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Albuquerque Operations Office
Los Alamos, New Mexico 87544

APR 08 1994

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Mr. Joel Dougherty
Hazardous Waste Management Division
RCRA Enforcement Branch (ALONM)
Environmental Protection Agency, Region 6
1445 Ross Ave., Suite 1200
Dallas, TX 75202-2733

Dear Mr. Dougherty:

This letter transmits the final versions of the Los Alamos National Laboratory (LANL) deliverables and reports prepared in response to the following milestones:

AR 100	Annual Report
ATS 100	Program Management Plan for Generic Development, Design, Permitting, Construction, and Operation of Low-Level Mixed Waste (LLMW) Treatment Skids
GAS 100	Gas Cylinder Work-Off Plan
IFLL 100	Preconceptual Study to Identify Required LLMW Storage Upgrades
HLL 100	Characterization Plan for Historical LLMW
OSS 100	Feasibility of Diversified Scientific Services, Inc., Treatment
WM 100	Waste Minimization Plan
WM 200	Waste Minimization Annual Work Plan

The Department of Energy's (DOE) submittal of these documents to the Environmental Protection Agency (EPA) is required to ensure compliance with the Federal Facilities Compliance Agreement (FFCA). This FFCA has just been signed addressing hazardous and radioactive mixed wastes pursuant to the Resource Conservation and Recovery Act. The FFCA specified a due date for compliance with the referenced milestones within 30 days of the signature date (April 14, 1994).

We have prepared these documents to be consistent as possible in appearance and format. It is our expectation that this format would be used for all future deliverables, notices and reports prepared pursuant to the FFCA. Please advise us as to whether this format is acceptable or whether changes are desired.

An initial Annual Report was prepared and submitted herewith (AR 100). While it complies with the FFCA Appendix B requirements by providing information on the current status of implementation of waste minimization efforts (WM 100), treatment skid development, design, and construction (ATS 100), and the availability/applicability of off-site treatment capacity for low-level mixed wastes (OSS 100), it also provides discussion on

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the status of all other FFCA milestones, as well as an explanation of the interrelationships among milestones. It is our expectation that this format would be used for all future annual reports.

Additionally, as you have discussed with my staff, changes and updates to the waste inventory information in the FFCA Appendix B enclosures which have occurred since their development will be included in the AR 100 report. Thereafter, the inventory information will be updated and reported to you annually in the AR 100 report, and modifications to the FFCA will be made, if necessary.

Notifications of the completion of milestones HW 100, HW 300, LD 100, and CAI 100 are being sent to you concurrently under separate cover.

Supporting documentation will be retained in DOE and LANL files to support the FFCA, and will be made available to EPA and the State of New Mexico upon request. If you have any questions regarding this activity, please contact Jon Mack of my staff at (505) 665-5026.

Sincerely,

Joseph C. Vozella

Joseph C. Vozella, Chief
Environment, Safety, and Health
Branch

LESH:7JM-114

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FFCO 0228

IFLL 100
PRECONCEPTUAL STUDY TO IDENTIFY REQUIRED INTERIM LOW-LEVEL MIXED WASTE STORAGE FACILITIES/UPGRADES

Final

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

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PREFACE

This *Preconceptual Study to Identify Required Interim Low-Level Mixed Waste (LLMW) Storage Facilities/Upgrades* is being submitted to the United States Environmental Protection Agency (EPA) by the Department of Energy (DOE) and Los Alamos National Laboratory (LANL) in fulfillment of DOE's commitment to EPA under the Federal Facility Compliance Agreement (FFCA) developed pursuant to the Land Disposal Restrictions (LDR) requirements of the Resource Conservation and Recovery Act (RCRA), as promulgated in 40 CFR Part 268. This report is provided in compliance with Milestone IFLL 100 in Appendix B of the FFCA.

The purpose of the Preconceptual Study to Identify Required Interim LLMW Storage Facilities/Upgrades is to document the options for modifying current LLMW storage facilities at TA-54 to meet 40 CFR 264 requirements for permitted storage facilities in the near term. Additionally, National Fire Protection Association (NFPA) requirements with potential relevance to facilities like waste storage facilities , were reviewed and will be incorporated as applicable or relevant and appropriate. This information will be used to support development of the RCRA Part B permit application for these units. Options are identified for upgrades to the LLMW storage facilities at TA-54 Areas G and L. Implementation schedules for the selected final upgrades to these TA-54 solid and liquid LLMW facilities will be provided to EPA as deliverable IFLL-200 of Appendix B of the FFCA.

The following table discuss the LDR FFCA milestones that relate to IFLL 100 and the nature of that inter-relationship.

PRIMARY MILESTONE	RELATED MILESTONE	NATURE OF INTERRELATIONSHIP
IFLL 100:	HLL 100	Waste characterization data developed from the characterization plan for historical LLMW will impact storage area types and storage area volumes in the required interim LLMW storage facilities/upgrades.
	HLL 200	The formal plan for prioritizing LLMW treatment will influence the length of time waste is stored and waste segregation configurations in the interim LLMW storage facilities/upgrades.
	IFLL 200	The LLMW storage facilities/upgrades must be included in the schedule.

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LIST OF ACRONYMS

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

LIST OF ACRONYMS
(Continued)

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

IFLL 100
PRECONCEPTUAL STUDY TO IDENTIFY REQUIRED INTERIM LOW-LEVEL MIXED WASTE STORAGE FACILITIES UPGRADES

1.0 INTRODUCTION

The Los Alamos National Laboratory (LANL) currently has over 4100 drums of low-level mixed wastes (LLMW) stored in Technical Area 54 (TA-54). Most of the waste generated at LANL is the result of hundreds of bench-scale Research and Development (R&D) activities. These activities typically include the use of exotic compounds and radionuclides. Therefore, although LANL produces a large variety of mixed waste, most volumes are very small. These wastes generally do not include the large volume wastes generated through the Environmental Restoration Program at LANL.

Because treatment capacity for LLMW at LANL currently is inadequate, these wastes have been stored for more than one year. This long-term storage of mixed waste, combined with the lack of treatment and disposal facilities, has resulted in noncompliance with the storage prohibitions of the LDR requirements set forth in the RCRA. This report is provided to comply with milestone IFLL-100 of the FFCA with the EPA, Region VI.

Low-level mixed waste is currently stored at TA-54 in Areas G and L (see Figures 3-1 and 4-1). Solid LLMW is stored at Area G in Building 49. This facility contains a bermed (curbed) asphalt pad with a tension support dome structure. Containers stored in this building consist primarily of 55-gallon DOT-approved steel drums stacked two and three high on pallets in rows. The rows are separated by a minimum 2-foot aisle space. Some non-RCRA-regulated low-level radioactive wastes likewise are stored in this area, principally as a best management practice to minimize the potential for worker radiation exposure and to ensure their management complies with DOE requirements for worker safety and environmental protection.

Liquid LLMW is currently stored at TA-54, Area L. The containers, which are primarily 30 and 55 gallon DOT-approved polyethylene and steel containers, and also 85-gallon DOT-approved overpacks, are stacked two and three high on pallets in rows separated by a minimum 2-feet aisle space. Some non-RCRA-regulated low-level radioactive wastes likewise are stored in this area, principally as a best management practice to minimize the potential for worker radiation exposure and to ensure their management complies with DOE requirements for worker safety and environmental protection.

As discussed in Section II.B.1 of Appendix B to the draft FFCA, the storage of mixed wastes at Area L and G comply with 40 CFR Part 265, Subpart I requirements, the interim status management standards that currently apply to these units. LANL believes the Area G LLMW storage facility already complies with many of the requirements of 40 CFR Part 264, *Standards For Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities.* In addition, a new storage facility Mixed Waste Receiving and Storage Facility (MWRSF) designed and constructed in accordance with 40 CFR Part 264 standards is planned.

During FFCA negotiations, EPA raised concerns that the current LLMW storage facilities should be reviewed and upgraded to permitted facility standards in advance of LANL's RCRA permit schedule, if interim modifications could be identified and approved. Of greatest concern were the 40 CFR Part 264 secondary containment requirements and prevention of precipitation run-on (primarily for LLMW at Area L). DOE and LANL have previously identified similar concerns in internal appraisals.

1.1 Purpose of Report

This preconceptual design study presents options for modifying current LLMW storage facilities at TA-54 to meet 40 CFR Part 264 requirements for permitted storage facilities in the near term. Additionally, National Fire Protection Association (NFPA) requirements with potential relevance to facilities such as waste storage facilities are being considered, and will be incorporated as applicable or relevant and appropriate. To prepare this report, information was assembled by both the Waste Management and Engineering Groups at LANL.

Information developed herein will be used to support development of the RCRA Part B permit application for these units. Implementation schedules for the approved final upgrades to these TA-54 solid and liquid LLMW facilities will be provided to EPA as deliverable IFLL-200 of Appendix B of the FFCA.

1.2 Scope of Report

This report has five major sections:

- Section I covers the background, purpose, and scope of the report.
- Section II covers the applicable regulatory requirements, codes, standards, and state and local regulations.
- Section III describes the existing conditions and recommended upgrades to the TA-54, Area G solid LLMW storage facility to meet 40 CFR 264 requirements.
- Section IV describes the existing conditions and recommended upgrades to the TA-54, Area L liquid LLMW storage facility to meet 40 CFR Part 264 requirements.
- Section V describes the MWRSF which supports the Hazardous Waste Treatment Facility (HWTF).

2.0 APPLICABLE REGULATIONS, CODES, AND STANDARDS

The EPA has set minimum national standards for managing hazardous waste at permitted treatment, storage, and disposal facilities (TSDFs) under 40 CFR Part 264. In addition, the EPA has established basic permitting requirements in 40 CFR 270. These regulations describe the information that must be provided in the permit application in order to demonstrate compliance with 40 CFR 264. The standards for the management of hazardous waste in permitted container storage facilities are set by these regulations, which, for nonradioactive hazardous waste management units at LANL, are implemented in LANL's operating permit. The EPA has authorized the state of New Mexico to administer portions of RCRA including the permitting process but not including the LDR and the corrective action requirements of the Hazardous and Solid Waste Amendments of 1984 (HSWA).

2.1 State Regulations

The state of New Mexico is federally authorized to administer portions of the RCRA of 1976 , including the permitting process: the state is not authorized for HSWA, which includes the LDR and corrective action requirements. The state of New Mexico permitting regulations generally mirror the federal regulations; and include independent state authority for LDRs as set forth in Part VIII Land Disposal Restrictions of the *New Mexico Hazardous Waste Management Regulations.* Additionally, the state received authorization to administer its program for RCRA mixed waste on July 25, 1990. LANL submitted its mixed waste Part A permit application on January 25, 1991.

Management requirements for LANL's permitted nonradioactive hazardous waste facilities were established in the facility permit issued by the state in 1989. A permit has not yet been issued for LANL's LLMW units, including those addressed in this report; Part B application schedules currently are being developed in conjunction with the state. Therefore, the existing LLMW storage facilities are being managed in compliance with the interim status storage unit requirements found in 40 CFR Part 265 of the New Mexico Hazardous Waste Management Regulations.

Additionally information relating to hazardous waste container storage areas is found in the EPA document entitled *Guidance for Permit Writers: Facilities Storing Hazardous Waste in Containers* (EPA 1982). While RCRA does not specifically mention national standards for fire protection, this EPA guidance document references National Fire Protection Association (NFPA) 30, *Flammable and Combustible Liquids Code* (NFPA 1987), as guidance for the storage of combustible and flammable liquids in containers. Therefore, NFPA standards were reviewed for appropriateness to facility upgrades (see Exhibit 2-1). Specific NFPA standards reviewed are discussed in Sections 3 and 4 of this report.

2.2 Design Standards

In general, the RCRA regulations applicable to the design and operation of a permitted hazardous waste container storage facility include:

- General Facility Standards (40 CFR Part 264, Subpart B)
- Preparedness and Prevention (40 CFR Part 264, Subpart C)
- Use and Management of Containers (40 CFR Part 264, Subpart I)

In some cases, conformance with these requirements may be designed into the facility. In other cases, conformance can be demonstrated through operational or management means. These requirements are included as design standards, although they may not ultimately be addressed as design issues but as operating issues.

2.2.1 General Facility Standards

This section provides a review and summary of the potentially applicable requirements of RCRA. Section 3 and 4 of the report will present an evaluation of compliance of current LLMW facilities with each potentially applicable requirement identified herein.

RCRA security provisions require either a 24-hour surveillance system using television monitoring or surveillance by guards or facility personnel that continually monitors and controls entry into the active portion of the facility, or an artificial or natural barrier such as a fence or a fence combined with a cliff that completely surrounds the active portion of the facility. Entry to the active portion of the facility must be controlled at all times through gates or other entrances. Entry may be controlled using an attendant, television monitors, locked entrance, or controlled roadway.

Per 40 CFR Part 264, inspections must be conducted for malfunctions, deterioration of equipment (including monitoring, safety, security, and structural equipment), operator errors, and discharges that may cause or may lead to a release of hazardous waste to the environment or a threat to human health. General inspection requirements are typically an operational, as opposed to design, requirement. However, accessibility for inspection of the curbs, containers, and floor must be provided.

EXHIBIT 2-1
RATIONALE FOR ASSESSING APPLICABILITY OF NFPA STANDARDS

NFPA Guidance: RCRA regulations do not specifically state that NFPA guidance or the EPA permit writer's guidance must be followed; however, for two key RCRA regulations, NFPA guidance may be relevant:

1. General design requirements in 40 CFR Part 264.31 specify that facilities must be designed, constructed, maintained, and operated to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water which could threaten human health or the environment.

2. All facilities must be equipped with the following, unless it can be demonstrated to the Regional Administrator, that none of the hazards posed by waste handled at the facility could require a particular kind of equipment specified below:.....

   (c) Portable fire extinguishers, fire control equipment (including special extinguishing equipment, such as that using foam, inert gas, or dry chemicals)....(40 CFR 264.32) .

Interpretations of the type of fire control equipment required depend upon the type of waste, the anticipated waste handling activities, and the permit writer. Nevertheless, it is clear that fire control equipment must be provided unless it can be demonstrated in Part B of the RCRA permit application (40 CFR 270) that none of the hazards posed by the facility's waste could require that equipment.

In the introduction to the EPA (1982) document *Facilities Storing Hazardous Waste in Containers, Guidance for Permit Writers*, it is stated that:

> "Various sections for the final regulations for storage reflect the use of the 'Best Engineering Judgment' (BEJ).....BEJ provides for tailoring of permit requirements to the specific wastes, facility design, and environmental conditions of the storage area, based on the best engineering judgment of the permit writer."

This document also states that NFPA standards should be applied when storing ignitable or reactive waste (pp. 4-12) with the strong implication being that this application was intended to focus on RCRA-regulated ignitable or reactive waste. The above language in RCRA and the EPA guidance document formed Parsons' (1993) basis for recommending that the design of Area G and L facilities which store both ignitable waste and reactive waste should conform to NFPA; however, they applied this recommendation in the context of designing and constructing a new storage facility, rather than focusing on short-term upgrades to the existing Area G and L LLMW units. Therefore, their recommendations will be considered and adopted as appropriate when designing and constructing new storage facilities such as the Mixed Waste Receiving and Storage Facility (MWRSF) (Section 5). Those applicable to existing units are discussed in Sections 3 and 4. As stated above, there is flexibility in the application of NFPA to RCRA facilities.

Per 40 CFR Part 264, precautions must be taken to prevent accidental ignition or reaction of ignitable or reactive waste. Ignitable, reactive, or incompatible waste must be separated and protected from sources of ignition or reaction. Sources of ignition include, but are not limited to, open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical, or mechanical), spontaneous ignition from heat-producing chemical reactions, and radiant heat. Precautions must be taken to prevent reactions that:

- Generate extreme heat or pressure, fire, explosions, or violent reactions
- Produce uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities that threaten human health or the environment
- Produce uncontrolled flammable fumes or gases in sufficient quantities that pose a fire or explosion risk
- Damage the structural integrity of the device or facility or;
- Through other similar means threaten human health or the environment

During the handling of ignitable or reactive waste, smoking and open flames must be confined to specially designated locations. "No Smoking" signs must be placed near areas with a potential hazard from reactive and ignitable waste.

A RCRA facility that is located in a 100-year floodplain must be designed, constructed, and operated to prevent washout of any hazardous waste by a 100-year flood.

2.2.2 Preparedness and Prevention

A RCRA facility must be designed, constructed, maintained, and operated to minimize the possibility of a fire, explosion, or any unplanned release of hazardous waste that could threaten human health or the environment.

Per 40 CFR Part 264, unless characteristics of the waste or the facility render them unnecessary, the facility must be equipped with:

- An internal communications device or alarm system that provides immediate emergency instruction to facility personnel
- An emergency communications device (such as a telephone or hand-held radio) available at the scene of operations for summoning emergency assistance from the local police or fire departments or local or state emergency response teams
- Fire control equipment, including portable fire extinguishers and special extinguishing equipment that uses foam, inert gas, or dry chemicals
- Spill control equipment
- Decontamination equipment
- Water at an adequate volume and pressure to supply water hoses, foam-producing equipment, automatic sprinklers, or water spray systems

40 CFR Part 264 requires that personnel involved with the operations of handling hazardous waste must have immediate access to the emergency communications device either directly or through visual or voice contact with another employee. Only one employee is on the premises when the facility is operating, then the employee must have direct access to the emergency communications device.

40 CFR Part 264 requires that aisle space must be maintained to allow unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment. The required aisle space must be maintained during an emergency for any area of the facility operations, unless it can be demonstrated that aisle space is not needed for these purposes.

2.2.3 Use and Management of Containers

40 CFR Part 264 requires that the containment system be designed so that the following are true:

- Inspections can be conducted, looking for leaking containers, container deterioration, and containment system integrity.
- Containers holding ignitable or reactive waste are located at least 50 feet from the property line.
- Storage containers holding hazardous waste that is incompatible with any waste or other materials stored nearby must be stored separately from the other materials or protected from them by using a dike, berm, wall, or other containment device.

Container storage areas that hold wastes containing free liquids are required to have a containment system. Free liquids are liquids that readily separate from the solid portion of a waste under ambient temperature and pressure, and are typically determined through the paint filter test (see EPA, *Test Methods for the Analysis of Solid Wastes,* SW-846, Third Edition). A RCRA containment system must be designed and operated in accordance with the following:

- The base must be free of cracks or gaps and sufficiently impervious to contain leaks, spills, and accumulated precipitation until the collected material is detected and removed.
- The base must be sloped or the containment system must be designed and operated to drain and remove released liquids or precipitation, unless the containers are elevated or otherwise protected from contact with the accumulated liquids.
- The containment system must have sufficient capacity to contain 10 percent of the volume of containers or the volume of the largest container, whichever is greater. Containers that do not contain free liquids are not required to be included in the volume amount.
- Run-on to the containment system must be prevented, unless the collection system has sufficient excess capacity to contain any run-on in addition to the 10 percent volume or largest container volume capacity requirements.
- Spilled or leaked waste and accumulated precipitation must be removed soon to prevent overflow.

Container storage areas that hold wastes that do not contain free liquids are not required to have the containment system mentioned above, provided that the following conditions are met:

- The storage area is sloped or designed and operated to drain and remove precipitation.
- The containers are elevated or otherwise protected from contact with accumulated precipitation.

2.2.4 Limitations to Interpreting Regulations as Design Standards

Sections 3 and 4 of this report include an assessment of the extent to which the current LLMW facilities conform to the 40 CFR Part 264 requirements for permitted container storage units. There are two important limitations to determining design standards from these regulations:

1. In general, the RCRA regulations were developed in such a way as to maximize flexibility in design and to allow for a variety of approaches in meeting general facility requirements. Therefore, the wording of the regulations is, in many cases, nonspecific and/or unquantified, and subject to varied interpretation. LANL has attempted to be conservative in its interpretation where varied interpretations were possible. Guidance documents and precedence were reviewed to assess compliance with regulatory intent.

2. In preparing this report, the compliance of the current facilities components was assessed item-by-item with each specific regulatory standard. To assess fully each unit's compliance with 40 CFR Part 264 requirements, all elements of the assessment must be considered.

3.0 TA-54 AREA G - SOLID LOW-LEVEL MIXED WASTE

Solid low-level mixed waste is stored in Building 49 at Area G. TRU mixed waste facilities are not addressed in this report; they will be discussed in the report fulfilling FFCA milestone STRU-100. This section discusses the current storage configuration and recommended upgrades for storage.

3.1 Background

The LLMW consists primarily of room trash contaminated with low-level radioactivity, dewatered waste water treatment sludge, and lead shielding. Certain non-RCRA-regulated, low-level radioactive solid wastes, such as uranium chips and turnings in diesel fuel, currently are stored here as well. Steel fiberglass/plywood lined boxes contain the lead shielding.

The current inventory of both RCRA-related and non-RCRA-regulated waste is about 2250 drums. Approximately 160 of these drums are the nonregulated uranium chips and turnings individually coated in diesel fuel with a minimum of free liquid in each drum. The chips and turnings are packed in a 30-gallon drum overpacked in a 55-gallon drum. Sorbent material placed between the inner drum and overpack further ensures that any release of the minimal free liquid content from an inner drum would be absorbed and contained rather than released to the environment. Accordingly, 2090 drums at 55 gallons each and 160 drums at 30 gallons each represent a maximum of 114,950 gallon-equivalents of mixed waste and approximately 4800 gallon-equivalents of nonregulated waste, nearly all of which is solid. Also, included in the solid waste are boxes of lead shielding.

3.2 Design conformance to 40 CFR 264

Conformance of the Building 49 storage area within 40 CFR Part 264 for container storage area design criteria is discussed in the following paragraphs.

3.2.1 Security

The existing security system conforms to with RCRA design standards. The perimeter signs conform to the wording, size, number, and languages (Spanish and English) requirements of the *"Danger - Unauthorized Personnel Keep Out."*

3.2.2 General Inspection Requirements

The existing design allows sufficient space for inspecting the curb, containers, and floor. Since containers are double- and triple-stacked, inspection is performed using ladders or a two-person boom lift.

3.2.3 General Requirements for Ignitable, Reactive, or Incompatible Wastes

A few drums of regulated reactive solids such as lithium, lithium hydride, and magnesium solids are presently stored in this dome. The nonregulated uranium chips and turnings currently stored in this unit are coated with diesel fuel with a minimum of free liquid per drum. Diesel fuel is reactive and potentially ignitable (it may have a flash point between 110 and 190 degrees Fahrenheit). This coating was added to the uranium because of its pyrophoric nature when not in the oxidized form.

LANL is storing the chips and turnings in rows separated from each other and from the RCRA-regulated reactive solids by rows of nonreactive drummed wastes (essentially inert dewatered waste water treatment sludge), in a configuration meeting or exceeding NFPA recommendations. However, LANL is evaluating options for relocating the nonregulated uranium wastes to another existing storage unit. These wastes are scheduled to be treated chemically to remove their reactive characteristics within the next 1-2 years.

There are no open flames in the area. Smoking is prohibited in the controlled part of Area G, cutting and welding are not conducted in this area, and there are no hot surfaces or friction heat sources. The containers are protected from radiant heat (direct sunlight) by the facility cover, and from lightning by lightning rods. This storage unit conforms with the general requirements for ignitable, reactive, and incompatible wastes.

3.2.4 Location Standards

The mesa on which the storage area is located is between 6,400 and 6,920 feet above sea level and is not located on a flood plain; thus, the site location conforms with this standard.

3.2.5 Design and Operation of Facility

Building 49 is a container storage area covered by a tension support dome structure bolted to a bermed, unsealed, asphalt pad (see Figure 3-1). Building 49 pad dimensions are 321.5 feet by 61.5 feet. The walls of the building are located a few inches outside the berm. The berm is a perimeter curb that is approximately 6 inches in height, tapering to a ramp at the front end of the building at the forklift entrance. The nominal asphalt pad thickness is estimated at approximately 4 inches. Aisle space between the rows of pallets is a minimum of 2 feet.

Containers are stored on pallets, four pallets per row. Each row is 20 feet long and 5 feet wide. The ends of the rows are about 2 feet from the wall of the facility. The double-stacked 55-gallon containers are 7.3 feet high. The double-stacked 85-gallon containers are 8.1 feet high. The triple-stacked 30-gallon containers are 10 feet high. Thirty-two rows on one side and 22 rows on the other side are configured at a 45 degree angle from the center forklift aisle. The side with 22 rows has a temporary lead shielding box storage area, and a holding area where up to 8 drums are stored for up to 48 hours while swipe tests are conducted.

Thirty-gallon containers are triple-stacked, and larger containers are double-stacked. Most drums currently are banded together by steel strips as a best management practice to maximize stability of the stacks. The banding configuration is 4 drums banded together by strips around the upper third and the lower third of the drums. The existing facility has more than one exit to meet NFPA recommendations. Building 49 is located within a secure zone surrounded by a 8-foot, chain-link fence topped with ribbon wire, with controlled access.

TA-54, AREA G
MIXED WASTE STORAGE DOME

PATTERN CODES

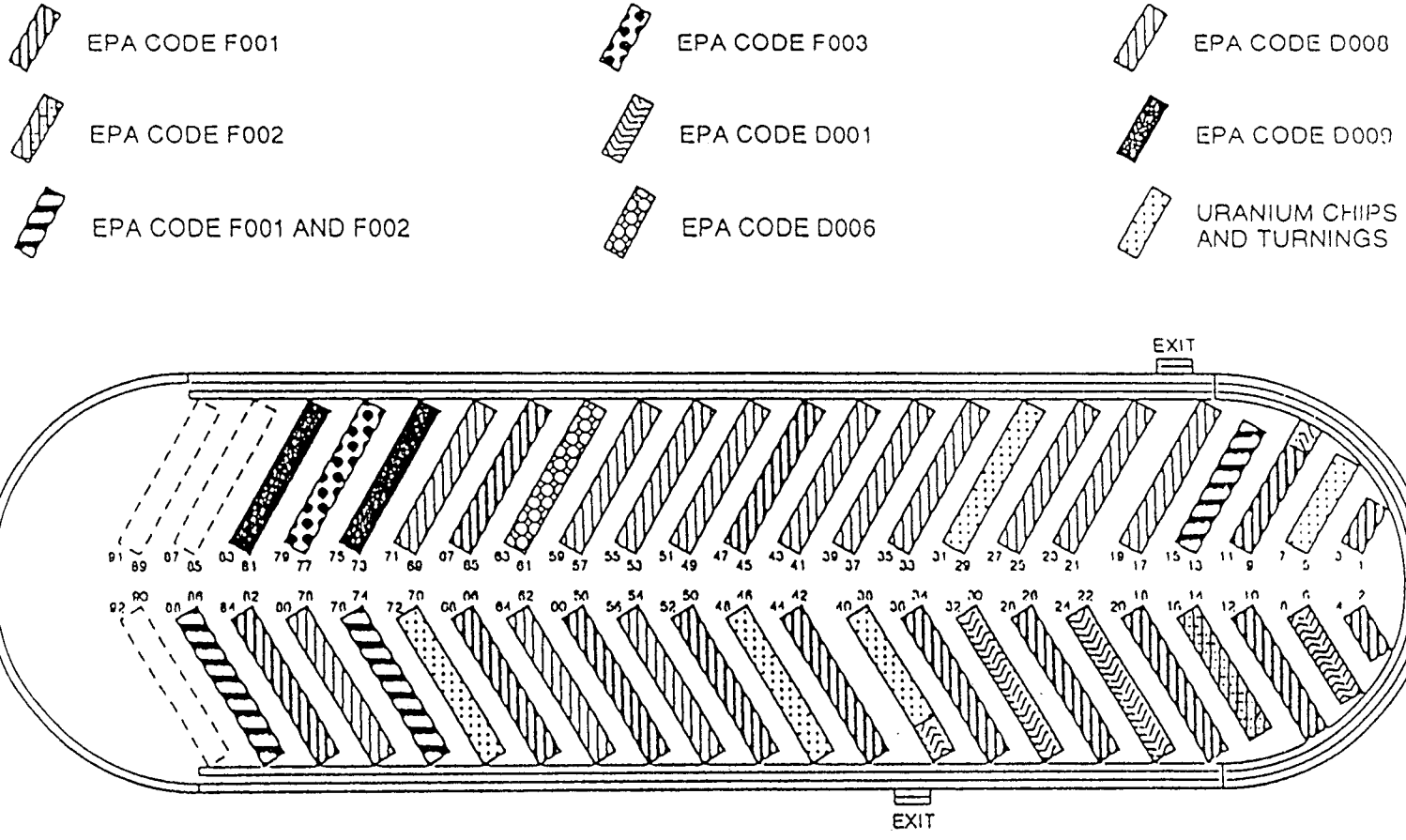

Figure 3-1

3.2.6 Required Equipment

Two continuous air monitors (CAMs) for alpha radiation are located at the front and back of the facility. An evacuation alarm, which can be triggered within the building from four locations in the front, back, and mid-section of the unit, signals both inside the building and in the Area G office.

Smoke alarms are located every 30 feet within the dome. There are 15 dry chemical fire extinguishers strategically located within the building. This system is sufficient for RCRA fire control equipment requirements, however, additional fire control equipment and systems will be considered per the NFPA guidelines (see Section 3.4).

Two fire hydrants are located in the vicinity of the facility, the nearest within approximately 500 feet of the LLMW dome. A 6-inch water supply line enters Areas G and L, and services the eyewashes and safety showers. This line provides adequate water volume and pressure for emergency purposes.
Spill control materials and equipment are located at each end of the building, and include standard contents such as gloves, brooms, and shovels. Spill control equipment will be disposed after use. Spill control and decontamination equipment conform with RCRA requirements through operational, rather than design, features.

The communication and alarm systems provided at the facility conform in terms of presence and adequacy. Telephones are located in a box on a pole adjacent to the southwest side of the dome and in the control room 1/4 mile from the dome at the Area G access building. A list of current emergency numbers is located at the telephone to summon emergency assistance.

3.2.7 Aisle Space

Aisle space at the facility is currently a minimum of 2 feet. New Mexico has required a 2-foot aisle space at hazardous waste facilities in LANL's permit. In the Part B permit application, LANL will demonstrate the adequacy of the aisle spacing for allowing the unobstructed movement of emergency equipment. The 4-foot separation between reactives recommended by NFPA is currently accomplished by placing intervening rows of nonreactives between the reactives rows.

3.2.8 Containment

The existing design has limited containment capacity. While the 6-inch berm decreases to zero at the front of the facility, the floor slopes to the southeast, ending at the perimeter berm. However, the only free liquids in the Area G facility are the residuals that may be present within the 160 drums of nonregulated uranium chips and turnings in diesel fuel. As stated before, these may be relocated and/or treated in the near future. However, a ramp will be built to ensure the berm is continuous around the interior of the facility.

Asphalt is soluble in organic solvents such as ketones, most chlorinated hydrocarbons, and aromatic hydrocarbons (*Perry's Chemical Engineering Handbook*, 1984). Given that diesel fuel is a hydrocarbon and the inherent secondary containment of the overpack configuration for the nonregulated uranium waste, it is not recommended that the floor be sealed at this time.

Containers are stored on pallets that are approximately 6 inches high and the perimeter berm is also 6 inches high. This configuration conforms with the requirement that containers be elevated (or the base be sloped) to allow for drainage and removal of liquids.

3.2.9 Special Requirements for Ignitable or Reactive Waste

Containers holding ignitable or reactive waste must be located at least 50 feet from the facility's property line. The existing design conforms to this requirement.

3.2.10 Special Requirements for Incompatible Wastes

Incompatible waste must be separated from other wastes or protected by a dike, berm, wall, or other device. The existing design conforms to this requirement and presently includes physical separation using essentially inert wastes (dewatered waste water treatment sludge) as buffers separating nonregulated uranium chips and turnings in diesel fuel from other incompatible wastes.

3.3 Options for Modifications to Area G LLMW

The following is a summary of identified options to the existing Area G LLMW dome to upgrade the facility to 40 CFR 264 requirements:

- Consider placing *"No Smoking"* signs in the facility especially near the reactive storage area
- Consider installing an additional telephone at the entrance to the facility
- Review existing fire control systems and equipment to determine if additional systems or equipment is necessary
- Develop demonstration of stability and inspection of triple stacked drums
- Evaluate options for short-term relocation of nonregulated chips and turnings before treatment

3.4 Fire Protection, Detection, and Alarm Systems

Based on a review of NFPA 30, NFPA 49, and NFPA 325M and associated codes. Recommendations regarding NFPA compliance are presented in the following sections.

3.4.1 Fire Suppression System

An automatic wet pipe fire sprinkler system meeting the requirements of NFPA 13 could be considered for the entire Area G facility. However, such a system would require heating the storage dome to avoid winter freezes, which have been problematic for safety showers and other systems at TA-54 in the past. See Section 3.5 for alternative fire suppression system enhancements.

3.4.2 Fire Detection and Alarm System

The facility currently has a fire detection system with smoke alarms installed every 30 feet. It is believed that this system meets NFPA 72E requirements for gas monitors and alarm systems. However, this should be reverified to assure compliance.

3.4.3 Portable Fire Control Equipment

It is required by NFPA 10 requires that UL listed portable dry chemical fire extinguishers be provided for the facility and installed every 50 feet. The facility would require a minimum of 14 extinguishers. Currently there are 15 fire extinguishers installed in the facility. It is believed that these extinguishers meet NFPA 10 requirements. However, this should be re-verified to assure compliance and adequate spacing per NFPA 10.

3.4.4 Fire Water Supply

A reliable fire water supply to the facility should be maintained with adequate pressure and flow to meet sprinkler system and hose requirements. Currently two fire hydrants are located within 1100 feet of the facility. Portable eyewash stands are available in the facility and safety showers are not required. Additionally, the facility has an 8,000-gallon water truck available for water supply.

3.4..5 Storage of Liquids and Solid Reactives

Relocating nonregulated reactives containing minimal free liquids (uranium in diesel fuel) will be evaluated. The need for storing solid reactives (lithium, lithium hydride, and magnesium) in a separate area will be evaluated.

NFPA References:
NFPA 30 - *Flammable and Combustible Liquids Code*
NFPA 10 - *Portable fire Extinguisher*
NFPA 13 - *Installation of Sprinkler Systems*
NFPA 72E - *Automatic Fire Detectors*
NFPA 49 - *Hazardous Chemicals Data*
NFPA 325M - *Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids*

3.5 Alternate Fire Suppression Systems

This section discusses two alternative fire suppression systems to the automatic wet-pipe sprinkler system covered in Section 3.4.1. The selected system would be used in place of the wet pipe sprinkler system and its associated fire-water booster pump system. Removing the potential problem of using a sprinkler system on drums that contain water-reactive waste even though these drums are overpacked. It would also remove the maintenance problems associated with winter freezing in an unheated dome.

3.5.1 Dry Chemical System

The first alternative is installing an automatic dry chemical system. Smothering a fire, however, would require a considerable number of nozzles and pipes to cover all confined spaces within the containment bay. This type of system would also require a substantial amount of clean-up of dry chemical after use.

3.5.2 CO_2 Suppression System

The second alternative system would be a total flooding automatic CO_2 fire suppression system. This system would require an air-tight enclosure to operate effectively including air-tight roll-up doors to allow personnel and forklift access. Modifying the existing dome into an air-tight enclosure would be prohibitively expensive, and could introduce additional operational and safety problems. On the other hand, little or no cleaning-up of the suppression agent would be required after use.

4.0 TA-54 AREA L - LIQUID LOW-LEVEL MIXED WASTE

Liquid LLMW is currently stored on an asphalt pad at TA-54 Area L. A tension dome structure similar to the TA-54 Area G Building 49 as discussed in Section 3.0 will be installed over the asphalt pad area.

4.1 Background

The current waste inventory is 573 30-gallon containers, 271 55-gallon containers, and 503 85-gallon containers (85-gallon overpacks contain a maximum of 55 gallons of waste). These 1,347 containers represent a maximum volume of 76,260 gallons of mixed waste. Each bay is approaching 100 percent capacity, with the exception of MW4 (reactives), in which one row contains only about seven drums.

Several other units for storing hazardous wastes, nonregulated wastes and polychlorinated biphenyls, and for the treatment of certain RCRA characteristic wastes, are also located at Area L. The RCRA units are managed in compliance with LANL's existing RCRA permit and the TSCA units are managed in compliance with LANL's TSCA permit.

4.2 Design Conformance to 40 CFR 264

Conformance of the Area L LLMW storage area with 40 CFR Part 264 container storage design criteria is discussed in the following sections.

4.2.1 Security

The existing security system conforms with RCRA requirements.

4.2.2 General Inspection Requirements

The existing design allows sufficient space for inspection of the curb, containers, and pad surface. For the proposed storage unit upgrade, a minimum of 24 inches will be between the palletized containers and the structure's walls. This design will conform for inspectability purposes.

4.2.3 General Requirements for Ignitable, Reactive, or Incompatible Wastes

There are no open flames in the area. Smoking is prohibited within the controlled area containing Area L, cutting and welding are not conducted in this area, and there are no hot surfaces or frictional heat sources are present. The location is 6,400 to 6,920 feet above sea level, and has a typical 75-percent isolation rate (incoming solar radiation). Since it is uncovered, it is exposed to radiant heat (direct sunlight). The area thus currently does not conform with standards requiring protection from sources of ignition (lightning and radiant heat). *"No Smoking"* signs are located on the area perimeter fence, but not immediately adjacent to the reactive and ignitable areas. A recommendation for additional signs to be placed near the reactive and ignitable storage areas is being evaluated. Installing of the dome cover and lightning protection will assure that protection for ignitable reactive and incompatible wastes is provided are met.

4.2.4 Location Standards

The mesa on which the storage area is located is between 6,400 and 6,920 feet above sea level and is not located in a flood plain; thus, the site location conforms with the location standard.

4.2.5 Design and Operation of Facility

Liquid LLMW is currently stored on an asphalt pad at TA-54, Area L. Containers (30-, 55-, and 85-gallon size) are stacked two and three high on 5-foot by 5-foot pallets and are separated by 2 feet of aisle space. Most (90 to 95 percent) of the containers are either in lab pack or overpack configuration. The nominal thickness of the asphalt pad is estimated to be 4 inches. The nominal perimeter curb height is 3 inches at ramped forklift entry and exit ways. The perimeter curbing is 7 to 10 inches high and 8 inches wide. The container storage area is separated into six bays, MW1 through MW6, for the segregating of incompatible material .

The current waste categories are presented in Table 4-1. The east and west sides of MW2, MW3, MW4, and MW5 have 7- to 10- inch high, 2-foot wide, flat-topped berms. The front berm across each of these bays is about 4 inches high and 2 feet wide, and acts as a ramp for forklift access from the center aisle. The pad dimensions, including the perimeter curbs, are 200 feet by 59 feet. Twenty-three rows of double-stacked 55- and 85-gallon containers and triple-stacked 30-gallon containers are arranged perpendicular to the center aisle on the north side, and 26 rows on the south side. Each row is 20 feet long and 5 feet wide. The center forklift aisle is 16 feet. The double-stacked 55-gallon containers are 7.3 feet high. The double-stacked, 85-gallon containers are 8.1 feet high. The triple-stacked 30-gallon containers are 10 feet high.

Area L is located within a secure zone surrounded by a 6-foot, chain-link fence topped with ribbon wire. A locked gate is used to control access. Access by personnel other than daily site workers may be obtained only by signing in at the office and obtaining an escort or key. "Danger - Unauthorized Personnel Keep Out" signs are placed at intervals on the perimeter fence in compliance with LANL's existing RCRA permit. Signs in Spanish and English are posted at the entrance.

A curb and about 1 foot of space currently separate containers from the embankment; the containers are also double and triple stacked. Consideration will be given to banding additional rows of containers following their relocation to maximize stack stability. Sustained winds exceeding 25 mph and peak wind gusts exceeding 50 mph are common during the spring. The highest recorded wind gust in recent history was 77 mph in 1988. A wind gust of 70 mph could knock over a 5-gallon pail of less than 18 pounds in weight; thus, a wind barrier is recommended. Enclosing the facility within a structure will address this concern.

4.2.6 Required Equipment

An alarm system and telephones are located in a control room about 200 feet from the pad, a location that conforms with RCRA regulatory standards. Additional fire extinguishers will be installed as discussed in Section 4.7. Spill control materials and equipment are located at each end of the building, and include acid and caustic neutralizers, Tyvek suits, nitrile gloves, face shields, brooms, and shovels. Respiratory equipment is also available for those personnel specifically trained and fit-tested. Oil-dry is also available in a nearby building. Spill control equipment will be disposed after use or decontaminated using surfactant and water. Spill control and decontamination equipment conform with RCRA regulatory requirements through operational, rather than design, features. As discussed in Section 3, a 6-inch water main line with 80 psi pressure from DOE pump stations currently supplies water to TA-54. This conforms with RCRA regulatory requirements for water at adequate volume and pressure, however, additional water supply modifications are in process. The communication and alarm systems provided at the facility conform in terms of presence and adequacy, and may be networked to the storage pad and dome enclosure as part of the upgrade.

4.2.7 Aisle Space

Aisle space at the LLMW liquids storage area is 2 feet, as specified for hazardous waste units in the RCRA permit.

Table 4-1
Los Alamos National Laboratory
Existing Waste Classifications

Bay	Maximum No. 55-gallon Drums[1]	Rows	Waste Classification
MW1	576	1-35 odd	Flammable/Combustibles/Scintillation Vials
MW2	64	37, 39	Oxidizers
MW3	96	41, 43, 45	Acids
MW4	64	44, 46	Reactives
MW5	96	38, 40, 42	Caustics
MW6	672	A, B, C, D, 2-34 even	ORM-A, B, E/Poisons/Nonregulated
Total	1,568		

[1]Number of 55-gallon drums which bay will accommodate. Assumes four drums per pallet, four pallets for single-stacked row, double stacked (4x4x2 = 32 drums per row).

4.2.8 Containment

Currently, containers are stored on pallets, and the floor slopes 2 percent over the pad length (to the east) and 2 percent over the pad width (to the north). This configuration conforms with the requirement that the base be sloped or containers elevated to allow for drainage and removal of liquids. To upgrade the container storage area, the secondary containment will be provided by portable secondary containment pallets.

4.2.9 Special Requirements for Ignitable or Reactive Waste

Containers holding ignitable or reactive waste must be located at least 50 feet from the facility's property line. The existing design conforms to this standard.

4.2.10 Special Requirements for Incompatible Wastes

Incompatible waste must be separated from other wastes or protected by a dike, berm, wall, or other device. The existing design includes internal curbing and bays for reactives, oxidizers, and other waste categories. It is noted, however, that some individual materials within these categories are incompatible and should be further segregated by placing on segregated portable containment pallets. Separating by rows of inert wastes by rows may also be considered.

4.3 Options for Modifications to Area L LLMW

The following is a summary of identified options to the existing Area L LLMW liquids storage area to upgrade the facility to 40 CFR Part 264 requirements:

- Enclose the storage area to protect the containers from ignition sources (radiant heat and lightning), wind, and corrosion caused by weathering, and to prevent precipitation run-on and accumulation. Install lightning protection

- Revise the container storage layout as shown in Figure 4-1 to a 60-foot by 202-foot configuration with a minimum of 24 inches between wall and pallets

- Replace wooden pallets with portable secondary containment pallets to ensure secondary containment conforms to 40 CFR Part 264 requirements and to segregate any potential incompatibles releases. Use a phased approach to install the portable pallets

- Install an active ventilation system to ensure adequate ventilation inside the dome

- Review fire control systems and equipment in the facility to determine if additional fire protection equipment is necessary

4.4 Area L LLMW Pad Upgrades

The current LLMW storage area will be extended to the west of the existing area. The total length will be approximately 262 feet and the width will be about 60 feet. A forklift access aisle of 18 feet will be provided from one end (of the long axis) to the other. The mixed waste drums will be stored on portable containment pallets which will serve as secondary containment units. A total of 4 drums will be stored on each pallet and stacked 2 rows high.

4.5 Facility Structure

The enclosure for the LLMW liquids storage area will be a tension support dome similar to others at TA-54. The structure will be approximately 60 feet wide by 262 feet long. The structure will include 4 single personnel doors as required by NFPA and one double panel rolling door for forklift access. See Figure 4-1 for the location of the structure within Area L.

The structure is a durable fabric treated with inhibitors to prevent degeneration from ultraviolet rays of the sun. This fabric is fire retardant and meets the requirements of NFPA 701. The structure will be capable of withstanding winds up to 130 mph and the snow loads encountered here at Los Alamos. Similar structures have demonstrated satisfactory performance at Area G and at other DOE facilities.

As shown in Figure 4-1, a similar 30-foot by 110-foot dome enclosure has already been installed to cover the existing gas cylinder storage area. Gas cylinder storage and handling has been upgraded at TA-54, Area L. Upgrades include paving of storage area, electrically grounding of storage racks, replacing all wooden crates with steel baskets, and purchasing a permanent cover for the gas cylinder storage area and installing the dome cover.

4.6 Area L Pad and Facility Construction

The existing LLMW liquids storage pad will be extended to the west and covered with asphalt to provide additional waste storage. The first phase in the recommended upgrade of the facility would be to construct the new paving, curbs, and staging area in this area without disturbing the present storage. This area can then be used for temporary storage of some drums while the structure is being erected. Drums will be protected from falling equipment, building materials, and tools during construction operations. This will allow the required space needed to build the structure inside the Area L site. By using this incremental construction progression, the facility can be completed with minimal double-handling of stored waste.

Once the new pad and curbing have been completed, the sprung instant structure can be erected over the pad with the stored mixed waste in place. At this point, ventilation, fire protection, fire detection, evacuation alarms, telephone, lightning protection, and other required equipment may be installed to complete the facility.

Electrical service is being upgraded and placed below ground. Fire protection, telephone, and evacuation alarm systems may be connected to Building 54-37. Fire water supply is available from an existing hydrant located on the east side of Mesita Del Buey Road between Buildings 54-37 and 54-51. The existing water supply line is being upgraded.

4.7 Fire Protection, Detection, and Alarm Systems

UL-listed portable fire extinguishers will be provided and installed in the structure. A remote alarm system meeting the requirements of NFPA 72E will be installed in the facility to detect potential smoke or extreme heat from a fire within the storage location.

5.0 MIXED WASTE RECEIVING AND STORAGE FACILITY

The MWRSF has been designed to support the Hazardous Waste Treatment Facility by providing storage , repackage , and/or overpack facilities for mixed waste generated at various laboratories and research facilities at LANL.

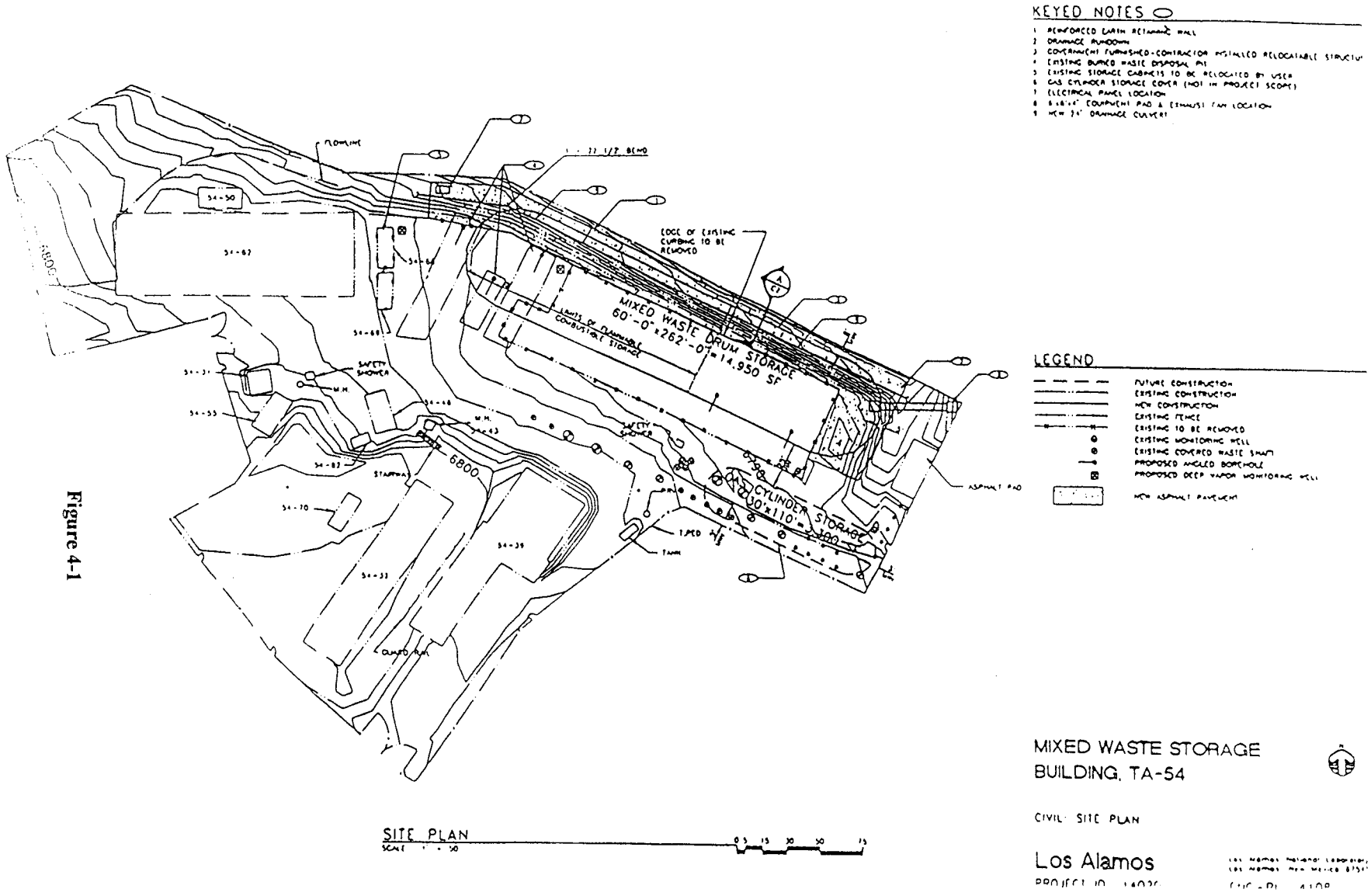
KEYED NOTES
LEGEND
MIXED WASTE DRUM STORAGE
60'-0" x 262'-0" = 14,950 SF
CYLINDER STORAGE
SITE PLAN
MIXED WASTE STORAGE
BUILDING, TA-54
CIVIL SITE PLAN
Los Alamos

Figure 4-1

5.1 Project Description

At present, the MWRSF is designed to accommodate only those mixed wastes generated by existing and future operations at LANL and any legacy wastes already stored at LANL. The facility is not designed or expected to treat wastes from sources other than these. It is planned that this facility will replace the LLMW single access at TA-54 Areas L and G.

No treatment or disposal of these wastes will be accomplished within the storage facility. Wastes received at the facility will be inventoried, characterized (if required) and stored for later processing. Stored waste will be prepared for treatment or size reduction at other LANL facilities, such as the Controlled Air Incinerator or the Hazardous Waste Treatment Facility.

5.2 Physical Description of Project

The final design specifics are still under review at this time. The following description is representative of the expected facility functions. Specific details such as conference areas, number of offices etc. are not yet final. The MWRSF will consist of a 16,100 square-foot single story building. The building will be classified as a Non Reactor Nuclear Facility and will be designed to the general design criteria specified in DOE Order 6430.1A. Space for the various functions within the building will be allocated as follows.

- Receiving/Loading Dock - 2080 square feet
- Flammable Storage - 3500 square feet
- Non-Flammable Storage - 5900 square feet
- Bulking/Repacking - 480 square feet
- Change Rooms/Airlocks - 1180 square feet
- Support Office Space - 2200 square feet
- Mechanical/Electrical Rooms - 760 square feet.

The receiving and storage areas of the building will be constructed of reinforced concrete or such other materials that will meet the requirements of DOE 6430.1A and LANL building codes. The office portion of the building will most likely be a prefabricated steel structure.

The primary storage areas will be high-bay facilities with overhead cranes for handling the waste storage containers. To improve facility safety, wastes to be handled or stored within the facility will be segregated by their flammable and reactive characteristics. Highly reactive chemicals will be stored in individual safe store units within the facility. The receiving/loading area will consist of a standard loading dock with dock levelers enclosed within a protective air lock to prevent any escape of contaminated materials in case of an accidental spill during loading/unloading operations. Wastes will be received and stored in DOT-approved shipping containers. Waste containers will be handled in this area with light-weight manual and electric lifts and fork trucks.

The bulking and repackaging area will be used to inspect, characterize and repackage both liquid and dry wastes. The area will be provided with appropriate equipment for the safe opening of waste containers. Once opened, container contents will be inspected and sampled for characterization tests if necessary. Similar wastes will be consolidated in order to make waste treatment processes more efficient. For example, flammable solvents may be transferred from existing small volume containers (1 liter to 5 gallon) to 55-gallon drums for eventual incineration in the Controlled Air Incinerator. Repackaged wastes will be stored within the storage building or be moved to the appropriate treatment building.

The support office and conference area for the Mixed Waste Receiving and Storage Building will be a single story addition to the main storage facility. Primary access control to the storage facility will be through the support area. Entrance to and from the storage and repackaging areas and the exterior yard will be through

the support area and the change rooms. The support area will provide office space for record-keeping functions and a break and lunch room facility for employees.

The storage building is designed to provide maximum control of potential contaminants and is also designed for maximum safety in handling mixed wastes including flammable and reactive wastes. All aspects of the project will be designed in accordance with the mandatory safety and health standards listed in DOE Order 5480.4 and LANL's *Environment, Safety, and Health Manual*.

Some specific containment/safety features of the building are as follows:

- Containment perimeter of the building to be constructed of reinforced concrete designed to withstand damage from natural hazards such as high winds and earthquake.
- Air locks provided at all standard and emergency entrances and exits.
- Personnel and vehicle monitoring required upon exit of the controlled areas.
- Personnel decontamination and change rooms provided; vehicle decontamination facility to be located nearby.
- All floor surfaces and walls to a height of 4 feet above the floor within the storage, repackaging, and loading areas will be finished with a corrosion resistant and easily decontaminated coating material.

Extensive secondary and even tertiary containment features for spill control and fire water retention will be designed into the project. Other building safety design features will include breathing air supply points, spill monitoring equipment, and CAMs. All air exhaust stacks to be manifolded together to exhaust through a single exhaust stack. All exhausts will be HEPA-filtered and directed through a chemical scrubbing unit. The primary exhaust stack will be monitored in accordance with DOE 5400 series Radiological Effluent Monitoring and Environmental surveillance requirements.