWI-		
79-100	1803	Dep. NTIS, PC A12/MF A01
79-100-3Q	1804	Dep. NTIS, PC A04/MF A01
79-100-4Q	1805	Dep. NTIS, PC A04/MF A01
80-100-2Q	1806	NTIS, PC A05/MF A01
80-100-3Q	1807	NTIS, PC A04/MF A01
80-100-19	1808	Dep. NTIS, PC A05/MF A01
RHO-BWI-C-		
13	1809	Dep. NTIS, PC A04/MF A01
25	3517	Dep. NTIS, PC A99/MF A01
29	1810	Dep. NTIS, PC A04/MF A01
40	1811	Dep. NTIS, PC A03/MF A01
45	1812	NTIS, PC A06/MF A01
47	1813	Dep. NTIS, PC A10/MF A01
49	1814	NTIS, PC A14/MF A01
50	3559	Dep. NTIS, PC A05/MF A01
54	3560	Dep. NTIS, PC A05/MF A01
55	3561	Dep. NTIS, PC A05/MF A01
59	1815	NTIS, PC A23/MF A01
60	1816	NTIS, PC A99/MF A01
62(Vol.1)	1817	NTIS, PC A09/MF A01
62(Vol.2)	1818	NTIS, PC A09/MF A01
65	2471	NTIS, PC A02/MF A01
66	1819	NTIS, PC A17/MF A01
68	1820	NTIS, PC A06/MF A01
70	1821	NTIS, PC A03/MF A01
76	1822	NTIS, PC A03/MF A01
82	3518	NTIS, PC A03/MF A01
RHO-BWI-CD-		
2(Rev.1)	1823	Dep. NTIS, PC A09/MF A01
22(Rev.1)	1824	Dep. NTIS, PC A02/MF A01
35	1825	NTIS, PC A99/MF A01
42	1826	NTIS, PC A03/MF A01
RHO-BWI-LD-		
19	1827	NTIS, PC A03/MF A01
22	1828	Dep. NTIS, PC A05/MF A01
23	1829	NTIS, PC A03/MF A01
RHO-BWI-SA-		
19	1830	Dep. NTIS, PC A02/MF A01
20	1831	Dep. NTIS, PC A02/MF A01
21	1832	Dep. NTIS, PC A02/MF A01
25	1833	Dep. NTIS, PC A02/MF A01
26	3519	Dep. NTIS, PC A02/MF A01
29	1834	Dep. NTIS, PC A03/MF A01
30	1835	Dep. NTIS, PC A03/MF A01
32	1836	Dep. NTIS, PC A03/MF A01
43	1837	NTIS, PC A02/MF A01
49	1838	NTIS, PC A02/MF A01
50	1839	NTIS, PC A02/MF A01
51	1840	NTIS, PC A02/MF A01
66	1841	NTIS, PC A03/MF A01
RHO-BWI-ST-		
6	3496	Dep. NTIS, PC A10/MF A01
6	3520	Dep. NTIS, PC A11/MF A01
7	1842	NTIS, PC A99/MF A01
8	1843	NTIS, PC A11/MF A01
9	1844	NTIS, PC A03/MF A01
RHO-C-		
22	1845	Dep. NTIS, PC A04/MF A01
25(Vol.2) (Draft)	250	Dep. NTIS, PC A03/MF A01
28	1846	Dep. NTIS, PC A06/MF A01
39	1847	NTIS, PC A05/MF A01
RHO-CD-		
34-4Q	1848	NTIS, PC A11/MF A01
78-34-4Q	1849	Dep. NTIS, PC A11/MF A01
78-35-4Q	1850	Dep. NTIS, PC A02/MF A01
79-34-4Q	1851	NTIS, PC A11/MF A01
79-35-4Q	3245	NTIS, PC A03/MF A01
132(Rev.4)	1852	Dep. NTIS, PC A04/MF A01
132(Rev.5)	1853	NTIS, PC A07/MF A01
394	977	Dep. NTIS, PC A02/MF A01
568	522	Dep. NTIS, PC A04/MF A01
739	978	Dep. NTIS, PC A06/MF A01
761	523	NTIS, PC A06/MF A01
773	1854	Dep. NTIS, PC A02/MF A01
783	979	Dep. NTIS, PC A02/MF A01
810	1855	Dep. NTIS, PC A05/MF A01
864	3010	NTIS, PC A02/MF A01
882	1856	NTIS, PC A04/MF A01
883	524	NTIS, PC A04/MF A01
896	1857	Dep. NTIS, PC A06/MF A01
980	1858	NTIS, PC A03/MF A01
RHO-F-		
7	980	NTIS, PC A04/MF A01
8	981	NTIS, PC A03/MF A01
RHO-LD-		
45	1859	Dep. NTIS, PC A13/MF A01
71	1860	Dep. NTIS, PC A08/MF A01
72	1861	Dep. NTIS, PC A10/MF A01
79-3A	73	Dep. NTIS, PC A07/MF A01
79-3B	74	NTIS, PC A07/MF A01
79-83-3Q	251	Dep. NTIS, PC A03/MF A01
79-101-D	525	Dep. NTIS, PC A03/MF A01
80-101-A	982	NTIS, PC A02/MF A01
82	1862	Dep. NTIS, PC A04/MF A01
95	252	Dep. NTIS, PC A03/MF A01
97	1863	Dep. NTIS, PC A05/MF A01
98	1864	NTIS, PC A02/MF A01
100	1865	Dep. NTIS, PC A02/MF A01
136	1866	NTIS, PC A02/MF A01
RHO-SA-		
50	526	Dep. NTIS, PC A03/MF A01
51	983	Dep. NTIS, PC A05/MF A01
81	3619	Dep. NTIS, PC A02/MF A01
91	984	Dep. NTIS, PC A02/MF A01
93	3562	Dep. NTIS, PC A03/MF A01
98	985	Dep. NTIS, PC A03/MF A01
108	1867	NTIS, PC A03/MF A01
116	986	Dep. NTIS, PC A02/MF A01
117	1868	Dep. NTIS, PC A02/MF A01
122	75	Dep. NTIS, PC A02/MF A01
123	987	NTIS, PC A03/MF A01
131	1869	Dep. NTIS, PC A02/MF A01
136	253	Dep. NTIS, PC A02/MF A01
141	254	Dep. NTIS, PC A02/MF A01
142	1870	NTIS, PC A02/MF A01
143	1871	Dep. NTIS, PC A02/MF A01
145	988	NTIS, PC A03/MF A01
148	527	Dep. NTIS, PC A02/MF A01
155	1872	Dep. NTIS, PC A02/MF A01
160	1873	NTIS, PC A03/MF A01
170	1874	NTIS, PC A02/MF A01
173	989	NTIS, PC A03/MF A01
174	990	NTIS, PC A02/MF A01
RHO/SFM-		
80/5	907	See ORNL/EIS-154/V1
RHO-ST-		
23	1875	Dep. NTIS, PC A10/MF A01
30	991	Dep. NTIS, PC A03/MF A01
33	992	NTIS, PC A08/MF A01
RISLEY-Trans-		
3352	3045	British Library Lending Division, Boston Spa
3373	993	British Library Lending Division, Boston Spa, Wetherby, West Yorkshire, England
3999	528	British Library Lending Division, Boston Spa
4086	336	Dep. NTIS (US Sales Only), PC A02/MF A01
4086	336	Dep. NTIS (US Sales Only), PC A02/MF A01
RISO-M-		
1972	2946	Dep. NTIS (US Sales Only), PC A10/MF A01; Also available from Risoe Library, DK-4000 Roskilde, Denmark
RLO-		
1953	3005	See DOE/ER/01953-T1
2225-T24-31	3467	See DOE/EV/70024-31
RLO-SA-		
79-1	3396	Dep. NTIS, PC A03/MF A01
RPDE-		
79-023	2472	Dep. NTIS, PC A04/MF A01
RS-		
137/78	2866	See SGAE-2971
149/79	2009	See SGAE-3035
SAC-		
21	1574	See LBL-8907
22	1562	See LBL-7061
24	1567	See LBL-8423
25	1566	See LBL-8313

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27	1591	See LBL-10559
SAI-		
78-904-LJ	994	Dep. NTIS, PC A07/MF A01
78-943-LJ	2891	See EPA-520/6-78-009
099-78-PA	2537	See ORNL/Sub-80/31048/1
132-79-764-LJ	995	Dep. NTIS, PC A10/MF A01
00979-1	76	Dep. NTIS, PC A03/MF A01
SAI/OR-		
565-2	1668	See ORNL/Sub-79/13617/2
SAND-		
77-0274 (Add.A)	1876	Dep. NTIS, MF A01
77-0274 (Add.B)	1877	Dep. NTIS, PC A02/MF A01
77-0274 (Add.C)	1878	Dep. NTIS, MF A01
77-0274 (Add.D)	1879	Dep. NTIS, PC A04/MF A01
77-0274 (Add.E)	1880	Dep. NTIS, PC A02/MF A01
77-0274 (Add.F)	1881	Dep. NTIS, PC A03/MF A01
77-0274 (Add.G)	1882	Dep. NTIS, PC A02/MF A01
77-0274 (Add.H)	1883	Dep. NTIS, PC A02/MF A01
77-0274 (Add.I)	1884	Dep. NTIS, PC A04/MF A01
77-0274 (Add.J)	1885	Dep. NTIS, PC A06/MF A01
77-0274 (Add.L)	1886	Dep. NTIS, PC A02/MF A01
77-0274 (Add.M)	1887	Dep. NTIS, PC A02/MF A01
78-1147	1888	Dep. NTIS, PC A03/MF A01
78-1332	2648	NTIS, PC A08/MF A01
78-1951	3619	Dep. NTIS, PC A04/MF A01
78-2317	2792	Dep. NTIS, PC A04/MF A01
79-0117	529	Dep. NTIS, PC A04/MF A01
79-0172	1889	Dep. NTIS, PC E04/MF E04
79-0199	996	Dep. NTIS, PC A02/MF A01
79-0273	1890	Dep. NTIS, PC A04/MF A01
79-0275	1891	NTIS, PC A04/MF A01
79-0276	3521	NTIS, PC A05/MF A01
79-0277	1892	NTIS, PC A04/MF A01
79-0278	1893	NTIS, PC A04/MF A01
79-0279	1894	Dep. NTIS, PC A04/MF A01
79-0280	1895	Dep. NTIS, PC A05/MF A01
79-0281	1896	Dep. NTIS, PC A05/MF A01
79-0283	1897	Dep. NTIS, PC A05/MF A01
79-0284	1898	NTIS, PC A05/MF A01
79-0344	1899	Dep. NTIS, PC A04/MF A01
79-0368	3299	Dep. NTIS, PC A22/MF A01
79-0377	1900	NTIS, PC A03/MF A01
79-0625	1901	Dep. NTIS, PC A05/MF A01
79-0895C	1902	Dep. NTIS, PC A02/MF A01
79-0896C	2473	Dep. NTIS, PC A02/MF A01
79-0900C	2474	Dep. NTIS, PC A02/MF A01
79-0905C	1903	Dep. NTIS, PC A02/MF A01
79-0907C	1904	Dep. NTIS, PC A02/MF A01
79-0911C	1905	Dep. NTIS, PC A02/MF A01
79-0954C	1906	Dep. NTIS, PC A02/MF A01
79-0955C	2475	Dep. NTIS, PC A02/MF A01
79-0981C	1907	Dep. NTIS, PC A02/MF A01
79-0988C	1908	Dep. NTIS, PC A02/MF A01
79-0989C	1909	Dep. NTIS, PC A02/MF A01
79-0990C	1910	Dep. NTIS, PC A02/MF A01
79-1000C	1911	Dep. NTIS, PC A02/MF A01
79-1013C	1912	Dep. NTIS, PC A02/MF A01
79-1016C	2476	Dep. NTIS, PC A02/MF A01
79-1019C	1913	Dep. NTIS, PC A02/MF A01
79-1036C	1914	Dep. NTIS, PC A02/MF A01
79-1047C	1915	Dep. NTIS, PC A02/MF A01
79-1076C	1916	Dep. NTIS, PC A02/MF A01
79-1095	3175	Dep. NTIS, PC A06/MF A01
79-1109	1917	NTIS, PC A03/MF A01
79-1110	1918	NTIS, PC A04/MF A01
79-1119	3563	Dep. NTIS, PC A04/MF A01
79-1156	1919	Dep. NTIS, PC A10/MF A01
79-1197C	1920	Dep. NTIS, PC A03/MF A01
79-1199	1921	NTIS, PC A03/MF A01
79-1245	530	Dep. NTIS, PC A04/MF A01
79-1259C	1922	Dep. NTIS, PC A03/MF A01
79-1265	1923	NTIS, PC A03/MF A01
79-1276	1924	NTIS, PC A08/MF A01
79-1278	1925	NTIS, PC A03/MF A01
79-1305	1926	Dep. NTIS, PC A11/MF A01
79-1306	1927	Dep. NTIS, PC A03/MF A01
79-1366	2793	NTIS, PC A06/MF A01
79-1402	255	Dep. NTIS, PC A06/MF A01
79-1424	256	NTIS, PC A03/MF A01
79-1429C	1928	Dep. NTIS, PC A02/MF A01
79-1474C	1929	Dep. NTIS, PC A02/MF A01
79-1475C	1930	Dep. NTIS, PC A02/MF A01
79-1484	1931	NTIS, PC A03/MF A01
79-1514	1932	Dep. NTIS, PC A05/MF A01
79-1519	3522	Dep. NTIS, PC A02/MF A01
79-1546C	3564	Dep. NTIS, PC A03/MF A01
79-1618/1	1933	Dep. NTIS, PC, $8.50/MF, $3.80
79-1618 (Vol.2)	1934	Dep. NTIS, PC A99/MF A01
79-1634C	1935	Dep. NTIS, PC A02/MF A01
79-1665	1936	Dep. NTIS, PC A03/MF A01
79-1665C	2477	Dep. NTIS, PC A02/MF A01
79-1667C	531	Dep. NTIS, PC A02/MF A01
79-1679	1937	Dep. NTIS, PC A04/MF A01
79-1746C	1938	Dep. NTIS, PC A02/MF A01
79-1773	3565	NTIS, PC A04/MF A01
79-1841	257	Dep. NTIS, PC A03/MF A01
79-1853	3566	Dep. NTIS, PC A03/MF A01
79-1855	1939	Dep. NTIS, PC A05/MF A01
79-1886C	532	Dep. NTIS, PC A03/MF A01
79-1889	1940	Dep. NTIS, PC A03/MF A01
79-1902	1941	Dep. NTIS, PC A02/MF A01
79-1929C	258	Dep. NTIS, PC A02/MF A01
79-1950C	1942	Dep. NTIS, PC A02/MF A01
79-1959C	1943	Dep. NTIS, PC A02/MF A01
79-2015	1944	Dep. NTIS, PC A04/MF A01
79-2019C	1945	Dep. NTIS, PC A02/MF A01
79-2023C	1946	Dep. NTIS, PC A03/MF A01
79-2073	1947	NTIS, PC A02/MF A01
79-2117	1948	NTIS, PC A03/MF A01
79-2117C	1949	Dep. NTIS, PC A03/MF A01
79-2131	1482	See GJBX-122(80)
79-2141	1950	Dep. NTIS, PC A02/MF A01
79-2212	1951	NTIS, PC A03/MF A01
79-2216A	1952	Dep. NTIS, PC A02/MF A01
79-2226	1953	NTIS, PC A04/MF A01
79-2230	3567	NTIS, PC A03/MF A01
79-2244C	1954	Dep. NTIS, PC A04/MF A01
79-2245	1955	NTIS, PC A03/MF A01
79-2245C	1956	Dep. NTIS, PC A03/MF A01
79-2250	1957	NTIS, PC A03/MF A01
79-2254	1958	NTIS, PC A03/MF A01
79-2254C	1959	Dep. NTIS, PC A02/MF A01
79-2262	259	Dep. NTIS, PC A10/MF A01
79-2328C	1960	NTIS, PC A03/MF A01
79-2354C	3620	NTIS, PC A04/MF A01
79-2423	1961	NTIS, PC A03/MF A01
79-2468	1962	NTIS, PC A03/MF A01
79-6002	3446	Dep. NTIS, PC A02/MF A01
79-6006	3348	Dep. NTIS, PC A02/MF A01
79-7030	3568	Dep. NTIS, PC A07/MF A01
79-7042	1963	Dep. NTIS, PC A10/MF A01
79-7045	3569	Dep. NTIS, PC A07/MF A01
79-7050	1964	Dep. NTIS, PC A05/MF A01
79-7102	1965	Dep. NTIS, PC A14/MF A01
79-7107	2552	Dep. NTIS, PC A06/MF A01
79-7109	3180	NTIS, PC A11/MF A01
79-7111	1966	NTIS, PC A05/MF A01
80-0007/1	1967	Dep. NTIS, PC A04/MF A01
80-0007/2	1968	Dep. NTIS, PC A04/MF A01
80-0021C	3102	Dep. NTIS, PC A02/MF A01
80-0023C	533	Dep. NTIS, PC A02/MF A01
80-0039	1969	PC A03/MF A01
80-0061C	260	NTIS, PC A02/MF A01
80-0062C	261	NTIS, PC A02/MF A01
80-0085C	262	NTIS, PC A02/MF A01
80-0087	1970	NTIS, PC A08/MF A01
80-0149	1971	NTIS, PC A04/MF A01
80-0201	1972	NTIS, PC A02/MF A01
80-0304C	1973	NTIS, PC A02/MF A01
80-0307C	1974	NTIS, PC A02/MF A01
80-0310C	1975	Dep. NTIS, PC A02/MF A01
80-0312C	1976	NTIS, PC A02/MF A01
80-0323C	1977	Dep. NTIS, PC A02/MF A01
80-0342	3246	NTIS, PC A03/MF A01
80-0358C	1978	NTIS, PC A03/MF A01
80-0359C	1979	Dep. NTIS, PC A02/MF A01
80-0366	2947	NTIS, PC A03/MF A01
80-0390C	1980	Dep. NTIS, PC A03/MF A01
80-0416	1981	Dep. NTIS, PC A02/MF A01
80-0426C	1982	NTIS, PC A03/MF A01
80-0440	1983	NTIS, PC A07/MF A01
80-0459	1984	NTIS, PC A03/MF A01
80-0467	1985	NTIS, PC A03/MF A01
80-0502C	1986	Dep. NTIS, PC A02/MF A01
80-0531C	1987	NTIS, PC A02/MF A01
80-0543C	3621	Dep. NTIS, PC A02/MF A01
80-0558	1988	NTIS, PC A03/MF A01
80-0632	1989	NTIS, PC A03/MF A01
80-0705C	1990	NTIS, PC A02/MF A01
80-0761C	263	NTIS, PC A02/MF A01
80-0769	3570	NTIS, PC A04/MF A01
80-0781C	1991	NTIS, PC A02/MF A01
80-0784	264	Dep. NTIS, PC A12/MF A01
80-0794C	2553	NTIS, PC A02/MF A01
80-0799	1992	NTIS, PC A05/MF A01
80-0812	1993	NTIS, PC A02/MF A01
80-1020/1	1994	NTIS, PC A03/MF A01
80-1020/1	1995	NTIS, PC A03/MF A01
80-1319C	1996	NTIS, PC A02/MF A01
80-1376C	997	NTIS, PC A02/MF A01
80-1407C	1997	NTIS, PC A02/MF A01
80-1464	1998	NTIS, PC A07/MF A01
80-1533C	1999	NTIS, PC A02/MF A01
80-1566C	2000	NTIS, PC A02/MF A01
80-1592C	2001	NTIS, PC A02/MF A01
80-1599C	2002	NTIS, PC A03/MF A01
80-1606C	2003	NTIS, PC A02/MF A01
80-1616C	2004	NTIS, PC A02/MF A01
80-1633C	265	NTIS, PC A02/MF A01
80-2035C	2005	NTIS, PC A02/MF A01
80-2096C	2006	NTIS, PC A02/MF A01
80-2414C	2007	NTIS, PC A02/MF A01

Report No.	Abstract No.	Availability
80-2462C	2008	NTIS, PC A02/MF A01
80-7107	2478	NTIS, PC E02/MF, $3.50
80-7121	3294	NTIS, PC E02/MF, $3.50
80-8021	266	NTIS, PC A02/MF A01
SGAE-		
2864	998	Dep. NTIS (US Sales Only), PC A03/MF A01
2889	2554	NTIS (US Sales Only), PC A02/MF A01
2932	999	Dep. NTIS (US Sales Only), PC A03/MF A01
2971	2866	Dep. NTIS (US Sales Only), PC A04/MF A01
3006	1000	Dep. NTIS (US Sales Only), PC A03/MF A01
3012	1001	Dep. NTIS (US Sales Only), PC A03/MF A01
3023	2555	Dep. NTIS (US Sales Only), PC A03/MF A01
3035	2009	Dep. NTIS (US Sales Only), PC A03/MF A01
3038	1002	NTIS (US Sales Only), PC A03/MF A01
SKBF/KBS-		
79-05	3523	Dep. NTIS (US Sales Only), PC A08/MF A01
SKBF-KBS-TR-		
79-01	2010	Dep. NTIS (US Sales Only), PC A03/MF A01
79-02	3524	Dep. NTIS (US Sales Only), PC A04/MF A01
79-03	2011	Dep. NTIS (US Sales Only), PC A03/MF A01
79-04	2012	Dep. NTIS (US Sales Only), PC A04/MF A01
79-06	3525	Dep. NTIS (US Sales Only), PC A03/MF A01
79-08	3404	NTIS (US Sales Only), PC A02/MF A01
79-09	2013	Dep. NTIS (US Sales Only), PC A03/MF A01
79-12	2014	Dep. NTIS (US Sales Only), PC A03/MF A01
79-14	2015	NTIS (US Sales Only), PC A03/MF A01
79-17	3405	NTIS (US Sales Only), PC A02/MF A01
79-19	1003	NTIS (US Sales Only), PC A04/MF A01
SLAC-		
228	3247	NTIS, PC A03/MF A01
SR-		
0980-10	2556	Dep. NTIS, PC A23/MF A01
SRO-		
1051-1	267	Dep. NTIS, PC A07/MF A01
1051-3	268	Dep. NTIS, PC A06/MF A01
1051-4	269	Dep. NTIS, PC A09/MF A01
1051-5	270	Dep. NTIS, PC A07/MF A01
STI/PUB-		
482	3248	IAEA
500	2812	IAEA
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