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**MACROENCAPSULATED AND ELEMENTAL LEAD
MIXED WASTE SITES REPORT**

prepared by

Asha Kalia
Roger Jacobson

submitted to

Nevada Operations Office
U.S. Department of Energy
Las Vegas, Nevada

MASTER

September 1996

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MACROENCAPSULATED AND ELEMENTAL LEAD MIXED WASTE SITES REPORT

prepared by

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Publication No. 45145

submitted to

U.S. Department of Energy
Nevada Operations Office
Las Vegas, Nevada

September 1996

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EXECUTIVE SUMMARY

The Desert Research Institute (DRI), University and Community College System of Nevada, was directed by the Department of Energy, Nevada Operation Office (DOE/NV) Waste Management Division (WMD) to review five DOE sites under the Federal Facility Compliance Act of 1992 (FFCA), Proposed Site Treatment Plans (PSTPs) and Final Site Treatment Plans (FSTPs). The purpose of this study was to compile a list of the Macroencapsulated (MACRO) and Elemental Lead (EL) Mixed Wastes sites that will be treated and require disposal at the Nevada Test Site within the next five to ten years. The five sites selected by the DOE/NV/WMD, Project Manager were: Hanford Site, Richland, Washington; Idaho National Engineering Laboratory (INEL), Idaho Falls, Idaho; Oak Ridge National Laboratory (ORNL), Oak Ridge, Tennessee; Rocky Flats Environmental Technology (RF), Golden, Colorado; and Savannah River (SRS), Charleston, South Carolina. DRI was able to review and compile information on the four available PSTPs and FSTPs. The Hanford site information was gathered from the DOE/ERWM report, "Contaminated Concrete: Occurrence and Emerging Technologies for the DOE Decontamination." Hanford has been exempted from preparing a PSTP and FSTP as described in the Introduction of this report.

A summary of total lead mixed waste forms at the five selected DOE sites is described in Table E-1. This table provides a summary of total waste and grand total of the current inventory and five-year projected generation of lead mixed waste for each site. It appears from the data obtained from the PSTPs and FSTPs that a large quantity of radioactively contaminated lead and other waste forms contaminated with lead are stored for macroencapsulation treatment and disposal at the four DOE facilities, INEL, ORNL, RF and SRS.

This report provides conclusions and recommendations for further investigations. The major conclusions are: (1) the quantity of lead mixed current inventory waste is 500.1 m³ located at the INEL, and (2) the five sites contain several other waste types contaminated with mercury, organics, heavy metal solids, and mixed sludges.

It is recommended that the DOE/NV/WMD continue to compile data on the rest of the DOE facilities on the MACRO/EL mixed waste and other contaminated wastes destined for disposal at the Nevada Test Site. The DRI recommends that the DOE/NV conduct onsite visits to collect additional information on the MACRO/EL waste mixed with other wastes at the major DOE facilities.

TABLE E-1. SUMMARY OF TOTAL LEAD MIXED WASTE AT THE FIVE DOE SITES.

Site Name	Type of Waste (Total Amount)	Technology Group	Current Inventory 1995 (m ³)	Five-Year Projected Generation 1995-1999 (m ³)
HANF	¹ Approximate Contaminated Concrete	No Information Available	525,364	No Information Available
INEL (Onsite)	Total Lead Contaminated	MACRO	500.109	226.640
INEL (Offsite)	Total Lead Contaminated	MACRO	31.798	10.446
ORNL	Elemental (Lead) Hazardous Metal	Elemental Lead	² INV 1993 (m ³) 94.884	GEN 1993 (m ³) 1.874
ORNL	MLLW Contact-handled Batteries	MACRO	18.675	7.380
RF	Total Lead Contaminated	MACRO	38.89	38.98
SRS	Total Lead Contaminated	MACRO	156.3	90.2
		Grand Total of four sites (m ³)	840.656	375.52

¹Hanford site data were compiled from the DOE/ERWM report, "Contaminated Concrete: Occurrence and Emerging Technologies for DOE Decontamination." The concrete lead contamination data are not included in the grand total.

²ORNL reported data other than that for 1995 under Inventory (INV) and Generated (GEN) wastes.

Note: The current inventory 1995 and the five-year projected generation of waste (1995-1999) figures in cubic meters are the same as described in the PSTPs and the FSTPs for the four sites except HANF. The HANF site data were obtained from the DOE/ERWM report.

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This report was prepared with the combined efforts of Dr. Asha Kalia and Dr. Roger Jacobson, Desert Research Institute, University and Community College System of Nevada. The funding for the Macroencapsulation and Elemental Lead Mixed Waste project was provided by the Department of Energy (DOE), Nevada Operations Office (NV), Office of Technology Development (TD). The authors gratefully acknowledge the support provided by Frank Di Sanza and Ralph F. Smiecinski of DOE/NV/TD. The project investigations were coordinated by Ms. Colleen O'Laughlin, Project Manager, DOE/NV Waste Management Division.

LIST OF ACRONYMS AND ABBREVIATIONS

APP	Appendix
DRI	Desert Research Institute
DOE	Department of Energy
DEQ	Division of Environmental Quality
EL	Elemental Lead
EPA	Environmental Protection Agency
ERWM	Environmental Restoration and Waste Management
ETF	Effluent Treatment Facility
FFCA	Federal Facility Compliance Act
FT	Feet
FSTP	Final Site Treatment Plan
HANF	Hanford
INEL	Idaho National Engineering Laboratory
LDR	Land Disposal Restriction
LLW	Low-Level Waste
MACRO	Macroencapsulated
MWIR	Mixed Waste Inventory Report
NV	Nevada Operations Office
NTS	Nevada Test Site
ORNL	Oak Ridge National Laboratory
OAT	Option Analysis Team
PSTP	Proposed Site Treatment Plan
RF	Rocky Flats
RCRA	Resource Conservation and Recovery Act
SRS	Savannah River Site
STP	Site Treatment Plan
TC	Toxic Characterization
TTP	Technical Task Plan
WEDS	Waste Engineering Development Facility
WMD	Waste Management Division
WROC	Waste Reduction Operation Complex

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INTRODUCTION

In May 1996, the Desert Research Institute (DRI) of the University and Community College System of Nevada was directed by the Department of Energy, Nevada Operations Office (DOE/NV), Waste Management Division (WMD) to review Final Site Treatment Plans (FSTPs) for the five DOE sites. DRI was requested to compile data only on the macroencapsulated (MACRO) and elemental lead (EL) waste forms that will be treated and may require disposal at the Nevada Test Site (NTS) within the next five to ten years. The five DOE sites investigated were:

- Hanford Site (HANF), Richland, Washington
- Idaho National Engineering Laboratory (INEL), Idaho Falls, Idaho
- Oak Ridge National Laboratory (ORNL), Oak Ridge, Tennessee
- Rocky Flats Environmental Technology Site (RF), Golden, Colorado
- Savannah River Site (SRS), Charleston, South Carolina

The MACRO/EL waste data were compiled only for four sites (INEL, ORNL, RF and SRS). The PSTPs were available at the DOE/NV Reading Facility for the study. The PSTP for the Hanford site in Richland, Washington, was not available. As described in the DOE National Summary Report, "Draft Site Treatment Plans, 1994," the Hanford site was exempted from preparing an STP as required by the Federal Facility Compliance Act (FFCA) of 1992. This site had an existing agreement with the state of Washington and the Environmental Protection Agency (EPA), Region 10, that addresses mixed waste treatment requirements. The Hanford site data on lead mixed waste were available in the DOE Environmental Restoration and Waste Management (ERWM), Office of Technology Development report "Contaminated Concrete: Occurrence and Emerging Technologies for the DOE Decontamination" (DOE/ORO-2034). Various terms used in this report are described in Definitions, Appendix A.

REQUIREMENTS

The requirements for this investigation are found in the FFCA of 1992. It requires that the DOE prepare STPs for each individual DOE site that generates or stores mixed waste. Mixed wastes contain both hazardous and radioactive components. This is also required by the Resource Conservation and Recovery Act (RCRA), as amended by the FFCA of 1992. The mixed waste streams are subject to the Land Disposal Restriction (LDR) regulations.

As required by the FFCA of 1992, each DOE STP must provide a list or inventory of mixed waste treatment technology required and the approach or treatment facility that will be used to treat the waste. The law also requires that the STP includes treatment capacity and schedules for bringing new facilities into operation. Each STP is a result of a three-part planning process consisting of a (1) Conceptual Site Treatment Plan, (2) Draft Treatment Plan, and (3) Proposed Site Treatment Plan. The PSTP, upon concurrence with the appropriate state regulatory agency, becomes the final STP.

OBJECTIVES

The basic objectives of this study were to determine the type and amount of lead mixed waste to be disposed of at the NTS in the next five to ten years. Information on the composition of lead mixed waste would then be provided to the University of Nevada, Reno (UNR) to help in the design of laboratory experiments. Another objective of this study was to determine whether macroencapsulation (MACRO) is the preferred treatment option of lead-contaminated mixed waste to be disposed of at the NTS as well as throughout the DOE complex. MACRO is accomplished by totally encasing the waste in a thermoset or thermoplastic resin or epoxy. The product of this unit is a final waste form suitable for land disposal.

PURPOSE AND SCOPE

The purpose of this study was to conduct research only on the final MACRO/EL waste forms and verify their suitability for disposal or recommend alternative modifications required prior to safe disposal at the NTS within five to ten years. Appendix C contains the Technical Task Plan (TTP) for this study. The TTP was provided to DRI by DOE and contains specific guidance for conducting these investigations. DRI was requested by the DOE/NV directives to obtain the following information in conjunction with the review of the PSTPs for the five DOE sites described earlier:

- DOE site responsible for the waste.
- Final waste form (e.g., MACRO lead, grouted material).
- Anticipated volume of final waste form (ballpark estimate, as needed).
- Waste treatment "recipe" (i.e., identify MACRO specifics such as coating thickness and constitution).
- Treatment schedule by fiscal years (described in the Tables wherever available).
- Proposed and alternative disposal locations, if determined.

The above information is presented in Tables 3 through 9 for the HANF, INEL, ORNL, RF and SRS sites. The waste treatment "recipe" is described in "Review of Encapsulation Technologies," report.

STUDY METHODOLOGY

DRI reviewed PSTPs and other documents available in the DOE public reading facility and from other sources. The bibliography at the end of this report provides a list of documents used in developing the data reported here. Data were also obtained by interviewing the site managers by telephone. Two interview forms were developed (Appendix B) to obtain consistent data on MACRO/EL waste forms from each site either by calling or by visiting the sites. However, during the investigation, no interviews were conducted and none of the five sites were visited.

DATA COMPILATION ON THE MIXED LEAD WASTE (MACRO/EL WASTE)

It was noted during the investigation that the density of the lead mixed waste is highly varied because of the variety of mixed waste forms. As discussed in the Introduction, the PSTPs were developed by each DOE site under similar format and guidelines to establish consistency among all the sites. These guidelines were developed and coordinated with the individual sites by the DOE task forces and working groups to provide guidance on the format and content of the proposed plans.

DRI was directed by the DOE/NV/WMD Project Manager to compile MACRO/EL waste forms-related information for each of the five sites investigated. The type of data to be gathered includes:

- localities within a given site;
- name of site
- name of waste stream;
- description of waste stream;
- treatability group;
- treatment technology;
- schedule for shipment to the facility;
- treatment on site;
- current inventory; and
- five-year projected generation of waste at the facility

During the investigation, it was noted that all of the PSTPs for the sites did not contain all of the information requested by DOE/NV/WMD.

DESCRIPTION OF TABLES FOR EACH SITE

Summary of Information Requested by the DOE/NV and the Type of Data Obtained from the PSTPs (Table 1)

Table 1 presents the information that was available, as directed by DOE/NV, and relevant information by each site. Cross checks are placed under similar information; inconsistent information is described in each individual column as it is described in each of the PSTPs. Data collected for each site are presented in Tables 1 through 9.

Hanford Site – Summary of Lead Mixed Waste Sites (Table 2)

As indicated earlier, the Hanford site was exempted from preparing a PSTP, as required by the FFCA of 1992 and RCRA. Therefore, the data reported in this table were compiled from the DOE/ERWM report "Contaminated Concrete: Occurrence and Emerging Technologies for the DOE

Decontamination" (DOE/ORO-2034). These data are inconsistent with the DOE directives because information reported in the ERWM document is in a different format. The approximate volume of contaminated concrete at the site in 1995 was 18,540,100 ft³ or 525,364 m³ for the four buildings. Contaminated concrete appears to be a major waste volume at this site

Idaho National Engineering Laboratory Site – Summary of Onsite Lead Mixed Waste Sites (Table 3)

This table identifies only MACRO/EL waste streams intended to be treated at INEL. These waste streams were generated onsite for treatment at INEL. The data compiled in this table are described in various sections of the INEL PSTP with other waste forms. MACRO/EL waste forms were separated from the other waste forms for this study. The total volume of current inventory of lead mixed waste in 1995 was 500.1 m³. However, the generation of lead mixed waste from 1995–1999 was projected to be 226.1 m³. All the lead waste is required for MACRO treatment at the INEL. The study shows about 70% of scrap metal contaminated with lead exist at the facility as it is described in Table 3 (ID-INL-143, current inventory 345.1 m³). Mixed wastes at INEL are predominantly expected to meet LDR treatment standards onsite through a number of facilities, such as the Waste Experimental Reduction Facility, Waste Reduction Operation Complex, Idaho Chemical Processing Plant, Argonne National Laboratory West and Test Area North.

The Waste Reduction Operation Complex (WROC), as described in Table 3, has been identified as a potential location for development, testing and implementation of various mixed low-level waste treatment technologies. The WROC is used to demonstrate, test and operate sizing, segregation, mercury retorting and MACRO/stabilization technologies.

The following are the treatment facility schedules (P1, P2, P3, P4, P5, P6) as described in Table 3, and the schedule for approval by the state (S1). A detailed description for MACRO/EL waste forms can be obtained in the INEL PSTP, Section 5, Table 5-1 "Milestones/Planning Dates for Mixed Wastes with Existing Treatment Technologies" for each individual facility.

- P1 – Submit Part B: The date on which INEL presents the RCRA Part B submittal to the DEQ for approval is June 30, 1996.
- P2 – Procure Contracts: The date on which contracts are in place for the design of facilities and/or process equipment is September 30, 1995.
- P3 – Initiate Construction: The date on which a contractor(s) mobilizes and begins construction of a process or facility containing a process is June 30, 1997.
- P4 – Commence System Testing: The date on which testing begins on the treatment process equipment on "cold" feedstock is December 31, 1998.
- P5 – Commence Operations: The date on which treatment of waste using the treatment process begins is June 30, 1998
- P6 – Schedule for System Backlog: The date on which the INEL submits a schedule after commencing operation identifying the time required for processing waste currently in

storage (this includes waste in storage at INEL and offsite waste intended to be treated at INEL) is December 31, 1999.

- S1 – State Action: The estimated date of approval of Part B. This date is not a milestone or planning date.

Idaho National Environmental Laboratory – Summary of Offsite Lead Mixed Waste Sites (Table 4)

This table presents MACRO/EL waste streams information for wastes generated at offsite sources for which (a) the generator selected the option of treatment at INEL and/or (b) the Options Analysis Team (OAT) recommended INEL as the treatment center of choice. It shows the offsite MACRO/EL waste streams that have been identified by the offsite generator and/or by the OAT as potential matches for treatment at the INEL. The total volume of current inventory of lead mixed waste in 1995 was 31.8 m³. However, the generation of lead mixed waste from 1995–1999 was projected to be 10.4 m³. All the lead mixed waste is planned for MACRO containment at the facility. It is considered to be the preferred option for treating waste. It is important to note that INEL was not identified as the recommended treatment facility by the OAT for some of the waste streams listed in this table. However, after contacting the generators of these waste streams, it was confirmed that they intended INEL to be their primary treatment option for the listed waste streams.

Waste streams from the Charleston Naval Shipyard and the Mare Island Naval Shipyard were shipped to the INEL in FY 1996 for treatment. Since these shipyards were scheduled for closure in early 1996, they had requested that their waste be transported by January 1996 to the DOE facilities that have been identified as the primary treatment options for storage prior to treatment.

Oak Ridge National Laboratory Site – Summary of Elemental (Lead) Hazardous Metals Waste Sites (Table 5)

Table 5 presents the most recent data available in the 1993 PSTP on the EL waste form. It appears that ORNL reported site data from the MWIR, as shown in the first column of this table. The last four columns present the 1993 inventory and EL hazardous waste generated in 1993 in kilograms (kg) and cubic meters (m³). The total elemental (lead) hazardous metal inventory in 1993 was projected to be 142,330 kg or 95 m³. However, the expected waste generated in 1993 was 2,811 kg or 1.9 m³. The total volume of current inventory of lead mixed waste in 1993 at ORNL was anticipated to be very modest and the projected generation of waste was expected to be very small. All the EL waste will require MACRO treatment. The waste density is variable because of the form and the packaging.

Oak Ridge National Laboratory Site – Summary of Mixed Wastes/Contact-handled Batteries Sites (Table 6)

Information presented in Table 6 was compiled from the ORNL PSTP. It is clear from the first column of this table that data were reported from the MWIR. The last four columns present the 1993 inventory and elemental (lead) hazardous waste generated in 1993 in kg and m³. The total mixed low-level waste/contact-handled batteries 1993 inventory was 27,815.5 kg or 19 m³. However, the

expected 1993 generated waste was projected to be 10,996 kg or 7.4 m³. Other detailed information is also provided in the table. The total volume of current inventory of lead mixed waste in 1993 at ORNL was anticipated to be very modest and the projected generation of waste was expected to be very small. The treatment method for most batteries will likely be MACRO.

Rocky Flats Environmental Technology Site – Summary of Lead Mixed Waste Sites (Table 7)

This table presents lead mixed waste stored at the Rocky Flats site. The total volume of waste in 1995 was 39 m³. The five-year (1995-1999) projected generation of waste from this site is 39 m³. It is anticipated that Polymer, either coating or extrusion, will be utilized for macroencapsulation.

Rocky Flats Environmental Technology Site – Summary of Lead Mixed Waste Characterization Report Schedules (Table 8)

This table describes schedules for completing the initial lead and leaded gloves waste characterization. The review of existing data was completed in September 1995 and the informal sampling and analysis will be completed in June 1997.

Savannah River Site – Summary of Lead Mixed Waste Sites (Table 9)

Information presented in this table contains categories requested by the DOE/NV, described in Table 1. Current inventory as reported in the 1995 PSTP for the 1994 total mixed lead waste stored at the SRS was 156 m³. The five-year (1995-1999) projected generation of waste is 90 m³. This DOE facility is projecting a decrease in the lead mixed waste to be generated during the next five years.

Summary of Lead Mixed Waste Data from MWIR and PSTP on the RF and SRS Sites (Tables 10 and 11)

The RF and SRS current inventory and five-year projected generation of waste (in cubic meters) from 1995-1999 were compared with the Mixed Waste Inventory Report (MWIR) data. The same data were also described in the DOE waste stream report of September 1996. It was also noted that the MWIR contains information on both current inventory and the five-year projected generation in kilograms. The PSTPs did not report the amount of waste in kilograms. This information is provided in Tables 10 and 11. The comparative study between the two documents show that a large quantity of lead mixed waste exists at both the sites as described in Tables 10 and 11. No description was provided in the MWIR on the RF five-year projected waste generation. The comparative study for the INEL and ORNL was not performed due to the unavailability of the MWIR data.

CONCLUSIONS

The total volume from the four major sites (INEL, ORNL, RF and SRS) is very modest at ~840 m³ (29,400 ft³). If this volume were to be shipped to Nevada, it would generate approximately \$500,000 utilizing the projected disposal rates up to \$17.00 per ft³. The largest potential volume of mixed waste that could come to Nevada is the contaminated concrete from the DOE complex. Some portion of this concrete is contaminated with lead mixed waste. Based on the investigations performed by DRI as directed by DOE/NV, the following conclusions can be drawn:

- HANF was exempted from preparing a PSTP. Therefore, data for this site were obtained from the DOE/ERWM report, "Contaminated Concrete: Occurrence and Emerging Technologies for the DOE Decontamination" (DOE/ORO-2034).
- The data for the other four sites, INEL, ORNL, RF and STS, reported in the PSTPs, were found to be inconsistent, as described in Table 1.
- The total volume of current inventory of lead mixed waste form for each site is as follows:
  - HANF

Approximate lead contaminated concrete	Total: 525,364 m ³
  - INEL

Onsite lead mixed waste:	Total: 500.1 m ³
Offsite lead mixed waste:	Total: 31.8 m ³
  - ORNL

Elemental lead waste:	Total: 95 m ³ , 142,330.5 kg
Mixed low-level waste/contact-handled batteries:	Total: 19 m ³ , 27,815.5 kg
  - RF

Mixed lead waste:	Total: 39 m ³
  - SRS

Mixed lead waste:	Total: 156 m ³
- The five-year projected generation of total waste for each site is as follows:
  - HANF (no data exist for this site)
  - INEL

Onsite lead mixed waste:	Total: 226.1 m ³
Offsite lead mixed waste:	Total: 10.4 m ³
  - ORNL

Elemental (lead) hazardous metals waste:	Total: 1.9 m ³ , 2,811 kg
Mixed low-level waste/contact-handled batteries:	Total: 7.4 m ³ , 10,996 kg
  - RF

Mixed lead waste:	Total: 39 m ³
  - SRS

Mixed lead waste:	Total: 90 m ³
  - Current inventory GRAND TOTAL: 840 m³
  - Five-year projected generation GRAND TOTAL: 376 m³
- The five DOE sites investigated contain several other types of contaminated wastes, such as mercury, organics, heavy metal solids, and various mixed sludges.
- MACRO appears to be the preferred treatment option for the contaminated lead waste.

RECOMMENDATIONS

It is recommended that DOE/NV:

- Continue to compile these types of data on all of the other DOE facilities to gain a better understanding of quantity and type of mixed low-level waste that might be disposed of at the NTS within five to ten years.
- Expand the data base to include other types of wastes that might be stored at the NTS over a five- to ten-year period.
- Conduct onsite visits to collect additional information for major DOE facilities. Appendix B contains interview forms, which can facilitate obtaining the needed data for the various sites.
- Investigate contaminated concrete from the DOE complex. (In the conclusion section of DOE/ORO-2034 is a description of contaminated concrete which could require macroencapsulation).

TABLE 1. INFORMATION REQUESTED BY THE DOE/NV ON THE FIVE MIXED LEAD WASTE SITES AND TYPE OF INFORMATION OBTAINED FROM THE PROPOSED SITE TREATMENT PLANS.

¹	DOE Sites	Site Name	Waste Stream Name	Waste Stream Description	Treatability Group	Treatment Technology	Schedule for Shipment to Facility	Treatment Onsite	Current Inventory (m ³)		Five-Year Projected Generation (m ³)	
² HANF	Site Code		Bldg Number	Site Type	Operating Status	Contaminant Type	Approximate Area of Contamination	Contaminant Name	No Other Information Found		No Other Information Found	
INEL Onsite/ Offsite	³ WS ID		x	Technology Group	Media Type (if more than one)	Volume %	Treatment Facility	Treatment Facility Schedules	x		x	
ORNL	⁴ MWIR	⁵ APP B	Description	x	Technology Group	Preferred Options	Treatment Facility	Treatment Facility Schedules	Inventory (kg)	Inventory (m ³)	Generated (kg)	Generated (m ³)
RF	WS ID		x	Technology Group	Treatment Facility Schedules	No Information Found	No Information Found	No Information Found	x		x	
SRS	WS ID		x	Preferred Options	Waste Stream Composition	Technology Needs	Treatment Facility	Treatment Facility Schedules	x		x	

¹Table headings are categories of information recommended by the DOE/NV; the other columns are defined differently by each of the DOE sites in the Proposed Site Treatment Plans.

²Hanford Site information was obtained from the DOE/ERWM report, "Contaminated Concrete: Occurrence and Emerging Technologies for the DOE Decontamination" (DOE/ORO/2034).

³WS - Waste Stream

⁴MWIR - Mixed Waste Inventory Report

⁵App - Appendix B

Note: The current 1995 inventory and the five-year projected generation of waste (1995-1999) figures in cubic meters are the same as described in the PSTPs and the FSTPs for the four sites except HANF. The HANF site data were obtained from the DOE/ERWM report.

TABLE 2. SUMMARY OF HANFORD LEAD MIXED WASTE SITE.

Site Name	Bldg. Number	¹ Site Type	Operating Status	² Contaminant Type	Approximate Contaminated Concrete (ft ³)	Approximate Contaminated Concrete (m ³)	Contaminant Name
Hanford	232Z	3	Surplus	R	259,000	7,339	Plutonium, Lead, Gamma
Hanford	105B	1	Surplus	R	5,357,100	151,802	Cadmium, Lead
Hanford	105H	1	Surplus	R	7,464,000	211,505	Cadmium, Lead
Hanford	105F	1	Surplus	R	<u>5,460,000</u>	<u>154,718</u>	Cadmium, Lead
TOTAL					18,540,100	525,364	

¹Site Type: 1 = production reactor; 3 = other radiologically contaminated building

²R = radiological

Note 1: Information for this table was obtained from the DOE/ERWM report "Contaminated Concrete: Occurrence and Emerging Technologies for DOE Decontamination."

Note 2: The current 1995 inventory and the five-year projected generation of waste (1995-1999) figures in cubic meters are the same as described in the PSTPs and the FSTPs for the four sites except HANF. The HANF site data were obtained from the DOE/ERWM report.

TABLE 3. SUMMARY OF IDAHO NATIONAL ENGINEERING LABORATORY ONSITE LEAD MIXED WASTE SITES.

Waste Stream ID	Waste Stream Name	Technology Group	Media Type (if more than one)	Volume %	Treatment Facility	Treatment Facility Schedule	Current Inventory 1995 (m ³)	Five-Year Projected Generation 1995-1999 (m ³)
CH-ANL-111	Uranium/ Cadmium from ⁴ IFR Experiments	¹ MACRO	Other Cd-ignot	99.00 1.00	² WROC WROC	³ P1, P2, P3, P4, P5, P6	0.4164	0.4000
ID-CH-ANL-142	Lead-contam. Solids ANL-W Operations	MACRO	Pb-metal / Gloves Paper	95.00 5.00	WROC WROC	Same as above	0.5469	0.0800
ID-CFA-280	Borax D&D Noncompactable Lead Shielding	MACRO	Pb-scrap Pb-recycle	50.00 50.00	WROC WROC	Same as above	0.0000	0.5000
ID-INL-143	Radioactive Contaminated Lead	MACRO	Pb-scrap Casks-outer metal Casks-Pb-scarred Casks-Pb-scrap Pb-scarred/smooth Pb-scrap	10.50 4.00 16.50 12.50 50.00 6.50	WROC WROC WROC WROC WROC WROC	Same as above	345.1160	12.0000
ID-PBF-272	Uranium Spikes and Lead	MACRO	No Description	No Description	WROC	Same as above	0.0303	0.0000
ID-TAN-531	Lead Shielding Loft Mobile Test Assembly	MACRO	Pb-shot/wool Pb-plate	95.00 5.00	WROC WROC	Same as above	0.0000	9.7000
ID-TAN-547	Radioactive Cadmium Sources	MACRO	No Description	No Description	WROC	Same as above	0.0303	0.0000
ID-CFA-533	ARA-1 D&D Noncompactable Lead	MACRO	Uncleanable Cleanable	50.00 50.00	WROC WROC	Same as above	0.0000	0.5500
ID-CFA-667	Mixed Lead	MACRO	Pb-cleanable Pb-not cleanable	90.00 10.00	WROC	Same as above	0.0303	0.1200
ID-CPP-154	Radioactive Contaminated Lead	MACRO	⁵ CH-blankets (Pb) CH-blankes (vinyl) CH-Pb-scarred Brick Sheet CH-Pb-scrap ⁶ RH	16.50 5.50 44.00 6.00 28.00	WROC	Same as above	56.0960	197.1800

TABLE 3. SUMMARY OF IDAHO NATIONAL ENGINEERING LABORATORY ONSITE LEAD MIXED WASTE SITES (Cont.).

Waste Stream ID	Waste Stream Name	Technology Group	Media Type (if more than one)	Volume %	Treatment Facility	Treatment Facility Schedule	Current Inventory 1995 (m ³)	Five-Year Projected Generation 1995-1999 (m ³)
ID-CPP-552	Radioactive Lead with Listed Codes	MACRO	No Description	No Description	WROC	Same as above	0.3964	0.0000
ID-INL-142	Lead Contaminated Debris	MACRO	HEPA-media HEPA-frames & other Pb & Dross Soil	15.00 44.00 40.00 1.00	WROC	Same as above	7.6209	3.8400
ID-SMC-400	Radioactive Contaminated Lead	MACRO	No Description	No Description	WROC	Same as above	0.0189	0.0000
ID-TAN-534	TAN 616 Lead Shielding (Plating)	MACRO	Cleanable Uncleanable	90.00 10.00	WROC	Same as above	0.0000	0.0500
ID-TRA-253	Cadmium Fuel Grid	MACRO	Al-grid Cd-strips	95.00 5.00	WROC	Same as above	43.3479	0.0000
ID-TRA-281	ETR Noncompactable Lead	MACRO	Pb-scrap Pb-recycle	50.00 50.00	WROC & WROC Lead Recycle	Same as above	0.0000	0.0000
ID-TRA-282	MTR D&D Noncompactable Lead	MACRO	Pb-scrap Pb-recycle	50.00 50.00	WROC WROC	Same as above	0.0000	0.0000
NR-NRF-143	Radioactive Contaminated Lead (NRF)	MACRO	Pb-scrap Pb-cleanable	50.00 50.00	WROC & WROC Lead Recycle	Same as above	46.2133	2.2200
NR-NRF-117	Cadmium Sheets	MACRO	No Description	No Description	WROC	Same as above	0.2082	0.0002
NR-NRF-190	Lead Fillings	MACRO	No Description	No Description	WROC	Same as above	0.0379	0.0000
Total							500.1097	226.6402

¹MACRO - Macroencapsulation²WROC - Waste Reduction Operation Complex³P1 - Submit Part B/S1 - Approval of Part B; P2 - Procure Contracts; P3 - Initiate Construction; P4 - Commence System Testing; P5 - Commence Operation; P6 - Schedule for System Backlog⁴IFR - Integral Fast Reactor⁵CH - Contact handled⁶RH - Remote handled

Note: The current inventory 1995 and the five-year projected generation of waste (1995-1999) figures in cubic meters are the same as described in the PSTPs and the FSTPs for the four sites except HANF. The HANF site data were obtained from the DOE/ERWM report.

TABLE 4. SUMMARY OF IDAHO NATIONAL ENGINEERING LABORATORY OFFSITE LEAD MIXED WASTE SITES.

Waste Stream ID	Waste Stream Name	Technology Group	Media Type (if more than one)	Volume %	Treatment Facility	Treatment Facility Schedule	Current Inventory 1995 (m ³)	Five-Year Projected Generation 1995-1999 (m ³)
BT-W019	Elemental Lead	¹ MACRO	Pb-scrap Pb-bricks	30.00 70.00	² WROC	³ P1, P2, P3, P4, P5, P6	1.1600	0.5300
GA-W013	Hot Cell D&D: Pb-brick	MACRO	No Description	No Description	WROC	Same as above	1.0400	0.8320
LA-W921	Activated or Inseparable Lead	MACRO	No Description	No Description	WROC	Same as above	15.6000	0.8000
MI-W931	Lead Requiring Sorting	MACRO	No Description	No Description	WROC	Same as above	9.9700	0.0000
MI-W007	Lead Brick, Sheets, Wool Scrapings	MACRO	Pb-scrap	100.00	WROC	Same as above	2.7600	0.4640
CN-W002	Lead and Lead-Bearing Materials	MACRO	No Description	No Description	WROC	Same as above	0.3200	3.5000
GA-W007	Hot Cell D&D: Pb-shot	MACRO	No Description	No Description	WROC	Same as above	0.2080	4.1600
LA-W903	Lead Blankets	MACRO	No Description	No Description	WROC	Same as above	0.7400	0.1600
Total							31.798	10.446

¹MACRO - Macroencapsulation²WROC - Waste Reduction Operation Complex³P1 - Submit Part B/S1 - Approval of Part B; P2 - Procure Contracts; P3 - Initiate Construction; P4 - Commence System Testing; P5 - Commence Operation; P6 - Schedule for System Backlog

Note 1: Onsite and offsite waste streams are currently being proposed for treatment at each INEL facility. (See INEL, STP, Sec.6, Waste Stream Treatment Plans).

Note: The current inventory 1995 and the five-year projected generation of waste (1995-1999) figures in cubic meters are the same as described in the PSTPs and the FSTPs for the four sites except HANF. The HANF site data were obtained from the DOE/ERWM report.

TABLE 5. SUMMARY OF OAK RIDGE NATIONAL LABORATORY ELEMENTAL (LEAD) HAZARDOUS METALS WASTE SITES.

MWIR#	APP	Waste Stream Name	Technology Group	Preferred Option	Treatment Facility	Treatment Facility Schedules	INV 1993 (kg)	INV 1993 (m ³)	GEN 1993 (kg)	GEN 1993 (m ³)
1721	B	Elemental Hazardous Metals	Elemental Lead	Further Characterization Required	Commercial or 2WEDF at INEL Option	Complete Radiological Assessment 9/1997. Complete Characterization of Elemental Hazardous Metal Waste 9/2002. Provide Plan/Schedule for Obtaining Treatment of Hazardous Elemental Metals.	135,041.30	90.027	1,002	0.668
2721	B	Elemental Hazardous Metals	Elemental Lead	Same as above	Same as above	Same as above	295.31	0.196	25	0.017
3721	B	Elemental Hazardous Metals	Elemental Lead	Same as above	Same as above	Same as above	6,992.93	4.661	1,784	1.189
Total							142,329.54	94.884	2,811	1.874

1 APP - Appendix

2 WEDF - Waste Engineering Development Facility

Note: The current inventory 1995 and the five-year projected generation of waste (1995-1999) figures in cubic meters are the same as described in the PSTPs and the FSTPs for the four sites except HANF. The HANF site data were obtained from the DOE/ERWM report.

TABLE 6. SUMMARY OF OAK RIDGE NATIONAL LABORATORY MIXED LOW-LEVEL WASTES/CONTACT-HANDLED-BATTERIES SITES.

Waste Stream ID MWIR# X7200	¹ APP	Waste Stream Name	Technology Group	Preferred Option	Treatment Facility	Treatment Facility Schedules	INV 1993 (kg)	INV 1993 (m ³)	GEN 1993 (kg)	GEN 1993 (m ³)
1741	B	Batteries	MACRO	Further Characterization Required	Onsite	Complete Radiological Assessment 9/1997. Complete Characterization 9/1999. Provide Plan/Schedule for Obtaining Treatment 9/2000.	21,439.34	14.296	8,695	5.797
2741	B	Batteries	Same as above	Same as above	Same as above	Same as above	949.13	0.761	367	0.294
3741	B	Batteries	Same as above	Same as above	Same as above	Same as above	5,427.02	3.618	1,934	1.289
Total							27,815.49	18.675	10,996	7.380

¹APP – Appendix

Note: The current inventory 1995 and the five-year projected generation of waste (1995–1999) figures in cubic meters are the same as described in the PSTPs and the FSTPs for the four sites except HANF. The HANF site data were obtained from the DOE/ERWM report.

TABLE 7. SUMMARY OF ROCKY FLATS ENVIRONMENTAL TECHNOLOGY LEAD MIXED WASTE SITES.

Waste Stream ID	Waste Stream Name	Technology Group	Treatment Facility Schedules	Current Inventory 1995 (m ³)	Five-Year Projected Generation 1995–1999 (m ³)
RF-W035	Glovebox Parts w/Lead	Polymer ¹ MACRO	See Table 8	0.42	0.00
RF-W023	Lead	Same as above	Same as above	34.69	
RF-W030	Leaded Gloves	Same as above	Same as above	3.57	27.85
RF-W031	Leaded Gloves Acid Contaminated	Same as above	Same as above	0.21	11.13
Total				38.89	38.98

¹MACRO – Macroencapsulation

Note: The current inventory 1995 and the five-year projected generation of waste (1995–1999) figures in cubic meters are the same as described in the PSTPs and the FSTPs for the four sites except HANF. The HANF site data were obtained from the DOE/ERWM report.

TABLE 8. SUMMARY OF ROCKY FLATS ENVIRONMENTAL TECHNOLOGY LEAD MIXED WASTE CHARACTERIZATION REPORT SCHEDULES.

Waste Form	Waste Identification Characterization Reassessment	Contracts Interviews	Review Existing Data	Review Real-time Radiography Tapes	Drum Walkdowns	Screening	Informal Sampling and Analysis	Formal Sampling and Analysis
Lead	2/95	Complete	Complete	1/96	1/96	3/96	3/96	Not Planned
Leaded Gloves	5/95	Complete	9/95	9/95	9/95	Not Planned	6/97	Not Planned

Note: The current inventory 1995 and the five-year projected generation of waste (1995–1999) figures in cubic meters are the same as described in the PSTPs and the FSTPs for the four sites except HANF. The HANF site data were obtained from the DOE/ERWM report.

TABLE 9. SUMMARY OF SAVANNAH RIVER LEAD MIXED WASTE SITES.

Waste Stream ID	Waste Stream Name	Preferred Options	Waste Stream Composition	Technology Needs	Treatment Facility	Treatment Facility Schedules	Current Inventory 1994 (m ³)	Five-Year Projected Generation 1995–1999 (m ³)
SR-W013	¹ LLW Lead to be Decontam.	² MACRO	Elemental Lead	Lead Decontam. Acid Bath	Offsite Vendor	No Description	82.2	30
SR-W023	Cadmium Safety Control Rods	MACRO in a cask as a 90-day generator	Inorganic Debris and Cadmium Containing Metals	MACRO	No Description	No Description	0.3	3.2
SR-W041	Aqueous Mercury and Lead	F&H Area ³ ETF	Aqueous & Lead Waste	Ion Exchange	F&H Area ETF, and Z Area	No Description	0.3	No future generation is expected
SR-W063	MACRO ⁴ TC Waste	Meets Treatment Standards	Metal Debris	MACRO	No Treatment Required., Waste Stream Already Meets Treatment Standard	No schedule required	0	42
SR-W069	LLW Lead to be MACRO Waste Stream	MACRO with Polymer by a vendor–onsite	EL, Non EL and Lead acid Batteries from Radiological Areas	MACRO	Onsite by Vendor	No Description	73.5	15
Total							156.3	90.2

¹LLW – Low-Level Waste²MACRO – Macroencapsulation³ETF – Effluent Treatment Facility⁴TC – Toxic Characterization

Note: The current inventory 1995 and the five-year projected generation of waste (1995–1999) figures in cubic meters are the same as described in the PSTPs and the FSTPs for the four sites except HANF. The HANF site data were obtained from the DOE/ERWM report.

TABLE 10. SUMMARY OF LEAD MIXED WASTE DATA FROM MWIR AND PSTP ON THE ROCKY FLATS SITES.

Waste Stream ID	Waste Stream Name	Technology Group	Treatment Facility Schedules	Current Inventory 1995 (m ³)	Current Inventory 1995 (kg)	Five-Year Projected Generation 1995–1999 (m ³)	Five-Year Projected Generation 1995–1999 (kg)
RF-W035	Glovebox Parts w/Lead	Polymer ¹ MACRO	See Table 8 of this report	.42	389.2	0.00	No Description
RF-W023	Lead	Same as above	Same as above	34.69	27,838.2	0.00	No Description
RF-W030	Leaded Gloves	Same as above	same as above	3.57	1,683.0	27.69	No Description
RF-W031	Leaded Gloves Acid Contaminated	Same as above	Same as above	0.21	46.9	11.13	No Description
Total				38.89	29,967.3	38.98	No Description

¹MACRO – Macroencapsulation

Note: The current inventory 1995 and the five-year projected generation of waste (1995–1999) figures in cubic meters are the same as described in the PSTPs and the FSTPs for the four sites except HANF. The HANF site data were obtained from the DOE/ERWM report.

TABLE 11. SUMMARY OF LEAD MIXED WASTE DATA FROM MWIR AND PSTP ON THE SAVANNAH RIVER SITES.

Waste Stream ID	Waste Stream Name	Preferred Options	Treatment Facility Composition	Technology Needs	Treatment Facility	Treatment Facility Schedules	Current Inventory 1995 (m ³)	Current Inventory 1995 (kg)	Five-Year Projected Generation 1995-1999 (m ³)	Five-Year Projected Generation 1995-1999 (kg)
SR-W013	¹ LLW Lead to be Decontaminated	² MACRO	Elemental Lead	Lead Decontaminated Acid Bath	Offsite Vendor	No Description	82.2	129,386.0	30.00	60,000.0
SR-023	Cadmium Safety Control Rods	MACRO in a Cask as a 90-Day Generator	Inorganic Debris & Cadmium Containing Metals	MACRO	No Description	No Description	0.3	2,270.0	3.2	20,874.0
SR-W041	Aqueous Mercury & Lead	F&H Area ³ #ETF	Aqueous & Lead Waste	Ion Exchange	F&H Area ETF, &Z Area	No Description	0.3	104.2	No Future Generation is Expected	No Description
SR-W063	MACRO @ ⁴ TC Waste	MACRO with Polymer by a Vendor Onsite	% EL, Non-EL & Lead Acid Batteries from Radiological Areas	MACRO	No Treatment Required. Waste Stream Meets Treatment Standard	No Schedule Required	0.0	0.00	42.	00.00
SR-W069	LLW Lead to be MACRO Waste Stream	MACRO with Polymer by a Vendor Onsite	EL, Non-EL & Lead acid Batteries from Radiological Areas	MACRO	Onsite by Vendor Treatment	No Description	73.5	98,852.0	15	30,000.0
Total							156.3	230,612.2	90.2	110,874.0

¹LLW - Low-level Waste²MACRO - Macroencapsulation³ETF - Effluent Treatment Facility⁴TC - Toxic Characterization

Note: The current inventory 1995 and the five-year projected generation of waste (1995-1999) figures in cubic meters are the same as described in the PSTPs and the FSTPs for the four sites except HANF. The HANF site data were obtained from the DOE/ERWM report.

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Proposed FFCACT STP Oak Ridge Reservation, April 1995.

APPENDIX A

Definitions

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.

Elemental Lead (EL) (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.

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.

Macroencapsulation (MACRO) – application of surface coating materials such as polymeric organics (e.g., resins and plastics) or a jacket of inert organic 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 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 Atomic Energy Act and RCRA. The term "radioactive component" refers only to the actual radionuclides dispersed or suspended in the waste substance.

Offsite – Any facility or installation other than generating or storing facility.

Onsite – (1) Within a single research or production site of the DOE weapons complex (e.g., Los Alamos National Laboratory is a site, as are Idaho National Engineering Laboratory and Sandia National Laboratories. (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.

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

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

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 the

management functions. That is, it is not a satellite of some other site. (2) For the purposes of the Environmental Restoration and Waste Management (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).

Technology-Based Standards – 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 approved by the administrator of EPA.

Treatability Group – The DOE has grouped its wastes to reflect salient treatment considerations for each waste form based on the radioactive characteristics, hazardous components and physical/chemical matrices. These "treatability groups" are used to relate waste forms 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 reduce in volume. (2) Any activity that alters the chemical or physical nature of hazardous waste to reduce its toxicity, volume, or mobility, or render it amenable for transport, storage, or disposal.

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

Treatment Method – a group of treatment technologies that utilize the same chemical or physical principle to destroy or mitigate the waste characteristics or constituents.

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

Treatment System – the equipment and processes used for similar waste types at treatment facilities. A treatment system is 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 vitrification unit for the ash).

Treatment Unit – the portion of a single treatment system that will treat mixed low level waste to meet both LDR requirements and the disposal site waste acceptance criteria.

Waste Form – a grouping of one or more item description codes based on presumed similarity of waste treatment requirements.

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 Stream – a flow of waste materials with specific definable characteristic that remain the same throughout the life of the process generating the waste.

**APPENDIX B
(PART A)**

**INTERVIEW FORM
DESERT RESEARCH INSTITUTE
UNIVERSITY AND COMMUNITY COLLEGE SYSTEM OF NEVADA
MIXED WASTE EXPERIMENTS QUESTIONNAIRES**

Site: _____ Address: _____

Contact: _____

Phone No: _____ Date: _____

1. Mixed waste quantities (m^3/kg).
2. Mixed waste type.
3. What specific elements or compounds exist in the mixed waste (for example, heavy metals (HM), radionuclide (RN), organic, or inorganic).
4. What form or valence exists in the mixed waste (leadoxide-dissolved chromium or any other specifics).
5. Mixed waste concentration range for each element.
6. Mixed waste matrix groups (for example, soil or any other matix group, including grain size primary, etc.).

**APPENDIX B
(cont.)**

(PART B)

INTERVIEW FORM

**DESERT RESEARCH INSTITUTE
UNIVERSITY AND COMMUNITY COLLEGE SYSTEM OF NEVADA**

MIXED WASTE INFORMATION FOR PLANNING

Site: _____ Address: _____

Contact: _____

Phone No: _____ Date: _____

1. Mixed waste quantities (m^3/kg).
2. Mixed waste treatment selection methodology applied.
3. Mixed waste treatability groups.
4. Mixed waste disposal period (month and year).
5. Mixed waste combination/concentration groups for treatability (for example, silt+clay+sand) or any other combination of waste applied.
6. Mixed waste treatability group and also % of each mixed waste (MW) group, if possible.
7. Mixed waste treatment cost estimate, if possible.

APPENDIX C

Desert Research Institute
Technical Task Plan

09-23-1996
13:57:44

Earned Value Method: No EVM Required

Approval: _____ Initials: _____ Date: _____
 Approval: _____ Initials: _____ Date: _____
 Approval: _____ Initials: _____ Date: _____

Resource estimates for the DRI Federal Facility Compliance Act (FFCA) Task Agreement Plan will provide labor and materials needed to determine what treated mixed waste from DOE sites might be disposed at the Nevada Test Site. This information will be used to research the final waste forms and verify their suitability for disposal at the Nevada Test Site or recommend modifications required prior to safe disposal.

DRI is directed to review five FFCAct Site Treatment Plans available at the DOE/NV Public Reading Facility and compile a list of the mixed waste that will be treated and require disposal within the next five to ten years. Following are the five selected DOE Sites to compile data on the Lead Mixed Waste Sites:

- Idaho National Engineering Laboratory Site
- Rocky Flats Environmental Technology Site
- Savannah River Site - Mixed Waste Site
- Oak Ridge National Laboratory Site
- Hanford Site

DRI is also directed to compile the following information in conjunction with the review of Site Treatment Plans for the five Lead Mixed Waste Sites described above:

- Name of DOE site responsible for waste
- Final waste form (e.g. macroencapsulated lead, grouted material)
- Anticipated volume of final waste form (ball-park estimate as needed)
- Waste treatment "recipe" (i.e., identify macroencapsulated specifics such as coating thickness and constitution)
- Treatment schedule
- Proposed and alternative disposal location, if determined

This information shall be presented in a draft and final report. The final report will include additional information on the Lead Mixed Waste sites selected by the Project Manager, Waste Management Division- DOE/NV, if time and resources permit.

Desert Research Institute
Technical Task Plan

DISTRIBUTION

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