



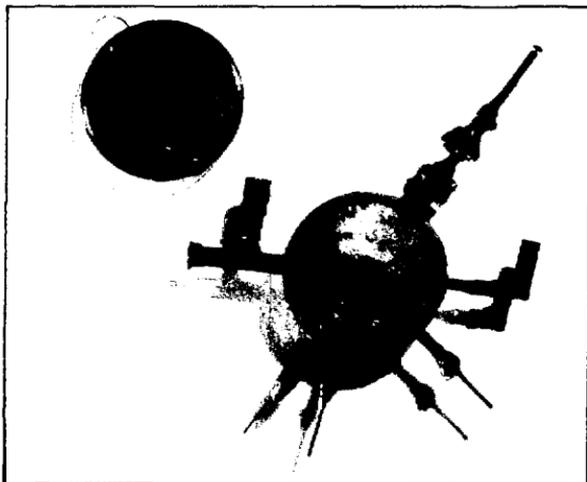
Lawrence Berkeley Laboratory

UNIVERSITY OF CALIFORNIA

ENVIRONMENT, HEALTH AND SAFETY DIVISION

Radioactive and Mixed Waste Management Plan for the Lawrence Berkeley Laboratory Hazardous Waste Handling Facility

January 1995



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**Radioactive and Mixed
Waste Management Plan**
for the Lawrence Berkeley Laboratory
Hazardous Waste Handling Facility

January 1995

Environment, Health and Safety Division
Lawrence Berkeley Laboratory
University of California
Berkeley, CA 94720

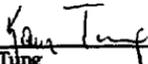
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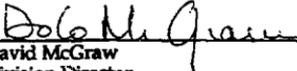
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**Radioactive and Mixed Waste Management Plan for the
Lawrence Berkeley Laboratory Hazardous Waste Handling Facility**

**PUB-5254 (1994)
January 1995**

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Contents

Executive Summary.....	1
Purpose	1
Radioactive and Mixed Waste Management Activities During FY 1994.....	1
Forecast for FY 1995.....	2
1. General Site Information.....	4
1.1 Organization and Administration.....	4
1.2 Site Description.....	8
2. Radioactive and Mixed Waste Management.....	12
2.1 Overview.....	12
2.2 System and Facility Description.....	12
2.3 Current and Future Plans.....	17
2.4 Implementation Summary.....	19
3. Schedule and Cost Summary.....	20
3.1 Hazardous Waste Handling Facility.....	20
3.2 Existing Hazardous Waste Handling Facility Closure.....	21
3.3 Facility Operations and Maintenance.....	21
3.4 Waste Minimization Planning and Evaluation.....	22
4 Environmental Monitoring Programs.....	23

Appendices

A. Waste Management Documentation Requirements.....	24
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List of Figures

Figure 1-1. EH&S Division Organization Chart.....	5
Figure 1-2. Waste Management Group Organization Chart.....	6
Figure 1-3. Organizational Flow for Radioactive and Mixed Waste at LBL.....	6
Figure 1-4. Map of Main ("Hill") LBL Site, Showing LBL Buildings.....	9
Figure 2-1. Radioactive and Mixed Waste Streams Handled at the HWHF.....	13

Executive Summary

Purpose

This Radioactive and Mixed Waste Management Plan for the Hazardous Waste Handling Facility (HWHF) at Lawrence Berkeley Laboratory (LBL) is written to meet the requirements for an annual report of radioactive and mixed waste management activities outlined in DOE Order 5820.2A, *Radioactive Waste Management* (dated 9/26/88). The document follows the format set forth in Section VI of DOE Order 5820.2A and covers the activities of Fiscal Year (FY) 1994 (from October 1, 1993 to September 30, 1994).

Radioactive and Mixed Waste Management Activities during FY 1994

Radioactive and mixed waste management activities during FY 1994 listed here include principal regulatory and environmental issues and the degree to which planned activities were accomplished.

The major activities during the past year include the following.

Part B Permit Modification

The Part B Permit, which was approved by the California Department of Toxic Substances Control (DTSC) in FY 1993, was modified, and the modifications were approved by DTSC in FY 1994. The major modifications allow the transfer of hazardous and mixed waste from off-site locations to the HWHF.

Continued Shipment of Low-Level and Mixed Waste

LBL continued the shipment of low-level and mixed waste to the Hanford, WA storage/disposal site. For FY 1994, 434 cubic feet of low-level and mixed waste were shipped.

Continued Shipment of Legacy Waste

LBL continued the shipment of its legacy waste (waste dating from before the DOE Moratorium) to Hanford. For FY 1994, 320 cubic feet of this waste (both low-level and mixed waste) were shipped. Each unit of this waste had to be characterized completely before it could be accepted by Hanford. During FY 1994, all low-level legacy waste was successfully characterized and shipped to Hanford.

Replacement HWHF

Work continued on the replacement HWHF. As of September 30, 1994, all site grading had been completed, and the site awaited the beginning of construction.

Continued on next page.

Executive Summary (continued)

Documentation Waste Management Group documentation continued to be upgraded. During FY 1994,

- five procedures were revised and reissued,
- the *Guidelines for Generators of Hazardous Waste at LBL and Guidelines for Generators of Radioactive and Mixed Waste at LBL (LBL PUB-3092)* was revised and reissued, and
- the *Waste Management Quality Assurance Plan* was revised and reissued.

Audits The following audits were completed:

- DTSC (The Waste Management Group passed the DTSC audit with no findings.)
- DOE (The Waste Management Group passed the DOE Conduct of Operations audit with three concerns.)
- Hanford (The Waste Management Group passed the Hanford audit in February 1994 with no findings.)

Forecast for FY 1995 This section provides a forecast of the coming year in waste management, including project startups, facility modifications, regulatory issues, and waste management budget.

Part B Permit Further modifications are planned for the Part B Permit. These modifications will include the following:

- requesting use of shelving in all mixed waste storage lockers,
- changing the storage volume to equal the actual waste volume,
- changing the storage capacity for a storage lane (Lane 7),
- adding new mixed waste streams for compressed gases, reactive metals, oxidizers, and mercury, and
- matching Part B Permit mixed waste streams to those outlined in the draft Mixed Waste Site Treatment Plan.

Replacement HWHF Work will continue on the replacement HWHF. Construction was scheduled to start on October 17, 1994.

Continued on next page.

Executive Summary (continued)

<i>Documentation</i>	Documentation will continue to be upgraded. For FY 1995, all radioactive waste certification plans will be revised and reissued, the Radioactive and Mixed Waste Management Plan will be revised and reissued, and all radioactive waste work procedures will be revised and reissued.
<i>Audits</i>	Upcoming audits include the Westinghouse Hanford audit (January 10 and 11, 1995) and the DOE Conduct of Operations audit (March 6 through 10, 1995).
<i>Budget</i>	For FY 1995, a budget of approximately \$1,000,000 has been allotted for the handling, transport, and disposal of radioactive and mixed waste.

1. General Site Information

1.1

Organization and Administration

1.1.1

DOE Field Organization

The Defense Program of the U.S. Department of Energy in the Oakland Operations Office, located at 1301 Clay Street, Oakland, California 94612, is the local DOE office for Lawrence Berkeley Laboratory (LBL). The DOE office is LBL's waste approval authority and primary formal contact for communications with the DOE Waste Management Division at the Richland Operations Office, Washington, and the Westinghouse Hanford Company Solid Waste Storage/Disposal site. The Westinghouse Hanford Company reviews each request for storage or disposal of LBL's radioactive and mixed waste and issues an approval for each LBL waste stream.

1.1.2

DOE Contractor Organizations

Lawrence Berkeley Laboratory is a low-level radioactive and mixed waste generator. The Laboratory has no waste disposal facilities. All radioactive or mixed wastes are packaged and transported, complying with applicable waste storage/disposal requirements, and state and federal regulations, to the Westinghouse Hanford Company disposal/storage site located in the state of Washington. The Westinghouse Hanford Company determines whether each request for storage or disposal of LBL's radioactive solid waste meets its requirements and prepares and issues a Storage/Disposal Approval Record (SDAR).

The lead responsibility for LBL waste treatment, storage, and shipment for disposal of radioactive and mixed waste is the Waste Management Group of the Environment, Health and Safety (EH&S) Division. The designated individual serving as primary contact is the Group Leader of the Waste Management Group. The same organization is also responsible for preparing this Radioactive and Mixed Waste Management Plan.

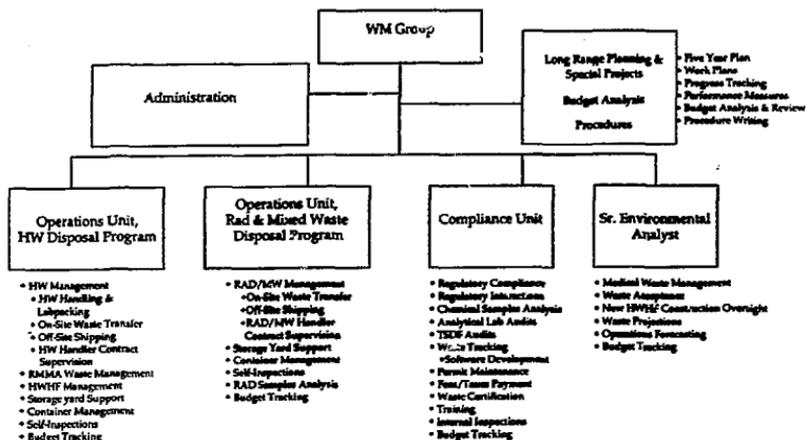
Figure 1-1 shows the organizational chart for the EH&S Division at LBL, and Figure 1-2 shows the organization chart for the Waste Management Group. Figure 1-3 shows the organizational flow for radioactive and mixed waste at LBL.

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1. General Site Information (continued)

Figure 1-2

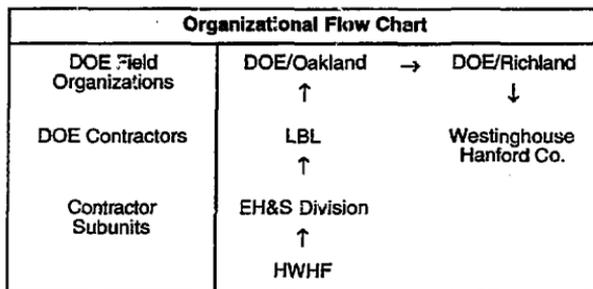
Waste Management Group Organization Chart



9/94

Figure 1-3

Organizational Flow for Radioactive and Mixed Waste at LBL



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1. General Site Information (continued)

1.1.3

Waste Management Documentation

The following radioactive and mixed waste management documents support and guide the LBL waste program.

- DOE Order 5820.2A, *Radioactive Waste Management*, applies to all DOE contractors performing work involved with the management of radioactive waste.
- RCRA regulations: 40 CFR 261, 264; 49 CFR 171-173; 4 CFR 761, Subpart B; WAC 173-303; and Title 22, California Administrative Code, Chapter 30, govern the packaging, transportation, and disposal of radioactive and mixed waste.
- *Hanford Site Radioactive Solid Waste Acceptance Criteria*, WHC-EP-0063 (latest revision), the Westinghouse Hanford Company regulations, guide waste generators in proper waste-disposal procedures.

The *LBL Health and Safety Manual*, LBL PUB-3000, is the primary safety guide for the Laboratory. It is issued to all divisions of the Laboratory to aid supervisors and employees in establishing and maintaining a low-accident work environment. The applicable waste disposal procedures and rules for LBL waste generators are included in this manual. The *Guidelines for Generators of Hazardous Waste at LBL* and *Guidelines for Generators of Radioactive and Mixed Waste at LBL (LBL PUB-3092)* are issued to all hazardous, radioactive, and mixed waste generators at LBL and describe the requirements of LBL personnel who generate radioactive and mixed wastes.

Documents specific to the Waste Management Group include the following:

- The operating procedures for the Hazardous Waste Handling Facility (HWHF) set forth procedures for HWHF personnel.
- The certification plans for low-level, mixed, and transuranic waste outline the procedures and controls used at LBL to ensure that LBL's radioactive, transuranic, and mixed waste meet the acceptance criteria set by the Hanford Waste Disposal Site in Richland, Washington.

The organization responsible for copies of the current documents at the contractor level is the Waste Management Group of the EH&S Division.

Continued on next page.

1. General Site Information (continued)

1.2

Site Description

1.2.1

Location

LBL is situated on a hillside above the main campus of the University of California at Berkeley (UCB). The 53-hectare (130-acre) site is located on the west-facing slope of the Berkeley Hills, at elevations ranging from 150 to 500 meters (500 to 1,500 feet) above sea level. Most of the site is within the City of Berkeley, but about one-quarter of the eastern part is within the City of Oakland. It is located 5 km (3 miles) east of San Francisco Bay and about 24 km (15 miles) east of San Francisco. Figure 1-4 shows the main ("hill") site of LBL.

LBL is located in an urban environment on land owned by the University. The LBL site is bordered on the north by predominantly single-family homes and on the west by multiunit dwellings, student residence halls, and commercial districts. The area to the south, which is part of the University lands, is maintained in a largely natural state and includes recreational facilities and the University Botanical Garden. The population within an 80-km (50-mi) radius of the Laboratory is approximately 6 million (1990 census).

1.2.2

Laboratory Size

The Laboratory's activities are located both on site and off site. There are 81 buildings on the LBL hillside site, plus additional facilities located on the University campus, notably the Donner Laboratory of Biology and Medicine and the Melvin Calvin Laboratory. The onsite space consists of 153,000 gross square meters (gsm) [1,650,000 gross square feet (gsf)] in about 60 buildings. Offsite space used by LBL consists of 16,000 gsm (170,000 gsf) in various buildings on the UCB campus and 14,000 gsm (150,000 gsf) in leased facilities in Emeryville and Berkeley.

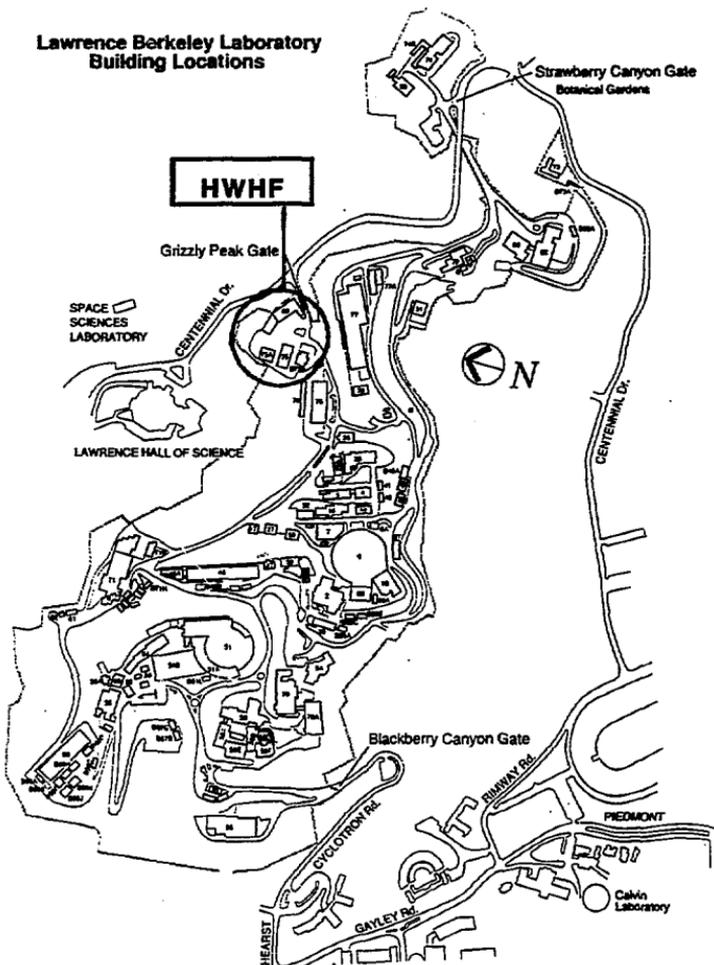
The Laboratory's 1993 population was approximately 3,535 full- and part-time employees, as well as a total of about 1,500 guests, of which about 600 were on site at any one time. Thus the total LBL population at any one time is about 4,200. Of this total, about 3,500 are located on the main site, 500 are located in campus buildings; and about 130 are in offsite leased space.

Continued on next page.

1. General Site Information (continued)

Figure 1-4

Map of LBL Main ("Hill") Site, Showing LBL Buildings



Continued on next page.

1. General Site Information (continued)

1.2.3 *Climate*

The climate of the LBL site is greatly influenced by its nearness to the Pacific Ocean and its exposure to the maritime air that flows in from the San Francisco Bay. Seasonal temperature variations are small, with a mean temperature difference between the summer 17°C (63°F) and winter 9°C (48°F) of only 8 degrees C (15 degrees F). Relative humidity ranges from 85–90 percent in the early morning to 65–75 percent in the afternoon. The average annual rainfall is 635 mm (25 inches). About 95 percent of the rainfall occurs from October through April, and intensities are seldom greater than 13 mm (0.5 inch) per hour. Thunderstorms, hail, and snow are extremely rare. Winds are usually light, but summer sea breezes range up to 32–48 kph (20–30 mph). Winter storm winds from the south or southwest have somewhat lesser velocities.

1.2.4 *Geology*

Most of the LBL site is underlain by complex sedimentary and volcanic rock. In general, the bedrock is relatively weak and weathers deeply. Consequently, a colluvial cover has been produced that is a few meters thick. The major geologic unit consists of poorly consolidated sandstones, siltstones, claystones, and conglomerates of relatively low strength and hardness. These rocks are blanketed by clay soils having high shrink-swell characteristics. The western and southern portions of the site are underlain by moderately well consolidated shales, siltstones, sandstones, and conglomerates. Throughout most of the upper elevations a volcanic unit overlays and is interbedded with the upper layers of the major geologic unit.

1.2.5 *Hydrogeology*

Highly complex groundwater conditions are present at LBL. Year-round springs, annual surface seeps, and variable water levels in observation wells indicate discontinuous and localized aquifers. These conditions are due to a combination of factors: open-fracture volcanic flow rock, impervious claystone interbeds, permeable sandstone lenses, and irregular fracture patterns associated with past folding and faulting. During the rainy season, groundwater levels increase and cause a decrease in slope stability. Consequently, the Laboratory has installed an elaborate groundwater detection and drainage system. Groundwater wells are not used as a source of Laboratory or local community drinking water. Groundwater drainage feeds into Blackberry Creek on the north portion and into Strawberry Creek on the south portion of the Laboratory. Both creeks eventually flow through the Berkeley campus and then into the City of Berkeley storm drainage system, which empties into San Francisco Bay.

Continued on next page.

1. General Site Information (continued)

1.2.6

Primary Mission

The Lawrence Berkeley Laboratory, operated by the University of California for the Department of Energy, provides national scientific leadership and supports technological innovation through its mission to

- perform leading multidisciplinary research in the energy sciences, general sciences, and biosciences;
 - develop and operate unique national experimental facilities for use by qualified investigators worldwide;
 - educate and train future generations of scientists and engineers; and
 - foster productive relationships between LBL research programs and industry.
-

2. Radioactive and Mixed Waste Management

2.1 Overview

The hazardous waste handling operations at LBL involve a wide range of chemicals and include radioactive and mixed wastes. Existing waste handling facilities consist of a centrally located waste handling complex to which radioactive and mixed wastes are routinely transported in small quantities from various locations within the Laboratory.

2.2 System and Facility Description

Figure 2-1 shows the radioactive waste streams handled at the HWHF. Brief descriptions of all these streams follow.

2.2.1 *High-Level Waste*

LBL is not a high-level waste generator.

2.2.2 *Transuranic Waste (Solid)*

Overview. LBL researchers generate very small quantities of transuranic waste, amounting to approximately one 55-gallon drum containing trace amounts over a two-year period.

Facility Description. LBL Building 75A, the waste handling and storage facility, is a completely enclosed metal structure. The floor is concrete and is completely curbed, with each curb being at least 150 mm (6 inches) high. This building was constructed to PCB-storage specifications and designed to hold TSCA, RCRA, and radioactive wastes. Its drum storage capacity for liquids is approximately 30 drums. Total drum capacity of all wastes is approximately 250 drums. The dimensions are 15 x 24 m (50 x 80) feet of floor area with a 5.5-meter (18-foot) ceiling height.

Controls to reduce the gross volume of transuranic waste are in place at LBL. The gross volume is reduced by evaporation, after which there are no free liquids. This waste is stored in the forms of dry salt crystals and oxide solids, which are contained in laboratory glassware and metal capsules.

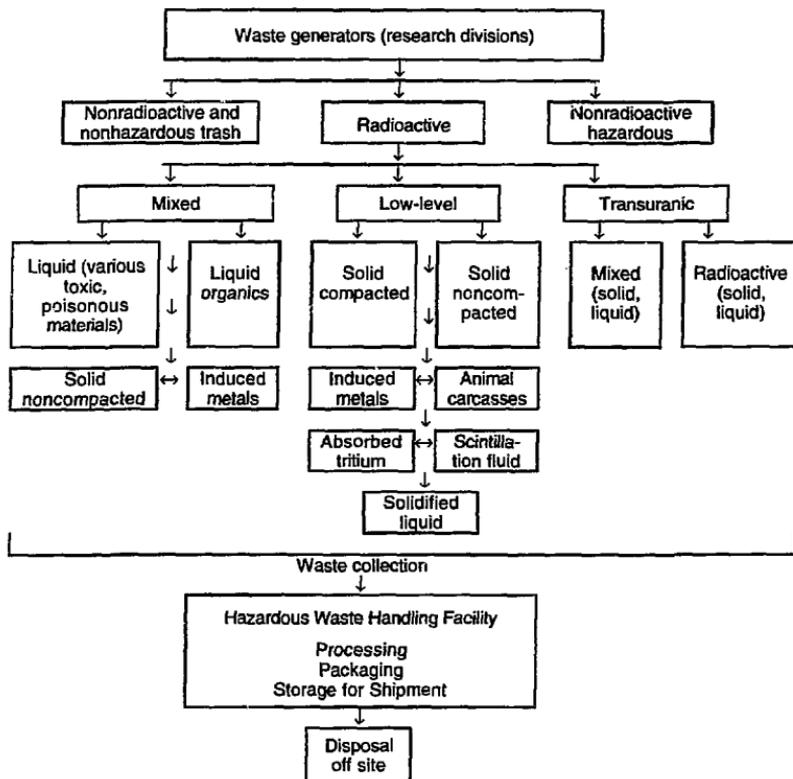
Transuranic wastes are assayed by the researchers, and a material balance is a requirement. The kinds and quantities of hazardous waste components are also estimated by the researchers. Mixed transuranic waste is treated to destroy hazardous components. LBL does not generate classified waste. The generation and treatment of transuranic waste at LBL is in compliance with DOE Order 5820.2A.

Four 55-gallon drums of transuranic waste are stored in Building 75A. Most of these transuranic wastes have been stored for up to 20 years pending offsite shipment when a disposal site becomes available.

Continued on next page.

2. Radioactive and Mixed Waste Management (continued)

Figure 2-1 Radioactive and Mixed Waste Streams Handled at the HWHF



Continued on next page.

2. Radioactive and Mixed Waste Management (continued)

2.2.3

Low-Level

Waste (General)

Overview. Low-level wastes constitute by far the greatest amount of radioactive waste generated at LBL. These low-level wastes include absorbed tritium, scintillation fluids, compacted solids, noncompact solids, solidified liquids, induced metals, and animal carcasses (biological material).

Facility Description. Refer to the description given in Section 2.2.2. This facility is used as a small-scale waste operation. The waste treatment techniques are continuously evolving to meet the waste disposal site's performance objectives. Dry laboratory waste is compacted to reduce the volume of radioactive waste.

2.2.4

Low-Level

Waste (Liquid)

Overview. LBL low-level liquid waste comes predominantly from its biological laboratories. It is collected in five-gallon plastic carboys and brought to the waste facility.

Facility Description. Refer to the description given in Section 2.2.2. The low-level liquid wastes are analyzed for organics, heavy metals, and total activity before they are solidified. The solidified wastes are packed in 55-gallon steel drums, with Hanford-approved absorbent filling the void space. The 55-gallon drums are eventually shipped off site for disposal.

2.2.5

Low-Level

Waste (Solid)

Overview. Low-level solid wastes are collected from laboratories throughout LBL and are packaged in cement sacks inside polyethylene bags approximately 4 mil thick, measuring 24 x 38 inches. These sacks are stored in metal cabinets and compacted, if the material is compactable.

Facility Description. Refer to the description given in Section 2.2.2. At the facility the bags of compactable low-level solid waste are compacted in 55-gallon drums. Noncompactable materials are consolidated uncompacted in 55-gallon drums or Hanford-approved wooden boxes. The bags' contents are recorded for eventual use in the shipping manifest.

Continued on next page.

2. Radioactive and Mixed Waste Management (continued)

2.2.6
Low-Level
Waste (Absorbed
Tritium)

Overview. At LBL practically all tritium waste is generated by the National Tritium Labeling Facility (NTLF). The personnel of the NTLF do the initial or primary packaging of all tritium waste generated at the Laboratory. This tritium waste is placed in glass or plastic jars inside one-gallon steel cans. The void space in these one-gallon cans, which must not be less than one inch deep, is filled with a special tar or asphalt specified by the disposal site. These cans are then stored in Building 75A until shipping.

Facility Description. Refer to the description given in Section 2.2.2. At the HWHF the cans are packed into 55-gallon drums with plastic liners specified by the disposal site. The contents and curie quantities of these are recorded and are used for the shipping manifests. The void spaces within the 55-gallon drums are backfilled with a Hanford-approved absorbent material. The drums are sealed and made ready for shipment to the disposal site.

2.2.7
Low-Level
Waste (Scintillation
Liquids)

Overview. Scintillation vials are collected in 10-gallon plastic containers. The majority of this waste is generated in the biological laboratories. It is collected and brought to Building 75A, where it is stored until further packaging for offsite shipment.

Facility Description. Refer to the description given in Section 2.2.2. At the facility the vials are packaged in 1-gallon (maximum) glass bottles and then placed in 55-gallon steel drums, with Hanford-approved absorbent filling the void space. The 55-gallon drums are eventually shipped off site for disposal.

Continued on next page.

2. Radioactive and Mixed Waste Management (continued)

2.2.8 Low-Level Waste (Animal Carcasses)

Overview. Animal carcasses are stored in freezers located at the animal research laboratories, where they are kept until shipment to the disposal site.

Facility Description. Refer to the description given in Section 2.2.2. Frozen carcasses are brought to the HWHF for treatment and shipping. First the short-half-life radioactive carcass wastes are separated from the long-half-life carcass wastes. Nonradioactive carcasses are disposed of as biological waste.

The radioactive carcasses are placed in a DOT 17C 30-gallon drum inner container, which is lined with a 4-mil (minimum) polyethylene film. The animal carcass wastes are placed in the drum with a mixture of 1 part lime and 10 parts diatomaceous earth by weight. This amount of absorbent is sufficient to absorb twice the volume of liquid potentially present. The liner is then sealed with cloth tape, and the lid is sealed with a locking ring and nut. This inner drum is then placed into a DOE 17C or 17H 55-gallon painted steel drum. The void spaces between the 30-gallon drum inside the 55-gallon drums are filled with absorbent. The drums are then sealed according to the disposal site specifications and made ready for shipping.

2.2.9 Low-Level Waste (Induced Metals)

Overview. Induced metals are self-contained metals that are made radioactive by bombardment with neutrons or charged particles in the LBL accelerators. Induced metals are palletized or placed in drums at the accelerators and brought to the Building 75 yard for storage.

Facility Description. Refer to the description given in Section 2.2.2. Personnel at the facility reduce the volume of induced metals by cutting and fitting items together during packing. The waste is strapped on pallets or placed in DOT-approved boxes and is stored at the Building 75 complex until shipped to the disposal site.

Continued on next page.

2. Radioactive and Mixed Waste Management (continued)

2.2.10

Mixed Waste

Overview. Mixed waste at LBL may fall into any of the following categories: solid noncompacted, liquid organic, compacted solid waste, or induced metals. LBL has an active minimization and segregation program in operation to minimize the generation of mixed waste.

Facility Description. Refer to description given in Section 2.2.2. Mixed waste is treated and packaged according to the specifications of the disposal site (Westinghouse Hanford Company, Hanford, Washington). Six metal lockers have been installed in Building 75A to store the mixed waste by proper hazard category. A storage lane has also been designated in Building 75A to store the Class 9 mixed waste before it is shipped to the Hanford site for disposal.

2.3

Current and Future Plans

2.3.1

Transuranic Waste Certification and Packaging Program

In accordance with DOE Order 5820.2A, transuranic solid waste generated at LBL will eventually be shipped to the Westinghouse Hanford Company Site and placed in interim storage pending eventual shipment to the Waste Isolation Pilot Project (WIPP) in New Mexico. Before shipment to WIPP, each waste package must be certified to meet the criteria of WIPP-DOE-069, *Transuranic Waste Acceptance Criteria for the WIPP*. LBL's plan for Westinghouse Hanford Company to certify stored waste is now under way. Westinghouse Hanford accepted LBL's Transuranic Waste Certification Plan in FY 1992.

2.3.2

Waste Reduction Program

A waste minimization program has been established at LBL. This program includes goals for minimizing the volume of both radioactive and hazardous wastes generated at the Laboratory. The program is consistent with the waste minimization implementation plan requirements of DOE Order 5820.2A, the EPA pollution prevention program, and the California waste reduction program.

2.3.3

Environmental Sampling Program

A site-characterization study designed to assess and characterize the extent of sitewide soil and groundwater contamination, if any, was initiated in FY 1990. This study will serve to provide the framework for a continuing environmental sampling program after the study is complete.

Continued on next page.

2. Radioactive and Mixed Waste Management (continued)

- 2.3.4 *Record-Keeping System* Low-level waste records and reports at LBL conform with the requirements of DOE Order 5820.2A. The computerized record-keeping system (Shoebox) is projected to be in place by the fourth quarter of FY 1995.
- 2.3.5 *Low-Level Waste Certification* The Low-Level Waste Certification Plan was written and accepted by Hanford in FY 1992.
- 2.3.6 *Mixed Waste Acceptance* Mixed waste at the HWHF is characterized in accordance with the mixed waste acceptance criteria by the Hanford Waste Disposal Site. A Mixed Waste Certification Plan was written and accepted by Hanford in FY 1992.
- A sitewide treatment plan (STP) is under development and is expected to be finalized in FY 1995. After gaining approval by the California Department of Toxic Substances Control (DTSC) and DOE Headquarters, LBL's mixed waste will be treated and disposed of as outlined in the STP.
- 2.3.7 *Replacement HWHF* This project will relocate the existing Hazardous Waste Handling Facility from a central area of the Laboratory to the Life Sciences Research Area at the eastern edge of the Laboratory site. The new facility will occupy approximately 12,000 square feet. The building will contain radioactive and mixed waste storage and handling functions, compactor space, and a radioactive waste solidification area on the first floor. The second floor will contain space for separation and storage areas for hazardous waste. The facility will be the central site for collection and packaging for all hazardous waste materials generated at the LBL site. The facility function will be to collect, treat, store, and prepare wastes for transport to offsite disposal facilities permitted by DOE, EPA, and the California Department of Health Services.

Continued on next page.

2. Radioactive and Mixed Waste Management (continued)

2.4 **Implementation Summary** The following table shows the LBL implementation summary requirements. This table follows the format shown in the LBL Site Implementation Plan.

LBL Implementation Requirements			
DOE 5280.2A Requirement	Actual Practice	Current Plans	Estimated Cost and Completion Date
Transuranic waste certification	Transuranic Waste Certification Plan accepted by Westinghouse Hanford	Obtain approval to ship.	Cost: See Section 3 (Schedule and Cost Summary) Date: Ongoing
Transuranic waste packaging	Transuranic waste packaging program designed to meet WIPP requirements	Package transuranic waste pending approval to ship.	Cost: See Section 3 (Schedule and Cost Summary) Date: Ongoing
Low-level waste generation	Existing low-level waste generation program fully auditable	Continue to upgrade generator training.	Cost: See Section 3 (Schedule and Cost Summary) Date: Ongoing
Low-level waste acceptance	Low-level Waste Certification Plan accepted by Westinghouse Hanford	Continue shipping low-level waste to Hanford.	Cost: See Section 3 (Schedule and Cost Summary) Date: Ongoing
Low-level waste treatment	Existing low-level waste treatment program fully auditable	Continue treatment per Hanford approval.	Cost: See Section 3 (Schedule and Cost Summary) Date: Ongoing
Low-level waste environmental monitoring	Existing sampling program is fully auditable	Additional site sampling wells to be installed.	Cost: See Section 3 (Schedule and Cost Summary) Date: Ongoing
Low-level waste reports and records	Existing program fully auditable	Continue to upgrade existing record-keeping system.	Cost: See Section 3 (Schedule and Cost Summary) Date: Ongoing

3. Schedule and Cost Summary

3.1

Hazardous Waste Handling Facility

3.1.1

Basis for Cost Estimates

A new and improved Hazardous, Radioactive, and Mixed Waste Handling Facility is being constructed to replace the aged existing facility. The new facility will consolidate existing waste collection, storage, and processing activities presently conducted in a complex of several older buildings and cargo containers, into a new, specially designed facility with improved containment features and additional work space. All waste from the new facility will be shipped off site to approved disposal sites.

In the Conceptual Design Report for the new facility, LBL detailed the basis for cost estimates for the new HWHF.

3.1.2

Five-year Costs (\$k) and Milestones

FY 95	FY 96	FY 97	FY 98	FY 99
625	171	0	0	0

Milestone	Start date	End date
Sitework Title II	6/90	3/93
Sitework Construction	4/93	11/93
Sitework Title III	4/93	1/94
Building Title II	10/93	7/94
Building Construction	10/94	4/96
Building Title III	9/94	5/96

Continued on next page.

3. Schedule and Cost Summary (continued)

3.2

Existing Hazardous Waste Handling Facility Closure

3.2.1

Basis for

Cost Estimates

This project consists of activities required by RCRA and the State of California Department of Health Services to close the existing LBL waste handling facilities at Buildings 75, 75A, and 69. The new waste handling facility is currently under construction. Closure of the existing facilities is provided in LBL's RCRA Part B Permit and includes decommissioning and decontamination of Buildings 75, 75A, and 69; relocation of furniture and equipment to the new facility; and a geotechnical investigation.

3.1.2

Five-year Costs (\$k) and Milestones

FY 95	FY 96	FY 97	FY 98	FY 99
0	500	1779	0	0

Milestone	Start date	End date
Assessment and closure plan	See note below	9/30/97
Facilities cleanup and equipment relocation start	See note below	9/30/97

Note: To start no later than 30 calendar days after completion of the replacement HWHF.

3.3

Facility Operations and Maintenance

3.3.1

Basis for

Cost Estimates

This activity supports the ongoing sitewide waste management program at LBL. The primary mission of the waste management program is to provide for the safe treatment, storage, transport, and disposal of hazardous, radioactive, and mixed wastes generated by LBL operations.

The FY 1995 costs include plans to clear the existing HWHF of mixed and low-level waste, in order to minimize the quantity of waste that will need to be moved to the replacement HWHF in FY 1996. In order to accomplish this goal, the Waste Management Group plans to ship approximately 670 cubic feet of mixed waste and 1700 cubic feet of low-level waste to Hanford. In FY 1995, the Waste Management Group will also begin a preoperational survey at the replacement HWHF site.

3.1.2

Five-year Costs (\$k) and Milestones

FY 95	FY 96	FY 97	FY 98	FY 99
8162	9030	6994	7123	7259

Milestone	Start date	End date
Continuing operations	N/A	N/A

Continued on next page.

3. Schedule and Cost Summary (continued)

3.4

Waste Minimization

Planning and Evaluation

3.4.1

Basis for

Cost Estimates

This project consists of planning activities needed to develop a sitewide waste minimization plan required by (1) provisions of LBL's RCRA Part B Permit; (2) provisions of State of California SB14, which required the preparation of a source reduction review and plan by September 1, 1991, with subsequent activities and reporting required in the out years; (3) provisions of LBL's Wastewater Discharge Permit from the East Bay Municipal Utility District, which requires the preparation of a waste minimization opportunity assessment report containing an audit and plan for pollutants released from LBL facilities; and (4) provisions of DOE Orders 5400.1 and 5820.2A, which require the preparation of a documented waste minimization program. Planning activities include carrying out a comprehensive inventory of all radioactive and hazardous materials used in Laboratory facilities, and assessing management techniques for reducing this inventory to the lowest practical level. Techniques to be evaluated include recycling spent chemicals, purchasing the smallest usable quantities of material practical, and the use of nonhazardous substitutes where possible. A formal waste minimization plan, which identifies actions to be implemented by the Laboratory, including documentation and reporting activities, was completed in FY 1991 and revised in FY 1994. Funding for implementation has been requested from the Office of Energy Research.

3.1.2

Five-year Costs (\$k) and Milestones

	FY 95	FY 96	FY 97	FY 98	FY 99
	518	424	1004	1025	1045

Milestone	Start date	End date
Submit revised waste minimization plan	4/94	11/94
Submit annual waste reduction report	-	6/94
Submit Hazardous Waste Recyclable Materials Report	-	6/94
Update Hazardous Waste Source Reduction and Management Review	-	9/94

4. Environmental Monitoring Programs

As part of a sitewide environmental monitoring and restoration program, the HWHF is monitored for soil and water contamination. The sitewide project was initiated after elevated levels of hazardous substances were found in groundwater outflow from two onsite hydrauger locations and a 1988 DOE environmental survey identified the need for the LBL site to be characterized for soil and groundwater contamination.

In addition, several instruments provide ongoing radiation monitoring of the HWHF site. These include the following:

- Atmospheric tritium (as HTO) is measured at 12 locations on the site, one of which (ENV-69A) is located at the northeast corner of Building 69A.
- Gross atmospheric particulate beta and alpha activities are measured at several sites around the Laboratory, one of which (ENV-75) is located at the south side of Building 69.
- A recording Geiger-Muller instrument located in the western end of Building 75A continuously monitors impact from waste storage in Building 75A and the adjacent corporation yard.

The Environmental Monitoring Unit conducts effluent monitoring of the HWHF Compactor. Unit staff also maintain a general particulate sampler and two tritium samplers inside the HWHF. The Unit samples the effluents from the storage box. Details of LBL's environmental monitoring program are provided in the *Annual Site Environmental Report of the Lawrence Berkeley Laboratory*.

Appendix A. Waste Management Documentation Requirements

1. High-Level Waste (Chapter I) Not applicable

2. Transuranic Waste (Chapter II)

- (a) Transuranic waste certification plan and date of issue: *Certification Plan, Transuranic Waste, Hazardous Waste Handling Facility*, LBL PUB-5355, June 1992
- (b) Closure plan for interim storage facilities: *Hazardous Waste Treatment and Storage Permit Application for the Lawrence Berkeley Laboratory Hazardous Waste Handling Facility (the "Part B Permit")*, Volumes 3A, 3B
- (c) Buried Transuranic-Contaminated Waste Program (not applicable)

3. Low-Level Waste (Chapter III)

- (a) Radiological performance assessment of disposal facilities (not applicable)
- (b) Waste acceptance criteria for each low-level waste treatment and disposal facility:
 - *Hanford Site Radioactive Solid Waste Acceptance Criteria*, WHC-EP-0063, latest revision (Westinghouse Hanford)
 - *Certification Plan, Low-Level Waste, Hazardous Waste Handling Facility*, LBL PUB-5353, June 1992 (LBL)
- (c) Status of audits of certification activities by operators of disposal facilities: LBL is audited yearly by Westinghouse Hanford Corporation.
- (d) Documents forecasting waste to be shipped:
 - Hanford 30-Year Forecast
 - Mixed Waste Inventory Report
 - Waste Management Group Five-Year Plan Activity Data Sheets
- (e) Reports justifying onsite waste disposal exceeding Class C limits (not applicable)
- (f) Major NEPA documentation supporting selection of new disposal sites (not applicable)
- (g) Closure plans for low-level waste disposal sites (not applicable)

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Appendix A. Waste Management Documentation Requirements (continued)

4. Decommissioning of Radioactively Contaminated Facilities

- (a) Field organization documentation where complete listing and the jurisdictional program responsibility for all contaminated facilities is recorded (not applicable)
 - (b) Post-operational documentation that records the potential for reuse and recovery of materials and equipment and the schedule for decommissioning contaminated facilities: *Hazardous Waste Treatment and Storage Permit Application for the Lawrence Berkeley Laboratory Hazardous Waste Handling Facility* (the "Part B Permit"), Volumes 3A, 3B
 - (c) Decommissioning project plans and dates of issue; schedule for presentation of plans in current fiscal year (not applicable)
 - (d) Final radiological and chemical survey reports and project final reports, showing dates of issue; show anticipated additions to this list for the coming year (not applicable)
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