



OSS 200  
ANNUAL ACTION PLAN FOR OFF-SITE SHIPMENT  
OF LOW-LEVEL MIXED WASTE

FINAL

July 27, 1994

Submitted in partial fulfillment of the  
requirements of the Federal Facility  
Compliance Agreement addressing hazardous  
and mixed waste under the Resource  
Conservation and Recovery Act

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## PREFACE

This *Annual Action Plan* (OSS 200) for off-site Shipment of Low-Level Mixed Waste (LLMW) is being submitted to the United States Environmental Protection Agency (EPA) by the Department of Energy (DOE) and Los Alamos National Laboratory (LANL) in fulfillment of DOE's commitment to EPA under the Federal Facility Compliance Agreement (FFCA) developed pursuant to the land disposal restriction (LDR) requirements of the Resource Conservation and Recovery Act (RCRA), as promulgated in 40 CFR Part 268. This plan is required by Milestone OSS 200 in Appendix B of the FFCA.

The FFCA Appendix B, Section II.D outlines the actions necessary to bring LANL into compliance with LDR storage prohibitions. The Annual Action Plan for Off-Site Shipment of LLMW describes the LLMW streams which LANL plans on shipping to off-site treatment and disposal (TSD) facilities during the period July 1, 1994 through June 30, 1995. Volume estimates and schedules for the shipment campaigns are presented. In addition, this plan presents the processes used in selecting the wastes to be shipped, and identifying the TSD facilities capable of treating and disposing of LANL waste streams. Administrative developments in support of the FFCA and off-site shipments are also described.

The following table presents the LDR FFCA milestones that relate to OSS 200 and the nature of each inter-relationship:

<b>PRIMARY MILESTONE</b>	<b>SECONDARY MILESTONE</b>	<b>NATURE OF INTERRELATIONSHIP</b>
OSS 200	OSS 100	The TSD facility technology and capacity identified in this document will be used for planning off-site shipments. The waste acceptance criteria for this facility will be used as criteria for selecting LLMWs for shipment.
	HLL 100	Information generated as part of the waste characterization plan will be used to determine which LLMW streams can be shipped to particular off-site TSDs.
	HLL 200	LLMW streams not able to be shipped to an off-site TSD facility for treatment and disposal will be evaluated for treatment in the Controlled Air Incinerator (CAI) and for development of skid mounted treatment units.
	CAI 300	LLMW streams not able to sent to off-site TSD facilities for treatment and disposal will be evaluated for treatment in the CAI.
	HW 300	LLMW streams not amenable for off-site treatment or disposal, or treatment in the CAI will be evaluated for development of skid mounted treatment units. The RCRA mixed waste permit for the Hazardous Waste Treatment Facility (HWTF) will be modified as appropriate to accomodate the new skid mounted treatment unit technologies to treat these LLMWs.
	HW 600	Those LLMW streams which cannot be sent to off-site TSDs for treatment and disposal, and which cannot be treated in the CAI will be included as appropriate in the LLMW Work-Off Plan for the HWTF.

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## LIST OF ACRONYMS

ACIS	Automated Chemical Inventory Systems
AET	Applied Environmental Technologies
ALARA	As Low As Reasonably Achievable
ATLAS	Advanced Testing for Actinide Separations
BAT	Best Available Technology
BDAT	Best Demonstrated Available Technology
BEJ	Best Engineering Judgment
BIF	Boiler and Industrial Furnace
CAI	Controlled-Air Incinerator
CAMs	Continuous Air Monitors
CFC	Chlorinated Solvents
CFR	Code of Federal Regulations
CLS	Analytical Chemistry Group
CWM	Chemical Waste Management, Inc.
CWDR	Chemical Waste Disposal Request
DOE	U.S. Department of Energy
DOE/AL	DOE Albuquerque Operations Office
DOT	Department of Transportation
DSSI	Diversified Scientific Services, Inc.
EPA	U.S. Environmental Protection Agency
ERC	Earth Resources Corporation
ES&H	Environment, Safety, and Health
FERC	Federal Energy Regulatory Commission
FFCA	Federal Facility Compliance Agreement
FY	Fiscal Year
GCP	Gas Cylinder Project
GSA	General Services Administration
HEPA	High Efficiency Particulate Air Filter
HSWA	Hazardous and Solid Waste Amendments
HWFP	Hazardous Waste Facility Permit
HWTF	Hazardous Waste Treatment Facility
ICP	Inductively Coupled Plasma
IPC	Industrial Partnership Center
JCI	Johnson Control Incorporated
KOP	Knowledge of Process
LAMPF	Los Alamos Meson Physics Facility
LANL	Los Alamos National Laboratory
LAO	LANL Assessment Office
LDR	Land Disposal Restriction
LLMW	Low-Level Mixed Waste
LLW	Low-Level Radioactive Waste
LP	LANL Procedures
MSDS	Material Safety Data Sheet
MWRSF	Mixed Waste Receiving and Storage Facility
NEPA	National Environmental Policy Act
NESHAPS	National Emissions Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
NMED	New Mexico Environmental Department
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission

## LIST OF ACRONYMS

(Continued)

PPAC	Pollution Prevention Awareness Campaign
PRD	Program Required Document
PTS	Project Tracking System
PWA	Process Waste Assessments
QA	Quality Assurance
QAP	Quality Assurance Plan
RCRA	Resource Conservation and Recovery Act
R&D	Research and Development
R&M	Redistribution and Marketing Center
RES	Rollins Environmental Services
RMMA	Radioactive Material Management Area
RSWD	Radioactive Solid Waste Disposal Record
SOP	Standard Operating Procedure
SSP	Site Specific Plans
SWDA	Solid Waste Disposal Act
TA	Technical Area
TCLP	Toxicity Characteristic Leaching Procedure
TRU	Transuranic
TSCA	Toxic Substance Control Act
TSDF	Treatment, Storage, or Disposal Facility
UBC	Uniform Building Code
UL	Underwriters Laboratories
ULISSES	Uranium Line for Special Separation Sciences
WAC	Waste Acceptance Criteria
WBS	Work Breakdown Structure
WIPP	Waste Isolation Pilot Plant
WMC	Waste Management Coordinator
WMPO	Waste Minimization Program Office
WPF	Waste Profile Form

**OSS 200**  
**ANNUAL ACTION PLAN FOR OFF-SITE SHIPMENT**  
**OF LOW LEVEL MIXED WASTE**

**1.0 INTRODUCTION**

This document satisfies the requirement for developing an *Annual Action Plan for Off-Site Shipment of Low Level Mixed Waste* (OSS 200) pursuant to the Federal Facilities Compliance Agreement (FFCA) signed on March 15, 1994 between the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE). This agreement places the Los Alamos National Laboratory (LANL) on a compliance schedule to treat low-level mixed waste (LLMW) in accordance with the land disposal restrictions (LDR). An agreement was needed because of a lack of available DOE and commercial treatment capacity for appropriate treatment of LLMW and a consequent exceedance of the LDR storage prohibition.

OSS 200 requires LANL to investigate and report the availability of off site capacity for the treatment of LLMW. If off-site capacity has been found, LANL is required to project the amount of LLMW planned to be shipped during the next reporting period. Each year, LANL reports the mixed waste shipped off-site for treatment during the previous reporting period in the FFCA *Annual Report* (AR 100), submitted concurrently with this Action Plan .

Other milestones which either contribute to or benefit from the annual action plan include *Feasibility of Treatment of LANL LLMW at Diversified Scientific Services, Inc.* (OSS 100), *Characterization Plan for LLMW* (HLL 100), *Low-Level Mixed Waste Treatment Prioritization Plan* (HLL 200), *RCRA Mixed Waste Permit for the HWTF* (HW 300), and *Work-Off Plan for LLMW at the HWTF* (HW 600). It should be noted that the off-site shipments pursuant to the *Gas Cylinder Work-Off Plan* (GAS 100) have been completed. However, some gas cylinders were not able to be sent off site for treatment and disposal. In accordance with HLL 200, those remaining cylinders will be evaluated annually along with the other LLMW remaining on site to determine if off-site treatment and disposal capacity is available. If so, the cylinders and other LLMW streams will be shipped to the appropriate off-site treatment, storage and disposal (TSD) facility, and such shipment plans will be reflected in future OSS 200 reports. LLMW streams, for which no off-site treatment and disposal capacity could be identified, will be evaluated for treatment in the Controlled Air Incinerator (CAI) or for skid mounted treatment unit development.

This annual action plan is divided into six sections. Section 2.0 describes DOE administrative developments which support shipment of LLMW to off-site TSDs. Section 3.0 describes the process used to identify off-site TSDs with the available technology, capacity, and permits for treating and disposing of LANL LLMWs. Section 4.0 describes how the LANL waste streams to be shipped were selected and Section 5.0 presents the waste types volume and schedule for the planned LLMW shipments. Section 6.0 lists the references used in the preparation of this document.

**2.0 DOE POLICY CONCERNING OFF-SITE SHIPMENTS**

In an effort to promote the use of off-site commercial facilities for treatment and disposal of LLMW, DOE issued a memorandum (October, 1993) which relaxed the restrictions for releasing radioactive materials off site. The memorandum authorizes DOE facilities to use commercial facilities for the treatment and disposal of LLMW, and establishes the conditions to be met so that DOE can approve off-site shipments. The conditions are designed to ensure that before a shipment is initiated, the appropriate shipping and manifesting documentation has been prepared and that the receiving TSD facility has been evaluated to determine the compliance status with applicable local, state and federal regulatory programs. In addition, the applicable National Environmental Policy Act (NEPA) documentation must be prepared and approved before an exemption is granted. The issuance of the

memorandum supports the FFCA goal of shipping LLMW to off-site TSD facilities as soon as available capacity has been identified.

### 3.0 SELECTION OF OFF-SITE TREATMENT AND DISPOSAL FACILITIES

Off-site treatment is the treatment of LLMW at another location outside of LANL. These off-site treatment facilities include both DOE and private commercial enterprises. At the present time, treatment capacity for LANL LLMW at other DOE sites is unavailable due to the limited number of treatment facilities in operation, incompatibility of LANL wastes with the available treatment processes, and regulatory barriers.

LANL and DOE have used a variety of information sources to identify those off-site treatment and disposal facilities with the technology and capacity to treat LLMW. The DOE complex has conducted surveys of available off-site DOE and commercial treatment and disposal facilities and their capabilities. These surveys have been published in such documents as *Albuquerque Mixed Waste Treatment Plan* (DOE 1994a), and *Alternatives for Mixed Waste Management Prior to Completion of the Los Alamos Mixed Waste Disposal Facility* (LANL 1993). In addition, EPA has published in the Federal Register (Volume 59, No. 76) the results of a national profile on commercially generated low-level mixed waste, which identify LLMW TSDs and included treatment capacity information. A more recent survey, *Review of Private Sector Treatment, Storage and Disposal Capacity for Radioactive Waste*, (EG&G Idaho, Inc. 1994) will be used by LANL to identify new facilities which can treat and dispose of LLMW.

While the available LLMW treatment facilities have been found to be limited, LANL has been using these surveys to select the facilities capable of treating and disposing of LANL LLMWs. The facilities found to have the capability to treat or dispose of LANL LLMWs were Diversified Scientific Services, Inc. (DSSI) of Kingston, Tennessee and Envirocare Inc. (Envirocare) of Salt Lake City, Utah.

The particular off-site facility selected becomes a limiting factor in selecting the wastes to be shipped since each facility has unique waste acceptance criteria. For example, the DSSI facility can only accept certain liquid LLMWs for incineration, while Envirocare can only accept certain solid or stabilized LLMWs for land disposal. The fact sheets for these facilities are presented in Appendix A.

Selection of off-site facilities also depends on whether treatment is required before wastes meet LDR standards, and if the contractual arrangement with the TSD includes treatment. If treatment is required and the contract with the TSD does not include treatment, contractive changes will be required before shipments to the facility can be conducted.

### 4.0 SELECTION OF LLMWs TO BE SHIPPED TO OFF-SITE FACILITIES

LLMW streams were identified as candidates based on the permits, radioactive materials licenses, and waste acceptance criteria of the two available commercial facilities which are currently accepting LLMW of the types LANL has generated. The two facilities identified are Envirocare and DSSI.

For Envirocare, two groups of solid LLMWs were identified as being appropriate for disposal. These wastes are those stored in Dome 49 of TA-54, Area G and waste resulting from environmental restoration activities. Liquid LLMW candidates for DSSI were identified in the document *Feasibility of Treatment of Los Alamos National Laboratory Low-Level Mixed Waste at Diversified Scientific Services, Inc.* (DOE 1994b).

#### 4.1 Solid LLMW

Solid LLMW such as lead contaminated soils, lead chips and turnings, and other lead contaminated wastes stored in Dome 49 that are not suitable for decontamination were considered good candidates for disposal at Envirocare because such materials are not amendable to the sand blastings type operation of the lead decontamination trailer. Envirocare is capable of treating these wastes to meet LDR via microencapsulation and macroencapsulation techniques. Other heavy metal contaminated wastes currently stored in Dome 49, such as barium contaminated scrap, cadmium, and mercury contaminated soils are considered as possible off-site candidates because of the small concentrations of radioactive constituents recorded for these wastes.

Contaminated lead waste streams planned for on-site decontamination in the lead decontamination trailer were removed from the lists of waste planned for off-site treatment and disposal. These wastes include lead bricks, glove boxes, and lead casks, and were removed from the total volume estimated for the lead wastes destined for off-site shipment. The volumes and container information for each of the above waste types were provided by the Chemical and Mixed Waste Operations (CMWO) Waste Characterization database. Following decontamination, these materials will be returned to LANL's inventory for possible reuse.

The sludges from TA-50, which are currently stored in dome 49, were also considered for disposal at Envirocare. However, the data revealed that these wastes contain concentrations of transuranic isotopes above the permissible limits of Envirocare's radioactive materials license.

Another component of the waste volumes forecasted to be sent to Envirocare was solid mixed waste generated from environmental restoration activities. Approximately 127 m<sup>3</sup> of soil was found to be contaminated with trichloroethylene and mercury. The soil is being considered to be a candidate for disposal at Envirocare and activities are underway to prepare the soil for shipment. It should be noted that this waste stream is not a legacy waste and therefore not subject to the FFCA.

The environmental restoration soil waste contains very low concentrations of radioactivity which appear to meet the Envirocare Waste Acceptance Criteria (WAC). It is also possible that the waste stream contains concentrations of hazardous constituents that already meet the LDR limits and thus would require no additional treatment before disposal at Envirocare. If treatment is required, then additional contract negotiations with Envirocare will be needed to procure their treatment services, or LANL could choose to treat the wastes on site if the technology and capacity are available. A rigorous sampling effort is being conducted to confirm that the waste meets the Envirocare WAC.

#### 4.2 Liquid LLMW

Volume forecasts for off-site shipments of liquid LLMW were based on a feasibility study for the treatment of liquid LLMW to DSSI at Kingston, Tennessee (OSS 100). The report provides a list of wastes that are candidates for DSSI, and provides container identification numbers, RCRA codes, descriptions, and weights for the candidates. Volumes, however, have not been provided. Therefore, the volumes presented in this report were estimated from OSS 100 data based on the following assumptions:

- The weight provided for each container was assumed to be the net weight of the waste
- The wastes were assumed to have a density equal to that of water (1 kg/L)
- Unless otherwise specified, for convenience, the container for each waste was assumed to be a 55 gallon steel drum
- Eighty-eight drums were assumed to comprise one full shipment. This is roughly the number of 55 gallon drums that can be placed on one 40-ft long transport vehicle.

The total liquid LLMW volume was calculated by dividing the total weight of the wastes by the density, and converting to cubic feet.

Factors which may affect the shipment of LLMWs to DSSI include the need to repackage and bulk the smaller quantities of LLMWs presently stored in lab packs. DSSI will only receive these wastes if they are in 55 gallon or larger containers. In addition, following repackaging, verification characterization will probably be required. It is unclear at this time how these activities will affect the shipment schedule.

## 5.0 SUMMARY OF LLMW TO BE SHIPPED

The solid and liquid LLMW off-site shipments forecast, volumes, estimated container information, and general waste descriptions are provided in the following tables. Tables 1 and 3 represent solid LLMW in which Envirocare would be the likely off-site disposal facility. Table 1 shows the forecast of wastes from TA-54, Dome 49. Table 3 shows the forecast of waste generated from environmental restoration activities. As stated previously, the environmental restoration wastes are not part of the legacy waste streams and are not subject to the FFCA. Table 2 shows the forecast for liquid LLMW that may be destined for disposal at DSSI. The fractions provided under the column titled "# of Shipments" is the fraction of a full truck load. This fraction was provided because it is likely that two or more waste streams could be combined to comprise a full shipment. Another option, provided for under the Albuquerque Complex Mixed Waste Treatment Plan, is to combine partial shipments from different DOE sites to comprise a full shipment to a commercial TSD facility.

The total volume of solid LLMWs planned for shipment to Envirocare is approximately 9840 ft<sup>3</sup> and will be sent during two separate shipment campaigns. The first campaign is scheduled to occur during the fourth quarter of FY94 and will be the Environmental Restoration program LLMWs presented in Table 3. The second shipment campaign will be comprised of the Area G, Dome 49 LLMWs and is scheduled for the second quarter of FY95

The total volume of liquid LLMWs planned for shipment to DSSI is approximately 441 ft<sup>3</sup> and will be shipped during the third quarter of FY95 (Table 2). It should be noted that the 441 ft<sup>3</sup> represents one-half of the total estimated volume of this waste stream planned for eventual shipment to DSSI. Due to the repackaging and verification activities required for shipment, it is expected that only one-half the total volume will be ready for shipment to DSSI before June 30, 1995.

## 6.0 REFERENCES

DOE. 1994a. *Albuquerque Mixed Waste Treatment Plan*. Waste Management Division, Albuquerque Office, Albuquerque, New Mexico.

DOE. 1994b. *Feasibility of Treatment of Los Alamos Low-Level Mixed Waste at Diversified Scientific Services, Inc.* Los Alamos Area Office, Los Alamos, New Mexico.

EG&G Idaho, Inc. 1994. *Review of Private Sector Treatment, Storage and Disposal Capacity for Radioactive Waste*, Private Sector Initiatives and Project Support Unit, Idaho Falls, Idaho.

LANL. 1993. *Alternatives for Mixed Waste Management Prior to Completion of the Los Alamos Mixed Waste Disposal Facility*. Environmental Restoration Program, Los Alamos, New Mexico.

LANL 1994. *Estimated Volumes of Mixed Waste Shipments to Off-Site Disposal Facilities*. Chemical Sciences and Technology Division, Group 7. Chemical and Mixed Waste Operations, Los Alamos, New Mexico.

EPA (U.S. Environmental Protection Agency). 1994. *Extension of the Policy on Enforcement of RCRA Section 3004(J) Storage Prohibition at Facilities Generating Mixed Radioactive/Hazardous Waste*. Policy Statement 59, Federal register, No. 76, pp.18813-18816, April 20, 1994.

TABLE 1

Three Year Low-Level Mixed Waste Off-Site Shipment Forecast:  
Waste Located in Dome 49 of TA-54, Area G That May be Suitable for Disposal at Envirocare

Schedule	Waste Description	Container Information			# of Shipments	Volume (ft <sup>3</sup> )
		Type	Size	# of Containers		
FY 95, Q2	D005 Barium Wastes	Metal Drum	55 gal.	10	0.1	79.45
FY 95, Q2	Cadmium Wastes	Metal Drum	55 gal.	16	0.18	117.58
FY 95, Q2	D008 Lead Wastes	Metal Drum	55 gal.	682	7.75	5010.49
FY 95, Q2	D009, F001 Contaminated Soil	Metal Drum	55 gal.	20	0.23	146.89
FY 95, Q2	D011 Silver	Metal Drum	55 gal.	1	0.01	0.07

Total Volume =5354.48

TABLE 2

Three Year Low-Level Mixed Waste Off-Site Shipment Forecast:  
Liquid Waste That May be Suitable for Disposal at DSSI

Schedule	Waste Description	Container Information			# of Shipments	Total Volume (ft <sup>3</sup> )
		Type	Size	# of Containers		
FY 95, Q3	Liquid Characteristic and Listed Wastes	Metal Drum	55 gal.	60	1	441.38

**TABLE 3**

**Three Year Low-Level Mixed Waste Off-Site Shipment Forecast:  
Waste Generated During Environmental Restoration Activities That May be Suitable for Disposal at Envirocare**

Schedule	Waste Description	Container Information			# of Shipments	Total Volume (ft <sup>3</sup> )
		Type	Size	# of Containers		
FY 94, Q4	F001 TCE Contaminated Soil from ER Clean Up	S-84, LSA Steel Container	84 ft	53	6	4484.37

**Appendix A**  
**Fact Sheets For DSSI and Envirocare, Inc**

ENVIROCARE, INC.

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Rep.: Rice, Sue  
Phone: (801) 532-1330  
FAX: (801) 537-7345

215 South State Street  
Suite 1160  
Salt Lake City, UT 84111

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**Services Provided:**

- LLRW Volume Reduction
- Decontamination of LLRW Metals
- x LLMW Treatment
- x LLMW-Alpha Contaminated
- LLMW Treatability Studies
- LLRW Decontamination/Recycling
- x LLMW Storage/Disposal

**Overview:**

Envirocare operates a waste disposal facility at Clive, Utah. The facility accepts and disposes of LLRW and LLMW.

**Current Capabilities:**

Envirocare treats LLMW using chemical stabilization for concentration-based mixed waste to meet land disposal restrictions. Envirocare can conduct treatability studies.

**Future Capabilities:**

Envirocare did not provide information on their plans for future expansion of current services or development of new capabilities.

**Permits and Licenses:**

Radioactive Material License, UT 2300249 with amendment No. 14, issued by the Utah Department of Environmental Quality, Division of Radiation Control.

DIVERSIFIED SCIENTIFIC SERVICES, INC.

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Rep.: Hembree, Larry L.  
Phone: (615) 376-0084  
FAX: (615) 376-0087

P.O. Box 863  
Kingston, TN 37763

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**Services Provided:**

- LLRW Volume Reduction
- Decontamination of LLRW Metals
- x LLMW Treatment
- x LLMW-Alpha Contaminated
- LLMW Treatability Studies
- x LLRW Decontamination/Recycling
- LLMW Storage/Disposal

**Overview:**

Diversified Scientific Services, Inc. (DSSI), a subsidiary of Chemical Waste Management, Inc., operates a mixed waste treatment facility. The facility employs an industrial boiler to combust solvents for generation of electricity. Other materials, such as containers that hold the flammable solvents, are also recycled for beneficial use.

**Current Capabilities:**

The DSSI facility treats hazardous liquid wastes through combustion. The facility can accept and recycle waste solvents in the D001 and F001 through F005 categories, plus numerous D, U, and P-listed materials. DSSI's radiological license allows the receipt of low-level liquid mixed wastes that contain some special nuclear material and source material.

**Future Capabilities:**

The burning capacity will be increased to meet future demands. There are no plans to increase the level of radionuclides in solvents accepted at the facility.

**Permits and Licenses:**

- Permits issued by the Tennessee Department of Health and Environment
  - Radioactive Materials License
  - TSD Part B-Hazardous Waste Permit
  - Air Pollution Permit
  - EPA Generator Number
- NPDES Storm Water Runoff Permit issued by the Tennessee Department of Conservation

**WM 200  
FY95 WASTE MINIMIZATION ANNUAL WORK PLAN**

**FINAL**

July 27, 1994

Submitted in partial fulfillment of the  
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This *Annual Waste Minimization Plan* (WM 200) is being submitted to the U.S. Environmental Protection Agency (EPA) by the U.S. Department of Energy (DOE) and Los Alamos National Laboratory (LANL) in fulfillment of DOE's commitment to EPA under the Federal Facility Compliance Agreement (FFCA) developed pursuant to the Land Disposal Restrictions (LDR) requirements of the Resource Conservation and Recovery Act (RCRA), as promulgated in 40 CFR Part 268. This Annual Waste Minimization Plan is provided as a deliverable in compliance with Milestone WM 200 in Appendix B of the FFCA.

The purpose of this Annual Waste Minimization Plan is to identify how waste minimization priorities are developed, and activities implemented to assure that mixed waste streams are promptly identified; have their Process Waste Assessments (also called Pollution Prevention Opportunity Assessments, PPOA) completed quickly; have their Site Specific Plans developed; and corrective actions completed or necessary Research and Development initiated to solve identified problems. The Annual Waste Minimization Plan discusses the following elements:

- Mixed Waste Minimization Activities
- Ongoing Miscellaneous Activities

The following table discuss the LDR FFCA milestones that relate to WM 200 and the nature of that inter-relationship.

<b>PRIMARY MILESTONE</b>	<b>RELATED MILESTONE</b>	<b>NATURE OF INTERRELATIONSHIP</b>
WM 200	OSS 100	Information developed from the report on the feasibility of treatment of LANL low-level mixed waste (LLMW) at off-site facilities will be reviewed to ensure that treatment and disposal problems created by generating particular LDR or mixed waste (MW) waste streams are used as lessons learned for waste streams currently being generated and new waste streams.
	OSS 200	Information developed from the annual report on off-site shipment of wastes will be reviewed to ensure that treatment and disposal problems created by generating particular LDR or MW waste streams are used as lessons learned for waste streams currently being generated and new waste streams.
	CAI 300	Information developed from the CAI work-off plan will be reviewed to ensure that treatment problems created by generating particular LDR or MW waste streams are used as lessons learned for waste streams currently being generated and new waste streams.
	TRU 100	Information developed from the TRU waste work-off plan will be reviewed to ensure that treatment and disposal problems created by generating particular LDR or MW waste streams are used as lessons learned for waste streams currently being generated and new waste streams.

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3.2 Ongoing Administrative Approaches .....	4

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CWDR	Chemical Waste Disposal Request
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DOE/AL	DOE Albuquerque Operations Office
DOT	Department of Transportation
DSSI	Diversified Scientific Services, Inc.
EPA	U.S. Environmental Protection Agency
ERC	Earth Resources Corporation
ES&H	Environment, Safety, and Health
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FFCA	Federal Facility Compliance Agreement
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LANL	Los Alamos National Laboratory
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LLW	Low-Level Radioactive Waste
LP	LANL Procedures
MSDS	Material Safety Data Sheet
MWRSF	Mixed Waste Receiving and Storage Facility
NEPA	National Environmental Policy Act
NESHAPS	National Emissions Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
NMED	New Mexico Environmental Department
NPDES	National Pollutant Discharge Elimination System
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## LIST OF ACRONYMS

(Continued)

PPAC	Pollution Prevention Awareness Campaign
PRD	Program Required Document
PTS	Project Tracking System
PWA	Process Waste Assessments
QA	Quality Assurance
QAP	Quality Assurance Plan
RCRA	Resource Conservation and Recovery Act
R&D	Research and Development
R&M	Redistribution and Marketing Center
RES	Rollins Environmental Services
RMMA	Radioactive Material Management Area
RSWD	Radioactive Solid Waste Disposal Record
SOP	Standard Operating Procedure
SSP	Site Specific Plans
SWDA	Solid Waste Disposal Act
TA	Technical Area
TCLP	Toxicity Characteristic Leaching Procedure
TRU	Transuranic
TSCA	Toxic Substance Control Act
TSDF	Treatment, Storage, or Disposal Facility
UBC	Uniform Building Code
UL	Underwriters Laboratories
ULISSES	Uranium Line for Special Separation Sciences
WAC	Waste Acceptance Criteria
WBS	Work Breakdown Structure
WIPP	Waste Isolation Pilot Plant
WMC	Waste Management Coordinator
WMPO	Waste Minimization Program Office
WPF	Waste Profile Form

**WM 200**  
**FY95 WASTE MINIMIZATION ANNUAL WORK PLAN**

**1.0 INTRODUCTION**

The FY95 Waste Minimization Annual Work Plan (WM 200) describes how Los Alamos National Laboratory's (LANL's) Waste Minimization Plan (Federal Facilities Compliance Agreement (FFCA) report WM 100) will be implemented for FY95. It identifies how waste minimization and pollution prevention priorities are updated and implemented for the fiscal year to ensure that mixed waste streams are promptly identified; which process waste assessments (PWAs) and site specific plans (SSPs) are to be completed on time; and how corrective actions are completed or necessary Research and Development (R&D) activities will be initiated to resolve the identified problem. The operational overview of waste minimization activities at LANL is provided in the *Waste Minimization Plan* (WM 100).

Approximately 210 separate waste streams are currently generated at LANL, of which 39 are mixed waste and the remaining 171 are non-RCRA low-level radioactive waste (LLW), transuranic waste, or chemical waste. The first step in effectively minimizing the waste generated at a facility is to prioritize waste streams that exist. The nature of these waste streams differs from a production environment or industrial processes, in that the waste may be of small volume, short-lived, intermittent, or pulsed, and may vary in composition with time. For example, decontamination and decommissioning waste streams vary in volume, can be short-lived, and vary in composition with time. This variation in waste streams exacerbates the problems associated with implementing and tracking effective waste management, waste minimization, and pollution prevention programs, including on and off-site treatment, storage, and disposal.

Section 2.0, "Mixed Waste Minimization Activities", presents details of specific PWAs and SSPs that will be developed and/or implemented for the remainder of the 39 mixed waste generating functions and an estimated 15 large chemical generating functions at the LANL during FY95. During FY94 the 39 mixed waste generating functions received primary attention, due to the prioritization criteria established in the *Waste Minimization Plan*. Section 3.0, "Ongoing Waste Minimization," details the general and ongoing waste minimization activities at LANL that also affect mixed waste generation.

**2.0 MIXED WASTE MINIMIZATION ACTIVITIES**

In FY95 the Pollution Prevention Program Office (P30) at LANL will direct and manage activities to continue work on the 54 PWAs that were initiated in FY93 and FY94. PWAs are detailed site surveys to identify storage, operation and process concerns, waste stream characterization, pollution prevention, and waste minimization opportunities.

The 39 LLMW PWAs that will be continued in FY95 are

- Analyses of TA-55 plutonium and other samples
- Waste Isolation Pilot Plant (WIPP)-related programs (bin-scale testing, development of mixed waste LANL standards)
- Plutonium compounds chemistry
- Magnetic plutonium separation
- Metals separation
- Surface contamination recovery on process residue
- Firesafe pit process
- Residues from scrap leaching, etc.
- Metal forming
- Metal from a vessel recovery campaign

- Analyses of plutonium and special nuclear material samples from MEE-9
- Analyses of uranium samples from MST-5
- Analyses of SP-100 (space reactor) samples
- Toxicity Characteristic Leaching Procedure (TCLP) of compositional/environmental samples
- Analyses of waste management samples
- Analyses of WIPP waste from TA-54 and other storage areas
- Analyses of samples from environmental restoration programs
- Mixed waste analyses Research and Development (R&D)
- R&D on hazardous waste treatment options
- R&D on alternative methods of analyses
- Plutonium-238 programs
- Radiochemistry analyses of actinide samples
- Analysis of tritium-containing samples
- Analysis of production and surveillance samples for uranium program
- Differential thermal analysis
- Evaporator waste metal
- Plutonium fluoride reduction
- Plutonium oxide dissolution with nitric acid
- Off-gas treatment
- Volume reduction
- Hot cells
- Non aqueous chemistry
- Plutonium chlorination
- Aqueous chloride recovery
- Thermochemistry
- Hydroxide precipitation of chloride waste streams
- Gas-solid reaction
- Diagnostics development
- Automated Retirement and Integrated Extraction System support

During FY93 and FY94, all mixed waste processes that were tracked via waste management data bases were identified and process descriptions were developed. These are the 39 most significant mixed waste generating processes at LANL. The completion of these PWA's will involve the identification and evaluation (when applicable) of pollution prevention opportunities. Completion of these PWA's is dependent upon implementation of a LANL recharge system to generate revenue from waste generators. (Note that DOE pollution prevention funding does not cover implementation; implementation must be funded by waste generators.)

The P30 will use three PWA methodologies: process flow diagram alternative methodologies, DOE plant profiles, and where appropriate, walk-through site surveys. These PWA methodologies will provide detailed data on waste-generating processes and generating problems. Solutions will then be identified through the use of the Best Available Technology (BAT) database, and the most economically feasible means of implementing the solution will be identified through cost/benefit analysis. For detailed explanation of the PWA methodologies, see WM 100, Section 2.2.

The final product of these PWAs will be SSPs to implement identified waste minimization actions on each waste stream. SSPs detail possible improvements to the waste stream generation process, and opportunities and strategies for waste minimization and pollution prevention activities.

The P30 will then work with the waste generators to write SSPs that will provide data on waste generating activities; BAT and administrative solutions; cost/benefit analysis of solutions to provide economic

efficiency; and an implementation plan for these waste streams. For a detailed explanation of SSP, BAT and administrative solutions, and cost benefit analysis, see WM 100, Sections 2.3 and 2.4.

The P30 uses internal reviews and develops quarterly reports to ensure that LANL deliverables and internal milestones are achieved. The P30 portion of this effort will be funded through the DOE Waste Management FY95 Baseline. The waste generator's portion of this effort will be funded through individual generators' budget requests to DOE Defense Programs through the DOE Work Authorization Directive System for waste minimization. In addition, P30 has developed a LANL recharge system. This recharge system will partially fund waste generator's minimization activities.

### **3.0 ONGOING MISCELLANEOUS ACTIVITIES**

This section will address aspects of the Pollution Prevention Program that do not specifically fit into the PWA and SSP process scheme. They are ongoing technical actions and administrative approaches. These are discussed in the following section.

#### **3.1 Ongoing Technical Actions**

The ongoing technical actions are as follows:

1. P30 supports a Solvent Substitution Working Group and a Material Substitution Committee that works with waste management coordinators and waste generators to find suitable substitutes for various waste solvent generating programs, and other operations using highly toxic and regulated materials (e.g. Chlorofluorocarbons [CFCs]). The effort includes (a) working with the users, vendors, and other DOE facilities to identify potential substitutes for specific applications; (b) analyzing the suitability of commercially available substitutes for a particular application and verifying characteristics such as the flash point at high altitude (lower atmospheric pressure and lower flash point than specified for sea level); and (c) expanding this effort into an Integrated Material Substitution Committee that will integrate with procurement and other hazardous material programs to cooperatively address the technical assessment and application of material substitutes and the life-cycle control of materials from purchase through ultimate disposal.
2. Implementing procedural and contractual programs for internal redistribution and subsequent external recycling of excess chemicals, which will allow for economical and technically sound recycling. The program will also require the maximum amount of segregation of recyclable materials for ease of recycling.
3. Participating in a DOE/AL funding opportunity to implement projects which reduce the volume and toxicity of waste generated on a Return on Investment (ROI) basis.
4. P30 is providing a pollution prevention assessment of the design of the TA-63 (Hazardous Waste Treatment Facility) Hazardous Waste Management Units, to ensure that pollution prevention/waste minimization practices are included in the design, construction, and operation phases in FY95. The P30 will continue to provide this support and expand its efforts in pollution prevention for the design, decontamination and decommissioning, and environmental restoration programs.

### 3.2 Ongoing Administrative Approaches

The ongoing administrative approaches are as follows:

- The P30 will continue to use the Environmental, Safety, and Health (ES&H) Questionnaire Committees' review of new and modified projects to require and specify procedures and methodologies for controlling materials through SSPs and standard operating procedures.
- P30 continues to review standard operating procedures (SOPs) for pollution prevention/waste minimization practices, providing written feedback and guidance on pollution prevention/waste minimization practices that should be included. In FY94, over 150 SOPs were reviewed. A similar number of reviews is expected for FY95.
- P30 distributed 40 Waste Acceptance Criteria (WAC) guidelines on pollution prevention/waste minimization practices that may be appropriate for SOPs.
- The P30 Pollution Prevention Awareness Campaign will continue to provide general pollution prevention and waste minimization information directly to LANL employees and indirectly through training support to the LANL Training Office. Currently the LANL Training Office is responsible for providing ongoing general employee training to all employees. The P30 will continue to provide waste minimization training to all Waste Management Coordinators (WMC) and provide updates during the regular WMC meetings.
- Representatives of P30 are participating on the CST-7 customer service office phone lines to provide direct question/answer service to WMC and generators with regards to waste minimization and pollution prevention, and where appropriate, site visits and assistance with PWA/SSPs will be scheduled.
- A video and handbook developed in FY94 will be used for employee training.
- The waste minimization awards program, founded in 1992, will be continued in FY95. The 1994 awards will be presented in August, 1994.
- P30 is working to begin a recharge system in FY95 to fund implementation of pollution prevention. If successful, revenue will be used to assist waste generators in implementation of pollution prevention. The first step in this process is completion of PWAs.