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Operated by
UNION CARBIDE NUCLEAR COMPANY
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Post Office Box X
Oak Ridge, Tennessee

DATE: July 22, 1958

COPY NO. 17

SUBJECT: Radioactive Waste Treatment and Disposal--
A Bibliography of Unclassified Literature, Part 2

TO: F. L. Culler

FROM: J. O. Blomeke

ABSTRACT

This bibliography of the 238 unclassified literature on radioactive waste treatment and disposal has been compiled from references published in the Nuclear Science Abstracts, Volume 11, No. 11 (June 15, 1957) through Volume 12, No. 12 (June 30, 1958).

The bibliography brings up to date a previous bibliography published as CF 57-8-118.

DISCLAIMER

TABLE OF CONTENTS

1.00 GENERAL

1. General Specification for the PWR Commercial Nuclear Power Plant Waste Disposal Equipment. Report WAPD-PWR-PMA-206 (December 12, 1955).

2. Resume of Radioactive Waste Handling at the Knolls Atomic Power Laboratory. D. A. Manieri and C. N. Perleberg. Report KAPL-M-DAM-1 (May, 1956).
   The history of waste handling operations at KAPL is reviewed.

3. "The Control, Conveyance, Treatment, and Disposal of Radioactive Effluents from the Atomic Weapons Research Establishment, Aldermaston." W. L. Wilson, P. A. F. White, and J. G. Milton. J. Brit. Nuclear Energy Conf. 1, 149-72 (July, 1956).

4. Radioactive Waste Disposal System; System Description No. 24. Charles R. Claxton. Report AECU-3606 (August 31, 1956).
   Procedures and equipment used in segregating, processing or storing, and ultimate disposal of the radioactive wastes from the Pressurized Water Reactor plant and its auxiliaries are described in detail.

5. PWR Radioactive Waste Disposal System. J. R. LaPointe. Report WAPD-PWR-PMF-414 (September 7, 1956).

6. Waste and Disposal System. J. E. Kuster. Report CF-56-10-15 (Oct. 1, 1956).
   Waste and vent systems discussed in detail are venting and evacuation, flooding, liquid waste, evacuation of holdup tank, steam blowdown from heat exchangers, disposal, gaseous wastes, and waste storage emergency overflow.

7. A Discussion of the Radioactive Waste Disposal Facilities at the Shippingport Atomic Power Station. Report WAPD-T-387 (1956).

8. Estimation of Radioactivity at a Power Reactor; Its Treatment and Control. J. R. LaPointe. Report WAPD-T-419 (1956).

9. Reactor Evaluation Quarterly Progress Report for January--March, 1957. R. J. Beeley, ed. Report NAA-SR-1938 (June 15, 1957).
   Various methods of high-activity fission product waste disposal were considered.

10. Status of Radioactive Waste Processing and Accumulation in Presently Operating AEC Research and Production Sites. B. Manowitz and W. A. Rodger. Report BNL-1091(Del.) (April 5, 1951) Decl. with deletions February 12, 1957.
    Over-all waste disposal problems at the presently operating major AEC sites are presented. Data are given on volumes and radioactive concentrations of the wastes handled and effluents discharged.

11. Process Waste Water Treatment Plant. Preliminary Report. Report AECU-3370 (February, 1957).

12. Report of Investigative Studies and Tentative Design Criteria for Destructor Plant. T. W. Burtt and W. E. Grebe. Report WASH-4 & Suppl.(Del.) (December 8, 1949) Decl. with deletions March 4, 1957.
Details of a proposed "destructor plant" for the disposal of contaminated wastes at Los Alamos are presented.

13. Liquid Waste Disposal. J. A. Ayres, G. E. McCullough, and E. C. Pitzer. Report KAPL-117 (January 24, 1949) Decl. March 12, 1957.

14. Health-Physics Procedures for an Aeromedical Radioisotopes Laboratory. Thomas J. McGuire. Report WADC-TR-57-142 (March 29, 1957).
Recommendations are presented which are applicable to waste disposal.

15. Process Design for the Livermore Waste Disposal Plant. Summary Report. J. L. Schewennesen, L. R. Michels, and M. L. Feldman. Report LWS-24632 (September 10, 1952) Decl. April 1, 1957.
Several methods for treating and disposing of wastes were evaluated.

16. "Treatment of Highly Active Wastes." C. B. Amphlett. Atomics 8, 116-20 (April, 1957).
The principal methods include fixation by ion exchange followed by firing, combined calcination and ion exchange, and conversion to unleachable glasses, melts or ceramics.

17. Preliminary Process Design for Waste Residue Recovery Plant. Job 23. Report KLX-1218 (June 30, 1951) Decl. April 3, 1957.

18. Radioactive Waste Processing and Disposal (1950-1957) Bibliography. Frederick E. Frost. Report UCRL-4891 (May 6, 1957).

19. "How Radioactive Wastes will be Handled at PWR." J. R. LaPointe. Nucleonics 15, No. 5, 114-16 (May, 1957).

20. Papers Presented at the Belgium Symposium on Chemical Reprocessing, Brussels, May 20-24, 1957. Report TID-7534.
In Disposal of Plant Effluents the methods used for treatment, concentration, storage, and dispersal of gaseous, liquid, and solid wastes from radiochemical processing plants are summarized. Treatment of gaseous effluents, preparation of waste for liquid disposal, and the retention of high level radioactive wastes are discussed. The problems of ultimate disposal of radioactive waste to the environment are surveyed with consideration of the development of a nuclear power economy during the next fifty years. Unit costs and economic relationships for some of the better understood stages of the general scheme of waste disposal are derived.

21. Status Report on the Disposal of Radioactive Wastes. Floyd L. Culler, Jr., and Stuart McLain, comps. and eds. Report CF-57-3-114(Rev.) (June 25, 1957).

22. Radioactive Waste Disposal System. J. R. LaPointe. Report AECU-3602 (July 24, 1957).
Seven illustrations are given which include radioactive waste disposal systems for service building wastes, liquid effluents, solid and gaseous wastes, cooling water, steam system, and miscellaneous service lines.

23. Status Report on Handling and Disposal of Radioactive Wastes in the AEC Program. Report WASH-742 (August, 1957).

24. Section 9.0 to Status Report on the Disposal of Radioactive Wastes. Floyd L. Culler, Jr., comp. and ed. Report CF-57-3-114(Rev.)(Suppl. 1) (September 3, 1957).

25. Radioactive Waste Disposal and Miscellaneous Work. Annual Report for Calendar Year 1956. H. E. Seagren and E. J. Witkowski, comps. Report CF-57-1-172 (September 11, 1957).

26. "Chemical Reprocessing." S. Lawroski. Nucleonics 15, No. 9, 140-1 (September, 1957).
Waste Disposal studies are briefly reviewed.

27. "The Principles of Waste Disposal from Nuclear Power Stations." John D. Abbatt and B. D. Willson. Atomic Energy Rev. 1, 106-9 (Sept., 1957).

28. The Disposal of Radioactive Waste on Land. Report NP-6503 (Sept., 1957).

29. "The Behaviour of Radioisotopes in Sewage Treatment and the Disposal of Radioactive Wastes to Sewers." A. W. Kenny. J. Brit. Nuclear Energy Conf. 2, 341-50 (October, 1957).

30. "The Safe Disposal of Radioactive Wastes." H. J. Blythe. Energia nucleare (Milan) 4, 375-8 (October, 1957).

31. "Outlook for Waste Disposal." Nucleonics 15, No. 11, 155-64 (Nov., 1957).
A survey of experts in the field of waste disposal agreed that a permanent plan for final disposition of wastes will be found.

32. Treatment and Disposal of Gaseous, Liquid, and Solid Radioactive Wastes. Information Bibliography. Report IGRL-IB/R-28 (November, 1957).

33. Disposal of Industrial Atomic Waste Products. R. H. Burns and E. Glueckauf. pp. 145-52 in Disposal of Industrial Waste Materials. New York, The Macmillan Co., 1957.

34. Control of Radioactive Material at the Pressurized Water Reactor. Jacques R. LaPointe and Robert D. Brown. Report WAPD-T-436 (1957).

35. "Treatment and Disposal of Fuel-Reprocessing Waste." Joseph A. Lieberman. Nucleonics 16, No. 2, 82-9 (1958).

2.00 RADIOLOGICAL HEALTH AND HAZARDS

36. Safe Levels of Contamination From Fission Products. James L. Dick, William R. Hurdlow, and Ellen M. Hippeli. Report AFSWC-TN-56-2 (April 27, 1956).

37. Relative Biological Hazards of Radiations Expected in Homogeneous Reactors TBR and HPR. E. D. Arnold and A. T. Gresky. Report ORNL-1982 (December 2, 1955) Decl. March 12, 1957.

38. The Volatilization of Fission Products by Melting of Reactor Fuel Plates. George W. Parker and George E. Creek. Report CF-57-6-87 (July 15, 1957).

3.00 MONITORING

39. Special Process Equipment. E. R. Edmondson. Report CF-51-10-71 (October 12, 1951) Decl. February 13, 1957.
The report on the special process equipment includes service waste monitoring.

40. Development of a Coincidence Spectrometer and a Method for Analysis of Cobalt-60. H. R. Helmholz. Report HW-49718 (April 22, 1957).
A specific instrumental method is described for the determination of Co^{60} in fission product waste streams.

41. "Reactor Monitoring." Atomics 8, 181-3 (May, 1957).

42. Meeting of the AEC Waste Processing Committee (Held at Knolls Atomic Power Laboratory), June 26-28, 1950. Part III. L. L. German, ed. Report KAPL-364 (October 11, 1950) Changed from OFFICIAL USE ONLY June 3, 1957.
Methods of monitoring water at K-25 and Hanford are described. Attempts to beta assay liquid waste solutions of high salt content are described. Methods of monitoring municipal water supplies are discussed. A discussion is given on the monitoring of solutions containing low levels of radioactivity.

43. Proportional Waste Line Sampler. J. F. Honstead. U. S. Patent 2,800,797. (July 30, 1957).

4.00 WASTE TREATMENT

4.10 Origin and Characteristics and Processes

44. The Argonne Fluoride Volatility Process, Status as of December 31, 1951. H. H. Hyman and J. J. Katz. Report ANL-4709(Del.) (February 10, 1952) Decl. with deletions Feb. 13, 1957.
Discussions are given of waste disposal associated with this type of process.

45. Sludge Acidification. M. K. Harmon. Report HW-18149 (June 23, 1950) Decl. February 19, 1957.
Data are tabulated from a study on the acidification of a synthetic incubated metal waste, free of product and fission products.

46. Viscosity and Settling Rates of TBP Waste Metal Slurries as a Function of Shear. L. P. Varga and M. K. Harmon. Report HW-19933 (January 2, 1951). Decl. February 25, 1957.

47. Physical Properties of Hanford Metal Waste. C. E. Schilling. Report ORNL-724 (June 29, 1950) Decl. March 5, 1957.

48. Properties of Neutralized and Concentrated Aqueous Waste--Low Acid Flowsheets TBP-HW-No. 4 and No. 5. M. H. Curtis, M. K. Harmon, and V. R. Cooper. Report HW-18404(Rev.) (July 18, 1950) Decl. March 14, 1957.

49. Chemical Development of the 25-TBP Process. J. R. Flanary, J. H. Goode, A. H. Kibbey, J. T. Roberts, and R. G. Wymer. Report ORNL-1993 (Rev.)(Del.) (April 9, 1957) Decl. with deletions September 18, 1957.
Procedures for recovering the solvent for process reuse and for reducing the volume of the radioactive $Al(NO_3)_3$ containing waste are proposed.

50. "Fuel Reprocessing Series. I. Fuel Reprocessing by Aqueous Methods." Edward L. Anderson, Jr. Nucleonics 15, No. 10, 72-7(October, 1957).
This is the first of a definitive and comprehensive series that will cover high-level waste disposal and other topics.

4.20 Treatment for Disposal

51. "Some Studies Applicable to the Chemical Treatment of Radioactive Effluents." P. Dejonghe and M. D'Hont. Energie Nucleaire 1, 27-33 (January--March, 1957). (In French)
The results showed that the adsorption on sawdust is a simple, efficient, and inexpensive method for the treatment of very large quantities of radioactive wastes.

52. Factors Affecting the Concentration of TBP Plant Wastes. D. F. Shepard. Report HW-27489 (March 25, 1953) Decl. February 19, 1957.
Control of neutralized waste pH at 9.5 has relieved the process difficulty of line plugging in the TBP plant waste disposal.

53. Progress Report on Fission Products Utilization. IV. Proposals for Concentrating High-Level Wastes. Part 2. F. V. Caccavo, R. J. Isler, and B. Manowitz. Report BNL-211(Del.) (April 1, 1953) Decl. with deletions March 6, 1957.

54. General Research Report for June 26 to September 18, 1950. Report MLM-498 (October 23, 1950) Decl. March 28, 1957.
A two-step process for the decontamination of waste solutions is discussed.

55. "Influence of Some Decontaminating Agents on the Purification of Radioactive Residual Water." J. Cantel and P. Cohen. Energie nucleaire 1, 138-40 (July--September, 1957). (In French)

56. Reactor Fuel Processing. Technical Progress Review, Vol. 1, No.1. Lemont, Argonne National Laboratory, 1958.
Waste Disposal. A flow diagram is given for a radioactive liquid and gaseous waste-disposal system for the Shippingport Pressurized Water Reactor. A flow diagram is given for radioactive solid waste disposal. A process is discussed for the evaporation and calcination of liquid wastes for disposal. Three methods are discussed for the isolation of Cs^{137} from liquid wastes.

4.21 Evaporation

57. HRT Waste Tank Evaporator Sampler. J. E. Kuster and C. A. Burchsted. Report CF-56-10-16 (October 11, 1956).

58. Ruthenium Distillation in Purex Acid Waste Evaporation. J. R. Flanary and V. J. Reilly. Report CF-53-7-130 (July 20, 1953) Decl. Feb. 14, 1957.

59. Multi-Stage Evaporation of Purex Acid Wastes. V. J. Reilly. Report CF-52-1-22 (January 4, 1952) Decl. February 14, 1957.

60. Effluent Concentration. Report for Period July 18, 1949-March 7, 1950. Report KLX-1067 (March 7, 1950) Decl. February 25, 1957.
Test runs of an evaporator on waste from Hanford metal recovery process are described.

61. Nitration Reactions of Shell Spray Base Under Purex Waste Recovery Process Conditions. R. M. Wagner. Report HW-26517 (December 5, 1952) Decl. March 4, 1957.

62. Ruthenium Behavior in Nitric Acid Distillation. A. S. Wilson. Report HW-45620 (September 1, 1956) Decl. March 16, 1957.

63. Pilot Model Evaporator for Concentration of Radioactive Chemical Wastes. S. E. Beall. Report ORNL-224 (February 7, 1949) Decl. March 19, 1957.

64. "High-Purity Evaporator for Waste Concentration." T. C. Carnavos and J. W. Hagen. Nucleonics 16, No. 2, 125-7 (February, 1958).

4.22 Calcination

65. Recovery of Fission Products from Calcined First Cycle Solvent Extraction Wastes. E. S. Grimmett. Report IDO-14408 (June 26, 1956).

66. Chemical Engineering Division Summary Report for April, May, and June, 1955. Report ANL-5466 (July 27, 1955) Decl. February 7, 1957.
Progress is reported on the calcination of fuel-processing waste solutions.

67. Chemical Engineering Division Summary Report for July, August, and September, 1956. Report ANL-5633 (December, 1956) Decl. March 14, 1957.
Fabrication of the fluidized-bed calciner for reactor fuel processing wastes was completed.

68. Development of a Waste Calciner. Progress Report on Waste Processing Development Project. B. Manowitz and S. Zwickler. Report BNL-447 (April, 1957).

69. Calcination of Aluminum-Type Reactor Fuel Wastes in a Fluidized Bed. E. S. Grimmett. Report IDO-14416 (August 1, 1957).

4.23 Fixation

70. Ultimate Fission Product Disposal. The Disposal of Curie Quantities of Fission Products in Siliceous Materials. J. M. White and G. Lahaie. Report CRCE-591 (March, 1955).

71. Packaging of Radioactive Waste in Ceramic Bodies. Lane Mitchell. Report CF-56-1-131 (January 30, 1956).

72. Fixation of Highly Active Wastes in Solid Form. C. B. Amphlett. Report UK/C/5/19 (September 25, 1956).

73. Chemical Engineering Division Summary Report for January, February, and March, 1954. Report ANL-5254(Del.) (May 1, 1954) Decl. with deletions February 13, 1957.
The fixation of activity of wastes in a form suitable for use as radiation sources is being studied.

74. Fixation of Activity in Solid Form by Absorption on Soils. Part 2. Final Report. A. B. Amphlett and D. T. Warren. Report AERE-C/R-2202 (April, 1957).

75. "The Fixation of Strongly Radioactive Residues in Solid Form." C. B. Amphlett. Energie nucleaire 1, 80-8 (April--June, 1957). (In French)

76. Report of Working Meeting on Fixation of Radioactivity in Stable, Solid Media at the Johns Hopkins University, June 19-21, 1957. James M. Morgan, Jr. Report TID-7550.

4.24 Precipitation and Scavenging--Co-Precipitation and Co-Crystallization

77. The Separation of Fission Products by Electrolytic Precipitations. A. C. Littlejohn. Report AERE-C/R-1537(Del.) (November 11, 1954) Decl. with deletions December 19, 1956).

78. Fission Product Separations Study. Quarterly Progress Report for December 1, 1956--February 28, 1957. Vitro Job 2077. R. A. Keeler, C. J. Anderson, and M. Kibrick. Report KLX-10066 (March 31, 1957).
The feasibility of using a $SrSO_4$ precipitation process for the decontamination of acid wastes is discussed.

79. Total Plutonium Assay in the Presence of Aluminum by $La(OH)_2$--LaF_3 Carrier Precipitations. M. Cefola and W. S. Andrus. Report KAPL-M-MC-2 (September 23, 1949) Decl. February 23, 1957.

80. The Distribution of Thorium-Decay Products in the Thorium-Purification Process. G. D. Calkins, M. Poberskin, J. E. Gates, R. H. Blackmore, and J. H. Duffee. Report BMI-967 (December 7, 1954) Decl. March 1, 1957.
Process wastes of the fluoride precipitation and solvent extraction were readily decontaminated by carrier precipitation with barium sulfate and subsequent neutralization.

81. Potassium Hydroxide Recovery from High Pressure Scrubber Wastes. T. O. Anderson. Report NYO-5250 (October, 1951) Decl. March 25, 1957.
Experiments are described which demonstrate the feasibility of a lime precipitation system.

82. A Precipitation Process for the Separation of Radiobarium from Irradiated MTR Assemblies. Quarterly Report for November, 1951 Through January, 1952. J. H. Pannell. Report CF-52-1-189 (January 31, 1952) Decl. April 2, 1957.

83. Removal of Fission Products from Feeds. M. K. Harmon. Report HW-49544 A (April 3, 1957).

84. Determination of Radiocesium by Complex Cobaltcyanide Precipitation. J. C. Langford. Report HW-49668 (April 15, 1957).

85. Fission Product Separations Study. Quarterly Progress Report for March 1, 1957--May 31, 1957. R. A. Keeler, C. J. Anderson, and M. Kibrick. Report KLX-10078 (June 28, 1957).
The evaluation of several silicate and phosphate minerals for the removal of Sr and Cs from fission product wastes was continued.

86. Meeting of the AEC Waste Processing Committee on June 26-28, 1950. Part II. Coprecipitation as a Method of Waste Disposal. J. A. Ayres, ed. Report KAPL-364 (April 25, 1951) Changed from OFFICIAL USE ONLY September 9, 1957.

87. The Removal of Fission Products from Solution with a Precipitator-Column Treatment. Part I. Laboratory Trials. K. G. Seedhouse, J. Monahan, and G. Wallis. Report AERE-ES/R-2220 (1958).

4.25 Electrolytic and Ion Exchange

88. The Alkaline Method for Treatment of High Radiation Level Aluminum Wastes. I. R. Higgins. Report CF-57-1-139 (January 17, 1957).

89. Electrodialysis of Fission Product Solutions. R. W. Durham and P. D. Goulden. Report CRDC-614 (March, 1957).

90. Project Summary. Decontamination of Dilute Low Activity Wastes (24-A3). Job 24-A. Report KLX-1372 (July 5, 1952) Decl. March 12, 1957.

91. Recovery of Uranium from Fused Salt Melts by Electrodeposition. L. W. Niedrach and G. R. Fountain. Report KAPL-1693 (March 29, 1957).
An electrolytic method is described for recovering U values from waste salts from an electrorefining process for reactor fuels.

92. Separation of Plutonium from Irradiated Uranium and Fractionation of Long-Lived Fission Products by Ion Exchange. Rolf O. Lingjaerde. Report JENER-48 (April, 1957).

93. Preliminary Process Design for Waste Residue Recovery Plant. Job 23. Report KLX-1218 (June 30, 1951) Decl. April 3, 1957.
The design of the plant is based on the sulfuric acid leach-ion exchange process.

94. Use of Ion Exchange Resins to Concentrate Radionuclides for Subsequent Analysis. Bernd Kahn, Edwin R. Eastwood, and William J. Lacy. Report ORNL-2321 (June 17, 1957).

95. Electrolytic Recycle Method for the Treatment of Radioactive Nitric Acid Waste. A Status Report at the Termination of the Project at KAPL. H. W. Alter, D. L. Barney, J. K. Davidson, A. C. Schafer, Jr., and F. J. Witt. Report KAPL-1721 (June 26, 1957).

96. "Mixed Bed Ion Exchange for the Removal of Radioactivity." H. Gladys Swope. J. Am. Water Works Assoc. 49, 1085-1102 (August, 1957).

97. Destruction of Cyanide Wastes by Electrolytic Chlorination. J. T. Byrne, W. S. Turnley, and A. K. Williams. Report RFP-80 (Sept. 16, 1957).

98. Evaluation of Waste Disposal by Electrodeionization and Clay Absorption. W. H. Burgus and E. S. Grimmett. Report IDO-14367 (October 20, 1954) Decl. with deletions March 14, 1957.

99. "Effluent Treatment. Precipitation--Ion Exchange Methods." K. G. Seedhouse. Nuclear Eng. 2, 413-17 (October, 1957).

100. "The Separation of Carrier-Free Y^{90} from Sr^{90} by Electrolysis." Gerald Lange, Gunter Herrmann, and Fritz Starssmann. J. Inorg. and Nuclear Chem. 4, No. 3 and 4, 146-54 (1957). (In German)

101. Proposed Development Program for Treatment of Radioactive Wastes from Merchant Ship Reactors. I. R. Higgins and W. J. Neill. Report CF-58-3-67 (March 19, 1958).
Both ion exchange resin and filters are to be used for coolant system cleanup. The development program is concerned with methods of handling and packaging of the spent resin, filter cake, and rare gases for safe disposal.

4.26 Solvent Extraction

102. Process Development for Clinton Waste Metal Recovery. Final Report. Report MonN-123 (May 15, 1946) Decl. March 9, 1957.

103. The Feasibility of Continuous Chelation. Job 11. Report KLX-44 (April 29, 1949) Decl. March 28, 1957.

104. The Purex Process--A Solvent Extraction Reprocessing Method for Irradiated Uranium. E. R. Irish and W. H. Reas. Report HW-49483 A (April 8, 1957).

105. Removal of Fission Products from Reactor Wastes: Laboratory Studies of Liquid-Liquid Extraction from an Acid Aluminum Nitrate Solution. Herman L. Krieger, Bernd Kahn, and Conrad P. Straub. Report ORNL-2297 (May 24, 1957).

106. Effect of Some Organic Amines on the Extraction Behavior of Ruthenium. A. S. Wilson and H. D. Warren. Report HW-51663 (July 22, 1957).

In the product decontamination processes used at Hanford, a major portion of the Ru present as a fission product is removed either in the feed preparation cycle by oxidation to RuO_4 and subsequent volatilization, or in a co-decontamination cycle by solvent extraction.

4.27 Others

107. Use of "Hot" Solvent In The Purex Second Uranium Cycle. R. W. Vest. Report CF-53-3-102 (March 11, 1953) Decl. February 16, 1957.

108. The Sorption of Fission Product Mixtures in Relation to Effluent Disposal. G. B. Cook and J. Wilkinson. Report AERE-C/R-340 (December, 1948) Decl. April 2, 1957.

109. Removal of α Activity from Effluent. Some Experiments on the Use of Tannic Acid and Lime. A. A. Smales and L. Airey. Report AERE-C/R-289 (December, 1948) Decl. May 9, 1957.

4.30 Treatment Processes for Recovery of Constituents

110. Proposal for "25" or Thorex Waste Disposal: Selective Recovery of Fission Products in Relation to the Long-Range Aspects of Chemical Waste Economics. A. T. Gresky and R. P. Wischow. Report CF-55-11-97 (November 17, 1955) Decl. March 4, 1957.

4.31 Fission Products

111. A Radiochemical Separation for Cobalt-60 in Aqueous Waste Solutions. R. A. Schneider. Report HW-47896 (January 1, 1957).

112. Pilot Plant Development of a Process for Separating Barium-140 from MTR Fuel. B. M. Legler, W. L. Chase, M. D. Martin, D. M. Paige, and F. K. Wrigley. Report IDO-14344 (September 1, 1955) Decl. with deletions February 11, 1957.

113. Tentative Plan for the Recovery of Fission Products and Neptunium from Redox Special Runs. G. W. Parker. Report CF-50-2-27 (Feb. 8, 1950) Decl. with deletions February 13, 1957.

114. Separation of Cesium and Strontium from Calcined Metal Oxides as a Process in Disposal of High Level Wastes. A. Abriss, J. J. Reilly, and E. J. Tuthill. Report BNL-453 (April, 1957).

115. Isolation of Carrier-Free Cs^{137} from Fission Products. R. A. Wolschrijn. Report JENER-49 (May 13, 1957).

116. Fission Product Recovery from Chemical Processing Plant Waste Solutions. G. B. Barton, J. L. Hepworth, E. D. McClanahan, Jr., R. L. Moore, and H. H. Van Tuyl. Report HW-48776 RD (February 26, 1957) Decl. July 25, 1957.

117. Preparation of Radiation Sources from Fission Products by the Clay Process. J. E. Schoolmeester and J. J. Martin. Report AECU-3618 (August, 1957).

118. Startup Operations of Production Facility for Separating Barium-140 from MTR Fuel. B. M. Legler, S. F. Fairbourne, P. N. Kelly, and R. A. Robinson. Report IDO-14414 (September 1, 1957).

119. The Extraction of Individual Fission Products from Chemical Process Wastes. Presented at the International Conference on Radioisotopes in Scientific Research, September 9-20, 1957 at Paris. No. UNESCO/NS/RIC/16. K. Saddington. London, Pergamon Press, Ltd., 1957.

120. Industrial Treatment of Solutions of Fission Products--Separation of Cs^{137}. Presented at the International Conference on Radioisotopes in Scientific Research, September 9-20, 1957 at Paris. No. UNESCO/NS/RIC/13. C. Fisher and A. Raggenbass. London, Pergamon Press, Ltd., 1957. (In French)

121. Flowsheet No. 2--Cesium Isolation and Packaging. R. W. Wirta. Report HW-53617 (November 14, 1957).

122. Fission Product Separations Study. Final Report for the period September 27, 1956--June 30, 1957. R. A. Keeler and C. J. Anderson. Report KLX-10089 (November 29, 1957).

The solubility of $SrSO_4$ as a function of temperature and HNO_3 concentration was studied to evaluate this property as a means of separating Sr from radioactive waste.

123. "Problems of Radioactive Waste in Modern Technique." W. J. Spicyn. Nucleonika 2, 451-4 (1957). (In Polish)

Methods for separation and recovery of Cs^{137} and Sr^{90} from mixtures of fission products and the absorptive properties of soil as a medium for waste disposal are discussed.

124. "Batch Processing for Kilocurie Production of Barium-140." A. L. Ayers and B. M. Legler. Chem. Eng. Progr. 54, No. 2 83-6 (Feb., 1958).

4.32 Uranium

125. Tributyl Phosphate Solvent Extraction of Uranium from Metal Waste--Laboratory Investigation. D. E. Ferguson and T. C. Runion. Report ORNL-260(Del.) (October 7, 1949) Decl. with deletions February 8, 1957.

126. Uranium Recovery from Scrap Material (23-J). Project Summation January 1951--January 1952. Job 23. Report KLX-1224(Del.) (June 16, 1952) Decl. with deletions February 26, 1957.

127. Liquid Waste Treatment (23C). Summation Report for the Period February 1950 through April 1951. Job 23. Report KLX-1220 (Nov. 21, 1951) Decl. February 28, 1957.

128. TBP Process Pilot Plant Design Report. R. P. Milford. Report ORNL-543 (January 27, 1950) Decl. March 1, 1957.
A set of stainless steel columns and accompanying process equipment, including a product evaporator, was installed to demonstrate the TBP Process for recovering uranium metal waste.

129. Application of Pulse Column to Recovery of Uranium in Waste Solutions. R. P. Webb, W. L. Griffith, M. E. Nathan, and J. F. O'Donnell. Report KT-79 (June 28, 1950) Decl. March 4, 1957.

130. Pulse-Column Operating Conditions for Uranium Recovery from Waste Solutions. H. A. Larsen, D. L. James, G. T. Parish, and J. D. Roarty. Report KT-84 (September 13, 1950) Decl. March 8, 1957.

131. The Recovery of Uranium from Ether Extraction Waste Residues (AM-7). Progress Report. E. R. Johnson, R. L. Doyle, W. H. Malotte, and E. O. Rutenkroger. Report FMPC-532 (January 21, 1955) Decl. March 18, 1957.

132. Solvent Extraction Recovery of Uranium from Metal Waste. C. V. Ellison, D. E. Ferguson, and T. C. Runion. Report ORNL-258 (June 1, 1949) Decl. March 19, 1957.

133. Recovery of U from Recycle Wastes. I. R. Higgins. Report CF-56-6-155 (June 29, 1956) Decl. March 19, 1957.

134. "Recovery of Uranium Values from Waste Material." British Patent 768,831. Nuclear Eng. 2, 224 (May, 1957).

135. "The Recovery of Thorium-230 from Uranium Wastes." D. J. Carswell, J. M. Fletcher, and D. W. Clelland. J. Inorg. and Nuclear Chem. 5, 147-52 (1957).

4.33 Transuranics

136. Recovery of Neptunium-237 from Special Hanford Wastes. H. B. Evans, W. B. Seefeldt, and H. H. Hyman. Report ANL-4442 (March 27, 1950) Decl. February 12, 1957.

137. Chemistry Division, Section C-I Summary Report for April, May, and June 1950. D. W. Osborne, ed. Report ANL-4490(Del.) (July 27, 1950) Decl. with deletions February 12, 1957.

Process Chemistry. Progress is reported on further purification of Pa from Pa^{230} waste stream 2U1 and recovery of Sc and Pa^{230} from Pa^{230} wastes.

138. Chemistry Division Semiannual Progress Report for Period Ending December 20, 1955. Report ORNL-2046 (April 13, 1956) Decl. March 2, 1957.

Neptunium recovery from Purex wastes was studied.

4.34 Inert Chemicals

139. Recovery of Aluminum Nitrate from Redox Aqueous Waste Streams. J. A. Ayres, G. E. McCullough, W. F. McKeehan, and R. H. Simon. Report KAPL-213(Del.) (July 20, 1949) Decl. with deletions February 28, 1957.

5.00 WASTE DISPOSAL

5.10 Tank Storage

140. Purex Waste Storage. Part I. 241-A Waste Storage Facilities. G. L. O'Neill and W. H. Swift. Report HW-41791 (March 7, 1956).

The basic intentions of the 241-A Storage Facility design is to control the boiling wastes by providing suitable tanks to contain the liquid and a vapor system provided with suitable seals to control the vapors.

141. Gaseous Radioactivity from HRT Fuel Storage Tanks. R. F. Aven. Report CF-56-6-142 (June 22, 1956).

142. "Design Considerations of Storage Tanks for Radioactive Wastes." Edgar E. Wilson. Chem. Eng. Progr. 52, Symposium Ser. No. 19, 153-7 (1956).

143. The Design and Application of a Heat Transfer Analogue for Radially Symmetrical Problems. M. W. Cook. Report HW-47088 (January 30, 1957).

144. Clinton Laboratories Process Manual. Section 8. Waste Disposal--Wet B Process. W. E. Kirst. Report A-3789 (1943) Decl. Feb. 12, 1957.

All waste solutions and slurries containing varying amounts of radioactive materials which require permanent storage are neutralized to a pH of 7 to 7.5 by the addition of caustic and held indefinitely in underground concrete tanks.

145. Resolution of the Sodium Diuranate Precipitate in the W-7 Metal Waste Tank. J. E. Savolainen. Report CF-52-6-162 (June 26, 1952) Decl. February 13, 1957.

146. Corrosion Tests--SAE 1010 Mild Steel in Synthetic Neutralized Redox Waste Solution. Noborn Endow. Report HW-26201 (November 13, 1952) Decl. February 25, 1957.

147. Corrosion of Stainless Steels in Uranyl Ammonium Phosphate Filtrates from Hanford Waste. H. A. Bernhardt, W. Davis, Jr., and J. R. Flanary. Report K-405 (June 1, 1949) Decl. February 23, 1957.
Storage of acid filtrates from the UAP process for uranium recovery from alkaline Hanford waste has imposed the problem of determining the type of metal than can be used for storage tanks.

148. "Tanks for 1000 Years: Design Considerations of Storage Tanks for Radioactive Waste." Edgar E. Wilson. Chem. Eng. Progr. 53, 151M-2M (March, 1957).

149. Field Corrosion Tests in Redox and Purex Underground Waste Storage Tanks. Norman D. Groves, Morris C. Fraser, and William L. Walker. Report HW-37642 (June 28, 1955) Changed from OFFICIAL USE ONLY March 22, 1957.

150. Studies on Characteristics of Savannah River Wastes. Final Report. B. Manowitz, C. W. Pierce, and S. Zwickler. Report BNL-446 (April, 1957).
Pilot plant and laboratory studies were made in support of the Savannah River program of storage and concentration of waste.

151. Corrosion of Redox Waste Storage Tank Construction Materials. W. W. Koenig and K. L. Sanborn. Report HW-18595 (August 21, 1950) Decl. April 11, 1957.

152. Protection of Exterior Buried Waste Lines. G. U. Udine. Report HW-24500 (September 24, 1952) Changed from OFFICIAL USE ONLY May 22, 1957.

5.20 Surface Disposal

153. Unit Operations Status Report for March, 1955. W. K. Eister. Report CF-55-3-190(Del.) Decl. with deletions February 14, 1957.
A study of the permeability of a 0.5-in. thick asphalt membrane to acid waste, neutralized waste, and water is presented.

154. The Proposed System for Radio Remote Control of a Bulldozer for Burial of Radioactive Waste. (Summary letter and scope Blueprint). G. L. Davis. Report HW-51841 (February 19, 1957).

155. Development of Design Criteria for Waste Stabilization Ponds. Final Report. E. R. Hermann and E. F. Gloyna. Report AECU-3481 (March 1, 1957).

156. Effect of Detergents upon Absorption of Radioisotopes by Soils. K. C. Knoll. Report HW-52055 (August 1, 1957).

157. Heat Transfer in Waste Basins. S. H. Jury. Report CF-55-8-76(Del.) (August 11, 1955) Decl. with deletions March 11, 1957.

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158. "Heat-Conduction Losses in Reactor Waste Basins." Stanley H. Jury. A.I.Ch.E. Journal 3, 143, 9M (March, 1957).

159. Laboratory Studies on the Ground Disposal of ORNL Intermediate-Level Liquid Radioactive Wastes. Richard L. Blanchard, Bernd Kahn, and Gordon G. Robeck. Report ORNL-2475 (April 11, 1958).

160. Radioactive Waste Disposal Report on Seepage Pit Liquid Waste--Shale Column Experiment. William J. Lacy. Report ORNL-2415 (November 12, 1957).

5.30 Subterranean Disposal

161. Hydraulic Characteristics of Hanford Aquifers. William H. Bierschenk. Report HW-48916 (March 3, 1957).

Three analytical techniques were applied to data from aquifer tests at Hanford to determine the hydraulic characteristics of the ground-water reservoirs.

162. The Movement of Radiostrontium Through Natural Porous Media. Progress Report No. 2 Covering Period July 1, 1955 to June 30, 1956. Richard G. Orcutt, Warren J. Kaufman, and Gerhard Klein. Report AECU-3608 (November 1, 1956).

5.40 Rivers

163. Elimination of Second Stage Hold-Up of Laboratory Liquid Waste to the Mohawk River. W. H. Truran. Report KAPL-M-WHT-1 (August, 1956).

164. "The Problem of Radioactivity and Legislation on the Discharge of Radioactive Waste Substances in Water." F. Devlamink. Translated by J. Cooke from Centre belge etude et document, eaus, Bull. mens. No. 65, 204-9; 212-13 (1956).

165. Accumulation of Radioactivity in Columbia River Fish in the Vicinity of the Hanford Works. P. A. Olson, Jr. and R. F. Foster. Report HW-23093 (July 1, 1952) Decl. February 19, 1957.

166. Columbia River Survey, 1951, 1952, 1953. J. F. Honstead. Report TID-10126 (July 21, 1954) Decl. March 1, 1957.

167. The Turbulent Diffusion of River Contaminants. H. T. Norton. Report HW-49195 (March 25, 1957).

168. A Study of the Fluoride Concentration in the Scioto River and Tributary Streams. H. L. Burkhardt, H. L. Caterson, B. Kalmon, and R. A. Manning. Report GAT-184(Rev. 1) (April 1, 1957).

169. Radioactivity Levels of the Columbia River Below Richland, Washington for the Period October, November, December 1956. H. V. Clukey. Report HW-49840 (April 23, 1957).

170. Radiological Development Activities in the Health Physics Unit. Semiannual Progress Report for January--June 1953. Report KAPL-997 Changed from OFFICIAL USE ONLY June 3, 1957.

Liquid waste studies during the period include the investigation and recommendation of a proportional sampler for combined sewer effluents and adsorption studies of fission-product activity on the Mohawk River sediment. A discussion of the metering and sampling system for the liquid waste discharged into the Mohawk River is included in this report.

171. The Chalk River Liquid Disposal Area, 1956. I. L. Ophel and C. D. Fraser. Report CRHP-709 (June, 1957).

172. A Method for the Determination of Radiocalcium and Radiostrontium in Effluent. B. A. Loveridge. Report AERE-C/R-1902 (March, 1956) Decl. July 22, 1957.

Methods are presented for determining γ and β emitters in radioactive effluent which may be discharged into the Thames River by Harwell.

173. The Suspended Microbiota of the Clinch River and Adjacent Waters, In Relation to Radioactivity in the Summer of 1956. J. B. Lackey. Report ORNL-2410 (November 13, 1957).

174. Fluctuations of Hanford Water Levels. William H. Bierschenk. Report HW-53599 (November 14, 1957).

5.50 Oceans

175. United States' Sea Disposal Operations. A Summary to December, 1956. Arnold B. Joseph. Report WASH-734.

176. Factors Affecting the Distance of the Discharge Point from the Shore in the Sea Disposal of Effluent. A. E. Shaw. Report IGR-TN/D-443 (February, 1957).

177. Survey of Radioactivity in the Sea and in Pelagic Marine Life West of the Marshall Islands, September 1--20, 1956. Allyn H. Seymour, Edward E. Held, Frank G. Lowman, John R. Donaldson, and Dorothy J. South. Report UWFL-47 (March 15, 1957).

178. Simulation of Container Venting Under Sea Water. M. J. McGoff and S. J. Rodgers. Report NP-6541 (December 31, 1957).

179. The Effects of Atomic Radiation on Oceanography and Fisheries. Publication No. 551. Washington, National Academy of Sciences--National Research Council, 1957.

General considerations concerning the ocean as a receptacle for artificially radioactive materials are given. A picture of disposal of radioactive wastes in the ocean: the fission product spectrum in the sea as a function of time and mixing characteristics--was also discussed.

180. "The Use of Radioisotopes in Tracing Sewage Introduced into the Sea and Coastal Waters." E. Sons. Atompraxis 3, 306-9 (1957). (In German)

181. A Summary of the Biological Investigations of the Discharges of Aqueous Radioactive Waste to the Sea from Windscale Works, Sellafield, Cumberland. H. J. Dunster and F. R. Farmer. Report IGS-R/R-3 (Jan., 1958).

182. The Disposal of Radioactive Waste to the Sea During 1956 by the United Kingdom Atomic Energy Authority. H. J. Dunster. Report IGS-R/R-2 (January, 1958).

183. "Discussions on the Atomic Industry Waste Disposal into the Black Sea." V. A. Vodyanitskii. Priroda 47, No. 2, 46-52 (February, 1958) (In Russian)

5.60 Incineration

184. Incinerator for Radioactive Residue. W. D. McNeese, W. J. Maraman, and T. E. Chronister. Report LA-1691 (March, 1954) Decl. April 1, 1957.

6.00 GASEOUS WASTES

185. Investigation of the Stack Gas Filtering Requirements and Development of Suitable Filters. Report No. 5. Report ALI-14 (May 31, 1949).

186. Reduction of Air Borne Contamination---UO_3 Plant. W. P. Ingalls and Kenneth L. Sanborn. Report HW-43099 (May 11, 1956).

187. Removal of Radioiodine from PWR Plant Container Air. A. S. Kesten. Report WAPD-PWR-CP-2428 (September 26, 1956).

188. Removal of Iodine-131 from Dissolver Off-Gas Streams by Isotopic Exchange. E. D. McClanahan, Jr. Report HW-47676 (November 15, 1956).

189. Meteorology as Related to Waste Disposal and Weapons Tests. (Lecture Delivered to AFSWP Personnel, January 15, 1957). J. J. Fuquay. Report HW-47721 (January 15, 1957).

190. Removal of Radioiodine from PWR Plant Container Air. A. S. Kesten. Report WAPD-PWR-CP-2673 (January 28, 1957).

191. Radiological Development Activities in the Health and Safety Unit. Semiannual Progress Report for July--December, 1952. Report KAPL-863 (January, 1953) Decl. February 7, 1957.

Progress is reported on separations pilot plant stack effluent studies and determination of the counting efficiency of an inert gas monitor.

192. Absorption of Waste Hydrogen Fluoride. V. J. Reilly. Report CF-51-12-50 (December 7, 1951) Decl. February 15, 1957.
Experiments on four methods of disposal of HF from the Pu peroxide hydrofluorination furnace in a waste gas stream are discussed.

193. Boiling and Slurry Progress. R. N. Lyon. Report CF-52-10-194 (October 1, 1952) Decl. February 16, 1957.
Topics discussed include the treatment of boiling reactor waste gases.

194. Fourth Atomic Energy Commission Air Cleaning Conference Held at Argonne National Laboratory, November 1955. Report TID-7513(Pt. 2) Decl. March 4, 1957.

195. Report of and Papers Presented at the 3rd Meeting of the Stack Gas Decontamination Working Group Held January 12, 1949 at the Academy of Sciences Building. Report M-4400(Del.) Decl. with deletions March 7, 1957.

196. Radiological Development Activities. Health and Safety Unit Semiannual Progress Report for January--June, 1952. Report KAPL-814 (July, 1952) Decl. March 29, 1957.
Data are reported from a study of the isotopic composition of the radioactive components discharged from the stack during the dissolving, head-end, and extraction operations of the separations process. The atmospheric dilution of the stack effluent was also estimated.

197. Treatment of Gaseous Effluents. W. C. Schmidt. Report HW-49549 A (April 10, 1957).

198. KAPL Air Cleaning Program. L. J. Cherubin and J. J. Fitzgerald. Report KAPL-1014 (January 4, 1954) Changed from OFFICIAL USE ONLY June 3, 1957.

199. Radiological Development Activities in the Health Physics Unit. Semiannual Progress Report for January--June, 1954. Report KAPL-1268 Changed from OFFICIAL USE ONLY June 3, 1957.
Results are reported from studies of the efficiencies of air-cleaning and air-sampling filter media and studies of methods for monitoring radioactive gases.

200. Radiological Development Activities in the Health Physics Unit. Semiannual Progress Report for July--December, 1954. Report KAPL-1313 Changed from OFFICIAL USE ONLY June 3, 1957.
Data are presented from studies on the efficiency of air-cleaning filter materials and air-cleaning equipment. Liquid waste studies were confined to an analysis of P^{32} activity collected on suspended Mohawk River sediment.

201. High Level Alpha Air Monitor. G. D. Linsey and R. A. Harvey. Report HW-49561 (June 14, 1957).

202. Integrated Air Sampling Program for a Radioactive Plant. T. S. Chapman. Report RFP-85 (June 17, 1957).

203. Removal of Fission Product Gases by Transient Melting. A. R. Gilman. Report NMI-1167 (May 6, 1957) Decl. August 2, 1957.

204. Evaluation of KAPL Separations Process Stack Effluent. J. J. Fitzgerald. Report KAPL-1015 (January 5, 1954) Decl. August 22, 1957.

205. "Air Treatment in Active Laboratories." C. Fisher and A. V. Bestre. Nuclear Power 2, 311-14 (August, 1957).

206. "Molecular Sieves Adsorb Iodine-131 from Air." Morris A. Wahlgren and W. Wayne Meinke. Nucleonics 15, No. 9, 156, 158, 160 (Sept., 1957).

207. Blast Effects on an Air-Cleaning System. Preliminary Report. Richard Dennis and C. E. Billings. Report ITR-1475 (September, 1957).

208. Aerial Sampling of Effluent from Waste Fires. H. G. Bradbury and M. J. Young. Report NARF-57-56T (December 15, 1957).

209. "Portable Radon Detector for Continuous Air Monitoring." W. B. Harris, H. D. LeVine, and S. I. Watnick. Arch. Ind. Health 16, 493-8 (December, 1957).

210. "Notes on the Track Density of Minimum-Ionizing Particles in Large Emulsion Stacks." B. Bhowmik, J. H. Davies, D. Evans, and D. J. Prowse. Nuovo cimento (10) 7, 712-14 (March 1, 1958).

211. "Gas Monitoring Equipment for Berkeley Power Station." F. Harlen. Nuclear Eng. 3, 158-62 (April, 1958).

7.00 ECONOMICS AND TRANSPORTATION

212. Industrial Sterilization Machine vs Fission Product Source Cost Study. Job 24-A. Lawrence E. Crean, Morris Papish, and Frederich Fahnoe. Report AECU-3557 (January 30, 1953).

213. Reactor Waste Processing Cost Analysis. M. McEwen. Report MLM-672 (March 5, 1952) Decl. March 9, 1957.

214. Comments on the Transportation of Irradiated Fuel and Radioactive Wastes for M. Louis Armand, Euratom Group. F. L. Culler. Report CF-57-5-24 (May 6, 1957).

215. The Economics and Hazard Potential of Waste Disposal. E. D. Arnold. Report CF-57-7-31 (July 18, 1957).

216. Radioactive Waste Economics: Optimum Storage Time Prior to Shipping to Disposal Site. H. R. Zeitlin and J. W. Ullmann. Report CF-55-10-101 (October 24, 1955).

8.00 COMMERCIAL UTILIZATION

217. The Industrial Utilisation of Fission Products. R. Roberts. Report NP-6653 (1955).

9.00 PROGRESS REPORTS

Argonne National Laboratory

218. Chemical Engineering Division Summary Report for January, February, and March 1953. Report ANL-5039(Del.) (May 12, 1953) Decl. with deletions February 12, 1957.
The processing of radioactive laboratory wastes is briefly outlined.

219. Chemical Engineering Division Summary Report for October, November, and December 1953. Report ANL-5213 (February 1, 1954) Decl. Feb. 12, 1957.
Progress is reported on processing and utilization of radioactive wastes.

220. Chemical Engineering Division Quarterly Report for April, May, June 1956. Report ANL-5602 (August 1, 1956) Decl. February 18, 1957.
Studies were continued on radioactive waste processing.

Brookhaven National Laboratory

221. Quarterly Progress Report for October 1--December 31, 1952. Report BNL-225 Decl. February 13, 1957.
Progress is reported on studies of pilot plant for packaging Savannah River wastes.

222. Quarterly Progress Report for April 1--August 15, 1953. Clarke Williams, comp. Report BNL-249 Decl. February 14, 1957.
Waste-processing development studies are reported.

223. Quarterly Progress Report for August 16--November 15, 1953. Report BNL-267 (January, 1954) Decl. April 8, 1957.
Progress is reported on waste processing development.

Hanford Atomic Products Operation

224. Radiological Sciences Department Research and Development Activities Quarterly Progress Report for January--March 1956. H. M. Parker. Report HW-42403 (April 13, 1956) Decl. March 6, 1957.
Progress is reported in waste disposal.

Kellex Corporation

225. Progress Report for Period April 1-30, 1950. Job 24-A. Report KLX-1302 (May 5, 1950) Decl. March 2, 1957.
Studies are summarized on the development of an efficient method of decontaminating crib wastes using ion exchange resins.

226. Progress Report for October 1950. Job 23. Report KLX-1208 (Nov. 10, 1950) Decl. February 27, 1957.
The investigation of the recovery of uranium from Tonawanda solid waste has been resumed.

227. Progress Report for November 1950. Job 23. Report KLX-1209 (Jan. 3, 1951) Decl. February 27, 1957.
Progress is reported on the liquid waste treatment by ion-exchange methods and recovery of U from solid wastes.

228. Decontamination of Crib Wastes (24-A3). Progress Report for Fourth Quarter 1950 Covering Period October 1--December 31, 1950 on Job 24-A. Report KLX-1329 (January 18, 1951) Decl. March 4, 1957.

Knolls Atomic Power Laboratory

229. Waste Disposal Progress Report for September, October, November 1951. Report KAPL-649 Decl. February 26, 1957.

Mound Laboratory

230. Report for Liquid Waste Disposal Research; November 13, 1950 to March 5, 1951. Report MLM-554(Del.) (April 9, 1951) Decl. with deletions February 26, 1957.
Investigations are being made on the decontamination of liquid wastes and scavenging.

231. Liquid Waste Disposal Research Report for March 5, 1951 to June 4, 1951. Report MLM-579 (July 9, 1951) Decl. March 9, 1957.
Decontamination of TBP metal-recovery wastes by FeS precipitation has been studied and compared cost-wise to the evaporation process.

232. Liquid Waste Disposal Research Report for Period June 4, 1951 to September 3, 1951. Report MLM-614 (October 8, 1951) Decl. Feb. 26, 1957.
Development of the ferrous sulfide, ferrous hydroxide-calcium phosphate precipitation process for decontaminating TBP Metal Recovery Wastes has been continued.

233. Report for Liquid Waste Disposal Research--September 3, 1951 to December 3, 1951. Report MLM 652 (January 7, 1952) Decl. Feb. 7, 1957.
A report is given on the decontamination and scavenging of Purex wastes.

North American Aviation, Inc.

234. Sodium Graphite Reactor Quarterly Progress Report for July--September, 1954. Sidney Siegel and Guy M. Inman, eds. Report NAA-SR-1109(Rev.) (December 1, 1954) Decl. March 4, 1957.
A waste disposal system is outlined.

Oak Ridge National Laboratory

235. Technical Division Report for Quarter Ending February 28, 1949. Part II. E. C. Miller, ed. Report ORNL-323 (February 28, 1949) Decl. March 8, 1957.
Radiochemical liquid waste disposal plans are being formed for extensive modification and improvement of the ORNL waste collection, treatment, and storage systems.

236. Chemical Technology Division; Unit Operations Section Monthly Progress Report for November 1956. W. K. Eister, J. C. Bresee, J. T. Long, E. O. Nurmi, and C. D. Watson. Report CF-56-11-143 .
Waste studies are reported.

237. Radioactive Waste Disposal and Decontamination Annual Report for 1957. E. J. Witkowski. Report CF-57-12-143 (April 18, 1958).
The operation of facilities, which include the hot-chemical and the metal waste systems, the process waste system, and the radioactive gas disposal system, is described.

238. Health Physics Division Annual Progress Report for Period Ending July 31, 1957. Report ORNL-2384 (November 26, 1957).
Progress is reported on radiobiological-ecological studies on the drained bed of White Oak Lake, an impoundment used as a holdup basin for low-level radioactive wastes; investigations of waste processing by evaporations, storage in deep wells and waste pits, adsorption on soil columns; solvent extraction, and sintering; assays of the soil movement and dilution of wastes from storage pits; and a survey of possible waste disposal sites.

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