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Federal Facility Compliance Act

Proposed Site Treatment Plan for Lawrence Berkeley Laboratory

Prepared for

The State of California
California Environmental Protection Agency
Department of Toxic Substances Control
Hazardous Waste Management Program
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EXECUTIVE SUMMARY

Purpose of the Site Treatment Plan

The Proposed Site Treatment Plan (PSTP) for the Lawrence Berkeley Laboratory (LBL) was written in response to the Federal Facility Compliance Act (FFCAct). The FFCAct requires that site treatment plans (STPs or plans) be developed for facilities at which the U.S. Department of Energy (DOE) generates or stores mixed waste. Mixed waste is defined by the FFCAct as any waste containing both a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) and source, special nuclear, or by-product material subject to the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.).

On April 6, 1993, DOE published *The Schedule for Submitting Plans for the Treatment of Mixed Waste Generated or Stored at Each Site* in the *Federal Register* (58 *FR* 17875) describing its proposed process for developing the site treatment plans. The plans would be developed in three phases: conceptual, draft, and proposed. The conceptual plan presented known treatment needs, capabilities, and preliminary options for treating the mixed waste. The purpose of the draft plan was to identify site-specific preferred options for treating the mixed waste, or for developing technologies where technologies do not exist or need modification. The proposed plan reflects DOE's preferred options, developed with State input and based on existing available information. The options reflect a "bottom-up" approach and have been evaluated for their potential affects on other DOE sites and the overall DOE program. Changes in the preferred options and associated schedules were also made between the draft and proposed site treatment plans as a result of evaluations from the DOE-wide perspective. These may change further as a result of discussions with affected states and public comments before the approval of the PSTP and issuance by the California Department of Toxic Substances Control (DTSC) of an Order (FFCAct Order) requiring DOE to implement the STP for each site.

The PSTP consists of the Compliance Plan Volume, and the Background Volume and its Appendices. The Compliance Plan Volume contains the enforceable milestones associated with the preferred treatment options. A more detailed discussion of the preferred treatment options, which is provided for informational purposes only, is presented in the Background Volume and its Appendices.

DOE faces increasingly tight budgets throughout the DOE complex and anticipates that funding will continue to be constrained. The schedules in this and other Plans reflect those constraints. DOE has asked regulatory agencies to work with DOE and other interested parties at the site and National level to assist DOE in prioritizing its activities. Through this process, DOE expects that some schedules will be revised before the Site Treatment Plans are approved and FFCAct Orders issued.

Summary of PSTP Proposed Options for LBL

Current inventories of mixed low-level wastes at LBL are relatively small, with total known quantities not exceeding 6.25 m^3. All mixed waste is proposed to either be characterized, undergo additional technology assessment, or to be shipped offsite for treatment at: the Idaho National Engineering Laboratory (INEL) in Idaho (5.41 m^3), the Oak Ridge National Laboratory in Tennessee (0.42 m^3), or the Hanford Site in Washington (0.42 m^3). Some wastes will be neutralized at LBL before being shipped offsite to the INEL (1.74 m^3). Schedules for these activities vary by waste stream.

Future generation of small quantities of mixed wastes at LBL is expected due to continued laboratory operations. Future mixed wastes generated that do not meet RCRA Land Disposal Restriction requirements will be characterized and addressed in updates to this plan as required.

FEDERAL FACILITY COMPLIANCE ACT
PROPOSED SITE TREATMENT PLAN
FOR
LAWRENCE BERKELEY LABORATORY
BERKELEY, CALIFORNIA

BACKGROUND VOLUME

Prepared for

The State of California
California Environmental Protection Agency
Department of Toxic Substances Control
Hazardous Waste Management Program
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List of Abbreviations and Acronyms

CCR	California Code of Regulations
CFR	Code of Federal Regulations
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CH	Contact Handled
CSTP	Conceptual Site Treatment Plan
CTF	Cyanide Treatment Facility
D&D	Decontamination and Decommissioning
DOE	U.S. Department of Energy
DOE/OAK	U.S. Department of Energy/Oakland Operations Office
DSTP or Draft Plan	Draft Site Treatment Plan
DSTP Framework	Draft Site Treatment Plan Development Framework
DTSC	State of California Department of Toxic Substances Control
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EM	Environmental Management
EMAB	Environmental Management Advisory Board
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
FFCAct or the Act	Federal Facility Compliance Act
FY	Fiscal Year
HLW	High-level Waste
HWHF	Hazardous Waste Handling Facility
INEL	Idaho National Engineering Laboratory
IWPF	Idaho Waste Processing Facility
LDR	Land Disposal Restriction
LBL or the Laboratory	Lawrence Berkeley Laboratory
MLLW	Mixed Low-level Waste
MTRU	Mixed Transuranic Waste
MWIR	Mixed Waste Inventory Report
MSDS	Material Safety Data Sheets
NEPA	National Environmental Policy Act
NGA	National Governors Association
NRC	Nuclear Regulatory Commission
OAT	Options Analysis Team
ORNL	Oak Ridge National Laboratory
PEIS	Programmatic Environmental Impact Statement
PSTP	Proposed Site Treatment Plan
QA/QC	Quality Assurance and Quality Control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
ROD	Record of Decision
SRS	Savannah River Site
STP	Site Treatment Plan
SWMU	Solid Waste Management Unit
TRU	Transuranic Waste
WAC	Waste Acceptance Criteria
WEDF	Waste Engineering Development Facility
WERF	Waste Experimental Reduction Facility
WIPP	Waste Isolation Pilot Project
WRAP II-A	Waste Recovery and Processing Facility II-A

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1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

The Proposed Site Treatment Plan (PSTP) for the Lawrence Berkeley Laboratory (LBL) was written in response to the Federal Facility Compliance Act (FFCAct). The FFCAct requires that site treatment plans (STPs or plans) be developed for facilities at which the U.S. Department of Energy (DOE) generates or stores mixed waste. Mixed waste is defined by the FFCAct as any waste containing both a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA), and source, special nuclear, or by-product material subject to the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.). On April 6, 1993, DOE published *The Schedule for Submitting Plans for the Treatment of Mixed Waste Generated or Stored at Each Site* as a notice in the *Federal Register* (58 *FR* 17875) describing its proposed process for developing the site treatment plans. The plans would be developed in three phases: conceptual, draft, and proposed. The conceptual plan presented known treatment needs, capabilities, and preliminary options for treating the mixed waste. The purpose of the draft plan was to identify site-specific preferred options for treating the mixed waste, or for developing technologies where technologies do not exist or need modification. The proposed plan reflects DOE's preferred options, developed with state input and based on existing available information. The options reflect a "bottom-up" approach and have been evaluated for their potential affects on other DOE sites and the overall DOE program. Changes in the preferred options and associated schedules were also made between the draft and proposed site treatment plans as a result of evaluations from the DOE-wide perspective. Public comment and discussions with affected states may result in further changes prior to approval of the PSTP and issuance by the regulating agency of an Order (FFCAct Order) requiring DOE to implement the STP for each site. For DOE Oakland Operations Office (DOE/OAK) sites in California, the plans must be submitted to the State of California Department of Toxic Substances Control (DTSC) for approval, approval with modification, or disapproval.

The PSTP identifies specific facilities for treating mixed waste and proposes schedules as required by the FFCAct. Schedules for activities associated with the preferred treatment options are also provided as appropriate. A standardized evaluation procedure was used to identify the specific treatment facilities for treating the mixed wastes. If existing onsite treatment, onsite small-scale treatment (less-than-90-days generator treatment or a treatability study), or an existing commercial treatment agreement was available, then that option was considered the preferred treatment option. If these options were not available, then planned onsite, existing offsite, or planned offsite facilities that could potentially treat the waste were identified and evaluated. The evaluations were based on criteria including: (1) treatment effectiveness, (2) environmental health and safety, (3) implementability, (4) regulatory concerns, (5) stakeholder concerns, and (6) life-cycle costs. The preferred treatment option selected for each characterized waste stream as a result of these evaluations, as modified by the DOE site-wide mixed waste treatment configuration, is presented in the PSTP.

The Proposed Plan also contains schedules for the implementation of the preferred treatment options. DOE faces increasingly tight budgets throughout the DOE complex and anticipates that funding will continue to be constrained. The schedules in this and other Plans reflect those constraints. DOE is providing schedules to support further discussions with the expectation that schedules in the approved Plans will differ for some sites from the schedules in the Proposed Plans.

The schedules contained in this and the Proposed Plans for other sites are based on funds currently budgeted for and projected to be available for waste management activities. As a result, schedules in the Proposed Plans for some facilities, particularly the largest and most costly facilities, may be protracted. Schedules for small sites that are relying on the treatment capacity at larger sites are also affected. DOE anticipates that, at some sites, funds will be shifted from other environmental management activities to support more sensible and integrated schedules for mixed waste treatment.

DOE discussed with States and EPA the difficulty DOE faces in providing timely schedules for some new treatment facilities given current budgetary constraints, and the need to consider whether funds from other activities should be shifted to support more timely schedules. The States and EPA recommended that the Proposed Plans be submitted with schedules consistent with current budget and priorities, even though they recognized schedules may be extended. As part of its efforts to develop its budget request for FY 1997, DOE has asked regulatory agencies to work with DOE and other interested parties at the site and National level to assist DOE in prioritizing its activities, including mixed waste treatment, and in assessing activities under way and that need to be accomplished at the site. Through this budget development process and through discussions on the Proposed Plans, DOE and the regulatory agencies expect that some schedules will be revised before the Site Treatment Plans are approved and the FFCAct Orders are issued.

Even after the Plans are approved, DOE anticipates that modifications and adjustments to the Plan will be necessary because of the technical and funding uncertainties that naturally exist with long-term activities like those covered by the Plans. For example, emerging or new technologies not yet considered may be identified in the future that provide opportunities to manage waste more safely, effectively, and at lower cost than the current technologies identified in the Proposed Plan. DOE will continue to evaluate and develop technologies that offer potential advantages in the areas of public acceptance, risk abatement, and performance and life cycle cost. Should more promising technologies be identified, DOE may request a modification of its treatment plan in accordance with provisions of the final Site Treatment Plan and/or the FFCAct Order.

The PSTP reflects the results of discussions among the State of California and other states, the U.S. Environmental Protection Agency (EPA), and others based on the *Conceptual Site Treatment Plan* (CSTP) submitted to the State of California in October 1993, and the *Draft Site Treatment Plan* (DSTP) submitted in August of 1994. The plans for DOE/OAK mixed wastes located at LBL are available for review at the Department of Energy Oakland Operations Office Public Reading Room at 1301 Clay Street, Oakland, California.

The PSTP consists of the Compliance Plan Volume, the Background Volume and its Appendices. The Compliance Plan Volume contains the enforceable milestones associated with the preferred treatment options. A more detailed discussion of the preferred treatment options, which is provided for informational purposes only, is presented in the Background Volume and its Appendices.

1.2 SITE HISTORY AND MISSION

Lawrence Berkeley Laboratory

LBL is a 130-acre site, situated within 1,183 acres of land owned by the University of California. It is located at One Cyclotron Road, Berkeley, California 94720. LBL land is leased to the DOE through a series of 50-year lease agreements. The primary mission of LBL is to perform leading multidisciplinary research in the general sciences, including high energy and nuclear physics, the energy sciences, materials research, biology, medicine, chemistry, geology, applied science and engineering.

Environmental Restoration activities include both soil and groundwater assessment and interim actions. One interim action currently involves the capture of contaminated groundwater in a pump and treat system. The potential source of the contaminated groundwater has been identified and removed. Remediation activities will consist of the design and implementation of corrective measures dictated by the results of the assessment phase. It is anticipated that remediation efforts will be accomplished in three phases. Based on evaluations conducted by the LBL Environmental Restoration Group, the activities described above are not anticipated to generate mixed wastes.

Currently, waste management activities include the transportation of hazardous, radioactive (including Transuranic-TRU), and mixed waste, limited treatment, and storage. Waste Management activities occur in Buildings 75 and 75A and part of Building 69 and the adjacent storage yards. A RCRA Part B Permit was issued to LBL on May 4, 1993. The

permit allows for the consolidation, neutralization, and solidification of mixed waste, as well as the temporary storage of hazardous and radioactive wastes. A replacement Hazardous Waste Handling Facility (HWHF) is currently under construction and is planned to be completed in FY96.

1.3 FRAMEWORK FOR DEVELOPING DOE'S SITE TREATMENT PLANS

RCRA Land Disposal Restrictions (LDR) require the treatment of hazardous waste [including the hazardous component(s) of mixed waste] to certain standards before the waste can be land-disposed, and prohibit storage of hazardous wastes that do not meet LDR standards, except for the purposes of accumulating sufficient quantities to facilitate proper recovery, treatment, or disposal of the waste. DOE is currently storing mixed waste inconsistent with the LDR provisions because the treatment capacity for such wastes, either at DOE sites or in the commercial sector, is not adequate or is unavailable at this time.

The FFCAct, signed on October 6, 1992, waives sovereign immunity for fines and penalties for RCRA violations at Federal facilities. However, the FFCAct postpones the waiver for three years for LDR storage prohibition violations for DOE mixed wastes and requires DOE to prepare plans for developing the required treatment capacity for its mixed waste at each site at which it stores or generates mixed waste. Each plan must be approved by the state or EPA, after consultation with other affected states and consideration of public comment, and an order issued by the regulatory agency requiring compliance with the plan. The FFCAct further provides that DOE will not be subject to fines and penalties for LDR storage prohibition violations for mixed waste as long as it is in compliance with an approved plan and order.

The FFCAct requires the plans to contain schedules for developing capacity for mixed waste for which identified treatment technologies exist, and, for mixed waste without an identified existing treatment technology, schedules for identifying and developing technologies. The FFCAct also requires the plan to provide certain information where radionuclide separation is

proposed. The FFCAct states that the plans may provide for centralized, regional or onsite treatment of mixed waste, or any combination thereof, and requires the states to consider the need for regional treatment facilities in reviewing the plans.

The *Schedule for Submitting Plans for the Treatment of Mixed Waste Generated or Stored at Each Site* was published as a notice on April 6, 1993, in the *Federal Register* (58 *FR* 17875). In the notice, DOE committed to providing the site treatment plans in three phases: a conceptual plan to be submitted in October 1993, a draft plan to be submitted no later than August 1994, and a final proposed plan to be submitted no later than February 1995. The date for submittal of the final proposed plan has been amended to April 1995. This process provides opportunity for early involvement by the states and other stakeholders to discuss technical and equity issues associated with the plans.

The CSTP, submitted in October 1993, focused on identifying treatment needs, capabilities, and options for treating the site's mixed waste. The DSTP, submitted in August 1994, focused on identifying preferred options for treating the site's mixed wastes, as well as proposed schedules for constructing treatment capacity. The options presented in the DSTP represent the site's best judgment of the available information, the states' input, and provided a starting point for discussions leading to the development of the PSTP. The proposed plan is being submitted to the regulatory agency for review and approval, approval with modification, or disapproval, as required by the FFCAct. Each version of the plan reflects discussions among states, as well as site-specific input from the individual regulatory agency and other interested parties on the previous submittal. It is DOE's intent that this iterative process, with ample opportunity for input and discussion, will facilitate approval of the *Site Treatment Plan* and issuance of the compliance Order required by the FFCAct. DOE's goal is to have all plans and FFCAct Orders in place by October 1995.

1.4 PSTP ORGANIZATION

The PSTP for DOE/OAK mixed wastes located at LBL follows the same format as the proposed plans of other DOE sites to facilitate cross-site comparisons. The proposed plan is organized in two separate, but integrated volumes. The Compliance Plan Volume is a short, focused document containing the preferred options and schedules for implementing the options and is intended to contain all the information required by the FFCAct. The Compliance Plan Volume also contains a mechanism to implement the plan and establish schedules that will be enforced by the Order. It references, but does not duplicate, details on the options in the Background Volume. This *Background Volume* is one of two volumes that constitute the PSTP. It provides a detailed discussion of the preferred treatment option or options, identifies the waste streams the option addresses, and gives explanatory information for the *Compliance Plan Volume*.

Sections 1.0 and 2.0 in the Background and Compliance Plan Volumes contain introductory material relevant to the purpose of each volume. The Background Volume contains general information on the proposed plan and the site in Section 1.0, and provides top-level assumptions and a description of the process used to determine the preferred options in Section 2.0.

Sections 1.0 and 2.0 of the Compliance Plan Volume propose certain administrative provisions appropriate for implementing the plan when finalized. These include provisions such as the approach to setting milestones, updates to the plan, additions or removals of waste streams covered by the plan, and funding considerations. These sections are intended to initiate discussion; it is expected that the specific language will be developed in conjunction with the regulatory agency. New language to address other administrative provisions may eventually be added to these compliance plan volume sections or incorporated into a separate FFCAct Order.

Sections 3.0 through 5.0 of the Compliance Plan and Background Volumes discuss the preferred option or options for mixed low-level waste (MLLW), mixed transuranic waste (MTRU), and high-level waste (HLW). Each volume discusses the same waste streams and options in parallel sections. The Background Volume discusses the waste streams, technology needs, and uncertainties and other details on the preferred options. In the Compliance Plan Volume, the sections include proposed schedules as required under the FFCAct.

The Background Volume includes three additional sections that are not included in the Compliance Plan Volume because they are not required by the Act and are not compliance-related. *Section 6.0* discusses mixed wastes expected to be generated in the future to assist in anticipating treatment needs. These waste streams will be incorporated into the Compliance Plan Volume, and treatment approaches and schedules developed, when the wastes are generated. *Section 7.0* discusses storage capacity needs and how compliant storage will be provided for DOE/OAK mixed wastes located at LBL pending treatment. Section 7.0 also includes a discussion of storage for waste treatment residues prior to disposal.

Section 8.0 describes a process being followed by DOE and the states for evaluating options for disposal of mixed waste treatment residues. Although the FFCAct does not require disposal to be covered in the plans, DOE is including disposal information to be responsive to the states' request that disposal be addressed and to support state discussions. Section 8.0 identifies that LBL is not being considered as a disposal site. Resources and guidance documents used to prepare this document are summarized in *Section 9.0*.

The PSTP also includes the agreements between DOE/OAK and offsite treatment facilities in Appendix A of the Background Volume. Appendix B of the Background Volume includes a glossary of terms.

1.5 RELATED DOCUMENTS

Other DOE efforts that could be closely linked to STP development may include treatment options analysis, cost estimating for treatment options, the Mixed Waste Inventory Report (MWIR), activities conducted pursuant to the National Environmental Policy Act (NEPA), California Environmental Quality Act (CEQA), RCRA Part B permit, and compliance and cleanup agreements containing commitments relevant to mixed waste.

1.5.1 Draft Site Treatment Plan Appendices

The appendices to the draft STP (DSTP) present summaries and evaluations of treatment options initially identified for DOE/OAK mixed wastes identified at that time. In some cases, the likely preferred option identified in the DSTP for a waste has been changed due to technical considerations (e.g., trace contaminants found to be incompatible with the treatment process), or policy decisions (e.g., proposed facilities eliminated or inconsistent with the overall DOE preferred mixed waste treatment configuration).

1.5.2 The Mixed Waste Inventory Report

The *Mixed Waste Inventory Report*, which is required by the FFCAct contains inventories of (a) mixed waste currently stored or generated or expected to be generated during the next five years from DOE activities and (b) treatment capacities and technologies. The *Interim Mixed Waste Inventory Report* provided information on each waste stream for each site that generates or stores DOE mixed waste. Updated waste stream, treatment facility, and technology data was made available to the states and EPA in May 1994. The MWIR represents the best record of mixed waste at LBL inventory at the beginning of 1994. Because data are constantly being refined, waste stream information in DOE/OAK's proposed plan for LBL may differ somewhat from the most recent inventory report. An updated MWIR is currently being prepared and is being closely coordinated with preparation

of the proposed plans to ensure consistency in waste stream information between the two documents. The updated MWIR data is expected to be released by DOE in July 1995.

1.5.3 The Programmatic Environmental Impact Statement for Waste Management (NEPA)

DOE is preparing a Programmatic Environmental Impact Statement (PEIS) which will be used to formulate and implement a waste management program in a safe and environmentally sound manner and in compliance with applicable laws, regulations and standards. The PEIS is intended to present to the public, states, EPA, and DOE an understanding of impacts to human health and the environment together with the costs associated with a wide range of alternative strategies for managing the DOE's environmental program. The PEIS is examining the following waste types and activities: high-level, transuranic, mixed low-level waste, low-level, and hazardous. The analysis for the Waste Management (WM) PEIS will evaluate decentralized, regional, and centralized approaches for storage of high-level waste; treatment and storage of transuranic waste; treatment and disposal of low-level and low level mixed waste; and treatment of hazardous waste.

Development of the WM PEIS is being coordinated with the preparation of the Site Treatment Plans under the Federal Facility Compliance Act. Information being generated to support the WM PEIS (e.g., hypothetical configurations, preliminary risk analyses, and cost studies) is shared with states to support STP discussions. The Draft WM PEIS will not identify a preferred alternative (i.e., configuration) for mixed waste facilities since this will be evolving in consultation with the states and EPA through the STP process. However, the WM PEIS analyses of potential environmental risks and costs associated with a range of possible waste management configurations will provide valuable insight as the public, states, and DOE discuss using existing facilities and constructing new mixed waste facilities to treat mixed waste.

The Draft WM PEIS is scheduled to be published in May 1995. The Final PEIS will be issued after a public comment period, at or near the time of issuance of the Consent Orders

by the appropriate regulatory agency. To remain flexible and accommodate potential changes, the WM PEIS Record of Decision for mixed waste will be issued after the appropriate regulatory agency has fulfilled their legislative requirement of issuing the Consent Orders.

1.5.4 Documents Required by The California Environmental Quality Act

The CEQA, California Public Resources Code Section 21000 et seq, as amended, is the principal statute mandating environmental impact review of governmental actions in the State of California. Guidelines for implementing the CEQA program are contained in 14 CCR 1500 et seq. CEQA was developed by the California legislature with the intent to: maintain a quality environment; take all actions necessary to protect and rehabilitate the environmental quality of the state; and require governmental agencies at all levels to develop standards and procedures necessary to protect environmental quality. The CEQA process provides opportunities for input and comment by other governmental agencies and the public.

The California DTSC has determined that approval of the PSTPs for DOE-managed waste located at California sites is subject to CEQA. An Initial Study will be prepared by DTSC for each of the sites to determine if implementation of the PSTPs may have a "significant effect on the environment." If an Initial Study indicates that no significant effects will occur, DTSC will issue a "Negative Declaration." If any aspect of an Initial Study reveals that a project may cause a significant effect on the environment, an Environmental Impact Report (EIR) must be prepared before the plan for that site is implemented.

1.5.5 RCRA Permit Status

LBL is permitted by the DTSC to operate an onsite hazardous waste storage and treatment facility under RCRA authority delegated to the State from the U.S. EPA. The permit allows LBL to store certain mixed wastes in containers at its existing HWHF and at a replacement HWHF to be constructed in 1996. The waste streams permitted are those generated onsite

and at LBL research facilities located at the U.C. Berkeley campus and a separate leased research laboratory located in Berkeley. The treatment processes permitted include neutralization, consolidation and solidification of certain mixed wastes in the existing facility as well as the replacement facility. The total maximum storage capacity for mixed wastes at the existing facility (February 1995) is 3,245 gallons. LBL is planning to request in the spring of 1995 an expansion to one mixed waste storage area to allow an additional 3,080 gallons to be stored. The maximum storage capacity of the replacement facility will be 6,490 gallons for mixed waste. The maximum daily treatment capacity at the existing facility is 550 gallons per day for consolidation and solidification and 50 gallons per day for neutralization of mixed waste. The maximum daily treatment capacity at the replacement facility will be 550 gallons per day for consolidation and solidification and 72 gallons per day for neutralization of mixed waste.

1.6 Summary and Status of DOE/OAK Mixed Wastes At LBL

Current inventories of mixed wastes at LBL are relatively small, with total quantities not exceeding 7 m^3. All mixed waste is proposed to be either characterized, undergo additional technology assessment, or shipped offsite for treatment at the Idaho National Engineering Laboratory, Oak Ridge National Laboratory, or Hanford facilities. Some wastes will be neutralized at LBL before offsite shipment. Schedules for these activities vary by waste stream. The projected volume of mixed waste through 1997 is approximately 4 m^3.

A summary of DOE/OAK mixed wastes located at LBL identified to date is shown in Table 1-1. This table is included as a tracking tool to indicate the status or disposition of mixed wastes that are subject to this PSTP. When a mixed waste no longer needs to be included in this PSTP (e.g., if further characterization indicates that it is not a RCRA waste, or when treatment is complete), discussions of the waste, schedule, and treatment information about the mixed waste stream will be deleted from this PSTP. The reference to the waste stream in Table 1-1 will be kept, however, to provide a final accounting of the waste stream disposition.

Table 1-1

Summary of DOE/OAK Mixed Waste Streams at LBL

MWIR No.	Waste Stream Description	Background Volume Section	Status
MLLW, Aqueous Liquids/Solids - Corrosives, CH			
LB-W001 a (onsite) b (offsite)	Ignitable and non-ignitable acidic aqueous solutions/solids with metals and radionuclides. Alpha contamination less than or equal to 10 nanoCuries/gram (nCi/g).	3.1.1	Onsite Neutralization & INEL: WERF Incineration and Stabilization, if necessary
LB-W011 a (onsite) b (offsite)	Ignitable and non-ignitable acidic aqueous solutions/solids with metals and radionuclides. Alpha contamination greater than 10 nCi/g, but less than or equal to 100 nCi/g.	3.1.1	Onsite Neutralization & INEL: IWPF Thermal Treatment and Stabilization, if necessary
LB-W002 a (onsite) b (offsite)	Alkaline solutions/solids with metals and radionuclides. Alpha contamination less than or equal to 10 nCi/g.	3.1.1	Onsite Neutralization & INEL: WERF Incineration and Stabilization, if necessary
LB-W012 a (onsite) b (offsite)	Alkaline solutions/solids with metals and radionuclides. Alpha contamination greater than 10 nCi/g, but less than or equal to 100 nCi/g.	3.1.1	Onsite Neutralization & INEL: IWPF Thermal Treatment and Stabilization, if necessary
MLLW, Aqueous Liquids/Solids - Reactives, CH			
LB-W003	Cyanide solutions contaminated with radionuclides.	3.1.2	ORNL: Cyanide Treatment Facility
LB-W013	Organic water reactives contaminated with radionuclides.	3.3	Technology Assessment required
LB-W023	Lithium salts contaminated with radionuclides.	3.3	Technology Assessment required
LB-W033	Uranium chips contaminated with radionuclides.	3.3	Technology Assessment required
MLLW, Organic Liquids/Solids, CH			
LB-W004	Ignitable and non-ignitable liquids/solids containing solvents and oil contaminated with metals and radionuclides. Alpha contamination less than or equal to 10 nCi/g.	3.1.3	INEL: WERF Incineration and Stabilization
LB-W014	Ignitable and non-ignitable liquids/solids containing solvents and oil contaminated with metals and radionuclides. Alpha contamination greater than 10 nCi/g, but less than or equal to 100 nCi/g.	3.1.3	INEL: IWPF Thermal Treatment and Stabilization
MLLW, Elemental Lead, CH			
LB-W005	Blocks and sheets of lead induced and surface contaminated with radionuclides.	3.1.4	Hanford: WRAP II-A Macroencapsulation
MLLW, Elemental Mercury, CH			
LB-W006	Elemental Induced Mercury.	3.1.5	INEL: WEDF Amalgamation
MLLW, Scintillation Fluids, CH			
LB-W007	Organic liquids (scintillation fluid) contaminated with radionuclides. Alpha contamination less than or equal to 10 nCi/g.	3.1.3	INEL: WERF Incineration

Table 1-1

Summary of DOE/OAK Mixed Waste Streams at LBL

MWIR No.	Waste Stream Description	Background Volume Section	Status
LB-W017	Organic liquids (scintillation fluid) contaminated with radionuclides. Alpha contamination greater than 10 nCi/g, but less than or equal to 100 nCi/g.	3.1.3	INEL: IWPF Thermal Treatment
MLLW, Aqueous Liquids/Solids - Oxidizers, CH			
LB-W008	Aqueous liquid/solid oxidizers, ignitable and non-ignitable, contaminated with tritium and other radionuclides. Alpha contamination less than or equal to 10 nCi/g.	3.1.3	INEL: WERF Incineration
LB-W018	Aqueous liquid/solid oxidizers, ignitable and non-ignitable, contaminated with tritium and other radionuclides. Alpha contamination greater than 10 nCi/g, but less than or equal to 100 nCi/g.	3.1.3	INEL: IWPF Thermal Treatment
MLLW, Predominantly Combustible Debris, CH			
LB-W009	Contaminated debris: paper, plastic and glass contaminated with volatile organics, metals, and radionuclides. Alpha contamination less than or equal to 10 nCi/g.	3.1.3	INEL: WERF Incineration and Stabilization
LB-W019	Contaminated debris: paper, plastic and glass contaminated with volatile organics, metals, and radionuclides. Alpha contamination greater than 10 nCi/g, but less than or equal to 100 nCi/g.	3.1.3	INEL: IWPF Thermal Treatment and Stabilization
MLLW, Uncharacterized			
LB-W010	Uranium hexaflouride gas	3.3	Uncharacterized
LB-W101	Aqueous organic liquids	3.3	Uncharacterized
LB-W111	Aqueous waste liquids	3.3	Uncharacterized
LB-W020	Boron triflouride gas	3.3	Uncharacterized
LB-W030	Carbon monoxide gas	3.3	Uncharacterized
LB-W040	Ethylene gas	3.3	Uncharacterized
LB-W050	Methane gas	3.3	Uncharacterized

2.0 METHODOLOGY

2.1 ASSUMPTIONS

All sites used the following assumptions to provide for a degree of consistency in the preparation of the Proposed STPs. The assumptions were developed as a part of the "Draft Site Treatment Plan Development Framework" and reflect review and comment from the states and EPA.

1. HLW will continue to be managed according to current plans at each site (i.e., Hanford, West Valley, Savannah River Site (SRS), INEL). Primarily due to potential safety concerns, HLW will not be transported offsite except as a treated, stable waste that is ready for disposal. The PSTPs will not change management strategies for HLW.

2. Regarding defense-related MTRU, the PSTPs reflect DOE's current strategy that WIPP will open and receive a No-Migration Variance. The PSTPs identify characterization, processing, and treatment of MTRU waste to meet the WIPP Waste Acceptance Criteria (WAC). Consistent with this policy, treatment of MTRU waste to meet LDR standards will not be included in the PSTPs at this time.

   However, the PSTP recognizes that DOE's policy regarding WIPP is under review and may change in the future. As such, the PSTPs provide for the flexibility to modify activities and milestones regarding MTRU waste to reflect potential future changes in DOE policy.

   Under current DOE policy, non-defense related TRU waste will not be disposed of at WIPP. As such, the PSTPs do reflect LDR treatment of non-defense MTRU waste.

3. DOE recognizes some states' preference for treatment of all wastes onsite. Where appropriate, existing onsite capacity will be utilized before new facilities are

constructed. When onsite treatment or use of commercial or mobile facilities is not practicable, the use of existing offsite capacity, as well as the construction of new facilities, will be considered.

4. Sites in the same state will investigate the practicality of consolidated treatment facilities.

5. Mixed waste resulting from Environmental Restoration (ER) and Decontamination and Decommissioning (D&D) activities will be factored into planning activities and equity discussions, particularly where utilization of facilities identified in the PSTPs are being considered for managing ER and D&D waste.

6. On a volume basis, the large majority of DOE's mixed waste will be treated onsite. Because of transportation concerns and costs, this generally includes process waste water, and some explosives and remote-handled wastes. In addition, other large volume waste streams will generally be treated onsite. At a minimum, the Hanford site, Oak Ridge National Laboratory (ORNL), INEL, and SRS will have onsite facilities to treat the majority of their wastes.

7. The DOE Environmental Management Programmatic Environmental Impact Statement (PEIS) is being prepared in parallel with the development of the STPs. The PSTP process will provide input to the PEIS. Each site will prepare any necessary specific NEPA documentation before proceeding with a specific project or facility approved by the state or EPA and incorporated into the STP and FFCAct Order.

The State of California is required to comply with all requirements of CEQA prior to approval of the Plans. Each California site will prepare any necessary specific CEQA documentation before proceeding with a specific project or facility approved by the state or EPA as part of the STP process.

8. In support of DOE's cradle-to-grave waste management philosophy, disposal site location and criteria will be factored into state equity discussions, waste treatment facility designs, and the characteristics of the final waste forms.

9. In order to provide target dates for schedules regarding offsite shipment of wastes, various assumptions are identified in Tables 3-3 (a) and (b). Some assumptions specify time periods for actions by the offsite facilities that will receive the wastes; if these time periods are exceeded, the target date(s) may be impacted. Assumptions for off-site shipment schedules include estimated time frames for receiving the treatment facility WAC approval of certification plans and waste profiles, and identification of an approved shipping date.

2.2 PREFERRED OPTION SELECTION PROCESS

The preferred option selection process was conducted in two phases. Phase 1 consisted of the respective DOE sites developing preferred options for their mixed waste streams. This process and the sites' preferred treatment options were detailed in Appendix A of the DSTP. Phase 2 consisted of a Options Analysis Team (OAT) evaluating the respective DOE site's preferred options and optimizing the overall treatment configuration. The resulting overall DOE-preferred mixed waste treatment configuration is included as a reference in Section 9 of this Background Volume.

2.2.1 Preferred Option Selection Process - Phase 1

DOE prepared several guidance documents to assist the sites in working through treatment identified and selection of preferred options. The overall process is contained in the DSTP Framework, which establishes common terminology, objectives and values, planning assumptions, and a recommended methodology for narrowing the alternatives presented in the CSTP. The Treatment Selection Guides, Revision 0, dated March 14, 1994, provides information on selecting among treatment options by comparing the options on fundamental criteria such as regulatory compliance, environmental health and safety, treatment effective-

ness, implementability, stakeholder concerns, and life-cycle costs. The Draft Site Treatment Plan Cost Information Guidance, dated April 21, 1994, provides a level of consistency in the cost information by providing common cost assumptions. In some cases, site-specific cost information was also used to develop cost estimates for the preferred treatment options. Drafts of these and other technical assistance documents were provided to the states and their comments were incorporated into the final revision. These documents are available in the DOE/OAK Public Reading Room at 1301 Clay Street, Oakland, California.

DOE/OAK developed an option selection process consistent with the DOE's Draft Framework. The process favors the use of existing onsite or readily implementable treatment capabilities. Therefore, onsite treatment of wastes at existing facilities (such as treatment of aqueous liquids and homogeneous solids at LBL) is considered a preferred treatment option. Additionally, onsite "less than 90-day treatment" (as allowed under the state tiered permitting program) and treatability studies as allowed under 22 CCR 66261.4(e) were preferred treatment options when determined to be appropriate for a specific waste stream. If appropriate, existing commercial contracts for treatment of mixed waste were identified as preferred treatment options.

If none of the preferred treatment options described above is identified for a given waste stream, then planned onsite and planned and existing offsite treatment facilities were evaluated. DOE's evaluation of planned onsite facilities consisted of mobile, fixed-base, or bench-scale treatment units. Mobile treatment units are made up of small-scale units (which could include a series of units or "treatment train") than can be transported from site to site to allow waste treatment at the site where the waste is generated. Fixed-base treatment facilities are typically large-scale units permanently located at a site and are typically expensive to construct and operate. Additional information regarding fixed-base units is available in Section 3.3 of Appendix A to the DSTP. Bench-scale units are small-scale units that may require regulatory approval but are typically designed to treat very small quantities of waste. Additional discussion of bench-scale units is available in Section 3.0 of the Appendix A to the DSTP. Planned and existing offsite facilities evaluated by DOE/OAK consisted of a hypothetical centralized treatment facility located in California and proposed to

be operated at LBL and other existing or planned treatment facilities at other DOE sites in the DOE complex. The proposed centralized treatment option at LBL would utilize several existing and planned treatment units. This centralized option was considered for treatment of waste generated from five DOE/OAK sites located in California. The evaluation of the mobile, fixed-base, bench-scale and centralized treatment options was conducted using the following major criteria categories:

- Treatment Effectiveness
- Environmental Health and Safety
- Implementability
- Regulatory Concerns
- Stakeholder Concerns
- Life-Cycle Costs

The results of these evaluations were used as an analytical tool to determine a preferred treatment option. The process is considered to be a subjective evaluation process that relies on the best professional judgements of the evaluators. Additional data regarding how preferred treatment options were identified are outlined in Section 2.0 of Appendix A to the DSTP.

In summary, the options selection process examined preferred treatment options, including existing onsite treatment (including mobile treatment), existing commercial agreements, potential modifications to existing facilities, treatability studies, or treatment of wastes in tanks and containers within 90 days of generation (generator treatment option). If none of these options was available, planned onsite or existing or planned offsite facilities were evaluated to determine a preferred treatment option. The preferred treatment options identified as a result of these evaluations are summarized in Appendix A to the DSTP.

2.2.2 Options Selection Process - Phase 2

Because the DSTPs were prepared by the sites using a "bottom-up" approach, the resulting treatment configuration, when viewed from a national level, contained many redundancies and inefficiencies. In developing the PSTPs, an assessment was performed to determine what accommodations are necessary to blend the "bottom-up" DSTPs into a more sensible national configuration of treatment systems. To facilitate this assessment, DOE established the OAT comprised of site representatives and members of the Headquarters' FFCAct Task Force. The OAT coordinated their efforts with the states, through the National Governors' Association, to ensure the national mixed waste configuration reflects both the states' and DOE's concerns. As part of this evaluation, the impacts of implementing the emerging DSTP configuration, as well as alternative configurations, were evaluated.

The focus of the OAT's efforts has been on MLLW. While HLW and MTRU are also covered by the FFCAct, the strategies for managing these wastes have already been established. However, DOE recognizes that modifications of these strategies may be needed as the programs evolve and new information becomes available.

In combination, the DSTPs form a mixed waste treatment configuration which was the baseline for the OAT analyses. Changes to the DSTP configuration proposed by the OAT are based on the following analyses:

1. Review of the DSTP baseline configuration to identify redundant and technically inefficient proposed treatment options.

2. Identification of alternative treatment configurations that emphasize key state and DOE concerns.

3. Evaluation of the DSTP baseline and alternate configurations against key evaluation areas to determine what combination of treatment options results in a configuration that best meets DOE's, the states', EPA's and other stakeholders' concerns.

The results of the initial OAT analysis were shared with each of the sites and the state regulators, as well as DOE management. The OAT worked for several more months responding to state requests for additional analysis, incorporating ongoing site analysis, and responding to comments. The resulting configuration, as presented in the PSTPs, is DOE's best attempt to balance competing DOE and stakeholder interests.

The overall DOE preferred mixed waste treatment configuration results in two changes to the preferred treatment options identified in the LBL DSTP. The OAT decision to eliminate the Hanford Thermal Treatment Facility from the Preferred Treatment Configuration impacts the treatment of organic liquids and debris currently stored at LBL. As a result of the first change, these waste streams will be treated at either the INEL's Waste Experimental Reduction Facility (WERF) or Idaho Waste Processing Facility (IWPF). The INEL WERF will be used to treat waste streams with less than or equal to 10 nanocuries/gram (nCi/g) of alpha emitting radionuclides. Those waste streams that have greater than 10 nCi/g of alpha emitting radionuclides will be treated at the IWPF which will be designed to treat alpha contaminated mixed waste. The change is reflected in Section 3.0 of the LBL PSTP. The second change involves sending mercury waste to the INEL's Waste Engineering Development Facility (WEDF) instead of treating it onsite through a treatability study.

2.3 COORDINATION WITH REGULATORY AGENCIES AND OTHER STAKEHOLDERS

The FFCAct offers an opportunity for DOE, the state, and EPA regulators who will be approving the Plans to work cooperatively toward defining mixed waste treatment plans. As requested by the states, DOE signed a cooperative agreement in August 1993 with the NGA to facilitate the DOE-to-State interactions. The NGA has sponsored national meetings on a routine basis with DOE, the states, EPA, and the Indian Nations throughout the development of the STPs.

The FFCAct requires the states and EPA to provide for public involvement after the PSTPs are submitted. DOE has provided additional opportunities for public input into the

development of the Conceptual and Draft Plans through existing public involvement mechanisms at the site.

DOE/OAK has initiated and encouraged public participation during the development of the PSTPs from Oakland Operations Office sites. DOE/OAK regularly conducts FFCAct Coordination meetings with the DTSC, the State of California Department of Health Services, and Region 9 of the EPA. In coordination with DTSC, two FFCAct Fact Sheets have also been developed. Volume Numbers 1 and 2 in a series of three Fact Sheets were published in January and September of 1994. These were sent to approximately 1,000 public recipients. The Fact Sheets explain commonly asked questions regarding the FFCAct and the STP development and approval process, addresses how the public can become more involved, and provide contact names and repository locations where STP documents can be reviewed. Additionally, throughout the STP process, mixed waste issues have been included on the agenda at several meetings conducted by DOE/OAK. These meetings were attended by the public and a wide variety of regulatory agencies.

At the national level, DOE has presented information on the development of the STPs to the Environmental Management Advisory Board, and held an Open House in Washington, D.C. when the Draft Plans were released. DOE also met informally with representatives of Indian Tribes and separately with representatives of other groups that may have interest in Site Treatment Plan development. The purpose of the meetings was to determine if there are national issues that may not be identified through site-specific activities. Additional opportunities to obtain input at the National level may be offered in coordination with the States and EPA. The Center for Environmental Management provides information on FFCAct activities at the National level (1-800-736-3282; or 202-863-5084 in Washington, D.C.).

2.4 CHARACTERIZATION OF MIXED WASTES

Characterization of mixed wastes at LBL is performed in accordance with the *Guidelines for Generators of Radioactive and Radioactive Mixed Waste at LBL*. Waste characterization

procedures are also addressed in the LBL RCRA Part B Permit in Section III, Waste Analysis Plan.

Each mixed waste to be sent to the HWHF is characterized before pickup to determine the chemical and physical nature of the hazardous or mixed waste. Insufficiently characterized or unknown waste is not accepted for transfer to the HWHF. The waste is characterized using information from one or more of the following sources:

- Process knowledge of wastes whose composition is documented by the procedures generating them, and records (logs) of accumulation that document each time a chemical is added to a container
- A material safety data sheet (MSDS) for all chemicals or materials used in an experiment or process
- An MSDS for spent or unused materials
- A generic description when the material has a well-known standard composition (e.g., waste batteries or waste mercury-contaminated glassware)
- Analytic results from a certified laboratory on known waste streams where the chemical makeup will not change for some time (waste profile)
- Analytic results from a certified laboratory for each sample

LBL maintains data on mixed wastes for at least three years or until the wastes are shipped offsite. These data are available for review at LBL. For each characterized waste, as indicated in this document, data are adequate to propose a treatment plan.

Process Knowledge

Because most of the mixed waste streams at LBL are generated during specific processes in the course of laboratory experiments, the generator knows the chemical contents of a unit of waste from his/her knowledge of the process used to generate that waste. This knowledge includes how the chemicals were used, whether the process produced hazardous intermediate constituents, or if the conversion of hazardous to nonhazardous constituents occurred.

Furthermore, the generator is able to validate the contents on the basis of the pertinent written procedure, logs of activities, and the results of analyses conducted in the course of the experiment and recorded in data books. Sampling and analysis is conducted on 10% of the mixed waste at LBL to verify chemical components and radioisotopes.

Waste Profiling

If hazardous waste of a known waste stream whose composition and chemical makeup will not change over time are generated, the waste may be profiled to avoid completing required analysis for every batch of waste. HWHF personnel are available to assist generators with sampling and with the arrangements for analysis of the waste to be profiled. A HWHF compliance specialist reviews the data; and, if the waste qualifies, the compliance specialist will issue the generator a numbered profile for the waste stream.

Radioactive Waste Tag and Hazardous Waste Label

All mixed wastes require a Hazardous Waste label and a Radioactive Waste tag. All generators are required to certify that the information on the radioactive waste tag is accurate by signing and dating the tag. The Radioactive Waste tag provides the supporting documentation for chemical characterization and contains the following information:

- Physical form (e.g., dry, aqueous liquid, organic liquid, gas, scintillation vials, biological)
- Building, Room, Division, and Operator account number
- Generator's name
- Radioactivity (date placed in container, isotope, and total activity). Radioactivity is quantified through mass balances, and occasionally also through surface counts
- Complete composition and concentration (in grams per milliliter) of all chemicals
- Dry waste constituents (item and volume percent)
- The total weight of dry constituents and total volume of liquid constituents

- Whether the waste is compactable or noncompactable.

The Hazardous Waste Label requires the following information:

- Generator name and building number
- Chemical name, material name, or waste stream description and a description of the waste composition
- Satellite Accumulation Area start date
- Waste Accumulation Area receival or accumulation start date
- Generator's phone number
- Hazardous properties (e.g., toxic, corrosive, ignitable, reactive, other)
- Waste form (e.g., solid, gas, liquid)

Segregation of Hazardous and Mixed Wastes

As a waste minimization practice, hazardous and mixed wastes are managed separately, from the point of generation to disposal. The two categories of wastes are separated to prevent inadvertent generation of mixed waste by contamination of hazardous wastes with radioactive constituents; to prevent dispersal of mixed wastes to the environment; and, for occupational health reasons, to reduce personnel exposure to radiological health hazards.

2.4.1 DOE Treatability Groups

Treatability groups are used to characterize DOE waste stream information in a consistent and technically valid manner based on waste characteristics. Treatability groupings for waste streams in this PSTP are based on three parameters: (1) radiological, (2) waste stream matrix, and (3) regulated contaminants. Each of the three parameters are divided into subcategories based on the type of treatment required to meet RCRA LDR requirements for disposal. DOE mixed waste streams are classified using the treatability group classification

system outlined in *Waste Treatability Group Guidance*. The three parameters that define a treatability group are defined as follows:

The *Radiological* parameter identifies up to four key elements including (1) radiological waste classification as low-level, TRU, high-level, or mill tailings; (2) handling restrictions, noted as contact-handled (CH) or remote-handled (RH); (3) TRU alpha levels, indicating the presence and activity level (if known) of alpha-emitting TRU radionuclides; and (4) nonTRU alpha levels, indicating the presence and activity level (if known) of other alpha-emitting radionuclides.

The waste *Matrix* identifies the overall bulk physical and chemical form of the waste. The matrix code is selected from a list containing approximately 100 codes, and consists of a title and a single character to describe the waste stream physical form (e.g., "S" for solids, "L" for liquids), plus a four-digit code describing the chemical form of the waste stream (if known).

The *Regulated Contaminant* parameter identifies up to three key elements to indicate the regulatory classification and types of regulated contaminants in the waste, including (1) the regulatory program that covers the waste (e.g., "RC" for RCRA-regulated); (2) the presence of any RCRA-regulated hazardous organics (code "O") and/or metals (code "M") for which LDR treatment standards have not been met or established; and (3) whether the waste exhibits a RCRA hazardous characteristic (code "C") for ignitable, corrosive, or reactive wastes.

Under this waste classification system, waste streams that fit the criteria for a specific treatability grouping will have the same or similar matrices, and the same or similar radiological and chemical contaminants. This allows site-wide comparisons and groupings of DOE waste streams in order to assess treatment technology, capacity, and development needs. Treatability groups have been identified, if known, for DOE/OAK mixed waste located at LBL in Table 3-1 (for MLLW). The definitions for the codes used for the LBL treatability groups are provided in Table 2-1.

Table 2-1

DOE TREATABILITY GROUP CODES FOR DOE/OAK MIXED WASTES AT LBL

Code	Definition
Radiological Parameters	
LL	Low-Level
CH	Contact-Handled
T11	$10 \leq$ TRU α $<$ 100 nCi/g
T12	$0 <$ TRU α $<$ 10 nCi/g
T90	TRU α Presence Unknown
N11	NonTRU $\alpha \geq$ 10 nCi/g
N12	$0 <$ NonTRU α $<$ 10 nCi/g
N90	NonTRU α Presence Unknown
Matrix	
L1110	Acidic Waste Waters
L1120	Basic Waste Waters
L1140	Cyanide Waste Waters
L1190	Unknown/Other Wastewaters
L2190	Unknown/Other Aqueous/Organic Liquids
L2900	Unknown/Other Organic Liquids
S3290	Unknown/Other Organic Homogeneous Solids
S3141	Chloride Salts
S5440	Predominantly Organic Debris
X7100	Elemental Mercury
X7210	Elemental Lead
X7510	Bulk Reactive Metals
X7590	Unknown
X7700	Compressed Gases/Aerosols
Regulated Contaminant	
RC	RCRA-Regulated
SR	Suspect Regulated
C11	Ignitable
C12	Corrosive
C13	Reactive
C14	Ignitable and Corrosive
C16	Corrosive/Reactive
C17	Ignitable/Corrosive/Reactive
C90	Not Ignitable, Corrosive, or Reactive
O11	Organics Present
O90	No Organics Present
M11	Metals without Mercury
M12	Metals with Mercury
M90	No Metals

2.5 WASTE MINIMIZATION

The LBL Waste Minimization and Pollution Prevention Awareness Program is designed to eliminate or minimize pollutant releases to all environmental media from all aspects of the site's operations. In accordance with the EPA guidelines and DOE policy, a hierarchical approach to waste reduction has been adopted and is applied to all types of wastes including mixed wastes. Waste minimization/pollution prevention will be accomplished by eliminating or minimizing the generation of wastes through application of source reduction techniques where appropriate. Those potential waste materials that cannot be eliminated or minimized will be recycled (i.e., reused, reclaimed, or decontaminated) if practicable. Moreover, selected waste streams will be treated to reduce volume, toxicity, or mobility prior to storage or disposal. Waste minimization/pollution prevention techniques will be implemented with the support of employee training and awareness programs. New opportunities for waste minimization/pollution prevention will be identified and developed through the performance of waste minimization assessments and surveys.

3.0 LOW-LEVEL MIXED WASTE STREAMS

The waste streams identified in this section are MLLW located at LBL, which contain both a RCRA-hazardous waste and radioactive constituents. MLLW is defined as mixed waste that does not satisfy the definition of HLW as defined in Section 5, nor is it a transuranic waste (contains TRU constituents over 100 nCi/g). Alpha-contaminated MLLW (α-MLLW), which is waste with TRU contamination greater than 10 nCi/g but less than or equal to 100 nCi/g, has historically been managed at DOE along with TRU waste, but is addressed in this document as MLLW.

Table 3-1 provides a detailed description of LBL's mixed waste streams (including RCRA waste codes) for which technology exists, a summary of preferred treatment options, and a summary of the volumes of mixed waste in inventory. The volumes in Table 3-1 reflect current information and are not necessarily those listed in the MWIR database dated May 1994. The updated MWIR will be developed during July 1995. Table 3-2 addresses the MLLW streams that have not been characterized adequately to determine a treatment option. The treatment options identified will meet the Land Disposal Restriction Standards as defined in 22 CCR 66268 (40 CFR 268), and will be conducted in accordance with all RCRA requirements. This includes, but is not limited to, adhering to Waste Analysis Plans written in accordance with RCRA and maintaining/developing the applicable record-keeping, notification, and/or certification requirements mandated by RCRA.

For the purpose of determining the appropriate treatment technologies and identifying treatment options, mixed waste streams are categorized into treatability groups based on their radiological, matrix and regulated contaminant parameters (see Section 2.4.1 of Background Volume). The treatability groups are identified in Table 3-1 for characterized waste streams, and in Section 3-3 as available for uncharacterized waste streams and waste streams requiring technology assessment.

Tables 3-3(a) through (e) contain the proposed treatment or characterization schedules for DOE/OAK MLLW at LBL. Activities noted in boldface print in these tables are repeated in the Compliance Plan Volume as enforceable milestones and/or non-enforceable target dates. Other intermediate activities and dates shown in these Background Volume tables are for information only, and may be used to facilitate internal tracking of progress for each waste stream. For consistency in comparing activities for treating MLLW at DOE/OAK sites required to prepare PSTPs, the tables have been assigned the following standard identification: (a) is reserved for onsite treatment schedules; (b) is reserved for offsite treatment schedules; (c) is reserved for technology development schedules; (d) is reserved for small scale treatment; and (e) is reserved for schedules for waste streams requiring characterization or technology assessment. The tables are included in the PSTP only if applicable to this site at this time.

3.1 MIXED WASTE STREAMS FOR WHICH TECHNOLOGY EXISTS

The waste streams at LBL have been broken into eight treatability group matrix categories. These categories are: (1) Aqueous Liquids/Solids - Corrosive; (2) Cyanide Wastewaters; (3) Organic Liquids/Solids; (4) Scintillation Fluids; (5) Aqueous Liquid/Solid Oxidizers; (6) Predominantly Combustible Heterogeneous Debris; (7) Elemental Lead; and (8) Elemental Mercury.

This section describes the technology required to treat these waste streams and the preferred treatment option or options. The preferred treatment option(s) was (were) identified utilizing the option selection process described in Section 2.2 of the PSTP and Appendix A in the DSTP.

As explained in Section 2.2 of this Background Volume, the OAT identified two changes with regard to the LBL preferred treatment options. These changes include shipping wastes that require incineration to the INEL WERF or IWPF instead of the previously proposed

Table 3-1
Preferred LDR Treatment Options for LBL Mixed Waste Streams

MWIR No.	Waste Stream Description/Treatability Group No.	RCRA Waste Codes[1]	Universal Treatment Standard	Best Demonstrated Available Technology (BDAT)	Preferred Treatment Option	Current Volume (m^3)	Projected Generation through 1997)[2]
MMLW, Acidic Aqueous Liquids/Solids, CH							
LB-W001 a = onsite b = offsite	Ignitable and non-ignitable acidic aqueous solutions and solids with metals and radio-nuclides. Alpha contamination less than or equal to 10 nano Curies/gram (nCi/g)/LL-CH-T12-N12/L1110/RC-011-M11-C14	D001, D002, D004-D011, D019, D022, D028, D031, D038, D039, F002, F003, F005	Technology Based Code: Deactivation followed by treating underlying constit-uents to concentra-tion based standards cited in 40 CFR 268.48 or discharge to POTW	Neutralization, Stabilization, Incineration	Onsite (Neutralization), INEL WERF Incinerator (Stabilization and when necessary Incineration)[3]	0.74[4]	0.60[4]
LB-W011 a = onsite b = offsite	Ignitable and non-ignitable acidic aqueous solutions and solids with metals and radionuclides. Alpha contamination greater than 10 nCi/g but less than or equal to 100 nCi/g. / LL-CH-T11-N11 N90/Ll110/RC-011-M11-C14	D001, D002, D004-D011, D019, D022, D028, D031, D038, D039, F002, F003, F005	Technology Based Code: Deactivation followed by treating underlying constituents to concentration based standards cited in 40 CFR 268.48 or discharge to POTW	Neutralization, Stabilization, Incineration	Onsite (Neutralization), INEL IWPF Thermal Treatment (Stabilization and when necessary Incineration)[3]		

Table 3-1 (Continued)
Preferred LDR Treatment Options for LBL Mixed Waste Streams

MWIR No.	Waste Stream Description/Treatability Group No.	RCRA Waste Codes[1]	Universal Treatment Standard	Best Demonstrated Available Technology (BDAT)	Preferred Treatment Option	Current Volume (m^3)	Projected Generation through 1997)[2]
MLLW, Basic Aqueous Liquid/Solids, CH							
LB-W002 a = onsite b = offsite	Basic aqueous solutions and solids with metals and radionuclides. Alpha contamination less than or equal to 10 nCi/g / LL-CH-T12-N12/L1120/RC-011-M11-C12	D002, D004-D011, D022, D035. D039, F002, F003, F005	Technology Based Code: Deactivation followed by treating underlying constituents to concentration based standards cited in 40 CFR 268.48 or discharge to POTW	Neutralization, Stabilization, Incineration	Onsite (Neutralization), INEL WERF Incinerator (Stabilization and when necessary Incineration)[3]	1.0[4]	0.81[4]
LB-W012 a = onsite b = offsite	Basic aqueous solutions and solids with metals and radionuclides. Alpha contamination greater than 10 nCi/g but less than or equal to 100 n Ci/g / LL-CH-T11-N11/L1120/RC-011-M11-C12	D002, D004-D011, D022, D035. D039, F002, F003, F005	Technology Based Code: Deactivation followed by treating underlying constituents to concentration based standards cited in 40 CFR 268.48 or discharge to POTW	Neutralization, Stabilization, Incineration	Onsite (Neutralization), INEL IWPF Thermal Treatment (Stabilization and when necessary Incineration when necessary)[3]		
Cyanide Wastewaters							
LB-W003	Cyanide solutions contaminated with radio nuclides. / LL-CH-T90-N90/L1140/RC-011-M11-C17	D001, D002, D003	Technology Based Code: Deactivation followed by treating underlying constituents to concentration based standards cited in 40 CFR 268.48 or discharge to POTW	Alkaline Chlorination (for wastewater concentration standards)	Oak Ridge National Laboratory (Chemical Oxidation)	0.42	0.32

Table 3-1 (Continued)
Preferred LDR Treatment Options for LBL Mixed Waste Streams

MWIR No.	Waste Stream Description/Treatability Group No.	RCRA Waste Codes[1]	Universal Treatment Standard	Best Demonstrated Available Technology (BDAT)	Preferred Treatment Option	Current Volume (m^3)	Projected Generation through 1997)[2]
MLLW, Organic Liquids/Solids, CH							
LB-W004	Ignitable and non-ignitable liquids/solids containing solvents and oil contaminated with metals and radionuclides. Alpha contamination less than or equal to 10 nCi/g. / LL-CH-T12-N12-N90/L2900/RC-011-M11-C11	D001, D004-D011, D018, D019, D022, D028, D035, D038, D040, F002, F003, F005	Technology Based Code: Deactivation followed by treating underlying constituents to concentration based standards cited in 40 CFR 268.48 or discharge to POTW	Fuel substitution. organics recovery, or incineration; Stabilization; Deactivation	INEL WERF Incinerator and Stabilization (Incineration and Stabilization when necessary)[3]	3.3[4]	2.28[4]
LB-W014	Ignitable and non-ignitable liquids and solids containing solvents and oil contaminated with metals and radionuclides. Alpha contamination greater than 10 nCi/g but less than or equal to 100 nCi/g. / LL-CH-T11-N11/L2900RC-011-M11-C11	D001, D004-D011, D018, D019, D022, D028, D035, D038, D040, F002, F003, F005	Technology Based Code: Deactivation followed by treating underlying constituents to concentration based standards cited in 40 CFR 268.48 or discharge to POTW	Fuel substitution. organics recovery, or incineration; Stabilization; Deactivation	INEL IWPF Thermal Treatment Facility and Stabilization (Incineration and Stabilization when necessary)[3]		
MLLW, Elemental Lead, CH							
LB-W005	Blocks and sheets of lead metal induced and surface contaminated with radionuclides. / LL-CH-T90-N90/X7210/RC-090-M11-C90	D008	Subcategory: Radioactive lead. Technology based code: macro encapsulation.	Macroencapsulation	Hanford WRAP II A Facility (Macroencapsulation)	0.42	0.00
MLLW, Elemental Mercury, CH							
LB-W006	Induced Mercury Waste. / LL-CH-T90-N90/X7100/RC-090-M12-C90	D009	Subcategory: Radioactive elemental mercury. Technology based code: Amalgamation	Amalgamation	INEL WEDF Amalgamation	0.11	0.00

Table 3-1 (Continued)
Preferred LDR Treatment Options for LBL Mixed Waste Streams

MWIR No.	Waste Stream Description/Treatability Group No.	RCRA Waste Codes[1]	Universal Treatment Standard	Best Demonstrated Available Technology (BDAT)	Preferred Treatment Option	Current Volume (m^3)	Projected Generation through 1997)[2]
MLLW, Scintillation Fluids, CH							
LB-W007	Labpacked organic liquids (scintillation fluids) contaminated with radionuclides. Alpha contamination less than or equal to 10 nCi/g. / LL-CH-T12-N12/L2900/RC-011-M90-C11	D001, F003	Technology Based Code: Deactivation followed by treating underlying constituents to concentration based standards cited in 40 CFR 268.48 or discharge to POTW	Fuel substitution. organics recovery, or incineration	INEL WERF Incinerator (Incineration)	0.00[5]	0.00[5]
LB-W017	Labpacked organic (scintillation fluids) contaminated with radionuclides. Alpha contamination greater than 10 nCi/g but less than or equal to 100 nCi/g. / LL-CH-T11-N11/ L2900/RC-011-M90-C11	D001, F003	Technology Based Code: Deactivation followed by treating underlying constituents to concentration based standards cited in 40 CFR 268.48 or discharge to POTW	Fuel substitution. organics recovery, or incineration	INEL IWPF Thermal Treatment (Incineration)		
MLLW, Aqueous Liquids/Solids, CH							
LB-W008	Labpacked aqueous and/or solid ignitable and non-ignitable oxidizers contaminated with tritium and other radionuclides. Alpha contamination less than or equal to 10 nCi/g. / LL-CH-T12-N12/X6120/RC-090-M90-C11	D001	Technology Based Code: Deactivation followed by treating underlying constituents to concentration based standards cited in 40 CFR 268.48 or discharge to POTW	Chemical Reduction; Incineration	INEL WERF Incinerator (Incineration)	0.15[4]	0.12[4]
LB-W018	Labpacked aqueous and/or solid ignitable and non-ignitable oxidizers contaminated with tritium and other radionuclides. Alpha contamination greater than 10 nCi/g but less than or equal to 100 nCi/g. / LL-CH-T11-N11/ X6120/RC-090-M90-C11	D001	Technology Based Code: Deactivation followed by treating underlying constituents to concentration based standards cited in 40 CFR 268.48 or discharge to POTW	Chemical Reduction; Incineration	INEL IWPF Thermal Treatment (Incineration)		

Table 3-1 (Continued)
Preferred LDR Treatment Options for LBL Mixed Waste Streams

MWIR No.	Waste Stream Description/Treatability Group No.	RCRA Waste Codes[1]	Universal Treatment Standard	Best Demonstrated Available Technology (BDAT)	Preferred Treatment Option	Current Volume (m^3)	Projected Generation through 1997)[2]
MLLW, Predominantly Combustible Debris, CH							
LB-W009	Paper, plastic, and glass contaminated with organic volatiles, metals, and radionuclides. Alpha contamination less than or equal to 10 nCi/g. / LL-CH-T12-N12/S5440/RC-011-M11-C11	D001, D004-D011, F003	Technology Based Code: Deactivation followed by treating underlying constituents to concentration based standards cited in 40 CFR 268.48 or discharge to POTW	Organic Destruction/Extraction and Immobilization	INEL WERF Incinerator and Stabilization (Incineration, Stabilization, Macroencapsulation)	0.11[4]	0.09[4]
LB-W019	Paper, plastic, and glass contaminated with organic volatiles, metals, and radionuclides. Alpha contamination greater than 10 nCi/g but less than or equal to 100 nCi/g. / LL-CH-T11-N11/S5440/RC-090-M11-C11	D001, D004-D011, F003	Technology Based Code: Deactivation followed by treating underlying constituents to concentration based standards cited in 40 CFR 268.48 or discharge to POTW	Organic Destruction/Extraction and Immobilization	INEL IWPF Thermal Treatment and Stabilization (Incineration, Stabilization, Macroencapsulation)		

[1] RCRA codes may vary for individual waste items. This column represents all possible constituents (including toxic levels of metals). All of the codes listed may not apply to each waste item in each waste stream.

[2] The values in this column represent projected generation. The current DSTP inventory volumes are not included in these values.

[3] Treatment required depends on waste matrix and hazardous characteristic.

[4] This volume represents the total volume for two waste streams.

[5] Small volumes of this waste stream may be generated.

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Table 3-2

DOE/OAK MLLW STREAMS AT LBL REQUIRING ADDITIONAL CHARACTERIZATION OR TECHNOLOGY ASSESSMENT

Waste Stream No.	Waste Stream Description	Current (1) Volume	Projected Additional Volume
LB-W013	Organic Water Reactives (Technology Assessment)	<5 Kg.	TBD
LB-W023	Lithium Salts (Technology Assessment)	< 5 Kg.	TBD
LB-W033	Uranium Chips (Technology Assessment)	< 3 Kg.	TBD
LB-W010	Uranium Hexaflouride Gas (Uncharacterized)	< 1 Kg	TBD
LB-W020	Boron Triflouride Gas (Uncharacterized)	< 1 Kg	TBD
LB-W030	Carbon Monoxide Gas (Uncharacterized)	< 1 Kg	TBD
LB-W040	Ethylene Gas (Uncharacterized)	< 1 Kg	TBD
LB-W050	Methane Gas (Uncharacterized)	< 1 Kg	TBD
LB-W101	Aqueous Organic Liquids (Uncharacterized)	< 5 Liters	TBD
LB-W111	Aqueous Liquids (Uncharacterized)	< 10 Liters	TBD

(1) Packaging requirements will result in increased volumes.

Table 3-3a

SCHEDULE FOR WASTE STREAMS TO BE TREATED ONSITE BY EXISTING TREATMENT, FOLLOWED BY OFFSITE TREATMENT

Milestone Activities	LB-W001	LB-W011	LB-W002	LB-W012
Submission of RCRA Permit Application to the State of CA	Completed	Completed	Completed	Completed
Procure Construction Contracts	Completed	Completed	Completed	Completed
Initiate Construction	Completed	Completed	Completed	Completed
Conduct System Testing	10/30/96	10/30/96	10/30/96	10/30/96
Commencing Operations	4/30/97	4/30/97	4/30/97	4/30/97
Treat 100% of waste	9/30/97	9/30/97	9/30/97	9/30/97
Offsite Treatment Location	**INEL**	**INEL**	**INEL**	**INEL**
Request WAC from selected offsite treatment facility[a]	12/30/97	12/30/97	12/30/97	12/30/97
Submit a written certification plan[b] to the offsite facility	4/30/98	4/30/98	4/30/98	4/30/98
Conduct sampling and analysis of waste if required[c], and submit profiles of the waste to the offsite facility following sampling and analysis	10/30/98	10/30/98	10/30/98	10/30/98
Request an acceptable shipping schedule for waste	11/15/98	11/15/98	4/30/99	4/30/99
Complete shipment of the wastes	d	d	d	d

Notes:

a Waste Acceptance Criteria (WAC).

b A certification plan is required by DOE Order 5820.2A and includes packaging requirements, waste form acceptance criteria, and constituent acceptance criteria. The plan is developed from the information established in the offsite facility's WAC.

c The offsite facility may or may not require additional sampling and analysis prior to waste acceptance; sampling and analysis would be conducted in accordance with the procedures established in the approved certification plan.

d The completion of the waste shipment will be accomplished within six months following the designated shipment date provided by the treatment facility.

Assumptions:

The offsite facilities will require 3 months following the request to provide the WAC.
The offsite facilities will approve the certification plan within 6 months of submittal.
The offsite facilities will approve the waste profile within 6 months of submittal.

Table 3-3b

SCHEDULE FOR WASTE STREAMS TO BE TREATED OFFSITE BY EXISTING TECHNOLOGIES AND EXISTING OR PLANNED TREATMENT UNITS

Milestone Activities	Waste Stream No.										
	LB-W003	LB-W004	LB-W014	LB-W005	LB-W006	LB-W007	LB-W017	LB-W008	LB-W018	LB-W009	LB-W019
Offsite Treatment Location	ORNL	INEL	INEL	Hanford	INEL	INEL	INEL	INEL	INEL	INEL	INEL
Request WAC from selected offsite treatment facility[a]	11/15/95	11/15/95	11/15/95	11/15/95	11/15/95	11/15/95	11/15/95	11/15/95	11/15/95	11/15/95	11/15/95
Submit a written certification plan[b] to the offsite facility	9/15/96	9/15/96	9/15/96	9/15/96	9/15/96	9/15/96	9/15/96	9/15/96	9/15/96	9/15/96	9/15/96
Conduct sampling and analysis of waste if required[c] and submit profiles of the waste to the offsite facility following sampling and analysis	12/15/97	12/15/97	12/15/97	12/15/97	12/15/97	12/15/97	12/15/97	12/15/97	12/15/97	12/15/97	12/15/97
Request an acceptable shipping schedule for waste	6/15/98	6/15/98	6/15/98	6/15/98	9/30/98	6/15/98	6/15/98	6/15/98	6/15/98	6/15/98	6/15/98
Complete shipment of the wastes	d	d	d	d	d	d	d	d	d	d	d

Notes:

a Waste Acceptance Criteria (WAC).
b A certification plan is required by DOE Order 5820.2A and includes packaging requirements, waste form acceptance criteria, and constituent acceptance criteria. The plan is developed from the information established in the offsite facility's WAC.
c The offsite facility may or may not require sampling and analysis prior to waste acceptance; sampling and analysis would be conducted in accordance with the procedures established in the approved certification plan.
d The completion of the waste shipment will be accomplished within six months following the designated shipment date provided by the treatment facility.

Assumptions:

The offsite facilities will require 3 months following request to provide the WAC.
The offsite facilities will approve the certification plan within 6 months of submittal.
The offsite facilities will approve the waste profile within 6 months of submittal.

Table 3-3e

SCHEDULE: MIXED LOW LEVEL WASTE STREAMS REQUIRING CHARACTERIZATION OR TECHNOLOGY ASSESSMENT

Activity	Waste Stream No.									
	LB-W013	LB-W023	LB-W033	LB-W010	LB-W020	LB-W030	LB-W040	LB-W050	LB-W101	LB-W111
Complete necessary characterization to allow the identification of treatment option, or complete technology assessment.	1/31/96	1/31/96	1/31/96	1/31/96	1/31/96	1/31/96	1/31/96	1/31/96	1/31/96	1/31/96
Select treatment option, and develop and submit a schedule for treating the waste stream with annual updates.	3/31/97	3/31/97	3/31/97	3/31/97	3/31/97	3/31/97	3/31/97	3/31/97	3/31/97	3/31/97

Hanford Thermal Treatment facility, and shipping mercury waste to the INEL WEDF for amalgamation instead of treating it through an onsite treatability study.

3.1.1 Aqueous Liquids/Solids - Corrosive (LB-W001 a and b, LB-W011 a and b, LB-W002 a and b, and LB-W012 a and b)

Waste streams LB-W001 and LB-W011 consist of lab packed ignitable and nonignitable acidic aqueous liquids/solids with metals and radionuclides which are generated from several research laboratories. The radionuclides include Am-241, Pu-239, Np-237, Hg-194, Bk-249, Th-229, Th-228, Pu-238, Zr-99, Pa-233, Bi-205, Bi-206, U-232, and H-3. The treatability group matrix category for these waste streams is Acidic Aqueous Liquids/Solids. Waste streams LB-W001 and LB-W011 differ in their respective levels of transuranic contamination. LB-W001 contains transuranic contamination less than or equal to 10 nCi/g. LB-W011 contains transuranic contamination greater than 10 nCi/g but less than or equal to 100 nCi/g. Furthermore, each waste stream will require onsite neutralization and offsite treatment. To account for these "treatment trains," LB-W001 and LB-W011 have each been subdivided into onsite and offsite treatment components identified as "a" and "b", respectively. The current combined inventory of these waste streams is 0.74 m^3. Updated waste stream volumes will be recorded in the 1995 MWIR.

Waste streams LB-W002 and LB-W012 consist of lab packed alkaline aqueous liquids/solids containing metals and radionuclides generated from various research operations. Radioactive isotopes found in this waste stream include S-35, Pu-239, Np-237, S-35, C-14, U-238, and H-3. The treatability group matrix category for these waste streams is Aqueous Liquids/Solids. As for waste streams LB-W001 and LB-W011, and waste streams LB-W002 and LB-W012, they differ in their respective levels of transuranic contamination. LB-W001 and LB-W002 contain transuranic contamination less than or equal to 10 nCi/g, while LB-W011 and LB-W012 contain transuranic contamination greater than 10 nCi/g, but less than or equal to 100 nCi/g. Furthermore, each of these four waste streams will require onsite neutralization and offsite treatment. To account for these "treatment trains," LB-W001 and LB-W011, as well as LB-W002 and LB-W012, have each been subdivided into onsite and

offsite treatment components identified as "a" and "b", respectively. The current combined inventory of waste streams LB-W001 and LB-W011 is 0.74 m^3. The current combined inventory of waste streams LB-W002 and LB-W012 is 1.0 m^3. Updated waste stream volumes will be recorded in the 1995 MWIR.

3.1.1.1 Description of Technology and Capacity Needs

The LDR treatment standards for LB-W001, LB-W011, LB-W002, and LB-W012 are deactivation and concentration-based standards for metals and F-listed solvent wastes. When the concentration-based standards for metals and F-listed solvent wastes are not exceeded, neutralization of these waste streams will meet the LDR. When metals are present above concentration-based standards, neutralization and stabilization are required. Corrosive liquids containing F-listed solvents and metal constituents above the concentration based standards will require neutralization, organic destruction and stabilization.

3.1.1.2 Preferred Option

The preferred option consists of onsite neutralization followed by offsite treatment. The option selection process described in Section 2.2 of the PSTP Background Volume and Appendix A of the DSTP identified LBL onsite neutralization, and offsite thermal treatment and stabilization as the preferred treatment option for LB-W001, LB-W011, LB-W002, and LB-W012. These waste streams have been included in the LBL RCRA Part A and Part B permit which allows for neutralization of these wastes in the LBL Mixed Waste Unit 131A-Fume Hood. This unit is currently permitted under the LBL Existing HWHF RCRA Part B permit which was issued on May 4, 1993. There is no existing onsite capacity at LBL for wastes requiring thermal treatment and stabilization. Where both thermal treatment and stabilization are required, the wastes will be shipped to the INEL WERF or IWPF facility following onsite neutralization at LBL.

To prepare for onsite treatment and offsite shipment, the radioactive waste tag and hazardous waste label will be checked for the contents of the container. The radioactivity level of the container will be recorded to ensure that the radioactivity of the waste is within the expected range. Containers will be swiped for any removable radioactive contamination. Decontamination material will be decontaminated as needed and treated as a low-level (compatible) waste. After treatment in the onsite unit, the operator will complete the Neutralization Log and QA/QC Checklist. Mixed wastes scheduled to be shipped and later treated offsite will be characterized and packaged for shipment in accordance with the receiving facility's Waste Acceptance Criteria (WAC).

The INEL's WERF is an existing incinerator which can process combustible mixed low-level waste liquids, sludges, and solids. The incinerator is capable of destroying a wide range of hazardous organic constituents with temperatures of up to 2,000 degrees Fahrenheit. Ash remaining from the incineration process is containerized, stabilized with portland cement, and transferred to an approved storage area. Offgases are filtered through the use of HEPA filters to remove particulate matter. WERF Incinerator operations are expected to resume during the first quarter of FY-1995. A schedule for treating the mixed waste backlog located at the INEL will be developed based on actual operation results. The WERF Incinerator, among other waste acceptance criteria, is restricted to treating mixed wastes with alpha content less than or equal to 0.1 nCi/g. Mixed waste with alpha content greater than 0.1 nCi/g and less than or equal to 10 nCi/g may be treated at WERF on a case-by-case basis. Waste with alpha content greater than 10 nCi/g but less than or equal to 100 nCi/g will need to be treated at the INEL IWPF, which is planned for the treatment of alpha contaminated waste. Based on these criteria, LB-W001 and LB-W002 are targeted for WERF incineration; LB-W011 and LB-W012 are those waste streams with alpha content greater than 10 nCi/g but less than or equal to 100 nCi/g and are targeted for the IWPF.

The INEL IWPF is a planned thermal treatment facility. Its primary mission will be to treat mixed waste with alpha content in excess of 10 nCi/g. The facility will require technology development prior to construction focusing on adapting existing hazardous waste treatment

technologies to a high-alpha/remote-handled environment. The current schedule for the IWPF calls for completion of technology development and operational plans by the end of FY-1997. A schedule for treating the mixed waste backlog will be developed based on the results of system design parameters developed during the second quarter of FY-1997.

3.1.2 Cyanide Wastewaters (LB-W003)

Waste stream LB-W003 consists of lab packed cyanide solutions. This waste has been generated as a result of research operations. Radioactive isotopes found in this waste stream include Np-237, Am-241, Pu-239, S-35, P-32, Cl-36, and H-3. The treatability group matrix category for this waste stream is Cyanide Wastewaters. LB-W003 was divided into four reactive waste streams (LB-W003, LB-W013, LB-W023, and LB-W033), three of which (LB-W013, LB-W023 and LB-W033) require additional characterization and are included in Table 3-2. Updated waste stream volumes will be recorded in the 1995 MWIR.

3.1.2.1 Description of Technology and Capacity Needs

The LDR treatment standard for LB-W003 is deactivation (using an alkaline chlorination treatment process). Additionally, all underlying hazardous constituents have to be treated to below the universal treatment standards. Currently, there is no onsite capacity at LBL for complete treatment of this waste.

3.1.2.2 Preferred Option

The preferred treatment option for LB-W003 is chemical oxidation at the Oak Ridge National Laboratory (ORNL) Cyanide Treatment Facility (CTF). The CTF is an existing facility and is currently operating. The CTF treats (destroys) cyanide waste solutions by using a two-stage alkaline chlorination oxidation process that converts cyanide to nitrogen and carbon dioxide. The CTF contains a single exhaust hood and three storage areas that can store up to forty 55-gallon drums. Cyanide wastes are processed in 55-gallon drums under the exhaust

hood. Gaseous effluents from the CTF consist of nitrogen and carbon dioxide gas, which are released through a permitted stack to the atmosphere. The cyanide treatment process does not generate any solid wastes.

3.1.3 Organic Liquids/Solids (LB-W004 and LB-W014), Scintillation Fluids (LB-W007 and LB-W017), Aqueous Liquid/Solids - Oxidizers (LB-W008 and LB-W018), and Predominantly Combustible Debris (LB-W009 and LB-W019)

Former waste stream LB-W004 was divided into waste streams LB-W004 and LB-W014. These waste streams consist of lab packed ignitable and non-ignitable liquids/solids containing solvents and oil contaminated with metals and radionuclides generated during research operations. Radioactive isotopes found in these waste streams include U-238, Pu-239, Np-237, Am-241, Cm-248, Ra, 226, I-125, Pu-242, U-238, Am-243, and H-3. The treatability group matrix category for these waste streams is Organic Liquids/Solids. Waste streams LB-W004 and LB-W014 differ in their respective levels of transuranic contamination. LB-W004 contains transuranic contamination less than or equal to 10 nCi/g. LB-W014 contains transuranic contamination greater than 10 nCi/g, but less than or equal to 100 nCi/g. The current combined inventory of these waste streams is 3.3 m^3. Updated waste stream volumes will be recorded in the 1995 MWIR.

Waste streams LB-W007 and LB-W017 are no longer in inventory. However, these mixed waste streams may be generated in small volumes in the future at the offsite LBL facility (Building 934). LB-W007 and LB-W017 have consisted of lab packed organic nonhalogenated scintillation fluids. The treatability group matrix category for these waste streams is Scintillation Fluids. Scintillation vials are used for biomedical research and are generated from scintillation counting operations. Waste streams LB-W007 and LB-W017 differ in their respective levels of transuranic contamination. LB-W007 contains transuranic contamination less than or equal to 10 nCi/g. LB-W017 contains transuranic contamination greater than 10 nCi/g, but less than or equal to 100 nCi/g.

Waste streams LB-W008 and LB-W018 consist of lab packed Aqueous Liquid/Solid Oxidizers, ignitable and nonignitable, contaminated with tritium and other radionuclides generated from various research operations. The treatability group matrix category for these waste streams is Aqueous Liquid/Solid Oxidizers. Waste streams LB-W008 and LB-W018 differ in their respective levels of transuranic contamination. LB-W008 contains transuranic contamination less than or equal to 10 nCi/g. LB-W018 contains transuranic contamination greater than 10 nCi/g, but less than or equal to 100 nCi/g. The current combined inventory of these waste streams is 0.15 m^3. Updated waste stream volumes will be recorded in the 1995 MWIR.

Waste streams LB-W009 and LB-W019 consist of contaminated debris such as paper, plastic and glass contaminated with volatile organics, metals and radionuclides generated from routine cleanup during research activities. The treatability group matrix category for these waste streams is Predominantly Combustible Debris. Waste streams LB-W009 and LB-W019 differ in their respective levels of transuranic contamination. LB-W009 contains transuranic contamination less than or equal to 10 nCi/g. LB-W019 contains transuranic contamination greater than 10 nCi/g, but less than or equal to 100 nCi/g. The current combined inventory of these waste streams is 0.11 m^3. Updated waste stream volumes will be recorded in the 1995 MWIR.

3.1.3.1 Description of Technology and Capacity Needs

The LDR treatment standards for both LB-W004 and LB-W014 (organic liquids/solids) and LB-W007 and LB-W017 (scintillation fluids) can be accomplished using fuel substitution, organics recovery or incineration, or treatment to meet the concentration-based standards for metals and F-listed solvent wastes (LB-W004 and LB-W014). Because these waste streams are ignitable, all underlying constituents must be treated to concentration-based universal treatment standards cited in 40 CFR 268.48. There is no onsite treatment capacity at LBL for these waste streams.

The LDR treatment standard for LB-W008, LB-W018, LB-W009 and LB-W019 is deactivation. Additionally, for LB-W009 and LB-W019, specified debris treatment technologies or concentration-based standards for metals and F-listed solvents must be met. Incineration of LB-W008 and LB-W018 will meet the specified LDR treatment standards. For LB-W009 and LB-W019 the LDR treatment standards can be met by using various organic destruction or extraction technologies for debris treatment and immobilization technologies for metals. The technology required for treatment of these debris waste streams depends on the matrix and contaminants present. There is no onsite treatment capacity at LBL for treatment of these waste streams.

3.1.3.2 Preferred Option

The preferred option for waste streams LB-W004, LB-W014, LB-W007, LB-W017, LB-W008, LB-W018, LB-W009, and LB-W019 is incineration at the INEL WERF and IWPF. In addition, stabilization may be required following incineration for LB-W004 and LB-W014, and will be required following incineration for LB-W009 and LB-W019. This will also be conducted at the INEL WERF or IWPF.

The INEL's WERF is an existing incinerator which can process combustible mixed low-level waste liquids, sludges, and solids. The incinerator is capable of destroying a wide range of hazardous organic constituents with temperatures of up to 2,000 degrees Fahrenheit. Ash remaining from the incineration process is containerized, stabilized with portland cement, and transferred to an approved storage area. Offgases are filtered through the use of HEPA filters to remove particulate matter. WERF Incinerator operations are expected to resume during FY-1995. A schedule for treating the mixed waste backlog located at the INEL will be developed based on actual operation results. The WERF Incinerator, among other waste acceptance criteria, is restricted to treating mixed wastes with alpha content less than or equal to 0.1 nCi/g. Mixed waste with alpha content greater than 0.1 nCi/g, and less than or equal to 10 nCi/g, may be treated at WERF on a case-by-case basis. Waste with alpha content greater than 10 nCi/g, but less than or equal to 100 nCi/g, will need to be treated at

the INEL IWPF, which is planned for the treatment of alpha-contaminated waste. Based on these criteria, LB-W004, LB-W007, LB-W008 and LB-W009 are targeted for WERF incineration as they have alpha content less than 10 nCi/g; LB-W014, LB-W-017, LB-W018, and LB-W019 are those waste streams with alpha content greater than 10 nCi/g, but less than or equal to 100 nCi/g and are targeted for IWPF.

The INEL IWPF is a planned facility. Its primary mission will be to treat mixed waste with alpha content in excess of 10 nCi/g. The facility will require technology development prior to construction focusing on adapting existing hazardous waste treatment technologies to a high-alpha/remote-handled environment. The current schedule for the IWPF calls for completion of technology development and operational plans by the end of FY-1997. Thus a schedule for developing the treatment capacity will be completed and submitted to the state of Idaho by the end of FY-1997.

3.1.4 Elemental Lead (LB-W005)

Waste stream LB-W005 consists of blocks and sheets of surface contaminated lead, and lead induced with radioactivity during accelerator operations. Radioactive isotopes found in this waste stream include Np-237, Pa-231, and Pb-206. The treatability group matrix categories for this waste stream is Elemental Lead. The current inventory of this waste steam is 0.42 m^3.

3.1.4.1 Description of Technology and Capacity Needs

The LDR treatment standards for LB-W005 is macroencapsulation. There is no onsite treatment capacity at LBL for this waste stream.

3.1.4.2 Preferred Option

The preferred treatment option for LB-W005 is stabilization/macroencapsulation at the planned Hanford WRAP II-A facility. The WRAP II-A is a planned treatment facility for solids, sludges, particulates, and debris waste.

The Hanford Site is proposing to seek treatment services from the private sector for waste streams, including wastes from other DOE sites, that were to be treated in a new facility, WRAP II-A. Accordingly, DOE-Richland has requested that the Milestone M-19-00, "Complete WRAP II-A Module Construction and Initiate Operations," in the Hanford Tri-Party Agreement be amended. The proposed amendment would not change the milestone date for initiating operations on September 30, 1999. If the amendment is approved, the specific nature and location of the facility will be determined through the contracting process. The status of the privatization effort, progress in securing treatment services by DOE-Hanford and any change to the facility title will be reported in subsequent Annual Update Reports to the Plan.

Storage of waste at the Hanford site while treatment capacity is being developed will be in compliance with the RCRA LDR storage prohibition in accordance with Hanford's Tri-Party Agreement signed by the EPA, DOE, and the State of Washington. Therefore, any LBL wastes shipped to Hanford for future treatment will be in compliance with the LDR storage prohibition when they are accepted for storage at Hanford. These pre-treatment storage plans are described in Section 7 of this Background Volume.

3.1.5 Elemental Mercury (LB-W006)

Waste stream LB-W006 consists of induced mercury waste generated from the maintenance of diffusion pumps and equipment associated with acceleration operations. The treatability group matrix categories for this waste stream is Elemental Mercury. The current inventory of this waste stream is 0.11 m^3.

3.1.5.1 Description of Technology and Capacity Needs

The LDR treatment standard for LB-W006 is amalgamation. There is no onsite treatment capacity at LBL of this waste stream.

3.1.5.2 Preferred Option

The preferred treatment option for LB-W006 is amalgamation at the INEL WEDF. The primary purpose of the WEDF Amalgamation Unit is to provide treatment capability for small amounts of radioactively contaminated liquid mercury. The process involves mixing liquid mercury, copper powder, and nitric acid. The resulting paste is placed into a disposal container. Once hardened, the amalgam will meet the treatment standards and can be disposed of as a strictly low-level waste. The INEL's WEDF mercury amalgamation capabilities will utilize existing technology. Submittal of the RCRA Part B permit application for this facility is anticipated during the first quarter of FY-1996. Construction of the facility is planned to begin the first quarter of FY-1997, with system testing initiated during the second quarter of FY-1997. Full operation of the facility is expected by the second quarter of FY-1999. A schedule for treating the mixed waste backlog will be developed based on the results of system operations up to the first quarter of FY-2000.

3.2 MIXED LOW-LEVEL WASTE STREAMS FOR WHICH TECHNOLOGY EXISTS, BUT NEEDS ADAPTATION, OR FOR WHICH NO TECHNOLOGY EXISTS

LBL has no waste streams in this category.

3.3 MLLW STREAMS REQUIRING FURTHER CHARACTERIZATION, OR FOR WHICH TECHNOLOGY ASSESSMENTS HAVE NOT BEEN DONE

Table 3-2 summarizes the DOE/OAK MLLW streams at LBL that require characterization with schedule information for these waste streams presented in Table 3-3 (e).

3.3.1 Organic Water Reactives, LB-W013

This waste has been generated as a result of research operations, and is contained in aqueous lab packs. This waste stream requires further characterization before a treatment option can be identified. The DOE mixed waste treatability group for this waste has been tentatively identified as LL-CH-T90-N90/X7590/RC-011-M11-C17.

3.3.2 Lithium Salts, LB-W023

This waste has been generated as a result of research operations, and is contained in solid lab packs. This waste stream requires further characterization before a treatment option can be identified. The DOE mixed waste treatability group for this waste has been tentatively identified as LL-CH-T90-N90/S3141/RC-090-M11-C16.

3.3.3 Uranium Chips, LB-W033

This waste has been generated as a result of research operations, and is contained in solid lab packs. This waste stream requires further characterization before a treatment option can be identified. The DOE mixed waste treatability group for this waste has been tentatively identified as LL-CH-T90-N90/X7510/RC-090-M11-C13.

3.3.4 Compressed Gases, LB-W010, LB-W020, LB-W030, LB-W040, and LB-W050

This waste stream includes various gases which are contaminated with radionuclides. These gases include uranium hexaflouride, boron triflouride, carbon monoxide, ethylene, methane, and carbon dioxide. These waste streams require further characterization before a treatment option can be identified. The DOE mixed waste treatability group for all compressed gases has been tentatively identified as LL-CH-T90-N90/X7700/SR.

3.3.5 Aqueous Organic Liquids, LB-W101

This waste stream includes aqueous organic liquids from various research operations. This waste stream requires further characterization before a treatment option can be identified. It is believed that this waste stream potentially contains transuranic radionuclides exceeding 100 nCi/g. This activity level will be confirmed through additional characterization. If the level does exceed 100 nCi/g, and it is a RCRA-regulated waste, then it will be managed as a MTRU waste. The DOE mixed waste treatability group for this waste stream has been tentatively identified as TR-CH/L2190/SR.

3.3.6 Aqueous Liquids, LB-W111

This waste stream includes aqueous waste waters from various research operations. This waste stream requires further characterization before a treatment option can be identified. It is believed that this waste stream potentially contains transuranic radionuclides exceeding 100 nCi/g. This activity level will be confirmed through additional characterization. If the level does exceed 100 nCi/g, and it is a RCRA-regulated waste, then it will be managed as a MTRU waste. The DOE mixed waste treatability group for this waste stream has been tentatively identified as TR-CH/L1190/SR.

4.0 TRANSURANIC MIXED WASTE STREAMS

MTRU waste is defined as waste that is contaminated with (1) alpha-emitting transuranium radio nuclides with half-lives greater than 20 years and concentrations greater than 100 nCi/g at the time of assay and (2) RCRA-regulated waste. LBL has not identified any waste streams that are applicable to this category. If TRU mixed wastes are identified in the future the information will be added to the STP at that time.

LBL has identified two potential waste streams that are currently undergoing characterization. The waste streams, described in Sections 3.3.5 and 3.3.6, are currently classified as low-level waste requiring characterization. If it is determined that these wastes are MTRU, they will be incorporated into the Plan as a MTRU waste stream.

5.0 HIGH-LEVEL MIXED WASTE STREAMS

HLW is defined as the highly radioactive waste material that results from the reprocessing of spent nuclear fuel, including liquid waste provided directly in reprocessing and any solid waste derived from the liquid, that contains a combination of transuranic waste and fission products in concentrations requiring permanent isolation. LBL does not generate or store high-level mixed waste streams, therefore this category does not apply to this PSTP.

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6.0 FUTURE GENERATION OF MIXED WASTE STREAMS

The mixed waste identified in this section is expected to be generated in the future at the LBL site. These wastes will be generated primarily from environmental restoration and decontamination and decommissioning activities. To the extent possible, the volumes of such wastes have been estimated. The waste streams will be incorporated into the STP following generation only if: (1) they do not meet LDR requirements, regardless of the time of generation, or (2) if storage/treatment of the mixed waste is not addressed under an existing agreement or permit with the State of California (i.e., a CERCLA-based environmental restoration agreement).

6.1 Environmental Restoration Waste

LBL Environmental Restoration (ER) Program activities have currently not generated any mixed waste. However, for future operations, the possibility exists that some soils may be encountered that could be contaminated with hazardous constituents at a level that will be designated hazardous waste, and at the same time, contain some low levels of radionuclides such as tritium. Estimates in this section do not include projections for groundwater contamination. ER activities at LBL are currently being addressed under a RCRA corrective action permit.

LBL was issued a RCRA Part B Permit for storage and treatment on May 4, 1993. The permit identifies the corrective actions required at LBL and is the primary driver of remedial actions. DTSC completed a RCRA Facility Assessment of LBL in November of 1992 and required LBL to conduct RCRA Facility Investigations (RFI's) of Solid Waste Management Units (SWMU's). A total of 15 SWMU's are currently being investigated in a single RFI to determine the source and extent of soil and groundwater contamination. LBL's RCRA Part B Permit does not provide relief from the RCRA storage prohibition for any mixed waste generated during ER activities. However, modification of this permit to include a Corrective Action Management Unit (CAMU) could provide relief from the RCRA storage prohibition.

If this modification is made, mixed waste generated in a CAMU will not be added as a new waste stream to the STP in accordance with Section 2 of the Compliance Plan Volume.

To estimate the volume of such mixed waste, over the next five years, two different operations have been considered. The first possible source of mixed waste could be from soil cuttings generated during assessment activities. If 100 or more boreholes are assumed to be drilled for monitoring well construction, geologic studies, and soil investigations, and if approximately 1% of these borings were to produce mixed waste, the associated volume for this activity would be three 55-gallon drums. This would be about 0.6 m^3,or about 21 ft^3. The other possible source of mixed waste could be soils produced during remediation activities. Based on present information, it is unlikely to encounter major volumes of soil which would be designated as mixed waste; a conservative number such as 1.0 m^3 or 35 ft^3 may be reasonable. This volume of soil could be associated with the past operation of the cyclotrons, the Bevatron and the National Tritium Labeling Facility. The most likely site in which contaminated soil at the hazardous level could be encountered is in the vicinity of the present HWHF. In the HWHF area, which is very close to the National Tritium Facility's tritium stack, the chance of detecting tritium in the soil, and thus mixed waste, is fairly high. The other possibility, but less likely source of mixed waste, could be associated with past operations of Cyclotrons and the Bevatron.

Therefore, the total volume of mixed waste that could possibly be generated at LBL is presently estimated to be about 1.6 m^3 or 56 ft^3. The projections in this section were revised to reflect the reevaluation performed by LBL's ER Group. The new estimates focus more on the National Tritium Labeling Facility as opposed to the Cyclotrons and the Bevatron.

6.2 D&D Wastes

LBL is anticipating to begin decommission and decontamination (D&D) activities at the Bevelac facility in FY-1998 pending the DOE-EM acceptance of the Bevelac facility for D&D. The potential mixed wastes that could be generated are activated mercury and lead.

If timely treatment of these waste streams cannot be accomplished, these future waste streams will be added to the STP as described in Section 2 of the Compliance Plan Volume.

The HWHF is currently planned for RCRA closure in the near future. While it is not anticipated that mixed wastes will be generated through closure of the HWHF, there is a potential for generation of such waste.

6.3 Future Operations Waste

Table 3-1 of this volume lists waste volumes that are anticipated to be generated through the year 1997 for laboratory and research operations. The mixed wastes to be generated in the future are planned to be included in the annual update of the STP. LBL plans to treat and/or ship offsite these future mixed wastes in accordance with the treatment options identified in Section 3. Therefore, by the time the mixed waste streams are shipped offsite pursuant to the preferred treatment option identified in Section 3, the volume shipped will likely have increased to include waste generated beyond October 6, 1995. LBL will expedite offsite shipping activities to the greatest extent possible. Expediting these activities will reduce the potential for exceeding onsite storage capacity as described in Section 7.

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7.0 STORAGE REPORT

DOE is committed to storing waste in compliance with RCRA storage requirements in 22 CCR 66264 pending the development of treatment capacity and implementation of the STPs.

7.1 STORAGE FOR CURRENT INVENTORY AND FUTURE WASTES

LBL's RCRA Part B Permit allows for seven mixed waste storage units. They are currently below maximum storage capacity. LBL currently ships mixed wastes to Hanford which allows for the maintenance of compliant storage capacity. Once the STP is in place, LBL will maintain compliant storage capacity through shipments of mixed waste to Hanford, INEL and ORNL. Schedules for shipping mixed waste offsite and the offsite storage location to be used prior to treatment are identified in the agreements between DOE/OAK and the offsite treatment facility included in Appendix A. Under the worst-case scenario of the receiving sites being unable to accept LBL's mixed waste for storage prior to treatment, additional storage space would have to be constructed at LBL. There is no anticipated shortage of compliant storage capacity at the receiving sites.

7.2 STORAGE FOR WASTES PRIOR TO TREATMENT

As noted in Section 3.1 of this Volume, waste identified for treatment at the Hanford WRAP II-A facility, and INEL's IWPF, and WEDF facilities may be shipped to the offsite facilities and held in temporary storage prior to the treatment facilities becoming operational. DOE/OAK believes that the small volume of waste to be shipped will have a negligible impact on the offsite receiving facility's compliant storage capacity. The specific information on where these wastes will be stored at the offsite facility is included in the agreements with the offsite treatment facility, shown in Appendix A to this PSTP Background Volume.

7.3 STORAGE FOR WASTE TREATMENT RESIDUALS PRIOR TO DISPOSAL

It is anticipated that all residuals from the offsite treatment of mixed waste at LBL will meet the definition of low-level radioactive waste which meets the RCRA LDR requirements. DOE/OAK's approach for treatment residuals from wastes shipped offsite for treatment consists of the following two options in order of preference:

(1) Treatment residuals will be stored in an approved storage location at the treatment site pending final decisions regarding disposal. The identification that treatment residuals will be stored at the treatment site is noted in the tables contained in Appendix A.

(2) If the above option is not feasible, treatment residuals will be shipped back to a DOE/OAK site located within California, pending final decisions regarding disposal.

8.0 PROCESS FOR EVALUATING DISPOSAL ISSUES IN SUPPORT OF THE SITE TREATMENT PLAN DISCUSSIONS

This section discusses the overall DOE process for evaluating issues related to the disposal of residuals from the treatment of MLLW subject to the FFCAct. LBL is not among the sites being analyzed further for potential development as a disposal site for residuals from the treatment of MLLW subject to the FFCAct. This section outlines the disposal planning process developed by DOE, in consultation with the states, for evaluating potential options for the disposal of residuals from the treatment of MLLW. Importantly, because DOE is not currently developing MLLW disposal sites (with the exception of the Hanford Site) preferred alternatives or final destinations for disposal of treatment residuals are not known at this time. The results of this process are intended to be considered during subsequent planning activities and discussions between DOE and regulatory agencies.

8.1 BACKGROUND

The FFCAct requires DOE to develop a plan for the treatment of mixed wastes. The Act does not impose any similar requirement for the disposal of mixed wastes after they have been treated; however, DOE recognizes the need to address this final phase of mixed waste management. The following process reflects DOE's current strategy for evaluating the options for disposal; the evaluation will increase understanding of the strengths and weaknesses of a site's potential for disposal but is not a site selection process. Ultimately the identification of sites that may receive mixed waste for disposal will follow state and federal regulations for siting and permitting, and will include appropriate public involvement.

HLW and MTRU are among the mixed waste subject to the FFCAct. Options for disposal of these mixed wastes are not identified by this process because there are established processes for studying, designing, constructing, and operating disposal facilities for these wastes.

The DOE has historically planned to develop MLLW disposal facilities at the six DOE sites currently disposing of low-level waste. These sites are Hanford, Savannah River, Oak Ridge Reservation, Idaho National Engineering Laboratory, Nevada Test Site, and Los Alamos National Laboratory. Currently, the Hanford Site has the only active permitted facility operated by DOE for the disposal of residuals from the treatment of MLLW. This plan has been re-directed in conjunction with the planning efforts of the FFCAct to include the results of the disposal planning process (Figure 8.1), and the Environmental Management Programmatic Environmental Impact Statement (EM PEIS). The sites subject to evaluation under this process are the 49 sites reported to Congress by DOE in the MWIR, April 1993, that are currently storing or expected to generate mixed waste.

8.2 Disposal Planning Process

Although the FFCAct does not specifically address disposal of treated mixed wastes, both DOE and the states have recognized that disposal issues are an integral part of treatment discussions. A process was established to evaluate and discuss the issues related to the potential disposal of the residuals from the treatment of DOE MLLW at the sites subject to the FFCAct, shown in Figure 8.1. The focus of this process has been to identify, from among the 49 sites that currently store or are expected to generate mixed waste, sites that are suitable for further evaluation of their potential as disposal sites. Sites determined to have marginal or no potential for disposal will be removed or deferred from further evaluation under this process. The remaining sites will be evaluated more extensively. Ultimately, a number of sites are expected to be identified that are technically acceptable for disposal of treated residuals.

8.2.1 Activities to Date

Site Grouping

The initial step in this process was to examine each of the 49 sites to determine which sites, while individually listed in the MWIR, were in such geographic proximity that further

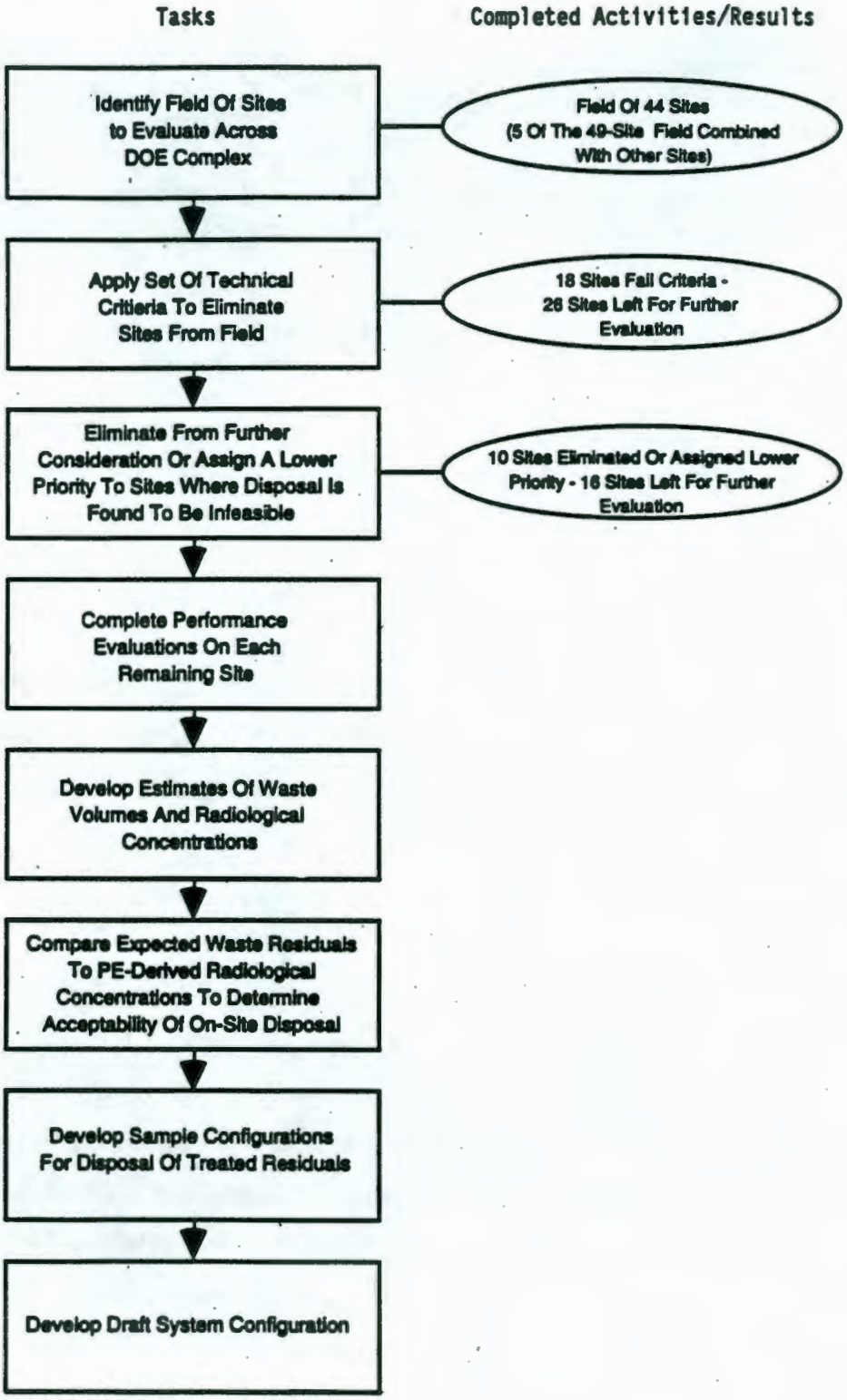

FIGURE 8-1 Disposal Planning Process

analysis could address them as a single site. This grouping reduced the number of sites to 44, as follows:

- Idaho National Engineering Laboratory and Argonne National Laboratory (West) are located on a single federally-owned reservation near Idaho Falls, Idaho;
- The Sandia National Laboratories, California, and Lawrence Livermore National Laboratory are located on adjoining, federally-owned properties near Livermore, California;
- The Inhalation Toxicology Research Institute and Sandia National Laboratories, New Mexico, are located on the same federally-owned reservation, and;
- The Oak Ridge National Laboratory, Oak Ridge K-25 Site, and Oak Ridge Y-12 are all located within the federally-owned Oak Ridge Reservation, near Oak Ridge, Tennessee.

Initial Site Screening

At a joint meeting on March 3-4, 1994, DOE and the states agreed on three exclusionary criteria for further screening the 44 remaining sites. These criteria were developed by reviewing federal and state requirements regarding the siting of waste treatment, storage, and disposal facilities. In order to be evaluated further, a site:

- must not be located within a 100-year floodplain;
- must not be located within 61 meters (200 feet) of an active fault, and;
- must have sufficient area to accommodate a 100-meter buffer zone.

The first criterion (100-year flood plain) is derived from both National Regulatory Commission (NRC) and Resource Conservation and Recovery Act (RCRA) requirements. The second criterion (active fault) was selected from requirements found in RCRA which restrict the location of waste treatment, storage, and disposal facilities. The third criterion (sufficient area for 100-meter buffer) is derived from guidance from the EPA, NRC, and DOE for the proper operation of waste facilities.

Evaluation of the 44 sites resulted in identification of 26 sites meeting the above criteria. At a joint meeting on March 30-31, 1994, DOE and the states agreed to remove from further evaluation those sites not meeting the screening criteria. Also at that meeting, DOE agreed to collect additional, more detailed information on the remaining 26 sites to identify additional strengths and weaknesses of the sites. It was agreed that DOE or any affected state may propose further elimination of sites from consideration following the site-specific evaluation.

Evaluation of the Remaining 26 Sites

DOE and the states met on July 26-27, 1994, to discuss the site-specific data on the remaining 26 sites, and to consider proposals for eliminating additional sites from further evaluation. The focus of these discussions was to identify sites suitable for further evaluation under this process.

The criteria that DOE and the states used to eliminate sites from further evaluation at this stage were derived from three main groupings of considerations: Technical Considerations, Potential Receptor Considerations, and Practical Considerations. Each of the remaining 26 sites were evaluated against criteria in these groupings that included; soil stability and topography, precipitation and evapotranspiration, population, proximity to sensitive environment, land acquisition, government presence at the site, and regulatory constraints.

Sites with marginal or no potential for disposal, based on these criteria, were recommended for removal or postponement from further evaluation. As a result of the meeting, DOE and the states agreed to eliminate five sites from further evaluation due to their limited potential for disposal. These are:

Site	State
Energy Technology Engineering Center	California
General Atomics	California
General Electric Vallecitos Nuclear Center	California
Pinellas Plant	Florida
Site A/Plot M	Illinois

Additionally, DOE and the states agreed to merge the evaluation of Knolls Atomic Power Laboratory at Niskayuna, New York, and Knolls Atomic Power Laboratory at Kesselring, New York, due to their close, geographic proximity.

While not eliminated from further evaluation, it was agreed to lower the evaluation priority of an additional four sites. Issues such as the technical capabilities of the site, the volume of mixed waste that may be generated by the sites, and the acceptability of off-site waste contributed to a conclusion that further evaluation of some sites should not be a high priority. DOE and the states agreed to evaluate these sites in terms of their capability to dispose of their own mixed waste if no other off-site disposal options could be identified. These sites will not be considered for disposal of wastes from other sites, and may be eliminated from further analysis if sufficient evidence suggests the potential for disposal is too limited. The sites in this category are:

Site	State
Weldon Spring Remedial Action Project	Missouri
Brookhaven National Laboratory	New York
Mound Plant	Ohio
Bettis Atomic Power Laboratory	Pennsylvania

Performance Evaluation

The performance evaluation being conducted for the 16 sites identified for further evaluation entails the collection of more detailed site-specific data related to the site characteristics. The

performance evaluation methodology is based on the principles of radiological performance assessments and was developed by DOE performance assessment experts. Additionally, the evaluation will be based on RCRA-compliant engineered facilities. This information will be used to evaluate the sites and estimate the radionuclide concentration limits of waste that may be disposed at a given site. The performance evaluations were initiated in August 1994. The 16 sites for which performance evaluations are being prepared are:

Site	State
Lawrence Livermore National Laboratory, Site 300	California
Rocky Flats Environmental Technology Site	Colorado
Idaho National Engineering Laboratory	Idaho
Argonne National Laboratory	Illinois
Paducah Gaseous Diffusion Plant	Kentucky
Nevada Test Site	Nevada
Los Alamos National Laboratory	New Mexico
Sandia National Laboratories	New Mexico
Knolls Atomic Power Laboratory-Kesselring	New York
West Valley Demonstration Project*	New York
Fernald Environmental Management Project	Ohio
Portsmouth Gaseous Diffusion Plant	Ohio
Savannah River Site	South Carolina
Oak Ridge Reservation	Tennessee
Pantex Plant	Texas
Hanford Site	Washington

* Because the West Valley Demonstration Project Act does not authorize the site to accept off-site wastes, the site will only be evaluated for disposal of on-site wastes.

8.2.2 Next Steps in the Evaluation Process

As illustrated in Figure 8.1, progress has been made in the planning of the disposal process. The following steps outline future activities that are either ongoing or are to be completed to facilitate an informed decision about the disposal of DOE MLLW. Coordination with the states will continue to ensure stakeholder input and to resolve concerns at the earliest possible stage.

Complete Remaining Performance Evaluations

To date, 10 performance evaluations have been completed for the following sites: Savannah River, Oak Ridge Reservation, Idaho National Laboratory, Hanford, Sandia National Laboratories, Rocky Flats Environmental Technology Site, Los Alamos National Laboratory, Pantex Plant, Nevada Test Site, and Lawrence Livermore Laboratory. Performance evaluations for the remaining 6 sites are scheduled to be completed by June 1995. A progress report for the performance evaluation activities has been issued at approximately the same time frame as the final Proposed Site Treatment Plans (PSTPs) in order to keep the states and other interested parties informed of the progress.

Develop Estimates of Waste Volumes and Radionuclide Concentrations in Treated Residuals

Once treatment methods for the MLLW waste streams are finalized through the FFCAct process, estimates of the volumes and radionuclide concentrations of the treated residuals will be developed for all waste streams; this analysis will take place after the PSTPs have been approved by the appropriate regulatory agencies. These estimates are needed to compare to the performance evaluation-derived radionuclide concentration guides.

Compare Estimates of Radionuclide Concentration in Treated Residuals to Performance Evaluation-Derived Radionuclide Concentration Guides

Radionuclide concentrations for each treated residual will be compared to those disposal values derived in the performance evaluation in this step. Comparing radionuclide concentrations in treated residuals with performance evaluation concentration guides will compare MLLW stream characteristics to potential disposal sites' capabilities. This evaluation will also include off-site DOE and commercial disposal site candidates for those treated waste streams which do not have on-site capabilities. Confirmation of the candidates streams and sites will be attained through detailed performance assessment efforts.

Develop Sample Configurations for Disposal of Treated Residuals

An Options Analysis Team (OAT) approach will be employed to develop sample complex-wide configurations for the disposal of treated MLLW residuals. These configurations will take into account such technical issues as compatibility of radionuclides (both handled at the site and those considered acceptable by the performance evaluations), capacity to handle projected residual volumes, etc. Under the OAT approach, other types of issues will be weighed during the configuration discussions such as transportation costs and distances.

Develop a Draft Disposal System Configuration

Using the sample configurations as a starting point, DOE will develop with state and stakeholder input, a draft disposal system configuration. This configuration will be the basis for determining future funding and schedules for proposed disposal facilities. The Final EM PEIS will provide bounding analysis of potential environmental impacts for the range of sample configurations considered. It will identify preferred sites for further development as disposal facilities. Following the issuance of the ROD for the EM PEIS, DOE may initiate site-specific NEPA evaluations for the proposed disposal facilities; initiate performance assessment analyses for compliance with DOE Order 5820.2A; and initiate processes for permitting disposal facilities.

8.3 Integration with the STP Process

The FFCAct does not require disposal to be included in the STPs; however, given the complex issues involved, DOE recognizes the importance of state input to facilitate resolution of issues related to disposal. Chapter 8.0 information is provided in the PSTP to continue to involve the states and inform them of DOE's continued work on the disposal issue. For more detailed information on the ongoing performance evaluation process, refer to the *Progress Report on Performance Evaluation of DOE Sites' Capabilities for Mixed Low-Level Waste Disposal.* As the disposal planning process moves forward, further information will be provided and coordination with the states will continue.

9.0 REFERENCES

This section provides a summary of references and guidance documents referenced throughout this volume.

1. Lawrence Berkeley Laboratory, *Conceptual Site Treatment Plan*, October 1993.

2. U.S. Department of Energy, Albuquerque Operation Office, *AL Mixed Waste Treatment Plan,* March 1994.

3. U.S. Department of Energy, *DOE Waste Treatability Groups Guidance*, Final Draft, September 1993.

4. U.S. Department of Energy, *Draft Site Treatment Plan Development Framework*, Revision 7, April 7, 1994.

5. U.S. Department of Energy, Federal Facility Compliance Act Task Force, *Draft Site Treatment Plan Cost Information Guidance*, Revision 1, April 21, 1994.

6. U.S. Department of Energy, Office of Environmental Restoration and Waste Management, *Hanford Site Waste Acceptance Criteria*, Document No. WHC-EP-0063-4, November, 1993.

7. U.S. Department of Energy, *Mixed Waste Inventory Report*, Phase 2, May 1994.

8. U.S. Department of Energy, Chemical/Physical Treatment Technical Support Group, *Technical Area Status Report for Chemical/Physical Treatment*, Draft Volume 1, May 1993.

9. Lawrence Berkeley Laboratory, Draft Site Treatment Plan, August 1994.

10. U.S. Department of Energy, *Overall DOE Preferred Mixed Waste Treatment Configuration*, Feburary 1995.

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Appendix A

PROPOSED OFFSITE TREATMENT FACILITY AGREEMENTS FOR DOE/OAK MIXED WASTES

PROPOSED OFFSITE TREATMENT FACILITY AGREEMENTS

Mixed waste streams have been identified for treatment at offsite facilities in some of the DOE/OAK Proposed Site Treatment Plans. For these options, it was necessary for DOE/OAK to initiate discussions with the offsite treatment facility(s) to develop an offsite shipping agreement for implementation of the option.

DOE/OAK initiated the process for developing an offsite shipping agreement by developing a proposed agreement. The proposed agreement was transmitted to the DOE Operations Office responsible for the respective offsite treatment facility. The proposed offsite shipping agreement(s) related to this PSTP are included in this Appendix. The proposed agreements include all DOE/OAK managed waste streams planned for treatment at the respective offsite treatment facility, not just those identified in this PSTP.

DOE/OAK is presently coordinating activities with the offsite treatment facilities to obtain formal approval or concurrence on the proposed offsite shipping agreements. Major issues that still require resolution are the pre-treatment storage of wastes and the storage of post-treatment residuals at the treatment site. Treatment options that involve pre- and/or post-treatment storage at the treatment site may require additional discussions between DOE, States, regulators, and interested members of the public. These discussions could impact the schedule dates for shipping the affected waste streams to the receiving site. For example, one resolution of the pre- and/or post-treatment storage issue could be that mixed waste will not be shipped to an offsite treatment facility until the treatment facility becomes operational and/or treats the existing onsite mixed waste backlog first. This resolution could result in a delay in the actual shipping date.

DOE/OAK recognizes that although these proposed offsite shipping agreements may require further discussions prior to approval or concurrence, such proposals should be presented in the PSTPs.

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DOE F 1325.8
(8-89)

United States Government **Department of Energy**

memorandum

DATE: February 9, 1995

REPLY TO ATTN OF: DOE Oakland Operations Office

SUBJECT: Federal Facility Compliance Act Proposed Site Treatment Plans: Proposed Offsite Shipping Agreement with Idaho National Engineering Laboratory (INEL) for Pre-treatment Storage, Treatment, and Post-treatment Residual Management of DOE/OAK Mixed Wastes

TO: Don Rasch, DOE/Idaho (DOE/ID)

As required under the Federal Facility Compliance Act of 1992, DOE is required to prepare Site Treatment Plans (STPs) for sites which generate and store DOE mixed waste subject to the RCRA LDR storage prohibition. Consistent with DOE Headquarters protocol for finalizing offsite waste treatment options, the DOE Oakland Operations Office (DOE/OAK) and its proposed receiving sites have agreed to develop "Offsite Shipping Agreements" which will be incorporated (along with supporting documentation), as an Appendix into applicable DOE/OAK Proposed Site Treatment Plans (PSTPs).

This memorandum requests concurrence from DOE/ID on the attached Offsite Shipping Agreement, addressing the shipment, pre-treatment storage, treatment, and post-treatment management of residuals of DOE/OAK mixed wastes. Table 1 of the Shipping Agreement has been developed to include: Shipping and Receiving Site Contacts; Waste Stream ID Numbers and Volumes; Pre-treatment and Post-treatment Storage Locations; Treatment Facilities; and Milestone Dates for "Requesting Shipping Schedules" (from INEL), as well as "Approved Shipping Dates." An Approved Shipping Date will be added to Column 5 of Table 1 based upon DOE/IDs response to this memorandum.

The following information request and proposed terms of the Offsite Shipping Agreement include:

Treatment Facility Scheduling Information: Consistent with DOE Headquarters guidance regarding the development of treatment options in the PSTPs, DOE/OAK is requesting treatment schedule information for four separate INEL Facilities, including: WEDF (the Waste Engineering Development Facility); WERF (the Waste Experimental Reduction Facility); IWPF (the Idaho Waste Processing Facility); and ICPP (the ICPP Decontamination Facility). Treatment schedule data will be incorporated into the PSTP Background Volumes for the DOE/OAK sites proposing to ship to these facilities.

Pre-treatment Storage: Please note that DOE/OAK is proposing pre-treatment storage of it's mixed wastes at INEL. Based on the small volume of waste to be shipped, it is DOE/OAKs position that compliant storage capacity at INEL should not be significantly impacted.

Approved Shipping Dates: In order to develop PSTP Milestones and/or Target Dates for shipment of mixed wastes to INEL, DOE/OAK is requesting acceptable shipping dates for each waste stream. The information provided by DOE/ID will be added to Table 1, and will be incorporated into both the PSTP Background and Compliance Plan Volumes of the applicable DOE/OAK sites' as an acceptable Milestone and/or Target Date.

Post-treatment Residual Storage: DOE/OAK is also proposing that post-treatment residuals be managed at the INEL site pending the outcome of the DOE disposal-site evaluations (described in Section 8.0 of the PSTPs). DOE/OAK believes that until the outcome of the disposal issue is resolved, post-treatment storage of residuals at the treatment site is a technically and economically sound management approach, especially when considering the very small volumes likely to be generated.

In order for DOE/OAK to submit its PSTPs to DOE Headquarters according to schedule (March 3, 1995), DOE/OAK is requesting a response to this memorandum . no later than February 17, 1995. Should you have any questions, please contact me at (510) 637-1625, or Dave Osugi at (510) 637-1628.

Sincerely,

Alex E. Dong

Alex E. Dong
Deputy Director,
Waste Management Division

Enclosures (2): -DOE/OAK - DOE/ID Offsite Shipping Agreement
-Table 1: DOE/OAK Mixed Waste Identified for Treatment at INEL

cc w/ encl: Patty Bubar, EM-352
Dan Ruge, GC-51

DOE/OAK / DOE-ID Off-Site Shipping Agreement

Transportation Safety Standards: DOE/OAK will assure that the shipping sites identified in the following table, adhere to all appropriate shipping requirements including those identified by the Idaho National Engineering Laboratory (INEL).

Off-site Pretreatment Storage: In the case where the waste streams are identified for treatment at: WEDF (the Waste Engineering Development Facility); WERF (the Waste Experimental Reduction Facility); IWPF (the Idaho Waste Processing Facility); and ICPP (the Idaho Chemical Processing Plant Decontamination Facility), waste streams will be shipped to the INEL prior to the operation of the facility.

Shipping Date: DOE/OAK has identified in the accompanying table the date that the site will request a shipping date from the INEL. This request is to take place after all technical issues regarding the shipment of the waste stream to the INEL have been addressed. The date identified for "the request of a shipment date" coincides with the date for this milestone included in the DOE/OAK Proposed Site Treatment Plan. Additionally, it is indicated in the DOE/OAK PSTPs that the shipment of mixed waste to the INEL for treatment will take place no later than 6 months after the approved shipping date provided by the INEL.

Treatment Residuals Management Plan: Treatment residuals will be stored at the INEL site pending the outcome of the disposal investigations (as described in Section 8 of the Proposed Site Treatment Plan Background Volume). Following the completion of the disposal investigation, DOE/OAK will work with DOE-ID to identify the appropriate disposal site for the DOE/OAK treatment residuals. If a California disposal site is selected, it is likely that the disposal of the DOE/OAK treatment residuals would be disposed at this site.

Funding Requirements: DOE/OAK agrees to provide funding to DOE-ID for the purpose of pretreatment storage, treatment and management of the treatment residuals for the mixed wastes described in the attached table. The amount of funding provided by DOE/OAK will be consistent with the yet to be developed Idaho National Engineering Laboratory (INEL) treatment costs for off-site waste.

Table 1 - DOE/OAK Mixed Waste Identified For Treatment at the Idaho National Engineering Laboratory

Shipping Site / Contact	Waste ID / Volume (M^3)	Projected Annual Future Generation (M3)[1]	Receiving Site / Contact	Pretreatment Storage Facility / Treatment Facility	Request Shipping Schedule (MM/YY)/ Approved Shipping Date	Treatment Residuals Storage Facility
LBL/Maxwell Yao	LB-W001/0.74	0.3	INEL/	INEL/INEL	11/98 / TBD	INEL
LBL/Maxwell Yao	LB-W011/Included in LB-W001	Included in LB-W001	INEL/	INEL/INEL	11/98 / TBD	INEL
LBL/Maxwell Yao	LB-W002/1.0	0.4	INEL/	INEL/INEL	4/99 / TBD	INEL
LBL/Maxwell Yao	LB-W012/Included in LB-W002	Included in LB-W002	INEL/	INEL/INEL	4/99 / TBD	INEL
LBL/Maxwell Yao	LB-W004/3.3	1.14	INEL/	INEL/INEL	6/98 / TBD	INEL
LBL/Maxwell Yao	LB-W014/Included in LB-W004	Included in LB-W004	INEL/	INEL/INEL	6/98 / TBD	INEL
LBL/Maxwell Yao	LB-W006/0.11	0.0	INEL/	INEL/INEL	9/98 / TBD	INEL
	LB-W007/0.0	Less Than 1.0	INEL	INEL/INEL	6/98 / TBD	INEL
	LB-W017/0.0	Included in LB-W007	INEL	INEL/INEL	6/98 / TBD	INEL
LBL/Maxwell Yao	LB-W008/0.15	0.06	INEL/	INEL/INEL	6/98 / TBD	INEL
LBL/Maxwell Yao	LB-W018/Included in LB-W008	Included in LB-W008	INEL/	INEL/INEL	6/98 / TBD	INEL
LBL/Maxwell Yao	LB-W009/0.11	0.05	INEL/	INEL/INEL	6/98 / TBD	INEL
LBL/Maxwell Yao	LB-W019/Included in LB-W009	Included in LB-W009	INEL/	INEL/INEL	6/98 / TBD	INEL
LBL/Maxwell Yao	LB-W101/Less than 5 liters[2].	TBD	INEL/	INEL/INEL	TBD / TBD	INEL
LBL/Maxwell Yao	LB-W111/Less than 10 liters[2].	TBD	INEL/	INEL/INEL	TBD / TBD	INEL
LLNL/Glenn May	LL-W003/0.7	1.4	INEL/	INEL/INEL	10/98 / TBD	INEL
LLNL/Glenn May	LL-W006/15.2	1.0	INEL/	INEL/INEL	10/98 / TBD	INEL

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Table 1 - DOE/OAK Mixed Waste Identified For Treatment at the Idaho National Engineering Laboratory

Shipping Site / Contact	Waste ID / Volume (M^3)	Projected Annual Future Generation (M3)[1]	Receiving Site / Contact	Pretreatment Storage Facility / Treatment Facility	Request Shipping Schedule (MM/YY)/ Approved Shipping Date	Treatment Residuals Storage Facility
LLNL/Glenn May	LL-W017/50.7	10.0	INEL/	INEL/INEL	10/98 / TBD	INEL
LLNL/Glenn May	LL-W021/0.8	0.3	INEL/	INEL/INEL	10/98 / TBD	INEL
LLNL/Glenn May	LL-W024/0.09	0.01	INEL/	INEL/INEL	10/98 / TBD	INEL
LLNL/Glenn May	LL-W001/5.5[3]	1.0	INEL/	INEL/INEL	TBD / TBD	INEL
LLNL/Glenn May	LL-W008/7.1[3]	2.0	INEL/	INEL/INEL	TBD / TBD	INEL
LLNL/Glenn May	LL-W009/3.6[3]	1.7	INEL/	INEL/INEL	TBD / TBD	INEL
LLNL/Glenn May	LL-W014/13.7[3]	4.0	INEL/	INEL/INEL	TBD / TBD	INEL
LLNL/Glenn May	LL-W016/0.3[3]	0.2	INEL/	INEL/INEL	TBD / TBD	INEL
LLNL/Glenn May	LL-W026/1.2[3]	1.0	INEL/	INEL/INEL	TBD / TBD	INEL
ETEC/Ravnesh Amar	ET-W020/0.15	0.0	INEL/	INEL/INEL	9/96 / TBD	INEL
ETEC/Ravnesh Amar	ET-W023/0.0002	0.0	INEL/	INEL/INEL	9/96 / TBD	INEL

Footnotes:

1 - The annual mixed waste projection identifies waste to be generated after October 1995. These wastes will be shipped to the INEL pursuant to updated agreements as necessary. Updated mixed waste volumes will be provided in the Annual Updates to the STP.

2 - These non-defense related waste streams are undergoing characterization. It is possible that the characterization results will indicate that these are MTRU waste streams. If the waste stream is determined to be MTRU, DOE/OAK will propose that the preferred treatment option be the IWPF.

3 - The preferred treatment option for these waste streams is the Mixed Waste Management Facility at LLNL. The INEL WERF Incinerator has been included as the alternative for these waste streams if the preferred treatment option cannot be implemented.

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DOE F 1325.8
(8-89)
United States Government **Department of Energy**

memorandum

DATE: February 9, 1995

REPLY TO ATTN OF: DOE Oakland Operations Office

SUBJECT: Federal Facility Compliance Act Proposed Site Treatment Plans: Proposed Offsite Shipping Agreement with Hanford for Pre-treatment Storage, Treatment, and Post-treatment Residual Management of DOE/OAK Mixed Wastes

TO: Ed MacAlister, DOE/Richland (DOE/RL)

As required under the Federal Facility Compliance Act of 1992, DOE is required to prepare Site Treatment Plans (STPs) for sites which generate and store DOE mixed waste subject to the RCRA LDR storage prohibition. Consistent with DOE Headquarters protocol for finalizing offsite waste treatment options, the DOE Oakland Operations Office (DOE/OAK) and its proposed receiving sites have agreed to develop "Offsite Shipping Agreements" which will be incorporated (along with supporting documentation), as an Appendix into applicable DOE/OAK Proposed Site Treatment Plans (PSTPs) .

This memorandum requests concurrence from DOE/RL on the attached Offsite Shipping Agreement, addressing the shipment, pre-treatment storage, treatment, and post-treatment management of residuals of DOE/OAK mixed wastes. Table 1 of the Shipping Agreement has been developed to include: Shipping and Receiving Site Contacts; Waste Stream ID Numbers and Volumes; Pre-treatment and Post-treatment Storage Locations; Treatment Facilities; and Milestone Dates for "Requesting Shipping Schedules" (from Hanford), as well as "Approved Shipping Dates." An Approved Shipping Date will be added to Column 5 of Table 1 based upon DOE/RLs response to this memorandum.

The following information request and proposed terms of the Offsite Shipping Agreement include:

WRAP IIA Scheduling Information: Consistent with DOE Headquarters guidance regarding the development of treatment options in the PSTPs, DOE/OAK is requesting treatment schedule information for the WRAP IIA Facility. Treatment schedule data will be incorporated into the PSTP Background Volumes for the DOE/OAK sites proposing to ship to WRAP IIA.

Pre-treatment Storage: Please note that DOE/OAK is proposing pre-treatment storage of it's mixed wastes at Hanford. Based on the small volume of waste to be shipped, it is DOE/OAKs position that compliant storage capacity at Hanford should not be significantly impacted.

Approved Shipping Dates: In order to develop PSTP Milestones and/or Target Dates for shipment of mixed wastes to Hanford, DOE/OAK is requesting acceptable shipping dates for each waste stream. The information provided by DOE/RL will be added to Table 1, and will be incorporated into both the PSTP Background and Compliance Plan Volumes of the applicable DOE/OAK sites' as an acceptable Milestone and/or Target Date.

Post-treatment Residual Storage: DOE/OAK is also proposing that post-treatment residuals be managed at the Hanford site pending the outcome of the DOE disposal-site evaluations (described in Section 8.0 of the PSTPs). DOE/OAK believes that until the outcome of the disposal issue is resolved, post-treatment storage of residuals at the treatment site is a technically and economically sound management approach, especially when considering the very small volumes likely to be generated.

In order for DOE/OAK to submit its PSTPs to DOE Headquarters according to schedule (March 3, 1995), DOE/OAK is requesting a response to this memorandum no later than February 17, 1995. Should you have any questions, please contact me at (510) 637-1625, or Dave Osugi at (510) 637-1628.

Sincerely,

Alex E. Dong

Alex E. Dong
Deputy Director,
Waste Management Division

Enclosures (2): -DOE/OAK - DOE/RL Offsite Shipping Agreement
-Table 1: DOE/OAK Mixed Waste Identified for Treatment at the Hanford Site

cc w/ encl: Patty Bubar, EM-352
Dan Ruge, GC-51

DOE/OAK / DOE-RL Off-Site Shipping Agreement

Transportation Safety Standards: DOE/OAK will assure that the shipping sites identified in the following table, adhere to all appropriate shipping requirements including those identified by the Hanford Site.

Off-site Pretreatment Storage: The attached Table identifies waste streams to be treated at the WRAP IIA Facility. These waste streams will be shipped to the Hanford Site prior to the operation of the WRAP IIA facility. The waste streams identified for treatment at the WRAP IIA Facility are currently located at 4 sites in California and 1 site in Missouri.

Shipping Date: DOE/OAK has identified in the accompanying table the date that the site will request a shipping date from the Hanford Site. This request is to take place after all technical issues regarding the shipment of the waste stream to the Hanford Site have been addressed. The date identified for "the request of a shipment date" coincides with the date for this milestone included in the DOE/OAK Proposed Site Treatment Plan. Additionally, it is indicated in the DOE/OAK PSTPs that the shipment of mixed waste to the Hanford Site for treatment will take place no later than 6 months after the approved shipping date provided by the Hanford Site.

Treatment Residuals Management Plan: The treatment residuals will be stored at the Hanford Site pending the outcome of the disposal investigations (as described in Section 8 of the Proposed Site Treatment Plan Background Volume). Following the completion of the disposal investigation, DOE/OAK will work with DOE-RL to identify the appropriate disposal site for the DOE/OAK treatment residuals. If a California disposal site is selected, it is likely that the disposal of the DOE/OAK treatment residuals would be disposed at this site.

Funding Requirements: DOE/OAK agrees to provide funding to DOE-RL for the purpose of pretreatment storage, treatment and management of the treatment residuals for the mixed wastes described in the attached table. The amount of funding provided by DOE/OAK will be consistent with the Hanford Site treatment costs for off-site waste.

Table 1 - DOE/OAK Mixed Waste Identified For Treatment at the Hanford Site						
Shipping Site / Contact	**Waste ID / Volume (M^3)**	**Projected Annual Future Generation (M3)[1]**	**Receiving Site / Contact**	**Pretreatment Storage Facility / Treatment Facility**	**Request Shipping Schedule (MM/YY) / Approved Shipping Date (MM/YY)**	**Treatment Residuals Storage Facility**
LBL/Maxwell Yao	LB-W005/0.42	0.0	Hanford/	Hanford/Hanford	6/98 / TBD	Hanford
LLNL/Glenn May	LL-W015/3.0	3.0	Hanford/	Hanford/Hanford	10/98 / TBD	Hanford
LLNL/Glenn May	LL-W007/3.9	1.0	Hanford/	Hanford/Hanford	10/98 / TBD	Hanford
GA/Brian Laney	GA-W007/0.208	0.0	Hanford/	Hanford/Hanford	8/96 / TBD	Hanford
GA/Brian Laney	GA-W013/1.04	0.0	Hanford/	Hanford/Hanford	8/96 / TBD	Hanford
GA/Brian Laney	GA-W003/1.47	0.0	Hanford/	Hanford/Hanford	8/96 / TBD	Hanford
Univ. of Mo. / Mike Azizi	MU-W001/1.0	1.33	Hanford/	Hanford/Hanford	12/96 / TBD	Hanford
ETEC/Ravnesh Amar	ET-W009/0.64	0.0	Hanford/	Hanford/Hanford	3/96 / TBD	Hanford
ETEC/Ravnesh Amar	ET-W019/2.45	0.0	Hanford/	Hanford/Hanford	3/96 / TBD	Hanford
ETEC/Ravnesh Amar	ET-W026/0.1	0.0	Hanford/	Hanford/Hanford	3/96 / TBD	Hanford

Footnote:

1 - The annual mixed waste projection identifies waste to be generated after October 1995. These wastes will be shipped to the Hanford site pursuant to updated agreements as necessary. Updated mixed waste volumes will be provided in the Annual Updates to the STP.

DOE F 1325.8
(8-89)
United States Government **Department of Energy**

memorandum

DATE: February 9, 1995

REPLY TO ATTN OF: DOE Oakland Operations Office

SUBJECT: Federal Facility Compliance Act Proposed Site Treatment Plans: Proposed Offsite Shipping Agreement with Oak Ridge National Laboratory (ORNL) for Pre-treatment Storage, Treatment, and Post-treatment Residual Management of DOE/OAK Mixed Wastes

TO: Harvey Rice, DOE/Oak Ridge (DOE/OR)

As required under the Federal Facility Compliance Act of 1992, DOE is required to prepare Site Treatment Plans (STPs) for sites which generate and store DOE mixed waste subject to the RCRA LDR storage prohibition. Consistent with DOE Headquarters protocol for finalizing offsite waste treatment options, the DOE Oakland Operations Office (DOE/OAK) and its proposed receiving sites have agreed to develop "Offsite Shipping Agreements" which will be incorporated (along with supporting documentation), as an Appendix into applicable DOE/OAK Proposed Site Treatment Plans (PSTPs) .

This memorandum requests concurrence from DOE/OR on the attached Offsite Shipping Agreement, addressing the shipment, pre-treatment storage, treatment, and post-treatment management of residuals of DOE/OAK mixed wastes. Table 1 of the Shipping Agreement has been developed to include: Shipping and Receiving Site Contacts; Waste Stream ID Numbers and Volumes; Pre-treatment and Post-treatment Storage Locations; Treatment Facility; and Milestone Dates for "Requesting Shipping Schedules" (from ORNL), as well as "Approved Shipping Dates." An Approved Shipping Date will be added to Column 5 of Table 1 based upon DOE/ORs response to this memorandum.

The following information request and proposed terms of the Offsite Shipping Agreement include:

Cyanide Treatment Facility Scheduling Information: Consistent with DOE Headquarters guidance regarding the development of treatment options in the PSTPs, DOE/OAK is requesting treatment schedule information for the Cyanide Treatment Facility. Treatment schedule data will be incorporated into the PSTP Background Volume for the DOE/OAK site [(Lawrence Berkeley Laboratory (LBL)] proposing to ship to the Cyanide Treatment Facility.

Pre-treatment Storage: Please note that DOE/OAK is proposing pre-treatment storage of it's mixed waste at ORNL. Based on the small volume of waste to be shipped, it is DOE/OAKs position that compliant storage capacity at ORNL should not be significantly impacted.

Approved Shipping Date: In order to develop PSTP Milestones and/or Target Dates for shipment of mixed waste to ORNL, DOE/OAK is requesting an acceptable shipping dates for the waste stream. The information provided by DOE/OR will be added to Table 1, and will be incorporated into both the PSTP Background and Compliance Plan Volumes for the LBL site as an acceptable Milestone and/or Target Date.

Post-treatment Residual Storage: DOE/OAK is also proposing that post-treatment residuals be managed at the ORNL site pending the outcome of the DOE disposal-site evaluations (described in Section 8.0 of the PSTPs). DOE/OAK believes that until the outcome of the disposal issue is resolved, post-treatment storage of residuals at the treatment site is a technically and economically sound management approach, especially when considering the very small volumes likely to be generated.

In order for DOE/OAK to submit its PSTPs to DOE Headquarters according to schedule (March 3, 1995), DOE/OAK is requesting a response to this memorandum no later than February 17, 1995. Should you have any questions, please contact me at (510) 637-1625, or Dave Osugi at (510) 637-1628.

Sincerely,

Alex E. Dong
Deputy Director,
Waste Management Division

Enclosures (2): -DOE/OAK - DOE/OR Offsite Shipping Agreement
-Table 1: DOE/OAK Mixed Waste Identified for Treatment at ORNL

cc w/ encl: Patty Bubar, EM-352
Dan Ruge, GC-51

DOE/OAK / DOE-OR Off-Site Shipping Agreement

Transportation Safety Standards: DOE/OAK will assure that the shipping sites identified in the following table, adhere to all appropriate shipping requirements including those identified by the Oak Ridge National Laboratory (ORNL).

Off-site Pretreatment Storage: The attached Table identifies a single Lawrence Berkeley Laboratory waste stream to be treated at the Cyanide Treatment Facility. This waste stream will be shipped to the ORNL prior to the re-start of the Cyanide Treatment Facility.

Shipping Date: The accompanying table identifies the date that the site will request a shipping date from the ORNL. This request is to take place after all technical issues regarding the shipment of the waste stream to the ORNL have been addressed. The date identified for "the request of a shipment date" coincides with the date for this milestone included in the DOE/OAK Proposed Site Treatment Plan. Additionally, it is indicated in the DOE/OAK PSTPs that the shipment of mixed waste to the ORNL for treatment will take place no later than 6 months after the approved shipping date provided by the ORNL.

Treatment Residuals Management Plan: Treatment residuals will be stored at the ORNL site pending the outcome of the disposal investigations (as described in Section 8 of the Proposed Site Treatment Plan Background Volume). Following the completion of the disposal investigation, DOE/OAK will work with DOE-OR to identify the appropriate disposal site for the DOE/OAK treatment residuals. If a California disposal site is selected, it is likely that the disposal of the DOE/OAK treatment residuals would be disposed at this site.

Funding Requirements: DOE/OAK agrees to provide funding to DOE-OR for the purpose of pretreatment storage, treatment and management of the treatment residuals for the mixed wastes described in the attached table. The amount of funding provided by DOE/OAK will be consistent with the yet to be developed ORNL treatment costs for off-site waste.

Table 1 - DOE/OAK Mixed Waste Identified For Treatment at the Oak Ridge National Laboratory						
Shipping Site / Contact	**Waste ID / Volume (M^3)**	**Projected Annual Future Generation (M3)**	**Receiving Site / Contact**	**Pretreatment Storage Facility / Treatment Facility**	**Request Shipping Schedule / Approved Shipping Date**	**Treatment Residuals Storage Facility**
LBL/Maxwell Yao	LB-W003/0.42	0.16	ORNL/	ORNL/ORNL	6/98 / TBD	ORNL

Footnote:

1 - The annual mixed waste projection identifies waste to be generated after October 1995. These wastes will be shipped to the ORNL pursuant to updated agreements as necessary. Updated mixed waste volumes will be provided in thEcology and Environment, Inc., (E & E) Annual Updates to the STP.

Appendix B

GLOSSARY

The terms defined below (a) have been collected or derived from documentation for regulatory agencies and U.S. Department of Energy (DOE) sites and environmental and other sources of regulations and documents or (b) were written as part of the Site Treatment Plan development. The words and phrases are listed alphabetically. Common abbreviations, if any, follow the term. In cases where the regulatory definition differs from the definition provided in this section, the regulatory definition has been used.

Amalgamation - Mixing liquid mercury, at room temperature, with powdered reagents such as copper, zinc, tin, nickel, gold and/or sulfur to yield a metal alloy with no free mercury.

Aqueous Liquids (as a waste matrix) - Liquids/slurries with a Total Organic Carbon (TOC) content less than 1%. Slurries must be pumpable (e.g., suspended/settled solids can be up to approximately 35-40%). Only liquids/slurries packaged/stored in bulk form (i.e., tank-stored, drummed, bulk free liquids) are included in this category. Liquids packaged in a laboratory pack-type configuration are categorized as "lab packs."

Best Available Technology (BAT) or Best Demonstrated Available Technology (BDAT) - (1) The preferred technology for treating a particular process liquid waste selected from among others after taking into account factors related to technology, economics, public policy, and other parameters. As used in DOE Order 5400.5, BAT is not a specific level of treatment but the conclusion of a selection process that includes several treatment alternatives. (2) Treatment technologies that have been shown through actual use to yield the greatest environmental benefit among competing technologies that are practically available.

Biodegradation (BIODG) - The degradation of organics or non-metallic inorganics (i.e., inorganics that contain the elements of phosphorous, nitrogen, and sulfur) in units operated under either aerobic or anaerobic conditions such that a surrogate compound or indicator parameter has been substantially reduced in concentration in the residuals (e.g., TOC can often be used as an indicator parameter for the biodegradation of many organic constituents that cannot be directly analyzed in wastewater residues).

Capacity (of a facility) - The annual process throughput, in cubic meters per year (m^3/yr) under normal operating conditions. "Normal operating conditions" are defined as the shift schedule under which the facility normally operates (i.e., one 8-hour shift/day, five days per week; two shifts/day, five days per week; 24 hours/day, seven days per week).

Carbon Adsorption (CARBN) - A treatment technology used to treat wastewaters containing dissolved organics at concentrations less than about 5% and, to a lesser extent, dissolved metal and other inorganic contaminants. The most effective metals removal is achieved with metal complexes.

The two most common carbon adsorption processes are Granular Activated Carbon (GAC), which is used in packed beds, and Powdered Activated Carbon (PAC), which is added loosely to wastewater.

Cemented Solids (as a waste matrix) - Sludges or solids (e.g., particulates) that have been solidified/stabilized with cement or other solidifying agents but do not meet Land Disposal Restriction (LDR) treatment standards. These wastes may require pretreatment (e.g., crushing/grinding) before subsequent LDR treatment.

Characterization - The determination of waste contents and properties, whether by review of process knowledge, Nondestructive Examination/Nondestructive Assay (NDE/NDA), or sampling and analysis.

Chemical Fixations - Any waste treatment process that involves reactions between the waste and certain chemicals and results in solids that encapsulate, immobilize, or otherwise tie up hazardous components in the waste to minimize the leaching of such components and to render the waste nonhazardous and more suitable for disposal.

Chemical Oxidation (CHOXD) - Chemical or electrolytic oxidation utilizing the following oxidation reagents (or waste reagents) or combinations of reagents: (a) hypochlorite (e.g., bleach), (b) chlorine, (c) chlorine dioxide, (d) ozone or UV- (ultraviolet light-) assisted ozone, (e) peroxides, (f) persulfates, (g) perchlorates, (h) permanganates, and/or (i) other oxidizing reagents of equivalent efficiency, performed in units operated such that a surrogate compound or indicator parameter has been substantially reduced in concentration in the residuals. For example, TOC can often be used as an indicator parameter for the adsorption of many organic constituents that cannot be directly analyzed in wastewater residues. Chemical oxidation specifically includes what is commonly referred to as alkaline chlorination.

Chemical Reduction (CHRED) - Chemical reduction utilizing the following reducing reagents (or waste reagents) or combination of reagents: (a) sulfur dioxide or (b) sodium, potassium, or alkali salts of sulfites, bisulfites, metabisulfates, and polyethylene glycols (e.g., Total Organic Halogens can often be used as an indicator parameter for the reduction of many halogenated organic constituents that cannot be directly analyzed in wastewater residues). Chemical reduction is commonly used for the reduction of hexavalent chromium to the trivalent state.

Cleanup - (1) Actions undertaken during a removal or remedial response to physically remove or treat a hazardous substance that poses a threat or potential threat to human health and welfare, the environment, and/or real and personal property. Sites are considered cleaned up when removal or remedial programs have no further expectation or intention of returning to the site and threats have been mitigated or do not require further action. (2) Actions taken to deal with a release or threat of release of a hazardous substance that could affect humans and/or the environment. The term "cleanup" is sometimes used interchangeably with either remedial action, removal action, response action, or corrective action.

Closure - Operational Closure: Those actions that are taken upon completion of operations to prepare the disposal site or disposal unit for custodial care (e.g., addition of cover, grading, drainage, erosion control). **Final Site Closure**: Those actions that are taken as part of a formal

decommissioning or remedial action plan, the purpose of which is to achieve long-term stability of the disposal site and to eliminate to the extent practical the need for active maintenance so that only surveillance, monitoring, and minor custodial care are required.

Compliance Agreements - Legally binding agreements between regulators and regulated entities that set standards and schedules for compliance with environmental statutes. Includes Consent Order and Compliance Agreements, Federal Facilities Agreements, and Federal Facility Compliance Agreements.

Concentration-Based Standard - A restricted waste for which a concentration-based standard has been developed for an extract of the waste or treatment residue, or the constituent concentration in the waste or treatment residue. Concentration-based standards are based on BDAT and the waste, waste extract, or treatment residue must not exceed these concentrations if the waste is to be land disposed.

Contact-Handled Waste (CH Waste) - Waste or waste containers whose external surface dose rate does not exceed 200 millirems (mrem) per hour at the surface of the container.

Corrosive/Corrosivity - (1) A solid waste exhibits corrosivity if (a) a sample of the waste is either aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5, or (b) it is a liquid and corrodes steel at a rate greater than 6.35 millimeters (mm) (0.25 inch) per year at a test temperature of 55°C (130°F). (2) A chemical agent that reacts with the surface of a material causing it to deteriorate or wear away. (3) Identifies waste that must be segregated because of its ability to extract and solubilize toxic contaminants (especially heavy metals) from other waste; identifies waste that requires the use of corrosion-resistant containers for disposal.

Deactivation (DEACT) - The removal of the hazardous characteristics of a waste due to its ignitability, corrosivity, and/or reactivity.

Debris - Materials that are primarily nongeologic in origin such as grass, trees, stumps, and man-made materials such as concrete, clothing, partially buried whole or empty drums, capacitors, and other synthetic manufacturing items (such as liners). (Debris does not include synthetic organic chemicals but may include materials contaminated with these chemicals.)

Decommissioning - (1) Actions taken to reduce the potential health and safety impacts of contaminated DOE facilities, including activities to stabilize, reduce, or remove radioactive materials or to demolish the facilities. (2) Preparations taken for retirement of a nuclear facility from active service, accompanied by the execution of a program to reduce or stabilize radioactive contamination. (3) The process of removing a facility or area from operation and decontaminating and/or disposing of it or placing it in a condition of standby with appropriate controls and safeguards.

Decontamination - The removal of unwanted material (typically radioactive material) from facilities, soils, or equipment by washing, chemical action, mechanical cleaning, or other techniques.

Delist - Use of the petition process to have a waste stream's toxic designation rescinded.

Delisting - According to 40 Code of Federal Regulations (CFR) 260.20 and 260.22, to be exempted from the Resource Conservation and Recovery Act (RCRA) hazardous waste "system," a listed hazardous waste, a mixture of a listed and solid waste, or a derived-from waste must be delisted. Characteristic hazardous wastes never need to be delisted but can be treated to no longer exhibit the characteristic. A contained-in waste also does not have to be delisted; it only has to "no longer contain" the hazardous waste.

Department of Energy Waste - Radioactive waste generated by activities of the DOE (or its predecessors); waste for which DOE is responsible under law or contract; or other waste for which the DOE is responsible.

Derived-From Rule - The derived-from rule states that any solid waste derived from the treatment, storage, or disposal of a listed RCRA hazardous waste is itself a listed hazardous waste (regardless of the concentration of hazardous constituents). For example, ash and scrubber water from the incineration of a listed waste are hazardous wastes on the basis of the derived-from rule. Solid wastes derived from a characteristic hazardous waste are hazardous wastes only if they exhibit a characteristic.

Disposal - The permanent isolation of waste with no intent of recovery.

Disposal Facility - (1) The land, structures, and equipment used for the disposal of waste. (2) A facility or part of a facility at which waste is intentionally placed into or on the land or water and at which waste will remain after closure.

Effluent - (1) Airborne and liquid wastes discharged from a DOE site or facility following such engineering waste treatment and all effluent controls, including onsite retention and decay, as may be provided. This term does not include solid wastes, wastes for shipment offsite, wastes that are contained (e.g., underground nuclear test debris) or stored (e.g., in tanks), or wastes that are to remain onsite through treatment or disposal. (2) Wastewater (treated or untreated) that flows out of a treatment plant, sewer, or industrial outfall. May refer to wastes discharged into surface waters.

Elemental Lead (activated and non-activated, as a waste matrix) - Both surface-contaminated and activated elemental lead. Activated lead includes lead from accelerators or other neutron sources that may result in irradiation. Surface-contaminated lead materials include bricks, counterweights, shipping casks, and other shielding materials.

Environmental Impact Statement (EIS) - (1) A document prepared in accordance with the requirements of Section 102(2)(C) of the National Environmental Policy Act (NEPA). (2) A tool for decision making; it describes the positive and negative effects of the undertaking and lists alternative actions. A draft environmental impact statement (DEIS) is prepared by the U.S. Environmental Protection Agency (EPA), or under EPA guidance, and attempts to identify and analyze the environmental impacts of a proposed action and feasible alternatives. DEIS is circulated for public comment before preparation of the final environmental impact statement (FEIS).

Environmental Restoration (ER) - Measures taken to clean up and stabilize or restore a site that has been contaminated with hazardous substances during past production or disposal activities to previolation conditions.

Environmental Restoration Waste - Waste generated by environmental restoration program activities.

Existing Facility - (1) Any equipment, structure, system, process, or activity that fulfills a specific purpose. Examples include accelerators, storage areas, fusion research devices, nuclear reactors, production or processing plants, coal conversion plants, magnetohydrodynamics experiments, windmills, radioactive waste disposal systems and burial grounds, testing laboratories, research laboratories, transportation activities, and accommodations for analytical examinations of irradiated and unirradiated components. (2) Buildings and other structures; their functional systems and equipment, including site development features such as landscaping, roads, walks, and parking areas; outside lighting and communications systems; central utility plants; utilities supply and distribution systems; and other physical plant features. (3)(a) Any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft or (b) any site or area where a hazardous substance has been deposited, stored, disposed of, placed, or otherwise come to be located but does not include any consumer product in consumer use or any vessel.

Facilities - Buildings and other structures; their functional systems and equipment, including site development features such as landscaping, roads, walks, and parking areas; outside lighting and communications systems; central utility plants; utilities supply and distribution systems; and other physical plant features.

Federal Facility Compliance Agreement - An agreement between the DOE and a host state with respect to how and/or when some waste-related activity will be conducted to achieve compliance with applicable regulations in a timely manner. A major driver or constraint on activities that a particular site must undertake for waste operations.

Filtration - Removal/separation of particles from a mixture of fluid and particles by a medium that permits the flow of the fluid but retains the particles. Usually, the larger the particles, the easier they are to remove from the fluid.

Generation - Includes the wastes resulting from new production, rework operations, wastes generated from decontamination and decommissioning (D&D) operations and the wastes resulting from environmental restoration operations, including the recovery of pre-1970 wastes, should their recovery be determined to be necessary.

Generator - Refers to current or previously operated facilities that have produced or are producing RCRA-regulated waste.

Glovebox - (1) A sealed volume penetrated by leaded-rubber gloves that allow safe manipulation of some alpha-emitting materials. (2) A windowed, low-leakage enclosure equipped with one or more pairs of flexible gloves to allow personnel on the outside to handle radioactive material within the enclosure.

Hazardous Waste (HW) - Solid waste that possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity) or that is listed as described by 40 CFR 261.

Heterogeneous Debris (as a waste matrix) - Wastes with matrices meeting the definition of debris pursuant to the August 18, 1992, LDR debris rulemaking (57 Federal Register [FR] 37194, August 18, 1992). This category includes debris that does not meet the criteria for categorization as either *Organic Debris* or *Inorganic Debris*. This category also includes mixtures of debris and solid process residues and soil, provided debris constitutes no more than 50% of the waste.

Ignitability - A waste property describing waste with a flash point lower than 140°F.

Immobilization - Treatment of waste through macroencapsulation, microencapsulation, or sealing to reduce surface exposure to potential leaching media or to reduce the leachability of the hazardous constituents.

Immobilized Materials - Materials that are fixed in a matrix.

Incineration - (1) The controlled process by which combustible solid, liquid, or gaseous wastes are burned and changed into noncombustible gases and solid ash. (2) A treatment technology using combustion to destroy organic constituents and reduce the volume of wastes.

Inorganic Debris (as a waste matrix) - Wastes with matrices meeting the definition of debris pursuant to the August 18, 1992, LDR debris rulemaking (57 FR 37194, August 18, 1992). More specifically, inorganic debris is defined as wastes that contain greater than 90% inorganic debris. Inorganic debris includes metal shapes (e.g., equipment, scrap), metal turnings, glass (e.g., light tubes, leaded glass), ceramic materials, concrete, and rocks.

Inorganic Sludges/Particulates (as a waste matrix) - Solid process residues with a predominately inorganic matrix. Solid process residues are solids that do not fit the definition of debris. Typically, these solids are sludge or particulate materials. Wastes in this category may also contain some debris materials, provided the amount of debris is less than 50% (based on the LDR debris rule). The solids in this category may be contaminated with or contain organics such that thermal treatment is required. However, the matrices are predominantly inorganic such that thermal treatment would result in a high residue. Waste materials in this category include sludges, ashes, sand-blasting media, absorbed aqueous or organic liquids (or inorganic particulate absorbents), ion exchange resins, and paint chips/residues.

Ion Exchange - A process used to separate a mixed waste into its radioactive and hazardous constituents if the radioactive components are ionic. It will also concentrate the radioactive ionic species into a small volume, leaving a nonradioactive aqueous phase. The principal mixed waste application of this process is to recover metallic radionuclides from wastewaters or acid leach liquors.

Key Decision (KD) - DOE projects proceed through several discrete phases: research, design, and operation. These phases are separated by KD points, which are numbered consecutively from KD-0 to KD-4.

Lab Packs with Metals and Lab Packs without Metals (as waste matrices) - Wastes with one or more small containers of free liquids or solids surrounded by solid materials (virgin or waste materials) within a larger container. These categories include scintillation fluids that are packaged in vials. These categories are differentiated by contaminants in the wastes. Wastes contaminated with toxicity characteristic (TC) metals are categorized as "Lab packs with Metals." Wastes that are not contaminated with TC metals are categorized as "Lab packs without Metals."

Land Disposal Restrictions (LDRs) - (1) Provisions of the Hazardous and Solid Waste Amendments (HSWA) requiring phased-in treatment of hazardous wastes before disposal. (2) A RCRA program that restricts land disposal of RCRA hazardous wastes and requires treatment to promulgated treatment standards. (See **Thirds Rule**.)

Leachate - (1) Any liquid, including any suspended components in the liquid, that has percolated through or drained from hazardous waste. (2) A contaminated liquid resulting when water percolates or trickles through waste materials and collects components of those wastes. Leaching may occur at landfills and may result in hazardous substances entering soil, surface water, or groundwater.

Legacy Waste - The backlog of stored waste remaining from the development and production of U.S. nuclear weapons, about which a permanent disposal determination remains to be made (i.e., waste that is currently in warehouse storage, retrievable storage on bermed pads, or disposed of in trenches and that has not been examined by DOE's Environmental Management, Environmental Restoration Group (EM-40) and determined to be permanently disposed of). Also called backlog waste.

Listed Waste - Wastes, listed as hazardous under RCRA, that have not been subjected to the Toxic Characteristics Listing Process because the dangers they present are considered self-evident.

Liquid-Liquid Extraction (LLEXT) - Extraction (often referred to as solvent extraction) of organics from liquid wastes into an immiscible solvent for which the hazardous constituents have a greater solvent affinity, resulting in (a) an extract high in organics that must undergo either incineration, reuse as a fuel, or other recovery/reuse and (b) a raffinate (extracted liquid waste) proportionately low in organics that must undergo further treatment as specified in the standard.

Liquid Mercury (as a waste matrix) - Any wastes containing bulk volumes of elemental liquid mercury. The category includes lab packs of strictly liquid mercury or other containers containing bulk mercury.

Low-Level Radioactive Waste (LLW) - (1) Waste that contains radioactivity and is not classified as high-level waste, transuranic (TRU) waste, or spent nuclear fuel or the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source-material content. Test specimens of fissionable material irradiated for research and development only, and not for the production of power or plutonium, may be classified as LLW provided the concentration of TRU elements is less than 100 nanocuries/gram (nCi/g).
(2) Radioactive waste not classified as high-level waste, TRU waste, spent nuclear fuel, or by-product material.

Macroencapsulation (MACRO) - Application of surface-coating materials such as polymeric organics (e.g., resins and plastics) or a jacket of inert inorganic materials to substantially reduce surface exposure to potential leaching media. Macroencapsulation specifically does not include any material that would be classified as a tank or container according to 40 CFR 260.10.

Metals Recovery (RMETL) - Recovery of metals or inorganics utilizing one or more of the following direct physical/removal technologies: ion exchange, resin or solid (i.e., zeolites) adsorption, reverse osmosis, chelation/solvent extraction, freeze crystallization, ultrafiltration, and/or simple precipitation (i.e., crystallization). Note: This does not preclude the use of other physical phase separation or concentration techniques such as decantation, filtration (including ultrafiltration), and centrifugation when used in conjunction with the direct physical/removal technologies.

Microencapsulation - Stabilization of the debris with the following reagents (or waste reagents) such that the leachability of the hazardous contaminants is reduced: portland cement or lime/pozzolans (e.g., fly ash and cement kiln dust). Reagents (e.g., iron salts, silicates, clay) may be added to enhance the set/cure time and/or compressive strength or to reduce the leachability of the hazardous constituents.

Mixed Low-Level Waste (MLLW) - Low-level waste that also includes hazardous materials as identified in 40 CFR 261, Subparts C and D.

Mixed Waste - (1) Radioactive waste [as defined by the Atomic Energy Act (AEA)] that contains material listed as hazardous waste in Subpart D of 40 CFR 261 or that exhibits any of the hazardous waste characteristics identified in Subpart C of 40 CFR 261. (2) Waste that contains both radioactive and hazardous components as defined by the AEA and RCRA. The term "radioactive component" refers only to the actual radionuclides dispersed or suspended in the waste substance.

Mixture Rule - Under the mixture rule, when any solid waste and a listed hazardous waste are mixed, the entire mixture is a listed hazardous waste. Mixtures of solid wastes and characteristic hazardous wastes are hazardous only if the mixture exhibits a characteristic [40 CFR 261.3(a)(2)].

Neutralization (NEUTR) - Use of the following reagents (or waste reagents) or combinations of reagents: acids, bases, or water (including wastewaters) resulting in a pH greater than 2 but less than 12.5 as measured in the aqueous residuals.

Onsite - (1) Within a single research or production site of the DOE complex; for example, Lawrence Livermore National Laboratory (LLNL) is a site, as is the Lawrence Berkeley Laboratory (LBL), the Sandia National Laboratory-California (SNLC). (2) The contaminated area and all potential areas in very close proximity to the contamination that must be taken into account for effective implementation of the response action.

Onsite Facility - A hazardous waste treatment, storage, or disposal area that is located on the generating site.

Operable Unit (OU) - (1) A discrete action that consists of an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages

migration or eliminates or mitigates a release, threat of release, or pathway of exposure. The cleanup of a site can be divided into a number of OUs, depending on the complexity of the problems associated with the site. OUs may address geographical portions of a site, specific site problems, or initial phases of an action or may consist of any set of actions performed over a period of time or any actions that are concurrent but located in different parts of a site. (2) A discrete portion of a site consisting of one or more release sites considered together for assessment and cleanup activities. The primary criteria for placement of release sites into an OU include geographic proximity, similarity of waste characteristics and site type, and the possibilities for economy of scale. (3) An overall response action that by itself eliminates or mitigates a release, a threat of a release, or an exposure pathway.

Organic Debris (as a waste matrix) - Wastes with matrices meeting the definition of debris pursuant to the August 18, 1992, LDR debris rulemaking (57 FR 37194, August 18, 1992). More specifically, organic debris is defined as wastes that contain greater than 90% organic debris. Organic debris includes rags (including "solvent rags") plastic/rubber, paper, wood, glovebox gloves (including lead-lined), and animal carcasses.

Organic Liquids (as a waste matrix) - Liquids/slurries with a TOC content greater than or equal to 1%. Slurries must be pumpable (e.g., suspended/settled solids can be up to approximately 35-40%). Only liquids/slurries packaged or stored in bulk form (i.e., tank-stored, drummed, bulk free liquids) are included in this category. Liquids packaged in a lab pack-type configuration are categorized as lab packs.

Organic Sludges/Particulates (as a waste matrix) - Solid process residues with an organic matrix. Solid process residues are solids that do not fit the definition of debris. Typically, these solids are sludges or particulate materials. Waste in this category may also contain some debris materials provided the amount of debris is less than 50% (based on the LDR debris rule). As opposed to inorganic sludges/particulates, wastes in this category would not leave a large residue when thermally treated. Waste materials in this category include organic sludges (e.g., sewage sludges), activated carbon, organic resins, and absorbed liquids (organic particulate absorbents).

Package - A barrel, box, or other container into which waste is initially placed. A waste is placed in packaging before transportation.

pH - (1) Used to describe the hydrogen-ion activity of a system. The logarithm (the exponent that indicates the power to which a number must be raised to produce a given number) of the reciprocal of hydrogen-ion concentration ($-\log_{10}[H^+]$, where $[H^+]$ is hydrogen-ion concentration in moles per liter). (2) A symbol for the degree of acidity or alkalinity.

Precipitation (PRECP) - Treatment of metals and other inorganics to form insoluble precipitates of oxides, hydrides, carbonates, sulfides, sulfates, chlorides, fluorides, or phosphates. The following reagents (or waste reagents) are typically used alone or in combination: lime (i.e., containing oxides and/or hydroxides of calcium and/or magnesium), caustic (i.e., sodium and/or potassium hydroxides), soda ash (i.e., sodium carbonate), sodium sulfide, ferric sulfate or ferric chloride, alum, or sodium sulfate. Additional flocculating, coagulating, or similar reagents/processes that enhance sludge dewatering characteristics are not precluded from use.

Pretreatment Processes - Processes (e.g., shredding, grinding, physical separation) that make the waste amenable to the treatment process, which ultimately destroys, removes, or immobilizes the hazardous contaminants or characteristics.

Radiation - (1) Ionizing radiation that includes any or all of the following: gamma rays and x-rays, alpha and beta particles, high-speed electrons, neutrons, high-speed protons, and other atomic particles. This definition does not include nonionizing radiations, such as soundwaves, microwaves, radiowaves or visible, infrared, or ultraviolet light. (2) The process of emitting energy in the form of rays or particles that are thrown off by disintegrating atoms. The rays or particles emitted may consist of alpha, beta, or gamma radiation.

Radioactive Waste - (1) Solid, liquid, or gaseous material that contains radionuclides regulated under the AEA of 1954, as amended, and that is of negligible economic value considering costs of recovery. (2) A solid, liquid, or gaseous material of negligible economic value that contains radionuclides in excess of threshold quantities. Does not include material contaminated by radionuclides from nuclear weapons testing.

Radioactivity - (1) The spontaneous nuclear decay of a material with a corresponding release of energy in the form of particles and/or electromagnetic radiation. (2) The property or characteristic of radioactive material to spontaneously "disintegrate" with the emission of energy in the form of radiation. The unit of radioactivity is the curie (or becquerel).

Radionuclide - (1) A species of atom having an unstable nucleus that is subject to spontaneous decay. (2) Any nuclide that emits radiation. A nuclide is a species of atom characterized by the constitution of its nucleus, hence by the number of protons, the number of neutrons, and the energy content.

Reactive Metals (as a waste matrix) - Bulk reactive metals and equipment contaminated with reactive metals. Bulk reactive metals include sodium, alkali metal alloys, aluminum fines, uranium fines, zirconium fines, and other pyrophoric materials. Contaminated equipment includes piping, pumps, and other materials with a residue or reactive metals that cannot be separated from the equipment medium.

Reactivity - (1) A characteristic of a waste that is explosive, reacts violently with water, or generates toxic gases when exposed to water or liquids that are moderately acidic or alkaline. (2) An EPA characterization of hazardous waste that identifies waste that, under routine management, presents a hazard because of instability or extreme reactivity.

Remote-Handled Waste (RH Waste) - Packaged waste with an external surface dose rate that exceeds 200 mrem per hour.

Resource Conservation and Recovery Act (RCRA) Part A Permit - The first part of a RCRA permit application that identifies treatment, storage, and disposal units within a to-be-permitted facility.

Resource Conservation and Recovery Act (RCRA) Part B Permit - The second part of a RCRA permit application that describes in detail waste to be managed, waste quantities, and facilities.

Segregation - The separation of waste materials to facilitate handling, storage, treatment, transportation, or disposal.

Site - (1) A geographic entity comprising land, buildings, and other facilities required to perform program objectives. Generally a site has, organizationally, all the required facilities for management functions; that is, it is not a satellite of some other site. (2) For the purposes of the Environmental Restoration and Waste Management (ER&WM) Five-Year Plan, sites are lands, installations, and/or facilities for which DOE has or shares responsibility for ER&WM activities. (3) An area or a location at which hazardous substances have been stored, treated, disposed of, placed, or otherwise come to be located. This includes all contiguous land, structures, other appurtenances, and improvements on the land used for treatment, storage, or disposal of hazardous substances. A site may consist of several treatment, storage, or disposal facilities (e.g., impoundments, containers, buildings, equipment).

Stabilization (STABL) - A broad class of treatment processes that immobilize hazardous constituents in a waste. For treatment of metals in mixed low-level wastes and for TRU wastes containing low-level radioactive components, stabilization technologies will reduce the leachability of the hazardous metal constituents (regardless of whether the metals are radioactive) in non-wastewater matrices.

Storage - (1) Temporary holding of waste pending treatment or disposal. Storage may include containers, tanks, waste piles, and surface impoundments. (2) The containment of hazardous waste, either on a temporary basis or for a period of years, in such a manner as not to constitute disposal of such hazardous waste. (3) Retrievable retention of waste pending disposal.

Storage Facility - Land area, structures, and equipment used for the storage of waste.

Storage Unit - A discrete part of the storage facility in which waste is stored.

Supercompaction - A volume-reduction method relying on mechanical compaction.

Technology-Based Standard - A restricted waste for which a technology-based standard is specified may be land-disposed after it is treated using that specified technology or an equivalent treatment method approved by the EPA Administrator.

Thermal Treatment - The treatment of hazardous waste in a device that uses elevated temperatures as the primary means to change the chemical, physical, or biological character or composition of the hazardous waste. Examples of thermal treatment processes are incineration, pyrolysis, calcination, wet air oxidation, and microwave discharge.

Transuranic (TRU) Waste - The following core definition appears in modified form in various relevant documents: Waste containing alpha-emitting radionuclides with an atomic number greater than 92, half-lives greater than 20 years, and at concentrations greater than 100 nCi/g of waste. Modifications include the following. (1) DOE Order 5820.2A, for purposes of management, (a) considers TRU waste, as defined above, "without regard to source or form" [the proposed revision to the Order (DOE Order 5820.2A, "Major Issues for Revision," May 6, 1992) contemplates removing this clause]; (b) allows heads of field elements to determine whether wastes containing other alpha-emitting radionuclides must be managed as TRU waste; and (c) adds "at time of assay," implying both that the classification of a waste as

TRU is to be made based on an assay and that such classification can be superseded only by another assay. (2) For purposes of setting standards for management and disposal, 40 CFR 191.02(i) adds "except for: (a) high-level radioactive wastes; (b) wastes that the DOE has determined, with the concurrence of the EPA Administrator do not need the degree of isolation required by this part; or (c) wastes that the [Nuclear Regulatory] Commission (NRC) has approved for disposal on a case-by-case basis in accordance with 10 CFR 61 ["Licensing Requirements for Land Disposal of Radioactive Wastes"].

Treatability Group - Based on the radioactive characteristics, hazardous components, and physical/chemical matrices (see relevant discussions elsewhere in this Glossary), DOE has grouped its wastes to reflect salient treatment considerations for each waste stream. These "treatability groups" are used to relate waste streams and waste quantities to treatment facilities and technology development needs.

Treatment - (1) Any method, technique, or process designed to change the physical or chemical character of waste to render it less hazardous; safer to transport, store, or dispose of; or reduced in volume. (2) Any activity that alters the chemical or physical nature of a hazardous waste to reduce its toxicity, volume, or mobility, or render it amenable for transport, storage, or disposal.

Treatment Facility - The specific area of land, structures, and equipment dedicated to waste treatment and related activities.

Treatment, Storage, and Disposal (TSD) Facility - Any building, structure, or installation where a radioactive or hazardous substance has been treated, stored, or disposed of.

Treatment System - The equipment and processes used for similar waste types at treatment facilities. A treatment system is the unit treatment operation or sequence of unit treatment operations carried out on all wastes that enter the system (e.g., a treatment system may consist of chemical reduction followed by precipitation, or an incinerator and a vitrification unit for the ash).

Volatile Organic Compound (VOC) - (1) Any reactive organic compound as defined in 40 CFR 60.2. (2) An organic (carbon-containing) compound that evaporates (volatilizes) readily at room temperature.

Waste Acceptance Criteria (WAC) - The criteria used to determine whether waste and waste packages are acceptable for treatment, storage, transportation, and disposal purposes.

Waste Characterization - Activities to determine the extent and nature of the waste. Note: Waste characterization may be based on process knowledge, nonintrusive or nondestructive (NDE, NDA) examination, or intrusive examination, such as sampling and analysis.

Waste Form - The physical form of the waste (e.g., sludges, combustibles, metals).

Waste Isolation Pilot Plant (WIPP) - (1) The project authorized under Section 213 of the DOE National Security and Military Applications of Nuclear Energy Authorization Act of 1980 (Public Law 96-164; 93 Stat. 1259, 1265) to demonstrate the safe disposal of radioactive waste materials generated by atomic energy defense activities. (2) A research and development facility, located near Carlsbad, New Mexico, to be used for demonstrating the safe disposal of TRU wastes from DOE activities.

Waste Management - The planning, coordination, and direction of those functions related to generation, handling, treatment, storage, transportation, and disposal of waste, as well as associated surveillance and maintenance activities.

Waste Minimization - (1) An action that effectively avoids or reduces the generation of waste by source reduction, improving energy usage, or by recycling. This action is consistent with the general goal of minimizing present and future threats to human health and safety and the environment. (2) The reduction, to the extent feasible, of hazardous waste that is generated before treatment, storage, or disposal of the waste. Waste minimization includes any source reduction or recycling activity that results in either reduction of total volume of hazardous waste or reduction of toxicity of hazardous waste, or both.

Waste Segregation - The separation of waste materials before the packaging or repackaging process to facilitate handling, storage, treatment, transportation, or disposal.

Waste Stream - A flow of waste materials with specific definable characteristics that remain the same throughout the life of the process that generates the waste stream. A waste stream is produced by a single process or subprocess; however, that process or subprocess may be one that combines two or more input waste streams together to produce a single output waste stream.

Wastewaters - Wastes that contain less than 1% by weight TOC and less than 1% by weight Total Suspended Solids (TSS) with the following exception: F001, F002, F003, F004, or F005 wastewaters are solvent-water mixtures that contain less than 1% by weight TOC or less than 1% by weight total F001, F002, F003, F004, or F005 solvent constituents listed in 40 CFR 286.41, Table CCWE (Constituent Concentrations in Waste Extract).

Wet Air Oxidation (WETOX) - A treatment technology applicable to wastewaters containing organics and oxidizable inorganics such as cyanide. The basic principle of operation for WETOX is that the enhanced solubility of oxygen in water at high temperatures and pressures aids in the oxidation of organics.

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FEDERAL FACILITY COMPLIANCE ACT
PROPOSED SITE TREATMENT PLAN
FOR
LAWRENCE BERKELEY LABORATORY
BERKELEY, CALIFORNIA

COMPLIANCE PLAN VOLUME

Prepared for

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2.0 IMPLEMENTATION OF THE SITE TREATMENT PLAN

This section establishes the mechanisms and procedures for administering and implementing the treatment plans and schedules in Sections 3.0 through 5.0 of the Compliance Plan Volume of the STP.

2.1 COVERED MATTERS

The Compliance Plan Volume and implementing FFCAct Order of the STP address LDR requirements pertaining to storage and treatment of covered wastes, whether such wastes were generated or accumulated in the past, present or future. Covered wastes are all mixed waste at LBL identified in the STP or added to the STP in accordance with Section 2.4, except those mixed wastes that (1) meet LDR requirements, regardless of the time of generation or that (2) are being stored or will be stored when generated solely for the purpose of accumulating sufficient quantities of mixed waste necessary to facilitate proper recovery, treatment, or disposal.

2.2 COMPLIANCE SCHEDULES

2.2.1 The Compliance Plan Volume of the STP provides overall schedules for achieving compliance with LDR requirements for mixed wastes at LBL. The schedules include those activities required to bring existing waste treatment facilities or technologies into operation and those required to develop new facilities and capacity for treatment. The Compliance Plan Volume shows target dates and milestones for treatment technologies and facilities for wastes covered under the STP. The schedules symbolically depict and differentiate between milestones and target dates that will be converted to milestones. Other schedule information may be depicted in the Background Volume of the STP, but such information is provided solely for informational purposes.

2.2.1.1 For the purposes of this STP, milestones and target dates shall identify dates or time frames by which a certain activity (including an event such as submittal of a deliverable) is scheduled to occur, as set forth in the Compliance Plan Volume, or any other dates or deliverables that are properly incorporated into the approved STP.

2.2.1.2 The assumptions upon which individual schedules are dependent are contained in Sections 3.0 through 5.0 of the Background Volume and this Compliance Plan Volume. The schedules may be affected if the underlying assumptions are incorrect or change.

2.2.1.3 *Milestones* are fixed, firm, and enforceable dates as set forth in the Compliance Plan Volume. Milestones correspond to the categories of milestones set forth in Section 2.2.3. Changes or revisions to milestones are subject to approval, approval with modifications, or disapproval by California Department of Toxic Substances Control (DTSC) according to the process and framework set forth in this STP. Milestones are set based on target dates, defined in Section 2.2.1.4 below, in accordance with the process in Section 2.2.2.

2.2.1.4 *Target dates* mark the anticipated completion of tasks that have not been designated as milestones. Target dates correspond to the categories of milestones set forth in Section 2.2.3. Target dates are not requirements and are not enforceable. Target dates are converted into enforceable milestones in accordance with the process in Section 2.2.2.

2.2.2 *Approach to Setting Milestones and Target Dates.* DOE proposes using the rolling milestone approach outlined in the Addendum to this Compliance Plan Volume, "Milestone Approach and Environmental Management Budget Formulation Process."

2.2.3 *Categories of Milestones and Target Dates.* Examples of categories of activities for which milestones and target dates will be provided for different types of treatment approaches in the Compliance Plan Volume are listed in the Tables 2-1 through 2-4 and in other provisions below. The categories of activities are based on Section 3021(b)(1)(B)(i), (ii) and (iii) of RCRA, to the extent appropriate. Depending upon the status of the facility (e.g., operating

under interim status or at differing stages of development) certain types of target dates or milestones may not be necessary, activities may appear in a different order, or an alternative activity more appropriate to the facility or treatment approach may be provided.

2.2.3.1 Plans Where Treatment Technology Exists Onsite. For some of the mixed wastes, treatment technologies have been identified and developed. For wastes that will be treated onsite, the categories of milestones and target dates identified in Table 2-1, "Schedule For Wastes With Existing Treatment Technologies" shall apply.

TABLE 2-1

SCHEDULE FOR WASTES WITH EXISTING TREATMENT TECHNOLOGIES

Categories of Milestones/Target Dates:

a. Submit RCRA permit applications to DTSC.
b. Procure contracts.
c. Initiate construction.
d. Commence systems testing.
e. Commence operations.
f. Submit a schedule for processing backlogged and currently generated mixed wastes.

2.2.3.2 Plans Where Technology Must Be Developed. For some mixed wastes, no treatment technologies have been identified and developed, or treatment technology must be modified or adapted to be made applicable for mixed waste. For wastes which will be treated onsite, the categories of milestones and target dates identified in Table 2-2, "Schedule for Waste Without Existing Treatment Technologies" shall apply.

TABLE 2-2

SCHEDULE FOR MIXED WASTES WITHOUT EXISTING TREATMENT TECHNOLOGIES

Categories of Milestones/Target Dates:

a. Identify funding requirements for identification and development of technology.
b. Identify and develop technology.
c. Submit treatability study exemption application.
d. Submit Research, Development, and Demonstration (RD&D) permit applications.
e. Submit schedule in accordance with Table 2-1 or new schedule for development of alternative treatment technologies in accordance with this section.

2.2.3.3 Requirements Pertaining to Radionuclide Separation. The FFCAct sets additional requirements in cases where DOE intends to conduct radionuclide separation of mixed waste. Should DOE/OAK determine to conduct radionuclide separation of such mixed wastes onsite, DOE/OAK will provide those milestones and target date categories identified in Table 2-3, "Schedule for Radionuclide Separation of Mixed Waste."

TABLE 2-3

SCHEDULE FOR RADIONUCLIDE SEPARATION OF MIXED WASTES

Categories of Milestones/Target Dates:

a. Complete an estimate of the volume of waste generated by each case of radionuclide separation.
b. Complete an estimate of the volume of waste that would exist or be generated without radionuclide separation.
c. Complete an estimate of the costs of waste treatment and disposal if radionuclide separation is used compared to the estimated costs if it is not used.
d. Provide the assumptions underlying such waste volume and cost estimates.
e. Submit a plan for treatment or management of residues, as appropriate, in accordance with this section.

2.2.3.4. Plans for Other Types of Activities. The Compliance Plan Volume may contain additional milestones and target dates for other types of situations related to treatment of DOE/OAK's mixed wastes, including:

a. For mixed waste that shall be shipped offsite for treatment, two activities are identified. First, LBL must request approval from the offsite treatment facility to ship the waste. This request will result in the offsite treatment facility providing a shipping date to LBL. The shipping date will identify when LBL will be allowed to ship the waste to the offsite treatment facility. In some cases, the shipping date is currently unknown because the approval to ship the waste(s) has not been requested. LBL will obtain this date as a result of completing the first milestone. The completion of the waste shipment will be accomplished no later than 6 months following the designated date for shipment provided by the offsite treatment facility. Information supporting development or use of offsite treatment capacity or technology for treatment of such wastes is provided in the background volume of the STP. In the event that changes in the schedule of the offsite treatment facility impact the schedule in DOE/OAK's Compliance Plan Volume, DOE/OAK shall notify DTSC, and DOE/OAK and DTSC shall negotiate necessary changes in accordance with Sections 2.5, "Revisions," or 2.6, "Extensions," as appropriate, and subject to Section 2.10, "Disputes." Table 2-4 contains some examples of milestones/target dates that may be provided for mixed wastes shipped offsite for treatment.

TABLE 2-4 SCHEDULE FOR MIXED WASTE TO BE SHIPPED OFFSITE FOR TREATMENT
Examples of Milestones/Target Dates: a. Request approval to ship the waste offsite. b. Complete shipment of waste(s) offsite.

b. In the event that DOE decides to treat waste at an offsite facility in lieu of plans to treat such waste onsite, DOE shall so notify DTSC, and the schedules, target dates and pre-existing milestones pertaining to management of that particular waste will no longer be applicable or enforceable. DOE shall propose a new schedule with milestone and target dates, as appropriate, as part of the notice, which shall be subject to approval by DTSC under Section 2.8, "Procedures for Review and Approval," and, if applicable, shall also be subject to Section 2.5, "Revisions." Where waste will be shipped to another DOE facility, it is the expectation that DOE/OAK shall ensure notification (or DTSC shall notify if so agreed) of the proposed shipment to the regulatory agency of the state in which the receiving facility is located.

c. For mixed wastes that are not sufficiently characterized to allow identification of appropriate treatment or for which technology assessment has not been

completed, the Compliance Plan Volume will contain schedules for characterizing such wastes and/or completing technology assessment. The final milestone/target date for such a schedule will be the requirement for DOE/OAK to either identify the facility that will receive the waste and any necessary changes to the pertinent schedule for that facility or submit a proposed schedule as described in this section.

d. TRU Waste - Notwithstanding any other provision of this Compliance Plan Volume, the provisions of Section 4.0 shall apply regarding schedules for MTRU wastes destined for WIPP in lieu of other schedule requirements of this Section 2.0 of the Compliance Plan Volume.

e. Storage of mixed wastes for purposes of allowing for radioactive decay of the radioactive portion of the mixed waste shall be considered to be storage for the purpose of accumulation of such quantities of waste as are necessary to facilitate proper recovery, treatment, or disposal in compliance with RCRA Section 3004(j). Such storage may be included in the schedules of the Compliance Plan Volume, as appropriate, including treatment schedules or schedules related to radionuclide separation.

2.3 ANNUAL SITE TREATMENT PLAN UPDATES

2.3.1 This section provides a mechanism to (1) communicate and exchange information about schedule, technology development, funding and other concerns that affect the implementation of the STP; (2) update the Background Volume to the STP in a timely fashion, including information on new waste streams; (3) propose and establish the next ensuing milestones; and (4) update and propose revisions to the Compliance Plan Volume.

2.3.2 Each fiscal year after the fiscal year in which this STP is approved and accompanying FFCAct Order executed, DOE/OAK shall provide an Annual Update to the STP to DTSC for review and comment. The Annual Update shall (1) provide DTSC with information to track progress on milestones and target dates; (2) allow input from the public, affected states, and EPA to be obtained when revisions to the STP are proposed; (3) bring the STP current to the end of the previous fiscal year (September 30); and will minimize the paperwork necessary to document changes, which will be handled by page changes to the extent practicable. These changes will be marked for comparison to the previous STP. If there are no changes to the information, milestones, or target dates in the STP, a letter to that effect will be sent to DTSC in lieu of an Annual Update.

2.3.3 The Annual Update of the STP shall update the Background Volume and the Compliance Plan Volume.

2.3.3.1 The update to the Background Volume will provide the following information:

a. The amount of each covered waste stored at LBL as follows: (1) the estimated amount in storage at the end of the previous fiscal year, and (2) the estimated amount anticipated to be placed in storage in the next five fiscal years.

b. A description of progress made up to the end of the last fiscal year on treatment or technology development of each treatment facility or activity scheduled in the STP. If applicable, DOE will also describe current or anticipated alternative treatment technology which is being evaluated for use in lieu of treatment technologies or capacities identified in the STP. This description will include potential alternate commercial treatment and offsite DOE treatment capacity or technology development.

c. An evaluation of characterization, packaging, and/or treatment capabilities and/or plans for MTRU waste to ensure that the activities and commitments included in the STP remain consistent with the Waste Isolation Pilot Plant (WIPP) waste acceptance criteria (WAC), No-Migration Variance petition, RCRA Part B permit, and/or compliance certification development.

d. A description of DOE's funding for STP-related activities and any funding issues that may impact the schedule.

e. The status of any pending or planned extension, treatability variance, or no-migration petition.

f. Information that has changed or has not been previously included regarding waste form, waste code, technology, and capacity needs, including new waste streams in accordance with Section 2.4.2.

g. Notification of the deletion of waste streams in accordance with Section 2.7.1.

2.3.3.2 The Annual Update will update the Compliance Plan Volume and may also contain notification of changes or requests for approval of changes to the Compliance Plan Volume. These notifications or requests for approval may include, as appropriate:

a. Any changes to the Compliance Plan Volume incorporated since the previous Annual Update;

b. Any proposed revisions or conditionally approved revisions;

c. Any proposed new milestones, in accordance with Section 2.2; and

d. Any other changes to the overall schedules.

The Annual Update would clearly identify proposed changes requiring approval under Sections 2.8, "Procedures for Review and Approval," and 2.5, "Revisions."

2.3.4 DOE shall make the Annual Update publicly available. When the update includes proposed revisions to the Compliance Plan Volume, the provisions of Section 2.5, "Revisions," also apply to such proposed revisions.

2.4 INCLUSION OF NEW WASTE STREAMS

2.4.1 This section establishes a method for including new mixed waste streams at LBL in the STP, including mixed wastes that are newly discovered, identified, generated, or received from offsite and mixed wastes that are generated through environmental restoration (ER) and decontamination and decommissioning (D&D) activities to the extent such wastes are expected to become a covered waste.

2.4.2 DOE/OAK shall notify DTSC of additional or new mixed wastes or waste streams that have been generated or stored and may notify DTSC of mixed wastes that are anticipated to be generated or stored at LBL, and that are expected to be covered wastes. Unless otherwise specified in the notification, the mixed waste will be a covered waste and subject to the requirements of this Compliance Plan Volume upon receipt of such notification or when generated or stored at LBL, whichever is later. To the extent practicable, DOE/OAK shall provide a description of the waste code, waste form, volumes, technology, and capacity needs, and similar pertinent information in the notification. In general, additional detail on the waste and the proposed plan and schedules consistent with Section 2.2, "Compliance Schedules," will be provided in the next regularly scheduled Annual Update, or a date for submittal of such a proposed plan and schedules will be provided if additional time is required for its preparation. The information provided pursuant to this subsection is subject to DTSC approval to the extent provided for in Section 2.4.4.

2.4.3 If DOE/OAK cannot provide such information or schedules as required by Section 2.4.2 because of inadequate characterization or because it is otherwise impracticable, DOE/OAK shall include appropriate justification, supporting information, and proposed plans for approval as a deliverable under Section 2.8, "Procedures for Review and Approval," for developing such information and schedules consistent with Section 2.2, "Compliance Schedules."

2.4.4 DOE/OAK may propose changes to the Compliance Plan Volume of the STP to accommodate new waste streams. If any such changes are required, DOE/OAK shall submit the changes for approval as a deliverable under Section 2.8, "Procedures for Review and Approval." Also, DOE/OAK may propose revisions to the Compliance Plan Volume of the STP as necessary to accommodate new waste streams subject to Section 2.5, "Revisions."

2.5 REVISIONS

2.5.1 A revision is a change to the Compliance Plan Volume of the STP that requires, for those affected portions of the STP, publication of a notice of availability to the public and consultation with affected states and EPA pursuant to this STP and Section 3021(b)(2) and (3) of RCRA. A revision is (1) the addition of a treatment facility at LBL or technology development not previously included in the Compliance Plan Volume to the STP; or (2) an extension to a milestone (including an extension by mutual agreement under Section 2.6 or a proposed milestone converting a target date under Section 2.2) for a period greater than one year. Changes in waste volume; the addition or deletion of wastes or waste types; extensions; changes to milestones for a period less than a year; or changes to target dates shall not, by themselves, constitute a revision.

2.5.2 Revisions to the STP shall be made as follows:

2.5.2.1 DOE/OAK shall identify to DTSC the need to revise the Compliance Plan Volume of the STP and provide supporting information on the basis for the revision as a deliverable pursuant to Section 2.8, "Procedures for Review and Approval." Under these procedures, within 30 days of receipt, DTSC may conditionally approve the revision, return it to DOE/OAK with comments so that changes can be made for resubmittal, or disapprove it. In reviewing the revision, DTSC shall consider the need for regional treatment facilities. Conditional approval of a revision is a determination by DTSC that the revision is acceptable subject to the results of public comment and consultation with affected states and EPA.

2.5.2.2 Within 30 days subsequent to conditional approval, DTSC shall publish a notice of availability and make the revision to the STP available to the public for review and comment and to affected states and EPA for consideration and consultation. Revisions shall be approved or approved with modification by DTSC within 6 months after DTSC's receipt of the proposed revision. DTSC shall either (1) notify DOE/OAK that the revision has final approval or (2) notify DOE/OAK that DTSC received comments from the public, affected states, or EPA indicating that such revision should be modified before approval. Any proposed modifications to the

revision shall include supporting explanation and information. DOE/OAK shall have 30 days to discuss the proposed modifications with DTSC. If agreement is not reached on the proposed modifications in this 30-day period, the procedures of Section 2.10, "Disputes," will apply.

2.5.3 To the extent practicable, comments from the public, affected states, and EPA on conditionally approved revisions will be obtained in conjunction with the Annual Update to the STP, governed by Section 2.3, "Annual Site Treatment Plan Updates." However, in the event a conditionally approved revision is proposed to become effective before it could be addressed in the regularly scheduled Annual Update, DTSC shall publish a Notice of Availability and consult with affected states and EPA, as appropriate, within 30 days of such conditional approval.

2.6 EXTENSIONS

2.6.1 DOE/OAK shall implement this STP in accordance with the milestones set forth in the STP, as well as milestones subsequently developed pursuant to this STP. DOE/OAK further agrees to adopt all reasonable measures to avoid or minimize any delays in the implementation of this STP.

2.6.2 A milestone that is established according to the provisions of the FFCAct Order shall be extended upon receipt by the DTSC of a timely request for extension, provided good cause, as defined in this section, exists for the requested extension. Any request for extension by DOE/OAK shall be made to the DTSC prior to the milestone date in the manner described below and shall specify:

a. The milestone that is sought to be extended;

b. The length of the extensions sought;

c. The good cause(s) for the extension; and

d. Any related milestone or target date that would be affected if the extension were granted.

2.6.3 Good cause for an extension includes, but is not limited to:

a. An event of *force majeure* (as defined in Section 2.6.6 below);

b. A delay caused by the DTSC's failure to meet any requirement of this STP;

c. A delay caused by the good faith invocation of dispute resolution or the initiation of administrative or judicial action; and

d. A delay caused, or which is likely to be caused, by the grant of an extension in regard to another milestone;

e. A delay caused by additional work agreed to by DOE/OAK and the DTSC;

f. Circumstances that are unforeseen at the time this STP was prepared and that significantly affect the work required under the STP;

g. Delay in the DTSC's review of a permit application or issuance of a permit required to conduct the work specified in the STP or to meet a milestone;

h. Inconsistency with the requirements of any other existing permit, order, or agreement to which DOE is a party;

i. A delay caused by a change to a planning assumption, as specified in the STP, that results from either a request by the DTSC or is identified by DOE but does not represent a failure of DOE or its contractor to properly manage the work specified in the STP;

j. A stop-work order by the DTSC; or

k. Any other event or series of events mutually agreed upon by DOE/OAK and the DTSC as constituting good cause.

2.6.4 In the absence of agreement between the DOE/OAK and the DTSC with respect to the existence of good cause, the parties may seek and obtain a determination through the dispute resolution process, Section 2.10, whether good cause exists.

2.6.5 For extension requests by DOE/OAK, except for extensions sought on the basis of *force majeure* (defined in Section 2.6.6), the following procedures shall apply:

a. DOE/OAK requests for an extension for one or more milestones shall be made to the DTSC no less than thirty (30) days prior to the date of the first milestone for which the extension is sought, either in writing or orally with a written follow-up request within ten (10) business days of the request.

b. Within fifteen (15) business days of receipt of a written request for an extension of a milestone, the DTSC shall advise DOE/OAK in writing whether it shall approve, approve in part, or deny the request. Any failure by the DTSC to respond within the fifteen (15) day period shall be deemed to constitute the DTSC's approval of the requested extension. If the DTSC approves in part or denies the requested extension, it shall explain in its written response to DOE/OAK its reasons for the partial approval or denial of the requested extension.

c. If the DTSC approves the requested extension, then the affected milestone(s) shall be extended accordingly. If the DTSC approves in part or denies the requested extension, then the affected milestone(s) shall not be extended except as set forth in Paragraph b of this section, or in accordance with a determination resulting from the dispute resolution process.

d. Within fifteen (15) business days of receipt of the DTSC's written determination to approve in part or deny DOE/OAK's extension request, the DOE/OAK may invoke dispute resolution. If DOE/OAK does not invoke dispute resolution within this time period, then DOE/OAK shall be deemed to have accepted the DTSC's determination and the existing milestone schedule set forth in the STP.

2.6.6 *Force Majeure*

2.6.6.1 The DOE/OAK shall perform the requirements of this FFCAct Order within the time limits set forth in the STP, unless performance is prevented or delayed by events which constitute a *force majeure*. A *force majeure* is defined as any event arising from a cause not foreseeable and beyond the control of the DOE/OAK, which could not be avoided or overcome by due diligence and which delays or prevents performance by a date required by the FFCAct Order. Such a cause shall be considered an event of *force majeure* and shall include, but not be limited to:

a. Acts of God, fire, war, insurrection, civil disturbance, or explosion;

b. Adverse weather conditions that could not be reasonably anticipated;

c. Unusual delays in transportation beyond the control of DOE/OAK;

d. Unanticipated malfunction or breakdown of, or accident to, machinery, equipment, or lines of pipe not due to negligence, inadequate maintenance, or improper operation;

e. Restraint by court order or order of public authority;

f. Inability to obtain, at reasonable cost and after exercise of reasonable diligence, any necessary authorizations, approval, permits, or licenses due to untimely

action or failure to act of any governmental agency or authority other than the DOE/OAK;

g. Delays caused by compliance with applicable statutes or regulations such as those governing contracting, procurement, or acquisition procedures, despite the exercise of reasonable diligence;

h. A strike, lockout, or other labor difficulty whether or not within the control of the DOE/OAK;

i. Unavailability of equipment despite reasonable diligence used to obtain the equipment in a timely manner;

j. Lack of or inability to obtain raw materials, labor, fuel, or supplies; or

k. Unanticipated condition or hazard posed to persons or property.

2.6.6.2 To claim *force majeure* the DOE/OAK shall give prompt oral notification to the DTSC within forty-eight (48) hours after the event which the DOE/OAK knows or should know constitutes a *force majeure*, and shall serve written notice on the DTSC not less than seven (7) days after such oral notification. The written notice shall contain an estimate of the anticipated length of delay, a description of the cause of delay, a plan for implementing measures to correct the problem and avoid such delays in the future, and an estimated schedule for implementation of these measures. The DOE/OAK shall adopt all reasonable measures to avoid and minimize the delay. If the suspension of obligation(s) under this section would, in the DTSC's opinion, render compliance with this FFCAct Order impossible or impracticable, the DTSC reserves the right to terminate this FFCAct Order or to seek judicial enforcement, or both.

2.6.6.3 Except as otherwise provided in this FFCAct Order, the DTSC shall notify the DOE/OAK in writing of the DTSC's determination regarding the asserted claims of *force majeure*. If the DTSC agrees that the delay or anticipated delay is attributable to a *force majeure* event, the time for performance of the obligations under this FFCAct Order that are affected by the *force majeure* event shall be extended by the DTSC for such time as corresponds to the delay shown to have resulted from the *force majeure* event or for such longer period of time that is reasonable under the circumstances. An extension of the time for performance of the obligations affected

by the *force majeure* event shall also extend the time for performance of any subsequent obligation that is affected by such delay. If the DTSC does not agree that the delay or anticipated delay has been or will be caused by a *force majeure* event, the DTSC shall notify the DOE/OAK in writing of its decision.

2.6.6.4 If the DOE/OAK elects to invoke the dispute resolution procedures set forth in this FFCAct Order in response to the DTSC's determination that a delay or anticipated delay has not been or will not be caused by a *force majeure* event, the DOE/OAK shall do so no later than thirty (30) days after receipt of this written determination from the DTSC. In any such proceeding, the DOE/OAK shall have the burden of demonstrating, by a preponderance of the evidence, that the delay or anticipated delay has been or will be caused by a *force majeure* event, that reasonable efforts were exercised to avoid and mitigate the effects of the delay, and that the DOE/OAK reasonably complied with all requirements imposed by this section. If the DOE/OAK carries this burden, the delay at issue shall not be deemed to be a violation by the DOE/OAK of the affected obligation of this FFCAct Order.

2.6.7 A timely and good faith request for extension shall toll any assessment of penalties or the initiation of any action to enforce the affected milestone(s) until a decision by DTSC is reached on whether to approve, approve in part, or deny the requested extension. If dispute resolution is invoked and the contested portion of the extension request is denied, penalties may be assessed based on an accrual date of the original milestone(s) for which the extension request was sought. Following the approval of an extension request, the DTSC may assess penalties or initiate any action to enforce the affected milestone(s) based on the most recently approved new milestone(s).

2.6.8 Extension requests made in writing by the DTSC to DOE/OAK shall be deemed approved if the DOE/OAK does not invoke dispute resolution within fifteen (15) business days after receiving written notice of the request.

2.7 DELETION OF WASTES AND TERMINATION OF THE STP

2.7.1 Deletion of Wastes. The requirements of this Compliance Plan Volume shall terminate with regard to any covered waste upon DOE/OAK's notice to DTSC of the following:

a. Completion of activities required pursuant to a milestone under the Compliance Plan Volume for treatment of such waste;

b. Shipment of wastes offsite for treatment, disposal, or storage pending treatment or disposal;

c. Changes to statute or regulation or determinations of the regulatory authority that causes a waste or waste categories to be no longer subject to the requirements of RCRA or the LDR requirements of RCRA;

d. Storage for the sole purpose of accumulating such quantities of covered wastes as are necessary to facilitate proper recovery, treatment, or disposal;

e. Information demonstrating the waste meets the treatment standards of RCRA, Section 3004 (m);

f. Treatment in accordance with the conditions of an approved LDR treatability variance; or

g. Mutual agreement between DOE/OAK and DTSC.

2.7.2 Inasmuch as the intent of the FFCAct requirement to develop an STP is to address compliance with RCRA Section 3004(j), this STP shall terminate either at such time as (1) there is no longer any mixed waste, regardless of when generated, being stored or generated at LBL which does not meet LDR requirements or (2) the mixed waste being stored or generated at LBL is being stored, or will be stored when generated, solely for the purpose of accumulating sufficient quantities of mixed wastes as are necessary to facilitate proper recovery, treatment, or disposal.

2.7.3 DOE/OAK will notify DTSC of such termination independently and/or in the Annual Updates to the STP. DTSC will provide DOE/OAK with a written response to the notification within 30 days. DTSC's response to this notice shall be subject to the provisions of Section 2.10, "Disputes."

2.8 PROCEDURES FOR REVIEW AND APPROVAL

2.8.1 Deliverables developed by DOE/OAK pursuant to this Compliance Plan Volume shall be submitted by DOE/OAK to DTSC for review and comment as provided in this section. Deliverables include documents or notices signifying completion of milestones, identifying new wastes, and supporting proposed revisions as required or permitted under this Compliance Plan Volume. Where DTSC approval of a deliverable is expressly required in this Compliance Plan Volume, the approval provisions in this section apply. Permit applications and National Environmental Policy Act (NEPA) documents shall not be subject to the procedures of this section. Permit applications shall be submitted and reviewed under applicable regulations, and NEPA documents shall be submitted and reviewed under the DOE regulations implementing NEPA. Each submittal of a deliverable shall specify the milestone or other provision of this Compliance Plan Volume requiring submittal of that deliverable.

2.8.2 Unless otherwise noted, each deliverable shall be transmitted directly to the project manager of DTSC responsible for implementation of this STP.

2.8.3 DTSC will promptly review each deliverable submitted by DOE/OAK required to be approved pursuant to this Compliance Plan Volume, within the time frames established in this section unless other time frames are agreed to in writing. In the course of their review, DTSC will consult with DOE/OAK regarding the adequacy of each deliverable. Oral comments made during these discussions shall not require a written response.

2.8.4 Deliverables that do not require DTSC approval shall be provided to DTSC for review and comment. In the event that DOE/OAK disagrees with DTSC's comments, DOE/OAK shall respond to DTSC's comments in writing explaining the DOE/OAK's position. If DOE/OAK has not received comments from DTSC within 30 days of submittal of the deliverable, it will be deemed that DTSC has no comments.

2.8.5 For any deliverable that requires DTSC approval under the provisions of this Compliance Plan Volume, the following procedures shall apply:

2.8.5.1 DTSC shall, within 30 days of receipt, take action as follows: (1) approve, conditionally approve (if the deliverable is a revision), or disapprove the deliverable as submitted; or (2) return the deliverable to DOE/OAK with comments so that changes can be made for resubmittal. Conditionally approved revisions will be approved or approved with modification after public review and comment and consultation with affected states and EPA pursuant to Section 2.5, "Revisions." DTSC may extend this review period by an additional 30 days by notifying DOE/OAK. This period may be further extended for an additional period of time, as may be agreed to by DTSC and DOE/OAK. Comments on the deliverable shall be provided with adequate specificity so that DOE/OAK can make the appropriate changes to the document. To the extent applicable, comments should refer to specific paragraphs of any sources of authority or references on which the comments are based; and upon request of DOE/OAK, DTSC shall provide a copy of the cited authority or reference.

2.8.5.2 If DTSC fails to take one of the actions specified above within the time frames required by this STP, the deliverable shall be considered approved or conditionally approved as submitted. If DTSC extends the review period for a deliverable, any milestones or target dates dependent upon the results of deliverable review will automatically be extended an equivalent amount of time as the time taken beyond the specified time frame for review. DOE/OAK will notify DTSC in writing of any enforceable milestones that will need to be extended or revised.

2.8.5.3 In the event that DTSC returns the deliverable to DOE/OAK with comments, within thirty (30) days of receipt, DOE/OAK shall incorporate the comments and shall retransmit the deliverable. DOE/OAK may extend this period by an additional 30 days by notifying DTSC. This period may be further extended for an additional period of time, as may be agreed to by DTSC and DOE/OAK. In the event DOE/OAK disagrees with DTSC's comments and the parties are unable to resolve their disagreement, DOE/OAK may invoke the dispute resolution provisions of Section 2.10, "Disputes."

2.9 FUNDING

2.9.1 DOE proposes DTSC an opportunity to input into formulating the DOE/OAK budget and setting the DOE/OAK priorities as outlined in the addendum to this STP, "Milestone Approach and Budget Formulation Process." Nothing in the STP affects DOE's authority over its budget and funding level submissions. Further, it is DOE's position that any requirement for the payment or obligation of funds by DOE established by the terms of the STP and FFCAct Order requiring compliance with the STP would be subject to the availability of appropriated funds, and that no provision of the STP or FFCAct Order should be interpreted to require the obligation or payment of funds in violation of the Anti-Deficiency Act, 31 U.S.C. Section 1341, as amended. In cases where the payment or obligation of funds would constitute a violation of the Anti-Deficiency Act, the dates established requiring the payment or obligation of such funds should be appropriately adjusted.

2.10 DISPUTES

2.10.1 Except as specifically set forth elsewhere in this STP, any action which leads to or generates a dispute regarding compliance with this STP, is subject to resolution under this section. DOE/OAK and DTSC must exhaust the dispute resolution process prior to seeking any administrative or judicial relief.

2.10.2 DOE/OAK and DTSC shall make reasonable efforts to informally resolve disputes as expeditiously as possible at the project manager/division director levels. If resolution cannot be achieved informally, the disputing party may elevate the dispute for formal resolution in accordance with this section.

2.10.3 To initiate formal dispute resolution, the disputing party shall submit to the other party a written Notice of Dispute specifying:

a. The nature of the dispute;

b. The work affected by the dispute;

c. The disputing party's position; and

d. The information the disputing party is relying upon to support its position.

2.10.4 Upon receipt of the Notice of Dispute, the DTSC Assistant Director for Hazardous Waste Management shall notify the DOE/OAK Assistant Manager for Environmental Management and Support to begin attempts at formal dispute resolution. The parties (or their respective delegates) shall have thirty (30) days from the date of the receipt by DTSC of the Notice of Dispute to resolve the dispute. If the parties cannot agree on a resolution of the dispute, the dispute shall be escalated by the disputing party to the Director, DTSC. Within thirty (30) days of escalation, the DTSC Director shall consult with the Manager, DOE/OAK, and issue a final written determination of DTSC. This 30-day period may be extended by mutual agreement of the parties. The decision of DTSC shall be binding upon the parties unless timely appeal is taken.

2.10.5 DOE shall have the right to seek administrative or judicial relief from DTSC's final determination under this section, as provided for by law. During the pendency of any dispute, DOE/OAK agrees that it shall continue to implement those portions of this STP affected by the dispute that can be reasonably implemented pending final resolution of the issue(s) in dispute. All elements of work required by this Compliance Plan Volume that are not affected by the dispute shall continue and be completed in accordance with the applicable schedule.

2.10.6 Unless timely appeal is made, DOE/OAK shall incorporate the resolution and final determination into the appropriate plan, schedule, or procedure and proceed with implementation in accordance with the amended plan, schedule, or procedure within forty-five (45) days after resolution of the dispute pursuant to the procedures specified in this section, in order for Section 2.11, "Covenants and Reservations," to remain effective for the affected waste stream.

2.10.7 States affected by the dispute and/or EPA may be consulted by the parties as part of the dispute resolution process, as appropriate.

2.11 COVENANTS AND RESERVATIONS

2.11.1 This STP and implementing FFCAct Order shall stand in lieu of any administrative, legal, and equitable remedies which are available to the DTSC against DOE, its contractors and subcontractors at any tier and all persons bound by this STP and implementing FFCAct Order with respect to the matters covered by this STP and implementing Order, so long as DOE and all parties bound by this STP and implementing FFCAct Order are in compliance with the STP and implementing FFCAct Order as determined by DTSC or a court of competent jurisdiction.

2.11.2 Except as specifically set forth herein, DOE reserves and does not waive any rights, authority, claims or defenses, including sovereign immunity, that it may have or wish to pursue in any administrative, judicial or other proceeding with respect to any person; nor does DOE waive any claim of jurisdiction over matters which may be reserved to DOE by law, including the Atomic Energy Act. Nothing in this STP and implementing FFCAct Order shall constitute an admission on the part of DOE, in whole or in part, in any proceeding except in a proceeding to enforce the FFCAct Order implementing this STP. DOE specifically reserves all rights it may have by law to seek and obtain administrative or judicial review or appeal according to law of any determination made by DTSC during DOE/OAK's performance of its obligations under this STP and implementing FFCAct Order. DOE also specifically reserves all rights it may have by law to seek and obtain administrative or judicial review or appeal of permit requirements.

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3.0 MIXED LOW-LEVEL WASTE TREATMENT PLAN AND SCHEDULES

This section describes the proposed treatment plans and schedules for mixed low-level waste (MLLW) streams at LBL. These schedules represent enforceable milestones for the purposes of the FFCAct. More detailed information regarding the preferred treatment options, including additional breakdowns of schedules and target dates, is provided in the Background Volume. It is DOE/OAK's intention to develop enforceable milestones only as specifically required by the FFCAct.

Table 3-3 (a) through (e) contain the proposed treatment or characterization schedules for DOE/OAK MLW at LBL. For consistency in comparing activities for treating MLLW at any of the several DOE/OAK sites required to prepare PSTPs, the tables have been assigned the following standard identification: (a) is reserved for onsite treatment schedules; (b) is reserved for offsite treatment schedules; (c) is reserved for technology development schedules; (d) is reserved for treatability studies; and (e) is reserved for schedules for waste streams requiring characterization or technology assessment. The tables are included in the PSTP only if applicable at this site.

3.1 MLLW STREAMS FOR WHICH TECHNOLOGY EXISTS

The preferred treatment option for LBL waste streams for which technology exists are identified in Table 3-1, with detailed schedule information provided in Tables 3-3 (a) or (b), as appropriate. Additional schedule information and a description of the interim steps needed to bring these wastes into compliance with RCRA LDR requirements are included in Section 3.1 of the Background Volume. Treatment plans selected will meet RCRA LDR standards as defined in 22 CCR 66268 (40 CFR 268) and will be conducted in accordance with all RCRA requirements. This includes, but is not limited to, adhering to waste analysis plans written in accordance with RCRA and maintaining/developing the applicable recordkeeping, notification, and/or certification requirements mandated by RCRA.

3.2 MLLW STREAMS FOR WHICH TECHNOLOGY EXISTS BUT NEEDS ADAPTION OR FOR WHICH NO TECHNOLOGY EXISTS

LBL has no waste streams in this category.

3.3 MLLW STREAMS REQUIRING FURTHER CHARACTERIZATION, OR FOR WHICH TECHNOLOGY ASSESSMENTS HAVE NOT BEEN DONE

LBL waste streams requiring further characterization are identified in Table 3-2, with detailed schedule information in Table 3-3 (c). Following the completion of the characterization process, DOE/OAK will select a treatment option and submit a proposed schedule as described in Section 2.0 of the Compliance Plan Volume. Additional schedule information and a description of the interim steps needed to bring these wastes into compliance with RCRA LDR requirements are included in Section 3.3 of the Background Volume.

Table 3-1

TREATMENT PLAN FOR CHARACTERIZED DOE/OAK MLLW STREAMS AT LBL

Waste Stream No.	Waste Stream Description	Preferred Treatment Option
MLLW, Aqueous Liquids/Solids - Corrosives, CH		
LB-W001 a (onsite) b (offsite)	Ignitable and non-ignitable acidic aqueous solutions/solids with metals and radionuclides. Alpha contamination less than or equal to 10 nanoCuries/gram (nCi/g).	Onsite Neutralization & INEL: WERF Incineration and Stabilization, if necessary
LB-W011 a (onsite) b (offsite)	Ignitable and non-ignitable acidic aqueous solutions/solids with metals and radionuclides. Alpha contamination greater than 10 nCi/g, but less than or equal to 100 nCi/g.	Onsite Neutralization & INEL: IWPF Thermal Treatment and Stabilization, if necessary
LB-W002 a (onsite) b (offsite)	Alkaline solutions/solids with metals and radionuclides. Alpha contamination less than or equal to 10 nCi/g.	Onsite Neutralization & INEL: WERF Incineration and Stabilization, if necessary
LB-W012 a (onsite) b (offsite)	Alkaline solutions/solids with metals and radionuclides. Alpha contamination greater than 10 nCi/g, but less than or equal to 100 nCi/g.	Onsite Neutralization & INEL: IWPF Thermal Treatment and Stabilization, if necessary
MLLW, Aqueous Liquids/Solids - Reactives, CH		
LB-W003	Cyanide solutions contaminated with radionuclides.	ORNL: Cyanide Treatment Facility

Table 3-1

TREATMENT PLAN FOR CHARACTERIZED DOE/OAK MLLW STREAMS AT LBL

Waste Stream No.	Waste Stream Description	Preferred Treatment Option
MLLW, Organic Liquids/Solids, CH		
LB-W004	Ignitable and non-ignitable liquids/solids containing solvents and oil contaminated with metals and radionuclides. Alpha contamination less than or equal to 10 nCi/g.	INEL: WERF Incineration and Stabilization
LB-W014	Ignitable and non-ignitable liquids/solids containing solvents and oil contaminated with metals and radionuclides. Alpha contamination greater than 10 nCi/g, but less than or equal to 100 nCi/g.	INEL: IWPF Thermal Treatment and Stabilization
MLLW, Elemental Lead, CH		
LB-W005	Blocks and sheets of lead induced and surface contaminated with radionuclides.	Hanford: WRAP II-A Macroencapsulation
MLLW, Elemental Mercury, CH		
LB-W006	Elemental Induced Mercury.	INEL: WEDF Amalgamation
MLLW, Scintillation Fluids, CH		
LB-W007	Organic liquids (scintillation fluid) contaminated with radionuclides. Alpha contamination less than or equal to 10 nCi/g.	INEL: WERF Incineration
LB-W017	Organic liquids (scintillation fluid) contaminated with radionuclides. Alpha contamination greater than 10 nCi/g, but less than or equal to 100 nCi/g.	INEL: IWPF Thermal Treatment
MLLW, Aqueous Liquids/Solids - Oxidizers, CH		
LB-W008	Aqueous liquid/solid oxidizers, ignitable and non-ignitable, contaminated with tritium and other radionuclides. Alpha contamination less than or equal to 10 nCi/g.	INEL: WERF Incineration
LB-W018	Aqueous liquid/solid oxidizers, ignitable and non-ignitable, contaminated with tritium and other radionuclides. Alpha contamination greater than 10 nCi/g, but less than 100 nCi/g.	INEL: IWPF Thermal Treatment
MLLW, Predominantly Combustible Debris, CH		
LB-W009	Contaminated Debris: paper, plastic and glass contaminated with volatile organics, metals, and radionuclides. Alpha contamination less than or equal to 10 nCi/g.	INEL: WERF Incineration and Stabilization
LB-W019	Contaminated Debris: paper, plastic and glass contaminated with volatile organics, metals, and radionuclides. Alpha contamination greater than 10 nCi/g, but less than or equal to 100 nCi/g.	INEL: IWPF Thermal Treatment and Stabilization

Key: INEL WEDF = Idaho National Engineering Laboratory Waste Engineering Development Facility
INEL WERF = Idaho National Engineering Laboratory Waste Experimental Reduction Facility
INEL IWPF = Idaho National Engineering Laboratory Idaho Waste Processing Facility
WRAP IIA = Waste Receiving and Processing (Facility); CH = Contact-Handled

TABLE 3-2

MLLW STREAMS AT LBL: UNCHARACTERIZED

Waste Stream No.	Description	Status
LB-W013	Organic water reactives contaminated with radionuclides	Technology Assessment Required
LB-W023	Lithium Salts	Technology Assessment Required
LB-W033	Uranium Chips	Technology Assessment Required
LB-W010	Uranium Hexaflouride Gas	Uncharacterized
LB-W020	Boron Triflouride Gas	Uncharacterized
LB-W030	Carbon Monoxide Gas	Uncharacterized
LB-W040	Ethylene Gas	Uncharacterized
LB-W050	Methane Gas	Uncharacterized
LB-W101	Aqueous Organic Liquids	Uncharacterized
LB-W111	Aqueous Liquids	Uncharacterized

Table 3-3 (a)

SCHEDULE: MLLW STREAMS TO BE TREATED ONSITE BY EXISTING TREATMENT, FOLLOWED BY OFFSITE TREATMENT

Activity	Waste Stream No.			
	LB-W001	LB-W011	LB-W002	LB-W012
Target Dates				
Treat 100% of waste	9/30/97	9/30/97	9/30/97	9/30/97
Offsite Treatment Location	INEL	INEL	INEL	INEL
Request an acceptable shipping schedule for waste	11/15/98	11/15/98	4/30/99	4/30/99
Complete shipment of the wastes	Assumption #1	Assumption #1	Assumption #1	Assumption #1

Assumptions:

1. Wastes will be shipped within 6 months after the approved shipping date is provided by the treatment facility (in response to LBL's request shown as the first target date)

Note:

Compliance Plan schedule tables generally show only activities that have not yet been completed. Where a milestone is shown as completed for a waste stream in the table, the next target date becomes the milestone for that waste stream.

Table 3-3 (b)

SCHEDULE: MLLW STREAMS TO BE TREATED OFFSITE WITH EXISTING TECHNOLOGIES

Activity	Waste Stream No.										
	LB-W003	LB-W004	LB-W014	LB-W005	LB-W006	LB-W007	LB-W017	LB-W008	LB-W018	LB-W009	LB-W019
Offsite Treatment Location	ORNL	INEL	INEL	Hanford	INEL	INEL	INEL	INEL	INEL	INEL	INEL
Target Dates											
Request an acceptable shipping schedule for waste.	6/15/98	6/15/98	6/15/98	6/15/98	9/30/98	6/15/98	6/15/98	6/15/98	6/15/98	6/15/98	6/15/98
Complete shipment of the waste(s).	Assumption #1	Assumption #1	Assumption #1	Assumption #1	Assumption #1	Assumption #1	Assumption #1	Assumption #1	Assumption #1	Assumption #1	Assumption #1

Assumptions:

1. Wastes will be shipped within 6 months after the approved shipping date is provided by the treatment facility (in response to LBL's request shown as the first milestone)

Note:

1. Compliance Plan schedule tables generally show only activities that have not yet been completed. Where a milestone is shown as completed, for a waste stream in the table, the next target date becomes the milestone for that waste stream.

Table 3-3(e)

SCHEDULE: MLLW STREAMS REQUIRING CHARACTERIZATION

Activity	Waste Stream No.									
	LB-W013	LB-W023	LB-W033	LB-W010	LB-W020	LB-W030	LB-W040	LB-W050	LB-W101	LB-W111
Milestones										
Complete necessary characterization to allow the identification of treatment option, or complete technology assessment.	1/31/96	1/31/96	1/31/96	1/31/96	1/31/96	1/31/96	1/31/96	1/31/96	1/31/96	1/31/96
Target Dates										
Select treatment option, and develop and submit a schedule for treating the waste stream with annual updates.	3/31/97	3/31/97	3/31/97	3/31/97	3/31/97	3/31/97	3/31/97	3/31/97	3/31/97	3/31/97

Note:

Compliance Plan schedule tables generally show only activities that have not yet been completed. Where a milestone is shown as completed, for a waste stream in the table, the next target date becomes the milestone for that waste stream.

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4.0 MIXED TRANSURANIC WASTE TREATMENT PLAN AND SCHEDULES

This section describes the proposed treatment plans and schedules for DOE/OAK mixed transuranic (MTRU) wastes located at LBL. MTRU waste, by definition, contains Transuranic (TRU) constituents at levels exceeding 100 nCi/g and RCRA-regulated waste. LBL has not identified any waste streams that are applicable to this category. If MTRU wastes are identified in the future the information will be added to the STP at that time.

LBL has identified two potential waste streams that are currently undergoing characterization. The waste streams, described in Sections 3.3.5 and 3.3.6, are currently classified as low-level waste requiring characterization. If it is determined that these wastes are MTRU, they will be incorporated into the Plan as a MTRU waste stream.

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5.0 MIXED HIGH-LEVEL WASTE STREAMS

DOE/OAK has not generated or stored mixed high-level waste (HLW) at LBL requiring treatment prior to land disposal, nor are mixed HLW requiring treatment prior to land disposal anticipated to be generated as a result of DOE/OAK activities at LBL in the future.

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Addendum

MILESTONE APPROACH AND ENVIRONMENTAL MANAGEMENT BUDGET FORMULATION PROCESS

March 1995

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-ADDENDUM-

MILESTONE APPROACH AND ENVIRONMENTAL MANAGEMENT BUDGET FORMULATION PROCESS

In view of recent budget cuts and future budget uncertainties, the Department of Energy (DOE) faces a significant challenge in maintaining an environmental program that complies with environmental laws, including the Federal Facility Compliance Act (FFCAct), in a manner that maximizes use of DOE's resources and addresses the most serious risks first. DOE must work closely with regulatory agencies and stakeholders to develop less costly and more efficient approaches to achieving compliance while recognizing fiscal constraints. DOE is moving forward on several fronts to meet this challenge, including initiatives to improve internal efficiency and productivity, to involve regulatory agencies and stakeholders in a "bottom-up" process for setting environmental management budgets and priorities, and to seek increased flexibility in the appropriation process for DOE's Environmental Management Program. A key element in meeting this challenge is the development of a process for setting milestones that provides accountability, focuses resources on high priority activities, and recognizes fiscal and technical uncertainties.

To meet these objectives, DOE proposes using a two-year rolling milestone approach to implement the schedules provided in the Compliance Plan Volume of the Site Treatment Plan. Under this approach, schedule dates are designated as either "milestones" or "target dates." Milestones and target dates would be established in accordance with available Environmental Management funding for the site. Milestones are enforceable deadlines for near-term activities (i.e., the current fiscal year plus one additional year). Milestones are established for near-term activities because there is greater fiscal and technical certainty about these activities. Target dates are non-enforceable deadlines for longer-term activities and would be converted to milestones on an annual basis. Each year, after receipt of the Approved Funding Program that reflects the final Congressional appropriation for that fiscal year, existing milestones would be reviewed,

and adjusted if necessary, based on funding availability, new technical information, and other factors. An additional year of milestones would also be established by converting upcoming target dates to milestones, adjusting the target dates as necessary before converting them to milestones. Affected out-year target dates would also be adjusted as necessary. To the extent practical, this process would coincide with the process for the Annual Site Treatment Plan Updates and would be conducted in a consistent time-frame across the DOE sites (for example, no later than March 31 of each year).

During the annual review and establishment of milestones and target dates, DOE and the regulatory agencies would consider a variety of factors, including: funding availability; latest information on cost estimates; site priorities identified through consultations among DOE, regulatory agencies, and stakeholders; new or emerging technologies; and other relevant factors.

Because the process for modifying and extending milestones is resource-intensive for both DOE and regulatory agencies, only major project activities required by the FFCAct and other statutes should be designated as enforceable milestones. Other mechanisms, such as submission of the Annual Site Treatment Plan Updates, would provide regulatory agencies with information on progress on enforceable milestones and interim activities.

Target dates would be established using realistic assumptions. DOE and the regulatory agencies must recognize the uncertainties associated with long-term target dates which set forth DOE's strategic vision of how it plans to accomplish the project.

DOE will work with the regulatory agencies to resolve disputes concerning the establishment of milestones. DOE proposes that the parties agree to exhaust all available dispute resolution mechanisms prior to resorting to formal enforcement actions for disputes involving insufficient funding.

As noted above, DOE will provide the regulatory agencies and other stakeholders an opportunity to participate in developing the Environmental Management budget and priorities. Open discussions between DOE, regulatory agencies, and other stakeholders will facilitate the development of a sensible Environmental Management program and budget proposal that uses DOE's resources wisely in light of budget constraints confronting DOE.