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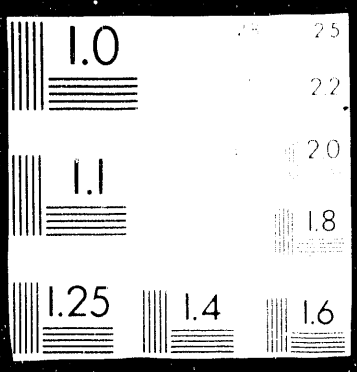

DOE/EA-0785

Environmental Assessment for the Decommissioning and Decontamination of Contaminated Facilities at the Laboratory for Energy-Related Health Research University of California, Davis

September 1992

Prepared by

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Environmental Restoration
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1.0 INTRODUCTION

The Laboratory for Energy-Related Health Research (LEHR) was established in 1958 at its present location by the Atomic Energy Commission. Research at LEHR originally focused on the health effects from chronic exposures to radionuclides, primarily strontium 90 (Sr-90) and radium 226 (Ra-226), using beagles to simulate radiation effects on humans. In 1988, pursuant to a memorandum of agreement between the U.S. Department of Energy (DOE) and the University of California, DOE's Office of Energy Research decided to close out the research program, shut down LEHR, and turn the facilities and site over to the University of California, Davis (UCD) after remediation. The decontamination and decommissioning (D&D) of LEHR will be managed by the San Francisco Operations Office (SF) under DOE's Environmental Restoration Program.

The LEHR facility is located on a 15-acre site leased from the University of California at its Davis campus (Figure 1-1). The LEHR facilities consist of 16 buildings, including a main administration and office building, two animal hospitals, a laboratory and support buildings, cargo container waste storage facilities, and numerous dog pens. A diagram of the current LEHR site is shown in Figure 1-2. Because DOE-sponsored research at LEHR has ceased, there are no ongoing DOE funded research operations that produce radioactive waste.

From 1958 to 1973, LEHR occupied about half of the current site. The original site was adjacent to UCD's former campus sanitary landfill site. UCD recently completed a Solid Waste Water Assessment Test on that property and follow-up investigations are ongoing. Close to the landfill are some trenches and pits that were used by UCD for the disposal of low-level radioactive waste from both campus and LEHR activities. Such disposal, which was a legally accepted practice at the time, ceased in 1974. At that time, the LEHR site was expanded to its current size, by incorporation of the old inactive landfill and adjacent radioactive disposal trenches.

This environmental assessment (EA) addresses the D&D of four site buildings and a tank trailer, and the removal of the on-site cobalt 60 (Co-60) source. Future activities at the site will include D&D of the Imhoff building and the outdoor dog pens, and may include remediation of underground tanks, and the landfill and radioactive disposal trenches. The remaining buildings on the LEHR site are not contaminated.

The environmental impacts of the future activities cannot be determined at this time because the extent of contamination has not yet been ascertained. The impacts of these future activities (including the cumulative impacts of the future activities and those addressed in this EA) will be addressed in future National Environmental Policy Act (NEPA) documentation.

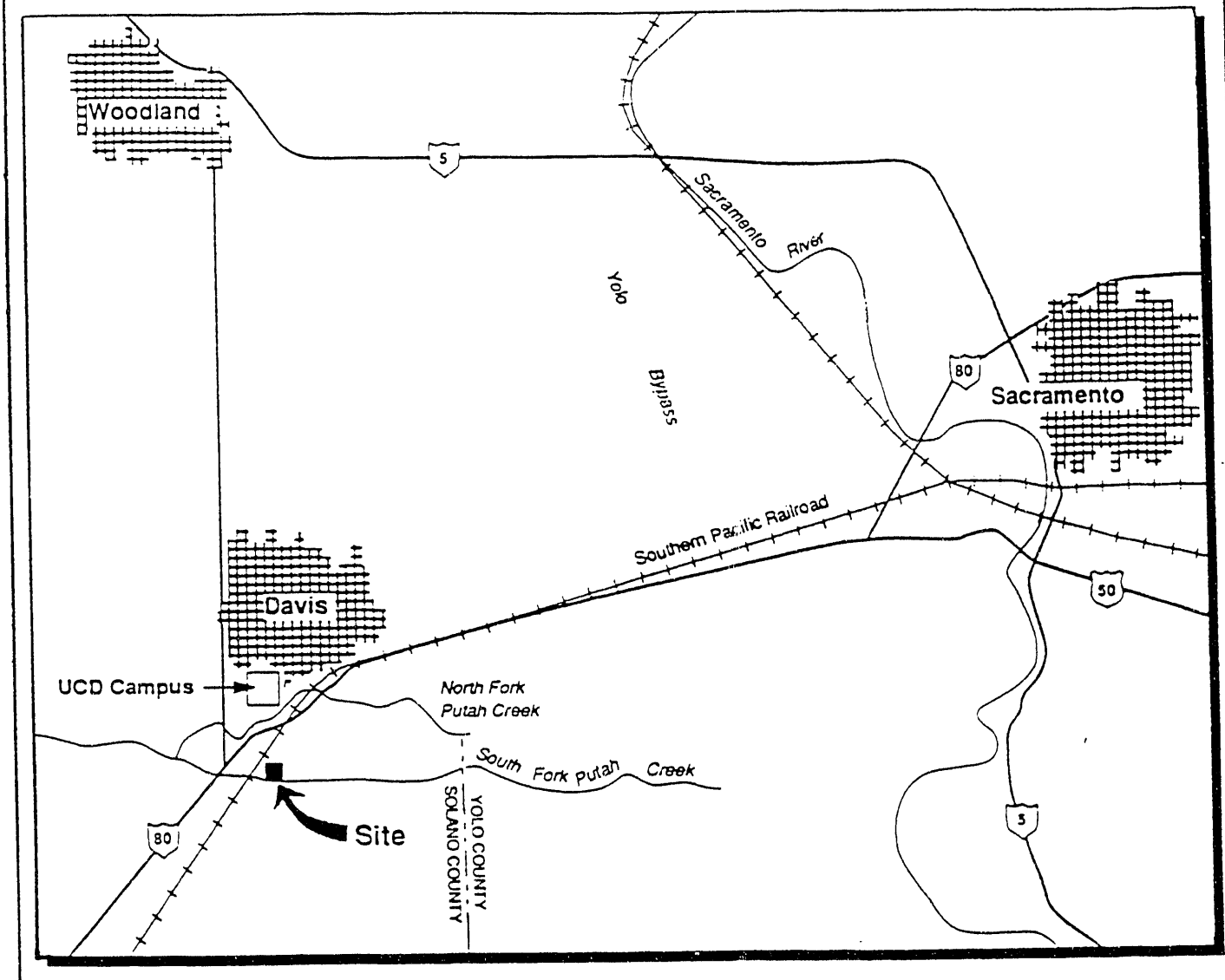

Figure 1-1	U C Davis Location Map	

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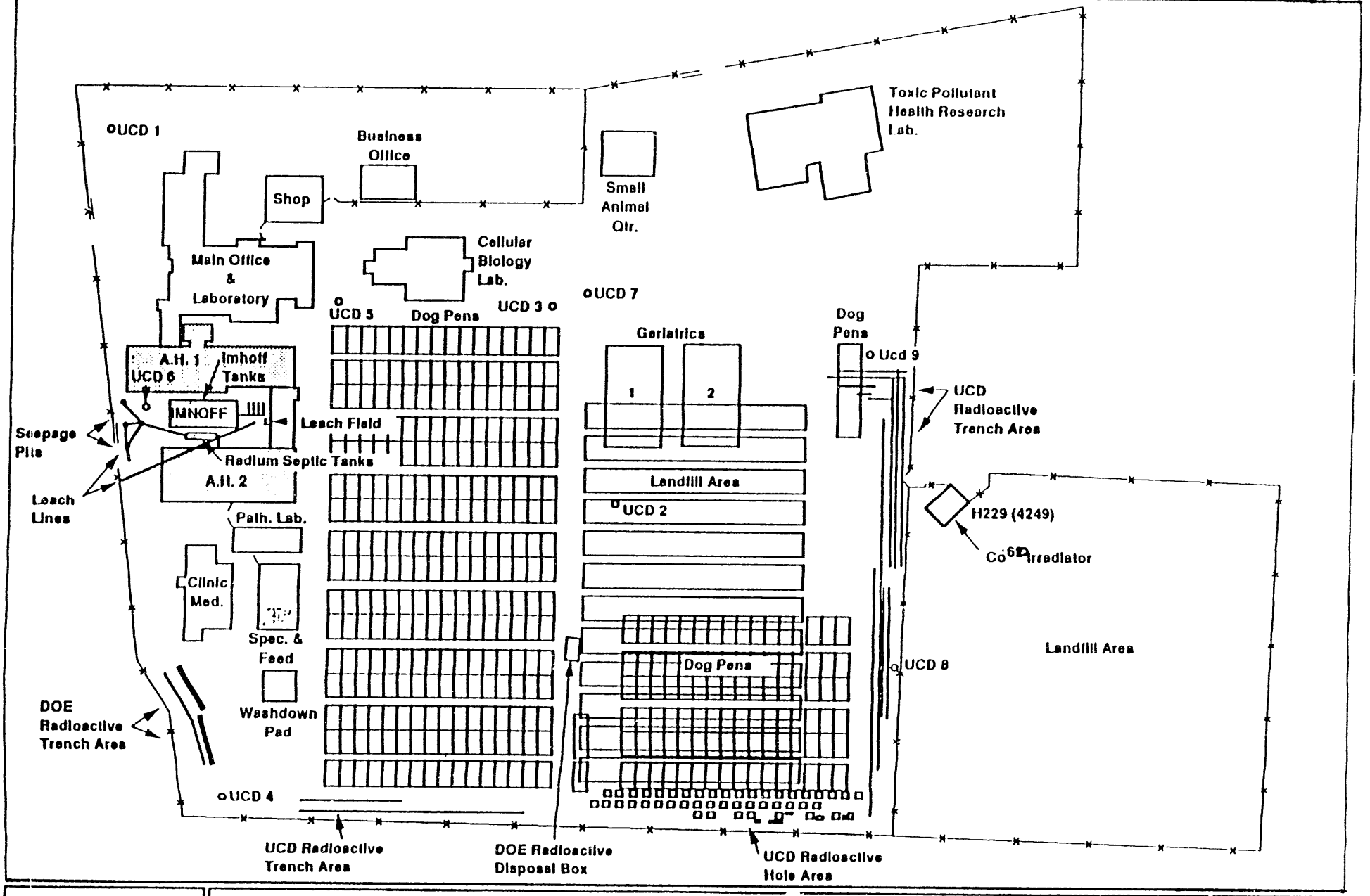

Figure 1-2

LEHR Plot Plan

1.1 DESCRIPTION OF THE PROPOSED ACTION

This EA addresses the potential environmental impacts of the following proposed actions:

- Decontamination and decommissioning of the following buildings with emphasis noted as follows:

  - Animal Hospital-1 (AH-1) - plumbing; heating, ventilation and air conditioning (HVAC); cages; freezers; walls and floors.
  - Animal Hospital-2 (AH-2) - plumbing, HVAC, cages, walls and floors.
  - Co-60 building - plumbing, HVAC, walls and floors
  - Specimen Storage Room - walls and floors.

- Decontamination and removal of the on-site 4,000-gallon capacity tank trailer containing approximately 250 gallons of liquid contaminated primarily with Sr-90 and Ra-226.

- Disposal of one 120 Curie (Ci) Co-60 sealed source secured in a shielded irradiator on top of the Co-60 building.

- Packaging, shipment and disposal of approximately 8,000 cubic feet of low-level radioactive waste and 600 cubic feet of asbestos waste.

All activities conducted as part of these proposed actions would be in accordance with applicable laws, regulations and DOE Orders including, but not limited to those orders listed in Table 1-1.

1.2 PURPOSE OF THE PROPOSED ACTION

The purpose of the proposed action is to comply with the environmental restoration requirements for the LEHR site as outlined in the Memorandum of Agreement between DOE and the Regents of the University of California, regarding site restoration and decontamination (Ref. 1). The primary objective of the LEHR Environmental Restoration project is to clean up the facilities and site to a condition that would permit transfer of ownership of the LEHR facilities to UCD.

With the cessation of the DOE-sponsored research at LEHR, DOE has a responsibility to clean up contaminated buildings, facilities, and the site. After completion and verification of D&D activities, the buildings' titles would be transferred to UCD for unrestricted use. The standards for unrestricted use of released buildings are provided in Section 4.1.3 and detailed in References 2 and 3.

Pursuant to DOE Order 5820.2A, DOE is required to D&D radioactively contaminated facilities under its control. Such actions must be conducted in a safe, cost-effective manner

that minimizes risks to human health and the environment in compliance with applicable federal and state environmental laws and regulations.

TABLE 1-1 APPLICABLE DOE ORDERS

DOE Order 1540.1	Materials Transportation and Traffic Management
DOE Order 1540.2	Hazardous Materials Packaging for Transport - Administrative Procedures
DOE Order 1540.3	Base Technology for Radioactive Material Transportation Packaging Systems
DOE Order 5400.1	General Environmental Protection Program Requirements
DOE Order 5400.2	Environmental Compliance Issue Coordination
DOE Order 5400.5	Radiation Protection of the Public and Environment
DOE Order 5440.1D	National Environmental Policy Act
DOE Order 5480.1B	Environment, Safety, and Health Program for the Department
DOE Order 5480.3	Safety Requirements for the Packaging and Transportation of Hazardous Material, Hazardous Substances, and Hazardous Wastes
DOE Order 5480.4	Environmental Protection Safety, and Health Protection Standards
DOE Order 5480.11	Radiation Protection, for Occupational Workers
DOE Order 5820.2A	Radioactive Waste Management

2.0 ENVIRONMENTAL SETTING

LEHR is bordered on the south by a levee located on the north side of the South Fork of Putah Creek and is located on relatively flat-lying land termed the Putah plain. The LEHR Site lies outside the 100-year flood plain, which is bounded by the levee just north of Putah Creek (Ref. ES-1).

The proposed actions and alternatives for implementation were reviewed and evaluated for ten major environmental components, which are routinely considered during environmental analyses. Those components are air quality, biological resources, historical and archeological sensitive areas and cultural resources, infrastructure, land use, natural resources, noise, public health and safety, socioeconomics, and water quality. A brief description of each component's environmental setting is summarized below. References are provided in Section 10.

2.1 AIR QUALITY

The LEHR site is located in the Sacramento Valley Air Basin, which is one of the largest air basins in California and has a very high air pollution potential. Topographic and meteorological conditions often reduce atmospheric dispersion allowing pollutants, such as carbon monoxide, particulates, and ozone, to attain relatively high ambient concentrations. Present air quality problems result from extensive industrial, agricultural and urban development in the Sacramento Valley and in adjacent air basins (Ref. ES-2).

2.2 BIOLOGICAL RESOURCES

Information sources were reviewed for the potential occurrence of sensitive, rare, threatened, and endangered biological resources listed in the references for the Environmental Setting Section (ES-3 - ES-7).

The sources indicated no reported observations of sensitive, rare, threatened, or endangered plants at the project site. However, the sources did indicate that Swainson's Hawk (a state-listed threatened species) is present within 1/4 mile of the site. These sources also indicated a potential for occurrence of the following sensitive biological resources in the vicinity of the project site:

- Valley elderberry longhorn beetle (Desmocerus californicus dimorphis), a federally listed threatened species.
- Giant garter snake (Thamnophis couchi gigas), a state-listed threatened species and Category 2 candidate for federal listing as threatened or endangered.
- Western snowy plover (Charadrius alexandrinus nivosus), a California species of concern and Category 2 candidate for federal listing as threatened or endangered.
- Burrowing owl (Athene cunicularia), a California species of concern.

2.3 CULTURAL RESOURCES

Contact with the California State University at Sacramento's Anthropology Department did not result in the identification of any cultural resources, historical or archeological sensitive areas at the LEHR Site (Ref. ES-8). Additionally, all areas affected by the proposed action are existing building structures and equipment located on previously graded and developed land. A complete professional survey would be performed prior to the preparation of the second NEPA document. Furthermore, an archeological evaluation of the area was conducted during the Phase II Soil and Groundwater Characterization of the LEHR facility by the DOE and no evidence of cultural resources, historical or archeological sensitive areas was encountered. This evaluation was conducted by a senior archeologist with Dames & Moore (Ref. ES-9).

2.4 INFRASTRUCTURE

The major transportation arteries through the local LEHR vicinity are Interstate 80, Old Davis Road, and the Southern Pacific Railroad line. Interstate 80 handles routine traffic patterns for a low population zone near a major city. Old Davis Road has high use during crop harvesting periods. The Southern Pacific Railroad is used for passenger and freight traffic on a scheduled basis (Ref. ES-1). Traffic volumes on Old Davis Road and Interstate 80 (waste shipment initial routes) are 4,000 and 90,000 vehicles per day respectively (Ref. ES-10 and ES-11).

2.5 LAND USE (WITHIN ONE MILE OF THE SITE)

The land within a one-mile radius of the LEHR Site is owned both privately and by UCD, and is used for animal research, agriculture, and recreation (fishing and swimming). Privately-owned lands toward the south and east of the facility include permanent residences and are used to produce wheat, tomatoes, corn, barley, and oats. The property west, north and south (Putah Creek Reserve) of the facility is owned by UCD and is currently used for various types of animal, agricultural, and health research facilities. Putah Creek is occasionally used for fishing and swimming (Ref. ES-12 and ES-13).

2.6 NATURAL RESOURCES

The primary natural resources within Yolo and Solano County study area (where LEHR is located) are prime agricultural land and mineral resources (construction aggregate and natural gas) and water (surface and ground). The South Sacramento Valley contains abundant construction aggregate deposits (Ref. ES-14). Natural gas reserves are located throughout the South Sacramento Valley. Water resources are discussed in Section 2.10.

2.7 NOISE

The primary sources of noise in the vicinity of the study area (Yolo and Solano Counties, and the western edge of Sacramento County) are vehicular traffic on the main local highways and arterial roadways, trains using local rail lines, aircraft, and farmers' equipment (Ref. ES-2).

2.8 PUBLIC HEALTH AND SAFETY

The radiologically controlled site buildings are kept locked and the entire 15 acre site is secured by fences and security gates. The results of the 1991 environmental monitoring at the fence line ranged from 2 mrem/yr at the site north corner to 9 mrem/yr at the site east corner above natural background of 98 mrem/yr. These results are well below the DOE exposure limit to the public of 100 mrem/yr above background.

2.9 SOCIOECONOMICS

The local economies of Yolo, Solano, and Sacramento Counties (the Tri-County Area), while varying to some degree, generally follow the cyclical patterns of the larger state and national economies. The Tri-County Area is fairly uniform with respect to age distribution with the exception of Yolo County, which has a higher proportion of 20 to 29-year-olds than the other counties, largely because of the number of college students living in Davis and nearby communities. Population age distribution is not expected to change substantially through the year 2000. The local economy relies primarily upon state/local government, retail services, UCD, and agriculture for employment (Ref ES-2).

2.10 WATER QUALITY

The regional groundwater is very good quality, according to state, county and local water agency officials. Stream flow as a result of rainfall runoff and releases from Lake Berryessa is of good quality. Poorer water quality occurs in late summer when flows are low. The higher flows during the winter are generally of better quality, but are higher in sediments and turbidity (Ref. ES-2 and ES-15).

Seasonal groundwater levels fluctuate about 10 feet between fall and spring months. In general, movement of groundwater is from west to east. However, local variations in the water table surface are present. Local depressions in the water table reflect discharge due to pumping. Since most municipal and industrial water in the area is supplied by groundwater, these depressions are most pronounced near the urban areas. Pumping depressions in rural areas reflect agricultural pumping (Ref. ES-2 and ES-15).

As part of the soil and groundwater characterization efforts, certain constituents in excess of maximum concentration levels (MCLs) have been found in several monitoring wells on the LEHR site. These constituents are nitrate, hexavalent chromium, some organics, carbon 14,

and tritium. Off-site, nitrate and hexavalent chromium have been confirmed in excess of the MCLs (Ref. ES-11 and ES-12). None of the proposed activities would be performed within, or impact upon, a floodplain or wetland.

3.0 CURRENT STATUS

This section describes the existing radiological condition of the contaminated facilities covered by this EA. Section 3.1 describes the condition and contents of the buildings, and the on-site tank trailer. Section 3.2 describes the condition of the Co-60 irradiator.

3.1 BUILDING AND TANK TRAILER CONTAMINATION

AH-1 was previously used for Sr-90 work. The building contains offices, a storage room, a mixing kitchen, showers, bench scale testing laboratories, freezers, and dog cages. The plumbing and ventilation systems of the dog cages are contaminated with beta activity levels to greater than 10^6 disintegrations per minute (dpm)/100 cm^2 and alpha activity up to 10,000 dpm/100 cm^2. Biowastes that were stored in the freezers of AH-1 were removed, packaged, and shipped to the Hanford Site for disposal in September 1990 under a memo to file NEPA documentation.

AH-2 contains two offices, an operating room, an examination area, a medical supply storage area, a locker room, and a cage room. Several dog cages in Room 310 of AH-2 have shown alpha activity above the limits for fixed contamination. Levels in individual samples range from a low of 360 to a high of 12,000 net disintegration per minute (dpm) per 100 cm^2. Results of swipe measurements indicate that residual alpha activity is fixed (Ref. 4). Many of the dog cages in Room 310 of AH-2 have beta activities above the DOE Order 5400.5 limit for fixed contamination (see Table 4-1), with levels in individual samples ranging from a low of 3,000 to a high of 92,000 net dpm per 100 cm^2.

A preliminary survey discovered similar contamination exists in the Specimen Storage Room, and the Co-60 irradiator building. The Specimen Storage Room is a single large room attached to a building not part of this action. The Specimen Storage Room can be accessed only from the outside. There is no access to the Specimen Storage Room from the building to which it is attached.

An asbestos survey indicates that asbestos is present in some of the floor tiles and/or mastic backing, wallboard tape and grout, piping insulation and roofing materials. Asbestos abatement would be conducted as part of the building decontamination. No other hazardous materials are expected to be encountered in any of the buildings.

The 4,000-gallon tank trailer has not been fully characterized, however, its 250 gallons of liquid content and structure are known to be contaminated with low levels of Sr-90 and Ra-226.

3.2 COBALT 60 IRRADIATOR

The encapsulated Co-60 source is located in a shielded irradiator on top of a small irradiation control building at the eastern end of the LEHR facility (see Figure 1-2). The Co-60 source, is housed in a specially designed lead and stainless steel container that is fitted with electronically activated mechanical shutters (Ref. 5). No residual contamination has ever resulted from this source.

Because of the presence of the Co-60 source in the irradiator control building, no detailed survey (radiation, contamination levels) of this building has been conducted to date. Current plans call for full characterization of the building after the Co-60 source is removed. Removal, packaging and shipment of the Co-60 source to the Hanford Site for disposal is planned to be completed by the end of 1992.

4.0 DISCUSSION OF ALTERNATIVES

4.1 ALTERNATIVES

Three alternatives have been evaluated. These alternatives are: (1) no action, which consists of cessation of all activities in these buildings, including surveillance and maintenance (S&M), (2) continued S&M, and (3) the proposed action, D&D of the buildings, tank trailer, and removal of the Co-60 source. These alternatives are addressed below.

4.1.1 No-Action Alternative

The no-action alternative would result in the cessation of all activities relating to these facilities, including any future S&M. The no-action alternative would also result in further deterioration of the building structures, and environmental releases of contaminated materials. The no-action alternative is not a viable option because of the potential for environmental releases and the potential long-term liability to DOE and UCD.

4.1.2 Surveillance and Maintenance Alternative

The S&M alternative is to prepare and implement a S&M program of the contaminated buildings, tank trailer, and the Co-60 irradiator. This program would include continued environmental monitoring to ensure that radioactive contamination has not migrated to the environment. Regularly scheduled inspection and maintenance of health, safety, and radiation protection equipment and instrumentation calibration would be performed and documented. A program of health physics surveillance monitoring and personnel dosimetry would also have to be established, and emergency planning, training, and drills conducted. This option is not a viable alternative because it does not meet the objective of being able to turn these facilities back to UCD for unrestricted use. The annual cost of S&M is estimated to be $500,000 per year.

4.1.3 Proposed Alternative - Decommissioning of the Buildings and Tank Trailer, and Removal of the Co-60 Irradiator

This action involves on-site removal of the elevated alpha, beta, and beta-gamma contaminated cages, piping, equipment, components, structures, and waste having radioactivity levels greater than those permitted for unrestricted release of the property. This action also involves the removal and disposal of the Co-60 sealed source in its shielded container from the roof of the Co-60 building. No hazardous waste is known to be present in the buildings. If hazardous wastes are encountered, they would be disposed of in accordance with applicable Federal and California State regulations and requirements including the Resource Conservation and Recovery Act (RCRA) regulations and DOE Order 5480.3. The decontamination would reduce contamination to levels consistent with use of the facilities without radiological restrictions. These levels are provided in Table 4-1 (see

TABLE 4-1
Surface Radioactivity Guidelines
(from DOE Order 5400.5)

Radionuclides[2]	Allowable Total Residual Surface Contamination (dpm/100 cm²)[1] Average[3,4]	Maximum[4,5]	Removable[4,6]
Transuranics, I-125, I-129, Ra-226, Ac-227, Ra-228, Th-228, Th-230, Pa-231.	100[7]	300[7]	20[7]
Th-Natural, Sr-90, I-126, I-131, I-133, Ra-223, Ra-224, U-232, Th-232.	1,000	3,000	200
U-Natural, U-235, U-238, and associated decay product, alpha emitters.	5,000	15,000	1,000
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.[8]	5,000	15,000	1,000

[1] As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute measured by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[2] Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

[3] Measurements of average contamination should not be averaged over an area of more than 1 m². For objects of less surface area, the average should be derived for each such object.

[4] The average and maximum dose rates associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at 1 cm.

[5] The maximum contamination level applies to an area of not more than 100 cm².

[6] The amount of removable material per 100 cm² of surface area should be determined by wiping an area of that size with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wiping with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm² is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. It is not necessary to use wiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination levels are within the limits for removable contamination.

[7] Limits used are U.S. NRC Regulatory Guide 1.86 limits plus ALARA.

[8] This category of radionuclides includes mixed fission products, including the Sr-90 which is present in them. It does not apply to Sr-90 which has been separated from the other fission products or mixtures where the Sr-90 has been enriched.

DOE Order 5400.5 for details). Wastes generated during the operation would be managed in accordance with all applicable federal and state requirements and DOE Orders.

Decontamination would be conducted in compliance with DOE Order 5820.2A and in a manner that would minimize the potential for the uncontrolled release of radionuclides or hazardous materials (if found) to the surrounding environment. Typical decontamination approaches are discussed below. Environmental consequences associated with the D&D alternative are provided in Section 8.0. The estimated cost to decontaminate these buildings for unrestricted reuse is estimated at $4 million.

This option is the preferred alternative. This option one, removes contamination and the potential for adverse environmental impacts; two, returns facilities to UCD in accordance with the Memorandum of Agreement; and, three, is the most cost effective alternative.

4.1.3.1 Approach. The approach for implementing the proposed actions involves decontamination of building structures and dismantling, removal and disposal of contaminated equipment. The residual contamination of the buildings would be reduced to levels consistent with use of the facilities without radiological restriction (See Refs. 2 and 3). The decontamination operations are similar to activities that have been successfully undertaken at other facilities around the country (Ref. 6). The general decontamination process would be the same for all buildings.

4.1.3.2 General Decontamination Process. The general decontamination process for the buildings and tank trailer involves the following sequence of operations (Ref. 7, 8 and 9):

- Perform a comprehensive radiological and asbestos survey to further define the extent and locations of contamination for purposes of scoping and planning the D&D effort.
- Based on the survey results, prepare D&D plans. These plans which would be approved by DOE, UCD, and regulatory agencies, as required would include detailed procedures on how to effectively conduct the cleanup work and implement engineering control measures to ensure that there would be no adverse impact to the workers, public or the environment as a result of the decontamination activities.
- Isolate the area(s) to be decontaminated and install access control.
- Cap all floor drains and ventilation systems.
- Survey and remove uncontaminated equipment; package contaminated equipment for disposal.
- Remove pipes, ducts, and drains; survey and package contaminated material and asbestos (if found) for disposal. Any asbestos encountered would be handled in accordance with 40 Code of Federal Regulations (CFR) Part 61.152, the Washington Administrative Code, the Hanford Site Radioactive Solid Waste Acceptance Criteria, and State of California regulations.
- Decontaminate ceilings, walls, floors, tanks, drains, and pipes consistent with the standards of DOE Order 5400.5.
- Survey for residual contamination and continue the decontamination as necessary.

- Release individual buildings for reuse as independent verification is completed.

All of the D&D operations would be carried out with suitable technical and administrative controls to minimize the risks of inadvertent exposure and contamination.

The precautions would include use of the following:

- protective clothing for workers
- tents, bags, or other containment to isolate operations area(s)
- filter systems with monitors and alarms
- emergency air, power, and other supplies
- radiation monitors, area and personnel dosimetry, etc.

These controls would also be instrumental in preventing the spread of contamination outside the facilities during decontamination. The general decontamination process as outlined above has been successfully used in many previous D&D operations of federal and non-federal facilities (Ref. 10).

4.1.3.3 Decontamination Methods. The criteria that would be used for selecting the appropriate decontamination methods include worker safety, environmental protection, waste minimization, and cost effectiveness. It is anticipated that all radioactive wastes generated would be low-level wastes. Some of this waste may contain asbestos. Any such wastes encountered during decontamination operations would be handled in accordance with all applicable laws and regulations including the State of Washington regulations and Westinghouse Hanford Company requirements and would be shipped to the Hanford Site for disposal. Non-radiologically-contaminated asbestos waste would be disposed of according to an approved asbestos abatement plan and in compliance with all applicable federal and state requirements.

The generic decontamination methods for building equipment and components will be described in detail in the D&D Work Plans and field operating procedures and instructions being developed. Where feasible, passive decontamination techniques would be applied first. These techniques include standard high efficiency particulate air (HEPA) vacuuming, damp cloth wiping, and, to a limited extent, hand scrubbing. More aggressive decontamination methods would be applied as needed. These methods include HEPA vacuumed dry abrasive blasting and scabbling/scarification.

The tank trailer would either be decontaminated on-site and scrapped or dismantled, and packaged and shipped to the Hanford Site for disposal. Tank liquid contents (250 gallons) would be solidified, packaged and also shipped to Hanford for disposal. The tank trailer would be totally enclosed during the decontamination process.

4.1.3.4 Removal Method of the Co-60 Irradiator. The entire Co-60 source assembly, with the source in its shielded container, would be removed from the roof of the Co-60

building using a crane. The entire assembly would then be placed in a Type B overpack designed to very stringent U.S. Department of Transportation (DOT) criteria (see Section 1.1 in Appendix A). The source would be packaged, labelled, and transported in accordance with the DOT specifications for Type B materials. The entire assembly would be transported to Hanford, Washington, where the lead shielding would be removed in a hot cell. The lead shielding would be swiped and cleaned and either disposed of in a hazardous waste facility or recycled. The pencil source would then be reloaded into a transport/burial cask and transported to the disposal site.

5.0 WASTE MANAGEMENT

Approximately 8,000 cubic feet of low-level radioactive waste in the form of contaminated debris and equipment is expected to be generated from the proposed actions. An additional 600 cubic feet of asbestos bearing material is estimated to exist. It is U.S. DOE policy to comply with hazardous waste regulations and laws and low-level radioactive waste regulations. All such laws and regulations that are applicable to LEHR D&D activities including waste transportation would be complied with. All radioactive waste would be characterized and classified to provide the information necessary to obtain a Storage/Disposal Approval Record from Westinghouse Hanford Corporation for disposal. The Washington State Dangerous Waste Classification requirements would be followed for the characterization. The waste would then be packaged in containers approved for each specific waste classification in accordance with the DOE Orders 1540.1, 1540.2, 5480.3, and 5820.2A. Waste Management Plans and Waste Certification Plans would be prepared to ensure that the Hanford Site waste acceptance criteria and all applicable DOE Orders and federal and state regulations are met.

Low-level waste and radioactively contaminated asbestos would be disposed at the DOE Hanford burial site. All low-level radioactive waste and radioactively contaminated asbestos generated from LEHR D&D activities would be handled in accordance with requirements of the Toxic Substance Control Act and transported to the Hanford disposal site by a U.S. DOE approved transporter. The DOE "Motor Carrier Evaluation Program" (WHC-EP-0336) would be used to select the motor carrier.

Wastes that are not radioactively contaminated would be so certified by the Project Health Physics staff and approved by the DOE project manager prior to final disposition. This non-contaminated waste would be disposed of in local landfills or removed as scrap. Numerous landfills are available in the area to handle this non-contaminated waste.

No hazardous wastes other than asbestos are expected to be generated from the proposed action. Decontamination methods would be selected that would eliminate the use of hazardous chemicals (i.e., solvents). If hazardous waste, including non-radioactively contaminated asbestos, is encountered as a result of the proposed actions, it would be handled in accordance with RCRA and state regulations.

The 4,000 gallon tank trailer was used as an overflow tank for the Imhoff building radium and strontium tanks. The 250 gallons of residual sludge in the tank is contaminated with low-levels of Ra-226 and Sr-90. The sludge from the Imhoff building tanks has previously been solidified on-site with grout and shipped to the Hanford burial site in 55-gallon drums. Regardless of whether the tank trailer is to be decontaminated on site and scrapped, or dismantled, packaged, and shipped to Hanford for disposal, the sludge in the tank trailer would be fully characterized, treated, and disposed following similar procedures. This work

would be performed adjacent to the trailer in a diked area with an impervious liner to contain any accidental spills.

Many of the D&D wastes that need to be shipped off site, even those that are properly containerized, would be stored on site until a quantity appropriate for shipping accumulates. These wastes must be protected from the elements and properly designated and segregated during staging. Because part of the site is still being used by UCD researchers and much of the site will be subjected to environmental restoration activities, use of the existing temporary waste staging facility would minimize both long-term waste clutter at the site and interference with ongoing research and restoration activities.

All generated wastes would be segregated in the waste storage facility based on the nature and compatibility of the waste. They would be held, containerized, and transported in such a manner that no intermingling of wastes occurs, no wastes are released to the environment, and no water infiltrates the wastes. Contaminated waste generated from the proposed actions would be temporarily stored at the waste staging facilities in accordance with all applicable regulations and would be transported to the disposal site shortly after being generated.

6.0 RADIATION HEALTH AND SAFETY

Radiation protection for both decontamination workers and the general public would be emphasized. All work conducted during the D&D process would be in accordance with DOE Order 5400.5, Radiation Protection of the Public and Environment; DOE Order 5480.4, Environmental Protection Safety and Health Protection Standards; DOE Order 5480.11 Radiation Protection For Occupational Workers; and Occupational Safety and Health Act (OSHA) regulations contained in 29 CFR Part 1910. Staff familiar with the activities conducted at these facilities and with the radiation hazards that exist will participate in the D&D efforts. These staff are experienced in radiological health safety requirements and procedures. All workers would receive radiation safety training prior to beginning decontamination activities. This training would include information on the biological effects of radiation, protective clothing requirements, use of respirators, and external and internal exposure control methods specific to the activity being performed. Health Physics staff would be assigned to each work crew to review procedures and proposed activities established in the health and safety plans, monitor activities to enforce as low as reasonably achievable (ALARA) principles, survey radiation levels, and maintain personnel exposure records. Health Physics staff would have authority to stop any operations that they believe may involve unusual, unnecessary, or radiological risk to workers, the public, or the environment.

Areas within buildings being decontaminated would be isolated and maintained as closed systems relative to atmospheric pressure to prevent the release of radioactive contamination outside the work areas during decontamination operations. Any areas outside buildings being decontaminated, such as the tank trailer, would also be ground covered, isolated, enclosed and maintained as closed systems under negative pressure to minimize the airborne release of any radioactive particulates during decontamination. All radioactive wastes generated would be collected and packaged in approved containers and the outside of containers would be decontaminated prior to removal to the waste staging facility.

Air releases will be minimized by implementing the following procedures:

- Installing a system of air locks to entrances
- Establishing a negative pressure work area
- Installing multi-stage/redundant HEPA filtration systems on equipment exhaust pickups and the room exhaust
- Using water sprays, on non-contaminated surfaces where feasible, to reduce dust
- Closing ducts, vents, and passages.

During decontamination operations, potential air releases from facilities being decontaminated will pass through multi-stage filtration systems to protect both workers and the public by eliminating airborne contamination. The decontamination equipment would have a roughing filter and redundant HEPA filters, in series, and utilize a close capture ventilation system for

the area being decontaminated. Approximately 97 percent of contaminated particulates would be captured in the rough filter, with HEPA filters removing 99.97 percent of the remaining particulates. This would ensure local pickup of particulates as they are generated and would preclude the buildup of airborne contamination in the area being decontaminated. The HEPA filter would be equipped with a pressure gauge to monitor filter performance.

The use of redundant HEPA filters for air exhaust from the decontamination area minimizes release of and exposure of workers and the public to airborne particulate contamination. Monitoring of filter performance ensures that operations that could generate airborne contamination are stopped in the unlikely event of a HEPA filter failure. HEPA filter failures are extremely rare, and the simultaneous failure of three filters in series is even more improbable. The used HEPA filters would be placed in storage bags or drums and then collected for disposal.

7.0 CONFIRMATORY SURVEY AND RESTORATION

Following the completion of the proposed actions, a confirmatory survey would be performed by an independent verification contractor to ensure that the facility or area has been decontaminated to levels consistent with the DOE's guidelines for use without radiological restriction, as presented in DOE Order 5400.5. If non-radiologic contamination is detected during the course of survey and decontamination activities, the confirmatory survey would ensure that such non-radiologic contaminants have been reduced to levels consistent with applicable federal, state, and local laws and regulations.

8.0 ENVIRONMENTAL CONSEQUENCES OF EVALUATED ALTERNATIVES

Potential environmental consequences of the evaluated alternatives are discussed in this section.

8.1 NO ACTION ALTERNATIVE

The No Action Alternative does not sufficiently address the contaminants that exist at the facilities covered in this EA primarily because it is not consistent with DOE Order 5820.2A "Radioactive Waste Management" and it does not comply with the California Health and Safety Code, Division 20, Chapter 7.6, Articles 13 & 14. As detailed in Section 3.1, the AH-1 and AH-2 buildings are contaminated with beta activity levels greater the 10^6 dpm/100 cm^2 and 92,000 dpm/cm^2, respectively. The No Action Alternative would result in deterioration of building structures and releases of radiologically contaminated materials to the environment.

8.2 SURVEILLANCE AND MAINTENANCE ALTERNATIVE

If properly planned and implemented, the S&M alternative would minimize releases of radiologically contaminated materials to the environment. Based on the level of Sr-90 and Ra-226 contamination in the controlled buildings and the half-life of these radionuclides, S&M would need to be maintained for 284.7 years (Sr-90) and 2020 years (Ra-226) before the existing contamination could be reduced to levels below DOE release limits for unrestricted use. During this period, the buildings would remain unlocked and maintained at an unescalated cost of about $500,000 per year. Furthermore, in case of emergency situations such as fire or earthquake, there would be a great potential for the on-site sources to release contamination to the environment with significant adverse consequences to the site workers and neighboring communities.

8.3 PROPOSED ALTERNATIVE

A brief evaluation of potential consequences of the proposed actions (see Section 4.1.3) on air quality, biological resources, historical and archeological sensitive areas and cultural resources, infrastructure, land use, natural resources, noise, public health and safety, socioeconomics, and water quality, along with engineering control measures to minimize adverse impacts, are discussed below. A list of State Agencies contacted in the preparation of this EA is provided in Table 10.1 preceding the References for Environmental Settings.

8.3.1 Air Quality

No adverse air quality impact is expected to result from the proposed action. Areas within facilities being decontaminated would be isolated and maintained as a closed system under negative pressure. Potential air releases from facilities being decontaminated would pass

through a multi-stage filtration system to protect workers and the public by minimizing airborne contamination. As an additional safeguard, constant ambient air monitors would be employed in the area being decontaminated to detect and measure airborne radioactive contamination.

8.3.2 Biological Resources

The proposed activities do not involve any potential habitat disturbance in the vicinity of the project site and, therefore, would have no impacts on the site's biological resources.

8.3.3 Cultural Resources

As stated in Section 2.3, there is no evidence of the presence of any cultural resources or historically or archaeologically sensitive areas in the project site. As such, and because no disturbance of undisturbed ground is anticipated, there would be no potential for cultural resource impacts from the proposed actions.

8.3.4 Infrastructure

Except for adjacent highway and railroad systems, there is no major infrastructure near the project site. Transportation of project workers to and from LEHR will add approximately ten vehicles to the daily traffic volumes. During maximum waste transport activity to the Hanford site, it is estimated that one truck load would originate from the LEHR site per day, for a total of 21 truck shipments. This would result in one additional truck load added to the 4,000 and 90,000 vehicles that travel on Old Davis Road and Interstate 80 each day, respectively. Accident risk analysis from waste transportation to the Hanford Site is presented in Appendix A and summarized in Section 8.8.2.

8.3.5 Land Use

The proposed activities would not involve any alteration to existing land use and therefore, would have no impact on the land use within and in the vicinity of the LEHR site.

8.3.6 Natural Resources

No natural resources are being exploited at the site and the proposed action would not change this condition.

8.3.7 Noise

Since all of the decontamination activities would be conducted in enclosed structures, no significant impact on noise level is expected outside these structures. Any adverse impact to site staff and decontamination workers would be mitigated by providing ear protection equipment and by limiting exposure to noise levels as specified by OSHA.

8.3.8 Public Health And Safety

The potential radiological and non-radiological impacts of the proposed actions on the health and safety of workers and the general public are discussed below.

8.3.8.1 Decontamination and Decommissioning Activities. The potential radiological and non-radiological impacts of the proposed D&D activities are summarized below:

Radiological Impact

During the conduct of the proposed decontamination activities and the removal of the Co-60 source, project workers would be in direct contact with potentially contaminated equipment and materials. However, with the implementation of the radiation safety procedures presented in Section 6.0, exposure to radiological materials would be maintained below occupational limits and consistent with ALARA principles. Non-project workers would not be allowed to enter work areas and any connecting hallways or doors would be blocked with appropriate barriers as necessary to prevent contamination transfer to persons not involved in project activities. A detailed dispersion modelling analysis of airborne dose emissions was performed in accordance with National Emission Standards for Hazardous Air Pollutants (NESHAP) requirements. The maximum radiation dose that the general public could incur during facility D&D activities, based on the assumption that the entire source of radiation in the facilities is released through the exhaust stacks, was estimated to be 0.52 mrem/yr. This dose is considerably below the annual dose limits of 100 mrem/yr given in DOE Order 5400.5 and 500 mrem/yr established by the State of California. Using a risk factor of 8.1 x 10^{-4}/person-rad, developed by the National Research Council (1990) Committee on the Biological Effects of Ionizing Radiation (Ref. 11) to determine the risk of increased mortality from cancer induction over an individual's lifetime, the risk associated with the D&D of the facilities is 4.2 x 10^{-7}. The annual risk of cancer induced mortality from natural radiation (i.e., radon, terrestrial and cosmic radiation) based on an effective dose equivalent of 300 mrem/yr (National Council on Radiation Protection and Measurements 1987, Ref. 12) is 2.4 x 10^{-4}. Although the estimated radiological dose and risk to the public from D&D activities are low, they would be reduced considerably through the implementation of engineering controls, including the use of multi-stage exhaust filtration systems in all work areas with 99.9% efficient HEPA filters positioned in series to control the release of airborne contaminants during project activities. Source emission monitoring would also be conducted. If monitoring results indicate the presence of radiological activities in excess of the DOE limit of 100 mrem/yr to the public, D&D work would cease immediately and not resume until adequate engineering control measures to reduce emissions are implemented.

Non-Radiological Impact

Except for asbestos, no hazardous chemical wastes have been identified in the buildings and none are expected to be generated. During D&D activities, asbestos may be encountered while accessing radiologically contaminated material, such as drain pipes. Asbestos removal

would be handled by a licensed asbestos abatement firm and would be in compliance with all State and Federal regulations. Asbestos removal areas would be tented inside buildings and workers would be fully protected from contacting asbestos materials.

8.3.8.2 Transportation of Waste. A total of 20 Type A shipments of low level waste and one Type B shipment of the Co-60 source would be transported by truck to the DOE Hanford Site in Richland, Washington for disposal. The packaging and transportation of this waste would comply with the applicable Federal and State regulations including, but not limited to 49 CFR 173 (DOT) and 10 CFR 71 (Nuclear Regulatory Commission). As detailed in Appendix A, the low level radioactive waste will be shipped from Davis, California, crossing Oregon, to the Hanford site in Washington. The waste carrier will have all necessary U.S. Department of Transportation permits to transport this waste through the above mentioned states. All permit requirements, including notification of shipment, will be met prior to waste shipment.

Radiological Impact

A detailed transportation impact analysis of the proposed actions is presented in Appendix A. Based on a dose rate of 2 mrem/hr in the truck cab (maximum allowed by DOT), the maximum individual dose to a truck crew member was calculated to be 0.8 rem, assuming that one 2-person crew would be utilized to transport the generated waste to the disposal site. This dose is only 16% of the 5 rem/yr allowable radiation dose to workers as specified in DOE Order 5480.11.

The maximum individual dose to a member of the public from waste shipments, based on the most probable pathway scenarios (see Table 4 of Appendix A), was calculated to be 5 mrem. This resultant dose is only 5% of the 100 mrem/yr maximum allowable routine dose to the public as specified in DOE Order 5400.5 and the estimated incremental lifetime radiological risk to the public is 4.1×10^{-6}.

The maximum individual radiation doses from the maximum credible accident involving the Co-60 source and the other 20 shipments of the low-level waste are 0.4 rem and 0.6 rem respectively. While these doses exceed DOE guidelines for routine exposures to the public, the probability that a member of the public would actually receive this large a dose is remote, since the probability of the accident is low and most of the postulated dose would be derived from ingestion of products grown in the area of the accident. The maximum dose from pathways other than ingestion (inhalation and external radiation exposure) would be about half of the dose limit specified in DOE guidelines for routine exposures to the public.

Non-Radiological Impact

Non-radiological accident risks consist of injuries and fatalities that may result from traffic accidents involving the shipment of LEHR decommissioning wastes to the disposal site. As detailed in Appendix A, the probability of traffic accidents associated with waste shipment is

approximately 1 in 33 and no excess fatalities are estimated to occur as a result of transporting the LEHR decommissioning wastes to the Hanford site.

8.3.8.3 Disposal of Waste. The Hanford Site in Washington is fully approved and qualified to accept and dispose of the low-level wastes from decommissioning activities and the Co-60 irradiator. The volume of low-level waste generated would be a small percentage (approximately 4%) of the typical 200,000 cubic feet of waste that is disposed of at Hanford annually and an insignificant percentage of the total volume of waste at the site (Ref. 13).

8.3.9 Socioeconomics

Due to the nature of the required work, field labor would not be provided by local contractors and no direct hire or employment of local workers is expected. At its peak, the D&D activities would employ about 20 people. Approximately $350,000, out of the total estimated project cost of $4 million, would be expended within the local economy for goods and services.

8.3.10 Water Quality

The proposed actions would not involve waste discharge on land or to surface water bodies or groundwater at the project site, and therefore no water quality impact is expected from these actions.

8.3.11 Conflicts With Federal, Regional, State, Local or Indian Tribe Land Use Plans, Policies, and Controls

The purpose of the D&D activities is to turn the facilities and site over to UCD after remediation and restoration. Consequently, no conflicts with land-use plans, policies, and controls exist.

8.3.12 Energy Requirements and Conservation Potential

Anticipated energy requirements for the proposed actions are well within the energy supply capacity of the LEHR. Energy requirements would be subject to the routine energy conservation practices at the LEHR.

8.3.13 Natural or Depletable Resource Requirements

Other than energy resources used in the D&D procedures and in the transportation of wastes to Hanford, Washington, there would be no significant natural or depletable resource requirements associated with the proposed action.

8.3.14 Adverse Environmental Effects That Cannot Be Avoided

There would be no known adverse environmental effects that cannot be avoided.

8.3.15 Relationship Between Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

The proposed action would not eliminate any options for future use of the land at UCD; indeed, it would expand future options.

8.3.16 Irreversible or Irretrievable Commitment of Resources

Other than the energy required for the various decontamination procedures and waste transport, no significant irreversible or irretrievable commitment of resources is anticipated. The decommissioning alternative is scheduled to take 2 years, including the planning phase. The estimated cost is $4 million.

8.3.17 Compliance With Orders and Agency Regulations

The principal U.S. Department of Energy (DOE) Orders which have been consulted in the preparation of this environmental assessment are summarized below:

"Hazardous and Radioactive Mixed Waste Program," DOE Order 5400.3, establishes the program and requirements to manage hazardous and mixed waste generated by DOE operations.

"Radiation Protection of the Public and the Environment," DOE Order 5400.5, establishes the programs and standards for protection of the public and environment. These standards are implemented by limits on public exposure (doses) and limits on the release of radioactive materials to the environment.

"National Environmental Policy Act Compliance Program," DOE Order 5440.1D, establishes the policies and program to implement the National Environmental Policy Act (NEPA).

"Safety Requirements for the Packaging and Transportation of Hazardous Materials, Hazardous Substances, and Hazardous Waste," DOE Order 5480.3, establishes the program to fulfill the transport requirements of the U.S. Department of Transportation and U.S. Environmental Protection Agency.

"Radiation Protection for Occupational Workers," DOE Order 5480.11, establishes the programs and standards for protection of workers. These standards are implemented by limits on worker exposure (doses) and limits on the release of radioactive materials into the environment.

"Radioactive Waste Management," DOE Order 5820.2A, establishes the policies, guidelines, and minimum requirements by which DOE manages its (1) radioactive mixed waste and (2) contaminated facilities.

Potential State and Federal agency consultation and permitting requirements for the proposed action are presented in Table 8-1. The relevant statute or act, the cognizant regulatory agency, specific action components, and the potentially applicable requirements are identified. No additional local consultation or permits have been identified. Other specific permit modification requirements might be identified as a result of consultations with the appropriate agencies. All permits and approvals would be obtained prior to initiating the proposed action. DOE-SF would continue to comply with the applicable local, state, and federal requirements that affect the D&D activities at the UCD/LEHR facility.

8.3.18 Accident Risk

As discussed in Section 6.0, all workers involved in the project would be properly trained and would be subject to the authority of the Health Physics staff. An emergency response plan (see Appendix A) would be prepared for the project to address emergency situations and to prevent or minimize exposure to workers and the general public. The emergency response plan would analyze the probability of accidents, determine potential hazard from such accidents, and provide procedures for emergency response to minimize adverse impacts. In addition, the physical nature of the materials that would be generated during the decontamination and removal activities that could be released (i.e., particulates, water droplets) allow for relatively easy control. The following paragraphs qualitatively discuss potential accidents (see Appendix A) that could occur during the project and their potential impact on workers and the general public.

All work areas would be equipped with HEPA filters to control the release of airborne contaminants during the project. Failure of an HEPA filter would result in minimal, if any, release of contaminants for two reasons: (1) all work areas would be maintained under negative atmospheric pressure, precluding the escape of particulates from the area, and (2) the HEPA filters are set in series (see Section 6.0), providing backup in the event of a failure.

Failure of the work-area containment system (e.g., shrouds, temporary walls) has the potential to result in the release of contaminants during the project. Such failure could occur, for example, if a lift truck accidently collided with the containment structure. Releases from such an event would be minimal because: (1) work areas would maintain negative atmospheric pressure, precluding release, and (2) the work areas and the buildings are equipped with HEPA filters, which would control any release. The potential risk of exposure from containment system failure, therefore, is considered low.

TABLE 8-1. APPLICABLE FEDERAL AND STATE REGULATIONS REQUIRING PERMITS AND/OR CONSULTATION

STATUTE OR ACT REQUIREMENT	AGENCY	PROPOSED ACTION	APPLICABLE
Federal and State Statutes and Acts			
Atomic Energy Act	DOE/NRC	Possession of nuclear material; decontamination activities	License/certification required. Compliance with environmental and worker protection standards[1]
California Environmental Quality Act (CEQA)	Cal EPA	Facility decontamination and decommissioning	Public notification of proposed action, preparation of CEQA document
California Health and Safety Code, Div. 20, Chapter 7.6, Arts. 13,14	Cal EPA	Facility decontamination and decommissioning	Public and Worker Health and Safety
California Integrated Waste Management Act	State Dept. of Health Services Solano County	Transportation of LLW	Notification/consultation manifest required[1]
Hazardous Material Transport Act	DOT/EPA	LLW packaging and transport	Certification and manifest required[1]
National Emissions Standards for Hazardous Air Pollutants (NESHAP)	EPA	Facility decontamination and decommissioning	Air dispersion modelling analysis required
National Environmental Policy Act (NEPA)	DOE	Surplus facility decommissioning and decontamination	Public notification of proposed action; preparation of EA
Oregon Hazardous Waste and Hazardous Materials II	Oregon Dept. of Environmental Quality	Transportation of LLW	Manifest required[1]
Resource Conservation and Recovery Act	EPA	Waste Handling	Generator ID No.[1] (If RCRA waste encountered)
Washington Dangerous Waste Regulations	Washington Dept. of Ecology	Package, Transport and waste disposal at Hanford of LLW	Manifest required[1]
Washington Dangerous Waste Regulations	Washington Dept. of Ecology	Waste Acceptance for Disposal	Certification required[1]

[1] Would be obtained or completed prior to initiation of corresponding on-site activity.

Rupture of waste containers during handling and movement to the loading areas, either through dropping the container or spearing the container with a lift truck, has the potential to release contaminants. Such potential releases would be addressed by procedures established by the emergency response plan and would be immediately cleaned up. Because waste containers would be tightly sealed inside the buildings prior to being transported to the waste staging facility for off-site shipment, the maintenance of the negative atmospheric pressure and HEPA filters would prevent any potential particulate releases. The potential risk of exposure from waste container rupture is considered low. However, in the event that a rupture does occur outside encapsulated conditions, the maximum exposure to the public is estimated to be 0.5 mrem, which corresponds to a radiological risk to the public of 4.2×10^{-7}, assuming that the entire source of radiation inside the facilities was in the ruptured container. This is a very conservative estimation because the waste generated during facility D&D will be packaged separately in numerous containers.

The risk of exposure from a general power failure is also considered low. In such an event, all D&D and removal activities would cease. The primary release control systems, the HEPA filters, would prevent any releases until power is restored. In addition, backup power systems would be available and power would be restored as quickly as possible.

Accidents that could occur during off-site transportation are addressed in Section 8.3.8.2. Risks that could result during waste disposal at Hanford are addressed in the Environmental Impact Statement for the Hanford Site (Ref. 14).

9.0 CONCLUSIONS

Neither the no-action alternative nor the S&M alternative would allow the DOE to release the buildings and facilities to UCD for future use without radiological restrictions. The no-action case would also lead to further deterioration of the contaminated structures and releases to the environment while the S&M only case could cost, in as little as four to five years, as much as the cleanup of the facilities is expected to cost. The D&D alternative, therefore, is the environmentally preferred and the proposed action. For the buildings and facilities in question, this action would generally involve the decontamination of structures, tank trailer, and the decontamination and/or removal of equipment, and use of the Waste Staging Facility. The decontaminated buildings would be made available to the UCD for future use without radiological restrictions.

10.0 REFERENCES

1. U.S. Department of Energy and the Regents of the University of California, Davis, 1990. Memorandum of Agreement Regarding Restoration and Decontamination, March 13.

2. U.S. Nuclear Regulatory Commission, Regulatory Guide 1.86, Termination of Operating Licenses for Nuclear Reactors, June 1974.

3. State of California, Department of Health Services, 1977, Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use (Decon-1), June.

4. Layton, D., et. al., 1989. Radiological Survey of Facilities at the Laboratory for Energy-Related Health Research, Lawrence Livermore National Laboratory, Livermore, California, April 3.

5. U.S. Department of Energy, 1990. San Francisco Operations Environmental Restoration and Waste Management Program Five Year Site Specific Plan.

6. Oak Ridge National Laboratory, 1990. Nuclear Facility Decommissioning and Site Remedial Actions - A Selected Bibliography (Vol 11), ORNL/EIS-154/V11, September.

7. Battelle Environmental Management Operations, 1990. Cobalt 60 Source, Strontium 90/Radium 226-Contaminated Sludges and Strontium 90/Radium 226 Contaminated Tanker at UCD/LEHR Facility, Draft Interim Action Plans.

8. Battelle Environmental Management Operations, 1990. Draft Summary of D&D Alternatives, Memorandum, September 28.

9. Battelle Environmental Management Operations, 1990 Screening of Alternatives, Draft Memorandum, November 19.

10. Old General Atomic Fuel Fabrication Facility Decontamination and Decommissioning, San Diego, California, 1991.

11. National Academy of Science, National Research Council, 1990. Health Effects of Exposure to Low Levels of Ionizing Radiation, BEIR V. Committee on the Biological Effects of Ionizing Radiation, Board on Radiation Effects Research, Commission on Life Sciences, National Research Council.

12. National Council on Radiation Protection and Measurements, 1987. Exposure of the Population in the United States and Canada from Natural Background Radiation, NCRP Report No. 94, Bethesda, Maryland.

13. U.S. Department of Energy Waste Operations Branch, personnel communication, R.F. Guercia, Branch Chief Richland Field Office, June 1992.

14. U.S. Energy Research and Development Administration, 1975. Final Environmental Impact Statement: Waste Management Operations, Hanford Reservation, Richland, WA. (Washington, DC: U.S. Energy Research and Development Administration), December.

TABLE 10.1 STATE AGENCY CONTACT LIST

Reference for EA			
Section	Category	Name	Agency
2.1	Air Quality	Debbie Poopjoy	California Air Resource Board
2.2	Biological Resource	Darleen McGerf	California Department of Fish and Game
2.3	Cultural Resource	Dr. Jerry Johnson	California State University at Sacramento Anthropology Department Resources
2.4	Infrastructure	Alphonse Rajasekhan	Cal Trans Department of Traffic Counts and Volumes
		Kaj Malthe	Solano County Transportation Department
2.5	Land Use	Debra Right	City of Davis, Planning & Zoning Community Development
2.6	Natural Resources	Bob Sleppy	California Department of General Services
2.7	Noise	Alphonse Rajasekhan	Cal Trans Department of Traffic Counts and Volumes
		Kaj Malthe	Solano County Transportation Department
2.8	Public Health and Safety	Don Bunn	California Department of Health Services, Radiation Health Branch
2.9	Socioeconomic	Debra Right	City of Davis, Planning & Zoning Community Development
2.10	Water Quality	Heidi Temko	California State Water Resources Control Board

REFERENCES FOR ENVIRONMENTAL SETTINGS

ES-1 National Flood Insurance Program, Flood-Insurance Rate Map, Solano County, California-Community Panel No. 060631-0075B, 1982 [2.0 Environmental Setting]

ES-2. California Collider Commission, 1988. Environmental Setting for the Superconducting Super Collider Project Area, April [2.1 Air Quality, 2.4 Infrastructure, 2.6 Natural Resources, 2.7 Noise, 2.9 Socioeconomics, 2.10 Water Quality].

ES-3. California Department of Fish and Game (CDFG) Natural Diversity Data Base (CNDDB) (CDFG, 1990) [2.2 Biological Resources].

ES-4. California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants (Smith and Berg, 1988) [2.2 Biological Resources].

ES-5. Information on Swainson's hawk nests provided by Mr. Sid England (UC Davis Planning and Budget Office, personal communication, and unpublished data) [2.2 Biological Resources].

ES-6. Local and regional checklists and distribution guides (Richmond, 1985, Gaines and Beedy, 1987; McCaski et. al., 1988) [2.2 Biological Resources].

ES-7. Regional information previously developed for other projects (Dames & Moore files) [2.2 Biological Resources].

ES-8 California State University at Sacramento Anthropology Department, personnel communication, Dr. Jerry Johnson, April 1992 [2.3 Cultural Resources].

ES-9. October 9, 1990 memo from Mike Kelly, Senior Archeologist, (Dames & Moore) [2.3 Cultural Resources].

ES-10. Solano County Transportation Department, personnel communication, Kaj Malthe, April 1992 [2.4 Infrastructure].

ES-11. California Transportation Department of Traffic Counts and Volumes, personnel communication, Alphonse Rajasekhan, April 1992 [2.4 Infrastructure].

ES-12. Dames & Moore, 1990. Final SWAT Report, Old UCD Landfill, University of California, Davis, July. [2.5 Land Use, 2.10 Water Quality].

ES-13. Dames & Moore, 1990. Evaluation of Potential Nitrate and Hexavalent Chromium

Sources in the Vicinity of the UCD LEHR Facility for the University of California, Davis, November. [2.5 Land Use, 2.10 Water Quality].

ES-14. California Department of Conservation, Division of Mines and Geology. 1985. Mineral Land Classification Special Report 156. [2.6 Natural Resources].

ES-15. California Department of Water Resources, 1978. Evaluation of Groundwater Resources, Sacramento Valley, U.S. Geolcgical Survey Bulletin p. 118-6, 136. [2.10 Water Quality].

APPENDIX A

TRANSPORTATION IMPACT ANALYSIS

APPENDIX A
TRANSPORTATION IMPACT ANALYSIS

This appendix presents an analysis of the impacts associated with transportation of LEHR Facility decommissioning wastes to the Hanford Site, Washington. Also described here are the regulations governing transport activities and the organizations responsible for them, the volume and radionuclide content of the wastes to be transported, and the radiological and nonradiological effects of transporting wastes under both routine and accident conditions.

1.0 APPLICABLE REGULATIONS AND RESPONSIBLE ORGANIZATIONS

The transportation of wastes from the LEHR facility to offsite disposal facilities will comply with the regulations and orders promulgated by the U.S. Department of Transportation (DOT) and the U.S. Nuclear Regulatory Commission (NRC). These agencies have developed comprehensive regulations covering the performance of the shipping packagings, vehicle safety, routing of shipments, and physical protection. The following sections briefly discuss the regulations and organizations responsible for the safe highway transport of radioactive materials in the United States.

Regulations for the safe transportation of radioactive materials are designed to protect the public from the potential consequences of loss or dispersal of radioactive materials during transit as well as from routine (non-accident) radiation doses. These regulations ensure safety through standards for packaging, handling, and routing of shipments. Specific regulations that apply to offsite shipments of LEHR decommissioning wastes are found in the CFR under the following headings:

- 49 CFR 107 Rule-making Procedures for the Materials Transportation Bureau (DOT)
- 49 CFR 171 General Information, Regulations, and Definitions (DOT)
- 49 CFR 172 Materials Table and Materials Communications Regulations (DOT)
- 49 CFR 173 Shippers--General Requirements for Shipments and Packagings (DOT)
- 49 CFR 177 Carriage by Public Highway (DOT)
- 49 CFR 178 Shipping Container Specifications (DOT)
- 10 CFR 71 Packaging of Radioactive Material for Transportation and Transportation of Radioactive Material Under Certain Conditions (NRC)

The following subsections present key elements of the regulations pertaining to shipment of LEHR decommissioning wastes.

1 1 PACKAGING

Packaging, as used in this report, is defined as the shipping container for radioactive material. Properly designed, manufactured, and prepared packaging is the primary means for ensuring the safe transport of radioactive materials. Consequently, most of the regulations are concerned with packaging standards.

DOT regulations that apply to shipments of decommissioning wastes are contained in 49 CFR 173. These regulations seek to enhance safety through three key elements: 1) containment of radioactive material, with allowances for heat dissipation if required, 2) shielding from radiation emitted by the material, and 3) prevention of nuclear criticality in fissile materials (not applicable to this action; no fissile materials involved). These aspects of DOT regulations are addressed in the remainder of this subsection.

Regulations allow radioactive materials to be shipped in different types of packagings, depending on the total radioactive hazard presented by the material within the package. Based on the radionuclide contents and forms of the materials to be transported from the LEHR Facility, all wastes except for the encapsulated Co-60 irradiator will be shipped in Type A packages. The radionuclide content of the Co-60 irradiator exceeds the limits specified in 49 CFR 173.435 for a Type A package and so must be shipped in a Type B package.

All packagings must meet, as a minimum, the design requirements described in 49 CFR 173, Sections 411 and 412. Type B packagings must additionally meet the design requirements for Type B packages specified in 49 CFR 173.413. These Type B design requirements are found in 10 CFR 71, Subpart E. In addition, the packagings must meet the testing requirements specified in 49 CFR 173.465 for Type A packages and 49 CFR 173.467 for Type B packages. Type B packaging tests are found in Nuclear Regulatory Commission regulations in 10 CFR 71, Subpart F. These tests are briefly described in Table 1.

Radioactive materials exceeding the limits for Type A packagings, such as the Co-60 irradiator, can be shipped only in Type B packagings. These packagings are extremely accident-resistant. Any Type B packaging design placed in service must be certified to the design and testing standards of the NRC. In addition to meeting the standards for a Type A packaging, a Type B packaging must be designed to withstand severe hypothetical accident conditions that demonstrate resistance to impact, puncture, fire, and water immersion (10 CFR 71.73). To be acceptable, the Type B packaging must release no radioactivity except for limited amounts of contaminated coolant and gases. Also, there can be no external radiation dose rate exceeding 1,000 mR/hour at one meter from the external surface of the packaging [10 CFR 71.51(a)(2)]. Surface contamination of packagings is limited to specified levels. The method for determining amounts of surface contamination is specified in 49 CFR 173.443.

TABLE 1. Type A and Type B Packaging Design Requirements
General Design Requirements for all Packages (49 CFR 173.411)

- Ease of handling, either manually or mechanically
- Lifting attachment requirements
- Ease of decontamination of external surface
- Free of pockets or crevices where water might collect

Type A Package Design Requirements (49 CFR 173.412)

- General design requirements for all packages
- Provisions for sealing packages
- External dimension limitations
- External surface free from protrusions
- Containment and shielding maintained during transport and storage at temperatures between -40°C (-40°F) to 70°C (158°F)
- Withstand normal transport conditions, including effects of acceleration, vibration, or vibration resonance
- Physical/chemical compatibility of package and associated structures
- Containment system retains contents under reduction of pressure to 0.25 kg/cm2 (3.5 psi)
- Valve protection
- Capable of withstanding the following tests (49 CFR 173.465)
  1. Water spray
  2. Free drop (drop height is function of package weight)
  3. Compression test
  4. Penetration test

Type B Package Design Requirements[a]

- General and Type A package design requirements
- Capable of withstanding the following hypothetical accident conditions (10 CFR 71)
  1. Free drop from 9 m (30 ft) onto an unyielding surface
  2. Puncture from a free drop from 1 m (40 in) onto a cylindrical puncture probe
  3. Exposure to an engulfing fire for 30 minutes at temperature of 800°C (1475°F)
  4. Immersion under water for not less than 8 hr

Radiation allowed to escape from a packaging must be below specified limits that minimize the exposure of the handling personnel and general public. Radioactive packages are handled only by the shipper and receiver (i.e., shipped in exclusive-use or sole-use vehicles in which

[a] Additional requirements are applicable to specific types of packages; e.g., fissile material and plutonium packages.

the radioactive materials are the only commodity aboard the truck) and must be designed so that the following radiation limits are not exceeded (49 CFR 173.441) during normal transport activities:

- 1,000 mrem/hr at 1 m from the exterior of the package (in a closed transport vehicle only).
- 200 mrem/hr at any point on the external surface of the car or vehicle (in a closed transport vehicle only).
- 10 mrem/hr at any point 2 m from the vertical planes projected by the outer lateral surfaces of the car or vehicle; or if the load is transported in an open transport vehicle, at any point 2 m from the vertical planes projected from the outer edges of the vehicle.
- 2 mrem/hr in any normally occupied position in the car or vehicle. This provision does not apply to private motor carriers under certain conditions.

1.2 VEHICLE SAFETY

The carriers of radioactive materials must meet, at a minimum, the same requirements as carriers for any material. Truck safety is governed by the Bureau of Motor Carrier Safety of the DOT, which imposes vehicle-safety standards on all truck carriers (49 CFR 350 through 49 CFR 398). Trucks carrying radioactive wastes must be placarded in accordance with 49 CFR 172 Subpart F. Along with other functions, the Bureau may conduct unannounced wayside inspections of truck-carrier vehicles and drivers. Several states, including Washington and Oregon, also have truck inspection programs. The State of California will be invited to inspect a sample of the shipments originating at LEHR. During the inspection, the condition and loading of the vehicle and the drivers' documents are checked.

1.3 HIGHWAY ROUTING

The DOT's routing regulations, 49 CFR 177.825 (Docket HM-164), were published January 19, 1981, and became effective February 1, 1982. The objectives of these regulations are to reduce impacts of transporting radioactive materials, to establish consistent and uniform requirements for route selection, and to identify the role of state and local governments in the routing of radioactive materials. The regulations attempt to reduce potential hazards by avoiding populous areas and minimizing transit times. A carrier or any person operating a motor vehicle carrying a "highway-route-controlled quantity" of radioactive materials is required by Docket HM-164 to use the interstate highway system except when moving from origin to interstate or interstate to destination. Other "preferred highways" may be designated by any state to replace or supplement the interstate highway system. Under its authority, however, to regulate interstate transportation safety, the DOT can overrule state and local bans and restrictions as "undue restraint of interstate commerce."

All regulations announced by state and local governments have to be consistent with the provisions of Docket HM-164 or they will be preempted. The DOT holds that conflicting requirements among jurisdictions may be unduly restrictive and may increase risks by directing shipments to highways having higher accident rates.

The DOT regulation requires carriers to use routes selected to minimize transit time and radiological risk. Based on the low levels of radioactivity, the 20 Type A shipments and the Co-60 shipment are not considered "highway-route-controlled" shipments and carriers transporting LEHR decommissioning wastes will be required to travel on interstate circumferential or bypass routes, if available, to avoid populous areas. Carriers may use interstate or preferred highways that pass through urban areas only if circumferential routes are not available.

1.4 EMERGENCY RESPONSE

Many agencies share the responsibilities for dealing with accidents involving shipments of radioactive materials. A national radiological assistance plan has been developed for responding to real or suspected releases of radioactive material from a shipment in transit. For example, under this plan, the Federal Emergency Management Agency (FEMA) has the primary responsibility for emergency response planning for transportation accidents involving radioactive materials. Also at the federal level, the DOE will make available from its resources radiological advice and assistance to protect the public health and safety and to cope with radiological hazards. Federal support is also available from the Environmental Protection Agency (EPA), the Department of Health and Human Services through the Food and Drug Administration, the DOT, and the NRC.

The ultimate responsibility for emergency response planning generally lies with state and local governments. Most State and local governments have established emergency response plans. Local jurisdictions assume primary responsibility for emergency response planning because a member of a local law enforcement agency or fire department is likely to be the first responder to a transportation accident. It is the policy of DOE, upon request from State, Federal, or local authorities, NRC licensees, private organizations, or commercial carriers, to provide radiological assistance teams and training to state and local authorities. One such radiological assistance team operates out of the Hanford Site.

The FEMA has published "Guidance for Development of State and Local Radiological Emergency Response Plans and Preparedness" (FEMA 1983). This document details necessary components of emergency response plans, including institutional responsibilities and jurisdictions, accident characteristics and assessment, radiological exposure control, resources, communications, medical support, notification methods and procedures, emergency response training activities, and post-accident operations.

2.0 TRANSPORTATION IMPACT ANALYSIS

This section discusses the impacts of transporting decommissioning wastes from the LEHR Facility to low-level waste (LLW) disposal facilities located at the Hanford Site, Washington. The transportation impacts estimated in this section include radiological impacts of accidents, routine radiation doses, and nonradiological accident risks. Radiological impacts are addressed in terms of the projected radiological dose to the maximum exposed individuals. Nonradiological accident risks are presented in terms of the number of traffic accidents, fatalities, and injuries projected to result from the shipments from LEHR to Hanford.

The following subsections discuss the bases, assumptions, methods, and results of the transportation impact analysis. Separate subsections are provided for radiological and nonradiological impacts.

2.1 RADIOLOGICAL IMPACTS

This section discusses the radiological impacts to the maximum exposed individuals from accidents that may occur during transport of LEHR decommissioning wastes as well as the routine radiation doses. In routine (or incident-free) transport, the packages of radioactive wastes arrive at their destinations without releasing their contents. The accident analysis considers the potential release of radioactive materials from the package and its associated impacts on a hypothetical maximum exposed individual.

2.1.1 Bases, Assumptions, and Methodology

This analysis estimates the routine radiation doses and accident risks to exposed population groups associated with transporting LEHR decommissioning wastes to Hanford Site disposal facilities. In routine (i.e., incident-free) transport, the package of radioactive material arrives at its destination without releasing its contents. Routine radiation doses consider the direct external radiation dose emitted by the radioactive material package as the shipment passes by. Even though the shipping packages are provided with radiation shields, some radiation penetrates the package and exposes the nearby population to a low dose rate. After the shipment passes by, no further exposure occurs.

The population groups exposed to radiation include those exposed on a random basis and those exposed as a result of their occupation. Examples of occupationally exposed persons include truck crewmembers and persons who handle waste packages. The general public is the nonoccupationally exposed group, which includes bystanders at truck stops, persons living or working along a route, and nearby travelers (moving in the same and opposite directions). In general, the radiation doses received by the general public are largest for individuals that live adjacent to or near a highway over which all the radioactive material shipments will travel (e.g., person living near the point of origin or destination for the shipments may be present at the times each shipment passes).

Routine Dose Calculation Methodology

Routine radiological doses to individuals are a function of the strength of the radiation field that persons are exposed to and the duration of the exposure. The basic equation used to calculate these doses is:

$$DOSE = DR * T$$

where: DR = Dose rate, mrem/hr
T = Exposure duration, hr

The derivation of each of these parameters is described below.

The parameter DR represents the dose rate that an individual is exposed to. The dose rate is a function of the source strength (e.g., the number of Ci of each radionuclide in the shipment), the effectiveness of radiation shielding provided by intervening structures and air, and the distance between the receptor and the source. For this analysis, the dose rate field in the truck cab of a LEHR decommissioning waste shipment was assumed to be at the maximum level allowed by DOT regulations (i.e., 2 mrem/hr).

The exposure time for a truck crew member was calculated by dividing the shipping distance from LEHR to Hanford by the average speed the truck travels. The average speed for a truck shipment with a 2-person crew was given by Hostick, Lavender, and Wakeman (1992; p. 3.1) at about 73 km/hr (45 mph), including time spent at stops. The per-shipment travel time was then multiplied by the number of shipments to calculate the total exposure time for an individual truck crew member assuming this person is a crewmember for all of the LEHR waste shipments. The shipping distance, which was taken from Cashwell et al. (1986, p. 110), was broken down into distances traveled in rural, suburban, and urban areas. The distance from the Rancho Seco nuclear power plant to Hanford was used in this analysis because actual distances traveled in rural, suburban, and urban population zones were not available. Rancho Seco is located approximately 20 miles northeast of the LEHR Facility and would most likely use the same truck route to Hanford except for local route variations near the origin facilities. The local variations would consist of relatively short route segments necessary to gain access to the Interstate Highway system that would be used for the bulk of the shipment. The difference in shipping distances was estimated to be less than 50 km, which results in an approximately 4% shorter travel distance from Rancho Seco to Hanford than from LEHR to Hanford. This difference will result in insignificant differences in the routine doses calculated in Section 2.1.2, which are reported to 2 significant figures. The shipping distances used in this analysis were 1012 km in rural areas, 375 km in suburban areas, and 21 km in urban areas.

The equation that was used to calculate the maximum individual routine dose to a member of the public was taken from DOE (1986; p. A-19). This document indicates that a person located 30 m from the highway over which a truck shipment passes receives approximately

0.00283 mrem/shipment. This unit dose was calculated assuming that the passing shipping cask is emitting radiation at the maximum allowable level (i.e., 10 mrem/hr at 2 m from the vehicle; see Section 1.1). The dose rate at the specified distance and exposure duration have already been factored into this coefficient. No intervening shielding (e.g., structures) is assumed to be located between the shipment and the exposed individual. This value was multiplied by the total number of LEHR decommissioning waste shipments to estimate the maximum individual dose to a member of the public.

The equation above was used to calculate the radiation dose to a maximally-exposed individual that could potentially be in the vicinity of all of the LEHR shipments. A number of additional possibilities exist for individuals that could potentially be exposed during a single shipment and then not be exposed to another LEHR shipment. Dose calculations are presented by Sandquist et al. (1985) for several possible situations that may arise during a truck shipment, including:

- **Caravan**: Persons traveling in adjacent lanes in the same direction as the radioactive shipment
- **Traffic obstruction**: Passengers stopped in lanes adjacent to the shipment which has stopped due to a traffic obstruction
- **Residents and Pedestrians**: Slow transit through areas with residents or pedestrians; truck stops.
- **Truck servicing**: Refueling attendants; load inspection/enforcement; weight scales; and tire changes or repairs to trailers.

The bases for the calculations presented by Sandquist et al. (1985) are similar to this analysis in that the dose rates emitted by the shipments were assumed to be at the regulatory maximum levels (i.e., 10 mrem/hr at 2 m distance).

Accident Impact Methodology

The objective of the accident impact analysis is to calculate the radiation doses received by a maximally-exposed member of the public in the event of a severe transportation accident involving a LEHR shipment. This accident is assumed to involve a severe collision with another vehicle or highway structural member, such as an overpass support column. The initial collision is assumed to fail the fuel tank on the vehicle and result in a fire that further exacerbates the accident. The collision/fire sequence is assumed to fail the cargo and result in a release of the contained radioactivity to the environment. The released materials are then taken up by wind action and dispersed as a cloud of radioactive-contaminated materials.

The GENII system (Napier et al. 1988), also referred to as the Hanford Environmental Dosimetry System, was used to perform the radiation dose calculations for accidental releases

of radioactive materials from LEHR waste shipments. GENII is capable of calculating the following doses:

- Doses from acute releases, including options for annual dose, committed dose, and accumulated dose
- Doses from chronic releases, including options for annual dose, committed dose, and accumulated dose
- GENII evaluates the following exposure pathways; direct exposure via water, soil, and air as well as inhalation and ingestion pathways
- Acute and chronic elevated and ground-level releases to air
- Acute and chronic releases to water
- Initial contamination of soil or surfaces
- Radionuclide decay may be accounted for

The pathways analyzed for this EA included inhalation of radioactive materials entrained in the cloud of material released from the accident and borne by wind to the receptor, external exposures from material deposited on the ground, and ingestion of contaminated foods (including terrestrial foods such as fruits, vegetables, and cereals as well as animal products such as beef, milk, poultry and eggs).

GENII is composed of seven linked computer codes and their associated data libraries. The seven programs may be divided into three categories: user interfaces (interactive, menu-driven programs to assist the user); internal and external dose factor generators; and the environmental dosimetry programs. For more information, the reader is referred to Napier et al. (1988). Inputs to GENII that were used in the analysis of onsite and offsite doses from this accident are discussed in the following paragraphs.

The code requires the user to input the receptor location as well as the applicable atmospheric dispersion information for the site being analyzed. For this study, the atmospheric dispersion parameter, E/Q, which is used to calculate the concentrations of each released radionuclide at the specified receptor locations, was input to the computer code. It was assumed that the maximum individual receptor was located 100 m away from the accident. The atmospheric dispersion parameter was determined to be 2.0×10^{-2} sec/m^3 based on data given in NRC Regulatory Guide 1.3 (NRC 1974).

The hypothetical individual was assumed to be present for the entire length of time it takes for the cloud of dispersed material to pass. The individual is also assumed to reside near the accident and eat foods that are grown nearby. The foods are assumed to become contaminated with radioactive materials that deposit from the passing cloud onto the ground or on crops. This individual is assumed to ingest the contaminated crops as well as meat products (beef, milk, poultry, eggs) that may become contaminated through animals eating contaminated grass, hay, etc. Standard ingestion parameters were used, such as animal food consumption rates, vegetable and fruit growing times, and crop yields (Napier et al. 1988).

The following standard GENII data libraries were used in the radiological dose calculations:

- GENII Version 1.485 (12/3/90)
- GENII Default Parameter Values (3/28/90)
- RMDLIB - Radionuclide Master Library (11/15/90)
- External Dose Factor Library (5/8/90)
- Food Transfer Factor Library (RAP 29-Aug-88)
- Internal Dose Increment Library, PNL Case Solubilities, (12/3/90)

The final input parameters are the quantities of radioactive materials that are projected to be released from the shipping packages. Two cases were evaluated for this EA. The first is an accident involving a Type A shipment of decommissioning wastes and the second is an accident involving the Type B shipment for the Co-60 source. The quantities of radioactive material in each shipment type were derived from information provided by D. Mitchell (see Addendum 1 to this Appendix) which gave the quantities of each radionuclide that are projected to be removed from the LEHR Facility during the decommissioning campaign. The quantities per shipment were developed based on generation of approximately 175 m^3 (6,180 ft^3) of waste that will be transported in Type A shipments. Assuming that these wastes will be packaged in 208 ℓ (55-gal) drums, a total of approximately 840 drums will be shipped. A typical Type A shipment holds 45 55-gal drums so a total of about 20 Type A shipments are required. A total of one Co-60 shipment in a Type B package will be required. The total radionuclide quantities provided by Mitchell and the calculated per-shipment quantities are shown on Table 2.

The quantities of radioactive materials released from each accident type were derived as follows. For the Type A accident, Finely et al. (1988) states that, historically, 8.8% of the Type A packages have failed in accidents involving multiple-package shipments, such as the

LEHR decommissioning waste shipments (other than the Co-60 source). For this analysis, it was assumed that 25% of the packages in a single shipment will fail. It was assumed that 100% of the gaseous or liquid radionuclides (H-3 and C-14) would be released in a severe accident. For the particulates, a release fraction of 0.1 of the radioactive materials in the failed packages will be released in respirable form, as suggested by Finely et al. (1988). This fraction is believed to be reasonable given that the bulk of the decommissioning wastes are metals and other solid, nondispersible forms. Therefore, the total release fractions are 0.25 for gases and liquids and 0.025 for particulates.

Release fractions for the Type B shipments were taken from NUREG/CR-4829 (NRC 1987; p. 8-13). The release fraction given for cesium (2×10^{-4}) was used to represent the Co-60 release fraction for an accident with a frequency of about 1×10^{-6}/yr. This is conservative in that cesium is semi-volatile whereas cobalt is most likely to be released as a particle. The total release quantity for the Type B accident is the product of the total Co-60 inventory and the release fraction (120 Ci times 2×10^{-4} = 0.024 Ci).

TABLE 2. Radionuclide Quantities Associated with LEHR Decommissioning Wastes

Radionuclide	Total Quantity, Ci [a]	Per-Shipment Quantity, Ci[b]
TYPE A SHIPMENT		
Sr-90	5	2.5×10^{-1}
Ra-226	0.005	2.5×10^{-4}
H-3	0.005	2.5×10^{-4}
C-14	0.005	2.5×10^{-4}
Fe-59	0.001	5.0×10^{-5}
I-125	0.001	5.0×10^{-5}
I-129	0.001	5.0×10^{-5}
I-131	0.001	5.0×10^{-5}
V-48	0.001	5.0×10^{-5}
Pu-241	0.00005	2.5×10^{-6}
Th-228	0.001	5.0×10^{-5}
TYPE B SHIPMENT		
Co-60	120 [C]	120

(a) Information developed by D. Mitchell; see Addendum 1.
(b) Based on total of 20 Type A shipments and 1 Type B shipment.
(c) Decayed to 1990.

NUREG/CR-4829 focuses on irradiated fuel transportation safety. Although the quantities and types of radionuclides in an irradiated fuel shipment are significantly greater than the Co-60 source shipment, there are many similarities, including:

- The Co-60 source and irradiated fuels are both transported in Type B packages.
- Both irradiated fuels and Co-60 sources are pelletized forms.
- The Co-60 pellets are sealed within a stainless steel cylinder; irradiated fuel pellets are sealed within a zircalloy metal cylinder.

The Co-60 source is sealed within a second stainless steel cylinder for additional protection. Based on these observations, the release fractions presented in NUREG/CR-4829 are believed to be reasonable approximations for the Co-60 shipment.

2.1.2 Results of Radiological Impact Calculations

The results of the radiological accident impact calculations are presented in Table 3. As shown, the maximum individual radiation dose from the maximum credible accident involving the Co-60 source was estimated to be 0.36 rem effective dose equivalent (EDE). The controlling organ was the lower large intestine and the controlling pathway was ingestion of Co-60. The maximum individual dose from the Type A shipment accident was calculated to be 0.61 rem, primarily from ingestion of Sr-90. The controlling organ was bone surfaces.

TABLE 3. Results of Radiological Accident Impact Calculations

		Effective Dose Equivalent, Rem	
Dose Category	Pathway	Truck Crew	Public
Radiological Accident			
Type A Shipment	Inhalation	NA	1.2×10^{-2}
	Ingestion	NA	6.0×10^{-1}
	External	NA	1.2×10^{-5}
	Total	NA	6.1×10^{-1}
Type B (Co-60 source) Shipment	Inhalation	NA	3.2×10^{-2}
	Ingestion	NA	3.2×10^{-1}
	External	NA	1.3×10^{-2}
	Total	NA	3.6×10^{-1}
Radiological Routine			
All Shipments	External	1.6×10^{0}	6.0×10^{-5}

NA = Not applicable.

Note that the doses from the Type A accident were calculated to be higher than for the Type B accident, even though the radiological hazards of the Co-60 source are greater than those for the wastes in the Type A shipments. This is because the strength and durability of the Type B package are greater than the Type A package. This results in a higher probability of breaching containment of the Type A shipments than the Type B shipment. Therefore, the maximum credible accident fails a substantial fraction of the Type A packagings and has a relatively high release fraction relative to the maximum credible accident involving Type B packages.

The routine (incident-free) radiological doses to maximum-exposed truck crewmembers and the general public are presented in Table 4. The maximum individual dose to a truck crewmember was calculated by multiplying together the dose rate (2 mrem/hr), one-way shipping time, and the number of shipments. The shipping time, which was calculated by dividing the total shipping distance (1408 km) by the average trip speed (73 km/hr), was calculated to be about 19.3 hr. This results in a radiation dose of about 38.6 mrem/shipment. Assuming that this individual is a crewmember on all 21 shipments, the maximum individual dose to a truck crewman is about 0.8 rem. This dose is significantly smaller than the 5 rem/yr allowable radiation dose to workers specified in DOE Order 5480.11 (DOE 1989b).

The calculated dose to the truck crew member is considered conservative in that the dose rate in the truck cab was set at the maximum allowed by DOT regulations. This dose rate (2 mrem/hr) was also used to represent the dose rate at shipment stops. This tends to overstate the doses based on the observation that truck crewmembers would be in a much lower radiation field during stops because they are likely to leave the truck cab for meals, rest, etc. Calculations indicate that each shipment will take approximately 55 hr, including 19.3 hr to travel each direction plus about 8 hr to load the shipment at LEHR and 8 hr to unload the shipment at Hanford. Therefore, approximately 1146 hr is required to complete 21 shipments. Assuming that the shipping campaign will be completed in a 2-month period, a total of 1440 hr (2 months at 30 days/month at 24 hr/day) is available to complete the shipments. Therefore, it is conceivable that the shipments can be completed within 2 months by a single 2-person crew/vehicle combination. The maximum individual dose to a crewmember is therefore about 0.8 rem.

The maximum individual dose to a member of the public who resides 30 m from a highway in which all of the shipments pass by was calculated to be 0.06 mrem (6×10^{-5} rem). The one-time exposures shown in Table 4 range from about 0.1 to 5 mrem. These projected public exposures are only small fractions of the 100 mrem/yr maximum allowable routine dose to a member of the public that is given in DOE Order 5400.5 (DOE 1990). This may also be compared to the radiation dose from routinely encountered sources of radiation, such as cosmic background radiation, natural internal body radioactivity, medical and dental treatment X-rays, natural terrestrial radiation, and inhalation of radon. These sources of radiation contribute about 350 mrem/yr, on average, to each person in the United States (NCRP 1987). The additional 0.06 mrem to the maximum exposed member of the public from LEHR shipments is insignificant relative to the annual dose from other sources of radioactivity.

2.2 NONRADIOLOGICAL ACCIDENT RISKS

Nonradiological accident risks consist of injuries and fatalities that may result from traffic accidents involving the shipments of LEHR decommissioning wastes. These risks are in no way related to the radioactive nature of the waste materials being transported. In fact, the number of estimated injuries and fatalities would be the same even if the cargo were not

TABLE 4. Results of Radiological Incident-Free Impact Calculations[a]

Description (Service or Activity)	Distance to Cask, m	Exposure Time, min	Total Dose, rem
Resident or Pedestrians			
Person living adjacent to route exposed to all shipments	N/A	N/A	6×10^{-5}
Slow transit due to traffic control devices in residential areas	6	6	4×10^{-4}
Truck stop for drivers rest. Exposures to residents and passersby	40	480 (overnight)	3×10^{-3}
Slow transit through area with residents (homes, businesses, etc.)	15	6	1×10^{-4}
Caravan			
Passengers in stopped vehicles in lanes adjacent to the cask vehicle - stopped due to traffic obstruction	10	30	3×10^{-3}
Truck Servicing			
Refueling (100 gal. capacity)			
- 1 nozzle from 1 pump	7 (at tank)	40	2×10^{-3}
- 2 nozzles from 1 pump	7 (at tank)	20	1×10^{-3}
Load inspection/enforcement	3	12	2×10^{-3}
Tire change or repair to cask trailer	5	50	$.5 \times 10^{-3}$
State weight scales	5	2	2×10^{-4}

(a) Source: Sandquist et al. (1985), except for the first entry in the table which was calculated for this assessment.

radioactive materials. This section uses standard unit risk factors to estimate the nonradiological risks of transporting LEHR decommissioning wastes to Hanford Site, Washington, disposal facilities.

2.2.1 Assumptions, and Bases for Nonradiological Risk Estimates

The potential for accidents involving shipments of LEHR cleanup wastes is assumed to be comparable to that of general truck transport in the United States. Cashwell et al. (1986) used statistics compiled by the DOT (1985) to develop nonradiological risk factors. These risk factors, in units of fatalities- and injuries-per-km of travel, are multiplied by the total distance traveled by all of the waste shipments to calculate the expected number of nonradiological injuries and fatalities due to transportation of LEHR decommissioning wastes. These risk factors are shown in Table 5. As shown, separate unit risk factors are given for travel in rural, suburban, and urban population zones. The basic equation used to calculate the nonradiological accident risks (NR) is shown below:

$$NR = URF \times SD \times N$$

where: URF = unit risk factor; fatalities, injuries per km
SD = round-trip shipping distance, km
N = total number of shipments

The total number of traffic accidents involving these shipments were also estimated using a similar approach. The number of accidents was estimated using the truck accident rates in rural, suburban, and urban areas that are given by Finley et al. (1988). These rates, shown in Table 5, were multiplied by the total travel distances in these areas, as described above for developing estimates of nonradiological fatalities and injuries.

2.2.2 Results of Nonradiological Accident Risk Calculations

The estimated number of traffic accidents and the total estimated fatalities and injuries for the LEHR decommissioning waste shipping campaign are shown in Table 6. As shown, the projected number of traffic accidents for LEHR waste shipments were estimated to be about 0.03 accidents (i.e., the probability that at least one accident occurs is approximately 1 in 33). The total nonradiological occupational fatalities were about 4×10^{-4} (probability of one in 2500 that at least one fatality occurs) and the total occupational injuries were about 7×10^{-4} (probability of one in 1400). Public nonradiological impacts were estimated to be about 1×10^{-3} fatalities (one chance in 1000) and 2×10^{-2} injuries (one chance in 50) over the entire LEHR shipping campaign. These estimates include the contributions from both Type A and Type B (Co-60 source) shipments. In no cases were there any excess fatalities estimated to occur as a result of transporting LEHR decommissioning wastes to Hanford.

TABLE 5. Nonradiological Unit Risk Factors for All Waste Types[a]

Population Zone	Affected Group	Unit Risk Factor, per-km[a]
Rural	Occupational	1.5×10^{-8} fatalities
		2.8×10^{-8} injuries
	Nonoccupational	5.3×10^{-8} fatalities
		8.0×10^{-7} injuries
	Not Applicable	1.4×10^{-7} accidents
Suburban	Occupational	3.7×10^{-9} fatalities
		1.3×10^{-8} injuries
	Nonoccupational	1.3×10^{-8} fatalities
		3.8×10^{-7} injuries
	Not Applicable	1.4×10^{-7} accidents
Urban	Occupational	2.1×10^{-9} fatalities
		1.3×10^{-8} injuries
	Nonoccupational	7.5×10^{-9} fatalities
		3.7×10^{-7} injuries
	Not Applicable	1.6×10^{-5} accidents

(a) Source: Cashwell et al. (1986) for the fatality and injury rates and Finley et al. (1988) for the accident rates.

TABLE 6. Projected Nonradiological Accidents, Fatalities, and Injuries for LEHR Waste Shipping Campaign

	Projected Fatalities	Projected Injuries
Truck Crew	3.5E-04	7.0E-04
Public	1.2E-03	2.0E-02
No. of Accidents	3.2E-02	

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ADDENDUM 1
APPENDIX A

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December 7, 1990

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Re: Estimates of Nuclide and Activity Amount left at LEHR

The following table lists the nuclides and associated activities that were once used and may still exist in one form or another at LEHR. Some if not all of these nuclide were stored or used in AH-1, AH-2, Cobalt 60 building, Imhoff, and/or specimen storage.

Nuclide	Primary Form	Estimated* Maximum Activity
Sr-90	Unsealed	5 Ci
Ra-226 and decay chain products and including Pb-210 all in equilibrium	Unsealed	5 mCi
H-3	Unsealed	5 mCi
C-14	Unsealed	5 mCi
Fe-59**	Unsealed	(1)
I-131**	Unsealed	(1)
I-125**	Unsealed	(1)
I-129	Unsealed	(1)
Vn-48**	Unsealed	(1)
Pu-241	Unsealed	50 μCi
Th-228	Unsealed	(1)
Co-60	1 sealed source	390 Ci - 1982 (120 Ci 1990)

* Most values are only estimates, a more detailed file and record search would have be performed and personal interviews conducted of those who worked at the site.

** These nuclides have relatively short half-lives

(1) Millicurie levels at most

There may have been other nuclides used on-site, but a more thorough record search would have to be performed.

I hope this helps.

Sincerely

Dawn Mitchell
Project Health Physicist

dm/la

cc: Steve Eckberg
Dick Bateman
Salem Attiga

File: Waste Correspondence

dm8/tenra.dm

Certificate Of Measurement

OF

COBALT 60 SOURCES

FOR

CUSTOMER	UC Lawrence Berkeley Lab., Berkeley, California
AECL ORDER NO.	P&S 42414 CUSTOMER ORDER NO. 3344106
DESCRIPTION	As per customer capsules no. HCD-69933A, serial number 934.
MEASUREMENT	Source End Output
	Curie output 349 (Content 388 curies)
	Roentgens per hour at one metre 454
DATE OF MEASUREMENT	April 22, 1982
NOTES	Quality Control Specification QM2 was used, for which notes 1, 2, 3, 4, 7 & 8 apply (see reverse). Values of 1.30 $Rm^2h^{-1}Ci^{-1}$ of cobalt 60, and half-life 5.261 years have been used.
ACCURACY	The absolute accuracy of the measured output is $\pm 5\%$ (3σ). No error in the conversion to curies content has been assumed.

ISSUED 1982 April 30

S.D. Booth Quality Control

ATOMIC ENERGY OF CANADA LIMITED, COMMERCIAL PRODUCTS,
OTTAWA, CANADA

QUALITY CONTROL SPECIFICATION QA3-2

TITLE: CHEMICAL DOSIMETRY

The absorbed gamma radiation dose rate was measured by Fricke dosimetry (ASTM D1671-63) which is calibrated spectrophotometrically with acidified ferric sulphate at a constant temperature.

QUALITY CONTROL SPECIFICATION QM2 (DG 0295)

TITLE: CAVITY ION CHAMBER.

The photon exposure rate was measured with a cavity ionization chamber which has been calibrated in a cobalt 60 exposure rate certified by the National Research Council of Canada.

QUALITY CONTROL SPECIFICATION QM6

TITLE: NEUTRON MEASUREMENT.

The neutron output was compared to that from a radium: beryllium neutron standard which has been certified by the National Research Council of Canada. A boron trifluoride gas counter in a wax moderator was used.

NOTES:

1. CHAMBER CALIBRATION. All ion chamber calibrations are based on graphite walled ionization chamber measurements of the photon emissions from cobalt 60, and are consistent with the internationally agreed output from radium of 0.825 roentgens per hour at one metre from 1 gram in 0.5 mm platinum.
2. COMPARATIVE MEASUREMENTS. In all comparative measurements identical geometry is used for the source and standard and a standard of similar output to the source is chosen.
3. DISTANCE. All quotations of gamma output are corrected by inverse square law to 1 metre from the reference point on the source. The measurement distance used is large compared to the longest dimension of source or detector.
4. SCATTER. All quotations of photon exposure rate and corresponding curie values have been corrected for the contribution to the reading by the scatter radiation inherent in the measurement position, unless otherwise stated.
5. RADIUM. Sources sealed less than 30 days prior to measurement and which are not at equilibrium are measured several times during the growth period and the maximum value of the output and content extrapolated to the equilibrium value.
6. NEUTRON SOURCES. Note 5 applies to sources of radium: beryllium. The neutron output is also extrapolated to the equilibrium value.
7. THE CURIE. Curie content values have been corrected for self absorption of the photon exposure rate by the source and its encapsulation. Curie effective values are the product of this corrected exposure rate and the appropriate specific gamma ray emission for the isotope.
8. SI UNITS. The curie or rad quantities shown on this certificate may be converted to the special S.I. units, becquerel (Bq) and gray (Gy) using the following factors:

   for activity: 1 curie = 37 gigabecquerels (GBq)
   for absorbed dose: 1 rad = 10 milligrays (mGy)

APPENDIX B

STATE COMMENTS

AND

U.S. DEPARTMENT OF ENERGY RESOLUTIONS

STATE OF CALIFORNIA
ENVIRONMENTAL MANAGEMENT BRANCH COMMENTS

AND

U.S. DEPARTMENT OF ENERGY RESOLUTIONS

STATE OF CALIFORNIA—HEALTH AND WELFARE AGENCY PETE WILSON, *Governor*

DEPARTMENT OF HEALTH SERVICES
714/744 P STREET
P.O. BOX 942732
SACRAMENTO, CA 94234-7320
(916)445-0498

August 27, 1992

Don Williams-EM-443
Department of Energy
Office of Environmental Restoration
Washington, D.C. 20585

RE: Environmental Assessment for the Decommissioning and Decontamination of Contaminated Facilities at LEHR, University of California, Davis, SCH #92074021

Dear Mr. Williams:

Enclosed are the Environmental Management Branch's comments regarding the above referenced document.

These comments are submitted as part of the State's participation in the Agreement In Principle between the Department of Energy and the State of California. This review by the Environmental Management Branch will not constitute a determination by the State of California Department of Health Services that the level to which the contamination is to be reduced will eliminate the hazard to public health (Health & Safety Code, Division 20, Chapter 7.6, Article 13).

Also enclosed is a response to our comments prepared by the DOE field office. We have reviewed these responses with DOE staff and have no further comments.

If you have any questions I can be reached at (916) 323-3019, or call Gary Butner at (916) 323-5027.

Sincerely,

Don J. Woneldorf, Chief
Environmental Management Branch

Enclosures

cc: Ed Ballard, DOE
Salem Attiga, Project Mgr.
Roger Liddle, DOE
John J. Adams, Jr., SWRCB
Ed Bailey, RHB

Environmental Management Branch Comments on Environmental Assessment (EA) for the Decommissioning and Decontamination of Contaminated Facilities at LEHR

1. Section 1.1, Page 1-2

The proposed action includes the decontamination and decommissioning (D&D) of "plumbing" in the animal hospitals and Cobalt 60 buildings. It is assumed that floor drain lines leading to a waste storage tank would be considered part of the building's "plumbing".

Section 3.0 does not discuss the current status of the drain lines buried under the animal hospitals, or any characterization of the soil surrounding these drain lines that would be required.

Page 8-4 states that "During D&D activities, asbestos may be encountered while accessing radiologically contaminated material, such as drain pipes." This implies that drain pipes from the buildings leading to the Imhoff Building or radium tanks would be D&D'ed since their level of radiological contamination will be characterized during this proposed action.

On Page 8-6, Section 8.3.10 states that there would be no water quality impact from the proposed action. This is not necessarily true if contaminated, leaking drain lines are left in the ground and not remediated.

If it is planned to leave the buried drain lines to a future NEPA analysis, then it should be clearly stated. An explanation should also be provided on how the buildings will be released to U.C. Davis without including the contaminated drain lines. If U.C. Davis takes control of the building with contaminated drain lines, it may need to be added to their California State radioactive materials license. This should be discussed with the Radiologic Health Branch in the Department of Health Services.

2. Page 4-2

DOE Order 5400.5 (Figure IV-1) does not specify acceptable contamination levels for transuranics, Ra-226, Ra-228, et al., however, Table 4-1 of the EA provides some contamination values. The heading on Table 4-1 incorrectly indicates that all the surface contamination levels are from DOE Order 5400.5. There is no discussion as to why these levels are

2. Page 4-2 (cont.)

acceptable to DOE. A note on this table indicates that US NRC Regulatory Guide 1.86 values were used with the phrase "...plus ALARA." Does "plus ALARA" mean that if residual contamination levels exceed the values on Table 4-1 for transuranics then the exceeded levels will be evaluated using ALARA? If so, the criteria for this ALARA evaluation should be specified in detail so that in the future when people occupy the buildings, their health and safety will not be questioned.

DOE Order 5400.5 also specifies that maximum dose rates from beta-gamma emitters should not exceed 0.2 and 1.0 mrad/hr, respectively, at 1 cm. The EA does not discuss that these types of measurements will be made in the buildings after D&D.

3. Page 4-5

A discussion of how to deal with mixed waste is not provided. On Page 4-5 and 5-1, it is clear that radioactively contaminated asbestos could be encountered. On Page 5-2 it states that "Contaminated waste generated from the proposed actions would be temporarily stored at the waste staging facilities . . ." Has a special exemption from the EPA's mixed waste land ban regulations been approved for the storage of mixed waste at LEHR?

4. Page 4-2

On this page it states, " The residual contamination of the buildings would be reduced to levels consistent with use of the facilities without radiological restriction (See Refs. 2 and 3)." Reference 3 refers to the DHS document Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use (Decon-1). It should be understood that Decon-1 is a **guideline** for use by the Department of Health Services in determining if residual contamination levels are acceptable.

5. Page 5-1

On this page it states that "Wastes that are not radioactively contaminated would be so certified by the Project Health Physics staff. . ." and possibly disposed of at local landfills. Certification by the Project Health Physics staff would not override the requirements of the California Department of Health Services nor operators of sanitary landfills.

6. Page 8-2 and Page 10-2

A member of the Environmental Management Branch staff (Penny McLay, misspelled as Penny McLain) was referenced as being contacted about the preparation of this EA. To her recollection there was no contact, formal or otherwise, about this document and therefore it is inappropriate to use her name in this document. For clarification, it is under the scope of the AIP for staff to facilitate DOE activities, and if called upon, AIP staff would have provided assistance on radiological issues.

7. Page 8-10

In Section 8.3.18, Accident Risk, there was no discussion of tank trailer accidents or loss of control of the cobalt 60 source during transfer. The accident scenarios discussed appear to be limited to accidents associated with D&D of buildings.

8. Last Page, Certificate of Measurement

This certificate is attached to the EA but it is not referenced in the document. In addition, based on the curie content listed and the date of measurement, the curie content of the cobalt 60 source would be much less than the 120 curies (as of 1990) mentioned in the text. Is this the right certificate for the source currently in possession?

9. What specific model of Type B shipping container will be used for the cobalt 60 device shipment? It is important to identify a specific Type B container approved for this device. If an approved container is not available, then the cobalt 60 source may have to be removed from the device housing prior to shipment, thereby affecting what has been stated in the EA.

10. Page 3-1

Page 3-1 specifies that AH-1 was used for strontium 90 work and then goes on to specify alpha contamination levels up to 10,000 dpm/100 cm^2. Since strontium 90 is not an alpha emitter, this section should specify the alpha emitters used in AH-1 and AH-2.

11. The EA should specify the reasons for the temporal order of decontamination work as outlined on Pages 4-4 through 4-6. Why has the tank trailer removal been chosen as the last action to be completed? A practical approach to environmental mitigation is removal of sources that have the greatest

11. (cont.)

potential for release of contaminants to the environment. Therefore, shouldn't the tank trailer and drain lines be D&D'ed prior to the buildings?

12. Transportation Impact Analysis Appendix

Addendum 1 contains a letter addressing the estimated maximum activities that were once used at LEHR. The transportation impact analysis was prepared using the values in this letter. The letter states:

> "Most values are only estimates, a more detailed file and record search would have be performed and personal interviews conducted of those who worked at the site."

and;

> "There may have been other nuclides used on-site, but a more thorough record search would have to be performed."

These statements indicate that the transportation impact analysis has been based on incomplete information. A more accurate determination should have been made as to the curie content remaining in the buildings with confirmation through actual field measurements.

In addition, the listing of estimated maximum activity in this addendum appears to be a listing of maximum possession limits that were allowed at any one time, and not necessarily the maximum accumulation of these nuclides in the buildings.

THE U.S. DEPARTMENT OF ENERGY
SAN FRANCISCO FIELD OFFICE
LABORATORY FOR ENERGY-RELATED HEALTH RESEARCH (LEHR)
UNIVERSITY OF CALIFORNIA, DAVIS

RESOLUTION OF COMMENTS FROM THE STATE OF CALIFORNIA ENVIRONMENTAL MANAGEMENT BRANCH ON ENVIRONMENTAL ASSESSMENT (EA) FOR DECOMMISSIONING AND DECONTAMINATING OF CONTAMINATED FACILITIES

Comment No. 01

Section 1.1, Page 1-2

The proposed action includes the decontamination and decommissioning (D&D) of "plumbing" in the animal hospitals and Cobalt 60 buildings. It is assumed that floor drain lines leading to a waste storage tank would be considered part of the building's "plumbing".

Section 3.0 does not discuss the current status of the drain lines buried under the animal hospitals, or any characterization of the soil surrounding these drain lines that would be required.

Page 8-4 states that "During D&D activities, asbestos may be encountered while accessing radiologically contaminated materials, such as drain pipes." This implies that drain pipes from the buildings leading to the Imhoff building or radium tanks would be D&D'ed since their level of radiological contamination will be characterized during this proposed action.

On Page 8-6, Section 8.3.10 states that there would be no water quality impact from the proposed action. This is not necessarily true if contaminated, leaking drain lines are left in the ground and not remediated.

If it is planned to leave the buried drain lines to a future NEPA analysis, then it should be clearly stated. An explanation should also be provided on how the buildings will be released to UC Davis without including the contaminated drain lines. If UC Davis takes control of the building with contaminated drain lines, it may need to be added to their California State radioactive materials license. This should be discussed with the Radiologic Health Branch in the Department of Health Services.

Response

Contaminated drain lines in Building AH-1 and AH-2 were identified as part of the radiological characterization completed in 1991. This characterization consisted of opening each drain within the buildings and inserting a radiation detector and obtaining residue samples. Inspection and sampling of the drain opening indicated all lines were

dry and residual activity "fixed" to the inside surfaces of the drain piping.

The D&D includes removal of all floor and cage drains within the two buildings. This will be done by removing the concrete and excavating the soil to expose the lines beneath the building floor slabs to a distance not greater than 4 feet beyond the building wall line. Any contaminated soil within the buildings found to exceed DOE 5400.5 limits for soil will be removed as part of the drain line removal and disposed of at Hanford Site. The exposed pipe ends leading to the Imhoff and radium tanks will be capped. These lines will be characterized and remediated as necessary and will be addressed in a future NEPA document. No radioactive drain lines will be left in Building AH-1 and AH-2 and building will not be released to UC Davis until all contamination is reduced below DOE 5400.5 action level. Since no liquid is expected to be generated from the D&D activities, the proposed action will not impact groundwater quality.

Comment No. 02

Page 4-3, Table 4-1

DOE Order 5400.5 (Fig. IV-1) does not specify acceptable contamination levels for transuranics, Ra-226, Ra-228, et al., however Table 4-1 incorrectly indicates that all surface contamination levels are from DOE Order 5400.5. There is no discussion as to why these levels are acceptable to DOE.

A note on this table indicates that US NRC Regulatory Guide 1.86 values were used with the phrase "...plus ALARA." Does "plus ALARA" mean that if residual contamination levels exceed the values on Table 4-1 for transuranics then the exceeded levels will be evaluated using ALARA? If so, the criteria for this ALARA evaluation should be specified in detail so that in the future when people occupy the buildings, their health and safety will not be questioned.

DOE Order 5400.5 also specifies that maximum dose rates from beta-gamma emitters should not exceed 0.2 and 1.0 mrad/hr, respectively, at 1 cm. The EA does not discuss that these types of measurements will be made in the buildings after D&D.

Response

DOE adopted NRC regulatory guide 1.86 limits for acceptable contamination levels for transuranics, Ra-226, Ra-228, et al. Table 4-1 of the EA document includes NRC 1.86 limits for these isotopes.

The values provided in Table 4-1 of the EA are used as decontamination objectives of the D&D. Surfaces must be at or below these levels before they can be designated as releasable for unrestricted use. The concept of ALARA is applied during the decontamination efforts for removing residual surface activity below the Table 4-1 limits where practicable and cost effective.

DOE Order 5400.5 specifies that average and maximum dose rates from beta-gamma

emitters should not exceed o.2 and 1.0 mrad/hr, respectively at 1 cm. This criteria is applicable to conditions where residual surface activity is below the guidelines but sub-surface activity remains. As stated in Section 7 of the EA, clean-up will be verified by an independent contractor. Verification will include meeting Table 4-1 limits, including the 0.2 and 1.0 mrad/hr limits for beta-gamma emitters.

Comment No. 03

Page 4-5

A discussion of how to deal with mixed waste is not provided. On Page 4-5 and 5-1, it is clear that radioactively contaminated asbestos could be encountered. On Page 5-2, it states that "Contaminated waste generated from the proposed actions would be temporarily stored at the waste staging facilities..." Has a special exemption from the EPA's mixed waste land ban regulations been approved for the storage of mixed waste at LEHR?

Response

Presently, the US EPA does not classify radioactively contaminated asbestos waste as a mixed waste. Also, the State of Washington and the Hanford Site allow disposal of this type of waste as a low-level radioactive waste. As such, no special exemption from the EPA's mixed waste land ban regulations is required. If present requirements change in the future, we will deal with the situation and ensure compliance with any new requirements.

Comment No. 04

Page 4-2 On this page it states, "The residual contamination of the buildings would be reduced to levels consistent with use of the facilities without radiological restriction (See Refs. 2 and 3)." Reference 3 refers to the DHS document Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use (Decon-1). It should be understood that Decon-1 is a guideline for use by the Department of Health Services in determining if residual contamination levels are acceptable.

Response

We recognize that Decon-1 is a guideline. The surface contamination guidelines for unrestricted release in DOE Order 5400.5, NRC Reg Guide 1.86 and ANSI Standard N13.12 (draft) are all similar in value to the State of California guidelines in Decon-1 and are used as decontamination objectives in all radiological decommissioning projects.

Comment No. 05

Page 5-1

On this page it states that "Wastes that are not radioactively contaminated would be so

certified by the Project Health Physics staff..." and possibly disposed of at local landfills. Certification by the Project Health Physics staff would not override the requirements of the California Department of Health Services nor operators of sanitary landfills.

Response

Certification by the Project Health Physics staff is the first step in a long process to verify and dispose of non-contaminated waste. California DHS and the landfill operator requirements will have to be met prior to waste disposal. As an additional note, the plan is to minimize the generation of all waste including non-contaminated waste. Most of the non-contaminated waste will be used as a backfill material after drain pipes are removed.

Comment No. 06

Page 8-2 and 10-2

A member of the Environmental Management Branch staff (Penny McLay, misspelled as Penny McLain) was referenced as being contacted about the preparation of this EA. To her recollection there was no contact, formal or otherwise, about this document and therefore it is inappropriate to use her name on this document. For clarification, it is under the scope of the AIP for staff to facilitate DOE activities, and if called upon, AIP staff would have provided assistance on radiological issues.

Response

We apologize for misspelling Ms. Penny McLay's name. We intended to contact Penny to verify our statement in Section 2.8 of the EA (Public Health and Safety). Agency contact is a NEPA requirement. Later, we contacted Mr. Don Bunn instead but inadvertently left Penny's name on the list along with Don Bunn's name.

Comment No. 07

Page 8-10

In Section 8.3.18, Accident Risk, there was no discussion of tank trailer accidents or loss of control of the Cobalt 60 source during transfer. The accident scenarios discussed appear to be limited to accidents associated with D&D of buildings.

Response

As stated in the EA, the tank trailer will not be transported as is to Hanford but will either be decontaminated on-site and scrapped, or cut into pieces, packaged and shipped to Hanford Site for disposal. The 250 gallon radioactive liquid content will be discharged from the trailer into a proper container and solidified, properly packaged and shipped to Hanford for disposal. This work will be performed in a diked area with an imperious liner system to contain any accidental spills (see Page 5-2 of the EA). Also, as stated in Page 6-1 of the EA, the tank trailer work area will be ground covered, isolated, enclosed and

maintained under negative pressure to minimize any airborne release of any radioactive particulates during tank decontamination.

Loss of control of the Co-60 source during transfer is addressed in the activity emergency response plan. In this plan, the worst case accident scenario was used and the exposure rates were calculated. The accident response plan consisting of 1) prevention, 2) preparation, 3) initial response, and 4) recovery is being prepared and will be in place prior to start up of source removal.

Comment No. 08

Last page, Certificate of Measurement

This certificate is attached to the EA but it is not referenced in the document. In addition, based on the curie content listed and the date of measurement, the curie content of the cobalt 60 source would be much less than the 120 curies (as of 1990) mentioned in the text. Is this the right certificate for the source currently in possession?

Response

At the time of the EA preparation, the Co-60 source activity was about 120 Ci. The certificate of measurement attached to the EA represents activity in 1969. The source was reloaded in April 1982 and another certificate of measurement was issued (see attachment). The curie content in 1982 was 388. The source activity is anticipated to be about 89 Ci at the time of removal (September 1992).

Comment No. 09

What specific model of Type B shipping container will be used for the cobalt 60 device shipment? It is important to identify a specific Type B container approved for this device. If an approved container is not available, then the cobalt 60 source may have to be removed from the device prior to shipment, thereby affecting what has been stated in the EA.

Response

The shipping container to be used for the cobalt source/housing transport is the Nupak 10-142B Type B Cask, by NRC Certification of Compliance No. 9208, provided by Pacific Nuclear. For more Type B Cask description, see Table 1 of the Appendix. It should be noted that the source housing will not be removed from the top of the building until a proper Type B container is available on-site.

Comment No. 10

Page 3-1 specifies that AH-1 was used for strontium 90 work and then goes on to specify alpha contamination levels up to 10,000 dpm/100cm^2. Since strontium 90 is not an alpha emitter, this section should specify the alpha emitters used in AH-1 and AH-2.

Response

The primary alpha emitter found in Building AH-1 is thorium-228 in Rooms 209 and 219. Also, trace amounts of plutonium-241 were identified in the cage drains in Room 209. Radium-226 was identified in the freezer, Room 203B. The only alpha emitter identified in Building AH-2 is radium-226.

Comment No. 11

The EA should specify the reasons for the temporal order of decontamination work as outlined on Pages 4-4 through 4-6. Why has the tank trailer removal been chosen as the last action to be completed? A practical approach to environmental mitigation is removal of sources that have the greatest potential for release of contaminants to the environment. Therefore, shouldn't the tank trailer and drain lines be D&D'ed prior to the buildings?

Response

The order for the D&D tasks at the LEHR Site have, in fact, been determined by an approximate risk of environmental contamination. The first source removed was the contaminated biological samples stored in the freezers of Building AH-1. Failure of the freezer compressors was determined to have the highest risk, e.g., the product of failure probability and release potential. Next, the sludge in the septic tanks because of the liquid form and activity level (≈300 mCi of ^{90}Sr) were removed. The priority for this action was based on release potential in the event of an earthquake. The largest source on-site, the cobalt-60 irradiator, is sealed in a heavily shielded housing but causes significant community concerns. Removal of this source is the next planned removal task. With removal of the cobalt source, the largest source of residual radioactivity remaining on-site is the contamination in AH-1 and AH-2, estimated to total 12-15 mCi. The greatest risk posed by this source, left unattended, is a fire that would destroy the buildings, potentially releasing a significant fraction of that source. Removal of this activity is planned to start concurrent with the cobalt 60 removal. In addition, socio-economic benefit and DOE obligation to the University necessitates initiation of building D&D in 1992.

The tank trailer is inspected weekly and does no present a great risk in case of fire or earthquake. DOE often reprioritizes project activities based on risk analyses and other factors including public and regulatory agencies comments. It should be noted that the tank trailer D&D is only less than a year behind AH-1 and AH-2 building D&D.

Comment No. 12

Transportation Impact Analysis Appendix

Addendum 1 contains a letter addressing the estimated maximum activities that were once used at LEHR. The transportation impact analysis was prepared using the values in this letter. The letter states:

> "Most values are only estimates, a more detailed file and record search would have

to be performed and personal interviews conducted of those who worked at the site."

and;

"There may have been other nuclides used on-site, but a more thorough record search would have to be performed."

These statements indicate that the transportation impact analysis has been based on incomplete information. A more accurate determination should have been made as to the curie content remaining in the buildings with confirmation through actual field measurements.

In addition, the listing of estimated maximum activity in this addendum appears to be a listing of maximum possession limits that were allowed at any one time, and not necessarily the maximum accumulation of these nuclides in the buildings.

Response

Curie activity data contained in Addendum 1 represents the total maximum activity used at LEHR during the DOE funded research project and not the maximum possession limits allowed at any time. Large portions of these activities were removed from the site after the completion of the biowaste and sludge shipment to the Hanford Site. Based on the characterization activities in AH-1 and AH-2, completed in 1991, the estimates of total activity in these two buildings are:

strontium-90	11 mCi
radium-226	0.5 mCi
thorium-228	32 μCi
plutonium-241	0.1 μCi
carbon-14	11 μCi
tritium	11 μCi

In summary, data input to the transportation risk analysis represents the worst case scenario, and any qualifications presented in Addendum 1 would not change this conclusion.

d:\wp\sa\eacom

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY COMMENTS

AND

U.S. DEPARTMENT OF ENERGY RESOLUTIONS

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

Mail Stop PV-11 • Olympia, Washington 98504-8711 • (206) 459-6000

May 14, 1992

Mr. Leo P. Duffy
Assistant Secretary for Environmental
Restoration and Waste Management
U.S. Department of Energy
1000 Independence Avenue
Washington D.C. 20585

Dear Mr. Duffy:

Thank you for the opportunity to review and comment on the Department of Energy's Environmental Assessment for the "Decommissioning and Decontamination of the Laboratory for Energy-Related Health Research Facility at the University of California, Davis. The Nuclear and Mixed Waste Management Program staff have completed review of the document and would like to offer the following comments:

1. We note there is an extensive evaluation in the Environmental Assessment (EA) of impacts at the University of California, Davis site, however, there is no discussion of disposal impacts at the Hanford site in Washington. Without a more extensive assessment of the proposed activities at Hanford, it is difficult to measure the impacts.

2. The EA lacks information regarding the composition of waste to be disposed at Hanford. We are concerned about this omission in light of the proposal to dispose of asbestos and uncharacterized tank waste.

   Washington State Dangerous Waste Regulations require all wastes to be properly designated prior to disposal. In addition, the Dangerous Waste Regulations exempt asbestos only if the asbestos is handled in accordance with the Environmental Protection Agency's Toxic Substance Control Act (TSCA) regulations. There is no mention of how either waste material will be handled and TSCA regulations are not listed in the table of applicable regulations under this EA.

3. In section 4.1.3, the Department of Energy proposes to decommission and decontaminate buildings and the tank trailer. They do not believe hazardous wastes are present in these buildings, however, "if hazardous wastes are encountered, they will be disposed of in accordance with the Resource Conservation and Recovery Act (RCRA)." It is unclear in the EA where the decontamination process will take place, in California or Washington. In addition, there is no mention of applicable state regulatory requirements for the management of hazardous waste.

4. Section 4.1.3.3 states the tank tailer will either be decontaminated on-site (in California) or dismantled, packaged, and shipped to Hanford for disposal. There is no discussion of the contents of the tank waste and no mention of Washington State requirements for decontamination and waste designation.

Prior to issuance of a final determination, we request the Department of Energy resolve our concerns and address the potential impacts the decommissioning and decontamination of the laboratory may have at Hanford. In addition, disposal of this waste at Hanford may require further consideration under the Washington State Environmental Policy Act.

If you have any questions, please feel free to call me at (206) 438-7020.

Sincerely,

Roger Stanley
Program Manager
Nuclear and Mixed Waste Management

RS:md

cc: Dave Jansen, Section Manager, Department of Ecology - NMWMP
Joe Stohr, Section Manager, Department of Ecology - NMWMP
Barbara Ritchie, Supervisor, Ecology - Central Programs

Department of Energy
Washington, DC 20585

JUN 17 1992

Mr. Roger Stanley
Program Manager
Nuclear and Mixed Waste Management
State of Washington Department of Ecology
Olympia, Washington 98504-8711

Dear Mr. Stanley:

Thank you for your letter of May 14, 1992, transmitting comments on the Environmental Assessment (EA) for the Decontamination and Decommissioning (D&D) of Contaminated Facilities at the Laboratory for Energy-Related Health Research (LEHR), University of California, Davis. Mr. Leo Duffy has asked me to respond to your comments since I direct the organization for cleanup of Department of Energy sites located in the Northwestern Area.

Responses to your comments follow in the order they were presented in your letter.

1. As stated in the EA, the total volume of low-level radioactive waste is estimated to be approximately 8000 cubic feet. Except for the Cobalt-60 source (approximately 120 curies), the D&D waste will have less than 0.5 curies total. This waste volume and activity is expected to have little impact on the Department of Energy (DOE) Hanford site. Impacts of waste disposal at Hanford have been addressed in an Environmental Impact Statement for waste management operations (EA Reference 11) which covers receipt of waste from all DOE facilities.

2. Prior to D&D activities and as part of the packaging process for shipment, all waste will be characterized to provide the information necessary to obtain a Storage/Disposal Approval Record from Westinghouse Hanford Corporation for disposal. Washington State Dangerous Waste Classification requirements will be followed for the planned characterization. DOE plans to ship asbestos waste to Hanford if it contains low-level radioactivity, and any such waste will be handled in accordance with Washington State requirements and requirements of the Toxic Substance Control Act.

3. All treatment activities to decontaminate waste will be conducted on site at LEHR. Any hazardous waste that is generated will be segregated and sent to a licensed facility in California for disposal according to applicable Federal and State regulations and requirements.

4. The tank waste will be removed prior to tank dismantlement and fully characterized and classified per all applicable Federal and State regulations. Characterization and designation will be conducted in California. If the result of characterization indicates the waste contains low-level radioactivity, waste disposal will be at Hanford, otherwise the waste will be disposed at a licensed facility in California.

Your comments will be incorporated in the final Environmental Assessment and a copy will be provided to you when issued. If you have any questions concerning our response, please call Mr. Don Williams of my staff at (301) 903-8173.

Sincerely,

Sally A. Mann

Sally A. Mann, Ph.D.
Director
Office of Northwestern Area Programs
Environmental Restoration

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Mail Stop PV-11 • Olympia, Washington 98504-8711 • (206) 459-6000

May 15, 1992

Mr. Leo P. Duffy
U.S. Dept. of Energy
Environmental Restoration and
Waste Management
Washington DC 20585

Dear Mr. Duffy:

Thank you for the opportunity to review the environmental assessment (EA) for the decontamination and decommissioning of selected areas at the Laboratory for Energy-Related Health Research. We reviewed the EA and have the following comments.

The generator and transporter must comply with all applicable hazardous waste regulations and laws as well as low level waste regulations.

If you have any questions, please call Ms. Donna Smith with the Central Regional Office at (509) 575-2012.

Sincerely,

M Vernice Santee

M. Vernice Santee
Environmental Review Section

MVS:
92-2733

cc: Donna Smith, CRO

Department of Energy
Washington, DC 20585

JUN 17 1992

Ms. M. Vernice Santee
State of Washington
Department of Ecology
Environmental Review Section
Mail Stop PV-11
Olympia, Washington 98504-8711

Dear Ms. Santee:

Thank you for your letter of May 15, 1992, transmitting comments on the Environmental Assessment (EA) for the Decontamination and Decommissioning (D&D) of Contaminated Facilities at the Laboratory for Energy-Related Health Research (LEHR), University of California, Davis. Mr. Leo Duffy has asked me to respond to your comments since I direct the organization responsible for cleanup at Department of Energy sites located in the Northwestern Area.

With regard to your comment, it is U.S. Department of Energy policy to comply with hazardous waste regulations and laws and low-level radioactive waste regulations. It is our intent to comply with all such laws and regulations that are applicable at LEHR when conducting D&D activities and transporting the resulting waste for disposal.

Your comments will be incorporated in the final Environmental Assessment and a copy will be provided to you when issued. If you have any questions concerning our response, please contact Mr. Don Williams of my staff at (301) 903-8173.

Sincerely,

Sally A. Mann

Sally A. Mann, Ph.D
Director
Office of Northwestern Area Programs
Environmental Restoration

STATE OF OREGON
DEPARTMENT OF ENERGY COMMENTS

AND

U.S. DEPARTMENT OF ENERGY RESOLUTIONS

Oregon

DEPARTMENT OF ENERGY

May 19, 1992

Leo P. Duffy
Assistant Secretary for Environmental
Restoration and Waste Management
US Department of Energy
Washington, D.C. 20585

Dear ~~Mr. Duffy~~ Leo:

Attached are Oregon's comments on the Environmental Assessment (EA) concerning the Energy-Related Health Research Laboratory (LEHR) at the University of California, Davis. The waste from the LEHR will be shipped through Oregon to Hanford for disposal.

I am pleased that we are being asked to review and comment on the EA. This EA -- combined with the review process -- is the way USDOE should work with transport corridor states. The EA is thorough and supports your conclusion that these low-level waste shipments can be made safely.

Sharing the EA with corridor states notifies us of the shipments, and allows us to prepare. In our comments, we ask for more information that will help us better understand the shipments. We also make a few recommendations concerning safety. We will appreciate hearing from your staff on the issues raised before the shipments begin

Thank you for the chance to comment. Your staff should contact Bob Robison, at (503) 378-3194 regarding the attached comments.

Sincerely,

Michael W. Grainey, Director
Legislative Affairs

Enclosure

nuclear\rad-mat\br\mwg21d.w51

Barbara Roberts
Governor

625 Marion Street NE
Salem, OR 97310
(503) 378-4040
FAX (503) 373-7806
Toll-Free 1-800-221-8035

Oregon Comments on the

U.S. Department of Energy's
Environmental Assessment for the
Decommissioning and Decontamination
of Contaminated Facilities at
The Laboratory For
Energy Related Health Research (LEHR)
University of California, Davis

Summary of Proposed Action

The US Department of Energy (USDOE) proposes 21 shipments of low-level radioactive waste through Oregon. The wastes are bound for USDOE's low-level waste disposal site at Hanford, Washington. The shipments are to clean up a laboratory at the University of California, Davis. The lab was used for research on the health effects of exposure to radiation.

There are approximately 840 drums of solid low level waste. This will require about 20 shipments of about 45 55-gallon drums each. The drums are approved by the US Department of Transportation for low level wastes. One shipment will include a Cobalt-60 radiation source. This is a higher radiation source and will be shipped in a shielded cask approved by the Nuclear Regulatory Commission. The cask is designed to withstand serious accident conditions.

Oregon Comments

Oregon appreciates the chance to comment on the Environmental Assessment (EA). Oregon agrees with the proposed finding of no significant impact.

These questions and recommendations concern the shipments. We will appreciate an answer to our questions before the shipments are made.

1. Approximately 250 gallons of liquid waste will be solidified prior to shipment to Hanford (p. 5-1).

   Please describe the physical nature of this waste. Will this material be grouted and shipped as a solid block, or as a dry sludge?

2. The packaged waste will be transported to the site by an approved transporter (p. 5-1).

   Who will approve the motor carrier, and by what criteria? Oregon recommends the carrier be selected by evaluation through the "Motor Carrier Evaluation Program" (WHC-EP-0336) developed by USDOE.

3. Table 8-1: "Applicable Federal and State Regulations Requiring Permits and/or Consultation" (p. 8-7).

Attached to these comments are the state statute and rules covering the transport of radioactive material in Oregon. Table 8-1 should include:

Statute or Act:	Oregon Radioactive Material Transport Act
Agency:	Oregon Public Utility Commission
Proposed Action:	Transport of radioactive material
Applicable:	Carrier permit, insurance, routing, liability for damages and emergency response costs, notification, inspection, etc.

4. Vehicle safety and state inspection (p. A-6).

Oregon rules require inspection of all Highway Route Controlled Quantity Shipments. Is the Co-60 shipment a Route Controlled Quantity?

Oregon recommends that USDOE invite the State of California to inspect a sample of all shipments. We further recommend that the carrier commit the same tractors, trailers, and drivers to the 21 shipments.

5. Highway Routing (p. A-6).

For placarded shipments, the carrier is responsible to select the route that will minimize transit time and radiological risk. More specific guidance to use interstate freeways, and urban bypasses, is established for Route Controlled shipments. The EA implies that the carrier will select routes for all 21 shipments using the more specific guidelines for Route Controlled shipments.

What route will be used in Oregon? Will the shipments be on US 97 to I-84 to I-82? Or, will the shipments be on I-5 to I-205 to I-84 to I-82?

DIVISION 60

TRANSPORTATION OF RADIOACTIVE MATERIAL

Definitions

345-60-001 (1) The definitions set out in ORS 469.300 (1985 Replacement Part) are hereby incorporated as the definitions to be used in interpreting these rules, unless the context requires otherwise or unless a term is specifically defined in this section. Terms not otherwise defined shall be defined as found in **10 CFR 71 and 73 and 49 CFR 171 through 178.**

(2) For the purpose of these rules radioactive material shall be defined as defined in **49 CFR 173.403.**

(3) "Radioactive Material Shipments" include but are not limited to any number of truck trailers, automobiles, vans or barges, moved by one or interconnected power sources.

(4) "Radiopharmaceuticals" are radioactive materials used in the medical testing or treatment of animals or humans.

(5) "Radiographic materials" include any sealed radioactive source fastened or contained in any instrument used for the examination of the macroscopic structure of materials by nondestructive methods using the source.

(6) "Well-logging radioactive materials" are radioactive sources used in measuring devices or tools used to obtain information about wells or the adjacent soil or geologic formations.

[**Publications:** The publication(s) referred to or incorporated by reference in this rule are available from the office of the Energy Facility Siting Council.]

Stat. Auth.: ORS Ch. 469.605 & 469.607
Hist.: NTEC 7, f. 2-20-74, ef. 3-1[illegible]74; EFSC 3-1982, f. & ef. 3-8-82; EFSC 2-1983(Temp), f. 6-22-83, ef. 7-1-83; EFSC 5-1986, f. & ef. 9-5-86; EFSC 1-1991, f. & cert. ef. 3-12-91

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Applicability and Scope

345-60-003 (1) These rules apply to the transportation of radioactive material by means other than railcars in the State of Oregon. The rules contained in OAR 345-60-001 to 345-60-055 are auxiliary to and supplemental to the rules of OAR 860-66-073 to 860-66-075 for highway transport.

(2) Transport by or under the direction of an agency of the federal government in federal vehicles is exempt. This section does not exempt shipments:

(a) Because federal physical security requirements are applicable;

(b) Because they originate from or are destined for a federal facility; or

(c) Because the material is owned by the federal government.

(3) In accordance with ORS 469.603 and 469.607, it is the intent of these rules to be consistent with the United States Department of Transportation and Nuclear Regulatory Commission rules.

Stat. Auth.: ORS Ch. 469.605 & 469.507
Hist.: NTEC 7, f. 2-20-74, ef. 3-11-74; EFSC 3-1982, f. & ef. 3-8-82; EFSC 2-1983(Temp), f. 6-22-83, ef. 7-1-83; EFSC 5-1986, f. & ef. 9-5-86; EFSC 1-1991, f. & cert. ef. 3-12-91

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Permits

345-60-004 (1) Persons shall obtain an "Oregon Radioactive Materials Transport" permit from the Oregon Public Utility Commission, Transportation Safety Division prior to transport in the State of Oregon of radioactive material which requires a placard on the vehicle according to **49 CFR 172(f).**

(2) An application for a permit shall be submitted annually to the Oregon Public Utility Commission, Transportation Safety Division, 351 West Summer Street NE, Salem, Oregon 97310-0335. A carrier applying for the first time shall submit the application at least thirty (30) days prior to transporting any materials specified in section (1) of this rule.

(3) A permit may be issued on an emergency basis by telephone when, as a result of conditions not subject to the control of the carrier, compliance within the thirty (30) day requirements of section (2) of this rule is not possible. A carrier acquiring a permit under this section shall provide information contained in subsection (4)(a) through (d), and (f) of this rule, and the name of its insurance company, policy number, minimum levels of coverage and date of policy expiration, or provide verification of self insurance.

(4) An application shall include:

(a) Name and address of the carrier;

(b) Telephone numbers of the carrier that will be answered at any time for emergencies and a statement that the carrier has a 24 hour telephone number for all shippers;

(c) A description of the material to be transported, number of shipments and estimated radioactivity per shipment. Precise information is not necessary if unavailable;

(d) A description of the route or routes to be taken and approximate schedule. Precise information is not necessary if unavailable;

(e) A description of any violations by the applicant of any local, state or federal regulations within the past year related to radioactive material transportation. Copies of the most recent Federal and/or state motor carrier safety and/or Hazardous Material audit and inspection reports are sufficient to satisfy this requirement;

(f) Oregon PUB Operating Authority Identification Number, U.S. Department of Transportation Number, and U.S. Environmental Protection Agency Identification Number, when appropriate;

(g) Proof of insurance including minimum levels of coverage and policy expiration date, or provide verification of self-insurance.

(5) A regular permit will be issued if the applicant's record of violations of federal and state motor carrier safety and hazardous material requirements indicate that its practices have not and will not create an undue risk to public health, safety, or the environment.

(6) A conditional permit which requires pre-trip notification to arrange for inspection will be issued for one or both of, but not limited to, the following reasons:

(a) The carrier's Federal Highway Administration safety rating is "unsatisfactory" or "conditional" pursuant to the authority of Title 49 CFR 385.1;

(b) The carrier's safety profile with the Oregon Public Utility Commission is unsatisfactory as based on accident rates, inspection reports, and/or safety audits.

(7) Copies of the Oregon Radioactive Material Transport Permit shall accompany all shipments for which a permit is required.

(8) Any person who has been denied a permit under this section shall upon request be granted a hearing before the Public Utility Commission. After hearing, the Commission shall grant or deny the permit.

(9) Once issued, permits may remain valid for one year from date of issuance.

(10) Permits may be revoked or suspended for failure to comply with the conditions named on the permit, and/or violations of the motor carrier safety, hazardous and/or radioactive materials requirements.

(11) Reinstatement of a permit revoked or suspended under section (10) of this rule will require submission of a new application and a demonstration that remedial actions have been taken to prevent recurrence of the violation(s).

(12) Temporary permits are available at Oregon Ports of Entry and Public Utility Commission field offices. (Ports of Entry are open all hours except from 4:00 p.m. December 24th to 12:01 a.m. December 26th and from 4:00 p.m. December 31st to 12:01 a.m. January 2nd.) Ports of entry are located on I-84 westbound at Farewell Bend; US 97 northbound at Klamath Falls; I-84 eastbound at Cascade Locks; I-5 northbound at Ashland and I-5 southbound at Woodburn. Public Utility Commission field offices are located on US 730 eastbound at Umatilla (8:00 a.m. to 5:00 p.m., Monday through Friday) and I-5 southbound at Portland (6:00 a.m. to 6:00 p.m., Monday through Friday).

[**Publications:** The publication(s) referred to or incorporated by reference in this rule are available from the office of the Energy Facility Siting Council.]

Stat. Auth.: ORS Ch. 469.605 & 469.607
Hist.: EFSC 3-1982, f. & ef. 3-8-82; EFSC 2-1983(Temp), f. 6-22-83, ef. 7-1-83; EFSC 3-1983, f. & ef. 11-4-83; EFSC 5-1986, f. & ef. 9-5-86; EFSC 1-1991, f. & cert. ef. 3-12-91; Prior sectic · (10) renumbered to 345-60-00(1) - (5)

[**ED. NOTE:** The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Notification for Inspection

345-60-005 (1) Notification pursuant to Nuclear Regulatory Commission rules found in CFR 10 Section 71.97 and CFR 10 Section 73.37(f) for irradiated reactor fuel and other materials shall be to: Administrator, Nuclear Safety and Energy Facilities Division, Oregon Department of Energy, 625 Marion St., NE., Salem, Oregon 97310, Telephone: (503) 378-4040.

(2) Notice and arrangements for inspection shall be made by the carrier for all spent nuclear reactor fuel, Highway Route Controlled Quantity Shipments, and when required as a condition to an Oregon Radioactive Material Transport Permit. Notice for inspection shall be by the carrier as follows:

(a) As soon as practicable, but no later than forty-eight (48) hours before time of shipment in Oregon;

(b) When, as a result of conditions not subject to the control of the carrier, it is not possible to comply with the 48-hour minimum notification, then notice shall be made immediately by telephone, or in any event not later than on the next working day, and shall explain why the carrier could not comply with the 48-hour requirement;

(c) When an inspection has been scheduled, additional notice is required if the shipment is canceled, or if the carrier's arrival at the inspection location will miss the designated inspection time by two or more hours (early or late);

(d) All notice for inspection and schedule changes shall be in writing or by telephone between 8 am and 5 pm Pacific Time to: Oregon Public Utility Commission, Transportation Safety Division, 351 West Summer Street NE, Salem, Oregon 97310-0335, Telephone: (503 378-5916, (503) 378-4601;

(e) Notice for inspection shall include the following information:

(A) Carriers name, address, telephone number and Oregon PUC Operating Authority Identification Number;

(B) Shipper's and receiver's name, address, and telephone number;

(C) A description of the material, which shall include proper shipping name, hazard class, hazardous material identification number, and total quantity by weight or volume, and number of curies;

(D) A description of the route and approximate schedule;

(E) A description of the transport vehicle(s) and name of driver(s).

[**Publications:** The publication(s) referred to or incorporated by reference in this rule are available from the office of the Energy Facility Siting Council.]

Stat. Auth.: ORS Ch. 469.605 & 469.607
Hist.: NTEC 7, f. 2-20-74, ef. 3-11-74; EFSC 3-1982, f. & ef. 3-8-82; EFSC 2-1983(Temp), f. 6-22-83, ef. 7-1-83; EFSC 5-1986, f. & ef. 9-5-86; EFSC 1-1991, f. & cert. ef. 3-12-91

[**ED. NOTE:** The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Fees

345-60-006 (1) Except as provided in section (2) through (5) of this rule, a $70 fee shall be submitted by the carrier to the Oregon Department of Energy, 625 Marion St., N.E. Salem, Oregon 97310 for each placarded shipment. The Oregon Department of Energy will invoice motor carriers each three months for shipments recorded at Oregon truck Ports of Entry in the last quarter. The Oregon Department of Energy may establish with carriers

special invoice procedures for shipments that do not regularly pass through an Oregon Port of Entry.

(2) Placard shipments of well-logging material, radiographic material, and radiopharmaceuticals shall submit an annual fee of $500 or $70 per shipment, whichever is less.

(3) No additional fee will be charged for shipments which:

(a) The cargo is transferred from a previous vehicle for which a fee has been assessed, or;

(b) The vehicle has a number of stops before unloading the radioactive cargo for which a fee has been assessed.

(4) Radioactive materials carriers may petition for an alternative fee schedule. The Administrator, Nuclear Safety and Energy Facilities Division, may grant such a request based on evaluation of whether:

(a) The carrier demonstrates that the applicable fee schedule severely impacts the cost of the product; or

(b) Other payments to the Oregon Department of Energy support applicable safety programs of the State of Oregon; or

(c) The shipment of the material involves one source and frequent movement between sites where the source is used; or

(d) The carrier is a public university or research organization using the material for public benefit.

(5) There will be a $100 fee applied to each shipment traveling under a temporary permit described under OAR 345-60-004(12), unless the carrier applies for a permit from the Oregon Public Utility Commission within two weeks notice of the need for a permit.

Stat. Auth.: ORS Ch. 469.605 & 469.607
Hist.: EFSC 3-1982, f. & ef. 3-8-82; EFSC 2-1983(Temp), f. 6-22-83, ef. 7-1-83; EFSC 3-1983, f. & ef. 11-4-83; EFSC 5-1986, f. & ef. 9-5-86; EFSC 1-1991, f. & cert. ef. 3-12-91; Renumbered from 345-60-004(5) - (10)

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the Secretary of State.]

Inspections

345-60-007 Shipments under these rules may be inspected by the State of Oregon, or its agents, for compliance with applicable rules and regulations. The State will inspect all spent nuclear reactor fuel (defined in **10 CFR 73.37**) and highway route controlled quantity shipments (defined in **49 CFR 173.403(1)**). The state may inspect samplings of other shipments. The State may inspect highway shipments made under conditional permits, as stipulated in OAR 345-60-004(6). The arrangements for inspection will be made when notice for inspection is given, as described in OAR 345-60-005.

[Publications: The publication(s) referred to or incorporated by reference in this rule are available from the office of the Energy Facility Siting Council.]

Stat. Auth.: ORS Ch. 469.605 & 469.607
Hist.: NTEC 7, f. 2-20-74, ef. 3-11-74; EFSC 3-1982, f. & ef. 3-8-82; EFSC 2-1983(Temp), f. 6-22-83, ef. 7-1-83; EFSC 5-1986, f. & ef. 9-5-86; EFSC 1-1991, f. & cert. ef. 3-12-91

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Vehicles, Operator, Equipment

345-60-015 All aspects of vehicles, operators and equipment shall be in accordance with Oregon Administrative Rules, Chapter 860, Division 65. (These Public Utility Commissioner rules reference the requirements of **49 CFR 390 through 397.**)

[Publications: The publication(s) referred to or incorporated by reference in this rule are available from the office of the Energy Facility Siting Council.]

Stat. Auth.: ORS Ch. 469.605 & 469.607
Hist.: EFSC 3-1982, f. & ef. 3-8-82; EFSC 2-1983(Temp), f. 6-22-83, ef. 7-1-83; EFSC 1-1991, f. & cert. ef. 3-12-91

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Packaging, Placarding, Labeling and Documentation

345-60-025 Packaging, placarding, labeling, shipment documentation and all other aspects of transporting any radioactive materials shall be in accordance with **10 CFR 71 and 73, and 49 CFR 171 through 179.**

[Publications: The publication(s) referred to or incorporated by reference in this rule are available from the office of the Energy Facility Siting Council.]

Stat. Auth.: ORS Ch. 469.605 & 469.607
Hist.: EFSC 3-1982, f. & ef. 3-8-82; EFSC 2-1983(Temp), f. 6-22-83, ef. 7-1-83; EFSC 5-1986, f. & ef. 9-5-86; EFSC 1-1991, f. & cert. ef. 3-12-91

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Reporting and Emergency Response

345-60-030 The carrier of any radioactive material shall immediately notify local emergency response authorities and the Oregon Emergency Response System (within Oregon call 1-800-452-0311, outside Oregon call 1-503-378-4124) of:

(1) Any vehicle accidents regardless of whether radioactive material has been damaged or dispersed;

(2) Loss of any radioactive material; and

(3) Tampering with or obstruction of any shipments.

Stat. Auth.: ORS Ch. 469.605 & 469.607
Hist.: EFSC 3-1982, f. & ef. 3-8-82; EFSC 2-1983(Temp), f. 6-22-83, ef. 7-1-83; EFSC 5-1986, f. & ef. 9-5-86; EFSC 1-1991, f. & cert. ef. 3-12-91

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Highway Routes

345-60-040 In Oregon, spent nuclear reactor fuel shall be routed in accordance with **10 CFR 73.37** and highway shipments shall be routed in accordance with **49 CFR 177.825**

[**Publications**: The publication(s) referred to or incorporated by reference in this rule are available from the office of the Energy Facility Siting Council.]

Stat. Auth.: ORS Ch. 469.605 & 469.607
Hist.: EFSC 3-1982, f. & ef. 3-8-82; EFSC 2-1983(Temp), f. 6-22-83, ef. 7-1-83; EFSC 5-1986, f. & ef. 9-5-86; EFSC 1-1991, f. & cert. ef. 3-12-91

[**ED. NOTE**: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Financial Assurance

345-60-045 (1) Spent nuclear reactor fuel shall be insured as required by the Price-Anderson Act.

(2) Carriers of radioactive materials shall comply with applicable federal and Oregon insurance requirements (see Oregon Administrative Rules, Chapter 860, Division 63, Public Utility Commission rules and **Title 49 Code of Federal Regulations, Part 387**).

(3) Carriers of radioactive material shall indemnify the State of Oregon and its political subdivisions and agents for any claims arising from the release of radioactive material during transportation and pay for the cost of response to an accident.

[**Publications**: The publication(s) referred to or incorporated by reference in this rule are available from the office of the Energy Facility Siting Council.]

Stat. Auth.: ORS Ch. 469.605 & 469.607
Hist.: EFSC 3-1982, f. & ef. 3-8-82; EFSC 2-1983(Temp), 6-22-83, ef. 7-1-83; EFSC 5-1986. f. & ef. 9-5-86; EFSC 1 1991, f. & cert. ef. 3-12-91

[**ED. NOTE**: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Weather and Road Conditions

345-60-050 Motor vehicles shall avoid movement during a road condition advisory of the Oregon State Highway Division unless vehicles have the required traction tires or devices specified in OAR Chapter 734, Division 17.

Stat. Auth.: ORS Ch. 469.605 & 469.607
Hist.: EFSC 5-1986, f. & ef. 9-5-86; EFSC 1-1991, f. & cert. ef. 3-12-91

Enforcement

345-60-055 (1) The Director of the Oregon Department of Energy may halt the transport of radioactive material if he or she believes there is a clear and immediate danger to public health or safety. Such a halt shall be by an order which may be served without prior hearing or notice.

(2) The Director of the Department of Energy may petition the appropriate circuit court to impose civil penalties for violation of OAR 345-60-001 to 345-60-055. The circuit court may assess a civil penalty in an amount not more than $25,000 per day for each day of violation.

Stat. Auth.: ORS Ch. 469.605 & 469.607
Hist.: EFSC 1-1991, f. & cert. ef. 3-12-91

limited to procedures for printing related material in the voters' pamphlet.

(2) A site certificate for a nuclear-fueled thermal power plant shall not be issued until the electors of this state have approved the issuance of the certificate at an election held pursuant to subsection (1) of this section. [1981 c.1 §§4, 5]

469.599 Public Utility Commission's duty. The Public Utility Commission shall not authorize the issuance of stocks, bonds or other evidences of indebtedness to finance any nuclear-fueled thermal power plant pursuant to ORS 757.400 to 757.450 until the Energy Facility Siting Council has made the finding required under ORS 469.595. [1981 c.1 §6]

469.601 Effect of ORS 469.595 on applications and applicants. ORS 469.595 does not prohibit:

(1) The council from receiving and processing applications for site certificates for nuclear-fueled thermal power plants under ORS 469.300 to 469.570, 469.590 to 469.621 and 469.930; or

(2) An applicant for a site certificate under ORS 469.300 to 469.570, 469.590 to 469.621 and 469.930 from obtaining any other necessary licenses, permits or approvals for the planning or siting of a nuclear-fueled thermal power plant. [1981 c.1 §8]

(Transportation of Radioactive Material)

469.603 Intent to regulate transportation of radioactive material. It is the intention of the Legislative Assembly that the state shall regulate the transportation of radioactive material to the full extent allowable under and consistent with federal laws and regulations. [1981 c.707 §2]

469.605 Permit to transport required; application; delegation of authority to issue permits. (1) No person shall ship or transport radioactive material identified by the council by rule as posing a significant hazard to public health and safety or the environment if improperly transported into or within the State of Oregon without first obtaining a permit from the department.

(2) Such permit shall be issued for a period not to exceed one year and shall be valid for all shipments within that period of time unless specifically limited by permit conditions.

(3) Application for a permit under this section shall be made in a form and manner prescribed by the director and may include:

(a) A description of the kind, quantity and radioactivity of the material to be transported;

(b) A description of the route or routes proposed to be taken and the transport schedule;

(c) A description of any mode of transportation; and

(d) Other information required by the director to evaluate the application.

(4) The director shall collect a fee from all applicants for permits under this section in an amount reasonably calculated to provide for the costs to the department of performing the duties of the department under ORS 469.550 (3), 469.570, 469.603 to 469.621 and 469.992. Fees collected under this subsection shall be deposited in the Energy Department Account established under ORS 469.120.

(5) The director shall issue a permit only if the application demonstrates that the proposed transportation will comply with all applicable rules adopted under ORS 469.603 to 469.621 and if the proposed route complies with federal law as provided in ORS 469.606.

(6) The director may delegate the authority to issue permits for the transportation of radioactive material to the Public Utility Commission of Oregon. In exercising such authority, the Public Utility Commission of Oregon shall comply with the applicable provisions of ORS 469.603 to 469.621 and rules adopted by the director or the Energy Facility Siting Council under ORS 469.603 to 469.621. Permits issued by the Public Utility Commission under this subsection shall be enforced according to the provisions of ORS 767.457. The director also may delegate other authority granted under ORS 469.605 to 469.621 to other state agencies if the delegation will maintain or enhance the quality of the transportation safety program. [1981 c.707 §5; 1989 c.6 §4; 1991 c.233 §3]

469.606 Determination of best and safest route. (1) Upon receipt of an application required under ORS 469.605 for which radioactive material is proposed to be transported by highway, the department shall confer with the following persons to determine whether the proposed route is safe, and complies with applicable routing requirements of the United States Department of Transportation and the United States Nuclear Regulatory Commission:

(a) The Public Utility Commission, or a designee of the Public Utility Commission;

(b) The Energy Facility Siting Council, or a designee of the Energy Facility Siting Council; and

(c) The Oregon Transportation Commission, or a designee of the Oregon Transportation Commission.

(2) If, after consultation with the persons set forth in subsection (1) of this section, a determination is made that the proposed route is not the best and safest route for transporting the material, the director shall deny the application except as provided in subsection (3) of this section.

(3) If the applicant is prohibited by a statute, rule or other action of an adjacent state or a political subdivision in an adjacent state from using the route that complies with federal law, the director:

(a) Shall petition the United States Department of Transportation for an administrative determination of preemption of the ban, pursuant to section 13 of the Hazardous Materials Transportation Uniform Safety Act of 1990, P.L. 101-615.

(b) May issue a permit as provided under ORS 469.605 (5) with conditions necessary to assure safe transport over a route available to the applicant, until the United States Department of Transportation determines whether the prohibition by the other state or political subdivision is preempted. [1991 c.233 §2]

469.607 Authority of council. (1) After consultation with the Public Utility Commission of Oregon and other appropriate state, local and federal agencies, the council by rule:

(a) May fix requirements for notification, record keeping, reporting, packaging and emergency response;

(b) May designate those routes by highway, railroad, waterway and air where transportation of radioactive material can be accomplished safely;

(c) May specify conditions of transportation for certain classes of radioactive material, including but not limited to, specific routes, permitted hours of movement, requirements for communications capabilities between carriers and emergency response agencies, speed limits, police escorts, checkpoints, operator or crew training or other operational requirements to enhance public health and safety; and

(d) May establish requirements for insurance, bonding or other indemnification on the part of any person transporting radioactive material into or within the State of Oregon under ORS 469.603 to 469.621 and 469.992.

(2) The requirements imposed by subsection (1) of this section must be consistent with federal Department of Transportation and Nuclear Regulatory Commission rules.

(3) Rules adopted under this section shall be adopted in accordance with the provisions of ORS 183.310 to 183.550. [1981 c.707 §6; 1989 c.6 §5]

469.609 Annual report to state agencies and local governments on shipment of radioactive wastes. Annually, the director shall report to interested state agencies and all local government agencies trained under ORS 469.611 on shipment of radioactive material made during the preceding year. The director's report shall include:

(1) The type and quantity of material transported;

(2) Any mode of transportation used;

(3) The route or routes taken; and

(4) Any other information at the discretion of the director. [1981 c.707 §8; 1989 c.6 §6]

469.611 Emergency preparedness and response program; radiation emergency response team; training. Notwithstanding ORS chapter 401:

(1) The director shall coordinate emergency preparedness and response with appropriate agencies of government at the local, state and national levels to assure that the response to a radioactive material transportation accident is swift and appropriate to minimize damage to any person, property or wildlife. This program shall include the preparation of localized plans setting forth agency responsibilities for on-scene response.

(2) The director shall:

(a) Apply for federal funds as available to train, equip and maintain an appropriate response capability at the state and local level; and

(b) Request all available training and planning materials.

(3) The Health Division shall maintain a trained and equipped radiation emergency response team available at all times for dispatch to any radiological emergency. Before arrival of the Health Division at the scene of a radiological accident, the director may designate other technical advisors to work with the local response agencies.

(4) The Health Division shall assist the director to insure that all emergency services organizations along major transport routes for radioactive materials are offered training and retraining in the proper procedures for identifying and dealing with a radiological accident pending the arrival of persons with technical expertise. The Health Division shall report annually to the director on training of emergency response personnel. [1981 c.707 §9; 1983 c.586 §44; 1989 c.6 §7]

469.613 Records; inspection. (1) Any person obtaining a permit under ORS 469.605 shall establish and maintain any records, make any reports and provide any informa-

tion as the council may by rule or order require to assure compliance with the conditions of the permit or other rules affecting the transportation of radioactive materials and submit the reports and make the records and information available at the request of the director. Any requirement imposed by the council under this subsection shall be consistent with regulations of the United States Department of Transportation and the United States Nuclear Regulatory Commission.

(2) The director may authorize any employee or agent of the director to enter upon, inspect and examine, at reasonable times and in a reasonable manner for the purpose of administration or enforcement of the provisions of ORS 469.550, 469.570, 469.603 to 469.621 and 469.992 or rules adopted thereunder, the records and property of persons within this state who have applied for permits under ORS 469.605.

(3) The director shall provide for:

(a) The inspection of each highway route controlled shipment prior to or upon entry of the shipment into this state or at the point of origin for the transportation of highway route controlled shipments within the state; and

(b) Inspection of a representative sample of shipments containing material required to bear a radioactive placard as specified by federal regulations. [1981 c.707 §10; 1989 c.6 §8]

469.615 Indemnity for claims against state insurance coverage certification; reimbursement for costs incurred in nuclear incident. (1) A person transporting radioactive materials in this state shall indemnify the State of Oregon and its political subdivisions and agents for any claims arising from the release of radioactive material during that transportation and pay for the cost of response to an accident involving the radioactive material.

(2) With respect to radioactive materials, the director shall ascertain and certify that insurance coverage required under 42 U.S.C. 2210 is in force and effect at the time the permit is issued under ORS 469.605.

(3) A person who owns, designs or maintains facilities, structures, vehicles or equipment used for handling, transportation, shipment, storage or disposal of nuclear material shall reimburse the state for all expenses reasonably incurred by the state or a political subdivision of the state, in protecting the public health and safety and the environment from a nuclear incident or the imminent danger of a nuclear incident caused by the person's acts or omissions. These expenses include but need not be limited to, costs incurred for precautionary evacuations, emergency response measures and decontamination or other clean-up measures. As used in this subsection "nuclear incident" has the meaning given that term in 42 U.S.C. 2014(q).

(4) Nothing in subsection (3) of this section shall affect any provision of subsection (1) or (2) of this section. [1981 c.707 §11; 1987 c.705 §9; 1989 c.6 §9]

469.617 Report to legislature; content. The director shall prepare and submit to the Governor for transmittal to the Legislative Assembly, on or before the beginning of each regular legislative session, a comprehensive report on the transportation of radioactive material in Oregon and provide an evaluation of the adequacy of the state's emergency response agencies. The report shall include, but need not be limited to:

(1) A brief description and compilation of any accidents and casualties involving the transportation of radioactive material in Oregon;

(2) An evaluation of the effectiveness of enforcement activities and the degree of compliance with applicable rules;

(3) A summary of outstanding problems confronting the department in administering ORS 469.550, 469.570, 469.603 to 469.621 and 469.992; and

(4) Such recommendations for additional legislation as the council considers necessary and appropriate. [1981 c.707 §12; 1989 c.6 §10]

469.619 Department to make federal regulations available. The department shall maintain and make available copies of all federal regulation and federal code provisions referred to in ORS 469.300, 469.550, 469.570, 469.603 to 469.621 and 469.992. [1981 c.707 §14; 1989 c.6 §11]

469.621 Advisory committee. The director may establish a committee of local officials and interested citizens to advise the council on radioactive materials transportation issues from a local perspective. [1981 c.707 §7]

RESIDENTIAL ENERGY CONSERVATION ACT

(Investor-owned Utilities)

469.631 Definitions for ORS 469.631 to 469.645. As used in ORS 469.631 to 469.645:

(1) "Cash payment" means a payment made by the investor-owned utility to the dwelling owner or to the contractor on behalf of the dwelling owner for energy conservation measures.

(2) "Commercial lending institution" means any bank, mortgage banking company, trust company, savings bank, savings and

Department of Energy
Washington, DC 20585

JUN 17 1992

Michael W. Grainey
Director, Legislative Affairs
State of Oregon
Department of Energy
625 Marion Street, NE
Salem, Oregon 97310

Dear Mr. Grainey:

Thank you for your letter of May 19, 1992, transmitting comments on the Environmental Assessment (EA) for the Decontamination and Decommissioning (D&D) of Contaminated Facilities at the Laboratory for Energy-Related Health Research (LEHR), University of California, Davis. Mr. Leo Duffy has asked me to respond to your comments since I direct the organization for cleanup of Department of Energy sites located in the northwestern area.

Responses to your comments follow in the order in which the comments were presented in your letter.

1. The 250-gallons of residual liquid in the 4000-gallon tank trailer is comprised of low-level strontium-90 and radium-226 contaminated sludge. Regardless of whether the tank trailer is to be decontaminated on site and scrapped, or dismantled, packaged, and shipped to Hanford for disposal, the tank liquid contents will be removed and solidified with grout and shipped to Hanford in 55-gallon drums. The waste will not be shipped as a dry sludge.

2. All low-level radioactive waste and radioactively-contaminated asbestos generated from LEHR D&D activities will be transported to the Hanford disposal site by a U. S. Department of Energy (DOE) approved transporter. The DOE "Motor Carrier Evaluation Program" (WHC-EP-0336) will be used to select the motor carrier.

3. Table 8-1 "Applicable Federal and State Regulations Requiring Permits and/or Consultation" will be revised to include the Oregon Radioactive Material Transport Act and all related information that was provided in your letter.

4. The activity of the cobalt-60 shipment is 120 curies. The limit for a route-controlled shipment established in 49 CFR 177 and 173 is 21,000 curies, therefore, the shipment is not considered a route-controlled quantity. DOE agrees with the State of Oregon's suggestion that the State of California should be invited to inspect a sample of the shipments. A formal invitation will be prepared. Also, the waste shipment motor carrier will be instructed to commit the same tractors, trailers, and drivers to the maximum extent practicable for all shipments.

5. As discussed in response number 4 above, the waste shipments originating from LEHR are not considered route-controlled, however, to minimize transit time and risk to the public, shipments are scheduled to follow I-5 to I-205 to I-84 to I-82.

Your comments will be incorporated in the final EA and a copy will be provided to you when issued. If you have any questions concerning our response, please call Mr. Don Williams of my staff at (301) 903-8173.

Sincerely,

Sally A. Mann

Sally A. Mann, Ph.D.
Director
Office of Northwestern Area Programs
Environmental Restoration

END DATE
12-2-93