TA 55

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

MAY 26 2005

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NMED Hazardous Waste Bureau

John Kieling, Manager
RCRA Permits Management Program
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Dear Mr. Kieling:

Subject: Transmittal of the U.S. Department of Energy/University of California (DOE/UC) Closure Certification Report for Technical Area 55, Building PF4, Room B38 (TA-55-PF4-B38)

The purpose of this letter is to transmit three copies of the DOE-NNSA/UC Closure Certification Report for the hazardous waste management unit located at Los Alamos National Laboratory (LANL), TA-55-PF-B38. Activities associated with this closure were conducted in accordance with an approved closure plan submitted to NMED in December, 2004.

If you have any comments or questions regarding this submittal, please contact either myself at (505) 667-5794 or Jack Ellvinger, UC, at (505) 667-0633.

Sincerely,

Gene Turner

Gene Turner
Environmental Permitting Manager
Office of Environmental Stewardship

ES: 2GT-007

Enclosures

cc w/enclosures:
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MAY 26 2005

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Los Alamos

CLOSURE CERTIFICATION REPORT

Technical Area 55, Building 4
B38 Interim Status Container Storage Unit

Revision 0.0

LA-UR-05-3872
May 2005

Prepared By:
Environmental Stewardship Division,
Solid Waste Regulatory Compliance Group
Los Alamos National Laboratory
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CLOSURE CERTIFICATION REPORT

Technical Area 55, Building 4
B38 Interim Status Container Storage Unit

Revision 0.0

LA-UR-05-3872

Facility ID No.:	**NM0890010515**
Facility Name:	**Los Alamos National Laboratory**
Legal Owner:	**U.S. Department of Energy**
Legal Operators:	**U.S. Department of Energy** **Los Alamos Area Office** **528 35th Street** **Los Alamos, New Mexico 87544** **University of California** **P.O. Box 1663** **Los Alamos, New Mexico 87544**
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May 2005

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LIST OF ACRONYMS/ABBREVIATIONS

20.4.1 NMAC	New Mexico Administrative Code, Title 20, Chapter 4, Part 1
cm^2	centimeters squared
CSU	container storage unit
DI	de-ionized
dL	deciliter
DTSC	California Department of Toxic Substances Control
EDC	1, 2 Dichloroethane
EPA	U.S. Environmental Protection Agency
ft	foot/feet
in.	inch/inches
L	liter
LANL	Los Alamos National Laboratory
µg	microgram
MADAM	Multiple Assay Duel Analysis Measurement
MEK	2 -Butanone
mg	milligram
MSSL	Medium-Specific Screening Level
ND	non-detect
NIOSH	National Institute of Occupational Safety and Health
NMED	New Mexico Environment Department
PPE	personal protective equipment
QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
SVOC	Semi-Volatile Organic Compound
SW-846	*"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"*
TA	Technical Area
TCLP	Toxicity Characteristic Leaching Procedure
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

The purpose of the attached Closure Certification Report is to describe the closure activities implemented to complete closure of the Resource Conservation and Recovery Act interim status container storage unit (CSU) located at the Los Alamos National Laboratory (LANL) Technical Area (TA) 55 Building 4 (TA-55-4). The closure was witnessed by an independent, registered professional engineer or a designated inspector under the engineer's direct supervision. The closure activities were implemented in accordance with the procedures, methods, and approvals outlined in *Los Alamos National Laboratory Technical Area 55 Closure Plan for the B38 Container Storage Unit*, LA-UR-04-8493, hereinafter referred to as the Closure Plan (LANL, 2004). The attached report addresses only the closure activities implemented to close the TA-55-4, B38 CSU.

The TA-55-4, B38 CSU was decontaminated in September 2003. The effectiveness of the decontamination procedure was verified through rinse/wash water and swipe sampling in September 2003 and November 2003, respectively. The samples were analyzied for toxicity characteristic leaching procedure metals, semi-volatile organic compounds, and volatile organic compounds based upon the composition of waste items known to have been stored in the CSU. The performance standard for closure was no residual hazardous constituent concentrations above baseline results, quality assurance/quality control results, U.S. Environmental Protection Agency (EPA) Region 6 Human Health Medium Specific Screening Levels, and/or EPA guidance for occupational risk exposure.

All surfaces of the TA-55-4, B38 CSU were able to meet the performance standard for closure after decontamination. LANL is seeking approval of the attached Closure Certification Report by the New Mexico Environment Department as an adequate demonstration of closure in accordance with the Closure Plan.

CLOSURE CERTIFICATION REPORT

Technical Area 55, Building 4, B38
Interim Status Container Storage Unit

1.0 INTRODUCTION

The information provided in this Closure Certification Report is submitted to describe the closure activities implemented to close the Technical Area (TA) 55, Building 4, B38 Interim Status Container Storage Unit (CSU) at the Los Alamos National Laboratory (LANL). These closure activities will minimize the need for further maintenance, preclude the release of hazardous constituents to environmental media, and protect human health in accordance with the closure performance standards specified in New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart V (20.4.1.500 NMAC) (incorporating Code of Federal Regulations [CFR], Title 40 §265.111), revised October 1, 2003.

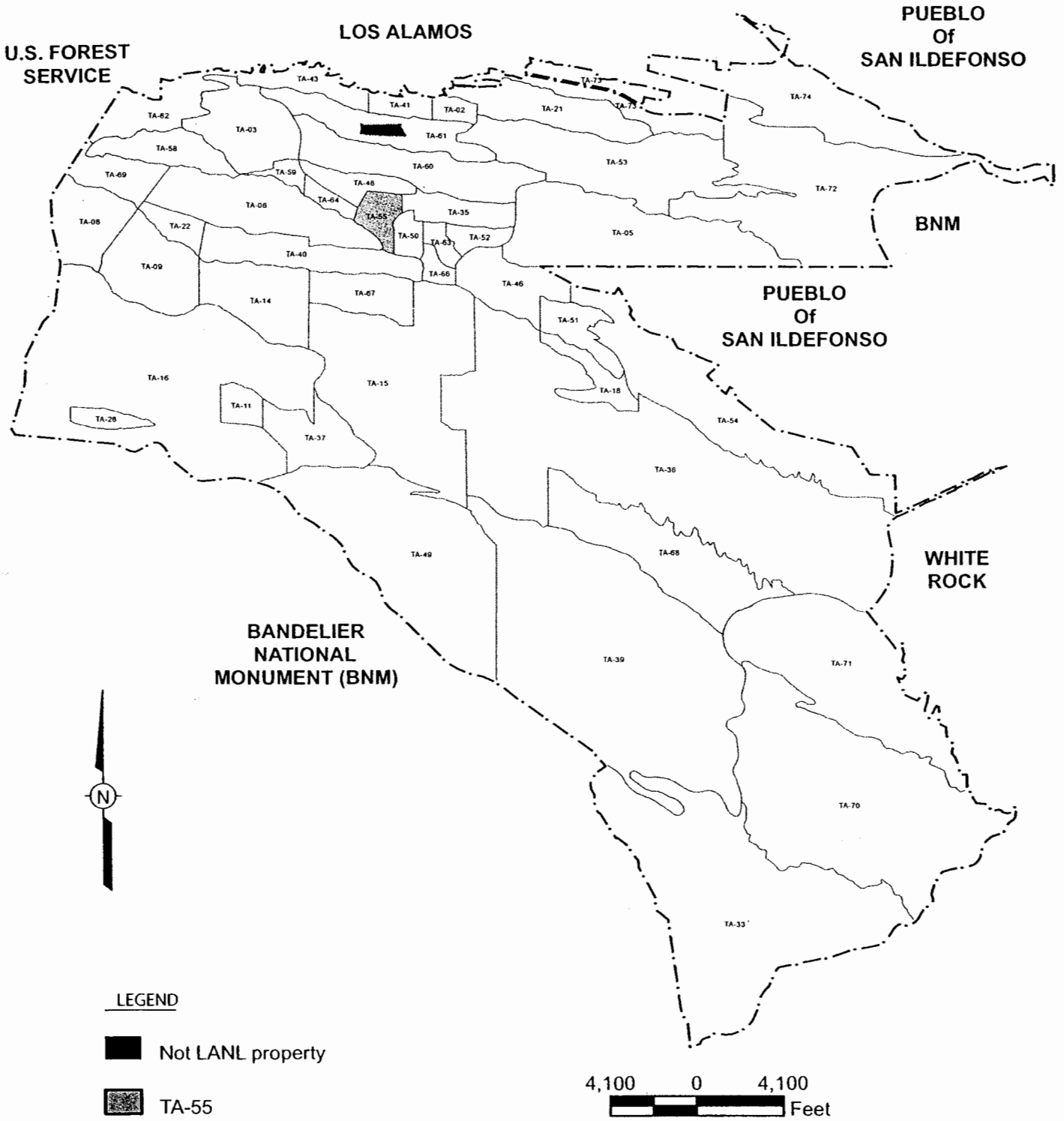
The closure activities described in this report were implemented in accordance with the procedures outlined in the *Los Alamos National Laboratory Technical Area 55 Closure Plan for the B38 Container Storage Unit*, LA-UR-04-8493 (LANL, 2004), hereinafter referred to as the Closure Plan. The Closure Plan was submitted to the New Mexico Environment Department in August 2002 and revised in December 2004.

1.1 Background

TA-55 is located on the mesa between a branch of Mortandad Canyon to the north and Two Mile Canyon to the south. Figure 1-1 shows the location of TA-55 at LANL. The B38 CSU is located in the southeast section of the basement floor of TA-55-4 and has been identified as Area 2 in previous permitting documents (Figure 1-2). The B38 CSU consists of an area approximately 26.5 feet (ft) long by 11 ft wide and was used for solid and liquid mixed waste storage of 55-gallon drums in support of waste operations at TA-55. The maximum total inventory of waste in storage at any time at the B38 CSU is estimated at 3,000 gallons.

1.2 Purpose

The purpose of this Closure Certification Report is to document the implementation of closure activities at the B38 CSU as described in the Closure Plan. Additionally, this report presents the independent registered professional engineer's closure certification as required by 20.4.1.500 NMAC (incorporating 40 CFR §265.115), revised October 1, 2003.



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

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Figure 1-1
Location Map of Technical Area (TA) 55 at Los Alamos National Laboratory (LANL)

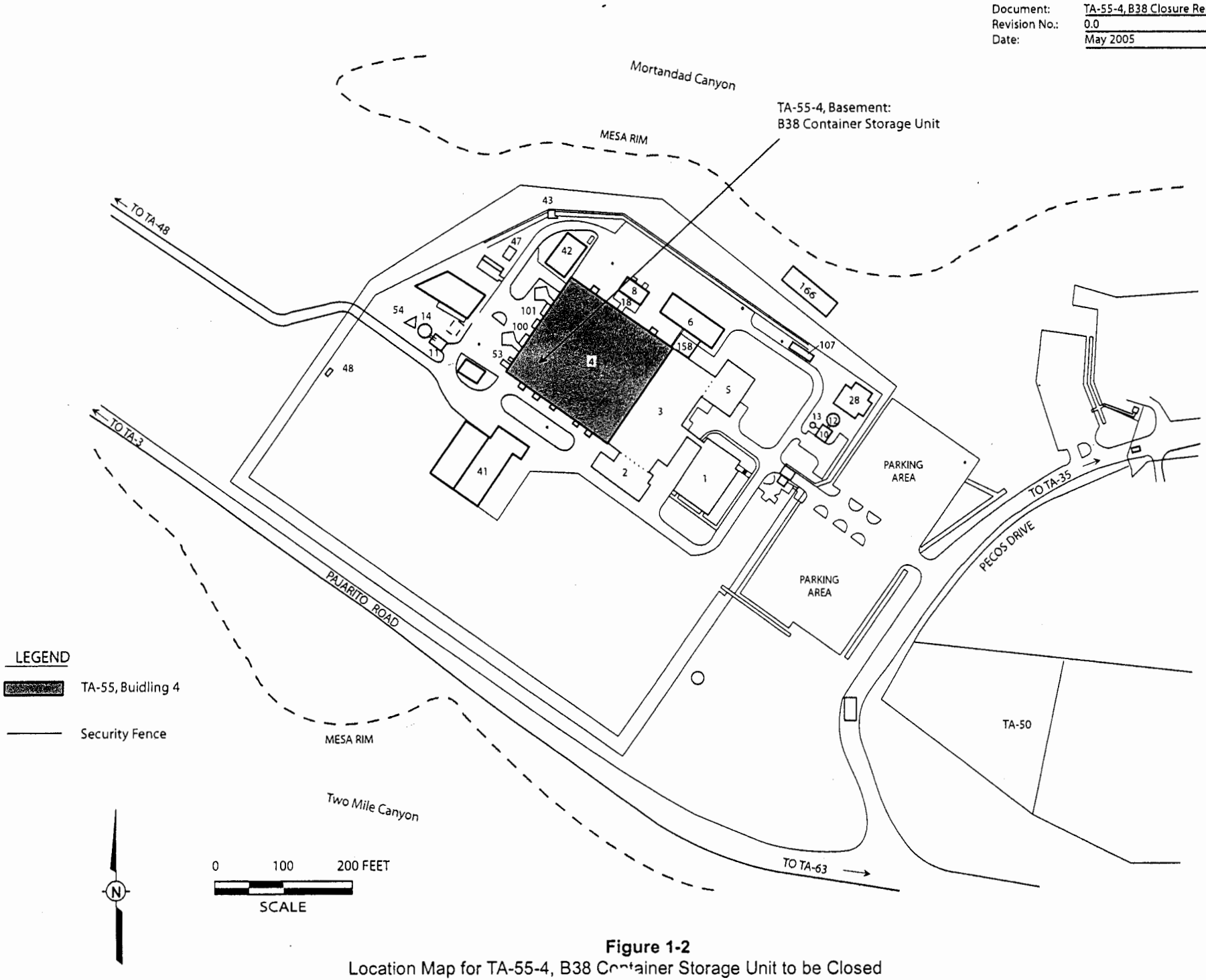

Figure 1-2
Location Map for TA-55-4, B38 Container Storage Unit to be Closed

2.0 PERFORMANCE OF CLOSURE

The information provided in this section documents the implementation and completion of the closure activities for the Technical Area (TA) 55, Building 4, B38 Interim Status Container Storage Unit (CSU). Closure was performed in accordance with the procedures outlined in the *Los Alamos National Laboratory Technical Area 55 Closure Plan for the B38 Container Storage Unit*, LA-UR-04-8493 (Los Alamos National Laboratory [LANL] 2004), hereinafter referred to as the Closure Plan and provided in Appendix A. The operating record, field logbook, analytical data, chain of custody documentation, and decontamination waste disposal records in support of the completed closure activities at the B38 CSU will be maintained by the LANL Solid Waste Regulatory Compliance Group.

2.1 Description

The B38 CSU is located in the southeast section of the basement floor of Technical Area (TA)-55, Building 4 and consists of an area approximately 26.5 feet (ft) long, by 11 ft wide (Figure 2-1). The room height varies from 9.2 ft to 10.3 ft. The B38 CSU operating record indicates that the unit has not received any waste for storage since 1994; however, it remained active in order to remain compatible with TA-55 operations and to allow flexibility for additional storage.

The B38 CSU was used to store 55-gallon drums of solid mixed waste generated during research and development activities, processing and recovery operations, decontamination and decommissioning projects, and general facility operations at TA-55. These wastes included solidified evaporator salt solutions and solidified analytical solutions. A majority of the analytical solutions were only corrosive; however, a small portion of these analytical solutions contained organics. Envirostone® cement, which is a calcium sulfate dehydrate, was used to solidify these solutions. Collectively, the solidified evaporator salt solutions and the analytical solutions were assigned the U.S. Environmental Protection Agency (EPA) hazardous waste numbers for toxic metals, volatile organic compounds (VOC), and semivolatile organic compounds (SVOC). It should be noted that only the analytical solutions contained organic compounds. Table 2-1 provides a list of applicable compounds and associated EPA hazardous waste numbers based on analytical data from characterization of the waste stored at the B38 CSU.

2.2 Pre-Closure Inspection

The B38 CSU was inspected by LANL and contract personnel prior to the commencement of closure activities. Figures 2-2 through 2-7 provide a photographic record of the pre-closure inspection. The pre-closure inspection included examination of the B38 CSU floor, which is painted. Figures 2-2, 2-3 and 2-4 show some minor peeling of the paint as well as some minor floor gouges and scuff marks. It was determined that none of the above compromised the integrity of the floor for decontamination. The overall condition of the painted walls of the CSU was determined to be good although it should be noted that the paint on the northwest wall was found to be peeling, as seen in Figure 2-5. All equipment and waste was removed prior to the inspection with the exception of the Multiple Assay Duel Analysis Measurement (MADAM) and its associated ancillary equipment. MADAM (43 inches [in.] wide by 47 in. long) and its associated electrical equipment (25 in. wide by 28 in. long) are not portable and could not be moved out of the CSU during closure. MADAM and its associated equipment are located along the southeast wall of the B38 CSU (Figure 2-8) and remained in place during the decontamination and verification sampling of the main surfaces of the CSU.

2.3 Closure Activities

Closure activities at the B38 CSU consisted of decontamination, verification sampling, and swipe sampling of the floors and walls to a height of 5 ft. This height was determined based on the fact that containers stored in B38 CSU were not stacked beyond the height of a 55-gallon drum on a secondary containment pallet. Also, the containers were never opened or closed within B38 CSU nor do records indicate any spills. The activities were commenced on September 9, 2003, and were completed on November 20, 2003. The following sections provide a detailed description of the steps taken to decontaminate the surfaces of the CSU and collect the necessary samples to verify closure as described in the Closure Plan.

2.3.1 Decontamination

Decontamination of the CSU surfaces was conducted in accordance with Section 7.2 of the Closure Plan. Figures 2-8 through 2-15 provide a photographic record of the decontamination process. Commencement of decontamination activities at the B38 CSU included the wash down of all four walls to a height of approximately 5-ft. After the walls were decontaminated, the floor was washed/wiped down. There was enough space between MADAM and the walls and floor that these areas were wiped down. The B38 CSU does not have any recessed areas (i.e.,

sumps), so excess used wash water was contained, collected, removed, and transferred to an appropriate sample container for analysis.

2.3.2 Verification Sample Collection

Verification of closure was conducted using wash water sampling as described in Section 8.2 of the Closure Plan. This included the wash/wipe down of discrete surfaces, as specified in Table 3 of the Closure Plan, with a sponge wetted with a solution of Alconox® and de-ionized (DI) water. To prevent cross contamination of samples, gloves and booties were changed prior to the collection of each surface verification wash/wipe down and subsequent sample collection. The following steps were followed for each surface:

1. A clean 5-gallon bucket containing approximately 2 gallons of DI water, Alconox®, and a sponge was placed near the area.
2. The sponge was submerged into the bucket and squeezed out.
3. The surface was wiped down using the sponge.
4. Steps 2 and 3 were repeated (Figures 2-16 through 2-23).
5. The wash water solution was sampled by pouring the water into the sample containers.
6. The sample containers were labeled and placed in a cooler pending shipment to the laboratory for analysis.
7. Steps 1-6 were then repeated.
8. A Radiological Control Technician checked the samples and the coolers for radiological contamination. No radiological materials were detected.

Table 2-2 identifies the verification samples collected for closure including the sample types, locations, descriptions, and requested analysis.

2.3.2.1 Baseline Sampling

A set of baseline and equipment blank samples were prepared to determine if the materials that were used during the closure and/or environment contributed any contaminants to the samples. The samples were collected from five-gallon buckets of Alconox® and DI water solution allowed to sit inside B38 overnight with a pair of gloves, cheesecloth, a mop head, and sponge (see Figure 2-24 a and b).

2.3.2.2 Quality Assurance/Quality Control Samples

The requisite quality assurance (QA)/quality control (QC) samples were prepared and/or collected in accordance with Table 8 of the Closure Plan. This included the collection of a single trip blank for the sample shipping cooler and two field duplicates.

2.3.2.3 Waste Characterization Samples

Samples of the used decontamination wash water solution were collected for waste characterization of the decontamination solution, personal protective equipment (PPE), sponges, cheesecloth, and other waste items generated during closure activities. Section 2.7 provides additional details regarding waste management.

2.3.3 Swipe Samples

Analytical results from the verification samples collected in September 2003 indicated that several of the B38 CSU surfaces could not meet the criteria specified for closure (Section 2.5). The analytical data from these locations was not directly relatable to a reasonable risk based scenario for exposure (i.e., inhalation, dermal absorptions) to an occupational worker. The data was instead used to identify locations where subsequent swipe samples were collected. The swipe samples were collected from each location, on November 20, 2003. Table 2-3 identifies the swipe samples collected from B38 CSU and includes the sample types, locations, descriptions, and requested analysis.

The samples were collected using the *National Institute of Occupation Safety and Health (NIOSH) Manual of Analytical Methods* (National Institute of Occupational Safety and Health) [NIOSH], 1996) for collection of lead swipe samples. This method included wiping a 100 square centimeter (cm^2) area (identified using a template) at each discrete location with a swipe wetted with an appropriate collection media for the analytes to be sampled. The following steps were followed for each surface:

1. Don a clean pair of gloves.
2. Remove the swipe from its sample jar and/or packaging.
3. Fold the swipe into fourths.
4. Wipe the surface to be sampled with firm pressure using an overlapping "S" pattern to cover the entire surface area with horizontal strokes (approximately 100 cm^2).

5. Fold the swipe, exposed side in, and place into a clean hard-walled sample container.
6. Seal the container and label.
7. Repeat steps 2 - 6 for the other analytes to be sampled for at that location.
8. Discard gloves.

2.3.3.1 Baseline Samples

No baseline samples were collected during swipe sampling at the B38 CSU.

2.3.3.2 Waste Samples

No waste samples were collected during swipe sampling at the B38 CSU.

2.3.3.3 Quality Assurance/Quality Control Samples

No QA/QC samples were collected during swipe sampling at the B38 CSU.

2.4 Deviations from the Closure Plan

There were no closure plan modifications or amendments as described in New Mexico Administrative Code Title 20, Chapter 4, Part I, Subpart V (20.4.1.500 NMAC) (incorporating Code of Federal Regulations [CFR] §265.112(c)), revised October 1, 2003 and Section 1.4 of the approved Closure Plan. However, there were several procedural refinements associated with decontamination of the CSU and the collection of samples. The following sections provide a detailed description of all deviations from the Closure Plan as it was submitted to the New Mexico Environmental Departments (NMED) in August 2002 and revised in December 2004.

2.4.1 Baseline Verification Samples

The collection of baseline samples is discussed in Section 8.0 of the Closure Plan. This section specifies that a baseline sample will be collected from the verification solution prior to its use for the verification wipe down. This was excessive given the number of discrete sample locations associated with the verification of closure and the use of identified sample equipment and media. Therefore, LANL and contract personnel collected a single set of baseline samples from the unused verification wash water solution.

2.4.2 Medium-Specific Screening Levels

Section 9.0 of the Closure Plan describes the proposed alternative demonstrations of closure including comparison of the verification analytical data to the EPA Region 9 Human Health Medium-Specific Screening Levels (MSSL) for drinking water. LANL is located in EPA Region 6, which has recently adopted the Region 9 levels as its own risk-based screening levels. The EPA Region 6 MSSLs were used for this closure.

2.4.3 Field Blank Samples

Table 8 of the Closure Plan called for the analysis of the field blank samples which included SVOCs and Toxicity Characteristic Leaching Procedure (TCLP) metals. Typically, a field blank is designed to capture VOC contamination in the vicinity of the sampling site. The requirement listed in Table 8 was incorrect. For the verification sampling at the B38 CSU, the field blank was collected as an equipment blank. The samples were collected from a five-gallon bucket of Alconox® and DI water solution allowed to sit inside B38 overnight with a pair of gloves, cheesecloth, a mop head, and sponge.

2.4.4 Swipe Samples

Verification samples collected from the wash water in September 2003 were not sufficient to demonstrate closure in accordance with the criteria specified in the Closure Plan (Appendix A). In addition, the analytical data from these samples was not sufficient to support an alternative demonstration of closure using risk assessment. The Closure Plan did not specify procedures or methods for the collection of samples capable of providing data directly relatable to a reasonable risk based scenario for exposure (i.e., inhalation, dermal absorptions) to an occupational worker. So, the sampling procedures in the Closure Plan were refined to include the collection of swipe samples. Swipe samples were collected using the *National Institute of Occupational Safety and Health Manual of Analytical Methods* (NIOSH, 1996) for collection of lead swipe samples.

2.4.5 Performance of Risk Assessment

The Closure Plan did not specify procedures or methods for the performance of a human health risk assessment (HHRA) (criterion 4) using swipe sample results that exceeded baseline or QA/QC sample results. The HHRA was conducted for the maximum detected concentration of each contaminant using methods developed by the EPA Technical Review Workgroup for Lead

(EPA, 2003). The assessment included an evaluation of health risks to occupational workers from exposure to contaminated indoor surfaces. The exposure pathways used to estimate an occupational worker's chronic daily intake of chemicals were ingestion, inhalation, and dermal exposure to chemicals on indoor surfaces. The results of this risk assessment are summarized in Section 3.0 of this Closure Certification Report and detailed in Appendix C.

2.5 Analytical Data

Sampling and analysis activities during the B38 CSU closure were conducted in accordance with Sections 10.0 and 11.0 of the Closure Plan and in accordance with the procedures given in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, (*SW-846)* (EPA, 1986a).

2.5.1 Verification Sampling Results

The samples collected for verification were analyzed by Assaigai Analytical Laboratories, Inc., in Albuquerque, New Mexico, which operates under a QA Plan and implements QC procedures that meet the requirements of *SW-846* (EPA, 1986a). Table 2-4 provides a summary of the analytical results for the verification and QA/QC samples collected on September 10, 2003.

Clean closure of the B38 CSU is demonstrated in accordance with at least one of the following criteria as shown in the logic diagram provided as Figure 2-25 and specified in Section 8.0 of the Closure Plan:

1. No detectable Resource Conservation and Recovery Act (RCRA)-regulated constituent residues from the management of stored authorized RCRA-regulated wastes are identified in samples collected during closure activities.

2. Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.

3. Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health and the environment based on the results of risk assessment methods.

4. Detectable concentrations of RCRA-regulated constituents that cannot be removed or decontaminated to acceptable levels as described above will be allowed to remain provided that these RCRA-regulated constituents do not pose an unacceptable risk when combined with technical or administrative control measures agreed upon with the NMED.

As indicated in Table 2-4, several of the surfaces in the B38 CSU had analytical results that indicated the detection of metals, SVOC, and VOC contaminants. For the purpose of closure, it was assumed that these contaminants were the result of storage activities at the B38 CSU.

To demonstrate clean closure for these surfaces in accordance with criterion 2 each of the detected constituents was compared to the analytical results the baseline samples, equipment blank samples, and QA/QC samples. This comparison was used to eliminate constituents from additional sampling requirements by determining one of the following:

- **Baseline Samples** - Materials used to conduct the decontamination and verification sampling and/or environment contributed to the detected level of the constituent.
- **QA/QC Samples** - Environmental or laboratory conditions contributed to the detected level of the constituent.

Table 2-5 provides a comparison of the detected constituents against the baseline and QA/QC sample results. The constituents that were not eliminated due to the baseline or QA/QC sample results were then considered for an alternative demonstration of closure in accordance with criterion 3. Section 9.0 of the Closure Plan describes the proposed alternative demonstrations of closure including comparison of the verification analytical data to the EPA Region 6 Human Health MSSLs for drinking water. Constituents at detected levels below the MSSL met criterion 3. Surfaces with constituents detected above baseline, QA/QC, and MSSLs underwent swipe sampling to allow for a risk based analysis in accordance with criterion 4.

2.5.2 Swipe Sampling Results

Swipe samples were analyzed by Assaigai Analytical Laboratories, Inc., in Albuquerque, New Mexico, which operates under a QA Plan and implements QC procedures that meet the requirements of *SW-846* (EPA, 1986a). Table 2-6 provides a summary of the analytical results for the swipe samples collected on November 20, 2003. The results form swipe sampling are used to demonstrate clean closure in accordance with criteria 2 or 4 as specified in Section 2.5.1 and Figure 2-25.

As indicated in Table 2-6, several of the surfaces had analytical results that indicated detections for metal and VOC contamination. To demonstrate clean closure for these surfaces in

accordance with criterion 2, each of the detected constituents was compared against the sample results from baseline samples and QA/QC samples. This comparison was used to eliminate constituents from the HHRA by determining one of the following:

- **Baseline Samples** - Materials used to conduct the decontamination and verification sampling and/or the environment contributed to the detected level of the constituent.
- **QA/QC Samples** - Environmental or laboratory conditions contributed to the detected level of the constituent.

Table 2-7 provides a comparison of the detected constituents against the baseline and QA/QC sample results. The constituents that were not eliminated due to the baseline or QA/QC sample results were then considered for an alternative demonstration of closure in accordance with criterion 4. This demonstration includes the use of risk assessment modeling and is described in Section 3.0 of this report.

2.6 Statement of Quality Assurance/Quality Control Adequacy

QA/QC activities during the B38 CSU closure were conducted in accordance with Section 11.3 of the Closure Plan. This included the collection of QA/QC samples to assess data quality and evaluate field sampling procedures and laboratory analyses. Appendix D provides the detection limits and uncertainty associated with all of the analytical data from the sampling activities in September 2003 and November 2003. A review of the sampling procedures, shipping procedures and analytical data has determined that the analytical data related to closure are of acceptable quality and should therefore be accepted as valid.

2.7 Waste Management

The decontamination and verification of the B38 CSU was conducted with waste minimization goals in mind. The waste materials generated during closure were managed in accordance with LANL waste management procedures as described in Section 12.0 and Table 9 of the Closure Plan. The decontamination wash water solutions were transferred to a 30-gallon polypropylene drum and stored on a secondary containment pallet pending the results of analysis. The PPE, sponges, cheesecloth, and other trash generated during closure activities were packaged into 55-gallon plastic drum liners pending characterization based on the results of waste sampling described in Section 2.3.2.3. The verification wash water solutions were segregated from the

decontamination wash water solutions and placed into a separate 30-gallon polypropylene drum. This drum was also stored on a secondary containment pallet pending characterization. All waste generated from the closure activities was stored in the TA-55-4, B40 Interim Status CSU. The waste materials were characterized based upon the analytical results provided in Table 2-8. Table 2-9 provides a list of the waste materials generated during closure and includes the estimated quantity, waste type, and final disposal destination.

Table 2-1
Hazardous Waste Constituents Stored at the B38 Container Storage Unit

Category	EPA Hazardous Waste Numbers	Specific Constituents[a]
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
Volatile Organic Compounds	F002, F003, F005	Acetone, methyl ethyl ketone Bromomethane, Methylene, 1,2-dibromo-3-chloropropane
Semivolatile Organic Compounds	NA	N-Nitrosodimethylamine, Phenol, Benzyl Alcohol, 2-Nitrophenol, 4-Nitrophenol, Benzoic Acid, Diethylphthalate, Di-n-Butylphthalate, Bis-2-Ethylhexlphthalate, Di-n-Octylphthalate, Butylbenzylphthalate

a. Based on the operating record of the unit.

Definition of Acronyms

EPA = U.S. Environmental Protection Agency.

NA = not applicable.

Table 2-2
Verification Samples Collected During Closure of B38, September 2003

Sample ID	Location [a]	Requested Analysis [a,b]
03SWRC597	Baseline	SVOC (SW846 Method 8270C)
03SWRC598	Baseline	VOC (SW846 Method 8260B)
03SWRC599	Baseline	Total Metals (SW846 Methods 6010B and 7471A)
03SWRC603	Duplicate	VOC (SW846 Method 8260B)
03SWRC614	Duplicate	SVOC (SW846 Method 8270C)
03SWRC629	Duplicate	Total Metals (SW846 Methods 6010B and 7471A)
03SWRC607	Equipment Blank	VOC (SW846 Method 8260B)
03SWRC615	Equipment Blank	SVOC (SW846 Method 8270C)
03SWRC625	Equipment Blank	Total Metals (SW846 Methods 6010B and 7471A)
03SWRC622	Floor #1	SVOC (SW846 Method 8270C)
03SWRC623	Floor #1	VOC (SW846 Method 8260B)
03SWRC624	Floor #1	Total Metals (SW846 Methods 6010B and 7471A)
03SWRC626	Floor #2	SVOC (SW846 Method 8270C)
03SWRC627	Floor #2	VOC (SW846 Method 8260B)
03SWRC628	Floor #2	Total Metals (SW846 Methods 6010B and 7471A)
03SWRC608	Northeast Wall	SVOC (SW846 Method 8270C)
03SWRC609	Northeast Wall	VOC (SW846 Method 8260B)
03SWRC610	Northeast Wall	Total Metals (SW846 Methods 6010B and 7471A)
03SWRC600	Northwest Wall #1	SVOC (SW846 Method 8270C)
03SWRC601	Northwest Wall #1	VOC (SW846 Method 8260B)
03SWRC602	Northwest Wall #1	Total Metals (SW846 Methods 6010B and 7471A)
03SWRC604	Northwest Wall #2	SVOC (SW846 Method 8270C)
03SWRC605	Northwest Wall #2	VOC (SW846 Method 8260B)
03SWRC606	Northwest Wall #2	Total Metals (SW846 Methods 6010B and 7471A)
03SWRC611	Southeast Wall #1	SVOC (SW846 Method 8270C)
03SWRC612	Southeast Wall #1	VOC (SW846 Method 8260B)
03SWRC613	Southeast Wall #1	Total Metals (SW846 Methods 6010B and 7471A)
03SWRC616	Southeast Wall #2	SVOC (SW846 Method 8270C)
03SWRC617	Southeast Wall #2	VOC (SW846 Method 8260B)
03SWRC618	Southeast Wall #2	Total Metals (SW846 Methods 6010B and 7471A)
03SWRC619	Southwest Wall	SVOC (SW846 Method 8270C)
03SWRC620	Southwest Wall	VOC (SW846 Method 8260B)
03SWRC621	Southwest Wall	Total Metals (SW846 Methods 6010B and 7471A)
03SWRC629A	Trip Blank	VOC (SW846 Method 8260B)

a. Specified in the *Los Alamos National Laboratory Technical Area 55 Closure Plan for the B38 Container Storage Unit,* LA-UR-02-5451, Los Alamos National Laboratory, Los Alamos, New Mexico, (LANL, 2002).

b. 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.

Definition of Acronyms

ID = identification.

SVOC = semivolatile organic compounds.

VOC = volatile organic compounds.

Table 2-3
Swipe Samples Collected During Closure of B38, November 2003

Sample ID	Location	Requested Analysis [a]
03SWRC773	Floor #1	Total Metals (SW846 Methods 6010B and 7471A)
03SWRC772	Floor #2	Total Metals (SW846 Methods 6010B and 7471A)
03SWRC774	Floor #3	Total Metals (SW846 Methods 6010B and 7471A)
03SWRC775	Floor #4	Total Metals (SW846 Methods 6010B and 7471A)
03SWRC777	Northeast Wall	VOC (SW846 Method 8260B)
03SWRC778	Northwest Wall #1	VOC (SW846 Method 8260B)
03SWRC779	Northwest Wall #2	VOC (SW846 Method 8260B)
03SWRC776	Southwest Wall	VOC (SW846 Method 8260B)

a. 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.

Definition of Acronyms

ID = identification.

SVOC = semivolatile organic compounds.

VOC = volatile organic compounds.

Table 2-4
Summary of Verification Sample Results for the B38 Container Storage Unit

Sample ID	Location	Analysis	Parameter	Result	Units	Qualifier
03SWRC597	Baseline	SVOC	Benzyl alcohol	8.5	µg/L	2
03SWRC597	Baseline	SVOC	bis (2-Ethylhexyl) phthalate	130	µg/L	2
03SWRC597	Baseline	SVOC	Diethylphthalate	5.4	µg/L	2
03SWRC597	Baseline	SVOC	di-n-Butylphthalate	3.1	µg/L	2
03SWRC597	Baseline	SVOC	di-n-Octylphthalate	5	µg/L	2
03SWRC598	Baseline	VOC	1,4-Dichlorobenzene	1.5	µg/L	
03SWRC598	Baseline	VOC	2-Butanone (MEK)	49	µg/L	
03SWRC598	Baseline	VOC	Bromodichloromethane	20	µg/L	
03SWRC598	Baseline	VOC	Bromoform	2.2	µg/L	
03SWRC598	Baseline	VOC	Chlorodibromomethane	8.9	µg/L	
03SWRC598	Baseline	VOC	Chloroform	42	µg/L	
03SWRC600	NW wall #1	SVOC	Benzyl alcohol	8.3	µg/L	
03SWRC600	NW wall #1	SVOC	bis (2-Ethylhexyl) phthalate	15	µg/L	
03SWRC600	NW wall #1	SVOC	Butylbenzylphthalate	3.4	µg/L	
03SWRC600	NW wall #1	SVOC	di-n-Butylphthalate	32	µg/L	
03SWRC600	NW wall #1	SVOC	di-n-Octylphthalate	1	µg/L	
03SWRC601	NW wall #1	VOC	1,2 Dichloroethane (EDC)	2.2	µg/L	
03SWRC603	Duplicate	VOC	1,2 Dichloroethane (EDC)	2.5	µg/L	
03SWRC604	NW wall #2	SVOC	Benzyl alcohol	12	µg/L	2
03SWRC604	NW wall #2	SVOC	bis (2-Ethylhexyl) phthalate	170	µg/L	2
03SWRC604	NW wall #2	SVOC	Butylbenzylphthalate	5	µg/L	2
03SWRC604	NW wall #2	SVOC	Diethylphthalate	1.1	µg/L	2
03SWRC604	NW wall #2	SVOC	di-n-Butylphthalate	24	µg/L	2
03SWRC604	NW wall #2	SVOC	di-n-Octylphthalate	2	µg/L	2
03SWRC605	NW wall #2	VOC	1,2 Dichloroethane (EDC)	3.4	µg/L	
03SWRC608	NE wall	SVOC	Benzyl alcohol	8.1	µg/L	2
03SWRC608	NE wall	SVOC	bis (2-Ethylhexyl) phthalate	2500	µg/L	2
03SWRC608	NE wall	SVOC	Butylbenzylphthalate	8.6	µg/L	2
03SWRC608	NE wall	SVOC	di-n-Butylphthalate	25	µg/L	2
03SWRC608	NE wall	SVOC	di-n-Octylphthalate	96	µg/L	2
03SWRC609	NE wall	VOC	1,2 Dichloroethane (EDC)	3.4	µg/L	
03SWRC610	NE wall	Total Metals	Barium	0.1	mg/L	
03SWRC611	SE wall #1	SVOC	Benzyl alcohol	5.7	µg/L	2
03SWRC611	SE wall #1	SVOC	bis (2-Ethylhexyl) phthalate	150	µg/L	2
03SWRC611	SE wall #1	SVOC	Diethylphthalate	1	µg/L	2
03SWRC611	SE wall #1	SVOC	di-n-Butylphthalate	23	µg/L	2
03SWRC611	SE wall #1	SVOC	di-n-Octylphthalate	30	µg/L	2
03SWRC613	SE wall #1	Total Metals	Barium	0.1	mg/L	B
03SWRC613	SE wall #1	Total Metals	Chromium	0.05	mg/L	B
03SWRC614	Duplicate	SVOC	Benzyl alcohol	7.6	µg/L	
03SWRC614	Duplicate	SVOC	bis (2-Ethylhexyl) phthalate	14	µg/L	
03SWRC614	Duplicate	SVOC	di-n-Butylphthalate	27	µg/L	
03SWRC615	Equipment Blank	SVOC	di-n-Butylphthalate	27	µg/L	
03SWRC616	SE wall #2	SVOC	Benzyl alcohol	16	µg/L	
03SWRC616	SE wall #2	SVOC	bis (2-Ethylhexyl) phthalate	700	µg/L	
03SWRC616	SE wall #2	SVOC	Butylbenzylphthalate	3.4	µg/L	
03SWRC616	SE wall #2	SVOC	di-n-Butylphthalate	25	µg/L	
03SWRC616	SE wall #2	SVOC	di-n-Octylphthalate	4.4	µg/L	
03SWRC618	SE wall #2	Total Metals	Barium	0.1	mg/L	B
03SWRC618	SE wall #2	Total Metals	Chromium	0.06	mg/L	B
03SWRC619	SW wall	SVOC	Benzyl alcohol	8.5	µg/L	2

Table 2-4
Summary of Verification Sample Results for the B38 Container Storage Unit

Sample ID	Location	Analysis	Parameter	Result	Units	Qualifier
03SWRC619	SW wall	SVOC	bis (2-Ethylhexyl) phthalate	14	µg/L	2
03SWRC619	SW wall	SVOC	Butylbenzylphthalate	2.4	µg/L	2
03SWRC619	SW wall	SVOC	di-n-Butylphthalate	36	µg/L	2
03SWRC619	SW wall	SVOC	di-n-Octylphthalate	1.1	µg/L	2
03SWRC620	SW wall	VOC	1,2 Dichloroethane (EDC)	1	µg/L	
03SWRC620	SW wall	VOC	1,4 Dichlorobenzene	1.6	µg/L	B
03SWRC621	SW wall	Total Metals	Chromium	0.05	mg/L	B
03SWRC622	Floor #1	SVOC	Benzyl alcohol	6.5	µg/L	2
03SWRC622	*Floor #1*	*SVOC*	*bis (2-Ethylhexyl) phthalate*	*950*	µg/L	*2*
03SWRC622	Floor #1	SVOC	Butylbenzylphthalate	5	µg/L	2
03SWRC622	Floor #1	SVOC	Diethylphthalate	36	µg/L	2
03SWRC622	Floor #1	SVOC	di-n-Butylphthalate	46	µg/L	2
03SWRC622	Floor #1	SVOC	di-n-Octylphthalate	53	µg/L	2
03SWRC624	Floor #1	Total Metals	Barium	0.1	mg/L	B
03SWRC624	Floor #1	Total Metals	Chromium	0.06	mg/L	B
03SWRC624	Floor #1	Total Metals	Lead	0.08	mg/L	B
03SWRC625	Equipment Blank	Total Metals	Chromium	0.05	mg/L	B
03SWRC626	Floor #2	SVOC	Benzyl alcohol	10	µg/L	
03SWRC626	Floor #2	SVOC	bis (2-Ethylhexyl) phthalate	13	µg/L	
03SWRC626	Floor #2	SVOC	Butylbenzylphthalate	3.9	µg/L	
03SWRC626	Floor #2	SVOC	Diethylphthalate	1.7	µg/L	
03SWRC626	Floor #2	SVOC	di-n-Butylphthalate	48	µg/L	
03SWRC626	Floor #2	SVOC	di-n-Octylphthalate	18	µg/L	
03SWRC628	Floor #2	Total Metals	Barium	0.1	mg/L	B
03SWRC628	Floor #2	Total Metals	Chromium	0.06	mg/L	B
03SWRC628	Floor #2	Total Metals	Lead	0.09	mg/L	
03SWRC629	Duplicate	Total Metals	Barium	0.1	mg/L	B
03SWRC629	Duplicate	Total Metals	Chromium	0.06	mg/L	B
03SWRC629	Duplicate	Total Metals	Lead	0.09	mg/L	
Method Blank	Method Blank	VOC	1,2 Dichlorobenzene	1	µg/L	
Method Blank	Method Blank	VOC	1,3 Dichlorobenzene	1.3	µg/L	
Method Blank	Method Blank	VOC	1,4 Dichlorobenzene	1.6	µg/L	
Method Blank	Method Blank	Total Metals	Arsenic	0.2	mg/L	
Method Blank	Method Blank	Total Metals	Arsenic	0.2	mg/L	
Method Blank	Method Blank	Total Metals	Chromium	0.04	mg/L	
Method Blank	Method Blank	Total Metals	Chromium	0.04	mg/L	
Method Blank	Method Blank	VOC	Styrene	1.1	µg/L	

Qualifier

B = Analyte detected in Method Blank.

2 = A surrogate recovery rate was outside of QC criteria, suggesting matrix interference problems. This should be taken into account when reviewing the data.

Definition of Acronyms

ID = identification.

µg/L = microgram per liter.

mg/L = milligram per liter.

SVOC = semivolatile organic compounds.

VOC = volatile organic compounds.

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Table 2-5

B38 Verification Sample Results - Comparison to Baseline, QA/QC, and EPA Region 6 MSSLs[a]

Sample ID	Location	Parameter	Result (mg/L)	Qualifier	EPA Region 6 MSSL (mg/L)	Comparison Results
Method Blank	Method Blank	1,2 Dichlorobenzene	0.001		0.061	NA
03SWRC605	NW wall #2	1,2 Dichloroethane (EDC)	0.0034		0.00012	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample and is above the MSSL. This sample location must be forwarded to swipe sampling.
03SWRC609	NE wall	1,2 Dichloroethane (EDC)	0.0034		0.00012	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample and is above the MSSL. This sample location must be forwarded to swipe sampling.
03SWRC603	Duplicate	1,2 Dichloroethane (EDC)	0.0025		0.00012	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample and is above the MSSL. This sample location must be forwarded to swipe sampling.
03SWRC601	NW wall #1	1,2 Dichloroethane (EDC)	0.0022		0.00012	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample and is above the MSSL. This sample location must be forwarded to swipe sampling.
03SWRC620	SW wall	1,2 Dichloroethane (EDC)	0.001		0.00012	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample and is above the MSSL. This sample location must be forwarded to swipe sampling.
Method Blank	Method Blank	1,3 Dichlorobenzene	0.0013		0.18	NA
03SWRC620	SW wall	1,4 Dichlorobenzene	0.0016	B	0.00047	The detected levels are equal to or less than the detected level in the Method Blank.
Method Blank	Method Blank	1,4 Dichlorobenzene	0.0016		0.00047	NA
03SWRC598	Baseline	1,4-Dichlorobenzene	0.0015		0.00047	NA
03SWRC598	Baseline	2-Butanone (MEK)	0.049		1.9	NA
Method Blank	Method Blank	Arsenic	0.2		0.000045	NA
Method Blank	Method Blank	Arsenic	0.2		0.000045	NA
03SWRC610	NE wall	Barium	0.1		2.6	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC613	SE wall #1	Barium	0.1	B	2.6	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC618	SE wall #2	Barium	0.1	B	2.6	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC624	Floor #1	Barium	0.1	B	2.6	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC628	Floor #2	Barium	0.1	B	2.6	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.

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Table 2-5

B38 Verification Sample Results - Comparison to Baseline, QA/QC, and EPA Region 6 MSSLs[a]

Sample ID	Location	Parameter	Result (mg/kg)	Qualifier	EPA Region 6 MSSL (mg/kg)	Comparison Results
03SWRC629	Duplicate	Barium	0.1	B	2.6	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC616	SE wall #2	Benzyl alcohol	0.016		11	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC604	NW wall #2	Benzyl alcohol	0.012	2	11	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC626	Floor #2	Benzyl alcohol	0.01		11	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC597	Baseline	Benzyl alcohol	0.0085	2	11	NA
03SWRC619	SW wall	Benzyl alcohol	0.0085	2	11	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC600	NW wall #1	Benzyl alcohol	0.0083		11	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC608	NE wall	Benzyl alcohol	0.0081	2	11	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC614	Duplicate	Benzyl alcohol	0.0076		11	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC622	Floor #1	Benzyl alcohol	0.0065	2	11	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC611	SE wall #1	Benzyl alcohol	0.0057	2	11	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC608	NE wall	bis (2-Ethylhexyl) phthalate	2.6	2	0.0048	A surrogate recovery rate was outside of the laboratories QC criteria, suggesting matrix interference problems that likely resulted in either false positive readings or elevated levels. This analytical result will, therefore, be discarded from further comparison.
03SWRC622	Floor #1	bis (2-Ethylhexyl) phthalate	1.95	2	0.0048	A surrogate recovery rate was outside of the laboratories QC criteria, suggesting matrix interference problems that likely resulted in either false positive readings or elevated levels. This analytical result will, therefore, be discarded from further comparison.

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Table 2-5

B38 Verification Sample Results - Comparison to Baseline, QA/QC, and EPA Region 6 MSSLs[a]

Sample ID	Location	Parameter	Results (mg/L)	Qualifier	EPA Region 6 MSSLs (mg/L)	Comments/Sample Results
03SWRC616	SE wall #2	bis (2-Ethylhexyl) phthalate	0.7		0.0048	A surrogate recovery rate was outside of the laboratories QC criteria, suggesting matrix interference problems that likely resulted in either false positive readings or elevated levels. This analytical result will, therefore, be discarded from further comparison.
03SWRC604	NW wall #2	bis (2-Ethylhexyl) phthalate	0.17	2	0.0048	A surrogate recovery rate was outside of the laboratories QC criteria, suggesting matrix interference problems that likely resulted in either false positive readings or elevated levels. This analytical result will, therefore, be discarded from further comparison.
03SWRC611	SE wall #1	bis (2-Ethylhexyl) phthalate	0.15	2	0.0048	A surrogate recovery rate was outside of the laboratories QC criteria, suggesting matrix interference problems that likely resulted in either false positive readings or elevated levels. This analytical result will, therefore, be discarded from further comparison.
03SWRC597	Baseline	bis (2-Ethylhexyl) phthalate	0.13	2	0.0048	NA
03SWRC600	NW wall #1	bis (2-Ethylhexyl) phthalate	0.015		0.0048	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC614	Duplicate	bis (2-Ethylhexyl) phthalate	0.014		0.0048	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC619	SW wall	bis (2-Ethylhexyl) phthalate	0.014	2	0.0048	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC626	Floor #2	bis (2-Ethylhexyl) phthalate	0.013		0.0048	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC598	Baseline	Bromodichloromethane	0.02		0.00018	NA
03SWRC598	Baseline	Bromoform	0.0022		0.0085	NA
03SWRC608	NE wall	Butylbenzylphthalate	0.0086	2	7.3	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC604	NW wall #2	Butylbenzylphthalate	0.005	2	7.3	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC622	Floor #1	Butylbenzylphthalate	0.005	2	7.3	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC626	Floor #2	Butylbenzylphthalate	0.0039		7.3	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.

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Table 2-5

B38 Verification Sample Results - Comparison to Baseline, QA/QC, and EPA Region 6 MSSLs[a]

Sample ID	Location	Parameter	Result (mg/l)	Qualifier	EPA Region 6 MSSL (mg/l)	Comparison Results
03SWRC600	NW wall #1	Butylbenzylphthalate	0.0034		7.3	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC616	SE wall #2	Butylbenzylphthalate	0.0034		7.3	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC619	SW wall	Butylbenzylphthalate	0.0024	2	7.3	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC598	Baseline	Chlorodibromomethane	0.0089		0.00013	NA
03SWRC598	Baseline	Chloroform	0.042		0.00016	NA
03SWRC618	SE wall #2	Chromium	0.06	B	0.11	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC624	Floor #1	Chromium	0.06	B	0.11	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC628	Floor #2	Chromium	0.06	B	0.11	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC629	Duplicate	Chromium	0.06	B	0.11	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC613	SE wall #1	Chromium	0.05	B	0.11	The detected levels are equal to or less than the detected level in the Equipment Blank sample.
03SWRC621	SW wall	Chromium	0.05	B	0.11	The detected levels are equal to or less than the detected level in the Equipment Blank sample.
03SWRC625	Equipment Blank	Chromium	0.05	B	0.11	NA
Method Blank	Method Blank	Chromium	0.04		0.11	NA
Method Blank	Method Blank	Chromium	0.04		0.11	NA
03SWRC622	Floor #1	Diethylphthalate	0.036	2	29	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC597	Baseline	Diethylphthalate	0.0054	2	29	NA
03SWRC626	Floor #2	Diethylphthalate	0.0017		29	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC604	NW wall #2	Diethylphthalate	0.0011	2	29	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC611	SE wall #1	Diethylphthalate	0.001	2	29	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC626	Floor #2	di-n-Butylphthalate	0.048		3.7	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.

replacement page

Table 2-5

B38 Verification Sample Results - Comparison to Baseline, QA/QC, and EPA Region 6 MSSLs[a]

Sample ID	Location	Parameter	Results (mg/kg)	Qualifier	EPA Region 6 MSSLs (mg/kg)	Comparison Results
03SWRC622	Floor #1	di-n-Butylphthalate	0.046	2	3.7	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC619	SW wall	di-n-Butylphthalate	0.036	2	3.7	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC600	NW wall #1	di-n-Butylphthalate	0.032		3.7	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC614	Duplicate	di-n-Butylphthalate	0.027		3.7	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC615	Equipment Blank	di-n-Butylphthalate	0.027		3.7	NA
03SWRC608	NE wall	di-n-Butylphthalate	0.025	2	3.7	The detected levels are equal to or less than the detected level in the Equipment Blank sample.
03SWRC616	SE wall #2	di-n-Butylphthalate	0.025		3.7	The detected levels are equal to or less than the detected level in the Equipment Blank sample.
03SWRC604	NW wall #2	di-n-Butylphthalate	0.024	2	3.7	The detected levels are equal to or less than the detected level in the Equipment Blank sample.
03SWRC611	SE wall #1	di-n-Butylphthalate	0.023	2	3.7	The detected levels are equal to or less than the detected level in the Equipment Blank sample.
03SWRC597	Baseline	di-n-Butylphthalate	0.0031	2	3.7	NA
03SWRC608	NE wall	di-n-Octylphthalate	0.096	2	0.73	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC622	Floor #1	di-n-Octylphthalate	0.053	2	0.73	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC611	SE wall #1	di-n-Octylphthalate	0.03	2	0.73	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC626	Floor #2	di-n-Octylphthalate	0.018		0.73	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC597	Baseline	di-n-Octylphthalate	0.005	2	0.73	NA
03SWRC616	SE wall #2	di-n-Octylphthalate	0.0044		0.73	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC604	NW wall #2	di-n-Octylphthalate	0.002	2	0.73	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC619	SW wall	di-n-Octylphthalate	0.0011	2	0.73	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC600	NW wall #1	di-n-Octylphthalate	0.001		0.73	The detected levels are equal to or less than the detected level in the Baseline sample.

replacement page

Table 2-5

B38 Verification Sample Results - Comparison to Baseline, QA/QC, and EPA Region 6 MSSLs[a]

Sample ID	Location	Parameter	Result (mg/L)	Qualifier	EPA Region 6 MSSL (mg/L)	Comparison Results
03SWRC628	Floor #2	Lead	0.09		0.015	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample and is above the MSSL. This sample location must be forwarded to swipe sampling.
03SWRC629	Duplicate	Lead	0.09		0.015	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample and is above the MSSL. This sample location must be forwarded to swipe sampling.
03SWRC624	Floor #1	Lead	0.08	B	0.015	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample and is above the MSSL. This sample location must be forwarded to swipe sampling.
Method Blank	Method Blank	Styrene	0.0011		1.6	NA

a. Drinking Water Medium-Specific Screening Levels.

Qualifier

B = Analyte detected in Method Blank.

2 = A surrogate recovery rate was outside of QC criteria, suggesting matrix interference problems. This should be taken into account when reviewing the data.

Definition of Acronyms

EPA = U.S. Environmental Protection Agency.
ID = identification.
mg/L = milligram per liter.
MSSL = Medium-Specific Screening Level.
NA = not applicable.
QA/QC = quality assurance/quality control.

Table 2-5
B38 Verification Sample Results - Comparison to Baseline, QA/QC, and EPA Region 6 MSSLs

Sample ID	Location	Parameter	Results (mg/L)	Qualifier	EPA Region 6 MSSLs (mg/L)	Comparison Results
Method Blank	Method Blank	1,2 Dichlorobenzene	0.001		0.061	NA
03SWRC605	**NW wall #2**	**1,2 Dichloroethane (EDC)**	**0.0034**		**0.00012**	**The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample and is above the MSSL. This sample location must be forwarded to swipe sampling.**
03SWRC609	**NE wall**	**1,2 Dichloroethane (EDC)**	**0.0034**		**0.00012**	**The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample and is above the MSSL. This sample location must be forwarded to swipe sampling.**
03SWRC603	**Duplicate**	**1,2 Dichloroethane (EDC)**	**0.0025**		**0.00012**	**The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample and is above the MSSL. This sample location must be forwarded to swipe sampling.**
03SWRC601	**NW wall #1**	**1,2 Dichloroethane (EDC)**	**0.0022**		**0.00012**	**The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample and is above the MSSL. This sample location must be forwarded to swipe sampling.**
03SWRC620	**SW wall**	**1,2 Dichloroethane (EDC)**	**0.001**		**0.00012**	**The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample and is above the MSSL. This sample location must be forwarded to swipe sampling.**
Method Blank	Method Blank	1,3 Dichlorobenzene	0.0013		0.18	NA
03SWRC620	SW wall	1,4 Dichlorobenzene	0.0016	B	0.00047	The detected levels are equal to or less than the detected level in the Method Blank.
Method Blank	Method Blank	1,4 Dichlorobenzene	0.0016		0.00047	NA
03SWRC598	Baseline	1,4-Dichlorobenzene	0.0015		0.00047	NA
03SWRC598	Baseline	2-Butanone (MEK)	0.049		1.9	NA
Method Blank	Method Blank	Arsenic	0.2		0.000045	NA
Method Blank	Method Blank	Arsenic	0.2		0.000045	NA
03SWRC610	NE wall	Barium	0.1		2.6	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC613	SE wall #1	Barium	0.1	B	2.6	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC618	SE wall #2	Barium	0.1	B	2.6	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC624	Floor #1	Barium	0.1	B	2.6	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC628	Floor #2	Barium	0.1	B	2.6	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.

Table 2-5
B38 Verification Sample Results - Comparison to Baseline, QA/QC, and EPA Region 6 MSSLs

Sample ID	Location	Parameter	Results (mg/L)	Qualifier	EPA Region 6 MSSLs (mg/L)	Comparison Results
03SWRC629	Duplicate	Barium	0.1	B	2.6	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC616	SE wall #2	Benzyl alcohol	0.016		11	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC604	NW wall #2	Benzyl alcohol	0.012	2	11	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC626	Floor #2	Benzyl alcohol	0.01		11	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC597	Baseline	Benzyl alcohol	0.0085	2	11	NA
03SWRC619	SW wall	Benzyl alcohol	0.0085	2	11	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC600	NW wall #1	Benzyl alcohol	0.0083		11	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC608	NE wall	Benzyl alcohol	0.0081	2	11	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC614	Duplicate	Benzyl alcohol	0.0076		11	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC622	Floor #1	Benzyl alcohol	0.0065	2	11	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC611	SE wall #1	Benzyl alcohol	0.0057	2	11	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC608	**NE wall**	**bis (2-Ethylhexyl) phthalate**	**2.5**	**2**	**0.0048**	**A surrogate recovery rate was outside of the laboratories QC criteria, suggesting matrix interference problems that likely resulted in either false positive readings or elevated levels. This analytical result will, therefore, be discarded from further comparison.**
03SWRC622	**Floor #1**	**bis (2-Ethylhexyl) phthalate**	**0.95**	**2**	**0.0048**	**A surrogate recovery rate was outside of the laboratories QC criteria, suggesting matrix interference problems that likely resulted in either false positive readings or elevated levels. This analytical result will, therefore, be discarded from further comparison.**

Table 2-5
B38 Verification Sample Results - Comparison to Baseline, QA/QC, and EPA Region 6 MSSLs

Sample ID	Location	Parameter	Results (mg/L)	Qualifier	EPA Region 6 MSSLs (mg/L)	Comparison Results
03SWRC616	**SE wall #2**	**bis (2-Ethylhexyl) phthalate**	**0.7**		**0.0048**	**A surrogate recovery rate was outside of the laboratories QC criteria, suggesting matrix interference problems that likely resulted in either false positive readings or elevated levels. This analytical result will, therefore, be discarded from further comparison.**
03SWRC604	**NW wall #2**	**bis (2-Ethylhexyl) phthalate**	**0.17**	**2**	**0.0048**	**A surrogate recovery rate was outside of the laboratories QC criteria, suggesting matrix interference problems that likely resulted in either false positive readings or elevated levels. This analytical result will, therefore, be discarded from further comparison.**
03SWRC611	**SE wall #1**	**bis (2-Ethylhexyl) phthalate**	**0.15**	**2**	**0.0048**	**A surrogate recovery rate was outside of the laboratories QC criteria, suggesting matrix interference problems that likely resulted in either false positive readings or elevated levels. This analytical result will, therefore, be discarded from further comparison.**
03SWRC597	Baseline	bis (2-Ethylhexyl) phthalate	0.13	2	0.0048	NA
03SWRC600	NW wall #1	bis (2-Ethylhexyl) phthalate	0.015		0.0048	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC614	Duplicate	bis (2-Ethylhexyl) phthalate	0.014		0.0048	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC619	SW wall	bis (2-Ethylhexyl) phthalate	0.014	2	0.0048	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC626	Floor #2	bis (2-Ethylhexyl) phthalate	0.013		0.0048	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC598	Baseline	Bromodichloromethane	0.02		0.00018	NA
03SWRC598	Baseline	Bromoform	0.0022		0.0085	NA
03SWRC608	NE wall	Butylbenzylphthalate	0.0086	2	7.3	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC604	NW wall #2	Butylbenzylphthalate	0.005	2	7.3	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC622	Floor #1	Butylbenzylphthalate	0.005	2	7.3	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC626	Floor #2	Butylbenzylphthalate	0.0039		7.3	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.

Table 2-5
B38 Verification Sample Results - Comparison to Baseline, QA/QC, and EPA Region 6 MSSLs

Sample ID	Location	Parameter	Results (mg/L)	Qualifier	EPA Region 6 MSSLs (mg/L)	Comparison Results
03SWRC600	NW wall #1	Butylbenzylphthalate	0.0034		7.3	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC616	SE wall #2	Butylbenzylphthalate	0.0034		7.3	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC619	SW wall	Butylbenzylphthalate	0.0024	2	7.3	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC598	Baseline	Chlorodibromomethane	0.0089		0.00013	NA
03SWRC598	Baseline	Chloroform	0.042		0.00016	NA
03SWRC618	SE wall #2	Chromium	0.06	B	0.11	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC624	Floor #1	Chromium	0.06	B	0.11	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC628	Floor #2	Chromium	0.06	B	0.11	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC629	Duplicate	Chromium	0.06	B	0.11	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC613	SE wall #1	Chromium	0.05	B	0.11	The detected levels are equal to or less than the detected level in the Equipment Blank sample.
03SWRC621	SW wall	Chromium	0.05	B	0.11	The detected levels are equal to or less than the detected level in the Equipment Blank sample.
03SWRC625	Equipment Blank	Chromium	0.05	B	0.11	NA
Method Blank	Method Blank	Chromium	0.04		0.11	NA
Method Blank	Method Blank	Chromium	0.04		0.11	NA
03SWRC622	Floor #1	Diethylphthalate	0.036	2	29	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC597	Baseline	Diethylphthalate	0.0054	2	29	NA
03SWRC626	Floor #2	Diethylphthalate	0.0017		29	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC604	NW wall #2	Diethylphthalate	0.0011	2	29	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC611	SE wall #1	Diethylphthalate	0.001	2	29	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC626	Floor #2	di-n-Butylphthalate	0.048		3.7	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.

Table 2-5
B38 Verification Sample Results - Comparison to Baseline, QA/QC, and EPA Region 6 MSSLs

Sample ID	Location	Parameter	Results (mg/L)	Qualifier	EPA Region 6 MSSLs (mg/L)	Comparison Results
03SWRC622	Floor #1	di-n-Butylphthalate	0.046	2	3.7	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC619	SW wall	di-n-Butylphthalate	0.036	2	3.7	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC600	NW wall #1	di-n-Butylphthalate	0.032		3.7	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC614	Duplicate	di-n-Butylphthalate	0.027		3.7	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC615	Equipment Blank	di-n-Butylphthalate	0.027		3.7	NA
03SWRC608	NE wall	di-n-Butylphthalate	0.025	2	3.7	The detected levels are equal to or less than the detected level in the Equipment Blank sample.
03SWRC616	SE wall #2	di-n-Butylphthalate	0.025		3.7	The detected levels are equal to or less than the detected level in the Equipment Blank sample.
03SWRC604	NW wall #2	di-n-Butylphthalate	0.024	2	3.7	The detected levels are equal to or less than the detected level in the Equipment Blank sample.
03SWRC611	SE wall #1	di-n-Butylphthalate	0.023	2	3.7	The detected levels are equal to or less than the detected level in the Equipment Blank sample.
03SWRC597	Baseline	di-n-Butylphthalate	0.0031	2	3.7	NA
03SWRC608	NE wall	di-n-Octylphthalate	0.096	2	0.73	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC622	Floor #1	di-n-Octylphthalate	0.053	2	0.73	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC611	SE wall #1	di-n-Octylphthalate	0.03	2	0.73	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC626	Floor #2	di-n-Octylphthalate	0.018		0.73	The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample, however it is below the MSSL.
03SWRC597	Baseline	di-n-Octylphthalate	0.005	2	0.73	NA
03SWRC616	SE wall #2	di-n-Octylphthalate	0.0044		0.73	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC604	NW wall #2	di-n-Octylphthalate	0.002	2	0.73	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC619	SW wall	di-n-Octylphthalate	0.0011	2	0.73	The detected levels are equal to or less than the detected level in the Baseline sample.
03SWRC600	NW wall #1	di-n-Octylphthalate	0.001		0.73	The detected levels are equal to or less than the detected level in the Baseline sample.

Table 2-5
B38 Verification Sample Results - Comparison to Baseline, QA/QC, and EPA Region 6 MSSLs

Sample ID	Location	Parameter	Results (mg/L)	Qualifier	EPA Region 6 MSSLs (mg/L)	Comparison Results
03SWRC628	**Floor #2**	**Lead**	**0.09**		**0.015**	**The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample and is above the MSSL. This sample location must be forwarded to swipe sampling.**
03SWRC629	**Duplicate**	**Lead**	**0.09**		**0.015**	**The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample and is above the MSSL. This sample location must be forwarded to swipe sampling.**
03SWRC624	**Floor #1**	**Lead**	**0.08**	**B**	**0.015**	**The detected level cannot be ruled out due to a detected level in a baseline or QA/QC sample and is above the MSSL. This sample location must be forwarded to swipe sampling.**
Method Blank	Method Blank	Styrene	0.0011		1.6	NA

Qualifier

B = Analyte detected in Method Blank.

2 = A surrogate recovery rate was outside of QC criteria, suggesting matrix interference problems. This should be taken into account when reviewing the data.

Definition of Acronyms

EPA = U.S. Environmental Protection Agency.
ID = identification.
mg/L = milligram per liter.
MSSL = Medium-Specific Screening Level.
NA = not applicable.
QA/QC = quality assurance/quality control.

Table 2-6
Summary of Swipe Sample Results for B38, November 2003

Sample ID	Location	Analysis	Parameter	Result (µg/100 cm^2)
03SWRC772	Floor #2	Total Metals	Lead	0
03SWRC773	Floor #1	Total Metals	Lead	13
03SWRC774	Floor #3	Total Metals	Lead	0
03SWRC775	Floor #4	Total Metals	Lead	0
03SWRC776	Southwest Wall	VOC	1,2 Dichloroethane (EDC)[a]	0
03SWRC777	Northeast Wall	VOC	1,2 Dichloroethane (EDC)[a]	0
03SWRC778	Northwest Wall #1	VOC	1,2 Dichloroethane (EDC)[a]	0
03SWRC779	Northwest Wall #2	VOC	1,2 Dichloroethane (EDC)[a]	0

a. Samples for 1, 2 Dichloroethane were received with headspace.

Definition of Acronyms

ID = identification.

µg/100 cm^2 = microgram per 100 square centimeters.

VOC = volatile organic compounds.

Table 2-7
B38 Swipe Sample Results - Comparison to Baseline and QA/QC

Sample ID	Location	Parameter	Result (µg/100 cm^2)	Comparison Results
03SWRC772	Floor #2	Lead	ND	NA
03SWRC773	**Floor #1**	**Lead**	**13**	**Baseline and QA/QC samples were not collected during swipe sampling activities at the B38 Container Storage Unit. The detection for lead will be forwarded to risk assessment.**
03SWRC774	Floor #3	Lead	ND	NA
03SWRC775	Floor #4	Lead	ND	NA
03SWRC776	Southwest Wall	1,2 Dichloroethane (EDC)[a]	ND	NA
03SWRC777	Northeast Wall	1,2 Dichloroethane (EDC)[a]	ND	NA
03SWRC778	Northwest Wall #1	1,2 Dichloroethane (EDC)[a]	ND	NA
03SWRC779	Northwest Wall #2	1,2 Dichloroethane (EDC)[a]	ND	NA

a. Samples for 1, 2 Dichloroethane were received with headspace.

Definition of Acronyms

ID = identification.
µg/100 cm^2 = micrograms per 100 square centimeters.
NA = not applicable.
ND = not detected.
QA/QC = quality assurance/quality control.
SVOC = semivolatile organic compounds.
VOC = volatile organic compounds.

Table 2-8
Summary of Waste Sampling Results for the B38 Container Storage Unit

Sample ID	Description	Requested Analysis	Analyte	Result	Units	Qualifier
05SWRC121	Decontamination Solutions	SVOC	2,4,5-Trichlorophenol	6.0	ug/L	
05SWRC121	Decontamination Solutions	SVOC	2,4,6-Trichlorophenol	11	ug/L	
05SWRC121	Decontamination Solutions	SVOC	2,4-Dichlorophenol	1.6	ug/L	J
05SWRC121	Decontamination Solutions	SVOC	Benzoic Acid	24	ug/L	J
05SWRC121	Decontamination Solutions	SVOC	Benzyl alcohol	12	ug/L	
05SWRC121	Decontamination Solutions	SVOC	Benzyl alcohol	15	ug/L	E
05SWRC121	Decontamination Solutions	SVOC	bis(2-Ethylhexyl)phthalate	3.6	ug/L	JB
05SWRC121	Decontamination Solutions	SVOC	di-n-Butylphthalate	0.31	ug/L	J
05SWRC121	Decontamination Solutions	SVOC	Phenol	6.4	ug/L	J
05SWRC123	Decontamination Solutions	Total Metals	Aluminum	0.131	mg/L	
05SWRC123	Decontamination Solutions	Total Metals	Antimony	0.0243	mg/L	
05SWRC123	Decontamination Solutions	Total Metals	Barium	0.0114	mg/L	
05SWRC123	Decontamination Solutions	Total Metals	Boron	0.307	mg/L	
05SWRC123	Decontamination Solutions	Total Metals	Calcium	2.66	mg/L	
05SWRC123	Decontamination Solutions	Total Metals	Chromium	0.0145	mg/L	
05SWRC123	Decontamination Solutions	Total Metals	Cobalt	0.00116	mg/L	J
05SWRC123	Decontamination Solutions	Total Metals	Copper	0.0189	mg/L	J
05SWRC123	Decontamination Solutions	Total Metals	Iron	0.314	mg/L	
05SWRC123	Decontamination Solutions	Total Metals	Lead	0.0300	mg/L	
05SWRC123	Decontamination Solutions	Total Metals	Magnesium	267	mg/L	
05SWRC123	Decontamination Solutions	Total Metals	Manganese	0.0577	mg/L	
05SWRC123	Decontamination Solutions	Total Metals	Mercury	0.142	ug/L	J
05SWRC123	Decontamination Solutions	Total Metals	Nickel	0.00811	mg/L	
05SWRC123	Decontamination Solutions	Total Metals	Potassium	2.49	mg/L	
05SWRC123	Decontamination Solutions	Total Metals	Silica	40.2	mg/L	
05SWRC123	Decontamination Solutions	Total Metals	Sodium	196	mg/L	
05SWRC123	Decontamination Solutions	Total Metals	Zinc	0.611	mg/L	
05SWRC130	Decontamination Solutions	VOC	1,1,2,2 Tetrachloroethane	0.16	ug/L	JB
05SWRC120	Decontamination Solutions	VOC	1,1,2,2 Tetrachloroethane	1.7	ug/L	JB
05SWRC120	Decontamination Solutions	VOC	1,2 Dichlorobenzene	2.8	ug/L	JB
05SWRC120	Decontamination Solutions	VOC	1,2,3 Trichloropropane	1.9	ug/L	JB
05SWRC120	Decontamination Solutions	VOC	1,3 Dichlorobenzene	3.4	ug/L	J
05SWRC120	Decontamination Solutions	VOC	1,3,5-Trimethylbenzene	2.8	ug/L	J
05SWRC120	Decontamination Solutions	VOC	1,4 Dichlorobenzene	3.9	ug/L	J
05SWRC120	Decontamination Solutions	VOC	4-Methyl-2-pentanone (MIBK)	3.8	ug/L	J
05SWRC130	Decontamination Solutions	VOC	Bromodichloromethane	0.52	ug/L	J
05SWRC120	Decontamination Solutions	VOC	Bromomethane	15.0	ug/L	J
05SWRC120	Decontamination Solutions	VOC	Carbon tetrachloride	20.0	ug/L	
05SWRC120	Decontamination Solutions	VOC	Chlorobenzene	2.1	ug/L	J
05SWRC130	Decontamination Solutions	VOC	Chloroform	1.9	ug/L	
05SWRC120	Decontamination Solutions	VOC	Chloroform	170.0	ug/L	
05SWRC130	Decontamination Solutions	VOC	Chloromethane	1.4	ug/L	JB
05SWRC120	Decontamination Solutions	VOC	Chloromethane	9.2	ug/L	JB
05SWRC120	Decontamination Solutions	VOC	Naphthalene	3.2	ug/L	JB
05SWRC120	Decontamination Solutions	VOC	Styrene	1.4	ug/L	J
05SWRC130	Decontamination Solutions	VOC	Toluene	0.77	ug/L	J
05SWRC120	Decontamination Solutions	VOC	Toluene	3.3	ug/L	J
05SWRC120	Decontamination Solutions	VOC	Trichlorofluoromethane	2.9	ug/L	J

Qualifier

B = The substance or analyte was detected in the blank.

E = estimated

J = The analyte was positively identified- the associated numerical value is the approximate concentration of the analyte in the sample. One or more QA/QC requirements have not met contact required acceptance criteria but the instrumentation was functioning properly during the analysis.

Definition of Acronyms

ID = identification.

mg/L = milligrams per liter.

SVOC = semivolatile organic compounds.

ug/L = micrograms per liter.

VOC = volatile organic compounds.

Table 2-9
Waste Materials and Disposition for Closure of the B38 Container Storage Unit

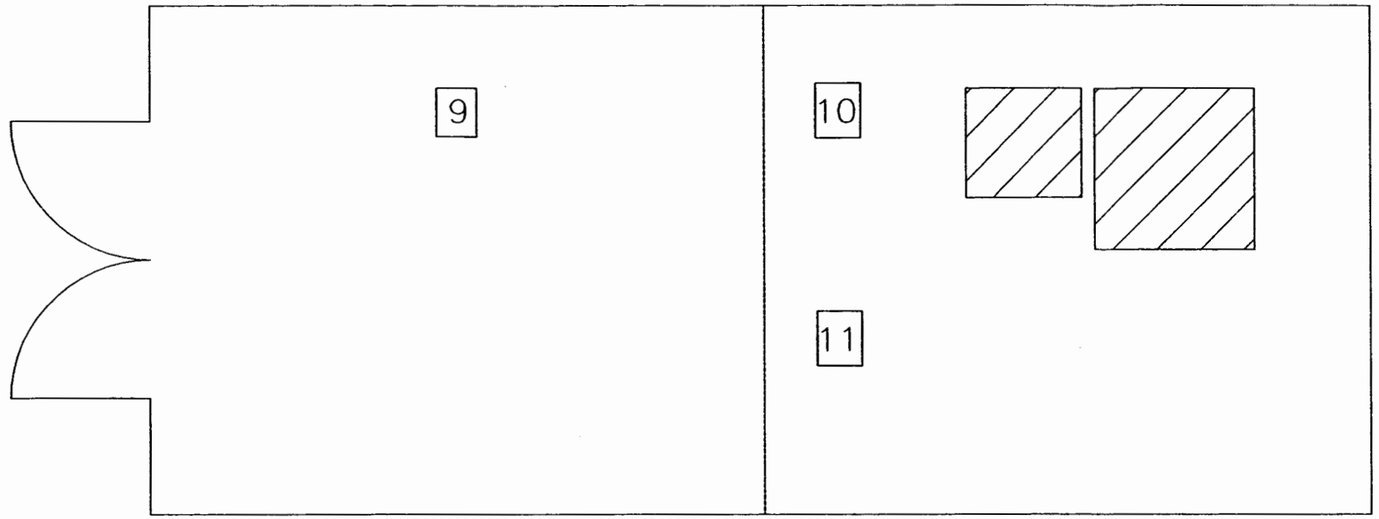
Waste Material	Estimated Quantity	Type	Disposal Destination
PPE, Sponges, Buckets, cheesecloth, etc.	<1 cubic meter	Solid	TA-54
Decontamination Wash Water	<30 gallons	Liquid	RLWTF
Verification Wash Water	<30 gallons	Liquid	RLWTF

Definition of Acronyms

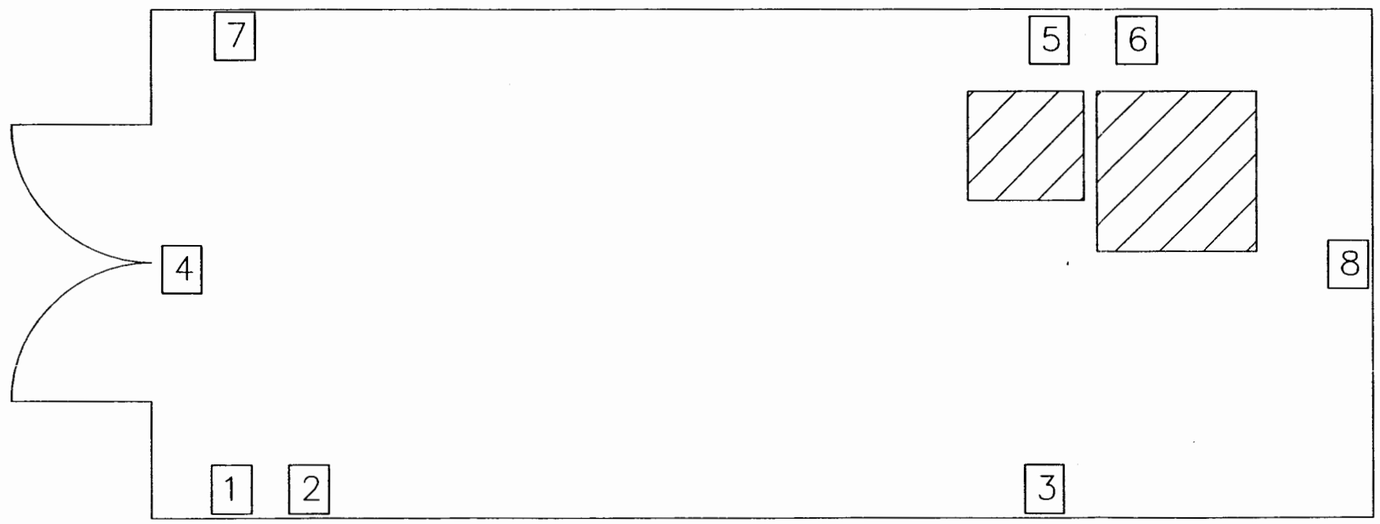
PPE = personal protective equipment.

RLWTF = Radioactive Liquid Waste Treatment Facility.

TA = technical area.



LOCATION OF FLOOR SAMPLES



LOCATION OF WALL SAMPLES

GENERAL NOTES:

1. SEE THE TABLES BELOW FOR A LIST OF SAMPLES COLLECTED DURING CLOSURE.

VERIFICATION SAMPLES:

NUMBER	LOCATION	SAMPLE ID #	REQUESTED ANALYSIS
1	NORTHWEST WALL #1	03SWRC602	TCLP METALS
		03SWRC601	VOC
		03SWRC600	SVOC
2	NORTHWEST WALL #1 DUPLICATE	03SWRC603	TCLP METALS
3	NORTHWEST WALL #2	03SWRC606	TCLP METALS
		03SWRC605	VOC
		03SWRC604	SVOC
4	NORTHEAST WALL	03SWRC610	TCLP METALS
		03SWRC609	VOC
		03SWRC608	SVOC
5	SOUTHEAST WALL #1	03SWRC613	TCLP METALS
		03SWRC612	VOC
		03SWRC611	SVOC
6	SOUTHEAST WALL #1 DUPLICATE	03SWRC614	TCLP METALS
7	SOUTHEAST WALL #2	03SWRC618	TCLP METALS
		03SWRC617	VOC
		03SWRC616	SVOC
8	SOUTHWEST WALL	03SWRC621	TCLP METALS
		03SWRC620	VOC
		03SWRC619	SVOC
9	FLOOR #1	03SWRC624	TCLP METALS
		03SWRC623	VOC
		03SWRC622	SVOC
10	FLOOR #2	03SWRC628	TCLP METALS
		03SWRC627	VOC
		03SWRC626	SVOC
11	FLOOR #2 DUPLICATE	03SWRC629	TCLP METALS

LEGEND

INDICATES EQUIPMENT ASSOCIATED WITH MADAM

Figure 2–1

TECHNICAL AREA (TA) 55, BUILDING 4 (TA–55–4), B38 INTERIM STATUS CONTAINER STORAGE UNIT VERIFICATION SAMPLE LOCATIONS

TA–55–4, B38 CSU, CLOSURE VERIFICATION SAMPLE LOCATIONS

N NOT TO SCALE

NO.	DATE	DWN	DES	CHKD	APP	REVISIONS

Shaw™ Environmental & Infrastructure, Inc.

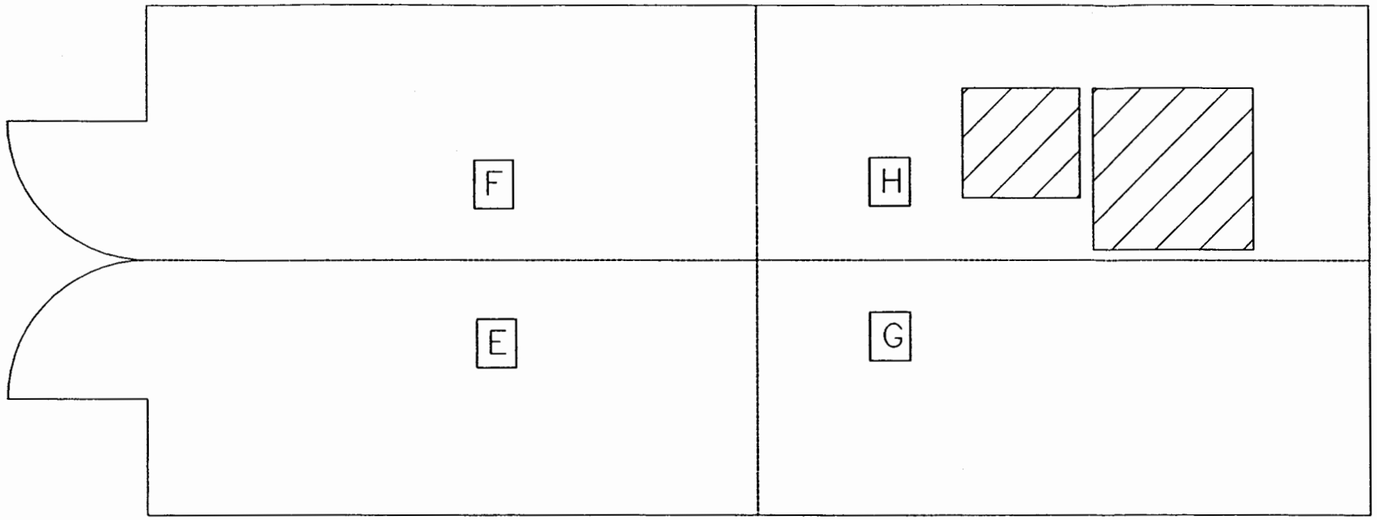
LOS ALAMOS — LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO 87545

LOS ALAMOS NATIONAL LABORATORY
CLOSURE CERTIFICATION REPORT

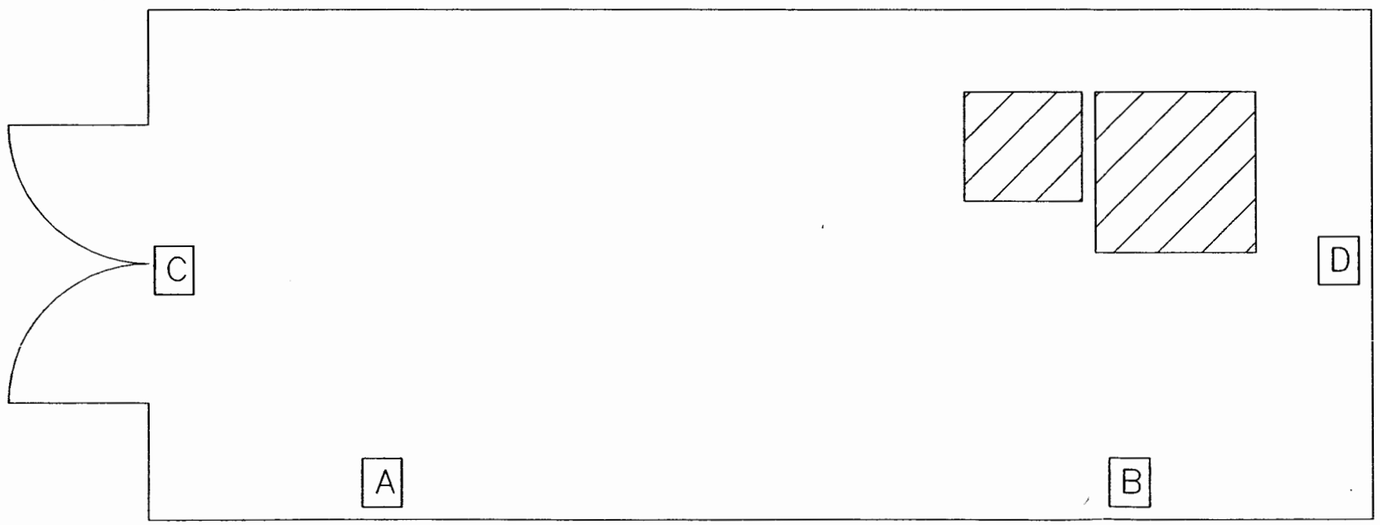
TECHNICAL AREA (TA) 55, BUILDING 4, B38 CSU
CLOSURE VERIFICATION SAMPLE LOCATIONS

BLDG. 4 — TA– 55

DESIGNED	J. GRIFFIN	6/9/04	CHECKED	J. CARMICHAEL	6/9/04	APPROVED	J. CARMICHAEL	6/9/04
DRAWN	A. MARTINEZ	6/9/04	SUBMITTED	J. GRIFFIN	6/9/04	SHEET NO. M1	1 OF 1	REVISION NO. 0
PROJECT ID 819592			DRAWING NO. FIGURE 2–1					



LOCATION OF FLOOR SAMPLES



LOCATION OF WALL SAMPLES

GENERAL NOTES:

1. SEE THE TABLES BELOW FOR A LIST OF SAMPLES COLLECTED DURING CLOSURE.

SWIPE SAMPLES:

LETTER	LOCATION	SAMPLE ID #	REQUESTED ANALYSIS
A	NORTHWEST WALL #1	03SWRC778	1,2 DICHLOROETHANE (EDC)
B	NORTHWEST WALL #2	03SWRC779	1,2 DICHLOROETHANE (EDC)
C	NORTHEAST WALL	03SWRC777	1,2 DICHLOROETHANE (EDC)
D	SOUTHWEST WALL	03SWRC776	1,2 DICHLOROETHANE (EDC)
E	FLOOR #1	03SWRC773	LEAD
F	FLOOR #2	03SWRC772	LEAD
G	FLOOR #3	03SWRC775	LEAD
H	FLOOR #4	03SWRC774	LEAD

LEGEND

INDICATES EQUIPMENT ASSOCIATED WITH MADAM

Figure 2–2

TECHNICAL AREA (TA) 55, BUILDING 4 (TA–55–4), B38 INTERIM STATUS CONTAINER STORAGE UNIT SWIPE SAMPLE LOCATIONS

TA–55–4, B38 CSU CLOSURE SWIPE SAMPLE LOCATIONS

N NOT TO SCALE

NO.	DATE	DWN	DES	CHKD	APP	REVISIONS

Shaw™ Environmental & Infrastructure, Inc.

LOS ALAMOS — LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO 87545

LOS ALAMOS NATIONAL LABORATORY
CLOSURE CERTIFICATION REPORT

TECHNICAL AREA (TA) 55, BUILDING 4, B38 INTERIM STATAUS CSU CLOSURE SWIPE SAMPLE LOCATIONS

BLDG. 4 — TA– 55

DESIGNED	J. GRIFFIN	6/9/04	CHECKED	J. CARMICHAEL	6/9/04	APPROVED	J. CARMICHAEL 6/9/04
DRAWN	A. MARTINEZ	6/9/04	SUBMITTED	J. GRIFFIN	6/9/04	SHEET NO. M1	1 OF 1
PROJECT ID 819592			DRAWING NO. FIGURE 2–2				REVISION NO. 0

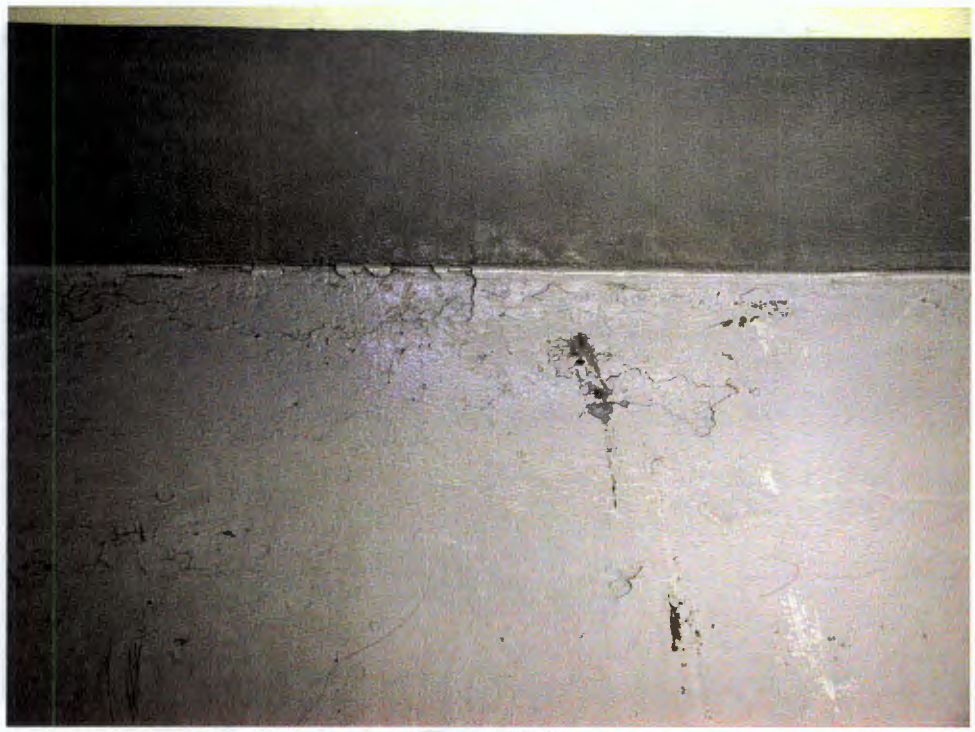


Figure 2-3
Pre-Closure Inspection
Floor and Northwest Wall Paint Blemishes
[Photograph Taken 9/09/03]

Figure 2-4
Pre-Closure Inspection
Painted Floor Under Electronic Cabinet
[Photograph Taken 9/09/03]

Figure 2-5
Pre-Closure Inspection
Minor Floor Gouges and Scuff Marks, Northeast End
[Photograph Taken 9/09/03]

Figure 2-6
Pre-Closure Inspection
Northwest Wall Paint Blemishes
[Photograph Taken 9/09/03]

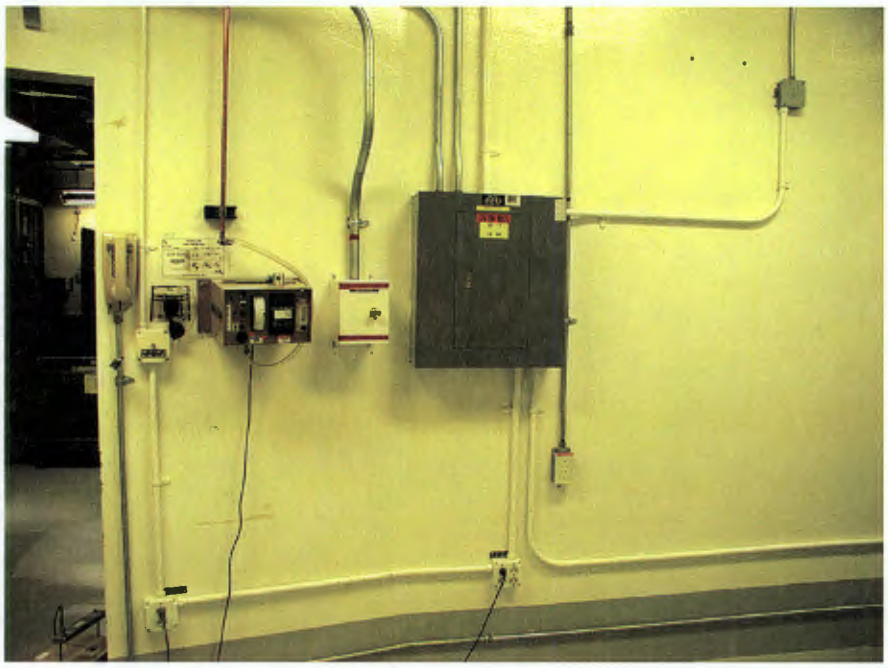


Figure 2-7
Pre-Closure Inspection
Southeast Wall with Electrical Equipment and Conduit
[Photograph Taken 9/09/03]

Figure 2-8
Pre-Closure Inspection
Southeast Wall Electrical Conduit Behind Electronic Cabinet
[Photograph Taken 9/09/03]

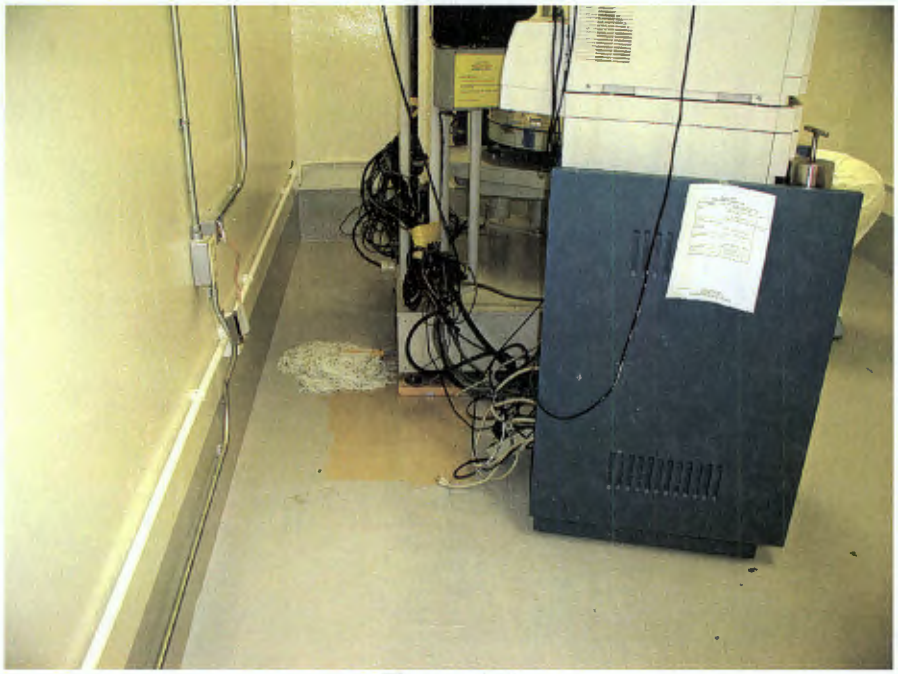


Figure 2-9
Surface Decontamination #1
Underneath Multiple Assay Duel Analysis Measurement Equipment
[Photograph Taken 9/09/03]

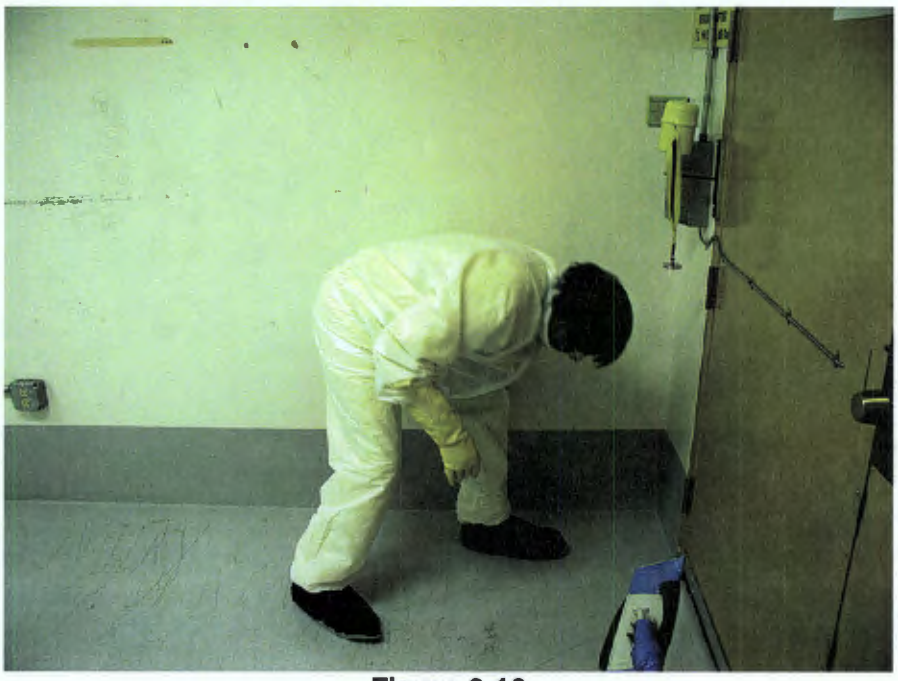


Figure 2-10
Surface Decontamination #1
Floor
[Photograph Taken 9/09/03]

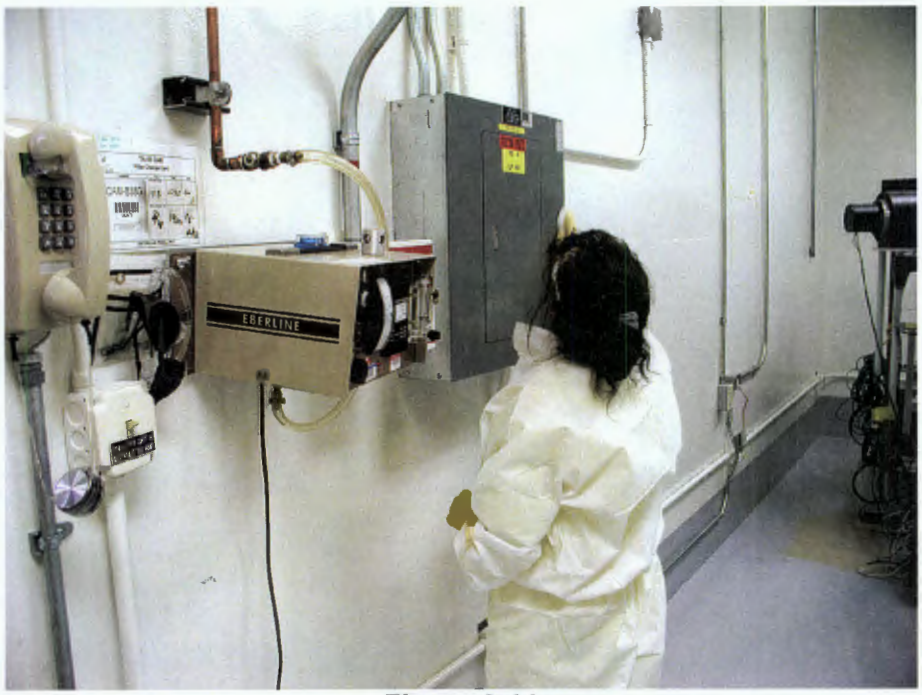


Figure 2-11
Surface Decontamination #1
Southeast Wall
[Photograph Taken 9/09/03]

Figure 2-12
Surface Decontamination #1
Northwest Wall
[Photograph Taken 9/09/03]

Figure 2-13
Surface Decontamination #1
Southeast Wall
[Photograph Taken 9/09/03]

Figure 2-14
Surface Decontamination #2
Floor
[Photograph Taken 9/09/03]

Figure 2-15
Surface Decontamination #2
Mop Head Covered with Cheesecloth
[Photograph Taken 9/09/03]

Figure 2-16
Surface Decontamination #2
Underneath Multiple Assay Duel Analysis Measurement Equipment
[Photograph Taken 9/09/03]

Figure 2-17
Verification Sampling
Collection of VOC Sample from Baseline Bucket
[Photograph Taken 9/10/03]

Figure 2-18
Verification Sampling
Collection of Floor Sample Northwest Side
[Photograph Taken 9/10/03]

Figure 2-19a
Verification Sampling
Collection of Floor Sample Near and Under MADAM
[Photograph Taken 9/10/03]

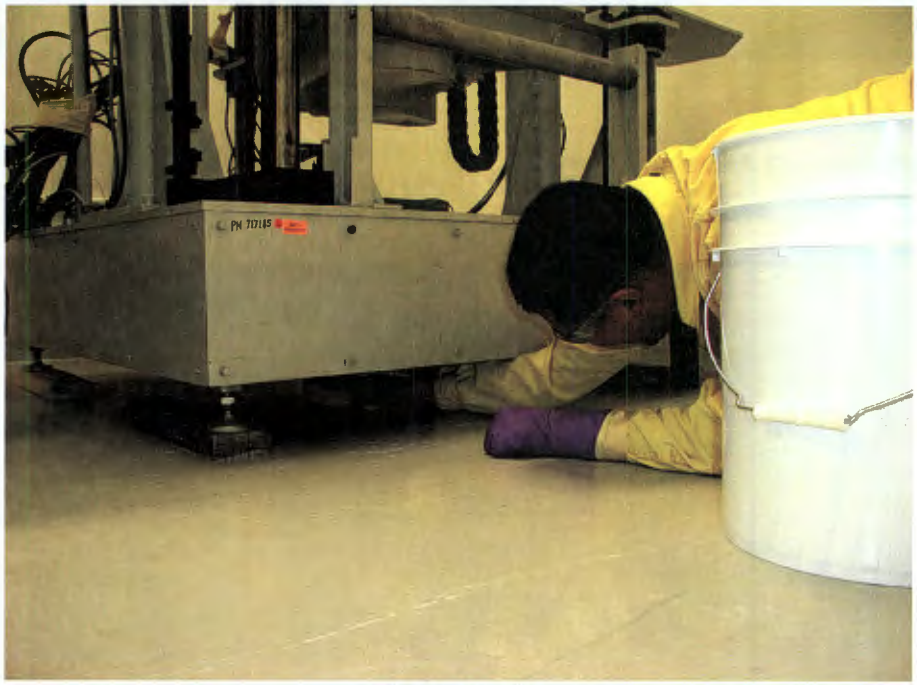


Figure 2-19b
Verification Sampling
Collection of Floor Sample Near and Under MADAM
[Photograph Taken 9/10/03]

Figure 2-20
Verification Sampling
Collection of SVOC Sample from Floor
[Photograph Taken 9/10/03]

Figure 2-21
Verification Sampling
Collection of Northeast Wall/Door Sample
[Photograph Taken 9/10/03]

Figure 2-22a
Verification Sampling
Collection of Northeast Wall Sample
[Photograph Taken 9/10/03]

Figure 2-22b
Verification Sampling
Collection of Northeast Wall Sample
[Photograph Taken 9/10/03]

Figure 2-23
Verification Sampling
Collection of Southwest Wall Sample
[Photograph Taken 9/10/03]

Figure 2-24a
Verification Sampling
Collection of Southeast Wall Sample
[Photograph Taken 9/10/03]

Figure 2-24b
Verification Sampling
Collection of Southeast Wall Sample
[Photograph Taken 9/10/03]

Figure 2-25a
Baseline Sample Preparation
[Photograph Taken 9/09/03]

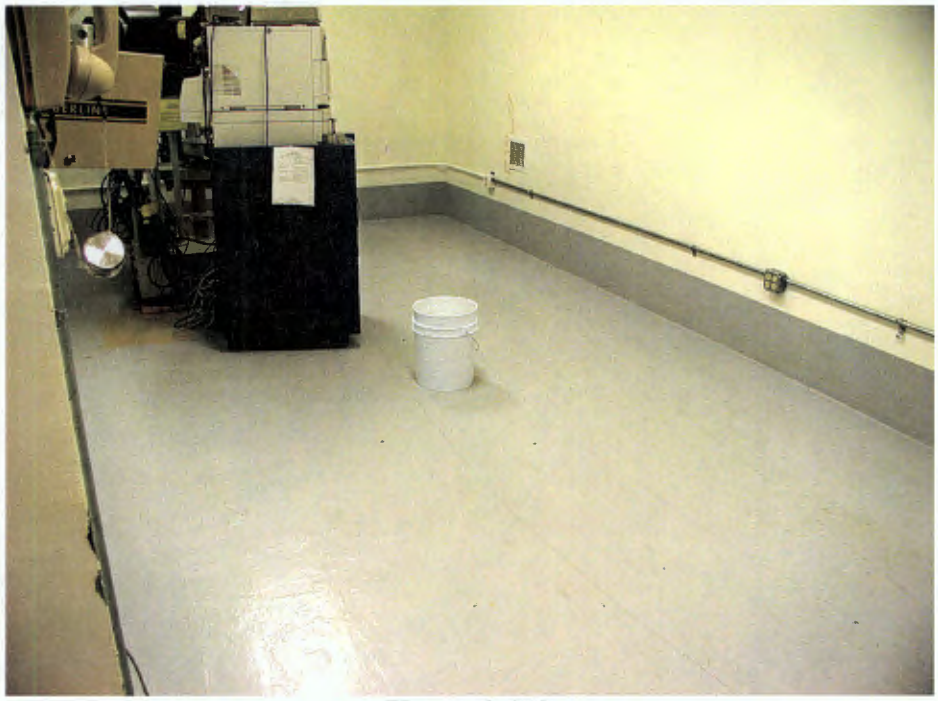


Figure 2-25b
Baseline Sample Preparation
[Photograph Taken 9/09/03]

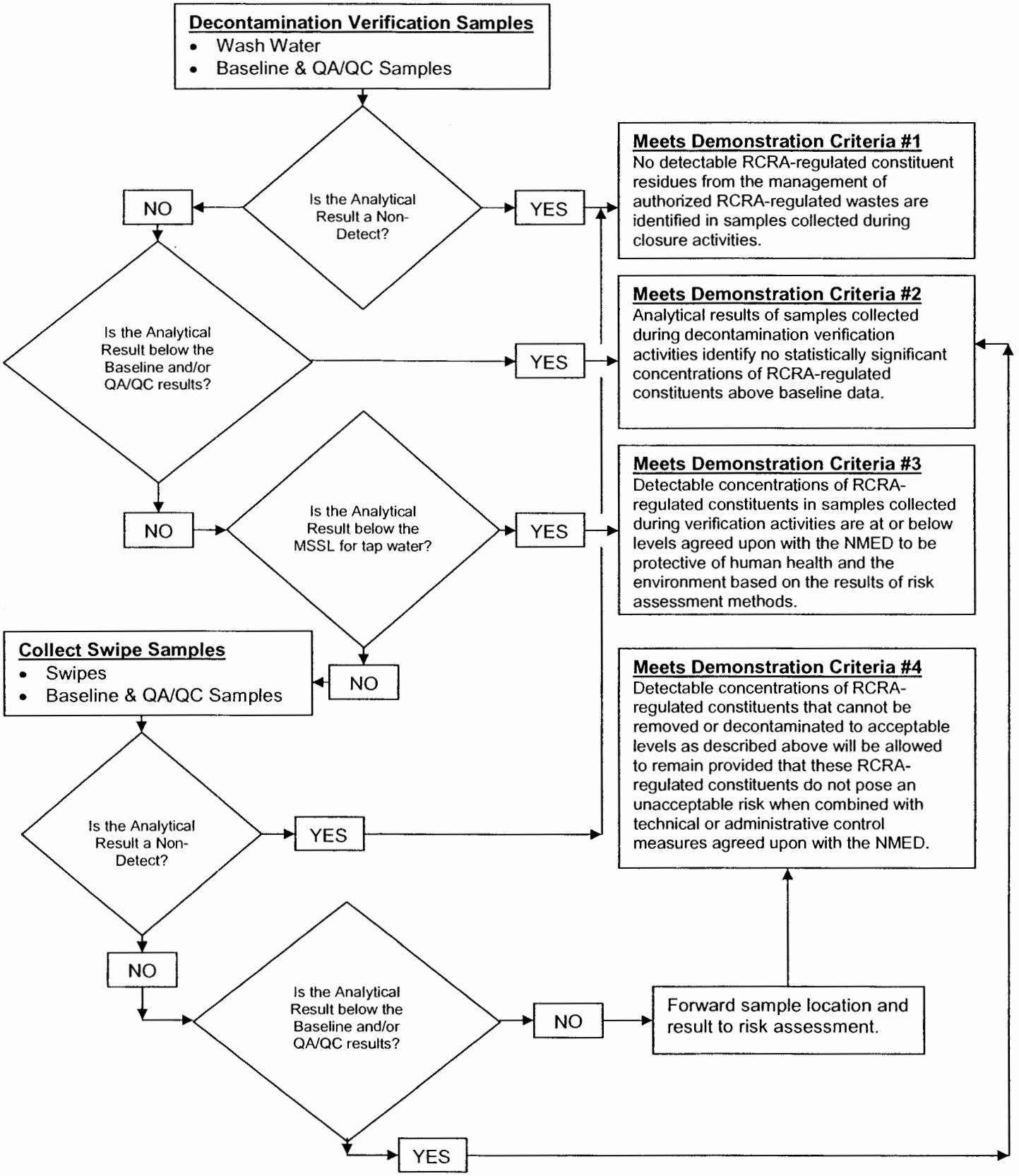


Figure 2-26
Logic Diagram for Demonstration of Closure

3.0 RISK ASSESSMENT

The B38 container storage unit (CSU) is located in a secured area utilized for the operation of the Multiple Assay Dual Analysis Measurement (MADAM) system. The Los Alamos National Laboratory intends to continue using the B38 CSU for MADAM operations upon completion of the closure requirements set forth in the Closure Plan. This proposed future use of the CSU is classified as occupational/industrial. The constituent detection forwarded to risk assessment from sampling activities at the B38 CSU was lead at 13 micrograms per 100 square centimeters (µg/100 cm^2) in quadrant #1 of the floor. The detailed risk assessment, potential exposure pathways, and calculations are provided in Appendix C.

Risk assessment methods based on threshold values do not apply in the B38 closure because lead toxicity does not exhibit a threshold for non-cancer health effects. Therefore, the California Department of Toxic Substances Control (DTSC) developed a model to evaluate exposures to lead contamination in soil. The lead assessment for this closure is based on a surface swipe model that specifically evaluates exposures to lead on building surfaces as measured by surface swipe samples. The surface swipe model was developed as a modification of the DTSC model. The model estimates the lead concentration in the blood of a pregnant worker who is exposed to contaminated surfaces. The model is designed to ensure that the estimated concentrations of lead in blood of the worker and the fetus are below the goal of 10 micrograms per deciliter (µg/dL) specified in the U.S. Environmental Protection Agency (EPA) guidance (EPA, 1986b and 2003) with 95 percent confidence. It is assumed in the assessment that the maximum lead concentration measured on a swipe sample (i.e., 13 µg/100 cm^2) is representative of the entire decontaminated B38 CSU.

The results of the risk assessment indicate that estimated concentrations of lead in blood of the worker and the fetus are well below the goal of 10 µg/dL specified in EPA guidance with 95 percent confidence (EPA, 1986b and 2003). The probability that the mean concentration exceeds 10 µg/dL is approximately 0.3%. Based on this assessment, the potential risk to a future worker in the B38 CSU from exposure to lead on surfaces is below the applicable criteria specified in EPA guidance (EPA, 1986b).

4.0 CONCLUSIONS

Table 4-1 provides the analytical results from the sampling of each surface associated with storage activities in the Technical Area (TA) 55, B38 Interim Status Container Storage Unit (CSU). Table 4-1 lists the constituent detected in each room during verification sampling and compares the results to the baseline samples, quality assurance/quality control samples, and U.S. Environmental Protection Agency (EPA) Human Health Medium Specific Screening Levels to demonstrate closure in accordance with criteria 2 or 3. Those detected constituents that could not meet criteria 2 or 3 were used to identify locations for the collection of swipe samples. Swipe samples were collected because the analytical results from verification sampling (wash water samples) could not be related to a reasonable risk based scenario for exposure (i.e., inhalation, dermal absorption) to an occupational worker (to demonstrate closure in accordance with criterion 4). Table 4-2 provide a summary of the swipe sampling results. The swipe sampling results were also compared to blank/baseline sample results to identify those detections and subsequent locations that required further evaluation during risk assessment.

A human health risk assessment (HHRA), described in Section 3.0 of this report and further detailed in Appendix C, was performed for the contaminants of potential concern identified on the CSU surfaces by swipe sampling. This HHRA determined that the potential risk to future occupational site workers is below the applicable criteria specified in the EPA guidance (EPA, 1986b). Based upon the demonstration of closure provided in Tables 4-1 and 4-2 and the results of the HHRA, this Closure Certification Report concludes that the TA-55 B38 Interim Status CSU is clean closed in accordance with the Closure Plan.

Table 4-1
Verification Samples - Demonstration of Closure by Criteria

Sample ID	Location	Parameter	Results (mg/L)	Qualifier	EPA Region 6 MSSLs (mg/L)	Comparison Results
03SWRC603	**Duplicate**	**1,2 Dichloroethane (EDC)**	**0.0025**		**0.00012**	**Sample location swipe sampled for risk assessment.**
03SWRC629	**Duplicate**	**Lead**	**0.09**		**0.015**	**Sample location swipe sampled for risk assessment.**
03SWRC629	Duplicate	Barium	0.1	B	2.6	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the New Mexico Environment Department (NMED) to be protective of human health based on the results of risk assessment methods.
03SWRC629	Duplicate	Chromium	0.06	B	0.11	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC614	Duplicate	di-n-Butylphthalate	0.027		3.7	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC614	Duplicate	Benzyl alcohol	0.0076		11	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC614	Duplicate	bis (2-Ethylhexyl) phthalate	0.014		0.0048	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC624	**Floor #1**	**Lead**	**0.08**	**B**	**0.015**	**Sample location swipe sampled for risk assessment.**
03SWRC624	Floor #1	Barium	0.1	B	2.6	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC622	Floor #1	Butylbenzylphthalate	0.005	2	7.3	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC624	Floor #1	Chromium	0.06	B	0.11	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.

Table 4-1
Verification Samples - Demonstration of Closure by Criteria

Sample ID	Location	Parameter	Results (mg/L)	Qualifier	EPA Region 6 MSSLs (mg/L)	Comparison Results
03SWRC622	Floor #1	Diethylphthalate	0.036	2	29	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC622	Floor #1	di-n-Butylphthalate	0.046	2	3.7	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC622	Floor #1	di-n-Octylphthalate	0.053	2	0.73	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC622	Floor #1	Benzyl alcohol	0.0065	2	11	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC628	**Floor #2**	**Lead**	**0.09**		**0.015**	**Sample location swipe sampled for risk assessment.**
03SWRC628	Floor #2	Barium	0.1	B	2.6	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC626	Floor #2	Benzyl alcohol	0.01		11	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC626	Floor #2	Butylbenzylphthalate	0.0039		7.3	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC628	Floor #2	Chromium	0.06	B	0.11	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.

Table 4-1
Verification Samples - Demonstration of Closure by Criteria

Sample ID	Location	Parameter	Results (mg/L)	Qualifier	EPA Region 6 MSSLs (mg/L)	Comparison Results
03SWRC626	Floor #2	di-n-Butylphthalate	0.048		3.7	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC626	Floor #2	di-n-Octylphthalate	0.018		0.73	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC626	Floor #2	bis (2-Ethylhexyl) phthalate	0.013		0.0048	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC626	Floor #2	Diethylphthalate	0.0017		29	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC609	**Northeast Wall**	**1,2 Dichloroethane (EDC)**	**0.0034**		**0.00012**	**Sample location swipe sampled for risk assessment.**
03SWRC610	Northeast Wall	Barium	0.1		2.6	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC608	Northeast Wall	Butylbenzylphthalate	0.0086	2	7.3	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC608	Northeast Wall	di-n-Octylphthalate	0.096	2	0.73	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC608	Northeast Wall	Benzyl alcohol	0.0081	2	11	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.

Table 4-1
Verification Samples - Demonstration of Closure by Criteria

Sample ID	Location	Parameter	Results (mg/L)	Qualifier	EPA Region 6 MSSLs (mg/L)	Comparison Results
03SWRC608	Northeast Wall	di-n-Butylphthalate	0.025	2	3.7	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC601	**Northwest Wall #1**	**1,2 Dichloroethane (EDC)**	**0.0022**		**0.00012**	**Sample location swipe sampled for risk assessment.**
03SWRC600	Northwest Wall #1	Butylbenzylphthalate	0.0034		7.3	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC600	Northwest Wall #1	di-n-Butylphthalate	0.032		3.7	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC600	Northwest Wall #1	Benzyl alcohol	0.0083		11	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC600	Northwest Wall #1	bis (2-Ethylhexyl) phthalate	0.015		0.0048	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC600	Northwest Wall #1	di-n-Octylphthalate	0.001		0.73	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC605	**Northwest Wall #2**	**1,2 Dichloroethane (EDC)**	**0.0034**		**0.00012**	**Sample location swipe sampled for risk assessment.**
03SWRC604	Northwest Wall #2	Benzyl alcohol	0.012	2	11	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC604	Northwest Wall #2	Butylbenzylphthalate	0.005	2	7.3	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.

Table 4-1
Verification Samples - Demonstration of Closure by Criteria

Sample ID	Location	Parameter	Results (mg/L)	Qualifier	EPA Region 6 MSSLs (mg/L)	Comparison Results
03SWRC604	Northwest Wall #2	Diethylphthalate	0.0011	2	29	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC604	Northwest Wall #2	di-n-Octylphthalate	0.002	2	0.73	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC604	Northwest Wall #2	di-n-Butylphthalate	0.024	2	3.7	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC613	Southeast Wall #1	Barium	0.1	B	2.6	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC611	Southeast Wall #1	di-n-Octylphthalate	0.03	2	0.73	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC611	Southeast Wall #1	Benzyl alcohol	0.0057	2	11	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC611	Southeast Wall #1	Diethylphthalate	0.001	2	29	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC613	Southeast Wall #1	Chromium	0.05	B	0.11	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC611	Southeast Wall #1	di-n-Butylphthalate	0.023	2	3.7	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.

Table 4-1
Verification Samples - Demonstration of Closure by Criteria

Sample ID	Location	Parameter	Results (mg/L)	Qualifier	EPA Region 6 MSSLs (mg/L)	Comparison Results
03SWRC618	Southeast Wall #2	Barium	0.1	B	2.6	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC616	Southeast Wall #2	Benzyl alcohol	0.016		11	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC616	Southeast Wall #2	Butylbenzylphthalate	0.0034		7.3	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC618	Southeast Wall #2	Chromium	0.06	B	0.11	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC616	Southeast Wall #2	di-n-Octylphthalate	0.0044		0.73	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC616	Southeast Wall #2	di-n-Butylphthalate	0.025		3.7	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC620	**Southwest Wall**	**1,2 Dichloroethane (EDC)**	**0.001**		**0.00012**	**Sample location swipe sampled for risk assessment.**
03SWRC619	Southwest Wall	Butylbenzylphthalate	0.0024	2	7.3	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.
03SWRC619	Southwest Wall	di-n-Butylphthalate	0.036	2	3.7	**Criterion #3:** Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health based on the results of risk assessment methods.

Table 4-1
Verification Samples - Demonstration of Closure by Criteria

Sample ID	Location	Parameter	Results (mg/L)	Qualifier	EPA Region 6 MSSLs (mg/L)	Comparison Results
03SWRC619	Southwest Wall	Benzyl alcohol	0.0085	2	11	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC619	Southwest Wall	bis (2-Ethylhexyl) phthalate	0.014	2	0.0048	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC619	Southwest Wall	di-n-Octylphthalate	0.0011	2	0.73	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC621	Southwest Wall	Chromium	0.05	B	0.11	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.
03SWRC620	Southwest Wall	1,4 Dichlorobenzene	0.0016	B	0.00047	**Criterion #2:** Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.

Qualifier

B = Analyte detected in Method Blank.

2 = A surrogate recovery rate was outside of QC criteria, suggesting matrix interference problems. This should be taken into account when reviewing the data.

Definition of Acronyms

ID = identification.

mg/L = milligrams per liter.

MSSL = Medium-Specific Screening Level.

NMED = New Mexico Environment Department.

RCRA = Resource Conservation and Recovery Act.

Table 4-2
Swipe Samples - Demonstration of Closure by Criteria

Sample ID	Location	Parameter	Result (µg/100 cm^2)	Comparison Results
03SWRC772	Floor #2	Lead	ND	**Criterion #1:** No detectable Resource Conservation and Recovery Act (RCRA)-regulated constituent residues from the management of stored, authorized RCRA-regulated wastes are identified in samples collected during closure activities.
03SWRC773	**Floor #1**	**Lead**	**13**	**Criterion #4: Detectable concentrations of RCRA-regulated constituents that cannot be removed or decontaminated to acceptable levels as described above will be allowed to remain provided that these RCRA-regulated constituents do not pose an unacceptable risk when combined with technical or administrative control measures agreed upon with the NMED.**
03SWRC774	Floor #3	Lead	ND	**Criterion #1:** No detectable Resource Conservation and Recovery Act (RCRA)-regulated constituent residues from the management of stored, authorized RCRA-regulated wastes are identified in samples collected during closure activities.
03SWRC775	Floor #4	Lead	ND	**Criterion #1:** No detectable Resource Conservation and Recovery Act (RCRA)-regulated constituent residues from the management of stored, authorized RCRA-regulated wastes are identified in samples collected during closure activities.
03SWRC776	Southwest Wall	1,2 Dichloroethane (EDC)	ND	**Criterion #1:** No detectable Resource Conservation and Recovery Act (RCRA)-regulated constituent residues from the management of stored, authorized RCRA-regulated wastes are identified in samples collected during closure activities.
03SWRC777	Northeast Wall	1,2 Dichloroethane (EDC)	ND	**Criterion #1:** No detectable Resource Conservation and Recovery Act (RCRA)-regulated constituent residues from the management of stored, authorized RCRA-regulated wastes are identified in samples collected during closure activities.
03SWRC778	Northwest Wall #1	1,2 Dichloroethane (EDC)	ND	**Criterion #1:** No detectable Resource Conservation and Recovery Act (RCRA)-regulated constituent residues from the management of stored, authorized RCRA-regulated wastes are identified in samples collected during closure activities.
03SWRC779	Northwest Wall #2	1,2 Dichloroethane (EDC)	ND	**Criterion #1:** No detectable Resource Conservation and Recovery Act (RCRA)-regulated constituent residues from the management of stored, authorized RCRA-regulated wastes are identified in samples collected during closure activities.

a. Samples for 1, 2 Dichloroethane were received with headspace.

Definition of Acronyms

ND = not detected

SVOC = semivolatile organic compounds

VOC = volatile organic compounds

5.0 CERTIFICATIONS

5.1 Certification of Accuracy

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 — 5/25/05

Kenneth M. Hargis
Acting Environmental Stewardship Division Leader
Los Alamos National Laboratory
Operator

Date

Gene Turner for — 6/25/05

Edwin L. Wilmot
Manager, Los Alamos Site Office
U.S. Department of Energy
Albuquerque Operations
Owner/Operator

Date

5.2 Independent Engineering Certification

This certification was prepared in accordance the requirements of New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20.4.1.500 NMAC) (incorporating 40CFR §264.115) revised October 1, 2003, for an independent registered professional engineer's certification. These services have been performed with the care and skill ordinarily exercised by members of the profession practicing under similar conditions at the same time and in the same manner or in a similar locality. We make no other warranty either expressed or implied. The finding and certification are based on 1) reviewing the New Mexico Environment Department approved closure plan dated December 2004; 2) discussion with the Shaw Environmental, Inc. field engineer who was present during closure and sampling activities; 3) reviewing the analytical results.

With the signature and seal below, I certify that, except for the deviations presented in Section 2.4 of the attached Closure Certification Report, the closure of the **Technical Area 55, Building 4, B38 Interim Status Container Storage Unit** was conducted substantially in accordance with the closure plan submitted to the NMED in December 2004. The information presented in this report is, to the best of my knowledge and belief, true, accurate, and complete.

Respectfully,

Shaw Environmental, Inc.

P. Scott den Baars
NEW MEXICO
10653
5-19-05
REGISTERED PROFESSIONAL ENGINEER

P. Scott den Baars
New Mexico Registered Professional Engineer No.: 10653
Expires: 12/31/05

Date: 5-19-05

6.0 REFERENCES

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APPENDIX A

Los Alamos National Laboratory Technical Area 55
***Closure Plan for the B38 Container Storage Unit*, LA-UR-04-8493, August 2004**

LA-UR-04-8493
December 2004

Los Alamos National Laboratory
Technical Area 55

Closure Plan for the
B38 Container Storage Unit

Prepared by:

Los Alamos National Laboratory
Solid Waste Regulatory Compliance (SWRC)
Los Alamos, New Mexico 87545

Los Alamos National Laboratory
Technical Area 55

Closure Plan for the B38 Container Storage Unit

December 2004

Prepared by:

Los Alamos National Laboratory
Solid Waste Regulatory Compliance (SWRC)
Los Alamos, New Mexico 87545

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LIST OF ABBREVIATIONS/ACRONYMS

20.4.1 NMAC	New Mexico Administrative Code, Title 20, Chapter 4, Part 1
BUS-4	Materials Management Group
°C	degrees Celsius
CFR	Code of Federal Regulations
CSU	container storage unit
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration Group
ft.	feet/foot
HSR-1	Health Physics Operations Group
HSR-5	Industrial Hygiene and Safety Group
in.	inch(es)
LANL	Los Alamos National Laboratory
MADAM	Multiple Assay Duel Analysis Measurement
NMED	New Mexico Environment Department
OLASO	Office of Los Alamos Site Operation
PPE	personal protective equipment
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
SOP	standard operating procedure
SW-846	*"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"*
SWRC	Solid Waste Regulatory Compliance Group
TA	technical area

CLOSURE PLAN FOR THE B38 CONTAINER STORAGE UNIT

The information provided in this closure plan is submitted to address the applicable closure requirements specified in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20.4.1 NMAC), Subpart VI, Part 265, Subparts G and I, revised June 14, 2000 [6-14-00]. This closure plan describes the activities necessary to clean close the B38 container storage unit (CSU) at the Los Alamos National Laboratory (LANL) Technical Area (TA) 55. 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 NMAC, Subpart V, 265.111 [6-14-00].

Until closure is complete and has been certified in accordance with 20.4.1 NMAC, Subpart VI, 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 at LANL's Solid Waste Regulatory Compliance Group (SWRC) and at the U.S. Department of Energy (DOE) Office of Los Alamos Site Operations (OLASO).

1.0 GENERAL CLOSURE INFORMATION

1.1 Closure Performance Standard [20.4.1 NMAC, Subpart VI, 265.111]

The B38 CSU will be closed to meet the following performance standards:

- Minimize the need for further maintenance,
- Controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, the 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
- Complies with the closure requirements of 20.4.1 NMAC, Subpart VI, Part 265, Subparts G and I [6-14-00], including, but not limited to the requirements of 20.4.1 NMAC, Subpart VI, 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 the CSU and decontamination, if necessary, of the surfaces and equipment that may have come into contact with the wastes. Decontamination activities will ensure the removal of hazardous waste residues from the B38 CSU to established cleanup levels.

1.2 Partial and Final Closure Activities [20.4.1 NMAC, Subpart VI, 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 clean closing the B38 CSU, 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 clean closure has been verified; all surfaces and equipment have been decontaminated, or otherwise properly disposed, if necessary; and closure certification has been submitted to and approved by the New Mexico Environment Department (NMED). Final closure will occur when the remaining hazardous/mixed waste management units at LANL are closed. Final closure will consist of assembling documentation on the closure status of each unit, including all previous partial clean closures as well as land-based units that have been or are being addressed via alternative closure requirements. Final closure will be deemed complete when the closure certification has been submitted to the NMED and the NMED has approved the final closure.

1.3 Closure Schedule [20.4.1 NMAC, Subpart VI, 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 B38 CSU. However, pursuant to 20.4.1 NMAC, Subpart VI, 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 NMAC, Subpart VI, 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 NMAC, Subpart VI, 265.113(a) [6-14-00], within 90 days after final receipt of waste at the B38 CSU. This timeframe will be met as long as facilities are available for storage, treatment, 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 NMAC, Subpart VI, 265.113(a) [6-14-00]. Closure activities and reporting requirements will be completed within 180 days of receipt of the final volume of waste at the CSU. Closure will be conducted in accordance with the schedule presented in Table 1.

Table 1
Closure Schedule for the B38 Container Storage Unit at Technical Area 55

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
Remove waste.	Day 5
Decontaminate surfaces and equipment.	Day 20
Sample excess used decontamination water for disposal.	Day 20
Perform verification sampling.	Day 30
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 of the B38 CSU cannot proceed according to schedule, LANL will notify the Secretary of the NMED in accordance with extension request requirements in 20.4.1 NMAC, Subpart VI, 265.113(b) [6-14-00]. In addition, the demonstrations in 20.4.1 NMAC, Subpart VI, 265.113(a)(1) and (b)(1) [6-14-00], will be made in accordance with 20.4.1 NMAC, Subpart VI, 265.113(c) [6-14-00].

1.4 Amendment of the Closure Plan [20.4.1 NMAC, Subpart VI, 265.112(c)]

In accordance with 20.4.1 NMAC, Subpart VI, 265.112(c) [6-14-00], LANL will submit a written change in 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 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 NMAC, Subpart VI, 265.140(c)]

In accordance with 20.4.1 NMAC, Subpart VI, 265.140(c) [6-14-00], LANL, as a federal facility, is exempt from the requirements of 20.4.1 NMAC, Subpart VI, 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 NMAC, Subpart VI, 265.115]

Within 60 days after completion of closure activities for the B38 CSU, LANL will submit to the Secretary of the NMED, via certified mail, a certification that the unit has 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 and will be, in accordance with 20.4.1 NMAC, Subpart VI, 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 NMAC, Subpart VI, 265.115 [6-14-00]. Both DOE/OLASO and SWRC will maintain a copy of the certification and supporting documentation.

1.7 Security

Because of the ongoing nature of operations at LANL TA-55, site security at the B38 CSU 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-55 will be maintained to ensure that public access is prevented.

1.8 Closure Report

Upon completion of the closure activities at the B38 CSU, 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.
- 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/quality control (QA/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 UNIT TO BE CLOSED

TA-55 is located on a finger mesa between a branch of Mortandad Canyon to the North and Two Mile Canyon to the South. Figure 1 shows the location of TA-55 at LANL. The B38 CSU is located in the southeast section of the basement floor of TA-55, Building 4 as shown on Figure 2 and has been identified as Area 2 in previous permitting documents. The B38 CSU consists of an area approximately 26.5 feet (ft) long by 11 ft wide as indicated in Figure 3. The CSU was used for solid and liquid mixed waste storage of 55-gallon drums in support of waste operations at TA-55. A photograph of the CSU is provided as Figure 4.

3.0 ESTIMATE OF MAXIMUM WASTE IN STORAGE

The maximum total inventory of waste in storage at any time in the TA-55-4, B38 CSU is estimated at 3,000 gallons.

4.0 DESCRIPTION OF WASTE

The B38 CSU was used to store 55-gallon drums of solid mixed waste generated during research and development activities, processing and recovery operations, decontamination and

decommissioning projects, and general facility operations at TA-55. These wastes included solidified evaporator salt solutions and solidified analytical solutions. A majority of the analytical solutions were only corrosive; however, a small portion of these analytical solutions contained organics. Envirostone® cement, which is a calcium sulfate dehydrate, was used to solidify these solutions. Over time it was discovered that a small percentage of the solutions migrated out of the cement matrix on to the surface of the cement. Collectively, the solidified evaporator salt solutions and the analytical solutions were assigned the U.S. Environmental Protection Agency (EPA) hazardous waste numbers for toxic metals, volatile organic compounds, and semi-volatile organic compounds. It should be noted that only the analytical solutions contain organic compounds. Table 2 provides a list of applicable compounds and associated EPA hazardous waste numbers based on analytical data.

Table 2

Hazardous Waste Constituents Stored at the B38 Container Storage Unit[a]

Category	EPA Hazardous Waste Numbers	Specific Constituents
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
Volatile Organic Compounds	F002, F003, F005	Acetone, MEK, Bromomethane, Methylene, Chloride, Toluene, MIBK, DBCP
Semi-Volatile Organic Compounds		N-Nitrosodimethylamine, Phenol, Benzyol Alcohol, 2-Nitrophenol, 4-Nitrophenol, Benzoic Acid, Diethylphthalate, Di-n-Butylphthalate, Bis-2-Ethylhexlphthalate, Di-n-Octylphthalate, Butylbenzylphthalate

[a] Based on the operating record of the unit

MEK = methyl ethyl ketone
MIBK = 4-methyl-2-pentanone
DBCP = 1,2-dibromo-3-chloropropane

LANL will verify that the constituents listed in Table 2 are not present on the surfaces of the B38 CSU for a clean closure certification.

5.0 REMOVAL OF WASTE

The operating record of the B38 CSU indicates that the unit has not received any waste for storage since 1994, however, it has remained active in order to remain compatible with TA-55 operations and to allow flexibility for additional storage.

6.0 PRELIMINARY CLOSURE PROCEDURES

6.1 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 Health Physics Operations Group (HSR-1) and 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, booties, gloves, ear plugs, steel-toed/composite 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-55 site-specific training, as appropriate. Personnel may also be required to have Radiation Worker, Level II training based on the radiological survey conducted prior to the commencement of closure. Contaminated PPE will either be decontaminated or managed in compliance with appropriate waste management regulations.

6.2 Structural Assessment

Preventive maintenance inspections were conducted weekly at the B38 CSU while waste was in storage. If any defects, deterioration, damage, or hazards affecting containment developed, appropriate remedial actions (including sampling, repairs, maintenance, or replacement) were completed immediately. Prior to beginning any decontamination activities at the B38 CSU, the base or secondary containment 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 Table 2 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., scabbling) 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.

6.3 Waste Management

After each decontamination wash down process, the used wash water will be collected, transferred

to containers, sampled, and analyzed for the hazardous constituents listed in Table 2 as appropriate. The results of this analysis will be used to determine if the used wash water can 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 12.0.

7.0 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.

7.1 Equipment Located in the B38 CSU

All portable equipment (if present) will be wiped down with a solution consisting of Alconox® and water. A portable berm will be used to collect excess wash water and provide containment during the decontamination process. The Multiple Assay Duel Analysis Measurement (MADAM) and its associated ancillary equipment are located along the southeast wall of the B38 CSU and are shown in Figure 4. MADAM (43 inches (in.) wide by 47 in. long) and its associated electrical equipment (25 in. wide by 28 in. long) are not portable and will remain in place during the decontamination of the main surfaces of the B38 CSU.

7.2 Decontamination of the B38 Surfaces

Decontamination of the B38 CSU surfaces will commence in two phases. The first phase will consist of the decontamination of the walls and floor of the CSU with the exception of the areas immediately underneath and adjacent to MADAM and its ancillary equipment. 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 consisting of Alconox® and water and used to wipe down the walls and floor. Containers in the TA-55, B-38 CSU were not stacked beyond the height of a 55-gallon drum on a secondary containment pallet. The containers were not opened or closed 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 5-ft (i.e., just above the height of a 55-gallon drum on a secondary containment pallet).

The second phase will consist of decontamination of the walls and floor, as in the first phase, only immediately adjacent and underneath MADAM and its ancillary equipment. There is approximately 30 in. of space between MADAM, its ancillary equipment, and the walls of the CSU. This should allow for sufficient space to wipe down the walls using mops, cloths, and/or other absorbent materials to remove hazardous constituents. There is approximately 4 in. of space between the bottom of MADAM and the floor underneath. This space may allow for the use of a mop, cloth, and/or other absorbent materials to remove hazardous constituents. If this space is insufficient, the equipment may be raised by a hydraulic lift or other means to a position which allows for appropriate access to the floor for decontamination.

The B38 CSU does not have recess areas (i.e., sumps) so excess used wash water during both phases will collect within temporary berms located on the floor of the unit. After the walls have been decontaminated, the floor and the secondary containment berms located in the room will be wiped down and excess used wash water removed from the area and transferred to an appropriate container for analysis and waste disposal.

When decontamination of the CSU is complete, verification will be conducted as indicated in Section 8.0. If sampling and analysis indicate that hazardous constituents are present, the wash cycles and analyses will continue 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 9.0.

7.3 Equipment Used During Closure

Reusable protective clothing, tools, and equipment used during decontamination activities 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.

8.0 VERIFICATION OF DECONTAMINATION

LANL proposes analysis of wash water samples for decontamination verification at the B38 CSU 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 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 blank, the decontamination is verified for the discrete area sampled. Sample blanks (field blanks and trip blanks) will be prepared as described in Section 11.3.1 of this closure plan.

5. If the result is above the blank, repeat the decontamination and verification of the discrete location in accordance with Sections 7.0 and 8.0 of this closure plan.

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

8.1 Verification Criteria

Successful decontamination of the B38 CSU will meet a minimum of one of the following criteria:

- No detectable Resource Conservation and Recovery Act (RCRA)-regulated constituent residues from the management of stored authorized RCRA-regulated wastes are identified in samples collected during closure activities.

- Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline data.

- Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health and the environment based on the results of risk assessment methods.

- Detectable concentrations of RCRA-regulated constituents that cannot be removed or decontaminated to acceptable levels as described above will be allowed to remain provided that these RCRA-regulated constituents do not pose an unacceptable risk when combined with technical or administrative control measures agreed upon with the NMED.

The following sections provide a detailed description of how decontamination verification will be conducted at the B38 CSU.

8.2 Verification Procedures

Verification sampling at theTA-55, B38 CSU will be conducted at 8 discrete locations as described below:

1. Divide the northwest wall (26.5-ft long, 5-ft high) of the CSU into two equal sections. Wipe each down with sufficient wash water solution to collect one set of verification samples per

section. Collect the wash water solution in a bermed area at the base of the wall. Sample and remove the excess water.

2. Wipe down the northeast wall (11-ft long, 5-ft high) of the CSU with sufficient wash water solution to collect one set of verification samples. Collect the wash water solution in a bermed area at the base of the wall. Sample and remove the excess water.

3. Divide the southeast wall (26.5-ft long, 5-ft high) of the CSU into two equal sections. Wipe each down with sufficient wash water solution to collect one set of verification samples per section. Collect the wash water solution in a bermed area at the base of the wall. Sample and remove excess water.

4. Wipe down the southwest wall (11-ft long, 5-ft high) of the CSU with sufficient wash water solution to collect one set of verification samples. Collect the wash water solution in a bermed area at the base of the wall. Sample and remove the excess water.

5. Divide the floor (26.5-ft long, 11-ft wide) of the CSU into two equal sections. Wipe each down with sufficient wash water solution to collect one set of verification samples per section. Collect the wash water solution in a bermed area. Sample and remove excess water.

9.0 ALTERNATE DEMONSTRATION OF CLOSURE

An alternate demonstration of decontamination may be justified at the B38 CSU if decontamination methods described in Section 7.0 are not feasible. LANL proposes the following alternate demonstration for the B38 CSU:

- Comparison of the verification analytical results to the EPA Region 9 Human Health Risk Based levels for drinking water. If the result is below the human health risk based level, decontamination at the CSU will be considered complete.

10.0 SAMPLING ACTIVITIES [20.4.1 NMAC, Subpart VI, 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.

10.1 Sampling Strategy/Approach

Sampling activities will be conducted to verify that the decontamination efforts described in Section 7.0 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. Table 3 identifies the sample locations, types, and quantities applicable to the closure of the TA-55, B38 CSU. Each discrete location will be wiped down with a clean Alconox® and de-ionized water solution that will be allowed to collect in a bermed area. 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 for each of the walls and finally for the floor to prevent cross contamination of the samples and allow for the identification of contaminated areas.

Table 3
Sample Types and Quantities for the TA-55, B38 Container Storage Unit Closure

Discrete Sample Location	Verification Sample Sets [a]	Blank Comparison Samples
Northwest Wall (26.5-ft x 5-ft)	2	2
Northeast Wall (11-ft x 5-ft)	1	1
Southeast Wall (26.5-ft x 5-ft)	2	2
Southwest Wall (11-ft x 5-ft)	1	1
Floor (26.5-ft x 11-ft)	2	2

[a] Analysis for Metals, VOCs, and SVOC as identified in Table 2.

ft = feet

10.2 Sample Collection Procedure

10.2.1 Soil and Sediment Sampling

The B38 CSU is located inside TA-55-4 and is provided with secondary containment and run-on protection. The TA-55-4 basement floor is constructed of 10-in. thick concrete and is coated with a chemical-resistant epoxy primer and paint, which effectively prevents the migration of any liquids through the concrete and into the environment. Inspections were conducted at the unit while waste was in storage to ensure that defects, deterioration, damage, or hazards affecting this containment were discovered and repaired. These features, inspections, and maintenance were effective at preventing the migration of waste to the environment. In addition, the operating record indicates that there are no recorded spills of liquids at the B38 CSU. For these reasons, soil sampling is not applicable for the B38 CSU closure and will not be conducted.

10.2.2 Liquid Sampling

Sampling of the clean/used wash water solution will be performed in accordance with Environmental Restoration Group (ER) standard operating procedures (SOP) ER-SOP-6.13, "Surface Water Sampling" (LANL, 2001).

10.2.3 Cleaning of Samplers

Disposable sampling equipment will be used for the B38 CSU closure. This equipment may be presumed clean if still in a factory-sealed wrapper.

10.3 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 EPA 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.

10.3.1 Chain-of-Custody

Sample chain-of-custody form 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 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.

10.3.2 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).

10.3.2.1 Sample Labels and Custody Seals

A sample label 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.

10.3.2.2 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.

10.3.2.3 Analysis Request Form

An analysis request form must 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. All samples for laboratory analysis will be submitted to an accredited off-site contract laboratory.

10.3.2.4 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.

10.3.3 Sample Handling, Preservation, and Storage

Samples will be collected and containerized in appropriate pre-cleaned sample containers. Table 4 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 4
Recommended Sample Containers[a], Preservation Techniques, and Holding Times[b]

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP Metals: Arsenic Barium Cadmium Chromium Lead Selenium Silver	500-mL Wide Mouth-Polyethylene or Glass with Teflon Liner	Cool to 4°C	180 Days
TCLP/Total Mercury	500-mL Wide Mouth-Polyethylene or Glass with Teflon Liner	Cool to 4 °C	28 Days
Volatile Organic Compounds			
Target Compound VOCs	Two 40 mL Amber Glass Vials with Teflon-Lined Septa	HCl to pH<2 Cool to 4 °C	14 days
Semi-Volatile Organic Compounds			
Target Compound SVOCs	Four 1 L Amber Glass with Teflon-Lined Lid	Cool to 4 °C	Seven days from field collection to preparative extraction. 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 = milliter
SVOC = semi-volatile organic compounds
TCLP = Toxicity Characteristic Leaching Procedure
VOC = volatile organic compounds

10.3.4 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 Regulation [CFR] and 49 CFR). The LANL document Laboratory Implementation Requirement (LIR) 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 program 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 Materials Management Group (BUS-4) shipping office (667-4174) unless the shipper is specifically authorized through formal documentation by BUS-4 to independently tender shipments to common motor or air carriers.

11.0 ANALYTICAL REQUIREMENTS

11.1 Proposed Analytical Methods

Analytical methods to be used for verification during the TA-55, B38 CSU closure are summarized in Table 5.

Table 5
Summary of Proposed Analytical Methods

Parameter	Method Numbers	Test Methods	Rationale
Metals			
TCLP Metals: Arsenic Barium Cadmium Chromium Lead Selenium Silver Mercury	 (7060A[c], 7061A)[a] (7080A[d], 7081[c])[a] (7130[d], 7131A[c])[a] (7190[d], 7191[c])[a] (7420[d], 7421[c])[a] (7740[d], 7741[c]) (7760A[d], 7761) (7471A[e], 7470A)[a] or equivalent methods [b]	Inductively-coupled plasma atomic emission spectroscopy Atomic absorption Furnace technique Gaseous hydride Direct aspiration Borohydride reduction Manual cold vapor technique	Determine the metalconcent ration in the samples.
Volatile Organic Compounds (VOCs)			
VOCs	8260B[a] or equivalent methods	Gas chromatography /mass spectometry (GC/MS)	Determine the VOCs in the samples.
Semi-Volatile Organic Compounds (SVOCs)			
SVOCs	8270C[f a]	GC/MS	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] Equivalent methods subject to EPA approval may be substituted.
[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.
[f] Method being revised per the May 1998 SW-846 Draft Update IVA.

Each sample will be analyzed for the constituents identified in Table 2 as appropriate. Target detection limits and instrumentation for metals and organic analyses are presented in Tables 6 and 7, respectively.

Table 6
Target Detection Limits, Analytical Methods, and Instrumentation for Metals Analysis

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

a Detection limits listed are for clean water. Actual detection limits may be higher depending on sample composition and matrix type.
b U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846.
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 7
Target Detection Limits, Analytical Methods, and Instrumentation for Organic Analysis

Analyte	Target Detection Limit [a]	EPA SW-846 [c] Analytical Method	Instrumentation
Target compound list VOCs plus ten tentatively identified compounds (TIC)	10 mg/L[d] water	8260B	GC/MS [c]
Target compound list SVOCs plus 20 TICs	10 mg/L water	8270C [c]	GC/MS

a Detection limits expressed as practical quantitation limits.
b U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846.
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
VOC = volatile organic compounds

11.2 Analytical Laboratory Requirements

The analytical laboratory will perform the detailed qualitative and quantitative chemical analyses specified in Table 5. 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 Table 5 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)

11.3 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 used to evaluate precision, accuracy, and potential sample contamination associated with the sampling/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.

11.3.1 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. 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. Table 8 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 8
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/SVOC, metals,	One sample daily per analysis	Not Applicable
Field Duplicate	Chemical	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.

VOC = volatile organic compound
SVOC = semi-volatile organic compound

11.3.2 Analytical Laboratory QC 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.

11.4 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.

11.5 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, 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.

12.0 WASTE MANAGEMENT FROM SAMPLING AND ANALYSIS ACTIVITIES

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 inspection record for this unit 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 the B38 CSU closure will be non-regulated waste with respect for hazardous constituents. However, should contamination be present the closure has the potential to generate several different types of waste materials. Table 9 provides a list of the full spectrum of waste materials that could be generated during closure and potential disposal options.

Table 9
Potential Waste Materials, Waste Types, and Disposal Options

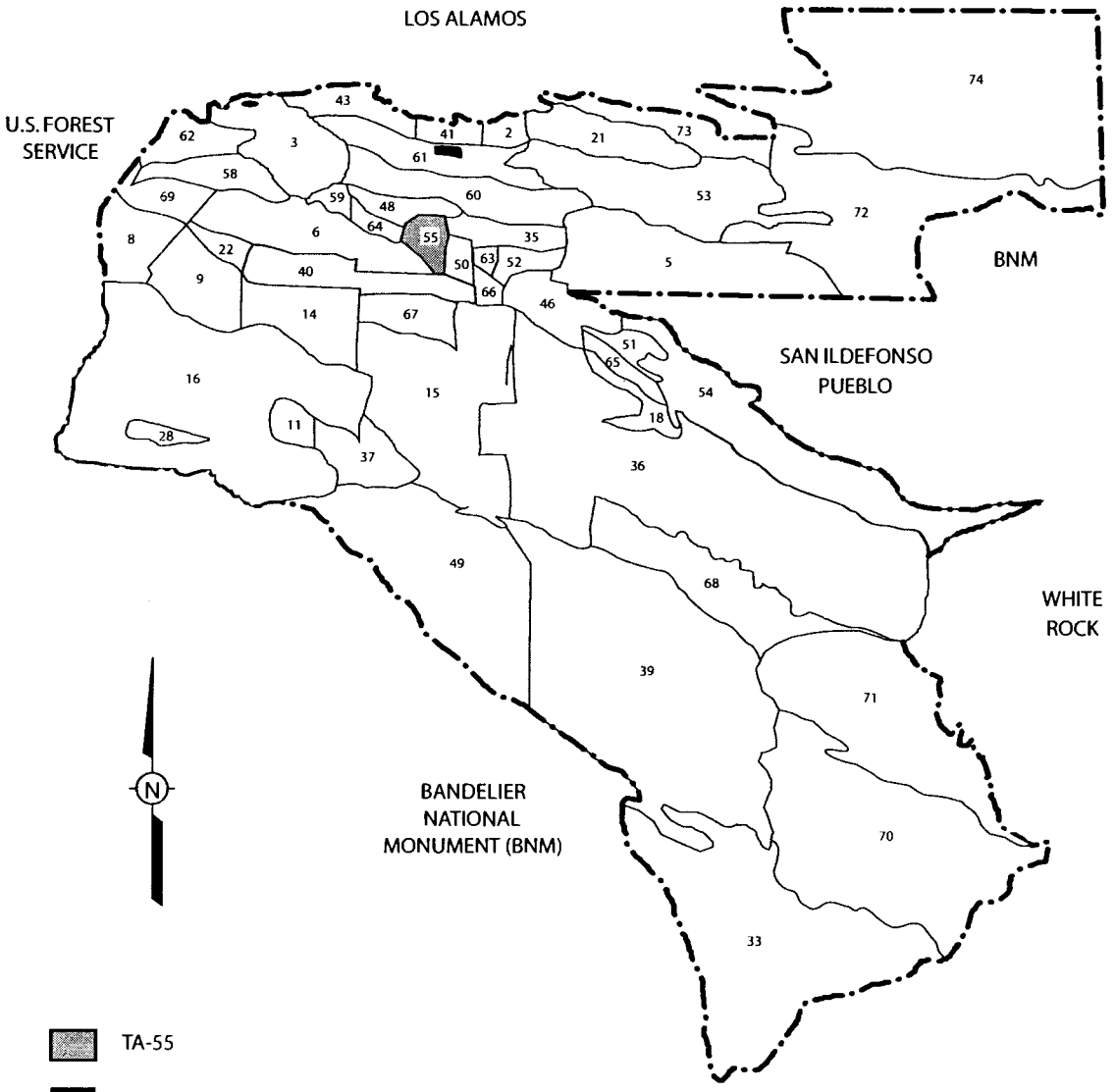
Potential Waste Materials	Potential Waste Type (s)	Disposal Options
PPE	Non-regulated solid waste Low-level solid	SWSC – non-regulated waste TA-54 – solid low-level waste (LLW)
Decontamination wash water	Non-regulated liquid waste Low-level liquid and solid	RLWTF – radioactive liquid waste (RLW) SWSC – non-regulated waste
Verification wash water	Non-regulated liquid waste Low-level liquid and solid	RLWTF – radioactive liquid waste (RLW) SWSC – non-regulated waste

13.0 REFERENCE

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," LIR 405-10-01.1, Los Alamos National Laboratory, Los Alamos, New Mexico.

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



Note: Technical Area 57, the Fenton Hill Geothermal Site, is not shown on this figure.

Modified from Los Alamos National Laboratory, 1994, "Environmental Surveillance at Los Alamos During 1992," LA-12764-ENV, Los Alamos National Laboratory, Los Alamos, New Mexico.

Figure 1
Location of Technical Area (TA) 55 at Los Alamos National Laboratory

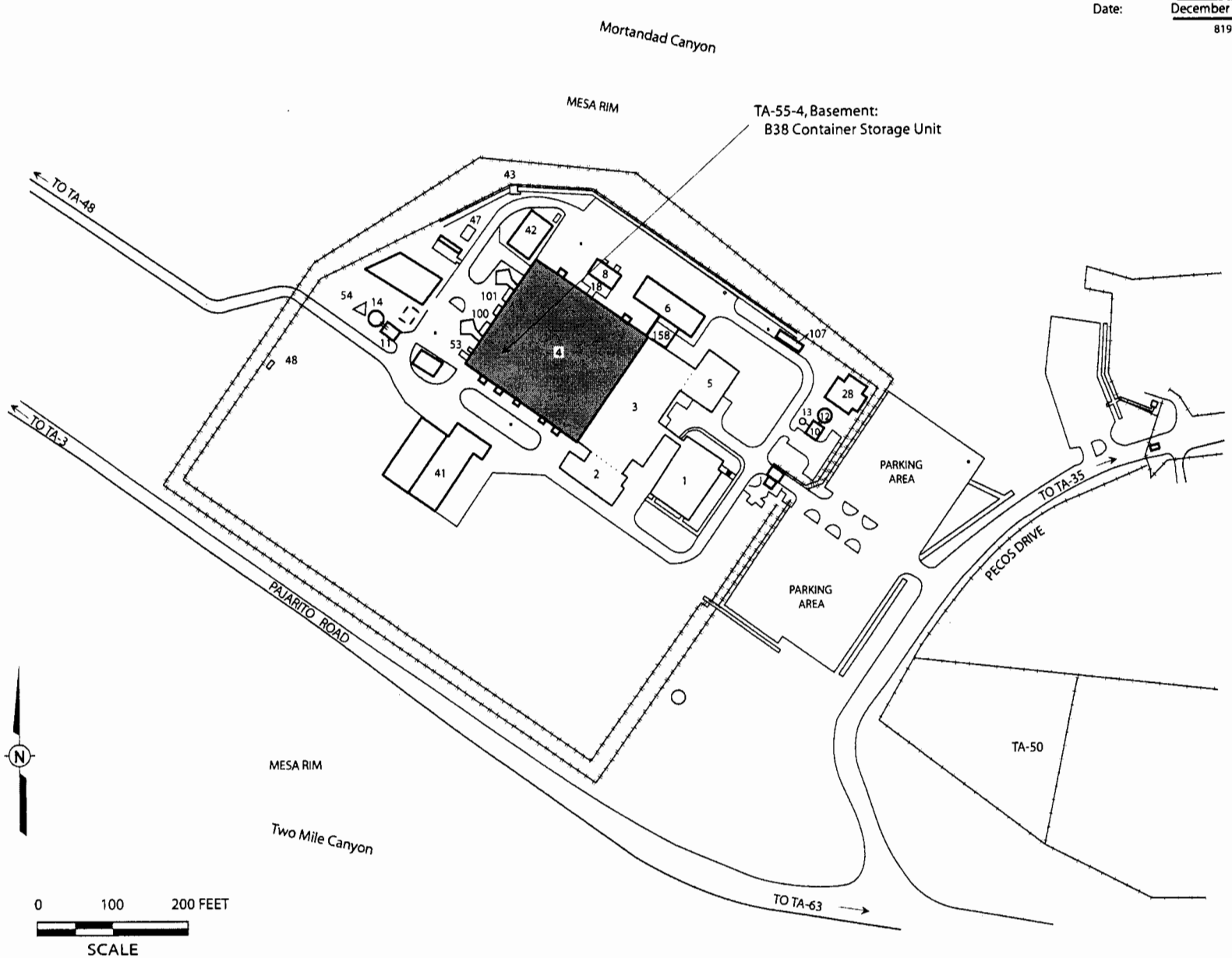
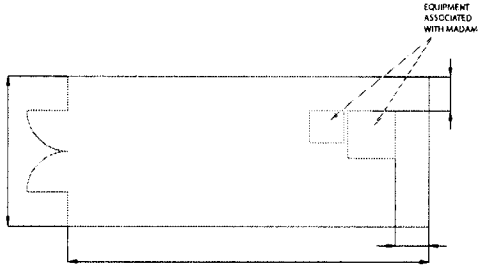


Figure 2
Technical Area (TA) 55, Building 4 - Site Location Map



TA-SS-4, CONTAINER STORAGE UNIT, B38
(TO BE CLOSED)

GENERAL NOTES:

1. SEE THE TABLE BELOW FOR A LIST OF WASTE AND CONTAINER TYPES THAT ARE STORED IN THE CONTAINER STORAGE UNIT.
2. THE MAXIMUM CAPACITY WAS CALCULATED BASED ON FULL 55-GALLON DRUMS, DOUBLE STACKED, WITH A MINIMUM 2' AISLE SPACE.

CONTAINER STORAGE UNIT (CSU) DETAILS

	MAX CAPACITY (GALLONS)	WASTE TYPES	CONTAINER TYPES
	3,000	LIQUID AND SOLID MIXED WASTE	30 , 55 , AND 85-GALLON DRUMS

LEGEND

INDICATES EQUIPMENT ASSOCIATED WITH MADAM

LOS ALAMOS

LOS ALAMOS NATIONAL LABORATORY
TA-55-4 B38 CLOSURE PLAN

FIGURE 3

M1

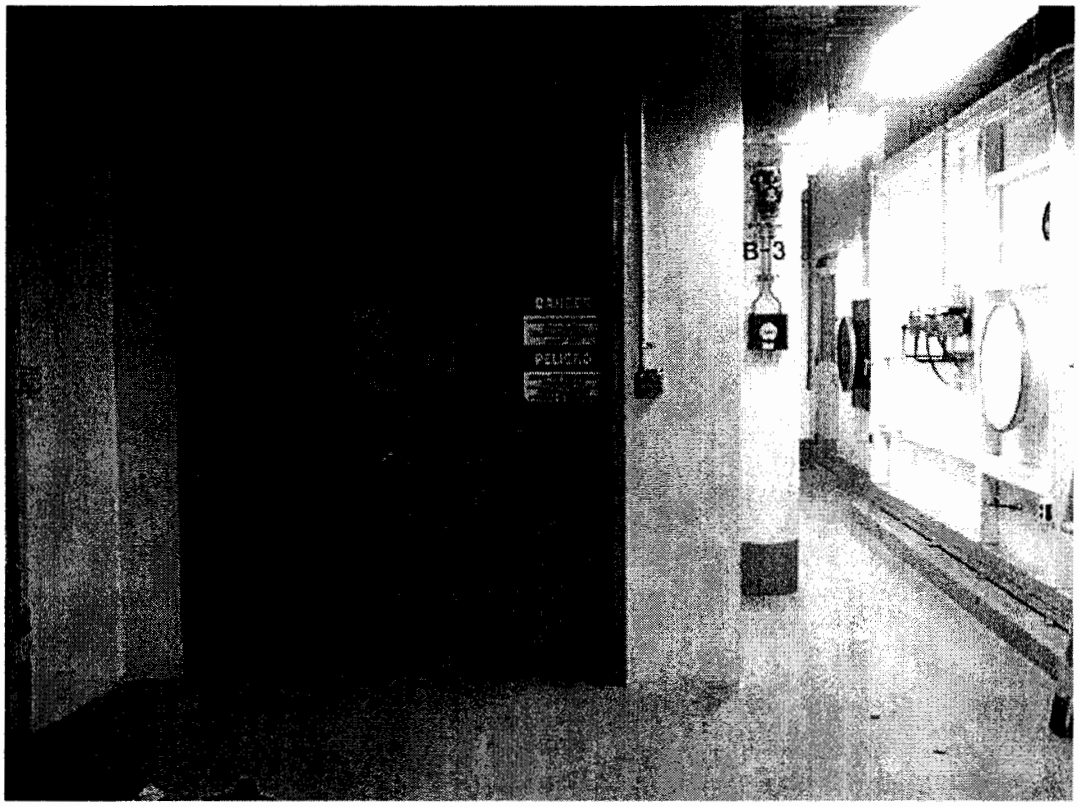


Figure 4

Photograph – Technical Area 55, Building 4, B38 Container Storage Unit
(Container storage area is located within the room pictured)
(Photograph taken 3/17/98)

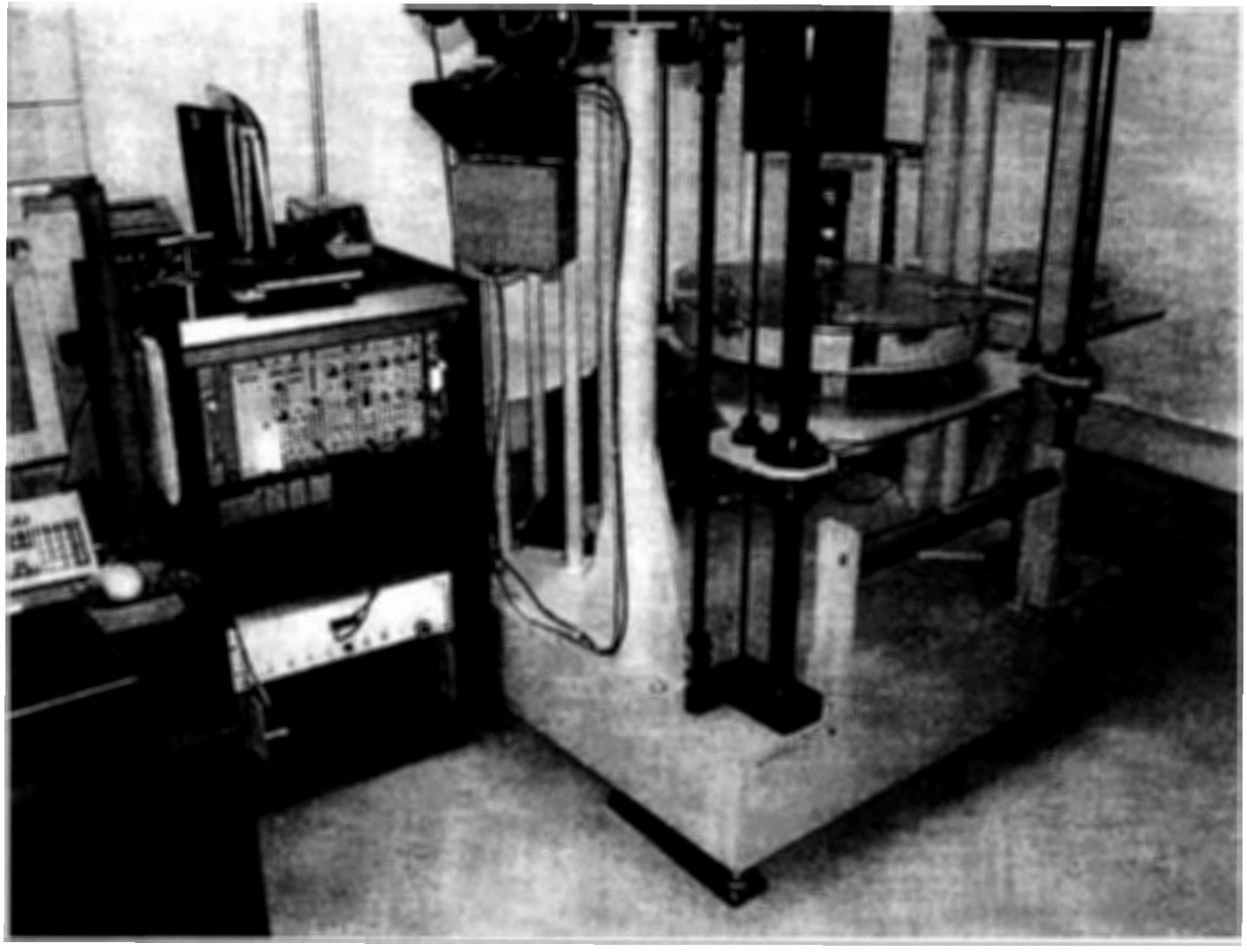


Figure 5
Multiple Assay Duel Analysis Measurement (MADAM) Equipment
(November 2001)

APPENDIX B
Letters of Agreement/Communication with New Mexico Environment Department

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 115 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

cc w/ enclosure
Laurie King, Chief (6PD-N)
New Mexico/Federal Facilities Section
Environmental Protection Agency
Regoin 6, 1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

cc w/out enclosure:
James Bearzi, Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

J. Ellvinger, LANL ENV-SWRC, MS K490
E. Louderbough, LANL LC-ESH, MS A187
J. Carmichael, LANL ENV-SWRC/
NMT-7, MS E501
R. Lechel, LANL NWO-RLW, MS J593

State of New Mexico
ENVIRONMENT DEPARTMENT
Hazardous Waste Bureau
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Fax (505) 428-2567
www.nmenv.state.nm.us

BILL RICHARDSON
GOVERNOR

RON CURRY
SECRETARY

DERRITH WATCHMAN-MOORE
DEPUTY SECRETARY

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

November 16, 2004

G. Pete Nanos, Director
Los Alamos National Laboratory
P.O. Box 1663, Mail Stop A100
Los Alamos, NM 87545

Edwin Wilmot, Manager
Los Alamos Site Office
Department of Energy
528 35th Street, Mail Stop A316
Los Alamos, NM 87544

RE: APPROVAL WITH MODIFICATION OF CLOSURE PLANS FOR INTERIM STATUS CONTAINER STORAGE UNITS:
TECHNICAL AREA 50, BUILDING TA-50-1, ROOM 59 AND BUILDING TA-50-37, [ROOMS 115 AND 118], AND TECHNICAL AREA 55, ROOM B38
LOS ALAMOS NATIONAL LABORATORY NM0890010515
HWB-LANL-02-014, 02-025

Dear Messrs. Nanos and Wilmot:

The New Mexico Environment Department (NMED) received comments during the public comment period for *Los Alamos National Laboratory Technical Area 50 Closure Plan for Interim Status Container Storage Units TA-50-1, Room 59 and TA-50-37 [Rooms 115 and 118]*, July 2003 (LA-UR-03-5409) and *Los Alamos National Laboratory Technical Area 55 Closure Plan for the B38 Container Storage Unit*, August 2002 (LA-UR-02-5451). NMED has reviewed these comments and requires modifications to the Closure Plans in response to the comments. NMED hereby approves these documents with the modifications described in the attachment to this letter.

The University of California and the Department of Energy (collectively, the "Permittees") must modify the Closure Plans as described in the attachment within thirty (30) days of receipt of this letter. If the Permittees fail to modify these documents and provide the revised documents within the given timeframe, the approval for these documents will be rescinded.

Should you have any questions, please feel free to contact Lee Winn of my staff at (505) 428-2541.

Sincerely,

John E. Kieling
Manager
Permits Management Program

JEK: lw

cc: J. Bearzi, NMED HWB
D. Cobrain, NMED HWB
L. King, EPA Region 6 (6PD-N)
J. Ellvinger, LANL RRES-SWRC, MS K490
G. Bacigalupa, LANL RRES-SWRC, MS K490
G. Turner, DOE LASO, MS A316

File: Reading and LANL 2004 TA's 50 and 55

Attachment

Table A -Required Modifications to the Los Alamos National Laboratory (LANL) Technical Areas 55 and 50 Container Storage Unit Closure Plans		
No.	**Location**	**Closure Plan Modification**
Closure Plan for Technical Area 55 B38 Container Storage Unit		
1	**1.6 Closure Certification**	LANL shall modify the closure plan to revise the sentence to "The certification will be signed by the appropriate DOE and LANL officials and by an independent, registered professional engineer and will be, in accordance with 20.4.1 NMAC, Subpart VI, 265.115 [6-14-00]."
2	**8.0 Verification of Decontamination**	LANL shall modify the closure plan to clarify the type of blank to be used; and how it will be prepared and handled as follows: "The sample wash water blank will be prepared by the analytical laboratory. It will consist of de-ionized water. The blank container will remain closed on site."
3	**10.3.2.3 Analysis Request Form**	LANL shall modify the closure plan to include the following: "All samples for laboratory analysis will be submitted to an accredited off-site contract laboratory."
4	**11.3.1 Field Quality Control**	LANL shall modify the closure plan to include the following to describe a more specific frequency for field QC samples: "The frequency of field blank QC sampling will be 1 per day or one per 20 samples, whichever is more frequent."
5	**11.3.2 Analytical Laboratory QC Samples**	LANL shall modify the closure plan to describe laboratory QC samples to include the following: "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."
Closure Plan for Interim Status Container Storage Units TA-50 Room 59 and TA-50-37 Rooms 115 and 118		
6	**General**	LANL shall modify the closure plan by changing the second citation from 20.4.1.500 NMAC § 264.112(e) [6-14-00] to 20.4.1.600 NMAC § 265.112(e) [6-14-00].
7	**3.2.2 Structural Assessment**	LANL shall modify the closure plan by changing the sentence to "The sample will be analyzed for the hazardous contaminants identified in Tables 2 or 3 of this closure plan.
8	**4.1 Sampling Strategy/ Approach**	LANL shall modify the closure plan by changing the sentence to "These results from these samples will be used to determine if the equipment used for closure contribute any contaminants to the samples."

Table A -Required Modifications to the Los Alamos National Laboratory (LANL) Technical Areas 55 and 50 Container Storage Unit Closure Plans		
No.	**Location**	**Closure Plan Modification**
9	**4.3 Sample Management Procedures**	LANL shall modify the closure plan to include the following: "All samples for laboratory analysis will be submitted to an accredited off-site contract laboratory."
10	**4.4.3.1 Field Quality Control**	LANL shall modify the closure plan to include the following to describe a more specific frequency for field QC samples: "The frequency of field blank QC sampling will be 1 per day or one per 20 samples, whichever is more frequent."
11	**4.4.3.2 Analytical Laboratory Quality Control Samples**	LANL shall modify the closure plan to describe laboratory QC samples to include the following: "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."
12	**4.4.4 Data Reduction, Verification, Validation, and Reporting**	LANL shall remove section **4.4.4 Data Reduction, Verification, Validation and Reporting** from the closure plan. LANL shall include the following language in section **4.4.5 Data Reporting Requirements**: "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."

State of New Mexico
ENVIRONMENT DEPARTMENT
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Telephone (505) 428-2500
Fax (505) 428-2567
www.nmenv.state.nm.us

BILL RICHARDSON
GOVERNOR

RON CURRY
SECRETARY

DERRITH WATCHMAN-MOORE
DEPUTY SECRETARY

May 7, 2004

SUBJECT: NOTICE OF PUBLIC COMMENT PERIOD AND INTENT TO APPROVE A CLASS 3 PERMIT MODIFICATION TO RCRA PERMIT FOR LOS ALAMOS NATIONAL LABORATORY

Dear Interested Citizen:

Enclosed is a **Public Notice** regarding the intent to approve proposed closure plans for six hazardous waste storage units at Los Alamos National Laboratory (**LANL**). LANL is owned by the U.S. Department of Energy and is co-operated by the University of California. LANL is located approximately 25 miles northwest of Santa Fe in Los Alamos County, New Mexico and is at the following addresses: U.S. DOE, 528 35th Street, Los Alamos, NM 87544, and UC LANL, P.O. Box 1633, Mail Stop K490, Los Alamos, NM 87545.

The enclosed Public Notice provides locations where the administrative record for this action can be reviewed, and provides procedures for submitting comments and requesting a Public Hearing. Comments and requests for Public Hearing will be received through **5:00 p.m.** on **June 7, 2004**.

Any person seeking additional information regarding this notice or the draft permit may contact:

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

Email: john_kieling@nmenv.state.nm.us
Telephone: (505) 428-2500
Fax: (505) 428-2567

Sincerely,

John E. Kieling
Manager
Permits Management Program

State of New Mexico
ENVIRONMENT DEPARTMENT
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Telephone (505) 428-2500
Fax (505) 428-2567
www.nmenv.state.nm.us

BILL RICHARDSON
GOVERNOR

RON CURRY
SECRETARY

DERRITH WATCHMAN-MOORE
DEPUTY SECRETARY

PUBLIC NOTICE NO. 04-06

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS WASTE BUREAU
Santa Fe, New Mexico
May 7, 2004

NOTICE OF PUBLIC COMMENT PERIOD
AND OPPORTUNITY TO REQUEST A PUBLIC HEARING

APPROVAL OF CLOSURE PLANS
HAZARDOUS WASTE STORAGE UNITS
LOS ALAMOS NATIONAL LABORATORY EPA ID NO. NM0890010515

The New Mexico Environment Department (NMED) proposes to approve the following three closure plans for six hazardous waste storage units at Los Alamos National Laboratory (LANL).

Los Alamos National Laboratory
Technical Area 50
Closure Plan for Interim Status Container Storage Units
TA-50-1, Room 59 and TA-50-37 [Rooms 115 and 118]
July 2003

Los Alamos National Laboratory
Technical Area 55
Closure Plan for the
B38 Container Storage Unit
August 2002

Closure Plan
Technical Area 54
Material Disposal Area G
Storage Shafts 145 and 146
November 1999

LANL is located 25 miles northwest of Santa Fe in Los Alamos County, New Mexico. The storage units being closed are authorized to store hazardous waste as interim status units under the federal Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §§ 6901 *et seq.*, the New Mexico Hazardous Waste Act (HWA), NMSA 1978 §§ 74-4-1 *et seq.*, and New Mexico Hazardous Waste Management Regulations, 20.4.1.600 NMAC (incorporating 40 C.F.R. Part 265). The storage units were in existence prior to June 25, 1990, the effective date of regulation of

mixed hazardous waste and radioactive source, special nuclear, or by-product material under RCRA. The storage units were included in the mixed waste RCRA Part A permit application submitted to NMED by the U.S. Department of Energy (DOE) and the University of California (UC), dated January 25, 1991.

The closures are in compliance with 20.4.1.600 NMAC (incorporating 40 CFR Part 265, Subpart G). This public notice is in compliance with 20.4.1.600 NMAC (incorporating 40 C.F.R. § 265.112(d)(4)). NMED proposes to approve the Closure Plan because the proposed method of closure will meet RCRA closure standards.

The storage units at TA-50 were included in the most recent TA-50 RCRA Part A permit application submitted by DOE and UC, dated December 2000. The TA-50 storage units were also included as units to be permitted in the most recent LANL TA-50 RCRA Part B permit application submitted by DOE and UC and dated December 2000.

DOE and UC have elected to terminate using the storage units for storage of hazardous waste for more than 90 days. Storage for more than 90 days requires authorization under a RCRA permit or interim status. These units will not be included in the renewed LANL RCRA permit.

PUBLIC REVIEW OF THE ADMINISTRATIVE RECORD

A copy of the administrative record, including the Closure Plans, may be reviewed at the following locations:

NMED - Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Mondays - Fridays 8:00 a.m. to 5:00 p.m.

LANL Community Relations Office
1619 Central Avenue
Los Alamos, New Mexico 87544
Contact: Linda Anderman 665-4400
Mondays - Fridays 8:00 a.m. to 5:00 p.m.

To obtain a copy of the administrative record or a portion thereof, or for additional information, please contact John Kieling of the Hazardous Waste Bureau, at (505) 428-2535, or the address given below. NMED will provide members of the public with up to 80 pages of the administrative record free of charge. NMED will charge a copy fee of $0.25 per page. The administrative record for this action consists of the Closure Plans and related correspondence.

The 30-day public comment period begins on May 7, 2004, and ends on June 7, 2004. Any person who wishes to comment on this action or request a public hearing should submit written or e-mail comments with the commenter's name and address to the address below. Only comments or requests received on or before 5:00 p.m. June 7, 2004 will be considered.

John E. Kieling, Program Manager
Hazardous Waste Bureau - New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303
Ref: Los Alamos National Laboratory Interim Status Unit Closures
e-mail: hazardous_waste_comment@nmenv.state.nm.us

Written comments must be based on the information available for review and include, to the extent practicable, all referenced factual materials. Documents in the administrative record need not be re-submitted if expressly referenced by the commenter. Requests for a public hearing shall provide: (1) a clear and concise factual statement of the nature and scope of the interest of the person requesting the hearing; (2) the name and address of all persons whom the requestor represents; (3) a statement of any objections to the Closure Plans; and (4) a statement of the issues which the commenter proposes to raise for consideration at the hearing. NMED will provide a 30 day notice of a public hearing, if a hearing is scheduled.

NMED must ensure that the approved Closure Plans are consistent with New Mexico Hazardous Waste Management Regulations. All written comments submitted will be considered in formulating a final decision and may result in NMED modifying or disapproving the Closure Plans. NMED will respond in writing to all public comments. This response will specify which provisions, if any, of the Closure Plans have been changed in the final decision and the reasons for the change, and will briefly describe and respond to all public comments. All persons who submit written comments or who request notification in writing will be notified of the decision by mail. NMED's responses to comments will also be posted on the NMED website.

After consideration of all written comments received, NMED will approve, modify, or disapprove the Closure Plans. If NMED modifies or disapproves the Closure Plans, NMED will provide to DOE and UC by mail a copy of the modified Closure Plans and a detailed written statement of reasons for the modifications or disapproval.

NMED will make the final closure decision publicly available and will notify DOE and UC by certified mail. The final closure decision will constitute a final agency decision and may be appealed as provided by the HWA.

ARRANGEMENTS FOR PERSONS WITH DISABILITIES

Any person with a disability requiring assistance or auxiliary aid to participate in this process should contact Judy Bentley, NMED, Room N-4030, P.O. Box 26110, 1190 St. Francis Drive, Santa Fe, NM 87502-6110, phone number 505-827-2580. TDD or TDY users please access Ms. Bentley's number via the New Mexico Relay Network. Albuquerque users may access Ms. Bentley's number at 505-275-7333 or 800-659-1779.

Department of Energy
National Nuclear Security Administration
Albuquerque Operations Office
Office of Los Alamos Site Operations
Los Alamos, New Mexico 87544

OCT 0 4 2002

Mr. Carl Will
LANL Permits Project Leader
RCRA Permits Management Program
Hazardous & Radioactive Materials Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Dear Mr. Will:

Subject: Transmittal of the Container Storage Unit TA-55 B38 Closure Plan, Los Alamos National Laboratory, EPA ID# NM0890010515

The purpose of this letter is to transmit to you a copy of the TA-55 B38 closure plan. As we have discussed, DOE/UC and Nuclear Materials Technology Division representatives have reviewed the mission associated with this storage unit and decided that it is no longer necessary for the fulfillment of that mission.

As our previous conversations and correspondence on the issue of closure have discussed, DOE and UC will begin closure at risk of this unit shortly after this plan is submitted. It is our intention to not have this unit permitted and therefore, consistent with previous discussions, it must be closed prior to the new permit being issued.

If you should have any questions concerning this submittal please feel free to contact either Gene Turner (505) 667-5794 of my staff or Jack Ellvinger (505) 667-0633 of the University of California.

Sincerely,

Joseph C. Vozella
Associate Director
Office of Facility Operations

OFO:IGT-012

Attachments

cc:
See Page 2

cc w/attachments:

James P. Bearzi, Chief
Hazardous & Radioactive Materials Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

John E. Kieling, Manager
RCRA Permits Management Program
Hazardous & Radioactive Materials Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe,NM 87505-6303

Laurie King, Chief (6PD-N)
New Mexico/Federal Facilities Section
Environmental Protection Agency -Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Gene Turner, LASO, MS-A316
James Balkey, NMT-DO, MS-A500
Jack Ellvinger, ESH-19, MS-K490
Jeff Carmichael, ESH-19, MS-K490
Ellen Louderbough, OGC, MS-A187

APPENDIX C
Technical Area 55, B38 Interim Status Container Storage Unit
Human Health Risk Assessment

HUMAN HEALTH RISK ASSESSMENT METHODOLOGY
Technical Area 55, Building 4 Interim Status Container Storage Unit

C.1 INTRODUCTION

This attachment presents the assessment of potential risks associated with lead residues on interior surfaces at the Technical Area (TA) 55, Building 4, B38 Container Storage Unit (CSU). The CSU was used for storage of 55-gallon drums of solid and mixed waste generated by TA-55 operations. The CSU was decontaminated as described in Section 2.0 of the closure document. The decontaminated B38 CSU will continue to be used for Multiple Assay Dual Analysis Measurement operations.

The assessment provides an evaluation of potential risks to future workers at the decontaminated CSU and incorporates data from sampling conducted to verify decontamination. The assessment of potential health risks to a worker involved in waste storage activities at the decontaminated CSU is described below. The results of lead decontamination sampling and exposure point concentrations are described in Section C.2. Exposure assumptions and the description of potential intake by workers are described in Section C.3. The estimated risks to human health from exposure and conclusions are described in Section C.4. Section C.5 describes uncertainties associated with the risk assessment and references are provided in Section C.6.

C.2 DATA EVALUATION

The swipe sampling data were evaluated to identify lead as the contaminant of potential concern as described in Section 2.5.2 of the B38 Closure Report. The maximum concentration of lead measured on a swipe sample (13 micrograms lead per 100 square centimeters [µg Pb/100 cm^2]), from Table 2-6, was used in the risk assessment.

C.3 EXPOSURE ASSESSMENT

The assessment of exposure to lead on interior surfaces involves identification of complete exposure pathways. A complete exposure pathway is defined by all of the following factors (U.S. Environmental Protection Agency [EPA], 1989):

- Source of contaminated media
- Contaminant release mechanisms
- Contaminant transport pathways
- Intermediate or transport media
- Exposure media
- Receptors
- Routes of exposure.

If any of these factors is absent, the exposure pathway is considered incomplete and has no associated risk.

C.3.1 Lead Release and Transport

The maximum detected lead concentration was measured on a swipe sample taken from the floor (Table 2-6) and is assumed to represent the surficial lead concentration throughout the CSU. This concentration is used as the exposure point concentration in the risk assessment. The assessment incorporates release by physical suspension of lead from the floor or walls during normal waste handling activities and suspension as airborne dust and direct contact with the skin.

C.3.2 Human Receptors and Exposure Pathways

Potential exposure of a future worker to lead on surfaces is assumed to occur by direct dermal contact, incidental ingestion of dust from the hands, and inhalation of resuspended airborne dust.

C.3.3 Surface Swipe Lead Model for Worker Exposure

Risk assessment methods based on threshold values do not apply in the B38 closure because lead toxicity does not exhibit a threshold for non-cancer health effects. Therefore, the EPA has developed the Adult Lead Model (ALM) to address worker exposures (EPA, 2003). The ALM estimates the lead concentration in the blood of a pregnant worker exposed by ingestion of soil and dust. However, the ALM does not address the inhalation and dermal absorption pathways, except as a default baseline concentration that also includes dietary contributions. Various other simulation models developed to evaluate blood lead concentration from exposures to lead have been reviewed and compared with the ALM (EPA, 2001a). Although none of the models reviewed address worker exposure to lead contamination on surfaces, the review found that the

model developed by the California Department of Toxic Substances Control (DTSC) (DTSC, 2000) specifically addresses the ingestion, dermal contact and inhalation exposure pathways and can provide simulation results consistent with the ALM.

The surface swipe model developed for this risk assessment is a modification of the model (DTSC, 2000) that evaluates exposure to lead on surfaces as measured by swipe samples. The surface swipe model and the DTSC model assume that the concentration of lead in blood from exposure via separate pathways is additive, such that:

$$PbB_{adult} = PbB_{ing} + PbB_{derm} + PbB_{inh} \qquad Eq\,(1)$$

where:

PbB_{adult} = Concentration of lead in blood of an adult worker, (micrograms per deciliter [µg/dL]).

PbB_{ing}, PbB_{derm}, PbB_{inh} = Contributions to adult blood lead concentration from the ingestion, dermal contact and inhalation pathways, respectively, (µg/dL).

The surface swipe model developed for this risk assessment is a modification of the model (DTSC, 2000) that evaluates exposure to lead on surfaces as measured by swipe samples. The surface swipe model and the DTSC model assume that the concentration of lead in blood from Table C-1.

$$PbB_{adult} = PbB_0 + \left\{ Pb_{sw} \times \frac{EF}{AT} \times \left[\left(SF_{ing} \times SA_h \times EV \times F_{s-s} \times F_{s-m}\right) + \left(SF_{derm} \times SA_{uex} \times EV \times F_{s-s} \times ABS_d\right) + \left(SF_{inh} \times K \times CF\right) \right] \right\} \qquad Eq\,(2)$$

The ALM describes the concentration of lead in fetal blood as:

$$PbB_{fetal} = PbB_{adult} \times R_{fetal/maternal} \qquad Eq\,(3)$$

where:

PbB_{fetal} = Concentration of lead in the fetus, µg/dL.

$R_{fetal/maternal}$ = Concentration ratio of lead in fetal blood to adult blood, dimensionless.

The EPA guidance (EPA, 1986 and 2003) assumes that PbB_{adult} is lognormally distributed. The guidance requires remediation of lead concentrations such that PbB_{fetal} will not exceed 10 µg/dL with 95% confidence as follows:

$$PbB_{fetal,0.95} = PbB_{fetal} \times GSD^{1.645} \qquad Eq\ (4)$$

where:

$PbB_{fetal,0.95}$ = 95th percentile of fetal blood lead concentration, µg/dL.
GSD = Geometric standard deviation of adult blood lead concentration in the United States population.

The regulatory goal for the 95th percentile fetal blood lead concentration ($PbB_{fetal,\ goal}$) is specified as 10 µg Pb/dL to be achieved with 95% confidence (EPA, 1986 and 2003). Therefore, use of the model to evaluate whether the B38 CSU residual concentration (Pb_{SW} = 0.13 µg Pb/cm^2) meets the specified limit requires that:

$$PbB_{fetal,0.95} \leq PbB_{fetal\ goal} = 10\mu g / dL \qquad Eq\ (5)$$

C.3.4 Exposure Factors

The surface swipe model (Eq 1-4) is applied to evaluate $_{PbBfetal,0.95}$ using exposure factors described in Table C-1. The maximum lead concentration (13 µg Pb/100 cm^2) was measured on a swipe sample from the floor and was assumed representative of the surficial lead concentration in the B38 CSU (Pb_{sw} = 0.13 µg Pb/cm^2) after remediation.

In the model (Table C-1), default values are used for PbB_0 and $R_{fetal/maternal}$ (EPA, 2003), the dermal absorption factor (ABS_d, DTSC, 2000), the geometric standard deviation of the mean

blood lead concentration in the adult population (EPA, 2001b), and the exposure frequency (EPA, 1989).

The slope factors used in the calculations for ingestion (SF_{ing}; Food and Drug Administration [FDA], 1990; DTSC, 2000), dermal contact (SF_{derm}; DTSC, 2000) and inhalation exposures (SF_{inh}; EPA, 1986) are intake factors for the pathways indicated.

Exposures by the dermal pathway are evaluated using the surface area of the hands (SA_h) and the face and upper extremities (SA_{uex}) of an adult female worker (EPA, 2001b). The fractions transferred from the contaminated surface to the skin (F_{s-s}) and from skin to mouth (F_{s-m}) are used as described by the World Trade Center Indoor Air Taskforce Working Group (WTCIATWG) (WTCIATWG, 2002). For the purpose of this risk assessment it is assumed that two exposure events will occur daily, in the forenoon and afternoon, such that EV = 2 events/day.

The inhalation exposure pathway included the resuspension factor (K) as empirically developed to estimate resuspension of dust from soil surfaces by pedestrians or vehicular traffic (Linsley, 1978; Royal Society, 2002).

The chosen values for exposure frequency (EF) and averaging time (AT) are consistent with EPA (1989 and 2003) guidance and with LANL (2000) guidance.

C.4. RISK CHARACTERIZATION AND CONCLUSIONS

The estimated concentrations of lead in blood of the worker and the fetus (Table C-1) are well below the goal of 10 µg/dL specified in EPA guidance (EPA, 1986 and 2003) with 95% confidence. This conclusion is confirmed by the following calculation of the probability that the mean blood lead concentration of the fetus (PbB_{fetal}) exceeds 10 µg/dL based on the assumption that the adult blood lead concentration is lognormally distributed (EPA, 1986 and 2003). For a distribution with geometric mean concentration (PbB_{fetal}) of 1.6 and geometric standard deviation of 1.8, the probability that the mean concentration exceeds 10 µg/dL approximately 0.3% (Table C-1). Based on this assessment, the potential risk to a future worker in the B38 CSU from

exposure to lead on surfaces is below the applicable criterion specified in EPA guidance (EPA, 1986).

C.5 UNCERTAINTIES

Generally, risk assessments carry two types of uncertainty. Measurement uncertainty refers to the usual variance that accompanies measurements of chemical concentrations, e.g., uncertainty associated with laboratory instrument accuracy and precision. Methodological uncertainty arises from assumptions made to account for gaps in knowledge of the site and the potentially exposed population. Assumptions related to the use of data from the sampling effort to validate decontamination of the B38 CSU and use of default exposure parameters are the predominant sources of uncertainty in this assessment.

Use of the maximum concentration of lead measured on a swipe sample (13 µg Pb/100 cm^2) as representative of the entire decontaminated area introduces uncertainty to the exposure assessment. Because the decontamination of other areas in the CSU is shown to meet project and regulatory requirements (Table 2-6, Section C.2) the uncertainty is believed to conservatively overestimate the surface concentration in other decontaminated areas.

In the absence of data describing future workers at the decontaminated building, the use of default parameters describing the intake of lead by the three exposure pathways, and the variability of the adult population introduces additional uncertainty. However, the regulatory limit of mean blood concentration (10 µg/dL) was developed as a conservatively protective criterion (EPA, 1986 and 2003). The default parameters used to describe exposure were all developed, as described in the references cited, to result in conservatively high estimates of blood lead concentration in an otherwise uncharacterized worker population. Therefore, the exposure assumptions address the absence of specific data about the future worker population by making selecting conservatively protective values.

The assumption that two exposure events will occur daily is a reasonably conservative when coupled with the assumption that the worker will be employed full time (250 days/year) at the decontaminated building. The use of the dust resuspension factor ($K = 1 \times 10^{-7}$ cm^{-1})

conservatively assumes that dust suspension by future waste handling operations can be approximated by pedestrians or vehicular traffic on bare soil.

6.0 REFERENCES

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Table C-1
Risk Assessment, Workers Potentially Exposed to Lead Contained on Surfaces at the TA-55 B38 Container Storage Unit

Exposure Parameter	Exposure Parameter Description	Units	Parameter	Reference
Pb_{sw}	Lead concentration on swipe/100[a]	$\mu g/cm^2$	0.13	Maximum Detected
$PbB_{fetal\ goal}$	Goal for the 95th percentile fetal blood lead concentration	µg/dL	10.0	EPA, 2003
PbB_o	Baseline blood concentration in absence of site exposure	µg/dL	2.2	EPA, 2003[b]
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	dimensionless	0.9	EPA, 2003
SF_{ing}	Ingestion Slope Factor	µg/dL per µg/day	0.04	FDA, 1990; DTSC, 2000
SF_{derm}	Dermal Slope Factor	µg/dL per µg/day	0.0001	DTSC, 2000
SF_{inh}	Inhalation Slope Factor	µg/dL per $\mu g/m^3$	1.64	EPA, 1986; DTSC, 2000
ABS_d	Dermal Absorption Factor	dimensionless	0.0006	DTSC, 2000
GSD	Geometric standard deviation of PbB_{adult}	dimensionless	1.8	EPA, 2003
SA_h	Surface Area (hands, adult female)	cm^2/event	817	EPA, 2001b
SA_{uex}	Surface Area (upper extremities, adult female)	cm^2/event	2,220	EPA, 2001b
EV	Exposure Events per Day	events/day	2	Assumed
F_{s-s}	Fraction Transferred from Surface to Skin	dimensionless	0.05	WTCIATWG, 2002
F_{s-m}	Fraction Transferred from Skin to Mouth	dimensionless	0.1	WTCIATWG, 2002
K	Dust Resuspension Factor	cm^{-1}	1.0E-07	Linsley, 1978; Royal Society, 2002
CF	Conversion Factor	cm^3/m^3	1.0E+06	--
EF	Exposure Frequency	days/year	250	EPA, 1989; LANL 2000
AT	Averaging Time	days/year	365	EPA 2003

Surface Swipe Model Results[c]

$PbB_{adult} = PbB_0 + [(Pb_{sw}*(EF/AT)*((SF_{ing}*SA_h*EV*F_{s-s}*F_{s-m}) + (SF_{derm}*SA_{uex}*EV*F_{s-s}*ABS_d) + (SF_{inh}*K*CF)] =$ **2.2E+00**

$PbB_{fetal} = PbB_{adult} * R_{fetal/maternal} =$ **2.0E+00**

$PbB_{fetal,\ 0.95} = PbB_{fetal} * (GSD^{1.645}) =$ **5.3E+00**

$P(PbB_{fetal} > PbB_{fetal,goal})$[d] (%) = **0.32%**

Table C-1 (continued)
Risk Assessment, Workers Potentially Exposed to Lead Contained on Surfaces at the TA-55 B38 Container Storage Unit

Notes:
(a) Swipe concentrations are reported in units of $\mu g/100cm^2$.
(b) Upper value of plausible range reported for U.S. women ages 20-49 years.
(c) Equations based on Equations 1-3 in EPA (2003).
(d) Probability that fetal PbB > $PbB_{fetal,goal}$, assuming lognormal distribution with mean concentration.
EPA = U.S. Environmental Protection Agency.
DTSC = Department of Toxic Substance Control.
FDA = U.S. Food and Drug Administration.
LANL = Los Alamos National Laboratory.
WTCIATWG = World Trade Center Indoor Air Taskforce Working Group.
$\mu g/cm^2$ = Micrograms per square centimeter.
µg/dL = Micrograms per deciliter.
$\mu g/m^3$ = Micrograms per cubic meter.
cm^2 = Square centimeters.
cm^{-1} = Reciprocal centimeters.
cm^3/m^3 = Cubic centimeters per cubic meter.
µg = Micrograms

APPENDIX D
Detection Limits and Uncertainty Associated with Analytical Data

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Table D-1
Range of Reporting Limits for Verification Samples

Analytical Method	Analyte	Minimum [illegible] (ppm)	Maximum [illegible] (ppm)	[illegible] (ppm)	Minimum [illegible] (ppm)	Maximum [illegible] (ppm)	[illegible] Region [illegible] (ppm)
Total Metals (Method 6010A)	Arsenic	100	100	0	0.00089	0.0608	0.045
	Barium	100	100	0	0.00951	0.13778	2,600
	Cadmium	20	20	0	0[d]	0.12515	18
	Chromium	20	20	0	0[d]	0.0644	110
	Lead	50	50	0	0[d]	0.8874	15
	Selenium	50	50	0	0[d]	0.01673	180
	Silver	40	40	0	0[d]	0.00954	180
7000 Series	Lead	100	100	0	0[d]	0[d]	15
Mercury (Method 7470)	Mercury	0.2	0.2	0	0[d]	0.00009	11
Volatile Organic Compounds (Method 8260B)	1,1,1,2-Tetrachloroethane	1	1	0.062	0	0.43	0.43
	1,1,1-Trichloroethane	1	1	0.08	0[d]	0.31	840
	1,1,2,2-Tetrachloroethane	1	1	0.328	0	0.96	0.055
	1,1,2-Trichloroethane	1	1	0.19	0	0.51	0.2
	1,1-Dichloroethane	1	1	0.07	0	0.22	810
	1,1-Dichloroethene	1	1	0.17	0.38	2.38	340
	1,2,3-Trichlorpropane	1	1	0.372	0	0.74	0.0016
	1,2,4-Trimethylbenzene	1	1	0.442	0[d]	0.94	12
	1,2-Dibromoethane (EDB)	1	1	0.092	0	0.58	0.00076
	1,2-Dichlorobenzene	1	1	0.48	0	0.41	61
	1,2-Dichloroethane (EDC)	1	1	0.06	0.23	17.27	0.12
	1,2-Dichloropropane	1	1	0.122	0	1.91	0.16
	1,3,5-Trimethylbenzene	1	1	0.37	0[d]	0.5	12
	1,3-Dichlorobenzene	1	1	0.488	0	2.2	18
	1,4-Dichloro-2-butene	10	10	0.098	0	6.73	0.0012
	1,4-Dichlorobenzene	1	1	0.506	0.26	8.22	0.47
	2-Butanone (MEK)	5	5	0.554	0[d]	245.11	7,100
	2-Hexanone (MBK)	5	5	0.218	0.48	3.54	n/a
	4-Methyl-2-pentanone (MIBK)	5	5	0.272	0	22.39	2,000
	Acetone	10	10	0.59	0[d]	20.05	33,000
	Acrolein	20	20	1.224	1.55	8.82	0.042
	Acrylonitrile	20	20	0.3	0	2.01	0.039
	Benzene	1	1	0.104	0.09	2	0.35
	Bromodichloromethane	1	1	0	0	101.34	0.18
	Bromoform	1	1	0.044	0	10.79	8.5
	Bromomethane	5	5	0.186	0[d]	0[d]	8.7
	Carbon disulfide	5	5	0.336	0.96	8.89	1000
	Carbon tetrachloride	1	1	0.148	0[d]	0.31	0.17
	Chlorobenzene	1	1	0.192	0	2.91	110
	Chlorodibromomethane	1	1	0.072	0	44.51	0.13
	Chloroethane	5	5	0.174	0[d]	10.7	3.9
	Chloroform	1	1	0.48	0	210.75	75
	Chloromethane	5	5	0.128	0[d]	7.38	1.5
	cis-1,2-Dichloroethene	1	1	0.078	0	0.45	61
	cis-1,3-Dichloropropene	1	1	0	0	0.4	0.4
	Dibromomethane	1	1	0.054	0	1.06	61

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Table D-1
Range of Reporting Limits for Verification Samples

Analytical Method	Analyte	Minimum RL (µg/L)	Maximum RL (µg/L)	[illegible] (µg/L)	Minimum RD (µg/L)	Maximum RD (µg/L)	Region Residential Tap Water (µg/L)
Volatile Organic Compounds (Method 8260B)	Ethyl methacrylate	5	5	0.092	0	16.13	550
	Ethylbenzene	1	1	0.242	0.46	1.25	1,300
	Freon 113	5	5	0.204	0[d]	0.4	n/a
	Freon 12	10	10	0.198	0	0.44	n/a
	Methyl t-butyl ether (MTBE)	1	1	0.184	0	0.19	20
	Methylene chloride	10	10	1.046	1.3	3.29	4.3
	Naphthalene	5	5	1.554	0.29	1.18	6.2
	o-Xylene	1	1	0.218	0.1	2.98	1,400
	p/m-Xylenes	2	2	0.546	0.65	1.41	10
	Styrene	1	1	0.272	0	3.83	1,600
	t-1,2-Dichloroethene	1	1	0.16	0	0.64	120
	t-1,3-Dichloropropene	1	1	0.079	0	0.39	0.4
	Tetrachloroethene (PCE)	1	1	0.318	0	0.57	0.1
	Toluene	1	1	0.186	0[d]	4.45	720
	Trichloroethene	1	1	0.196	0	2.08	0.028
	Trichlorofluoromethane	5	5	0.246	0	0.24	1,300
	Vinyl acetate	5	5	0.094	0.26	1.27	410
	Vinyl chloride	5	5	0.114	0[d]	0.36	0.043
Semivolatile Organic Compounds (Method 8270B)	1,2,4-Trichlorobenzene	1	11	0.08	0	0	8.2
	1,2-Dichlorobenzene	1	1	0.19	0	0	61
	1,3-Dichlorobenzene	1	1	0.16	0	0	18
	1,4-Dichlorobenzene	1	1	0.1	0	0	0.47
	1-Methylnaphthalene	1	11	0.07	0	0.26	n/a
	2,3,4,6-Tetrachlorophenol	5	5	0.29	0	0.01	1,100
	2,4,5-Trichlorophenol	5	5	0.28	0	0.12	3,700
	2,4,6-Trichlorophenol	5	5	0.3	0	0.24	6.1
	2,4-Dichlorophenol	5	55	0.66	0	1.48	110
	2,4-Dimethylphenol	1	11	0.19	0	0.05	730
	2,4-Dinitrophenol	10	10	0	0	61.03	73
	2,4-Dinitrotoluene	5	5	0.38	0	0.38	73
	2,6-Dinitrotoluene	5	5	0.27	0	1.02	37
	2-Chloronaphthalene	1	1	0.13	0	0.01	490
	2-Chlorophenol	1	1	0.18	0	0.06	30
	2-Methylnaphthalene	1	11	0.08	0	0.24	n/a
	2-Methylphenol	1	1	0.18	0.02	0.32	1,800
	2-Nitroaniline	5	5	0.16	0.01	0.77	1.1
	2-Nitrophenol	5	55	0.23	0	0.05	n/a
	3,3-Dichlorobenzidine	10	10	0.17	0[d]	0.29	0.15
	3+4 Methylphenol	1	1	0.16	0	0.39	180
	3-Nitroaniline	5	5	0.3	0[d]	1.6	n/a
	4,6-Dinitro-2-methylphenol	10	10	0.62	0	5.71	n/a
	4-Bromophenyl-phenylether	1	1	0.2	0	0.81	n/a
	4-Chloro-3-methylphenol	5	55	0.81	0	0.2	n/a
	4-Chloroaniline	5	55	0.52	0[d]	2	150
	4-Chlorophenyl-phenylether	1	1	0.15	0	0	n/a

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Table D-1
Range of Reporting Limits for Verification Samples

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	4-Nitroaniline	5	5	0.32	0	0.25	n/a
	4-Nitrophenol	10	10	0	0.03	1.38	290
	Acenaphthene	1	1	0.1	0	0.02	370
	Acenaphthylene	1	1	0.12	0	0.06	n/a
	Aniline	10	10	0.17	0	0.34	12
	Anthracene	1	1	0.07	0	0.09	1800
	Azobenzene&1,2-Diphenylhydrazine	1	1	0.1	0.01	0.15	0.084
	Benzo(a)anthracene	1	1	0.11	0	0.17	0.0092
	Benzo(a)pyrene	1	1	0.13	0	0.03	0.0092
	Benzo(b&k)fluoranthene	1	1	0.144	0	0.02	0.092
	Benzo(g,h,i)perylene	1	1	0.06	0	0.01	n/a
	Benzoic acid	25	275	0	0	8.53	150,000
	Benzyl alcohol	5	5	0.21	0.12	7.84	11,000
	bis(2-Chloroethoxy)methane	1	11	0.14	0	0.42	n/a
	bis(2-Chloroethyl)ether	1	1	0.05	0	0.45	0.0098
	bis(2-Chloroisopropyl)ether	1	1	0.18	0	0.1	0.27
	bis(2-Ethylhexyl)phthalate	5	510	4.32	0.37	306.16	4.8
	Butylbenzylphthalate	1	1	0.13	0.26	4.21	7,300
	Chrysene	1	1	0.09	0	0.18	9.2
Semivolatile Organic Compounds (Method 8270B)	Dibenz(a,h)anthracene	1	1	0.09	0	0.01	0.0092
	Dibenzofuran	1	1	0.12	0	0.33	12
	Diethylphthalate	1	1	0.08	0.08	16.66	29,000
	Dimethylphthalate	1	1	0.09	0	0.07	370,000
	di-n-Butylphthalate	1	1	0.12	1.49	23.77	3,700
	di-n-Octylphthalate	1	1	0.33	0.08	47.2	1,500
	Fluoranthene	1	1	0.1	0.01	0.38	1,500
	Fluorene	1	1	0.15	0	0.05	240
	Hexachlorobenzene	10	10	0.29	0	0	0.042
	Hexachlorobutadiene	10	110	0.44	0	0	0.86
	Hexachlorocyclopentadiene	10	10	0.2	0	0	220
	Hexachloroethane	5	5	0.26	0	0.71	4.8
	Indeno(1,2,3-cd)pyrene	1	1	0.1	0	0	0.092
	Isophorone	1	11	0.07	0	0.31	71
	Naphthalene	1	11	0.09	0	0.14	6.2
	Nitrobenzene	1	11	0.08	0	0.42	3.4
	n-Nitroso-dimethyl-amine	10	10	0	0.02	0.67	0.0013
	n-Nitroso-di-n-propylamine	1	1	0.16	0	0.28	0.0096
	n-Nitrosodiphenylamine	1	1	0.02	0	0.1	14
	Pentachlorophenol	10	10	0.74	0	4.32	0.56
	Phenanthrene	1	1	0.04	0	0.1	n/a
	Phenol	10	10	0.16	0	1.07	11,000
	Pyrene	1	1	0	0	0.04	180
	Pyridine	10	10	0	0	0.01	37

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Table D-1
Range of Reporting Limits for Verification Samples

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

a. Reporting limits (RLs) are 3 to 5 times the method detection limit (the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the value is above zero) and are sample-specific (i.e., reporting limit multiplied by the dilution factor). Treating results as nondetect at the RL sets the acceptable rate of false negatives at <1 percent.

b. Detection Limits (DLs) are the minimum concentration of a substance that can be measured. Values for DLs were obtained from analytical data packages provided by the analytical laboratory. DLs for metals and semivolatile organic compounds are expressed in parts per million (ppm), and and DLs for volatile organic compounds are expressed in parts per billion (ppb).

c. Raw quanitity (RQ) is the an estimated concentration of a substance detected above the detection limit. Ranges for RQ were obtained from analytical data packages provided by the analytical laboratory. RQs for metals and semivolatile organic compounds are expressed in parts per million (ppm), and RQs for volatile organic compounds are expressed in parts per billion (ppb).

d. Raw quantities that are negative numbers are expressed as 0 within this table.

µg/L = micrograms per liter
ppm = parts per million
ppb = parts per billion

Table D-1

Range of Reporting Limits for Verification Samples

Analytical Method	Analyte	Minimum RL (µg/L) [a]	Maximum RL (µg/L) [a]	EPA Region 6 MSSL* (µg/L)
Total Metals (Method 6010A)	Arsenic	***100***	***100***	0.045
	Barium	100	100	2,600
	Cadmium	***20***	***20***	18
	Chromium	20	20	110
	Lead	***50***	***50***	15
	Selenium	50	50	180
	Silver	40	40	180
7000 Series	Lead	***100***	***100***	15
Mercury (Method 7470)	Mercury	0.2	0.2	11
Volatile Organic Compounds (Method 8260B)	1,1,1,2-Tetrachloroethane	***1***	***1***	0.43
	1,1,1-Trichloroethane	1	1	840
	1,1,2,2-Tetrachloroethane	***1***	***1***	0.055
	1,1,2-Trichloroethane	***1***	***1***	0.2
	1,1-Dichloroethane	1	1	810
	1,1-Dichloroethene	1	1	340
	1,2,3-Trichloropropane	***1***	***1***	0.0016
	1,2,4-Trimethylbenzene	1	1	12
	1,2-Dibromoethane (EDB)	***1***	***1***	0.00076
	1,2-Dichlorobenzene	1	1	61
	1,2-Dichloroethane (EDC)	***1***	***1***	0.12
	1,2-Dichloropropane	***1***	***1***	0.16
	1,3,5-Trimethylbenzene	1	1	12
	1,3-Dichlorobenzene	1	1	18
	1,4-Dichloro-2-butene	***10***	***10***	0.0012
	1,4-Dichlorobenzene	***1***	***1***	0.47
	2-Butanone (MEK)	5	5	7,100
	2-Hexanone (MBK)	5	5	n/a
	4-Methyl-2-pentanone (MIBK)	5	5	2,000
	Acetone	10	10	33,000
	Acrolein	***20***	***20***	0.042
	Acrylonitrile	***20***	***20***	0.039
	Benzene	***1***	***1***	0.35
	Bromodichloromethane	***1***	***1***	0.18
	Bromoform	1	1	8.5
	Bromomethane	5	5	8.7
	Carbon disulfide	5	5	1000
	Carbon tetrachloride	***1***	***1***	0.17
	Chlorobenzene	1	1	110
	Chlorodibromomethane	***1***	***1***	0.13
	Chloroethane	***5***	***5***	3.9
	Chloroform	1	1	75
	Chloromethane	***5***	***5***	1.5
	cis-1,2-Dichloroethene	1	1	61
	cis-1,3-Dichloropropene	***1***	***1***	0.4
	Dibromomethane	1	1	61
	Ethyl methacrylate	5	5	550

Table D-1

Range of Reporting Limits for Verification Samples

Analytical Method	Analyte	Minimum RL (µg/L) [a]	Maximum RL (µg/L) [a]	EPA Region 6 MSSL (µg/L)
Volatile Organic Compounds (Method 8260B)	Ethylbenzene	1	1	1,300
	Freon 113	5	5	n/a
	Freon 12	10	10	n/a
	Methyl t-butyl ether (MTBE)	1	1	20
	Methylene chloride	***10***	***10***	4.3
	Naphthalene	5	5	6.2
	o-Xylene	1	1	1,400
	p/m-Xylenes	2	2	10
	Styrene	1	1	1,600
	t-1,2-Dichloroethene	1	1	120
	t-1,3-Dichloropropene	***1***	***1***	0.4
	Tetrachloroethene (PCE)	***1***	***1***	0.1
	Toluene	1	1	720
	Trichloroethene	***1***	***1***	0.028
	Trichlorofluoromethane	5	5	1,300
	Vinyl acetate	5	5	410
	Vinyl chloride	***5***	***5***	0.043
Semivolatile Organic Compounds (Method 8270B)	1,2,4-Trichlorobenzene	1	11	8.2
	1,2-Dichlorobenzene	1	1	61
	1,3-Dichlorobenzene	1	1	18
	1,4-Dichlorobenzene	***1***	***1***	0.47
	1-Methylnaphthalene	1	11	n/a
	2,3,4,6-Tetrachlorophenol	5	5	1,100
	2,4,5-Trichlorophenol	5	5	3,700
	2,4,6-Trichlorophenol	5	5	6.1
	2,4-Dichlorophenol	5	55	110
	2,4-Dimethylphenol	1	11	730
	2,4-Dinitrophenol	10	10	73
	2,4-Dinitrotoluene	5	5	73
	2,6-Dinitrotoluene	5	5	37
	2-Chloronaphthalene	1	1	490
	2-Chlorophenol	1	1	30
	2-Methylnaphthalene	1	11	n/a
	2-Methylphenol	1	1	1,800
	2-Nitroaniline	***5***	***5***	1.1
	2-Nitrophenol	5	55	n/a
	3,3-Dichlorobenzidine	***10***	***10***	0.15
	3+4 Methylphenol	1	1	180
	3-Nitroaniline	5	5	n/a
	4,6-Dinitro-2-methylphenol	10	10	n/a
	4-Bromophenyl-phenylether	1	1	n/a
	4-Chloro-3-methylphenol	5	55	n/a
	4-Chloroaniline	5	55	150
	4-Chlorophenyl-phenylether	1	1	n/a
	4-Nitroaniline	5	5	n/a
	4-Nitrophenol	10	10	290

Table D-1

Range of Reporting Limits for Verification Samples

Analytical Method	Analyte	Minimum RL (µg/L) [a]	Maximum RL (µg/L) [a]	EPA Region 6 MSSL (µg/L)
Semivolatile Organic Compounds (Method 8270B)	Acenaphthene	1	1	370
	Acenaphthylene	1	1	n/a
	Aniline	10	10	12
	Anthracene	1	1	1800
	Azobenzene&1,2-Diphenylhydrazine	***1***	***1***	0.084
	Benzo(a)anthracene	***1***	***1***	0.092
	Benzo(a)pyrene	***1***	***1***	0.0092
	Benzo(b&k)fluoranthene	***1***	***1***	0.092
	Benzo(g,h,i)perylene	1	1	n/a
	Benzoic acid	25	275	150,000
	Benzyl alcohol	5	5	11,000
	bis(2-Chloroethoxy)methane	1	11	n/a
	bis(2-Chloroethyl)ether	***1***	***1***	0.0098
	bis(2-Chloroisopropyl)ether	***1***	***1***	0.27
	bis(2-Ethylhexyl)phthalate	***5***	***510***	4.8
	Butylbenzylphthalate	1	1	7,300
	Chrysene	1	1	9.2
	Dibenz(a,h)anthracene	***1***	***1***	0.0092
	Dibenzofuran	1	1	12
	Diethylphthalate	1	1	29,000
	Dimethylphthalate	1	1	370,000
	di-n-Butylphthalate	1	1	3,700
	di-n-Octylphthalate	1	1	1,500
	Fluoranthene	1	1	1,500
	Fluorene	1	1	240
	Hexachlorobenzene	***10***	***10***	0.042
	Hexachlorobutadiene	***10***	***110***	0.86
	Hexachlorocyclopentadiene	10	10	220
	Hexachloroethane	***5***	***5***	4.8
	Indeno(1,2,3-cd)pyrene	***1***	***1***	0.092
	Isophorone	1	11	71
	Naphthalene	1	11	6.2
	Nitrobenzene	1	11	3.4
	n-Nitroso-dimethyl-amine	***10***	***10***	0.0013
	n-Nitroso-di-n-propylamine	***1***	***1***	0.0096
	n-Nitrosodiphenylamine	1	1	14
	Pentachlorophenol	***10***	***10***	0.56
	Phenanthrene	1	1	n/a
	Phenol	10	10	11,000
	Pyrene	1	1	180
	Pyridine	10	10	37

a. Reporting limits (RLs) are 3 to 5 times the method detection limit (the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the value is above zero) and are sample-specific (i.e., reporting limit multiplied by the dilution factor). Treating results as nondetect at the RL sets the acceptable rate of false negatives at <1 percent.
µg/L = Micrograms per liter

Table D-2

Range of Reporting Limits for Swipe Samples

Analytical Method	Analyte	Minimum RL ($\mu g/100\ cm^2$)	Maximum RL ($\mu g/100\ cm^2$)
7000 Series	Lead	5	5
Volatile Organic Compounds (Method 8260B)	1,2-Dichloroethane (EDC)	0.9	0.9

a. Reporting limits (RLs) are 3 to 5 times the method detection limit (the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the value is above zero) and are sample-specific (i.e., reporting limit multiplied by the dilution factor). Treating results as nondetect at the RL sets the acceptable rate of false negatives at <1 percent.
$\mu g/100\ cm^2$ = Micrograms per 100 square centimeters