SITE TREATMENT PLAN

for the MIXED WASTES

at the MOUND FACILITY MIAMISBURG, OHIO

Background and Plan Volumes

U. S. DEPARTMENT OF ENERGY

SITE TREATMENT PLAN

BACKGROUND VOLUME

for the

Mixed Wastes

at

Mound Facility

Miamisburg, Ohio

September 15, 1995

Revision 8

EXECUTIVE SUMMARY

for the

MOUND FACILITY, MIAMISBURG, OHIO

SITE TREATMENT PLAN

Site Treatment Plans (STPs) are required for facilities at which DOE generates or stores mixed waste; mixed waste contains both a hazardous waste subject to the Resource Conservation and Recovery Act, and a source, special nuclear or by-product material subject to the Atomic Energy Act of 1954. On April 6, 1993, DOE published a Federal Register notice (58 FR 17875) describing its proposed process for developing the STP in three phases, including a Conceptual STP, a Draft STP, and a Final STP. The purpose of these Plans is to identify the preferred options for treating the mixed waste at Mound Facility or for developing treatment technologies where technologies do not exist or need modification. The PSTP is DOE's proposal to manage these wastes. The preferred options have been reviewed for DOE-wide impacts and were evaluated by the Options Analysis Team (OAT) to formulate the "wise" configuration for treatment for the overall DOE program. The preferred options could change between the Proposed STP and approval of the final STP by the Ohio EPA, based on continuing discussions with regulators and continuing analysis of DOE-wide impacts.

Since 1947, Mound Facility's mission has been the development of processes for the nuclear weapons program, production of non-nuclear components for nuclear weapons, and diagnostic testing of explosive and nuclear components. With the DOE consolidation of non-nuclear manufacturing, the current mission assignment for Mound is changing to include clean-up of contaminated buildings and land, along with commercial economic development of the site.

The treatment ranking hierarchy preferred by the Ohio EPA is (1) modify or build on-site treatment, (2) on-site portable/mobile units, (3) Ohio option (off-site, in state), and last (4) off-site out-of-state. Treatment technology evaluation consisted of listing feasible alternatives, screening the selected technologies, and performing an evaluation of the remaining technologies. The evaluation is based on the Treatment Selection Guides developed by the DOE FFCAct Task Force. The scores were based on the available information at this time. This procedure could produce different preferred options if redone in the future, particularly as new technologies mature. As technologies are developed and system efficiencies are sought to reduce costs and expedite treatment, a new preferred option may surface. When changes are determined to be appropriate, DOE will consult with the state to request approval.

The waste streams with DOE preferred options along with volume in storage and estimated treatment residual volume are summarized in the table below. Two waste stream volumes, W007 lead-acid batteries and W002 TRU corrosives, have been adjusted to zero. TRU corrosives were found to not meet the definition of corrosives. The lead-acid batteries were disassembled. The lead in the batteries was found to be not contaminated and awaits recycle.

Summary of Mound Facility Mixed Waste Streams and Preferred Treatment Options

MWIR#	WASTE STREAM	VOL.(m^3)	PREFERRED OPTION	EST. RESIDUAL VOL. (m^3)
W001	Scintillation Cocktail	43.3	Commercial Treatment	6.8
W013	Waste Oils	26.8	Commercial Treatment	0.196
		0.6	TSCA Incinerator	0.004
W008	Kerosene, PCB's	1.1	TSCA Incinerator	0.1
W012	Lead Loaded Gloves	0.0204	Encapsulation	0.11
W007	Lead-Acid Batteries	0.0	Survey/Decon	0.0
W004	Lead Shapes	5.0	Surface Decon	2.0
W009	Absorbed Oil PCB's	0.227	Thermal Desorb/TSCA	1.2
W005	Liquid Mercury	0.018	Amalgamation	0.025
W010/11	Lab Packs	0.16	Sort/Survey/Analyze	0.3
W014	Newly Discovered Waste	19.9	Sort/Survey/Analyze	2.5
W002	TRU Corrosives	0.0	WIPP	0.0
W003	TRU Lead Gloves	1.6	WIPP	1.6
TOTAL		98.73 m^3		14.84 m^3

SITE TREATMENT PLAN
BACKGROUND VOLUME
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1.0

1.0 INTRODUCTION

1.1 Purpose and Scope

The Department of Energy (DOE) is required by section 3021(b) of the Resource Conservation and Recovery Act (RCRA), as amended by the Federal Facility Compliance Act (FFCAct or the Act), to prepare Proposed Site Treatment Plans (PSTPs or Plans) describing the development of treatment capacities and technologies for treating mixed waste. Plans are required for facilities at which DOE generates or stores mixed waste, defined by the Act as waste containing both a hazardous waste subject to the Resource Conservation and Recovery Act, and a source, special nuclear or by-product material subject to the Atomic Energy Act of 1954 (42 U.S.C.2011 et seq.). The Mound Facility Site Treatment Plan (STP) is being provided to the Ohio EPA for approval in accordance with the Act.

The Mound Facility Plan is the result of a "bottom up" process described in an April 6, 1993, Federal Register notice (58 FR 17875). DOE has followed an iterative process in developing the Plans, working closely with State regulatory agencies and EPA at the site and national level throughout the process. This Plan follows two interim versions - a Conceptual Site Treatment Plan submitted in October 1993 and a Draft Plan submitted in August 1994, which were provided to regulatory agencies and made publicly available. The Conceptual Plan identified a range of preliminary options for treating the mixed waste at Mound Facility. The Draft Plans identified site specific preferred options which had not yet been evaluated for impacts to other DOE sites or the overall DOE program. The Mound Facility Conceptual Plan and Draft Plan and other related information are available at the Miamisburg Senior Adult Center Public Reading Room, 305 Central Ave., Miamisburg, Ohio.

This Plan contains DOE's preferred options developed after evaluation and integration of the site-specific treatment options contained in the Draft Plans of the other sites with DOE mixed waste. The process DOE followed was coordinated with State and EPA regulators and is described in Section 2.2. DOE believes the treatment options contained in the Plans represent a sensible national configuration for mixed waste treatment systems that balances DOE's interests and concerns and the input DOE received on the Draft Plans from the regulatory agencies and others.

The Plan also contains schedules for obtaining treatment for mixed wastes. However, the schedules in this Plan have not yet integrated with those of other DOE sites from a technical, complex-wide perspective. Moreover, 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 from the schedules in the Plans.

The schedules contained in this and the 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 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 large 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 management.

DOE has discussed with States and EPA the difficulty DOE faces in providing timely schedules for some new treatment facilities given its current budgetary constraints, and the need to consider whether funds from other activities should be shifted to support more timely schedules. Rather than have DOE determine on its own what activities are high priority, the States and EPA recommended that the Plans be submitted with schedules consistent with current budget and priorities. 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 process and discussions in reviewing the Plans, DOE and the regulatory agencies expect that some schedules in the Plans will be revised before the Site Treatment Plans are approved and orders 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 Plan. DOE will continue to evaluate and develop technologies or system efficiencies that offer potential advantages in the areas of public acceptance, risk abatement, performance and life cycle cost. Should better alternatives such as 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 Order.

This "Background Volume" is one of two volumes that constitute the Site Treatment Plan. It provides a detailed discussion of the preferred option or options, identifies the waste streams the option addresses and gives explanatory information for the "Compliance Plan Volume." The Compliance Plan Volume identifies the capacity to be developed and associated schedules as required by the Act.

1.2 Site History and Mission

Mound Facility, located in Miamisburg, Ohio, about 16 km. Southwest of Dayton, is operated by EG&G Mound Applied Technologies for DOE. Since 1947, Mound's mission has been the development of processes for the nuclear weapons program, production of non-nuclear components for nuclear weapons, and diagnostic testing of explosive and nuclear components. Additional programs include the manufacture of stable isotopes for research, the development and manufacture of small chemical heat sources for the defense program, recovery and purification of tritium from scrap materials, and the development and fabrication of heat sources fueled by plutonium-238 to provide power for satellites and spacecraft. With the DOE consolidation of non-nuclear manufacturing, the current mission assignment for Mound is changing to include clean-up of contaminated buildings and land along with commercial economic development of the site. Mound Facility has 120 buildings on 1.24 square km of land.

1.3 Framework For Developing DOE's Site Treatment Plans

RCRA Land Disposal Restriction (LDR) requirements require the treatment of hazardous waste (including the hazardous component 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 Federal Facility Compliance Act, signed on October 6, 1992, waives sovereign immunity for fines and penalties for RCRA violations at Federal facilities. However, the Act postpones that waiver for three years for mixed waste LDR storage prohibition violations for DOE's 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 Act 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 Act requires the plans to contain schedules for developing treatment 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 Act also requires the plan provide certain information where radionuclide separation is proposed. The Act states the plans may provide for centralized, regional or on-site 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 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" completed in October 1993, a "draft plan" no later than August 1994, and a "proposed plan" no later than February 1995. This process provided opportunity for early involvement by the States and other stakeholders to discuss technical and equity issues associated with the plans.

The submittal date for the final proposed plan has been moved back to not later than April 7, 1995 with agreement from the states. A notice will be placed in the Federal Register to reflect this change.

The Conceptual STP, submitted in October 1993, focused on identifying treatment needs, capabilities, and options for treating the site's mixed waste. The **Draft STP** focused on the site specific preferred options for treating the site's mixed wastes, wherever possible, as well as proposed schedules for constructing capacity. The options presented represent the site's best judgment of the available information and the States preferences, and should be viewed as a starting point for discussion leading to the development of **The Proposed Plan** which is being submitted to the regulatory agency for review and approval, approval with modification, or disapproval, as required by the Act. Each version of the STP reflects discussions among the 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 STP and issuance of the compliance order** required by the Act. DOE's goal is to have all plans and orders in place by October 1995.

1.4 Site Treatment Plan Organization

Mound Facility's STP follows the same format as the STPs of the other DOE sites to facilitate cross-site comparisons. The PSTP is organized in two separate, but integrated, volume. The "Background Volume," provides the detailed discussion of the options: it contains information on the waste streams and treatability groups a particular treatment option or options would address, and describes and uncertainties associated with that option, as well as the budget status of the option, and regulator and stakeholder input. The "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 Act. It references, but does not duplicate, details on the options in the Background Volume.

Section 1.0 and 2.0 in both Volumes contain introductory material relevant to the purpose of the Volume. The Background Volume contains general information on the 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.

Section 2.0 of the Plan Volume presents certain funding and scheduling administrative issues relevant to the implementation of the Site Treatment Plan.

Sections 3.0 through 5.0 discuss the preferred option or options for low-level mixed waste, mixed transuranic waste, and mixed high-level waste (Mound does not have high level waste), and 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 Plan Volume, these sections include proposed schedules, to the extent feasible, as required under the Act.

The Background Volume includes three additional sections that are not included in the Plan Volume because they are not required by the Act nor are 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 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 mixed wastes pending treatment.

Section 8.0 describes a process being followed by DOE for evaluating options for disposal of mixed waste treatment residues. Although the Act does not require disposal to be covered in the Plans, DOE is including disposal information to be responsive to the States' request and to support equity discussions. Section 8.0 identifies whether Mound Facility is being considered as a disposal site and explains why or why not.

Appendices contain more detailed information on Selection of Treatment Alternatives, the Ohio option, Definitions, and Estimated Life Cycle Costs for Treatment Technologies.

1.5 Related Documents and Permits

Other DOE efforts are closely linked to STP development. These include the Mixed Waste Inventory Report; activities conducted pursuant to the National Environmental Policy Act (NEPA); and compliance and cleanup agreements containing commitments relevant to mixed waste. All public documents are available at Mound Facility's public reading room located at Miamisburg Senior Adult Center Public Reading Room, 305 Central Ave., Miamisburg, Ohio.

Mixed Waste Inventory Report

The Mixed Waste Inventory Report, (MWIR) required by the Act, provides an inventory of mixed waste currently stored or generated, or expected to be generated over the next five years, at each DOE site, and an inventory of treatment capacities and technologies. The Interim Mixed Waste Inventory Report, published by DOE in April of 1993, provided information on a waste stream-by-waste stream basis for each DOE site that generates or stores mixed waste. DOE made updated waste stream and capacity data available to the States and EPA in May 1994. The May 1994 MWIR data represents the best record of DOE's mixed waste inventory at the beginning of 1994. However, because data is constantly being refined, waste stream information in Mound Facility's Proposed Plan may differ somewhat from the May 1994 MWIR data. Any changes in waste stream information are explained in the Background Volume.

DOE is in the process of a further update of the MWIR data. The MWIR update is being closely coordinated with preparation of the Plans to ensure maximum consistency in waste stream information between the Proposed Plans and the MWIR. The updated MWIR data will be available by June 1995.

NEPA Activities

The Programmatic Environmental Impact Statement for Waste Management

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, low-level, and hazardous waste. The analysis for the waste management 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 Waste Management (WM) PEIS is being coordinated with the preparation of the Site Treatment Plans under the FFCAct. 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 its legislative requirement of issuing the Consent Orders.

Mound Facility Final Environmental Impact Statement

The Final Environmental Impact Statement for Mound Facility was published June, 1979 as DOE/EIS-0014. The existing environmental setting was described and the cumulative impact of Mound's mission was evaluated. The EIS concluded that normal plant operations produce no significant offsite air or water pollution and have only a minor impact on the local areas land use by reason of the removal of the plant site from marginal agricultural or residential use. The impact of nuclear operations is that tritium levels have increased in well water in the plant vicinity. A remedial program of induced infiltration has reduced these levels. The only appreciable quantity (approximately 5 curies) of plutonium-238 found off-site is confined to one localized area in the abandoned Miami-Erie Canal adjacent to the West boundary of the plant site. This deposition resulted from an onsite underground radioactive waste line break in 1969.

Environmental studies are continuing as part of Mound's monitoring, surveillance and environmental protection program. These are published annually.

Compliance Agreements

Mound Facility was placed on the CERCLA (i.e. Superfund) National Priorities List (NPL) in November 1989. Pursuant to that status, a CERCLA Section 120 Federal Facility Agreement (FFA) was signed between DOE and US EPA (EPA Administrative Docket Number OH6 890

008 984). The FFA became effective October 12, 1990. On July 15, 1993 the State of Ohio entered into the agreement by signing the document. The FFA contains both the procedural and substantive requirements for Remedial Investigation/Feasibility Study (RI/FS) work. The RI/FS process at Mound follows the methodology that the Superfund program has established for characterizing the nature and extent of risks posed by uncontrolled hazardous waste sites and for evaluating potential remedial options.

Assessment and possible remediation of Mound Facility will be completed in a comprehensive manner and will be enhanced by the division of the facility into operable units. Each operable unit has a schedule outlining the enforceable agreement milestones which have been approved by the regulatory agencies. The FFA specifies and stipulates fines or penalties that could result if milestones are missed.

Other Permits

Mound is under interim RCRA status and submitted a revised Part B in August 1994. Other environmental permits are listed in the table below.

A. Permit Type	B. Permit Number	C. Description
Water	OH0009857	NPDES permit
Air	0857091196K001	Paint spray booth/paint shop (dry)
Air	0857091196L002	Vapor Degreaser 2
RCRA	OH6890008984	RCRA Part A and B
Air	OH57091196B001	92.5 MM BTUH Oil Gas-Fired Boiler
Air	0857091196B006	Gas/oil-fired boiler 2 [a]
Air	0857091196F001	Plant roadways and parking lots [a]
Air	0857091196G001	Above-ground fuel dispensing facility [a]
Air	0857091196P001	Miscellaneous grinding equipment [a]
Air	0857091196T001	Underground storage tank, day tank 1[a]
Air	0857091196T002	Underground storage tank, day tank 2[a]
Air	0857091196T003	Underground storage tank, day tank 3[a]

A. Permit Type	B. Permit Number	C. Description
Air	0857091196T004	Underground storage tank, day tank 4[a]
Air	0857091196T007	Glass Melter furnace (R&D) PTI
Air	0857091196N002	Retort PTI
Air		Open Burn Unit for explosives wastes [b]

[a] Registration rather than permit.
[b] Permit by Letter

2.0

2.0 METHODOLOGY

2.1 Assumptions

All sites used the following assumptions to provide for a degree of consistency in the preparation of the 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. Regarding defense related TRU Waste, the STPs reflect DOE's current strategy that the Waste Isolation Pilot Plant (WIPP) will open and receive a No Migration Variance. The STPs identify characterization, processing, and treatment of TRU waste to meet the WIPP Waste Acceptance Criteria. Consistent with this policy, treatment of mixed TRU waste to meet Land Disposal Restriction (LDR) standards will not be included in the PSTPs at this time. No non-defense mixed TRU waste has been or will be generated at Mound Facility.

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

2. DOE recognizes some states' preference for treatment of all wastes on-site. Where appropriate, existing on-site capacity or mobile treatment units will be utilized before new facilities are constructed. When on-site treatment or use of commercial or mobile facilities is not practicable, the use of existing off-site capacity, as well as the construction of new facilities, will be considered.

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

4. 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.

5. The STP will address all wastes in the updated Mixed Waste Inventory Report (MWIR). Any changes/corrections to the MWIR waste stream and treatment facility information will be explained in the STP.

6. On a volume basis, the large majority of DOE's mixed waste will be treated on-site. 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 on-site. At a minimum, Richland (RL), Oak Ridge (OR), Idaho (ID) and Savannah River (SR) will have on-site facilities to treat the majority of their wastes.

7. The Programmatic Environmental Impact Statement (PEIS) is being performed in parallel with the development of the STPs. The STP process will provide information to the PEIS. Each site will prepare any necessary specific NEPA documentation before proceeding with a given project or facility identified in the STP.

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. DOE sites which fabricate mobile treatment units and those sites which indicate mobile treatment as a preferred option will sign MOUs or similar documents to assure the regulators that responsibility to meet schedules under their control is shared between those sites.

Assumptions and Comments for Schedules in Plan Volume:

- Durations for many activities are best estimates based on current knowledge of the characteristics of the various waste streams. Durations of sampling activities are dependent on waste stream characteristics, especially the level and nature of radioactive contamination. Estimated times for these activities may change as characterization proceeds and more complete information on contaminants is available.

- The Drum Opening Facility (WD 113) will be operational April 10, 1995, with all construction complete and required documentation and approvals in place. This facility will initially be utilized to sort, bulk and repackage the scintillation cocktail wastes.

- A temporary drum opening facility (Building 23 Tent) will be operational by April 18, with all construction and approvals in place. Documentation will allow sampling of Waste Oils (Low Level Rad), Kerosene PCBs, Lead battery acid, lead gloves, and lead shapes. If this facility is contaminated during sampling activities, replacement with a new temporary facility may be necessary.

- Adequate Health Physics support will be available for monitoring of sampling operations, surface wipes (including counting room support) for waste characterization and transportation, and monitoring waste treatment activities.

- Regulatory approvals (RCRA treatment permits, NEPA FONSI (if required), applicable air and water permits) will not significantly set back treatment schedules. Two years for RCRA approvals has been assumed for waste streams requiring treatment permits.

- Waste streams will be treated with the preferred treatment technologies identified in the Site Treatment Plan (STP). Treatment windows for the various mobile treatment units (MTUs) reflect the integrated treatment schedule provided by GJPO.

- MTUs will be available as scheduled in the integrated treatment schedule.

- While planning on treatment of mixed wastes as indicated in the STP, Mound will continue to assess new treatment alternatives. Alternative treatment/disposal options will be implemented if they will eliminate waste inventories more quickly and/or at a lower cost. Changes of this type may impact the characterization and treatment schedule.

- The mixed waste characterization schedule has been developed based on facility and personnel constraints. Budget constraints have not been applied to this schedule. As noted in previous discussions, at this time Mound has insufficient funds available to support the attached characterization schedule.

- One location onsite will be available for MTU operation. This location will be identified and necessary building modifications will be made to be suitable (size, utilities availability) for the MTUs scheduled at Mound.

Waste stream-specific assumptions:

<u>Lab packs, Newly Discovered Potentially Mixed Waste</u>
Treatment technologies cannot be completely identified until characterization is complete. Time requirements for treatment and disposal can be more accurately estimated at that time.

Waste Oils
Approximately one third of the Waste Oils inventory will not be hazardous waste as defined by RCRA, and will thus be eliminated from the mixed waste inventory and disposed of as radioactive waste. Disposal options will be evaluated once characterization is complete. Approximately 5000 gallons of oils will be characterized as mixed waste, and will be treated commercially.

Scintillation cocktails
Time required for sorting trash and bulking scintillation cocktails will average 2 drums/man-day for alpha drums, and 0.5 drums/man-day for all other drums (beta drums, alpha + beta drums, unknown rad constituent drums). Additional time is due to monitoring and venting requirements for tritium-containing drums.
Volume of the bulk scintillation cocktail will range between 1 and 5 gallons/drum.
Volume and nature of lab trash in scintillation cocktail drums will vary widely. Trash contaminated with scintillation cocktail will be treated by thermal desorption - the volume of this material is difficult to accurately predict and will directly affect treatment time.

2.2 Treatment Options Selection Process

Because the Draft Site Treatment Plans (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 STPs, 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 Options Analysis Team (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 mixed low-level waste (MLLW). While High Level Waste (HLW) and Mixed Transuranic Waste (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.

2.3 Coordination with Regulatory Agencies and Other Stakeholders

The Act offers an opportunity for DOE and the state 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 National Governor's Association (NGA) to facilitate the DOE-to-State interactions. The NGA has sponsored national meetings on a routine basis with DOE, the States, EPA, and Indian Nations throughout the development of the STP's.

The Act requires the States and EPA to provide for public involvement after the Plans are submitted. DOE has provided additional opportunities for public input into the development of Conceptual and Draft Plans through existing public involvement mechanisms at the site.

A number of activities have been initiated to communicate with local residents about the storage and treatment of mixed wastes at Mound Facility including:

- Community Meetings held to discuss the FFCAct and a variety of possible treatment technologies.

- A site tour was conducted August 25, 1994

- A mailing list of all interested parties is maintained for notification of up coming activities

- The date and time for each meeting was published in local newspapers several times

Specifically, Mound has held meetings with stakeholders on January 27, 1994, March 10, 1994, April 14, 1994, May 12, 1994, June 7, 1994, and December 8, 1994. The meetings have been used to provide information about the FFCAct and its requirements, the Mixed Waste Inventory Report and a variety of possible treatment technologies. Information on treatment technologies was presented by subject matter experts. The public relations department at Mound maintains a mailing list of all interested parties. Forms are provided and comments requested at every meeting. Comments from stakeholders are summarized as follows:

Formal Comments from the December 8, 1994 Public Meeting

1. Several members of the public requested a correlation between the cubic feet and pounds of waste, since both of these units of measure are used to describe the amount of waste stored at Mound in various documents.

Each mixed waste stream's volume is included in the Site Treatment Plan in cubic meters; this is the unit of measure used in the national Mixed Waste Inventory Report. For reference, a cubic meter is equal to 35.3 cubic feet. These units are not necessarily easy to understand, and drums, gallons, and pounds are units of measure which make the volume of the individual waste streams more relevant to everyday experience. These units of measure have been used in the text of the document, where appropriate, to help clarify the amounts under consideration.

2. A concern was expressed as to the potential for generating additional mixed waste during "cleaning".

Waste generated during Environmental Restoration activities is addressed in the PSTP. In addition, this question and similar comments in informal comment sessions may refer to the wastes generated during the treatment of the existing mixed waste inventory. These additionally generated wastes, referred to as residual wastes, or residuals, are addressed in more detail in the STP than they were in the Draft Site Treatment Plan.

3. A member of the public expressed concern that EG&G, the management contractor

at the Rocky Flats DOE site, was also in charge at Mound. This questioner was concerned about the amount of money that has been spent at Rocky Flats and the perception that it was "the most dangerous facility in the entire country."

Mound does not believe that it is appropriate to comment on the management of the Rocky Flats plant. We ask simply that, for this process, the public assess the management team at Mound based on the results of managing the mixed wastes at Mound, including the extent to which the public is satisfactorily informed and participates in the process.

4. Comments were made regarding the storage of wastes which will be generated during waste treatment operations.

As noted in the response to comment #2, more detail on residuals is included in the PSTP. This includes potential generation volumes and storage plans.

5. Public comment was received on the ultimate disposal site for wastes treated at Mound; the commenter wanted to know where the treated waste was destined for disposal before Mound began treatment operations.

The FFCAct requires DOE sites to develop treatment options for their mixed waste inventories and that is the purpose of the PSTP. However, the ultimate disposal of the treated wastes is of legitimate concern to the sites, to the Ohio EPA, and to the public. The PSTP indicates that Mound is actively pursuing disposal options, including the possible use of the DOE owned Nevada Test Site and potentially available commercial disposal facilities.

6. One member of the public indicated an overall lack of confidence in DOE's plans, based on the difficulty in explaining the overall situation to the public, and to the location of the Mound facility in a residential neighborhood.

Mound recognizes the problems in explaining the complex regulatory and technical details of the FFCAct and mixed waste treatment technologies to members of the public. Mound is committed to provide the public with the information required, and the adequate explanation of that information, in the format which provides members of the public with the ability to participate in the FFCAct decision making process.

This commitment has taken the form, to date, of six public meetings, and a public tour of two Mound proposed mixed waste treatment facilities. The compiling of the public's comments, as in this response, has provided additional guidance on a format for the public meeting to be held following issuance of the PSTP. Mound is also working with the Ohio EPA to participate in the OEPA's public meeting on the Mound PSTP, and will seek the OEPA's input on how we might better meet the public's needs.

Informal Response To Public Comments Received By The Ohio EPA June 7, 1995

1. The treatment hierarchy preferred by the Ohio EPA as (1) modify or build on-site treatment, (2) on-site portable mobile units, (3) Ohio option (off-site, in state), and (4) off-site out-of-state, meets my approval.

This order of preference is fine, but economics, timeliness, and risk also need to be factored into the equation. These factors come into play especially for smaller waste streams and sites.

2. The OEPA reviews of all PSTP plans appear to be taking place simultaneously with stakeholder reviews. Stakeholders (I,for one) could have benefitted from being able to peruse the OEPA report.

3. No mention is made of quantities or qualities of the MLLW at each of the other Ohio five sites. Logically, each would benefit, as a cost saving, from a cooperative scheduling and use of the available mobile equipment.

The "Ohio Option" explored the possibilities for common treatment but found that wastes contained incompatible radionuclides or other minor chemical contaminants.

4.The preferred treatment option for treatment of the Scintillation Cocktail in Vials (MD-W001) at the Mound Facility is incineration at the Inhalation Toxicology Research Institute (ITRI) in Albuquerque, NM. I noted that the hazardous constituent in the scintillation cocktail formulation is xylene and dioxane, is an explosion hazard when exposed to heat or flame. In addition, human exposures result in teratogenic and reproductive effects from xylene; dioxane is a confirmed carcinogen, tumorigen, and poison inside the body. Will ITRI be informed and take precautions?
The secondary treatment option for the scintillation cocktail, the Mound glass melter, should not be considered as an option due to this explosion hazard from xylene and dioxane.

Originally, DOE-MB proposed to utilize a contract that ITRI has/had with a commercial facility for the incineration of scintillation cocktail. DOE-MB will not use this contract. DOE-MB is in process of developing its own contract with a commercial firm, Diversified Scientific Services Incorporated (DSSI), which can treat these wastes under their license. DSSI will be informed of all constituents present in the scintillation cocktail waste stream. Control of the feed rate of the waste stream to the incinerator along with other incinerator operating conditions will prevent explosion.

The secondary option would only be considered if the primary option could not treat the waste stream.

5. The glass melter is named as a secondary treatment option for the Waste Oil (MD-W013). Assuming a borosilicate glass is used in the glass melter, the melting point for the glass is between 1420 degrees and 2300 degrees Fahrenheit. A serious risk exists if ignitable oils are added to the molten glass at temperatures of this level.

The waste oil waste stream is also designated to be treated at DSSI. The DSSI license permits them to treat specific waste constituents at specific rates. DOE-MB waste oils are being analyzed to determine if they meet the DSSI criteria. Secondary treatment options will only be considered if the waste oils do not meet the DSSI permit criteria. If, as a last resort, the glass melter was to be used, the feed rate of the waste stream to the melter would be controlled similarly as in the case of the incinerator to prevent explosion.

6. Radionuclide contaminated residuals from the Waste Lead categories MD-W012, MD-W007, and MD-W004 are slated to be sent to a commercial disposal site. Will the commercial site be licensed (or otherwise approved), and how will the commercial site differ from any land disposal site?

The commercial facility will be licensed to accept low level radioactive waste. There are a limited number of such facilities in the United States.

7. Amalgamation of mercury (MD-W005) with another metal may stabilize the mercury, but does it also stabilize the tritium which is very hard to contain? Will there not also need to be special containers as well?

Amalgamation stabilizes and immobilizes the mercury minimizing leachates which therefore removes the waste stream from the mixed waste category. The tritium radioactive residue must then be disposed as low level radioactive waste. Special containers for disposal of LLRW would be required.

8. The triaryl phosphates present in MD-W008 wastes are undoubtedly very caustic. Will their caustic characteristic inhibit acceptance of these mixed wastes at the TSCA incinerator?

The constituents of this waste stream have been given a preliminary perusal at the TSCA incinerator and indications were given that there should be no problems in incinerating this waste.

9. Is it likely that a commitment will be in place in regard to the development and use of the mobile units before the six-month approval period for the PSTP is completed?

The commitment to furnish the mobile units is subject to funding constraints. At this date, July 31, 1995, we have received no indication that the units we propose to use will not be furnished. However, we continue to pursue alternative treatment options that may be better technically, more economic, or more timely partly to guard against the possibility of failure of any of the proposed treatments for whatever reason.

10. Is the Hanford site open to the receipt of residuals for disposal? If sites are technically acceptable to manage residuals, will they be expected to do so unconditionally?

At this time, none of the residuals from Mound are proposed to be sent to Hanford. Sites that are technically able to manage residuals do not unconditionally accept them. One factor that must be thoroughly documented is the constituents of the waste including the source and history of the waste stream. A second factor is the question of state equity.

At the National level, DOE presented information on the development of the STP's to the Environmental Management Advisory Board (EMAB), 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 Act activities at the National level (1-800-736-3282; 202-863-5084 in Washington D.C.).

2.4 Characterization of Mixed Wastes

Waste streams where insufficient process knowledge is available must be characterized by sampling and analysis. The waste description narrative in Section 3 describes which wastes require further characterization before treatment. In cases where insufficient data exists, the characterization process involves assembling all process knowledge, past data, and drum markings, interviewing actual waste generating personnel, determining sampling facility requirements and availability, defining analysis parameters and data quality requirements, selecting/qualifying/certifying an analytical laboratory, and finally validating analysis data.

2.5 Mixed Waste Minimization

Mound Facility has had a general policy of waste minimization for some time which includes mixed waste generation. All current generation of mixed waste which is not required for protection of personnel or plant and equipment must be approved in advance and in writing by the Miamisburg Area Office of DOE (DOE/MB).

3.0

3.0 LOW-LEVEL MIXED WASTE STREAMS

The Ohio EPA, as the regulatory oversight body, has expressed a desire to have an organized, orchestrated approach for the development of each STP by the five Ohio DOE sites. The treatment ranking hierarchy preferred by the Ohio EPA is (1) modify or build on-site treatment, (2) on-site portable/mobile units, (3) Ohio option (off-site, instate), and last (4) off-site out-of-state. Representatives from each of the five Ohio DOE sites began meeting in March 1994, to discuss existing or planned treatment facilities at each site, strategies for treatment of wastes from individual sites, waste volumes, and potential strategies for combined treatment. Appendix B further describes this process. The goal of developing a unified approach presented challenges because of each site's differing mission assignment and unique waste characteristics. For example, Mound is the only Ohio site to handle significant quantities of plutonium-238 and tritium. The five Ohio sites report to and receive direction from three different DOE field offices.

The evaluation consisted of listing feasible alternatives, screening the selected technologies, and performing an evaluation of the remaining technologies. The screening criteria used to eliminate technologies from further consideration were: technology was in early development, technology was incompatible with the radionuclides in the waste, or capacity considerations. As a screening criterion, capacity is considered such that the waste stream treatment will be completed for the inventory listed in the MWIR within a reasonable period of time after it begins full operation. The detailed evaluation is based on the Treatment Selection Guides developed by the FFCAct Task Force. The scores were based on the best available information. This procedure could produce different preferred options if redone in the future, particularly as new technologies become more mature. This ranking is for the PSTP only and may be subject to change based on negotiations with the Ohio EPA, stakeholder concerns, and cost.

3.1 Mixed Waste Streams for which Technology Exists

3.1.1 Scintillation Cocktail in Vials with Tritium and/or Pu-238

Mixed Waste Inventory Number: MD-W001
Waste Codes: D001, F003
Treatability group: Scintillation Cocktail
LDR Treatment Standard: Incineration, Xylene 28 ppm
Volume: 43.3 m^3
Five-Year Projection: 0.0 m^3

Scintillation cocktail waste was generated during routine counting operations on bio-assay, environmental and other radioactive samples containing tritium or plutonium-238. Process knowledge of the RCRA hazardous constituents present is well defined but records of the radionuclide content are nonexistent. The RCRA hazardous constituent in the scintillation cocktail formulation itself is xylene, pseudocumene or dioxane. This waste stream is no longer generated because all scintillation cocktail used in the past several years has been changed to a formulation containing no RCRA hazardous material. Plastic or glass scintillation vials of approximately 15 ml volume each were packaged in plastic bags in 190 fifty five gallon drums along with laboratory trash such as booties and smocks.

3.1.1.1 Description of Technology and Capacity Needs

Management will begin with separation and repackaging of the vials and lab trash. A repackaging system scheduled to be completed by April 1995 will be used for this operation. The lab trash will be compacted and repackaged. If the lab trash is contaminated with scintillation cocktail, a treatment scheme similar to that devised for MD-W009 (absorbed organics) will be formulated. The vials will be emptied and the cocktail will be bulked and analyzed for radionuclide content. Bulking of the scintillation cocktail waste will significantly reduce the waste volume. Past experience has shown each drum of waste will yield 5 gallons or less of bulked liquid. Best Demonstrated Available Technology (BDAT) treatment technology is incineration, fuel substitution or recovery of organics.

3.1.1.2 Preferred Option and other Options

The preferred treatment option for the waste is a commercial firm. At this time, it appears Mound could meet the waste acceptance requirements of such a facility. The Inhalation Toxicology Research Institute (ITRI), a DOE site in Albuquerque, New Mexico, has a waste treatment contract in place with a commercial facility that Mound could possibly utilize. The treatment residual volume is estimated at 6.8 m^3, based on the volume of compacted trash (3.0 m^3), compacted scintillation vials (3.7 m^3), and waste ash (0.1 m^3).

The Mound Glass Melter, an existing system, is determined to be a secondary treatment option. In order to begin operation the revised Environmental Assessment must be approved by DOE-HQ, a Finding Of No Significant Impact (FONSI) issued and the Ohio EPA must approve the Trial Burn Plan. Safety analysis documents and an Operational Readiness Review will require additional time to complete. After the trial burn, the Ohio EPA may require modifications to be made to meet additional operational requirements. The secondary wastes from the Glass Melter are radionuclide contaminated glass, scrubber salts, and filters which will be packaged and stabilized if necessary and then placed in interim storage. These secondary wastes will be sampled, if necessary, to meet the requirements of the disposal site waste acceptance criteria. The Glass Melter has received no unfavorable written comments from stakeholders after being presented in a public meeting on March 10, 1994. The glass melter is one of the recommended treatment options of the Options Analysis Team (OAT). The maximum total treatment residual volume, if the Glass Melter was used to treat all the scintillation vials, is estimated to be approximately 11.4 m^3. This is based on the combined volume of compacted trash (3.0 m^3), compacted scintillation vials (3.7 m^3), scrubber salts (4.1 m^3), waste glass (0.1 m^3), and HEPA filters (0.5 m^3). A detailed description of the Glass Melter is contained in the Mound Facility RCRA Part B application. Treatment residuals meeting the appropriate waste acceptance criteria could be sent to a commercial disposal site or possibly the low-level radioactive waste disposal site at the Nevada Test Site.

3.1.2 Waste Oil, Tritium, Pu-238, Contaminated

Mixed Waste Inventory Number: MD-W013
Waste Codes: F001, F003
Treatability group: Unknown/Other Aqueous and Organic Liquids
LDR Treatment Standard: Incineration, F001, F003 varies from 28 ppm to 5.6 ppm
Volume: 27.4 m^3
Five-Year Projection: 0.0 m^3

This waste stream consists of vacuum pump oil, hydraulic oil, and lubricating oil as free liquid from various sources plant wide contained in 130 thirty and fifty five gallon drums. This material is thought to be radioactively contaminated and has not been characterized for RCRA constituents. Analysis of the material is required for both RCRA and radioactive constituents before treatment. The waste oils were generated by various production processes on-site, therefore no future generation is anticipated.

3.1.2.1 Description of Technology and Capacity Needs

A repackaging facility scheduled to be completed by April 1995 will be used to collect samples of oils for radionuclide and RCRA analysis. Waste oils which are found to contain no RCRA constituents, or DOE added radioactive contaminants, are not mixed waste and will be transferred to the appropriate low level radioactive or hazardous waste facility for treatment and disposal. BDAT treatment technology is incineration.

3.1.2.2 Preferred Option and other Options

Treatment requirements for this waste stream are the same as those specified for bulked scintillation cocktail. The preferred treatment option is a commercial firm.

The secondary treatment option is the Mound Glass Melter. Secondary wastes from the Glass Melter are radionuclide contaminated glass, scrubber salts, and filters which will be packaged and stabilized if necessary and then placed in interim storage. Secondary wastes produced by treatment will be low-level radioactive waste if the input waste is mixed waste solely because of the ignitablity characteristic (D001). Funding for the Glass Melter has been included in the DOE-AL Budget Plan. The glass melter is one of the recommended treatment options of the Options Analysis Team (OAT). The maximum total treatment residual volume is estimated to be approximately 10.2 m^3. This is based on the combined volume of scrubber salts (8.0 m^3), waste glass (0.2 m^3), and HEPA filters (2.0 m^3). Treatment residuals could be sent to a commercial disposal site or the Nevada Test Site.

3.1.3 Waste Lead Loaded Gloves

Mixed Waste Inventory Number: MD-W012
Waste Codes: D008
Treatability group: Leaded Gloves/Aprons
LDR Treatment Standard: Macroencapsulation
Volume: 0.0204 m^3
Five-Year Projection: 0.02 m^3

Lead loaded gloves have been used on certain glove boxes in plutonium areas. The gloves contain an inner layer of rubber that is compounded with approximately 8% by weight powdered lead oxide. Gloves were removed from service after a specified period of time or if they were damaged in use. Previous analysis of the gloves by Los Alamos National Laboratory has shown that new gloves will pass TCLP analysis for lead but used gloves will usually fail the analysis. The gloves in storage are used. The gloves will need to be surveyed for plutonium contamination in the repackaging/sampling facility. If they are shown to be uncontaminated they will be disposed of as hazardous waste. If the gloves are plutonium contaminated it is unlikely that they could be satisfactorily decontaminated due to the cracks in the rubber. The five year projection is derived from an estimate of the number of gloves still in service.

3.1.3.1 Description of Technology and Capacity Needs

Macroencapsulation is BDAT. Macroencapsulation makes use of surface coating materials such as polymer resins or a jacket of inert inorganic material such as concrete. The small volume of waste (about 15 lbs.) would allow treatment in an on-site bench scale or mobile treatment unit.

3.1.3.2 Preferred Option and other Options

The DOE site at Pantex in Amarillo, Texas is planning to build a mobile encapsulation unit which will be available to Mound and other DOE sites once constructed and proven. Construction of this unit is in Pantex's budget. This will need to be coordinated with treatment of lead shapes and lead-acid battery secondary wastes which require macroencapsulation. The maximum total treatment residual volume (based on filling one 30 gallon drum with gloves and encapsulant) is estimated to be approximately 0.11 m^3. Treatment residuals could be sent to a commercial disposal site.

3.1.4 Waste Lead-Acid Batteries Pu-238 Contaminated

Mixed Waste Inventory Number: MD-W007
Waste Codes: D008
Treatability group: Batteries Lead-Acid
LDR Treatment Standard: Macroencapsulation/Thermal Recovery
Volume: 0.0 m^3
Five-Year Projection: 0.79 m^3

Large lead-acid batteries are used in electric fork lifts in radiation control areas. The two batteries currently comprising this waste stream are assumed to be contaminated but the plutonium contamination level of this waste is not known. At the end of their service life both batteries were drained and packaged in wooden boxes. The five year projection includes batteries now in service.

3.1.4.1 Description of Technology and Capacity Needs

The first step in the treatment strategy is to determine whether the repackaging facility described in 3.1.1.1 can be used to examine the contents of the packages. The extent of contamination of the acid drained from the battery will be measured. This measurement should indicate the amount of internal contamination present in the batteries. If the interior is shown to be free of contamination, the outside of the battery case will be wiped and decontaminated if needed. Decontamination will start with a soap and water wash followed by more vigorous treatment if necessary to reduce contamination to free release levels. If the interior is found to be contaminated, each battery will be disassembled to remove all noncontaminated parts to reduce the amount of mixed waste as much as possible. All lead that is not contaminated or has been decontaminated will be prepared for recycle. BDAT treatment for radioactive contaminated lead is macroencapsulation.

3.1.4.2 Preferred Option and other Options

The preferred option is survey/decontamination/recycle followed by macroencapsulation of parts which cannot be decontaminated along with all residues. Treatment will be done on-site in a bench scale unit or skid mounted unit. The DOE site at Pantex in Amarillo, Texas is building a mobile encapsulation unit which will be available to Mound and other DOE sites once constructed and proven. Construction of this unit is in Pantex's budget. Uncontaminated lead will be recycled and lead which has been decontaminated will also be recycled. The maximum total treatment residual volume is estimated to be approximately 1.1 m^3. This is based on the worst case scenario in which the batteries are encapsulated as is and repackaged in slightly larger boxes. A large portion of the lead should be recyclable by a commercial vendor with radionuclide contaminated treatment residuals sent to a commercial disposal site.

As of August 17, 1995 the inventory of batteries in storage had been completely dissassembled and decontaminated. The clean lead will be recycled.

3.1.5 Waste Lead Shapes

Mixed Waste Inventory Number: MD-W004
Waste Codes: D008
Treatability group: Nonactivated Lead
LDR Treatment Standard: Macroencapsulation/Thermal Recovery
Volume: 5.00 m^3
Five-Year Projection: 0.65 m^3

Waste lead in the form of bricks or other shapes were removed from glove boxes and equipment. Portions of this waste are contaminated with either tritium, cobalt-60, uranium, or plutonium-238. The radionuclide contamination has not been well characterized in most cases. All contamination is on the surface of the lead. The five year projection is based on estimates for waste lead from building cleanouts.

3.1.5.1 Description of Technology and Capacity Needs

The drums will be opened in the repackaging facility if that is determined to be the appropriate location and the radioactivity of the lead surface will be surveyed with portable instruments to determine containment requirements for decontamination. The BDAT technology macroencapsulation is required for radioactively contaminated lead.

3.1.5.2 Preferred Option and Other Options

The preferred treatment strategy involves surface abrasion, recycling the clean lead and secondary treatment (macroencapsulation) of the removed material. If the material meets the requirements of the Los Alamos National Laboratory (LANL) lead decontamination trailer for radionuclide containment the trailer will be scheduled to be transported to Mound. The surface layer of lead now included with blast grit requires further treatment as mixed waste. The cleaned bulk lead meeting free release criteria can be sent to recycle. Lead decontamination has received no unfavorable written comments from stakeholders after being presented in a public meeting on May 12, 1994. The lead decontamination trailer is funded through the LANL budget. A treatment capacity of about 20 lbs. per day would be required to work off the lead inventory in 2 years. The mixture of the lead surface layer and spent blast grit will be macroencapsulated. The maximum total treatment residual volume is estimated to be approximately 2.0 m^3. This is based on the Los Alamos National Laboratory operating experience. Water filtered from the spent blast grit and lead particles will be below the RCRA regulatory limit for lead and will be processed by the radioactive wastewater treatment facility. The maximum volume of dewatered spent blast grit and lead particles is estimated to be 10% of the original lead volume. This material will need approximately three times the volume of encapsulant yielding a waste form about 40% of the original volume. A large portion of the lead should be recyclable by a commercial vendor with radionuclide contaminated treatment residuals sent to a commercial disposal site.

If decontamination and recycling of the lead is not feasible, the bulk lead will be macroencapsulated.

3.1.6 Liquid Mercury, Tritium Contaminated

Mixed Waste Inventory Number: MD-W005
Waste Codes: D009
Treatability group: Elemental Mercury
LDR Treatment Standard: Amalgamation
Volume: 0.018 m^3
Five-Year Projection: 0.002 m^3

Mercury metal has been used in various applications in tritium areas. Tritium contamination has not been well characterized and thus must be further defined to determine containment requirements before treatment by amalgamation can proceed. To do this the waste package must be evaluated to determine if it can be opened in the drum opening facility or if the facility must be modified to accept the package or another suitable facility found. The five year projection includes radionuclide contaminated mercury from building clean-outs.

3.1.6.1 Description of Technology and Capacity Needs

Tritium levels can be determined while the amalgamation procedure details are being worked out on noncontaminated mercury before proceeding with the contaminated mercury. BDAT treatment requires amalgamation. A bench sized unit on-site would be used to treat the approximately 50 lbs. of mercury in less than one month.

3.1.6.2 Preferred Option and other Options

The DOE site at Pinellas, Florida is assigned to build an amalgamation unit which would be available after proven for use at Mound. Amalgamation has received no unfavorable written comments from stakeholders after being presented in a public meeting on March 10, 1994. The Pinellas unit is in their budget. Based on a 40% volume expansion during amalgamation, the maximum total treatment residual volume is estimated to be approximately 0.025 m^3. The radioactively contaminated treatment residuals would be sent to a commercial disposal facility or the Nevada Test Site.

3.1.7 Kerosene, PCB, Tritium Contaminated

Mixed Waste Inventory Number: MD-W008
Waste Codes: D001
Treatability group: Halogenated Pure Organic Liquids
LDR Treatment Standard: Deactivation (for RCRA characteristic only)
Volume: 1.1 m^3
Five-Year Projection: 0.0 m^3

This waste stream consists of hydraulic fluid and rinsate from a tritium contaminated hydraulic press. The material is stored in 30 gallon drums with polyethylene liners. All drums of this material have been sampled and analyzed for RCRA and radionuclide constituents. Total tritium content is 15 curies. Investigation of the historical process documents revealed the presence of major amounts of triaryl phosphates which were not known previously. Characterization will be confirmed prior to treatment. This waste stream generation was a one time event; no additional waste will be generated in the future.

3.1.7.1 Description of Technology and Capacity Needs

The RCRA Land Disposal Restrictions 40 CFR 268.42(1) and Ohio Administrative Code (OAC) 3745-59-42(1) dictate the treatment standard for liquid PCB waste in concentrations greater than 1,000 mg/kg to be incineration in accordance with the technical requirements of 40 CFR 761.70.

No commercial PCB incineration facility can accept liquid radioactively contaminated PCB's. Conversations with TSCA incinerator personnel indicate it could potentially be used to treat this waste. However, Mound is not listed on the TSCA incinerator's off-site generators in the facility Part B permit.

Treatment of this waste is complicated by the presence of nonhazardous triaryl phosphates which will produce large quantities of dust and phosphoric acid upon oxidation. The incinerator regulatory requirement is 99.9999% PCB destruction removal efficiency. The underlying hazardous constituent is kerosene. RCRA BDAT treatment for ignitable characteristic wastes is deactivation which 40 CFR 268 Appendix VI recommends the use of incineration, wet-air oxidation, chemical/electrolytic oxidation, or biodegradation.

3.1.7.2 Preferred Option and Other Options

The preferred option is treatment by the TSCA incinerator. This option would assume the Mound could be added to the TSCA incinerator Part B permit and that state equity issues could be resolved.

A secondary treatment option would be to locate a commercial firm that could perform the same treatment.

3.2 Mixed Waste Streams for Which Technology Exists But Needs Adaptation

There are no Mound mixed waste streams in this category.

3.3 Waste Streams Requiring Further Characterization or for Which Technology Assessment Has Not Been Done

3.3.1 Absorbed Oil, PCB, Pu-238 Contaminated

Mixed Waste Inventory Number: MD-W009
Waste Codes: Unknown
Treatability group: Absorbed Organic Liquids
Volume: 0.227 m^3
Five-Year Projection: 0.0 m^3

This absorbed oil, which is contained in one 55 gallon drum, was drained from a hydraulic press used in a plutonium area. The oil was found to be free liquid but has not been sampled and analyzed for RCRA, PCB or radionuclide content. The treatment plan is formulated from the information available and could change if results of the analysis are different than expected.

3.3.1.1 Plan for Characterization or for Technology Assessment

This waste will be analyzed for PCB's and RCRA hazardous characteristics. Treatment would consist of a separation step, thermal desorption to remove the organic materials from the absorbant, followed by destruction of PCB's if present. The technology assessment may change based on the characterization data.

The RCRA Land Disposal Restrictions 40 CFR 268.42(2) and Ohio Administrative Code (OAC) 3745-59-42(2) dictate the treatment standard for solid PCB waste in concentrations greater than 1,000 mg/kg to be incineration in accordance with the technical requirements of 40 CFR 761.70.

No DOE or commercial PCB incineration facility can accept solid radioactively contaminated PCB's.

OAC 3745-59-44 and 40 CFR 268.44 allow a facility to petition the U.S. EPA for a variance from the treatment standard. An alternative treatment method must be shown to achieve performance equivalent to that achieved by the treatment method specified. A treatability study would provide the information necessary to make this judgment. After the waste is characterized by sampling and analysis, Mound will proceed to evaluate the thermal desorption/TSCA incinerator treatment train to treat this waste stream.

Thermal desorption uses an indirectly heated chamber containing the waste through which a stream of nitrogen is passed. The gas stream exiting the chamber is chilled to condense the volatile compounds which are further treated in the same manner as PCB liquids. The waste from the chamber will be low-level radioactive waste. A bench top or trailer mounted unit could be used. Grand Junction Projects Office (GJPO) in Colorado is planning to build a mobile thermal desorption unit that will be available to Mound after built and proven. Construction of the unit is in the GJPO budget. Thermal desorption has received no unfavorable written comments from stakeholders after being presented in a public meeting on May 12, 1994.

3.3.2 Miscellaneous Lab Packs

Mixed Waste Inventory Number: MD-W010, MD-W011
Waste Codes: D001, D001, D002, D004, D007, D010, D011, P015
Treatability group: Solid Lab Packs
Volume: 0.16 m^3
Five-Year Projection: 3.0 m^3

Lab packs are small containers of chemicals ranging from a few grams to a few kilograms in weight packed in absorbant in larger buckets or drums. These are usually generated during laboratory clean-outs in radiation areas. Similar compatible materials are packed together. The five year projection is based on building cleanouts in preparation for economic development.

3.3.2.1 Plan for Characterization or for Technology Assessment

These materials will be sorted and repackaged then characterized further to determine appropriate treatment. The drums will be opened in an appropriate facility, the material will be removed from the drum, inner package labels will be visually examined, surveyed for radioactive contamination and sorted according to the results of the survey. In some cases, the wastes may require further sampling and analysis.

Material which is visually identified by package labels as mixed waste is documented as such and repackaged. Radioactive materials that are not mixed waste will be packaged separately. Based on past experience, it is anticipated that a significant part of the material will not be mixed waste. The maximum total treatment residual volume is estimated to be approximately 0.2 m^3 or about 1.3 times the original waste volume. A treatment facility has not been identified. The contaminated treatment residuals will be sent to a commercial disposal site.

3.3.3 Newly Discovered Potentially Mixed Waste

Mixed Waste Inventory Number: MD-W014
Waste Codes: Unknown
Treatability group: Unknown
Volume: 19.9 m^3
Five-Year Projection: 0.0 m^3

Orphan radioactive sources have been collected for a number of years to facilitate disposal. Recently information became available which indicated some concern that a portion of the sources may contain RCRA hazardous waste. Visual inspection of inner package labels in several drums confirmed this to be the case.

3.3.3.1 Plan for Characterization or for Technology Assessment

Discovery of this waste stream was communicated to the Ohio EPA June 9, 1993. Sort, Survey and Decontamination is the technique used to deal with these materials. The drums are opened in an appropriate facility, the material is removed from the drum, inner package labels are visually examined, surveyed for radioactive contamination and sorted according to the results obtained. In some cases, the wastes may require further sampling and analysis.

Material which is visually identified by package labels as mixed waste is documented as such and repackaged. Radioactive materials that are not mixed waste are packaged separately. BDAT treatment requirements can not be determined until the waste is further characterized. Initial sorting of this material was substantially completed in August 1994.

4.0

4.0 TRU MIXED WASTE STREAMS

4.1 TRU Wastes Expected to Go To WIPP

DOE National Strategy for Managing Mixed Transuranic Waste

The current DOE strategy for mixed transuranic (MTRU) waste is to segregate MTRU wastes from mixed low-level wastes; to maintain the MTRU wastes in safe interim storage; to characterize, certify, process if necessary, and package the wastes to meet the waste acceptance criteria (WAC) of the Waste Isolation Pilot Plant (WIPP); and to permanently dispose of applicable MTRU waste in WIPP. Compliance with the requirements of the federal facility compliance act (FFCAct) for MTRU waste will be achieved using the RCRA no-migration petition approach provided in the Code of Regulations (CFR) 40 Part 268.6. Under this strategy, no treatment, other than that necessary to meet WIPP WAC is anticipated; however, the performance assessment, and the EPA no-migration variance determination will ascertain what treatments if any, will be required to ensure disposal compliance.

DOE is actively gathering inventory and characterization data for input into the performance assessment and preparing several regulatory submittals to EPA to demonstrate compliance with no-migration petition requirements. The current plan is to submit a draft compliance certification package to EPA in March 1995, a No-Migration Petition to EPA by May, 1995, a revised RCRA Part B permit application to the New Mexico Environment Department by June 1995, a Final Compliance Certification Package (including final performance assessment results) to EPA by December 1996, and to finalize the disposal WIPP WAC by June 1997. DOE plans to declare operational readiness for WIPP by December 1997. Disposal of contact handled (CH) TRU Waste will begin in June 1998, followed by remote handled (RH) TRU Waste in June 1999. These dates are contingent upon permit approval, certification of disposal compliance, and determination of no migration from the appropriate regulations, and availability of funds.

In the interim, site-specific information is included in the section, "Site MTRU Waste Management Approach," to outline activities being performed at Mound to maintain safe, compliant storage, waste characterization activities and other activities planned to support the ultimate goal of shipment to and disposal at WIPP under a no-migration petition.

MOUND FACILITY MIXED TRU WASTE MANAGEMENT APPROACH

- Develop site logic diagram

- Determine applicable treatment, storage and disposal strategies

4.1.1 TRU Corrosives

Mixed Waste Inventory Number: MD-W002
Waste Codes: D002
Treatability Group: Inorganic Particulate Adsorbents
Volume: 0.0 m^3
Five-Year Projection: 0.0 m^3

Although this waste stream was identified as absorbed liquid from plutonium 238 and plutonium 239 operations, information on the waste input forms indicated that it has been characterized as corrosive and that there is a potential for the presence of free liquids. It should also be noted that the volume of this waste has changed from that previously reported in the MWIR. This adjustment was necessary based on careful reexamination of the historical records which was completed in May, 1995. The actual amount of waste in storage has not changed, however, reclassification of existing waste streams was done to more accurately define Mound's entire TRU waste inventory.

The MD-W002 waste stream is contact handled (CH) and stored in eight 55 gallon Type B containers without overpack. The WIPP waste acceptance criteria (WAC) requires treatment of a D002 waste prior to storage at WIPP. These drums have been re-characterized by process knowledge which indicated that the liquid was absorbent onto an absorbent material acceptable to WIPP, therefore, the waste would no longer meet the definition of a D002 waste.

4.1.1.1 Preferred Options

In order to verify that the corrosive liquids were properly absorbed on WIPP acceptable absorbent material and validate process knowledge, Mound will open the eight MD-W002 drums. In the event that free liquids are present, Mound will determine the pH of the material. If the pH is less than or equal to 2.0 or greater than or equal to 12.5, the material will be neutralized. Any remaining free liquid will be absorbed. Since the waste will no longer be classified as a D002 corrosive, Mound proposes that the MD-W002 stream be deleted from the PSTP upon completion of the verification. The schedule for completion of this verification is as follows:

TASK	DATE COMPLETE
Develop/Approve Internal Procedures	07/17/95
Open Drums and Verify Proper Absorption	08/03/95

Document Results	08/17/95
MB Notification to OEPA	08/23/95

A memo from Raymond Finney EG&G Mound to Robert Rothman DOE-MB dated August 8, 1995 certified completion of the verification.

The DOE- wide strategy for managing this defense related TRU waste is disposal at WIPP which, if successful, will not require TRU waste to meet LDR treatment standards. A schedule should be developed prior to WIPP operation to allow for interim activities and approval of schedule.

Mound is attempting to arrange for storage of its TRU waste at another DOE site to await final disposition.

4.1.2 TRU Lead

Mixed Waste Inventory Number: MD-W003
Waste Codes: D008
Treatability Group: Leaded Gloves/Aprons
Volume: 1.6 m^3
Five-Year Projection: 0.0 m^3

Lead loaded gloves have been used on some glove boxes in plutonium areas. The glove contains an inner layer of rubber that is compounded with approximately 8% by weight powdered lead oxide. It should be noted that the volume of this waste has changed from that previously reported in the MWIR. The adjustment was necessary based on careful reexamination of the historical records which was completed May, 1995. The actual amount of waste in storage has not changed however reclassification of existing waste streams was done to more accurately define Mound's waste inventory. The MD-W003 waste is contact handled (CH) and stored in eight Type B containers without overpack.

4.1.2.1 Preferred Option

The DOE wide strategy for managing this defense related TRU wastes is disposal at WIPP which, if successful, will not require TRU waste to meet LDR treatment standards. It is not known at this time whether the final WIPP waste acceptance criteria could place additional treatment requirements on TRU waste. A schedule should be developed prior to WIPP operation to allow time for interim activities such as characterization and approval of schedule.

Mound is attempting to arrange for storage of its TRU waste at another DOE site to await final disposition.

4.2 TRU Wastes Not Destined for WIPP

Mound does not expect to generate any nondefense related TRU waste.

5.0

5.0 HIGH-LEVEL MIXED WASTE STREAMS

High-level mixed waste originates from the nuclear fuel cycle. No activities of this nature have been carried out at Mound. No high-level mixed waste has been or will be generated at Mound.

6.0

6.0 FUTURE GENERATION OF MIXED WASTE STREAMS

6.1 Environmental Restoration Waste

No mixed waste has been produced by ER activities in the past. It is unlikely any will be generated in the future, but because of the large volumes of ER generated radioactive waste anticipated, a nominal 200 cubic meters was estimated as the maximum amount of mixed waste which could possibly be generated over the next five years. Neither the RCRA nor radioactive contaminants of this possible waste stream are known at this time. To address ER generated mixed waste Mound will utilize the exemption provided in the Section 3021(b)(1)(A)(ii) of RCRA as amended by the FFCAct. Thus the existing CERCLA mechanism as implemented by the FFA will be utilized to manage these wastes and a STP will not be developed for these wastes. As part of this strategy, CERCLA generated documents (i.e., Feasibility Study, Plan, Record of Decision, etc.) and the CERCLA decision making process leading up to those documents, will integrate the rationale and processes used in the decision making exercise leading up to development of the STP.

6.2 Decontamination and Decommissioning (D&D) Wastes

The only D&D generated mixed waste from past operations consists of one piece of contaminated equipment. It is unlikely any will be generated in the future, but because of the large volumes of D&D generated radioactive waste anticipated from building shut down activities, a nominal amount was included in the ER generated mixed waste estimate for the next five years. Neither the RCRA nor radioactive contaminants of this possible waste stream are known at this time. To address mixed waste generated under the Mound Decontamination and Decommissioning (D & D) program, waste from D & D activities for Mound structures which are to be removed, based on decisions made during Safe Shutdown, are not scheduled to begin until the year 2002, and will continue until 2007. Any wastes generated as a result of these activities will be managed as required by the FFCA as outlined in Section 3.3.3, Newly Discovered Potentially Mixed Waste. It is unknown at this time what volume of mixed waste may be generated by D & D activities.

6.3 Other Wastes

No other mixed waste generation is anticipated.

7.0

7.0 STORAGE REPORT

DOE is committed to storing waste in compliance with RCRA storage requirements in 40 CFR 264 or 40 CFR 265 pending the development of treatment capacity and implementation of the Site Treatment Plans.

The Mound Facility mixed waste storage facility, Building 23, has an estimated capacity of 125 m^3, therefore it has sufficient capacity for current (98.73 m^3) and anticipated future storage requirements (4.6 m^3). Treatment residual volume from current wastes is estimated to be 14.84 m^3.

For mixed waste to be shipped off-site for treatment, storage plans will be arranged on a case-by-case basis between the shipping and receiving sites, in consultation with the affected states. As a general rule, for new mixed waste transfer arrangements established as a result of the STP process, mixed wastes will be stored at the generating site until such time as transfer is needed to support execution of treatment. Variations to this arrangement will be considered in the event of a potential compliant storage situation at the shipping site (for example, where there is insufficient storage capacity at the shipping site), to facilitate closure of the shipping site, or when other arrangements are acceptable to affected sites and states.

The treatment residuals management plan at Mound Facility will consist of the following:

- Secondary wastes will be repackaged in DOT approved containers.
- Secondary wastes will be placed in a RCRA storage facility and stored in an environmentally sound manner awaiting final disposal.
- DOE will aggressively pursue necessary contracts or other necessary agreements to enable disposal at a DOE or commercial site.
- DOE will determine activities necessary to meet the disposal site waste acceptance criteria and proceed to meet those criteria.
- Status of the residual management plan will be reported in the FFCA annual report.
- A courtesy notification will be provided to the Ohio EPA before residuals are shipped to the disposal site.

8.0

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

This section discusses the overall Department Of Energy (DOE) process for evaluating issues related to the disposal of residuals from the treatment of mixed low-level waste (MLLW) subject to the Federal Facilities Compliance Act (FFCAct). Due to its limited potential for disposal of off-site wastes, the priority of Mound Facility has been lowered in the evaluation process. Mound Facility will only be evaluated further in the event that disposal capacity is not identified for MLLW treatment residuals through the evaluation process. 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.

High-level and mixed transuranic wastes 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 Mixed Waste Inventory Report (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.

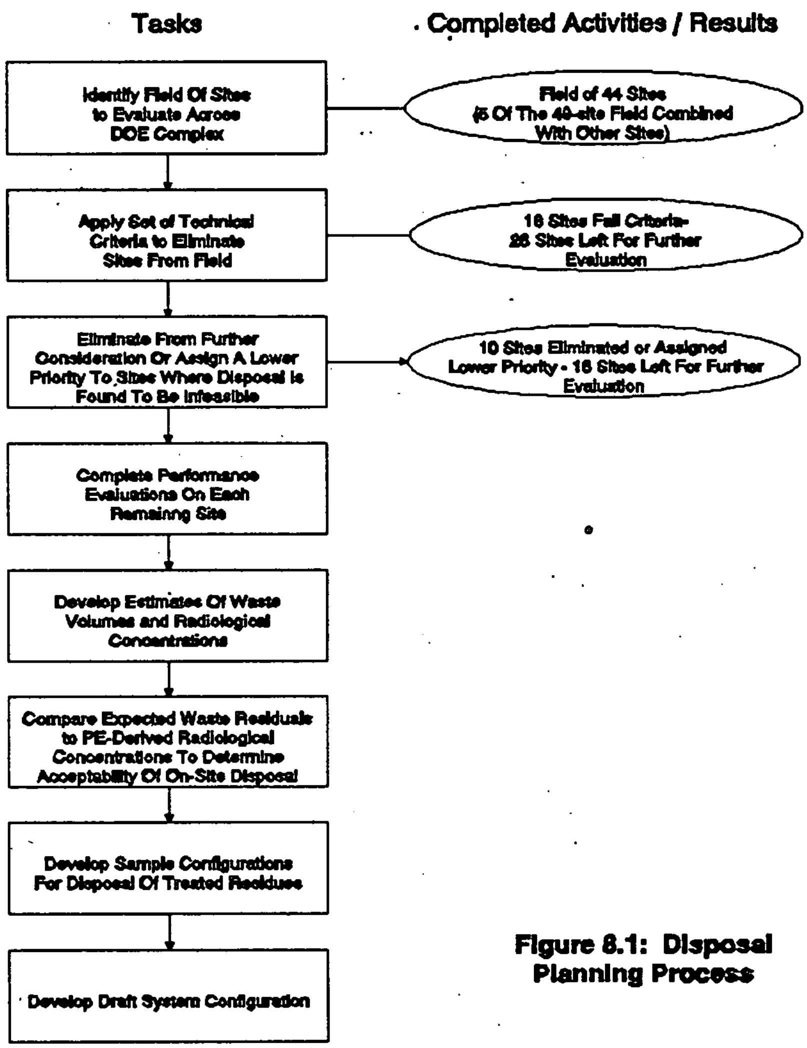


Figure 8.1: Disposal Planning Process

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 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 Environmental Protection Agency (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 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 Record of Decision (ROD) for the EM PEIS, DOE may initiate site-specific National Environmental Policy Act (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.

APPENDICES

APPENDIX A
MOUND FACILITY
TREATMENT ALTERNATIVES EVALUATION

1. INTRODUCTION

This appendix augments the information presented in Section 3 that was used to select the appropriate treatment alternatives to support the Site Treatment Plan. The purpose of the PSTP is to develop plans for treating, storing, and disposing of radioactive and hazardous (mixed) waste currently stored and expected to be generated in the future.

The content of this appendix includes the following:
- a description of the PSTP options evaluation process and methodology,
- the criteria used to evaluate the options,
- the results of the options evaluation and a comparison of the options.

This appendix is divided into two sections: methodology and evaluations. The methodology describes how alternatives were developed, screened, and evaluated. The evaluations were conducted separately for each treatability group using the same waste categories as those presented in Section 3 of the Background Volume.

2. METHODOLOGY

The methodology employed in evaluating treatment options was a three-step process. First, a list of technically feasible alternatives was developed; second, the technologies selected were screened; and third, a detailed evaluation of the remaining technologies was performed. The initial list of technologies were developed from:

- regulatory requirements,
- alternatives presented in the CSTP,
- alternatives described in the AL Mixed Waste Treatment Plan, March 1994

These alternatives were screened using best engineering judgment and common sense. For example, a treatment option may not be considered viable if the cost of implementing that option is exorbitant, if implementing the option does not contribute to the goal of meeting LDR standards, or if the technology is incompatible with the radionuclide content of the waste creating significant increase in risk to human health and the environment. These basic screening considerations were supplemented with site-specific limitations or conditions for further screening analysis. Any treatment options that did not pass this basic screening process were documented and removed from further evaluation.

2.1 Treatment Selection Guides

The purpose of the Treatment Selection Guides is to facilitate the selection, analysis, and evaluation of the preferred treatment options. This selection guidance is representative of those currently in use across the DOE complex and by some key stakeholders (e.g., the Western Governor's Association and the EPA). Criteria established in the selection guides for comparative evaluations are:

- regulatory compliance
- environmental health and safety
- stakeholder concerns
- treatment efficiency
- implementability
- life-cycle cost
- technology development

These sub-elements have been established to ensure evaluations are conducted in a comparable manner between different waste stream categories and from one DOE site to another. The definitions for these sub-elements are specified in the Treatment Selection Guides, March 1, 1994, and are reproduced here.

For ease of scoring only a high (5), medium (3), or low (1) value was assigned for each treatment sub-element.

<u>Regulatory Compliance</u>

This guide assesses the ease with which process-specific regulations (e.g., federal, state, and local) and commitments in compliance agreements or orders are satisfied. The regulatory requirements include state and local laws, EPA and Department of Transportation (DOT) laws, and other laws that specify requirements or milestones. Treatment systems under consideration should be developed to ensure that, at a minimum, the waste meets the LDR standards. It is anticipated that options not meeting regulatory requirements, either through standard application of regulatory requirements or established variance procedures, will not pass a basic viability screening. This parameter gives high scores to treatment technologies or options that have been previously permitted and are relatively straightforward, and lower scores to technologies or options that require regulatory exemptions or demonstrations of equivalency that may pose additional permitting difficulties.

Environmental Health and Safety

The environmental health and safety guide gives high marks to processes providing little or no additional risk to the industry workers, the public, or the environment in general. This includes all occupational safety and health issues, pollution issues, and mechanical and electrical hazard issues, as well as legally driven issues.

Environment/Public Health and Safety. This sub-element assesses risk to all off-site populations due to routine operational and potential accidents at a facility with the proposed process. This assessment includes routine emissions (radiological and hazardous) from the facility under normal operating conditions, under less than ideal conditions (e.g., waste streams marginally characterized or overly aggressive production schedules), and all accident scenarios (both high probability/low consequence and low probability/high consequence). Treatment processes which operate near ambient temperature and pressure receive higher ratings than those which operate above ambient.

Non-Operational Worker Health and Safety. This sub-element assesses occupational risks to all on-site workers due to activities exclusive of facility operations using the proposed process. Risks include those from construction of the facility, non routine maintenance (substitution of technologies, equipment replacement, etc.), and decontamination/decommissioning of the facility. Rating rational is the same as that for environmental/public health and safety.

Operational Worker Health and Safety. This sub-element assesses the radiological and hazardous risks to all on-site workers during operations at a facility with the proposed process including both routine operations and accidents. Risks due to routine operations include radiological and hazardous exposure during drum handling, waste sorting, primary and/or secondary treatment, packaging of the treatment residuals, and routine equipment maintenance. Risks due to accidents include radiological and hazardous exposure resulting from equipment failure (with possible associated fires or explosions) or worker error. Simple treatment processes requiring minimal waste handling receive the highest ratings.

Transportation Risk. This sub-element assesses the radiological and hazardous risks to workers and the public posed by off-site transportation of mixed waste. Risks include those from additional waste characterization required for transportation, handling of waste containers during certification and loading/unloading, fatalities and accidents due to traffic accidents, and chronic and acute effects of exposure to radiological and hazardous constituents of the waste during both routine operations and as the result of an accident. On-site treatments generating little or no secondary wastes received high ratings since no transport of untreated or no transport or small quantity shipments of secondary wastes would occur over public roads. On-site treatments generating moderate or large amounts of secondary wastes received moderate ratings due to the transport of moderate or large quantities of treated wastes over public roads to off-site disposal facilities. Off-site treatments were rated either medium or low based upon the distance to the treatment facility of untreated wastes.

Stakeholder Concerns

The stakeholder concerns guide assesses the ability of the treatment option to satisfy concerns of the stakeholders. Recognition of stakeholders' concerns is important to the progress of DOE's waste management program and successful achievement of milestones. Stakeholders may include the local public, public near the intermediate and final destinations of the waste, state and local governments, Indian tribes, Congress, Department of Defense (DOD) and industry. A series of informational meetings have been held beginning early in 1994. Subject matter experts presented information on proposed preferred options to treat Mound mixed waste. Ratings assigned to each treatment technology are an estimate of stakeholder reaction to the treatment methodology. When comments are received, public acceptance and equity issue ratings may be changed accordingly.

Treatment Effectiveness

The treatment effectiveness guide assesses how well the proposed process performs technically and what the anticipated advantages are compared to alternatives.

Volume Reduction. This sub-element assesses the ability of the treatment technology or option to reduce the volume of the original waste. Net volume of residuals divided by net input volume provides a measurable way to express this factor. This sub-element provides a measure of the system's waste minimization as compared to other alternatives under consideration. The determination of volume reduction should include volumes of secondary waste generated during the process. Processes which produce small secondary wastes from large input waste streams or secondary wastes that become RCRA unregulated, receive high ratings. Processes which produce more secondary wastes than the input waste volume or RCRA regulated secondary wastes were rated low.

Secondary Waste Generation. This sub-element assesses the difficulty of managing contaminated material generated during the treatment of primary waste. Secondary waste may have additional chemical or other characteristics providing new problems relating to treatment and disposal. Scrubber effluents are a large portion of typical secondary wastes. Secondary waste may include contaminated filters, contaminated protective equipment, swipes, used oil, and off-gases. The difficulty of meeting any additional treatment requirements for treatment residuals would be accounted for by ranking the sub-element of destruction and removal efficiency. The value of this assessment should be weighed according to the level of difficulty associated with managing the secondary waste. Secondary wastes requiring further treatment, present any unusual or new hazards, or are difficult to handle or package were given low ratings.

Destruction, Removal, and/or Immobilization Efficiency. This sub-element assesses the ability of the treatment option to destroy or remove unwanted contaminants from the waste stream or to reduce the potential hazard by isolating or rendering the hazardous constituents immobilized. High efficiency processes were given high ratings.

Flexibility. This sub-element assesses the system's ability to process a range of inputs with minimal effect on system operations. This includes accommodating the expected waste stream changes and daily variations as well as unanticipated spikes in the waste stream rate and composition. A treatment system that can accept a broad range of treatability groups was given a high flexibility rating.

Final Waste Form Performance. The treatment systems posed as options for evaluation should at a minimum be able to meet the LDR treatment standards. This sub-element assesses the long-term stability of the treatment residuals or the difficulty encountered in meeting post-treatment acceptance criteria required to comply with disposal requirements. Although disposal WACs have not been developed, the evaluation of this sub-element should represent a first order approximation of the closeness of the treatment residuals to the anticipated disposal requirements. This evaluation may need to include consideration of factors such as:

- compressive strength
- biological stability
- radiation stability
- resistance to thermal cycling
- TCLP analysis results
- radionuclide leachability
- solubility
- radiolytic decomposition

Ability to be Shipped. This sub-element assesses the amount of additional treatment required to make the treatment residuals meet shipping requirements. For example, contaminants in a large volume of waste are concentrated in a very small volume producing an intensely radioactive secondary waste.

<u>Implementability</u>

The implementability guide assesses the ease and likelihood of bringing a treatment facility or technology in operation within the proposed schedule and estimated cost. It gives high scores to existing or proven treatment technologies and options and lower scores to new or unproven technologies. Existing facilities should use this guide to evaluate the availability of capacity to meet the specific treatment requirements. Implementability guides give high scores to technologies that can be designed, built, demonstrated, and put into production while exhibiting high levels of maturity, development, and availability. For other than existing facilities this is an "educated guess" based on the maturity of the technology.

System Implementability. This sub-element assesses the ability to build, construct, or implement the treatment option on the site. The demonstrability of the system is assessed by the ratio of the number of process sub-elements previously demonstrated and validated in both actual and similar environments to the total number of sub-elements in the treatment system. The technical analysis of alternatives should not be based on the presumed performance of untested methods. An estimate of the probability of failure, in either qualitative or quantitative terms, should be made for each component technology and for the complete alternative process. The ranking of this sub-element gives preference to technologies proven effective under conditions similar to those anticipated.

Availability. This sub-element assesses the fraction of time the system is available, considering labor and materials as well as the frequency and complexity of necessary maintenance. Availability is decreased by technologies requiring frequent or complex operation and maintenance activities as opposed to technologies requiring straightforward operation and maintenance.

Scalability. This sub-element assesses the ability to transfer the technology from bench-scale or demonstration testing to full-scale operation or vice versa. It also addresses the ease with which a treatment system or technology can be scaled up to a larger capacity or down to a smaller capacity. High ratings are assigned to processes which can be readily sized up or down as needed.

Waste Management Schedule. This sub-element assesses the time required to process the waste, including special studies, design, demonstrations, construction, permitting, and any other steps that may be required to complete treatment of the waste. The sub-element is also affected by facility capacity limitations where a waste stream may not be able to be treated for a lengthy period of time.

Life-Cycle Cost

The life-cycle cost guide includes all factors relating to the life-cycle, maintainability, and the expected lifetime of a proposed system. The cost estimates also consider the particular radionuclides present by incorporating the containment, accountability, and special handling requirements posed.

Technology Development

The technology development guides encompass privatization concerns to be considered when evaluating technology development options. This guide assesses the value of a technology development activity or program to the commercial sector.

Market for Technology. This sub-element assesses the market inside and outside of the DOE complex for the option under consideration. This assessment includes a determination of whether the development would be beneficial to others or whether there is a potential for commercialization of the technology or facility.

Private Sector Involvement. This sub-element assesses the potential for private sector involvement in the development and marketing of the proposed process in a teaming arrangement with DOE. The desire of a private company to develop or assist in the development of a process increases the desirability for the development of that process. Technologies and facilities may be developed and privatized by DOE to be operated by the private sector.

2.2 Ohio Work Group Modifications to the Treatment Selection Guides

The Ohio Work Group determined it would be necessary to uniformly evaluate treatment options to meet the Ohio EPA criteria to both eliminate options as well as to determine the preferred option for each waste stream. The DOE/HQ Framework Guidance stated that if a viable on-site option existed no further options need to be evaluated.

Worksheets were developed to summarize, facilitate, and homologize the comparative analysis. These tables were constructed in the same format as the form used for the evaluation process.

Several sub-elements were judged to be critical enough to be considered go no-go criteria. Thus if the technology received a low rating either in Regulatory Compliance or Environmental Health and Safety it was eliminated.

The other criteria were given a weight equal to perceived importance by the work group. The weight of each criteria were:

Treatment Effectiveness	45%
Implementability	30%
Life Cycle Costs	20%
Technology Development	5%

Sub-elements were averaged for each criterion, then multiplied by the respective per cent weight giving a maximum score of 5.0.

3. EVALUATIONS

Numerical evaluation sheets are at the end of this section.

3.1.1 Scintillation Cocktail in Vials with Tritium and/or Pu-238
Mixed Waste Inventory Number: MD-W001

Three options were rated with DSSI receiving lower ratings for transportation risk (about 325 miles) and equity issues because it is located out of state. Biodegradation received lower ratings for treatment effectiveness because secondary waste streams are much larger volume than the input waste, the secondary waste stream is liquid, and lack of flexibility since some organics are toxic to the bacteria (i.e. 1,4-dioxane). Biodegradation received lower ratings for implementability because it is still in the R&D stage and requires scale up and other tests for viability. It was assumed the life cycle cost for biodegradation would be lower than the other processes since it is a fairly simple technology. The preferred treatment option was judged to be a commercial treatment firm. The secondary option was judged to be the Glass Melter because it exists on-site (although it is not permitted). Other commercial options such as Quadrex were eliminated from consideration because they could not handle tritium or plutonium-238 in the quantities assumed to be present.

3.1.2 Waste Oil, Tritium, Pu-238, Contaminated
Mixed Waste Inventory Number: MD-W013

The ratings for the Glass Melter and DSSI are the relatively the same as that for scintillation cocktail therefore the commercial option was determined to be the preferred option.

3.1.3 Waste Lead Loaded Gloves
Mixed Waste Inventory Number: MD-W012

Decon/Recycle is rated slightly higher than macroencapsulation based upon volume reduction and on the amount of volume of secondary waste produced. Decon/Recycle may not be practical if contamination extends into cracks in the rubber. Given this drawback the preferred option was determined to be macroencapsulation.

3.1.4 Waste Lead-Acid Batteries Pu-238 Contaminated
Mixed Waste Inventory Number: MD-W007

Decon/Recycle is rated slightly higher than macroencapsulation based upon volume reduction and on the amount of volume of secondary waste produced. In this case the preferred option is a combination of the options, i.e. decon/recycle batteries which can be cleaned to free release criteria and macroencapsulate the balance of the material.

3.1.5 Waste Lead Shapes
Mixed Waste Inventory Number: MD-W004

Decon/Recycle is rated slightly higher than macroencapsulation based upon volume reduction and on the amount of volume of secondary waste produced. In this case, the preferred option is a combination of the options, i.e. decon/recycle material which can be cleaned to free release criteria and macroencapsulate the balance of the material.

3.1.6 Liquid Mercury, Tritium Contaminated
Mixed Waste Inventory Number: MD-W005

Amalgamation and Triple distillation are rated with distillation presenting slightly more hazard than amalgamation. The preferred option picked was amalgamation.

3.1.7 Kerosene, PCB, Tritium Contaminated
Mixed Waste Inventory Number: MD-W008

The TSCA incinerator is considered the preferred option but will require the Mound to be included in the incinerator's Part B permit and resolution of state equity issues. DETOX has been removed from DOE/AL's list of viable treatment options. The commercial treatment facility that is capable of treating this waste is yet to be identified.

3.3.1 Absorbed Oil, PCB, Pu-238 Contaminated
Mixed Waste Inventory Number: MD-W009

Thermal desorption received higher ratings for implementability because the technology is much more mature than supercritical carbon dioxide. Based on this thermal desorption was picked as the preferred option.

3.3.2 Miscellaneous Lab Packs
Mixed Waste Inventory Number: MD-W010, MD-W011

This waste stream was not rated because it requires further characterization to proceed.

3.3.3 Newly Discovered Potentially Mixed Waste
Mixed Waste Inventory Number: MD-W014

This waste stream was not rated because a sort and survey project is underway.

TREATMENT EVALUATION CRITERIA

W001 - Scintillation Cocktail	ALT ONE: GLASS MELTER	ALT. TWO: BIODEGRAD	ALT THREE: DSSI
Threshold Criteria			
REGULATORY COMPLIANCE			
Regulatory Compliance	3	3	5
ENVIRONMENTAL HEALTH AND SAFETY			
Environmental/Public Health	3	5	3
Non-Operational Worker Health and Safety	3	3	3
Operational Worker Health and Safety	3	3	3
Transportation Risk	5	5	3
AVERAGE	3.50	4.00	3.00
STAKEHOLDER CONCERNS			
Public Acceptance	5	5	5
Equity Issues	5	5	1
AVERAGE	5.00	5.00	3.00
Evaluation Criteria			
TREATMENT EFFECTIVENESS			
Volume Reduction	3	1	5
Secondary Waste Generation	5	5	5
Destruction, Removal, & Demobiliztion Efficiency	3	3	3
Flexibility	3	1	3
Final Waste Form	3	1	3
Ability to be Shipped	3	3	3
AVERAGE	3.33	2.33	3.67
IMPLEMENTABILITY			
System Implementability	5	1	5
Availability	3	5	3
Scalability	3	5	5
Schedule for Waste Treatment	5	1	5
AVERAGE	4.00	3.00	4.50
LIFE-CYCLE COST			
Life-cycle cost	3	3	5
TECHNOLOGY DEVELOPMENT			
Market for Technology	1	1	5
Private Sector Involvement	1	1	5
AVERAGE	1.00	1.00	5.00
SUMMARY OF EVALUATION AND WEIGHTED AVERAGE			
Treatment Effectiveness (45%)	1.50	1.05	1.65
Implementability (30%)	1.20	0.90	1.35
Life-Cycle Cost (20%)	0.60	0.60	1.00
Technology Development (5%)	0.05	0.05	0.25
Weighted Average	3.35	2.60	4.25

TREATMENT EVALUATION CRITERIA

W013 - Waste Oils	ALT ONE: GLASS MELTER	ALT. TWO: DSSI	ALT THREE:
Threshold Criteria			
REGULATORY COMPLIANCE			
Regulatory Compliance	3	5	
ENVIRONMENTAL HEALTH AND SAFETY			
Environmental/Public Health	3	5	
Non-Operational Worker Health and Safety	3	3	
Operational Worker Health and Safety	3	3	
Transportation Risk	5	3	
AVERAGE	3.50	3.50	
STAKEHOLDER CONCERNS			
Public Acceptance	5	5	
Equity Issues	5	1	
AVERAGE	5.00	3.00	
Evaluation Criteria			
TREATMENT EFFECTIVENESS			
Volume Reduction	5	5	
Secondary Waste Generation	5	5	
Destruction, Removal, & Demobiliztion Efficiency	3	3	
Flexibility	3	3	
Final Waste Form	3	3	
Ability to be Shipped	3	3	
AVERAGE	3.67	3.67	
IMPLEMENTABILITY			
System Implementability	5	5	
Availability	3	5	
Scalability	3	5	
Schedule for Waste Treatment	5	5	
AVERAGE	4.00	5.00	
LIFE-CYCLE COST			
Life-cycle cost	3	5	
TECHNOLOGY DEVELOPMENT			
Market for Technology	1	5	
Private Sector Involvement	1	5	
AVERAGE	1.00	5.00	
SUMMARY OF EVALUATION AND WEIGHTED AVERAGE			
Treatment Effectiveness (45%)	1.65	1.65	
Implementability (30%)	1.20	1.50	
Life-Cycle Cost (20%)	0.60	1.00	
Technology Development (5%)	0.05	0.25	
Weighted Average	3.50	4.40	

TREATMENT EVALUATION CRITERIA

W012 - Lead Loaded Gloves	ALT ONE: Macroencapsulation	ALT. TWO: Decon/Recycle	ALT THREE:
Threshold Criteria			
REGULATORY COMPLIANCE			
Regulatory Compliance	5	5	
ENVIRONMENTAL HEALTH AND SAFETY			
Environmental/Public Health	5	3	
Non-Operational Worker Health and Safety	5	5	
Operational Worker Health and Safety	5	3	
Transportation Risk	5	5	
AVERAGE	5.00	4.00	
STAKEHOLDER CONCERNS			
Public Acceptance	5	5	
Equity Issues	5	5	
AVERAGE	5.00	5.00	
Evaluation Criteria			
TREATMENT EFFECTIVENESS			
Volume Reduction	1	5	
Secondary Waste Generation	3	3	
Destruction, Removal, & Demobiliztion Efficiency	5	5	
Flexibility	5	5	
Final Waste Form	5	5	
Ability to be Shipped	5	5	
AVERAGE	4.00	4.67	
IMPLEMENTABILITY			
System Implementability	3	1	
Availability	3	3	
Scalability	5	5	
Schedule for Waste Treatment	5	5	
AVERAGE	4.00	3.50	
LIFE-CYCLE COST			
Life-cycle cost	3	3	
TECHNOLOGY DEVELOPMENT			
Market for Technology	1	1	
Private Sector Involvement	1	1	
AVERAGE	1.00	1.00	
SUMMARY OF EVALUATION AND WEIGHTED AVERAGE			
Treatment Effectiveness (45%)	1.80	2.10	
Implementability (30%)	1.20	1.05	
Life-Cycle Cost (20%)	0.60	0.60	
Technology Development (5%)	0.05	0.05	
Weighted Average	3.65	3.80	

TREATMENT EVALUATION CRITERIA

W007 - Lead-Acid Batteries	ALT ONE: Macroencapsulate	ALT. TWO: Decon/Recycle	ALT THREE:
Threshold Criteria			
REGULATORY COMPLIANCE			
Regulatory Compliance	5	5	
ENVIRONMENTAL HEALTH AND SAFETY			
Environmental/Public Health	5	3	
Non-Operational Worker Health and Safety	5	5	
Operational Worker Health and Safety	5	3	
Transportation Risk	5	5	
AVERAGE	5.00	4.00	
STAKEHOLDER CONCERNS			
Public Acceptance	5	5	
Equity Issues	5	5	
AVERAGE	5.00	5.00	
Evaluation Criteria			
TREATMENT EFFECTIVENESS			
Volume Reduction	1	5	
Secondary Waste Generation	3	3	
Destruction, Removal, & Demobiliztion Efficiency	3	5	
Flexibility	5	5	
Final Waste Form	5	5	
Ability to be Shipped	5	5	
AVERAGE	3.67	4.67	
IMPLEMENTABILITY			
System Implementability	3	1	
Availability	3	3	
Scalability	5	5	
Schedule for Waste Treatment	5	5	
AVERAGE	4.00	3.50	
LIFE-CYCLE COST			
Life-cycle cost	3	3	
TECHNOLOGY DEVELOPMENT			
Market for Technology	1	1	
Private Sector Involvement	1	1	
AVERAGE	1.00	1.00	
SUMMARY OF EVALUATION AND WEIGHTED AVERAGE			
Treatment Effectiveness (45%)	1.65	2.10	
Implementability (30%)	1.20	1.05	
Life-Cycle Cost (20%)	0.60	0.60	
Technology Development (5%)	0.05	0.05	
Weighted Average	3.50	3.80	

TREATMENT EVALUATION CRITERIA

W004 - Lead Shapes	ALT ONE: Macroencapsulation	ALT. TWO: Decon/Recycle	ALT THREE:
Threshold Criteria			
REGULATORY COMPLIANCE			
Regulatory Compliance	5	5	
ENVIRONMENTAL HEALTH AND SAFETY			
Environmental/Public Health	5	3	
Non-Operational Worker Health and Safety	5	5	
Operational Worker Health and Safety	5	3	
Transportation Risk	5	5	
AVERAGE	5.00	4.00	
STAKEHOLDER CONCERNS			
Public Acceptance	5	5	
Equity Issues	5	5	
AVERAGE	5.00	5.00	
Evaluation Criteria			
TREATMENT EFFECTIVENESS			
Volume Reduction	1	5	
Secondary Waste Generation	3	3	
Destruction, Removal, & Demobiliztion Efficiency	3	5	
Flexibility	5	5	
Final Waste Form	5	5	
Ability to be Shipped	5	5	
AVERAGE	3.67	4.67	
IMPLEMENTABILITY			
System Implementability	3	1	
Availability	3	3	
Scalability	5	5	
Schedule for Waste Treatment	5	5	
AVERAGE	4.00	3.50	
LIFE-CYCLE COST			
Life-cycle cost	3	3	
TECHNOLOGY DEVELOPMENT			
Market for Technology	1	1	
Private Sector Involvement	1	1	
AVERAGE	1.00	1.00	
SUMMARY OF EVALUATION AND WEIGHTED AVERAGE			
Treatment Effectiveness (45%)	1.65	2.10	
Implementability (30%)	1.20	1.05	
Life-Cycle Cost (20%)	0.60	0.60	
Technology Development (5%)	0.05	0.05	
Weighted Average	3.50	3.80	

TREATMENT EVALUATION CRITERIA

W005 - Liquid Mercury	ALT ONE: Amalgamation	ALT. TWO: Triple Distill	ALT THREE:
Threshold Criteria			
REGULATORY COMPLIANCE			
Regulatory Compliance	5	3	
ENVIRONMENTAL HEALTH AND SAFETY			
Environmental/Public Health	5	3	
Non-Operational Worker Health and Safety	3	3	
Operational Worker Health and Safety	3	3	
Transportation Risk	5	5	
AVERAGE	4.00	3.50	
STAKEHOLDER CONCERNS			
Public Acceptance	5	3	
Equity Issues	5	5	
AVERAGE	5.00	4.00	
Evaluation Criteria			
TREATMENT EFFECTIVENESS			
Volume Reduction	1	5	
Secondary Waste Generation	5	3	
Destruction, Removal, & Demobiliztion Efficiency	5	1	
Flexibility	3	3	
Final Waste Form	5	3	
Ability to be Shipped	3	1	
AVERAGE	3.67	2.67	
IMPLEMENTABILITY			
System Implementability	3	1	
Availability	3	3	
Scalability	3	3	
Schedule for Waste Treatment	3	3	
AVERAGE	3.00	2.50	
LIFE-CYCLE COST			
Life-cycle cost	3	3	
TECHNOLOGY DEVELOPMENT			
Market for Technology	1	1	
Private Sector Involvement	1	1	
AVERAGE	1.00	1.00	
SUMMARY OF EVALUATION AND WEIGHTED AVERAGE			
Treatment Effectiveness (45%)	1.65	1.20	
Implementability (30%)	0.90	0.75	
Life-Cycle Cost (20%)	0.60	0.60	
Technology Development (5%)	0.05	0.05	
Weighted Average	3.20	2.60	

TREATMENT EVALUATION CRITERIA

W008 - PCB's Kerosene	ALT ONE: TSCA Incinerator	ALT. TWO: DETOX	ALT THREE: Commercial Treatment
Threshold Criteria			
REGULATORY COMPLIANCE			
Regulatory Compliance	5	3	5
ENVIRONMENTAL HEALTH AND SAFETY			
Environmental/Public Health	5	5	5
Non-Operational Worker Health and Safety	5	3	5
Operational Worker Health and Safety	5	3	5
Transportation Risk	3	5	3
AVERAGE	4.50	4.00	4.50
STAKEHOLDER CONCERNS			
Public Acceptance	5	5	5
Equity Issues	5	5	5
AVERAGE	5.00	5.00	5.00
Evaluation Criteria			
TREATMENT EFFECTIVENESS			
Volume Reduction	5	3	3
Secondary Waste Generation	3	3	3
Destruction, Removal, & Demobiliztion Efficiency	5	5	5
Flexibility	5	5	5
Final Waste Form	5	3	3
Ability to be Shipped	3	3	3
AVERAGE	4.33	3.67	3.67
IMPLEMENTABILITY			
System Implementability	5	3	3
Availability	3	3	1
Scalability	5	3	3
Schedule for Waste Treatment	5	3	3
AVERAGE	4.50	3.00	2.50
LIFE-CYCLE COST			
Life-cycle cost	5	3	5
TECHNOLOGY DEVELOPMENT			
Market for Technology	1	1	1
Private Sector Involvement	1	1	1
AVERAGE	1.00	1.00	1.00
SUMMARY OF EVALUATION AND WEIGHTED AVERAGE			
Treatment Effectiveness (45%)	1.95	1.65	1.65
Implementability (30%)	1.35	0.90	0.75
Life-Cycle Cost (20%)	1.00	0.60	1.00
Technology Development (5%)	0.05	0.05	0.05
Weighted Average	4.35	3.20	3.45

TREATMENT EVALUATION CRITERIA

W009 - Absorbed PCB/Oil	ALT ONE: Thermal Desorption	ALT. TWO: Super Critical CO2	ALT THREE:
Threshold Criteria			
REGULATORY COMPLIANCE			
Regulatory Compliance	3	3	
ENVIRONMENTAL HEALTH AND SAFETY			
Environmental/Public Health	3	3	
Non-Operational Worker Health and Safety	3	3	
Operational Worker Health and Safety	5	3	
Transportation Risk	5	5	
AVERAGE	4.00	3.50	
STAKEHOLDER CONCERNS			
Public Acceptance	3	3	
Equity Issues	5	5	
AVERAGE	4.00	4.00	
Evaluation Criteria			
TREATMENT EFFECTIVENESS			
Volume Reduction	3	3	
Secondary Waste Generation	3	5	
Destruction, Removal, & Demobiliztion Efficiency	3	3	
Flexibility	5	3	
Final Waste Form	1	1	
Ability to be Shipped	1	1	
AVERAGE	2.67	2.67	
IMPLEMENTABILITY			
System Implementability	5	3	
Availability	5	3	
Scalability	3	3	
Schedule for Waste Treatment	3	3	
AVERAGE	4.00	3.00	
LIFE-CYCLE COST			
Life-cycle cost	3	3	
TECHNOLOGY DEVELOPMENT			
Market for Technology	1	1	
Private Sector Involvement	1	1	
AVERAGE	1.00	1.00	
SUMMARY OF EVALUATION AND WEIGHTED AVERAGE			
Treatment Effectiveness (45%)	1.20	1.20	
Implementability (30%)	1.20	0.90	
Life-Cycle Cost (20%)	0.60	0.60	
Technology Development (5%)	0.05	0.05	
Weighted Average	3.05	2.75	

APPENDIX B

OHIO MIXED WASTE TREATMENT SCHEME
(THE OHIO OPTION)

In response to comments by the regulatory agency, Ohio EPA, to coordinate efforts for site treatment plan development within the state of Ohio representatives of the five DOE sites within the state began meeting in early 1994. The Ohio Work Group as it became known was chartered to examine opportunities for coordinated treatment of mixed wastes within Ohio. The purpose for developing this strategy is to take advantage of existing or planned treatment facilities or capacities located at other DOE sites within Ohio and to provide a coordinated plan for treatment of like wastes from each of the five sites. The Work Group examined each sites waste stream descriptions for areas of commonality. Existing and proposed treatment systems waste acceptance criteria were compared with candidate wastes from other sites. Finally the Work Group identified key issues that will need to be resolved to allow implementation of the Ohio Option. The issues included permitting, funding, timing, residual management, and stakeholder concerns.

There was less commonality than had been anticipated, waste streams which appeared identical in the Mixed Waste Inventory Report actually contained incompatible radionuclides or other minor chemical contaminants. Stakeholders do not want new radionuclides introduced at any site. The Work Group concluded that Mound would not send nor receive waste from the other Ohio sites.

DOE-MB has reevaluated the preferred treatment options for treating the scintillation cocktail, waste oil, and PCB/kerosene/Tritium waste streams. Primary considerations involved economics and timeliness. The fact that these new preferred options are currently operating facilities was also given weight.

The scintillation cocktail and waste oil streams are treatable at a commercial facility for significantly fewer dollars, estimated to be $0.9M vs. $1.8M for treatment in the secondary option, the glass melter. These estimates include all characterization costs for the waste streams. Commercial treatment is estimated to take less than 100 hours vs. 11 months elapsed time for the glass melter. There is a slight risk that a small part of these yet to be fully characterized waste streams will not meet the waste acceptance criteria of the commercial entity.

Treatment of the 240 gallon PCB/kerosene/Tritium waste stream at the TSCA incinerator also makes both economic and timely sense. Estimated reduction of 80% of the operating cost ($1.4M) attributed to the previously considered option appears likely. Much of the $3.2 M cost of designing and constructing the packed bed reactor can also be eliminated if other DOE sites can also identify more practical treatment options. The entire waste stream will be treated in a matter of hours vs. 300 days estimated for the previous system. This option requires the Mound being added to the TSCA incinerator Part B permit and resolution of state equity issues.

APPENDIX C

DEFINITIONS

Amalgamation (AMLGM) - A process applicable to radioactive wastes containing mercury and particularly to wastes containing radioactive mercury isotopes. Mercury compounds are converted into a solid mercury-zinc alloy, which is more easily managed and less mobile than solutions containing radioactive mercury. Amalgamation provides a significant reduction in air emissions of mercury and provides a change in mobility from liquid mercury to a paste-like solid, potentially reducing leachability. Amalgamation may be performed using any of the following elements: zinc, copper, nickel, gold, and sulfur.

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

Batteries (as a waste matrix) - This category includes lead acid, cadmium, and miscellaneous batteries.

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., Total Organic Carbon can often be used as an indicator parameter for the biodegradation of many organic constituents than cannot be directly analyzed in wastewater residues).

Capacity (of a facility) - The annual process throughput, in 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, 5 days a week; two shifts/day, 5 day a week; 24 hours a day, 7 days a week.

Characterization - The determination of waste contents and properties, whether by review of process knowledge, 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: (1) hypochlorite (e.g. bleach); (2) chlorine; (3) chlorine dioxide; (4) ozone or UV (ultraviolet light) assisted ozone; (5) peroxides; (6) persulfates; (7) perchlorates; (8) permanganates; and/or (9) 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 (e.g. Total Organic Carbon 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.

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. Include 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. These standards were based on best demonstrated available technology (BDAT) and the waste or 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 mrem per hour at surface of 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 it is a liquid and corrodes steel at a rate greater than 6.35 mm (0.250 inch) per year at a test temperature of 55° (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.

CSTP Logic Diagrams or Logic Diagrams - A pictorial depiction of the thought process which defines the activities required to treat a particular waste stream and describes the relationships between those activities.

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. (It 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 DOE contaminated 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.

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 - This 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.

Designated Facility - A hazardous or mixed waste treatment, storage, or disposal facility that has received an EPA permit (or facility with interim status) in accordance with the requirements of Parts 270 and 124 of 40 CFR, a permit from a state authorized in accordance with Part 271 of 40 CFR, or that is regulated under §261-6(c)(2) or Subpart F of Part 266 of 40 CFR, and that has been designated on the manifest by the generator pursuant to §262.20.

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 §102(2)(C) of NEPA. (2) A tool for decision making; it describes the positive and negative effects of the undertaking and lists alternative actions. The draft document (DEIS) is prepared by the EPA, or under EPA guidance, and attempts to identify and analyze the environmental impacts of a proposed action and feasible alternatives, and is circulated for public comment prior to preparation of the final environmental impact statement.

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

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, or 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 (FFCA) - 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.

Generation - Includes the wastes resulting from new production, rework operations, wastes generated from D&D operations, and 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 of the DOE that have produced or are producing waste.

Glass Melter or Mound Glass Melter - Consists of a melt chamber lined with refractory material with an outer shell of stainless steel connected to an off-gas emission control system. During cold start-up soda-lime/silica glass cullet will be heated in the melt chamber by a propane burner. After the glass melts, electrical resistance heating will maintain the glass in a molten state. When the melt has reached a temperature of 1,000 to 1,333 °C., waste will be introduced into the melt chamber through a feed port. A small amount of combustion air is introduced through valved ports. Radiant heat from the glass pool ignites the waste stream. Nonvolatile residues combine with the glass. Periodically the glass containing these residues is drained into molds.

Hazardous Substance - (1)(a) Any substance designated pursuant to §311(b)(2)(A) of the FWPCA; (b) any element, compound, mixture, solution, or substance designed pursuant to §102 of CERCLA; (c) any hazardous waste having the characteristics identified under or listed pursuant to §3002 of the SWDA; (d) any toxic pollutant listed under §307(a) of the FWPCA; (e) any hazardous air pollutant listed under §112 of the CAA; and (f) any imminently hazardous chemical substance or mixture with respect to which the Administrator of EPA has taken action pursuant to §7 of TSCA. (2) Any material that poses a threat to human health and/or the environment. Typical hazardous substances are toxic, corrosive, ignitable, explosive, or chemically reactive. Any substance designated by EPA to be reported if a designated quantity of the substance is spilled in the waters of the United States or if otherwise emitted into the environment. (3) §101(14) of CERCLA, as amended, defines "hazardous substance" chiefly by reference to other environmental statutes, such as the SWDA, FWPCA, CAA, and TSCA. The term excludes petroleum, crude oil or any fraction thereof, natural gas, natural gas liquids, or synthetic gas usable for fuel. Under the Act, OERR also may include other substances that it specifically designates as "hazardous".

Hazardous Waste (HW) - (1) Those wastes that are designated hazardous by EPA [or state] Regulations. (2) Byproducts of production or operation that can pose a potential hazard to human health or the environment when improperly managed and that possess at least one of four characteristics (ignitability, corrosivity, reactivity, toxicity), or that appear on special EPA lists. (3) A solid waste or combination of solid waste, that, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may (a) cause, or significantly contribute to, an increase in mortality or an increase in serious, irreversible, or incapacitating reversible illness; or (b) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed. (4) Those wastes listed by EPA or meeting characteristics specified by EPA in their criteria pursuant to the RCRA. Disposal treatment or storage of hazardous wastes can only take place in a site or facility issued a permit by EPA or a state. Note: Source, special nuclear material, and byproduct material, as defined by the AEA of 1954 as amended, are specifically excluded from the term hazardous waste.

Heterogeneous Debris (as a waste matrix) - Wastes with matrices meeting the definition of debris per the 8/18/92 LDR debris rulemaking (57 FR 37194, 8/18/92). This category includes debris that do not meet the criteria for categorization as either Organic Debris or Inorganic Debris. This category also includes mixtures of debris and solid progress residues or soil, provided debris comprises no more than 50 percent of the waste.

High-Level Radioactive Waste (HLW) - (1) The highly radioactive waste material that results from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid waste derived from the liquid, that contains a combination of TRU waste and fission products in concentrations requiring permanent isolation. (2)(a) Irradiated reactor fuel, (b) liquid wastes resulting from the operation of the first cycle solvent extraction system, or equivalent, and the concentrated wastes from subsequent extraction cycles, or equivalent, in a facility for reprocessing irradiated reactor fuel, and (c) solids into which such liquid wastes have been converted. (3) As defined by the NWPA, high-level waste is (a) the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including the liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and (b) other highly radioactive material that the NRC, consistent with existing law, determines by rule to require permanent isolation. (4) Waste generated in the fuel of a nuclear reactor, or waste found at nuclear reactors or nuclear fuel reprocessing plants. These wastes are a serious threat to anyone who comes near them without shielding.

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 per the 8/18/92 LDR debris rulemaking (57 FR 37194, 8/18/92). More specifically this category is defined for wastes that contain >90 percent inorganic debris. Example inorganic debris materials are: metal shapes (e.g. equipment, scrap), metal turnings, glass (e.g. light tubes, leaded glass, etc.), ceramic materials, concrete, rocks.

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 with vials. The difference between wastes within these categories is contaminants. Lab packed wastes contaminated with TC metals are categorized as "Lab packs with Metals". Lab packed wastes that are not contaminated with TC metals are categorized as "Lab packs without Metals".

Land Disposal Restrictions (LDRs) - (1) Provisions of the 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.

Legacy Waste - That 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, that has not been examined by EM-40, Environmental Restoration Group, 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 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, 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 low-level waste, provided the concentration of TRU is less than 100 nCi/g. (2) Radioactive waste not classified as high-level waste, TRU waste, spent nuclear fuel, or byproduct 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.

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

Mixed TRU (MTRU) Waste - TRU 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) 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 the 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: (1) Acids; (2) bases; or (3) 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 weapons complex; e.g., LANL is a site, as is INEL, SNL, etc. (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 comprises 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 operable units, depending on the complexity of the problems associated with the site. Operable units 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 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 to many release sites considered together for assessment and cleanup activities. The primary criteria for placement of release sites into an operable unit 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 per the 8/18/92 LDR debris rulemaking (57 FR 37194, 8/18/92). More specifically this category is defined for wastes that contain >90 percent organic debris. Example organic debris materials are: rags (including "solvent rags") plastic/rubber, paper, wood, and glovebox gloves (including lead-lined), animal carcasses.

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

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

Packed Bed Reactor - A treatment technique, developed by Las Alamos National Laboratory, in which a chlorinated hydrocarbon liquid waste (i.e., PCB's) and excess air is injected into a refractory packed column which is at elevated temperature. Heat is provided by an external tube furnace. The waste and excess air mixture actually cools the reactor slightly. The waste reacts with the air to form hydrogen chloride, products of combustion and traces of products of incomplete combustion. A silent discharge plasma cell can be used to polish the output from the packed bed reactor.

pH - (1) Used to describe the hydrogen-ion activity of a system. The logarithm (the exponent indicating the power to which a given 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.

Pollutant or Contaminant - Includes, but is not limited to, any element, substance, compound, or mixture, including disease-causing agents, that after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformations, in such organisms or their offspring; except that the term "pollutant or contaminant" shall not include petroleum, including crude oil or any fraction thereof that is not otherwise specifically listed or designated as a hazardous substance under subparagraphs (A) through (F) of paragraph (14) and shall not include natural gas, liquefied natural gas, or synthetic gas of pipeline quality (or mixtures of natural gas and such synthetic gas).

Pretreatment Processes - Processes (e.g., shredding, grinding, physical separation, etc.) that make the waste amenable to the treatment process that 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 sound, microwave, radiowave or visible, infrared, or ultraviolet light. (2) Refers to 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 Mixed Waste - (See Mixed Waste)

Radioactive Waste - (1) Solid, liquid, or gaseous material that contains radionuclides regulated under the AEA of 1954, as amended, and 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 and hence by the number of protons, the number of neutrons, and the energy content.

Radionuclide Separation - The process by which the radioactive portion of a waste stream is physically separated from the hazardous portion creating two separate waste streams, one purely radioactive and one purely hazardous.

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.

Remedial Action (RA) - (1) Activities conducted at DOE facilities to reduce potential risks to people and/or harm to the environment from radioactive and/or hazardous substance contamination. (2) Those actions consistent with permanent remedy taken instead of, or in addition to, removal action in the event of a release or threatened release of a hazardous substance into the environment to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health or welfare or the environment. (3) The term includes, but is not limited to, such actions at the location of the release as storage, confinement, perimeter protection, clay cover, neutralization, cleanup of released hazardous substances or contaminated materials, recycling or reuse, diversion, destruction, segregation of reactive wastes, dredging or excavations, repair or replacement of leaking containers, collection of leachate and runoff, onsite treatment or incineration, provision of alternative water supplies, and any monitoring reasonably required to ensure that such actions protect the public health and welfare and the environment. The term includes the costs of permanent relocation of residents and businesses and community facilities where the President determines that, alone or in combination with other measures, such relocation is more cost-effective than, and environmentally preferable to, the transportation, storage, treatment, destruction, or secured disposition offsite of such hazardous substances, or may otherwise be necessary to protect the public health or welfare. The term does not include offsite transport of hazardous substances or contaminated materials unless the President determines that such actions: are more cost-effective than other remedial actions; will create new capacity to manage in compliance with Subtitle C of the SWDA, hazardous substances in addition to those located at the affected facility; or are necessary to protect public health or welfare or the environment from a present or potential risk that may be created by further exposure to the continued presence of such substances or materials [as defined by §101(24) of CERCLA].

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

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

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

Silent Discharge Plasma - A Los Alamos developed waste treatment technology which destroys trace quantities of halogenated hydrocarbon vapor contained in a gas stream. The technology involves the use a large electrical potential difference across a dielectric to produce oxygen free radicals which attack the halo-organics producing hydrogen chloride and combustion products.

Site - (1) A geographic entity comprising land, buildings, and other facilities required to perform program objectives. Generally a site has, organizationally, all of the required facilities for management functions. That is, it is not a satellite of some other site. (2) For the purposes of the ERWM Five-Year Plan, sites are lands, installations, and/or facilities for which DOE has or shares responsibility for ERWM 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, or equipment).

Site Characterization - The program of exploration and research, both in the laboratory and in the field, undertaken to establish the geologic conditions and the ranges of those parameters of a particular site relevant to the procedures under this part. Site characterization includes borings, surface excavations, excavation of exploratory shafts, limited subsurface lateral excavations and borings and geophysical testing.

Site Closure and Stabilization - Those actions that are taken upon completion of operations that prepare the disposal site for custodial care and that ensure that the disposal site will remain stable and will not need ongoing active maintenance.

Soil (as a waste matrix) - Soils contaminated with hazardous constituents and radioactivity that are stored in waste containers. Includes soils contaminated with organics, inorganics, or both.

Soil With <50 Percent Debris (as a waste matrix) - Soils contaminated with hazardous constituents and radioactivity that are stored in waste containers. Includes soils contaminated with organics, inorganics, or both. Wastes in this category may include debris, provided it is less than 50 percent of the waste.

Stabilization (STABL) - A broad class of treatment processes that immobilize hazardous constituents in a waste. For treatment of metals in low-level mixed 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 nonwastewater matrices.

Storage - (1) Temporary holding of waste pending treatment or disposal. Storage methods 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.

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 Administrator of EPA.

Toxic Characteristic Leaching Procedure (TCLP) - A procedure developed by USEPA to simulate leaching processes thought to occur in a sanitary landfill. The procedure involves extraction of the solid waste and analysis of the extraction fluid for RCRA hazardous materials. If a total analysis of the waste demonstrates that all RCRA materials are at levels below the regulatory limits then the TCLP need not be run.

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 Waste (TRU) - This core definition appears in modified form in various relevant documents: Waste containing alpha-emitting radionuclides with an atomic number greater than 92 and half-lives greater than 20 years, at concentrations greater than 100 nCi/g of waste. Modifications include the following: (1) For purposes of management, DOE Order 5820.2A (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 that 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 Administrator [of EPA] do not need the degree of isolation required by this part; or (c) wastes that the 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 as discussed above, 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, 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.

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).

Vitrification - (1) A waste treatment process in which calcined or another decomposed form of waste is mixed with glass and fused into a solid mass. The resultant mass is expected to remain a stable and insoluble form for long time periods, and thus will be a leading candidate for the most benign wasteform for disposal. (Vitrification with borosilicate glass is the BDAT for HLW and certain mixed waste streams.) (2) The conversion of high-level waste materials into a glassy or noncrystalline solid for subsequent disposal. (3) The process of immobilizing waste that produces a glass-like solid that permanently captures the radioactive materials.

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

Waste Acceptance Criteria (WAC) - The criteria used to determine if 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 (NDE/NDA) examination, or intrusive examination such as sampling and analysis.

Waste Form - The physical form of the waste such as sludges, combustibles, metals, etc.

Waste Isolation Pilot Plant (WIPP) - (1) The project authorized under §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, safety, and the environment. (2) The reduction, to the extent feasible, of hazardous waste that is generated prior to treatment, storage, or disposal of the waste. Waste minimization includes any source reduction or recycling activity that results in either (a) reduction of total volume of hazardous waste, (b) reduction of toxicity of hazardous waste or (c) both.

Waste Segregation - The separation of waste materials before the package (or repackage) process to facilitate handling, storage, treatment, transportation, and/or disposal.

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

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

APPENDIX D

ESTIMATED LIFE CYCLE COSTS FOR TREATMENT TECHNOLOGIES

Assumptions used in the development of life cycle cost estimates for Mound

The life cycle cost estimates are for the time frame required to treat the existing mixed waste inventory at Mound, utilizing the preferred treatment options identified in the PSTP. This time frame currently extends through March 2001.

The cost estimates attached are based on engineering estimates, historical data for characterization efforts, and best available estimates for permitting resources required. The results of the characterization of each waste stream could significantly affect the assumptions used to develop these estimates. The quantity of waste to be treated, the specific hazardous characteristics and their concentrations, and the specific radioisotopes and their activity levels are all, to some extent, currently based on process knowledge of various degrees of completeness. If the characterization of these wastes by more precise analytical means results in significant changes to any of the above parameters, the associated cost estimates for treating these wastes will be recalculated and may be significantly affected by the revised data.

Cost elements included:

Characterization costs for all waste streams
Permitting costs for all treatment units - RCRA, TSCA, air, water, NEPA
Utilities, waste handling and Mound support (Health Physics, Industrial Hygiene, Safety, etc.) for operation of Mobile Treatment Units received from other DOE Sites

Cost elements not included:

Design, development and construction, operation and maintenance costs for Mobile Treatment Units fabricated by another DOE site are not included in these estimates; these costs are in the individual sites' budgets and/or the overall DOE/AL Mixed Waste Treatment Program budget.

Design and equipment modification costs for Glass Melter
Mixed waste storage costs, costs associated with FFCAct administrative tasks and mixed waste disposal costs are not included in these estimates.

Life Cycle Cost Estimates by Treatment Technology

Treatment Technology	Life Cycle Cost (thousands)
Thermal Desorption	$ 257
Macroencapsulation	257
Mercury Amalgamation	153
Lead decontamination	269
TSCA incinerator	280
Commercial	931
Sort, Survey *	1,154

* specific treatment to be determined following waste characterization

Life Cycle Cost Estimates by Waste Stream

Waste Stream	Life Cycle Cost (thousands)
MD-W001, Scintillation Cocktails	$ 381
MD-W004, Lead Shapes	199
MD-W005, Liquid Mercury	153
MD-W007, Lead Acid Batteries	174
MD-W008, Kerosene PCB contaminated	275
MD-W009, Absorbed Oil	262
MD-W010, W011, Lab Packs	352
MD-W012, Lead Loaded Gloves	153
MD-W013, Waste Oils	550
MD-W014, Newly Discovered Mixed Waste	802

APPENDIX E
GRAND JUNCTION PROJECTS OFFICE
MOBILE TREATMENT UNIT TECHNOLOGY SUMMARIES
AND DEPLOYMENT SCHEDULE

U.S. Department of Energy
Grand Junction Projects Office

Mixed-Waste Treatment Program
Waste Treatment Technologies Summary

DRAFT—June 1995

Prepared for
U.S. Department of Energy
Albuquerque Operations Office
Grand Junction Projects Office

Prepared by
Rust Geotech
Grand Junction, Colorado

Work performed under DOE Contract No. DE-AC04-94AL96907

Amalgamation of Elemental Mercury
(Pinellas Plant)

Process Description—Amalgamation is a treatment standard under the Land Disposal Restrictions (LDRs) for liquid elemental mercury contaminated with radioactive materials. The process produces a solid that is leach resistant and has a reduced potential for emitting mercury vapors. Amalgamation is achieved by mixing the liquid mercury, at room temperature, with powdered reagents such as copper, zinc, tin, nickel, gold, and sulfur to yield a metal alloy with no free mercury. Chemical pretreatment of the metals with an acid may be required for efficient formation of quality alloys with high mercury content. Mercury loading in excess of 50 percent is achievable.

The process (reference Figure 1) being developed at Pinellas uses a batch mixer and feed system for the mercury and cotreatment chemicals (e.g., sulfuric acid). Laboratory tests have shown that batch mixing the materials to a paste-like consistency is a critical factor in the treatment process. To minimize handling and personnel exposure to radionuclides and hazardous chemicals, a disposal/mixing vessel is being designed to contain the solid amalgam. Polyethylene (or polypropylene) containers (1- to 4-liter size) are being investigated as an economical mixing-vessel alternative to eliminate any corrosion problems caused by the addition of acid. The vessels can then be placed in a 55-gallon drum or other selected shipping container and sealed with a tamper-proof device in preparation for disposal. Handling and cleanup materials are being evaluated for possible inclusion in the shipping container.

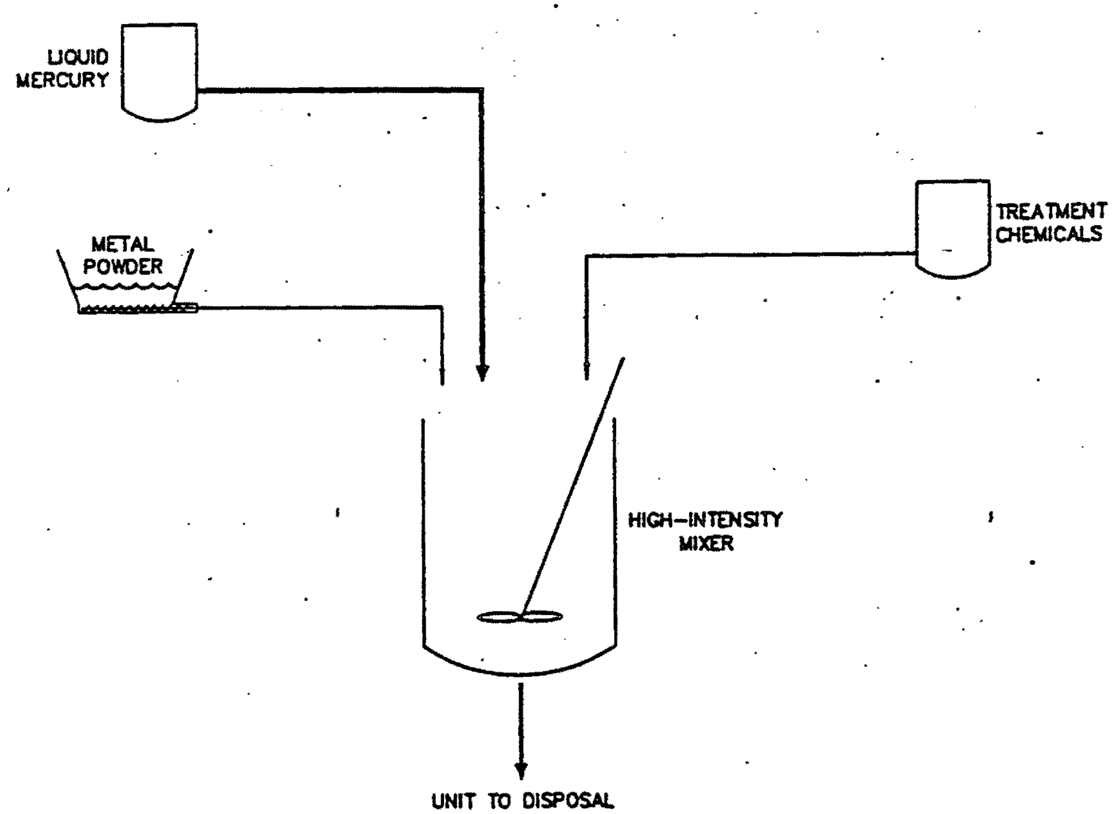


Figure 1, Process Flow for Amalgamation of Elemental Mercury MTU

Testing has been conducted using zinc and sulfur as metallic additives. The use of zinc requires the addition of sulfuric acid to promote a rapid reaction. The use of sulfur is less costly, does not require the addition of sulfuric acid, and produces less fumes. However, further study is required because of the current difficulties encountered with blending the mercury and sulfur into a homogenous amalgam.

Feed Preparation—No special feed preparation outside of batch weighing is needed for this process as long as the process limitations are respected.

Treatment of Residual Streams—Other than the alloy, this process has no residual streams requiring secondary treatment. However, untreated liquid mercury will emit vapors and must be handled using an adequate ventilation system.

Process Limitations—The process is not effective for mercury dispersed or dissolved in a liquid or a solid matrix. Amalgamation works best when the mercury is first separated from the matrix.

MTU Development Schedule—

Amalgamation of Elemental Mercury MTU	Date[a]
Conceptual Design Completion	May 1994
Detailed Design Completion	July 1995
Fabrication/Testing Completion	January 1996
Ready for Deployment	September 1996

[a] Based on data used to develop Revision 2 of the Integrated Deployment Schedule.

MTU Data Sheets—

Feed Waste Stream—Amalgamation of Elemental Mercury						
Matrix	Contaminants/Characteristic Hazard (Check all that applies)					
	Organics	Metals	Mercury	PCB	Corrosive	Reactive
Soil						
Sludge						
Organic Liquid						
Aqueous Liquid						
Organic Debris						
Inorganic Debris						
Scrap Metal*						
Liquid Mercury			✓			

*Scrap metals include lead, uranium turnings and reactive metals

Design and Operating Parameters—Amalgamation of Elemental Mercury (for major process unit operations)						
	Batch Size	Hold-up Time	Feed Rate Continuous	Design Temperature	Design Pressure	Material of Construction
Unit #1	1 liter	3 hr		Ambient	Ambient	
Unit #2						

Facility Supplied Utilities and Facility Requirements—Amalgamation of Elemental Mercury					
Electricity	TBD Volts	TB KW	Emission Controls	None required
Dry Air	TBD psi	SCFM	Emergency Power	None required
Steam	psi	lbs./hr	Monitoring Equipment	None required
Purge Gas	psi	SCFM	Others	
Chilled Water	°F	GPM		

Emissions/Effluents—Amalgamation of Elemental Mercury			
Type (Gas, liquid, sludge)	Vent or Release Rate	Composition	Disposal/Treatment
Air	TBD	Possibly Hg fumes	Treat before venting

MTU Module Physical Limits—Amalgamation of Elemental Mercury							
Module No.	1	2	3	4	5	6	7
Length	TBD						
Width	TBD						
Height	TBD						
Weight	TBD						

Lead Decontamination Trailer
(Los Alamos National Laboratory)

Process description—The lead-decontamination process is a trailer-mounted wet surface blasting operation. Surface-contaminated lead bricks and shapes are blasted with a mixture of water, air, and grit (usually alumina) at 40 pounds per square inch gauge (psig). The blasting removes a thin layer from the surface of the lead, removing the contamination. The cleaned bricks and shapes are surveyed and returned to service.

The existing trailer (reference Figure 6) at LANL has three sections; a staging area for unpacking containers, the blasting room, and a control room that includes the ventilation system. The trailer is enclosed and includes a high-efficiency particulate air (HEPA-) filtered ventilation system that is interlocked to the blasting operation. The blasting process will not operate unless the ventilation system is operating, keeping the trailer under negative pressure.

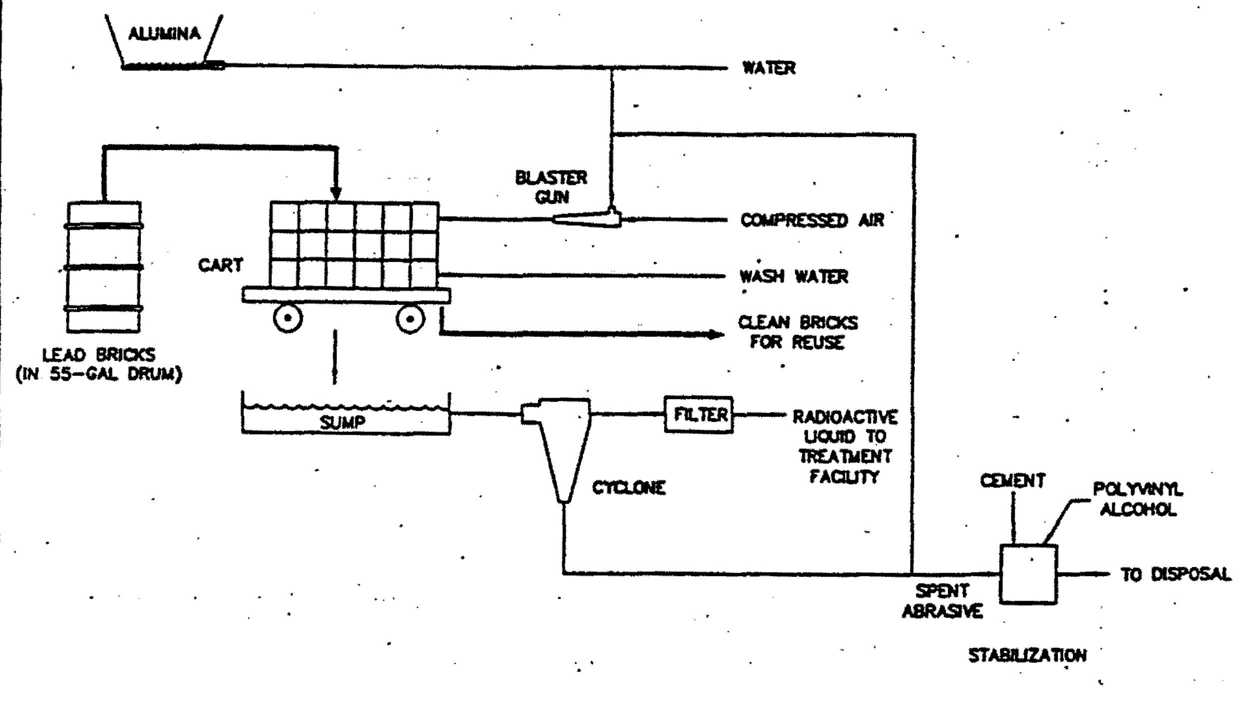


Figure 6, Process Flow for Lead-Decontamination Trailer

The staging room has a 2-ton overhead crane on a rail to move large items onto a cart on tracks. The cart moves parts into the blasting room. In the blasting room, the spent fluids drop through a grating, are collected and recycled. Occasionally the grit must be replaced. The blasting solution is pumped through a cyclone that separates the solids out as a slurry. The slurry is collected in a drum, and cement is added and mixed with an air-driven mixer in the staging area. The water is filtered and discharged to a radioactive wastewater treatment unit. Filtration is usually adequate for the water to pass the toxicity characteristic leaching procedure (TCLP) for lead.

Feed Preparation—Large pieces may need size reduction or dismantling to meet blasting area space constraints, to improve surface area exposure, or to meet crane weight limitations.

Treatment of Residual Streams—The blasting process produces 1 pound of waste slurry containing lead and grit for every 12 pounds of lead treated. The slurry is stabilized with cement.

Process Limitations—Lead shapes up to 10 feet by 4 feet can be handled, the weight limited by the 2-ton overhead crane. The decontamination process is not effective on lead that has crevices, subsurface contamination, or radioactive contamination from activation of the lead.

MTU Development Schedule—The original trailer has been in operation since April 1993. However, some modifications and maintenance must be performed before continued operation and mobilization is possible.

Lead Decontamination Trailer Schedule Milestones	Date[a]
Conceptual Design Completion	N/A
Detailed Design Completion	July 1994
Fabrication/Testing Completion	June 1996
Ready for Deployment	January 1997

[a] Based on data used to develop Revision 2 of the Integrated Deployment Schedule.

MTU Data Sheets—

Feed Waste Stream—Lead-Decontamination						
Matrix	Contaminants/Characteristic Hazard					
	Organics	Heavy Metals	Mercury	PCB	Corrosive	Reactive
Soil						
Sludge						
Organic Liquid						
Aqueous Liquid						
Debris						
Scrap Metal*						
Liquid Mercury		✓				
Gases						

*Scrap metals include lead, uranium turnings and reactive metals

Design and Operating Parameters—Lead-Decontamination (for major process unit operations)						
	Batch Size	Hold-up Time	Feed Rate Continuous	Design Temperature	Design Pressure	Material of Construction
Unit #1	600 lb	8 hr	N/A	Ambient	Ambient	Carbon and stainless steel
Unit #2						

Facility Supplied Utilities and Facility Requirements—Lead-Decontamination				
Electricity	480/208 Volts	100 KW	Emission Controls	HEPA filter
Dry Air	80 psi	100 SCFM	Emergency Power	
Steam	psi	lbs./hr	Monitoring Equipment	
Purge Gas	psi	SCFM	Others	
Chilled Water	°F	GPM		

Emissions/Effluents—Lead-Decontamination			
Type (Gas, liquid, sludge.....)	Vent or Release Rate	Composition	Disposal/Treatment
Air	50 SCFM	Air and moisture	Burial of filter elements
Sludge	50 lb / day	Lead, silica and water	Stabilize & dispose

MTU Module Physical Limits—Lead-Decontamination							
Module No.	1	2	3	4	5	6	7
Length	45 ft						
Width	18 ft						
Height	12 ft						
Weight	Mobile Trailer						

Macroencapsulation
(Pantex Plant)

Process Description—Macroencapsulation encloses solid wastes in an inert envelope to reduce their exposure to potential leaching media in a landfill. This treatment minimizes the risk of contaminants transferring to the environment and is the Land Disposal Restrictions treatment standard for debris and radioactive lead solids. The treatment standard requires that the encapsulating material completely and continuously surround the waste and be resistant to biodegradation and to degradation by the waste, the contaminants, and the surrounding materials in the landfill.

The macroencapsulation process being developed at Pantex (reference Figure 7) will enclose the waste in a polyethylene or polypropylene jacket. Polymer foam or cement will be used to fill the voids. After the drum are inserted into the jacket, the cover is sealed onto the jacket by friction-welding through spinning.

Feed Preparation—Size reduction may be required to ensure that the contaminated inorganic and organic debris and radioactive lead fit in the jacket. The debris may be compacted before macroencapsulation.

Treatment of Residual Streams—This process does not produce any residual waste. The overall volume, however, will be increased with the addition of the encapsulating media. There may be some off-gases requiring emission control.

Process Limitations—Treatment applies to radioactive lead solids and debris only. The waste must not contain free liquid.

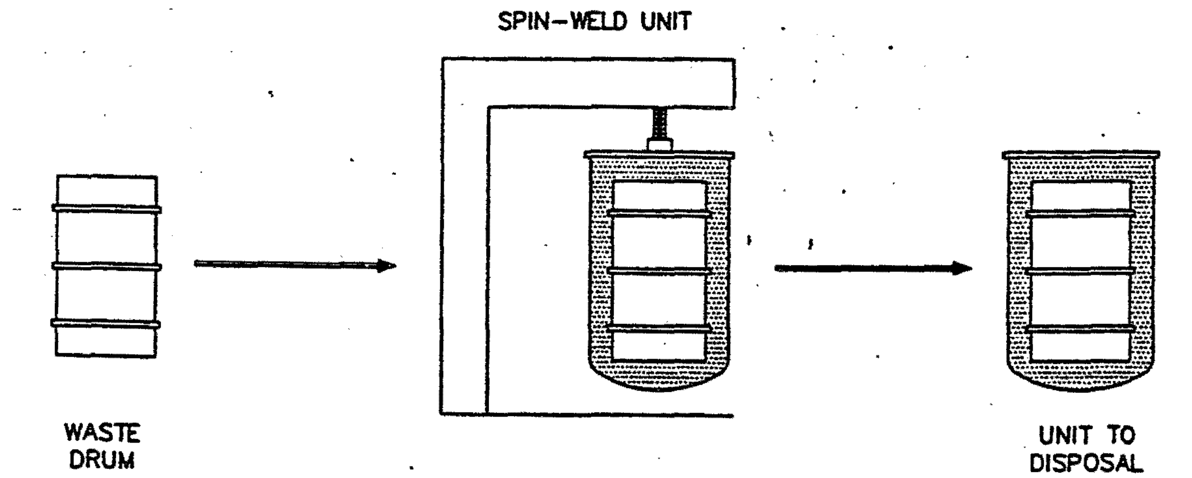


Figure 7, Process Flow for Macroencapsulation MTU

MTU Development Schedule—

Macroencapsulation MTU Schedule Milestones	Date[a]
Conceptual Design Completion	October 1995
Detailed Design Completion	March 1998
Fabrication/Testing Completion	July 1998
Ready for Deployment	July 1998

[a] Based on data used to develop Revision 2 of the Integrated Deployment Schedule.

MTU Data Sheets—

Feed Waste Stream—Macroencapsulation						
Matrix	Contaminants/Characteristic Hazard					
	Organics	Heavy Metals	Mercury	PCB	Corrosive	Reactive
Soil						
Sludge						
Organic Liquid						
Aqueous Liquid						
Debris		✓	✓	✓		
Scrap Metal*		✓				
Liquid Mercury						
Gases						

*Scrap metals include lead, uranium turnings and reactive metals

Design and Operating Parameters—Macroencapsulation (for major process unit operations)						
	Batch Size	Hold-up Time	Feed Rate Continuous	Design Temperature	Design Pressure	Material of Construction
Unit #1	1 drum	5 min				
Unit #2						

Facility Supplied Utilities and Facility Requirements (Preliminary)—Macroencapsulation				
Electricity	480 Volts	66 KW	Emission Controls	Will become available in final design.
Dry Air	80 psi	85 SCFM	Emergency Power	
Steam	psi		Monitoring Equipment	
Purge Gas	psi	SCFM	Others	
Chilled Water	40 °F	15 GPM		

Emissions/Effluents—Macroencapsulation			
Type (Gas, liquid, sludge...)	Vent or Release Rate	Composition	Disposal/Treatment
None expected			

MTU Module Physical Limits—Macroencapsulation							
Module No.	1	2	3	4	5	6	7
Length	TBD						
Width	TBD						
Height	TBD						
Weight	TBD						

Thermal Desorption
(Grand Junction Projects Office)

Process Description—This drying process is used to separate organic and other volatile contaminants from solids, soils, and sludges. The contaminants are vaporized in an indirectly-heated vessel and passed through an off-gas treatment system.

The system being developed at the GJPO is a vacuum-assisted batch operation. The primary component of this system (reference Figure 10) is a jacketed batch dryer. Oil, heated to less than 600 °F, is normally used as the heat transfer medium and is circulated through the dryer jacket. The desorption rates of the contaminants are enhanced by operating under vacuum, down to 29 inches Hg, and stirring the contaminated solids using a tumbling dryer. Nitrogen at low flow rates may be used to inert the dryer atmosphere and carry the volatiles through the vapor handling system.

Feed Preparation—Size reduction (e.g., shredding, crushing, or sorting) of feed material may be required. Contaminated soils may require that large chunks be size reduced. Sludges with a high water content will require dewatering and removal of any metallic pieces or large debris.

Treatment of Residual Streams—The main residuals will be treated solids, condensed water containing dissolved organics, condensed organics, and decontamination solution. The residual solids will be stabilized. Condensed water with dissolved organics and condensed organics will be suitable for shipment to an off-site treatment, storage, or disposal facility.

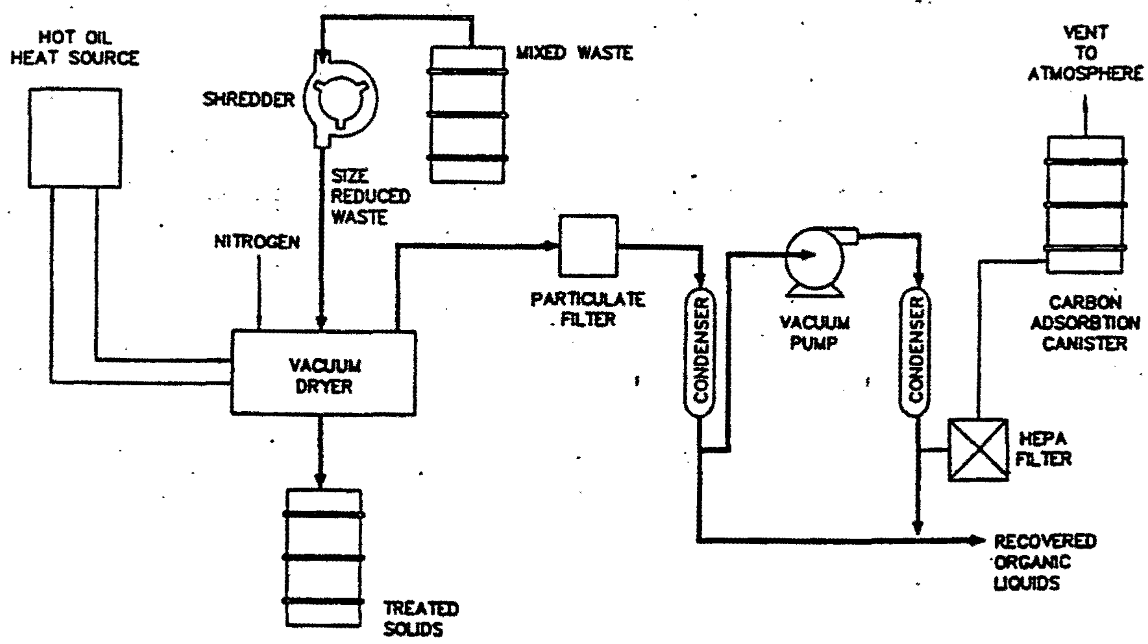


Figure 10, Process Flow for Thermal Desorption

Process Limitations—The current equipment is most effective with organic concentrations of less than 20 percent and a moisture content of less than 50 percent.

The quantity of materials with low melting points in the contaminated solids may be limited.

MTU Development Schedule—

Thermal Desorption MTU Schedule Milestones	Date[a]
Conceptual Design Completion	September 1995
Detailed Design Completion	March 1996
Fabrication/Testing Completion	December 1996
Ready for Deployment	January 1997

[a] Based on data used to develop Revision 2 of the Integrated Deployment Schedule.

MTU Data Sheets—

Feed Waste Stream—Thermal Desorption						
Matrix	Contaminants/Characteristic Hazard (Check all that applies)					
	Organics	Heavy Metals	Mercury	PCB	Corrosive	Reactive
Soil	✓		✓	✓		
Sludge	✓		✓	✓		
Organic Liquid						
Aqueous Liquid						
Debris	✓		✓	✓		
Scrap Metal*						
Liquid Mercury						
Gases						

*Scrap metals include lead, uranium turnings and reactive metals

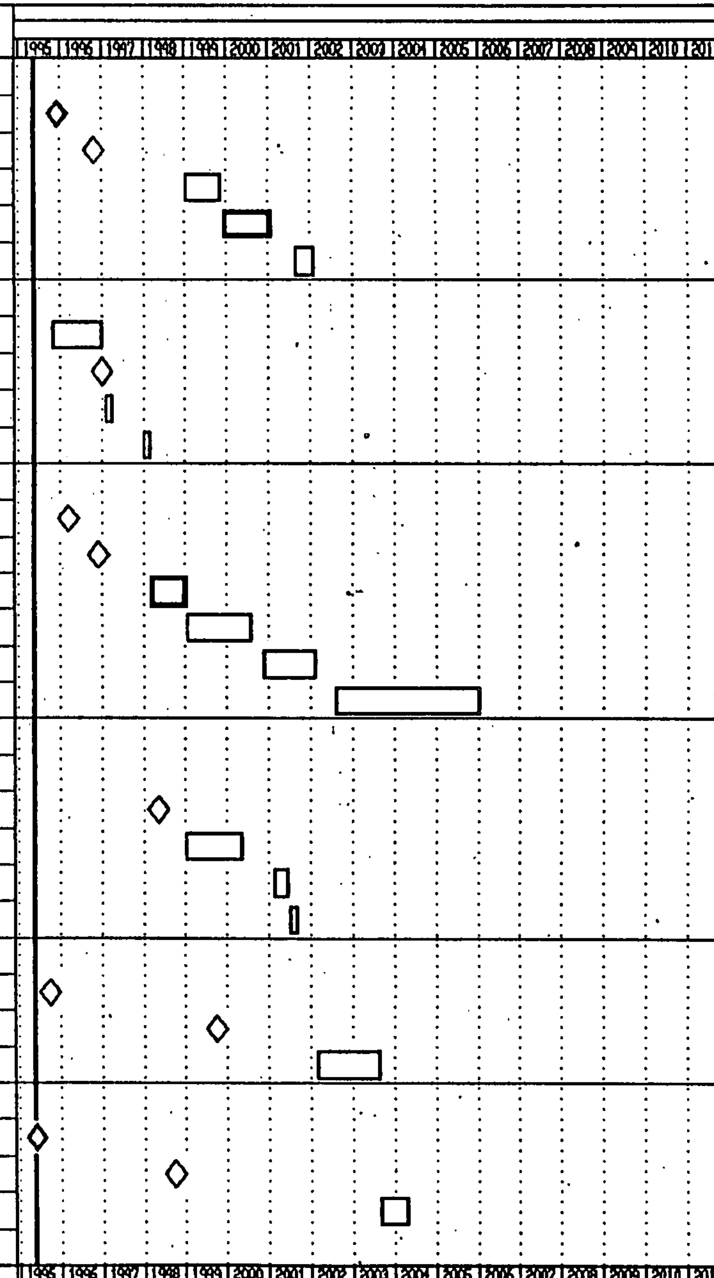
Design and Operating Parameters—Thermal Desorption (for major process unit operations)						
	Batch Size	Hold-up Time	Feed Rate Continuous	Design Temperature	Design Pressure	Material of Construction
Unit #1	14.8 ft.^{3}	6-8 hrs		550°F	full vac. to ambient	Stainless Steel
Unit #2						

Facility Supplied Utilities and Facility Requirements—Thermal Desorption				
Electricity	480 Volts	115 KW	Emission Controls	HEPA Filter/Carbon Beds supplied with unit
Dry Air	35 psi	460 SCFM	Emergency Power	N/A
Steam	psi	0 lbs./hr	Monitoring Equipment	Radiation Meter/(3) voc/organic meters supplied with unit
Purge Gas	psi	0 SCFM	Others	
Chilled Water	35 °F	16 GPM		

Emissions/Effluents—Thermal Desorption			
Type (Gas, liquid, sludge.....)	Vent or Release Rate	Composition	Disposal/Treatment
Rad Solids	14.8 ft.^{3}/batch	Variable	Macroencapsulation
Organics/Water		Variable	Commercial Disposal

MTU Module Physical Limits—Thermal Desorption							
Module No.	1	2	3	4	5	6	7
Length	8 ft.	8 ft.	8 ft.	8 ft.	8 ft.	8 ft.	
Width	10 ft.	10 ft.	10 ft.	10 ft.	10 ft.	10 ft.	
Height	11.5 ft.	11.5 ft.	11.5 ft	11.5 ft.	11.5 ft	11.5 ft	
Weight	TBD	TBD	3500 lbs	3000 lbs	4000 lbs	4000 lbs	

ACTIVITY ID	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	REM DUR
EVAPORATIVE OXIDATION				
TNA150	EO SITE PERMITTING INFO AVAIL.		13DEC95	0
TNA350	EO TREATMENT DEPLOYED		28OCT96	0
TNA410	LANL EVAPORATIVE OXIDATION SITE OPERATIONS	4JAN99	9NOV99	217
TNA710	SNL,NM EVAPORATIVE OXIDATION SITE OPERATIONS	1DEC99	26JAN01	289
TNA610	PTX EVAPORATIVE OXIDATION SITE OPERATIONS	22AUG01	31JAN02	111
LEAD DECON TRAILER				
TNJ410	LANL LEAD DECON TRAILER ON SITE OPERATIONS	30OCT95	1JAN97	294
TNJ350	LEAD DECON TRAILER AVAILABLE		1JAN97	0
TNJ710	SNL,NM LEAD DECON TRAILER SITE OPERATIONS	3FEB97	2APR97	42
TNJ510	MND LEAD DECON TRAILER SITE OPERATIONS	1JAN98	4MAR98	42
THERMAL DESORPTION				
TNB150	TD SITE PERMITTING INFO AVAIL.		14MAR96	0
TNB350	TD TREATMENT DEPLOYED		5DEC96	0
TNB510	MND THERMAL DESORPTION SITE OPERATIONS	23MAR98	28DEC98	195
TNB710	SNL,NM THERMAL DESORPTION SITE OPERATIONS	13JAN99	27JUL00	388
TNB410	LANL THERMAL DESORPTION SITE OPERATIONS	16NOV00	14FEB02	311
TNB610	PTX THERMAL DESORPTION SITE OPERATIONS	8AUG02	13JAN06	863
PLATING WASTE				
TND150	PLATING WASTE SITE PERMITTING INFORMATION AVAIL.		20JUN94A	0
TND350	PLATING WASTE TREATMENT DEPLOYED		5MAY98	0
TND410	LANL PLATING WASTE SITE OPERATIONS	4JAN99	8MAY00	339
TND610	PTX PLATING WASTE SITE OPERATIONS	13FEB01	15JUN01	87
TND710	SNL,NM. PLATING WASTE SITE OPERATIONS	2JUL01	3SEP01	45
GAS CYLINDER				
TNE150	GAS CYLINDER SCRUBBER SITE PERMITTING INFO AVAIL		29SEP95	0
TNE350	GAS CYLINDER TREATMENT DEPLOYED		30SEP99	0
TNE410	LANL GAS CYLINDER SITE OPERATIONS	1MAR02	28AUG03	378
REACTIVE METALS				
TNF150	REACTIVE METALS SITE PERMITTING INFO AVAIL.		31MAY95	0
TNF350	REACTIVE METALS TREATMENT DEPLOYED		30SEP98	0
TNF410	LANL REACTIVE METALS SITE OPERATIONS	29AUG03	21APR04	162



Plot Date 13JUN95
Data Date 21MAY95
Project Start 1JAN94
Project Finish 16NOV11

Activity Bar/Early Dates
Critical Activity
Progress Bar
◇ /F Milestone/Flag Activity

MWTP

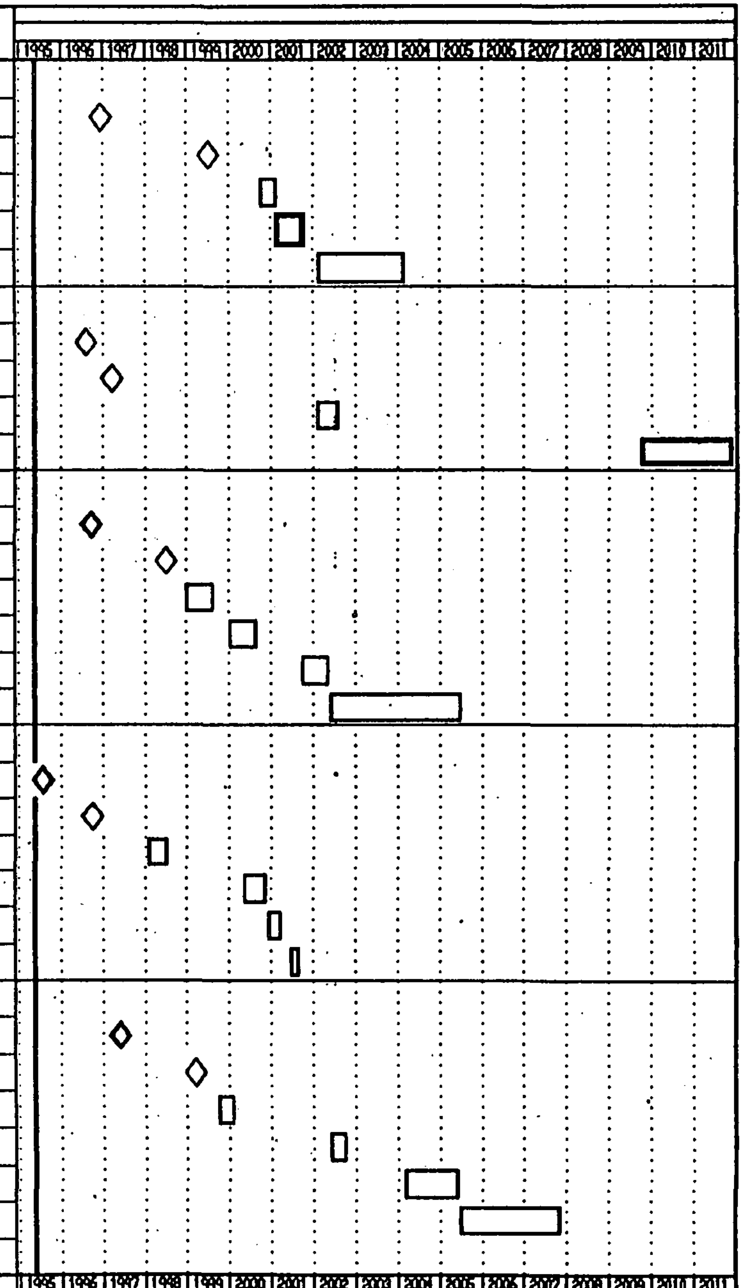
Sheet 1 of 2

UNITED STATES DEPARTMENT OF ENERGY
MIXED WASTE TREATMENT PROGRAM
DOE-AL DEPLOYMENT SUMMARY

RUST Geotech Inc.

Date	Revision	Checked	Approved
6/13/95		KGO	

ACTIVITY ID	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	REM DUR
HYDROTHERMAL PROCESSING				
TNK150	HYDROTHERMAL SITE PERMITTING INFO AVAIL.		13DEC96	0
TNK350	HYDROTHERMAL PROCESSING TREATMENT DEPLOYED		7JUL99	0
TNK610	PTX HYDROTHERMAL PROCESSING SITE OPERATIONS	2OCT00	12FEB01	90
TNH710	SNL,NM HYDROTHERMAL SITE OPERATIONS	28FEB01	25SEP01	147
TNK410	LANL HYDROTHERMAL PROCESSING SITE OPERATIONS	15FEB02	1MAR04	512
PBR/SDP				
TNM150	PBR/SDP SITE PERMITTING INFO AVAIL.		9AUG96	0
TNM350	PBR/SDP TREATMENT DEPLOYED		18MAR97	0
TNM610	PTX PBR/SDP SITE OPERATIONS	1FEB02	7AUG02	131
TNM910	SAV PBR/SDP SITE OPERATIONS	1OCT09	16NOV11	536
MACROENCAPSULATION				
TNP150	MACROENCAPSULATION SITE PERMITTING INFO AVAIL.		19SEP96	0
TNP350	MACROENCAPSULATION TREATMENT DEPLOYED		6JUL98	0
TNP510	MND MACROENCAPSULATION SITE OPERATIONS	29DEC98	16AUG99	160
TNP410	LANL MACROENCAPSULATION SITE OPERATIONS	4JAN00	25AUG00	165
TNP710	SNL,NM MACROENCAPSULATION SITE OPERATIONS	26SEP01	10MAY02	157
TNP610	PTX MACROENCAPSULATION SITE OPERATIONS	27MAY02	27JUN05	776
MERCURY AMALGAMATION				
TNQ150	MERCURY AMALGAMATION SITE PERMITTING INFO AVAIL.		31JUL95	0
TNQ350	MERCURY AMALGAMATION TREATMENT DEPLOYED		30SEP96	0
TNQ710	SNL,NM MERCURY AMALGAMATION SITE OPERATIONS	2FEB98	7JUL98	109
TNQ410	LANL MERCURY AMALGAMATION SITE OPERATIONS	9MAY00	15NOV00	134
TNQ510	MND MERCURY AMALGAMATION SITE OPERATIONS	4DEC00	23MAR01	75
TNQ610	PTX MERCURY AMALGAMATION SITE OPERATIONS	18JUN01	21AUG01	46
STABILIZATION/SULFATE PRECIP				
TNO150	STABILIZATION SITE PERMITTING INFO AVAIL.		29MAY97	0
TNO350	STABILIZATION TREATMENT DEPLOYED		15MAR99	0
TNO510	MND STABILIZATION SITE OPERATIONS	1OCT99	3FEB00	84
TNO710	SNL,NM STABILIZATION SITE OPERATIONS	3JUN02	4OCT02	88
TNO410	LANL STABILIZATION SITE OPERATIONS	2MAR04	3JUN05	318
TNO610	PTX STABILIZATION SITE OPERATIONS	28JUN05	30OCT07	590



Plot Date 13JUN95
Data Date 21MAY95
Project Start 1JAN94
Project Finish 16NOV11

(c) Primavera Systems, Inc.

Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

MWTP

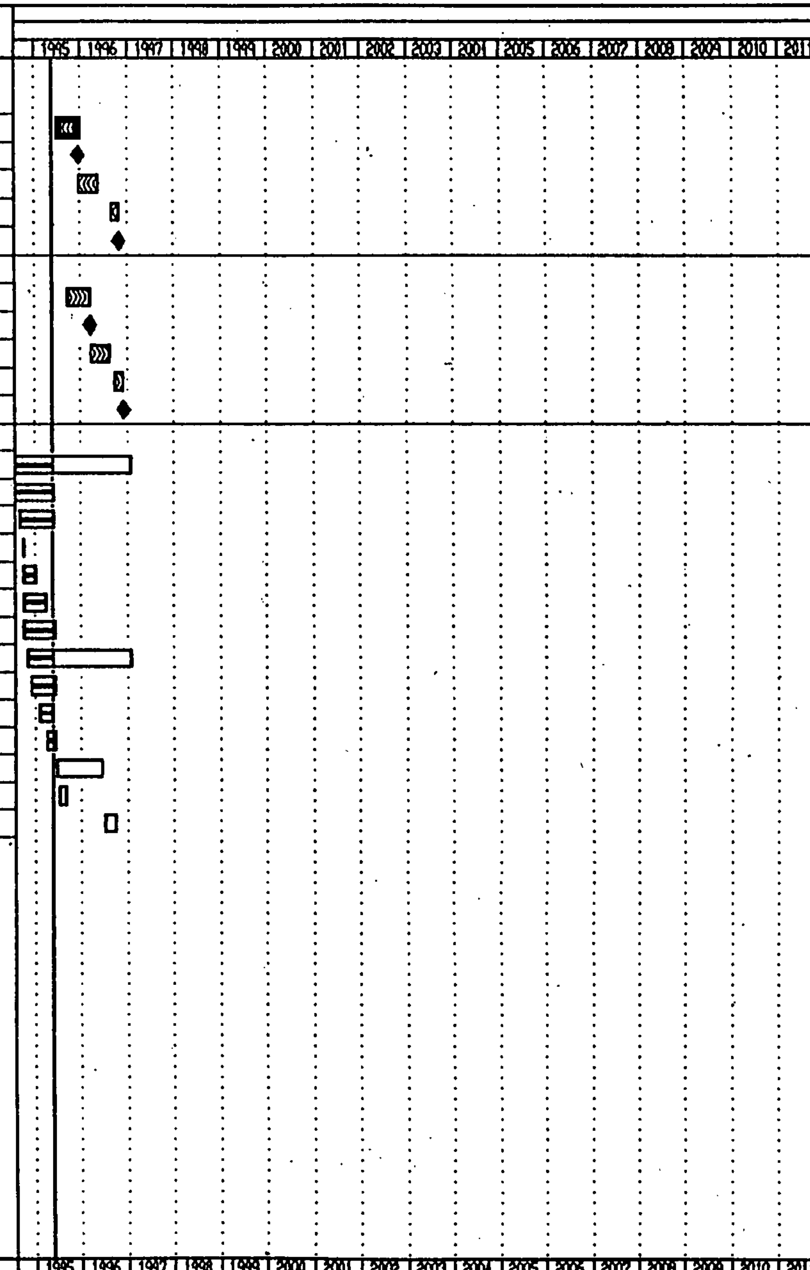
Sheet 2 of 2

UNITED STATES DEPARTMENT OF ENERGY
MIXED WASTE TREATMENT PROGRAM
DOE-AL DEPLOYMENT SUMMARY

RUST Geotech Inc.

Date	Revision	Checked	Approved

ACTIVITY ID	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	REM DUR
GRAND JUNCTION PROJECTS OFFICE				
EVAPORATIVE OXIDATION				
TNA120	EO FINAL ENGINEERING DESIGN	10JUL95	13DEC95	110
TNA150	EO SITE PERMITTING INFO AVAIL.		13DEC95	0
TNA200	EO FABRICATION	14DEC95	22MAY96	110
TNA250	EO ACCEPTANCE TESTING	26AUG96	28OCT96	45
TNA350	EO TREATMENT DEPLOYED		28OCT96	0
THERMAL DESORPTION				
TNB120	TD FINAL ENGINEERING DESIGN	14SEP95	14MAR96	124
TNB150	TD SITE PERMITTING INFO AVAIL.		14MAR96	0
TNB200	TD FABRICATION	15MAR96	19AUG96	110
TNB250	TD ACCEPTANCE TEST COMPLETE	18SEP96	5DEC96	55
TNB350	TD TREATMENT DEPLOYED		5DEC96	0
SORT, SURVEY, & DECON				
TNS50	SSD TASK MANAGEMENT	18APR94A	31JAN97	426
TNS55	SSD PROJECT PLANS	6JUN94A	31MAY95	7
TNS64	SSD SYS DEVELOP/PROCEDURES	29AUG94A	31MAY95	7
TNS70	SSD FIELD WORK/LAB ANALYSES--GJPO	27SEP94A	10OCT94A	0
TNS58	SSD SYS DEVELOP/FIELD INST(HAND HELD/LRAD/TCM2)	30SEP94A	9JAN95A	0
TNS60	SSD SYS DEVELOP/FLD EQUIP(SORTING TABLES/MAC21)	30SEP94A	3APR95A	0
TNS62	SSD SYS DEVELOP/MOBILE LAB)	30SEP94A	9JUN95	14
TNS80	SSD CERTIFICATION REPORTS	31OCT94A	31JAN97	426
TNS66	SSD SYS DEVELOP/TRAINING	28NOV94A	9JUN95	14
TNS72	SSD FIELD WORK/LAB ANALYSES--ITRI	6FEB95A	24MAY95	3
TNS75	SSD FIELD WORK/LAB ANALYSES--MOUND	31MAR95A	12JUN95	15
TNS74	SSD FIELD WORK/LAB ANALYSES--LANL	19JUN95	12JUN96	248
TNS78	SSD FIELD WORK/LAB ANALYSES--SNLCA	5JUL95	31AUG95	42
TNS76	SSD FIELD WORK/LAB ANALYSES--PANTEX/SNLCA	1JUL96	30SEP96	64



Activity Classification: TREATMENT TECH

EVAPORATIVE OXIDATION
TRITIUM CAPTURE
THERMAL DESORPTION
GAS CYLINDER
PLATING WASTE (BENCH)
PLATING WASTE
LEAD DECON TRAILER
REACTIVE METALS

Plot Date 13JUN95
Data Date 21MAY95
Project Start 1JAN94
Project Finish 16NOV11

Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

MWTP

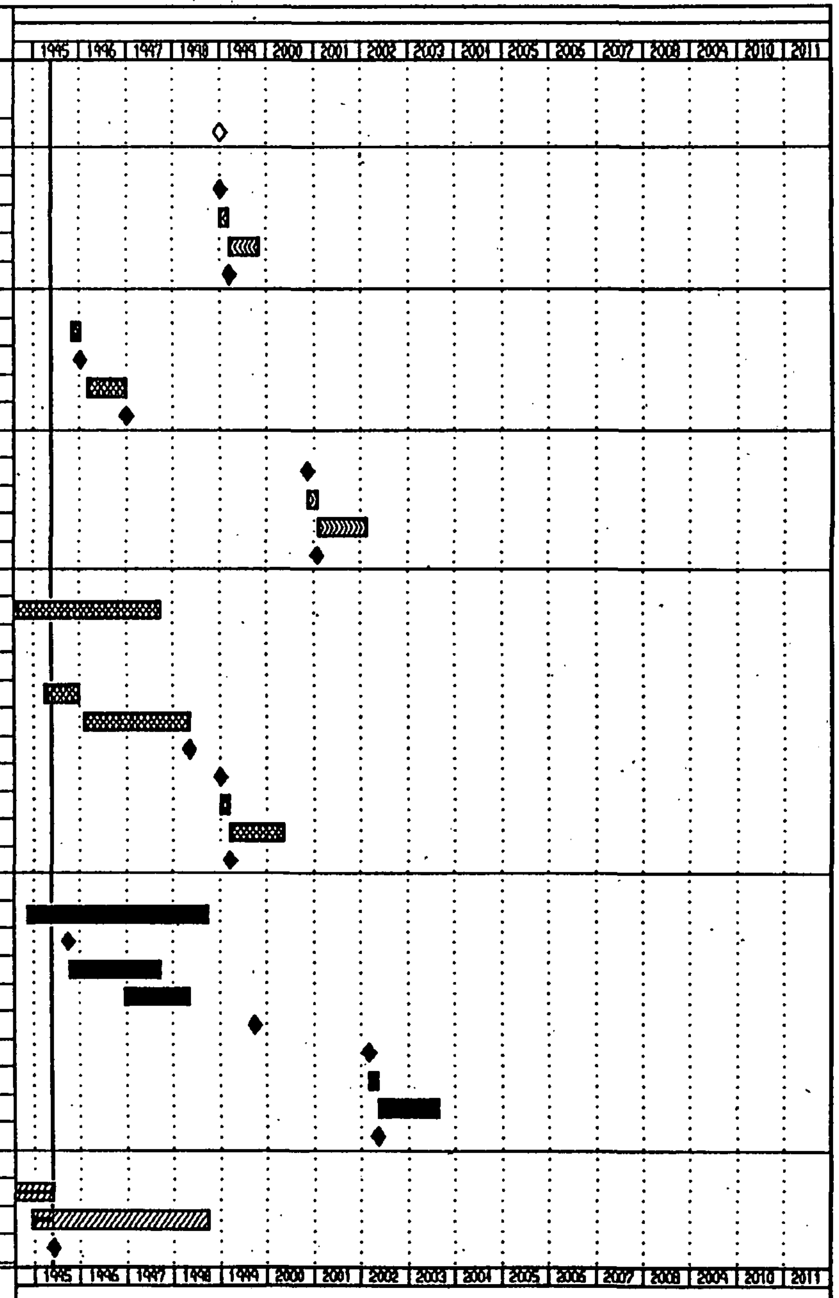
UNITED STATES DEPARTMENT OF ENERGY
MIXED WASTE TREATMENT PROGRAM
INTEGRATED TECHNOLOGIES DEPLOYMENT

Sheet 1 of 10

RUST Geotech Inc.

Date	Revision	Checked	Approved
6-13-95		[illegible]	

ACTIVITY ID	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	REM DUR
LOS ALAMOS NATIONAL LAB				
SITE AVAILABLE				
TNZ50	LANL HWTF AVAILABLE	4JAN99		0
EVAPORATIVE OXIDATION				
TNA401	LANL EVAPORATIVE OXIDATION UNIT ON SITE	4JAN99		0
TNA403	LANL EVAPORATIVE OXIDATION INST/SYSTEM TEST	4JAN99	16MAR99	50
TNA400	LANL EVAPORATIVE OXIDATION TREATMENT/RM 2	17MAR99	9NOV99	167
TNA404	LANL EVAPORATIVE OXIDATION/COMMENCE OPERATIONS	17MAR99		0
LEAD DECON TRAILER				
TNJ200	LEAD DECON TRAILER MODIFICATIONS	30OCT95	4JAN96	44
TNJ250	LEAD DECON TRAILER MODIFICATIONS COMPLETE		4JAN96	0
TNJ400	LANL LEAD DECON TRAILER TREATMENT	1MAR96	1JAN97	212
TNJ350	LEAD DECON TRAILER AVAILABLE		1JAN97	0
THERMAL DESORPTION				
TNB401	LANL THERMAL DESORPTION UNIT ON SITE	16NOV00		0
TNB403	LANL THERMAL DESORPTION INST./SYSTEM TEST	16NOV00	1FEB01	50
TNB400	LANL THERMAL DESORPTION TREATMENT/RM 1	2FEB01	14FEB02	261
TNB404	LANL THERMAL DESORPTION/COMMENCE OPERATIONS	2FEB01		0
PLATING WASTE				
TND175	PLATING WASTE LANL PERMITTING/APPLICATION	5NOV92A	29SEP97	593
TND120	PLATING WASTE FINAL ENGINEERING DESIGN	27JAN93A	20MAY94A	0
TND150	PLATING WASTE SITE PERMITTING INFORMATION AVAIL.		20JUN94A	0
TND180	PLATING WASTE TREATABILITY STUDIES	20MAR95A	29DEC95	153
TND160	PLATING WASTE FAB/TEST	29JAN96	5MAY98	572
TND350	PLATING WASTE TREATMENT DEPLOYED		5MAY98	0
TND401	LANL PLATING WASTE UNIT ON SITE	4JAN99		0
TND403	LANL PLATING WASTE INST./SYSTEM TEST	4JAN99	16MAR99	50
TND400	LANL PLATING WASTE TREATMENT/RM 1	17MAR99	8MAY00	289
TND404	LANL PLATING WASTE/COMMENCE OPERATIONS	17MAR99		0
GAS CYLINDER				
TNE160	GAS CYLINDER SCRUBBER DESIGN/FAB/TEST	11NOV94A	30SEP98	846
TNE150	GAS CYLINDER SCRUBBER SITE PERMITTING INFO AVAIL		29SEP95	0
TNE175	GAS CYLINDER SCRUBBER LANL PERMITTING	2OCT95	30SEP97	502
TNE251	GAS CYLINDER RECONTAINERIZATION TESTING	10DEC96	12MAY98	357
TNE350	GAS CYLINDER TREATMENT DEPLOYED		30SEP99	0
TNE401	LANL GAS CYLINDER UNIT ON SITE	1MAR02		0
TNE403	LANL GAS CYLINDER INST./SYSTEM TEST	1MAR02	9MAY02	50
TNE400	LANL GAS CYLINDER TREATMENT/RM 2	10MAY02	28AUG03	328
TNE404	LANL GAS CYLINDER/COMMENCE OPERATIONS	10MAY02		0
REACTIVE METALS				
TNF120	REACTIVE METALS FINAL ENGINEERING DESIGN	2MAY94A	31MAY95	7
TNF160	REACTIVE METALS FAB/TEST	13DEC94A	30SEP98	846
TNF150	REACTIVE METALS SITE PERMITTING INFO AVAIL.		31MAY95	0



Activity Classification: TREATMENT TECH
EVAPORATIVE OXIDATION
TRITIUM CAPTURE
GAS CYLINDER
PLATING WASTE
LEAD DECON TRAILER
REACTIVE METALS

Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

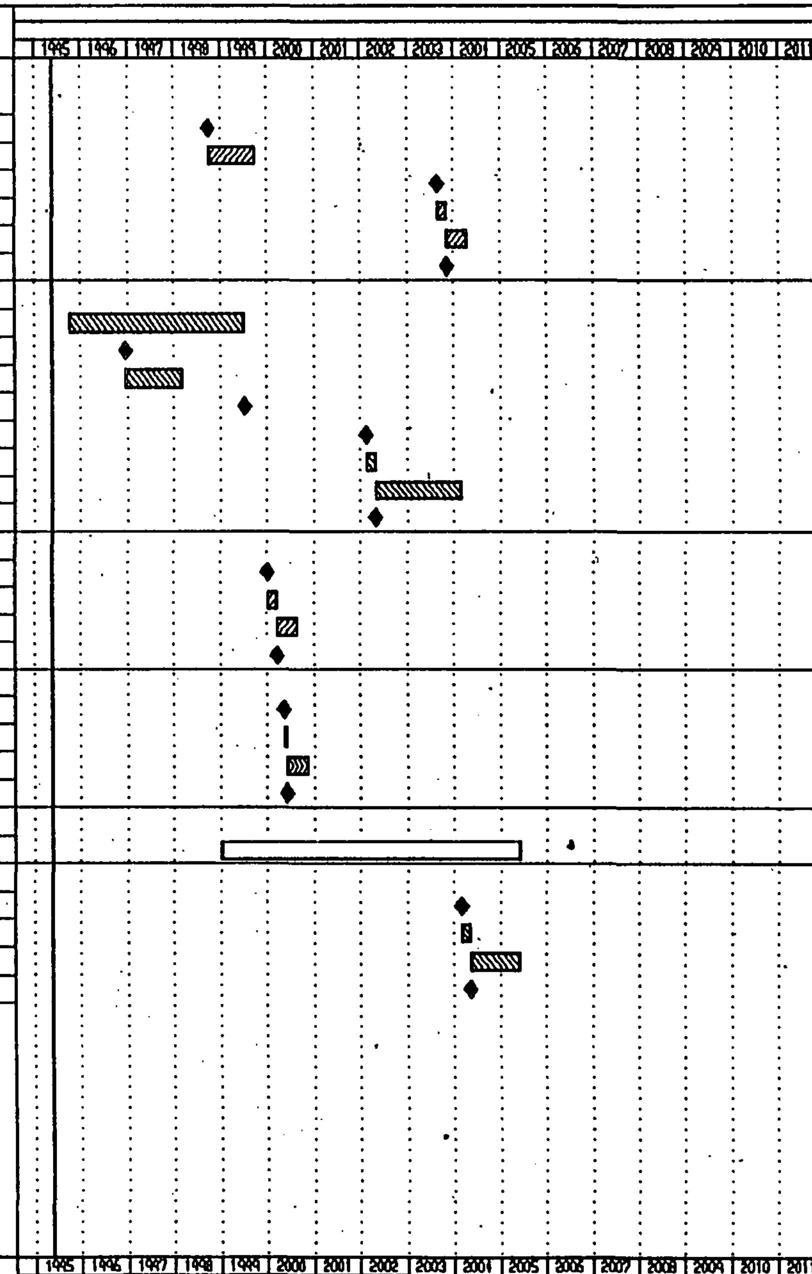
Sheet 2 of 10

RUST Geotech Inc.

Date	Revision	Checked	Approved

UNITED STATES DEPARTMENT OF ENERGY
MIXED WASTE TREATMENT PROGRAM
INTEGRATED TECHNOLOGIES DEPLOYMENT

ACTIVITY ID	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	REM DUR
LOS ALAMOS NATIONAL LAB				
REACTIVE METALS				
TNF350	REACTIVE METALS TREATMENT DEPLOYED		30SEP98	0
TNF175	REACTIVE METALS LANL PERMITTING	1OCT98	30SEP99	252
TNF401	LANL REACTIVE METALS UNIT ON SITE	29AUG03		0
TNF403	LANL REACTIVE METALS INST./SYSTEM TEST	29AUG03	7NOV03	50
TNF400	LANL REACTIVE METALS TREATMENT/RM 2	10NOV03	21APR04	112
TNF404	LANL REACTIVE METALS/COMMENCE OPERATIONS	10NOV03		0
HYDROTHERMAL PROCESSING				
TNK160	HYDROTHERMAL DESIGN/FAB/TEST	2OCT95	7JUL99	946
TNK150	HYDROTHERMAL SITE PERMITTING INFO AVAIL.		13DEC96	0
TNK175	HYDROTHERMAL LANL PERMITTING	16DEC96	11MAR98	309
TNK350	HYDROTHERMAL PROCESSING TREATMENT DEPLOYED		7JUL99	0
TNK401	LANL HYDROTHERMAL UNIT ON SITE	15FEB02		0
TNK403	LANL HYDROTHERMAL PROCESSING INST./SYSTEM TEST	15FEB02	26APR02	50
TNK400	LANL HYDROTHERMAL PROCESSING TREATMENT/RM 1	29APR02	1MAR04	462
TNK404	LANL HYDROTHERMAL PROCESSING/COMMENCE OPERATIONS	29APR02		0
MACROENCAPSULATION				
TNP402	LANL MACROENCAPSULATION UNIT ON SITE	4JAN00		0
TNP403	LANL MACROENCAPSULATION INST./SYSTEM TEST	4JAN00	15MAR00	50
TNP400	LANL MACROENCAPSULATION TREATMENT/RM 2	16MAR00	25AUG00	115
TNP404	LANL MACROENCAPSULATION/COMMENCE OPERATIONS	16MAR00		0
MERCURY AMALGAMATION				
TNQ401	LANL MERCURY AMALGAMATION UNIT ON SITE	9MAY00		0
TNQ403	LANL MERCURY AMALGAMATION INST./SYSTEM TEST	9MAY00	2JUN00	18
TNQ400	LANL MERCURY AMALGAMATION TREATMENT/RM 1	5JUN00	15NOV00	116
TNQ404	LANL MERCURY AMALGAMATION COMMENCE OPERATIONS	5JUN00		0
TREATMENT WINDOW				
TNS800	LANL TREATMENT ACTIVITIES	4JAN99	3JUN05	1614
STABILIZATION/SULFATE PRECIP				
TNO401	LANL STABILIZATION ON SITE	2MAR04		0
TNO403	LANL STABILIZATION INST./SYSTEM TEST	2MAR04	10MAY04	50
TNO400	LANL STABILIZATION TREATMENT/RM 1	11MAY04	3JUN05	268
TNO404	LANL STABILIZATION/COMMENCE OPERATIONS	11MAY04		0



Activity Classification: TREATMENT TECH

CHELATION/STABILIZATION · MACROENCAPSULATION · STABILIZATION/SULFATE PRECIP · DETOX · MERCURY AMALGAMATION · THERMAL DESORPTION · EVAPORATIVE OXIDATION · FBR/SIP · TRITIUM CAPTURE · GAS CYLINDER · PLATING WASTE (BENCH) · DEWATERING CHIPS (Not Part Of Project) · HYDROTHERMAL PROCESSING · PLATING WASTE · WASTE WATER EVAPORATOR · LEAD DECON TRAILER · REACTIVE METALS

Plot Date 13JUN95
Data Date 21MAY95
Project Start 1JAN94
Project Finish 16NOV11

Activity Bar/Early Dates · Critical Activity · Progress Bar · Milestone/Flag Activity

XMP

UNITED STATES DEPARTMENT OF ENERGY
MIXED WASTE TREATMENT PROGRAM
INTEGRATED TECHNOLOGIES DEPLOYMENT

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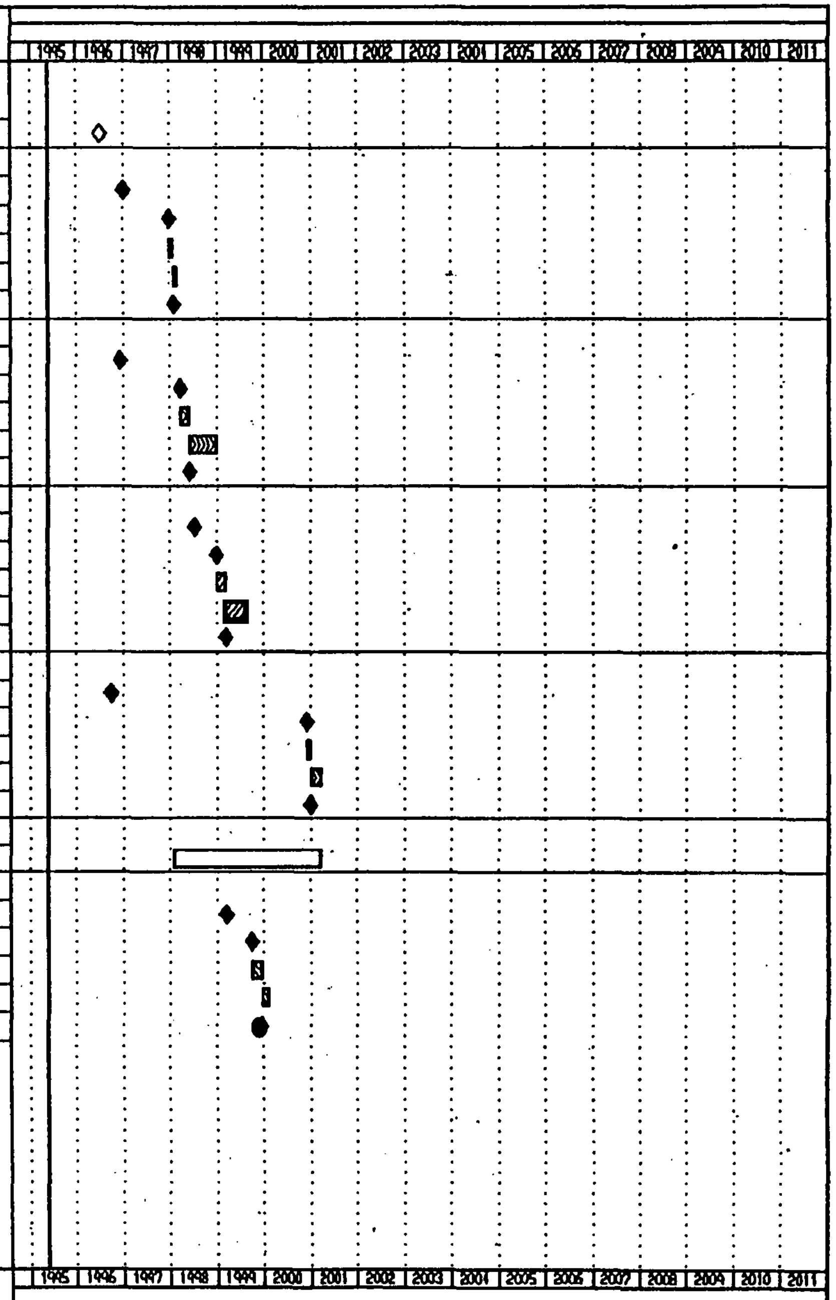
RUST Geotech Inc.

Date	Revision	Checked	Approved

ACTIVITY ID	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	REM DUR
MOUND				
SITE AVAILABLE				
TNZ51	MOUND TREATMENT FACILITY AVAILABLE	3JUL96		0
LEAD DECON TRAILER				
TNJ501	MOUND LEAD DECON TRAILER TREATMENT DEPLOYED		1JAN97	0
TNJ502	MND LEAD DECON TRAILER ON SITE	1JAN98		0
TNJ503	MND LEAD DECON TRAILER INST./SYSTEM TEST	1JAN98	28JAN98	18
TNJ500	MND LEAD DECON TRAILER TREATMENT	29JAN98	4MAR98	24
TNJ504	MND LEAD DECON TRAILER/COMMENCE OPERATIONS	29JAN98		0
THERMAL DESORPTION				
TNB501	MOUND TD TREATMENT DEPLOYED		5DEC96	0
TNB502	MND THERMAL DESORPTION TREATMENT UNIT ON SITE	23MAR98		0
TNB503	MND THERMAL DESORPTION INST/SYSTEM TEST	23MAR98	1JUN98	50
TNB500	MND THERMAL DESORPTION TREATMENT (FINAL)	2JUN98	28DEC98	145
TNB504	MND THERMAL DESORPTION/COMMENCE OPERATIONS	2JUN98		0
MACROENCAPSULATION				
TNP501	MND MACROENCAPSULATION TREATMENT DEPLOYED		6JUL98	0
TNP502	MND MACROENCAPSULATION UNIT ON SITE	29DEC98		0
TNP503	MND MACROENCAPSULATION INST./SYSTEM TEST	29DEC98	11MAR99	50
TNP500	MOUND MACROENCAPSULATION TREATMENT	12MAR99	16AUG99	110
TNP504	MOUND MACROENCAPSULATION/COMMENCE OPERATIONS	12MAR99		0
MERCURY AMALGAMATION				
TNQ501	MOUND MERCURY AMALGAMATION TREATMENT DEPLOYED		30SEP96	0
TNQ502	MND MERCURY AMALGAMATION UNIT ON SITE	4DEC00		0
TNQ503	MND MERCURY AMALGAMATION INST./SYSTEM TEST	4DEC00	29DEC00	18
TNQ500	MND MERCURY AMALGAMATION TREATMENT	1JAN01	23MAR01	57
TNQ504	MND MERCURY AMALGAMATION/COMMENCE OPERATIONS	1JAN01		0
TREATMENT WINDOW				
TNS805	MOUND TREATMENT ACTIVITIES	29JAN98	23MAR01	792
STABILIZATION/SULFATE PRECIP				
TN0501	MOUND STABILIZATION TREATMENT DEPLOYED		15MAR99	0
TN0502	MND STABILIZATION ON SITE	1OCT99		0
TN0503	MND STABILIZATION INST./SYSTEM TEST	1OCT99	13DEC99	50
TN0500	MND STABILIZATION TREATMENT	14DEC99	3FEB00	34
TN0504	MND STABILIZATION/COMMENCE OPERATIONS	14DEC99		0



Activity Classification: TREATMENT TECH
CHELATION/STABILIZATION
MACROENCAPSULATION
STABILIZATION/SULFATE PRECIP
DETOX
MERCURY AMALGAMATION
THERMAL DESORPTION
EVAPORATIVE OXIDATION
PEO/SP
TRITIUM CAPTURE
GAS CYLINDER
PLATING WASTE (BENCH)
SHEARING CHOPS (Not Part Of Project)
HYDROTHERMAL PROCESSING
PLATING WASTE
WASTE WATER EVAPORATOR
LEAD DECON TRAILER
REACTIVE METALS

Plot Date 13JUN95
Data Date 21MAY95
Project Start 1JAN94
Project Finish 16MAY11

Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

MTP

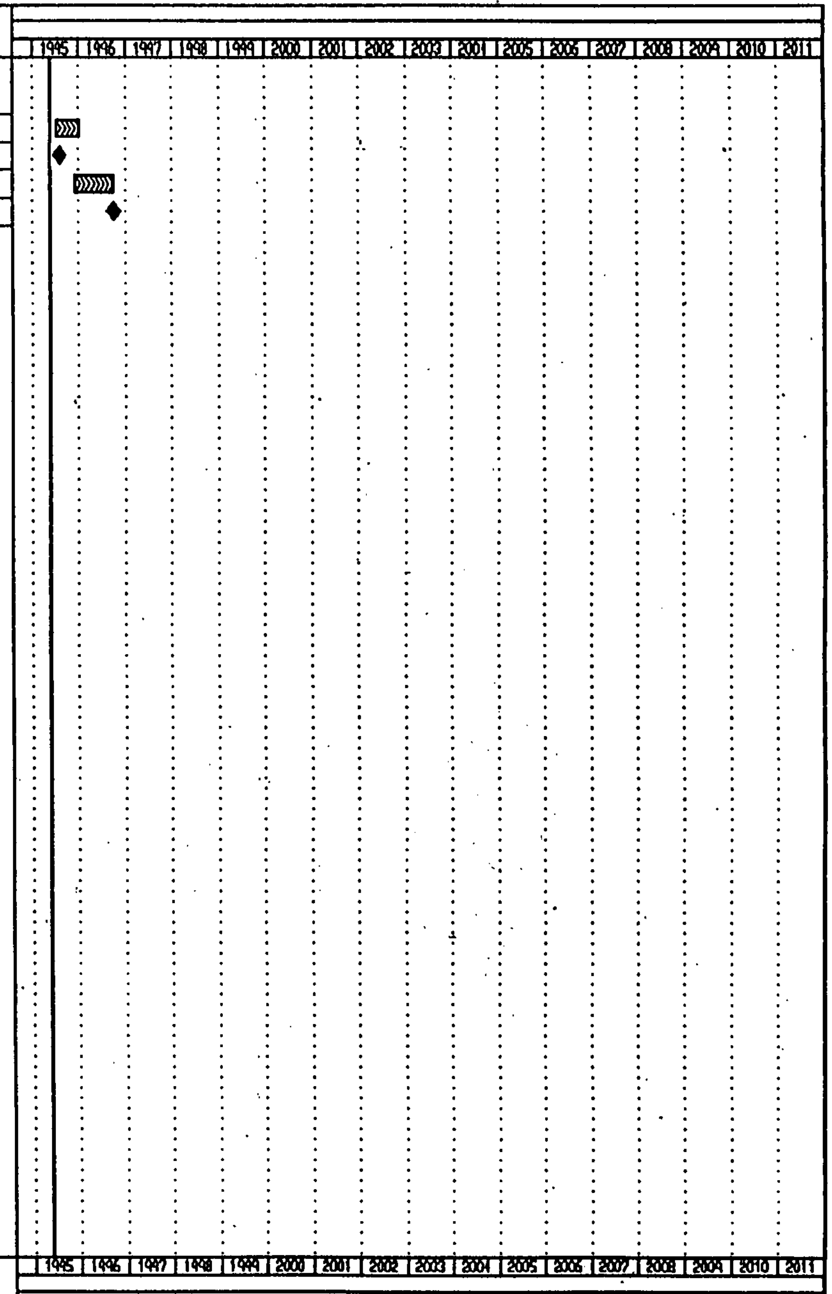
Sheet 4 of 10

UNITED STATES DEPARTMENT OF ENERGY
MIXED WASTE TREATMENT PROGRAM
INTEGRATED TECHNOLOGIES DEPLOYMENT

RUST Geotech Inc.

Date	Revision	Checked	Approved

ACTIVITY ID	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	REM DUR
PINELLAS MERCURY AMALGAMATION				
TNQ200	MERCURY AMALGAMATION FABRICATION	3JUL95	3JAN96	126
TNQ150	MERCURY AMALGAMATION SITE PERMITTING INFO AVAIL.		31JUL95	0
TNQ250	MERCURY AMALGAMATION TESTING	1DEC95	30SEP96	209
TNQ350	MERCURY AMALGAMATION TREATMENT DEPLOYED		30SEP96	0



Activity Classification: TREATMENT TECH

CHELATING/STABILIZATION; MACROENCAPSULATION; STABILIZATION/SULFATE PRECIP; DETOX; MERCURY AMALGAMATION; THERMAL DESORPTION; EVAPORATIVE OXIDATION; PBR/SCP; TRITIUM CAPTURE; GAS CYLINDER; PLATING WASTE (BENCH); URANIUM CHIPS (But Part BY PFOXCT); HYDROTHERMAL PROCESSING; PLATING WASTE; WASTE WATER EVAPORATOR; LEAD DECON TRAILER; REACTIVE METALS

Plot Date 13JUN95
Data Date 21MAY95
Project Start 1JAN91
Project Finish 16NOV11

Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

MTP

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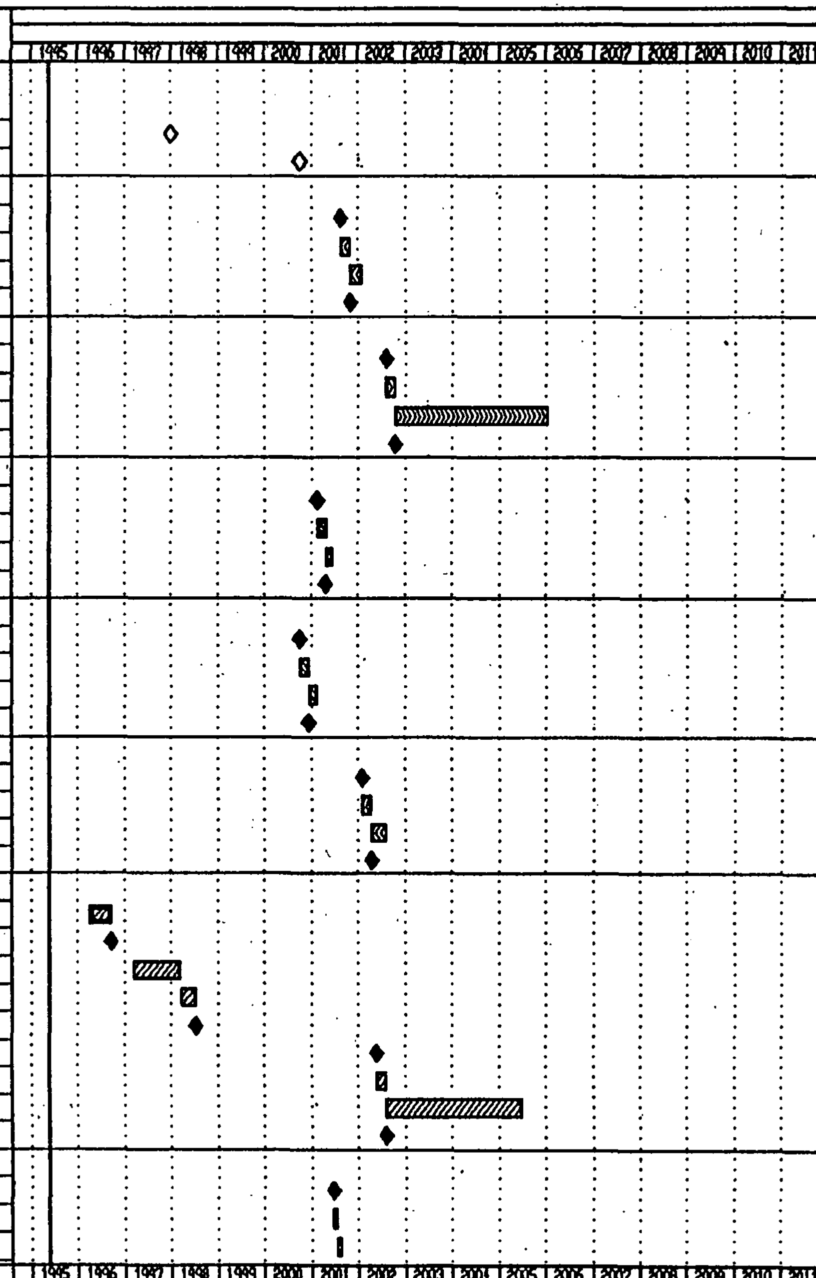
UNITED STATES DEPARTMENT OF ENERGY
MIXED WASTE TREATMENT PROGRAM
INTEGRATED TECHNOLOGIES DEPLOYMENT

RUST Geotech Inc.

Date	Revision	Checked	Approved

ACTIVITY ID	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	REM DUR
PANTEX				
SITE AVAILABLE				
TNZ52	PANTEX INTERIM TREATMENT FACILITY AVAILABLE	1JAN98		0
TNZ54	PANTEX TREATMENT FACILITY AVAILABLE	2OCT00		0
EVAPORATIVE OXIDATION				
TNA601	PTX EVAPORATIVE OXIDATION UNIT ON SITE	22AUG01		0
TNA603	PTX EVAPORATIVE OXIDATION INST./SYSTEM TEST	22AUG01	31OCT01	50
TNA600	PTX EVAPORATIVE OXIDATION TREATMENT/RM 2	1NOV01	31JAN02	61
TNA604	PTX EVAPORATIVE OXIDATION COMMENCE OPERATIONS	1NOV01		0
THERMAL DESORPTION				
TNB601	PTX THERMAL DESORPTION UNIT ON SITE	8AUG02		0
TNB603	PTX THERMAL DESORPTION INST/SYSTEM TEST	8AUG02	17OCT02	50
TNB600	PTX THERMAL DESORPTION TREATMENT/RM 2	18OCT02	13JAN06	813
TNB604	PTX THERMAL DESORPTION/COMMENCE OPERATIONS	18OCT02		0
PLATING WASTE				
TND601	PTX PLATING WASTE UNIT ON SITE	13FEB01		0
TND603	PTX PLATING WASTE INST./SYSTEM TEST	13FEB01	24APR01	50
TND600	PTX PLATING WASTE TREATMENT/RM 2	25APR01	15JUN01	37
TND604	PTX PLATING WASTE/COMMENCE OPERATIONS	25APR01		0
HYDROTHERMAL PROCESSING				
TNK601	PTX HYDROTHERMAL PROCESSING UNIT ON SITE	2OCT00		0
TNK603	PTX HYDROTHERMAL PROCESSING INST./SYSTEM TEST	2OCT00	12DEC00	50
TNK600	PTX HYDROTHERMAL PROCESSING TREATMENT/RM 2	13DEC00	12FEB01	40
TNK604	PTX HYDROTHERMAL PROCESSING/COMMENCE OPERATIONS	13DEC00		0
PBR/SDP				
TNM601	PTX PBR/SDP UNIT ON SITE	1FEB02		0
TNM603	PTX PBR/SDP INST./SYSTEM TEST	1FEB02	12APR02	50
TNM600	PTX PBR/SDP TREATMENT/RM 2	15APR02	7AUG02	81
TNM604	PTX PBR/SDP/COMMENCE OPERATIONS	15APR02		0
MACROENCAPSULATION				
TNP120	MACROENCAPSULATION FINAL ENGINEERING DESIGN	2APR96	19SEP96	120
TNP150	MACROENCAPSULATION SITE PERMITTING INFO AVAIL.		19SEP96	0
TNP200	MACROENCAPSULATION FABRICATION	11MAR97	9MAR98	251
TNP250	MACROENCAPSULATION TESTING	17MAR98	6JUL98	78
TNP350	MACROENCAPSULATION TREATMENT DEPLOYED		6JUL98	0
TNP601	PTX MACROENCAPSULATION UNIT ON SITE	27MAY02		0
TNP603	PTX MACROENCAPSULATION INST./SYSTEM TEST	27MAY02	6AUG02	50
TNP600	PTX MACROENCAPSULATION TREATMENT/RM 1	7AUG02	27JUN05	726
TNP604	PTX MACROENCAPSULATION/COMMENCE OPERATIONS	7AUG02		0
MERCURY AMALGAMATION				
TNQ601	PTX MERCURY AMALGAMATION UNIT ON SITE	18JUN01		0
TNQ603	PTX MERCURY AMALGAMATION INST./SYSTEM TEST	18JUN01	12JUL01	18
TNQ600	PTX MERCURY AMALGAMATION TREATMENT/RM 2	13JUL01	21AUG01	28



Activity Classification: TREATMENT ITEM

EVAPORATIVE OXIDATION
PBR/SDP
TRITIUM CAPTURE
GAS CYLINDER
PLATING WASTE (BENCH)
HYDROTHERMAL PROCESSING
PLATING WASTE
LEAD DECON TRAILER
REACTIVE METALS

Plot Date 13JUN95
Project Start
Project Finish

Activity Bar/Early Dates
Critical Activity
Progress Bar

(c) Primavera Systems, Inc.

UNITED STATES DEPARTMENT OF ENERGY
MIXED WASTE TREATMENT PROGRAM
INTEGRATED TECHNOLOGIES DEPLOYMENT

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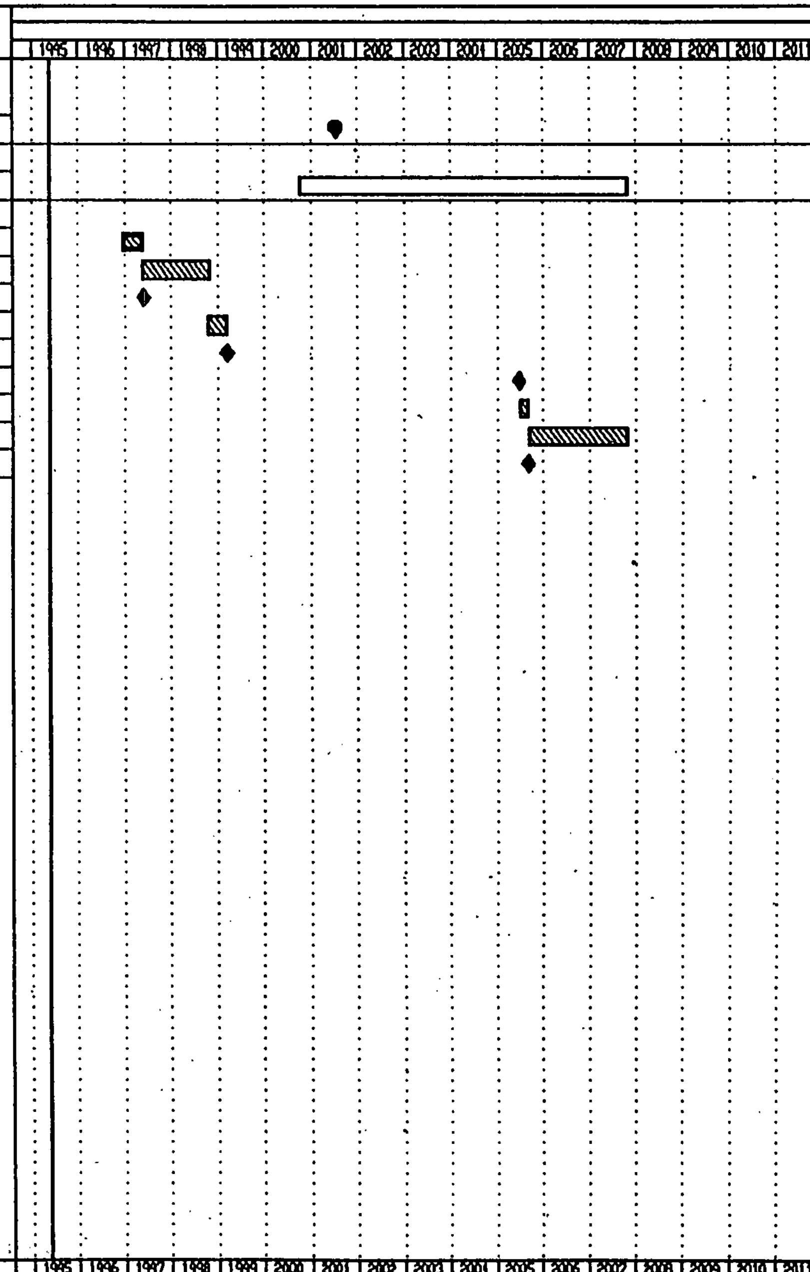
RUST Geotech Inc.

Date	Revision	Checked	Approved

ACTIVITY ID	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	REM DUR
PANTEX MERCURY AMALGAMATION				
TNQ604	PTX MERCURY AMALGAMATION/COMMENCE OPERATIONS	13JUL01		0
TREATMENT WINDOW				
TNS810	PANTEX TREATMENT ACTIVITIES	2OCT00	30OCT07	1780
STABILIZATION/SULFATE PRECIP				
TN0120	STABILIZATION FINAL ENGINEERING DESIGN	10DEC96	29MAY97	118
TN0200	STABILIZATION FABRICATION	19MAY97	3NOV98	370
TN0150	STABILIZATION SITE PERMITTING INFO AVAIL.		29MAY97	0
TN0250	STABILIZATION TESTING	14OCT98	15MAR99	103
TN0350	STABILIZATION TREATMENT DEPLOYED		15MAR99	0
TN0601	PTX STABILIZATION ON SITE	28JUN05		0
TN0603	PTX STABILIZATION INST./SYSTEM TEST	28JUN05	7SEP05	50
TN0600	PTX STABILIZATION TREATMENT/RM 1	8SEP05	30OCT07	540
TN0604	PTX STABILIZATION/COMMENCE OPERATIONS	8SEP05		0



Activity Classification: TREATMENT TECH
CHELATING/STABILIZATION
MACROENCAPSULATION
STABILIZATION/SULFATE PRECIP
DETOX
MERCURY AMALGAMATION
THERMAL DESORPTION
EVAPORATIVE OXIDATION
PBR/SIP
TRITIUM CAPTURE
GAS CYLINDER
PLATING WASTE (BENCH)
URANIUM CHIPS (Not Part of Project)
HYDROTHERMAL PROCESSING
PLATING WASTE
WASTE WATER EVAPORATOR
LEAD DECON TRAILER
REACTIVE METALS

Plot Date 13JUN95
Data Date 21MAY95
Project Start 1JAN94
Project Finish 16NOV11

Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

ITTP

UNITED STATES DEPARTMENT OF ENERGY
MIXED WASTE TREATMENT PROGRAM
INTEGRATED TECHNOLOGIES DEPLOYMENT

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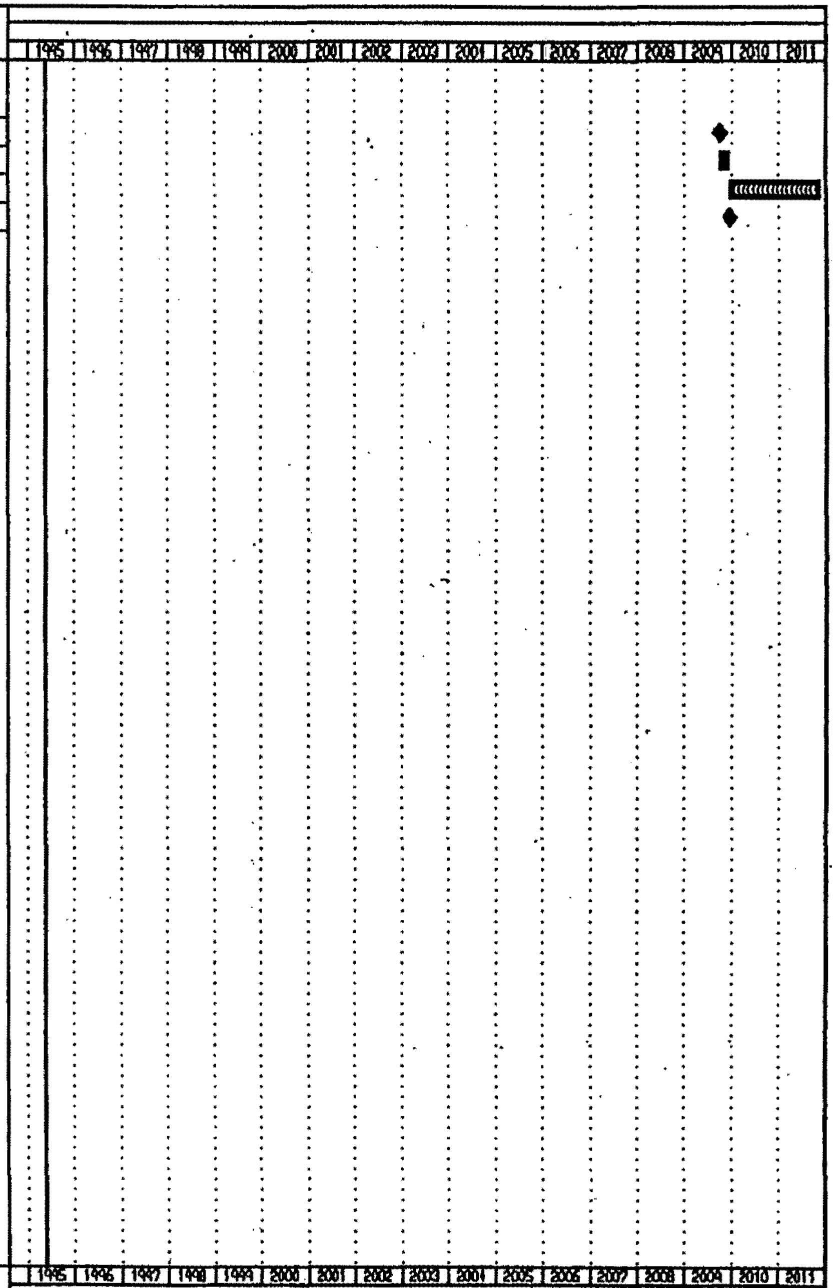
RUST Geotech Inc.

Date	Revision	Checked	Approved

ACTIVITY ID	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	REM DUR
SAVANNAH RIVER PBR/SDP				
TNM901	SAV PBR/SDP UNIT ON SITE	1OCT09		0
TNM903	SAV PBR/SDP INST./SYSTEM TEST	1OCT09	11DEC09	50
TNM900	SAV PBR/SDP TREATMENT	14DEC09	16NOV11	486
TNM904	SAV PBR/SDP/COMMENCE OPERATIONS	14DEC09		0



Activity Classification: TREATMENT TECH

CHELATING/STABILIZATION
DETOX
EVAPORATIVE OXIDATION
GAS CYLINDER
HYDROTHERMAL PROCESSING
LEAD DECON TRACKER
MACROENCAPSULATION
MERCURY AMALGAMATION
PBR/SDP
PLATING WASTE (DESIGN)
PLATING WASTE
REACTIVE METALS
STABILIZATION/SULFATE PRECIP
THERMAL DESORPTION
TRITIUM CAPTURE
URANIUM CHIPS (Not Part Of Project)
WASTE WATER EVAPORATOR

Plot Date 13JUN95
Data Date 01MAY95
Project Start 1JAN94
Project Finish 16NOV11

Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

MWP

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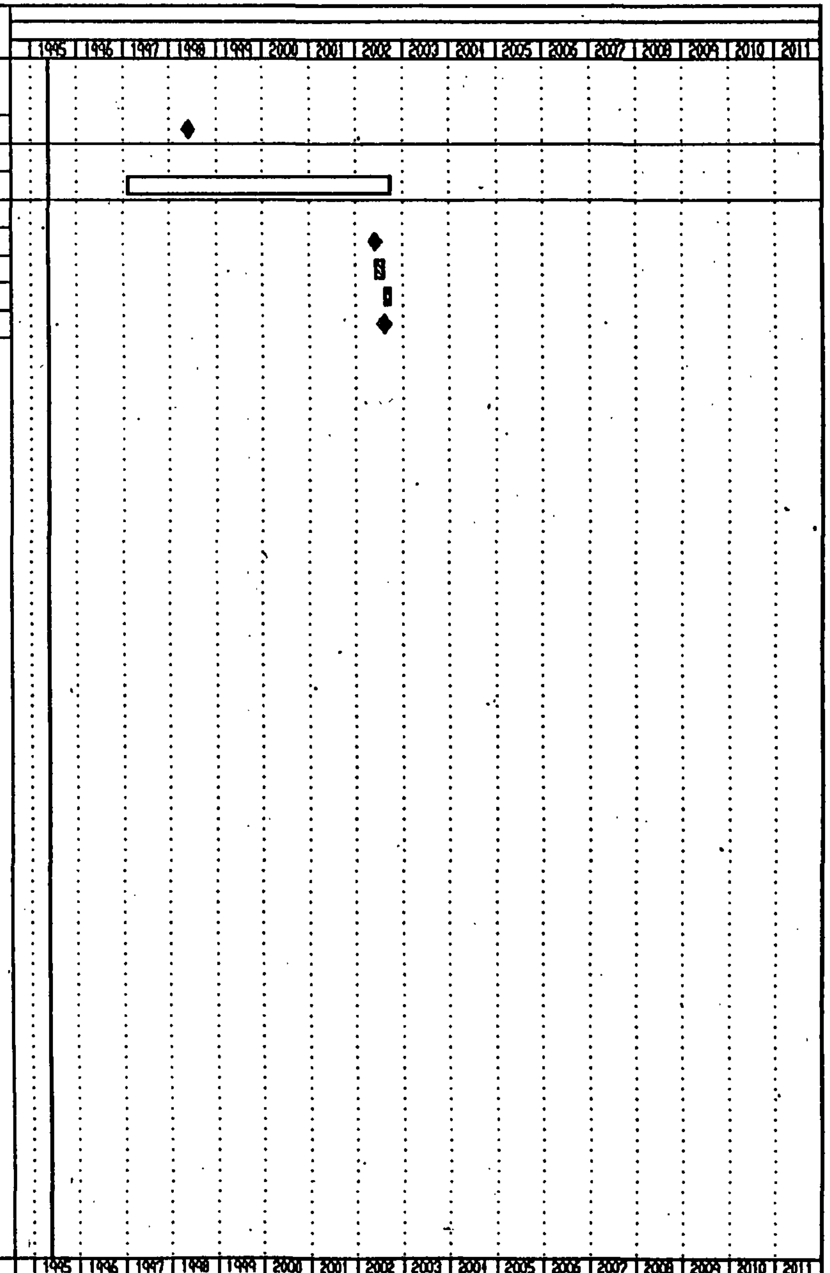
UNITED STATES DEPARTMENT OF ENERGY
MIXED WASTE TREATMENT PROGRAM
INTEGRATED TECHNOLOGIES DEPLOYMENT

RUST Geotech Inc.

Date	Revision	Checked	Approved

[redacted]

ACTIVITY ID	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	REM DUR
SANDIA, NM MERCURY AMALGAMATION				
TNQ704	SNL,NM MERCURY AMALGAMATION/COMMENCE OPERATIONS	27MAY98		0
TREATMENT WINDOW				
TNS815	SANDIA,NM TREATMENT ACTIVITIES	3FEB97	4OCT02	1429
STABILIZATION/SULFATE PRECIP				
TN0702	SNL,NM STABILIZATION ON SITE	3JUN02		0
TN0703	SNL,NM, STABILIZATION INST./SYSTEM TEST	3JUN02	12AUG02	50
TN0700	SNL,NM STABILIZATION TREATMENT	13AUG02	4OCT02	38
TN0704	SNL,NM STABILIZATION/COMMENCE OPERATIONS	13AUG02		0



Activity Classification: TREATMENT TECH

Plot Date 13JUN95
Data Date 21MAY95
Project Start 1JAN91
Project Finish 16MAY11

Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

(c) Primavera Systems, Inc.

MWTP

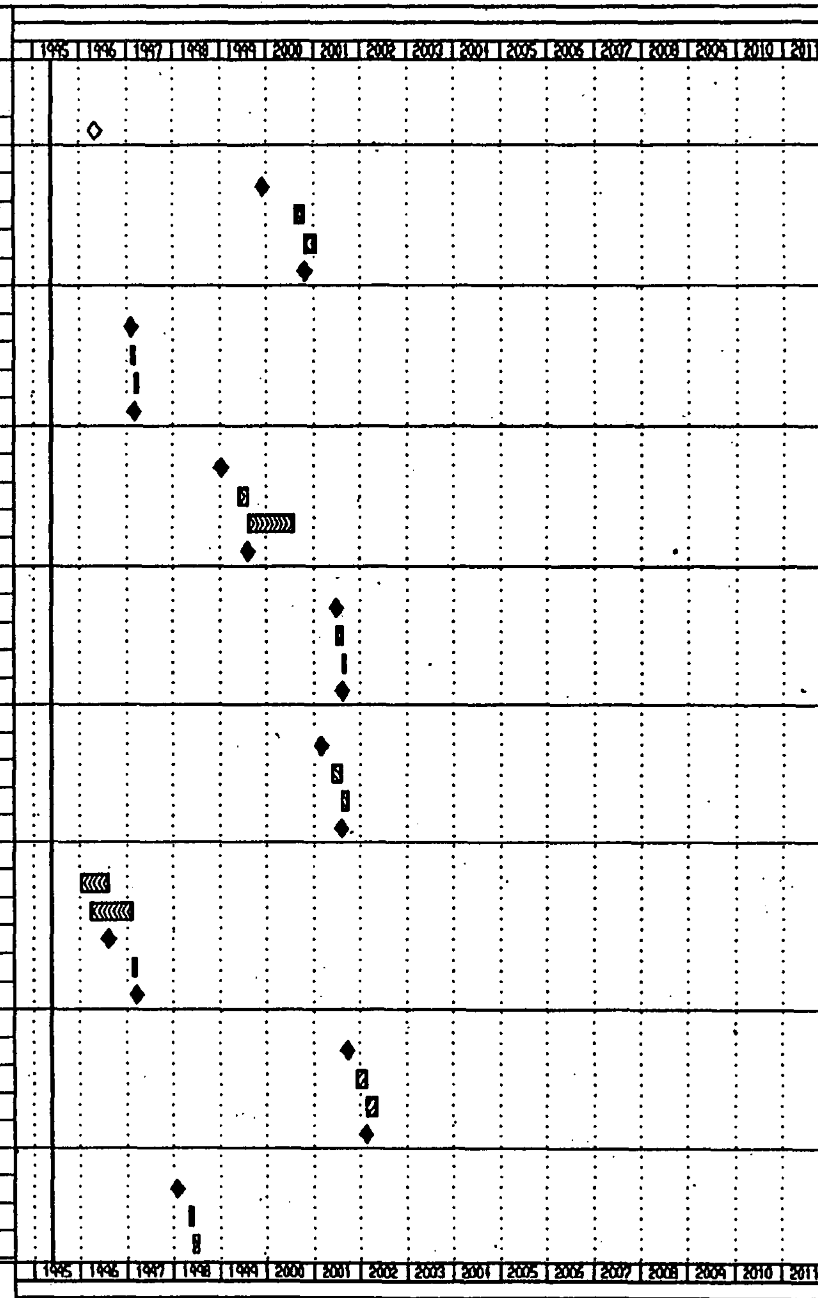
Sheet 10 of 10

UNITED STATES DEPARTMENT OF ENERGY
MIXED WASTE TREATMENT PROGRAM
INTEGRATED TECHNOLOGIES DEPLOYMENT

RUST Geotech Inc.

Date	Revision	Checked	Approved

ACTIVITY ID	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	REM DUR
SANDIA, NM				
SITE AVAILABLE				
TNZ53	SANDIA, NM TREATMENT FACILITY AVAILABLE	1MAY96		0
EVAPORATIVE OXIDATION				
TNA702	SNL,NM EVAPORATIVE OXIDATION UNIT ON SITE	1DEC99		0
TNA703	SNL,NM EVAPORATIVE OXIDATION INST./SYSTEM TEST	11AUG00	20OCT00	50
TNA700	SNL,NM EVAPORATIVE OXIDATION TREATMENT	23OCT00	26JAN01	64
TNA704	SNL,NM EVAPORATIVE OXIDATION/COMMENCE OPERATIONS	23OCT00		0
LEAD DECON TRAILER				
TNJ701	SNL,NM LEAD DECON TRAILER ON SITE	3FEB97		0
TNJ703	SNL,NM LEAD DECON TRAILER INST./SYSTEM TEST	3FEB97	27FEB97	18
TNJ700	SNL,NM LEAD DECON TRAILER TREATMENT	28FEB97	2APR97	24
TNJ704	SNL,NM LEAD DECON TRAILER/COMMENCE OPERATIONS	28FEB97		0
THERMAL DESORPTION				
TNB701	SNL,NM THERMAL DESORPTION UNIT ON SITE	13JAN99		0
TNB703	SNL,NM THERMAL DESORPTION INST./SYSTEM TEST	1JUN99	10AUG99	50
TNB700	SNL,NM THERMAL DESORPTION TREATMENT	11AUG99	27JUL00	242
TNB704	SNL,NM THERMAL DESORPTION COMMENCE OPERATIONS	11AUG99		0
PLATING WASTE				
TND701	SNL,NM. PLATING WASTE UNIT ON SITE	2JUL01		0
TND703	SNL,NM. PLATING WASTE INST./SYSTEM TEST	2JUL01	15AUG01	32
TND700	SNL,NM. PLATING WASTE TREATMENT	16AUG01	3SEP01	13
TND704	SNL,NM. PLATING WASTE/COMMENCE OPERATIONS	16AUG01		0
HYDROTHERMAL PROCESSING				
TNH701	SNL,NM HYDROTHERMAL UNIT ON SITE	28FEB01		0
TNH703	SNL,NM HYDROTHERMAL INST./SYSTEM TEST	23MAY01	2AUG01	50
TNH700	SNL,NM HYDROTHERMAL TREATMENT	3AUG01	25SEP01	37
TNH704	SNL,NM HYDROTHERMAL/COMMENCE OPERATIONS	3AUG01		0
PBR/SDP				
TNM120	PBR/SDP FINAL ENGINEERING DESIGN	3JAN96	9AUG96	154
TNM200	PBR/SDP FABRICATION	21MAR96	12FEB97	226
TNM150	PBR/SDP SITE PERMITTING INFO AVAIL.		9AUG96	0
TNM250	PBR/SDP ACCEPTANCE TEST COMPLETE	13FEB97	18MAR97	23
TNM350	PBR/SDP TREATMENT DEPLOYED		18MAR97	0
MACROENCAPSULATION				
TNP701	SNL,NM MACROENCAPSULATION UNIT ON SITE	26SEP01		0
TNP703	SNL,NM MACROENCAPSULATION INST./SYSTEM TEST	3DEC01	14FEB02	50
TNP700	SNL,NM MACROENCAPSULATION TREATMENT	15FEB02	10MAY02	60
TNP704	SNL,NM MACROENCAPSULATION/COMMENCE OPERATIONS	15FEB02		0
MERCURY AMALGAMATION				
TNQ701	SNL,NM MERCURY AMALGAMATION UNIT ON SITE	2FEB98		0
TNQ703	SNL,NM MERCURY AMALGAMATION INST./SYSTEM TEST	1MAY98	26MAY98	18
TNQ700	SNL,NM MERCURY AMALGAMATION TREATMENT	27MAY98	7JUL98	28



Activity Classification: TREATMENT TECH

Plot Date 13JUN95
Data Date 21MAY95
Project Start 1JAN94
Project Finish 1GNOV11

Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

Sheet 4 of 10

RUST Geotech Inc.

Date	Revision	Checked	Approved

UNITED STATES DEPARTMENT OF ENERGY
MIXED WASTE TREATMENT PROGRAM
INTEGRATED TECHNOLOGIES DEPLOYMENT

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APPENDIX F
MEMOS INDICATING DOE-AL AND DOE-MB COMMITMENT TO PROVIDE AND USE MOBILE TREATMENT UNITS

DAO:PR:RC

APR 4 1995

EM-SCHMALTZ
FS
4/4

EM-ROTHMAN

EM-VINCENT
GLV
4/4/95

MB:RSR

Communications on Status of Albuquerque Mobile Treatment Units

Jolene Stelmach, Waste Management, DOE, Grand Junction

The reporting relationship between Mound and Albuquerque has changed. However, Mound is still relying on the mobile treatment units for processing some of our waste streams. We will rely on you to keep us informed of progress and status in the building of the units and changes in schedules, if any, for the lead decontamination, thermal desorption, macroencapsulation, and mercury amalgamation units.

Mound has changed the primary treatment option for two of our waste streams from the glass melter to a commercial disposal facility. These streams are MD-W001, Scintillation Cocktails, and MD-W013, Waste Oils. The glass melter is a secondary treatment option in case the commercial facility option falls through or can not treat all of these waste streams. We have stopped refurbishing the glass melter until the determination of the capability of the commercial facility to totally treat these wastes is made. The problem in making this determination lies in our sampling and characterization to see if we meet their waste acceptance criteria. Sampling will be under way shortly and we hope to make this determination soon.

We have also decided to have the TSCA incinerator treat MD-W008, Kerosene/PCB/Tritium waste stream. As you know, we have stopped work here at Mound on the development of the packed bed reactor and the tritium capture units. The TSCA incinerator is capable of treating this waste stream and from our viewpoint the PBR is not an economical treatment. We will continue to list the PBR as a secondary treatment option.

Again, we need to remain on the distribution list for communications concerning the mobile treatment units. If you have any questions, please call Frank Schmaltz on FTS (513) 865-3620.

ORIGINAL SIGNED BY

Robert S. Rothman
Waste Management Team Leader

SCHMAL
JOLE
FILE CO

DOE F 1325.10
(5-88)

OFFICIAL FILE COPY

4700 09.00

cc:
Marilyn Bange, AL
Mona Williams, AL
Ray Finney, EG&G Mound

APR _5 1993

MB:RSR

Packed Bed Reactor (PBR)

Marilyn S. Bange, Waste Management Division, AL

This is to document our previous conversations regarding the Packed Bed Reactor (PBR) and other mixed-waste treatment technologies being developed in the AL complex.

As we discussed, Mound is taking steps to return the monies previously slated for the PBR. Mound had previously intended to use that savings to establish contingency for our mixed-waste program, as well as support some of our low-level waste activity. However, since this money will be used to develop the PBR, regardless of Mound's preferred treatment requirements, Mound will identify the PBR as a back-up technology for its PCB contaminated waste. Accordingly, Mound would like to maintain an active coordination role with your PBR related staff. In this vein, I would like Mr. Rob Rothman of my staff to continue to work with Ms. Mona Williams and participate in the PBR planning activity.

With regard to other treatment technologies being developed in your program, Mound continues to be directly dependant on the production of the following treatment systems: 1) lead decontamination, 2) thermal desorption, 3) macroencapsulation and 4) mercury amalgamation. Our schedule to use these technologies is included in the Mound Site Treatment Plan (STP). Again, it is important that my staff be kept abreast on related planning and development activities.

I would appreciate your written confirmation of the above request. AL's commitment to develop these technologies is intergal to the Mound STP and will be critical as we enter into consent-order negotiations with the Ohio EPA.

We appreciate the good working relationship we have with your staff and look forward to its continuation. If you have any

DAO:PR:RC

EM-ROTHMAN

EM-VINCENT
OLV 4/5/9

OOD-SMOTHERMAN
4/?/93

AD-SHERARD
4/9

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concerns, please call me on FTS (513) 865-3252 or Rob Rothman on FTS (513) 865-3823.

ORIGINAL SIGNED BY

W. C. Sherard, Jr.
Acting Director

cc:
Jody Stallmach, AL
James Orban, AL
Mona Williams, AL
Ray Finney, EG&G
J. Phil Hamric, OH
George Gartrell, OH
John Murphy, OH

DOE F 1325.8

United States Government | Department of Energy

memorandum

Albuquerque Operations Office

DATE: APR 18 1995

REPLY TO ATTN OF: WMD

SUBJECT: Coordination of Federal Facilities Compliance Act Activities

TO: W. C. Sherard, Jr., Acting Director, MB 4/25/95

This memorandum is in response to your April 5, 1995, memorandum entitled "Packed Bed Reactor."

We intend to continue to work with the Miamisburg Area Office (MB) and the Mound Plant regarding implementation of the mobile treatment units. Mound is scheduled to be a user of the technologies noted in your memorandum, and the associated project managers will continue to work with your site. This includes the Packed Bed Reactor, as you have designated it as a secondary option. We will continue to involve the Mound Plant and MB in working group activities associated with safety documentation, permitting, portable treatment, etc. We also request attendance in monthly conference calls and periodic meetings of the AL Mixed Waste Treatment Program.

We still consider MB and Mound an integral part of the success of mobile treatment and thank you for your continued support. Should you have questions, you can reach me at (505) 845-5089 or Mona Williams at (505) 845-5405.

Marilyn S. Bange
Director
Waste Management Division

cc:
Rob Rothman, MB
Ray Finney, EG&G-Mound
Jody Stelmach, GJPO
Jim Orban, WMD, AL
Joel Grimm, WMD, AL

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PLAN VOLUME

SITE TREATMENT PLAN

COMPLIANCE PLAN VOLUME

for the

Mixed Wastes

at

Mound Facility

Miamisburg, Ohio

September 15, 1995

Revision 8

SITE TREATMENT PLAN
COMPLIANCE PLAN VOLUME
TABLE OF CONTENTS

1.0 Purpose and Scope

1.1 This Site Treatment Plan (STP) and the implementing Director's Findings and Orders address storage and treatment of all mixed waste at the facility, which are not being stored in accordance with the LDR requirements of OAC rule 3745-59-50, whether such wastes were generated or accumulated in the past, are currently generated or accumulated, or will be generated or accumulated in the future, except for wastes that are exempt under the provisions of 42 U.S.C. Section 6939c(b) from the requirement to prepare an STP, (unless otherwise agreed to by DOE and Ohio EPA). Exempted wastes include environmental restoration mixed wastes, derived from corrective action and remedial action activities, the treatment and storage of which are governed by the Federal Facility Agreement, Administrative Docket Number OH6 890 008 989, effective July 15, 1993, to which Ohio is a party.

1.2 The Compliance Plan Volume comprises the approved Site Treatment Plan and provides overall schedules for compliance with LDR. DOE's submittal and the Director of Ohio EPA's approval of the STP, and the Director's issuance of an implementing Director's Findings and Orders, fulfill the requirement of Section 105(b) of the FFCAct, 42 U.S.C. Section 6939c(b).

2.0 Implementation of the Site Treatment Plan

The mechanism and procedures for administrating and implementing the treatment plans and schedules in sections 3.0 through 5.0 of the Compliance Plan Volume of the STP will be established in the FFCAct order.

3.0 Low-Level Mixed Waste Streams Treatment Plan and Schedules

Section 3.0 of the PSTP Background Volume provides a detailed discussion of the waste streams and the treatment option selection process. In addition, assumptions and comments supporting the schedules in this volume are included in Section 2.1 of the Background volume. Preferred options are identified in this Compliance Plan Volume along with schedules to implement those options. In the tables for each waste stream, due dates are milestones unless otherwise noted as target dates.

3.1 Mixed Waste Streams for which Technology Exists

3.1.1 Waste stream MD-W001: Scintillation Cocktail in vials with tritium and/or Pu-238

Commercial treatment is determined to be the preferred treatment option. No treatment residuals will be returned to Mound but will be sent directly to a disposal facility.

Action	Due Date	Remarks
Complete characterization	November 25, 1996	
Procure contract	June 30, 1996	
Prepare shipment	December 31, 1996	
Initiate Shipment	May 31, 1997	
Complete shipment	June 30, 1997	

3.1.2 Waste stream MD-W013: Waste Oil, Tritium, Pu-238 contaminated.

Commercial treatment is determined to be the preferred treatment option. No treatment residuals will be returned to Mound but will be sent directly to a disposal facility.

Action	Due Date	Remarks
Characterization complete	November 30, 1995	
Procure contract	June 30, 1996	
Prepare shipment	October 31, 1996	
Initiate shipment	May 31, 1997	
Complete shipment	June 30, 1997	

A portion of the waste oil stream, 0.6 cubic meters, has been found to contain PCBs. The preferred option is the TSCA incinerator. This assumes that Mound can be included in the TSCA incinerator Part B permit. Currently, treatment residuals are planned to be sent directly to a disposal facility.

Action	Due Date	Remarks
Characterization complete	November 30, 1995	
Procure approval	October 31, 1996	
Prepare shipment	April 30, 1997	
Initiate shipment	May 31, 1997	
Complete shipment	June 30, 1997	

3.1.3 - Waste stream MD-W012: Waste lead loaded gloves

Encapsulation is determined to be the preferred option. DOE-Pantex is designated to construct the macroencapsulation mobile treatment unit. This unit is projected to be available at Mound in May 1999. Treatment residuals will be managed on-site in an environmentally compliant manner until they can be transported to an approved disposal site.

Action	Due Date	Remarks
Characterization complete	September 15, 1995	
Submit permit application	October 31, 1997	Treatment permit for macroencapsulation. RCRA permit for decontamination not needed.
Install/System Test	January 1, 1998	Lead Decon Mobile treatment unit
Install/System Test	December 31, 1998	Macro MTU (TARGET)
Commence operations	February 28, 1998 May 31, 1999	Decontamination Macroencapsulation (TARGET)
Processing Complete	March 4, 1998 June 30, 1999	Decontamination Macroencapsulation (TARGET)

3.1.4 - Waste stream MD-W007: Waste Lead-acid batteries, Pu-238 contaminated

The preferred option is survey/decontaminate/recycle. Lead-acid batteries in storage have been decontaminated and are awaiting recycle. All future generated waste included in the five year projection will be added to the waste inventory when generated. A schedule similar to the one presented below will be developed at that time. All lead that is not contaminated will be prepared for recycle or disposal. Contaminated lead parts which cannot be decontaminated will be encapsulated. LANL is responsible for constructing the decontamination mobile treatment unit. Pantex is responsible for constructing the macroencapsulation unit. As noted, the decontamination unit is projected to be available at Mound in January 1998; the macroencapsulation unit in March 1999. Treatment residuals will be managed on-site in an environmentally compliant manner until they can be transported to an approved disposal site.

Action	Due Date	Remarks
Characterization	August 17, 1995	Batteries Decon/Char. Complete
Submit permit applications	Not Applicable	Treatment permit for macroencapsulation. RCRA permit for decontamination not needed.
Install/System Test	Not Applicable	Macro Mobile treatment unit
Commence operations	Not Applicable Not Applicable	Decontamination Macroencapsulation (TARGET)
Processing Complete	Not Applicable Not Applicable	Decontamination Macroencapsulation (TARGET)

3.1.5 - Waste stream MD-W004: Waste lead shapes

The treatment strategy involves surface decontamination, recycling the clean lead and secondary treatment of the removed material. If decontamination and recycling of the lead is not feasible, BDAT treatment for this waste is macroencapsulation. LANL is responsible for constructing the decontamination mobile treatment unit. Pantex is responsible for constructing the macroencapsulation unit. The decontamination unit is projected to be available at Mound in January 1998; the macroencapsulation unit in March 1999. Treatment residuals will be managed on-site in an environmentally compliant manner until they can be transported to an approved disposal site. The lead shapes in welded plate steel boxes will be much more difficult to open than the buckets and drums which is why there is a schedule entry for each container type.

Action	Due Date	Remarks
Characterization complete	November 30, 1995	Lead shapes in drums
Characterization complete	November 30, 1996	Lead shapes in welded steel boxes
Submit permit applications	October 31, 1997	Treatment permit for macroencapsulation; RCRA permit not required for decontamination
Install/System Test Decon	January 1, 1998	Lead Decon Mobile treatment unit
Install/System Test Macro	December 31, 1998	Macro Mobile treatment unit (TARGET)
Commence operations	January 31, 1998 March 31, 1999	Decontamination Macroencapsulation (TARGET)
Processing Complete	April 30, 1998 September 30, 1999	Decontamination Macroencapsulation (TARGET)

3.1.6 - Waste stream MD-W005: Liquid Mercury, Tritium contaminated

Amalgamation is determined to be the preferred treatment option. Pinellas is responsible for constructing the amalgamation treatment unit. The unit is projected to be available at Mound in November 2000. Treatment residuals will be managed on-site in an environmentally compliant manner until they can be transported to an approved disposal site.

3.1.6 - Waste stream MD-W005: Liquid Mercury, Tritium contaminated (continued)

Action	Due Date	Remarks
Characterization complete	February 28, 1995	
Treatability study	February 28, 1995	Notification of intent to conduct study
Submit permit applications	November 30, 1998	Permit for amalgamation unit (TARGET)
Install/System Test	December 31, 2000	Mobile treatment unit (TARGET)
Commence operations	January 31, 2001	(TARGET)
Processing Complete	April 30, 2001	(TARGET)

3.1.7 - Waste stream MD-W008: Kerosene, PCB, tritium contaminated

The preferred option is the TSCA incinerator. This assumes that Mound can be included in the TSCA incinerator Part B permit. Currently, treatment residuals are planned to be sent directly to a disposal facility.

Action	Due Date	Remarks
Characterization complete	October 31, 1995	
Procure approval	October 31, 1996	
Prepare shipment	April 30, 1997	
Initiate shipment	May 31, 1997	
Complete shipment	June 30, 1997	

3.2 Mixed Waste Streams for Which Technology Exists But Needs Adaptation

No Mound waste streams are in this category.

3.3 Waste Streams Requiring Further Characterization or for Which Technology Assessment Has Not Been Done

3.3.1 - Waste stream MD-W009: Absorbed Oil, Pu-238 contaminated

Visual inspection of this waste stream has shown that the oil is not absorbed, as originally believed, but is in free liquid form. The preferred option for this waste stream is the TSCA incinerator. This assumes that Mound can be included in the TSCA incinerator Part B permit. Currently, treatment residuals are planned to be sent directly to a disposal facility.

Action	Due Date	Remarks
Characterization complete	January 31, 1996	
Procure approval	October 31, 1996	
Prepare shipment	April 30, 1997	
Initiate shipment'	May 31, 1997	
Complete shipment	June 30, 1997	

3.3.2 - Waste stream MD-W010, MD-W011: Miscellaneous Lab Packs

Sort and survey followed by sampling and analysis where necessary is the preferred option.

Action	Due Date	Remarks
Submit permit applications	N/A	Not applicable for sort/survey/analyze
Commence operations	February 28, 1996	Sort/survey
Characterization complete	August 31, 1996	
Processing Complete	October 31, 1996	Sort/survey complete

3.3.3 - Waste stream MD-W014: Newly discovered potentially mixed waste

The contents of each drum have been examined and segregated. Suspect mixed waste will be sampled. When sufficient data are gathered, various treatment options will be examined. BDAT treatment requirements cannot be determined until the waste is further characterized.

Action	Due Date	Remarks
Submit permit applications	N/A	Not applicable for sort/survey/analyze
Commence operations	May 31, 1994	Sort/survey
Characterization complete	August 31, 1995	
Processing Complete	November 30, 1995	Sort/survey complete

4.0 TRU Mixed Waste Streams

National Strategy for Managing Mixed Transuranic Waste

As discussed in greater detail in Section 4.0 of the Background Volume of this STP, DOE plans to achieve compliance with the requirements of the FFCAct and the LDR for MTRU destined for WIPP by using the no-migration petition approach in 40 CFR section 268.6. Under this strategy, DOE intends to continue interim storage of such MTRU, continue preparation of such wastes for shipment to WIPP, and then to ship and dispose of such wastes in WIPP in a reasonable period of time.

DOE expects to have ongoing discussions with Ohio EPA to seek alternatives for the disposition of Mound's MTRU waste streams. If DOE does not decide to operate WIPP as a disposal facility by January 1998, or at such earlier time as DOE determines that (1) there will be a delay in the opening of WIPP substantially beyond 1998, or (2) LDR treatment will be required for disposal compliance, DOE will discuss alternatives with Ohio EPA and propose modifications to the STP within a timeframe agreed upon between the DOE and Ohio EPA. These modifications will describe planned activities and schedules for the new MTRU strategy.

DOE shall include information regarding progress of MTRU waste management in the update to the STP. This will include as applicable and appropriate, the status of the no-migration petition, and information related to characterization, packaging, and/or treatment capabilities or plans for MTRU waste related to WIPP waste acceptance criteria and disposal.

4.1 TRU Wastes Expected to go to WIPP

4.1.1 TRU Corrosives.

Visual inspection has determined that all of this waste is absorbed, and is therefore not corrosive by RCRA definition. This waste stream is being deleted from the Mound mixed waste inventory and will not be addressed in the Site Treatment Plan.

4.1.2 TRU Lead.

This waste stream is similar to low level waste stream MD-W012. Lead loaded gloves have been used on some glove boxes in plutonium areas. The gloves contain an inner layer of rubber that is compounded with approximately 8% by weight powdered lead oxide. This waste is characterized by process knowledge and is contact handled. These wastes are stored in Type B containers without overpack.

The DOE wide strategy for managing defense related TRU wastes is disposal at WIPP. A no migration variance is being pursued for WIPP which, if successful, will not require TRU waste to meet LDR treatment standards. It is not known at this time whether the final WIPP waste acceptance criteria could place additional treatment requirements on TRU waste.

4.2 TRU Waste Not Expected To Go To WIPP

Mound has no waste in this category.

5.0 High-Level Mixed Waste Streams

High-level mixed waste originates from the nuclear fuel cycle. No activities of this nature have been carried out at Mound. No high-level mixed waste has been or will be generated at Mound.

APPENDIX A

RESIDUALS MANAGEMENT CONTINGENCY PLAN

This Residuals Management Plan is considered an Interim Final document. No later than December 6, 1995 DOE shall submit a Final Residuals Management Plan for review and approval by Ohio EPA. Upon approval of the Ohio EPA, the approved Final Residuals Management Plan shall supersede this Interim Final Document and be automatically incorporated into the Compliance Plan Volume.

Introduction

Mound anticipates that it will send mixed waste off-site for treatment prior to final disposal. Further, Mound anticipates that mixed waste residuals derived from the treatment of Mound's mixed wastes will be sent directly to a disposal facility. However, Mound may be requested and/or required to receive back and manage mixed waste residuals derived from the treatment of Mound mixed wastes prior to their final disposal. An example of treatment which could require the possible return of mixed waste residues is the use of the Department of Energy TSCA incinerator located in Oak Ridge, Tennessee for the treatment of mixed wastes amenable to incineration. Currently, the Mound does not anticipate receiving residues from the TSCA incinerator as they are normally sent to a commercial facility for disposal. If this normal pathway to disposal does not function for some reason, the following contingency plan has been developed. The following contingency plan will apply unless otherwise provided in a RCRA Part B Permit.

Currently, Mound does not accept any mixed waste for treatment, storage, or disposal from off-site locations. However, Mound may be requested to accept mixed waste residues from treatment processes applied to Mound generated mixed wastes. Mound may accept mixed waste residues from these treatment processes which consist of any grouping from the Mound listed waste codes.

If Mound is requested to accept mixed waste residues from these treatment processes consisting of waste codes not identified in Mound's RCRA Part B permit, Mound will inform Ohio EPA. If Mound is requested to accept mixed waste residues containing radionuclides not normally found at Mound, Mound will inform Ohio EPA. Ohio EPA and Mound will then either determine an alternative residuals storage or disposal facility, or develop an approach by which such residuals may be returned to Mound.

The amount of mixed waste treatment residue to be returned to Mound would be dependent on the volume reduction achieved by the treatment process. Mound is currently anticipating that its liquid mixed wastes meeting the TSCA Waste Acceptance Criteria will be shipped to the Department of Energy TSCA incinerator in Oak Ridge, Tennessee for treatment in order to achieve volume reduction. The total amount of treatment residuals returned to Mound shall be an amount that is no more than that which is directly proportional to the mixed wastes that Mound contributed. The incineration of liquid mixed wastes will result in significant volume reductions and minimal treatment residuals to be returned to Mound.

Receipt and Management of Treatment Residuals

The Mound will request waste characterization data for each waste stream to be shipped to the Mound from an off-site treatment facility. The off-site treatment facility will provide the same types of data and level of detail that is required to characterize waste generated at the Mound. This data precedes actual shipment of the waste so that Mound personnel can review the data and confirm that the waste meets Mound waste acceptance criteria. The off-site treatment facility will furnish information for each waste stream such as:

- Physical parameters such as pH, color, physical state, flashpoint, particle size, specific gravity, density, viscosity, liquid content, compatibility;
- TCLP analytical results for toxicity characteristic constituents;
- RCRA waste code(s) with analytical data if the codes have been determined on the basis of analytical information;
- Analytical data concerning all radiological constituents, if the Mound waste was incinerated with waste from another ;
- Land disposal restriction information such as total organic carbon, total suspended solids, constituent specific organic scans as necessary; and
- Generator certification that the information for each waste stream is complete and accurate.

Results from analyses will be reviewed by Mound personnel to determine whether the waste can be accepted by the Mound. After it is determined that the waste can be accepted, the off-site treatment facility is notified to schedule shipment of the waste.

When the treatment residues arrive at Mound, acceptance verification is initiated by facility personnel. The following areas are examined prior to acceptance of the waste:

- Documentation;
- Manifest and land disposal notification/certification;

- Verification of manifest information: container count, weight, waste codes, etc.;
- Container condition and labeling; and
- Fingerprint analysis of the waste.

Designated personnel examine the hazardous waste manifest and land disposal restriction notification and certifications. Absent or incomplete receiving/shipping documentation such as an incomplete hazardous waste manifest or incomplete or missing land disposal restriction information are corrected or completed prior to acceptance of the hazardous waste shipment.

After verification of container condition and proper labeling, the contents of the containers will be examined to verify the physical state of the waste. The Mound will perform fingerprint sampling and analysis on all incoming shipments of waste treatment residues based on knowledge of the waste.

Additional analyses will be performed and repeated for wastes to be received from off-site treatment facilities under any of these conditions:

- Before the first shipment, and at least annually thereafter;
- Whenever the process generating the waste changes; or
- Fingerprinting results do not match the manifested waste preacceptance ranges and the discrepancy cannot be resolved with the generator.

Test method specified in "Test Methods for Evaluation of Solid Waste, Physical/ Chemical Methods" (EPA Office of Solid Waste and Emergency Response, SW-846, latest edition), or other EPA approved methods will be used in analyzed treatment residues. The quality assurance and quality control provisions for the waste acceptance shall be in compliance with applicable provisions of the latest edition of the wide CERCLA Quality Assurance Project Plan. Additionally, the Quality Assurance Program Description shall be applicable.

Between receipt of the treatment residues and verification, the residues will be segregated from other hazardous waste stored at the Mound or other hazardous waste undergoing acceptance verification. The Mound will not sign the manifest and formally accept the residues until fingerprint analysis of the hazardous waste is complete and verified for acceptance.

The off-site treatment facility will be contacted immediately by phone if any discrepancies or other problems are discovered in documentation, condition of containers, or identification of the treatment residues. If discrepancies cannot be resolved, the off-site treatment facility will send a letter describing the discrepancy and the attempts to resolve the discrepancy to OEPA and USEPA if the discrepancy is not resolved within 15 days of hazardous waste receipt.

Upon evaluation of the waste analysis data, a Reactivity Group Code will be stenciled onto the container. Each container will be assigned a storage location based on the physical state and its Reactivity Group Code. Any subsequent movement of the residues will be recorded in the Mound's hazardous waste tracking system. The residues will be stored in a hazardous waste storage unit identified in the Mound's RCRA Part B Permit Application pending final disposition.