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**Los Alamos National Laboratory  
Environmental Management**  
A Department of Energy environmental program

**ENVIRONMENTAL RESTORATION AND  
WASTE MANAGEMENT  
FIVE-YEAR PLAN  
SITE SPECIFIC PLAN**

Prepared by: Environmental Management Division, LANL  
for the Department of Energy, Albuquerque Operations Office  
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## **FOREWORD**

This is the third in a series of annual Site Specific Plans (SSPs) that complement the Department of Energy (DOE) annual Environmental Restoration and Waste Management (ER/WM) Five-Year Plan (FYP). Types of ER/WM projects described in this plan include Corrective Activities, Environmental Restoration, Waste Management, and Technology Development. Technology Development programs seek to resolve major technical issues and rapidly advance beyond current technologies for ER/WM activities.

Using the DOE's ER/WM FYP dated May 1992 as a foundation, this SSP includes a description of projects and planning information for Fiscal Year (FY) 1993 through FY 1998 with particular emphasis on FY 1993. Individuals should focus their review of this document on an evaluation of the FYP planning and implementation process. Additionally, evaluation of the specific program scope, schedules, and costs should utilize the specific installation's Activity Data Sheets available at public reading rooms located near each DOE installation.

It should be noted that the proposed plans described in this document are subject to change for the following reasons: (1) the results of more detailed field characterization or other unforeseen field conditions may necessitate a different remedial action approach, (2) regulatory requirements may change, or (3) necessary project funds may be delayed. Changes to last year's SSP are reflected in this document.

We appreciate your cooperation in working with the DOE and sharing common goals to eliminate potential environmental hazards to the public and comply with applicable regulatory requirements as expeditiously as possible.

Your suggestions and recommendations are most welcome. Comments regarding this Site Specific Plan may be directed to:

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Mail Stop K498  
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Los Alamos, New Mexico 87545**

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## ABBREVIATIONS AND ACRONYMS

A-E	Architect-engineer
ADM	Action description memorandum
ADS	Activity data sheet
AEA	Atomic Energy Act
AET	Applied Environmental Technologies
AL	Albuquerque Field Office
ALARA	As low as reasonably achievable
AO	Administrative Order
AOC	Area of Concern
CA	Corrective activities
CAA	Clean Air Act
CAI	Controlled air incinerator
CE	Capital equipment
CEARP	Comprehensive Environmental Assessment and Response Program
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH	Contact-handled
CMI	Corrective measures implementation
CMR	Chemical and Metallurgical Research
CMS	Corrective measures study
CSCSC	Cost and schedule control systems criteria
CTEN	Combined thermal/epithermal neutron
CWA	Clean Water Act
CY	Calendar year
D&D	Decontamination and decommissioning
DO	Division Office
DEC	DOE Environmental Checklist
DOE	US Department of Energy
DOE-AFO	US Department of Energy Albuquerque Field Office
DOE-AL	See DOE-AFO
DOE-HQ	US Department of Energy Headquarters
DOE-LAAO	US Department of Energy Los Alamos Area Office
DOT	Department of Transportation
EA	Environmental assessment
EIS	Environmental impact statement
EM	LANL Environmental Management Division
EM-7	Waste Management Group
EM-8	Environmental Protection Group
EM-9	Environmental Chemistry Group
EM-13	Environmental Restoration Group
ENG	LANL Facilities Engineering Division
EPA	U.S. Environmental Protection Agency

**ABBREVIATIONS AND ACRONYMS**  
(continued)

ER	Environmental restoration
ES&H	Environment, safety, and health
FFCA	Federal Facilities Compliance Agreement
FIMAD	Facility for Information Management, Analysis, and Display
FONSI	Finding of No Significant Impact
FS	Feasibility study
FSAR	Field safety analysis report
FY	Fiscal year
FYP	Five-Year Plan
GAO	General Accounting Office
GD/MS	Glow discharge mass spectrometry
GIS	Geographical Information System
GPP	General plant projects
H&S	LANL Health and Safety
HE	High explosive(s)
HRL	Health Research Laboratory
HQ	Headquarters
HS	LANL Health and Safety Division
HSE	Health, Safety, and Environment Division (included HS and EM Divisions prior to August 5, 1991)
HSWA	Hazardous and Solid Waste Amendments
HWA	Hazardous Waste Act
HWTF	Hazardous Waste Treatment Facility
ICP/MS	Inductively coupled plasma mass spectrometry
IRM	Interim remedial measure
IWP	Installation work plan
JCI	Johnson Controls Inc.
LAO	Los Alamos Area Office
LANL	or the Laboratory; Los Alamos National Laboratory
LAMPF	Los Alamos Meson Physics Facility
LDR	Land disposal restriction
LERC	Laboratory Environmental Review Committee
LI	Line item
LLRLW	Low-level radioactive liquid waste
LLW	Low-level waste
MDA	Material disposal area
MHW	Mixed hazardous waste
MIS	Management information system
MLLW	Mixed low-level waste
MP	Major Projects
MSA	Major System Acquisition
MW	Mixed Waste

**ABBREVIATIONS AND ACRONYMS**  
**(continued)**

MWSDF	Mixed Waste Storage/Disposal Facility
NAA/DNC	Neutron Activation Analysis and Delayed Neutron Counting
NDE/NDA	Non-Destructive Examination/Non-Destructive Analysis
NDT	Non-Destructive Testing Facility
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NMED	New Mexico Environment Department (formerly NMEID)
NMEID	New Mexico Environmental Improvement Division
NPDES	National Pollutant Discharge Elimination System
OSHA	Occupational Safety and Health Administration
OTD	Office of Technology Development
OU	Operable unit
PA/SI	Preliminary Assessment/Site Inspection
PACE	Plant and capital equipment
PCB	Polychlorinated biphenyl
PCS	Project control system
PEIS	Programmatic environmental impact statement
PL	Project leader
PM	Program Manager (ER)
PMP	Program Management Plan
PSAR	Preliminary safety analysis report
PTL	Project team leader
PTS	Project tracking system
PWA	Process Waste Assessment
QA	Quality assurance
QAPjP	Quality Assurance Project Plan
QAPP	Quality Assurance Program Plan
QPP	Quality Program Plan
R&D	Research and development
RA	Remedial action
RCRA	Resource Conservation and Recovery Act
RD	Remedial design
R & D	Research & Development
RDDT&E	Research, development, demonstration, testing, and evaluation
RFA	RCRA facility assessment
RFI	RCRA facility investigation
RH	Remote-handled
RI	Remedial investigation
RLW	Radioactive liquid waste
RLWTF	Radioactive liquid waste treatment facility
RPF	Records Processing Facility

**ABBREVIATIONS AND ACRONYMS**  
**(continued)**

<b>SA</b>	<b>Safety assessment</b>
<b>SAR</b>	<b>Safety analysis report</b>
<b>SARA</b>	<b>Superfund Amendments and Reauthorization Act</b>
<b>SC</b>	<b>Special case</b>
<b>SDWA</b>	<b>Safe Drinking Water Act</b>
<b>SEN</b>	<b>Secretary of Energy Notice</b>
<b>S &amp; M</b>	<b>Surveillance &amp; Maintenance</b>
<b>SNM</b>	<b>Special nuclear materials</b>
<b>SOP</b>	<b>Standard operating procedure</b>
<b>SPCC</b>	<b>Spill prevention control and countermeasure</b>
<b>SRF</b>	<b>Size Reduction Facility</b>
<b>SSP</b>	<b>Site-Specific Plan</b>
<b>SWCS</b>	<b>Sanitary wastewater consolidation system</b>
<b>SWMU</b>	<b>Solid waste management unit</b>
<b>SWOPE</b>	<b>Students Watching Over Our Planet Earth</b>
<b>TA</b>	<b>Technical area</b>
<b>TAD</b>	<b>Technology Activity Description</b>
<b>TD/TM</b>	<b>Technology Development/Transportation Management</b>
<b>TEC</b>	<b>Total estimated cost</b>
<b>TRU</b>	<b>Transuranic (waste)</b>
<b>TSD</b>	<b>Treatment, storage, and disposal</b>
<b>TSCA</b>	<b>Toxic Substances Control Act</b>
<b>TSDF</b>	<b>Treatment, storage, and disposal facility</b>
<b>TSR</b>	<b>Technology status report</b>
<b>TTP</b>	<b>Technical Task Proposal</b>
<b>UC</b>	<b>University of California</b>
<b>USC</b>	<b>United States Code</b>
<b>USGS</b>	<b>United States Geological Survey</b>
<b>UST</b>	<b>Underground storage tank</b>
<b>VCA</b>	<b>Voluntary corrective action</b>
<b>VOC</b>	<b>Volatile organic contaminant</b>
<b>WAC</b>	<b>Waste acceptance criteria</b>
<b>WBS</b>	<b>Work breakdown structure</b>
<b>WFE</b>	<b>Wiped film evaporator</b>
<b>WIPP</b>	<b>Waste Isolation Pilot Project</b>
<b>WM</b>	<b>Waste management</b>
<b>WMP</b>	<b>Waste management procedures</b>
<b>WTID</b>	<b>Waste Treatment Integrated Demonstration</b>

**ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT  
FIVE-YEAR PLAN  
SITE SPECIFIC PLAN  
LOS ALAMOS NATIONAL LABORATORY**

## **1.0. INTRODUCTION**

The Los Alamos National Laboratory's (LANL or the Laboratory) Site Specific Plan (SSP) presents implementation strategies for the Department of Energy's (DOE) Environmental Restoration/Waste Management (ER/WM) Five-Year Plan (FYP) for Fiscal Year (FY) 1993 for the Los Alamos installation. The SSP includes project descriptions and planning information for FY1992 through FY1998, with particular emphasis on FY1993. Types of ER/WM projects and activities described in this plan include Corrective Activities, Environmental Restoration, Waste Management and Technology Development.

### **1.1. Location, Site Description, and Mission**

The Laboratory is located in Los Alamos County in north central New Mexico, approximately 60 mi north-northeast of Albuquerque and 25 mi northwest of Santa Fe. The 24,400-acre Laboratory site (1,400 acres of developed land in a mountainous landscape), as shown in Figure 1-1, is situated on the Pajarito Plateau, which is composed of a series of finger-like mesas separated by deep, east-west oriented canyons cut by intermittent, short-lived streams. The mesa tops range in elevation from approximately 7,800 ft at the flank of the Jemez Mountains to about 6,200 ft on their eastern margin, terminating above the Rio Grande Valley.

The area includes large tracts of federal and state land located north, west, and south of the Laboratory site. Undeveloped land, much of which is not developable, buffers hazardous operations and acts as security zones. Numerous archaeological sites are located within and adjacent to LANL.

The county's population is approximately 20,000. Two major residential and related commercial areas exist in the county. About 40% of those employed in Los Alamos commute from other counties.

Laboratory environmental impact is minimal because of biological and hydrological characteristics of the area and past waste management practices. Surface water flow crossing the Laboratory is intermittent and/or ephemeral and reaches the Rio Grande only during significant periods of runoff caused, for example, by snowmelt or thunderstorms.

The main aquifer lies 600-1,200 ft below the surface and is separated from the surface by unsaturated tuff, a volcanic ash. There is no known hydrological connection between the Laboratory surface site and the main aquifer from which the municipal water supply for Los Alamos is obtained.

The Laboratory's primary mission is research and development of nuclear weapons. Programs include weapons development, nuclear fission and fusion research, nuclear safeguards and security, and verification and control

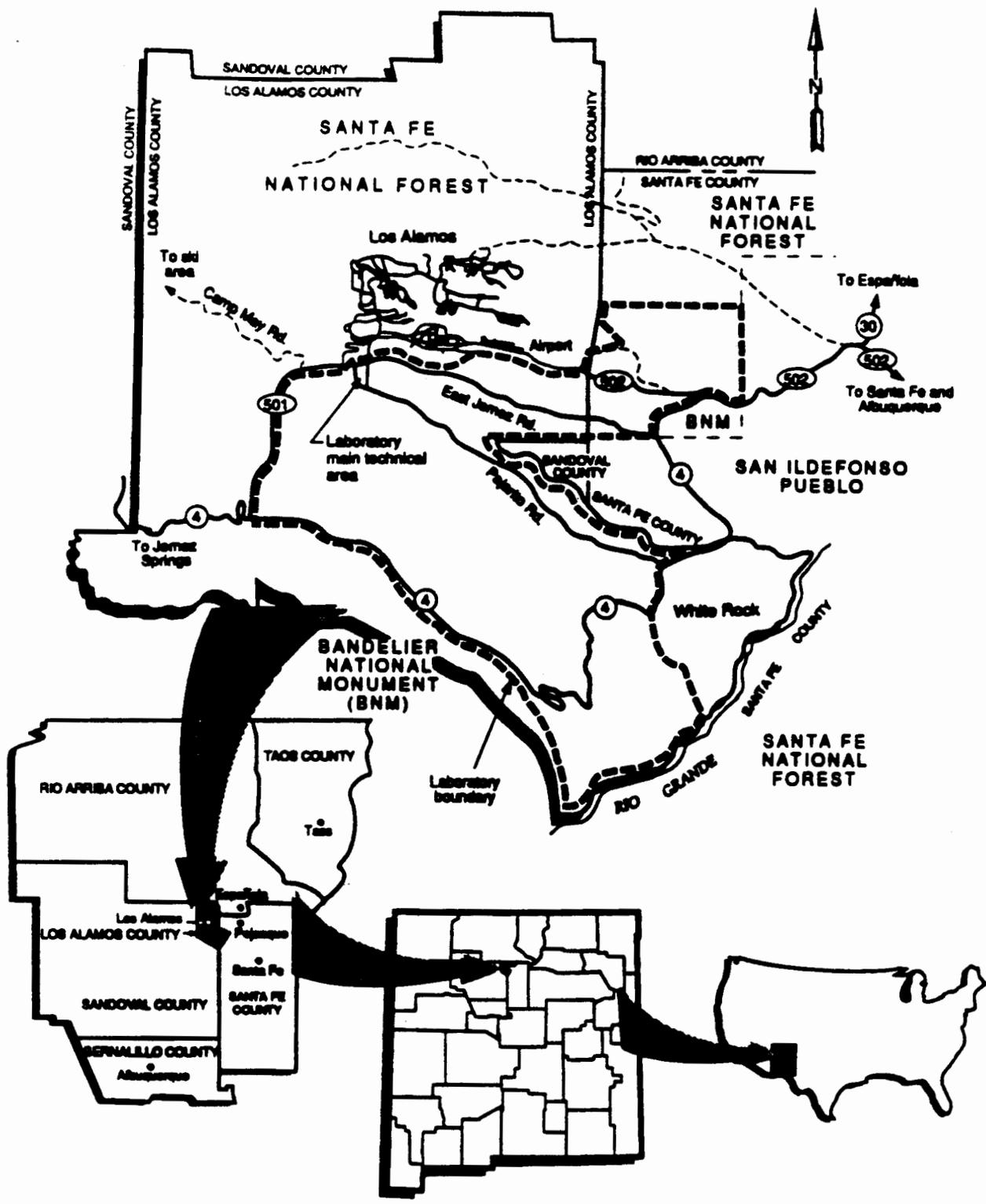


Figure 1-1. Regional location of Los Alamos.

technologies. Basic research in physics, chemistry, mathematics, engineering, and materials science is integral to Laboratory activities.

Research on peaceful uses of nuclear energy has included space applications, power reactor programs, magnetic and inertial fusion, radiobiology, and medicine. Other programs include astrophysics, earth sciences, lasers, computer sciences, solar energy, geothermal energy, biomedical and environmental research, and nuclear waste management research.

## **1.2. Management Overview**

**Laboratory Overview.** The Laboratory provides the highest possible level of protection to its employees, the public, government property, and the environment from harm that could arise from Laboratory operations. To accomplish this objective, line management is responsible for conducting only those operations and activities that can be controlled safely. The Environmental Management (EM) and Health and Safety (HS) Divisions maintain comprehensive environment, safety, and health programs to assist line management and to provide oversight of environment, safety, and health activities. In addition, Laboratory employees must observe the environment, safety, and health procedures and requirements specified by their supervisors and the Laboratory.

The primary responsibility for employee health and safety on the job and for environmental protection from Laboratory operations rests with line management; this responsibility will be given first priority before Laboratory operations are approved or carried out. Supervisors are expected to recognize and anticipate potential hazards, to inform employees of risks associated with their work, to specify protective measures, and to ensure that their employees receive appropriate training. Supervisors also will establish and maintain a system to ensure that appropriate consideration is given to significant changes made in operations, procedures, materials, or equipment that could affect the safety of an activity, including environmental impact.

**Laboratory Planning Model.** The Laboratory planning model, as described in the 1990 Site Development Plan, illustrates the basic functional and spatial organization of the Laboratory. This model establishes the framework and rationale for site planning. As such, the model proposes building upon and strengthening existing development patterns to achieve effective functional working relationships and considers locations for the accommodation, expansion, and sometimes the relocation of programs and facilities to enhance the compatibility of land uses. In the planning model, Technical Area 3 (TA-3) remains the Core Area, the Laboratory's administrative and functional center. Three main development corridors emanate from the Core Area, each with its own major programmatic emphasis: East Jemez Corridor, Pajarito Corridor, and West Jemez Corridor.

When the Laboratory updated its Site Development Plan in 1990, waste management was a major topic, both in terms of policies as well as land use. The Laboratory's primary environment, safety, and health goal is to continue to protect the environment, the public, and LANL personnel and facilities. Corrective Activities and Environmental Restoration Operable Units are located throughout the Laboratory and adjacent areas and are remediated on an as-needed basis. Waste Management activities take place primarily at TA-50 and

TA-54 on the Pajarito Corridor, the area reserved for future development of waste management functions and operations required to meet waste management goals.

The Laboratory has implemented a three-part resource management strategy that includes resource preservation, conservation, and restoration activities to continue to accomplish its mission while minimizing its effects on the environment. This strategy anticipates that current Laboratory/DOE lands would remain under institutional control.

Employees are often in the best position to evaluate health and safety risks that might cause harm to themselves and their coworkers. Therefore, Laboratory employees must observe applicable health, safety, and environment procedures; use prescribed personal protective equipment; promptly report accidents, injuries, and unsafe conditions; and participate in required medical and biological monitoring programs.

The Laboratory's health, safety, and environment policies are implemented through the administrative requirements in the Laboratory's Environment, Safety, and Health Manual. The Environment, Safety, and Health (ES&H) Council, whose members are upper-level managers, recommends policies to the Director and oversees policy implementation.

The EM Division initiates and promotes comprehensive environmental programs, which include waste management, environmental restoration, and environmental protection and preservation. The HS Division initiates and promotes comprehensive health and safety programs, which include such special fields as radiation protection, occupational medicine, industrial safety, industrial hygiene, and nuclear criticality safety. EM and HS Divisions address special requirements or needed emphasis within these programs, such as maintaining toxic and radiation levels as low as reasonably achievable (ALARA); transporting, handling, and disposing of hazardous materials; providing specific health, safety, and environment training; and providing emergency response.

**Estimates by Activity Data Sheet.** Activity Data Sheets (ADSs) are the primary planning unit for the FYP. The ADSs include such items as cost estimates, priority levels, regulatory drivers, milestones, and a narrative description of activities.

Table 1-1 presents a crosswalk between the previous and the new ADS structure for **Corrective Activities**. ADSs for Waste Management are based on the Work Breakdown Structure (WBS) approved on May 1, 1992 which utilize major activity areas to **organize work-related functions**. Table 1-2 presents the crosswalk between the previous and the new ADS structure.

Beginning this year, the Environmental Restoration Program was organized into 17 large projects which are defined and described in a way that organizes all the elements of the program into a coherent framework. ADS 2106, Programmatic Management Remediation, has been consolidated into ADS 2107, Programmatic Management Assessment. ADS 2122, D & D Remediation, 3 & 4 South, has been consolidated into ADS 1055, Total DPW Site. All other ER ADSs are the same as last year.

**TABLE 1-1**

**CROSSWALK BETWEEN OLD AND NEW ADS STRUCTURE - CORRECTIVE ACTIVITIES**

**The following old ADSs are consolidated into new ADS 81 - Corrective Activities Master ADS.**

**ADS 43 High Explosive Wastewater Treatment (FY92 operating only)  
ADS 49 PCB Equipment Replacement/Retrofilling (operating)  
ADS 51 Sanitary Wastewater Systems Consolidation (operating)  
ADS 55 Underground Storage Tanks (FY92 operating only)  
ADS 70 Water Supply System/Cross Connection Control (operating)  
ADS 80 Clean Water Act Projects (operating)  
ADS 3263 RCRA Active Firing Sites (operating)**

**The following old ADSs are consolidated into new ADS 82 - Corrective Activities GPP ADS.**

**ADS 49 PCB Equipment Replacement/Retrofilling (FY92 GPP only)  
ADS 80 Clean Water Act Projects (GPP)**

**The following ADSs stand alone:**

**ADS 42 Hazardous Waste Treatment Facility (design and construction)  
ADS 51 Sanitary Wastewater System Consolidation (construction)  
ADS 74 New Stack at Los Alamos Neutron Physics Facility (construction)**

**TABLE 1-2**

**CROSSWALK BETWEEN OLD AND NEW ADS STRUCTURE - WASTE MANAGEMENT**

The following old ADSs are consolidated into ADS 4172 - Waste Management Operations:

- ADS 3056 Hazardous & Toxic Waste Disposal
- ADS 3079 Mixed Low-Level Waste Storage Operations
- ADS 3084 Chemical Waste Storage
- ADS 3088 Chemical Waste Treatment
- ADS 4117 Remote Handled TRU Waste Treatment
- ADS 4133 Low-Level Waste Management Treatment Operations
- ADS 4138 Waste Management Operations
- ADS 4139 Low-Level Radioactive Waste Disposal
- ADS 4140 Construction Program Management & Facility Planning
- ADS 4146 TRU Solid Waste Storage Operations
- ADS 4154 TRU Waste Treatment Operations
- ADS 4170 Thermal Destruction: comprised of former
  - ADS 4132 Mixed TRU Thermal Destruction
  - ADS 4149 Hazardous Waste Thermal Destruction
  - ADS 4150 Mixed Low-Level Waste Thermal Destruction
  - ADS 4151 TRU Thermal Destruction
- ADS 4171 Radioactive Liquid Waste Treatment: comprised of former
  - ADS 4114 Low-Level Radioactive Liquid Waste Treatment
  - ADS 4134 TRU Radioactive Liquid Waste

The following ADSs stand alone:

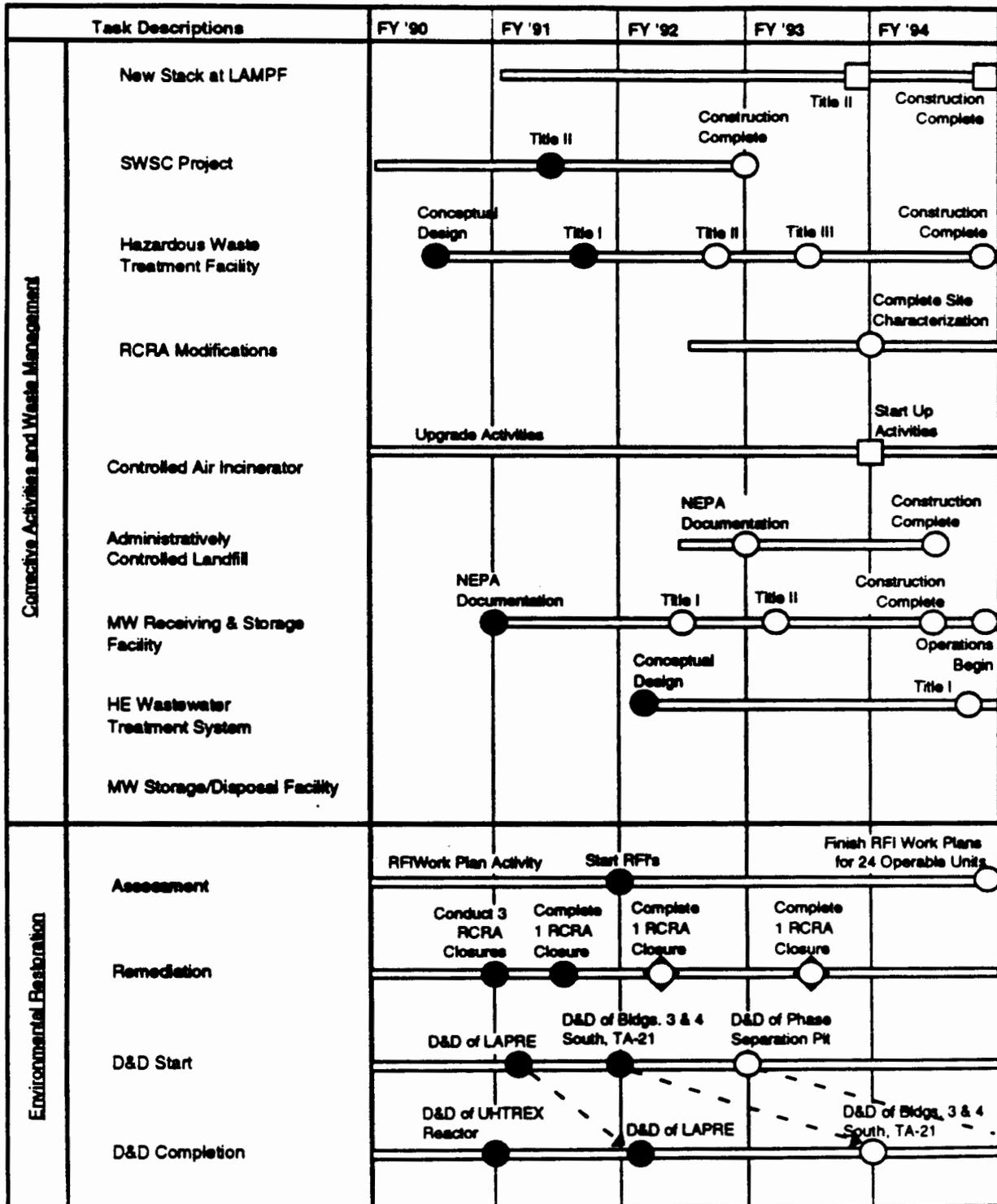
- ADS 43-A High Explosive Wastewater Treatment
- ADS 3258 Mixed Waste Receiving & Storage Facility
- ADS 4137 Waste Minimization
- ADS 4173 General Plant Projects
- ADS 4174 Line Item Projects

The following ADSs have been deleted:

- ADS 4147 Shop and Storage Addition, TA-50-54
- ADS 3080 Radioactive Liquid Waste Treatment Facility
- ADS 3097 Radioactive Liquid Waste Line, TA-53 to TA-50
- ADS 4135 Radioactive Liquid Waste Line Replacement, TA-21
- ADS 4163 Radioactive Liquid Waste Line Replacement, TA-55 to TA-50
- ADS 3086 Hazardous Waste Oil Storage Facility
- ADS 4157 PCB Building

**Five-Year Plan Overview.** Attachment 1 shows the Laboratory management structure. The Environmental Restoration/Waste Management/Corrective Activities (ER/WM/CA) programs are focused in EM Division. This focus includes a strong Planning and Resource Management function. The ER/WM/CA programs are headed by group leaders in EM Division who report to the Division Leader. The Research, Development, Demonstration, Testing, and Evaluation (RDDT&E) Program is managed by the Applied Environmental Technologies (AET) Program Office in the Energy and Environmental Directorate. Its activities are coordinated with the ER/WM/CA program management function. Figure 1-2 presents the projected progress for the ER/WM/CA programs over the five-year planning window for the budget-constrained scenario.

**Albuquerque Field Office:  
Progress Chart  
Los Alamos National Laboratory**



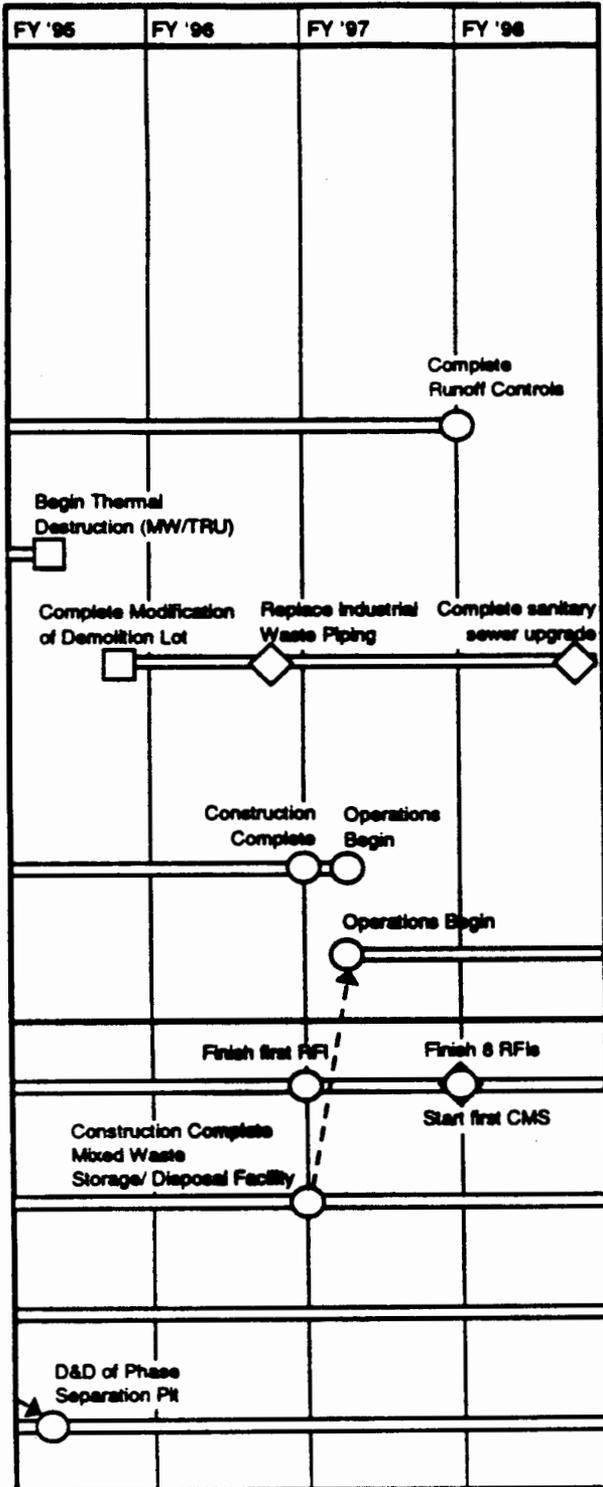
**Figure 1-2.** Projected progress for the LANL ER/WM/CA programs over the five-year planning window for the budget-constrained scenario

**Long-Term Objectives:**

- Bring active and standby facilities into compliance with air, water, and solid waste regulations.
- Complete RFI/CMS for all Operable Units by FY2002.
- Achieve significant reduction in waste generation.
- Decommission all identified surplus buildings by FY2020.

**Five-Year (FY1993-1997) Objectives:**

- Complete all RFI plans and begin all RFI's by FY1995.
- Complete characterization of all waste streams.
- Complete six RCRA closures by FY1994.
- Construct additional waste treatment, storage, and disposal facilities to handle wastes from current operations and cleanup of Operable Units.
- Decommission 90% of identified surplus building.



**Notes & Acronyms**

- (a) New stack at LAMPF  
- regulatory delays (ADS 74)
- (b) Controlled Air Incinerator  
- regulatory delays (TDD 4170)

- ADS Activity Data Sheet
- CMS Corrective Measures Study
- CWA Clean Water Act
- D&D Decontamination and Decommissioning
- FY Fiscal Year
- HE High Explosives
- LAMPF Los Alamos Meson Physics Facility
- LAPRE Los Alamos Plutonium Reactor Experiment
- LLW Low-Level Waste
- MW Mixed Waste
- NEPA National Environmental Policy Act
- RFI RCRA Facility Investigation
- RCRA Resource Conservation and Recovery Act
- SWSC Sanitary Wastewater Systems Consolidation
- TA Technical Area
- TDD Test Description Document
- TRU Transuranic Waste
- UHTREX Ultra-High Temperature Reactor Experiment

**Milestone Types:**

- Unchanged from FY 1993-1997 FYP
- ◻ Changed from FY 1993-1997 FYP
- ◊ New since FY1993-1997 FYP

**Milestone Status**

- ◊ ◻ Planned
- ◼ ■ Complete

---> Information Flow

Figure 1-2 (continued)

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### **1.2.1. Corrective Activities Overview**

**Environmental Concerns and Issues.** The Laboratory has numerous initiatives regarding the protection and management of environmental resources. Many of these initiatives and issues are driven by federal and state environmental regulations. These initiatives cross many environmental programs such as air quality, surface water and groundwater quality, and toxic and hazardous waste management.

The highest priority initiatives for CAs include such issues as upgrading wastewater treatment facilities regulated by the National Pollutant Discharge Elimination System (NPDES) permit; consolidating sanitary wastewater treatment by constructing a centralized sanitary wastewater system; replacing polychlorinated biphenyl (PCB) transformers/capacitors and cleaning up any PCB leaks/spills; construction of a new hazardous waste treatment facility to improve hazardous waste storage and treatment; ensuring safe drinking water through prudent operation and management of the water supply system; testing and replacement of underground tanks to prevent leaks; replacing the stack at the Los Alamos Meson Physics Facility (LAMPF) to meet National Emission Standards for Hazardous Air Pollutants (NESHAP) requirements and ensuring proper staffing to comply with environmental regulatory requirements, whether promulgated by federal or state environmental agencies.

CA funding for replacement of underground storage tanks (USTs) will end in FY93. Funding for this project will be the responsibility of operating groups of the Laboratory unless guidance changes for continuing CAs funding in FY93. Other projects are scheduled to continue under CAs in FY93 and FY94; however, no new CAs may be submitted for inclusion in the Five-Year Plan for funding starts in FY93 and beyond. The CA Program will be terminated in FY94. Funding for such projects will be the responsibility of individual operating groups at the Laboratory.

The public and the Laboratory are particularly concerned about the possibility of environmental problems associated with hazardous waste management, drinking water, adequate treatment of wastewater discharges to surface water and groundwater sources, toxic chemicals, and radiation exposure. Several of these issues, such as hazardous waste management and wastewater discharges, have been the subject of federal and state administrative enforcement actions. Many of these issues also involve costly environmental solutions. For instance, the following will cost in excess of a million dollars each: upgrading wastewater treatment systems, replacing PCB electrical equipment, upgrading hazardous waste treatment facilities, and reduction of radioactive air emissions. All CAs are ranked as Priority 1 activities.

Several specific examples of environmental concerns illustrate the complexity of the problems. For instance, radioactive emissions to the atmosphere from LAMPF represent the highest contributor to the total radiation dose to the public from Laboratory operations, approximately 9 mrem/year (effective dose equivalent). The 9 mrem/year is 36% of the pre-October, 1989, radiation limit of 25 mrem/year to members of the public from airborne emissions. These emissions are regulated under the Code of Federal Regulations (CFR) (40 CFR Part 61, Subpart H), the NESHAP program, as applied to the U.S. Department of Energy (DOE) facilities. On December 31, 1989, the U.S. Environmental Protection Agency (EPA) Administrator approved a significant reduction to the

dose limit to 10 mrem/year (effective dose equivalent). This new dose standard, which approximately equals the current maximum dose to the public from LANL, could limit Laboratory operations. The LAMPF experimental program may have to be reduced to ensure compliance. In addition, new research programs proposed at the Laboratory (not necessarily connected with LAMPF) that entail releases of airborne radioactivity will continue to encounter significant difficulty in obtaining EPA construction or modification approval. Without significant reductions in air emissions at LAMPF by implementation of corrective activities, the Laboratory's operation at the 10 mrem/year dose limitation would not leave any leeway for a slight increase in the off-site dose from radioactive emissions from a new project.

Another example involves approximately 20 high-explosive (HE) wastewater treatment sumps which physically separate HE residues and other contaminants from wastewater generated during experimental work. These sumps, currently regulated under the federal Clean Water Act (CWA), may eventually be required to also meet Resource Conservation and Recovery Act (RCRA) requirements, which could ultimately require elimination of the sumps. Improvements are being developed to meet anticipated requirements under the CWA and potential new RCRA requirements by design and construction of a centralized HE wastewater treatment facility. Line item funding for this project has been included in the Five-Year Plan under the WM Program.

The UST Removal and Replacement Program will involve the remediation of product-contaminated soil resulting from tank leakage, connecting piping system leakage, and tank overflow. Included in this effort are all of the supporting activities such as sampling, analysis, transportation, soil remediation, and tank salvage.

Existing hazardous waste handling and treatment facilities at TA-54, Area L, do not meet the requirements of the Resource Conservation and Recovery Act. A new facility is being designed under the CA Program to consolidate all existing on-site hazardous waste treatment processes, upgrade existing waste treatment facilities to comply with regulations, and to provide treatment for hazardous mixed wastes that are now being accumulated and stored.

**Current Status.** The following information addresses the status of the majority of Laboratory CAs at the close of FY91 and summarizes activities planned in FY92 and FY93.

- Title I design for the new Hazardous Waste Treatment Facility is nearing completion and work on the final plans and specifications (Title II) is scheduled to begin in the fourth quarter of FY92. Construction of this project is scheduled to be completed in the first quarter of FY95.
- A Conceptual Design Report for the HE Wastewater Treatment Project was completed in the second quarter of FY92. Line item funding for this project has been included in the Five-Year Plan under the WM Program in FY94.
- The new Sanitary Wastewater Systems Consolidation (SWSC) Project is designed to replace seven of the Laboratory's nine existing treatment facilities and approximately 30 septic tank

systems. This project is required by a Federal Facilities Compliance Agreement and Administrative Order issued by the EPA under the Laboratory's NPDES Permit. Construction (Title III) is approximately 80 percent complete and the plant is scheduled to be operational in the fourth quarter of FY92. It will be managed by Facilities Engineering (ENG-8) and operated by Johnson Controls Inc. (JCI). Funding for operations is from Utilities Funds in FY93 and FY94.

- A Conceptual Design Report for the new LAMPF stack has been completed. The cost estimate for the project has been revised to reflect additional cost of Title III Construction. Title I design for this project is scheduled to begin in the fourth quarter of FY92. Construction of this project is scheduled to be completed in the fourth quarter of FY94.
- Ongoing CAs being conducted in order to bring Laboratory facilities into compliance include: PCB equipment replacement and retrofilling projects; UST replacement projects; water supply and cross connection controls to protect the drinking water supply; and Clean Water Act projects. All PCBs will be eliminated from Laboratory electrical and other equipment by the end of FY94. Cross connection, microbiological, and lead surveys of the Laboratory's water supply system are scheduled to be completed in FY92 and FY93. Waste stream characterization required under the Laboratory's NPDES Permit is scheduled to be completed in FY93. Plumbing modifications to isolate noncomplying waste streams and to comply with the Laboratory's NPDES Permit are required beyond FY93.

**Waste Types.** Under the CA Program, numerous waste types must be addressed, as shown in Sec. 4.1. These include sanitary and industrial wastewater consisting of sewage effluent, power plant and boiler blowdown effluent, treated cooling water and noncontact cooling water effluent, HE processing effluent, photographic processing effluent; toxic substances such as PCBs; radioactive air emissions, such as those at LAMPF, and various hazardous wastes.

Specific hazardous waste results from various Laboratory operations and programs. For example, USTs at the Laboratory contain petroleum products such as gasoline, kerosene, dielectric mineral oil, and waste motor oil. Other USTs contain chemical products, such as acids and bases, and miscellaneous hazardous and radioactive wastes. Wastes generated at HE processing and testing sites can include HE compounds; various chemicals, such as solvents; and sometimes trace amounts of radioactive solids. Other hazardous wastes are generated because of diverse research and development (R&D) activities throughout the 37 active TAs at the Laboratory.

**Site and Facilities Involved.** The Laboratory covers 43 square miles, with 37 active TAs. The Laboratory's CA Program affects virtually all of these TAs. Throughout the Laboratory are 9 active sanitary wastewater treatment facilities, 131 active industrial wastewater treatment facilities, approximately 80 active septic tanks, 76 active USTs, more than 600 active satellite or less-than-90-day hazardous waste storage facilities, 50 PCB transformers, 30 large-volume

secondary containment facilities for spill control, and 1 major radioactive air emission source at TA-53.

**Risks.** The DOE conducted a comprehensive Tiger Team survey at LANL from September to November, 1991. The survey found no environmental problems at the Laboratory that represented an immediate threat to health or the environment with the exception of an improperly shored manhole which was categorized as a Class I finding. This shoring was immediately corrected. The problems identified in the survey vary in terms of their magnitude and risk. Since the survey, the DOE and the Laboratory have investigated all of the findings in order to prioritize them and close them out within available resources and regulatory constraints.

The major risk associated with not funding and implementing corrective activities, either through the CA Program or through the responsible Project Support Office is noncompliance with federal and state environmental regulations; potential fines and penalties; potential curtailment of Laboratory operations; and delays or prohibitions for implementing new Laboratory projects. In the meantime, all available means are being investigated and implemented toward reducing the risk of environmental problems and violations at the Laboratory.

**Major Objectives.** The major objective of the CA Program is the protection of public health and the environment. To accomplish this objective, the Laboratory is committed to attaining and maintaining compliance with all applicable federal and state environmental requirements through funding from the CA Program or from other sources.

### **1.2.2. Environmental Restoration Overview**

**Environmental Concerns and Issues.** No known measurable near-term environmental, public health or safety concerns are associated with potential release sites under existing conditions at the Laboratory.

The Laboratory was evaluated under Phase 1 of the DOE-Albuquerque (DOE-AL) Comprehensive Environmental Assessment and Response Program (CEARP), which was initiated in 1984. A major CEARP objective was to determine whether waste disposal practices followed in the past, before recognition of environmental hazards and passage of extensive environmental legislation, created environmental concerns that require remedial action today.

The CEARP Phase 1 conducted and documented DOE and Laboratory Preliminary Assessment/Site Inspection (PA/SI) activities under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or "Superfund," and preliminary activities under RCRA. The CEARP Phase 1 report is a public document, which is available at the ER Community Reading Room located at 2101 Trinity Drive and the Mesa Public Library in Los Alamos, New Mexico; it was distributed to State of New Mexico Environmental Improvement Division (NMEID) (now the New Mexico Environment Department [NMED]) and to the EPA, Region 6 (Dallas, Texas) in October 1987.

Potential hazardous and radioactive waste sites, referred to as potential release sites, identified during CEARP Phase 1 include managed Material Disposal Areas (MDAs); several canyon areas; older facilities, including several decontaminated and decommissioned facilities; and areas that have received waste discharges from past Laboratory operations. The Phase 1 effort identified

several potential release sites and areas of concern outside DOE Laboratory boundaries (primarily associated with historic Laboratory facilities that were decontaminated and decommissioned), including private property and properties belonging to Los Alamos County. The potential site findings, which were identified during Phase 1, are aggregated into operable units (OUs) to be addressed during the RCRA corrective action process.

As CEARP Phase 2, site characterization, was being implemented, CEARP was replaced by the DOE-wide ER Program in 1988. The findings of the earlier program were incorporated into the ER data base. Although the two programs differ somewhat in scope, the intent to fulfill the Laboratory's and DOE's obligations under CERCLA and RCRA (both acts as amended) for assessment and remediation of potential hazardous and radioactive waste sites has not changed. The Laboratory and DOE have continued to investigate potential release sites to fulfill RCRA and CERCLA requirements.

The scope of the D & D Program covers those activities required to decontaminate and decommission inactive, radioactive-contaminated, and hazardous materials contaminated facilities at the Laboratory. These activities also encompass interim activities such as assessment, characterization, surveillance, and maintenance.

Current ER Program issues include timely DOE compliance with the National Environmental Policy Act (NEPA) so that RCRA corrective measures are not delayed; adequate funding to support requirements of the Laboratory's RCRA permit schedule for closure and corrective actions; and timely construction and operation of a RCRA-permitted mixed waste storage/disposal facility (MWSDF) at the Laboratory (as described in Section 5.1, ADS 1067).

**Current Status.** The NMED issued its portion of the RCRA permit for the Laboratory in November 1989. The EPA portion of the permit was effective May 23, 1990. The RCRA operating permit requires the Laboratory to follow procedural requirements set forth in the Hazardous and Solid Waste Amendments (HSWA) for assessing and remediating potential release sites that meet the definition of solid waste management units (SWMUs, pronounced "schmoo"). A SWMU is any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at a facility at which solid wastes have been placed and any routine or systematic releases.

The Laboratory submitted to EPA and NMED a listing of approximately 1100 currently identified SWMUs in the December 1988 SWMU Report. Of these 1100, the EPA identified about 600 potential SWMUs that require further corrective action investigation based on EPA site inspections and review of documents prepared by the Laboratory. In addition to specific SWMUs, several known potential areas of concern must be addressed. The Laboratory updated the SWMU report and issued it to EPA and NMED, November 1990. The 1990 SWMU report is available in the ER Community Reading Room. Approximately 2250 SWMUs and areas of concern are listed in the SWMU report. Many of these SWMUs will not require corrective action investigation. It is anticipated that additional SWMUs and areas of concern will be added to the Laboratory's official listing of sites as investigations continue. The EPA or NMED can require these

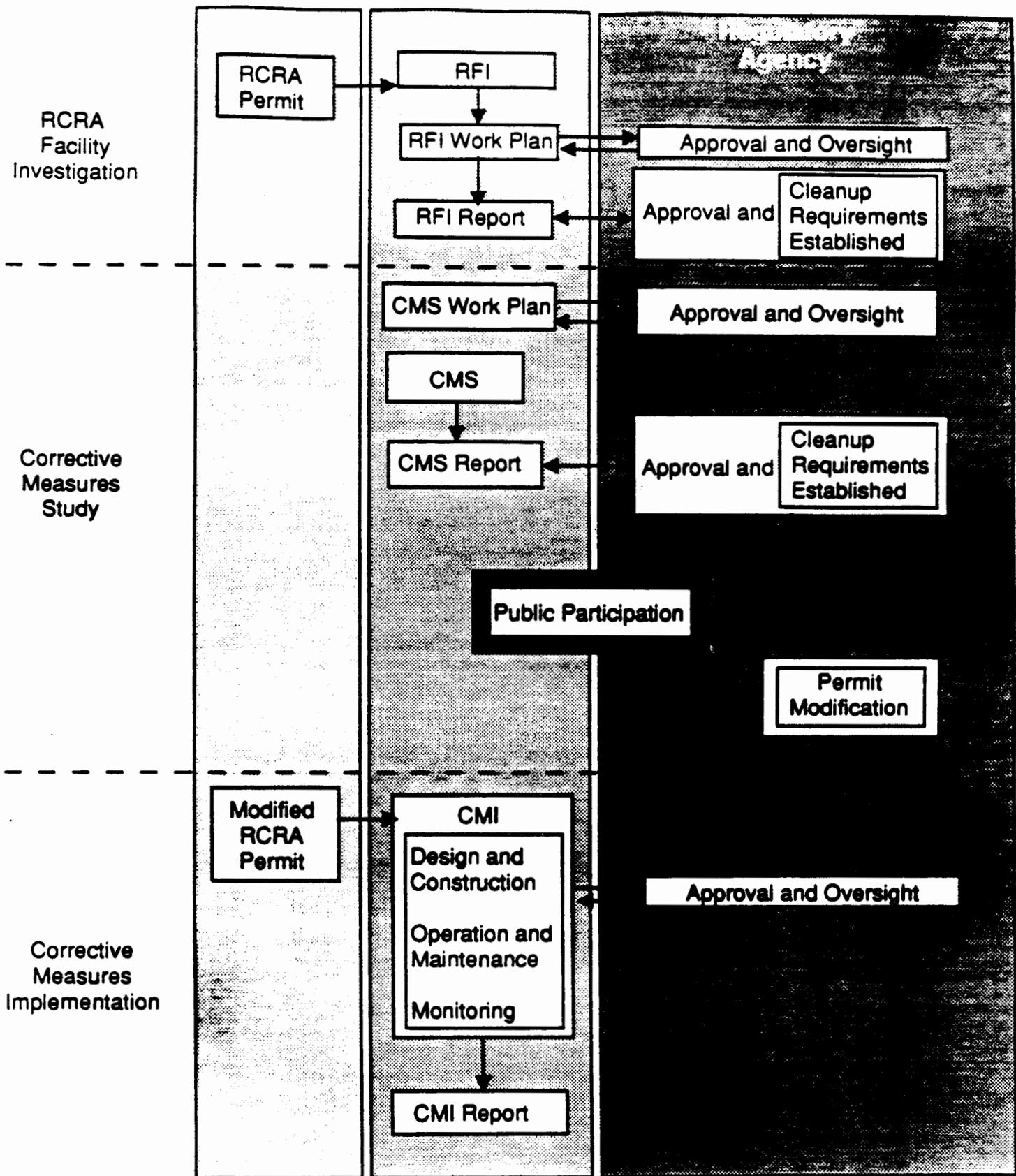
SWMUs to be addressed under the Laboratory's RCRA permit. The ER Program must also address applicable CERCLA requirements.

The Laboratory and DOE modified procedural requirements within the ongoing ER Program during FY89 to comply with the anticipated RCRA permit. The HSWA Module specifies a three-step corrective action process, as shown in Figure 1-3:

- **The RCRA facility investigation (RFI)**—The goal of this step is to identify the extent of contamination at point sources and the environmental pathways along which contaminants could travel to human and environmental receptors. This step will be implemented by characterizing the extent of contamination in the detail necessary to determine what corrective measures, if any, need to be taken. The approach will focus effort on answering those questions relevant to deciding further actions in a cost-effective manner.
- **Corrective measures study (CMS)**—If characterization indicates that corrective measures are needed, this study will evaluate alternatives that might reasonably be implemented. These measures will be evaluated based on their projected efficacy in reducing risks to human and environmental health and safety in a cost-effective manner.
- **Corrective measures implementation (CMI)**—This step will implement the chosen remedy, verify its effectiveness, and establish ongoing control and monitoring requirements.

These procedural requirements have been developed to assess and remediate SWMUs. SWMUs at Los Alamos are aggregated into OUs based on geographic location. The OUs will be assessed by means of the RFI/CMS and will be remediated by means of either CMI or closure under RCRA, as appropriate. SWMUs identified by EPA for corrective action consideration were already included in the Laboratory's ER Program. The permit schedule for completing RFI work plans is presented in Table 1-3.

<b>TABLE 1-3</b>		
<b>SCHEDULE FOR COMPLETING RFI WORK PLANS</b>		
<b>SWMU Due Date</b>	<b>HSWA Module Table A SWMUs (%)</b>	<b>HSWA Module Table B SWMUs (%) (high priority)</b>
5/23/91	10	20
5/23/92	35	55
5/23/93	55	100
5/23/94	100	100



**Figure 1-3. Resource Conservation and Recovery Act corrective action process.**

The Laboratory must prepare its annual update of the IWP and site characterization work plans for 35% of the SWMUs in FY92 (see Subsection 5.1 Task Descriptions). The Laboratory is continuing RCRA closure activities at several SWMUs during FY92. The RFI Work Plan for one Operable Unit at TA-21 was submitted. Ten underground storage tanks were removed in 1991.

Three Laboratory reactor facilities will be decommissioned by FY92 under the Decontamination and Decommissioning Program. These were the Water Boiler, UHTREX, and LAPRE II. Work is scheduled to begin in FY93 on the Phase Separator Pit, TA-35-3.

The assessment phase of the D&D of Buildings 3 and 4 South at TA-21 has been completed, and the remediation phase will continue. Work on Wing 9 at the Chemical Metallurgical Research Building has been withdrawn from the FYP as a result of reassignment of the building by Materials Science & Technology Division.

**Waste Types.** Carrying out the mission of the Laboratory has generated hazardous and radioactive wastes. These exist at potential release sites that are being addressed by the ER Program. The hazardous and radioactive wastes can be defined broadly as four waste types: wastes from processing operations, wastes from R&D, high explosives (HE) waste, and wastes from D&D. Each of these general waste types has unique characteristics. Wastes from processing operations typically consisted of significant volumes of materials that contain a limited number of contaminants, including radionuclides, solvents, organics, and metals. Treated and untreated liquid process streams were discharged to the canyons. Wastes from R&D, however, were usually smaller volumes of different laboratory reagents, chemicals, solvents, metals, radionuclides, and other general laboratory wastes. The composition and concentration of the contaminants in a given process waste were generally uniform, unless modifications to the process were made. Conversely, the waste constituents from R&D activities continually varied depending on the nature of the rapidly changing R&D efforts of the Laboratory. HE wastes consisted of a relatively small number of formulations, some of which contained small proportions of hazardous constituents such as barium and other metals. D&D wastes typically consisted of large quantities of building debris that were contaminated with radionuclides and occasionally with HE residuals. Laboratory wastes were typically disposed of in managed MDAs, usually consisting of trenches, pits, and shafts.

**Sites and Facilities Involved.** Potential release sites exist throughout the Laboratory and several exist off site. The sites have been aggregated into OUs to address site characterization and potential remediation, as required by the Laboratory's RCRA permit, in an efficient, cost-effective process under the ER Program.

ER Program potential release sites of highest priority include the following:

- Potential release sites that are off DOE property, including Los Alamos, New Mexico (because of potential public exposure);
- Canyon alluvial systems (because of potential off-site transport);

- MDAs (because these sites contain most of the Laboratory's disposed hazardous and radioactive wastes);
- Sites requiring closure under RCRA (because of mandated time frames once submitted Closure Plans are approved); and
- Sites requiring interim removal (because of institutional operational requirements).

The Laboratory proposes to construct and operate a RCRA-permitted MWSDF at the Laboratory to receive waste generated by the LANL ER Program. The goal of the ER Program is to minimize the number of land disposal units that require long-term management (for example, maintenance and monitoring); this will be done by cleaning up the units to acceptable risk-based residual contamination levels. ER Program activities will comply with land disposal restrictions (LDRs).

**Risks.** Continuing the existing institutional programs in monitoring and maintenance would maintain conditions as outlined in Subsection 1.2.2. ER Management Overview "Current Status." However, maintaining current conditions is not sufficient to comply with the Laboratory's RCRA permit. The ER Program will be implemented as outlined in this Laboratory SSP to help ensure compliance with the RCRA permit and other applicable requirements. In the unlikely event that unacceptable risks are identified for a potential release site while implementing the ER Program, the Laboratory's RCRA permit has provisions for taking interim remedial measures (IRMs), which require approval by the Administrative Authority (currently the EPA).

**Major Objectives.** The primary objective of the ER Program is to bring identified sites and facilities into compliance with environmental regulations and DOE orders that govern environmental restoration at the Laboratory, while ensuring environmental protection and public health and safety. The ultimate goal is to implement assessment and remediation activities as required for potential release sites and contaminated facilities at the Laboratory.

The Laboratory's proposed approach includes constructing and operating a RCRA-permitted MWSDF to receive waste generated by the ER Program. Cleanup will be based on cost-effective risk-based standards approved by the appropriate regulating agency. *In situ* stabilization and appropriate long-term monitoring will be used when possible for some sites. Laboratory environs are compatible with siting of a MWSDF and using *in situ* stabilization. Each site-specific action will be approved by the appropriate regulating agency through the regulatory process, including public participation. Major advantages of the Laboratory's proposed approach of retaining wastes on the Laboratory as described above are that the wastes would remain on DOE property under federal institutional control, worker exposure would be minimized during cleanup, off-site transportation risks would be minimized, and the total program would be more cost effective. ER Program activities will comply with RCRA LDRs. Activity Data Sheets (ADSs) for ER are discussed in Section 5.

The major objectives of the D & D Program are to:

- Complete decommissioning activities at all facilities currently designated or that may be designated as surplus facilities in the future,

ensuring that decommissioning activities are performed to all applicable standards, regulations, and codes;

- Maintain surplus facilities awaiting decommissioning in safe and secure states to eliminate potential hazards to the public and the environment;
- Conduct surveillance and maintenance activities cost-effectively; and
- Identify surplus facilities, equipment, materials, and other property available for programmatic use.

### **Environmental Restoration Program Major System Acquisition (MSA) Baseline**

Baseline development has been a high priority within the ER Program. The ER MSA baseline provides a sound foundation for program planning, execution, evaluation, and control. The approach to baseline development has been threefold: 1) establish a baseline of technical requirements using a Work Breakdown Structure (WBS) and supporting WBS Dictionary; 2) establish a schedule baseline that includes milestones relevant to achievement of key MSA objectives; and 3) establish a baseline of estimated costs that are completely documented and traceable to the scope and schedule of activities necessary to achieve the MSA mission. The ER Program issues monthly performance reports to the DOE, and changes to any of the baselines are controlled through a formal change control procedure.

#### **1.2.3. Waste Management Overview**

The Waste Management Group (EM-7) conducts the majority of operational activities in waste management at the Laboratory. The group is dedicated to managing liquid and solid wastes which include hazardous, mixed, and radioactive wastes generated by Laboratory operations.

To protect the environment and to ensure the safety of Laboratory employees and the public, the Laboratory maintains the following waste management programs:

- Waste minimization;
- Liquid waste treatment;
- Chemical waste management;
- Solid radioactive waste management;
- Decontamination and decommissioning; and
- Technical support for waste management.

Waste management activities take place primarily at TA-50 and TA-54. These areas have been reserved for future development of WM functions and operations required to meet the Laboratory's waste management objectives.

**Environmental Concerns and Issues.** Six radioactive waste burial sites are known or are suspected to contain transuranic (TRU) waste materials that were disposed of before the requirements for segregation and retrievable storage were implemented. Results of the routine and special monitoring of waste

management areas at Los Alamos are published in the annual Environmental Surveillance at Los Alamos reports and in topical reports.

Performance assessment efforts in waste management continue. The appraisal will assess the long-term risk to the general public, and the continuing emphasis in FY92 is the active disposal site, TA-54, Area G. A complete assessment of this site is required for operations to be in compliance with DOE Order 5820.2A. The FY91 assessment included review of ongoing PCB disposal at this site as well. When the performance assessment is complete, the waste acceptance criteria (WAC) and the environmental surveillance program for the site will be finalized. Operations criteria and plans for site closure will also be developed.

Efforts in future years will be devoted predominantly to continued validation of the established criteria for environmental monitoring data, and results of the performance assessment.

**Current Status.** Ongoing operations include the treatment of radioactive wastes, both low-level (LLW) and TRU liquids; disposal of radioactive solid wastes; preparation of wastes for eventual Waste Isolation Pilot Project (WIPP) storage; shipment of approximately 1,400 m<sup>3</sup> of hazardous waste off site for incineration; completed design of the Radioactive Liquid Waste Treatment Facility; continued upgrades to the Controlled Air Incinerator (CAI); implementation of the Waste Minimization & Pollution Awareness Programs; and waste generator education and training. In addition, improvements have been made in the record keeping and overall management of the Waste Management Group's activities.

Ongoing activities include the development, design, and construction of new facilities, which will enable the Laboratory's Waste Management Group to operate more efficiently within regulatory guidelines. Facilities being developed include the Radioactive Liquid Waste Treatment Facility and the Mixed Waste Receiving and Storage Facility. In addition, several recent small construction projects and equipment upgrades have improved the efficiency and operational abilities of other facilities.

In addition to successfully treating, disposing, or storing the wastes generated at the Laboratory, the following tasks were accomplished in FY92:

- Waste minimization education, training, and communication efforts; paper recycling; waste stream prioritization; and metal recycling;
- Activities designed to demonstrate compliance with DOE Order 5820.2A, Radioactive Waste Treatment;
- Design Criteria for the Mixed Waste Receiving and Storage Facility; and
- Approximately 1,400 m<sup>3</sup> of hazardous waste were shipped off site for incineration.

In addition to the continuing daily waste management operations to treat, dispose of, and store wastes generated at LANL, and upgrades to existing facilities and equipment, the following tasks will continue, or will be completed in FY93:

- Waste minimization education, training and communication efforts will continue; equipment decontamination, paper recycling, metal recycling and prioritization of waste streams will continue;

TRITIUM  
WASTE STREAMS ?

- DOE Order 5820.2A compliance activities will continue;
- Title I design for the Mixed Waste Receiving and Storage Facility;

In addition to the ongoing treatment, disposal, and storage of LANL wastes, continuing upgrades to existing facilities and equipment, and continuing waste minimization efforts, the following activities will continue, or will be completed in FY94:

- DOE Order 5820.2A compliance activities;
- Upgrades to the Controlled Air Incinerator (CAI) will be completed;
- Title II design for the Mixed Waste Receiving and Storage Facility; and
- Design Criteria for the High Explosives (HE) Wastewater Treatment

In addition to the continuing waste management operations and waste minimization efforts previously described, the following projects will be completed during the planning years FY95-98:

- Complete construction of HE Wastewater Treatment system;
- Start operations at the Mixed Waste Receiving and Storage Facility;
- A number of General Plant Projects (GPPs) relating to waste management Operations; and
- Restart the CAI.

**Other.** The Data Management Section supports the management of wastes and compliance with state and federal regulations. In FY89, a major upgrade of the section's data management system began. The upgrades included improved waste tracking systems and quality assurance (QA).

Efforts were initiated in FY91 to develop technologies for treatment of problem wastes. This entailed the development of a preconceptual design of an incinerator ash vitrification system, actinide decontamination, and recovery biodegradation.

**Waste Types.** Low-level waste; TRU waste; mixed hazardous waste (MHW); or by-products of production, extraction, or use of special nuclear material (SNM). Test specimens of fissionable material irradiated only for R&D and not for producing power or plutonium may be classified as LLW if the TRU concentration is <100 nCi/g (DOE Order 5820.2A).

LLW is solid or liquid waste that contains radioactivity and that is not high-level waste from reprocessing spent nuclear fuel. LLW is the largest volume of radioactive waste generated at Los Alamos. Averages from the last several years indicate that approximately 94% of the total radioactive solid waste volume is LLW; 5% is TRU; and 1% is mixed waste, hazardous waste that is also radioactive. The volume of D&D waste varies from project to project and has been incorporated into the low-level and TRU waste volumes. High-level wastes are not generated at the Laboratory.

TRU waste is radioactive material that has been contaminated with alpha-emitting TRU radionuclides (atomic number >92) with half-lives greater than 20 years and concentrations greater than 100 nCi/g of waste material.

Laboratory averages from the last several years indicate that approximately 5% of the total TRU solid waste volume is mixed TRU waste.

Newly generated TRU wastes are those produced by ongoing operations and are considered newly generated until they are placed into interim storage. Special case (SC) TRU waste is contact-handled (CH) or remote-handled (RH) TRU waste for which there is no identified practical means of processing for WIPP acceptance. Such wastes include massive metallic objects that cannot be processed in the Size Reduction Facility (SRF). Classified TRU waste may also be included in this category because of the special processing requirements needed to declassify the waste. Buried TRU waste is TRU waste disposed of by shallow land burial before the establishment of the TRU waste classification in 1970.

If TRU waste also contains hazardous chemicals regulated by the EPA, it is classified as TRU MHW. The hazardous components can be toxic, carcinogenic, teratogenic, mutagenic, or corrosive to living tissue. Included are solvents, heavy metals (primarily lead), spray cans (which must be removed and treated), and other chemically contaminated items.

A hazardous chemical waste is any waste as defined under RCRA (40 CFR 261.3). Chemical wastes commonly generated at the Laboratory include laboratory research chemicals, oils, solvents, beryllium, asbestos, carcinogens, compressed gases, and other nonradioactive solid or liquid wastes contaminated with hazardous chemicals.

MHW is radioactive waste that is also regulated as a hazardous waste under RCRA (40 CFR 261). Included are solvents, pyrophoric substances, spray cans, scintillation vials, miscellaneous reagent chemicals, vacuum pump oil contaminated with mercury, and other chemically contaminated material. Sludge was identified from the industrial waste treatment plant at TA-50-1 as a waste stream that should be regulated as a MHW. However, this has not been formally determined. Approximately 200 55-gallon drums of this waste are generated annually.

**Sites and Facilities Involved.** Activities within waste management include treating radioactive liquid and solid waste; packaging, transporting, and treating hazardous chemical waste; and operating the disposal and storage sites for radioactive and PCB waste. Waste management provides and operates the following sites and facilities:

- TA-54, Area G
  - TRU Waste Storage
  - Low-Level Waste Disposal
  - Mixed Waste Storage
  - PCB Solid Disposal
- TA-54-38
  - TRU Waste
- TA-54, Area J
  - Solid Disposal

- TA-54, Area L
  - Mixed Waste Storage
  - Hazardous Waste Storage
  - Hazardous Waste Treatment Tanks
  - PCB Storage
- TA-50-1
  - Batch Waste Treatment Facility
  - Radioactive Liquid Waste Treatment Plant
  - TRU Waste Treatment Plant
  - Decontamination Facilities
- TA-50-37
  - Hazardous/PCB/Mixed Waste Incinerator
- TA-50-69
  - TRU SRF
- TA-21-257
  - Radioactive Liquid Waste Treatment Plant

**Risks.** The risks associated with not implementing the activities addressed in the plan are possible environmental degradation and environmental regulatory noncompliance. Areas of potential regulatory noncompliance include RCRA, Toxic Substances Control Act (TSCA), Clean Air Act (CAA), CWA, and NEPA. If the Laboratory were to receive insufficient funding of treatment, storage, and disposal (TSD) activities, combined with its already limited permitted hazardous waste storage capacity, it would almost immediately be out of compliance and jeopardize many operations and projects.

Future environmental restrictions are expected in the following areas: more stringent NPDES conditions on effluents once the permit is renewed; more stringent effluent standards by NMED and/or Indian Tribes; more stringent radioactive containment standards; and inspectable USTs.

**Major Objectives.** The mission of the Waste Management Program at the Laboratory is to manage Laboratory-generated liquid and solid wastes using state-of-the-art methods to minimize the release of radioactive and hazardous materials to the environment; provide the highest possible level of protection to employees, the public, government property, and the environment that could arise from Laboratory operations; and comply with federal and state regulations.

To fulfill this mission, the following objectives have been established:

- to collect all radioactive liquid wastes and concentrate the radioactivity in a small volume of solid for burial or storage so it cannot endanger the health and safety of employees and the public;
- to collect and manage all liquid and solid hazardous wastes to reduce toxicity and prevent contamination of the environment so that the health and safety of employees and the public will be safeguarded;

*TRU SRF*

- to collect all solid radioactive wastes, apply volume-reduction techniques, and bury or store them in controlled facilities so that they will not contaminate the environment;
- to provide decontamination services that promote recycling and to provide decommissioning services that direct the safe, efficient physical removal of facilities that have outlived their usefulness so that the release of radioactivity is controlled and kept to a level ALARA;
- to do research and development activities with the goal of volume reduction and control of solid and liquid radioactive and hazardous wastes so that storage and disposal operations are minimized, and that all storage fully complies with applicable regulations;
- to spearhead the Laboratory-wide effort to minimize the generation of radioactive and hazardous wastes so that waste management costs are as low as possible and the health and safety of employees and the public are safeguarded. Additionally, the objective of the waste minimization program is to address methods of reducing hazardous chemical waste, LLW and TRU waste, liquid radioactive waste, and MHW.

TRU waste

#### **1.2.4. Technology Development Overview**

The Technology Development Plan summarizes environmental R&D activities that will support CA, waste management, and ER activities. LANL has many of the skills necessary to support the needs cited in the plan. In particular, the Laboratory can support waste treatment site characterization, robotics, development of geophysical techniques, remote sensing, and the development of appropriate models to support performance assessment. Because of the Laboratory's unique role in supporting ER activities at other AL sites, the Laboratory also proposes to develop techniques that are widely applicable to all DOE sites.

The Laboratory has extensive experience in developing performance assessment models and supporting analytical and field tests for high-level waste and proposes to use this expertise in development of performance assessment models for ER and waste management sites.

Accomplishments for FY91 include:

- Developed and field-tested a portable mini-mass spectrometer for field screening of chemical samples.
- Established a Cooperative Research and Development Agreement with ACW/Lockheed to investigate magnetic separation combined with gravimetric separation to clean heavy metals from soils.
- Initiated work on the ATLAS line for treating transuranic wastes while minimizing the other resultant wastes.

Research and development to support waste management technology needs and gaps was greatly enhanced during FY92 and will continue in FY93. A new

program was established at the Laboratory through the Office of Technology Development. The program, Waste Treatment Integrated Demonstration (WTID), was instituted to take advantage of the Laboratory's expertise in actinide chemistry, high-energy physics, and the requirements for waste treatment. The primary objective of the WTID is to develop technologies that can be used to treat Laboratory-generated waste in an effective and cost-efficient manner.

Projects that received funding during FY92 and will continue in FY93 under this program included:

- Polymers for Removal of Plutonium and Americium from Wastewaters Lithium Hydride Oxidation;
- Characterization of Incinerator Ash for Final Disposal;
- The Delphi DETOX<sup>R</sup> Process;
- Microwave Fluidized Bed Detoxification of Mixed Wastes;
- Uranium Chip Oxidation Demonstration;
- Electron Beam Waste Treatment; and
- Two-Stage Silent Discharge Plasma/Packed-Bed Waste Treatment.

The Waste Management Group also initiated several projects aimed at developing technologies for treatment of problem wastes. These projects included:

- Chelation Approaches to Actinide Decontamination and Recovery Biodegradation of Nitrated Rags; and
- Preconceptual Design of an Incinerator Ash Vitrification System.

## **2.0. REQUIREMENTS FOR IMPLEMENTATION**

### **2.1. Corrective Activities Requirements for Implementation**

**Regulatory Interfaces.** The EPA is the primary interface for corrective activities and WM activities associated with the CWA (NPDES Permit and SPCC Plan); radioactive emission requirements under the CAA; HSWA, CERCLA, and Superfund Amendment and Reauthorization Act (SARA); and TSCA (replacement of PCB equipment and disposal of PCBs).

The NMED assists in implementing these programs and has primary responsibilities in the environmental areas of water supply regulation (having primacy for implementing the federal Safe Drinking Water Act [SDWA]); hazardous waste regulation (having primacy for RCRA and UST regulations); air quality regulation (having primacy for nonradioactive air quality regulations); septic tanks and liquid waste disposal (implementing the New Mexico Liquid Waste Disposal Regulations); water quality (enforcing the New Mexico Water Quality Control Commission Regulations affecting surface water and groundwater quality and New Mexico Underground Storage Tank Regulations); and solid waste (implementing the New Mexico Solid Waste Disposal Regulations). Other state agencies that regulate the Laboratory's environmental programs include the New Mexico Oil Conservation Division that regulates the Fenton Hill Geothermal Site activities as they affect groundwater quality.

**Laboratory-Specific Drivers.** Most of the environmental compliance activities at the Laboratory are implemented under federal and state environmental permits and DOE orders. Specific agreements such as the Federal Facilities Compliance Agreement (FFCA) under the Laboratory's NPDES Permit also affect environmental concerns such as wastewater discharges. The FFCA requires the Laboratory to upgrade wastewater treatment facilities associated with noncompliant wastewater discharges within a specified time period so that compliance with the NPDES permit can be assured. A list of environmental permits under which the Laboratory operated in 1991 is included as Attachment 2.

**Pending Requirements.** DOE orders which define requirements as they relate to corrective activities are expected to be refined and clarified. In addition, amendments to the FFCA are expected in 1992.

### **2.2. Environmental Restoration Requirements for Implementation**

The primary objective of the ER Program is to implement assessment and remediation activities as required for potential release sites and contaminated facilities at the Laboratory. The ultimate goal is to bring identified sites and facilities into compliance with environmental regulations and DOE orders that govern environmental restoration at the Laboratory while ensuring environmental protection and public health and safety. See also Section 11.2 of this plan for a discussion of federal, state, and local interactions.

The scope of the ER Program includes:

- implementing RCRA Sections 3004(u) and 3004(v), pertaining to the RCRA Facility Assessment (RFA), the RFI, the CMS, and CMI for existing SWMUs;

- implementing CERCLA PA/SI, remedial investigation (RI), feasibility study (FS), remedial design (RD), and remedial action (RA), as appropriate;
- remediation and closure of land units subject to RCRA that operated before November 1988, including USTs;
- D&D of selected facilities in accordance with the Atomic Energy Act (AEA);
- development and implementation of new remediation technologies;
- management of expenses associated with cooperative multiparty cleanup plans and activities;
- protection of natural resources or restoration of natural resources damaged as the result of past releases of hazardous substances;
- installation of long-term environmental monitoring systems; and
- conducting the CERCLA assessments necessary before real property assets are considered for disposition.

**Regulatory Interfaces.** The ER Program regulatory interfaces have been established with the NMED since the RCRA operating permit was issued November 1989. Regulatory interfaces were established for SWMU closure activities with NMED during interim status under RCRA and will continue now that the Laboratory's RCRA operating permit is issued. Since the corrective action conditions of the RCRA permit became effective in May 1990, the ER Program has maintained an interface with EPA, Region 6. The Laboratory's organization and management for implementing the ER Program is presented in Subsection 3.2. of this plan. DOE orders applicable to the ER Program are also being implemented. The D & D Program is driven by primarily by DOE Order 5820.2, Radioactive Waste Management.

**Laboratory-Specific Drivers.** The ER Program at the Laboratory is driven primarily by requirements of the HSWA module of the RCRA permit. DOE orders applicable to the ER Program also are being followed.

**Pending Requirements.** The administrative authority for RCRA activities will depend on future delegation of authority by EPA to the State of New Mexico.

### **2.3. Waste Management Requirements for Implementation**

**Regulatory Interfaces.** The EPA is the primary interface for CA and waste management activities associated with the CWA (NPDES permits, SPCC, and Best Management Practices); radioactive emission requirements under the CAA; HSWA, CERCLA, and SARA; and TSCA (replacement of PCB equipment and disposal of PCB-contaminated solid waste); and NEPA, as discussed in Section 8.3 of this plan.

The NMED assists in implementing these programs and has primary responsibilities in water supply regulation (implementing the federal SDWA); hazardous waste regulation (having primacy for RCRA); air quality regulation

(having primacy for all regulations for nonradioactive air quality); liquid waste disposal (implementing the New Mexico Liquid Waste Disposal Regulations); water quality (enforcing the regulations of the New Mexico Water Quality Control Commission affecting quality of surface and ground water) UST regulations; and solid waste (implementing the New Mexico Solid Waste Regulations). Also interfacing with the Laboratory's environmental programs is the New Mexico Oil Conservation Division that regulates the activities at the Fenton Hill Geothermal Site as they affect the quality of groundwater.

The State of New Mexico's Hazardous Waste Program was delegated authority for mixed waste by EPA in July, 1990. In January 1991, the Laboratory submitted a Part A Permit application for mixed waste storage and treatment under RCRA. A schedule is being negotiated for submittal of the Part B application. The Laboratory is currently out of compliance with RCRA requirements related to storage of certain hazardous and mixed wastes subject to land disposal restrictions (LDR). These include solvents, dioxins/furans; California list; and first, second, and third scheduled wastes. The National Capacity Variance on storage of scheduled mixed wastes expired on May 8, 1992. DOE Headquarters and EPA have been unsuccessful at negotiating an extension to the Variance. The Laboratory will begin negotiating a Federal Facilities Compliance Agreement with EPA Region 6 to develop a schedule to bring all waste subject to LDR into compliance. A Part B for TA-53 Surface Impoundment was submitted in July 1991.

**Laboratory-Specific Drivers.** Most of the environmental compliance activities at the Laboratory in waste management are implemented because of federal and state environmental permits. Specific agreements such as the FFCA also affect specific environmental media such as wastewater discharges.

**Pending Requirements.** DOE orders which define requirements as they relate to corrective activities are expected to be refined and clarified. In addition, amendments to the FFCA are expected.

### **3.0. ORGANIZATION AND MANAGEMENT**

The organizational structure related to activities addressed in the ER/WM FYP, as discussed previously in Section 1.2., Management Overview, is presented in Attachment 1. The DOE-AL Manager is ultimately responsible for the Los Alamos ER/WM FYP. The LANL EM Division is responsible for coordination and submission of the ER/WM FYP through the DOE Los Alamos Area Office (DOE-LAAO). DOE-LAAO, as an extension of DOE-AL, is responsible for oversight of the Laboratory and provides a path of communication regarding day-to-day activities of the Laboratory. DOE-LAAO and the Laboratory provide the primary interface (including negotiations) with regulatory agencies; however, DOE-AL must concur with regulatory agreements as they affect DOE policy, resource requirements, and funding requirements.

#### **3.1. Corrective Activities Organization/Management**

DOE-LAAO operates LANL through its prime contractor, the University of California (UC). The University uses Johnson Controls Inc. (JCI), under subcontract as its major support contractor, and many of the utility systems, for example, water and wastewater, are operated by JCI. Within the Laboratory, environmental protection is a line management responsibility. However, EM Division is the primary Laboratory support program for all environmental activities. Specifically, EM's Environmental Protection Group (EM-8) has general responsibility for implementing and supporting environmental surveillance and environmental compliance activities.

Within EM-8, the following sections are responsible for the indicated environmental programs.

- **Water Quality and Toxics Section:** NPDES Permit, groundwater discharge plans, drinking water program, septic tank and liquid waste permits, SPCC Plan spill control and response, PCBs, and pest control program.
- **Hazardous and Solid Waste Section:** Hazardous and solid waste regulations and regulations for USTs.
- **Environmental Assessment and Resource Evaluations Section:** Environmental impacts; for example, NEPA, endangered species impacts, and historic/cultural impacts.
- **Air Quality and Meteorology Section:** Air quality regulations; for example, permits for nonradioactive pollutants.
- **Environmental Health Physics and Hydrology Section:** Compliance with DOE orders regarding environmental surveillance and applications for EPA construction approvals for projects involving radioactive air emissions.
- **Waste Site Studies Section:** Interim actions on OUs for the ER Program and environment sampling support for foodstuff monitoring, abandoned disposal sites and decommissioning and decontamination activities.

To implement CAs, specific projects are assigned to personnel (project team leaders [PTLs]) within EM-8. The PTLs are responsible for detailed planning and organization to assure completion of milestones within the scope of the fiscal year funding. PTLs must coordinate engineering designs and construction of improvements with the Facilities Engineering (ENG) Division and serve as a liaison between other operating groups, JCI, and other parties affected or involved. Furthermore, the PTLs serve as the points of contact with respect to regulatory agency interfaces. Each PTL reports activities and project progress through the Section Leader to the Group Leader, who in turn assures upward line management communications.

Most assignments and action items stemming from correspondence from regulatory agencies or from DOE-AL come through DOE-LAAO and are directed to the Laboratory's Associate Director for Operations. These items are assigned to personnel in EM-8 through a management chain-of-command. All replies to correspondence regarding environmental activities or environmental permit correspondence circulate through a hierarchy of management and legal review, before transmittal to DOE-LAAO for final concurrence and official transmittal.

### **3.2 Environmental Restoration Organization/Management**

The DOE established its ER Program in 1987 to bring its weapons installations into compliance with relevant environmental statutes. The DOE-AL ER Project Office consists of three line divisions: MSA-1 Laboratories, MSA-2 Laboratories, and Project Support. The Region of Southwest Projects is responsible for overseeing LANL's ER Program. The DOE-LAAO is the primary line of communication between LANL and DOE-AL for day-to-day operations. For policy matters and ER Program direction at Los Alamos, the line of communication with the AL ER Project Office is through LAAO managers.

DOE-LAAO and the Laboratory are jointly responsible for the following activities:

- providing primary interface (including negotiations) with regulatory agencies;
- conducting assessment and remediation activities;
- preparing and/or reviewing ER Program documents (for example, RFI/CMS documents);
- conducting community relations activities;
- distributing documents for regulatory review;
- preparing FYPs;
- preparing and maintaining approved baselines;
- preparing monthly status reports by task for DOE-AL; and
- preparing completion reports for completed actions.

The Laboratory's ER Program documentation requirements are presented in Attachment 3. Cost, schedule, and technical performance of the Laboratory ER

Program will be monitored through monthly Cost and Schedule Status Reports as defined by DOE-AL. The typical RFI/CMS process to be implemented by the Laboratory under the RCRA permit is presented in Figure 1-3.

DOE-LAAO and the Laboratory will be responsible for negotiating agreements with regulatory authorities. DOE-AL management must concur with these agreements because they affect DOE policy, resource requirements, and funding requirements. DOE-HQ must concur with all negotiation strategies and approve final agreements. Daily interface with regulatory agencies is the primary responsibility of DOE-LAAO and the Laboratory.

The Laboratory ER Program Manager (PM) reports to the EM Division Leader. The PM is responsible for effective Laboratory-wide implementation of the Laboratory ER Program. Project Leaders (PLs), who report to the PM, are responsible for managing Laboratory ER tasks and ensuring that regulatory compliance requirements are achieved during all phases of the ER Program.

The LANL ER Program Office will use the Laboratory-wide resources, in a matrix fashion, to implement program activities. Outside contractors will be used for program activities when limitations in Laboratory resources would compromise meeting requirements of the Laboratory's RCRA operating permit or when it is more cost-effective to use contractor resources.

The ER Program Office will work closely with the Laboratory's Office of Applied Environmental Technology (AET) to ensure that basic R&D needs of the ER Program are identified and implemented in a timely fashion on a Laboratory-wide basis. The AET basic research effort, funded through EM-50, will provide technologies that will assist in implementing RFI/CMS activities (for example, geophysical investigative techniques). AET will also provide innovative remedial technologies, which will be implemented through the Laboratory's RFI/CMS process (that is, bench-scale and pilot-scale studies) on a task/site-specific basis as required by the Laboratory's RCRA permit. AET will provide input based on EM-50 funded studies at LANL and at other DOE facilities.

The ENG Division will play a major role in implementing the Remedial Design/Remedial Action aspects of the ER Program at the Laboratory. The ER Program Office will look to ENG Division and EM-7 to ensure effective implementation of these remedial activities. EM-8 will provide regulatory compliance oversight for the ER Program.

D & D projects are managed by the Waste Management Group, EM-7, as shown on Figure 3-1, which supplies Project Leaders to specific D & D task groups. Project Coordinators from the ENG Division act as liaison between the Laboratory and Johnson Controls Inc

### **3.3. Waste Management Organization/Management**

EM-7 reports directly to the Division Leader of EM Division. The group is responsible for ensuring effective Laboratory-wide implementation of the WM Program and expeditious achievement of requirements for regulatory compliance. WM personnel work directly with the ER PM and EM-8. WM coordinates its activities with the EM-DO, which, in turn interfaces with DOE-AL and the Area Office on an official basis. WM personnel also interact directly with DOE-AL and DOE-LAAO personnel.



The management structure within EM-7 (Figure 3-1) is typical of the Laboratory in general. There is a Group Leader who has ultimate responsibility for all WM activities within the Laboratory, as well as the SSP, related RDDT&E, and the FYP. Furthermore, the Group Leader is responsible for resource management, setting priorities, determining resource needs, tracking program activity, and QA activities associated with all aspects of WM. The group has one Deputy Group Leader and four Section Leaders. The sections within the group are divided by the type of waste that they manage. The Section Leaders are the first line managers and implement their respective areas noted within this document. Insert Figure 3-1 here - Waste Management (EM-7) Organizational Structure

WM uses resources throughout the Laboratory, including the ENG, EM-8, and off-site contractors when limitations in resources would compromise meeting the requirements of the Laboratory's RCRA operating permit. In addition, WM activities receive support from other EM & HS groups with expertise in analytical chemistry, industrial hygiene, medical surveillance, safety, and environmental compliance. Furthermore, JCI supplies janitorial support as well as personnel to transport waste on site under the guidelines established by the Laboratory's chemical waste management and radiation protection groups.

#### **3.4. Technology Development Organization/Management**

**Organization.** The mission of the Applied Environmental Technologies (AET) Program Office is to ensure the nation's security by developing and applying reliable, economic, and environmentally sound applied technologies that solve civilian and defense environmental management problems. The goal is to clean up, maintain, and operate the facilities at Los Alamos in a way that is environmentally advantageous and to develop new technologies that will serve LANL's efforts, as well as those of the Department of Energy, the nation, and the international community.

**Management.** The AET office is responsible for programs funded by the Department of Energy's Office of Environmental Restoration and Waste Management and is also responsible for reimbursable environmental management research and development programs. Personnel directly in AET have responsibility for Technology Development and non-DOE Programs. The Environmental Management Division, which programmatically reports to AET, has responsibility for Environmental Restoration, Waste Operations, Corrective Actions, Decontamination and Decommissioning, and Technology Application. Other organizations, also reporting to the AET Program Director, have responsibility for Financial Affairs, Independent Engineering Reviews, Hanford UST Support, and Technical Support.

#### 4.0. CORRECTIVE ACTIVITIES FIVE-YEAR PLAN PROGRAM

##### 4.1. Task Descriptions

Corrective activities for FY93 in solid waste, water releases, and air emissions are summarized in Table 4-1. These corrective actions are based, in part, on the conditions noted, which are evolving.

<b>TABLE 4-1 FY93 CORRECTIVE ACTIVITIES FOR SOLID WASTE, EFFLUENTS, AND AIR EMISSIONS</b>	
<b>Hazardous Waste Treatment Facility</b>	<b>New requirements for hazardous and mixed waste</b>
<b>Sanitary Wastewater Systems Consolidation Project</b>	<b>Existing FFCA, AO and new NPDES Permit</b>
<b>New Stack at LAMPF</b>	<b>New radioactivity emissions limits</b>
<b>PCB Equipment Replacement/Retrofilling</b>	<b>Existing TSCA requirements</b>
<b>Water Supply System/Cross-Connection Control</b>	<b>Existing SDWA requirements</b>
<b>Clean Water Act Projects</b>	<b>Existing FFCA, AO and new NPDES Permit</b>
<b>RCRA Active Firing Sites</b>	<b>New NPDES Permit and hazardous waste requirements</b>

##### 4.1.1. Task Descriptions for Solid Waste Corrective Activities

**ADS 0042: Hazardous Waste Treatment Facility.** This project includes funding for the design and construction of a hazardous waste treatment facility including a waste management office and two covered hazardous waste storage pads at Technical Area 50 (TA-50), a Laboratory waste management site. This project also includes funding for NEPA and safety documentation included in the DOE-HQ validated total estimated cost (TEC). This project is required to achieve compliance with Resource Conservation and Recovery Act (RCRA) regulations. The new facility will replace existing facilities at TA-54, Area L, which no longer will be available due to the expansion of the radioactive waste management site (TA-54, Area G). The new facility will consolidate all existing on site hazardous waste treatment processes, upgrade existing waste treatment facilities to comply with regulations, and provide treatment for hazardous mixed wastes that are now being accumulated and stored. The treatment facility includes sections for waste oil recycling, lead recycling, D38/reactive compounds treating, general purpose solidifying, plating wastes neutralizing and treating, sampling, and drum recycling.

Over the last several years, LANL has been cited for noncompliance with hazardous waste regulations by the NMED on existing waste management regulation criteria. The Laboratory has responded on an as-needed basis with the result that a variety of treatment processes have been installed at various locations throughout the area. The current waste management system does not ensure full compliance with RCRA regulations, creates higher risks of unnecessary transportation on public roads, high exposure of personnel and public to hazardous wastes, increased waste handling risks, and continued operation of a chemically contaminated facility. This facility will provide treatment for some mixed waste subject to RCRA for which no treatment alternative exists. Conceptual design was completed in FY90 and the project was validated by DOE/HQ. Title I design was started in the fourth quarter of FY91. A determination that an Environmental Assessment (EA) should be prepared was made by DOE/HQ on April 26, 1991. The EA was started in the first quarter of FY92. Title I design for this project is nearing completion and work on the final plans and specifications (Title II) is scheduled to begin in the fourth quarter of FY92. Construction of this project is scheduled to be completed in the first quarter of FY95.

#### **4.1.2. Task Descriptions for Water Release Corrective Activities**

##### **ADS 0051: Sanitary Wastewater Systems Consolidation (SWSC) Project.**

This project includes funding for the construction of a sanitary wastewater treatment facility which will replace seven existing wastewater treatment plants and approximately 30 septic tanks at the Laboratory. The existing wastewater treatment facilities are more than 30 years old, and the discharges are in violation of federal and state regulations. The new consolidated treatment plant will include Laboratory-wide collection and treatment and will comply with all federal and state regulations. The treatment plant will consist of flow equalization, primary and secondary treatment, disinfection, recycling for water conservation, and a laboratory to perform on-site analysis of effluent quality. This project is required under the Laboratory's Administrative Order (AO), and Federal Facility Compliance Agreement (FFCA) with the Environmental Protection Agency. The design capacity of the new treatment plant is 0.6 million gallons per day. Construction (Title III) is approximately 80 percent complete and the plant is scheduled to be operational in the fourth quarter of FY92. The plant will be managed by ENG-8 and operated by JCI; Utilities Funds provide funding in FY93 and FY94.

#### **4.1.3. Task Descriptions for Air Emissions Corrective Activities**

**ADS 0074: New Stack at Los Alamos Meson Physics Facility.** This project includes funding for the design and construction of modifications of the existing stack and air quality treatment system at Los Alamos Meson Physics Facility (LAMPF), to meet the new air quality requirements. The previous limit for off-site exposure under the Federal Clean Air Act (CAA) was 25 mrem per year. The existing LAMPF stack was emitting approximately 9 mrem per year prior to 1989. New regulations adopted in 1989 require a 10 mrem limit to be met. The proposed new stack at LAMPF would provide additional detention time for short-lived radioactivity and would allow the new limit of 10 mrem to be met consistently without shutdown of facilities. The LAMPF stack is presently the highest emitter of radioactivity to the atmosphere in the DOE complex.

A Conceptual Design Report has also been completed for this project and the project has been validated by DOE/HQ. Monitoring instrumentation is being installed Laboratory-wide to accurately monitor cumulative annual radioactive air emissions. This monitoring equipment will more precisely quantify Laboratory emissions for comparison with predictive modeling.

Title I design for this project is scheduled to begin in the fourth quarter of FY92. Construction is scheduled to be completed in the fourth quarter of FY94. Funding for the continued operation of LAMPF has been allocated for FY92 and FY93. A study is now being completed concerning the decommissioning of LAMPF in FY94. If funding is not available for the continued operation of LAMPF in FY94, Title III construction will not be initiated.

#### **4.1.4. Task Descriptions for CA Master ADS and CA GPP Projects**

##### **ADS 81: Corrective Activities Master ADS**

This activity consolidates that portion of the following corrective activities funded by operating funds in accordance with DOE guidance for FY93: Old ADS 49, PCB Equipment Replacement/Retrofilling; Old ADS 70, Water Supply System/Cross Connection Control; Old ADS 80, Clean Water Act Projects; and, Old ADS 3263, RCRA Active Firing Sites.

- **Old ADS 49-PCB Equipment Replacement/Retrofilling:** The purpose of this project is to reduce the amount of PCB liquids at the Laboratory. Reduction has been accomplished by replacement and retrofilling of PCB transformers and disposal of PCB capacitors and other equipment under previous DOE Five-Year Plan guidance. Approximately 130 PCB transformers (PCBs >500 ppm) will be replaced or retrofilled by the end of FY92. Remaining PCB equipment includes approximately 70 PCB contaminated transformers and other equipment (PCBs <500 ppm, >50 ppm) which are scheduled to be dechlorinated in FY94 under new DOE guidance.
- **Old ADS 70-Water Supply System/Cross Connection Control.** This project includes funding for cross-connection controls required to prevent nonpotable water from entering the drinking water supply, for preparation of a plan to improve microbiological quality, and for completing a survey to eliminate high levels of lead from drinking water outlets. The surveys for this project are scheduled to begin in FY92 and continue into FY93. Plumbing modifications and removal of lead piping will be required beyond FY93 in order to achieve compliance with the requirements of the Safe Drinking Water Act.
- **Old ADS 80-Clean Water Act Projects:** The purpose of this project is to achieve compliance with the Clean Water Act; and the Laboratory's NPDES Permit, FFCA, and AO regarding effluent discharges. This work includes waste stream characterization to verify that waste streams are properly segregated and monitored as required under the Laboratory's FFCA and AO. Also, development of permits for storm water discharges and sludge disposal, and implementation of toxicity testing (biomonitoring) of effluent discharges are included. Planning, design and construction of

improvements to existing treatment facilities as required to meet the conditions of the Laboratory's NPDES Permit, FFCA and AO are included in this project. Improvements to prevent wastewater overflows and releases, and implementation of SPCC Plan requirements are also included. Waste stream characterization surveys are approximately 50 percent complete and are scheduled to be finalized in the fourth quarter of FY93 in accordance with the Laboratory's FFCA and AO. Plumbing modifications to separate noncomplying waste streams and other projects to achieve compliance with the Laboratory's NPDES Permit will be required beyond FY93.

- **Old ADS 3263-RCRA Active Firing Sites:** The purpose of this project is to achieve compliance with the CWA and the RCRA at the 20 active firing sites at the Laboratory. The scope of this project includes characterization of the runoff from these sites to determine if any hazardous constituents are present and to construct runoff control structures as required.

#### **ADS 82: Corrective Activities GPP ADS**

This activity consolidates that portion of the following corrective activities funded by General Plant Project (GPP) funds in accordance with DOE guidance for FY93: Old ADS 80, Clean Water Act Projects.

- **Old ADS-80 Clean Water Act Projects:** The purpose of this project is to achieve compliance with the CWA; and the Laboratory's NPDES Permit, FFCA, and AO regarding effluent discharges. Planning, design and construction of improvements to existing treatment facilities as required to meet the conditions of the Laboratory's NPDES Permit, FFCA, and AO are included in this project. Improvements to prevent wastewater overflows and releases, and implementation of SPCC Plan requirements are also included. GPP funding is included to cover the larger improvements to existing treatment facilities. The GPP project to eliminate the TA-53 Sanitary Lagoons as required under the FFCA and AO is scheduled to be completed in the first quarter of FY93. Other GPP Clean Water Act Projects are scheduled in order to achieve full compliance with the Laboratory's NPDES Permit.

#### **4.2. Resources**

Personnel from EM-8 will initiate CAs. These personnel will work with the ENG and other Laboratory organizations involved in the specific corrective activities. Resources for initiation of projects and oversight in environmental compliance are provided from the base environmental program and are not included in the costs specified for CAs. Occasionally, consulting engineering or similar assistance will be required when available Laboratory personnel lack expertise in a specific area or work loads exceed the resources of EM-8. All CA projects are Priority 1 activities.

### 4.3. Schedules

A specific schedule for each individual task will be developed based upon available funding for that CA. Many of the corrective activities involve an aggregate of relatively small actions that will be applied to many Laboratory facilities, such as PCB equipment and UST replacements, rather than a major action that will be undertaken at a single facility. The schedules for these tasks depend on available funding in a given FY. PTLs assigned to specific corrective activities are responsible for developing detailed work schedules, the contents of which are beyond the detail level required for this report.

### 4.4. Costs

New guidance issued by DOE in December 1990 requires a notice of violation from a federal or state regulator, or from a DOE sanctioned audit team, in order to be eligible for Corrective Activities funding. Because of this new guidance, DOE has eliminated the projects listed in Table 4-2 from CAs funding for FY94.

<b>TABLE 4-2 CORRECTIVE ACTIVITIES ELIMINATED FROM EM FIVE-YEAR PLAN IN FY94</b>	
<u>Activity Data Sheet No.</u>	<u>Description</u>
55	Underground Storage Tank Replacements

*Does the  
USTB fund?*

The DOE December 1990 guidance also requires transfer of other CA projects into the WM Program in FY93. The projects shown in Table 4-3 will be transferred into the WM Program for FY93.

<b>TABLE 4-3 CORRECTIVE ACTIVITIES TRANSFERRED TO WASTE MANAGEMENT IN FY93</b>	
<u>Activity Data Sheet No.</u>	<u>Description</u>
43	Centralized High Explosives Wastewater Facility



#### **4.5 Scope with Higher Funding**

There is no difference in the Case 1 and Case 3 funding profile in the Program for FY93. However, the funding for ADS 55 Underground Storage Task Replacement has been eliminated from the FYP after FY92. All funding for the CA Program has been eliminated after FY94. Funding for FY94 and beyond is to be provided by the responsible Project Support Office.

## 5.0. ENVIRONMENTAL RESTORATION FIVE-YEAR PLAN PROGRAM

The Laboratory's ER Program must meet the requirements of all applicable environmental statutes; however, two primary laws, RCRA and CERCLA (as amended), govern ER activities at the Laboratory. The D & D Program meets the requirements of all applicable DOE orders.

### 5.1. Task Descriptions

**Background.** Items identified in Subsection 1.2.2. of this plan as environmental concerns and issues are addressed in the FYP. The program began addressing OUs with potential release sites of highest concern in FY90 and FY91. These SWMUs are aggregated into what the ER Program is terming OUs in order to more effectively manage the program. FY92 activities include updating the IWP and completing RFI work plans that cumulatively address 35% of the SWMUs at the Laboratory as required by the Laboratory's RCRA operating permit. In May, 1992, eight RFI work plans will be submitted to the EPA for approval under provisions of HSWA Module of the Laboratory's RCRA operating permit. Ten RFI work plans will be initiated in FY92 and submitted to EPA in May 1993. During FY92, site characterization will be initiated at TA-21 and the three townsite OUs. Site characterization will be initiated at an additional five OUs during FY93.

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During FY93, work plans will be initiated for five more OUs under the provisions of the HSWA Module. Management functions will continue. Additionally, information collection for and preparation of the DOE MWSDF NEPA documentation and planning for the MWSDF and the environmental analytical chemistry facility will continue.

During FY94-FY98, field work for characterizing 15 more OUs will begin. Corrective Measures Studies and Voluntary Corrective Actions (VCA) will be taken as appropriate. Management functions will continue and the MWSDF will be constructed and ready for operation by early FY97. The MWSDF NEPA documentation will be finalized during this period.

In Budget Year FY92, the D&D Master Plan was initiated to identify all excess facilities and Phase I needs. In addition, the project management plan for the decommissioning of TA-21, Buildings 3 and 4 South, was prepared, and remediation operations will begin. In FY93, remediation operations for Buildings 3 and 4 South will continue and will carry over into FY94. The planning phase will continue for the phase separator, and remediation will begin. Because of funding constraints, remediation will continue into FY94.

ADS 1063 has been deleted for FY93. The remaining underground storage tank (UST) removal or upgrade activities are addressed in the ADS for the applicable site. The UST activity at each applicable site includes supporting items such as sampling, analysis, transportation, soil remediation costs, and management.

EM-6 Transition Planning activities (ADS HQ-6007-AL) may be initiated in FY93.

During the five year planning period, additional D&D projects will be added to the Master Plan, probably at TAs 3, 21, 33, 16, and 50. The remediation of TA-21, Buildings 3 and 4 South, will be completed in FY94. For a detailed list and project descriptions, see Tables 5-1 and 5-2.

**Facility Transfer.** D&D personnel are actively engaged in effecting proper transfer of facilities within the appropriate DOE agencies. Identification of responsibilities between EM-40 and EM-6 will permit refinement of scopes of work for planned and future D&D projects.

**Ultimate Use of Facilities.** D&D projects are planned and executed in keeping with DOE guidance (Department of Energy Policy for Acceptance of Facilities for Environmental Restoration, 1991). Contaminated excess facilities will be decommissioned or decontaminated for reuse as nonradiological facilities. A decision will be project specific on the Laboratory's programmatic needs. Each ADS provides information on current plans for ultimate disposal of the facility.

### **Task Descriptions for Assessments**

**ADS 1049: Canyons Assessment.** The canyon effort addresses the impact to the watershed and to the Rio Grande as well as the shallow alluvial aquifers in each of 19 canyons. Facilities on top of the mesas may impact the canyons from outfalls along the canyon rims. Some facilities and firing sites are located in the canyons. There are potential release sites (mainly effluent receiving areas) with radioactive isotopes, beryllium, unexploded ordnance, heavy metals, and high explosive contaminants. Most contamination is expected to be very low-level, and therefore, limited removal and institutional controls would be sufficient remediation. It is unlikely that soils and alluvium would be removed and disposed of as mixed or hazardous wastes. This activity constitutes the RCRA Facility Investigation/Corrective Measures Study/Corrective Measures Implementation (RFI/CMS/CMI) and VCAs for this OU.

**ADS 1062: Interim Remedial Measures Assessment.** This activity constitutes interim remedial action assessments under the HSWA Module. In the past, remedial assessments have been carried out by the interim waste management program addressing old radioactive waste disposal sites at any TA where construction takes place prior to planned assessment and remediation. Priority will be given to investigating potential SWMUs in construction areas off Laboratory property if public health and safety are of concern. This activity will be phased out because the assessments will be integrated with the planned work in each operable unit as appropriate.

**ADS 1066: NEPA Documentation Assessment.** An EIS is anticipated to be required for NEPA compliance for the RCRA MWSDF. It is anticipated that the EIS will also support corrective measures of the ER Program by analyzing cumulative impacts of alternatives. A technical support document is being prepared to provide the necessary data for input to the EIS.

**ADS 1071: TA-0, 19, 26, 73, 74 Assessment.** Approximately 16 acres in TA-0, mostly in the Townsite; about 1.5 acres in TA-19; about 1.5 acres at TA-26; the Los Alamos airport (TA-73); and TA-74 (a buffer zone) are included in this OU. SWMUs and Areas of Concern (AOCs) include but are not limited to a small arms firing range, county landfill, airport incinerator, mortar impact areas left by the Army, surface disposal sites, septic tanks, sewage disposal plants, vehicular maintenance site, fuel tanks, and outfall areas. The operable unit includes private property, Los Alamos and Santa Fe county land, U.S. Forest Service land, and GAO land. Potential contaminants include radionuclides, unexploded ordnance, organic chemicals, heavy metals, high explosives, solvents, and hazardous chemicals. Potential remedial alternatives vary from selected removal to *in situ* remediation. This activity constitutes the RFI/CMS/CMI and VCAs for this OU.

**ADS 1078: TA-1 Assessment.** TA-1 was the original uranium and plutonium processing area where the first atomic weapons were fabricated during World War II at the current Los Alamos Townsite. All of the original structures have been removed, and extensive D&D has been done throughout the area. Some underground structures (i.e., sanitary waste lines) and contaminated soil may remain in the Townsite, even after extensive and thorough decommissioning and decontamination efforts, including removal of the acid sewer lines, manholes, and septic tanks, was accomplished. This OU consists of potential low concentration surface and subsurface contaminated areas which include hillside surface contamination, disposal areas, and soil associated with excavated acid sewer lines, manholes, septic tanks, storm drains, and outfalls. About 80 acres (owned by the DOE, Los Alamos County, and private owners) may still contain very low-levels of plutonium, uranium, fission products, and organic chemicals. Remediation is expected to include limited removal of small volumes of soil followed by disposal of these small volumes. This activity constitutes the RFI/CMS/CMI and VCAs for this OU.

**ADS 1079: TA-10, 31, 32, 45 Assessment.** OU 1079 incorporates TAs -10, -31, -32, and -45. Approximately 5 acres in TA-10 are included in this OU including firing sites, detonation sites, tanks, disposal pits, landfill, and decommissioned building areas. TA-10 is located in Bayo Canyon. The area was previously D&D and transferred to Los Alamos County with restricted use agreements. This OU also includes a septic tank and a contaminated area associated with buildings approximately 1 acre in size at TA-31 (East Receiving Yard). The area is located in the Eastern Area near the Los Alamos Airport. Approximately seven acres in TA-32 are included in this OU. The sites include an old lab area, septic tanks and associated structures, and an incinerator. TA-31 and TA-32 are located outside the Laboratory boundaries; no records are available on the D&D of these facilities. This OU also consists of a site about 5 acres at former TA-45, which resulted from the former industrial liquid waste treatment plant effluent released to Acid Canyon. The site is located outside Laboratory boundaries; the plant was decontaminated and decommissioned in 1966. Contaminants which could possibly be found at these sites include radionuclides, high explosives, acids, heavy metals, organic chemicals, and petroleum products. Possible remediation ranges from limited removal followed by institutional controls to the less likely case of removal and disposal for the disposal pits. This activity constitutes the RFI/CMS/CMI and VCAs for this OU.

**ADS 1082: TA-11, 13, 16, 24, 25, 28, 37 Assessment.** TA-11 was originally used for weapon mockup testing at various firing sites and now is used for high explosives drop tests. TA-13 was originally used for X-ray work with explosive testing and is currently part of TA-16. TA-16 produces, tests, and assembles high explosive components for weapons R&D. There are about 200 structures at TA-16. TA-24 (T-site) was originally a service area for X-ray examination of high explosive and for high explosive storage; it is now nonoperational and part of TA-16. TA-25 (V-site) was also a high explosive process area and is now non-operational and part of TA-16. Approximately five acres of outfall areas at TA-11, 13, 16, 24, and 25 are potentially contaminated. Sites consist of outfalls, sumps, sump pits, septic tanks, drain lines, and waste tanks. The OU also includes about 27 acres of potential release sites at TA-11, 13, 16, and 25 including filter/drying beds, burn areas, open landfills, burning pits, firing sites, and MDA R. The OU also includes approximately three acres of potentially contaminated ponds, pits, dry wells, and storage tanks at TA-16, 24, and 25. This OU also includes underground storage tanks that must be removed or upgraded to meet state and federal regulations. Related activities such as sampling, transportation, soil remediation, and management are included. Potential contaminants include high explosives, organic chemicals, heavy metals, radionuclides, and asbestos. Most sites are expected to require selected removal of small volumes and are less likely to be remediated by removal and disposal of larger volumes. This activity constitutes the RFI/CMS/CMI and VCAs for this OU.

**ADS 1085: TA-12, 14, 67 Assessment.** TA-14 is an active firing area used by the Explosives Technology and Application groups. Open and closed firing chambers, firing points and magazines were built on the site. This OU consists of several potential release sites comprising approximately 29 acres. The sites include active and inactive firing sites, a trash burning area at the east end, an area in which noncombustible residue of burned buildings was dumped in local drainage, and a septic tank. Possible remedial alternatives vary from selected removal, followed by institutional controls, to removal and disposal of larger volumes. TA-12 comprises inactive firing sites with support facilities. TA-67 is a buffer zone with no SWMUs. This activity constitutes the RFI/CMS/CMI and VCAs for this OU.

**ADS 1086: TA-15 Assessment.** Technical Area-15 (TA-15) (R-Site) contains a number of firing sites for the hydrodynamic studies of nuclear weapon components during explosions, and has been in operation since 1944. This OU consists of the active firing sites R44, R45, PHERMEX and Ector; inactive firing sites A, B, C, D, E, F, G, and H; active and inactive septic tanks, sumps, outfalls, and drain lines; material from firing sites disposed of at the edge of canyons; inactive material disposal areas (MDAs) N and Z; decommissioned building areas; and two shafts with potentially hazardous material. PHERMEX and Ector are the two main X-ray machines, used by the operating groups at TA-15 for dynamic studies of explosions. About 269 acres are associated with the current and abandoned firing sites and structures. Potentially hazardous materials that are distributed over the firing sites are uranium, beryllium, lead, other heavy metals, tritium, and possible residues from the detonation of high-explosives (HE). Remediation activities will be commensurate with the decision of the DOE on the projected end-use of the land. This OU also includes underground storage tanks that

must be removed or upgraded to meet State and Federal regulations. Related activities such as sampling, transportation, soil remediation, and management are included. This activity constitutes the RFI/CMS/CMI and VCAs for this OU.

**ADS 1093: TA-18, 27, 65 Assessment.** TA-18 was originally used for HE testing (up to 2 tons per test) at three firing sites. TA-18 is currently used for critical assembly research. TA-27 is down canyon from TA-18 and was (now abandoned) used for testing, using bullets fired into HE assemblies to determine resistance to individual detonation of HE. This operable unit consists of potentially contaminated areas such as firing sites, ballistic test sites, and contaminated buildings; sanitary sewer drains and outfalls, acid sewer system, sumps, acid waste tanks, magazines, and underground petroleum tanks. This OU also includes underground storage tanks that must be removed or upgraded to meet State and Federal regulations. Related activities such as sampling, transportation, soil remediation, and management are included. About 14.4 acres are associated with these structures and areas. Possible contaminants are organic chemicals, acids, radionuclides, high explosives, beryllium, and mercury. Remediation could include limited removal, or less likely, removal and disposal of larger volumes. This activity constitutes the RFI/CMS/CMI and VCAs for this operable unit. CMI and VCAs are not specified at this time.

**ADS 1098: TA-2, 41 Assessment.** TA-2 is the Omega West Reactor which is an 8MW-water cooled reactor fueled by ninety-three percent uranium-235. Two other reactors, a water boiler reactor and a fast reactor called Clementine, were also operated and decommissioned at TA-2. This OU consists of potential release sites comprising approximately 24.3 acres. The sites include contaminated areas associated with buildings, an oil storage area, burn pits, septic tanks, drain fields, outfall areas, sumps and lines, and effluents. Potential contaminants include fission products, heavy metals, potassium dichromate, and PCB-contaminated oil. Potential remedial alternatives may vary from selected removal followed by institutional controls to the less likely alternative of removal and disposal of larger volumes. This OU also includes underground storage tanks that must be removed or upgraded to meet State and Federal regulations. Related activities such as sampling, transportation, soil remediation, and management are included. This activity constitutes the RFI/CMS/CMI and VCAs for this OU.

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**ADS 1100: TA-20, 53, 72 Assessment.** TA-20, located below TA-53 in current TA-72, in Sandia Canyon, was a World War II testing and firing area for weapon initiators. TA-20 has been D&D and is currently abandoned. TA-53 is the LAMPF, which is a proton accelerator producing many secondary particles used in a wide range of experimental programs. The LAMPF is the third largest facility complex at Los Alamos. This OU consists of several potential release sites: disposal pits, firing sites, a cooling tower outfall area, and lagoons and outfall areas. These sites comprise an area of approximately 14.5 acres. Potential contaminants include activation products, high explosives, hazardous chemicals, radionuclides, and beryllium. Potential remedial alternatives for these sites include selected removal followed by institutional controls to the likely removal and disposal for larger volumes. This activity constitutes the RFI/CMS/CMI and VCAs for this OU.

**ADS 1106: TA-21 Assessment.** TA-21 was the plutonium processing, recovery, and fabrication facility at Los Alamos until 1978 when operations were transferred to TA-55. TA-21 was partially decommissioned and decontaminated in 1977-1980. Most of the contaminated buildings, exterior duct work, and underground structures still remain at the site. This OU consists of storage tanks, seepage pits, drain lines, septic tanks, sumps, pits, manholes, inactive MDAs A, B, T, U, V; surface disposal areas; and outfalls. MDA B has been used since 1984 to study alternative cover designs potentially applicable for remediation of LANL sites. The objective of the study is to design a trench cover system which maximizes waste site integrity by minimizing erosion and infiltration and maximizing water storage capacity. About 105 acres are associated with these areas with potential contaminants being acids, organic chemicals, uranium, americium, and plutonium, and heavy metals. Remediation is expected to consist of partial removal followed by institutional controls with removal and disposal possible. This OU also includes underground storage tanks that must be removed or upgraded to meet State and Federal regulations. Related activities such as sampling, transportation, soil remediation, and management are included. As appropriate, ER activities will be coordinated with building D&D at DP West. This activity constitutes the RFI/CMS and VCAs for this OU.

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**ADS 1111: TA-6, 7, 22, 40, 58, 62 Assessment.** OU 1111 includes approximately 24 acres in TAs -6, -7, -22, -40, -58, and 62. TAs -6, -7, -22, and -40 have been the sites for detonator development activities for most of the history of the Laboratory. The types of SWMUs present are outfalls, sumps, septic systems, underground storage tanks, dry wells, firing sites, disposal pits, canyon-site disposal areas, and MDA F. Potential contaminants are high explosives, water treatment chemicals, acids, organics, petroleum products, arsenic, heavy metals, beryllium, and radionuclides. Potential remedial alternatives vary from selected removal followed by institutional controls to the less likely alternative of removal and disposal of larger volumes. Area F may be used to demonstrate a landfill cover design and determine a cost-effective, optimized design for LANL across the elevational and climatic gradient in Los Alamos. All identified SWMUs are found in TAs -6 (now including TA-7, -22, and -40. TAs -58 and -62 were established in 1989 from acreage taken from surrounding technical areas addressed under ADSs 1155 and 1156. This activity constitutes the RFI/CMS/CMI and VCAs of this OU.

**ADS 1114: TA-3, 59, 60, 61, 64 Assessment.** ADS 1114 now includes former LANL-ER-1115 and LANL-ER-1116. This OU consists of cooling tower blowdown, lagoons, pits, landfills, outfalls, contaminated areas, fuel oil storage tanks, oil sump, floor drain, septic tanks, well, burn pits, chemical waste sumps and tanks, explosive manufacturing area, firing sites, vacuum pump repair shop and septic tank cesspool. TA-3 was originally South Mesa Site with firing sites. Currently TA-3 is the largest administrative and research area of the Laboratory. The main shop areas fabricate uranium items, the CMR building provides plutonium and uranium chemical support, and numerous operational areas include accelerators and other specialized R&D equipment. TA-59 is the EM Division complex which contains the chemical analysis laboratory. About 41 acres are associated with these areas with potential contaminants including asbestos, organic chemicals, fluoride, chromium, HE, heavy metals, beryllium, acids, bases, and radionuclides. Possible RAs include selective removal followed

by institutional controls with removal and disposal of larger volumes less likely. This OU also includes underground storage tanks that must be removed or upgraded to meet State and Federal regulations. Related activities such as sampling, transportation, soil remediation, and management are included. This activity encompasses the RFI/CMS for this OU.

**ADS 1122: TA-33, 70 Assessment.** This OU consists of buildings, outfalls, sumps, drains, septic tanks, magazines, firing sites and shafts, gun firing areas, drain lines, trenches, and inactive MDAs D, E, and K. These structures are associated with the now-abandoned TA-33 gun firing and tower/firings sites areas where munitions and weapons components were tested. The structures, debris areas, and associated outfalls may contain depleted uranium, beryllium, mercury, tritium, acids, organic chemicals, heavy metals, high explosives residues, and plutonium. These potential release sites cover about 152 acres. Remedial actions will probably consist of limited removal of contaminants and institutional controls. Removal and disposal could be possible at a few debris areas. This activity constitutes the RFI/CMS/CMI and VCAs for this OU.

**ADS 1129: TA-4, 5, 35, 42, 48, 52, 55, 63, 66 Assessment.** OU 1129 is comprised of nine TAs: former TA-4; TA-5; TA-35; former TA-42; TA-48; TA-52; TA-55; TA-63; and TA-66. The entire OU is within the boundaries of the Laboratory, and all OU 1129 land is under control of the DOE. All TAs in OU 1129 are currently or were previously used by DOE for Laboratory operations. A variety of SWMUs types are found in OU 1129, including firing sites, disposal areas, above and below ground storage tanks, septic systems, outfalls, waste lines, lagoons, oil spills, container storage areas, waste oil and waste water treatment facilities, and radioactive liquid waste spills.

This assessment addresses all SWMUs and AOCs located within OU 1129. These SWMUs and AOCs are contained on about 66 acres of potential surface and subsurface release sites. The sites have the potential for a variety of contaminants. Remediation is expected to consist of removal and disposal of contaminants and institutional control of the facilities. This OU also includes underground storage tanks that must be removed or upgraded to meet State and Federal regulations. Related activities such as sampling, transportation, soil remediation, and management are included. These activities constitute the RFI/CMS/CMI and VCAs for this OU.

**ADS 1130: TA-36, 68, 71 Assessment.** ADS 1130 consists of TAs -36, -68, and -71, covering 7 sq. miles. TA-36 consists of several firing sites in and near Potrillo Canyon and is operated by the Explosives Application Group to understand high-explosive detonation phenomena. This OU consists of several potential release sites including firing sites, a chamber for containment and recovery of shots at firing site, septic systems, landfill (explosive disposal area at Lower Slobbovia), burning pits and a sump. Potential contaminants include nitric acid, high explosives, depleted uranium, other heavy metals, and hazardous wastes. Potential remedial alternatives vary from selected removal followed by institutional controls (stabilization in place) to the less likely removal and disposal for larger volumes. TA-68 has been a buffer zone under institutional control throughout the history of the Laboratory and the Laboratory has never conducted any experiment there. TA-71 has never been used by the Laboratory to conduct any experiment. At one time, it was open to public access. This activity constitutes the RFI/CMS/CMS and VCAs for this OU.

**ADS 1132: TA-39 Assessment.** This OU consists of several potential release sites which comprise an area of approximately 35.2 acres. The sites include firing sites, a waste disposal pit, Material Disposal Area Y, and a septic tank. Since 1953, TA-39 (Ancho Canyon Site) has been operated by the Shockwave Physics Group and consists of five firing points and several gun sites. Potential contaminants include radionuclides, high explosives, heavy metals, and hazardous chemicals. Possible remedial alternatives vary in scope from selected removal followed by institutional controls to removal and disposal of larger volumes. This activity constitutes the RFI/CMS/CMI and VCAs for this OU.

**ADS 1136: TA-43 Assessment.** TA-43 is the Health Research Laboratory (HRL) near the Los Alamos Medical Center. HRL was first occupied in 1953 by groups doing biomedical and industrial hygiene research. Current operations are more diverse with research in toxicology, genetics, pathology, biophysics, and neurobiology. This OU consists of several potential release sites covering an area of approximately 1 acre. The area is potentially contaminated from past outfalls. Potential contaminants include radioactive waste and corrosion inhibitors. Possible remedial alternatives vary from selected removal of small volumes to the less likely alternative of removal and disposal of larger volumes. This activity constitutes the RFI/CMS/CMI and VCAs for this OU.

**ADS 1140: TA-46 Assessment.** TA-46 was originally used for nuclear reactor rocket (Rover) R&D. Currently, R&D activities conducted at TA-46 include: lasers; chemistry; photochemistry; fuel cells; particle accelerators; and surveillance. This OU comprises several potential release sites including septic tanks and associated drain fields; chemical and waste storage areas; sanitary lagoons; sewer system outfall from a metallurgical polishing lab; building sink, sump, and floor drain outfalls; and a material fill at the head of Canyon del Buey. Potential contaminants include hazardous chemicals, heavy metals, and radionuclides. Potential remedial alternatives include selected removal of large or small volumes of material. This activity constitutes the RFI/CMS/CMI and VCAs for this OU.

**ADS 1144: TA-49 Assessment.** At TA-49, underground hydronuclear experiments were conducted in 1960-1961. The experiments involved high explosives, plutonium, beryllium, and lead in nuclear weapon configurations to test weapon safety. A small radiochemistry facility also was built at the site to support the experiments. Most above-ground structures have been removed and the surface has been D&D. The site contains a leach field, surface radioactive contamination, and a landfill/trash burning area. This OU includes MDA AB which encompasses about seven acres. Potential remedial alternatives for mixed wastes existing at TA-49 vary from selective removal followed by capping to removal and disposal of larger volumes. This OU also includes underground storage tanks that must be removed or upgraded to meet State and Federal regulations. Related activities such as sampling, transportation, soil remediation, and management are included. This activity constitutes the RFI/CMS/CMI and VCAs for this OU.

**ADS 1147: TA-50 Assessment.** This OU consists of TA-50 and MDA C. TA-50 consists of liquid and solid waste treatment facilities for processing radioactive liquids, incinerating mixed waste, and reducing the volume of TRU waste. The liquid waste treatment facility contributes most of the SWMUs at TA-50 and generates liquid, solid, and gaseous effluents that likely contaminate surrounding soils and sediments. In addition, potential leaks in the liquid waste transfer, treatment, and storage systems at TA-50 lead to the possibility for uncontrolled releases of contaminants. The treatment facilities at TA-50 occupy about 10 acres. Potential contaminants include radionuclides, hazardous chemicals, mixed waste, and TRU waste. Area C is an 11.7-acre inactive landfill that has been used to dispose of radioactive, hazardous, mixed, and TRU waste in 6 pits and over 100 shafts. Remediation of this landfill could include no action, engineering controls to limit contaminant migration, or removal of problem sites within the landfill. Characterizing the distribution and transport of contaminants, evaluating health and environmental consequences, and selecting appropriate remediation technologies constitute the RFI/CMS/CMI and VCAs for this OU.

**ADS 1148: TA-51, 54 Assessment.** This OU consists of potential release sites comprising an area of approximately 70 acres. TA-51 was an animal experimental and environmental research area. A dog holding facility and large animal buildings were used for toxicity studies. TA-54 is a currently active, solid waste disposal area at Los Alamos. The sites include MDAs L, H, G, and J. Radioactive (low-level and stored transuranic) wastes are handled at Area G. Area G also has buried pre-1973 transuranic mixed waste (6 trenches). Area L currently stores hazardous chemicals before shipment for treatment/disposal. Area L has old shafts augured into the tuff where hazardous chemicals were disposed. Area H consists of shafts with disposed waste. Area J consists of three trenches where flashed high-explosives inactive contaminated waste from TA-15 as well as other inactive nonhazardous wastes are disposed. Potential contaminants include hazardous wastes, radionuclides, and solvents. The most likely remedial alternative will be selected removal of small volumes with the less likely alternative of removal and disposal of larger volumes. A landfill cover will be designed and demonstrated at TA-54. This will determine a cost-effective optimized design for Los Alamos across the elevational and climatic gradient present at LANL. This activity constitutes the RFI/CMS/CMI and VCAs for this OU. Required Closure Activities at TA-54 have been integrated into the RFI/CMS/CMI process. CMI and VCA are not specified at this time except for the Area L plume.

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**ADS 1154: TA-57 Assessment.** TA-57 is the site where several very deep geothermal wells were drilled and tested near the Valle Caldera in the Jemez Mountains west of Los Alamos. The 20-acre development contains several support buildings. This OU consists of several potential release sites with an area of approximately one acre. The site consists of drilling mud and cuttings from the Fenton Hill geothermal sites. Potential contaminants include certain drilling muds which might be hazardous wastes. Possible remedial alternatives vary from selected removal to the less likely alternative of removal and disposal of larger volumes. This activity constitutes the RFI/CMS/CMI and VCAs for this OU.

**ADS 1157: TA-8, 9, 23, 69 Assessment.** TA-8 (Anchor Ranch) was originally used for ordnance and radioactive material storage and staging. Currently, TA-8 houses administrative offices and nondestructive testing facilities for the Dynamic Testing Division and the Fabrication and Assembly Groups. TA-9 is operated by the Explosive Technology Group for developing and testing new explosives. TA-23 consisted of two lab buildings, a magazine, and an office building; it is currently abandoned (decommissioned) and part of TA-9. TA-69 houses a guard house, an inactive incinerator, and office space in the form of trailers. This OU consists of several potential release sites comprising approximately 38 acres. The sites consist of radiography facilities; septic systems, sumps, and outfalls; contaminated areas associated with explosive processing facilities; sanitary lagoon; firing sites; landfills; pits; and Material Disposal Areas M and Q. Potential contaminants include radionuclides, hazardous chemicals, lithium, asbestos, and high explosives. Potential remedial alternatives include selected removal followed by institutional controls capping, and the less likely alternative of removal and disposal of larger volumes. This activity constitutes the RFI/CMS/CMI and VCAs for this OU.

**ADS 2105: Programmatic Technical Support Assessment.** This ADS consists of all programmatic technical support activities associated with implementing the LANL ER Program assessment activities including preparing the LANL Installation Work Plan (IWP) annual updates in each fiscal year. Also under this task, an Integrated Test Plot for Laboratory-wide use will build upon the four-year database from the Material Disposal Area B cover demonstration, and assist in developing long-term data on hydrological performance of landfill covers by doing experiments at an intermediate scale under more controlled conditions than the field. The data will be used for precise calibration of water balance models for LANL to assist in field scale design of covers and performance assessment. This activity also includes the development and implementation of the Facility for Information Management Analysis and Display (FIMAD); Geographical Information System (GIS); development of the Sample Facility for coordinating/tracking of all analytical samples; application of LANL developed instrumentation technology; application of ongoing LANL-specific assessment and remediation technologies; background ecological studies; framework studies; decision analysis; risk assessment; and quality assurance. Additional activities include: standard operating procedures development and technical team support (geology, geochemistry, hydrology, and drilling). These activities will significantly enhance the cost effectiveness of the LANL ER Program. These elements will be incorporated into the IWP to be updated annually as required by the HSWA module.

**ADS 2107: Programmatic Management Assessment.** This ADS now also includes ADS 2106 and consists of management-related activities associated with implementing the LANL ER Program including preparing the ER Five-Year Plan; LANL Site-Specific Plan; administrative procedures; program management; and weekly, monthly, and quarterly reports. Also included are community relations activities; quality assurance; health and safety assurance; resource planning; maintenance of the MIS (including cost and schedule planning and reporting); and providing periodic briefings to the DOE, Laboratory management, and the public.

**ADS 2110: Environmental Analytical Chemistry Facility.** A 39,000 sq. ft. facility is proposed for chemical analysis of radioactive and nonradioactive samples that are collected primarily for environmental restoration activities at

LANL. Current facilities are not adequate for the numbers and types of samples that must be analyzed for trace levels of hazardous constituents (contamination problems affect sample analyses). Private contractors will provide approximately 80% of chemical analyses. This facility will be used for highly radioactive, fast-turnaround, and split sample analysis. This new facility will be designed specifically for the specialized analyses of trace levels (i.e., nanogram and picogram amounts) of inorganic, organic, and radiochemical constituents in water, waste water, soils, sludges and wastes. This facility will allow the LANL to meet current technical and schedule requirements and to develop new capabilities that will result in significant savings in analytical chemistry costs without sacrificing the validity of the data generated.

### **Task Descriptions for Remediations**

**ADS 1067: RCRA Mixed Waste Storage/Disposal Facility.** The MWSDF will provide Los Alamos with an on-site facility for the disposal of mixed wastes generated during RCRA closures, RCRA corrective actions, interim remedial actions, and D&D remedial actions activities at Los Alamos. The technical scope of this activity is to design and construct this facility. The main feature of this facility will be the double-lined, RCRA-approved disposal pit(s). The pit(s) will be provided with a waste handling system, two leachate collection systems, monitoring system, and an operational cover to protect the operations from the weather. Other features of the site include a monitoring and alarm system for detecting the release of gaseous or liquid contaminants, decontamination and leachate treatment facility, and temporary waste storage enclosure. Normal site requirements such as roads, utilities, parking areas, and office buildings are also provided. Other activities within the scope of this project include completing the necessary documentation for safety (PSAR and FSAR), NEPA (EA and/or EIS), permits (Part B and construction permits) and the performance assessment. The NEPA activities are funded out of ADS 1066.

**ADS 1127: TA-35, Waste Oil Storage Pits.** Two surface impoundments at TA-35 which were used to collect spilled or leaked oil from associated buildings have been closed. The final closure report will be prepared.

**ADS 1135: TA-40, Scrap Detonation Site.** TA-40 Scrap Detonation Site, an inactive site used to detonate scrap high explosives, is to be closed. The original closure plan was submitted to the NMEID, now NMED, in September 1985. The closure plan was updated in FY90, including plans for sampling of the site and detonation area to determine the extent of contamination. Contaminated soil, if any is found, may need to be removed/treated/disposed of as hazardous waste. The Closure Plan was approved by NMED.

### **Task Descriptions for D&D**

**ADS 1051: D&D Program, Defense Program (DP) Facilities.** This activity funds a LANL D&D Program that will identify all excess facilities at LANL and their Phase I needs. The initial focus will be on D&D Projects scheduled for FY92 and FY93 and will be expanded to include all activities included in the FYP. Another major activity will be to expand coordination of the ER Program SWMU activities with D&D activities to provide a long range cost-efficient and effective program at the Laboratory.

This ADS provides staff to maintain the base D&D Program for the Laboratory. General activities include:

- ensuring that the D&D Program is consistent with the goals of LANL management, DOE, EPA, and the State of New Mexico;
- ensuring compliance with the environmental permits specific to the D&D Program and with DOE Order 5820.2A, Chapter 5;
- performing cost, schedule, and performance measurements;
- ensuring the establishment, implementation, and support of quality assurance, health and safety, and records management programs; and
- providing direction to project leaders assigned to specific D&D projects (covered by separate ADSs).

During the five-year planning period, specific D&D projects will be added as the Laboratory Master Plan declares these facilities excess. Facilities are expected to become available for D&D at TAs 3, 21, 33, 16, and 50.

**ADS 1051B: D&D Program, Non DP Facilities.** This activity funds the LANL D&D Program to identify all excess non DP facilities and the Phase I needs. This ADS will be combined with ADS 1051 in FY94. General activities include:

- ensuring that the D&D Program is consistent with the goals of LANL management, DOE, EPA, and the State of New Mexico;
- ensuring compliance with the environmental permits specific to the D&D Program and with DOE Order 5820.2A, Chapter 5;
- performing cost, schedule, and performance measurements;
- ensuring the establishment, implementation, and support of quality assurance, health and safety, and records management programs; and
- providing direction to project leaders assigned to specific D&D projects (covered by separate ADSs).

**ADS 1055: Assessment and Remediation of the TA-21 Site.** This ADS now combines ADSs 1055 and 2122, and was expanded to include sixteen additional buildings at TA-21, Defense Programs Site, which are contaminated with radioactive and other hazardous materials.

The assessment phase (Phase I) of Buildings 3 and 4, South, D&D Project was completed in FY92, and a Project Management Plan was submitted to DOE-HQ for approval. The remediation phase (Phase II) is expected to begin in May 1992 and be completed in early FY94.

Beginning in FY94, the assessment phase will begin for the rest of the TA-21 site and remediation will begin in FY95 with assessments to continue throughout the duration of the TA-21 Project.

**ADS 2122: Remediation, TA-21 Buildings 3 and 4, South, Decommissioning.** This ADS has been combined with 1055, which now includes the entire TA-21 site.

**ADS 2134: TA-3, SM-35, Press Building.** This activity will affect the assessment and remediation phases of the decontamination and decommissioning (D&D) of the Press Building, TA-3, SM-35. The building, a materials access area, which houses a 5,000 ton press, a laboratory area with associated hoods, lab benches, and a ventilation system, has been used in the processing of  $U^{235}$ . The exhaust system in the north end of the building is reportedly highly contaminated. Major contaminants are  $U^{235}$  and  $U^{235}$  daughters. Operations were suspended in 1991.

Tasks include characterization, engineering, system development, certification development, systems dismantlement, decontamination, waste disposal, and building demolition.

**ADS 2135: TA-33, Building 86 Decommissioning.** This activity will affect the D&D of TA-33, Building 86 (a high pressure tritium gas repackaging facility). This facility has been closed down since October 1990 and has been replaced by a new tritium processing facility.

All tritium processing equipment, apparatus, and laboratory furniture will be removed and disposed of according to waste classification as low-level radioactive (tritium) waste, or stored as mixed waste if hazardous materials are also present. The building will be decontaminated including walls, ceilings, and floors. The exhaust and ventilation systems will be removed.

**ADS 2136: TA-16 HE Areas D&D.** This activity will address the D&D of approximately 25 buildings and structures which were used in the research and development (R&D), and storage of high explosives (HE) and which are in very bad condition with leaky roofs and rotting walls. A large number of these structures have asbestos siding and some have asbestos in a more friable form such as pipe and duct insulation. These buildings have been abandoned for several years.

**ADS 2137: Technical Support for D&D.** This activity will provide support to the D&D program with the application of equipment and technical expertise to the field projects. Initial purchases in FY94 will be followed by systematic replacement of individual equipment items, depending on their use and expected lifetime.

**ADS 2138: Surveillance and Maintenance.** This ADS will cover the surveillance and maintenance (S&M) of Defense Program (DP) facilities which are and will become accepted into the Environmental Restoration/D&D Program for the FY94-98 Five-Year Plan. The S&M plan will be developed for 10 years to complement the D&D plan for the site. The S&M activities for surplus facilities awaiting decommissioning will 1) ensure adequate containment of contamination, and 2) provide physical safety and security controls and regulated surveillance to maintain the facility in a manner which will minimize potential hazards to the public.

**ADS 2139: Transition Planning.** These activities will assist in the transfer of ownership of excess facilities into the DOE/EM-6 program to comply with the DOE mission. They will provide S&M activities to maintain a safety envelope and achieve safe operations shutdown. Characterization costs associated with assessing health and safety concerns and landlord costs associated with maintaining the physical operations at the facilities affected are covered by this ADS.

## **5.2. Resources**

The Laboratory ER Program Office staffing will be increased on an as-needed basis to implement the ER Program. The Laboratory will use existing internal resources when appropriate. However, it is anticipated that extensive external contracting (for example, for sampling and sample analysis) will be required to meet schedules and deliverables required by the Laboratory's RCRA operating permit and to implement a cost-effective program. The ER Program's Major System Acquisition Baseline process is described in Section 1.2.2.

## **5.3. Schedules**

Table 5-1 presents the ER Program schedules for the Planning Case. The level of confidence in the schedule is low because of the uncertainties about whether the Planning Case can be funded. Updated schedules must be negotiated with the appropriate regulating agency under the Laboratory's RCRA permit. Planning Case funding will require renegotiation of RCRA permit milestones.

## **5.4. Funding/Costs**

Table 5-2 presents the ER Program FY92-98 funding. The program funding totals for FY92 through FY98 are approximations of program funding requirements for this planning period and are consistent with funding information presented in the DOE-HQ FYP for the Unconstrained Case.

The level of confidence in cost is low because the Laboratory consists of multiple potential sites that may or may not be confirmed and RFI work plans have not been prepared. Cost estimates could change as a result of increased (or decreased) estimates of levels of contamination. Cost estimates will be updated on an OU/site-specific basis as additional information becomes available during the RFI/CMS process.

**D&D.** The following projects have received limited or no funding under the constrained budget scenario.

- The decontamination of Wing 9 of the CMR Building has been withdrawn from the FYP.
- Phase Separator Pit D&D will start in FY93. Because of constrained funding, completion will be delayed into FY96.
- Wings 1, 2, 4, and 9 of the CMR Building have been reassigned within the Laboratory and no longer are candidates for D&D.

Under any funding scenario, compliance with DOE Order 5820.2A, Chapter V will be given the highest of priorities. Individual D&D projects will receive the most severe impact resulting from reduced funding.

### **5.5. Environmental Restoration Roadmapping Activities**

LANL is actively involved in the ongoing DOE roadmapping project, the purpose of which is to identify issues that could result in programmatic failure of the program and to determine activities that could neutralize and/or resolve these issues. To aid in identifying these issues, the ER program was divided into its fundamental components - regulatory, management, budgetary, technical and public/political - to help determine the arena within which the issues arise and where activities should be directed. Input from LANL is provided to DOE-AL which consolidates and publishes the roadmap documents. Among the key ER issues identified by LANL are:

- It is anticipated that available on site and commercial analytical labs lack sufficient capacity to perform all required sample analyses.
- LANL's HSWA permit does not include deadlines for time frames for EPA review.

**TABLE 5-1  
SCHEDULE OF MILESTONES  
FOR ENVIRONMENTAL RESTORATION  
PLANNING CASE**

<u>ADS #</u>	<u>Milestone Description</u>	<u>Completion Date</u>
1049	RFI Work Plan	07/05/96
1049	PH1 Report	01/21/99
1049	RFI Report	03/07/01
1049	RFI	07/05/01
1049	CMS Plan	09/18/01
1049	CMS	12/04/01
1049	CMS Report	09/30/02
1051	D&D Master Plan/DP Activities	09/30/92
1051B	D&D Master Plan/Non-DP	09/30/92
1054	D&D Assessment	03/31/93
1054	D&D Remediation	09/30/94
1055	D&D Assessment	09/30/04
1055	D&D Remediation	09/30/04
1062	Interim Remedial Measures	09/30/92
1066	Draft EIS	09/02/94
1066	Final EIS	12/29/94
1067	Site Selection	10/03/91
1067	Engineering Study Report	02/28/92
1067	Design Criteria Document	08/04/92
1067	Title I Design	07/27/93
1067	Title II Design/RCRA Permit	03/20/95
1067	Facility Construction	10/16/96
1071	RFI Work Plan	05/22/92
1071	PH1 Report	09/26/95
1071	RFI Report	12/02/98
1071	RFI	03/21/99
1071	CMS Plan	06/21/99
1071	CMS	10/05/00
1071	CMS Report	01/12/01
1078	RFI Work Plan	05/22/92
1078	PH1 Report	07/20/94
1078	RFI Report	10/09/97
1078	RFI	02/02/98
1078	CMS Plan	05/01/98
1078	CMS	09/29/99
1078	CMS Report	01/06/00
1079	RFI Work Plan	05/23/92
1079	PH1 Report	04/26/93
1079	RFI Report	05/27/97
1079	RFI	09/24/97
1079	CMS Plan	02/20/98
1079	CMS	06/15/99
1079	CMS Report	09/15/99

**TABLE 5-1 (CONTINUED)  
SCHEDULE OF MILESTONES  
FOR ENVIRONMENTAL RESTORATION  
PLANNING CASE**

<u>ADS #</u>	<u>Milestone Description</u>	<u>Completion Date</u>
1082	RFI Work Plan	03/24/93
1082	PH1 Report	02/13/97
1082	RFI Report	11/07/00
1082	RFI	02/15/01
1082	CMS Plan	05/04/01
1082	CMS	04/16/02
1082	CMS Report	06/19/02
1085	RFI Work Plan	05/23/94
1085	PH1 Report	03/01/96
1085	RFI Report	11/03/98
1085	RFI	03/11/99
1085	CMS Plan	05/25/99
1085	CMS	09/11/00
1085	CMS Report	11/28/00
1086	RFI Work Plan	05/23/93
1086	PH1 Report	08/18/95
1086	RFI Report	01/14/99
1086	RFI	05/14/99
1086	CMS Plan	07/30/99
1086	CMS	11/16/00
1086	CMS Report	02/23/01
1093	RFI Work Plan	05/23/93
1093	PH1 Report	01/10/95
1093	RFI Report	09/12/97
1093	RFI	01/20/98
1093	CMS Plan	04/06/98
1093	CMS	07/26/99
1093	CMS Report	10/22/99
1098	RFI Work Plan	05/23/93
1098	PH1 Report	03/28/95
1098	RFI Report	02/04/98
1098	RFI	05/20/98
1098	CMS Plan	08/19/98
1098	CMS	12/09/99
1098	CMS Report	03/15/00
1100	RFI Work Plan	05/23/94
1100	PH1 Report	05/01/96
1100	RFI Report	03/15/99
1100	RFI	07/13/99
1100	CMS Plan	09/27/99
1100	CMS	01/19/01
1100	CMS Report	04/20/01

**TABLE 5-1 (CONTINUED)  
SCHEDULE OF MILESTONES  
FOR ENVIRONMENTAL RESTORATION  
PLANNING CASE**

<u>ADS #</u>	<u>Milestone Description</u>	<u>Completion Date</u>
1106	PH1 Report	10/08/96
1106	RFI Report	10/14/98
1106	RFI	02/22/99
1106	CMS Plan	02/25/99
1106	CMS	06/12/00
1106	CMS Report	11/08/00
1111	RFI Work Plan	05/23/93
1111	PH1 Report	11/03/95
1111	RFI Report	11/25/98
1111	RFI	07/01/99
1111	CMS Plan	09/16/99
1111	CMS	01/17/01
1111	CMS Report	08/01/01
1114	RFI Work Plan	05/18/93
1114	PH1 Report	02/19/97
1114	RFI Report	08/05/99
1114	RFI	12/08/99
1114	CMS Plan	02/28/00
1114	CMS	02/15/01
1114	CMS Report	05/17/01
1122	RFI Work Plan	05/21/92
1122	PH1 Report	03/22/95
1122	RFI Report	06/08/98
1122	RFI	10/06/98
1122	CMS Plan	01/05/99
1122	CMS	04/21/00
1122	CMS Report	07/24/00
1127	Closure Certification/Report	12/20/91
1129	RFI Work Plan	05/29/92
1129	PH1 Report	07/31/95
1129	RFI Report	09/08/97
1129	RFI	12/12/97
1129	CMS Plan	05/08/98
1129	CMS	04/06/99
1129	CMS Report	06/30/99
1130	RFI Work Plan	05/22/93
1130	PH1 Report	07/26/94
1130	RFI Report	04/21/97
1130	RFI	08/19/97
1130	CMS Plan	11/04/97
1130	CMS	03/11/99
1130	CMS Report	06/10/99

**TABLE 5-1 (CONTINUED)  
SCHEDULE OF MILESTONES  
FOR ENVIRONMENTAL RESTORATION  
PLANNING CASE**

<u>ADS #</u>	<u>Milestone Description</u>	<u>Completion Date</u>
1132	RFI Work Plan	06/08/93
1132	PH1 Report	11/13/96
1132	RFI Report	01/13/00
1132	RFI	04/19/00
1132	CMS Plan	08/01/00
1132	CMS	04/02/01
1132	CMS Report	06/14/01
1135	Closure Plan	08/03/92
1135	Closure Certification/Report	01/22/93
1136	RFI Work Plan	05/23/94
1136	PH1 Report	01/31/96
1136	RFI Report	11/04/98
1136	RFI	03/12/99
1136	CMS Plan	05/26/99
1136	CMS	09/28/00
1136	CMS Report	04/20/01
1140	RFI Work Plan	05/23/93
1140	PH1 Report	01/04/95
1140	RFI Report	09/17/97
1140	RFI	01/29/98
1140	CMS Plan	04/15/98
1140	CMS	08/06/99
1140	CMS Report	11/08/99
1144	RFI Work Plan	05/22/92
1144	PH1 Report	06/13/95
1144	RFI Report	09/21/00
1144	RFI	01/29/01
1144	CMS Plan	04/13/01
1144	CMS	07/31/02
1144	CMS Report	10/31/02
1147	RFI Work Plan	05/18/92
1147	PH1 Report	10/31/94
1147	RFI Report	07/11/97
1147	RFI	11/11/97
1147	CMS Plan	02/02/98
1147	CMS	05/19/99
1147	CMS Report	08/03/99
1148	RFI Work Plan	05/14/92
1148	PH1 Report	08/28/96
1148	CMS Plan	02/01/00
1148	RFI Report	06/29/00
1148	RFI	10/30/00
1148	CMS	03/15/01
1148	CMS Report	06/14/01

**TABLE 5-1 (CONTINUED)  
SCHEDULE OF MILESTONES  
FOR ENVIRONMENTAL RESTORATION  
PLANNING CASE**

<u>ADS #</u>	<u>Milestone Description</u>	<u>Completion Date</u>
1154	RFI Work Plan	05/17/94
1154	PH1 Report	01/19/96
1154	RFI Report	09/22/98
1154	RFI	01/28/99
1154	CMS Plan	04/14/99
1154	CMS	07/31/00
1154	CMS Report	10/13/00
1157	RFI Work Plan	05/23/93
1157	PH1 Report	01/03/95
1157	RFI Report	09/09/97
1157	RFI	01/15/98
1157	CMS Plan	04/01/98
1157	CMS	09/30/99
1157	CMS Report	12/17/99
2105	Installation Work Plan	11/19/92
2105	Installation Work Plan	11/18/93
2105	Installation Work Plan	11/18/94
2105	Installation Work Plan	11/20/95
2105	Installation Work Plan	11/19/96
2105	Installation Work Plan	11/19/97
2107	Programmatic Management FY92	09/30/92
2107	Programmatic Management FY93	09/30/93
2107	Programmatic Management FY94	09/30/94
2107	Programmatic Management FY95	09/29/95
2107	Programmatic Management FY96	09/30/96
2107	Programmatic Management FY97	09/30/97
2107	Programmatic Management FY98	09/30/98
2110	Facility Design	05/04/92
2110	Facility Construction	09/01/98
2122(1055)	D&D Remediation, 3&4 South	09/30/94
2134	D&D Assessment	03/31/94
2134	D&D Remediation	03/31/96
2135	D&D Assessment	12/30/93
2135	D&D Remediation	09/30/94
2136	D&D Assessment	09/30/98
2136	D&D Remediation	09/30/98
2137	Create list of D&D equipment	03/31/94
2137	Update list	09/30/98
2138	Develop initial S&M Plan	03/31/94
2138	Update S&M Plan	09/30/98
2138	S&M Operations	09/30/98
HQ-6007-AL	Transition Planning	09/30/93
HC-6007-AL	Characterization	09/30/94
HQ-6007-AL	S&M and Landlord Activities	09/30/98

**TABLE 5-2  
ESTIMATED FUNDING REQUIREMENTS  
FOR ENVIRONMENTAL RESTORATION FY92-FY93  
PLANNING CASE  
(dollars in thousands)**

ADS	Title	FY 92	FY 93
<b>Remedial Actions</b>			
1049	Canyons Assessment		
1062	Interim Remedial Measures Assess.		
1063	Interim Remedial Measures Remed.		
1066	NEPA Documentation Assess.		
1067	RCRA Mixed Waste Storage/ Disposal Facility		
1071	TA-0, 19, 26, 73, 74 Assess.		
1078	TA-1 Assessment		
1079	TA-10, 31, 32, 45 Assessment		
1082	TA-11,13, 16, 24, 25, 28, 37 Assess.		
1085	TA-12, 14, 67 Assessment		
1086	TA-15 Assessment		
1093	TA-18, 27, 65 Assessment		
1098	TA-2, 41 Assessment		
1100	TA-20, 53, 72 Assessment		
1106	TA-21 Assessment		
1111	TA-6, 7, 22, 40, 58, 62 Assess.		
1114	TA-3, 59, 60, 61, 64 Assess.		
1122	TA-33, 70 Assessment		
1127	TA-35 Waste Oil Pit Closure Remed.		
1129	TA-4, 5, 35, 42, 48, 52, 55, 63, 66 Assess.		
1130	TA-36, 68, 71 Assessment		
1132	TA-39 Assessment		

**TABLE 5-2 (CONTINUED)  
ESTIMATED FUNDING REQUIREMENTS  
FOR ENVIRONMENTAL RESTORATION FY92-FY93  
PLANNING CASE  
(dollars in thousands)**

ADS	Title	FY 92	FY 93
<b>Remedial Actions (continued)</b>			
1135	TA-40 Scrap Det. Site Closure Remed.		
1136	TA-47 Assessment		
1140	TA-46 Assessment		
1144	TA-49 Assessment		
1147	TA-50 Assessment		
1148	TA-51, 54 Assessment		
1154	TA-57 Assessment		
1157	TA-8, 9, 23, 69 Assessment		
2105	Programmatic Tech. Support Assess.		
2107	Programmatic Management Assess.		
2110	Environ. Analytical Chemistry Fac.		
	<b>SUBTOTAL REMEDIAL ACTIONS</b>		

**TABLE 5-2 (CONTINUED)  
ESTIMATED FUNDING REQUIREMENTS  
FOR ENVIRONMENTAL RESTORATION FY92-FY93  
PLANNING CASE  
(dollars in thousands)**

ADS	Title	FY 92	FY 93
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**Decontamination and Decommissioning**

1051	DP MANAGEMENT		
1051-B	NON-DP MANAGEMENT		
1054	TOTAL PHASE SEPARATOR PIT		
1055	TOTAL DPW SITE		
2134	PRESS BUILDING		
2135	TA-33 BUILDING 86		
2136	CONTAMINATED STRUCTURES		
2137	TECHNICAL SUPPORT		
2138	S&M FOR DP FACILITIES		
HQ 6007*	EM-6 TRANSITION ADS		

\* includes FY93 Target Funding

Total

## 6.0. WASTE MANAGEMENT FIVE-YEAR PROGRAM

### 6.1. Summary

#### Regulatory and Environmental Issues Related to Waste Management

**TRU Waste.** An EA, which covers all TRU waste work-off activities proposed for LANL was originally drafted in 1986. That and later revised drafts have been in review by DOE-HQ. The Laboratory has been requested to update the EA and bring it into compliance with the most recent DOE guidance. A revised draft of this EA was submitted to DOE in FY91.

copy of

**Mixed Waste.** The RCRA permit concerning the CAI was received by the Laboratory in November 1989. Several changes made to the permit over past drafts are being appealed through the legal system. The current hold up of the CAI is NEPA. A NEPA decision regarding the use of the CAI was made in the second quarter of FY91. An EA will be prepared and submitted to the agencies by the end of FY92 for review. Operation of the CAI was discontinued in 1987 to allow an upgrade to be liability approved.

In July 1990, the State of New Mexico received authorization from the EPA to administer the regulatory program for mixed waste under RCRA. The Laboratory submitted the Part A of the permit application for mixed waste in January 1991. At that time, mixed wastes and mixed waste facilities at the Laboratory became formally regulated under interim status. The Laboratory initiated efforts to bring mixed waste activities into RCRA compliance.

**TRU Mixed Waste.** An important regulatory issue is RCRA compliance for the accumulated inventory of legacy uncertified TRU wastes. This waste storage, both for contact and RH wastes, does not permit regular inspection of individual drums. Also, this waste is not usually sufficiently characterized to identify whether it is RCRA regulated waste.

**Low-Level Mixed Waste.** The sludge waste that results from the treatment of low-level liquids is presently being stored as a mixed waste because preliminary analyses have indicated parts per billion concentrations of listed hazardous organics. If *de minimis* levels of these organics are not defined and special handling is not authorized by EPA, this waste must be sent to a permitted disposal site according to current EPA RCRA regulations. Efforts have begun to conduct extensive sampling and analysis of this waste to better characterize it for either option.

should verify w/ Ed H that these are mixed

**Hazardous Waste.** The Laboratory is required to manage hazardous waste in compliance with all applicable federal and state regulations. Currently, steps are being taken to ensure compliance with requirements detailed in the RCRA Part B permit.

#### Degree of Accomplishment of Planned Activities

**TRU Waste.** All planned activities presented in the FY91 FYP were accomplished, except that the Laboratory goal of having all newly generated TRU wastes WIPP certified was not accomplished because two regularly generated streams could not be addressed, and several TRU waste streams lost certification.

The EPA has made a no-migration determination under RCRA for the test phase of WIPP. LANL wastes are not part of the test phase. The final waste acceptance criteria and the need to treat TRU waste to LDR standards will be based on the outcome of the test phase and whether or not a no-migration petition is approved for the operating phase. Until firm waste acceptance criteria are established, treatment of TRU wastes cannot be fully planned.

**Low-Level Waste.** Current practices in waste segregation were not evaluated because of budget and personnel limitations. This evaluation was identified as a task in the implementation plan for DOE 5820.2A.

**Mixed Waste.** Except for mixed waste incineration, all planned activities presented in the FY91 FYP were accomplished. Mixed waste was to be incinerated in the CAI. Operations will not begin until NEPA requirements have been satisfied. However, system upgrade work on this unit is continuing.

**Hazardous Waste.** All planned activities presented in the FY91 FYP were accomplished. EM-7 received \$5.8 million for the Gas Cylinder project in FY91. By the end of FY91, approximately 2,500 gas cylinders were characterized; 40 are awaiting characterization; 600 were recycled; 600 were shipped off site for treatment and disposal; and 2,000 are still remaining on site awaiting processing. By the end of FY92, the project will be complete and the equipment dismantled and moved.

## **6.2. General Site Information**

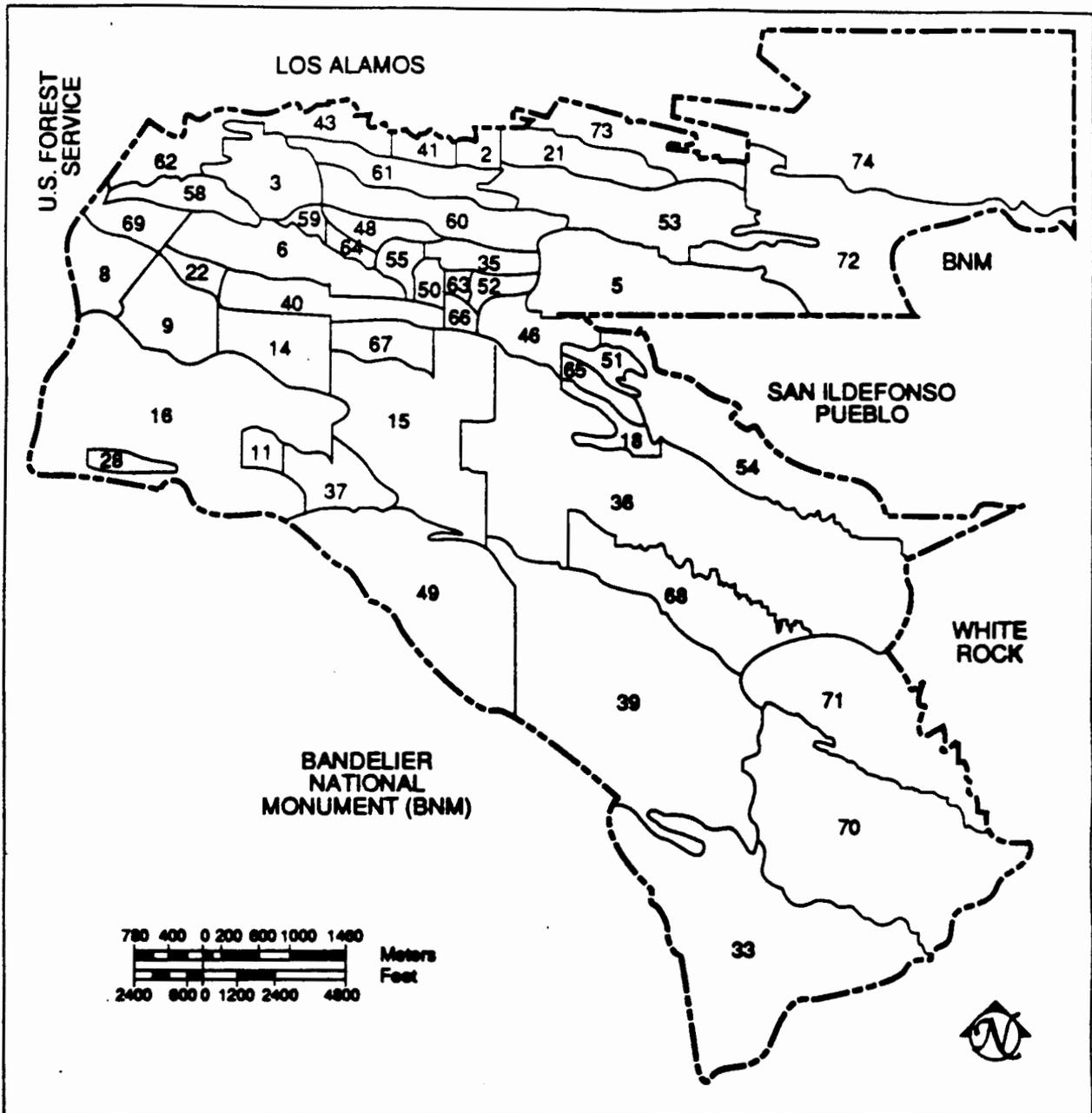
The Laboratory is operated for DOE by UC. JCI provides the major support work for the Laboratory. Waste is generated by the Laboratory and JCI.

The WM Group, EM-7 within EM Division, operates all WM facilities except those related to HE wastes, which are the responsibility of the generators of the waste, and those facilities operated by waste generators in preparing wastes for disposal or storage. Organizations that generate radioactive wastes must properly identify, segregate, and document their wastes for disposal.

The major objective of the WM program is to protect the worker, public health, and the environment. To accomplish this objective, the Laboratory is committed to attaining and maintaining compliance with all federal and state environmental requirements. The major environmental concerns and issues stated in this plan are the goals for accomplishing the major objective.

Activities within EM-7 include treating radioactive liquid and solid wastes; packaging, transporting, storing, treating, and disposing of hazardous and nonregulated chemical wastes; and operating the disposal and storage sites for radioactive and mixed wastes. EM-8 does environmental monitoring at the present and previous burial sites. EM-8 also ensures overall Laboratory compliance with environmental requirements for hazardous materials disposal, impact analyses, and reviews under the NEPA required by DOE-AL Order 5440.1B.

Laboratory activities are located in 37 TAs widely spread over the site (Figure 6-1).



**Figure 6-1.** Technical areas (TAs) of Los Alamos National Laboratory in relation to surrounding landholdings.

### **6.3. Environmental Monitoring Programs**

The Laboratory maintains an ongoing environmental surveillance program as required by DOE Orders 5400.1 and 5484.1. The surveillance program maintains routine monitoring stations for radiation and radioactive materials and hazardous chemical substances on the Laboratory site and in the surrounding environment. These activities document compliance with appropriate standards, identify trends, provide information for the public, and contribute to general environmental knowledge. The goal of this program is to provide ongoing assessments of releases from overall Laboratory operations into surrounding environmental media such as air, groundwaters, surface waters, and soil. Detailed, supplemental environmental studies also are carried out to determine the extent of potential problems, to provide a basis for any remedial actions, and to gather further information on surrounding environments.

The monitoring program supports the Laboratory's policy to protect the public, employees, and environment from harm that could be caused by Laboratory activities, and to reduce environmental impacts to the greatest degree practicable. Environmental monitoring information complements data on specific releases such as those from radioactive liquid-waste treatment plants and stacks at nuclear research facilities, as well as airborne releases of nonradioactive compounds from many Laboratory operations.

Monitoring and sampling locations for various types of environmental measurements are organized into three groups:

1. Regional stations are located within the five counties surrounding Los Alamos County at distances up to 50 miles from the Laboratory. The regional stations provide a basis for determining conditions beyond the range of potential influence from normal Laboratory operations.
2. Perimeter stations are located within approximately 2.5 miles of the Laboratory boundary, and many are in residential and community areas. The perimeter stations document conditions in areas regularly occupied by the public and potentially affected by Laboratory operations.
3. On-site stations are within the Laboratory boundary and most are in areas accessible only to employees during normal working hours. They document environmental conditions at the Laboratory where the public has limited access.

In addition, both active and inactive Material Disposal Areas (MDAs) which have received radioactive waste are annually evaluated for radiological migration. This is done by conducting a radiological reconnaissance and assessment via a survey of established sample points around the MDA. Results of the monitoring program are used to evaluate the performance of each MDA and determine the need for further action required to enhance the isolation of the radioactive wastes from the environment and human exposure. A detailed survey is performed on each MDA at least once every five years, with two to three MDAs being subject to the detailed survey in any given year. The greater sampling effort of these intensive surveys will permit quantitative interpretation of radiological conditions, and identify temporal and spatial trends at each MDA.

Samples for both the low-level radioactive waste and hazardous waste surveillance programs are collected from several media, including air and gases, ground and surface waters, soils, sediments, vegetation, and foodstuffs. External penetrating radiation from cosmic, terrestrial, and Laboratory sources is also measured. This sampling is carried out as an adjunct to the routine, site-wide sampling program, and sampling and analytical procedures follow those carried out for site-wide sampling operations. Additional samples are collected and analyzed to gain information about particular events such as major surface run-off events, nonroutine releases, or special studies.

In addition to overall surveillance activities at the Laboratory, routine monitoring is carried out at 1 active and 12 inactive low-level, radioactive waste management areas under contract to the DOE's Defense Waste Operations Office. This program is carried out to ensure ongoing compliance with DOE Order 5820.2A.

Levels of external penetrating radiation in the Los Alamos area are monitored with thermoluminescent dosimeters (TLDs) at 147 locations. Radiation levels are also measured at regional, perimeter, and on-site locations in the environmental TLD network. Some measurements were above background levels, reflecting ongoing research activities at or historical releases from Laboratory facilities.

Airborne radioactive emissions have been monitored at 87 release points at the Laboratory. Air is routinely sampled at several locations on site, along the Laboratory perimeter, and in distant areas that serve as regional background stations. Ambient air is routinely sampled for tritium, uranium, plutonium, americium, and gross beta activity. Measurements of radioactivity in the air are compared with DOE's Derived Air Concentration Guides. Since 1984, six air-monitoring stations have been maintained at TA-54 within the active radioactive waste management site Area G. These six stations are operated in the same manner as the air monitoring stations in the Laboratory's routine surveillance program. Samples are collected and analyzed monthly for tritium and quarterly for total uranium,  $^{238}\text{Pu}$ ,  $^{239,240}\text{Pu}$ , and  $^{241}\text{Am}$ .

A network of 92 TLD locations monitor external penetrating radiation levels at the low-level radioactive waste management areas, which are controlled access and not accessible to the general public. Active and inactive waste areas are monitored for external penetrating radiation with arrays of TLDs.

Surface waters, groundwaters, soils, and sediments are monitored to detect potential dispersion of radionuclides from Laboratory operations. Surface runoff and sediment in drainages are routinely monitored at two materials disposal areas, Area G and Area AB.

The Laboratory conducts two separate programs to monitor groundwater quality of the area and to meet regulatory requirements. The first program includes routine sampling of water supply wells and special monitoring wells under the Laboratory's long-term environmental surveillance program. The second program includes sampling from various points in the Laboratory and county distribution systems to ensure compliance with the Safe Drinking Water Act (SDWA). Samples are analyzed for organic and inorganic chemicals and for radioactivity at the state Scientific Laboratory Division (SLD) in Albuquerque. Measurable amounts of radioactivity have been found in shallow aquifers in several canyons.

#### **6.4. Radioactive and Mixed Waste Management**

This section of the SSP documents the activities for the safe storage, treatment, and disposal of radioactive waste at LANL to ensure environmental and public safety. Before discharge into the environment, LLW and TRU liquid wastes are treated to release limits outlined in DOE Order 5400.5. Solid residues from treatment are stored as mixed waste if they are low-level, or are stored retrievably if they are TRU.

Solid LLW is disposed of by shallow land burial at TA-54, Area G. Combustible or contaminated waste is covered daily to ensure that no pollutants spread to the environment.

After processing as necessary, newly generated and stored TRU waste at LANL is certified for compliance with the WAC of the WIPP for eventual shipment to the WIPP. Facilities for retrieving, certifying, processing, and transporting Laboratory TRU wastes to WIPP are provided.

Table 6-1 summarizes the radioactive solid waste buried or stored during FY91. Figure 6-2 presents the location of the facilities and operations described below. Figure 6-3 presents a flow sheet for LANL radioactively contaminated solid waste.

**TABLE 6-1  
WASTE BURIED OR STORED IN FY91.**

<u>Waste Category</u>	<u>Buried (B) Stored (S)</u>	<u>Volume (m<sup>3</sup>)</u>	<u>Radioactivity (Ci)<sup>a</sup></u>	<u>Radionuclide Content (g)</u>		
				<u>Pu</u>	<u>Am</u>	<u>U/Th</u>
contact-handled TRU	S	150.0	5060.6b	23967.0	21.8	13784.0
uranium/thorium	B	1404.4	11.0			32879612.8
mixed fission products	B	1429.1	7.1			
mixed activation products	B	602.2	7126.0			
tritium	B	96.5	45.0			
remote-handled TRU	S	51.0	0.004	0.0	0.0	0.0
alpha	B	<u>2203.0</u>	<u>3.9</u>	<u>9.7</u>	<u>0.0</u>	<u>242033.0</u>
<b>TOTALS</b>		<b>5936.2</b>	<b>12,253.6</b>	<b>23976.7</b>	<b>21.8</b>	<b>33135429.0</b>

<sup>a</sup> total activity of all contaminants

<sup>b</sup> WIPP-certified volume 130.0 m<sup>3</sup>; uncertified volume 38.4 m<sup>3</sup>

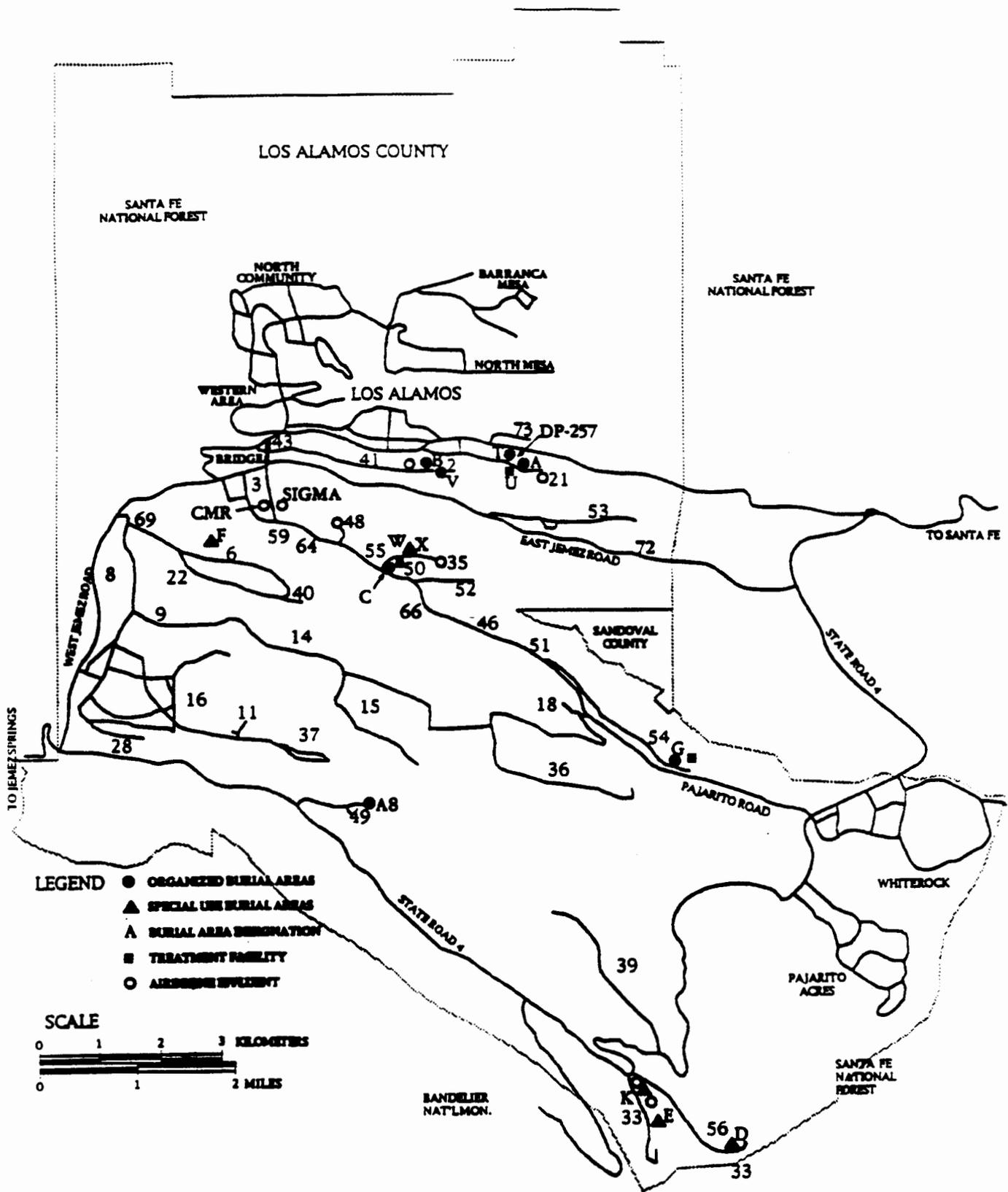
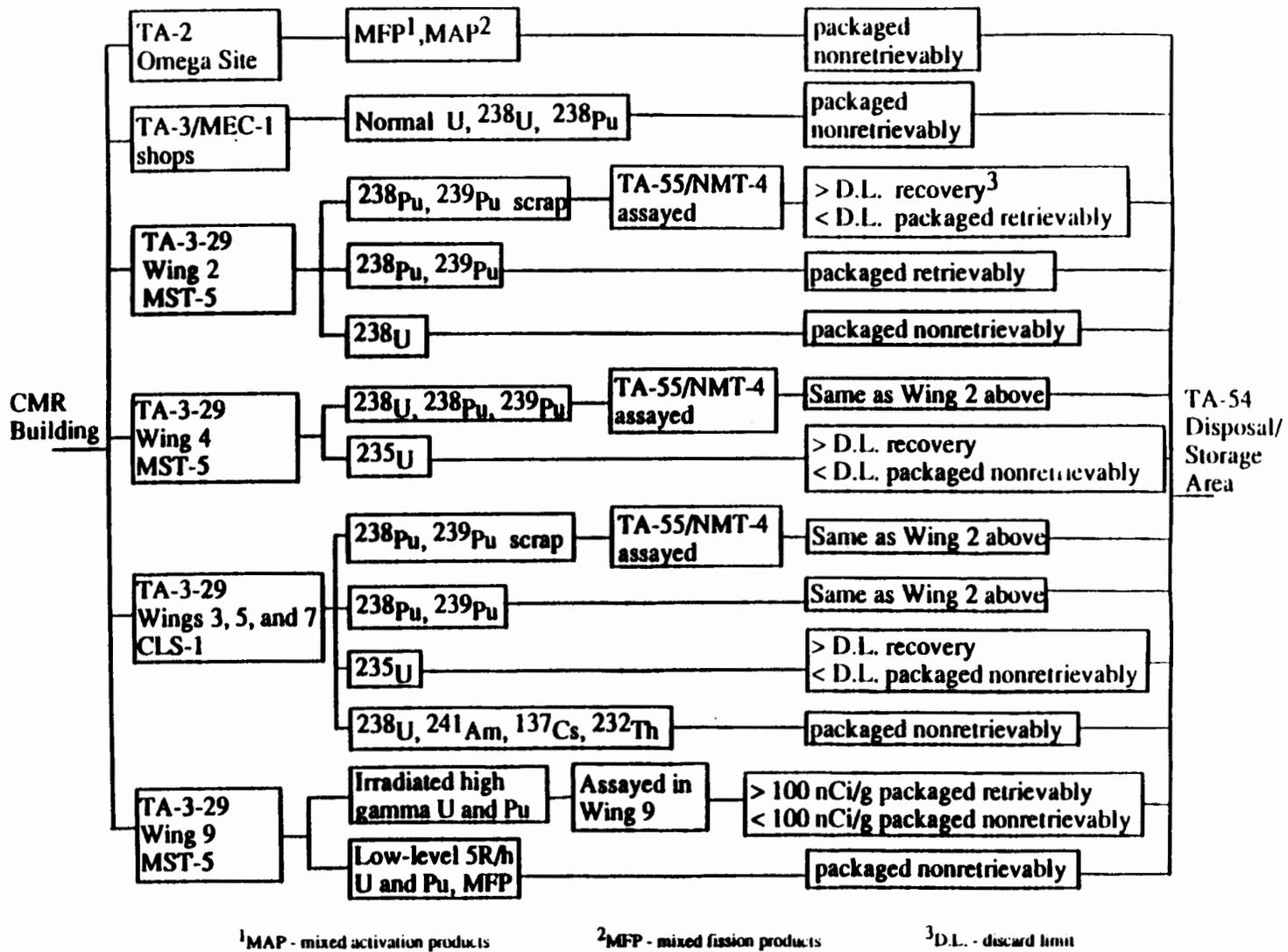


Figure 6-2. Radioactive Waste Management Facilities.



**Figure 6-3.** Flow sheet for Los Alamos Radioactively Contaminated Solid Waste (Continued on the next 3 pages).

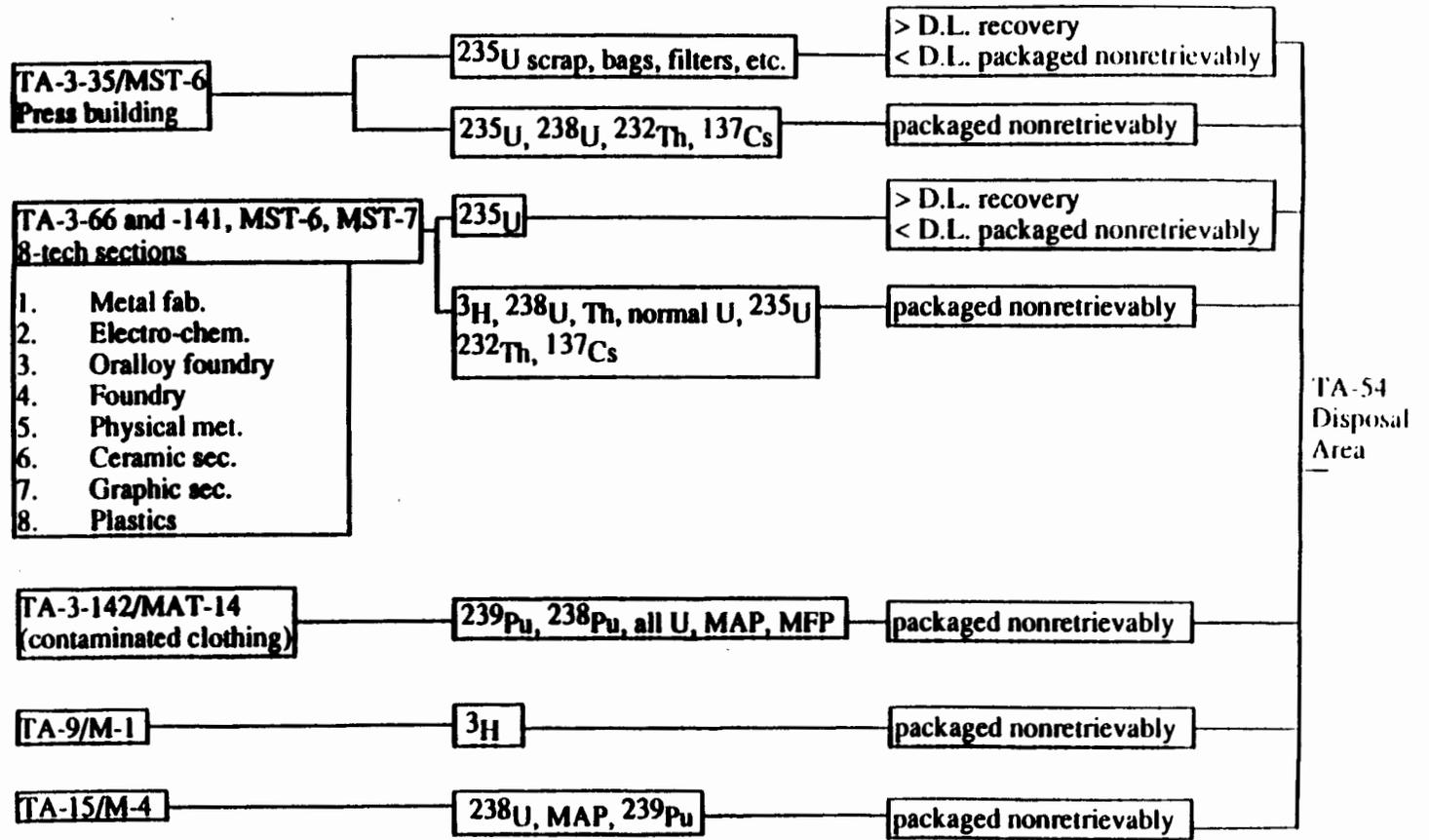


Figure 6-3. (Cont).

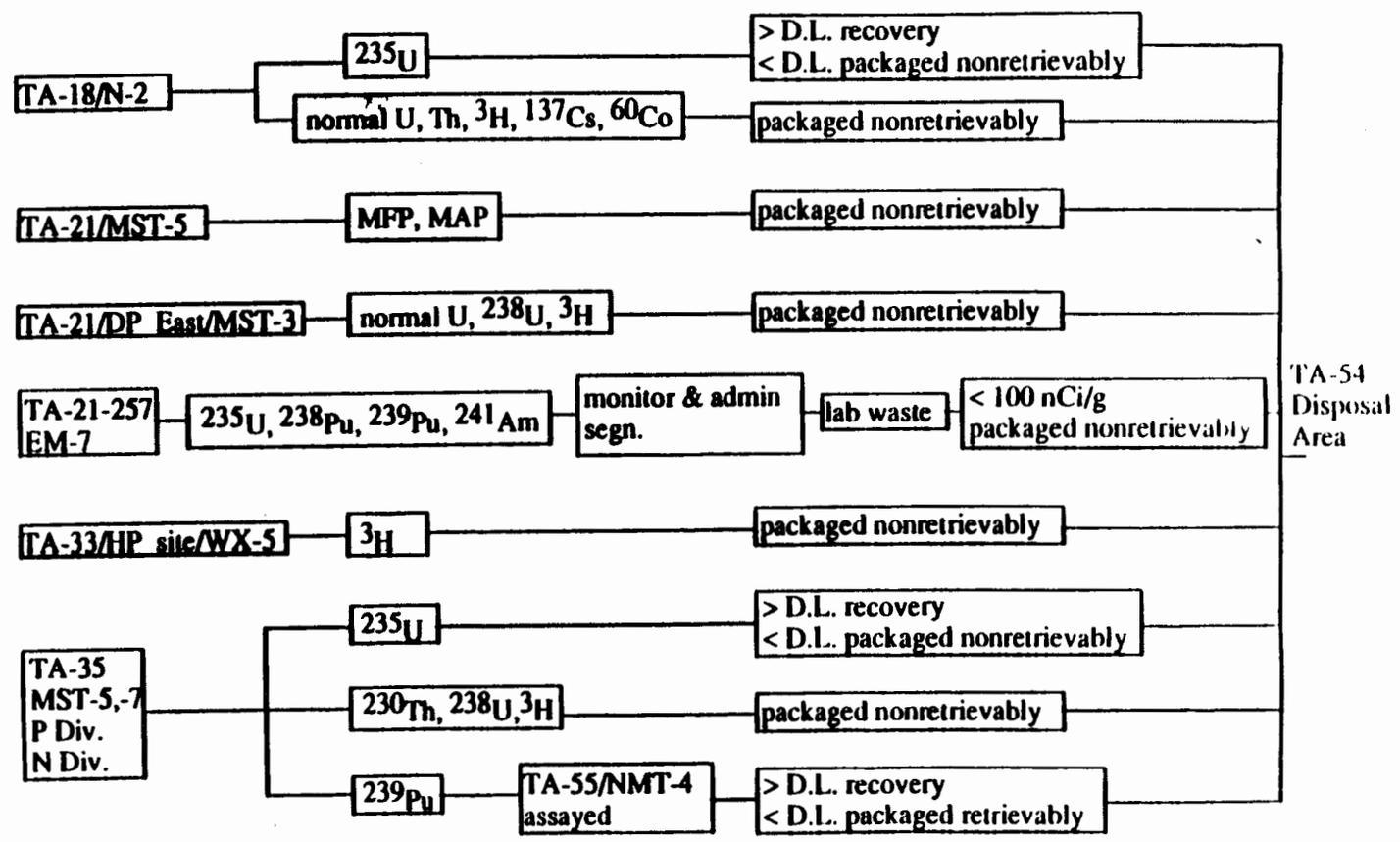


Figure 6-3. (Cont).

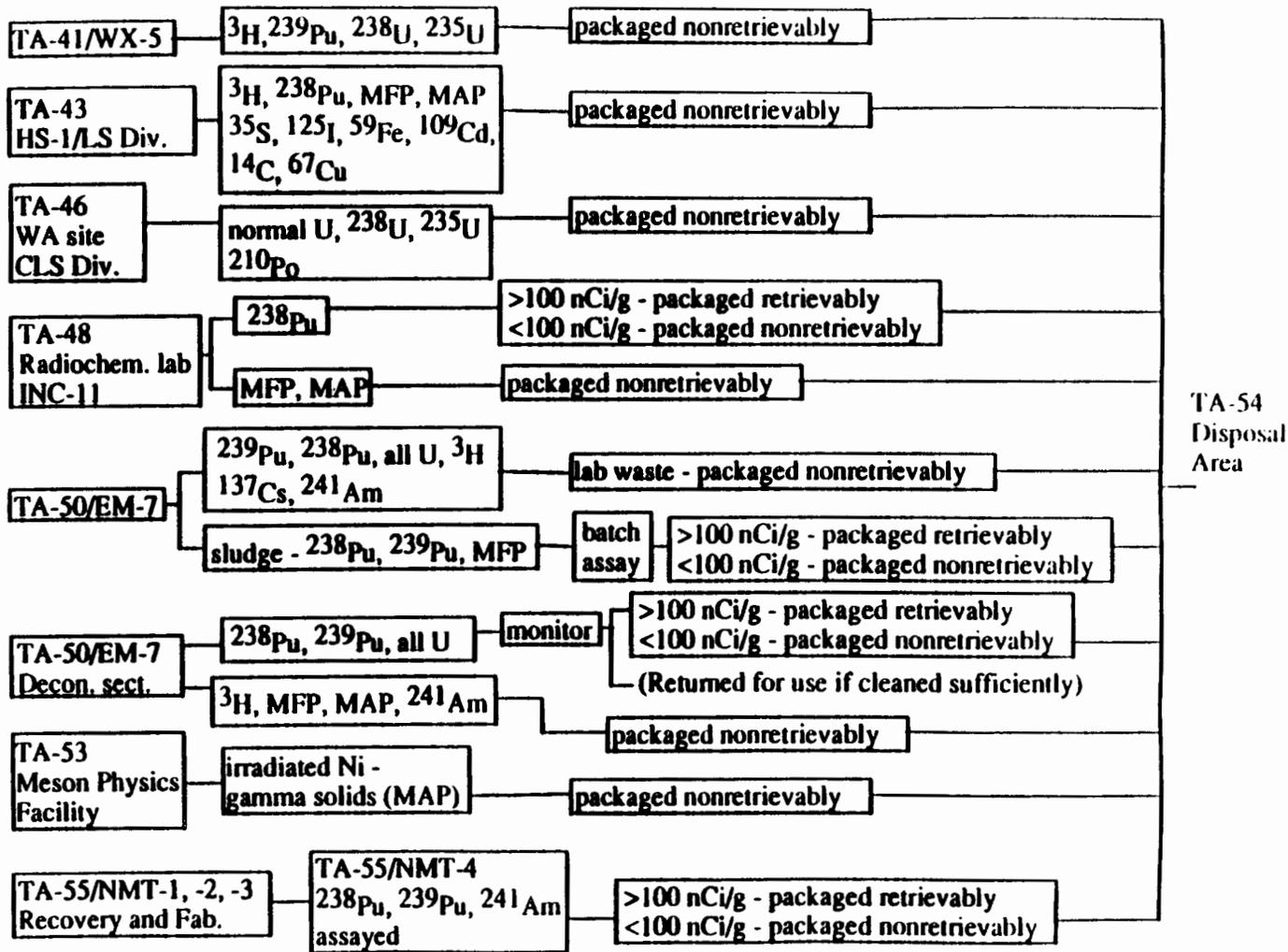


Figure 6-3. (Cont).

#### **6.4.1. High-Level Radioactive Waste**

The Laboratory does not generate, store, treat, or dispose of high-level radioactive wastes.

#### **6.4.2. Transuranic Waste**

**TRU Solid Wastes.** DOE Order 5820.2A requires that all newly generated TRU waste must be WIPP-certified by the waste generator. Efforts to reach this goal continued through FY91. However, some small volumes of uncertified TRU wastes are still accepted for storage under special circumstances. The generator ensures funding for future processing/certification of the waste.

Existing TRU waste facilities include the following:

- **Size Reduction Facility** - The SRF is designed to repackage and reduce the volume of metallic wastes such as gloveboxes, process equipment, and duct work. SRF treatment includes packaging waste in an appropriate container for eventual disposal at the WIPP and reducing waste volume and handling. The process will reduce future WIPP disposal costs. Through FY91, and since production operations began in the SRF in March 1987, a total output volume of 94.5 m<sup>3</sup> (3,335.9 ft<sup>3</sup>) has been achieved.
- **Storage of uncertified waste** in or on pads, pits, trenches, and shafts.
- **Pad storage of certifiable waste** - Until shipment of newly generated wastes begins, newly generated certifiable waste is stored above ground on an asphalt-paved pad and protected from the environment by a tension support structure. Lightning protection and electricity are provided to the TRU Waste Storage Facility.
- **Controlled Air Incinerator** - Treatment for combustible TRU waste, chemical hazardous waste, and mixed waste was successfully demonstrated on the CAI from 1976-1987. The CAI is not currently operating. Major efforts during FY91 involved continuing the system upgrade project; work progressed on instrumentation upgrades, utility upgrades, and on document preparation. After the system upgrade is completed, the CAI will be used initially to thermally destruct low-level mixed waste, then will stabilize and reduce the volume of newly generated and stored TRU waste, depending on the status of WIPP at that time. Plans for the proposed new LLW and hazardous mixed waste incineration system that was to have become operational in 1997, have been cancelled.

As of the end of FY91, approximately 8052 m<sup>3</sup> (284,332 ft<sup>3</sup>) of uncertified TRU waste remained accumulated in storage at TA-54. Of this, approximately 78 m<sup>3</sup> (2,770 ft<sup>3</sup>) is RH wastes stored in concrete casks; approximately 339 m<sup>3</sup> (11,967 ft<sup>3</sup>) is high-activity <sup>233</sup>U and <sup>238</sup>Pu wastes packaged in 114-L (30-gal.) drums stored in concrete casks; and 442 m<sup>3</sup> (15,600 ft<sup>3</sup>) is cemented sludge in corrugated metal pipes. The rest is primarily stored in 210-L (55-gal.) drums and fiberglass-coated plywood crates. These containers were placed on asphalt

pads, protected from the elements by plywood and a plastic cover, and topped with at least 1 m (3 ft) of tuff. Newly generated and recovered containers of uncertified TRU waste is stored above ground on asphalt pads covered by an extension support structure.

In addition to continuing SRF treatment, planned methods of meeting the WIPP criteria include visual inspection, real-time x-ray radiography, active/passive radionuclide analysis, sorting and repackaging, cementing, and size and/or volume reduction by sectioning or incineration. Furthermore, waste examinations, sorting, sampling, and analysis will be performed in accordance with the WIPP Waste Analysis Plan.

**TRU Liquid Waste.** Treatment facilities for TRU liquid waste at the Laboratory during FY91 included the primary chemical treatment and ion-exchange plant at TA-50 and pretreatment plant at TA-50 for TRU liquids from the Plutonium Facility.

During FY91, liquid process wastes totaling  $5.9 \times 10^4$  L ( $1.6 \times 10^4$  gal.) from the Plutonium Facility were pretreated in the TA-50 pretreatment plant. Pretreatment removed more than 99% of the americium (Am) and plutonium (Pu). For this period, the total amount of  $^{238}\text{Pu}$ ,  $^{239}\text{Pu}$ , and  $^{240}\text{Pu}$  contained in these drums was 90.3 Ci; the total amount of  $^{241}\text{Am}$  was 91.6 Ci.

#### **6.4.3. Low-Level Radioactive Waste**

TA-54, Area G, is the only currently operating disposal site for solid LLW at Los Alamos. Burial facilities within the area include pits and shafts of various dimensions. Facilities and procedures have been developed to ensure proper management and disposal of low-level radioactive solid waste. Other continuing and new program elements include the following.

- **Environmental surveillance at burial sites** - Specific data are available in the Environmental Surveillance at Los Alamos during 1990 report. The environmental effects of Laboratory operations are insignificant and are not considered hazardous to the population of the area or to Laboratory employees. The Environmental Surveillance Report is available to the public through the EM-8 Group Office.
- **Low-level Waste Certification** - Waste acceptance criteria for low-level waste have been developed to ensure waste complies with all applicable regulations and guidance, and to ensure waste meets all operational safety concerns. A low-level waste certification program is being developed in cooperation with waste generating organizations to document compliance with the waste acceptance criteria.
- **Preapproval of Disposal Requests** - Waste generators are required to submit applications for disposal of low-level waste and all associated documentation for review and approval prior to shipment of the waste to TA-54, Area G. This review verifies the accuracy and completeness of the application, and helps ensure that the waste meets the waste acceptance criteria.

- **LLW Incineration** - Plans for the new low-level waste/mixed waste incinerator proposed as an FY95 Line Item (LI) (with FY98 the projected start-up date) have been cancelled. Waste will be incinerated in the CAI when it returns to operation.

**Low-Level Liquid Waste.** Treatment facilities for low-level liquid waste at the Laboratory during FY91 include the primary chemical treatment and ion-exchange plant at TA-50, and a chemical treatment plant at TA-21.

The TA-50 facility provides a neutralization chamber, flash mixers, chemical feeders, flocculator-clarifiers, a distributor for CO<sub>2</sub>, ion-exchange columns, a spent regenerated storage-treatment tank, a vacuum filter, and a wiped-film evaporator. Chemicals used for separating and concentrating alpha-emitting radionuclides include ferric sulfate, lime, and coagulant aids. The sludge produced is dewatered by vacuum filtration to 25-40% solids. If the TRU alpha activity of the sludge is at or below 100 nCi/g, the sludge is then packaged in drums. These drums are currently stored as mixed LLW.

In FY91, the TA-50 plant treated  $2.2 \times 10^7$  L ( $5.7 \times 10^6$  gal.) of liquid waste that contained 0.8 Ci Pu and 0.2 Ci of Am. Effluents discharged contained  $2.3 \times 10^{-3}$  Ci of Pu and Am. The uranium content in this waste was negligible. The vacuum filter at TA-50 was used to dewater sludge that was placed in 259 drums. This sludge contained 0.3 Ci Am and 0.6 Ci Pu.

The TA-21-257 plant provides a bar screen, grit chamber, raw waste storage, flash mixer, chemical feeders, flocculator, sedimentation tank, filter pump, pressure filter, and treated waste storage tanks for treating low-level radioactive wastes. In FY91,  $2.1 \times 10^6$  L ( $5.5 \times 10^5$  gal.) of waste containing about  $2.0 \times 10^{-3}$  Ci of Pu and Am were treated. The treated effluent was transferred by pipeline to TA-50 for discharge into Mortandad Canyon.

#### **6.4.4. Mixed Waste**

Current inventories and projections of mixed wastes at Los Alamos are identified in Table 6-2.

Compliance efforts for the permit under RCRA for mixed wastes and facilities at Los Alamos continued in FY90. These efforts involved obtaining both technical and regulatory assistance to evaluate and identify those Laboratory waste streams and facilities that will eventually be subject to RCRA regulations. On July 25, 1990, the State of New Mexico received authorization from the EPA to regulate mixed wastes. On January 25, 1991, the Laboratory submitted Part A of the permit application for mixed waste.

The Laboratory is currently out of compliance with RCRA requirements related to storage of certain hazardous and mixed wastes subject to land disposal restrictions (LDR). These include solvents, dioxins/furans; California list; and first, second, and third scheduled wastes. The National Capacity Variance on storage of scheduled mixed wastes expired on May 8, 1992. DOE Headquarters and EPA have been unsuccessful at negotiating an extension to the Variance. The Laboratory will begin negotiating a Federal Facilities Compliance Agreement with EPA Region 6 to develop a schedule to bring all waste subject to LDR into compliance.

**Low-Level Mixed Waste.** All identified low-level mixed wastes continued to be segregated, packaged, and stored in compliance with RCRA requirements at TA-54, Area L or Area G. At Area G, these wastes, which are packaged in drums and boxes, are stored on an asphalt pad covered by a tension support structure. The structure currently covers approximately 18,734 ft<sup>2</sup> of surface area. Continuous air monitors are used to measure alpha airborne contamination. At Area L, secondary containment was provided for drums of mixed LLW.

#### **6.4.5. Current and Future Plans**

The Waste Management Group (EM-7), dedicated to managing all liquid and solid wastes excluding sanitary wastes, has redefined approaches for treating low-level mixed wastes and TRU-mixed wastes. The driving force behind EM-7's current plans are the Land Disposal Restrictions (LDRs) created by HSWA in order to restrict the land disposal of most hazardous wastes by imposing Best Demonstrated Available Technology (BDAT) standards onto all wastes which are land disposed.

**Treatment of Low-Level Mixed Wastes.** As a result of the LDRs, Waste Management is striving to treat waste currently in storage. Major treatment facilities for low-level mixed wastes are the CAI and the Hazardous Waste Treatment Facility (HWTF). The CAI has a RCRA operating permit for hazardous waste and has interim status for mixed waste. CAI operations were discontinued in 1987 for an upgrade to improve reliability and allow extended operations to treat waste. An Environmental Assessment (EA) is currently being prepared to address the risks associated with increased hours of operation for waste treatment. The Waste Management Group Office, currently located in TA-50-37 which houses the CAI, will be relocated to create space for the incinerator operating staff.

The schedule for restart of the CAI is limited by hiring and training of an operating staff. The CAI will undergo a new RCRA trial burn before waste operations commence. Waste operations will initially concentrate on treating the low-level mixed waste backlog which will take approximately three years to work off. After treating this backlog, the CAI will handle the current generation of low-level mixed wastes and will begin treating transuranic mixed wastes, depending on the status of WIPP at that time. The State of New Mexico's Environment Department is preparing regulations specific to radioactive waste incineration, and an EA must be approved to meet NEPA requirements. Both of these activities can potentially impact the restart schedule.

Several nontreatment facilities support the treatment facilities. The Mixed Waste Receiving and Storage Facility provides storage capacity that complies with 40 CFR 264, and will be used to segregate and stage mixed wastes for the different treatment facilities. Treatment processes used in the HWTF will be skid-mounted to allow multiple use of the facility. Early operation of these skids is subject to completion of NEPA documentation and RCRA permitting. Ultimately, low-level mixed wastes not handled at the CAI or off site will be treated at the HWTF. Several treatment processes are being developed as part of this facility project. Processes needed for wastes not currently addressed will be developed systematically following a program management plan.

**TABLE 6-2  
SUMMARY OF LOS ALAMOS MIXED WASTE**

<u>Waste name</u>	<u>EPA waste code</u>	<u>Rad</u>	<u>Generation rate (m3/y)</u>	<u>Est. inventory at end of 91 if not treated</u>	<u>Current treatment</u>	<u>Planned treatment</u>	<u>Comments</u>
lead or lead-containing solids	D008	LLW	43	145	none	TBD on-site	
lead or lead-containing solids	D008	TRU	24	542	none	none	disposal at the WIPP
aqueous process wastes	D004 D006 D007 D008 F001-F005	TRU	35	568	cement slab	cement stabilization	disposal at the WIPP
						incineration	small amounts of organics can be segregated
industrial sludge from LWPT	F002  F003 F005	TRU		1064	dewatered	microwave melter if newly generated	no generation planned; disposal at the WIPP
industrial sludge from LWPT	F002 F003 F005	LLW	52	189	dewatered	microwave melter	investigating option for activated carbon pretreatment

**TABLE 6-2 (CONTINUED)  
SUMMARY OF LOS ALAMOS MIXED WASTE**

<u>Waste name</u>	<u>EPA waste code</u>	<u>Rad</u>	<u>Generation rate (m3/y)</u>	<u>Est. inventory at end of 91 if not treated</u>	<u>Current treatment</u>	<u>Planned treatment</u>	<u>Comments</u>
misc. organics, solvents, oils, scintillation vials	D001 F003 F005 D012 - D043	LLW	29	66	incineration; ash cementation	incineration; ash cementation	
misc. aqueous corrosives with organics	F001-F005 D002	LLW	2.2	3.7	none	TBD	F: must pretreat to remove Hg; D: must verify organic contaminants
reactive solids	D003	LLW	2.9	4.0	none	TBD	
misc. metal-contaminated wastes	D004-D011	LLW	49	161	none	TBD	

TBD - to be determined

Other treatment processes described below are progressing quickly and will operate before completion of the HWTF; they will be incorporated into the facility when it is completed.

- Radioactive lead, mostly bricks, are surface contaminated, and the BDAT is macroencapsulation. However, if the lead can be decontaminated, it can be used. Therefore, a mobile self-contained decontamination trailer has been purchased for this purpose. A categorical exclusion has been obtained for this operation for NEPA, and as a recycle operation, it is exempt from RCRA permitting. Once operations begin, processing the backlog of bricks will take about six months.
- Although not technically a mixed waste, depleted uranium is pyrophoric and must be treated before disposal. Treatment of this waste frees storage capacity for other wastes. This process has a categorical exclusion for NEPA and is not subject to RCRA permitting requirements.
- The scintillation vial crusher processes scintillation vials by crushing them and separating the liquid from the solids. The crushed vials then meet the RCRA definition of an empty container and can be disposed of as low-level waste. The liquid is accumulated for further treatment either on site at the CAI or off site at a commercial treatment facility. As a repacking effort, the scintillation vial crusher is not subject to permitting requirements. An EA was prepared and a Finding of No Significant Impact (FONSI) has been issued.
- The DETOX process is a liquid phase iron-catalyzed oxidation process being developed as an alternative to incineration for some wastes, and as a treatment process that can handle certain wastes that cannot be processed in the CAI. Bench-testing of the process is being completed. If the bench tests and pilot work are successful, skid design, skid construction, and testing will be initiated and waste operations will begin following construction and testing.

Treatment skids for wastes not addressed above will continue to be developed, with the emphasis on applying demonstrated technology. Bench work is in progress for nitrated wastes, lead-contaminated soils, and mercury-contaminated oils. A program management plan is being prepared for generic skid development, and will include the total effort from waste characterization through construction, permitting, and operation.

Waste Management is actively pursuing available off-site treatment options to separate and incinerate scintillation fluids and organic laboratory chemicals. Other off-site options will be analyzed on a case-by-case basis as they become available. A formal review of off-site treatment and disposal options, both commercial and at other DOE sites, will be made each year and documented.

Dewatered sludge generated from treatment of radioactive wastewater has the potential presence of solvents in the wastewater. Administrative controls and additional sampling and analysis have been implemented to guarantee that hazardous waste solvents are not discharged to the wastewater system. As a

result, the current generation of sludge is not a mixed waste. A study will be undertaken and completed in FY93 to determine the disposition of stored sludge that is labeled as mixed waste, and define a plan of action and time frame for the approach justified by the study.

**Treatment of Transuranic (TRU) Mixed Wastes.** The currently identified final disposal option for TRU wastes is the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico. The need for treatment and the degree of treatment will be driven by the final waste acceptance criteria for the disposal facility.

The EPA has made a no-migration determination under RCRA for the test phase of WIPP; however, LANL wastes are not part of the test phase. The final waste acceptance criteria and the need to treat TRU waste to LDR standards will be based on the outcome of the test phase, and whether a no-migration petition is approved for the operating phase. Until firm waste acceptance criteria are established, treatment of TRU wastes cannot be fully planned.

The Laboratory has planned facilities for retrieving stored TRU wastes and preparing those wastes for shipment. An additional TRU Waste Facility is planned and will allow opening of waste containers and characterization and segregation of wastes for treatment or repackaging for shipment to the WIPP.

Combustible TRU waste can be treated at the CAI if required by the WIPP waste acceptance criteria. The CAI is specifically designed to handle TRU combustible materials and will be available for TRU operation in 1998 following treatment of the backlog of low-level mixed wastes. Ash generated by the CAI will be solidified for shipment to the WIPP, and a new ash solidification facility will be built to support the CAI operation.

The TRU Waste Facility, to be constructed in two phases, will provide proper work areas to characterize, assay, sort, reduce size, treat, and recontainerize stored legacy wastes.

**Waste Minimization.** The Laboratory sets a high priority on waste minimization, not only in compliance with RCRA and DOE Orders 5400.1, 5400.3, and 5820.2A, but also in response to the growing environmental and economic problems caused by waste generation. The Waste Management Group provides waste generators with the tools and information to minimize waste to the extent technically and economically feasible.

In addition, each waste-generating operation in EM-7 itself must prepare a waste minimization plan for the operation. The plan must provide for the maximum possible minimization, and must also apply the principles of waste minimization required by DOE policy and federal and state regulations. Approaches to waste minimization employed by the waste management group include abatement or prevention of generation; segregation of materials to prevent excess generation; applying administrative controls that include purchasing discipline and housekeeping; and reusing and recycling generated wastes.

Personnel in the Liquid Waste Treatment Facility work with waste minimization personnel to identify future waste minimization opportunities. Current practices include enforcing waste acceptance criteria that establish standards to be met

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by waste generators; keeping all products, especially chemicals, under inventory and purchasing in the minimum amounts required for efficient operations; researching and testing safe alternatives to corrosive chemicals; gravity filtering treated water to conserve resources and energy; concentrating sludge by filtering on a rotary drum filter; and monitoring influent and effluent to reduce volume by 50%.

The Chemical and Mixed Waste Operations Section at TA-54, Area L, are conducted in accordance with the RCRA Operating Permit, which limits the amounts and types of wastes that are managed at the facility. The Special Conditions clause in the HSWA module in the permit specifies requirements for waste minimization plans and programs. In addition, personnel actively seek out users of recyclable waste in the Laboratory; the section participates in the recycling program for nonhazardous solid wastes; personnel also participate in waste generator training and hazard communication which incorporates waste minimization concepts; and the section's draft plan for waste acceptance criteria incorporates waste minimization goals and issues.

Waste minimization efforts at TA-54, Area G, the disposal site for solid radioactive waste includes waste volume reduction 7:1 using a compactor; recycling aluminum and paper; employee training and awareness including technical assistance from the EM-7 Waste Minimization Team; and adherence to Laboratory policies and procedures for waste minimization.

The Technical Support Section minimizes wastes by segregating materials to prevent excess generation; and applying administrative controls which include purchasing discipline, good housekeeping and recycling of office paper and aluminum.

The Treatment, Storage, and Disposal Facilities (TSDF) encourage waste minimization through a number of avenues. EM has waste minimization plans for its TSDFs which include techniques for ensuring waste minimization and controls to waste generation. The TSDFs have WACs which promote generator responsibility and ownership of waste, and can be used as an enforcement tool for waste minimization. In addition, waste management personnel interact with the generator to increase the generator knowledge of waste generated through employee awareness. Finally, Waste Management works closely with the EM-DO Waste Minimization Program Office (through which the LANL program is administered) to identify new waste minimization opportunities through source reduction, process modification, administrative controls, and recycling; and follow guidelines set by the Waste Minimization and Pollution Prevention Awareness Plan (LA-UR-92-1306).

**Activity Descriptions.** Operations, modifications to existing facilities, and construction of new facilities for radioactive and mixed waste management are presented below. General activity descriptions and detailed Budget Year FY93 activities are provided.

The activity descriptions presented below are described as Activity Data Sheets (ADSs). The ADS serves as a management tool, containing information at the Division Operations level, and is basic to the FYP in that it describes program activities. The ADS includes budget information for the current year, budget year, and the five planning years; and includes regulatory requirements, milestones, priority ratings, and references to associated activities.

**ADS 4172: Waste Management Operations.** This ADS, comprising old ADSs 3056, 3079, 3084, 3088, 4133, 4139, 4117, 4138, 4140, 4146, 4154, 4170, and 4171, encompasses management of hazardous, mixed, and radioactive wastes generated by Laboratory operations. This includes reduction, treatment, storage, and disposal of radioactive, mixed, and nonradioactive regulated waste. Activities include the following:

- Preconceptual design of treatment, storage, and disposal facilities.
- Development of General Plant Projects including NEPA and safety documentation.
- Management of construction program for waste management facilities.
- Treatment of radioactive and mixed wastes accomplished on site; most hazardous waste is shipped to off-site commercial contractors for treatment.
- Mixed waste stored on site, while design of on-site treatment and disposal facilities is actively taking place.
- Most TRU waste generated and stored in a retrievable manner pending shipment to WIPP; some requiring special handling.
- LLW generated, treated as appropriate, and/or disposed of in on-site facility.
- Mixed LLW is stored on site pending identification of an appropriate management option.
- Safety and compliance with environmental regulations is ongoing and high priority.

At the end of planning period, FY98, the following accomplishments will have been achieved:

- Start-up of Mixed Waste Storage/Disposal Facilities (RCRA landfill)
- Start-up of the Mixed Waste Receiving and Storage Facility
- Start-up of the Sanitary Wastewater Treatment Facility
- Start-up of the Hazardous Waste Treatment Facility
- Start-up of the High Explosive Wastewater Treatment System

The following subsections describe the activities included in ADS 4172 in more detail.

**Remote Handled TRU Waste Treatment.** This activity closes out all RH-TRU waste at the Los Alamos TRU Hot Cell facility in TA-3-29, Chemistry Metallurgy Research building. This project includes certification and preparation for the safe storage of all RH-TRU wastes generated in the Los Alamos TRU hot cell facilities. In addition, RH-TRU waste already prepared in a manner compatible with final packaging in the RH canister will be certified and packaged for safe disposal. Certified RH waste canisters will be stored

until they can be shipped to WIPP. This legacy waste has been well documented and has been a part of WM efforts since as early as 1986, when the facility was designated for D&D. However, documentation dating back to 1983 exists for portions of the waste which remain in the hot cells and at the LANL Low-Level Solid Waste Disposal Facility (TA-54, Area G). This project does not include the retrieval of the waste buried at TA-54.

Efforts began on this project in late FY86 in preparation for canisterization of all RH-TRU wastes at LANL. A prototype system (unique to the LANL facility) has been designed, fabricated, and tested. The functions of the system are canister loading, welding, leak checking, video inspection and documentation, transferring, and transportation to an interim storage site. The canisterization process was developed in conjunction with the operating group preparing and certifying stored fuel for shipping Off-site. At the end of FY91, the majority of RH-TRU wastes have been certified, packaged, and stored; this waste now awaits canisterization. Small amounts of waste that still need to be certified and packaged as RH-TRU waste will continue to be returned from the SRF.

No funding was made available in FY91; no work was accomplished.

In Budget Year FY93, predetermination of curie and gram limits for drum loadings will be performed; mock-up loadings of RH-TRU waste to determine contact radiation levels will be prepared; hot cell facility will be reactivated; and canisters with RH-TRU waste will be loaded and transported to interim storage.

At the end of FY94, the following accomplishments will have been completed:

- Cold System Testing for RH TRU Testing of RH Canisters;
- Filling of RH Canisters with Waste;
- Storage of Stored RH Waste at TA-54, Area G;

No activities are anticipated beyond FY94 if requested funding is received and the project proceeds as scheduled.

**Radioactive Liquid Waste Treatment.** This activity funds a Laboratory-wide radioactive liquid waste treatment program. Former ADSs 4114 and 4134 from FY91 have been consolidated into this activity and address the radioactive liquid waste treatment program. This activity includes Laboratory-wide monitoring and collection of low-level radioactive liquid waste (LLRLW) for subsequent treatment at the Radioactive Liquid Treatment facilities located in the WM Technical Area (TA-50). Specifically, the plant performs chemical/physical separation processes to concentrate radioactive constituents in a residue that is dewatered to thirty percent solids before packaging for storage or disposal. The effluents are analyzed to ensure compliance with state and federal guidelines governing storage and disposal of wastes that contain radioisotopes and certain chemicals.

This activity also requests funding for operating a plant at TA-50 for pretreating liquid radioactive wastes from the plutonium processing facility and the SRF (formerly ADS 4134). These liquid radioactive wastes have plutonium and americium concentrations much greater than their concentrations in the main treatment plant influent.

In addition, ADS 4172 requests funding for the management of LLRLW at TA-21 including the collection and treatment at the TA-21 plant prior to transporting the treated effluent through a pipeline for final treatment at TA-50 (formerly ADS 4114). Also included is the management of LLRLW at TA-53, incorporating the collection and monitoring of accelerator-produced mixed activation products in a lined lagoon.

The Radioactive Liquid Waste Treatment plant was commissioned in June 1963, and has continually treated radioactive liquid wastes with only minor upgrades and modifications to improve effluent quality, and to adjust treatment for changes in influent characteristics. The collection system was upgraded with FY79 Line Item construction project funds.

This plant, located in Room 60 of WM-1, was commissioned on February 23, 1983. A settling tank (TK-7) was installed and commissioned on October 23, 1985, to correct treatment problems that occurred when process changes in the plutonium facility changed the waste stream characteristics. A major maintenance project to replace deteriorating plastic lines in the plant was started during FY90, and will be completed in FY92. With modifications and maintenance, the plant has consistently treated process waste streams containing high concentrations of TRU isotopes in strong acid and caustic solutions. Through FY91, 7.1 kilograms of  $^{239}\text{Pu}$  have been removed from liquid waste treated in the Room 60 plant. During FY92, treatment of process wastes from the plutonium facility and from the SRF will continue and maintenance work to replace deteriorating pipes will continue.

In Budget Year FY93, collection and treatment of LLRLW and wastes with high concentrations of TRU isotopes will continue. Process, packaging and disposal problems associated with the salt-rich sludge from the Wiped Film Evaporator (WFE) will be studied. Compliance deficiencies and design limited programs to partially satisfy more stringent operational and environmental regulations will be outlined. An emergency power system will be installed. By the end of the planning period, FY98, the following accomplishments will have been attained:

- Continued compliance with federal and state regulations, and DOE orders with proper documentation;
- Ongoing collection and treatment of LLRLW and wastes with a high concentration of TRU isotopes; and
- Evaluation of equipment to obtain uniform mixing and production of certifiable cemented sludge.

**TRU Solid Waste Storage Operations.** This project funds storing, inspecting, and maintaining TRU wastes. This activity comprises the storage operations at TA-54, Area G to provide storage until adequate treatment and/or disposal methods have been developed and constructed.

This activity provides for the storage of uncertified and WIPP-certifiable TRU wastes stored in pits, trenches, shafts, under earthen cover on above ground pads, and in self-supported fabric domes. It also provides for maintenance of the TRU Certification Program for the WIPP-certifiable TRU wastes, and data protection concerning the 20,000-plus stored uncertified TRU packages. This ADS also provides for the operation of the proposed Line Item facility "Prolonged Engineering Storage Facility".

By the end of FY91, WIPP-certified TRU waste will continue to be in retrievable storage at TA-54, Area G. Uncertified TRU waste packages are also retrievable and stored.

In Budget Year FY93, TRU wastes in the TRU certification plan will be certified. WM technicians will be required to receive, inspect, stack, and operate the varied storage arrays. Staff and technicians will be required to operate the TRU WIPP WAC Certification Program; provide for audits and audit response; provide program oversight, QA, and formality of operations; and oversee approximately 12 TRU waste streams. Major procurement for this budget year will be contractor support, dome sections, and design support. The amount of TRU waste to be stored will be 180 m<sup>3</sup>.

In Planning Years FY94-FY98, this storage activity will continue to package, store, inspect, and maintain TRU wastes generated from Laboratory operations.

**Thermal Destruction.** ADS 4172 now includes four former ADSs (4132, 4149, 4150, 4151) from FY91 that are consolidated into this activity. The Controlled Air Incinerator (CAI) is an existing incinerator located at TA-50-37 that was used in the past to demonstrate safe incineration of TRU and mixed wastes. The incinerator is currently being upgraded to improve control and reliability, and to allow the burning of wastes on a routine basis. When operational, the CAI is capable of treating 200 m<sup>3</sup> of liquid low-level, low-level mixed, and liquid hazardous wastes per year. The operation is conducted as a series of campaigns. This activity covers the completion of the upgrade, preparation for operation, and routine operations.

The CAI became operational in 1976, completed twenty-three test burns, and obtained a TSCA permit and RCRA permit for hazardous wastes. Operation was discontinued in 1987 to upgrade the incinerator for improved reliability. The upgrade does not increase capacity. The CAI is included in RCRA permit applications being prepared for mixed waste. Due to its small size, the CAI is not subject to current air regulations, but NMED is preparing regulations specific to radioactive waste incineration. There is no prediction of when the regulations will be promulgated, or how they will impact the CAI. An Environmental Statement was prepared for the CAI in 1972. In FY91, an EA was determined to be the level of NEPA documentation needed to support routine waste treatment.

Because of reduced FY92 funding, the scheduled startup of the CAI has been delayed until FY95. The present funding level does not allow funding for required staffing, and completion of equipment upgrades and documentation.

By the end of FY95, the CAI will be in full operation. The ultimate startup of the CAI is dependent on funding for full staffing, and completion of required documentation and equipment upgrades in advance of startup. RCRA and DOE requirements for increased documentation and monitoring will be in place. In addition, upgraded equipment and instrumentation to meet RCRA regulations will be in operation.

In Budget Year FY93, staffing for operation activities will be initiated. Training and qualification of operations personnel will occur, followed by preparation of operating documents and equipment installation by trained personnel. Equipment and systems will be upgraded to meet regulations. An ash removal system will be installed, glovebox for ash sweep will be designed and procured, exhaust gas ducting will be modified, new monitors will be installed, and testing and QA verification of equipment and systems will be initiated. Operating and safety documents will be prepared.

If the project is funded, CAI activities will be restarted during planning year FY95 and will work up to full operations by FY96.

The RCRA trial burn must be repeated in FY94, and a new TSCA trial burn is planned in FY96. By the end of FY97, RCRA and DOE requirements for increased documentation and monitoring will be in place. In addition, upgraded equipment and instrumentation meeting RCRA regulatory requirements will be in operation. By FY97, the CAI will routinely handle 200 cubic meters of waste per year.

**TRU Waste Treatment Operations.** This activity funds operations at TRU facilities: a Waste Remediation Facility; a Drum Preparation Facility; a Waste Treatment Facility; the Non-Destructive Evaluation/Non-Destructive Assay (NDE/NDA) Facility, the Size Reduction Facility; and a Drum Venting Facility. ADS 4172 summarizes a request for funding for the treatment of LLWs. This activity provides for the operation of the following facilities:

- TRU NDE/NDA facility operations to assay TRU wastes and verify drum contents;
- Drum Preparation Facility operations which will be used to clean old recovered drums, test their integrity (ultrasonic test for wall thickness), and temporarily hold the drums and boxes until remediated;
- Drum Venting Facility to remotely vent and sample the head space gases of the 22,000 drums currently in storage;
- Waste Remediation Facility operations to remediate old packages consisting of fiberboard boxes and drums which are no longer adequate containers for shipment to WIPP; and
- SRF operations used to reduce the size of some TRU wastes and to repackage them in containers suitable for shipment to WIPP.

Through FY89, and since production operations began in March 1987, 328.7 m<sup>3</sup> of both newly generated and stored TRU waste have been processed by the SRF, resulting in a output volume of 81.2 m<sup>3</sup>; the overall reduction factor was about 4:1. All SRF output has continued to be WIPP certified. Construction of the Drum Preparation Facility was completed in FY87. This facility is not yet fully operational because both the NDE/NDA operations with stored wastes, and the TRU waste retrieval operations have not been initiated. Design of a system for installing approved filter vents in retrieved drums was continued during FY90 but suspended in FY91 due to lack of funds.

Construction of the NDE/NDA Non-Destructive Testing Facility (NDT) Facility was completed in December 1988. Major Capital equipment (CE) items for NDE/NDA include the TRU drum assay system and the real time X-ray radiography system. During FY89, this equipment was installed, tested, and calibrated and has since been used for operator training. An effort was subsequently initiated to verify classification of approximately 1,000 drums of newly generated, precertified waste; this effort continued into FY91.

In Budget Year FY93, administrative/technical and contractor support for TRU waste treatment and operations activities will continue. Design activities of the waste remediation facility, centralized change room facility, mezzanine offices for NDA/NDE facility, and drum venting system will take place. Equipment and site maintenance and technical, safety and inspection training for operators will occur. Audits, nonconformance actions, inspections, and corrective actions will be supported. Certification and assessment programs, health physics surveillance, and database management capabilities will be provided. Operation of drum venting and drum preparation facilities, and construction of the TRU waste remediation facility will be initiated.

**Low-Level Waste Management Treatment Operations.** This activity consolidated previous ADSs which covered the operation of LLW treatment facilities. These activities include ADS 3104, WM Treatment. This ADS covers the portion of the treatment operations which deals with LLW, and is intended to provide for:

- Ongoing administrative management/support of LLW treatment activities;
- Equipment and site maintenance;
- Support for technical, safety, and inspection training for operators;
- Support for audits, nonconformance actions, and inspections;
- Health physics and other surveillance;
- Transportation of wastes in dumpsters;
- Waste receipt services;
- Database management capabilities;
- Maintenance of documents supporting LLW disposal operations including LLW certification, LLW/MW QA, LLW system performance, radiological performance and characterization; and
- Subcontractor support.

This activity will support establishment and operation of a LLW Nondestructive Examination and Nondestructive Analysis (NDA/NDE) function to certify that wastes not needing processing meet waste acceptance criteria for disposal/storage, and assure proper segregation of wastes.

The design, construction, and operation of a LLW remediation function in the Remediation Facility will be supported. This function will provide inspection of incoming waste packages to verify the waste's characterization, and to remediate damaged, improperly prepared or special waste packages. Remediation will result in enhanced site performance and stability, and allow nominally greater than Class C wastes to be managed as low-level waste. It will enable waste management to decontaminate trucks, scrapers, and other equipment.

ADS 4172 now also embodies essential support activities to meet regulatory requirements and DOE Orders. These include risk assessments; development of program documentation such as QA programs, Safety Assessments (SA) and NEPA; evaluation and improvement of existing modes of waste transportation; LLW certification programs; LLW system performance assessment; and support of the waste management portion in complying with the State Agreement.

This activity includes a new LLW Compactor Facility. Compaction/baling of low-level radioactive solid waste is a primary means of reducing waste volume and stabilizing the waste form for burial. X-ray verification of the waste packages will assist in assuring compliance with proper WAC. The NDE/NDA facility is required in order to certify wastes that do not require processing. The facility will also provide a base to x-ray low-level radioactive waste packages and mixed waste packages. A mobile x-ray and assay system will be operational in FY92 to assume control verification of waste package contents.

The WRF will allow for the inspection of incoming packages and waste inside the packages, verify proper waste characterizations, and assist in improved waste management. Operations at the facility will remediate damaged waste packages; allow the remediation of improperly prepared vacuum pumps; remove lead from lead-lined gloveboxes; and properly decontaminate trucks, scrapers, or other equipment.

LLW compaction operations continued through FY91. Annually, approximately 600-800 m<sup>3</sup> of LLW is compacted. In addition to the ongoing treatment of wastes, work on the NDE/NDA will be initiated by the end of FY91. Ongoing treatment of wastes will continue during the planning period in addition to the completion of the above listed projects.

In Budget Year FY93, administrative management/support of LLW treatment activities, and equipment and site maintenance will be provided. Technical, safety and inspection training for operators; support for audits, non-conformance actions and inspections; health physics surveillance; and preapproval services will be provided. Waste transportation in dumpsters, waste receipt services, database management capabilities, and compaction of Laboratory-generated wastes will continue. Completion of draft WAC for LLW, maintenance of documents supporting LLW disposal operations, and subcontractor support will be provided. Design and construction of LLW Remediation Facility and the LLW certification study will be initiated. A LLW/MW QA program will be developed, and the Radiological Performance Assessment will be completed.

**Low-Level Radioactive Waste Disposal.** This activity funds the following activities which support the disposal and operation of TA-54, Area G, Radioactive Waste Disposal Area, which has been LANL's primary low-level radioactive solid waste disposal area since the late 1950s. This ADS consolidates ADS 3074 (Low-Level Solid Waste Disposal), and ADS 4119 (TA-54 Indian Ruin Remediation). Included in the LANL waste burial operations are the design and physical excavation of burial pits and shafts to include safe and proper disposal of waste into these facilities, and backfill operations. Only LANL-generated LLW is disposed of through shallow land burial at TA-54, Area G site. The design features of these disposal pits and

shafts have grown more extensive, and construction costs are continuing to escalate. This activity also includes the remediation of approximately seventeen Indian ruins located at TA-54 during a five-year period, which contribute to the increased cost and FTEs required over previous years.

Two people are now required to assist with the additional handling and placement of waste no longer packaged in cardboard boxes, as directed by DOE Order 5820.2A. This DOE order now requires cardboard boxes to be replaced by metal containers. Currently the disposal site meets the Radiological Performance Assessment by being operated as a sanitary landfill with over seventy percent of the waste not being packaged, or being packaged in cardboard boxes. The lack of substantial handling allows for cost-effective disposal; however, the order now requires two additional FTEs to accommodate for increased package manipulations. This program is supported by the Radiological Performance Assessment, the SA, the Safety Analysis Report (SAR), Low-Level Waste Certification, and NEPA documentation.

Pit 37 has previously been excavated and is approved for use. All Indian ruins inside the boundaries of TA-54 have been surveyed and documented. Expansion design documents will be completed during FY92. FY91 funding is low due to omissions in the original FYP. Development of plans for Indian ruin remediations will begin in early FY92. Ongoing disposal operations will include the construction of new pits and shafts. FY92 increased funding reflects the expanded scope required because of inadequate FY91 funding.

In Budget Year FY93, administrative facilities will continue to be relocated due to Area G expansion; disposal operations of approximately 6,000 m<sup>3</sup> of low-level radioactive waste will continue; new pits and shafts will continue to be designed in Area G expansion area; plan development for Indian ruin remediation will continue; and the QA program and Standard Operating Procedures (SOPs) will be updated. New activities for FY93 include implementation of low-level radioactive waste certification program, and implementation of auditing procedures for generators to ensure compliance.

At the end of the planning period FY98, the following accomplishments will have been attained: the expansion of TA-54, Area G; fencing to include the design and excavation of additional pits and shafts; Indian ruin remediation; resiting of facilities, thereby allowing the effective disposal of LLW, and continuing support of operations at TA-54, Area G.

**Mixed Low-Level Waste Storage Operations.** This activity funds storing, inspecting, and maintaining of mixed low-level waste (MLLW) and covers funding for storage operations at TA-54, Area G. TRU Waste Storage/Mixed Waste Storage provides storage until adequate treatment and/or disposal methods have been developed and constructed. MLLWs include liquid treatment plant sludge; lead; and miscellaneous organic, inorganic, corrosive, toxic, and reactive materials contaminated or activated with radioactivity. This activity provides for MLLW storage at Area G, the Radioactive Waste Disposal/Storage Site. Storage is in self-supported fabric domes, chemical storage sheds, and storage pads. Daily and weekly inspections are performed to meet various DOE, NMED, and LANL concerns. Verification will be in the NDT Facility.

By the end of FY90, MLLW stored at the Laboratory complied with RCRA requirements. During FY91, storage activity and waste volumes increased over FY90 levels. Increased funding in FY92 reflects the expanded scope required due to inadequate funding for FY91. Facilities at TA-54 will continue to package and store MLLW waste generated from LANL operations. The MLLW disposal facility is to be constructed by FY96. Materials in the storage facility will then be processed for disposal.

In Budget Year FY93, 220 m<sup>3</sup> MLLW will be stored. Ongoing storage activities may decrease due to startup of the CAI. Generation rates will continue to increase over FY92 levels.

**ADS 3256: Mixed Waste Receiving & Storage Facility.** This stand-alone ADS funds the construction of a Mixed Waste Receiving and Storage Facility at the Laboratory. This facility will consist of a structure attached by corridors to the existing Treatment Development Facility. The proposed facility will contain 22,000 ft<sup>2</sup>, and will be designed and constructed of reinforced concrete. The building will have three types of functions; receiving and storage for contaminated liquids and solids; equipment assembly, test and storage; and office/conference.

The Receiving and Storage area will be in a high bay having four segregated areas for liquid waste storage, one segregated area with equipment for waste liquid bulking, feed preparation, and incinerator feed pumping. Wastes are received and stored in DOT approved shipping containers. The liquid storage rooms and Bulking and Pumping room are segregated by two hour fire-rated walls. The Receiving and Storage area will also contain a solid waste storage area, work area, a receiving/shipping area with a loading dock, and a ventilation equipment room. Radiation and air monitoring will be in accordance with the Laboratory manual. HEPA and carbon bed filtration are provided for the Receiving and Storage area exhaust air. An exhaust stack will be provided outside the ventilation room to support the HEPA filtration. The interior of the Receiving and Storage area will be connected to WM-37 with a forklift corridor. The Cold Test Assembly and Storage area will be in a high bay area with a five-ton bridge crane, and will be connected to the existing facility by means of a high bay corridor for use by forklifts and the transportation of equipment to and from WM-37. The Cold Test Assembly and Storage area will be separated from the Receiving and Storage area by a two hour fire-rated wall, and from the Office/Conference area by a one hour fire-rated wall. The office/conference area will be a single-story structure housing offices, a conference room, and toilet facilities.

The conceptual design was completed in FY90, and the project was validated by DOE/HQ. The Construction Project Data Sheet was also completed in FY90, and revised in FY91, and is being submitted concurrent with the Five-Year Plan. In Budget Year FY93, both Title I design and Title II design will be completed; the Preliminary Safety Analysis Report (PSAR) will be initiated and completed; and construction will be initiated. In addition, the RCRA permit modification will be prepared using requested operating funding.

**ADS 4173: General Plant Projects.** This stand-alone ADS (formerly ADS 4164 in the FYP) requests funding to develop, design, and construct General Plant Projects (GPP) required by the WM Program at the Laboratory. The types of programs included are small, new buildings; additions and alterations

to existing facilities; additions to roads; and general area improvements. Approval and authorization of individual projects will be in accordance with DOE Order 4700.3, General Plant Projects.

This ADS includes the following WM activities:

- Management of GPP program for WM facilities;
- Development of WM GPP from conceptual design through project authorization;
- Design/construction of GPP treatment, storage, and disposal facilities; and
- Preparation of NEPA, safety, and permitting documents for new GPP facilities.

In Budget Year FY93, Title II design of the following FY93 GPPs will be initiated and completed:

- Radioactive Liquid Waste Tank Farm;
- Short-term Storage Facility;
- Incinerator Ash Solidification Building;
- Centralized Change Room Facility;
- TRU Drum Venting Facility;
- Sludge Drum Staging Area; and
- Emergency Power Supply, TA-50-1.

In addition, design criteria for the Radioactive Liquid Waste Tank Farm, TRU Drum Venting Facility, Sludge Drum Staging Area, and Emergency Power Supply (TA-50-1) will be initiated and completed.

In Planning Years FY95-FY98, projects planned include design criteria, DOE Environmental Checklists (DECs), EAs, Preliminary Health Assessments, PSARs, and Field Safety Analysis Reports (FSARs) prepared for six GPPs.

**ADS 4174: Line Item Projects.** This stand-alone ADS requests funding to develop the Radioactive Liquid Waste Treatment Facility (RLWTF) Major System Acquisition (MSA) from Key Decision #0 (DOE conceptual design authorization) through Key Decision #1 (DOE request to the Office of Management and Budget). Justification and validation of this project will be in accordance with draft DOE Order 4700.1A, Project Management System.

In the future, this ADS will request funding to continue the development, design, and construction of the RLWTF; and to develop, design, and construct other outyear Line Item (LI) projects required by the WM Program at the Laboratory. This is a new ADS. It was not included in the FY93-FY97 FYP. The RLWTF will be developed through Key Decision #1 by the end of FY94.

In Budget Year FY93, preliminary process development will be completed; and conceptual design, draft design criteria and NEPA documentation will be initiated. WM project staff and Facilities Engineering project staff will be dedicated full-time to the project for the last three quarters of FY93.

**ADS 4137: Waste Minimization.** The Waste Minimization and Pollution Prevention Program is a Laboratory-wide activity to minimize the amount of waste that must be treated and disposed of. This stand-alone ADS supports

the planning and guidance efforts that provide technical and administrative direction to waste generating activities. Furthermore, this activity is for compliance with external regulatory requirements. D&D activity previously covered by this ADS is now covered in a separate ADS.

Planning, education, communications and training were initiated in FY88 and are ongoing. Prioritization of waste streams, initiated in FY90, is ongoing. Solvent and scintillation fluid substitution, design of Process Waste Assessment system, incentive award programs, technology transfer programs, waste tracking, and Program Effectiveness Evaluation programs were initiated in FY91 and are ongoing.

In Budget Year FY93, the following activities will be initiated or will continue:

- Initiate development of central waste minimization facility for chemical recycling efforts, and packaging and transportation support;
- Continue to provide technical guidance and software to generators;
- Continue to provide guidance in writing Site Specific Plans of highest priority generators;
- Initiate chemical, extra-Laboratory Recycling Program;
- Continue with incentive award program;
- Continue with prioritization of waste streams, and waste tracking; and
- Continue with Program Effectiveness Evaluation programs, and technology transfer programs.

At the end of the planning period, FY98, the following will have been refined and ongoing:

- Process Waste Assessment Program;
- Employee Awareness and Training;
- Waste Tracking and Reporting;
- Program Effectiveness Evaluation;
- Site-Specific Plans (SSP) operational; and
- SSPs written for 300 separate waste generating activities.

In addition, a central waste minimization facility that will provide housing for the recycling project will be operational. This facility will use existing buildings and will not require GPP or LI.

**Continuity of Operations (ADS 4172): Waste Management Operations.**

This activity is part of ADS 4172 and addresses those operational tasks necessary to support and maintain ongoing waste treatment, storage and disposal. Funding contained in this activity are in support of special studies, unique services, preparation of supporting documentation, maintenance of a WM training program, reporting, data management, and highly specialized technical support. These resources are necessary to support activities that are other than routine handling of waste, such as evaluation of innovative waste disposal technologies; risk assessments; feasibility studies; development of program documentation; evaluation and upgrade of existing modes of waste transportation, LLW certification program, and LLW System Performance Assessments; and support for the WM portion of complying with the State Agreement.

This activity also consolidates previous Continuity of Operations activities which are operational tasks necessary to support and maintain ongoing waste treatment, storage, and disposal. Functions included in continuity of operations are those that do not involve direct handling of wastes, but are essential support activities usually consisting of specific regulatory compliance requirements and/or DOE orders. Specific operations include the ongoing evaluation and upgrade of existing modes of waste transportation, planning, program development, record keeping, training, permit maintenance, generator education, professional development, contract management, on-site waste transfer, verification, mixed waste regulatory compliance, and facility development. The WM Group at the Laboratory has supported programs which handle hazardous and radioactive wastes while complying with applicable regulations and orders, and protecting workers, the public, and the environment. The majority of these programs and activities are ongoing activities.

In addition to ongoing activities, the following specific accomplishments are scheduled in FY93:

- LLW Certification Study;
- Finalize Radiological Performance Assessment;
- LLW/Mixed Waste QA Program;
- Initiate numerous NEPA documentation packages for existing WM projects and facilities modifications;
- Permitting for mixed waste and regulatory interface;
- Fully implement program management;
- Increase generator oversight and accountability;
- Fund WM treatment development and implementation; and
- Finalize two site-wide SARs (TA-50 & 54).

The majority of these programs and activities are ongoing activities which began prior to FY91, and will continue past FY98.

**Construction Program Management and Facility Planning.** This activity has been wrapped into ADS 4172 and includes the following WM activities:

- Preconceptual design of treatment, storage, and disposal facilities;
- Development of General Plant Projects (GPP) including NEPA and safety documentation;
- Management of construction program for WM facilities;
- Project justification documentation to support Key Decision #0, approval to start conceptual design for Line Item projects;
- Management of construction program for waste management facilities;
- Management of ES&H aspects of construction program;
- Facilities planning, including feasibility studies, identification and alternative evaluation, and preliminary project schedules/cost estimates;
- Preconceptual design of treatment, storage, and disposal facilities; and
- Project justification documentation to support requests for conceptual design authorization.

Budget Year FY93 includes the performance of engineering studies and preparation of preconceptual design reports for six WM facilities. Final engineering studies will be prepared for the proposed RLWTF MSA.

In the Planning Years FY94-FY98, engineering studies and preconceptual design reports for eight WM facilities will be prepared each year.

#### **6.4.6. Implementation Requirements**

**Radioactive Waste.** Extensive planning has been accomplished to implement compliance activities with DOE Order 5820.2A, "Radioactive Waste Management." A Los Alamos implementation plan was developed during FY89 and submitted to DOE. Full compliance with the order can be achieved within a three-year period.

Table 6-3 presents the Implementation Summary for TRU Wastes. Table 6-4 presents the Implementation Summary for LLW.

**Mixed Waste.** Los Alamos is under regulatory authority for mixed waste. Efforts are in process to ensure regulatory compliance, now that the State of New Mexico has received EPA authorization to regulate mixed wastes. Table 6-3 presents the Implementation Summary for TRU Mixed Waste; Table 6-4 presents the Implementation Summary for MLLW.

#### **6.5. Hazardous Waste**

Table 6-5 summarizes storage and disposal operations for FY91. Volumes of waste handled continue to increase, primarily because of enhanced Laboratory awareness of the proper management procedure for waste chemicals. The regulations under RCRA encourage recycling waste materials rather than disposing of them. As the Laboratory moves in this direction, the volume of recycled waste will increase.

##### **6.5.1. Characteristic/Listed (RCRA) Wastes**

The Los Alamos program for treating and storing nonradioactive hazardous waste ensures compliance with applicable federal and state regulations. The Laboratory submitted a RCRA Part B permit application to the EPA and State of New Mexico in May 1985 and received an approved permit on November 9, 1989. The following facilities were included:

- TA-14, -15, -16, -36, and -39: Thermal treatment facilities used to burn or detonate waste HE, HE-contaminated material, and reactives;
- TA-50: Batch treatment system and associated waste container storage area, chemical waste incinerator and associated container storage area, and storage facility; and
- TA-54, Area L: waste transfer, packaging and storage facilities, used for accumulating, packaging, and storing chemical wastes; and treatment tanks, used for the neutralizing, precipitating, and evaporating various wastes.

**TABLE 6-3  
IMPLEMENTATION SUMMARY FOR TRU AND TRU MIXED WASTE.**

<b>DOE 5820.2A Requirement</b>	<b>Actual Practice</b>	<b>Current Plans</b>	<b>Status/Progress</b>
II.3.b(1)	No documented program for volume reduction.	TRU waste minimization program developed in parallel with minimization for LLW/mixed waste.	Minimization plan approved and program being staffed.
II.3.c(1)	Partially implemented; certification generators must supply operational procedures before the plan can be implemented.	Generators must commit to implementation schedule and costs of implementation before LANL can comply.	Have received certification authority for all regular newly generated wastes. Generators are not committing to implementation.
II.3.c(8)	Cannot be implemented until generators supply the attachments.	EM-7 plans include all wastes; cannot comply with and implement the requirement until generators supply attachments and commit to implementation schedules and costs.	Have received certification authority for all regular newly generated wastes. Generators are not committing to implementation.
II.3.e		Negotiate with regulatory agencies to determine which regulations have been defined and apply.	Certified storage was reconfigured to all regular inspection of all packages in accordance with RCRA; effort complete in FY90. Changes currently are planned for previously stored, uncertified waste, but concurrence is required from DOE and the regulatory agencies.
II.3.3(4)		Negotiate with regulatory agencies and the State of New Mexico to determine which regulations have been defined and apply. Determine what LANL can reasonably do to follow these regulations, and determine what DOE will fund.	Certified storage was reconfigured to all regular inspection of all packages in accordance with RCRA; effort complete in FY90. Changes currently are planned for previously stored, uncertified waste, but concurrence and funding is required.
II.3.3(6)	Contingency plan does not presently exist.	LANL will write an SAR and develop the contingency plan after the consequences of releases have been analyzed.	Anticipate beginning to prepare an SAR in FY93, which will cover all operations at the disposal/storage site.

**TABLE 6-3 (CONTINUED)  
IMPLEMENTATION SUMMARY FOR TRU AND TRU MIXED WASTE.**

<b>DOE 5820.2A Requirement</b>	<b>Actual Practice</b>	<b>Current Plans</b>	<b>Status/Progress</b>
II.3.g(2)		LANL has enough capacity for several years with existing facilities; inspection requirement are tied to negotiation with regulatory agencies; requirements for mixed waste storage must be negotiated and defined.	See II.3.e. The State of New Mexico has regulatory authority for mixed waste; no specific regulations have yet been promulgated.
II.3.g(2)(h)	Closure plans do not currently exist.	Plans will be developed in accordance with negotiations; earliest that sites can be closed is FY99; most will be closed by FY99 or later.	Unchanged; costs are included in permitting costs.
II.3.g(3)	RCRA permit needed after 07/89.	FY89-91 Defense Waste Operations funding for preparing Part A and B permits for TRU mixed waste facilities, including storage.	Unchanged; \$100K-150K through 10/93.
II.3.i(2-4)	Characterization, verification, and developing closure plan and strategy are in progress.	Evaluation of old burial sites and development of closure plans are under DOE ER program; six sites containing buried waste will be evaluated under the ER program.	Unchanged; \$166.5M after 2000

**TABLE 6-4  
IMPLEMENTATION SUMMARY FOR LOW-LEVEL AND MIXED LOW-LEVEL WASTE.**

<b>DOE 5820.2A Requirement</b>	<b>Actual Practice</b>	<b>Current Plans</b>	<b>Status/Progress</b>
III.3.b(1)	No performance assessment.	<p>Prepare radiological performance assessment in three phases:</p> <ol style="list-style-type: none"> <li>1. Develop scenarios, data bases, and simulation models.</li> <li>2. Complete screening and second- and third-level simulations.</li> <li>3. Complete draft performance assessment.</li> </ol> <p>Ongoing maintenance of performance assessment.</p>	<p>Task initiated in FY89 and continues on schedule.</p> <p>Estimated completion 10/92; \$557K.</p> <p>\$450/y beginning FY92.</p>
III.3.b(2)	No system performance assessment.	<p>Prepare systems performance assessment. There must be a LANL site-wide assessment.</p> <p>Ongoing maintenance of performance assessment.</p>	<p>Implementation delayed by funding shortfall in FY90. Estimated completion date 09/92. Cost to complete is \$551K.</p> <p>\$250K/y, beginning FY95.</p>
III.3.b(3)	Current monitoring evaluates actual and prospective performance of active LLW facilities..	Compare monitoring results with model output.	Costs in III.3.b(1).
III.3.c(1)	Administrative Requirements to reduce waste (AR 10-2).	<p>Develop and implement proactive program for waste reduction.</p> <p>Complete and implement maintenance.</p>	<p>Task on schedule; full implementation by 09/95. Cost to implement is \$2507K.</p> <p>\$1109K-1326K/y, beginning FY95.</p>
III.3.c(3)	Administrative Requirements to segregate waste (AR 10-2); no established BRC level for distinguishing uncontaminated waste from LLW.	Alternative study of methods for segregating and disposing of BRC waste.	Changed approach to incorporate identified study. Estimated completion is 09/95. Estimated cost is \$450K.

**TABLE 6-4 (CONTINUED)**  
**IMPLEMENTATION SUMMARY FOR LOW-LEVEL AND MIXED LOW-LEVEL WASTE.**

<b>DOE 5820.2A Requirement</b>	<b>Actual Practice</b>	<b>Current Plans</b>	<b>Status/Progress</b>
III.3.d	Characterization procedures for radionuclides (AR 10-2).	Develop new characterization procedures.	Effort unfunded for FY92. Identified requirement of waste generators will be based on completed performance assessment and development of revised WAC.
	No established chemical analysis to differentiate between LLW and MW.	Major effort planned to allow RCRA characterization of contaminated waste.	Proposed analysis effort for MW initiated in FY93. The effort will be at a full funding level of \$569K/y beginning in FY94.
III.3.e	WAC defined by AR 10-2.	Prepare and implement LLW certification program.	Project delayed because effort is unfunded in FY93.
		Prepare and implement plan.	09/93; \$1236K
		Maintain program.	\$905K/y beginning FY94.
III.3.f	Current treatment is adequate to meet near-term objectives. No treatment for some mixed waste.	Develop and construct LLW/MW incinerator.	\$15M; 09/97; further delay possible because of NEPA issues
		Obtain RCRA permit for incinerator.	\$500K; 09/97; further delay possible because of NEPA issues.
		Ongoing operating expenses.	\$600K/y
		Interim incineration of selected MW at CAI.	\$100K/y; delayed because of NEPA issues and Richardson amendment.
		Add solidification process for LLW liquid treatment sludge.	\$1.2M; 10/93

**TABLE 6-4 (CONTINUED)  
IMPLEMENTATION SUMMARY FOR LOW-LEVEL AND MIXED LOW-LEVEL WASTE.**

<b>DOE 5820.2A Requirement</b>	<b>Actual Practice</b>	<b>Current Plans</b>	<b>Status/Progress</b>
		Ongoing operating expenses.	\$180K/y
		RCRA hazardous waste treatment facility.	\$11.5M; 10/94
		Ongoing operating expenses.	\$210K/y
		Develop interim treatment processes for mixed LLW; study alternative processes.	\$75K; work in progress
		Provide interim treatment.	\$425K; delayed because of FY90 funding shortfall.
III.3.g(4)	Program for labeling packages in accordance with DOE 1540.1 is in the On-Site Transportation Manual.	Full implementation of program.	The On-Site Transportation Manual is currently dated. LANL is reevaluating new DOT/DOE guidance.
III.3.h	Mixed wastes are stored; no storage for liquid and reactive waste.	Build receiving and storage facility.	\$9.6M; 10/94
		Build storage addition to support CAI.	\$630K; 04/91; delayed by safety assessment.
		Ongoing operating cost.	\$105K/y
		Interim mixed waste storage of reactivities and liquids.	\$150K; 10/90
		Possible interim expansion of solid mixed waste storage.	Expansion FY89-90 to add 6600 ft <sup>2</sup> at ~\$150K; future expansions anticipated.

**TABLE 6-4 (CONTINUED)**  
**IMPLEMENTATION SUMMARY FOR LOW-LEVEL AND MIXED LOW-LEVEL WASTE.**

<b>DOE 5820.2A Requirement</b>	<b>Actual Practice</b>	<b>Current Plans</b>	<b>Status/Progress</b>
III.3.i(1-2)	Disposal methods meet the performance objectives.	Cannot be identified until the performance assessment is complete.	Included in III.3.b(1)
III.3.i(5)(a)	Wastes are disposed of in cardboard boxes.	Study to determine alternative technologies for compacting, reducing size, and stabilizing wastes.  The study may determine alternative action.	Unfunded in FY92; delay to 09/94 estimated completion.  \$1367K CE and GPP requested FY92-FY93.
III.3.i(7)(b)	Disposal area operated and expanded under 1979 EIS.	Complete SAR for disposal area.  Obtain decision about NEPA documentation from EH-25.  Upgrade NEPA documentation as required.	Increased cost resulting from revised DOE guidance; \$500K; 01/93  Not yet provided.  Not determined.
III.3.i(8)(a)	Does not apply until new disposal site needed.	Designs for disposal unit address hydrology, geology, and waste characterization.	Not determined.
III.3.i(9)(a)	Operation procedures for disposal facilities have been evaluated.	Improve procedures to minimize need for long-term control and to meet requirements for closure/post-closure and performance assessment.	Not determined.
	No facilities for disposal of mixed waste.	Develop mixed waste landfill.  Ongoing operating expense.	\$5M; 09/93  \$1500K/y beginning FY94
III.3.j(1-6)	No closure/post-closure plan.	Prepare plan before closing Area G.	\$150K; 10/95

**TABLE 6-4 (CONTINUED)**  
**IMPLEMENTATION SUMMARY FOR LOW-LEVEL AND MIXED LOW-LEVEL WASTE.**

<b>DOE 5820.2A Requirement</b>	<b>Actual Practice</b>	<b>Current Plans</b>	<b>Status/Progress</b>
III.3.k(1-4)	Comprehensive program exists.	Establish groundwater pathway monitoring.	\$100K; 10/93
III.3.1	Overall QA program does not include LLW.	Develop QA program for LLW in two phases. 1. Develop QA program 2. Implement QA program	09/92 09/92
III.3.m	Record-keeping system in place.	Improve record-keeping to include quantity of nuclides, and track wastes through treatment.	\$100K; 05/91

**Table 6-5  
TOTAL STORAGE & DISPOSAL OPERATIONS  
FOR FY91**

<b>Waste Type</b>	<b>Volume (m<sup>3</sup>)</b>
Asbestos Waste	526.81
PCB Waste	107.23
Hazardous Waste	376.52
Admin Waste	513.66
Non-RCRA Waste	397.29
Mixed Waste	154.23
<hr/>	
Total	2,075.74

All these facilities are included in the Part B RCRA permit, which was approved for 10 years beginning November 8, 1989. Previous submittals of the Part B permit application included the chemical waste landfill at Area L. However, because the Laboratory could not comply with RCRA reauthorization requirements for groundwater monitoring and for double-lined and/or leachate collection facilities, all burial operations stopped in November 1985, and the Area L landfill operation was withdrawn from the permit application. A closure plan for the site burial facilities has been prepared and submitted. Closure plans have been submitted for several other landfills and for storage and treatment facilities.

### 6.5.2. Current and Future Plans

Recent and planned changes in hazardous waste management practices in management and administrative areas for FY92 and FY93 are presented below:

- A waste minimization program office was established in December 1991;
- Instituted a Laboratory-wide policy for waste minimization;
- Waste Minimization Committee was formed;
- Will establish Program Requirements Document, Laboratory Procedures for waste minimization;
- Educational program;
- Employee incentive program which has been defined; and
- Pollution Prevention Awareness program is operating and includes modifications to waste management practices in technical areas for FY92 and FY93.

These modifications are presented below:

- Established Process Waste Assessment (PWA) plans and methodology;
- Currently testing system, and have completed one PWA;
- Will complete five PWAs by end of FY92, and 50 PWAs by end of FY93;

- Will complete 80 PWAs per year in outyears FY94 through FY96;
- SSPs are being written as PWAs are being completed (technical support supplied as required);
- Chemical recycling program requirements are currently being defined;
- Performance evaluation procedure requirements are currently being defined, and initial goals have been set and will be refined.

**Activity Descriptions.** Operations, modifications to the existing hazardous waste management system, and construction of new facilities are presented below. Activities proposed for Budget Year FY93 are discussed in detail; only those activities with funding in FY93 are included.

The following hazardous waste activities are consolidated into ADS 4172.

**Hazardous & Toxic Waste Disposal.** This activity funds ongoing asbestos, oil and PCB waste disposal activities, and the disposal of administratively classified controlled waste on site. Nonradioactive asbestos waste is currently sent off site for disposal. Radioactively contaminated asbestos and asbestos suspected to be radioactively contaminated is packaged according to federal and state regulatory requirements and transported to TA-54, Area G, for disposal in an asbestos monofill.

Oil is used throughout the Laboratory in equipment ranging in size from several hundred-gallon transformers to several liter-sized pumps. Oil is classified as PCB (>500 ppm), PCB-contaminated (50-500 ppm) and non-PCB waste oil (5-50 ppm). Depending on the level of PCBs and the type of equipment, different disposal locations are used. Oil free of PCBs (<5 ppm) is stored at TA-54, Area L, for off-site incineration as a waste fuel. Oil, electrical equipment, and clean-up debris, (i.e. clothing and rags contaminated with PCB greater than 50 ppm) are sent off site for incineration. Nonelectrical equipment (>50 ppm) is drained, and the oil is sent off site for incineration while the metal parts are shipped off site for disposal. All soil, drained electrical equipment, and other solid materials contaminated with PCBs are shipped off site for incineration and disposal. All liquid PCB waste contaminated with radioactivity is stored at TA-54, Area L.

In addition, administratively controlled waste is landfilled at TA-54, Area J. Administratively controlled waste excludes wastes that are regulated by RCRA or TSCA. No federal or state agency regulates administratively controlled wastes; these are wastes which the Laboratory chooses to keep under their direct control on site, and should not be subject to general public exposure in a sanitary landfill jointly used with the County of Los Alamos. For example, waste that has suspect HE contamination must be fully characterized and meet stringent Waste Acceptance Criteria and QA requirements to ensure RCRA-regulated waste is not inadvertently landfilled as an administrative waste. These controls ensure that the waste is nonregulated and can be disposed of at TA-54, Area J.

The collection, storage, transport, and disposal of hazardous and toxic wastes are ongoing activities, and have increased over time with increased concerns and regulations addressing health, safety and environmental protection. In FY91, the Laboratory disposed of approximately 107 m<sup>3</sup> of PCB wastes.

This activity manages and disposes of hazardous and toxic wastes on a continuing and timely basis. Operations will continue throughout the planning period. An administratively controlled landfill will be constructed to meet the Laboratory's waste needs.

**Chemical Waste Storage.** This activity defines the funding required to store wastes at TA-54, Area L. This facility has a permit issued jointly by the USEPA and the New Mexico Environment Department (NMED) for storage of hazardous waste, and interim status from NMED for storage of low-level radioactive mixed wastes. This activity also includes the storage of wastes regulated by TSCA. All hazardous waste storage facilities have been constructed, operated, inspected, and maintained in accordance with established applicable regulations.

At the end of the planning period FY98, storage capabilities will continue to be enhanced. Facilities will be upgraded to ensure regulatory compliance. Permitted hazardous waste storage units meet RCRA requirements, including secondary containment. However, in addition to the hazardous wastes, over 2000 drums of radioactive mixed wastes are stored at TA-54, Area L on an asphalt pad without separation of incompatibles, which is required under Interim Status 40 CFR 265. Currently this mixed waste is stored outside in overpack containers, which provides some increased protection to worker safety and the environment. To meet the intent of 40 CFR 265 storage regulations, radioactive mixed waste storage facilities must be upgraded to provide secondary containment and protection from weather when the Part B is granted.

Facility requirements and design criteria for radioactive mixed waste will be completed in FY92. Other facility upgrades to be completed include installation of safety gates for emergency evacuation, upgrade of facility emergency equipment to meet minimum requirements, and excavation of Indian Ruins to increase storage space.

In FY93-94, radioactive mixed waste storage will be upgraded to meet minimum storage requirements. This upgrade will include secondary containment for liquid wastes. Beyond FY93-94, as WM activities are moved from TA-54, Area L to the new hazardous waste treatment facility, radioactive mixed waste storage will be expanded to include storage units now used exclusively for hazardous wastes at TA-54, Area L.

**Chemical Waste Treatment.** This activity funds the major chemical waste treatment activities for the Laboratory at TA-54, Area L. The purpose of this activity is to reduce the volume and/or toxicity of waste materials and remove these wastes from storage for disposal. Since October 1988, the volume of waste has increased four-fold, primarily attributable to generator awareness. The operations can be classified as:

- Chemical Waste Management - neutralizing bulk acid/base, incinerating, precipitating, solidifying, and encapsulating chemical wastes. Wastes are either treated on site or shipped off site for commercial treatment and proper disposal.

- **Mixed Waste Treatment Feasibility Studies - LANL WM** will investigate treatment for radioactive mixed and chemical wastes. Those identified as feasible will be adapted for Laboratory use by LANL WM.
- **Gas Cylinders - processing** which includes characterization, recycling, treatment, and disposal of over 3,700 gas cylinders at the Laboratory to date. All operations must meet specific permit and regulatory requirements. This requires quality control in all activities and proper training. Now that the backlog has been worked off, only newly identified gas cylinders will be characterized.

This is an ongoing operation at an active facility. In FY91, 2,100 cubic meters (approximately 10,000 x 55 gal.) of waste was disposed of. Most of this waste was treated off site by incineration. Barium sand treatment was fully implemented, and in FY90 all historical barium sand wastes were treated. In FY91, the best treatment technology for uranium chips was identified.

In Budget Year FY93, the following activities will take place:

- Develop and implement program for management of 1,000 waste profiles per year;
- Provide technical expertise for management of nonroutine waste streams;
- Develop and implement waste certification program;
- Implement WAC, and perform 10 visits per week to ensure waste meets WAC requirements;
- Continue to review all applicable DOE Orders and develop checklists for compliance;
- Develop and implement air quality monitoring system for gas cylinder storage;
- Off-site incineration of approximately 250 gas cylinders;
- Sample, analyze, and X-ray 50 historical mixed waste streams; and
- Implement training to meet RCRA permit requirements.

In Planning Years FY94-98, on-site treatment feasibility studies will continue. Documentation for treatment of waste in storage will be completed for some waste streams. Waste treatment operations will begin.

At the end of FY98, the existing Chemical Waste Treatment Facility will be compliant with federal regulations of the Department of Transportation (DOT) and RCRA. Through FY97, activities covered under this activity will streamline WM activities, reduce off-site treatment costs, and treat mixed wastes. LANL WM facilities will be upgraded and brought into compliance.

**ADS 43-A: High Explosive Wastewater Treatment.** This ADS requests funding for the design, development, and construction of a high explosive (HE) wastewater treatment system at Los Alamos to upgrade presently inadequate treatment facilities. This would allow them to consistently comply with existing effluent water quality requirements. The project will also enable the Laboratory to meet more stringent effluent quality limits to be required by EPA in the draft NPDES permit now under review.

The project will consist of two HE wastewater treatment facilities and a collection piping system to transfer HE-contaminated fluids from existing building sumps to treatment facilities. The system will require approximately 7,000 lineal feet of double wall pipe with appropriate manholes and leak detectors, and a central wastewater treatment plant with one satellite treatment plant.

The conceptual design was completed in the second quarter of FY92. The Schedule 44 (Construction Project Data Sheet) was completed in the second quarter of FY92 and is being submitted concurrent with the FYP. The project will be completed and in operation at the end of the FYP period.

In Budget Year FY93, design criteria will be completed. Architect-Engineer selection will be initiated and completed. The EA will be prepared and submitted.

### **6.6. Schedule and Cost Summary**

The current schedule for WM activities indicating the draft major milestones to be accomplished during the period FY 1992-1998 is presented below.

#### **Low-Level & TRU Waste:**

##### **Controlled Air Incinerator:**

- Complete preconceptual study for CAI support facilities by 8/30/92.
- Complete project schedules through Title II (definitive) design by 10/15/92.
- Complete staffing for Controlled Air Incinerator low-level mixed waste operations by 2/1/94.
- Complete RCRA trial burn by 2/13/95.
- Complete CAI Operational Readiness Review (ready to start operations) by 6/12/95.

##### **Waste Minimization:**

- Complete waste minimization policy by 7/30/92.
- Complete mixed waste program requirements documents by 9/30/92.
- Complete three process waste assessments for mixed waste by 9/30/92.
- Complete three site-specific plans for mixed waste by 1/30/93.

##### **Research and Development:**

- Complete mixed waste research and development paradigm by 10/30/92.

##### **Public Participation:**

- Complete public involvement and participation plan specific to LDR issues and planned facilities 120 days after effective date of agreement.

**Dewatered Sludge:**

- Complete study of options for delisting or relabelling stored dewatered sludge from radioactive wastewater treatment by 6/30/93.

**Low-Level Waste:**

**Off-site Treatment:**

- Complete report identifying off-site commercial facilities acceptable for treatment of low-level mixed waste by 9/30/92.
- Complete schedule for shipments of low-level mixed waste by 3/31/93.
- Complete annual update of off-site facilities for low-level mixed waste treatment by 9/30/93 and 9/30/94.

**Scintillation Vial Crusher:**

- Start operation of scintillation vial crusher 90 days after approval of NEPA documentation.

**Low-Level Mixed Waste Characterization:**

- Complete characterization plan for historical low-level mixed waste by 3/30/93.

**Lead Decontamination:**

- Start operation of lead decontamination trailer by 12/31/92.

**DETOX Process:**

- Complete bench-scale testing of DETOX process by 12/15/92.
- Complete waste treatment skid design by 6/30/93.
- Complete waste treatment skid construction 6 months after effective date of RCRA Part B Permit and approval of NEPA documentation.
- Start operation of waste treatment skid 14 months after effective date of RCRA Part B Permit and approval of NEPA documentation.

**Interim Low-Level Mixed Waste:**

- Complete preconceptual study for interim low-level mixed waste storage facilities/upgrades by 6/30/93.
- Complete project schedules through Title II (definitive) design and RCRA Part B permit application by 8/16/93.

**Hazardous Waste Treatment Facility:**

- Complete Title I (preliminary) Design Summary Report for the Hazardous Waste Treatment Facility by 10/30/92.
- Complete Title II (definitive) design by 11/14/94.

**Additional Treatment Skids:**

- Complete program management plan for generic development, design, permitting, construction, and operation of waste treatment skids by 12/30/92.
- Finalize completion schedules for waste treatment skids currently in progress based on program management plan by 3/30/93.

- Begin development of two new waste treatment skids (program management plan identifies completion schedule) by 10/1/93, 10/1/94 and 10/1/95.

**Mixed Waste Receiving/Storage Facility:**

- Complete design criteria for Mixed Waste Receiving and Storage Facility by 1/15/93.
- Complete project schedule through Title I (preliminary) design by 2/28/93.

**TRU Waste:**

**Interim TRU Waste Storage/Characterization/ Repackaging:**

- Complete preconceptual study for interim TRU waste storage/characterization/ repackaging facilities/upgrades by 9/30/92.
- Complete project schedules through Title II (definitive) design and RCRA Part B permit application by 11/16/92.
- Complete project schedule through Title II (definitive) design and RCRA Part B permit application by 11/16/92.
- Complete assessment plan for TRU waste stored on Pads 1, 2, and 4 by 11/16/92.
- Complete design criteria for Waste Remediation Facility (interim facility for TRU waste characterization and repackaging) by 9/30/93.

**TRU Waste Facility:**

- Complete preconceptual study for TRU Waste Facility by 10/30/92.
- Complete TRU work-off plan by 9/30/93.

Budget information for all projects dealing with WM is presented in Table 6-6.

**6.7. Waste Management Documentation Requirements**

(1) Section 6.3.1 - High-Level Waste

The Laboratory does not handle any high-level wastes.

(2) Section 6.3.2 - Transuranic Waste

- (a) "Los Alamos Transuranic Waste Certification Plan for Newly Generated TRU Waste," Los Alamos National Laboratory document, WCTCP-HSE7-CP-01, Revision 4 (October 21, 1988)
- (b) The earliest date for closing TRU storage sites is FY98.
- (c) "Comprehensive Implementation Plan for DOE Defense Buried TRU-Contaminated Waste Program," DOE-J10-025 (September 1987)

TABLE 6-6  
 FUNDING SUMMARY OF WASTE MANAGEMENT ACTIVITIES  
 (Planning Level Dollars in Thousands)

ADS	Title
<u>Continuity of Operations</u>	
4138	Waste Management Ops.
<u>Waste Minimization</u>	
4137	Waste Minimization Planning
<u>Treatment</u>	
3088	Chemical Waste Treatment
4133	Low-Level Waste Mgmt. Trmt.
4117	RH TRU Waste Treatment
4154	TRU Waste Treatment Ops.
4170	Thermal Destruction
4171	Radioactive Liquid Waste Trmt.
4175	Sanitary Wastewater Trmt. Ops.
<u>Sub-totals</u>	
<u>Storage</u>	
3079	Mixed Low-Level Waste Stor.
3084	Chemical Waste Storage
4146	TRU Solid Waste Storage
<u>Sub-totals</u>	
<u>Disposal</u>	
3056	Hazardous/Toxic Waste Disp.
3081	RCRA Landfill Ops.
4139	Low-Level Rad. Waste Disp.
<u>Sub-totals</u>	
<u>Line Item &amp; General Plant Projects</u>	
43A	HE Wastewater Trmt. System
3060	Rad. Liquid Waste Trmt. Facility
3256	Mixed Waste Receiving/Stor. Fac.
4140	Construct. Mgmt./Fac. Planning
4173	General Plant Projects:
	Haz. Waste Oil Storage Facility
	Sludge Solidification Facility
	Emergency Power Supply
	Radioactive Liquid Waste Line
	TA-21 Rad. Liquid Waste Line
	Extended Storage Facility
	TRU Waste Processing Facility
	Short-Term Storage Facility
	Shop & Storage Addition
	Centralized Change Room Facility
	Low-Level Rad. Waste Landfill
	PCB Building
	LL & Mixed Waste Incinerator
	TA-55/50 Rad. Liquid Waste Line
4174	New Facility Planning
<u>Sub-totals</u>	
<u>Grand Totals</u>	

(3) Section 6.3.3 - Low-Level Waste

- (a) "Low-Level Radioactive Solid Waste" in *Health, Safety, and Environment Manual*, Ed. B. Ronquillo, Los Alamos National Laboratory document.
- (b) The Waste Acceptance Criteria document will be approved by 2/28/92 and implemented by 10/31/93.
- (c) The audits of certification activities are not available until the certification plan is complete.
- (d) The Laboratory does not ship low-level waste to off-site disposal facilities.
- (e) The Laboratory does not handle Class C wastes.
- (f) "Final Environmental Impact Statement: Los Alamos Scientific Laboratory Site, Los Alamos, New Mexico," US Department of Energy, Washington D.C. 20585 DOE/EIS-0018, UC-2, 11 (December 1979).

This document contains the current disposal sites.

- (g) The Laboratory will prepare the closure plan for low-level waste disposal sites by 9/30/93.

(4) Section 5.1 - Decommissioning of Radioactively Contaminated Facilities

- (a) K. A. Balo, L. C. Borduin, J. R. Buchholz, R. Garde, J. Warren, "1988 Waste Management Site Plan," Los Alamos National Laboratory report LA-UR-88-4129 (January 1989).
- (b) see 4(a)
- (c) Dates of issue of decommissioning project plans  
UHTREX: 3/89  
TA-2 Water Boiler Reactor: 5/89  
LAPRE: 7/89
- (d) J. C. Elder, E. J. Cox, D. P. Hohner, A. M. Valentine, "Radioactive Liquid Waste Lines Removal Project at Los Alamos (1981-1986)," Los Alamos National Laboratory report LA-10821-MS (September 1986).

R. Garde, E. J. Cox, and A. M. Valentine, "Los Alamos DP West Plutonium Facility Decontamination Project," Los Alamos National Laboratory report LA-9513-MS (September 1982).

J. R. Harper and R. Garde, "Removal of Contaminated Air Scrubbers at TA-3-57, Los Alamos National Laboratory," Los Alamos National Laboratory report LA-9058-MS (November 1981).

J. R. Harper and R. Garde, "The Decommissioning of the Los Alamos Molten Plutonium Reactor Experiment (LAMPRE I)," Los Alamos National Laboratory report LA-9052-MS (November 1981).

J. R. Harper and R. Garde, "The Decommissioning of TA-21-153, A <sup>237</sup>Ac-Contaminated Old Filter Building," Los Alamos National Laboratory report LA-9047-MS (November 1981).

J. R. Harper and R. Garde, "The Decommissioning of the TA-42 Plutonium Contaminated Incinerator Facility," Los Alamos National Laboratory report LA-9077-MS (November 1981).

#### **6.8. Impact of Funding Constraints**

Waste management programs were funded at the level required to maintain safe and efficient treatment, disposal, and storage of radioactive, mixed and nonradioactive hazardous wastes.

If FY93 unconstrained funds are not received, a number of tasks, projects, and documents will be forwarded to the planning years. This required approach will continue to cause delays in either implementation or completion, and will create regulatory liabilities and work safety and exposure concerns.

#### **6.9. Waste Management Roadmapping Activities**

LANL is actively involved in the ongoing DOE-HQ roadmapping program. The purpose of this program is to identify waste management issues and develop logical approaches to resolving these issues. Input from LANL is provided to DOE-AL which consolidates input from other DOE-AL sites and publishes roadmap documents. To better define issues, waste streams are categorized, as follows:

**Low-Level and Low-Level Mixed Waste Roadmap** (Issued September 30, 1991; revised March 31, 1992)

LANL was unable to complete this portion of the roadmap process due to involvement with Tiger Team investigations. This roadmap will be completed in July 1992.

**Hazardous/Sanitary Waste Roadmap** (Issued February 21, 1992; revised June 1, 1992)

Among key issues identified by LANL in this category:

- Laboratory administrative controls are needed to ensure efficient hazardous/sanitary waste management at LANL.
- Additional strategic planning is needed regarding long-term waste generation to ensure that sufficient capacity and capabilities exist for effective management of all wastes.
- Implementation of an effective waste minimization program by waste generators is needed.

**Classified Waste Roadmap (Issued May 1, 1992)**

Among key issues identified by LANL in this category:

- When does classified material become waste?
- Standardized procedures for sanitization are lacking.
- Treatment capability/capacity to meet Land Disposal Restrictions for classified waste are limited.
- Disposal options for classified hazardous/mixed/non-regulated (Subtitle D) wastes are limited.

**Transuranic/Transuranic Mixed Waste Roadmap (Issue date - July 31, 1992)**

While LANL has these types of wastes, issues were still in the process of being developed at the time the Site Specific Plan was prepared.

## 7.0. TECHNOLOGY DEVELOPMENT

### 7.1. Technology Development/Transportation Management (TD/TM) Strategy

To meet the requirements of the Five-Year Plan and the objectives of solving environmental and waste management problems in a cost-effective and timely fashion frequently requires the development of new technologies and methods, or enhancement of older ones. The requirements are concisely defined as doing the job "faster, better, cheaper, and safer." Our current and anticipated technology development activities are grouped into eight major areas: (1) waste minimization (e.g., near net shape casting, solvent substitution); (2) waste treatment (e.g., supercritical water oxidation, biodestruction of organics/oils, enhanced solubilization); (3) site characterization (e.g., noninvasive geophysics, stable isotope tracer methods); (4) site remediation (e.g., soil washing/flushing, barriers technologies); (5) robotics and automation technology (e.g., analytical laboratory automation); (6) instrumentation and sensors (e.g., sensors for stack gas emissions); (7) analysis and assessment (e.g., cost-effectiveness methods, contaminant transport modeling); and (8) education and technology transfer (e.g., Students Watching Over Our Planet Earth [SWOOPE]).

### 7.2. TD/TM On-Site Needs Fulfilled On Site

**(a) Los Alamos Waste Treatment Program Technical Task Plan (TTP) no. AL1212P4.** The objective is to demonstrate various waste treatment technologies on waste streams (used as test beds) at Los Alamos to establish a performance baseline for application throughout the DOE. As such this activity will contribute to resolution of Los Alamos waste management issues.

**(b) Los Alamos Program on Barriers and Post-Closure Monitoring (TTP no. AL1212P6).** The goal for this task is to establish test bed(s) at Los Alamos for demonstrating the effectiveness of near-surface barriers to control water runoff, isolation barriers, treatment of isolated near-surface contamination, engineering assessments of technology applicability, and assessment of defense-program instrumentation for post-closure monitoring. Because these tests and evaluations will be performed at Los Alamos, of necessity they will be tied to environmental restoration needs at Los Alamos.

**(c) Australia/Kuwait: Cleanup of Heavy Metals (TTP AL no. 123301).** The purpose of this project is to assess the technology needs necessary for cleanup of uranium in Kuwait (as a result of the Gulf War) and plutonium and uranium in Australia (resulting from British Atomic Weapons Trials and uranium mining and milling), and also at various Department of Defense sites. This information is useful to Los Alamos because both uranium and plutonium exist in the environment at Los Alamos.

**(d) Unsaturated Zone Transport of Contaminants (TTP no. AL1111AB).** This task seeks to develop one, two, and three-dimensional models for predicting the movement of contaminants in the unsaturated zone. As such, it also has relevance to Los Alamos because LANL is situated on unsaturated tuff.

**(e) Magnetic Separation CRADA (TTP no. AL124012).** Development of magnetic separation of metal contaminants by use of their paramagnetic properties is being investigated together with an industrial partner, AWC Lockheed. If successful, this also will have relevance to metals contamination at Los Alamos.

**(f) Development of Gas Cylinder Disposal Plant (TTP no. AL1112XA).** A transportable sampling, analysis, and cylinder recontainerization device is to be developed for use at Los Alamos and various other DOE sites to increase handling safety, reduce indirect disposal costs, and avoid potential liabilities.

**(g) Robotics/Laboratory Automation (TTP no. AL113204).** Los Alamos activities include (1) forming the Standard Analysis Method concept to provide standard analytical hardware and software platforms for environmental samples, and (2) developing advanced sensor technology related to analytical laboratory automation. As such, this technology development effort potentially will reduce the costs associated with the Los Alamos site characterization effort.

**(h) Analytical Laboratory Management: Methods Compendium Development (TTP no. AL123103).** This project will develop a Methods Compendium that describes validated analytical chemistry methods for environmental restoration and waste management operations used across the DOE, including Los Alamos.

**(i) Analytical Laboratory Management: Research and Special Studies. A. Field Screening (TTP no. AL113101).** This program focuses on assessing and implementing current field screening technologies and establishing the type and level of analytical support for waste operations or site remediation. As such, it has relevance both to Los Alamos and to the DOE Complex.

**(j) Analytical Laboratory Management: Research and Special Studies. A. Blind Compliance (TTP no. AL123102).** The objective of this program is to establish the appropriate type and level of analytical support required for waste operations or site remediation.

**(k) Analytical Laboratory Management: Adaptation of SW-846 Methods to Mixed Waste Analysis (TTP no. AL123101).** This task addresses the need for sample preparation and determinative methods for analysis of hazardous constituents in radioactive samples that are acceptable to regulatory agencies. This task will be carried out to assure adherence to the DOE ALARA principle.

**(l) Selective Extraction/Leaching TTP no. AL121121).** The objectives of this task are to (1) develop extraction technologies based upon chelators, which are optimized for remediation of actinide-contaminated soils, with emphasis on uranium, and (2) to obtain performance and cost data for comparison to conventional soil washing methods. Such technology also may have benefit to the cleanup of uranium at firing sites at Los Alamos.

**(m) Improved TRU Waste Assay Instrumentation: CTEN (TTP no. AL121209).** The design, construction, and demonstration of a Combined Thermal/Epithermal Neutron (CTEN) interrogation device will allow improved TRU waste analysis accuracy, thereby allowing waste facility operators to better comply with shipping and disposal regulations. This includes Los Alamos.

**(n) Sequestering Agents/Removal of Transuranics from Radioactive Waste (TTP no. AL121217).** A series of polymer-supported, ion-specific extraction systems for removing actinides and other hazardous metal ions from wastewater streams will be developed, with the initial focus on plutonium and americium at the waste treatment facility at Los Alamos and Buildings 774 and 374 at Rocky Flats.

### **7.3 TD/TM Off-Site Needs Fulfilled On Site**

Tables 7-1 through 7-5 summarize the current technology development programs that are being performed in support of other sites' needs. It is anticipated that LANL will become involved in the following areas: Uranium in Groundwater (TAD no. GS11); Heavy Metals in Soil (TAD no. GS12); Priority Metals in Groundwater (TAD no. GS13); Toxic Chemicals in Soils & Groundwater (TAD no. GS14); Mixed Waste in Non-Arid Soils (TAD no. GS15); Non-VOCs in Non-Arid Soils (TAD no. GS16); Non-VOCs in Arid Soils (TAD no. GS17); Organics in Surface Water (TAD no. GS18); Tritium in Soils & Groundwater (TAD no. GS19); Mixed Fission Products in Soils & Groundwater (TAD no. GS20); Aqueous Liquids (TAD no. WR8); Organic Liquids (TAD no. WR9); Wet Solids (TAD no. WR10); Homogeneous Dry Solids (TAD no. WR11); Heterogeneous Dry Solids (TAD no. WR12); Materials (TAD no. WR13); Process Diagnostics and Controls (TAD no. WR14); and General Waste Minimization (TAD no. WM7).

### **7.4 TD/TM On-Site Needs Fulfilled Off Site.**

**(a) LANL Sampling Support to Plutonium in Soils ID (TTP no. AL121108).** The purpose of this task is to supply actual soil from Los Alamos that is contaminated with uranium from firing sites. This material will be tested with the gravimetric and magnetic separation methods utilized in the Nevada program. This information will be useful to Los Alamos environmental cleanup efforts.

**(b) Demonstration of Bioengineering Capping Technology (TTP no. AL221119).** Elimination of the infiltration of water into closed sites by a combination of engineered barriers and use of local plants to increase evapotranspiration is an attractive and acceptable method that is undergoing further testing. This also has relevance to Los Alamos where the water table is deep and annual rainfall is low.

**(c) Magnetic Separation CRADA (TTP no. AL124012).** Development of magnetic separation of metal contaminants by use of their paramagnetic properties is being investigated together with an industrial partner, AWC Lockheed. If successful, this also will have relevance to metals contamination at Los Alamos.

### **7.5 ER-Funded Development and Application Studies**

**(a) Bioremediation of High-Explosive Contaminated Soil.** This study integrates the expertise of HE operating personnel with researchers previously involved in developing bioremediation technologies in order to develop and test a pilot scale treatment facility. This permits leveraging past developments funded by DOE/DoD to solve a major problem resulting from large areas at LANL contaminated by HE.

Table 7-1  
RDDT&E Development Area  
Groundwater & Soils Cleanup Investment Areas

VOCs in Non-Arid Soils (Technology Activity Description [TAD] no. GS1)

*Modeling of Bioremediation Experiments at SRS ID (TTP no. AL121102)* We will apply our TRAMP model, which is the only validated model available which couples a realistic biological activity package to a fully 3-D multiphase flow and transport model, (1) to aid in design of bioremediation experiments, (2) to determine the sensitivity of the bioprocesses to various factors involved, and (3) to analyze the results of bioremediation experiments at the Savannah River Site.

*Integrated Groundwater and Cost Analysis Modeling at SRS ID (TTP no. AL121101)*. This work will extend the applicability of cost-effectiveness analyses currently underway as part of the Savannah River ID by incorporating groundwater modeling into the process, with concentration on relative costs and effectiveness of alternate remediation methods.

*Microwave Fluidized Bed Treatment of Off-Gas Effluents (TTP no. ALWW21A1)*. This task seeks to evaluate and demonstrate staged, microwave fluidized bed, flameless air oxidation technology for total detoxification of halohydrocarbons in off-gas effluent streams.

VOCs in Arid Soils (TAD no. GS2)

*Unsaturated Zone Transport of Contaminants (TTP no. AL1111AB)*. This task seeks to develop one, two, and three-dimensional models for predicting the movement of contaminants in the unsaturated zone. As such it also has relevance to Los Alamos since this site is situated on unsaturated tuff.

Mixed Waste Landfill (TAD no. GS3)

*Demonstration of Bioengineering Capping Technology (TTP no. AL121211)*. Elimination of the infiltration of water into closed sites by a combination of engineered barriers and use of local plants to increase evapotranspiration is an attractive and acceptable method that is undergoing further testing. This also has relevance to Los Alamos where the water table is deep and annual rainfall is low.

Plutonium in Soils (TAD no. GS4)

*Magnetic Separation CRADA (TTP no. AL124012)*. Development of magnetic separation of metal contaminants by use of their paramagnetic properties is being done together with an industrial partner, AWC Lockheed. If successful, this will also have relevance to any metals contamination at Los Alamos.

*LANL Sampling Support to Plutonium in Soils ID (TTP no. AL121108)*. The purpose of this task is to supply actual soil from Los Alamos that is contaminated with uranium from firing sites. This material will be tested using the gravimetric and magnetic separation methods utilized in the Nevada program. As such, the information will also be useful to Los Alamos environmental cleanup efforts.

Uranium in Soils (TAD no. GS5)

*Selective Extraction/Leaching (TTP no. AL121212)*. The objectives of this task are to (1) develop extraction technologies based upon chelators which are optimized for remediation of actinide-contaminated soils, with emphasis on uranium, and (2) to obtain performance and cost data for comparison to conventional soil washing methods. Such technology may also have benefit to the cleanup of uranium at firing sites at Los Alamos.

*Characterization of Site Geochemistry (TTP no. AL121222)*. The specific objective of this effort is to characterize the speciation (oxidation state, chemical structure, mode of binding) of uranium and uranium/organic mixtures in soils from the DOE facility at Fernald, Ohio.

Characterization, Monitoring, and Sensor Technology (TAD no. GS6)

*Noninvasive Site Characterization (TTP no. CHX11XX)*. Los Alamos will provide input to the Characterization, Monitoring, and Sensor Technology Development ID in the area of noninvasive methods to provide preliminary site characterization, thereby leading to optimal location and number of borehole penetrations.

In-Situ Remediation Technology Development (TAD no. GS9)

*In Situ Remediation Integrated Program: LANL Technical Support (TTP no. AL111102)*. The purpose of the In Situ Remediation Technology IP is to foster the development of advanced soil and groundwater cleanup methods. This task supports the activities of Los Alamos as a member of the Core Planning Group.

Other Technologies (TAD no. GS10)

*Los Alamos Barriers and Post-Closure Monitoring Program (TTP no. AL1212P6)*. The goal of this task is to establish test bed(s) at Los Alamos for demonstrating the effectiveness of near-surface barriers to control water runoff, isolation barriers, treatment of isolated near-surface contamination, engineering assessments of technology applicability, and assessment of defense-program instrumentation for post-closure monitoring. Since these tests and evaluation will be performed at Los Alamos, of necessity they will also be tied to environmental restoration needs at Los Alamos.

Table 7-2  
RDDT&E Development Area  
Waste Retrieval & Processing Investment Area

Buried Waste (TAD no. WR1)

*Supercritical Water Oxidation TSR (TTP no. AL121208).* Supercritical water oxidation can potentially be applied to priority wastes throughout the DOE as an alternative to incineration. Los Alamos was a pioneer in developing an understanding of the chemical processes involved and is continuing to aid in its testing and implementation, particularly as it applies to buried waste.

*Improved TRU Waste Assay Instrumentation (TTP no. AL121209).* The design, construction, and demonstration of a Combined Thermal/Epithermal Neutron (CTEN) interrogation device will allow improved TRU waste accuracy, thereby allowing waste facility operators to better comply with shipping and disposal regulations. This includes Los Alamos.

*Real-time Monitoring During Retrieval TSR (TTP no. AL121210).* A technology status report delineating the status of retrieval support and contamination control technology is being developed.

Underground Storage Tanks (TAD no. WR2)

*Magnetic Separation for Actinide Segregation (TTP no. AL124102).* The primary objective of this task is to predict and/or demonstrate the concentration of actinides, lanthanides, and certain other fission products from UST wastes.

*Supercritical Water Oxidation R&D (TTP no. AL111201).* Supercritical water oxidation can potentially be applied to priority wastes throughout the DOE as an alternative to incineration. Los Alamos was a pioneer in developing an understanding of the chemical processes involved and is continuing to aid in its testing and implementation to resolve problems with organics in the underground storage tanks at Hanford.

Efficient Separations (TAD no. WR4)

*Sequestering Agents/Removal of Transuranics from Radioactive Waste (TTP no. AL121217).* We will develop a series of polymer-supported, ion-specific extraction systems for removing actinides and other hazardous metal ions from wastewater streams, with initial focus of plutonium and americium at the waste treatment facility at Los Alamos and Buildings 774 and 374 at Rocky Flats.

Hazardous & Mixed Waste Destruction (TAD no. WR5)

*Los Alamos Waste Treatment Program (TTP no. AL1212P4).* The objective is to demonstrate various waste treatment technologies on waste streams (used as test beds) at Los Alamos to establish a performance baseline for application throughout the DOE. As such this activity will contribute to resolution of Los Alamos waste management issues.

*Cost Savings Support to MWIP (TTP no. AL121219).* This project seeks to develop a methodology with which to measure cost savings of research, development, demonstration, test, and evaluation efforts, specifically, in this case, for mixed-waste treatment methods.

*Mixed Waste Integrated Program Support (TTP no. AL121202).* This activity is for Los Alamos involvement in the core planning for the Mixed Waste Treatment ID.

Rocky Flats FFCA Compliance (TAD no. WR6)

*Analytical Chemistry for RF FFCA (TTP no. AL121214).* This activity addresses the problem of real-time measurement of radionuclides and hazardous metals that may be present in the off-gas from a mixed-waste incinerator. Inductively-couple plasma mass spectrometry will be used for the measurement of hazardous metals possibly present in gas streams. A low-level, on-line, alarming detector will be developed for measurement of radionuclides.

*Biodegradation of Contaminated Oils at RFP (TTP no. AL121213).* The objectives of this task are (1) to optimize biodegradation as a cost-effective technology for destruction of organics in wastes that cannot be easily incinerated (*i.e.*, paraffinic cutting oils), (2) to obtain performance and cost data for comparison with other technologies, and (3) to obtain kinetic data to allow design, construction, and optimization of a pilot-scale bioreactor.

*Nitric Acid Recycle/Nitrate Destruction (TTP no. AL121212).* The purpose of this effort is to develop a system to reduce the quantity of waste resulting from the neutralization of nitric acid waste streams.

*Development and Testing of Two-Stage Packed-Bed Silent Discharge Plasma Prototype (TTP no. AL121215).* Under this task, Los Alamos will construct and test a two-stage prototype apparatus for the treatment of combustible organic wastes at the Rocky Flats Plant. The prototype will consist of a first-stage thermal treatment unit (*i.e.*, high-temperature packed-bed reactor) and a second-stage silent-discharge-plasma reactor.

Other Technologies (TAD no. WR7)

*Development of Gas Cylinder Disposal Plant (TTP no. AL1112XA).* Development of a transportable sampling, analysis, and cylinder recontainerization device is to be developed for use at Los Alamos and various other DOE sites to increase handling safety, reduce indirect disposal costs, and avoid potential liabilities.

*Supercritical Water Oxidation Technical Support (TTP no. AL111201/4048D); Supercritical Water Oxidation (MODEC) (TTP no. AL121123).* Supercritical water oxidation can potentially be applied to priority wastes throughout the DOE as an alternative to incineration. Los Alamos was a pioneer in developing an understanding of the chemical processes involved and is continuing to aid in its testing and implementation.

Table 7-3  
RDDT&E Development Area  
**Waste Minimization & Avoidance Investment Area**

Waste minimization activities supported by DOE/EM/OTD were severely curtailed in FY92 as a result of the need to do the appropriate planning. Activities in this area will presumably be resumed in FY93. The directions currently are unknown.

Table 7-4  
Infrastructure Development Area  
**Infrastructure Initiatives Investment Area**

**Analytical Laboratory Management (TAD no. AL)**

*Analytical Laboratory Management: Methods Compendium Development (TTP no. AL123103).* This project will develop a Methods Compendium which describes validated analytical chemistry methods for environmental restoration and waste management operations used across the DOE, including Los Alamos.

*Analytical Laboratory Management: Research and Special Studies. A. Field Screening (TTP no. AL113101).* This program focuses on assessing and implementing current field screening technologies and establishing the type and level of analytical support for waste operations or site remediation. As such, it has relevance both to Los Alamos and to the DOE Complex.

*Analytical Laboratory Management: Research and Special Studies. A. Blind Compliance (TTP no. AL123102).* The objective of this program is to establish the appropriate type and level of analytical support required for waste operations or site remediation.

*Analytical Laboratory Management: Adaptation of SW-846 Methods to Mixed Waste Analysis (TTP no. AL123101).* This task addresses the need for sample preparation and determinative methods for analysis of hazardous constituents in radioactive samples that are acceptable to regulatory agencies. This task will be carried out to assure adherence to the DOE ALARA principle.

**Decision Support (TAD no. DS)**

*Cost Savings Analysis: Support to Integrated Demonstrations (TTP no. AL101202).* This project seeks to develop a methodology with which to measure cost savings of research, development, demonstration, test, and evaluation efforts, specifically, in this case, to support all Integrated Demonstrations on OTD.

*Decision Support: Cost Effectiveness Technical Support Group (TTP no. AL121102).* The objective of the Technical Support Group is to achieve consensus on the tools and data to be used for cost-effectiveness analysis for DOE/OTD.

**Robotics (TAD no. RO)**

*Robotics/Laboratory Automation (TTP no. AL113204).* Los Alamos activities include (1) forming the Standard Analysis Method concept to provide standard analytical hardware and software platforms for environmental samples and (2) developing advanced sensor technology related to analytical laboratory automation. As such this technology development effort potentially will reduce the costs associated with the Los Alamos site characterization effort.

*Robotics/Waste Minimization (TTP no. AL13203).* Los Alamos' efforts are directed technical consultation related to analytical plutonium laboratory automation, robot hardware testing and proof of concept prototyping for direct oxide reduction automation, and development of dust control and powder handling technologies.

Table 7-5  
Technology Integration and Education Development Area  
**Technology Integration Investment Area**

International Technology Exchange (TAD no. IT)

*Australia/Kuwait: Cleanup of Heavy Metals (TTP no. AL 123301).* The purpose of this project is to assess the technology needs necessary for cleanup of uranium in Kuwait (due to the Gulf War) and plutonium and uranium in Australia (due to British Atomic Weapons Trials and uranium mining and milling), and also at various Department of Defense Sites. This information is useful to Los Alamos since both uranium and plutonium exist in the environment at Los Alamos.

*LLW/Mixed-Waste Landfill Cover: Stabilization and Liner Design (TTP no. AL123302).* The objective of this task is to demonstrate pilot-scale landfill cover, *in situ* stabilization/isolation, and liner systems capable of confinement of radioactive and hazardous materials buried in landfills.

Technology Integration (TAD no. TI)

*Workshop for Technology Integration (TTP no. AL114101).* One or more focused workshops will be conducted that will (1) provide a forum for DOE Complex remediation or waste management needs to be identified and (2) for private sector organizations to respond with existing technologies or ideas for technologies that can be collaboratively developed.

**Environmental Education Investment Area**

Environmental Education and Development (TAD no. ED)

*Students Watching Over Our Planet Earth (SWOOPE) (TTP no. AL114201).* The SWOOPE is an environmental science education program for teachers and students, K-12. The main objectives are not only to inspire students to continue with their science education but to train teachers in both the scientific area and in the use of hands-on science in the classroom, to help bring science into the student's own personal setting, and to raise the general level of scientific literacy in the family and community.

**(b) Oscillating Pressure Effects on Organic Vapor Plume Dispersion.** This study will evaluate the potential for improved extractions of vapors from soil in the vicinity of a LANL waste disposal site. The evaluation of oscillating flow procedures is an extension of previous studies of *in-situ* vapor extraction technologies.

**(c) High-Resolution Seismic System.** Existing instruments have limited sensitivity at depth, especially in Bandelier Tuff which is generally found in Los Alamos. Development of this system will be facilitated by use of existing LANL instrumentation, and if successful, would reduce costs of characterization and reduce health/safety risks to workers in this field.

**(d) Soil Monitoring with Long-Range Alpha Detector.** Development of instrumentation to measure the secondary ionization energy produced by alpha radiation is an extension of previous work in the safeguards and occupational health areas. It is a high LANL priority interest because of difficulties of monitoring alpha radiation which is found in many LANL contaminated areas. Use of such instrumentation would reduce health hazards to field workers and facilitate waste segregation.

**(e) Flow Transport In Bandelier Tuff.** Capping and long-term monitoring associated with remediation actions requires a better flow transport model for the unsaturated fractured tuff which is found in Los Alamos. Model validation provided by this study will permit less extensive remediation. This study is facilitated by previous LANL studies for the Yucca Mountain Project.

**(f) On-Site Environmental Sample Determinations Using Inductively Coupled Plasma Mass Spectrometry (ICP/MS).** This effort will provide fieldable ICP/MS. This procedure could significantly reduce costs associated with field sampling and analysis by reducing sample preparation time and minimizing sample shipping and handling requirements. It would also facilitate near real-time decisions by field personnel. The ICP/MS, with laser ablation sample introduction, has been proven in the laboratory for direct soil analysis for metals. Current efforts focus on constructing a fieldable unit that is capable of providing rapid, on-site screening data. Screening data can be used to minimize the total number of samples collected and to direct future sampling efforts.

**(g) Optical Fiber Flow Optrode Spectrophotometry for Screening and Quantitative Analysis of Organics, Explosives, and Metals.** The objective of this effort is to provide a real-time, dependable, down-hole monitoring device for organic vapor detection. Previous work has proved the unit in a laboratory setting, and work is currently underway to provide a fieldable test unit. This unit will be used to detect migration of volatile organic contaminants from material disposal areas that have been stabilized in place.

**(h) EPA Certification of Neutron Activation Analysis and Delayed Neutron Counting (NAA/DNC) Analytical Procedures.** This analytical technique is cost-effective for analysis of many metals of interest to the LANL ER program. However, it is necessary to obtain formal EPA certification of these procedures to satisfy regulatory requirements. This has been a three year effort to obtain EPA certification and is expected to be completed this year.

## 7.6. Funding Information

Table 7-6 outlines funding for programs funded by OTD. Table 7-7 outlines funding for development and application projects funded by the LANL ER Program. Detailed projections cannot be made at this time because of funding uncertainties.

**TABLE 7-6**  
**TECHNOLOGY DEVELOPMENT PROGRAM**  
**(\$ IN MILLIONS)**

PROPOSED FUNDING LEVELS	FY 1992	FY 1993
Technology Development		
Operating		
Capital Equipment		
General Plant Project		
Line Item		
TOTAL TD PROGRAM *		

**\*NOTE:** Based on programmatic guidance, TD funding level reflects growth for the out-years. The level of growth and what Technical Task Plans (TTPs) will be funded cannot be defined at this time. TTPs are selected by an integrated demonstration or integrated program process. Funded TTPs are TTPs that meet programmatic requirements in a specific technology development program area.

## 7.7. TD/TM Responsibilities and Coordination

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**TABLE 7-7**  
**FUNDING SUMMARY OF LANL ER DEVELOPMENT AND APPLICATION STUDIES**  
**(dollars in thousands)**

Short Title	FY 1992	FY 1993
Bioremediation of High Explosive Soil		
Oscillating Pressure Effects on Plume Dispersion		
High Resolution Seismic System		
Soil Monitoring with a Detector		
Flow Transport in Bandelier Tuff		
Environmental Sample Determination ICP/MS		
Optical Fiber Flow Optrode Spectrometry		
EPA Certification of NAA/DNC		
TOTAL		

\*FY93 funding highly uncertain; therefore, no projections can be made.

## **8.0. COMPLIANCE WITH NEPA**

The actions proposed to be undertaken for FYP to achieve compliance with the NEPA are not obvious now. The DOE has initiated the preparation of a Programmatic Environmental Impact Statement (PEIS) on this FYP and on the Modernization Study. The nature, contents, and timing of any PEIS will have a significant effect on the NEPA documentation that would be tiered from this programmatic document.

**NEPA Program at the Laboratory.** The NEPA program is managed by the Environmental Assessments and Resource Evaluations Section of EM-8. DOE changed its procedures for fulfilling its NEPA responsibilities significantly in February, 1990, with the issuance of Secretary of Energy Notice (SEN)-15-90. DOE-AL guidance calls for the preparation of a DEC as the initial document for determining the appropriate level of NEPA determination - categorical exclusion, EA, or EIS.

The staff responsible for NEPA compliance reviews new projects for potential environmental impact and prepares DEC's on all projects or major activities at the Laboratory. The projects which are prepared generally include:

- New actions or modifications to existing activities with the potential for significant environmental impact involving processes; and
- Actions with a potential for negative public reaction.

**Project Identification and Review.** The initial step in reviewing new projects or programs for appropriate environmental documentation is clearly identifying those new projects. Historically, the NEPA staff has relied on the following sources of information:

- Lists of all LIs and GPPs from ENG;
- Lists of all projects, such as construction projects, office furniture installation, building modifications and installation of transportables, entered into the formal job number system; and
- Lists of all projects for which a siting determination had been made by ENG. Because these projects involve groundbreaking, the review is undertaken as early in the project as possible to identify potential impacts on critical habitats or cultural resources. The NEPA staff reviews these projects when they become sufficiently defined to evaluate overall environmental impacts.

In June 1987, HSE Division (separated into EM and HS Divisions in August 1991) integrated the process of project identification and review into the ES&H Preliminary Project Review Process. Proposed new projects or modifications are identified using jobs numbers, LIs, GPP funding, groundbreaking, etc., and any other means identified by EM field personnel. A questionnaire is sent to the responsible operating entity, with follow-ups by both the HS contact system and the Engineering Construction Project Management Group. The questionnaire is returned to HS and reviewed by a

team of EM, HS, and ENG personnel to identify ES&H requirements for the project. The questionnaire addresses more than NEPA: industrial safety, industrial hygiene, radiation protection, criticality safety, fire protection, etc. A checklist identifying the potential compliance issues is returned to the project personnel and EM/HS/ENG staff for appropriate action. In the case of NEPA, the EM staff prepares the document.

In addition, AR 9-2 NEPA Documentation of the Environment, Safety, and Health Manual, published in March 1991, states that it is line management's responsibility to initiate a Questionnaire for all actions that have the potential to affect the environment.

**The Laboratory Review Procedures.** All NEPA documents are reviewed internally within the Laboratory for technical accuracy. A final review of all EAs for completeness and consistency with Laboratory mission and policies is made by Laboratory Environmental Review Committee (LERC). This committee includes representatives from several divisions at the Laboratory, including Facilities Engineering, Legal, and Finance. LERC reports to the Associate Director for Operations, to whom the Laboratory Director has delegated responsibility for environmental documentation. After review and approval, the environmental document is transmitted by the Associate Director for Operations to the Manager of the Los Alamos Area Office.

**DOE Review Procedures.** NEPA documents are prepared for DOE. DOE-LAO forwards documents to the Environment and Health Division of DOE-AL. DOE-AL has been delegated authority to approve some categorical exclusions, subject to DOE-HQ (EH-25, Office of NEPA Oversight) concurrence.

All other DEC's are submitted to the relevant assistant Secretarial Offices (e.g., Defense Programs) for review and initial approval of all categorical exclusions. DOE-HQ EH-25 must concur in the determination both of the appropriate level of NEPA documentation and in the acceptability of the final document. If DOE-HQ EH determines that a given NEPA document is inadequate, the Secretary of Energy will be informed of this finding of deficiency.

If an EA is deemed appropriate, the information is communicated to the contractor for action. If an EIS is deemed appropriate, current DOE policies indicate that DOE-AL will prepare the document. Only DOE-HQ has the authority to approve an EA or an EIS.

Compliance with NEPA is a requirement for all federal agencies. The Laboratory, as a contractor, provides review of projects and prepares some levels of documentation. The final internal approval of any NEPA document is a DOE decision.

### **8.1. Corrective Activities Compliance with NEPA**

**NEPA Documents.** The general approach to NEPA compliance as described above has been followed for all projects that are proposed in the CAs FYP. The SWCS, an FY88 LI Project, has already been covered by an action description memorandum (ADM). The level of documentation for any particular project will be determined by DOE.

## **8.2. Environmental Restoration Compliance with NEPA**

The DOE has initiated a PEIS for the FYP, which includes the ER Program. A DEC was submitted in October 1990 for the proposed RCRA/MWSDF. DOE/HQ has decided that an EA is necessary to determine the need for an EIS on the MWSDF. The DEC included the potential impacts of the facility as well as the RAs giving rise to the waste. The NEPA document would bracket the range of reasonable RAs and their potential impacts, including cumulative impacts. RAs would include cleanup of most sites with the MWSDF receiving the wastes and *in situ* stabilization coupled with appropriate long-term monitoring for some sites. The NEPA process would not specify a RA decision for each potential release site. The appropriate regulating agency would select the remedial alternative on a site-by-site basis over the next decade during the corrective action selection process. DOE will make the final decision on the level of environmental documentation for ER.

An Action Description Memorandum (ADM), "Decommissioning of the Enriched Uranium Processing Facility, TA-21, Buildings 3 and 4 South" was submitted to the DOE in 1986 and received DOE approval on April 6, 1987. In 1991, DOE/HQ reviewed the existing ADM and determined that the current TA-21 project is covered by the existing NEPA documentation. Assessment activities under the D & D Program have been granted categorical exclusions.

## **8.3. Waste Management Compliance with NEPA**

The general approach to NEPA compliance as described above will be followed for all new projects that are proposed in the Waste Management FYP. Ongoing waste management operations were addressed in the Laboratory site-wide EIS. DOE has proposed a PEIS for the entire FYP. Any determination of a future EIS on the Laboratory waste management operations will be made by DOE.

DECs have been submitted on approximately 32 proposed waste management activities in CY91.

## **9.0. REPORTING AND DATA MANAGEMENT**

**Project Tracking System.** The Project Tracking System (PTS) was developed in response to the increasing need in DOE's Office of ER and WM for a system to track program progress and accomplishments. DOE has needed to improve the internal and external communication of program accomplishments and provide a consistent set of indicators for measuring program progress. The PTS is EM Headquarter's (HQ) response to internal project management needs and external project accomplishment reporting, and augments and complements existing DOE systems. The development and implementation of the PTS is jointly sponsored by Waste Operations (EM-30), ER (EM-40), and Technology Development (EM-50).

The primary use of the system is by HQ program managers tracking the status of their projects and programs. Monthly reports will be generated on the status of EM activities. The system will make it possible for HQ's program managers to fulfill several program/project management functions.

**Project Control System Policy and Application.** DOE policy for applying project control systems (PCS) to overall management of projects was established in early FY 1992. This includes Major System Acquisitions (MSAs), Major Projects (MPs), other line items, operating funded projects, General Plant Projects (GPPs), and contracts within those projects.

DOE previously encouraged the use of Cost and Schedule Control Systems Criteria (CSCSC) for use on MPs, and required its use on MSAs only. Consequently, DOE had no existing policy or formal system for application of a comprehensive and formalized Project Controls System.

### **9.1. Corrective Activities Reporting and Data Management**

**Reports.** Required reports include: the NPDES monitoring reports submitted to EPA monthly; the annual PCB report prepared by July 1 every year and kept on file at the Laboratory; the semiannual PCB reports prepared for EPA and NMED every January and July; the spill reports as required to EPA and NMED; the safe drinking water reports submitted to NMED monthly and annually; the 30-day advance notice reports regarding the removal of a UST to NMED, and the various hazardous WM reports that may be required for generator, storage, treatment, and disposal facilities. DOE orders, especially DOE Order 4700.1A, also direct reporting requirements.

**Maintenance of Records.** EM-8 does all environmental compliance record keeping for the Laboratory. All environmental sampling is conducted in accordance with the Quality Control/Quality Assurance Manual for Sampling prepared for EM-8. Any specific sampling requirements in permits or licenses are followed explicitly and are under the managerial control of personnel in EM-8.

### **9.2. Environmental Restoration Reporting and Data Management**

Reporting and data management requirements for the Laboratory ER Program will be driven primarily by requirements of DOE and the Laboratory's RCRA permit, which was issued by EPA during the beginning of 1990. The reporting

requirements include a monthly management report, including a year-end status report, as presented in Attachment 3. Additional reporting and data management requirements will be established in the IWP and implemented on a task-specific basis as required by the Laboratory's RCRA operating permit.

The D & D Program must submit a variety of reports on the project, including weekly highlights to the DOE/AL D & D Program Manager, a monthly program control system report to the ER Project Office, semiannual reviews to DOE/HQ and final close out reports on all D & D activities.

### **9.3. Waste Management Reporting and Data Management**

**Reports.** Reports required are the following: biennial EPA/NMED Hazardous Waste Generation and Management Report; monthly activity report to DOE-LAAO; annual report of radionuclides discharged in liquid effluents; monthly progress report for the Defense Operations Program; annual reports on Laboratory LLW and TRU operations; and ad hoc data requests from sources such as DOE-AL, the State of New Mexico, WIPP, other DOE facilities, and Congressional personnel.

**Maintenance Records.** The Laboratory maintains ongoing records for tracking RCRA and TSCA; nonregulated chemical wastes and mixed wastes; training records; various records to satisfy DOE Orders 5480.2A, 5400.5, and 5484.1 and to satisfy EPA regulations; radioactive Solid Waste Disposal Forms; and Certified Waste Storage Records for TRU waste.

In order for the WM group to comply with DOE's management policy of accountability for project controls, a formal and comprehensive Cost and Schedule Control System is being developed for use on all WM projects. The new Cost and Schedule Control System is being designed and implemented in FY92, and will be operational for WM FY93 projects.

## **10.0. QUALITY ASSURANCE**

### **10.1. Corrective Activities Quality Assurance**

Comprehensive QA programs are in place at the Laboratory for all environmental sampling and analytical procedures regardless of environmental media. Most of these QA programs are described in detail in various references, including: "Quality Assurance/Quality Control Manual For Sampling," LANL, 1986; "Quality Assurance Plan for the Radiological Air Sampling Network," LANL, in the Environmental Surveillance Group Quality Assurance Project Plans, LANL, 1987; "Quality Assurance Plan for Water Soil, Sediments, and Water Supply Sampling at LANL," in the Environmental Surveillance Group Quality Assurance Project Plans, LANL, 1987; and "Quality Assurance for Health and Environmental Chemistry: 1988," LANL 1989; to name a few. The annual Environmental Surveillance Report contains detailed references to all QA programs in place at the Laboratory. These annual reports are available to the public and may be obtained from LANL, EM-8), Mail Stop K490, Los Alamos, New Mexico, 87545.

### **10.2. Environmental Restoration Quality Assurance**

The ER Program QA program for the Laboratory is based upon both DOE (ANSI/ASME NQA-1, Quality Assurance Program Requirements for Nuclear Facilities) and EPA (QAMS/004, Interim Guidelines and Specifications for Preparation of Quality Assurance Program Plans, and QAMS/005, Interim Guidelines and Specifications for Preparation of Quality Assurance Project Plans). DOE-AL ER Program requirements (see DOE-AL Section 8) must be integrated into the Laboratory ER Program. DOE-AL QA activities will include document reviews, field audits, paper trail and traceability reviews, and regulatory compliance reviews by external parties. Internal QA for the Laboratory ER Program will be done through the following mechanisms.

- The Laboratory will prepare, including annual updates, an IWP containing the Quality Program Plan (QPP) and the generic Quality Assurance Project Plan (QAPjP) for RCRA Facility Field Investigations, which states QA requirements applicable to the LANL ER Program. The IWP also contains the Program Management Plan (PMP), Technical Data Management Program; Health and Safety (H&S) Program; and Community Relations Program. The IWP will be reviewed by appropriate parties, including DOE, EPA, and NMED.
- Each task-specific work plan prepared for ER Program activities contains a program management plan, QA project plan, field sampling plan, technical data management plan, health and safety plan, and community relations plan as appropriate. The task-specific work plans will be reviewed by appropriate parties before initiating field site-characterization activities.
- The Laboratory will maintain sample archives as necessary. Sample collection handling procedures and sample holding times will be specified in the IWP and task-specific work plans.

The D&D projects follow the QA procedures established by DOE Order 5700.6C in all aspects of the operation. Those procedures utilize a graded approach which provides a quality classification and maximizes the reliance upon inherent and obtained skills and the knowledge of process acquired by the project personnel through training and experience. Quality assurance plans are developed and followed for each D & D project.

### **10.3. Waste Management Quality Assurance**

The scope of EM-7 activities affecting quality that are controlled by DOE Orders include; siting, designing, contracting, treating, disposing, purchasing, fabricating, handling, shipping, receiving, storing, cleaning, erecting, installing, inspecting, testing, operating, maintaining, repairing, modifying, and decommissioning.

A Quality Assurance Implementation Plan has been developed to address the results of past audits and recent self assessments that indicate a need for a comprehensive Quality Assurance Program for EM-7. Successful implementation of this EM Division Quality Assurance Program will ensure that EM-7 and the Laboratory adequately and effectively comply with appropriate environmental regulations and DOE Orders.

The three major documents defining QA Program requirements are: ASME NQA-1, EPA QAMS 005/80, and DOE Order 5400.1. The documented management controls comprising the EM-7 QA Program consists of the EM-7 QA Manual, Waste Management Procedures (WMP), Quality Program/Project Plans, Standard Operating Procedures, and various detailed implementing instructions and procedures. The EM-7 Quality Assurance Manual and Waste Management Procedures have been developed, approved, and issued. Both the revised EM-7 QA Manual and the revised WMP manual were issued with an effective date of May 1, 1992.

To ensure that the documented QA Program is understood by all participants, personnel training will be initiated following the approval of the QA Program documents. In addition, training programs will be developed so that all personnel are qualified to perform their specific job duties.

Developed using the basic requirements of ANSI/ASME NQA-1, the WM Quality Assurance Program Plan (QAPP) defines the responsibilities, authorities, and requirements for the five sections in WM currently covered by the QA program.

The TRU Waste Certification QA Plan was developed specifically to meet the requirements of WIPP/DOE-120, "QA Requirements for Certification of TRU Waste for Shipment to the Waste Isolation Pilot Plant." WIPP/DOE-120 is modeled after ANSI/ASME NQA-1-1986.

The TRU Waste Certification QA plan is described fully in Section 3.0 of the Los Alamos TRU Waste Certification Plan (WCP-HSE7-CP-01) and applies only to the Los Alamos TRU Waste Certification Program.

Reference to the requested quality-related procedures may be defined in the waste generator's attachment to the Certification Plan, the generator's QAPP, or operating procedures, or may be quoted directly from Section 3.0 of the Certification Plan.

## **11.0. FEDERAL, STATE, AND LOCAL INTERACTIONS**

The Laboratory's Public Affairs Office has established a program to interact with the public on issues relating to ES&H. Although the full extent of the program is not defined, its general purpose is to disseminate information on various ES&H issues, to address the concerns of the public, and to answer questions. Public and private meetings in the surrounding communities have been conducted, with participation from DOE-LAAO, and tours of LANL facilities have been given. Public input meetings on the ER/WM SSP will be conducted by DOE.

The Laboratory has initiated a program that highlights ES&H related activity and keeps NMED and the EPA informed of its activities which are under regulatory authority by providing documents and attending frequent meetings.

### **11.1. Corrective Activities Federal, State, and Local Interactions**

Regarding Corrective Activities, only one agreement is now in place. The FFCA negotiated between EPA and DOE lists a schedule of compliance for ensuring compliance with the Laboratory's NPDES Permit. This agreement was adopted pursuant to the requirements of Executive Order 12088. The Laboratory will continue to interact with EPA, NMED, the public, and other agencies to assure that Corrective Activities are implemented with full confidence in meeting applicable regulations and fulfilling public participation requirements.

The EPA regulates radioactive air emissions from DOE facilities under the Clean Air Act. On November 27, 1991, DOE received a Notice of Noncompliance from EPA because the Laboratory cannot demonstrate compliance with all of EPA radioactive air emissions monitoring requirements. A draft FFCA to address bringing the the emissions monitoring program into compliance with the regulations was submitted by DOE to the EPA on March 12, 1992.

### **11.2. Environmental Restoration Federal, State, and Local Interactions**

The Laboratory's federal, state, and local interactions are based on CERCLA/SARA requirements or HSWA Corrective Action and Closure requirements of the Laboratory's RCRA permit. The regulatory interfaces for the ER Program were established with the EPA and NMED when the Laboratory's RCRA permit was issued. Regulatory interfaces were established for SWMU closure activities with NMED during interim status under RCRA. The Laboratory and DOE-LAAO are in the process of establishing CERCLA/SARA requirements for the ER Program. The Laboratory and DOE-LAAO will ensure compliance with CERCLA while implementing RCRA permit requirements.

The Laboratory's ER Program Community Relations Program, which is also driven by the Laboratory's RCRA operating permit, will include:

- establishing and maintaining an active mailing list of interested parties;
- holding informal meetings, including briefings and workshops as appropriate, with the interested federal, state and local public officials and tribal officials before and during RFI and CMS activities;

- disseminating news releases, fact sheets, and publicly available quarterly progress reports that explain the progress and conclusions of RFI and CMS activities;
- providing updates of materials in the information repository and public reading rooms; and
- providing public tours and briefings to inform, to listen informally to public concerns, and to answer individual questions.

The ER Program Community Relations Program will participate in meetings for public review of the D & D Program, the FYP, and the SSP.

The D & D Program interacts primarily with officials of the DOE and follows the requirements of all applicable DOE orders.

### **11.3. Waste Management Federal, State, and Local Interactions**

The Laboratory works with the EPA and the NMED to assure compliance with the following laws and regulations; RCRA and HSWA (Subtitled C and I) and the New Mexico Hazardous Waste Act (HWA) and accompanying hazardous waste and UST regulations. This interaction is initiated by EM-7 within the EM Division. Official contact is made through DOE-LAAO.

DOE and EPA are currently negotiating a FFCA relating to the storage of certain hazardous and mixed wastes subject to the land disposal regulations of RCRA. The Laboratory is unable to comply because of the lack of adequate or available treatment capacity; a National Capacity Variance expired in May, 1992.

### **11.4. Technology Development Federal, State, and Local Interactions**

Los Alamos has been in existence since the early 1940s and has tried or developed many of the technologies for the DOE Complex. Therefore, it has a representative set of the majority of DOE's environmental issues, which are, at the same time, not major concerns. As a consequence, these areas can be used as test beds for environmental problem solving. The following two programs are built upon this concept:

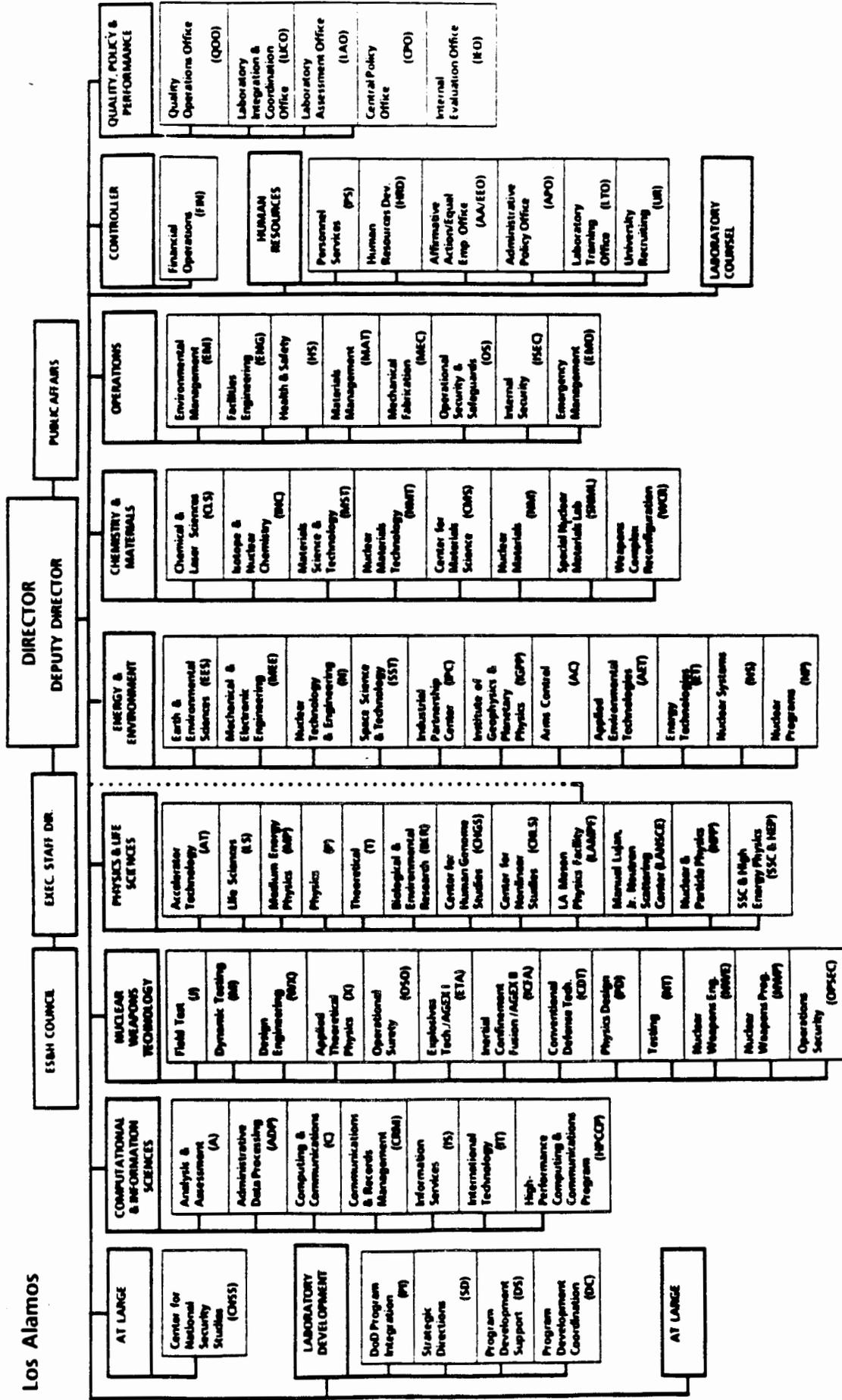
*Los Alamos' Waste Treatment Program (TTP no. AL1212P4).* The objective is to demonstrate various waste treatment technologies on waste streams (used as test beds) at Los Alamos to establish a performance baseline for application throughout the DOE.

*Los Alamos Program on Barriers and Post-Closure Monitoring (TTP no. AL1212P6).* The goal of this task is to establish test bed(s) at Los Alamos for demonstrating the effectiveness of near-surface barriers to control water runoff, isolation barriers, treatment of isolated near-surface contamination, engineering assessments of technology applicability, and assessment of defense-program instrumentation for post-closure monitoring.

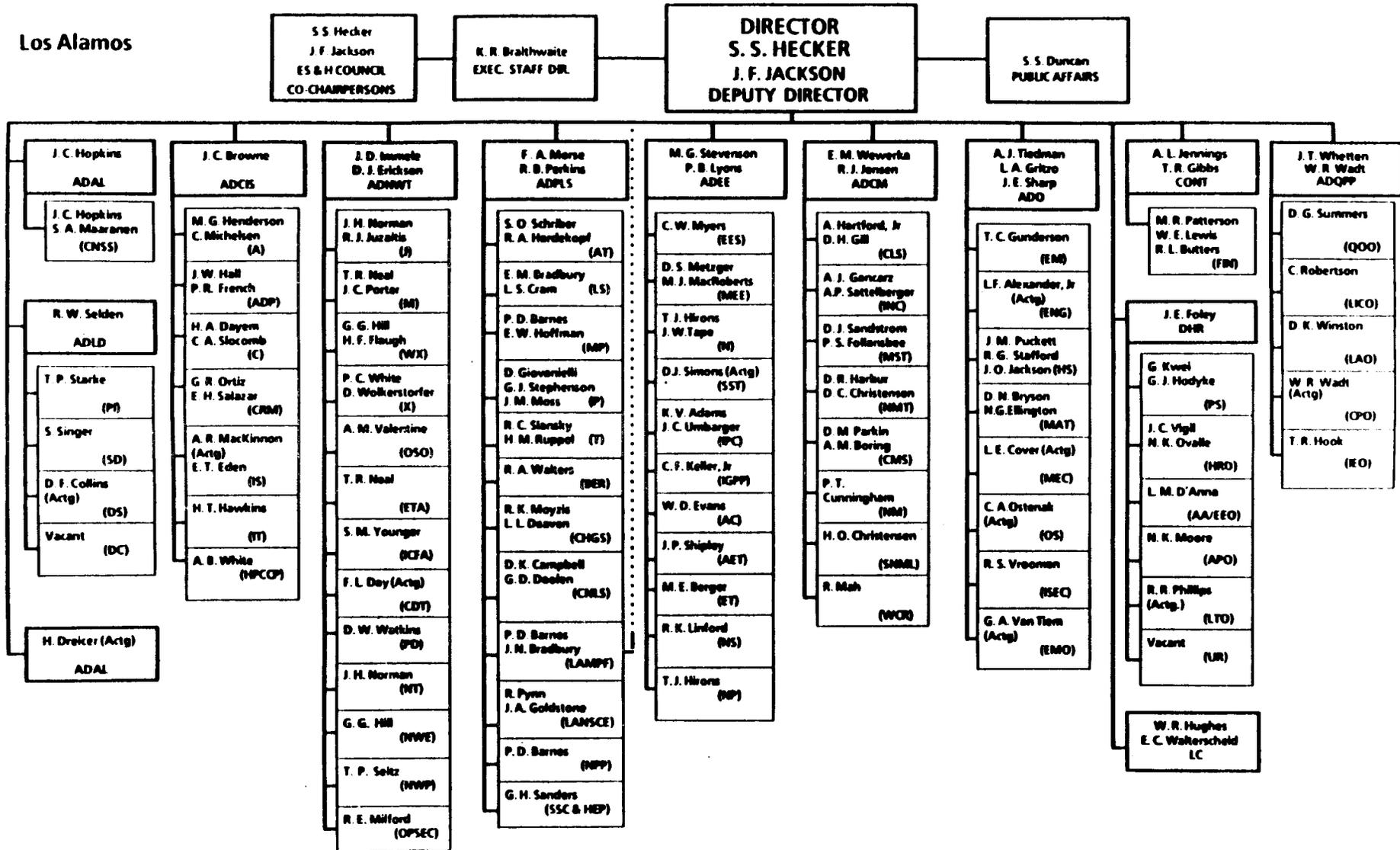
Interaction with the State of New Mexico and the Regional Office of the Environmental Protection Agency has begun. This interaction is undertaken

through the Environmental Protection Group (EM-8) and with the concurrence of the Environmental Restoration Group (EM-13) to permit portions of the technology testing program to be implemented at Los Alamos testbeds.

Los Alamos



Los Alamos



Attachment 1. (continued)

**Attachment 2. Environmental Permits under which the Laboratory Operated in 1991**

<b>Permit Type</b>	<b>Permitted Activity</b>	<b>Issue Date</b>	<b>Expiration Date</b>	<b>Administering Agency</b>
RCRA hazardous waste facility	Hazardous waste storage, treatment, and disposal	November 1989	November 1999	NMED
	Postclosure care	Application submitted September 1988		EPA
HSWA	RCRA Corrective Activities	March 1990	December 1999	EPA
NPDES <sup>a</sup> , Los Alamos	Discharge of industrial and sanitary liquid effluents	Modified permit January 30, 1990	March 1, 1991 <sup>b</sup>	EPA
NPDES, Fenton Hill	Discharge of industrial and sanitary liquid effluents	October 15, 1979	June 30, 1983	EPA
NMLWD <sup>c</sup>	Discharge of sanitary effluents from septic tank systems into soil	<sup>d</sup>	—	NMED
Groundwater discharge plan, Fenton Hill	Discharge to groundwater	July 9, 1990	June 5, 1995	NMOCD <sup>e</sup>
Air Quality (NESHAP) <sup>f</sup>	Construction and operation of four beryllium facilities	December 26, 1985; March 19, 1986; September 8, 1987 April 26, 1989	—	NMED
Open Burning (AQCR 301)	Burning of jet fuel for ordnance testing, TA-11	October 6, 1989 August 30, 1991	August 30, 1992	NMED
Open Burning (AQCR 301)	Burning of scrap wood from experiments, TA-36	October 10, 1991	October 10, 1992	NMED
PCBs <sup>g</sup>	Disposal of PCBs at TA-54, Area G	June 5, 1980	—	EPA
PCB oil	Incineration of PCB oils <sup>h</sup>	May 21, 1979	—	EPA

<sup>a</sup>National Pollutant Discharge Elimination System.

<sup>b</sup>Permit administratively extended while new permit is pending.

<sup>c</sup>New Mexico Liquid Waste Disposal Regulations.

<sup>d</sup>Dates vary depending on individual permits.

<sup>e</sup>New Mexico Oil Conservation Division.

<sup>f</sup>National Emission Standards for Hazardous Air Pollutants.

<sup>g</sup>Polychlorinated biphenyls.

<sup>h</sup>No incineration occurred during 1991 even though the activity was permitted.

**Attachment 3.  
Laboratory ER Program Documentation Requirements**

<b>Type</b>	<b>Frequency</b>	<b>Due Date To DOE/AL</b>	<b>UC</b>	<b>DOE/LAAO</b>	<b>DOE/AFO</b>	<b>Regulatory Agency</b>
<b>I. DOE Planning Documents</b>						
DOE/AFO Management Plan	O	NA	IN	IN	P/MA	NA
DOE/AFO Program and Implementation Plan	A	Sept 15	IN	IN	P/MA	NA
DOE/AFO Budget Request Summary	A	NA	IN	IN	P	NA
DOE/AFO Five-Year Plan	A	NA	IN	IN	P	R
DOE/AFO Site-Specific Plan	A	NA	P	AP	AP	R
DOE/AFO Current-Year Work Plan	A	September	P	AP	AP	R
<b>II. DOE Status Reports</b>						
Installation Monthly Status Report	M	3rd Friday each month	P	R	AP	NA
<b>III. Primary Regulatory Agency Documents</b>						
Laboratory Installation Work Plan	A	NA	P	R	R	AP
RFI OU Work Plans	NA	NA	P	R	R	AP
RCRA Closure Plans	NA	NA	P	R	R	AP
RFI Reports	NA	NA	P	R	R	AP
CMS Plan	NA	NA	P	R	R	AP
Interim Measures Plans	NA	NA	P	R	R	AP
Monthly Management Reports	M	NA	P	R	R	AP
Quarterly Technical Progress Reports	NA	NA	P	R	R	AP

Key: O = one-time or as required, NA = not applicable, IN = input, P = prepare, MA = DOE/AL manager approval, A = annual, M = monthly, R = review, AP = approve