National Nuclear Security Administration

**DEPARTMENT OF ENERGY**
National Nuclear Security Administration
Los Alamos Site Office
Los Alamos, New Mexico 87544

DEC 16 2004

Mr. John E. Kieling
Manager, Permits Management Program
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303



Subject: Submittal of Revised Closure Plans for Interim Status Container Storage Units-Technical Area (TA) 50, Building 1, Room 59 and TA-50, Building 37, Rooms 13 and 118; and TA-55, Room B38, Los Alamos National Laboratory (LANL)

Dear Mr. Kieling:

This letter submits revised closure plans for the units referenced above. A letter dated November 16, 2004 from your office approved the closure plans for these units and required changes to be made to the plans. The attached closure plans incorporate the changes required.

- LANL TA-50 Closure Plan for Interim Status Container Storage Units TA-50-1, Room 59 and TA-50-37, Revision 1.1, December 2004 (LA-UR-04-8494)
- LANL TA-55 Closure Plan for the B38 Container Storage Unit, Revision 0.1, December 2004 (LA-UR-04-8493).

Revisions to the closure plans were made as described in the approval letter's attachment, with one additional modification. One of the required changes to the closure plan for the TA-55 B38 container storage unit was edited. At the request of your office, LANL clarified the type and preparation of the blank sample to be used. This change was to be made within Section 8.0, "Verification of Decontamination." Instead, Section 8 was modified to contain the following sentence, "Sample blanks (field blanks and trip blanks) will be prepared as described in Section 11.3.1 of this closure plan." Then, Section 11.3.1 was modified to contain the statement, "The sample wash water blank (trip blank) will be prepared by the analytical laboratory. It will consist of deionized water. The blank container will remain closed on site." These changes clarify the type of blank to be used; and how it will be prepared and handled as required by the November 16, 2004 letter.

Included with this letter is a version of each closure plan containing editing marks as well as a clean version of each plan. Should you have any comments or questions, please contact either Gene Turner of my staff at (505) 667-5794 or Jack Ellvinger, UC, at (505) 667-0633.

Sincerely,

Edwin L. Wilmot
Manager

EM:5GT-019

Enclosure

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# CERTIFICATION

Los Alamos National Laboratory
TA-50 Closure Plan for TA-50-1, Room 59 and TA-50-37, Revision 1.1
December 2004

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Kenneth M. Hargis — 12/10/04

**Kenneth M. Hargis**
Division Director
Environmental Stewardship Division
Los Alamos National Laboratory

Date Signed

12/16/04

**Edwin L. Wilmot**
Manager, Los Alamos Site Office
National Nuclear Security Administration
U.S. Department of Energy
Owner/Operator

Date Signed

TA 50



LA-UR-04-8494
December 2004

# Los Alamos National Laboratory
# Technical Area 50

# Closure Plan for
# Interim Status Container Storage Units
# TA-50-1, Room 59 and TA-50-37

# Revision 1.1

Prepared by:

*Los Alamos National Laboratory*
*Los Alamos, New Mexico 87545*

LA-UR-04-8494
~~July 2003~~December 2004

# Los Alamos National Laboratory
# Technical Area 50

# Closure Plan for
# Interim Status Container Storage Units
# TA-50-1, Room 59 and TA-50-37

## Revision 1.1~~0~~

Prepared by:

*Los Alamos National Laboratory*
*Los Alamos, New Mexico 87545*

# Los Alamos National Laboratory
# Technical Area 50

# Closure Plan for
# Interim Status Container Storage Units

# TA-50-1, Room 59 and TA-50-37

**Revision 1.01**
**LA-UR-04-8494**

| | |
|---|---|
| **Facility ID No.:** | **NM0890010515** |
| **Facility Name:** | **Los Alamos National Laboratory** |
| **Legal Owner:** | **U.S. Department of Energy** |
| **Legal Operators:** | **U.S. Department of Energy**<br>**Los Alamos Area Office**<br>**528 35th Street**<br>**Los Alamos, New Mexico 87544**<br><br>**University of California**<br>**P.O. Box 1663**<br>**Los Alamos, New Mexico 87544** |
| **Contact Person:** | **~~Ralph E. Erickson~~Edwin L. Wilmot**<br>**Director, Los Alamos Site Office**<br>**U.S. Department of Energy**<br>**Albuquerque Operations**<br>**Owner/Operator** |
| **Date:** | **~~July 2003~~December 2004** |

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## LIST OF ABBREVIATIONS/ACRONYMS

| | |
|---|---|
| 20.4.1.600 NMAC | New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart VI |
| °C | degrees Celsius |
| CAI | Controlled Air Incinerator |
| CFR | Code of Federal Regulations |
| CSU | container storage unit |
| DOE | U.S. Department of Energy |
| EPA | U.S. Environmental Protection Agency |
| ft | feet/foot |
| HSR-1 | Health, Safety, and Radiation Protection Division, Health Physics Operations Group |
| HSR-5 | Health, Safety, and Radiation Protection Division, Industrial Hygiene and Safety Group |
| LANL | Los Alamos National Laboratory |
| LASO | Los Alamos Site Office |
| MSSL | Medium Specific Screening Level |
| NMED | New Mexico Environment Department |
| PPE | personal protective equipment |
| QA | quality assurance |
| QC | quality control |
| RLWTF | Radioactive Liquid Waste Treatment Facility |
| RRES | Risk Reduction and Environmental Stewardship Division |
| SUP-3 | Supply Chain Management Division, Materials Management Group |

## LIST OF ABBREVIATIONS/ACRONYMS (continued)

| | |
|---|---|
| *SW-846* | EPA, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C. |
| SWRC | Solid Waste Regulatory Compliance Group |
| TA | technical area |
| WCRRF | Waste Characterization, Reduction, and Repackaging Facility |

# CLOSURE PLAN FOR INTERIM STATUS CONTAINER STORAGE UNITS TA-50-1, ROOM 59; AND TA-50-37

The information provided in this closure plan is submitted to address the applicable interim status closure requirements specified in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart VI (20.4.1.600 NMAC), Part 265, Subparts G and I, revised June 14, 2000 [6-14-00]. This closure plan describes the activities necessary to perform Resource Conservation and Recovery Act Closure for the Technical Area (TA) 50, Building 1 (TA-50-1), Room 59 and TA-50-37 interim status container storage units (CSUs) at the Los Alamos National Laboratory (LANL). Closure activities will include removal of any remaining waste; decontamination or removal of contaminated equipment and surfaces; and verification that all residues have been removed. In the event that closure by removal and decontamination of a CSU cannot be met, the closure plan will be modified to include alternative decontamination demonstrations or alternative closure requirements, as necessary. Closure activities will minimize the need for further maintenance, preclude the release of hazardous constituents to environmental media, and be protective of human health in accordance with the closure performance standards specified in 20.4.1.600 NMAC § 265.111 [6-14-00].

Although this closure plan is written in the future tense, decontamination and verification activities at the TA-50-1, Room 59 CSU were conducted from September 20, 2002 to September 23, 2002 in accordance with 20.4.1.~~500~~600 NMAC § 265~~4~~.112(e) [6-14-00] and the "Los Alamos National Laboratory Technical Area 50 Closure Plan for Container Storage Units TA-50-1, Room 59; TA-50-37; and TA-50-114," LA-UR-02-4729, submitted to the New Mexico Environment Department (NMED) in July 2002. Per the NMED's request, the original closure plan was withdrawn in a letter dated June 17, 2003. This closure plan revises the interim status closure plans for TA-50-1 and TA-50-37 written in 1992 and is intended to replace LA-UR-02-4729. It is organized as follows:

- Section 1.0 – General closure information.
- Section 2.0 – Description of the CSUs to be closed.
- Section 3.0 – Closure procedures.
- Section 4.0 – Sampling and analysis plan.
- Section 5.0 – Waste management.
- Section 6.0 – References.

Until closure is complete and has been certified in accordance with 20.4.1.600 NMAC § 265.115 [6-14-00], as discussed in Section 1.6, a copy of the approved closure plan and any approved revisions will be on file with the Risk Reduction and environmental Stewardship Division (RRES) Solid Waste Regulatory Compliance Group (SWRC) and at the U.S. Department of Energy (DOE) Los Alamos Site Office (LASO).

## 1.0 GENERAL CLOSURE INFORMATION

### 1.1 Closure Performance Standard [20.4.1.600 NMAC § 265.111]

The CSUs addressed in this closure plan will be closed to meet the following performance standards:

- Minimize the need for further maintenance,
- Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground, or surface waters, or to the atmosphere, and
- Comply with the closure requirements of 20.4.1.600 NMAC § 265, Subpart G [6-14-00], including, but not limited to the requirements of 20.4.1 NMAC §§ 265.178, 265.197, 265.228, 265.258, 265.280, 265.310, 265.351, 265.601 through 265.603, and 265.1102.

This will be accomplished by removal of waste from each CSU and decontamination, if necessary, of all surfaces and equipment that may have come into contact with the wastes. Decontamination activities will ensure the removal of hazardous waste residues to established cleanup levels.

### 1.2 Partial and Final Closure Activities [20.4.1.600 NMAC § 265.112(d)]

This closure plan has been written for partial closure rather than final closure of the entire LANL facility. Partial closure will consist of closing the CSUs located at TA-50-1, Room 59; and TA-50-37 while leaving the other regulated hazardous/mixed waste units at LANL in service. Partial closure (hereinafter referred to as closure) will be deemed complete when closure has been verified; all surfaces and equipment have been decontaminated, or otherwise properly disposed, if necessary; closure certification has been submitted to the NMED; and the NMED has approved the closure. Final closure will occur when the remaining hazardous/mixed waste management units at LANL are closed.

1.3 Closure Schedule [20.4.1.600 NMAC §§ 265.112(b) (6), 265.112(e), and 265.113]

Written notification will be provided to the NMED 45 days before the start of closure activities for the CSUs addressed in this closure plan. However, pursuant to 20.4.1.600 NMAC § 265.112(e) [6-14-00], removing hazardous wastes and decontaminating or dismantling equipment in accordance with an approved closure plan may be conducted at any time before or after notification of closure. Closure activities will begin according to the requirements of 20.4.1.600 NMAC § 265.112(d) (2) [6-14-00]. Treatment, removal, or disposal of hazardous wastes will begin in accordance with the approved closure plan, as required by 20.4.1.600 NMAC § 265.113(a) [6-14-00], within 90 days after final receipt of waste at each CSU. This timeframe will be met as long as facilities are available for treatment, storage, or disposal of these wastes. In the event that closure activities cannot begin within 90 days, LANL will notify the Secretary of the NMED in accordance with the extension requirements in 20.4.1.600 NMAC § 265.113(a) [6-14-00]. Closure activities and reporting requirements will be completed within 180 days of the receipt of the final volume of waste at each CSU. Closure will be conducted in accordance with the schedule presented in Table 1 of this closure plan.

**Table 1**
**Closure Schedule**

| Activity | Maximum Time Required[a] |
|---|---|
| Submit Closure Plan. | -90 Days |
| Notify the NMED of intent to close. | -45 Days |
| Final receipt of waste. | Day 0 |
| Removal of waste. | Day 5 |
| Decontaminate surfaces and equipment. | Day 10 |
| Sample excess used decontamination water for disposal. | Day 10 |
| Perform verification sampling. | Day 20 |
| Evaluate analytical data from verification sampling. | Day 50 |
| Perform additional decontamination, if necessary. | Day 55 |
| Perform additional verification sampling, if necessary. | Day 60 |
| Evaluate additional analytical data. | Day 75 |
| Perform final clean up and disposal (i.e., removal of decontaminated equipment and decontamination waste). | Day 140 |
| Prepare closure report. | Day 150 |
| Certify closure. | Day 175 |
| Submit final report to NMED. | Day 180 |

[a] The schedule above indicates calendar days from the beginning by which activities will be completed. Some activities may be conducted simultaneously and/or may not require the maximum time listed. Extensions to this schedule may be requested, as needed.

NMED = New Mexico Environment Department

In the event that closure cannot proceed according to schedule, LANL will notify the Secretary of the NMED in accordance with extension request requirements in 20.4.1.600 NMAC § 265.113(b) [6-14-00]. In addition, the demonstrations in 20.4.1.600 NMAC §§ 265.113(a) (1) and (b) (1) [6-14-00], will be made in accordance with 20.4.1.600 NMAC § 265.113(c) [6-14-00].

## 1.4 Amendment of the Closure Plan [20.4.1.600 NMAC § 265.112(c)]

In accordance with 20.4.1.600 NMAC § 265.112(c) [6-14-00], LANL will submit a written change to the approved closure plan whenever:

- There are changes in operating plans or facility design that affect the closure plan.
- There is a change in the expected date of closure.
- Unexpected events occur during closure that requires modification of the approved closure plan.
- The owner or operator requests the Secretary of the NMED to apply alternative requirements to a regulated unit under 20.4.1.600 NMAC §§ 265.90(f) and/or 265.110(c).

The written notification or request will include a copy of the amended closure plan for approval by the NMED.

LANL will submit a written request for a permit modification with a copy of the amended closure plan at least 60 days prior to the proposed change in unit design or operation or no later than 60 days after an occurrence of an unexpected event that affects the closure plan. If the unexpected event occurs during closure, the permit modification will be requested within 30 days of the occurrence. The Secretary of the NMED may request a modification of the closure plan under the conditions presented in the bulleted items above. LANL will submit the modified plan in accordance with the request within 60 days of notification or within 30 days of notification if a change in facility condition occurs during the closure process.

## 1.5 Closure Cost Estimate, Financial Assurance, and Liability Requirements [20.4.1.600 NMAC § 265.140(c)]

In accordance with 20.4.1.600 NMAC § 265.140(c) [6-14-00], LANL, as a federal facility, is exempt from the requirements of 20.4.1.600 NMAC Subpart H [6-14-00], to provide a cost estimate, financial assurance mechanisms, and liability insurance for closure actions.

## 1.6 Closure Certification [20.4.1.600 NMAC § 265.115]

Within 60 days after completion of closure activities at the CSUs or final closure of the facility, LANL will submit to the Secretary of the NMED, via certified mail, a certification that the CSUs have been closed in accordance with the approved closure plan. The certification will be signed by the appropriate DOE and LANL officials and by an independent, registered professional engineer in accordance with 20.4.1.600 NMAC § 265.115 [6-14-00]. Documentation supporting the independent, registered engineer's certification will be furnished to the Secretary of the NMED upon request, as specified in 20.4.1.600 NMAC § 265.115 [6-14-00]. Both DOE/LASO and SWRC will maintain a copy of the certification and supporting documentation.

## 1.7 Security

Because of the ongoing nature of operations at TA-50, site security will be maintained by the DOE or another authorized federal agency for as long as necessary to prohibit public access. The security fence at TA-50 will be maintained to ensure that public access is prevented.

## 1.8 Closure Report

Upon completion of the closure activities, a closure report will be prepared and submitted to the Secretary of the NMED. The report will document the closure and contain the following:

- A copy of the certification described in Section 1.6 of this closure plan.
- A general summary of closure activities.
- Any significant variance from the approved activities and the reason for the variance.
- A summary of all sampling results, showing:
  - Sample identification.
  - Sampling location.
  - Datum reported.
  - Detection limit for each datum.
  - A measure of analytical precision (e.g., uncertainty, range, variance).

- Identification of analytical procedure.
- Identification of analytical laboratory.

- A quality assurance (QA)/ quality control (QC) statement on analytical data validation and decontamination verification.

- The location of the file of supporting documentation, including:
  - Field logbooks.
  - Laboratory sample analysis reports.
  - QA/QC documentation.
  - Chain-of-custody forms.

- Storage or disposal location of regulated hazardous/mixed waste resulting from closure activities.

- A certification of accuracy of the report.

## 2.0 DESCRIPTION OF UNITS

TA-50 is located at the northeast corner of the intersection of Pajarito Drive and Pecos Road, on the finger mesa bounded by Mortandad Canyon to the north and Two-Mile Canyon to the south. Figure 1 shows the location of TA-50 at LANL. Figure 2 provides the location of each CSU to be closed. The following sections provide detailed descriptions of the interim status units to be closed.

### 2.1 TA-50-1, Room 59

The TA-50-1, Room 59 CSU is located at the northeast end of the Radioactive Liquid Waste Treatment Facility (RLWTF). The room is constructed of pre-engineered steel framing and insulated metal roofing and siding. The CSU was used for mixed waste storage of 30- and 55-gallon drums in support of operations at the RLWTF. The CSU consists of a 10 foot (ft) wide by 19-ft long area in the northwest corner of the room as indicated on Figure 3. A photograph of the CSU is provided as Figure 4.

### 2.2 TA-50-37

The TA-50-37 CSU is located in a two-story building that contains offices, laboratories, two process bays, an egress bay, and a mechanical equipment area. The CSU consists of two storage locations in Rooms 115 and 118 on the first floor of the building as indicated on Figure 5. Room 115 is in the west central portion of the building and measures 10-ft wide by 21-ft long. Room 118 is located in the eastern portion of the building and measures 31-ft wide by 40-ft long. Photographs

of the CSU are provided as Figures 6 and 7, respectively. The TA-50-37 CSU was intended for hazardous and mixed waste storage of 5-, 30-, 55-, 83-, 85-, and 110-gallon drums/containers and standard waste boxes in support of the Waste Characterization, Reduction and Repackaging Facility (WCRRF) at TA-50-69 and at TA-50-37.

TA-50-37 previously housed the Controlled Air Incinerator (CAI) associated with the Treatment Development Facility at LANL. This incinerator received a Toxic Substances Control Act incineration permit in 1984 and a Resource Conservation and Recovery Act operating permit for hazardous waste in 1989. In 1995, it was determined that waste incineration would not be performed at the CAI. In 1996, closure of the CAI was initiated in accordance with an approved NMED closure plan.

## 2.3 Estimate of Maximum Waste in Inventory

The maximum total inventory of waste in storage at any time in the CSUs is estimated as follows:

- TA-50-1, Room 59 –1,485 gallons.
- TA-50-37, Room 115 – 220 gallons.
- TA-50-37, Room 118 – 5,500 gallons.

## 2.4 Description of Stored Waste

The CSUs addressed in this closure plan, were used to store waste generated from various research activities, material processing and recovery operations, and decontaminating and decommissioning operations conducted at various TAs throughout LANL. The following sections provide information regarding the waste types stored at the CSUs, as determined by the operating record and historical knowledge.

### 2.4.1 TA-50-1, Room 59

The TA-50-1, Room 59 CSU stored containers of mixed waste with potential residual free liquids. The majority of the waste stored in the CSU consisted of solid mixed waste generated by cementation operations in Room 60 of the RLWTF. Additional types of waste included items associated with decontamination and process operations at the TA-50-1 RLWTF. Table 2 provides a list of applicable compounds and associated U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers based on the operating record of the unit.

**Table 2**
**Hazardous Waste Constituents Stored at the TA-50-1, Room 59[a] Container Storage Unit**

| Category | EPA Hazardous Waste Numbers | Specific Constituents |
|---|---|---|
| RCRA Metals | D004, D005, D006, D007, D008, D009, D010, and D011 | Arsenic, Barium Hydroxide, Cadmium, Chromium, Lead, Mercury, Selenium, Silver |
| VOC | F003 | Acetone |
| SVOC | Not Applicable | N-Nitrosodimethylamine, Diethylphthalate, Di-n-Butylphthalate, Bis-2-Ethylhexlphthalate |

[a] Based on the TRUCON Code (LA111/211) assigned to the cement drums generated in Room 60 of the RLWTF.

EPA = U.S. Environmental Protection Agency
RCRA = Resource Conservation and Recovery Act
RLTWF = Radioactive Liquid Waste Treatment Facility
SVOC = semi-volatile organic compounds
VOC = volatile organic compounds

### 2.4.2 TA-50-37

The TA-50-37 CSU stored containers of mixed waste with potential residual free liquids. The CSU was used as a staging area for waste in support of waste characterization, segregation, and decontamination activities associated with operations of the WCRRF prior to long term storage at TA-54 and/or shipment to the Waste Isolation Pilot Plant for disposal. Due to the proximity of the CSU to the former CAI, LANL will close the unit conservatively and verify that constituents associated with the operations of the CAI did not contaminate the surfaces of the CSU. Table 3 provides a list of potential hazardous waste constituents and applicable EPA Hazardous Waste Numbers found during closure of the CAI as discussed in "Los Alamos National Laboratory Controlled-Air Incinerator Resource Conservation and Recovery Act Closure Report and Certification" (Benchmark, 1998).

**Table 3**
**Hazardous Waste Constituents Associated with the Controlled Air Incinerator at the TA-50-37 Container Storage Unit**

| Category | EPA Hazardous Waste Numbers | Constituents/Comments [a] |
|---|---|---|
| RCRA Metals | D004, D005, D006, D007, D008, and D009 | Arsenic, Barium, Cadmium, Chromium, Lead, Mercury |
| VOC | F002, F003, U165 | Acetone, Methylene Chloride, Naphthalene, Trans-1,2-Dichloroethene |
| SVOC | Not Applicable | Bis (2-ethyl hexyl phthalate) |
| PCB[b] | Not Applicable | The CAI treated a small amount of PCBs and organic compounds (Benchmark, 1998). Swipe sampling results conducted during closure of the CAI indicated the presence of PCBs. |

[a] Based on swipe sampling results conducted during closure of the CAI (Benchmark, 1998).
[b] PCBs contamination, if any, will be removed in accordance with applicable TSCA regulations.

CAI = Controlled Air Incinerator
EPA = U.S. Environmental Protection Agency
PCB = polychlorinated biphenyls
RCRA = Resource Conservation and Recovery Act
SVOC = semi-volatile organic compounds
TSCA = Toxic Substances Control Act
VOC = volatile organic compounds

## 3.0 CLOSURE PROCEDURES

### 3.1 Removal of Waste

Prior to initiation of closure activities, all waste will be removed from the CSUs and transported for storage/disposal. The containers will be removed using forklifts and/or manually handled with dollies depending on the size and weight of the container. Each container will be placed onto a flatbed truck or trailer for transport and will be accompanied by the appropriate shipping papers during transport. Containers will be transported to an approved LANL on-site CSU or permitted off-site treatment, storage, or disposal facility.

### 3.2 Preliminary Closure Procedures

#### 3.2.1 Safety Precautions

Job hazards associated with closure activities will be identified, controls developed, and workers briefed before closure activities are conducted, in accordance with LANL safety procedures. Personnel involved in closure activities will wear appropriate personal protective equipment (PPE), specified by the Health Physics Operations Group (HSR-1) and the Industrial Hygiene and Safety Group (HSR-5), and will follow good hygiene practices to protect themselves from exposure to hazardous and/or mixed waste. The level of PPE that will be required will depend upon the levels of radiological and/or chemical contamination detected, if any. If HSR-1 and HSR-5 surveys indicate no detectable contamination levels, minimum PPE requirements will consist of coveralls, steel-toed shoes, and safety glasses or face shields. If an overhead danger is present, hard hats will be worn. All workers involved in closure activities will be required to have appropriate training including Hazardous Waste Operations and Emergency Response Training for general site workers (24 hour and refresher) and TA-50 site-specific training for the RLWTF and TA-50-37, as appropriate. Personnel may also be required to have Radiation Worker, Level II training based on the radiological survey conducted at TA-50-1, Room 59 prior to the commencement of closure. Contaminated PPE will either be decontaminated or managed in compliance with appropriate waste management regulations.

### 3.2.2 Structural Assessment

Preventive maintenance inspections are conducted weekly at each of the TA-50 CSUs while waste is in storage. If any defects, deterioration, damage, or hazards affecting containment have developed, appropriate remedial actions (including sampling, repairs, maintenance, or replacement) are completed immediately. Prior to beginning any decontamination activities at the CSUs, the base or secondary containment of each CSU will be inspected for any cracks or conditions that could potentially lead to loss of decontamination water and/or verification wash water during closure. If a crack or gap is present, a swipe sample or a representative sample of the media (i.e., concrete, metal) will be taken to determine the presence of contamination. The sample will be analyzed for the hazardous ~~contaminates~~ contaminants identified in Tables 2 or 3 of this closure plan. If contamination is present, the surface flaw will be decontaminated prior to repairing the crack/gap. Complete or partial removal (e.g., scrabbling) of the material may be performed until contamination is no longer detected. If partial removal is successful in eliminating the contamination, it will be assumed that the remaining material, including underlying soil, is clean.

### 3.2.3 Waste Management

Used wash water will be collected, transferred to containers, sampled, and analyzed for the hazardous constituents listed in Tables 2 and 3, as appropriate. The results of this analysis will determine if the used wash water should be managed as hazardous or non-hazardous wastewater. The wastewater, PPE, and any other waste generated as a result of closure will be managed as discussed in Section 5.0.

## 3.3 Decontamination Procedures

To the extent possible, all contaminated surfaces and equipment (if present) will be decontaminated. Surfaces and equipment that cannot be decontaminated will be containerized and managed in compliance with applicable regulations. All sampling conducted during closure and decontamination will be done in accordance with QA/QC procedures defined by "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (*SW-846)* (EPA, 1986). Closure will be conducted in accordance with the schedule presented in Table 1. Monitoring for contamination will occur throughout closure activities, as appropriate.

### 3.3.1 Equipment Located in the CSUs

The TA-50 CSUs have a variety of equipment that must be removed, decontaminated, and/or

disposed of prior to decontamination of the main surfaces associated with each unit. This includes all portable equipment such as pallets, drum dollies, and carts that are used to manage waste at the CSUs. This equipment will be decontaminated, characterized, and/or disposed of based upon the level of contamination and future use. The used wash water will be collected, transferred to a container, and sampled to determine an appropriate location for disposal. The samples will be analyzed for the constituents identified in Tables 2 and 3, as appropriate.

### 3.3.2 TA-50-1, Room 59 Decontamination

Decontamination of the TA-50-1, Room 59 CSU will be conducted using mops, cloths, and/or other absorbent materials to remove any potential hazardous constituents. These materials will be rinsed in a wash water solution (e.g., Alconox, water) and used to wipe down the walls and floor. The TA-50-1, Room 59 CSU has two walls, a roll up door, and is open to the rest of Room 59 on the east side. Prior to the commencement of closure, plastic will be hung from the ceiling on the east side of the CSU to prevent cross contamination to operations conducted in the remaining portions of the room.

The containers stored in the CSU were not stacked beyond the height of a 55-gallon drum and were not opened within the unit and there is no record of any spills. For these reasons, decontamination will begin with the wash down of the walls to a height of 4-ft (i.e., the height of a 55-gallon drum). After the walls have been decontaminated, the floor will be wiped down. The CSU does not have recess areas (i.e., sumps) so used wash water will be contained, collected, removed, and transferred to an appropriate container for analysis.

When decontamination of the CSU is complete, verification will be conducted as indicated in Section 3.4. If analysis from the verification indicate that hazardous constituents are present, wash cycles and analyses will continue as described above until the walls and floor have been decontaminated or the decision is made to proceed with an alternate demonstration of decontamination as described in Section 3.5.

### 3.3.3 TA-50-37 Decontamination

Decontamination will be conducted using mops, cloths, and/or other absorbent materials to remove any potential hazardous constituents. These materials will be rinsed in a wash water solution (e.g., Alconox, water) and used to wipe down the walls and floor.

Decontamination of Room 115 will begin with the wash down of all four walls to a height of approximately 4-ft. After the walls have been decontaminated, the floor and containment berms located in the room will be wiped down. Room 115 does not have any recessed areas (i.e., sumps) so excess used wash water will be contained, collected, removed, and transferred to an appropriate container for analysis.

Decontamination of Room 118 will begin with the wash down of all four walls to a height of approximately 4-ft. Room 118 has a recessed sump located underneath a steel plate welded to a grate that is located in the center of the room. The sump has a pump and piping connected to a standpipe for removal of liquids. The sump will be bermed during the decontamination process to prevent wash water from collecting in the sump. When the walls and floor of the CSU have been decontaminated the sump will be wiped down and the used wash water contained, collected, removed, and transferred to an appropriate container for analysis.

When decontamination of the CSU storage locations is complete, verification will be conducted as indicated in Section 3.4. If analysis from the verification indicates that hazardous constituents are present, wash cycles and analyses will continue as described above until the walls and floor have been decontaminated or the decision is made to proceed with an alternate demonstration of decontamination as described in Section 3.5.

### 3.3.4 Equipment Used During Closure

Reusable protective clothing, tools, and equipment used during decontamination activities at the CSUs will be cleaned with a wash water solution. Residue, disposable equipment and reusable equipment that cannot be decontaminated will be containerized and managed as waste in accordance with LANL waste management procedures, depending on the regulated constituents present.

## 3.4 Verification of Decontamination

### 3.4.1 Methodology

LANL proposes analysis of verification solution samples for decontamination verification at the TA-50 CSUs addressed in this plan, utilizing the following methodology:

1. Minimize dilution of potential hazardous constituents by limiting the verification solution to an amount that is sufficient to wipe down the surface to be verified and collect the required number of samples.

2. Limit the sampling area to a specific discrete location (e.g., a wall or portion thereof depending on the size of the unit).

3. Verify decontamination by comparing the discrete sample results to a baseline sample result obtained from the verification solution prior to its use for the verification wipe down.

4. If the result is at or below that of the baseline, the decontamination is verified for the discrete area sampled.

5. If the result is above the baseline, repeat the decontamination and verification of the discrete location in accordance with Sections 3.3 and 3.4 of this closure plan.

This proposed method minimizes dilution and establishes criteria by which successful decontamination can be verified. Analytical procedures will conform to methods found in the most current version of *SW-846* (EPA, 1986).

### 3.4.2 Decontamination Demonstration Criteria

Successful decontamination will meet a minimum of one of the following four criteria:

- No detectable hazardous waste or hazardous waste constituents from container storage activities are identified in the verification solution sample.

- Detectable hazardous waste or hazardous waste constituents from container storage activities in the final verification solution sample are removed to statistically significant levels based on baseline concentrations in the clean verification solution.

- Detectable hazardous waste or hazardous waste constituents from container storage activities in the final sample are at or below levels agreed upon with the NMED.

- Detectable hazardous waste or hazardous waste constituent concentrations from container storage activities do not significantly decrease after several wash downs. In such an event, hazardous constituents that pose an acceptable risk will be allowed to remain, as mutually agreed upon with the NMED.

### 3.4.3 Verification Procedure

Verification of clean closure at the TA-50-1, Room 59; and TA-50-37 CSUs will be accomplished using verification solution sampling of the discrete surfaces specified in Table 4.

**Table 4**
**Discrete Locations and Approximate Areas for Verification Sampling**

| Location | Sample Description | Approximate Area ($ft^2$) |
|---|---|---|
| TA-50-1, Room 59 | North Wall | 40 |
| | West Wall | 76 |
| | South Wall | 40 |
| | Floor (north half) | 95 |
| | Floor (south half) | 95 |
| TA-50-37, Room 115[a] | West Section (3 walls and floor) | 153 |
| | Middle Section (2 walls and floor) | 153 |
| | East Section (3 walls and floor) | 153 |
| TA-50-37, Room 118[a] | West Wall #1 | 62 |
| | West Wall #2 | 62 |
| | South Wall #1 | 80 |
| | South Wall #2 | 80 |
| | East Wall #1 | 62 |
| | East Wall #2 | 62 |
| | North Wall #1 | 80 |
| | North Wall #2 | 80 |
| | Floor #1 (quadrant 1) | 155 |
| | Floor #2 (quadrant 1) | 155 |
| | Floor #3 (quadrant 2) | 155 |
| | Floor #4 (quadrant 2) | 155 |
| | Floor #5 (quadrant 3) | 155 |
| | Floor #6 (quadrant 3) | 155 |
| | Floor #7 (quadrant 4) | 155 |
| | Floor #8 (quadrant 4) | 155 |
| | Sump (4' x 4' x 4') | 64 |

[a] Per letter to Steve Jetter, "Confirmation of Agreement on Closure Procedure for Technical Area 50, Building 37 (TA-50-37), Los Alamos National Laboratory (LANL)," Hazardous Waste Bureau, New Mexico Environment Department, February 3, 2003.

$ft^2$ = square feet

For each surface, a new container will be prepared containing water and Alconox. A mop, cloth, and/or other absorbent material will be submerged into the container and squeezed out prior to wiping down the discrete CSU surface to be verified. This process will be repeated until the entire discrete surface has been wiped down. Then the verification solution will be sampled for analysis according to Section 4.0 of this closure plan.

### 3.5 Alternative Demonstration of Closure

An alternate demonstration of decontamination may be justified at the TA-50 CSUs addressed in this plan, if decontamination methods described in Section 3.3 are not feasible. LANL proposes the following alternate demonstrations:

- Comparison of the verification analytical results to the EPA Region 6 Medium Specific Screening Levels (MSSL) for tap water. If the result is below the MSSL decontamination at the CSU will be considered complete.
- Assessment of residual (i.e., above the MSSL) contamination levels using an occupational risk based scenario.

## 4.0 SAMPLING AND ANALYSIS PLAN [20.4.1 NMAC § 265.112(b) (4)]

The following sections describe procedures and methods for sampling, analysis, and documentation applicable to closure activities. Sampling will be conducted in accordance with procedures given in *SW-846* (EPA, 1986) or other approved procedures or methods.

### 4.1 Sampling Strategy/Approach

Sampling activities will be conducted to verify that the decontamination efforts described in Section 3.3 were effective at removing hazardous constituents, if any, from the surfaces of the CSU. Samples will be collected according to the methods and procedures provided in this section from discrete locations and analyzed for the appropriate hazardous constituents identified in Table 2 of this closure plan. Prior to the commencement of verification sampling, three baseline samples will be collected from the verification solution. These results from these samples will be used to determine if the equipment used for closure ~~to determine if these materials~~ contribute any contaminants to the samples.

For each surface, a new container will be prepared containing water and Alconox. A mop, cloth, and/or other absorbent material will be submerged into the container and squeezed out prior to wiping down the discrete CSU surface to be verified. To minimize dilution of the samples, the solution used for the wipe down will be limited to a quantity sufficient to collect the appropriate number of samples. Verification sampling for this CSU will be conducted first for the walls and then the secondary containment/floor of each cell to prevent cross contamination of the samples and allow for the identification of hot spots. Tables 5 and 6 identify the sample locations, types, and required analysis applicable to the closure of each CSU.

## Table 5
## Sample Types, Locations, and Required Analysis for the TA-50-1, Room 59 Container Storage Unit

| Sample Type | Description | Location | Required Analysis |
|---|---|---|---|
| Baseline #1 | Sample collected from a container of verification solution prior to use.<br><br>There are three samples collected for statistical comparison | Not Applicable | RCRA Metals, VOC, and SVOC |
| Baseline #2 | | Not Applicable | RCRA Metals, VOC, and SVOC |
| Baseline #3 | | Not Applicable | RCRA Metals, VOC, and SVOC |
| Verification | Sample collected from a verification solution container after the solution has been used to wash down the discrete surface.<br><br>There is at least one sample per analyte collected for each discrete location | North wall | RCRA Metals, VOC, and SVOC |
| | | West wall | RCRA Metals, VOC, and SVOC |
| | | South wall | RCRA Metals, VOC, and SVOC |
| | | Floor #1 (North) | RCRA Metals, VOC, and SVOC |
| | | Floor #2 (South) | RCRA Metals, VOC, and SVOC |
| Waste Sample | Sampled collected form the decontamination wash water. | NA | RCRA Metals, VOC, and SVOC |

RCRA = Resource Conservation and Recovery Act
VOC = volatile organic compound
SVOC = semi-volatile organic compound

## Table 6
## Sample Types, Locations, and Required Analysis for the TA-50-37 Container Storage Unit

| Container Storage Location | Sample Type | Description | Sample Description[a] | Required Analysis |
|---|---|---|---|---|
| Room 115 | Baseline #1 | Sample collected from a container of verification solution prior to use.<br><br>There are three samples collected for statistical comparison | NA | RCRA Metals, SVOC, and PCB |
| | Baseline #2 | | NA | RCRA Metals, SVOC, and PCB |
| | Baseline #3 | | NA | RCRA Metals, SVOC, and PCB |
| | Verification | Sample collected from a verification solution container after the solution has been used to wash down the discrete surface.<br><br>There is at least one sample per analyte collected for each discrete location | Floor and 4 ft up walls #1 (West) | RCRA Metals, SVOC, and PCB |
| | | | Floor and 4 ft up walls #2 (Middle) | RCRA Metals, SVOC, and PCB |
| | | | Floor and 4 ft up walls #3 (East) | RCRA Metals, SVOC, and PCB |
| | Waste Sample | Sampled collected form the decontamination wash water. | Decontamination Solution | RCRA Metals, SVOC, and PCB |

## Table 6 (continued)
## Sample Types, Locations, and Required Analysis for the TA-50-37 Container Storage Unit

| Container Storage Location | Sample Type | Description | Sample Description[a] | Required Analysis |
|---|---|---|---|---|
| Room 118 | Baseline #1 | Sample collected from a container of verification solution prior to use. There are three samples collected for statistical comparison | NA | RCRA Metals, VOC, and SVOC |
| | Baseline #2 | | NA | RCRA Metals, VOC, and SVOC |
| | Baseline #3 | | NA | RCRA Metals, VOC, and SVOC |
| | Verification | Sample collected from a verification solution container after the solution has been used to wash down the discrete surface. There is at least one sample per analyte collected for each discrete location | West Wall #1 | RCRA Metals |
| | | | West Wall #2 | RCRA Metals |
| | | | South Wall #1 | RCRA Metals |
| | | | South Wall #2 | RCRA Metals |
| | | | East Wall #1 | RCRA Metals |
| | | | East Wall #2 | RCRA Metals |
| | | | North Wall #1 | RCRA Metals |
| | | | North Wall #2 | RCRA Metals |
| | | | Floor #1 (quadrant 1) | RCRA Metals |
| | | | Floor #2 (quadrant 1) | RCRA Metals |
| | | | Floor #3 (quadrant 2) | RCRA Metals |
| | | | Floor #4 (quadrant 2) | RCRA Metals |
| | | | Floor #5 (quadrant 3) | RCRA Metals |
| | | | Floor #6 (quadrant 3) | RCRA Metals |
| | | | Floor #7 (quadrant 4) | RCRA Metals |
| | | | Floor #8 (quadrant 4) | RCRA Metals |
| | | | Sump (4 ft x 4 ft x 4 ft) | RCRA Metals, VOC, and SVOC |
| | Waste Sample | Sampled collected form the decontamination wash water. | NA | RCRA Metals, VOC, and SVOC |

[a] Per letter to Steve Jetter, "Confirmation of Agreement on Closure Procedure for Technical Area 50, Building 37 (TA-50-37), Los Alamos National Laboratory (LANL)," Hazardous Waste Bureau, New Mexico Environment Department, February 3, 2003.

ft = foot/feet
NA = not applicable
PCB = polychlorinated byphenyls
RCRA = Resource Conservation and Recovery Act
SVOC = semi-volatile organic compound
VOC = volatile organic compound

The floor plate covering the sump in TA-50-37, Room 118, will be decontaminated during the floor and sump decontamination process. Results from the rinse water samples taken from the floor and sump decontamination will be used to determine if the floor plate decontamination was effective. If the analysis of the decontamination wash water requires that it be managed as a hazardous waste, the floor plate will also be managed as hazardous waste. Otherwise, the floor plate will be managed as non-hazardous waste or reused.

When the verification sampling is complete, the waste wash water solution generated during decontamination will be sampled for characterization.

## 4.2 Sample Collection Procedure

### 4.2.1 Soil and Sediment Sampling

The CSUs identified in this closure plan are located inside buildings or structures provided with secondary containment and run-on protection. These features were effective at preventing the migration of waste to the environment. In addition, the operating records indicate that there are no recorded spills of liquids at any of the CSUs to be closed. Therefore, soil sampling is not applicable.

### 4.2.2 Liquid Sampling

Sampling of the clean/used wash water solution will be performed in accordance with Risk Reduction and Environmental Stewardship Division, Remediation Group standard operating procedure ER-SOP-6.13, "Surface Water Sampling" (LANL, 2001).

### 4.2.3 Cleaning of Samplers

Disposable sampling equipment will be used for each of the CSU closures. This equipment may be presumed clean if still in a factory-sealed wrapper.

## 4.3 Sample Management Procedures

Samples will be collected and transported using documented chain-of-custody and sample management procedures to ensure the integrity of the sample and provide an accurate and defensible written record of the possession and handling of a sample from the time of collection, through laboratory analysis. An approved laboratory will provide coolers, containers, preservative, labels, chain-of-custody forms, analysis request forms, and custody seals prior to sampling. The following provides a description of chain-of-custody; sample documentation; sample handling, preservation, and storage; and sample transportation requirements that will be followed during the sampling activities associated with the closure. All samples for laboratory analysis will be submitted to an accredited off-site contract laboratory.

### 4.3.1 Chain-of-Custody

Sample chain-of-custody forms will be maintained by sampling personnel until the samples are relinquished to the analytical laboratory. The sample collector will be responsible for the integrity of

the samples collected until properly transferred to another person. The EPA considers a sample to be in a person's custody if it is:

- In a person's physical possession,
- In view of the person in possession, or
- Secured by that person in a restricted access area to prevent tampering.

The sample collector will document all pertinent sample collection data. Individuals relinquishing or receiving custody of the samples will sign, date, and note the time on the analysis request/chain-of-custody form. A chain-of-custody form shall accompany the sample containers or coolers, including transport to the analytical laboratory.

### 4.3.2 Sample Documentation

Sampling personnel will complete and maintain records to document sampling and analysis activities. Sample documentation will include, at a minimum, sample identification numbers, sample container labels and custody seals, chain-of-custody forms, analysis request forms, sample logbooks detailing sample collection activities, and shipping forms (if necessary).

#### 4.3.2.1 Sample Labels and Custody Seals

A sample label, completed in blue or black ink, will be affixed to each sample container. The sample label will include, at a minimum the following information:

- A unique sample identification number.
- Name of the sample collector.
- Date and time of collection.
- Type of preservatives used, if any.
- Location from which the sample was collected.

A custody seal will be placed on each sample container to ensure detection of unauthorized tampering with the samples. These labels must be initialed, dated, and affixed, by the sample collector, to the container in such a manner that it is necessary to break the seal to open the container.

#### 4.3.2.2 Chain-of-Custody Form

A chain-of-custody form must accompany all samples from collection through laboratory analysis. The completed original chain-of-custody form will be returned by the laboratory and will become a part of the permanent record documenting the sampling effort. One chain-of-custody form may be

used to document all of the samples collected from a single sampling event.

4.3.2.3 Analysis Request Form

An analysis request form will accompany all samples to the analytical laboratory. The completed original analysis request form will be returned by the laboratory and will become a part of the permanent record documenting the sampling effort. A separate analysis request form must be completed for each sample from a given sampling event.

4.3.2.4 Sample Logbook

All pertinent information on the sampling effort must be recorded in a logbook. The sample logbook will include, at a minimum, the following information:

- The sample location.
- Suspected waste composition.
- Sample identification number.
- Volume/mass of waste taken.
- Purpose of sampling.
- Description of sample point and sampling methodology.
- Date and time of collection.
- Name of the sample collector.
- Sample destination and how it will be transported.
- Observations.
- Signatures of personnel responsible for the observations.

4.3.3 Sample Handling, Preservation, and Storage

Samples will be collected and containerized in appropriate pre-cleaned sample containers. Table 7 presents the requirements specified in *SW-846* (EPA, 1986), for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius (°C) will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

**Table 7**
**Recommended Sample Containers, Preservation Techniques, and Holding Times**

| Analyte Class and Sample Type | Container Type and Materials[a] | Preservation | Holding Time[b] |
|---|---|---|---|
| **Metals** | | | |
| TCLP Metals:<br>Arsenic<br>Barium<br>Cadmium<br>Chromium<br>Lead | 2 - 500 mL Wide Mouth High-Density Polyethylene or Glass with Teflon Liner | Cool to 4°C | 180 Days |

**Table 7 (continued)**
**Recommended Sample Containers, Preservation Techniques, and Holding Times**

| Analyte Class and Sample Type | Container Type and Materials[a] | Preservation | Holding Time[b] |
|---|---|---|---|
| **Metals (continued)** | | | |
| TCLP/Total Mercury | 2 - 500-mL Wide Mouth High-Density Polyethylene or Glass with Teflon Liner | Cool to 4°C | 28 Days |
| **VOCs** | | | |
| Target Compound VOCs | 40 mL Amber Glass Vials with Teflon-Lined Septa | HCl to pH<2<br>Cool to 4 °C | 14 days |
| **SVOCs** | | | |
| Target Compound SVOCs | 1 L Amber Glass with Teflon-Lined Lid | Cool to 4 °C | Seven days from field collection to preparative extraction.<br><br>40 days from preparative extraction to determinative analysis. |

[a] Smaller sample containers may be required due to health and safety concerns associated with potential radiation exposure, transportation requirements, and waste management considerations.
[b] Information obtained from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, U.S. Environmental Protection Agency, 1986 and all approved updates.

°C = degrees Celsius
HCl = hydrochloric acid
L = Liter
mL = milliliter
SVOC = semi-volatile organic compounds
TCLP = Toxicity Characteristic Leaching Procedure
VOC = volatile organic compounds

### 4.3.4 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE Orders, and relevant local, state, and federal laws (including 10 Code of Federal Regulations [CFR] and 49 CFR). The LANL Laboratory Implementation Requirement 405-10-01.1, "Packaging and Transportation" (LANL, 1999) establishes requirements that will be implemented for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, wastes, and defense programs materials. Samples that require cooling to 4 °C will be transported in a cooler with ice or ice gel.

Off-site transportation of samples will occur via private, contract, or common motor carrier, air carrier, or freight. All off-site transportation will be processed through the Materials Management

Group (SUP-3) shipping office unless the shipper is specifically authorized, through formal documentation by SUP-3, to independently tender shipments to common motor or air carriers.

## 4.4 ANALYTICAL REQUIREMENTS

### 4.4.1 Proposed Analytical Methods

Each sample will be analyzed for the constituents identified in Table 2 as appropriate. Target detection limits, proposed analytical methods, and instrumentation for metals and organic analyses are presented in Tables 8 and 9, respectively.

**Table 8**
**Target Detection Limits, Proposed Analytical Methods, and Instrumentation for Metals Analysis**

| Analyte | EPA SW-846 Analytical Method [a] | Test Methods /Instrumentation | Target Detection Limit (ug/L)[b] | Rationale |
|---|---|---|---|---|
| Arsenic | 7060A[c], 7061A | ICP, GFAA | 10 | Determine the TC concentration. |
| Barium | 7080A[d], 7081[c] | ICP, FLAA, GFAA | 200 | |
| Cadmium | 7130[d], 7131A[c] | ICP, FLAA, GFAA | 2 | |
| Chromium | 7190[d], 7191[c] | ICP, FLAA, GFAA | 10 | |
| Lead | 7420[d], 7421[c] | ICP, FLAA, GFAA | 5 | |
| Selenium | 7740[e], 7741A | ICP, FLAA, GFAA | 5 | |
| Silver | 7760A[d], 7761[c] | ICP, FLAA, GFAA | 10 | |
| Mercury | 7471A[e], 7470A | CVAA | 0.2 | |

[a] U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846.
[b] Detection limits listed are for clean water. Actual detection limits may be higher depending on sample composition and matrix type.
[c] Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.
[d] Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.
[e] Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = cold-vapor atomic absorption spectroscopy
FLAA = flame atomic absorption spectroscopy
GFAA = graphite furnace atomic absorption spectroscopy
ICP = inductively coupled plasma emission spectroscopy
ug/L = micrograms per liter

**Table 9**
**Target Detection Limits, Proposed Analytical Methods, and Instrumentation for Organic Analysis**

| Analyte | EPA SW-846 Analytical Method [a] | Test Methods/ Instrumentation | Target Detection Limit (ug/L)[b] | Rationale |
|---|---|---|---|---|
| Target compound list VOCs plus 10 TICs | 8260B | GC/MS | 10 mg/L water | Determine the VOCs in the samples. |
| Target compound list SVOCs plus 20 TICs | 8270C[c] | GC/MS | 10 mg/L water | Determine the SVOCs in the samples. |

[a] U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846.
[b] Detection limits expressed as practical quantitation limits.
[c] Method being revised per the May 1998 SW-846 Draft Update IVA.

GC/MS = gas chromatography/mass spectrometry
mg/L = milligrams per liter
SVOC = semi-volatile organic compounds
TIC = tentatively identified compounds
VOC = volatile organic compounds

### 4.4.2 Analytical Laboratory Requirements

The analytical laboratory will perform the detailed qualitative and quantitative chemical analyses specified in Tables 8 and 9. This analytical laboratory will include at a minimum:

- A documented comprehensive QA/QC program.
- Technical analytical expertise.
- A document control/records management plan.
- The capability to perform data reduction, validation, and reporting.

The selection of the analytical testing methods identified in Tables 8 and 9 was based on the following considerations:

- The physical form of the waste.
- Constituents of interest.
- Required detection limits (e.g., regulatory thresholds).
- Information requirements (e.g., waste classification).

### 4.4.3 Quality Assurance/Quality Control

Field sampling procedures and laboratory analyses will be evaluated through the use of QA/QC samples to assess the overall quality of the data produced. QC samples are used to evaluate precision, accuracy, and potential sample contamination, associated with the sampling and analysis

process, are described in the following sections for field and laboratory activities. The recommended frequency of collection or analysis, and acceptance criteria also are presented, along with information on calculations necessary to evaluate the QC results.

4.4.3.1 Field Quality Control

The types of field QC samples that will be collected include trip blanks, field blanks, and field duplicates, as appropriate. For each CSU sampled during decontamination verification, at least one field duplicate will be collected. Table 10 presents a summary of QC sample types, analysis, frequency, and acceptance criteria. QC samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples. QC samples will be identified on the applicable forms so that the results can be applied to the associated sample. The frequency of field blank QC sampling will be 1 per day or one per 20 samples, whichever is more frequent.

**Table 10**
**Recommended Quality Control Samples, Frequency, and Acceptance Criteria**

| QC Sample Type | Applicable Analysis[a] | Frequency | Acceptance Criteria |
|---|---|---|---|
| Trip Blank | VOC | One set per shipping cooler containing samples to be analyzed for VOCs. | Not Applicable |
| Field Blank | VOC | One sample daily per analysis. | Not Applicable |
| Field Duplicate | RCRA Metals, VOC, SVOC | 1 for each sampling sequence. | Relative percent difference less than or equal to 20 percent |

[a] For VOC and SVOC analysis, if blank shows detectable levels of any common laboratory contaminant (e.g., methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.

QC = quality control
RCRA = Resource Conservation and Recovery Act
SVOC = semi-volatile organic compound
VOC = volatile organic compound

4.4.3.2 Analytical Laboratory Quality Control Samples

QA/QC considerations are an integral part of analytical laboratory operations. Laboratory QA is undertaken to ensure that analytical methods generate data that are technically sound, statistically valid, and can be documented. Individual QC procedures are the tools employed to measure the degree to which these QA objectives are met. At a minimum, the laboratory shall analyze laboratory blanks, Matrix Spike/Matrix Spike Duplicate, Blank Spike/Blank Spike Duplicate, and laboratory

duplicates at a frequency of one in twenty for all batch runs requiring EPA test methods and at a frequency of one in ten for non-EPA test methods.

~~4.4.4 Data Reduction, Verification, Validation, and Reporting~~

~~Analytical data generated as a result of the activities described in this closure plan will be verified and validated. Data reduction will involve the conversion of raw data to reportable units; transfer of data between recording media; and computation of summary statistics, standard errors, confidence intervals, and statistical tests.~~

4.4.5 Data Reporting Requirements

Analytical results will include all pertinent information about the condition and appearance of the sample-as-received. At a minimum, analytical reports will include:

- A summary of analytical results for each sample.
- Results from QC samples such as blanks, spikes, and calibrations.
- Reference to standard methods or a detailed description of analytical procedures.
- Raw data printouts for comparison with summaries.

The laboratory will describe the sample preparation procedure used in the analysis in sufficient detail so that the data user can understand how the sample was manipulated during analysis. Summary tables of contract laboratory analytical data and EPA Level II QA/QC results will be presented to NMED. The raw analytical data, including calibration curves, instrument calibration data, data calculation work sheets, and other laboratory support data for samples from this project shall be compiled and kept on file at LANL for reference. LANL will make the data available to NMED upon request.

## 5.0 WASTE MANAGEMENT

All sample collection activities will be conducted with waste minimization goals in mind. All waste material generated will be controlled, handled, characterized, and disposed in accordance with LANL waste management procedures. The operational record for each of the units discussed in this plan indicates that there have not been any spills, which would cause contamination of the surfaces and equipment with hazardous constituents. For this reason, it is anticipated that the waste generated during decontamination and verification of closure will be non-regulated waste with respect to both hazardous and radiological constituents. However, should contamination be present, the closure has the potential to generate several different types of waste materials. Table

11 provides a list of the full spectrum of waste materials that could be generated during closure and potential disposal options.

**Table 11**
**Potential Waste Materials, Waste Types, and Disposal Options**

| Container Storage Unit | Potential Waste Materials | Waste Type(s) | Disposal Options |
|---|---|---|---|
| TA-50-1, Room 59 | PPE<br>Decontamination wash water<br>Verification wash water | Non-regulated liquid and solid waste<br><br>Low-level liquid and solid waste | RLWTF – RLW<br>SWCS – non-regulated waste<br>TA-54 – solid LLW |

~~**Table 11 (continued)**~~
~~**Potential Waste Materials, Waste Types, and Disposal Options**~~

| ~~Container Storage Unit~~ | ~~Potential Waste Materials~~ | ~~Waste Type(s)~~ | ~~Disposal Options~~ |
|---|---|---|---|
| TA-50-37 | PPE<br>Decontamination wash water<br>Verification wash water | Non-regulated liquid and solid waste<br><br>Low-level liquid and solid | RLWTF – RLW<br>SWCS – non-regulated waste<br>TA-54 – solid LLW |

LLW = low-level waste
PPE = personal protective equipment
RLW = radioactive liquid waste
RLWTF = Radioactive Liquid Waste Treatment Facility
SWCS = Sanitary Waste Collection System
TA = technical area

## 6.0 REFERENCES

EPA, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *(SW-846)* Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C.

LANL 1999, "Packaging and Transportation," Laboratory Implementation Requirement 405-10-01.1, Los Alamos National Laboratory, Los Alamos, New Mexico.

LANL, 2001, "Surface Water Sampling," ER-SOP-6.13, Los Alamos National Laboratory, Los Alamos, New Mexico.

LANL, 2002, "Los Alamos National Laboratory Technical Area 50 Closure Plan for Container Storage Units TA-50-1, Room 59; TA-50-37; and TA-50-114," LA-UR-02-4729, Los Alamos National

Laboratory, Los Alamos, New Mexico.

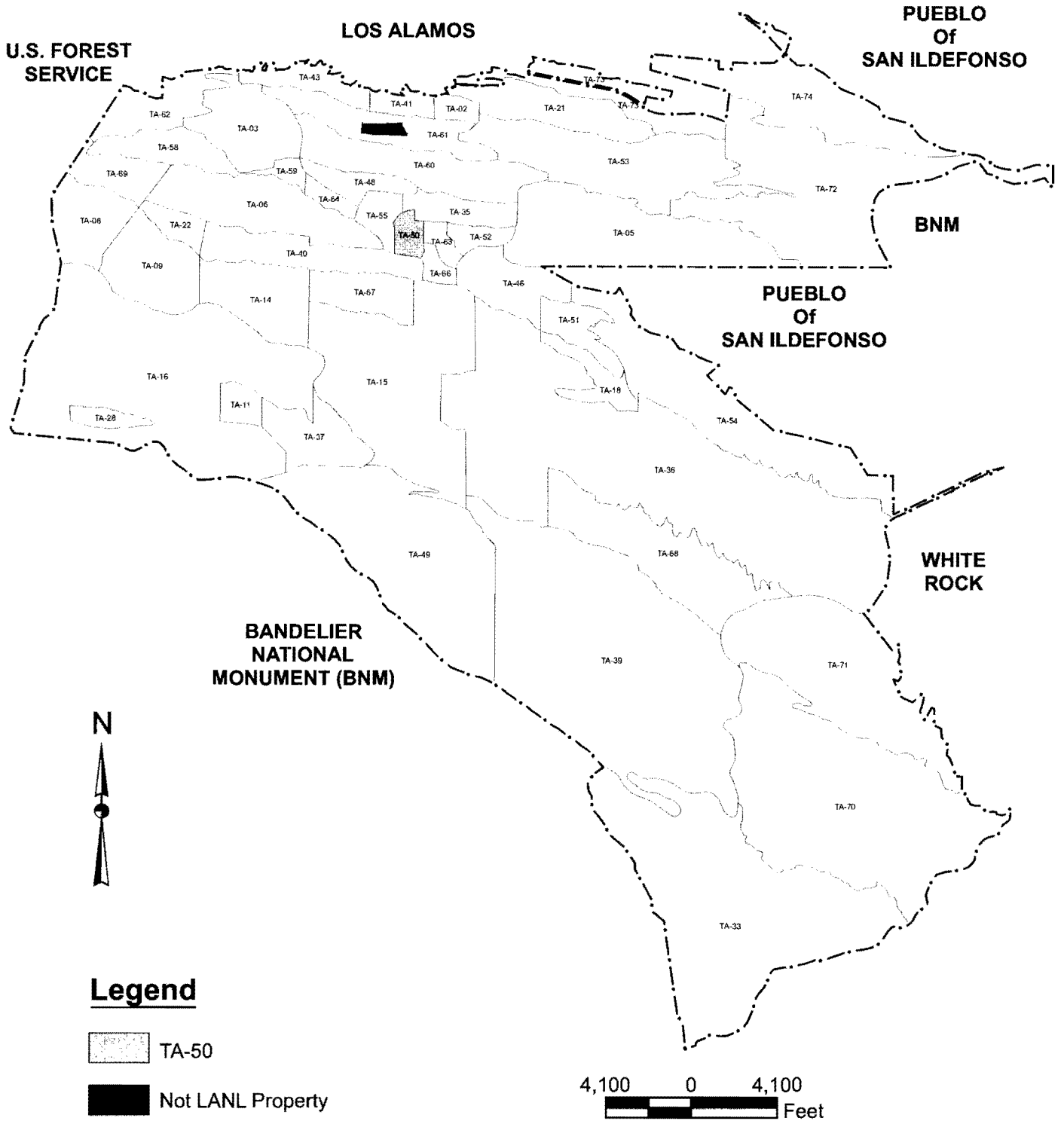



**Figure 1**
Location Map of Technical Area (TA) 50 at Los Alamos National Laboratory (LANL)

State Plane Coordinate System New Mexico Central Zone North American Datum 1983 (ft)

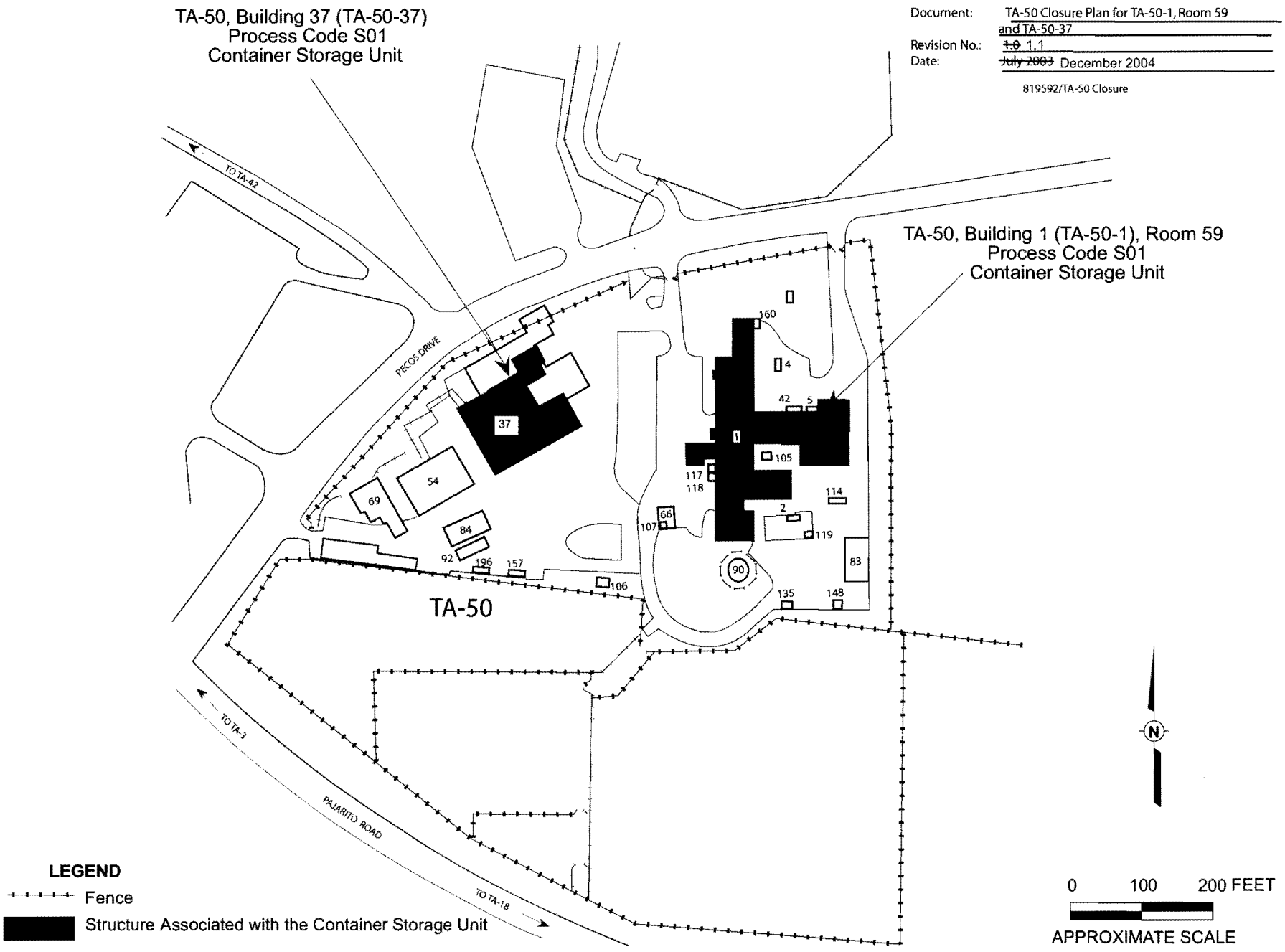
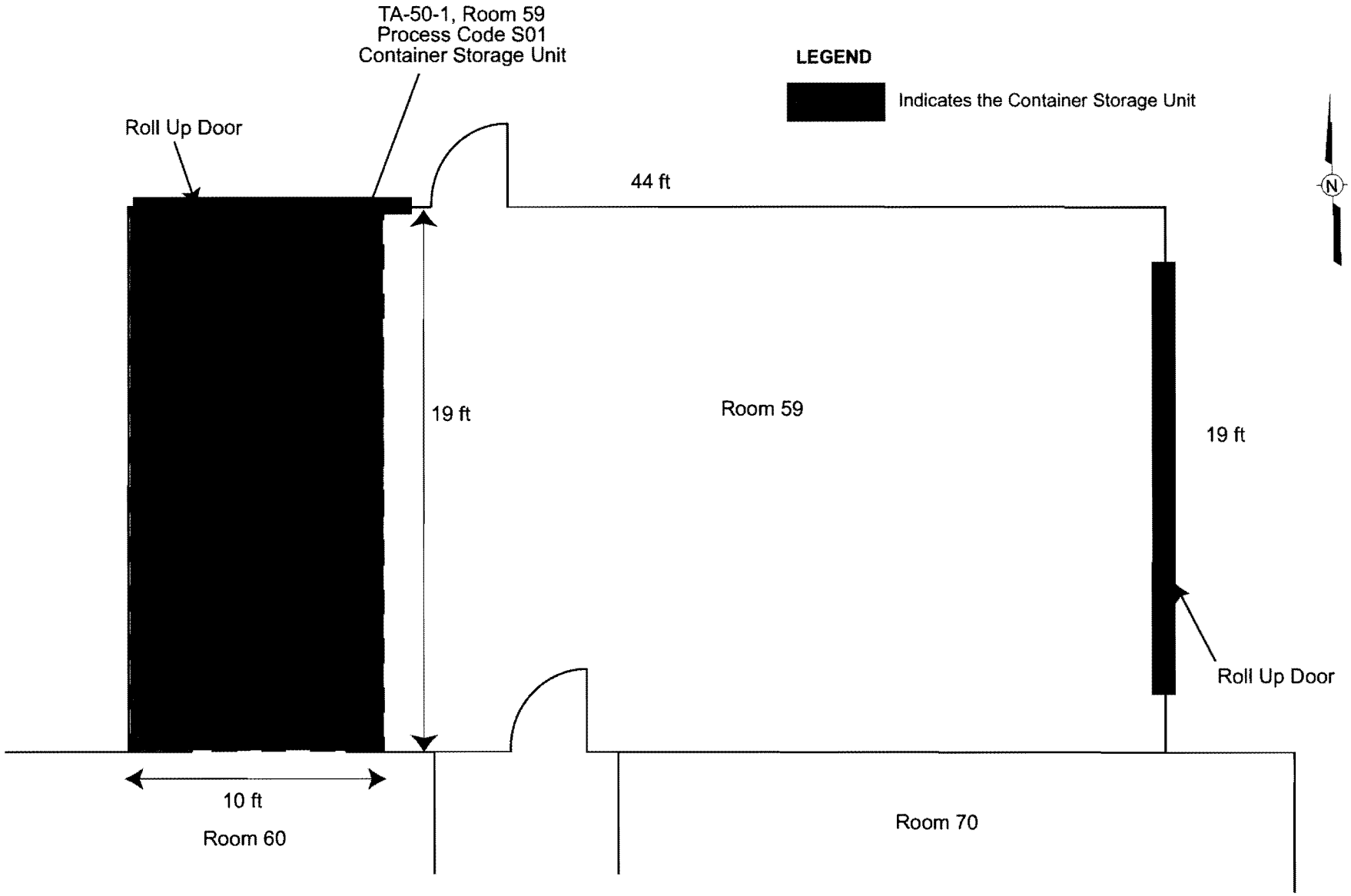



**Figure 2**
Location Map for Technical Area (TA) 50 Container Storage Units To be Closed




NOT TO SCALE

**Figure 3**

Technical Area (TA) 50, Building 1 (TA-50-1), Room 59 Container Storage Unit


**Figure 4**
Photograph – Technical Area (TA) 50, Building 1 (TA-50-1), Room 59 Container Storage Unit
(Photograph taken 10/30/01)

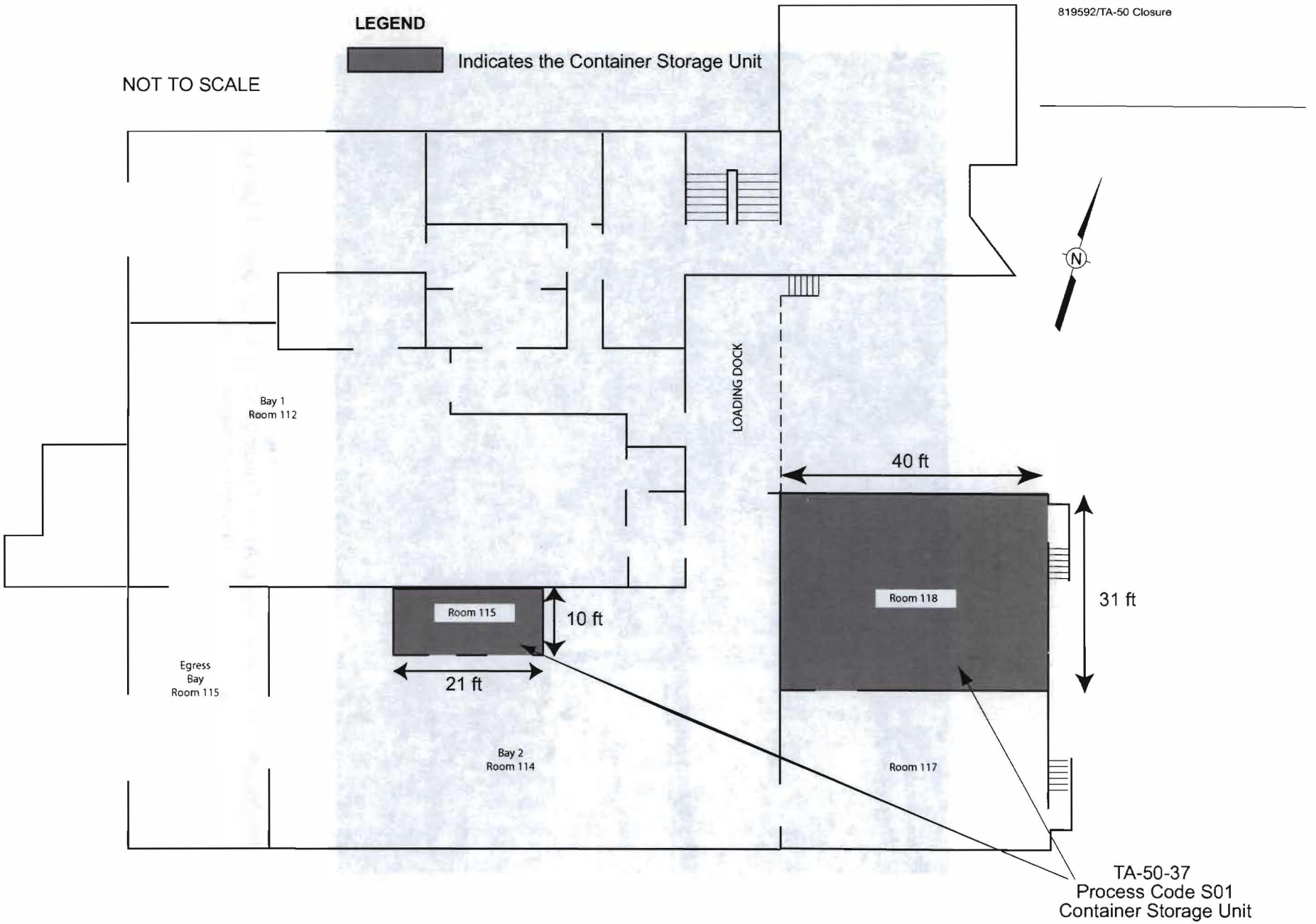



**Figure 5**
Technical Area (TA) 50, Building 37 (TA-50-37) Container Storage Unit

**Figure 6**
Photograph – Technical Area (TA) 50, Building 37 (TA-50-37), Room 115 Container Storage Unit
(Photograph taken 10/30/01)

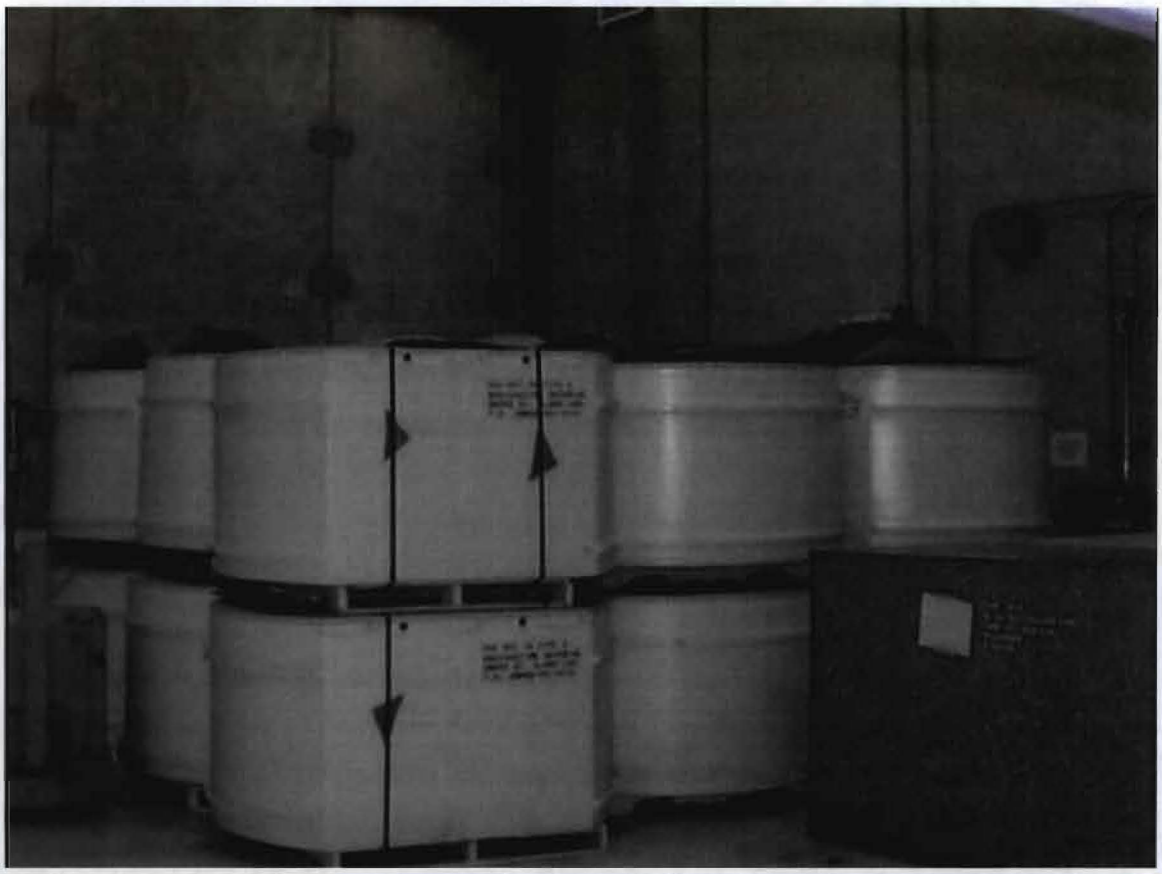


**Figure 7**
Photograph – Technical Area (TA) 50, Building 37 (TA-50-37), Room 118 Container Storage Unit
(Photograph taken 10/30/01)

# Clean Revised Closure Plan

LA-UR-04-8494
December 2004

# Los Alamos National Laboratory
# Technical Area 50

# Closure Plan for
# Interim Status Container Storage Units
# TA-50-1, Room 59 and TA-50-37

# Revision 1.1

Prepared by:

*Los Alamos National Laboratory*
*Los Alamos, New Mexico 87545*

# Los Alamos National Laboratory
# Technical Area 50

# Closure Plan for
# Interim Status Container Storage Units

# TA-50-1, Room 59 and TA-50-37

**Revision 1.1**
**LA-UR-04-8494**

| | |
|---|---|
| **Facility ID No.:** | **NM0890010515** |
| **Facility Name:** | **Los Alamos National Laboratory** |
| **Legal Owner:** | **U.S. Department of Energy** |
| **Legal Operators:** | **U.S. Department of Energy**<br>**Los Alamos Area Office**<br>**528 35th Street**<br>**Los Alamos, New Mexico 87544**<br><br>**University of California**<br>**P.O. Box 1663**<br>**Los Alamos, New Mexico 87544** |
| **Contact Person:** | **Edwin L. Wilmot**<br>**Director, Los Alamos Site Office**<br>**U.S. Department of Energy**<br>**Albuquerque Operations**<br>**Owner/Operator** |
| **Date:** | **December 2004** |

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## LIST OF ABBREVIATIONS/ACRONYMS

| | |
|---|---|
| 20.4.1.600 NMAC | New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart VI |
| °C | degrees Celsius |
| CAI | Controlled Air Incinerator |
| CFR | Code of Federal Regulations |
| CSU | container storage unit |
| DOE | U.S. Department of Energy |
| EPA | U.S. Environmental Protection Agency |
| ft | feet/foot |
| HSR-1 | Health, Safety, and Radiation Protection Division, Health Physics Operations Group |
| HSR-5 | Health, Safety, and Radiation Protection Division, Industrial Hygiene and Safety Group |
| LANL | Los Alamos National Laboratory |
| LASO | Los Alamos Site Office |
| MSSL | Medium Specific Screening Level |
| NMED | New Mexico Environment Department |
| PPE | personal protective equipment |
| QA | quality assurance |
| QC | quality control |
| RLWTF | Radioactive Liquid Waste Treatment Facility |
| RRES | Risk Reduction and Environmental Stewardship Division |
| SUP-3 | Supply Chain Management Division, Materials Management Group |

## LIST OF ABBREVIATIONS/ACRONYMS (continued)

| | |
|---|---|
| *SW-846* | EPA, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C. |
| SWRC | Solid Waste Regulatory Compliance Group |
| TA | technical area |
| WCRRF | Waste Characterization, Reduction, and Repackaging Facility |

# CLOSURE PLAN FOR INTERIM STATUS CONTAINER STORAGE UNITS TA-50-1, ROOM 59; AND TA-50-37

The information provided in this closure plan is submitted to address the applicable interim status closure requirements specified in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart VI (20.4.1.600 NMAC), Part 265, Subparts G and I, revised June 14, 2000 [6-14-00]. This closure plan describes the activities necessary to perform Resource Conservation and Recovery Act Closure for the Technical Area (TA) 50, Building 1 (TA-50-1), Room 59 and TA-50-37 interim status container storage units (CSUs) at the Los Alamos National Laboratory (LANL). Closure activities will include removal of any remaining waste; decontamination or removal of contaminated equipment and surfaces; and verification that all residues have been removed. In the event that closure by removal and decontamination of a CSU cannot be met, the closure plan will be modified to include alternative decontamination demonstrations or alternative closure requirements, as necessary. Closure activities will minimize the need for further maintenance, preclude the release of hazardous constituents to environmental media, and be protective of human health in accordance with the closure performance standards specified in 20.4.1.600 NMAC § 265.111 [6-14-00].

Although this closure plan is written in the future tense, decontamination and verification activities at the TA-50-1, Room 59 CSU were conducted from September 20, 2002 to September 23, 2002 in accordance with 20.4.1.600 NMAC § 265.112(e) [6-14-00] and the "Los Alamos National Laboratory Technical Area 50 Closure Plan for Container Storage Units TA-50-1, Room 59; TA-50-37; and TA-50-114," LA-UR-02-4729, submitted to the New Mexico Environment Department (NMED) in July 2002. Per the NMED's request, the original closure plan was withdrawn in a letter dated June 17, 2003. This closure plan revises the interim status closure plans for TA-50-1 and TA-50-37 written in 1992 and is intended to replace LA-UR-02-4729. It is organized as follows:

- Section 1.0 – General closure information.
- Section 2.0 – Description of the CSUs to be closed.
- Section 3.0 – Closure procedures.
- Section 4.0 – Sampling and analysis plan.
- Section 5.0 – Waste management.
- Section 6.0 – References.

Until closure is complete and has been certified in accordance with 20.4.1.600 NMAC § 265.115 [6-14-00], as discussed in Section 1.6, a copy of the approved closure plan and any approved revisions will be on file with the Risk Reduction and environmental Stewardship Division (RRES) Solid Waste Regulatory Compliance Group (SWRC) and at the U.S. Department of Energy (DOE) Los Alamos Site Office (LASO).

## 1.0 GENERAL CLOSURE INFORMATION

### 1.1 Closure Performance Standard [20.4.1.600 NMAC § 265.111]

The CSUs addressed in this closure plan will be closed to meet the following performance standards:

- Minimize the need for further maintenance,
- Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground, or surface waters, or to the atmosphere, and
- Comply with the closure requirements of 20.4.1.600 NMAC § 265, Subpart G [6-14-00], including, but not limited to the requirements of 20.4.1 NMAC §§ 265.178, 265.197, 265.228, 265.258, 265.280, 265.310, 265.351, 265.601 through 265.603, and 265.1102.

This will be accomplished by removal of waste from each CSU and decontamination, if necessary, of all surfaces and equipment that may have come into contact with the wastes. Decontamination activities will ensure the removal of hazardous waste residues to established cleanup levels.

### 1.2 Partial and Final Closure Activities [20.4.1.600 NMAC § 265.112(d)]

This closure plan has been written for partial closure rather than final closure of the entire LANL facility. Partial closure will consist of closing the CSUs located at TA-50-1, Room 59; and TA-50-37 while leaving the other regulated hazardous/mixed waste units at LANL in service. Partial closure (hereinafter referred to as closure) will be deemed complete when closure has been verified; all surfaces and equipment have been decontaminated, or otherwise properly disposed, if necessary; closure certification has been submitted to the NMED; and the NMED has approved the closure. Final closure will occur when the remaining hazardous/mixed waste management units at LANL are closed.

1.3 Closure Schedule [20.4.1.600 NMAC §§ 265.112(b) (6), 265.112(e), and 265.113]

Written notification will be provided to the NMED 45 days before the start of closure activities for the CSUs addressed in this closure plan. However, pursuant to 20.4.1.600 NMAC § 265.112(e) [6-14-00], removing hazardous wastes and decontaminating or dismantling equipment in accordance with an approved closure plan may be conducted at any time before or after notification of closure. Closure activities will begin according to the requirements of 20.4.1.600 NMAC § 265.112(d) (2) [6-14-00]. Treatment, removal, or disposal of hazardous wastes will begin in accordance with the approved closure plan, as required by 20.4.1.600 NMAC § 265.113(a) [6-14-00], within 90 days after final receipt of waste at each CSU. This timeframe will be met as long as facilities are available for treatment, storage, or disposal of these wastes. In the event that closure activities cannot begin within 90 days, LANL will notify the Secretary of the NMED in accordance with the extension requirements in 20.4.1.600 NMAC § 265.113(a) [6-14-00]. Closure activities and reporting requirements will be completed within 180 days of the receipt of the final volume of waste at each CSU. Closure will be conducted in accordance with the schedule presented in Table 1 of this closure plan.

**Table 1**
**Closure Schedule**

| Activity | Maximum Time Required[a] |
|---|---|
| Submit Closure Plan. | -90 Days |
| Notify the NMED of intent to close. | -45 Days |
| Final receipt of waste. | Day 0 |
| Removal of waste. | Day 5 |
| Decontaminate surfaces and equipment. | Day 10 |
| Sample excess used decontamination water for disposal. | Day 10 |
| Perform verification sampling. | Day 20 |
| Evaluate analytical data from verification sampling. | Day 50 |
| Perform additional decontamination, if necessary. | Day 55 |
| Perform additional verification sampling, if necessary. | Day 60 |
| Evaluate additional analytical data. | Day 75 |
| Perform final clean up and disposal (i.e., removal of decontaminated equipment and decontamination waste). | Day 140 |
| Prepare closure report. | Day 150 |
| Certify closure. | Day 175 |
| Submit final report to NMED. | Day 180 |

[a] The schedule above indicates calendar days from the beginning by which activities will be completed. Some activities may be conducted simultaneously and/or may not require the maximum time listed. Extensions to this schedule may be requested, as needed.

NMED = New Mexico Environment Department

In the event that closure cannot proceed according to schedule, LANL will notify the Secretary of the NMED in accordance with extension request requirements in 20.4.1.600 NMAC § 265.113(b) [6-14-00]. In addition, the demonstrations in 20.4.1.600 NMAC §§ 265.113(a) (1) and (b) (1) [6-14-00], will be made in accordance with 20.4.1.600 NMAC § 265.113(c) [6-14-00].

## 1.4 Amendment of the Closure Plan [20.4.1.600 NMAC § 265.112(c)]

In accordance with 20.4.1.600 NMAC § 265.112(c) [6-14-00], LANL will submit a written change to the approved closure plan whenever:

- There are changes in operating plans or facility design that affect the closure plan.
- There is a change in the expected date of closure.
- Unexpected events occur during closure that requires modification of the approved closure plan.
- The owner or operator requests the Secretary of the NMED to apply alternative requirements to a regulated unit under 20.4.1.600 NMAC §§ 265.90(f) and/or 265.110(c).

The written notification or request will include a copy of the amended closure plan for approval by the NMED.

LANL will submit a written request for a permit modification with a copy of the amended closure plan at least 60 days prior to the proposed change in unit design or operation or no later than 60 days after an occurrence of an unexpected event that affects the closure plan. If the unexpected event occurs during closure, the permit modification will be requested within 30 days of the occurrence. The Secretary of the NMED may request a modification of the closure plan under the conditions presented in the bulleted items above. LANL will submit the modified plan in accordance with the request within 60 days of notification or within 30 days of notification if a change in facility condition occurs during the closure process.

## 1.5 Closure Cost Estimate, Financial Assurance, and Liability Requirements [20.4.1.600 NMAC § 265.140(c)]

In accordance with 20.4.1.600 NMAC § 265.140(c) [6-14-00], LANL, as a federal facility, is exempt from the requirements of 20.4.1.600 NMAC Subpart H [6-14-00], to provide a cost estimate, financial assurance mechanisms, and liability insurance for closure actions.

## 1.6 Closure Certification [20.4.1.600 NMAC § 265.115]

Within 60 days after completion of closure activities at the CSUs or final closure of the facility, LANL will submit to the Secretary of the NMED, via certified mail, a certification that the CSUs have been closed in accordance with the approved closure plan. The certification will be signed by the appropriate DOE and LANL officials and by an independent, registered professional engineer in accordance with 20.4.1.600 NMAC § 265.115 [6-14-00]. Documentation supporting the independent, registered engineer's certification will be furnished to the Secretary of the NMED upon request, as specified in 20.4.1.600 NMAC § 265.115 [6-14-00]. Both DOE/LASO and SWRC will maintain a copy of the certification and supporting documentation.

## 1.7 Security

Because of the ongoing nature of operations at TA-50, site security will be maintained by the DOE or another authorized federal agency for as long as necessary to prohibit public access. The security fence at TA-50 will be maintained to ensure that public access is prevented.

## 1.8 Closure Report

Upon completion of the closure activities, a closure report will be prepared and submitted to the Secretary of the NMED. The report will document the closure and contain the following:

- A copy of the certification described in Section 1.6 of this closure plan.
- A general summary of closure activities.
- Any significant variance from the approved activities and the reason for the variance.
- A summary of all sampling results, showing:
  - Sample identification.
  - Sampling location.
  - Datum reported.
  - Detection limit for each datum.
  - A measure of analytical precision (e.g., uncertainty, range, variance).

- Identification of analytical procedure.
- Identification of analytical laboratory.

- A quality assurance (QA)/ quality control (QC) statement on analytical data validation and decontamination verification.

- The location of the file of supporting documentation, including:
  - Field logbooks.
  - Laboratory sample analysis reports.
  - QA/QC documentation.
  - Chain-of-custody forms.

- Storage or disposal location of regulated hazardous/mixed waste resulting from closure activities.

- A certification of accuracy of the report.

## 2.0 DESCRIPTION OF UNITS

TA-50 is located at the northeast corner of the intersection of Pajarito Drive and Pecos Road, on the finger mesa bounded by Mortandad Canyon to the north and Two-Mile Canyon to the south. Figure 1 shows the location of TA-50 at LANL. Figure 2 provides the location of each CSU to be closed. The following sections provide detailed descriptions of the interim status units to be closed.

### 2.1 TA-50-1, Room 59

The TA-50-1, Room 59 CSU is located at the northeast end of the Radioactive Liquid Waste Treatment Facility (RLWTF). The room is constructed of pre-engineered steel framing and insulated metal roofing and siding. The CSU was used for mixed waste storage of 30- and 55-gallon drums in support of operations at the RLWTF. The CSU consists of a 10 foot (ft) wide by 19-ft long area in the northwest corner of the room as indicated on Figure 3. A photograph of the CSU is provided as Figure 4.

### 2.2 TA-50-37

The TA-50-37 CSU is located in a two-story building that contains offices, laboratories, two process bays, an egress bay, and a mechanical equipment area. The CSU consists of two storage locations in Rooms 115 and 118 on the first floor of the building as indicated on Figure 5. Room 115 is in the west central portion of the building and measures 10-ft wide by 21-ft long. Room 118 is located in the eastern portion of the building and measures 31-ft wide by 40-ft long. Photographs

of the CSU are provided as Figures 6 and 7, respectively. The TA-50-37 CSU was intended for hazardous and mixed waste storage of 5-, 30-, 55-, 83-, 85-, and 110-gallon drums/containers and standard waste boxes in support of the Waste Characterization, Reduction and Repackaging Facility (WCRRF) at TA-50-69 and at TA-50-37.

TA-50-37 previously housed the Controlled Air Incinerator (CAI) associated with the Treatment Development Facility at LANL. This incinerator received a Toxic Substances Control Act incineration permit in 1984 and a Resource Conservation and Recovery Act operating permit for hazardous waste in 1989. In 1995, it was determined that waste incineration would not be performed at the CAI. In 1996, closure of the CAI was initiated in accordance with an approved NMED closure plan.

## 2.3 Estimate of Maximum Waste in Inventory

The maximum total inventory of waste in storage at any time in the CSUs is estimated as follows:

- TA-50-1, Room 59 –1,485 gallons.
- TA-50-37, Room 115 – 220 gallons.
- TA-50-37, Room 118 – 5,500 gallons.

## 2.4 Description of Stored Waste

The CSUs addressed in this closure plan, were used to store waste generated from various research activities, material processing and recovery operations, and decontaminating and decommissioning operations conducted at various TAs throughout LANL. The following sections provide information regarding the waste types stored at the CSUs, as determined by the operating record and historical knowledge.

### 2.4.1 TA-50-1, Room 59

The TA-50-1, Room 59 CSU stored containers of mixed waste with potential residual free liquids. The majority of the waste stored in the CSU consisted of solid mixed waste generated by cementation operations in Room 60 of the RLWTF. Additional types of waste included items associated with decontamination and process operations at the TA-50-1 RLWTF. Table 2 provides a list of applicable compounds and associated U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers based on the operating record of the unit.

**Table 2**
**Hazardous Waste Constituents Stored at the TA-50-1, Room 59[a] Container Storage Unit**

| Category | EPA Hazardous Waste Numbers | Specific Constituents |
|---|---|---|
| RCRA Metals | D004, D005, D006, D007, D008, D009, D010, and D011 | Arsenic, Barium Hydroxide, Cadmium, Chromium, Lead, Mercury, Selenium, Silver |
| VOC | F003 | Acetone |
| SVOC | Not Applicable | N-Nitrosodimethylamine, Diethylphthalate, Di-n-Butylphthalate, Bis-2-Ethylhexlphthalate |

[a] Based on the TRUCON Code (LA111/211) assigned to the cement drums generated in Room 60 of the RLWTF.

EPA = U.S. Environmental Protection Agency
RCRA = Resource Conservation and Recovery Act
RLTWF = Radioactive Liquid Waste Treatment Facility
SVOC = semi-volatile organic compounds
VOC = volatile organic compounds

### 2.4.2 TA-50-37

The TA-50-37 CSU stored containers of mixed waste with potential residual free liquids. The CSU was used as a staging area for waste in support of waste characterization, segregation, and decontamination activities associated with operations of the WCRRF prior to long term storage at TA-54 and/or shipment to the Waste Isolation Pilot Plant for disposal. Due to the proximity of the CSU to the former CAI, LANL will close the unit conservatively and verify that constituents associated with the operations of the CAI did not contaminate the surfaces of the CSU. Table 3 provides a list of potential hazardous waste constituents and applicable EPA Hazardous Waste Numbers found during closure of the CAI as discussed in "Los Alamos National Laboratory Controlled-Air Incinerator Resource Conservation and Recovery Act Closure Report and Certification" (Benchmark, 1998).

**Table 3**
**Hazardous Waste Constituents Associated with the Controlled Air Incinerator at the TA-50-37 Container Storage Unit**

| Category | EPA Hazardous Waste Numbers | Constituents/Comments [a] |
|---|---|---|
| RCRA Metals | D004, D005, D006, D007, D008, and D009 | Arsenic, Barium, Cadmium, Chromium, Lead, Mercury |
| VOC | F002, F003, U165 | Acetone, Methylene Chloride, Naphthalene, Trans-1,2-Dichloroethene |
| SVOC | Not Applicable | Bis (2-ethyl hexyl phthalate) |
| PCB[b] | Not Applicable | The CAI treated a small amount of PCBs and organic compounds (Benchmark, 1998). Swipe sampling results conducted during closure of the CAI indicated the presence of PCBs. |

[a] Based on swipe sampling results conducted during closure of the CAI (Benchmark, 1998).
[b] PCBs contamination, if any, will be removed in accordance with applicable TSCA regulations.

CAI = Controlled Air Incinerator
EPA = U.S. Environmental Protection Agency
PCB = polychlorinated biphenyls
RCRA = Resource Conservation and Recovery Act
SVOC = semi-volatile organic compounds
TSCA = Toxic Substances Control Act
VOC = volatile organic compounds

# 3.0 CLOSURE PROCEDURES

## 3.1 Removal of Waste

Prior to initiation of closure activities, all waste will be removed from the CSUs and transported for storage/disposal. The containers will be removed using forklifts and/or manually handled with dollies depending on the size and weight of the container. Each container will be placed onto a flatbed truck or trailer for transport and will be accompanied by the appropriate shipping papers during transport. Containers will be transported to an approved LANL on-site CSU or permitted off-site treatment, storage, or disposal facility.

## 3.2 Preliminary Closure Procedures

### 3.2.1 Safety Precautions

Job hazards associated with closure activities will be identified, controls developed, and workers briefed before closure activities are conducted, in accordance with LANL safety procedures. Personnel involved in closure activities will wear appropriate personal protective equipment (PPE), specified by the Health Physics Operations Group (HSR-1) and the Industrial Hygiene and Safety Group (HSR-5), and will follow good hygiene practices to protect themselves from exposure to hazardous and/or mixed waste. The level of PPE that will be required will depend upon the levels of radiological and/or chemical contamination detected, if any. If HSR-1 and HSR-5 surveys indicate no detectable contamination levels, minimum PPE requirements will consist of coveralls, steel-toed shoes, and safety glasses or face shields. If an overhead danger is present, hard hats will be worn. All workers involved in closure activities will be required to have appropriate training including Hazardous Waste Operations and Emergency Response Training for general site workers (24 hour and refresher) and TA-50 site-specific training for the RLWTF and TA-50-37, as appropriate. Personnel may also be required to have Radiation Worker, Level II training based on the radiological survey conducted at TA-50-1, Room 59 prior to the commencement of closure. Contaminated PPE will either be decontaminated or managed in compliance with appropriate waste management regulations.

### 3.2.2 Structural Assessment

Preventive maintenance inspections are conducted weekly at each of the TA-50 CSUs while waste is in storage. If any defects, deterioration, damage, or hazards affecting containment have developed, appropriate remedial actions (including sampling, repairs, maintenance, or replacement) are completed immediately. Prior to beginning any decontamination activities at the CSUs, the base or secondary containment of each CSU will be inspected for any cracks or conditions that could potentially lead to loss of decontamination water and/or verification wash water during closure. If a crack or gap is present, a swipe sample or a representative sample of the media (i.e., concrete, metal) will be taken to determine the presence of contamination. The sample will be analyzed for the hazardous contaminants identified in Tables 2 or 3 of this closure plan. If contamination is present, the surface flaw will be decontaminated prior to repairing the crack/gap. Complete or partial removal (e.g., scrabbling) of the material may be performed until contamination is no longer detected. If partial removal is successful in eliminating the contamination, it will be assumed that the remaining material, including underlying soil, is clean.

### 3.2.3 Waste Management

Used wash water will be collected, transferred to containers, sampled, and analyzed for the hazardous constituents listed in Tables 2 and 3, as appropriate. The results of this analysis will determine if the used wash water should be managed as hazardous or non-hazardous wastewater. The wastewater, PPE, and any other waste generated as a result of closure will be managed as discussed in Section 5.0.

## 3.3 Decontamination Procedures

To the extent possible, all contaminated surfaces and equipment (if present) will be decontaminated. Surfaces and equipment that cannot be decontaminated will be containerized and managed in compliance with applicable regulations. All sampling conducted during closure and decontamination will be done in accordance with QA/QC procedures defined by "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (*SW-846)* (EPA, 1986). Closure will be conducted in accordance with the schedule presented in Table 1. Monitoring for contamination will occur throughout closure activities, as appropriate.

### 3.3.1 Equipment Located in the CSUs

The TA-50 CSUs have a variety of equipment that must be removed, decontaminated, and/or

disposed of prior to decontamination of the main surfaces associated with each unit. This includes all portable equipment such as pallets, drum dollies, and carts that are used to manage waste at the CSUs. This equipment will be decontaminated, characterized, and/or disposed of based upon the level of contamination and future use. The used wash water will be collected, transferred to a container, and sampled to determine an appropriate location for disposal. The samples will be analyzed for the constituents identified in Tables 2 and 3, as appropriate.

### 3.3.2 TA-50-1, Room 59 Decontamination

Decontamination of the TA-50-1, Room 59 CSU will be conducted using mops, cloths, and/or other absorbent materials to remove any potential hazardous constituents. These materials will be rinsed in a wash water solution (e.g., Alconox, water) and used to wipe down the walls and floor. The TA-50-1, Room 59 CSU has two walls, a roll up door, and is open to the rest of Room 59 on the east side. Prior to the commencement of closure, plastic will be hung from the ceiling on the east side of the CSU to prevent cross contamination to operations conducted in the remaining portions of the room.

The containers stored in the CSU were not stacked beyond the height of a 55-gallon drum and were not opened within the unit and there is no record of any spills. For these reasons, decontamination will begin with the wash down of the walls to a height of 4-ft (i.e., the height of a 55-gallon drum). After the walls have been decontaminated, the floor will be wiped down. The CSU does not have recess areas (i.e., sumps) so used wash water will be contained, collected, removed, and transferred to an appropriate container for analysis.

When decontamination of the CSU is complete, verification will be conducted as indicated in Section 3.4. If analysis from the verification indicate that hazardous constituents are present, wash cycles and analyses will continue as described above until the walls and floor have been decontaminated or the decision is made to proceed with an alternate demonstration of decontamination as described in Section 3.5.

### 3.3.3 TA-50-37 Decontamination

Decontamination will be conducted using mops, cloths, and/or other absorbent materials to remove any potential hazardous constituents. These materials will be rinsed in a wash water solution (e.g., Alconox, water) and used to wipe down the walls and floor.

Decontamination of Room 115 will begin with the wash down of all four walls to a height of approximately 4-ft. After the walls have been decontaminated, the floor and containment berms located in the room will be wiped down. Room 115 does not have any recessed areas (i.e., sumps) so excess used wash water will be contained, collected, removed, and transferred to an appropriate container for analysis.

Decontamination of Room 118 will begin with the wash down of all four walls to a height of approximately 4-ft. Room 118 has a recessed sump located underneath a steel plate welded to a grate that is located in the center of the room. The sump has a pump and piping connected to a standpipe for removal of liquids. The sump will be bermed during the decontamination process to prevent wash water from collecting in the sump. When the walls and floor of the CSU have been decontaminated the sump will be wiped down and the used wash water contained, collected, removed, and transferred to an appropriate container for analysis.

When decontamination of the CSU storage locations is complete, verification will be conducted as indicated in Section 3.4. If analysis from the verification indicates that hazardous constituents are present, wash cycles and analyses will continue as described above until the walls and floor have been decontaminated or the decision is made to proceed with an alternate demonstration of decontamination as described in Section 3.5.

### 3.3.4 Equipment Used During Closure

Reusable protective clothing, tools, and equipment used during decontamination activities at the CSUs will be cleaned with a wash water solution. Residue, disposable equipment and reusable equipment that cannot be decontaminated will be containerized and managed as waste in accordance with LANL waste management procedures, depending on the regulated constituents present.

## 3.4 Verification of Decontamination

### 3.4.1 Methodology

LANL proposes analysis of verification solution samples for decontamination verification at the TA-50 CSUs addressed in this plan, utilizing the following methodology:

1. Minimize dilution of potential hazardous constituents by limiting the verification solution to an amount that is sufficient to wipe down the surface to be verified and collect the required number of samples.

2. Limit the sampling area to a specific discrete location (e.g., a wall or portion thereof depending on the size of the unit).

3. Verify decontamination by comparing the discrete sample results to a baseline sample result obtained from the verification solution prior to its use for the verification wipe down.

4. If the result is at or below that of the baseline, the decontamination is verified for the discrete area sampled.

5. If the result is above the baseline, repeat the decontamination and verification of the discrete location in accordance with Sections 3.3 and 3.4 of this closure plan.

This proposed method minimizes dilution and establishes criteria by which successful decontamination can be verified. Analytical procedures will conform to methods found in the most current version of *SW-846* (EPA, 1986).

### 3.4.2 Decontamination Demonstration Criteria

Successful decontamination will meet a minimum of one of the following four criteria:

- No detectable hazardous waste or hazardous waste constituents from container storage activities are identified in the verification solution sample.

- Detectable hazardous waste or hazardous waste constituents from container storage activities in the final verification solution sample are removed to statistically significant levels based on baseline concentrations in the clean verification solution.

- Detectable hazardous waste or hazardous waste constituents from container storage activities in the final sample are at or below levels agreed upon with the NMED.

- Detectable hazardous waste or hazardous waste constituent concentrations from container storage activities do not significantly decrease after several wash downs. In such an event, hazardous constituents that pose an acceptable risk will be allowed to remain, as mutually agreed upon with the NMED.

### 3.4.3 Verification Procedure

Verification of clean closure at the TA-50-1, Room 59; and TA-50-37 CSUs will be accomplished using verification solution sampling of the discrete surfaces specified in Table 4.

**Table 4**
**Discrete Locations and Approximate Areas for Verification Sampling**

| Location | Sample Description | Approximate Area ($ft^2$) |
|---|---|---|
| TA-50-1, Room 59 | North Wall | 40 |
| | West Wall | 76 |
| | South Wall | 40 |
| | Floor (north half) | 95 |
| | Floor (south half) | 95 |
| TA-50-37, Room 115[a] | West Section (3 walls and floor) | 153 |
| | Middle Section (2 walls and floor) | 153 |
| | East Section (3 walls and floor) | 153 |
| TA-50-37, Room 118[a] | West Wall #1 | 62 |
| | West Wall #2 | 62 |
| | South Wall #1 | 80 |
| | South Wall #2 | 80 |
| | East Wall #1 | 62 |
| | East Wall #2 | 62 |
| | North Wall #1 | 80 |
| | North Wall #2 | 80 |
| | Floor #1 (quadrant 1) | 155 |
| | Floor #2 (quadrant 1) | 155 |
| | Floor #3 (quadrant 2) | 155 |
| | Floor #4 (quadrant 2) | 155 |
| | Floor #5 (quadrant 3) | 155 |
| | Floor #6 (quadrant 3) | 155 |
| | Floor #7 (quadrant 4) | 155 |
| | Floor #8 (quadrant 4) | 155 |
| | Sump (4' x 4' x 4') | 64 |

[a] Per letter to Steve Jetter, "Confirmation of Agreement on Closure Procedure for Technical Area 50, Building 37 (TA-50-37), Los Alamos National Laboratory (LANL)," Hazardous Waste Bureau, New Mexico Environment Department, February 3, 2003.

$ft^2$ = square feet

For each surface, a new container will be prepared containing water and Alconox. A mop, cloth, and/or other absorbent material will be submerged into the container and squeezed out prior to wiping down the discrete CSU surface to be verified. This process will be repeated until the entire discrete surface has been wiped down. Then the verification solution will be sampled for analysis according to Section 4.0 of this closure plan.

### 3.5 Alternative Demonstration of Closure

An alternate demonstration of decontamination may be justified at the TA-50 CSUs addressed in this plan, if decontamination methods described in Section 3.3 are not feasible. LANL proposes the following alternate demonstrations:

- Comparison of the verification analytical results to the EPA Region 6 Medium Specific Screening Levels (MSSL) for tap water. If the result is below the MSSL decontamination at the CSU will be considered complete.
- Assessment of residual (i.e., above the MSSL) contamination levels using an occupational risk based scenario.

## 4.0 SAMPLING AND ANALYSIS PLAN [20.4.1 NMAC § 265.112(b) (4)]

The following sections describe procedures and methods for sampling, analysis, and documentation applicable to closure activities. Sampling will be conducted in accordance with procedures given in *SW-846* (EPA, 1986) or other approved procedures or methods.

### 4.1 Sampling Strategy/Approach

Sampling activities will be conducted to verify that the decontamination efforts described in Section 3.3 were effective at removing hazardous constituents, if any, from the surfaces of the CSU. Samples will be collected according to the methods and procedures provided in this section from discrete locations and analyzed for the appropriate hazardous constituents identified in Table 2 of this closure plan. Prior to the commencement of verification sampling, three baseline samples will be collected from the verification solution. These results from these samples will be used to determine if the equipment used for closure contribute any contaminants to the samples.

For each surface, a new container will be prepared containing water and Alconox. A mop, cloth, and/or other absorbent material will be submerged into the container and squeezed out prior to wiping down the discrete CSU surface to be verified. To minimize dilution of the samples, the solution used for the wipe down will be limited to a quantity sufficient to collect the appropriate number of samples. Verification sampling for this CSU will be conducted first for the walls and then the secondary containment/floor of each cell to prevent cross contamination of the samples and allow for the identification of hot spots. Tables 5 and 6 identify the sample locations, types, and required analysis applicable to the closure of each CSU.

## Table 5
## Sample Types, Locations, and Required Analysis for the TA-50-1, Room 59 Container Storage Unit

| Sample Type | Description | Location | Required Analysis |
|---|---|---|---|
| Baseline #1 | Sample collected from a container of verification solution prior to use.<br><br>There are three samples collected for statistical comparison | Not Applicable | RCRA Metals, VOC, and SVOC |
| Baseline #2 | | Not Applicable | RCRA Metals, VOC, and SVOC |
| Baseline #3 | | Not Applicable | RCRA Metals, VOC, and SVOC |
| Verification | Sample collected from a verification solution container after the solution has been used to wash down the discrete surface.<br><br>There is at least one sample per analyte collected for each discrete location | North wall | RCRA Metals, VOC, and SVOC |
| | | West wall | RCRA Metals, VOC, and SVOC |
| | | South wall | RCRA Metals, VOC, and SVOC |
| | | Floor #1 (North) | RCRA Metals, VOC, and SVOC |
| | | Floor #2 (South) | RCRA Metals, VOC, and SVOC |
| Waste Sample | Sampled collected form the decontamination wash water. | NA | RCRA Metals, VOC, and SVOC |

RCRA = Resource Conservation and Recovery Act
VOC = volatile organic compound
SVOC = semi-volatile organic compound

## Table 6
## Sample Types, Locations, and Required Analysis for the TA-50-37 Container Storage Unit

| Container Storage Location | Sample Type | Description | Sample Description[a] | Required Analysis |
|---|---|---|---|---|
| Room 115 | Baseline #1 | Sample collected from a container of verification solution prior to use.<br><br>There are three samples collected for statistical comparison | NA | RCRA Metals, SVOC, and PCB |
| | Baseline #2 | | NA | RCRA Metals, SVOC, and PCB |
| | Baseline #3 | | NA | RCRA Metals, SVOC, and PCB |
| | Verification | Sample collected from a verification solution container after the solution has been used to wash down the discrete surface.<br><br>There is at least one sample per analyte collected for each discrete location | Floor and 4 ft up walls #1 (West) | RCRA Metals, SVOC, and PCB |
| | | | Floor and 4 ft up walls #2 (Middle) | RCRA Metals, SVOC, and PCB |
| | | | Floor and 4 ft up walls #3 (East) | RCRA Metals, SVOC, and PCB |
| | Waste Sample | Sampled collected form the decontamination wash water. | Decontamination Solution | RCRA Metals, SVOC, and PCB |

## Table 6 (continued)
## Sample Types, Locations, and Required Analysis for the TA-50-37 Container Storage Unit

| Container Storage Location | Sample Type | Description | Sample Description[a] | Required Analysis |
|---|---|---|---|---|
| Room 118 | Baseline #1 | Sample collected from a container of verification solution prior to use.<br><br>There are three samples collected for statistical comparison | NA | RCRA Metals, VOC, and SVOC |
| | Baseline #2 | | NA | RCRA Metals, VOC, and SVOC |
| | Baseline #3 | | NA | RCRA Metals, VOC, and SVOC |
| | Verification | Sample collected from a verification solution container after the solution has been used to wash down the discrete surface.<br><br>There is at least one sample per analyte collected for each discrete location | West Wall #1 | RCRA Metals |
| | | | West Wall #2 | RCRA Metals |
| | | | South Wall #1 | RCRA Metals |
| | | | South Wall #2 | RCRA Metals |
| | | | East Wall #1 | RCRA Metals |
| | | | East Wall #2 | RCRA Metals |
| | | | North Wall #1 | RCRA Metals |
| | | | North Wall #2 | RCRA Metals |
| | | | Floor #1 (quadrant 1) | RCRA Metals |
| | | | Floor #2 (quadrant 1) | RCRA Metals |
| | | | Floor #3 (quadrant 2) | RCRA Metals |
| | | | Floor #4 (quadrant 2) | RCRA Metals |
| | | | Floor #5 (quadrant 3) | RCRA Metals |
| | | | Floor #6 (quadrant 3) | RCRA Metals |
| | | | Floor #7 (quadrant 4) | RCRA Metals |
| | | | Floor #8 (quadrant 4) | RCRA Metals |
| | | | Sump (4 ft x 4 ft x 4 ft) | RCRA Metals, VOC, and SVOC |
| | Waste Sample | Sampled collected form the decontamination wash water. | NA | RCRA Metals, VOC, and SVOC |

[a] Per letter to Steve Jetter, "Confirmation of Agreement on Closure Procedure for Technical Area 50, Building 37 (TA-50-37), Los Alamos National Laboratory (LANL)," Hazardous Waste Bureau, New Mexico Environment Department, February 3, 2003.

ft = foot/feet
NA = not applicable
PCB = polychlorinated byphenyls
RCRA = Resource Conservation and Recovery Act
SVOC = semi-volatile organic compound
VOC = volatile organic compound

The floor plate covering the sump in TA-50-37, Room 118, will be decontaminated during the floor and sump decontamination process. Results from the rinse water samples taken from the floor and sump decontamination will be used to determine if the floor plate decontamination was effective. If the analysis of the decontamination wash water requires that it be managed as a hazardous waste, the floor plate will also be managed as hazardous waste. Otherwise, the floor plate will be managed as non-hazardous waste or reused.

When the verification sampling is complete, the waste wash water solution generated during decontamination will be sampled for characterization.

## 4.2 Sample Collection Procedure

### 4.2.1 Soil and Sediment Sampling

The CSUs identified in this closure plan are located inside buildings or structures provided with secondary containment and run-on protection. These features were effective at preventing the migration of waste to the environment. In addition, the operating records indicate that there are no recorded spills of liquids at any of the CSUs to be closed. Therefore, soil sampling is not applicable.

### 4.2.2 Liquid Sampling

Sampling of the clean/used wash water solution will be performed in accordance with Risk Reduction and Environmental Stewardship Division, Remediation Group standard operating procedure ER-SOP-6.13, "Surface Water Sampling" (LANL, 2001).

### 4.2.3 Cleaning of Samplers

Disposable sampling equipment will be used for each of the CSU closures. This equipment may be presumed clean if still in a factory-sealed wrapper.

## 4.3 Sample Management Procedures

Samples will be collected and transported using documented chain-of-custody and sample management procedures to ensure the integrity of the sample and provide an accurate and defensible written record of the possession and handling of a sample from the time of collection, through laboratory analysis. An approved laboratory will provide coolers, containers, preservative, labels, chain-of-custody forms, analysis request forms, and custody seals prior to sampling. The following provides a description of chain-of-custody; sample documentation; sample handling, preservation, and storage; and sample transportation requirements that will be followed during the sampling activities associated with the closure. All samples for laboratory analysis will be submitted to an accredited off-site contract laboratory.

### 4.3.1 Chain-of-Custody

Sample chain-of-custody forms will be maintained by sampling personnel until the samples are relinquished to the analytical laboratory. The sample collector will be responsible for the integrity of

the samples collected until properly transferred to another person. The EPA considers a sample to be in a person's custody if it is:

- In a person's physical possession,
- In view of the person in possession, or
- Secured by that person in a restricted access area to prevent tampering.

The sample collector will document all pertinent sample collection data. Individuals relinquishing or receiving custody of the samples will sign, date, and note the time on the analysis request/chain-of-custody form. A chain-of-custody form shall accompany the sample containers or coolers, including transport to the analytical laboratory.

### 4.3.2 Sample Documentation

Sampling personnel will complete and maintain records to document sampling and analysis activities. Sample documentation will include, at a minimum, sample identification numbers, sample container labels and custody seals, chain-of-custody forms, analysis request forms, sample logbooks detailing sample collection activities, and shipping forms (if necessary).

#### 4.3.2.1 Sample Labels and Custody Seals

A sample label, completed in blue or black ink, will be affixed to each sample container. The sample label will include, at a minimum the following information:

- A unique sample identification number.
- Name of the sample collector.
- Date and time of collection.
- Type of preservatives used, if any.
- Location from which the sample was collected.

A custody seal will be placed on each sample container to ensure detection of unauthorized tampering with the samples. These labels must be initialed, dated, and affixed, by the sample collector, to the container in such a manner that it is necessary to break the seal to open the container.

#### 4.3.2.2 Chain-of-Custody Form

A chain-of-custody form must accompany all samples from collection through laboratory analysis. The completed original chain-of-custody form will be returned by the laboratory and will become a part of the permanent record documenting the sampling effort. One chain-of-custody form may be

used to document all of the samples collected from a single sampling event.

4.3.2.3 Analysis Request Form

An analysis request form will accompany all samples to the analytical laboratory. The completed original analysis request form will be returned by the laboratory and will become a part of the permanent record documenting the sampling effort. A separate analysis request form must be completed for each sample from a given sampling event.

4.3.2.4 Sample Logbook

All pertinent information on the sampling effort must be recorded in a logbook. The sample logbook will include, at a minimum, the following information:

- The sample location.
- Suspected waste composition.
- Sample identification number.
- Volume/mass of waste taken.
- Purpose of sampling.
- Description of sample point and sampling methodology.
- Date and time of collection.
- Name of the sample collector.
- Sample destination and how it will be transported.
- Observations.
- Signatures of personnel responsible for the observations.

4.3.3 Sample Handling, Preservation, and Storage

Samples will be collected and containerized in appropriate pre-cleaned sample containers. Table 7 presents the requirements specified in *SW-846* (EPA, 1986), for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius (°C) will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

**Table 7**
**Recommended Sample Containers, Preservation Techniques, and Holding Times**

| Analyte Class and Sample Type | Container Type and Materials[a] | Preservation | Holding Time[b] |
|---|---|---|---|
| **Metals** | | | |
| TCLP Metals:<br>Arsenic<br>Barium<br>Cadmium<br>Chromium<br>Lead | 2 - 500 mL Wide Mouth High-Density Polyethylene or Glass with Teflon Liner | Cool to 4°C | 180 Days |

**Table 7 (continued)**
**Recommended Sample Containers, Preservation Techniques, and Holding Times**

| Analyte Class and Sample Type | Container Type and Materials[a] | Preservation | Holding Time[b] |
|---|---|---|---|
| **Metals (continued)** | | | |
| TCLP/Total Mercury | 2 - 500-mL Wide Mouth High-Density Polyethylene or Glass with Teflon Liner | Cool to 4°C | 28 Days |
| **VOCs** | | | |
| Target Compound VOCs | 40 mL Amber Glass Vials with Teflon-Lined Septa | HCl to pH<2<br>Cool to 4 °C | 14 days |
| **SVOCs** | | | |
| Target Compound SVOCs | 1 L Amber Glass with Teflon-Lined Lid | Cool to 4 °C | Seven days from field collection to preparative extraction.<br><br>40 days from preparative extraction to determinative analysis. |

[a] Smaller sample containers may be required due to health and safety concerns associated with potential radiation exposure, transportation requirements, and waste management considerations.
[b] Information obtained from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, U.S. Environmental Protection Agency, 1986 and all approved updates.

°C = degrees Celsius
HCl = hydrochloric acid
L = Liter
mL = milliliter
SVOC = semi-volatile organic compounds
TCLP = Toxicity Characteristic Leaching Procedure
VOC = volatile organic compounds

### 4.3.4 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE Orders, and relevant local, state, and federal laws (including 10 Code of Federal Regulations [CFR] and 49 CFR). The LANL Laboratory Implementation Requirement 405-10-01.1, "Packaging and Transportation" (LANL, 1999) establishes requirements that will be implemented for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, wastes, and defense programs materials. Samples that require cooling to 4 °C will be transported in a cooler with ice or ice gel.

Off-site transportation of samples will occur via private, contract, or common motor carrier, air carrier, or freight. All off-site transportation will be processed through the Materials Management

Group (SUP-3) shipping office unless the shipper is specifically authorized, through formal documentation by SUP-3, to independently tender shipments to common motor or air carriers.

## 4.4 ANALYTICAL REQUIREMENTS

### 4.4.1 Proposed Analytical Methods

Each sample will be analyzed for the constituents identified in Table 2 as appropriate. Target detection limits, proposed analytical methods, and instrumentation for metals and organic analyses are presented in Tables 8 and 9, respectively.

**Table 8**
**Target Detection Limits, Proposed Analytical Methods, and Instrumentation for Metals Analysis**

| Analyte | EPA SW-846 Analytical Method [a] | Test Methods /Instrumentation | Target Detection Limit (ug/L)[b] | Rationale |
|---|---|---|---|---|
| Arsenic | 7060A[c], 7061A | ICP, GFAA | 10 | Determine the TC concentration. |
| Barium | 7080A[d], 7081[c] | ICP, FLAA, GFAA | 200 | |
| Cadmium | 7130[d], 7131A[c] | ICP, FLAA, GFAA | 2 | |
| Chromium | 7190[d], 7191[c] | ICP, FLAA, GFAA | 10 | |
| Lead | 7420[d], 7421[c] | ICP, FLAA, GFAA | 5 | |
| Selenium | 7740[e], 7741A | ICP, FLAA, GFAA | 5 | |
| Silver | 7760A[d], 7761[c] | ICP, FLAA, GFAA | 10 | |
| Mercury | 7471A[e], 7470A | CVAA | 0.2 | |

[a] U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846.
[b] Detection limits listed are for clean water. Actual detection limits may be higher depending on sample composition and matrix type.
[c] Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.
[d] Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.
[e] Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = cold-vapor atomic absorption spectroscopy
FLAA = flame atomic absorption spectroscopy
GFAA = graphite furnace atomic absorption spectroscopy
ICP = inductively coupled plasma emission spectroscopy
ug/L = micrograms per liter

**Table 9**
**Target Detection Limits, Proposed Analytical Methods, and Instrumentation for Organic Analysis**

| Analyte | EPA SW-846 Analytical Method [a] | Test Methods/ Instrumentation | Target Detection Limit (ug/L)[b] | Rationale |
|---|---|---|---|---|
| Target compound list VOCs plus 10 TICs | 8260B | GC/MS | 10 mg/L water | Determine the VOCs in the samples. |
| Target compound list SVOCs plus 20 TICs | 8270C[c] | GC/MS | 10 mg/L water | Determine the SVOCs in the samples. |

[a] U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846.
[b] Detection limits expressed as practical quantitation limits.
[c] Method being revised per the May 1998 SW-846 Draft Update IVA.

GC/MS = gas chromatography/mass spectrometry
mg/L = milligrams per liter
SVOC = semi-volatile organic compounds
TIC = tentatively identified compounds
VOC = volatile organic compounds

### 4.4.2 Analytical Laboratory Requirements

The analytical laboratory will perform the detailed qualitative and quantitative chemical analyses specified in Tables 8 and 9. This analytical laboratory will include at a minimum:

- A documented comprehensive QA/QC program.
- Technical analytical expertise.
- A document control/records management plan.
- The capability to perform data reduction, validation, and reporting.

The selection of the analytical testing methods identified in Tables 8 and 9 was based on the following considerations:

- The physical form of the waste.
- Constituents of interest.
- Required detection limits (e.g., regulatory thresholds).
- Information requirements (e.g., waste classification).

### 4.4.3 Quality Assurance/Quality Control

Field sampling procedures and laboratory analyses will be evaluated through the use of QA/QC samples to assess the overall quality of the data produced. QC samples are used to evaluate precision, accuracy, and potential sample contamination, associated with the sampling and analysis

process, are described in the following sections for field and laboratory activities. The recommended frequency of collection or analysis, and acceptance criteria also are presented, along with information on calculations necessary to evaluate the QC results.

4.4.3.1 Field Quality Control

The types of field QC samples that will be collected include trip blanks, field blanks, and field duplicates, as appropriate. For each CSU sampled during decontamination verification, at least one field duplicate will be collected. Table 10 presents a summary of QC sample types, analysis, frequency, and acceptance criteria. QC samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples. QC samples will be identified on the applicable forms so that the results can be applied to the associated sample. The frequency of field blank QC sampling will be 1 per day or one per 20 samples, whichever is more frequent.

**Table 10**
**Recommended Quality Control Samples, Frequency, and Acceptance Criteria**

| QC Sample Type | Applicable Analysis[a] | Frequency | Acceptance Criteria |
|---|---|---|---|
| Trip Blank | VOC | One set per shipping cooler containing samples to be analyzed for VOCs. | Not Applicable |
| Field Blank | VOC | One sample daily per analysis. | Not Applicable |
| Field Duplicate | RCRA Metals, VOC, SVOC | 1 for each sampling sequence. | Relative percent difference less than or equal to 20 percent |

[a] For VOC and SVOC analysis, if blank shows detectable levels of any common laboratory contaminant (e.g., methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.

QC = quality control
RCRA = Resource Conservation and Recovery Act
SVOC = semi-volatile organic compound
VOC = volatile organic compound

4.4.3.2 Analytical Laboratory Quality Control Samples

QA/QC considerations are an integral part of analytical laboratory operations. Laboratory QA is undertaken to ensure that analytical methods generate data that are technically sound, statistically valid, and can be documented. Individual QC procedures are the tools employed to measure the degree to which these QA objectives are met. At a minimum, the laboratory shall analyze laboratory blanks, Matrix Spike/Matrix Spike Duplicate, Blank Spike/Blank Spike Duplicate, and laboratory

duplicates at a frequency of one in twenty for all batch runs requiring EPA test methods and at a frequency of one in ten for non-EPA test methods.

### 4.4.5 Data Reporting Requirements

Analytical results will include all pertinent information about the condition and appearance of the sample-as-received. At a minimum, analytical reports will include:

- A summary of analytical results for each sample.
- Results from QC samples such as blanks, spikes, and calibrations.
- Reference to standard methods or a detailed description of analytical procedures.
- Raw data printouts for comparison with summaries.

The laboratory will describe the sample preparation procedure used in the analysis in sufficient detail so that the data user can understand how the sample was manipulated during analysis. Summary tables of contract laboratory analytical data and EPA Level II QA/QC results will be presented to NMED. The raw analytical data, including calibration curves, instrument calibration data, data calculation work sheets, and other laboratory support data for samples from this project shall be compiled and kept on file at LANL for reference. LANL will make the data available to NMED upon request.

## 5.0 WASTE MANAGEMENT

All sample collection activities will be conducted with waste minimization goals in mind. All waste material generated will be controlled, handled, characterized, and disposed in accordance with LANL waste management procedures. The operational record for each of the units discussed in this plan indicates that there have not been any spills, which would cause contamination of the surfaces and equipment with hazardous constituents. For this reason, it is anticipated that the waste generated during decontamination and verification of closure will be non-regulated waste with respect to both hazardous and radiological constituents. However, should contamination be present, the closure has the potential to generate several different types of waste materials. Table 11 provides a list of the full spectrum of waste materials that could be generated during closure and potential disposal options.

**Table 11**
**Potential Waste Materials, Waste Types, and Disposal Options**

| Container Storage Unit | Potential Waste Materials | Waste Type(s) | Disposal Options |
|---|---|---|---|
| TA-50-1, Room 59 | PPE<br>Decontamination wash water<br>Verification wash water | Non-regulated liquid and solid waste<br><br>Low-level liquid and solid waste | RLWTF – RLW<br>SWCS – non-regulated waste<br>TA-54 – solid LLW |
| TA-50-37 | PPE<br>Decontamination wash water<br>Verification wash water | Non-regulated liquid and solid waste<br><br>Low-level liquid and solid | RLWTF – RLW<br>SWCS – non-regulated waste<br>TA-54 – solid LLW |

LLW = low-level waste
PPE = personal protective equipment
RLW = radioactive liquid waste
RLWTF = Radioactive Liquid Waste Treatment Facility
SWCS = Sanitary Waste Collection System
TA = technical area

## 6.0 REFERENCES

EPA, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *(SW-846)* Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C.

LANL 1999, "Packaging and Transportation," Laboratory Implementation Requirement 405-10-01.1, Los Alamos National Laboratory, Los Alamos, New Mexico.

LANL, 2001, "Surface Water Sampling," ER-SOP-6.13, Los Alamos National Laboratory, Los Alamos, New Mexico.

LANL, 2002, "Los Alamos National Laboratory Technical Area 50 Closure Plan for Container Storage Units TA-50-1, Room 59; TA-50-37; and TA-50-114," LA-UR-02-4729, Los Alamos National Laboratory, Los Alamos, New Mexico.

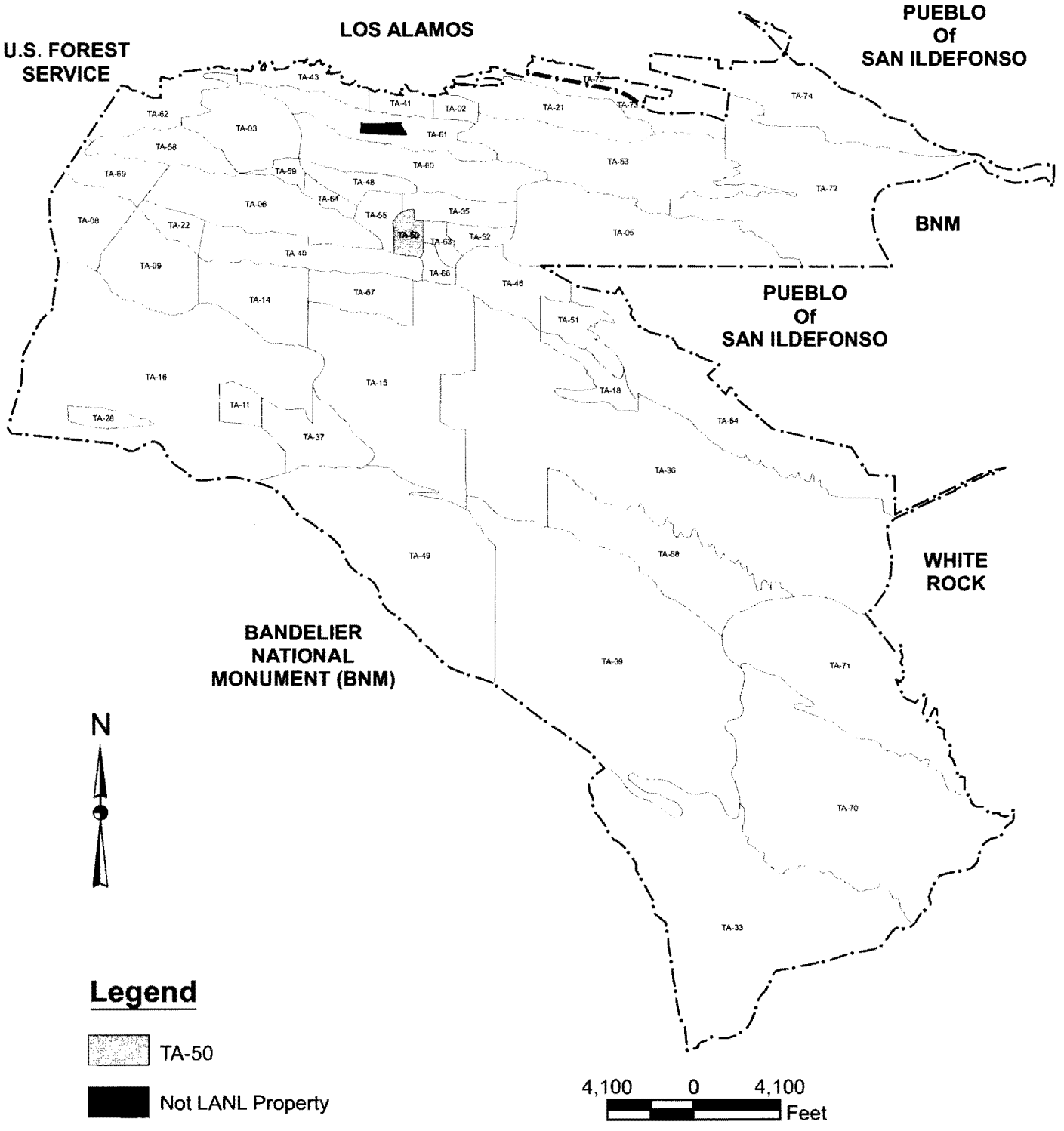



**Figure 1**
Location Map of Technical Area (TA) 50 at Los Alamos National Laboratory (LANL)

State Plane Coordinate System New Mexico Central Zone North American Datum 1983 (ft)

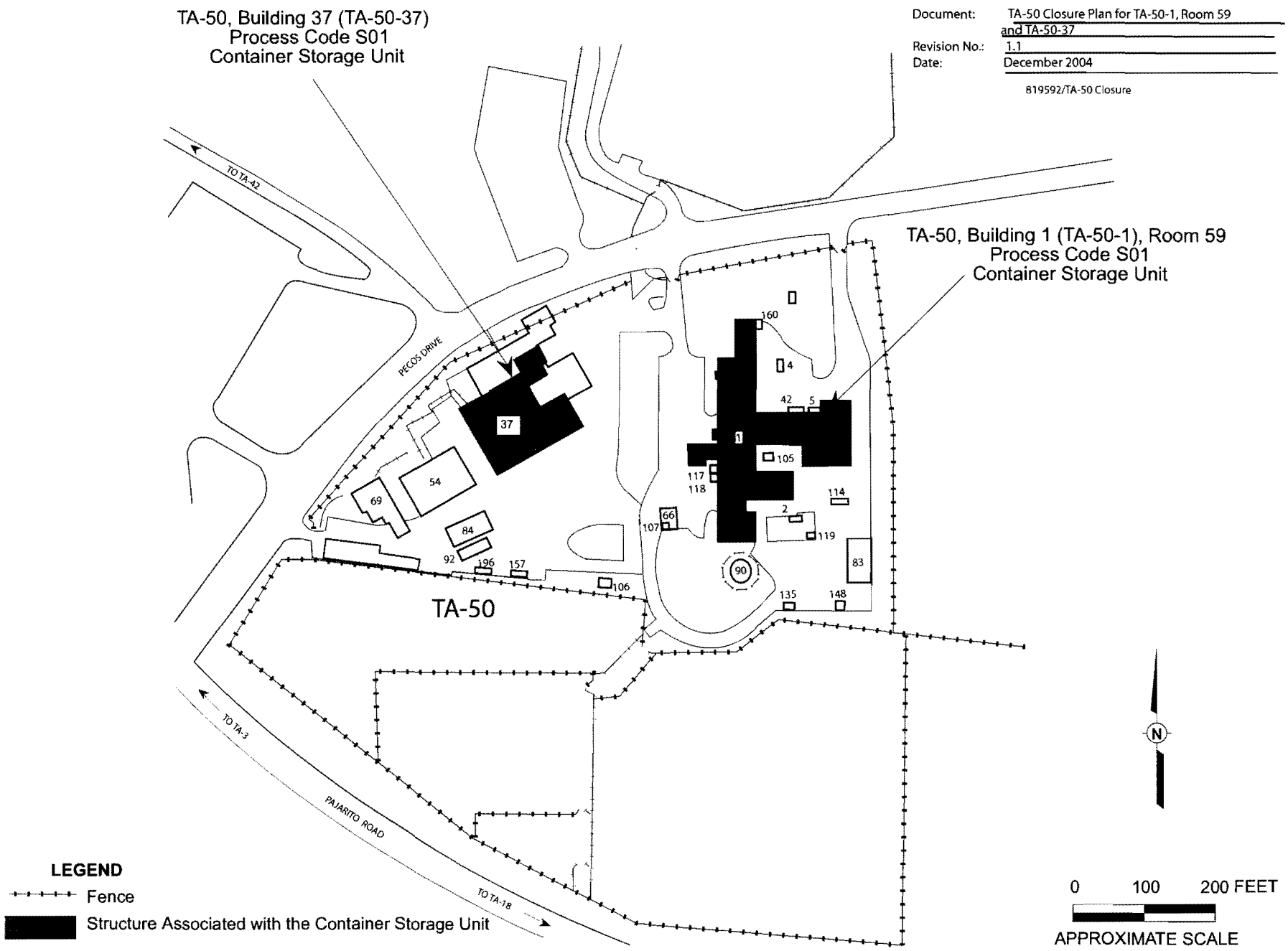
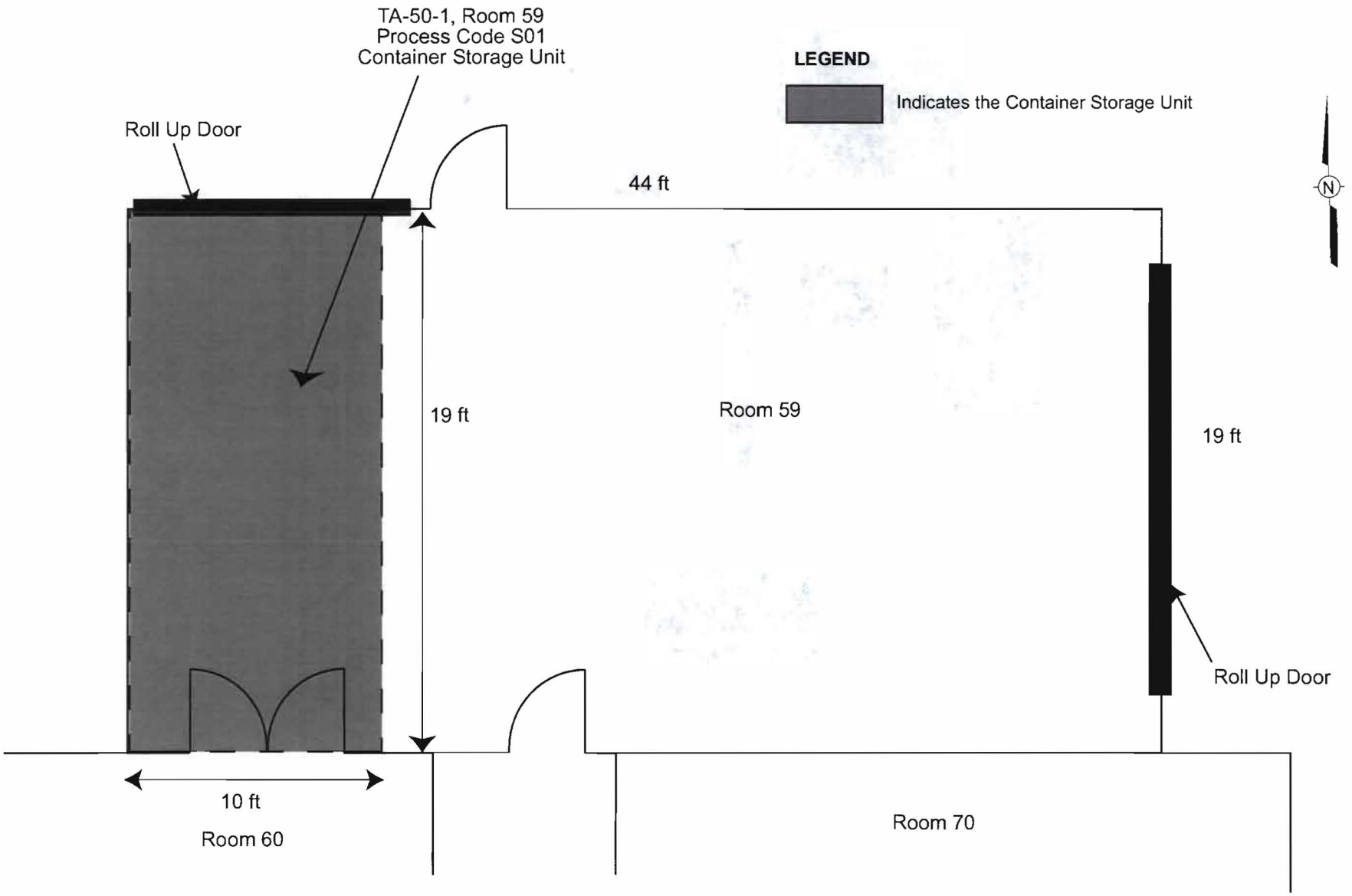



**Figure 2**

Location Map for Technical Area (TA) 50 Container Storage Units To be Closed




NOT TO SCALE

**Figure 3**
Technical Area (TA) 50, Building 1 (TA-50-1), Room 59 Container Storage Unit


**Figure 4**
Photograph – Technical Area (TA) 50, Building 1 (TA-50-1), Room 59 Container Storage Unit
(Photograph taken 10/30/01)

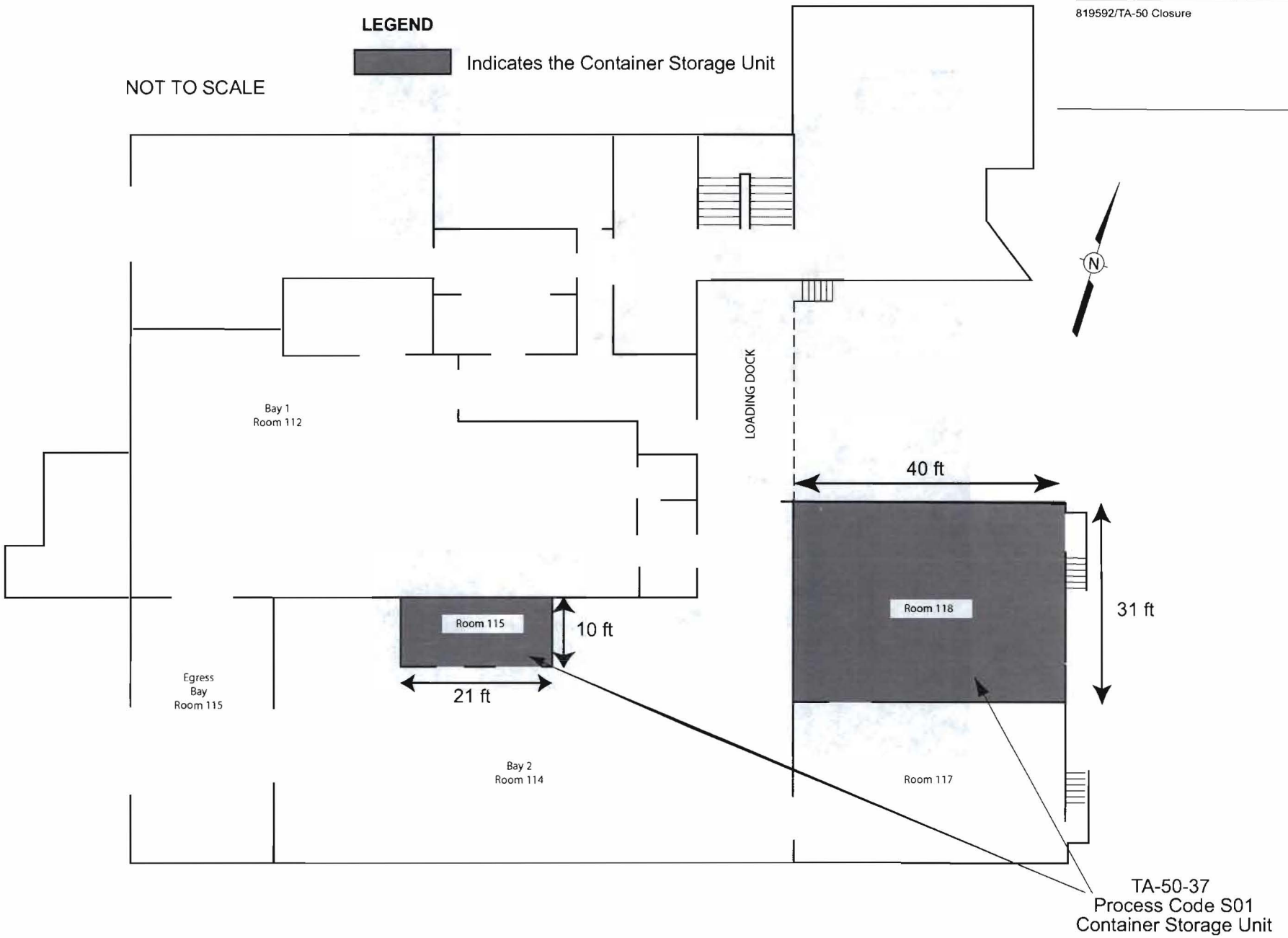



**Figure 5**
Technical Area (TA) 50, Building 37 (TA-50-37) Container Storage Unit

**Figure 6**
Photograph – Technical Area (TA) 50, Building 37 (TA-50-37), Room 115 Container Storage Unit
(Photograph taken 10/30/01)

**Figure 7**
Photograph – Technical Area (TA) 50, Building 37 (TA-50-37), Room 118 Container Storage Unit
(Photograph taken 10/30/01)