Nevada Environmental Restoration Project

DOE/NV--1324

Closure Report for Corrective Action Unit 117: Area 26 Pluto Disassembly Facility Nevada Test Site, Nevada

Controlled Copy No.: ____ Revision No.: 0

June 2009

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Environmental Restoration Project

U.S. Department of Energy National Nuclear Security Administration Nevada Site Office

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CLOSURE REPORT FOR CORRECTIVE ACTION UNIT 117: AREA 26 PLUTO DISASSEMBLY FACILITY NEVADA TEST SITE, NEVADA

U.S. Department of Energy National Nuclear Security Administration Nevada Site Office Las Vegas, Nevada

Controlled Copy No.: ____

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Derivative Classifier: Joseph Johnston, SNJV Classification Officer (Name/personal identifier and position title)
Signature: /s/ Joseph Johnston

Date: 06/24/2009

CLOSURE REPORT FOR CORRECTIVE ACTION UNIT 117: AREA 26 PLUTO DISASSEMBLY FACILITY NEVADA TEST SITE, NEVADA

Approved by: /s/ Kevin J. Cabble Date: 06/24/2009

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List of Acronyms and Abbreviations

Ac Actinium

ACM Asbestos-containing material

Am Americium

ASTM American Society for Testing and Materials

bgs Below ground surface

Bi Bismuth

BMP Best management practice

CAI Corrective action investigation

CAS Corrective action site
CAU Corrective action unit

CLP Contract Laboratory Program

cm Centimeter

Co Cobalt

COC Contaminant of concern

COPC Contaminant of potential concern

cpm Counts per minute

CR Closure report

Cs Cesium

CSM Conceptual site model

DoD U.S. Department of Defense

DOE U.S. Department of Energy

dpm/100cm² Disintegrations per minute per 100 square centimeters

DQA Data quality assessment

DQI Data quality indicator

DQO Data quality objective

DRO Diesel-range organics

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List of Acronyms and Abbreviations (Continued)

E-MAD Engine Maintenance, Assembly, and Disassembly

EERF Eastern Environmental Radiation Facility

EML Environmental Measurements Laboratory

EPA U.S. Environmental Protection Agency

Eu Europium

FADL Field activity daily log

FAL Final action level

FD Field duplicate

FFACO Federal Facility Agreement and Consent Order

FSL Field-screening level

FSR Field-screening result

ft Foot

ft² Square foot

ft³ Cubic foot

gal Gallon

GPS Global Positioning System

HASL Health and Safety Laboratory

HCTF Hydrogen Content Test Facility

HEPA High-efficiency particulate air

HWSU Hazardous Waste Storage Unit

I.D. Inside diameter

IDW Investigation-derived waste

in. Inchlb Pound

LCS Laboratory control sample

LEL Lower explosive limit

LLW Low-level waste

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List of Acronyms and Abbreviations (Continued)

LRL Lawrence Radiation Laboratory

m² Square meter

MDC Minimum detectable concentration

mg/kg Milligrams per kilogram

mg/L Milligrams per liter

mi Mile

mrem/yr Millirem per year

MS Matrix spike

MSD Matrix spike duplicate

N/A Not applicable

NAC Nevada Administrative Code

NAD North American Datum

ND Nondetect

NDEP Nevada Division of Environmental Protection

NIOSH National Institute for Occupational Safety and Health

NIST National Institute of Standards and Technology

NNSA/NSO U.S. Department of Energy, National Nuclear Security Administration

Nevada Site Office

NRC U.S. Nuclear Regulatory Commission

NSTec National Security Technologies, LLC

NTS Nevada Test Site

NV/YMP Nevada Yucca Mountain Project

PACM Presumed asbestos-containing material

PAL Preliminary action level

Pb Lead

PCB Polychlorinated biphenyl

pCi/g Picocuries per gram

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List of Acronyms and Abbreviations (Continued)

pCi/L Picocuries per liter

POC Performance objective criteria

PPE Personal protective equipment

PRG Preliminary Remediation Goal

PSM Potential source material

Pu Plutonium

QA Quality assurance

QAPP Quality Assurance Project Plan

QC Quality control

qt Quart

R-MAD Reactor Maintenance, Assembly, and Disassembly

Ra Radium

Rad Radiation

RadCon Radiological Control

RBCA Risk-based corrective action

RBSL Risk-based screening level

RCRA Resource Conservation and Recovery Act

RESL Radiological and Environmental Sciences Laboratory

RL Reporting limit

RMA Radioactive material area

RPD Relative percent difference

RWMC Radioactive Waste Management Complex

SAA Satellite accumulation area

SAFER Streamlined Approach for Environmental Restoration

SCL Sample collection log

SDG Sample delivery group

SNJV Stoller-Navarro Joint Venture

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List of Acronyms and Abbreviations (Continued)

SNL Sandia National Laboratories

Sr Strontium

SSTL Site-specific target level

SVOC Semivolatile organic compound

TCLP Toxicity Characteristic Leaching Procedure

Th Thorium
Tl Thallium

TPH Total petroleum hydrocarbons

TSCA Toxic Substances Control Act

U Uranium

UTM Universal Transverse Mercator

VOC Volatile organic compound

yd³ Cubic yard

μg/kg Micrograms per kilogram

μg/L Micrograms per liter

%R Percent recovery

Executive Summary

This Closure Report (CR) presents information supporting the closure of Corrective Action Unit (CAU) 117: Area 26 Pluto Disassembly Facility, Nevada Test Site, Nevada. This CR complies with the requirements of the *Federal Facility Agreement and Consent Order* that was agreed to by the State of Nevada; U.S. Department of Energy (DOE), Environmental Management; U.S. Department of Defense; and DOE, Legacy Management. Corrective Action Unit 117 comprises Corrective Action Site (CAS) 26-41-01, Pluto Disassembly Facility, located in Area 26 of the Nevada Test Site.

The purpose of this CR is to provide documentation supporting the completed corrective actions and provide data confirming that the closure objectives for CAU 117 were met. To achieve this, the following actions were performed:

- Review the current site conditions, including the concentration and extent of contamination.
- Implement any corrective actions necessary to protect human health and the environment.
- Properly dispose of corrective action and investigation wastes.
- Document Notice of Completion and closure of CAU 117 issued by the Nevada Division of Environmental Protection.

From May 2008 through February 2009, closure activities were performed as set forth in the Streamlined Approach for Environmental Restoration Plan for Corrective Action Unit 117, Area 26 Pluto Disassembly Facility, Nevada Test Site, Nevada. The purpose of the activities as defined during the data quality objectives process were:

- Determine whether contaminants of concern (COCs) are present.
- If COCs are present, determine their nature and extent, implement appropriate corrective actions, and properly dispose of wastes.

Analytes detected during the closure activities were evaluated against final action levels to determine COCs for CAU 117. Assessment of the data generated from closure activities indicated that the final action levels were exceeded for polychlorinated biphenyls (PCBs) reported as total Aroclor and radium-226. A corrective action was implemented to remove approximately 50 cubic yards of PCB-contaminated soil, approximately 1 cubic foot of radium-226 contaminated soil (and scabbled

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asphalt), and a high-efficiency particulate air filter that was determined to meet the criteria of a potential source material (PSM). Electrical and lighting components (i.e., PCB-containing ballasts and capacitors) and other materials (e.g., mercury-containing thermostats and switches, lead plugs and bricks) assumed to be PSM were also removed from Building 2201, as practical, without the need for sampling. Because the COC contamination and PSMs have been removed, clean closure of CAS 26-41-01 is recommended, and no use restrictions are required to be placed on this CAU. No further action is necessary because no other contaminants of potential concern were found above preliminary action levels. The physical end state for Building 2201 is expected to be eventual demolition to slab.

The DOE, National Nuclear Security Administration Nevada Site Office provides the following recommendations:

- Clean closure is the recommended corrective action for CAS 26-41-01 in CAU 117.
- A Notice of Completion to the DOE, National Nuclear Security Administration Nevada Site Office is requested from the Nevada Division of Environmental Protection for closure of CAU 117.
- Corrective Action Unit 117 should be moved from Appendix III to Appendix IV of the *Federal Facility Agreement and Consent Order*.

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1.0 Introduction

This Closure Report (CR) presents information supporting closure of Corrective Action Unit (CAU) 117, Area 26 Pluto Disassembly Facility, Nevada Test Site (NTS), Nevada. This complies with the requirements of the *Federal Facility Agreement and Consent Order* (FFACO) that was agreed to by the State of Nevada; U.S. Department of Energy (DOE), Environmental Management; U.S. Department of Defense (DoD); and DOE, Legacy Management (FFACO, 1996; as amended February 2008). Corrective Action Unit 117 is located approximately 10 miles (mi) northwest of Mercury, Nevada, in the southwest region of Area 26 at the NTS and comprises one Corrective Action Site (CAS) 26-41-01, Pluto Disassembly Facility. The NTS is located approximately 65 mi northwest of Las Vegas, Nevada (Figure 1-1).

Corrective Action Unit 117 consists of the potential releases associated with operations at Building 2201 Pluto Disassembly Facility, the facility water tower, and a nearby wood shed. The CAS location is shown in Figure 1-2.

1.1 Purpose

This CR provides documentation and justification for the closure of CAU 117 without further corrective action. This justification is based on implementation of a corrective action closure in accordance with the *Streamlined Approach for Environmental Restoration* (SAFER) *Plan for Corrective Action Unit 117: Area 26 Pluto Disassembly Facility, Nevada Test Site, Nevada* (NNSA/NSO, 2007). The SAFER Plan provides information relating to site history as well as the scope and planning of the investigation.

This CR also provides analytical and radiological survey data to confirm that the remediation goals were met as specified in the CAU 117 SAFER Plan (NNSA/NSO, 2007). The Nevada Division of Environmental Protection (NDEP) approved the CAU 117 SAFER Plan (Murphy, 2007), which recommended evaluation of the corrective action alternatives of closure in place and clean closure.

Closure of CAU 117 is required under the FFACO and is listed in Appendix III of the FFACO (FFACO, 1996; as amended February 2008).

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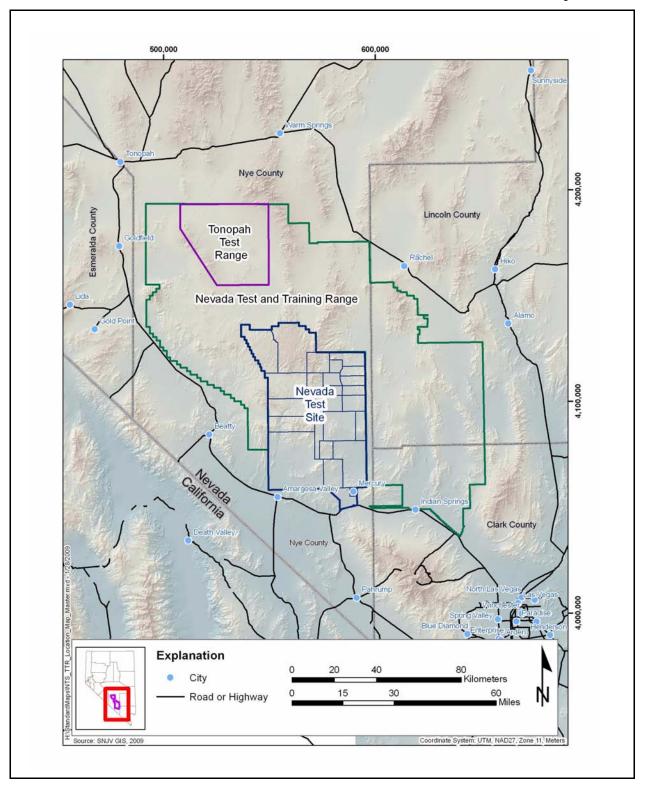


Figure 1-1 Nevada Test Site

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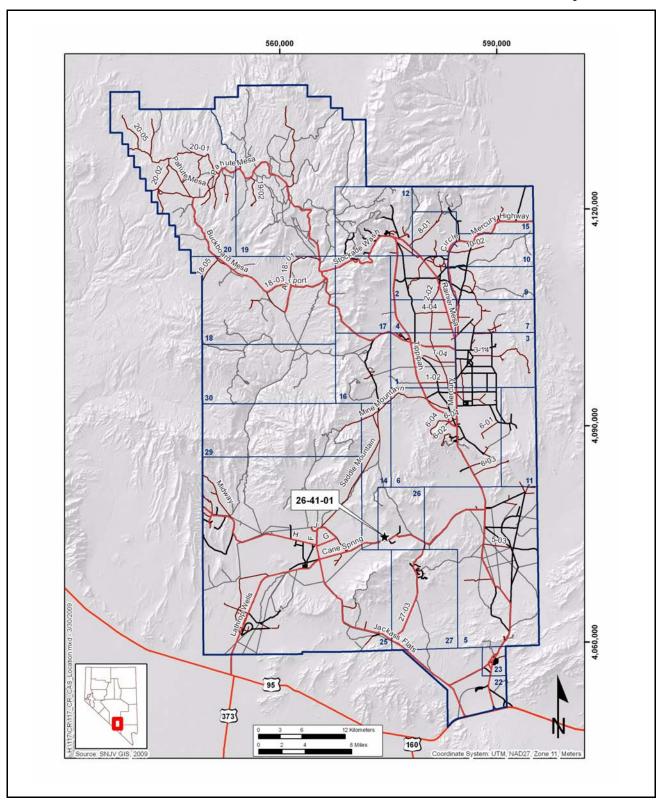


Figure 1-2
Nevada Test Site Map with CAU 117 CAS Location

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1.1.1 Site Description and History

Corrective Action Unit 117 is located north of Cane Spring Road in the southwestern portion of Area 26 of the NTS. It comprises a single CAS, CAS 26-41-01, which consists of the Pluto Disassembly Facility (also known as Building 2201), the facility water tower, and a nearby wood shed. Current access to CAS 26-41-01 is limited by a surrounding chain-link fence, locked gates, and locked entry ways to Building 2201. Figure 1-3 shows Building 2201 with respect to the facility water tower, wood shed, and the surrounding chain-link fence. Figure 1-4 is a photograph of Building 2201 facing northwest.

Construction of Building 2201 began in May 1959 for Project Pluto, approximately four years after the project's initiation by the DoD in 1955. After completion of the building in October 1960, the project was passed to Lawrence Radiation Laboratory (LRL), who managed Project Pluto until its cancellation in 1964. The objective of Project Pluto was to design a nuclear reactor that could propel a missile through the atmosphere at altitudes ranging from sea level to several miles and at velocities up to three times the speed of sound (LLNL, Date Unknown). As a result, the earthbound Tory II-A reactor and its flyable counterpart, the Tory II-C, were developed (Figure 1-5). The cores of these reactors incorporated several hundred thousand fuel elements consisting of a homogenous mixture of highly enriched uranium dioxide and beryllium oxide (AEC, Date Unknown). The propulsion system operated on the ramjet principle, in which large quantities of air were ingested, heated by the reactor, and expelled at a high temperature and pressure to provide thrust. Between 1961 and 1964, LRL conducted several tests of the Tory reactors, including four successful power runs with the Tory II-A and two power runs with the Tory II-C (Holmes & Narver, 1986; DRI, 1988).

Project Pluto was also associated with "Hot Box" tests performed in Building 2201. These tests consisted of using stacks of graphite blocks interspersed with a few oralloy (uranium [U]-235) foils. Air was heated to high temperatures and circulated through the reactor to obtain initial test data. Results from these tests were used to design the Tory II-A reactor (LLNL, Date Unknown).

Only the Tory II-A was disassembled in Building 2201 (DOE/NV, 1993). The Tory II-C reactor was stored in Building 2201 until 1974, when it was moved to the Reactor Maintenance, Assembly, and Disassembly (R-MAD) building for storage (Author Unknown, Date Unknown). Actual disassembly

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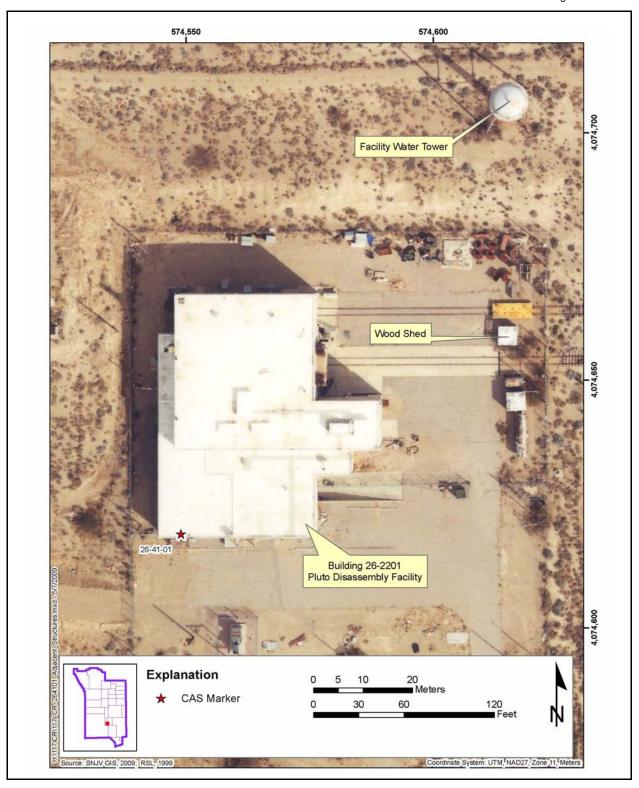


Figure 1-3
Corrective Action Site 26-41-01 Structures

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Figure 1-4
Pluto Facility Building 2201

of the Tory II-C was performed at the Engine Maintenance, Assembly, and Disassembly (E-MAD) building in 1976 (DOE/NV, 1993).

Building 2201 was designed specifically to perform remote adjustments, component replacement, and complete disassembly of the Tory II reactor systems. The Main Disassembly Bay (Room 102) housed the Tory II test vehicle when activities dictated that remote handling be used. Disassembly operations were viewed through 4-foot (ft)-thick leaded-glass observation windows immersed in oil (LRL, 1960). During disassembly, the reactor core was removed from the railcar (used to transport the reactor to the test pad) with remotely operated manipulators. The heavily shielded postmortem hot cells adjacent to the disassembly bay were used to monitor control rod actuators during Project Pluto. Vaults within each cell were operated with remote manipulators for "fuel elements and classified core parts" (Holmes & Narver, 1986). The Cold Assembly Bay (Room 101) was used for storage and assembly of modular components for the reactor test vehicle (LRL, 1960).

A maintenance service pit and battery charger for the locomotive were also located in Room 101 (LRL, 1960).

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Source: DOE/NV, Date Unknown

Figure 1-5
Tory II-A Reactor (top) and Tory II-C Reactor (bottom)

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The disassembly bay was supported by a maintenance shop, darkroom, offices, and equipment storage rooms. All controls for Building 2201 operation were located in Room 105 (DOE/NV, 1998). The Warm & Cold Storage Room (109) was used for repair and maintenance of equipment contaminated with low-activity radiological contaminants and was also intended for low-activity glove-box work (LRL, 1960). Both the Shower/Change Room (113) and Rad Safety Room (114) were designed as change rooms and check stations for personnel needing access to the hot cell and assembly areas (LRL, 1960). Before it was converted into a restroom, Room 115 served as a darkroom for quickly developing photograph negatives (LRL, 1960). Room 116 was originally used to store the many spare parts required for the facility. A small electronics maintenance area was later set up in Room 116.

During operation, Rooms 105 and 108 were air conditioned and maintained at a positive pressure so that air flowed into the Main Disassembly Bay (Room 102) and the hot cells (Rooms 104, 106, and 107) when equipment or services were passed through openings at each operating station (LRL, 1960). These openings were plugged with lead plates or bagged shot when not in use (DOE/NV, 1998). The ventilation system in Room 102 was exhausted at the west end of the room through roughing and absolute filters before being vented to the atmosphere via the main exhaust stack in Room 103 (LRL, 1960). In 1998, a portable air-conditioning system was installed by an unidentified "user." This user set up a portable system outside of the building with ducts running through external penetrations in the building that otherwise would have remained closed (DOE/NV, 1998).

The drainage system originating in the disassembly bay and postmortem cell area was designed to collect rinsate from gross decontamination efforts. Information from interviews with former personnel suggest that the septic drainage system was disconnected in 1964 (Barrow, 1998).

Following the cancellation of Project Pluto, Building 2201 was used for the Fuel Repackaging Operations Project conducted between 1971 and 1972 (REECo, 1972). During this period, fuel elements from the Tory II reactors were removed from their original containers and placed in 6-liter containers that were then sealed, cleaned, and removed from the hot cells (Rooms 104, 106, and 107) of Building 2201. The containers were temporarily stored in the machine shop area of Building 2201 until they were taken to the decontamination pad in Area 6 for storage or potential future use

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(REECo, 1972). The packaged fuel elements were eventually shipped to the Idaho National Engineering Laboratory (Holmes & Narver, 1986).

Starting in 1972, Building 2201 was used for a series of classified experiments following the fuel repackaging operations (DOE/NV, 1993). In the late 1970s and early 1980s, the Room 101 and Room 102 High Bays were modified to house the Hydrogen Content Test Facility (HCTF). The primary purpose of the HCTF was to simulate large dry holes for calibration of core logging instrumentation. The HCTF equipment (Figure 1-6) consisted of a series of aluminum cells, each containing a different combination of water content and density. The cells contain sand, aluminum oxide, glass marbles, and varying water moisture content. The HCTF equipment will be dismantled and dispositioned during the demolition of Building 2201.

As of 1986, Sandia National Laboratories (SNL) was using portions of Building 2201 to conduct weapons-related nondestructive testing of fast-acting closure systems (DOE/NV, 1998). Since 1996, SNL has performed activities in Building 2201 associated with non-nuclear rocket launching and other classified projects. Due to their sensitive nature, specific information on experiments conducted by SNL inside Building 2201 is not readily available (IT, 1996). In 1998, an unidentified "user" used Building 2201 for additional classified activities (DOE/NV, 1998).

1.2 Scope

The objective of the closure activities for CAU 117 were designed to support closure in place or clean closure. The corrective action of clean closure was completed by removal of potential source material (PSM) and contaminated material sufficiently that contaminants of concern (COCs) no longer exist within the CAS as demonstrated by verification sample analytical results. Closure activities used to achieve clean closure included the following:

- Performing radiological and visual surveys to identify biased sampling locations.
- Collecting soil samples to determine whether COCs are present in environmental media.
- Collecting step-out samples to define the lateral and vertical extent of COCs.
- Removing polychlorinated biphenyl (PCB)-contaminated and radiologically contaminated (radium [Ra]-226) soil.

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Figure 1-6
Room 101 (top) and Room 102 (bottom) HCTF Equipment

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- Collecting samples of materials to determine whether PSM exists.
- Removing assumed PSMs (without sampling) including:
 - Lead-shielding and other lead-containing items, including leaded-glass windows, lead plugs, lead bricks, and lead-acid batteries
 - Mercury-containing items, including thermostats, thermometers, and mercury-vapor bulbs
 - Fluorescent and sodium-vapor bulbs
 - PCB-containing items, including ballasts and capacitors
- Grouting fluid system lines from and to the building as well as all floor and surface drains to eliminate pathways to the environment.
- Collecting waste management samples.
- Characterizing and disposing of investigation-derived waste (IDW) streams and remediation waste streams
- Collecting quality control (QC) samples.
- Documenting Notice of Completion and closure of CAU 117.

The CAU 117 SAFER Plan (NNSA/NSO, 2007) also addressed potential best management practices (BMPs) and other activities that would be completed (outside of the FFACO) in order to place Building 2201 in a safe interim configuration for future demolition. The following activities were completed during the corrective action investigation (CAI) closure activities; however, they are considered outside of the FFACO scope:

- Site preparation activities (e.g., securing bi-parting door, performing Hantavirus cleanup)
- Asbestos identification and abatement
- Removal of readily removable wastes including:
 - Unused asbestos-containing high-efficiency particulate air (HEPA) filters
 - A pre-filter frame located in Room 104
 - Abandoned HEPA vacuums located within the facility
 - Radiologically contaminated flooring materials
 - Abandoned excess chemicals (e.g., industrial cleaners, oxidizers, algicides) located throughout the facility
 - Used lubricants, oils, detergents, and other fluids from various equipment/systems
 - Mineral oil from shielding windows
 - Domestic and process water

• Performance of final release and confirmatory radiological surveys to establish proper controls (postings)

1.3 Closure Report Contents

This CR is divided into the following sections and appendices:

- Section 1.0 Introduction: Summarizes the purpose, scope, and contents of this CR.
- Section 2.0 Closure Activities: Summarizes the closure activities, deviations from the SAFER Plan, the actual schedule, and the site conditions following completion of corrective actions.
- Section 3.0 Waste Disposition: Discusses the wastes generated and entered into an approved waste management system as a result of the corrective action.
- Section 4.0 Closure Verification Results: Describes verification activities and results.
- Section 5.0 Conclusions and Recommendations: Provides the conclusions and recommendations along with the rationale for their determination.
- Section 6.0 References: Provides a list of all referenced documents used in the preparation of this CR.
- Appendix A- Data Quality Objectives (DQOs) as Developed in the SAFER Plan: Provides the DQOs as presented in Appendix B of the CAU 117 SAFER Plan.
- Appendix B- Closure Certification: This appendix is not applicable to CAU 117.
- Appendix C- As-Built Documentation: This appendix is not applicable to CAU 117.
- Appendix D- Confirmation Sampling Test Results: Provides a description of the project objectives, field closure and sampling activities, and closure results.
- Appendix E- Waste Disposition Documentation: Documents disposal of items removed during closure activities.

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Appendix F- Modifications to the Post-Closure Plan: This appendix is not applicable to CAU 117.

Appendix G- Use Restrictions: This appendix is not applicable to CAU 117.

Appendix H- Evaluation of Risk: Presents the risk assessment results.

Appendix I - Contains responses to NDEP comments on the draft version of this document.

1.3.1 Applicable Programmatic Plans and Documents

To ensure all project objectives, health and safety requirements, and QC procedures were adhered to, all closure activities were performed in accordance with the following documents:

- Streamlined Approach for Environmental Restoration Plan for CAU 117, Area 26 Pluto Disassembly Facility, Nevada Test Site, Nevada (NNSA/NSO, 2007)
- Industrial Sites Quality Assurance Project Plan (QAPP) (NNSA/NV, 2002)
- Federal Facility Agreement and Consent Order (1996, as amended February 2008)
- Approved standard operating procedures

1.3.2 Data Quality Objectives

This section contains a summary of the DQO process that is presented in Appendix A. The DQOs were developed to identify data needs, clearly define the intended use of the environmental data, and design a data collection program that will satisfy these purposes.

The problem statement for CAU 117 is: "Existing information on the nature and extent of potential contamination is insufficient to evaluate and confirm closure of CAS 26-41-01 in CAU 117." To address this problem, the resolution of two decision statements is required:

• Decision I: "Is any COC present in environmental media within the CAS, or does PSM exist that, if released, could cause a COC in environmental media?" For a judgmental sampling design, any analytical result for a contaminant of potential concern (COPC) above the final action level (FAL) will result in that COPC being designated as a COC. A COC may also be defined as a contaminant that, in combination with other like contaminants, is determined to jointly pose an unacceptable risk based on a multiple constituent analysis (NNSA/NSO, 2006). If a COC is detected, then Decision II must be resolved.

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- Decision II: "Is sufficient information available to meet the closure objectives?" Sufficient information to meet these closure objectives is defined to include:
 - Identifying the volume of media containing any COC bounded by analytical sample results in lateral and vertical directions.
 - The information needed to characterize investigation-derived waste (IDW) for disposal.
 - The information needed to determine potential remediation waste types.

The presence of a COC would require a corrective action. A corrective action may also be necessary if there is a potential for wastes that are present at a site (i.e., PSM) to release COCs into site environmental media.

To evaluate PSM for the potential to result in the introduction of a COC to the surrounding environmental media, the following conservative assumptions were made:

- Building 2201 containment would fail at some point, and the contents would be released to the surrounding media.
- The resulting concentration of contaminants in the surrounding media would be equal to the concentration of contaminants within Building 2201.
- Any liquid contaminants within Building 2201 will be removed.

If sufficient information is not available to meet the closure objectives, then site conditions will be re-evaluated and additional samples will be collected (as long as the scope of the investigation is not exceeded and conceptual site model (CSM) assumptions have not been shown to be incorrect).

1.3.3 Data Quality Assessment Summary

The data quality assessment (DQA) presented in Section 4.1 includes an evaluation of the data quality indicators (DQIs) to determine the degree of acceptability and usability of the reported data in the decision-making process. The DQO process ensures that the right type, quality, and quantity of data will be available to support the resolution of those decisions at an appropriate level of confidence. Using both the DQO and DQA processes help to ensure that DQO decisions are sound and defensible.

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The DQA process as presented in Section 4.1 is composed of the following steps:

- Step 1: Review DQOs and Sampling Design.
- Step 2: Conduct a Preliminary Data Review.
- Step 3: Select the Test.
- Step 4: Verify the Assumptions.
- Step 5: Draw Conclusions from the Data.

Based on the results of the DQA presented in Section 4.1, the information generated during the investigation supports the CSM assumptions, and the data collected meet the DQOs and support their intended use in the decision-making process.

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2.0 Closure Activities

The following sections summarize the CAU 117 closure activities and any deviations from the original scope of work. Details regarding closure activities and results of confirmation sampling are presented in Appendix D of this document.

2.1 Description of Corrective Action Investigation Activities

The CAI activities were conducted in accordance with the requirements set forth in the CAU 117 SAFER Plan (NNSA/NSO, 2007). Table 2-1 lists the CAI activities that were conducted at CAU 117, whereas Table 2-2 lists the BMPs that were conducted during the CAI but outside of the FFACO process.

Closure verification samples were collected from potential contaminant sources, surface soils, and subsurface soils. Surface soil samples were collected by hand excavation. Subsurface soil samples were collected using hand augering and/or backhoe operations. Soil samples were field screened for alpha and beta/gamma radiation. The results were compared against screening levels to guide in the selection of CAS-specific verification sample locations. Resultant samples were shipped to offsite laboratories to be analyzed for appropriate chemical and radiological parameters.

A judgmental sampling scheme was implemented to select sample locations and evaluate analytical results, as outlined in the SAFER Plan (NNSA/NSO, 2007). Judgmental sampling allows the methodical selection of sample locations that target the populations of interest (defined in the DQOs) rather than nonselective random locations.

For the judgmental sampling scheme, individual sample results (rather than average concentrations) are used to compare to FALs. Therefore, statistical methods to generate site characteristics (averages) are not necessary. If good prior information is available on the target site of interest, then the sampling may be designed to collect samples only from areas known to have the highest concentration levels. If the observed concentrations from these samples are below the action level, then a decision can be made that the site contains safe levels of the contaminant without the samples being truly representative of the entire area (EPA, 2006). The judgmental sampling design was used to determine the existence of contamination at specific locations and provide information (such as

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extent of contamination) about specific areas of the site. Confidence in judgmental sampling scheme decisions was established qualitatively by the validation of the CSM and justification that sampling locations are the most likely locations to contain a COC, if a COC exists.

Table 2-1
Corrective Action Investigation Activities Conducted at CAU 117
To Meet SAFER Plan Requirements

CAI Activities	Building 2201	Water Tower	Wood Shed	Facility Boundary
Performed scanning radiological walkover surveys (i.e., soil, concrete surfaces, debris) using a handheld detector and visual surveys to identify biased sampling locations.	Х	х	Х	Х
Field screened samples for alpha and beta/gamma radiation using a hand-held survey instrument.	Х	Х	Х	х
Performed swipe sampling for removable radioactivity using a hand-held survey instrument and/or a gamma scintillator.	Х		Х	х
Collected soil samples from biased locations to determine whether COCs are present (Decision I) and from step-out sample locations to define the extent of COCs (Decision II).				х
Collected liquid, solid, oil, and paint samples from materials and equipment within the facility for waste characterization to support disposal recommendations and determine whether the waste could be a potential source of contamination for the environment (i.e., soil).	Х			
Removed PCB-contaminated and Ra-226 contaminated soil and collected verification samples.				Х
Removed assumed PSMs without sampling (e.g., lead shielding, mercury-containing thermometers, PCB-containing capacitors).	х			
Collected samples to characterize future demolition wastes.	Х			
Investigated underground vaults.	Х			
Isolated and sealed all utility and drain systems.	Х	Х		
Submitted select samples for offsite laboratory analysis.	Х	Х	Х	Х
Collected GPS coordinates for sample locations and points of interest.				Х

GPS = Global Positioning System

-- = Not applicable

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Table 2-2
Best Management Practices and Other Activities
Completed To Support Corrective Actions

BMPs and Other Activities					
Site preparation activities					
Asbestos abatement					
Removal of readily removable wastes and materials					
Placed final postings and markings (e.g., RMA, ACM)					

ACM = Asbestos-containing materials RMA = Radioactive material area

The following sections describe how the approved SAFER Plan (NNSA/NSO, 2007) was implemented for CAU 117, CAS 26-41-01.

2.1.1 Radiological Surveys

Radiological surveys were performed at various locations within the CAS. Radiological surveys were performed to identify the presence, the nature, and the extent of radiological contaminants at activities statistically distinguishable from background activities. Various radiological walkover surveys were conducted at CAS 26-41-01. The walkover surveys included the Main Disassembly Bay (Room 102), the hot cells (Rooms 104, 106, and 107), and an approximate 1,000-square-meter (m²) area within the fenced area surrounding the exterior of Building 2201. Radiological walkover surveys were performed using an NE Technology Electra fitted with a DP6BD dual-alpha and beta/gamma radiation probe.

In order to characterize the ventilation system, surveys were performed for fixed and removable radiological contamination. The HEPA pre-filters and 2-by-2-by-1-ft box-type HEPA filters were sampled as PSM and removed from the Building 2201 ventilation system (see Section 2.1.3). A thorough survey of the accessible areas of the HEPA ventilation system revealed that all HEPA banks/plenums in Rooms 102, 103, 104, 106, and 107 showed varying levels of removable and fixed alpha contamination. Table D.3-2 in Appendix D identifies the maximum contamination readings for each intake frame. As a result of the survey, the contamination on the frames was fixed in place (Figure 2-1). The filter banks in Room 103 and the basement are enclosed behind a set of double doors. The doors have been closed and sealed with radiological postings in place.

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Figure 2-1
Room 104 Intake Filter Frame with Pre-filters in Place (above) and Pre-filters Removed with Fixative Applied (below)

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2.1.2 Field Screening

Field screening for alpha and beta/gamma radiation was performed on soil samples at CAU 117 to support closure activities. Site-specific field-screening levels (FSLs) for alpha and beta/gamma radiation were defined as the mean background activity level plus two times the standard deviation of readings from 10 background locations selected near CAS 26-41-01. The radiation FSLs are instrument-specific and were established for each instrument before use. Alpha and beta/gamma radiation screening was performed using an NE Technology Electra fitted with a DP6BD dual-alpha and beta/gamma radiation probe.

2.1.3 Sample Collection

A total of 48 environmental soil samples were collected (including 4 field duplicates [FDs]), and a total of 6 PSM samples were collected (see Table D.3-1) during the investigation.

Decision I environmental sampling activities included the collection of surface and subsurface soil samples (Figure D.3-6). A total of 37 soil samples (including 3 FDs) were collected from 6 locations (AF01 through AF06) around Building 2201; 16 locations (AF07 through AF09, AF11 through AF14, AF20 and AF21, AF23 through AF27, and AF33 and AF34) on the south side of Building 2201; 3 locations (AF15 through AF17) from the service pit within the Cold Bay (Room 101); and 1 location (AF18) on the east side of Building 2201 near the entrance to the Main Disassembly Bay (Room 102).

Samples at locations AF01 through AF06 were collected based upon locations of roof drains, heavy traffic areas, and other potential likely sources of contamination. Samples at locations AF07 through AF09, AF11 through AF14, AF20 and AF21, AF23 through AF27, and AF33 and AF34 were collected to determine the extent of PCB-contaminated soil that was identified at location A06. Samples at locations AF15 through AF17 were selected based upon the historical use of the service pit located in Room 101. The service pit was used for maintenance and repair of railcars and locomotives during facility operations and had been backfilled with soil some time in the past. The sample at location AF18 was collected due to elevated radiation readings recorded during the site walkover survey. The sample was collected in a narrow utility trench between an area of asphalt and concrete.

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Six PSM samples were collected to determine whether wastes could be a potential source of contamination and release to environmental media. Media sampled included unknown solid material, solid filter materials, and solid absorbent material. Thirty-one drums that were located inside the wood shed contained an unknown white, powdery material from which a composite sample was collected (117AH501). Also located in the wood shed were box filters containing a yarn-like filter material from which a composite sample was collected (117AH502). Sample 117GF01 was collected from HEPA pre-filters located in the Room 103 filter bank, and samples 117AF01 and 117AF02 were collected from HEPA filters in the basement east and west filter banks, respectively. The HEPA filters were suspected to contain radiological contamination. Sample 117L003 was collected from sacks of an unknown mineral-like substance retrieved from the vault in Room 107. See Section D.4.0 for final disposition of wastes sampled for PSM purposes.

Samples of liquid, oil, paint, and various solid materials were collected at this CAS for the purpose of waste characterization and disposal determination. The analytical results for waste characterization samples are discussed in Section D.4.0.

Decision II sampling activities included the collection of 11 step-out surface and subsurface samples from two areas to define the lateral and vertical extent of PCB (see Figure D.3-10) and Ra-226 (see Figure D.3-11) soil contamination. Decision II samples were collected around the perimeter of the cooling tower to determine the lateral and vertical extent of PCB soil contamination identified at location AF06. Six surface samples (including one FD) from locations AF10, AF19, AF22, and AF32 define the lateral extent of PCB contamination, and four subsurface samples from locations AF28, AF29, AF30, and AF31 define the vertical extent of contamination to be approximately 5.0 to 5.5 ft below ground surface (bgs). A subsurface vertical step-out sample (117AF044) was also collected at location AF18 to define the vertical extent of radiologically contaminated (Ra-226) soil that was located in a narrow trench and bound laterally by asphalt and concrete.

2.1.4 Removal of Contaminated Soil

Collection of environmental soil samples identified PCB-soil contamination at the base of the cooling tower (maximum 8.3 milligrams per kilogram [mg/kg] total Aroclor) located on the southwest corner of Building 2201. Approximately 50 cubic yards (yd³) of soil was removed, and analytical results

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from final verification samples confirmed that all contamination was removed. The area was backfilled with native soil from the NTS.

An additional area of radiologically contaminated soil was identified during a site walkover survey. The area of elevated activity was located just outside the Main Assembly Bay (Room 102) and was confined to a small area of soil between the asphalt and concrete. Radiological results of a soil sample indicated the contamination was Ra-226 (maximum 245 picocuries per gram [pCi/g]). An area of the asphalt surface was scabbled and cleaned, and contaminated soil was removed to approximately 1 ft bgs. Analytical results from the verification sample confirmed the radioactive source and contaminated soil had been removed and the area was backfilled with native soil.

2.1.5 Removal of Potential Source Materials

Electrical and lighting components, and other building materials assumed to be PSM were removed from Building 2201, as practical, without sampling. These materials include:

- Mercury-containing switches, thermometers, and vapor light bulbs
- Fluorescent and sodium-vapor light bulbs
- Circuit boards
- PCB-containing ballasts and capacitors
- Leaded-glass windows and various lead shielding (e.g., plugs, bricks)
- Lead-acid batteries

See Section D.4.0 in Appendix D for details regarding removal activities, waste characterization, and final disposition of the removed materials.

Over 21,000 pounds (lb) of lead, primarily lead shield plugs, were removed from within the building. Three lead shield plugs approximately 6 inch (in.) diameter by 2 in. thick could not be removed from pass-throughs located in Rooms 102, 106, and 107. These three remaining plugs are not considered to be PSM because the concentration of lead in the soil, following degradation of the concrete building and release of the contaminant to the soil, would be less than the FAL (considering the mass of the lead divided by the mass of the building). Similarly, small quantities of other materials such as silver and lead solder in electrical components and lead in cast-iron pipe joints remain throughout Building 2201 and are also not considered to be PSM. The remaining lead plugs will be managed during the demolition of Building 2201 (anticipated in fiscal year 2010).

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Six leaded-glass observation windows were removed from the Main Disassembly Bay (Room 102) and the hot cells (Rooms 104, 106, and 107) in Building 2201. Because the windows were located more than 8 ft above the floor surface in these hot cells (designated as a contamination area), detailed radiological surveys were conducted before, during, and after the removal processes. While the glass material within the windows contains naturally occurring radioactive material, no contamination was found on these windows or on the cavities in which they were installed. The cavities that remained after the window removal were sealed with plastic sheets on the cold side, and radiological signs were posted to identify the existence of a contamination area on the other side of the wall penetration opening.

It should also be noted that remaining radiologically contaminated surfaces identified in Building 2201 (see Section D.3.1.2) were not considered to be PSM. Based upon the radiological data collected, a conservative analysis was performed using the Residual Radioactive computer code. The remaining contamination within the ventilation ducting and the hot cells (above 8 ft) was determined to contribute a dose of approximately 1-millirem per year (mrem/yr), which is significantly less than the 25-mrem/yr dose limit, and therefore these contaminated materials are not PSM.

2.1.6 Isolated and Sealed Utility Systems and Floor Drains

After tapping and draining activities, the utility systems were isolated and sealed with grout to prevent potential future migration of contaminants (Figure 2-2). Sealed features include surface and floor drains throughout the facility, drains located at the bottom of the bi-parting door pit (Figure 2-3), and penetrations in the hot cell vault lids.

2.1.7 Investigation of Underground Vaults

The Room 104 Hot and Warm Cell and the Room 106 Kilo-Curie Cell each contains one underground vault. Room 107 Hot Storage and Packaging Room contains two underground vaults. Each of these is 5 ft square and 10 ft deep, and constructed of high-density "barite" concrete (Figure 2-4). The vaults are covered with three 1-ft-thick high-density concrete lids for a total depth of 13 ft bgs (Figure 2-5).

Historical documentation indicates the vaults were used to store the uranium/beryllium fuel rods for the rocket motor reactor. Another report noted the vaults were used to store fuel elements and

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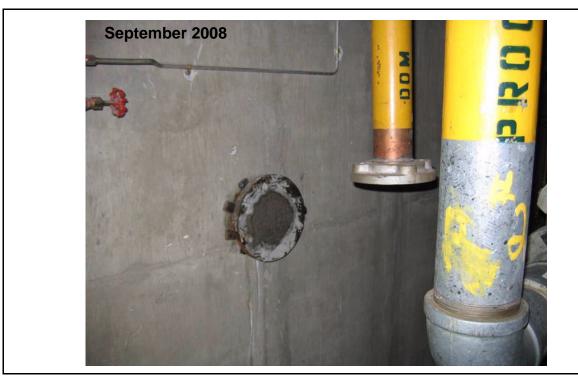


Figure 2-2
Grout Sealing of Water Supply Line



Figure 2-3
Grouting of Surface Drains at Bottom of Bi-Parting Door Pit

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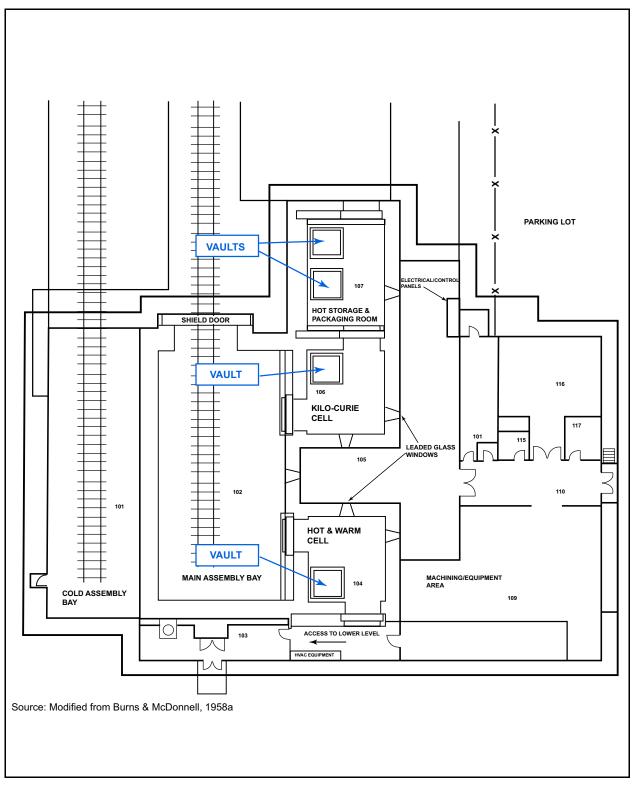


Figure 2-4
Building Vault Locations

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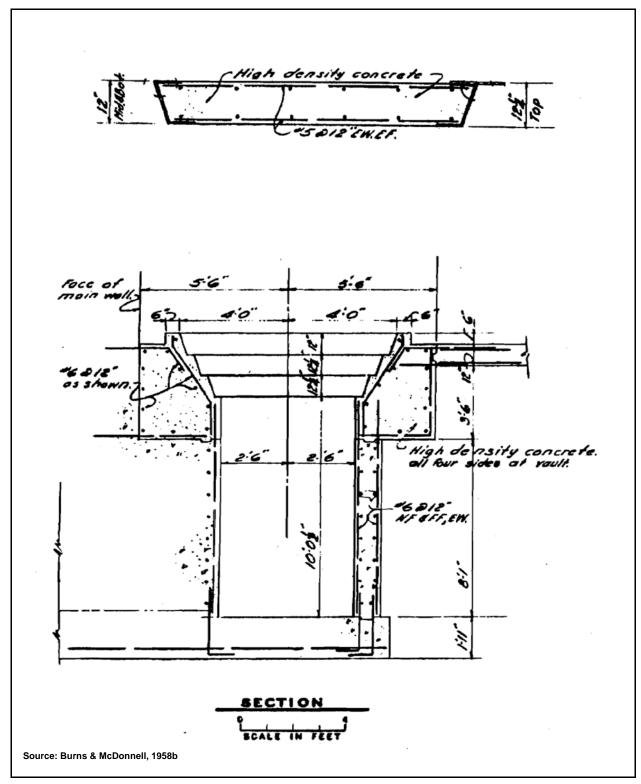


Figure 2-5
Section of Typical Vault Configuration at Building 2201

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classified core parts. When the Pluto program ended, fuel and core parts were packaged and shipped for reprocessing, and the facility was decontaminated. No other specific information was available regarding the status of the vaults (NNSA/NSO, 2007).

The vaults were investigated in order to determine whether any PSMs were contained inside. The investigation included core drilling a 4-in. diameter hole through the lids of each vault using a portable concrete core drill (Figure 2-6) and inserting field instrumentation and a video mole into each vault to determine whether PSM was present. The video survey revealed no breaches or residual materials in the vaults with the following exception: The video survey within the east vault in Room 107 identified several small paper sacks of a mineral-like substance. A sample (117L003) of the material was retrieved from the vault and submitted for analysis (see Section D.3.1.5). This material did not contain any hazardous constituents that would qualify it as PSM (see Table D.3-10 and Section D.3.2.8). A Ludlum 2221 scaler with 4421 and 4410 probes was lowered into the vault to monitor for potential radiological contamination. No radiological contamination was found, and



Figure 2-6
Core Drilling Operation

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all readings were indistinguishable from background levels. A Q-Rae+ Four Gas Meter, Model PGM 2000, was used to perform air monitoring within the underground vaults for worker safety and identification of potential contamination sources. All industrial hygiene monitoring levels were

normal (e.g., oxygen content, hydrogen sulfide, lower explosive limit [LEL], and carbon monoxide).

At completion of the investigation, the core holes in the lids were grouted to eliminate a migration

pathway into the vaults.

2.1.8 Best Management Practices

According to the CAU 117 SAFER Plan (NNSA/NSO, 2007), BMPs would be performed that would

place Building 2201 in a safe interim configuration for future demolition. The BMPs described

below were completed during the CAI but outside of the FFACO process.

2.1.8.1 Site Preparation

The following is a summary of site preparation activities that were completed before the CAI in order

to mitigate existing hazardous conditions and provide a safe and efficient working environment

within Building 2201.

Secure Bi-Parting Door

A large bi-parting shield door at the outside entrance to Room 102 is suspended and actuated by

opposing cables and two hydro-cylinders connected at the lower part of the door. The

counterbalanced shield sections are constructed of steel, filled with barite (barium) concrete, and

weigh approximately 160 tons each (Figure 2-7). The door opening is approximately 16 ft tall by

18 ft wide.

It was determined that the bi-parting door configuration was not in a safe configuration due to

weathering and aging of the steel support cables. A decision was made to install two steel columns

between the bi-parting sections (Figure 2-8) to prevent unplanned or inadvertent closure of the

door. Installation of the columns made the door safe for personnel and equipment entry should

the cables fail.

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Figure 2-7
Bi-Parting Shield Door at Entrance to Room 102



Figure 2-8
Installation of Steel Support Columns for Bi-Parting Door

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Clean up Potential Hantavirus

Potential Hantavirus-bearing rodent droppings were treated, removed, and disposed. Hantavirus

waste was surveyed and determined to be free of radiological contamination and was disposed

as industrial waste. Hantavirus cleanups were performed routinely throughout the performance

of fieldwork.

Perform Site Biological Survey

A pre-job biological survey of the site was performed, and the field survey identified the presence of

two bird nests in the basement of Building 2201. One nest was located directly above the roll-up door

and contained four eggs, and the other nest was located approximately 20 to 30 ft into the basement

on a pipe chase. The second nest contained two eggs. The birds were identified as Say's Phoebes,

which are protected under the Migratory Bird Treaty Act (USC, 2006). All workers at the site were

briefed of the presence of the nests, and the nesting areas were avoided during work activities. The

basement entry door was left open to allow movement of the birds in and out of the basement, until

the eggs hatched.

2.1.8.2 Removal of Readily Removable Wastes and Materials

Readily removable wastes are those wastes for which removal is practical, beneficial, and can be

performed without the need for special equipment. The purpose of this activity was also to remove

waste that could not be included with demolition waste from Building 2201 (i.e., it cannot be

disposed of at an industrial landfill). The following is a list of wastes that were removed from

Building 2201:

Unused asbestos-containing HEPA filters

A pre-filter frame located in Room 104

Abandoned HEPA vacuums located within the facility

Radiologically contaminated flooring materials

Abandoned excess chemicals (e.g., industrial cleaners, oxidizers, algicides) located

throughout the facility

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- Used lubricants, oils, detergents, and other fluids from various equipment/systems
- Mineral oil from shielding windows
- Domestic and process water

See Section D.4.0 in Appendix D for details regarding removal activities, waste characterization, and final disposition of the removed wastes.

During this phase of work, all utility systems within Building 2201 were opened, drained to the greatest extent possible, and verified empty (Figure 2-9). All equipment reservoirs including pumps, motors, overhead cranes, and manipulators were also drained. The water supply for Building 2201 was provided via the water tower located approximately 175 ft northeast of Building 2201. The water tower is approximately 100 ft tall with a capacity of 30,000 gallons (gal). The water tower provided a



Figure 2-9
Tapping and Draining Operation

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potable water supply to support facility operations. The main supply line to the building was

disconnected, and the water tower verified empty.

Nonhazardous electrical and lighting equipment (e.g., conduit, cables, wiring, fuse boxes, motors,

control panels, incandescent bulbs) within Building 2201 were surveyed and determined to meet

NV/YMP Radiological Control (RadCon) Manual Table 4-2 limits (NNSA/NSO, 2004) and Area 9

U10c Landfill acceptance criteria (NDEP, 2006). Therefore, the nonhazardous components were left

in place to be demolished with the building structure at a later date.

2.1.8.3 Asbestos Abatement

With the exception of the boiler located in the basement, and seven insulated pipe elbows remaining

in Rooms 101 and 103 (no photo available), all regulated friable ACM has been removed from the

facility (Figure 2-10). For safety/logistic reasons, the ACM on the five elbows in Room 103 and two

elbows in Room 101 will be removed before or during building demolition. The insulation around

the boiler is presumed asbestos-containing material (PACM) and will be removed during demolition

of the facility. It was determined that access and removal of the boiler and insulation would be more

efficient during facility demolition. Additionally, Category I/II nonfriable ACM (e.g., gaskets,

asphaltic roofing products) will remain in place within Building 2201 and be managed/disposed

during demolition.

See Section D.4.0 in Appendix D for details regarding waste characterization and final disposition of

asbestos-containing wastes.

2.1.8.4 Final Postings and Markings

A final walk-through of the facility was conducted to identify radiological posting requirements and

the need for any postings or markings for hazard communication. The survey identified the need for

Contamination Area postings in accordance with Table 2-2 of the NV/YMP Radiological Control

Manual (NNSA/NSO, 2004) in the Main Disassembly Bay (Room 102) and the hot cells (Rooms

104, 106, and 107).

Hazard communication warning postings were placed in Rooms 101 and 103 to identify areas with

potentially friable ACM, general warnings were placed at each entrance to Building 2201 for

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Figure 2-10
Typical Asbestos Removal at Pipe Elbows

potential nonfriable ACM hazards, and a hazard communication warning was placed at each window penetration in Room 105 to warn of a potential fall hazard.

2.2 Deviations from the CAU 117 SAFER Plan as Approved

Closure activities followed the approach specified in the CAU 117 SAFER Plan (NNSA/NSO, 2007), and there were no deviations.

2.3 Corrective Action Schedule as Completed

Closure activities were performed in the safest and most efficient manner possible. Sufficient flexibility was incorporated into the project schedule to account for minor difficulties (i.e., weather, equipment breakdown, resource issues, or equipment resources). Due to the cleanup of the PCB-contaminated soil in the vicinity of the cooling tower (southwest corner of Building 2201) and the extensive asbestos abatement activities within Building 2201, additional resources were mobilized to complete this scope of work. The extent of these activities was not anticipated;

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therefore, the duration of the fieldwork and field demobilization was extended 90 days. Table 2-3 presents a summary of the Corrective Action Schedule for the CAU 117 closure activities.

2.4 Site Plan/Survey Plat

No new construction was performed during closure activities at CAU 117. Additionally, there were no surface disturbing activities that significantly altered the grade or surface drainage patterns. Therefore, as-built drawings were not generated.

Table 2-3
Corrective Action Schedule for CAU 117

Date	Activity
04/22/2008 to 05/19/2008	Site Mobilization, Site Preparation Activities
05/19/2008 to 07/17/2008	Tapping and Draining Utility Systems and Equipment Reservoirs, Decision I Sampling
06/20/2009 to 07/28/2008	Vault Investigations
07/28/2008 to 08/27/2008	Leaded-Glass Shield Windows Removal
07/27/2008 to 10/01/2008	Hazardous Material Removal, Waste Management Sampling, Decision I and Decision II Sampling, PSM Sampling
12/08/2008 to 01/26/2009	Decision II Sampling, Soil Remediation
02/18/2009 to 03/12/2009	Placing of Final Postings and Markings, Demobilization

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3.0 Waste Disposition

This section summarizes the wastes and recyclable materials generated (including volume and mass) during SAFER Plan activities and their final disposition, as presented in Table 3-1. Waste streams included industrial waste, asbestos waste, used oil, *Resource Conservation and Recovery Act* (RCRA) hazardous waste, RCRA universal waste, PCB waste, low level radioactive waste (LLW), and reused/recycled wastes. All wastes and recyclable materials were managed in accordance with applicable state and federal regulations, DOE Orders, and the CAU 117 SAFER Plan (NNSA/NSO, 2007). The waste characterization data as well as details regarding the types, amounts, and disposition of these wastes are presented in Section D.4.0 in Appendix D.

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Table 3-1 CAU 117 Waste Streams and Disposal Pathways (Page 1 of 3)

Waste Item Description	Waste Characterization	Other	Container Number(s)	Container, Package Type	Waste Volume	Waste Weight (lb)	Disposal Pathway	Disposal Date	Disposal Doc ^a	
"Wood Shed Drums" - White Powder	Industrial Waste	N/A	117A01 - 117A31	Steel Drums	900 gal	4,960	Area 9, U10c	09/24/2008	LLVs	
Fuel Filters	Industrial Hydrocarbon	Hydrocarbon	117A32	Sanitary Roll-off	5 gal	10	Added to 117A92	12/11/2008	N/A	
Daily PPE, Trash, etc.	Industrial	N/A	117A34	Roll-off	30 yd ³	6,400	Area 9, U10c	10/14/2008	LLVs	
Daily FFE, Trasti, etc.	musmai	IN/A	117A92	Roll-off	30 yd ³	3,580	Alea 9, UTUC	04/28/2009	LLVS	
PCB Remediation -			117A104	End Dump	16 yd ³	41,720		12/09/2008		
Soil			117A105	End Dump	8 yd³	20,160		12/09/2008		
PCB Remediation - Concrete Pad	Industrial	N/A	117A106	Flatbed Truck	2.4 yd ³	9,460	Area 9, U10c	12/09/2008	LLVs	
PCB Remediation -				117A107	Roll-off	13 yd ³	31,960		01/22/2009	
Soil			117A109	End Dump	18 yd ³	44,640		01/13/2009		
Tap & Drain Liquids - Domestic Water	Industrial,	N/A	117A35 - 117A38, 117A40 - 117A53	55-gal Drums	812 gal	6,800	Area 23 Lagoon	BOL - Liquids, 12/11/2008 LLV - Empty Containers		
Tap & Drain Liquids - Process Water	Aqueous Liquids	N/A	117A55, 117A56, 117A73	55-gal Drums	82 gal	700	Alea 23 Lagoon			
Detergent	Industrial	N/A	117A39	N/A	1 qt	N/A	Sampled Away (Sample 117A502)	07/28/2008	N/A	
HEPA Filters, Unused	Industrial, Friable Asbestos	Friable Asbestos	117A71	3 Crates	4.3 yd ³	892	Area 23 Sanitary Landfill	12/17/2008	LLV	
			117A94	Roll-off	20 yd ³	4,000	Area 23 Sanitary Landfill	12/22/2008	LLVs, HAZTRAKs	
Asbestos Abatement Project Waste	Industrial, Friable Asbestos	Friable Asbestos	117A97 (117A54, 117A77, 117A78)	End Dump	17 yd ³	3,000		12/17/2008		
			N/A	Stakebed	100 ft ³	400		02/18/2009		

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Table 3-1 CAU 117 Waste Streams and Disposal Pathways (Page 2 of 3)

Waste Item Description	Waste Characterization	Other	Container Number(s)	Container, Package Type	Waste Volume	Waste Weight (lb)	Disposal Pathway	Disposal Date	Disposal Doc ^a
Waste Chemicals, Paint Can Contents	Hazardous	N/A	117A72	NSTec Lab Pack	8 gal	25	Area 5, HWSU	02/03/2009	MAN, RFS, HAZTRAK
Aqueous Liquid, with Cement Fines	Hazardous	N/A	117A79	Drum	15 gal	125	Area 5, HWSU	02/03/2009	MAN, RFS, HAZTRAK
Circuit Boards	Hazardous	N/A	117A93	Steel Drum	4 gal	5	Area 5, HWSU	02/03/2009	MAN, RFS, HAZTRAK
Contents of Vacuums #2 & #3	Hazardous	N/A	117A103	Drum	6 gal	10	Area 5, HWSU	02/03/2009	MAN, RFS, HAZTRAK
Mercury-Containing Items (thermostats, thermometers)	Hazardous	N/A	117A80	Steel Drum	6 gal	185	Area 5, HWSU	02/03/2009	MAN, RFS, HAZTRAK
PCB-Containing Ballasts, Small Capacitors	PCB	N/A	117A90, 117A91	Drum(s)	110 gal	710	Area 5, HWSU	02/03/2009	MAN, RFS, HAZTRAK
Leaking Small PCB-Containing Capacitor	PCB	N/A	117A74	Drum	1 gal	1	Area 5, HWSU	02/03/2009	MAN, RFS, HAZTRAK
Consolidated Oils, Tap & Drain	Used Oil	RCRA-exempt (Used Oil)	117A57	Drum	37 gal	335	Area 5 HWSU	02/03/2009	MAN, RFS, HAZTRAK
Room 103 HEPA Filters	Low-level Radioactive Asbestos	Friable Asbestos	117A99, 117A102 (117A58)	2 X B25	192 Ff	720	Area 5 RWMC	04/13/2009	HAZTRAK, CD
Metal Debris, HEPA Filter Frames	Low-level Radioactive	N/A	117A100, 117A101	2 X B25	192 ft ³	880	Area 5 RWMC	04/13/2009	HAZTRAK, CD
Control Room Window Mineral Oil	Used Oil	RCRA-exempt (Used Oil)	117A59-117A70	Drums	567 gal	4,400	Evergreen Environmental, Inc.	01/15/2009	UHWM, RFS

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Table 3-1 CAU 117 Waste Streams and Disposal Pathways

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Waste Item Description	Waste Characterization	Other	Container Number(s)	Container, Package Type	Waste Volume	Waste Weight (lb)	Disposal Pathway	Disposal Date	Disposal Doc ^a
Lead Plugs & Bricks, Unpainted	DOE/NRC Recycle (Subject to DOE Scrap	Waste Exempt (DOE/NRC	117A75	Pallets	2.2 yd ³	13,622	Toxco, Inc.	01/28/2009	Certificate of
Lead Plugs, Painted	Metal Recycle Moratorium)	Recycle)	117A81 - 117A89	Steel Drums	145 gal	7,535	Oak Ridge, TN	01/26/2009	Recycle
Computer Equipment	Property	Waste Exempt (Property)	117A76	Pallet	0.7 yd ³	200	NSTec Property Management	02/09/2009	Excess of Non-Accountable Inventory Form
Lamps - Fluorescent, Mercury Vapor, Sodium Vapor	RCRA Universal Waste (Recycle)	RCRA Universal Waste	117A95	Bulk	70 ft ³	100	Bldg 23-160 - Universal Waste Collection Center	01/12/2009	N/A
Compressed Gas Cylinder - Freon R-22	Industrial Waste	Waste Exempt (Property)	N/A	Cylinder	5 ft ³	N/A	NSTec Refrigeration Technicians	08/06/2008	N/A
Lead-Acid Batteries	RCRA Universal Waste (Recycle)	RCRA Universal Waste	117A96	Drum/Carton	1 ft ³	40	NSTec Motor Pool - Recycle	10/28/2008	N/A
Control Room Windows	Property-Salvage	Waste Exempt (Property)	N/A	Palletize (Wrap)	288 ft ³	68,000	Fermi National Accelerator Labs	10/29/2008	N/A

^aCopies of waste disposal documents are located in Appendix E of this document: BOL = Bill of Lading; CD = Certificate of Disposal; HAZTRAK = NSTec Hazardous Materials Notification System, NTS On-Site HazMat Transfer - Published shipping paper; LLV = NTS Landfill Load Verification form (NSTec Form FRM-0918); MAN = NSTec Onsite Waste Transport Manifest (NSTec Form FRM-0266); RFS = NSTec WGS/Hazardous Waste Operations Request for Service Form FRM-0766; UHWM = Uniform Hazardous Waste Manifest, EPA Form 8700-22

EPA = U.S. Environmental Protection Agency ft³ = Cubic foot HWSU = Hazardous Waste Storage Unit N/A = Not applicable NRC = U.S. Nuclear Regulatory Commission NSTec = National Security Technologies, LLC
PPE = Personal protective equipment
qt = Quart
RWMC = Radioactive Waste Management Complex

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4.0 Closure Verification Results

Closure verification consists of the analytical results from environmental samples that demonstrate that closure objectives were met. For the corrective action of clean closure, verification results demonstrate that COCs no longer exist within the CAS.

The CAU 117 SAFER Plan (NNSA/NSO, 2007) identified the type, quality, and quantity of data needed to resolve the DQO decision statements. To verify that the dataset obtained as a result of this investigation supports the DQO decisions, a DQA, was conducted. Section 4.1 provides a summary of the DQA, and Section 4.2 summarizes the closure recommendation for CAS 26-41-01.

A summary of verification data from the closure activities as detailed in Appendix D is provided in this section. The CAU 117 sampling locations were accessible, and sampling activities at planned locations were not restricted by buildings, storage areas, active operations, or aboveground and underground utilities. Environmental sampling within CAS 26-41-01 identified two areas with soil contamination exceeding preliminary action levels (PALs). The two areas are summarized below.

Radium-226 was detected in concentrations above the PAL in a soil sample (117AF028) collected at location AF18, which is near the entrance to the Main Assembly Bay (Room 102). The contamination was originally detected during a walkover survey using radiological field detection instrumentation (Electra). The asphalt surface was scabbled off, and the soil was removed to a depth of approximately 1 ft bgs. A subsurface vertical step-out (Decision II) sample (117AF044) was collected from 1.0 to 1.5 ft bgs at location AF18 and defines the vertical extent of radiologically contaminated soil, as Ra-226 activities were less than the PAL. The removed contaminated soil was located in a narrow trench and is bound laterally by asphalt and concrete. The area was backfilled with native soil.

Total Aroclor was detected above the PAL in soil samples (117AF013 and FD 117AF014) collected at location A06 near the southwest corner of Building 2201, adjacent to the small cooling tower. Decision II sampling activities included the collection of step-out surface and subsurface samples around the perimeter of the cooling tower, and to the south around the electrical substation to determine the lateral and vertical extent of PCB soil contamination. Approximately 50 yd³ of soil

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was removed to a depth of approximately 5 ft bgs, and the area was backfilled with native soil. Surface samples from locations AF10, AF19, AF22, and AF32 define the lateral extent of PCB contamination, and subsurface samples from locations AF28, AF29, AF30, and AF31 define the vertical extent of contamination to be approximately 5.0 to 5.5 ft bgs, as these verification samples confirmed total Aroclor concentrations were less than the PAL. See Figures D.3-6 and D.3-10 for Decision I and Decision II sample locations, respectively.

4.1 Data Quality Assessment

The DQA process is the scientific evaluation of the actual investigation results to determine whether the DQO criteria established in the CAU 117 SAFER Plan (NNSA/NSO, 2007) were met and whether DQO decisions can be resolved at the desired level of confidence. The DQO process ensures that the right type, quality, and quantity of data will be available to support the resolution of those decisions at an appropriate level of confidence. Using both the DQO and DQA processes help to ensure that DQO decisions are sound and defensible.

The DQA involves five steps that begin with a review of the DQOs and end with an answer to the DQO decisions. The five steps are briefly summarized as follows:

Step 1: Review DQOs and Sampling Design – Review the DQO process to provide context for analyzing the data. State the primary statistical hypotheses; confirm the limits on decision errors for committing false negative (Type I) or false positive (Type II) decision errors; and review any special features, potential problems, or any deviations to the sampling design.

Step 2: Conduct a Preliminary Data Review – A preliminary data review should be performed by reviewing quality assurance (QA) reports and inspecting the data both numerically and graphically, validating and verifying the data to ensure that the measurement systems performed in accordance with the criteria specified, and using the validated dataset to determine whether the quality of the data is satisfactory.

Step 3: Select the Test – Select the test based on the population of interest, population parameter, and hypotheses. Identify the key underlying assumptions that could cause a change in one of the DQO decisions.

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Step 4: Verify the Assumptions – Perform tests of assumptions. If data are missing or censored,

determine the impact on DQO decision error.

Step 5: Draw Conclusions from the Data – Perform the calculations required for the test.

4.1.1 Review DQOs and Sampling Design (Step 1)

This section contains a review of the DQO process presented in Appendix A. The DQO decisions are

presented with the DQO provisions to limit false negative or false positive decision errors. Special

features, potential problems, or any deviations to the sampling design are also presented.

4.1.1.1 Decision I

The Decision I statement as presented in the CAU 117 SAFER Plan is: "Is any COC present in

environmental media within the CAS, or does PSM exist that, if released, could cause a COC in

environmental media?"

Decision I Rules:

• If COC contamination is inconsistent with the CSM or extends beyond the spatial boundaries,

then work will be suspended and the investigation strategy will be reconsidered, else the

decision will be to continue sampling to define the extent.

• If contaminant concentrations in remaining environmental media exceed FALs, that

contaminant is identified as a COC.

• If source material is present that, if released, has the potential to cause future contamination of

site environmental media, then a corrective action is required.

If no COCs or PSM remain after SAFER Plan activities, a corrective action alternative of no

further action will be selected (pending demolition of Building 2201).

• If COCs or PSM remain at the CAS after SAFER Plan activities, a corrective action

alternative of closure in place with use restrictions will be implemented, and Decision II will

be resolved.

<u>Population Parameter:</u> For judgmental sampling results, the population parameter is the maximum

observed sample result from each individual sample. Each sample result will be compared to the

FALs to determine the appropriate resolution to Decision I and Decision II. For Decision I, a single

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sample result for any contaminant exceeding a FAL would cause a determination that a COC is

present within the CAS.

4.1.1.1.1 DQO Provisions To Limit False Negative Decision Error

A false negative decision error (where consequences are more severe) was controlled by meeting the

following criteria:

1. Having a high degree of confidence that locations selected will identify COCs if present

anywhere within the CAS.

2. Having a high degree of confidence that analyses conducted will be sufficient to detect any COCs

present in the samples at an acceptable level of sensitivity.

3. Having a high degree of confidence that the dataset is of sufficient quality and completeness.

Criterion 1:

To satisfy the first criterion, Decision I samples were collected in areas most likely to be

contaminated by COCs. Sample locations were selected using acceptable knowledge based on:

Source and location of a potential release

Biasing factors such as locations of areas of elevated radioactivity

• Biasing factors such as locations of roof drains, heavy traffic areas, and other potential likely

sources of contamination

Wastes that could be a potential source of contamination and release to environmental media

Criterion 2:

All samples were submitted and analyzed using the analytical methods listed in Tables 3-3 and 3-4 of

the SAFER Plan and for the chemical and radiological parameters listed in Section B.2.2.2 of the

SAFER Plan (NNSA/NSO, 2007).

Sample results were assessed against the acceptance criterion for the DQI of sensitivity as defined in

the Industrial Sites QAPP (NNSA/NV, 2002). The sensitivity acceptance criterion defined in the

CAU 117 SAFER Plan is that analytical detection limits will be less than the corresponding action

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level. The sensitivity criterion was not achieved for Aroclor 1254 (Table 4-1), although the result was considered nondetected. The Aroclor 1254 result for sample 117AF017 was not used in making DQO decisions, and this result is considered rejected data. Because the Aroclor 1248 result for sample 117AF017 exceeded the FAL at the same sample location, there is no adverse effect on the DQO decisions.

Table 4-1
Analytes Failing Sensitivity Criteria

Sample	Analyte	Result	MDC	FAL	
Number		(mg/kg)	(mg/kg)	(mg/kg)	
117AF017	Aroclor 1254	1.120 (U)	1.120	0.740	

MDC = Minimum detectable concentration

U = Not detected

Criterion 3:

To satisfy the third criterion, the entire dataset, as well as individual sample results, were assessed against the acceptance criteria for the DQIs of precision, accuracy, representativeness, completeness, and comparability, as defined in the Industrial Sites QAPP (NNSA/NV, 2002). The DQI acceptance criteria are presented in Table 7-1 of the SAFER Plan (NNSA/NSO, 2007). As presented in Tables 4-2 and 4-3, these criteria were met for each of the DQIs.

Precision

The analytical criteria for precision is evaluated using the relative percent difference (RPD), absolute difference, or normalized difference. For the purpose of determining the data precision of chemical analyses, either the RPD between duplicate analyses or the absolute difference (concentrations less than five times their reporting limit) was calculated. For radionuclides, the RPD was not calculated unless both the sample and its duplicate had concentrations of the target radionuclide exceeding five times their MDC. Otherwise radionuclide duplicate results were evaluated using the normalized difference. Table 4-2 provides the chemical and radiological precision analysis results for all contaminants that were qualified for precision. The chemical contaminants qualified for precision were arsenic, barium, chromium, lead, and selenium. The only radionuclides qualified for precision were lead (Pb)-214 and U-234.

Table 4-2 Precision Measurements

Analyte	Number of Measurements Qualified	Number of Measurements Performed	Percent within Criteria
Arsenic	2	11	81.8
Barium	2	11	81.8
Chromium	2	11	81.8
Lead	2	11	81.8
Selenium	7	11	36.4
Pb-214	3	13	76.9
U-234	3	12	75

Table 4-3 Accuracy Measurements

Analyte	Number of Measurements Qualified	Number of Measurements Performed	Percent within Criteria
Aroclor 1221	1	46	97.8
Aroclor 1232	1	46	97.8
Aroclor 1242	1	46	97.8
Aroclor 1248	1	46	97.8
Aroclor 1254	1	46	97.8
Aroclor 1260	1	46	97.8
Aroclor 1268	1	46	97.8
PCBs (low risk)	1	46	97.8
TPH-DRO	1	11	90.9
Barium	2	11	81.8
Chromium	2	11	81.8
Lead	2	11	81.8

DRO = Diesel-range organics TPH = Total petroleum hydrocarbons

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As shown in Table 4-2, the precision for three Pb-214 and three U-234 measurements did not meet the acceptance criterion of 80 percent. Although the six measurements exceeded criteria, they agreed within their associated uncertainties. Sample concentrations were substantially less than PALs and in the range of expected ambient concentrations. As a result, the high RPDs are not a concern with regards to DQO decision making. Additionally, the precision for seven selenium measurements did not meet the acceptance criterion of 80 percent, but there is negligible potential for a false negative DQO decision error because the highest reported selenium result was substantially less than the FAL. The highest reported selenium concentration (8.5 mg/kg) is approximately 1/17th the FAL of 5,100 mg/kg. Therefore, the selenium results that were qualified for reasons of precision can be confidently used to support DQO decisions. As the precision for all other constituents met the acceptance criteria for precision, the dataset is determined to be acceptable for the DQI of precision.

Accuracy

For the purpose of determining data accuracy of sample analyses, environmental soil samples were evaluated and incorporated into the accuracy calculation. The results qualified for accuracy were associated with matrix spike (MS) recoveries that were outside control limits and could potentially be reported at concentrations lower or higher than actual concentrations. Table 4-3 provides the chemical accuracy analysis results for all contaminants qualified for accuracy. Accuracy rates met the CAU 117 SAFER Plan criterion of 80 percent. There were no radiological data qualified for accuracy.

Representativeness

The DQO process as identified in Appendix A was used to address sampling and analytical requirements for CAU 117. During this process, appropriate locations were selected that enabled the samples collected to be representative of the population parameters identified in the DQO (the most likely locations to contain contamination and locations that bound COCs). The sampling locations identified in the Criterion 1 discussion meet this criterion. Therefore, the analytical data acquired during the CAU 117 closure activities are considered representative of the population parameters.

Completeness

The CAU 117 SAFER Plan (NNSA/NSO, 2007) defines acceptable criteria for completeness to be 80 percent of CAS-specific nontarget contaminants identified in the SAFER Plan having valid results

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and 100 percent of target contaminants (including Decision II samples) having valid results. Also,

the dataset must be sufficiently complete to be able to support the DQO decisions. There were no

data rejected during the validation process although one PCB sample failed the sensitivity criterion.

It was determined that the failure of the Aroclor 1254 did not adversely impact the DQO decisions.

Therefore the DQIs for completeness have been met.

Comparability

Field sampling, as described in the CAU 117 SAFER Plan (NNSA/NSO, 2007), was performed and

documented in accordance with approved procedures that are in conformance with standard industry

practices. Analytical methods and procedures approved by DOE were used to analyze, report, and

validate the data. These methods and procedures are in conformance with applicable methods used in

industry and government practices. Therefore, project datasets are considered comparable to other

datasets generated using standard industry procedures, thereby meeting DQO requirements.

4.1.1.1.2 DQO Provisions To Limit False Positive Decision Error

The false positive decision error was controlled by assessing the potential for false positive analytical

results. Quality assurance/QC samples such as field blanks, trip blanks, laboratory control samples

(LCSs), and method blanks were used to determine whether a false positive analytical result may

have occurred. This provision is evaluated during the validation process and appropriate qualifiers

are added to the data when applicable.

Proper decontamination of sampling equipment and the use of certified clean sampling equipment

and containers also minimized the potential for cross contamination that could lead to a false positive

analytical result.

4.1.1.2 Decision II

The Decision II statement as presented in the CAU 117 SAFER Plan is: "Is sufficient information

available to meet the closure objectives?"

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Decision Rules:

- If COC contamination is inconsistent with the CSM or extends beyond the spatial boundaries, then work will be suspended and the investigation strategy will be reconsidered, else the decision will be to continue sampling to define the extent.
- If a COC is detected through Decision I sampling, additional samples will be collected to determine the extent of contamination.
- If sufficient information is available to define the extent of COC contamination and confirm that closure objectives were met, no further assessment of the CAS is required.
- If sufficient information is not available to define the extent of contamination or confirm that closure objectives were met, then additional samples will be collected until the extent is defined.
- If the waste types, volumes, or costs of remaining demolition waste streams cannot be estimated, additional sampling and/or surveys will be performed.

<u>Population Parameter:</u> The Decision II population parameter is an individual analytical result from a bounding sample. For Decision II, a single bounding sample result for any contaminant exceeding a FAL would cause a determination that the contamination is not bounded.

4.1.1.2.1 DQO Provisions To Limit False Negative Decision Error

A false negative decision error (where consequences are more severe) is controlled by meeting the following criteria:

- 1. Having a high degree of confidence that the sample locations selected will identify the extent of the COCs.
- 2. Having a high degree of confidence that analyses conducted will be sufficient to detect any COCs present in the samples at an acceptable level of sensitivity.
- 3. Having a high degree of confidence that the dataset is of sufficient quality and completeness.
- 4. Having a high degree of confidence that the potential waste streams are characterized.

Criterion 1:

An area walkover survey using field radiological detection instrumentation, and a judgmental sampling scheme were used to determine sample locations for environmental soil samples within

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CAS 26-41-01. Two areas were identified as requiring additional delineation of COCs (Ra-226 and

PCBs). A small area located just outside the entrance to the Main Assembly Bay (Room 102),

located on the east side of Building 2201 was identified because it exceeded radiological FSLs. The

second area was identified due to concentrations of PCBs in the surface soil exceeding the PAL.

For both areas where COCs were detected, the analytical results of the Decision II samples verified

that the concentrations were below the FALs, and it was determined that the vertical and lateral extent

of COCs were defined.

Criterion 2:

All samples were analyzed for the COCs present at the corresponding CAS:

• Polychlorinated biphenyls and Ra-226 were identified as COCs at CAS 26-41-01.

The second criterion for extent was accomplished for all analyses as demonstrated in Table 4-1.

While sensitivity was not met for Aroclor 1254, Aroclor 1248 did meet the sensitivity requirement.

Aroclor 1248 is the driving COC associated with PCB soil contamination on the south side of

Building 2201.

Criterion 3:

To satisfy the third criterion for extent, the entire dataset, as well as individual sample results, were

assessed against the DQIs of precision, accuracy, representativeness, comparability, and

completeness, as defined in the Industrial Sites QAPP (NNSA/NV, 2002). The DQI discussion is

presented under Criterion 3 for Decision I.

4.1.1.2.2 DQO Provisions To Limit False Positive Decision Error

The false positive decision error was controlled by assessing the potential for false positive

analytical results. Quality assurance/QC samples such as field blanks, trip blanks, LCSs, and method

blanks were used to determine whether a false positive analytical result may have occurred. This

provision is evaluated during the validation process and appropriate qualifiers are added to the data

when applicable.

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Proper decontamination of sampling equipment, and the use of certified clean sampling equipment and containers also minimized the potential for cross contamination that could lead to a false positive analytical result.

4.1.1.3 Sampling Design

The SAFER Plan made the following commitments for sampling:

- 1. Biased (judgmental) soil samples will be collected adjacent to Building 2201 if it is determined that a pathway to soil exists. Locations for samples will be chosen based on process knowledge, visual inspection of the site, and biasing factors (e.g., soil staining, elevated radioactivity).
 - Result: Soil samples were collected at biased locations based on the presence of elevated radioactivity, the presence of a service pit backfilled with soil, and identified pathways from Building 2201 to the soil such as the locations of roof drains and heavy traffic areas.
- 2. Building media samples and radiological smears/surveys will be collected to obtain information for estimating demolition waste types, volumes, and costs. This will include surveys (fixed and removable) of Building 2201 surfaces for radiological contamination and beryllium, and sampling for ACM such as roofing material, acoustical ceiling tiles, asphalt floor tiles, piping and tank insulation, or other suspected materials.
 - Result: Building 2201 media samples including paint chips, filter media, asbestos, and beryllium were collected and analyzed. Radiological surveys of the interior surfaces and the exterior area of Building 2201 were completed. All analytical data exists in the Stoller-Navarro Joint Venture (SNJV) Analytical Services and Industrial Hygiene databases, and are available upon request.

4.1.2 Conduct a Preliminary Data Review (Step 2)

A preliminary data review was conducted by reviewing QA reports and inspecting the data. The contract analytical laboratories generate a QA nonconformance report when data quality does not meet contractual requirements. All data received from the analytical laboratories met contractual requirements, and a QA nonconformance report was not generated. Data were validated and verified to ensure that the measurement systems performed in accordance with the criteria specified. The validated dataset quality was found to be satisfactory.

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4.1.3 Select the Test and Identify Key Assumptions (Step 3)

The test for resolving DQO Decision I for the judgmental sampling design was the comparison of the maximum analyte result from CAS 26-41-01 to the corresponding FAL. The test for making DQO Decision II was the comparison of all COC analyte results from each bounding sample to the corresponding FALs.

The key assumptions that could impact a DQO decision are listed in Table 4-4.

4.1.4 Verify the Assumptions (Step 4)

The results of the investigation support the key assumptions identified in the CAU 117 DQOs and Table 4-4.

4.1.4.1 Other DQO Commitments

The SAFER Plan made the following commitments for sampling:

1. Decision II sampling will consist of defining the extent of contamination where COCs have been confirmed at the Decision I locations. If COCs in adjacent soils are not detected, then no further action is required. If a COC is detected in soil, then additional sampling will be conducted to determine the extent of COC contamination. If the extent of the contamination is defined and additional remediation is feasible, then contaminated media will be removed. If the extent of contamination has been determined and additional remediation is not feasible, then the extent of contamination will be defined and the planned use restriction will be extended to include the contaminated area.

Results: The Decision I sampling of the soil at the base of the cooling tower confirmed the presence of total Aroclor (PCBs) above the PAL. Removal of approximately 50 yd³ of soil remediated the COC contamination. Decision II sampling was performed to define both the vertical and lateral extent of COC contamination. Samples to bound the vertical extent of PCB contamination were collected in the subsurface below the former location of the concrete pad for the cooling tower. Samples to bound the lateral extent of COC contamination were collected around the perimeter of the excavation. Decision II sample results demonstrated that COC contamination was bound laterally and vertically, by sample results that were less than the PALs.

Decision I soil sampling and radiological field screening instrumentation identified the presence of Ra-226 in soil above the PAL near the entrance to Room 102. Removal of approximately 1 ft³ of soil and some asphalt surface remediated the COC contamination. Decision II sampling confirmed COC contamination was bound by sample results that were less than the PALs.

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Table 4-4 Key Assumptions

Exposure Scenario	Site workers are only exposed to COCs through oral ingestion, inhalation, external exposure to radiation, or dermal contact (by absorption) of COCs absorbed onto the soils. Exposure to contamination is limited to site workers, construction/remediation workers, and military personnel conducting training. The investigation results did not reveal any potential exposures other than those identified in the CSM.
Affected Media	Surface soil, shallow subsurface soil, and potentially perched (shallow) groundwater. Deep groundwater contamination is not a concern. Contaminants migrating to regional aquifers are not considered. The investigation results did not reveal any affected media other than those identified in the
	CSM.
Location of	Release points are those identified in the CAU 117 SAFER Plan.
Contamination/ Release Points	The investigation results indicated additional sources for PCB and Ra-226 contamination other than those identified in the SAFER Plan.
Transport	Surface transport may occur as a result of a spill or storm water runoff. Surface transport beyond shallow substrate is not a concern.
Mechanisms	The investigation results did not reveal any transport mechanisms other than those identified in the CSM.
Preferential	None.
Pathways	The investigation results did not reveal any preferential pathways.
Lateral and Vertical Extent of	Subsurface contamination, if present, is contiguous and decreases with distance and depth from the source. Surface contamination may occur laterally as a result of a spill or storm water runoff. The area of contamination is contiguous. The extent of COC concentration decreases away from the area of contamination.
Contamination	The investigation results did not reveal any lateral and vertical extent of contamination other than those identified in the CSM, and PCB and Ra-226 contamination potentially from historical spills or releases to the environment. Lateral and vertical extent was defined by confirmation sampling. Concentration of the COC decreased with lateral and vertical extent.
Groundwater	None.
Impacts	The investigation results did not reveal any indicators that groundwater could be potentially impacted.
Future Land Use	Nonresidential.
i uture Lanu USE	The investigation results did not reveal any future land uses other than nonresidential.
Other DQO Assumptions	Contamination may be present in the soils adjacent to a feature due to runoff or intended use (e.g., decontamination pad).
Assumptions	All detected contaminants were adjacent to features and decreased with distance.

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4.1.5 Draw Conclusions from the Data

This section resolves the two DQO decisions for CAS 26-41-01.

4.1.5.1 Decision Rules for Decision I

Decision Rule: If the concentration of any COPC in a target population exceeds the FAL for that

COPC during the initial investigation, then that COPC is identified as a COC and Decision II

sampling will be conducted.

<u>Result</u>: The following COCs were identified at CAS 26-41-01 as a result of Decision I sampling:

• Polychlorinated biphenyls and Ra-226 were identified as COCs at CAS 26-41-01.

4.1.5.2 Decision Rules for Decision II

<u>Decision Rule</u>: If the observed concentration of any COC in a Decision II sample exceeds the PALs,

then additional samples will be collected to complete the determination of the extent.

<u>Result</u>: Decision II sampling activities included the collection of step-out surface and subsurface

samples around the perimeter of the cooling tower, and to the south around the electrical substation to

determine the lateral and vertical extent of PCB soil contamination. Surface samples from locations

AF10, AF19, AF22, and AF32 define the lateral extent of PCB contamination, and subsurface

samples from locations AF28, AF29, AF30, and AF31 define the vertical extent of contamination, to

be approximately 5.0 ft bgs, as these verification samples confirmed total Aroclor concentrations

were less than the PAL. A subsurface vertical step-out sample (117AF044) was also collected from

1.0 to 1.5 ft bgs at location AF18 and defines the vertical extent of radiologically contaminated soil,

as Ra-226 activities were less than the PAL.

<u>Decision Rule</u>: If all observed COC population parameters are less than the PALs, then the decision

will be that the extent of contamination has been defined in the lateral and/or vertical direction.

Result: Decision II verification sampling confirmed removal of COCs to less than PALs. The

vertical and lateral extent of contamination at CAS 26-41-01 was defined.

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4.2 Use Restrictions

Analytes detected in soil above FALs and PSM identified during the CAI were removed under a corrective action of clean closure at CAS 26-41-01. Therefore, no further corrective actions are necessary, and no use restrictions were implemented.

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5.0 Conclusions and Recommendations

Based on the results of the corrective action of clean closure, no further corrective actions are necessary for CAU 117.

The DOE, National Nuclear Security Administration Nevada Site Office (NNSA/NSO) provides the following recommendations:

- No additional corrective actions are required at CAS 26-41-01. Clean closure of CAS 26-41-01 is warranted based upon the completed corrective actions to remove the COCs of PCBs and Ra-226, and the removal of identified PSM.
- A Notice of Completion is requested from NDEP for the closure of CAU 117.
- Corrective Action Unit 117 should be moved from Appendix III to Appendix IV of the FFACO.

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Appendix A

Data Quality Objectives as Developed in the CAU 117 SAFER Plan

Note: This appendix contains the DQOs presented in CAU 117 SAFER Plan and consists of Appendix B of the SAFER Plan. Therefore, all cross-references, page numbers, and header information in this appendix refer to the original document.

A.1.0 Introduction

The DQO process described in this appendix is a seven-step strategic systematic planning method used to plan data collection activities and define performance criteria for the CAU 117, Pluto Disassembly Facility, field investigation. The DQOs are designed to ensure that the data collected will provide sufficient and reliable information to determine the appropriate corrective actions, verify the adequacy of existing information, provide sufficient data to implement the corrective actions, and verify that closure was achieved.

The CAU 117 investigation will be based on the DQOs presented in this appendix as developed by representatives of the NDEP and the NNSA/NSO. The seven steps of the DQO process presented in Sections A.2.0 through A.8.0 were developed in accordance with *EPA Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA, 2006) and the CAS-specific information presented in Section A.2.0.

The DQO process presents a judgmental sampling approach. In general, the procedures used in the DQO process provide:

- A method to establish performance or acceptance criteria, which serve as the basis for
 designing a plan for collecting data of sufficient quality and quantity to support the goals of a
 study.
- Criteria that will be used to establish the final data collection design such as:
 - the nature of the problem that has initiated the study and a conceptual model of the hazards to be investigated
 - the decisions or estimates that need to be made and the order of priority for resolving them
 - the type of data needed
 - an analytic approach or decision rule that defines the logic for how the data will be used to draw conclusions from the study findings
- Acceptable quantitative criteria on the quality and quantity of the data to be collected, relative to the ultimate use of the data.
- A data collection design that will generate data meeting the quantitative and qualitative criteria specified. A data collection design specifies the type, number, location, and physical quantity of samples and data, as well as the QA and QC activities that will ensure that sampling design and measurement errors are managed sufficiently to meet the performance or acceptance criteria specified in the DQOs.

A.2.0 Step 1 - State the Problem

Step 1 of the DQO process defines the problem that requires study, identifies the planning team, and develops a conceptual model of the environmental hazard to be investigated.

The problem statement for the CAU 117 CAS is: "Existing information on the nature and extent of potential contamination is insufficient to evaluate and confirm closure of CAS 26-41-01 in CAU 117."

A.2.1 Planning Team Members

The DQO planning team consists of representatives from NDEP, NNSA/NSO, SNJV, and National Security Technologies, LLC (NSTec). The DQO planning team met on June 27, 2007, for the DQO meeting. The primary decision-makers are the NDEP and NNSA/NSO representatives.

A.2.2 Conceptual Site Model

The CSM is used to organize and communicate information about site characteristics. It reflects the best interpretation of available information at any point in time. The CSM is a primary vehicle for communicating assumptions about release mechanisms, potential migration pathways, or specific constraints. It provides a summary of how and where contaminants are expected to move and what impacts such movement may have. It is the basis for assessing how contaminants could reach receptors both in the present and future. The CSM describes the most probable scenario for current conditions at the site and defines the assumptions that are the basis for identifying appropriate sampling strategy and data collection methods. Accurate CSMs are important as they serve as the basis for all subsequent inputs and decisions throughout the DQO process.

The CSM was developed for CAU 117 using information from the physical setting, potential contaminant sources, release information, historical background information, knowledge from similar sites, site walk-downs, site investigation data, and physical and chemical properties of the potentially affected media and COPCs.

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The CSM consists of:

- Potential contaminant releases including media subsequently affected.
- Release mechanisms (the conditions associated with the release).
- Potential contaminant source characteristics including contaminants suspected to be present and contaminant-specific properties.
- Site characteristics including physical, topographical, and meteorological information.
- Migration pathways and transport mechanisms that describe the potential for migration and where the contamination may be transported.
- The locations of points of exposure where individuals or populations may come in contact with a COC associated with a CAS.
- Routes of exposure where contaminants may enter the receptor.

If additional elements are identified during the investigation that are outside the scope of the CSM, the situation will be reviewed and a recommendation will be made as to how to proceed. In such cases, NDEP and NNSA/NSO will be notified and given the opportunity to comment on, and concur with, the recommendation.

The applicability of the CSM to CAS 26-41-01 is summarized in Table A.2-1 and discussed below. Table A.2-1 provides information on CSM elements that will be used throughout the remaining steps of the DQO process. Figure A.2-1 represents site conditions applicable to the CSM.

A.2.2.1 Contaminant Release

The most likely location for potential contaminant releases to the environment are the soils directly below or adjacent to the CSM's surface and subsurface components (i.e., Building 2201, the Building 2201 basement, drains/piping stemming from Building 2201, and the wood shed). The CSM accounts for potential releases resulting from overflow or leaking of system components present at the ground surface (e.g., drains and piping) and surface spills. If present, contaminant concentrations in soil are expected to decrease with horizontal and vertical distance from the source. Sources for potential contamination include hazardous and radiological contaminants related to Project Pluto, fuel repackaging operations, and classified experiments conducted at Building 2201.

Table A.2-1
Conceptual Site Model Description of Elements for CAU 117, CAS 26-41-01

CAS Identifier	26-41-01
CAS Description	Pluto Disassembly Facility
Site Status	Site is inactive and/or abandoned
Exposure Scenario	Occasional Use
Sources of Potential Soil Contamination	Releases from activities conducted within Building 2201, releases from hazardous/radioactive materials stored in Building 2201, potential future releases from hazardous/radioactive waste currently in Building 2201, potential future releases from wastes currently stored in the wood shed
Location of Contamination/ Release Point	Exterior of Building 2201, facility water tower, and/or the wood shed
Amount Released	Unknown
Affected Media	Surface and shallow subsurface soil
Potential Contaminants	Polychlorinated biphenyls, hydrocarbons, RCRA metals, beryllium, radionuclides, volatile organic compounds, semivolatile organic compounds
Transport Mechanisms	Percolation of precipitation through subsurface media serves as the major driving force for migration of contaminants. Surface water runoff may provide for the transportation of some contaminants within or outside of the footprint of the CAS.
Migration Pathways	Vertical transport expected to dominate over lateral transport due to small surface gradients.
Lateral and Vertical Extent of Contamination	Contamination, if present, is expected to be contiguous to the release points. Concentrations are expected to decrease with distance and depth from the source. Groundwater contamination is not expected. Lateral and vertical extent of COC contamination is assumed to be within the spatial boundaries.
Exposure Pathways	The potential for contamination exposure is limited to industrial and construction workers, and military personnel conducting training. These human receptors may be exposed to COPCs through oral ingestion, inhalation, dermal contact (absorption) of soil and/or debris due to inadvertent disturbance of these materials or irradiation by radioactive materials.

COC = Contaminant of concern

COPC = Contaminant of potential concern

RCRA = Resource Conservation and Recovery Act

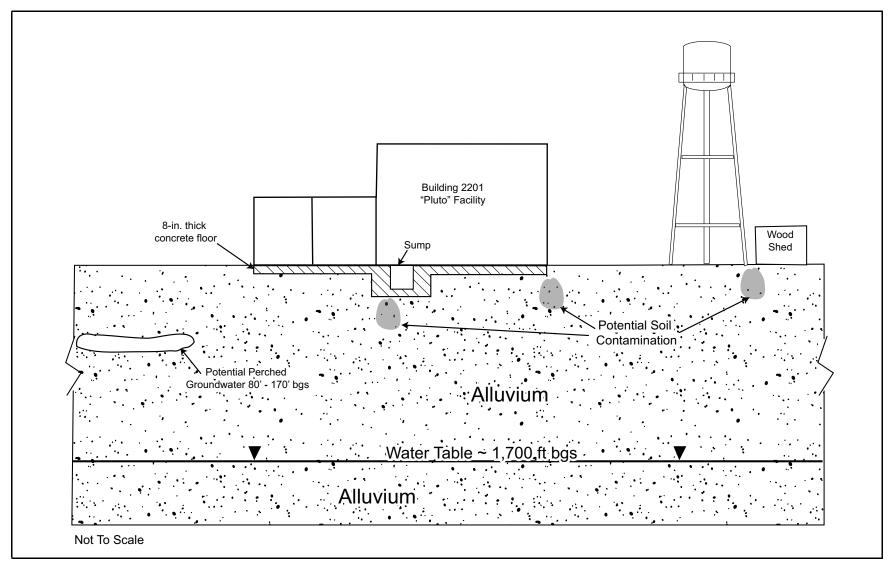


Figure A.2-1 Conceptual Site Model for CAS 26-41-01

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Two release scenarios are considered for this CSM:

- Potential past releases from activities conducted in Building 2201, hazardous/radioactive materials stored in Building 2201 and/or used as building materials, and hazardous/radioactive materials stored in the wood shed.
- Potential future releases from hazardous and/or radioactive materials currently stored in Building 2201 or the wood shed.

The primary source for potential radionuclide contamination to soil is suspected to be from radioactively contaminated liquid effluent that was washed down Building 2201 drains. Any releases from underground piping extending from Building 2201 to nearby radioactive and sanitary leachfields were covered in previous CASs (CAS 26-05-01 and 26-05-04, respectively). It is presumed that soil contamination from this source is negligible.

The primary potential source for a chemical contaminant release is suspected to be from hydraulic equipment fluids containing PCBs. However, no evidence of a past release from the building has been identified, and the thickness of the Building 2201 concrete floors and walls suggest excellent containment. Further investigation is needed to determine the presence of potential contamination from past spills, identified by the presence of floor stains. Soils will be sampled for potential contamination where it is determined that a pathway from Building 2201 to the soil exists.

Future environmental contamination could occur if hazardous or radioactive wastes currently contained within Building 2201 or the wood shed are released. Potential source material within Building 2201 and the wood shed will be investigated to define the nature and extent of potential contaminants as they are identified.

A.2.2.2 Potential Contaminants

The COPCs were identified during the planning process through the review of site history, process knowledge, personal interviews, past investigation efforts, and inferred activities associated with the CAS. The list of COPCs (presented in Table A.2-2) is intended to encompass all of the contaminants that could potentially be present at the CAS. The COPCs applicable to Decision I environmental samples for CAS 26-41-01 are defined as the constituents reported from the analytical methods stipulated in Table A.2-3.

Table A.2-2 CAS 26-41-01 Analytical Program^a

Analyses	Soil (if pathway exists)	Materials in containers/vaults ^b	Oil in leaded-glass windows	Hydraulic equipment oil	Filter material	Piping/tank insulation	Floor/ceiling tile	Roofing material
Organic Contaminants of Potential Concern (COPCs)								
Total Petroleum Hydrocarbons-Diesel-Range Organics	Χ	Х						
Polychlorinated Biphenyls	Χ	Х	Χ	Χ				
Semivolatile Organic Compounds	Χ	Χ	Χ	Χ				
Volatile Organic Compounds	Χ	Χ	Χ	Χ				
Inorganic COPC	s							
Resource Conservation and Recovery Act Metals	Χ	Х				Χ		
Total Beryllium	Χ	Χ			Χ			
Radionuclide COPCs								
Gamma Spectroscopy ^c	Χ	Х	Χ	Χ	Χ	Χ	Χ	Χ
Isotopic Uranium	Х	Х	Х	Χ	Χ	Χ	Х	Х
Isotopic Plutonium		Х	Χ	Х	Χ	Χ	Χ	Χ
Cesium-137 from Gamma		Χ	Χ	Χ	Χ	Χ	Χ	Χ
Niobium-94 from Gamma	Χ	Х	Χ	Χ	Χ	Χ	Χ	Χ
Strontium-90	Χ	Х	Χ	Χ	Χ	Χ	Χ	Χ

^aThe contaminants of potential concern are the constituents reported from the analytical methods listed.

^bDependent on site conditions.

^cResults of gamma analysis will be used to determine whether further radioanalytical analysis is warranted.

X = Required analytical method

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Table A.2-3 Analytes Reported by Analytical Methods

		T		I	1	1
VOCs		SVOCs	TPH	PCBs	Metals	Radionuclides
1,1,1-Trichloroethane 1,1,2,2-Tetrachloroethane 1,1,2,2-Tetrachloroethane 1,1,2-Trichloroethane 1,1-Dichloroethane 1,1-Dichloroethene 1,2-Dichloroethene 1,2-Dichloroethene 1,2-Dichloropropane 1,2,4-Trichlorobenzene 1,2-Trimethylbenzene 1,2-Trimethylbenzene 1,2-Trimethylbenzene 1,2-Trimethylbenzene 1,2-Trimethylbenzene 1,3-Trimethylbenzene 2-Dibromo-3-chloropropane 1,3-Trimethylbenzene 2-Butanone 2-Chlorotoluene 2-Hexanone 4-Methyl-2-pentanone Acetonitrile Allyl chloride Benzene Bromodichloromethane Bromoform Bromomethane Carbon disulfide Carbon tetrachloride Chlorobenzene Chloroform Chloromethane Chloroform Chloromethane Dichlorodifluoromethane Bromolicomethane Dichlorodifluoromethane Ethyl methacrylate Ethylbenzene Isobutyl alcohol Isopropylbenzene m-Dichlorobenzene (1,3) Methacrylonitrile Methyl methacrylate	Methylene chloride N-Butylbenzene N-Propylbenzene o-Dichlorobenzene (1,2) p-Dichlorobenzene (1,4) p-isopropyltoluene sec-Butylbenzene Styrene tert-Butylbenzene Tetrachloroethene Toluene Total Xylenes Trichloroethene Trichlorofluoromethane Vinyl acetate Vinyl chloride	2,3,4,6-Tetrachlorophenol 2,4-Dimethylphenol 2,4-Dimitrotoluene 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol 2-Methylnaphthalene 2-Methylphenol 2-Methylphenol 2-Mitrophenol 3-Methylphenol 3-Methylphenol 4-Chloroaniline 4-Chloroaniline 4-Methylphenol 4-Nitrophenol Acenaphthene Acenaphthene Acenaphthene Acenaphthene Anthracene Benzo(a)anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(b)fluoranthene Benzo(b)fluoranthene Benzo(c),fi,i)perylene Benzo(c),fi,i)perylene Benzo(c) Acid Benzyl Alcohol Bis(2-ethylhexyl) phthalate Butyl benzyl phthalate Carbazole Chrysene Dibenzo(a,h)anthracene Dibenzofuran Diethyl Phthalate Din-butyl phthalate Din-butyl phthalate Din-butyl phthalate Din-butyl phthalate Din-butyl phthalate Din-butyl phthalate Fluoranthene Fluorene Hexachlorobenzene Hexachlorobenzene Hexachlorobentane Indeno(1,2,3-cd)pyrene Naphthalene ^b Nitrobenzene N-Nitroso-di-n-propylamine Pentachlorophenol Phenanthrene Phenol Pyrene Pyridine	TPH (Diesel-Range Organics)	Aroclor 1016 Aroclor 1221 Aroclor 1232 Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 Aroclor 1268	Arsenic Barium Beryllium Cadmium Chromium Lead Mercury Selenium Silver	Plutonium-238 Plutonium-239/240 Strontium-90 Uranium-234 Uranium-235 Uranium-238 Gamma-emitting radionuclides Actinium-228 Americium-241 Cobalt-60 Cesium-137 Europium-152 Europium-154 Europium-155 Lead-212 Lead-214 Niobium-94 Potassium-40 Thallium-208 Thorium-234 Uranium-235

^aMay be reported as 3,4-methylpenol ^bMay be reported with VOCs

PCB = Polychlorinated biphenyl SVOC = Semivolatile organic compound TPH = Total petroleum hydrocarbons VOC = Volatile organic compound

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During a review of site history documentation, process knowledge information, personal interviews, past investigation efforts (where available), and inferred activities associated with the CAS, some of the COPCs were identified as targeted contaminants for the CAS. Targeted contaminants are those COPCs for which evidence in the available site and process information suggests that they may be reasonably suspected to be present at a given CAS. The targeted contaminants are required to meet a more stringent completeness criteria than other COPCs, thus providing greater protection against a decision error (see Appendix A.7.0). Targeted contaminants will be considered only for environmental samples (i.e., if a pathway to soil exists). If it is determined that a pathway to soil exists, targeted contaminants for CAS 26-41-01 soil samples will include PCBs and radionuclides.

Analytical methods for each CAU 117 COPC are provided in Tables A.2-4 and A.2-5. Due to changes in analytical methodology and changes in analytical laboratory contracts, information in Tables A.2-4 and A.2-5 that varies from corresponding information in the QAPP will supersede that information in the QAPP (NNSA/NV, 2002a).

A.2.2.3 Contaminant Characteristics

Contaminant characteristics include, but are not limited to: solubility, density, and adsorption potential. In general, contaminants with large particle size, low solubility, high affinity for media, and/or high density can be expected to be found relatively close to release points. Contaminants with small particle size, high solubility, low affinity for media, and/or low density are found further from release points or in low areas where evaporation of ponding will concentrate dissolved constituents.

A.2.2.4 Site Characteristics

Site characteristics are defined by the interaction of physical, topographical, and meteorological attributes and properties. Physical properties include permeability, porosity, hydraulic conductivity, degree of saturation, sorting, chemical composition, and organic content. Topographical and meteorological properties and attributes include slope stability, precipitation frequency and amounts, precipitation runoff pathways, drainage channels and ephemeral streams, and evapotranspiration potential.

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Table A.2-4 Analytical Requirements for Radionuclides for CAU 117

Analysis ^a	Matrix	Analytical Method	Minimum Detectable Concentration (MDC) ^b	Laboratory Precision	Laboratory Accuracy (%R)			
	Gamma-Emitting Radionuclides							
Gamma	Aqueous	EPA 901.1°	< Preliminary	RPD 35% ^d	Laboratory Control Sample			
Spectroscopy	Non-aqueous	HASL-300 ^f	Action Levels	ND ^e -2 <nd<sup>e<2</nd<sup>	80-120%R			
Other Radionuclides								
Plutonium-238	All	HASL-300 ^f			Laboratory Control Sample 80-120%R			
Plutonium-239/240	All	HASL-300 ^f						
Strontium-90	All	HASL-300 ^f	< Preliminary	RPD 35%⁴	Chemical Yield 30-105%R (not applicable for			
Uranium-234	All	HASL-300 ^f	Action Levels		•	ND° -2 <nd°<2< td=""><td>tritium and gross-alpha/beta)</td></nd°<2<>	tritium and gross-alpha/beta)	
Uranium-235	All	HASL-300 ^f			23110 12	Matrix Spike Sample 61-140%R		
Uranium-238	All	HASL-300 ^f			(tritium and gross alpha/beta only)			

^aApplicable constituents are listed in Table A.2-3.

EPA = U.S. Environmental Protection Agency HASL = Health and Safety Laboratory ND = Normalized difference RPD = Relative percent difference %R = Percent recovery

^bThe MDC is the lowest concentration of a radionuclide present in a sample and can be detected with a 95% confidence level.

^cPrescribed Procedures for Measurement of Radioactivity in Drinking Water (EPA, 1980)

^dSampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) with Guidance (EPA, 2000)

^{*}ND is not RPD; rather, it is another measure of precision used to evaluate duplicate analyses. The ND is calculated as the difference between two results divided by the square root of the sum of the squares of their total propagated uncertainties. Evaluation of Radiochemical Data Usability (Paar and Porterfield, 1997)

¹The Procedures Manual of the Environmental Measurements Laboratory, HASL-300 (DOE, 1997)

Table A.2-5
Analytical Requirements for Chemical COPCs for CAU 117

Analysis ^a	Matrix	Analytical Method (SW-846) ^b	Minimum Detectable Concentration (MDC) ^c	Laboratory Precision	Laboratory Accuracy (%R)			
ORGANICS								
Total Volatile Organic Compounds	All	8260B	< Preliminary Action Levels	Lab-specific ^d	Lab-specific ^d			
Total Semivolatile Organic Compounds	All	8270C	< Preliminary Action Levels	Lab-specific ^d	Lab-specific ^d			
Polychlorinated Biphenyls	All	8082	< Preliminary	Lab-specific ^d	Lab-specific ^d			
Total Petroleum Hydrocarbons- Diesel-Range Organics	All	8015B (modified)	Action Levels	Lab-specific ^d	Lab-specific ^d			
		INORGANIC	S					
Metals	All	6010B		RPD 35% (non-aqueous)° 20% (aqueous)°	Matrix Spike Sample 75-125%R ^b			
Mercury	Aqueous	7470A	< Preliminary Action Levels	Absolute Difference ^f ±2x RL	Laboratory Control			
Weitury	Non-aqueous	7471A		(non-aqueous) ^f ±1x RL (aqueous) ^f	Sample 80-120%R ^f			

^aApplicable constituents are listed in Table A.2-3.

RL = Reporting limit RPD = Relative percent difference

%R = Percent recovery

Corrective Action Site 26-41-01 is located in the southwestern corner of Area 26 at approximately 4,396 ft elevation (BN, 1996). A perched water table occurs throughout most of Area 26, with static water levels ranging from 81 to 167 ft below ground surface (bgs). The perched water occurs in highly fractured and altered rock, and may extend to a depth of 261 ft or more before reaching a low-permeable confining layer. Electrical resistivity vertical profiles indicate zones of saturation between 24 and 136 ft, 460 and 900 ft, and 1,050 and 1,800 ft. These zones may represent several perched aquifers present in permeable zones between the known perched aquifer and the regional water table located approximately 1,700 ft bgs (DRI, 1988; Johnson and Ege, 1964).

^bTest Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) (EPA, 1996)

The MDC is the lowest concentration that can be reliably achieved within specified limits of accuracy and precision.

^dRPD and %R performance criteria are developed by the analytical laboratory according to approved procedures.

^eSampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) with Guidance (EPA, 2000)

¹USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (EPA, 2004b)

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A large portion of Area 26 consists of thin gravel alluvium capping a pediment which dips 3 to 6 degrees to the southeast and merges with the valley alluvium along Cane Spring Wash to the south. Lateral migration may occur as a result of overland flow or erosion, though the permeability of the alluvium is low (ranging from roughly 10⁻³ to 10⁻⁵ centimeters per second) (DRI, 1988).

A.2.2.5 Migration Pathways and Transport Mechanisms

Migration pathways include the lateral migration of potential contaminants across surface soils/sediments and vertical migration of potential contaminants through subsurface soils. Environmental contamination is expected to be limited due to the physical barrier posed by Building 2201 between potential contaminants and potentially affected soil.

Infiltration and percolation of precipitation serves as a driving force for downward migration of contaminants. However, due to the low permeability of the alluvium throughout Area 26, high potential evapotranspiration rates, and low precipitation rates (approximately 7.8 in. per year at nearby Cane Spring [ARL, 2007]), percolation of infiltrated precipitation at the NTS does not provide a significant mechanism for vertical migration of contaminants to groundwater (DOE/NV, 1992).

Because of the expected limited mobility of contaminants, the affected media is typically the surface and shallow subsurface soil. The native soil interfaces below and adjacent to the identified release points are the most likely locations for potential soil contamination.

A.2.2.6 Exposure Scenarios

Human receptors may be exposed to COPCs through oral ingestion, inhalation, or dermal contact with contaminated materials due to inadvertent disturbance of these materials or irradiation by radioactive materials. The land-use and exposure scenario for CAS 26-41-01 is listed in Table A.2-6. According to the *Nevada Test Site Resource Management Plan* (DOE/NV, 1998), the area in which CAU 117 is located is restricted to use as a Research, Test, and Experiment Zone. Following closure activities outlined in this SAFER, Building 2201 would not be available for use by site personnel. Corrective Action Site 26-41-01 is therefore considered an Occasional Use area.

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Table A.2-6 Land Use and Exposure Scenarios

Corrective Action Site	Record of Decision Land Use Zone	Exposure Scenario
26-41-01	Research, Test, and Experiment Zone This area is designated for small-scale research and development projects and demonstrations; pilot projects; outdoor tests; and experiments for the development, quality assurance, or reliability of material and equipment under controlled conditions. This zone includes compatible defense and nondefense research, development, and testing projects and activities	Occasional Use Area Worker will be exposed to the site occasionally (up to 80 hours per year for 5 years). Site structures are not present for shelter and comfort of the worker.

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A.3.0 Step 2 - Identify the Goal of the Study

Step 2 of the DQO process states how environmental data will be used in meeting objectives and solving the problem, identifies study questions or decision statement(s), and considers alternative outcomes or actions that can occur upon answering the question(s). Figure A.3-1 depicts the sequential flow of questions, answers, and action alternatives required to fulfill the objectives of the SAFER process.

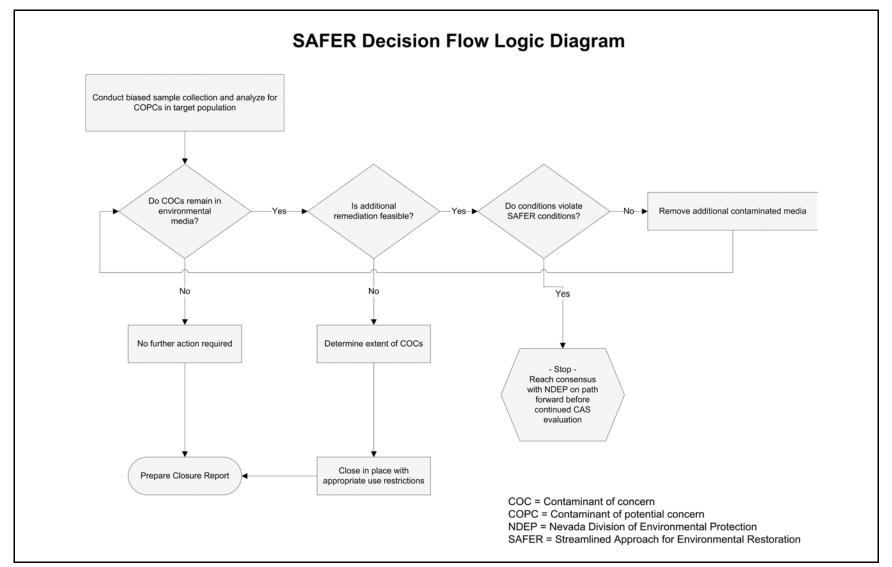


Figure A.3-1 SAFER Decision Flow Logic Diagram

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After completion of SAFER activities, the following closure objectives should be met for CAU 117:

- The chosen corrective action has been verified to be appropriate and effective.
- The nature and extent of any remaining contamination has been defined.
- Sufficient information is available to estimate decontamination and decommissioning waste types, volumes, and disposal costs.
- RCRA hazardous wastes have been removed.

Decision I and II statements intended to direct SAFER activities toward completion of these objectives are presented in the following sections.

A.3.1 Decision Statements

The Decision I statement is: "Is any COC present in environmental media within the CAS, or does potential source material exist that, if released, could cause a COC in environmental media?" For a judgmental sampling design, any analytical result for a COPC above the FAL will result in that COPC being designated as a COC. A COC may also be defined as a contaminant that, in combination with other like contaminants, is determined to jointly pose an unacceptable risk based on a multiple constituent analysis (NNSA/NSO, 2006). If a COC is detected, then Decision II must be resolved.

The Decision II statement is: "Is sufficient information available to meet the closure objectives?" Sufficient information to meet these closure objectives is defined to include:

- Identifying the volume of media containing any COC bounded by analytical sample results in lateral and vertical directions.
- The information needed to characterize IDW for disposal.
- The information needed to determine potential remediation waste types.

A corrective action will be determined for any site containing a COC. The evaluation of the need for corrective action will include the potential for wastes that are present at a site to cause the future contamination of site environmental media if the wastes were to be released. The following conservative assumptions were made to evaluate the potential for Building 2201 material or contents to result in the introduction of a COC to surrounding environmental media:

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- Building 2201 containment would fail at some point, and the contents would be released to the surrounding media.
- The resulting concentration of contaminants in the surrounding media would be equal to the concentration of contaminants within Building 2201.
- Any liquid contaminants within Building 2201 will be removed.

If sufficient information is not available to meet the closure objectives, then site conditions will be re-evaluated and additional samples will be collected (as long as the scope of the investigation is not exceeded and CSM assumptions have not been shown to be incorrect).

A.3.2 Alternative Actions to the Decisions

In this section the actions that may be taken to solve the problem are identified depending on the possible outcomes of the investigation.

A.3.2.1 Alternative Actions to Decision I

If no COC associated with a release from the CAS is detected, then further assessment of the CAS is not required and the corrective action alternative of no further action will be selected. If a COC associated with a release from the CAS is detected, then additional sampling will be conducted to determine the extent of COC contamination. If the extent of the contamination is defined and additional remediation is feasible, contaminated media will be removed until all the contamination has been removed. If the extent of contamination has been determined and additional remediation is not feasible, then the extent of contamination will be defined and the contaminated area will be closed in place with appropriate use restrictions.

If the collection of verification samples confirm that all the contaminated media has been removed, then the clean closure objectives will have been met. If contamination still exists and additional remediation would violate the conditions of the SAFER, then work will stop and a consensus reached with NDEP on the path forward before continuing the investigation of the CAS.

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A.3.2.2 Alternative Actions to Decision II

If sufficient information is available to define the extent of COC contamination and confirm that closure objectives were met, then further assessment of the CAS is not required. If sufficient information is not available to define the extent of contamination or confirm that closure objectives were met, then additional samples will be collected until the extent is defined.

A.4.0 Step 3 - Identify Information Inputs

Step 3 of the DQO process identifies the information needed, determines sources for information, and identifies sampling and analysis methods that will allow reliable comparisons with FALs.

A.4.1 Information Needs

To resolve Decision I (determine whether a COC is present at the CAS), samples need to be collected and analyzed following two criteria:

- Samples must be collected in areas most likely to contain a COC (judgmental sampling).
- The analytical suite selected must be sufficient to identify any COCs present in the samples.

To resolve Decision II (determine whether sufficient information is available to confirm that closure objectives were met at the CAS), samples must be collected and analyzed to meet the following criteria:

- Samples must be collected in areas contiguous to the contamination but where contaminant concentrations are below FALs.
- Samples of the waste or environmental media must provide sufficient information to characterize the IDW for disposal.
- Samples of the waste or environmental media must provide sufficient information to determine potential remediation waste types.
- Samples of material from Building 2201 must provide sufficient information to determine concentrations of potential source material.
- Samples and surveys of material remaining in Building 2201 must be sufficient to estimate future demolition wastes.
- The analytical suites selected must be sufficient to detect contaminants at concentrations equal to or less than their corresponding FALs.

A.4.2 Sources of Information

Information to satisfy Decision I and Decision II will be generated by sampling for COCs and sampling to characterize future demolition wastes. In all cases, sample collection and handling

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activities will follow standard procedures. Only validated data from analytical laboratories will be used to make DQO decisions.

Sampling for COCs will be done in areas most likely to contain a COC (judgmental sampling), and will include samples of environmental media, if necessary, and potential source material that could cause future contamination of the CAS. These areas include soils adjacent to or directly below contaminant pathways (if it is determined that a pathway from Building 2201 to environmental media exists), soils beneath the water tower, and material within Building 2201 and the wood shed. Samples of potential source material includes materials in containers in Building 2201 and the wood shed. Data generated from the sampling of potential source material must be sufficient to meet the quality requirements of the designated waste acceptance criteria.

Media samples and survey data will be used to characterize future demolition wastes from Building 2201. Samples from piping and tank insulation, floor and ceiling tile, and roofing material will be analyzed to determine the appropriate disposal strategy for these materials. Surveys of Building 2201 surfaces will be used to determine the extent of any remaining surface contamination and its potential impact on demolition wastes. All waste characterization data must be sufficient to meet the quality requirements of the designated waste acceptance criteria.

Waste disposal documentation, field surveys, and other appropriate information may also be used to ensure corrective actions were completed as planned.

A.4.2.1 Sample Locations

Design of the sampling approaches for the CAU 117 CAS must ensure that the data collected are sufficient for selection of the corrective action alternatives (EPA, 2002). To meet this objective, samples collected from the site should be from locations most likely to contain a COC, if present (judgmental sampling). These sample locations, therefore, can be selected using biasing factors for judgmental sampling (e.g., a stain, likely containing a spilled substance). Because sufficient data are available to develop a judgmental sampling plan, this approach was used to develop plans for sampling environmental media and potential source material at the CAS. Analytical suites for Decision I samples will include all COPCs identified in Table A.2-2.

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Environmental media (soil) will be sampled in the event that a pathway from Building 2201 or the wood shed to soil is confirmed. To determine whether such a pathway exists, historical documentation, surveys, interviews, and applied process knowledge will be used to determine the most likely locations for a contaminant release or barrier breach. Engineering drawings, visual inspections, examination of the Building 2201 foundation, and a review of Building 2201 drains covered in previous CASs, will be used to determine potential pathways from the building to environmental media. Environmental soil samples will be submitted to analytical laboratories meeting the quality criteria stipulated in the Industrial Sites QAPP (NNSA/NV, 2002a).

A judgmental sampling approach will also be used to select locations for samples taken from Building 2201 to determine potential source material. Sampled locations will depend on field-screening criteria and site history and process knowledge. Potential source material from Building 2201 and the wood shed will be characterized as it is identified.

Samples of potential source material will include samples of unknown materials in containers and vaults.

Field-screening techniques may be used to select appropriate sampling locations by providing semiquantitative data that can be used to comparatively select samples to be submitted for laboratory analyses from several screening locations. The following field-screening methods and biasing factors may be applied at CAU 117:

- Walkover surface area radiological surveys: A radiological survey instrument will be used to
 detect locations of elevated radioactivity. Field-screening levels will be determined by
 RadCon personnel.
- Documented process knowledge on source and location of release (e.g., volume of release).
- Stains: Any spot or area on the soil surface or floor of Building 2201. Typically stains indicate an organic liquid such as oil has reached the soil (or the potential exists for the liquid to have reached the soil if found inside a structure at the CAS).
- Drums, containers, equipment or debris: Materials that may have been used at, or added to, a location, and that may have contained or come in contact with hazardous or radioactive substances at some point during their use.

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- Preselected areas based on process knowledge of the site: Locations for which evidence such as historical photographs, experience from previous investigations, or interviewee's input, exists that a release of hazardous or radioactive substances may have occurred.
- Experience and data from investigations of similar sites.
- Other biasing factors: Factors not previously defined for the CAI but become evident once the investigation of the site is under way.

Decision II sample step-out locations will be selected based on the CSM, biasing factors, and existing data. Analytical suites will include those parameters that exceeded FALs (i.e., COCs) in prior samples. Biasing factors to support Decision II sample locations include Decision I biasing factors plus available analytical results.

A.4.2.2 Analytical Methods

Analytical methods are available to provide the data needed to resolve the decision statements. The analytical methods and laboratory requirements (e.g., detection limits, precision, and accuracy) are provided in Tables A.2-4 and A.2-5.

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A.5.0 Step 4 - Define the Boundaries of the Study

Step 4 of the DQO process defines the target population of interest and its relevant spatial boundaries, specifies temporal and other practical constraints associated with sample/data collection, and defines the sampling units on which decisions or estimates will be made.

A.5.1 Target Populations of Interest

The population of interest to resolve Decision I ("Is any COC present in environmental media within the CAS, or does potential source material exist that, if released, could cause a COC in environmental media?") is any location within the site that is contaminated with any contaminant above a FAL. The populations of interest to resolve Decision II ("Is sufficient information available meet the closure objectives?") are:

- Each one of a set of locations bounding contamination in lateral and vertical directions.
- Investigation-derived waste or environmental media that must be characterized for disposal.
- Potential remediation waste.
- Environmental media where natural attenuation or biodegradation or construction/evaluation of barriers is considered.

A.5.2 Spatial Boundaries

Spatial boundaries are the maximum lateral and vertical extent of expected contamination at the CAS, including all media likely to come in contact with the environment. Contamination found beyond these boundaries may indicate a flaw in the CSM and may require re-evaluation of the CSM before the investigation can continue. The CAS is considered geographically independent and intrusive activities are not intended to extend into the boundaries of neighboring CASs. The lateral boundary for Building 2201 will be the exisiting building footprint (walls). The lateral boundary for the wood shed will be the existing shed footprint (walls). The lateral boundary for the water tower will include the soil directly beneath the tower and in a 25-ft radius around the tower. The vertical boundary for all structures in scope at the CAS will be 15 ft bgs, approximately the extent of reach of a backhoe.

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A.5.3 Practical Constraints

Practical constraints such as military activities at the NTS, weather (i.e., high winds, rain, lightning, extreme heat), underground utilities, and/or access restrictions may affect the ability to investigate this site.

A.5.4 Define the Sampling Units

The scale of decision making in Decision I is defined as the CAS. Any COC detected at any location within the CAS will cause the determination that the CAS is contaminated and needs further evaluation. The scale of decision making for Decision II is defined as a contiguous area contaminated with any COC originating from the CAS. Resolution of Decision II requires this contiguous area to be bounded laterally and vertically.

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A.6.0 Step 5 - Develop the Analytic Approach

Step 5 of the DQO process specifies appropriate population parameters for making decisions, defines action levels and generates an "If ... then ... else" decision rule that defines the conditions under which possible alternative actions will be chosen. This step also specifies the parameters that characterize the population of interest, specifies the FALs, and confirms that the analytical detection limits are capable of detecting FALs.

A.6.1 Population Parameters

For judgmental sampling results, the population parameter is the observed concentration of each contaminant from each individual analytical sample. Each sample result will be compared to the FALs to determine the appropriate resolution to Decision I and Decision II. For Decision I, a single sample result for any contaminant exceeding a FAL would cause a determination that a COC is present within the CAS.

The Decision II population parameter is an individual analytical result from a bounding sample. For Decision II, a single bounding sample result for any contaminant exceeding a FAL would cause a determination that the contamination is not bounded.

A.6.2 Action Levels

The PALs presented in this section are to be used for site screening purposes. They are not necessarily intended to be used as cleanup action levels or FALs. However, they are useful in screening out contaminants that are not present in sufficient concentrations to warrant further evaluation and, therefore, streamline the consideration of remedial alternatives. The RBCA process used to establish FALs is described in the *Industrial Sites Project Establishment of Final Action Levels* (NNSA/NSO, 2006). This process conforms with NAC Section 445A.227, which lists the requirements for sites with soil contamination (NAC, 2006a). For the evaluation of corrective actions, NAC Section 445A.22705 (NAC, 2006b) requires the use of ASTM Method E 1739-95 (ASTM, 1995) to "conduct an evaluation of the site, based on the risk it poses to public health and the environment, to determine the necessary remediation standards (i.e., FALs) or to establish that corrective action is not necessary."

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This RBCA process defines three tiers (or levels) of evaluation involving increasingly sophisticated analyses:

- Tier 1 evaluation sample results from source areas (highest concentrations) are compared to action levels based on generic (non-site-specific) conditions (i.e., the PALs established in the SAFER plan). The FALs may then be established as the Tier 1 action levels, or the FALs may be calculated using a Tier 2 evaluation.
- Tier 2 evaluation conducted by calculating Tier 2 SSTLs using site-specific information as inputs to the same or similar methodology used to calculate Tier 1 action levels. The Tier 2 SSTLs are then compared to individual sample results from reasonable points of exposure (as opposed to the source areas as is done in Tier 1) on a point-by-point basis. Total TPH concentrations will not be used for risk-based decisions under Tier 2 or Tier 3. Rather, the individual chemicals of concern will be compared to the SSTLs.
- Tier 3 evaluation conducted by calculating Tier 3 SSTLs on the basis of more sophisticated risk analyses using methodologies described in Method E 1739-95 that consider site-, pathway-, and receptor-specific parameters.

The comparison of laboratory results to FALs and the evaluation of potential corrective actions will be included in the investigation report. The FALs will be defined (along with the basis for their definition) in the investigation report.

A.6.2.1 Chemical PALs

Except as noted herein, the chemical PALs are defined as the EPA Region 9 PRGs for chemical contaminants in industrial soils (EPA, 2004a). Background concentrations for RCRA metals and zinc will be used instead of PRGs when natural background concentrations exceed the PRG, as is often the case with arsenic on the NTS. Background is considered the average concentration plus two standard deviations of the average concentration for sediment samples collected by the Nevada Bureau of Mines and Geology throughout the Nevada Test and Training Range (formerly the Nellis Air Force Range) (NBMG, 1998; Moore, 1999). For detected chemical COPCs without established PRGs, the protocol used by the EPA Region 9 in establishing PRGs (or similar) will be used to establish PALs. If used, this process will be documented in the investigation report.

A.6.2.2 Total Petroleum Hydrocarbon PALs

The PAL for TPH is 100 ppm as listed in NAC 445A.2272 (NAC, 2006c).

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A.6.2.3 Radionuclide PALs

The PALs for radiological contaminants (other than tritium) are based on the NCRP Report No. 129 recommended screening limits for construction, commercial, industrial land-use scenarios (NCRP, 1999) scaled to 25 mrem/yr dose constraint (Murphy, 2004) and the generic guidelines for residual concentration of radionuclides in DOE Order 5400.5 (DOE, 1993). These PALs are based on the construction, commercial, and industrial land-use scenario provided in the guidance and are appropriate for the NTS based on future land use scenarios as presented in Section A.2.2.6. The PAL for tritium is based on the UGTA Project limit of 400,000 pCi/L for discharge of water containing tritium (NNSA/NV, 2002b).

Solid media such as concrete and/or structures may pose a potential radiological exposure risk to site workers if contaminated. The radiological PAL for solid media will be defined as the unrestricted-release criteria defined in the NV/YMP RadCon Manual (NNSA/NSO, 2004).

A.6.3 Decision Rules

The decision rules applicable to both Decision I and Decision II are:

• If COC contamination is inconsistent with the CSM or extends beyond the spatial boundaries identified in Section A.5.2, then work will be suspended and the investigation strategy will be reconsidered, else the decision will be to continue sampling to define the extent.

The decision rules for Decision I are:

- If contaminant concentrations in remaining environmental media exceed FALs, that contaminant is identified as a COC.
- If source material is present that, if released, has the potential to cause future contamination of site environmental media, then a corrective action is required.
- If no COCs or potential source material remain after SAFER activities, a corrective action alternative of no further action will be selected (pending demolition of Building 2201).
- If COCs or potential source material remain at the CAS after SAFER activities, a corrective
 action alternative of closure in place with use restrictions will be implemented, and Decision
 II will be resolved.

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The decision rules for Decision II are:

- If a COC is detected through Decision I sampling, additional samples will be collected to determine the extent of contamination.
- If sufficient information is available to define the extent of COC contamination and confirm that closure objectives were met, no further assessment of the CAS is required.
- If sufficient information is not available to define the extent of contamination or confirm that closure objectives were met, then additional samples will be collected until the extent is defined.
- If the waste types, volumes, or costs of remaining demolition waste streams cannot be estimated, additional sampling and/or surveys will be performed.

If a COC is detected in environmental media or potential source material, additional sampling will be conducted to determine the extent of COC contamination. If the extent of the contamination is defined and additional remediation is feasible, then the contaminated media will be removed and a closure strategy of clean closure will be selected. If the extent of contamination has been determined and additional remediation is not feasible, then a closure strategy of close in place will be chosen and appropriate use restrictions will be applied.

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A.7.0 Step 6 - Specify Performance or Acceptance Criteria

Step 6 of the DQO process defines the decision hypotheses, specifies controls against false rejection and false acceptance decision errors, examines consequences of making incorrect decisions from the test, and places acceptable limits on the likelihood of making decision errors.

A.7.1 Decision Hypotheses

The baseline condition (i.e., null hypothesis) and alternative condition for Decision I are:

- Baseline condition A COC is present.
- Alternative condition A COC is not present.

The baseline condition (i.e., null hypothesis) and alternative condition for Decision II are as follows:

- Baseline condition The extent of a COC has not been defined.
- Alternative condition The extent of a COC has been defined.

Decisions and/or criteria have false negative or false positive errors associated with their determination. The impact of these decision errors and the methods that will be used to control these errors are discussed in the following subsections. In general terms, confidence in DQO decisions based on judgmental sampling results will be established qualitatively by:

- The development of and concurrence of a CSM (based on process knowledge) by stakeholder participants during the DQO process,
- Testing the validity of CSMs based on investigation results, and
- Evaluating the quality of the data based on DQI parameters.

A.7.2 False Negative Decision Error

The false negative decision error would mean deciding that a COC is not present when it actually is (Decision I), or deciding that the extent of a COC has been defined when it has not (Decision II). In both cases, the potential consequence is an increased risk to human health and environment.

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In judgmental sampling, the selection of the number and location of samples is based on knowledge of the feature or condition under investigation and on professional judgment (EPA, 2002). Judgmental sampling conclusions about the target population depend upon the validity and accuracy of professional judgment.

The false negative decision error (where consequences are more severe) for judgmental sampling designs is controlled by meeting these criteria:

- For Decision I, having a high degree of confidence that the sample locations selected will identify COCs if present anywhere within the CAS. For Decision II, having a high degree of confidence that the sample locations selected will identify the extent of COCs.
- Having a high degree of confidence that analyses conducted will be sufficient to detect any COCs present in the samples.
- Having a high degree of confidence that the dataset is of sufficient quality and completeness.

To satisfy the first criterion, Decision I samples must be collected in areas most likely to be contaminated by COCs (supplemented by random samples where appropriate). Decision II samples must be collected in areas that represent the lateral and vertical extent of contamination (above FALs). The following characteristics must be considered to control decision errors for the first criterion:

- Source and location of release
- Chemical nature and fate properties
- Physical transport pathways and properties
- Hydrologic drivers

These characteristics were considered during the development of the CSM and selection of sampling locations. The field-screening methods and biasing factors listed in Section A.4.2.1 will be used to further ensure that appropriate sampling locations are selected to meet these criteria. Radiological survey instruments and field-screening equipment will be calibrated and checked in accordance with the manufacturer's instructions and approved procedures. The investigation report will present an assessment on the DQI of representativeness that samples were collected from those locations that best represent the populations of interest as defined in Section A.5.1.

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To satisfy the second criterion, Decision I samples will be analyzed for the chemical and radiological parameters listed in Sections 3.1 and A.2.0 of this document. Decision II samples will be analyzed for those chemical and radiological parameters that identified unbounded COCs. The DQI of sensitivity will be assessed for all analytical results to ensure that all sample analyses had measurement sensitivities (detection limits) that were less than or equal to the corresponding FALs. If this criterion is not achieved, the affected data will be assessed (for usability and potential impacts on meeting site investigation objectives) in the investigation report.

To satisfy the third criterion, the entire dataset, as well as individual sample results, will be assessed against the DQIs of precision, accuracy, comparability, and completeness as defined in the Industrial Sites QAPP (NNSA/NV, 2002a) and in Section 7.2 of this document. The DQIs of precision and accuracy will be used to assess overall analytical method performance as well as to assess the need to potentially "flag" (qualify) individual contaminant results when corresponding QC sample results are not within the established control limits for precision and accuracy. Data qualified as estimated for reasons of precision or accuracy may be considered to meet the constituent performance criteria based on an assessment of the data. The DQI for completeness will be assessed to ensure that all data needs identified in the DQO have been met. The DQI of comparability will be assessed to ensure that all analytical methods used are equivalent to standard EPA methods so that results will be comparable to regulatory action levels that have been established using those procedures. Strict adherence to established procedures and QA/QC protocol protects against false negatives. Site-specific DQIs are discussed in more detail in Section 7.2 of this document.

To provide information for the assessment of the DQIs of precision and accuracy, the following QC samples will be collected as required by the Industrial Sites QAPP (NNSA/NV, 2002a):

- Field duplicates (minimum of 1 per matrix per 20 environmental samples)
- Laboratory QC samples (minimum of 1 per matrix per 20 environmental samples or 1 per CAS per matrix, if less than 20 collected)

A.7.3 False Positive Decision Error

The false positive decision error would mean deciding that a COC is present when it is not, or a COC is unbounded when it is not, resulting in increased costs for unnecessary sampling and analysis.

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False positive results are typically attributed to laboratory and/or sampling/handling errors that could cause cross contamination. To control against cross contamination, decontamination of sampling equipment will be conducted according to established and approved procedures and only clean sample containers will be used. To determine whether a false positive analytical result may have occurred, the following QC samples will be collected as required by the Industrial Sites QAPP (NNSA/NV, 2002a):

- Trip blanks (1 per sample cooler containing VOC environmental samples)
- Equipment blanks (1 per sampling event for each type of decontamination procedure)
- Source blanks (1 per source lot per sampling event)
- Field blanks (minimum of 1 per 20 environmental samples)

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A.8.0 Step 7 - Develop the Plan for Obtaining Data

Step 7 of the DQO process selects and documents a design that will yield data that will best achieve performance or acceptance criteria. A judgmental sampling scheme will be implemented to select sample locations and evaluate analytical results for CAU 117. Sections A.8.1 and A.8.2 contain general information about collecting Decision I and Decision II samples under a judgmental sampling design, while the subsequent sections provide sampling activities, including proposed sample locations.

A.8.1 Decision I Sampling

A judgmental sampling design will be implemented for CAS 26-41-01. Because individual sample results, rather than an average concentration, will be used to compare to FALs at the CAS, statistical methods to generate site characteristics will not be used. Adequate representativeness of the entire target population may not be a requirement to developing a sampling design. If good prior information is available on the target site of interest, then the sampling may be designed to collect samples only from areas known to have the highest concentration levels on the target site. If the observed concentrations from these samples are below the action level, then a decision can be made that the site contains safe levels of the contaminant without the samples being truly representative of the entire area (EPA, 2006).

All sample locations will be selected to satisfy the DQI of representativeness in that samples collected from selected locations will best represent the populations of interest as defined in Section A.5.1. To meet this criterion for judgmentally sampled sites, a biased sampling strategy will be used for Decision I samples to target areas with the highest potential for contamination, if it is present anywhere in the CAS. Sample locations will be determined based on process knowledge, previously acquired data, or the field-screening and biasing factors listed in Section A.4.2. If biasing factors are present in soils below locations where Decision I samples were removed, additional Decision I soil samples will be collected at depth intervals selected by the Site Supervisor based on biasing factors to a depth where the biasing factors are no longer present. The Site Supervisor has the discretion to modify the judgmental sample locations, but only if the modified locations meet the decision needs and criteria stipulated in this DQO.

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A.8.2 Decision II Sampling

To meet the DQI of representativeness for Decision II samples (that Decision II sample locations represent the population of interest as defined in Section A.5.1), judgmental sampling locations at the CAS will be selected based on the outer boundary sample locations where COCs were detected, the CSM, and other field-screening and biasing factors listed in Section A.4.2. In general, sample locations will be arranged in a triangular pattern around the Decision I location or area at distances based on site conditions, process knowledge, and biasing factors. If COCs extend beyond the initial step-outs, Decision II samples will be collected from incremental step-outs. Initial step-outs will be at least as deep as the vertical extent of contamination defined at the Decision I location and the depth of the incremental step-outs will be based on the deepest contamination observed at all locations. A clean sample (i.e., COCs less than FALs) collected from each step-out direction (lateral or vertical) will define extent of contamination in that direction. The number, location, and spacing of step-outs may be modified by the Site Supervisor, as warranted by site conditions.

A.8.3 Sampling Design

This section discusses the specific sampling design for CAS 26-41-01, Pluto Disassembly Facility. The sampling plan will focus on the following:

- Identifying and sampling any releases to environmental media.
- Identifying and removing potential source material from Building 2201 and the wood shed.
- Characterizing SAFER wastes such as IDW and readily removable wastes from Building 2201.
- Collecting information for estimating demolition waste types, volumes, and costs.

Actual sampling locations will be selected based on biasing factors (i.e., cracks or staining of the Building 2201 foundation) and site conditions as documented during the initial visual inspection.

During Decision I sampling, soil samples will be collected from locations based on biasing factors (i.e., cracks or staining of the Building 2201 foundation), if it is determined likely that a breach in the Building 2201 barrier has occurred. If it is determined that soil sampling is necessary, the concrete floor of the Building 2201 basement will be penetrated to reach soil most likely to be contaminated.

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Soil samples will also be collected adjacent to Building 2201 if it is determined that a pathway to soil exists from a spill originating in Building 2201. Based on preliminary site investigations it is considered unlikely that such a breach in the Building 2201 containment has occurred.

Decision I samples will also be taken to assess potential source material within Building 2201 and the wood shed. Samples of material removed during SAFER activities will be taken for waste characterization purposes, as such material is identified. The actual locations of these Decision I samples will be selected based on biasing factors (i.e., process knowledge and results from historical surveys) and site conditions as documented during the initial visual inspection.

After completion of SAFER activities, building media samples and radiological smears/surveys will be taken to collect information for estimating demolition waste types, volumes and costs. These samples will include:

- Surveys (fixed and removable) of Building 2201 surfaces for radiological contamination and beryllium.
- Roofing material, acoustical ceiling tiles, asphalt floor tiles, piping and tank insulation, and other suspected material will be sampled for asbestos.

A.9.0 References

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Appendix B Closure Certification

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B.1.0 Closure Certification

This appendix does not apply to CAU 117.

Appendix C As-Built Documentation

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C.1.0 As-Built Documentation

No new construction was performed during closure activities at CAU 117 that generated as-built drawings. Additionally, there were no surface disturbing activities that significantly or permanently altered the existing grade or surface water drainage patterns. Site engineering drawings are available in the project record file.

Appendix D Confirmation Sampling Test Results

D.1.0 Introduction

This appendix presents the closure activities and analytical results for CAU 117. Corrective Action Unit 117 is located in Area 26 of the NTS (Figure 1-2) and comprises CAS 26-41-01, Pluto Disassembly Facility.

Corrective Action Site 26-41-01 consists of the potential releases associated with Building 2201 Pluto Disassembly Facility and its components (facility water tower and a nearby wood shed) (Figure 1-3), which are associated with historical operations related to the nuclear weapons program and the national defense of the United States of America during the Cold War. Refer to Section 1.1.1 for additional information regarding the site description and history of CAS 26-41-01.

D.1.1 Project Objectives

The primary objective of the investigation was to provide sufficient information to validate the assumptions used to select the corrective actions and to verify that closure objectives were met for CAU 117 CAS 26-41-01. This objective was achieved by determining the presence of COCs and the vertical and lateral extent of the COCs.

The selection of soil and/or waste characterization sample locations was based on site conditions and the strategy developed during the DQO process as presented in the CAU 117 SAFER Plan (see Appendix A). The sampling strategy involved judgmental sample locations that were chosen based upon process knowledge and visual inspection of the site.

D.1.2 Contents

This appendix contains information and data in sufficient detail to justify that no further corrective action is required at CAU 117. The contents of this appendix are as follows:

- Section D.1.0 describes the investigation background, objectives, and content.
- Section D.2.0 provides an investigation overview.
- Section D.3.0 provides CAS-specific information regarding the field activities, sampling methods, and laboratory analytical results from investigation sampling.

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- Section D.4.0 describes waste management activities and presents the laboratory analytical results for waste management samples.
- Section D.5.0 discusses the QA and QC procedures followed and results of the QA/QC activities.
- Section D.6.0 is a summary of the investigation results.
- Section D.7.0 lists the cited references.

The complete field documentation and laboratory data, including field activity daily logs (FADLs), sample collection logs (SCLs), analysis request/chain-of-custody forms, soil sample descriptions, laboratory certificates of analyses, analytical results, and surveillance results are retained in project files as hard copy files or electronic media.

D.2.0 Investigation Overview

Field investigation and sampling activities for the CAU 117 CAI were conducted from May 2008 through February 2009. Sections D.2.1 through D.2.4 provide the investigation methodology and laboratory analytical information. Table D.2-1 lists the CAI activities that were conducted at CAS 26-41-01.

The investigation and sampling program was managed in accordance with the requirements set forth in the CAU 117 SAFER Plan (NNSA/NSO, 2007). Field activities were performed in compliance with safety documents that are consistent with the DOE Integrated Safety Management System. Samples were collected and documented following approved protocols and procedures. Quality control samples (e.g., field blanks, equipment rinsate blanks, trip blanks, and duplicate samples) were collected as required by the Industrial Sites QAPP (NNSA/NV, 2002) and the CAU 117 SAFER Plan (NNSA/NSO, 2007). During field activities, waste minimization practices were followed according to approved procedures, including segregation of waste by waste stream.

Corrective Action Site 26-41-01 was investigated by conducting radiological surface screening and surveys, sampling potential contaminant sources, and sampling surface and subsurface soils. Surface soil samples were collected by hand excavation. Subsurface soil samples were collected using hand auger or backhoe methods. Soil samples were field screened for alpha and beta/gamma radiation. The results were compared against screening levels to guide in the selection of samples to be submitted for analysis. Samples of various media (e.g., filters, aqueous liquids, sediments) were collected to support both environmental and waste characterization using teflon bailers and scoops, scabbling, and a peristaltic pump with mylar tubing.

All CAU 117 Decision I sampling locations were accessible, and sampling activities at planned locations were not restricted. Decision II step-out sample locations were accessible and remained within anticipated spatial boundaries.

D.2.1 Sample Locations

Investigation locations selected for sampling were based on interpretation of existing engineering drawings, aerial and land photographs, interviews with former and current site employees,

Table D.2-1
Corrective Action Investigation Activities Conducted at CAU 117
To Meet SAFER Plan Requirements

CAI Activities	Building 2201	Water Tower	Wood Shed	Facility Boundary
Performed scanning radiological walkover surveys (i.e., soil, concrete surfaces, debris) using a handheld detector and visual surveys to identify biased sampling locations.	Х	Х	Х	Х
Field screened samples for alpha and beta/gamma radiation using a hand-held survey instrument.	Х	Х	Х	Х
Performed swipe sampling for removable radioactivity using a hand-held survey instrument and/or a gamma scintillator.	х		Х	Х
Collected soil samples from biased locations to determine whether COCs are present (Decision I) and from step-out sample locations to define the extent of COCs (Decision II).				X
Collected liquid, solid, oil, and paint samples from materials and equipment within the facility for waste characterization to support disposal recommendations and determine whether the waste could be a potential source of contamination for the environment (i.e., soil).	Х			
Removed PCB-contaminated and Ra-226 contaminated soil and collected verification samples.				Х
Removed assumed PSMs without sampling (e.g., lead shielding, mercury-containing thermometers, PCB-containing capacitors).	Х			
Collected samples to characterize future demolition wastes.	Х			
Investigated underground vaults.	Х			
Isolated and sealed all utility and drain systems.	Х	Х		
Submitted select samples for offsite laboratory analysis.	Х	Х	Х	Х
Collected GPS coordinates for sample locations and points of interest.				Х

^{-- =} Not applicable

information obtained during site visits, and site conditions as provided in the CAU 117 SAFER Plan (NNSA/NSO, 2007). Sampling points were selected based on the approach provided in the SAFER Plan. Actual environmental sample locations are shown on the figures included in Section D.3.0. In some cases, field-screening results (FSRs) and/or laboratory analytical results determined the need

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for step-out sampling locations. Sample locations were staked where appropriate and labeled. The majority of sample locations were surveyed with a GPS instrument. A Trimble Pathfinder ProXRSTM GPS instrument was used for determining the sample location coordinates as well as CAS points of interest.

D.2.2 Investigation Activities

The investigation activities performed at CAU 117 were based on field investigation activities discussed in the CAU 117 SAFER Plan (NNSA/NSO, 2007). The technical approach consisted of the activities listed in Table D.2-1. The investigation strategy allowed the nature and extent of contamination associated with CAS 26-41-01 to be established. Section D.3.0 describes the specific investigation activities that took place at CAU 117.

D.2.2.1 Surface and Subsurface Soil Sampling

Soil samples were collected using "scoop and trowel" (surface hand-grab sampling), hand auger, and backhoe operations. All sample locations were initially field screened for alpha and beta/gamma radiation before the start of sampling. Additional screening was conducted during sample collection to guide the investigation and serve as a health and safety control to protect the sampling team. Labeled sample containers were filled according to the following sequence: Soil was transferred into aluminum pans, homogenized, and field screened for alpha and beta/gamma radiation. Sample containers were then filled and any excess soil was returned to its original location.

Surface soil samples were collected from 0.0 to 0.5 ft bgs at biased locations such as aboveground features, areas with elevated radiological measurements, and areas determined by process knowledge. Subsurface soil samples were collected as a continuation at surface soil sample locations where FSRs or analytical results indicated contamination.

D.2.2.2 Waste Characterization Sampling

Characterization of CAS-specific components, objects, materials, and waste was performed to support recommendations for disposal of these items and determine whether the waste in question could be acting as a source of potential soil contamination. Investigation methods included visual inspection, radiological surveys, and direct sampling. Waste characterization activities were intended

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to gather adequate information and data about the CAS to support decisions regarding the disposal of materials located within the CAS.

Samples were analyzed in accordance with the CAU 117 SAFER Plan (NNSA/NSO, 2007). The specific analyses from the waste streams generated are listed in Section D.4.0. The analytical results are compared to the federal limits for hazardous waste, NDEP hydrocarbon action limit, landfill acceptance criteria, and the limits in the NTS performance objective criteria (POC) (BN, 1995). The POC limits have been established for NTS hazardous waste generators to ensure that all hazardous waste being shipped off site contains no "added radioactivity."

The following is a list of media that were sampled for waste characterization purposes:

- Swipe samples collected from debris and other equipment and material.
- Presumed asbestos-containing material samples collected from insulation, floor tiles and mastic, and other materials.
- Used oil and aqueous liquids samples from equipment and utility systems.
- Soil and sediment samples.
- Other PSMs.

Asbestos sampling was conducted at CAS 26-41-01 following the EPA guidance document *Asbestos in Buildings: Simplified Sampling Scheme for Friable Surfacing Materials* (EPA, 1985). A minimum of three independently numbered samples were collected from insulation and other materials to determine whether PACM is present. Sample locations were selected so that they were representative of the sampling area and material being sampled. For very small areas (less than 1,000 square feet [ft²]), collecting three samples per homogeneous area is the recommended procedure (EPA, 1985).

D.2.3 Laboratory Analytical Information

Radiological and chemical analyses were performed by General Engineering Laboratories in Charleston, South Carolina; and Paragon Analytics, Inc., of Fort Collins, Colorado. Asbestos, beryllium, and lead samples were analyzed by ALS Laboratory Group (formerly Data Chem

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Laboratories) of Salt Lake City, Utah. The analytical suites and laboratory analytical methods used to analyze investigation samples are listed in Table D.2-2. Analytical results are reported in this appendix if they were detected above the MDCs. The complete laboratory data packages are available in the project files.

Validated analytical data for CAU 117 investigation samples have been compiled and evaluated to confirm the presence of contamination and define the extent of contamination, if present. Samples collected during step-out sampling were only analyzed for the COPCs that exceeded FALs in the original samples. The analytical results for environmental samples collected at CAS 26-41-01 are presented in Section D.3.0. Waste sample results are provided in Section D.4.0. The analytical parameters were selected through the application of site process knowledge according to the DQOs presented in Appendix A.

Table D.2-2
Laboratory Analyses and Methods, CAU 117 Investigation Samples^a
(Page 1 of 2)

Analysis	Analytical Method ^b
VOCs	Aqueous/Non-aqueous - EPA SW-846° 8260
SVOCs	Aqueous/Non-aqueous - EPA SW-846° 8270
TCLP SVOCs	EPA SW-846° 1311/8270
PCBs	Aqueous/Non-aqueous - EPA SW-846° 8082
TPH-DRO	Aqueous/Non-aqueous - EPA SW-846° 8015 Modified
Metals	Aqueous - EPA SW-846° 6010/6020/7470 Non-aqueous - EPA SW-846° 6010/6020/7471
TCLP Metals	EPA SW-846° 1311/6010/7470
Bulk Asbestos	NIOSH 9002 ^d
Isotopic U	Aqueous/Non-aqueous - DOE EML HASL-300° U-02-RC
Isotopic Pu	Aqueous - DOE EML HASL-300° Pu-10-RC Non-aqueous - DOE EML HASL-300° Pu-02-RC
Gamma Spectroscopy	Aqueous - EPA 901.1 ^f Non-aqueous - DOE EML HASL-300°, Ga-01-R
Sr-90	Aqueous - EPA 905.0 ^f Non-aqueous - DOE EML HASL-300 ^e Sr-02-RC
Gross Alpha/Beta	Aqueous - EPA 900.0 ^f Non-aqueous - SM 7110 B ⁱ Modified

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Table D.2-2 Laboratory Analyses and Methods, CAU 117 Investigation Samples^a (Page 2 of 2)

Analysis	Analytical Method ^b
Tritium	Aqueous - EPA 906.0 ^f Non-aqueous ^b
Beryllium	NIOSH 7300

^aInvestigation samples include both environmental and waste characterization samples and associated QC samples.

Note: The term "modified" indicates modifications of approved methods. All modifications have been approved by SNJV's Analytical Services Department.

ASTM = American Society for Testing and Materials

EERF = Eastern Environmental Radiation Facility

EML = Environmental Measurements Laboratory

HASL = Health and Safety Laboratory

NIOSH = National Institute for Occupational Safety and Health

Pu = Plutonium

RESL = Radiological and Environmental Sciences Laboratory

Sr = Strontium

SVOC = Semivolatile organic compound

TCLP = Toxicity Characteristic Leaching Procedure

VOC = Volatile organic compound

D.2.4 Comparison to Action Levels

A COC is defined as any contaminant present in environmental media exceeding a FAL. If COCs are present, corrective action must be considered for the CAS. The FALs for the CAU 117 investigation are defined for CAS 26-41-01 in Appendix H. Results that are equal to or greater than FALs are identified by bold text in the CAS-specific results tables (Section D.3.0).

The presence of a COC would require a corrective action. A corrective action may also be necessary if there is a potential for wastes that are present at a site (i.e., PSM) to release COCs into site environmental media.

^bThe most current EPA, DOE, ASTM, NIOSH, or equivalent accepted analytical method may be used, including Laboratory Standard Operating Procedures approved by SNJV in accordance with industry standards and the SNJV Statement of Work requirements.

^cTest Methods for Evaluating Solid Waste, Physical/Chemical Methods (EPA, 2008).

^dNIOSH Manual of Analytical Methods (NMAM) (NIOSH, 1994).

^eThe Procedures Manual of the Environmental Measurements Laboratory (DOE, 1997).

¹Prescribed Procedures for Measurement of Radioactivity in Drinking Water, (EPA, 1980).

⁹RESL Technical Procedure CHEM-TP-Ni.1 Determination of ⁶³Ni in Water (RESL, 1999).

^hEastern Environmental Radiation Facility Radiochemical Procedures Manual (EPA, 1984).

Standard Methods for the Examination of Water and Wastewater (Clesceri, et al., 1998).

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To evaluate PSM for the potential to result in the introduction of a COC to the surrounding environmental media, the following conservative assumptions were made:

- Any existing physical waste containment would fail at some point, and the contents would be released to the surrounding media.
- The resulting concentration of contaminants in the surrounding media would be equal to the concentration of contaminants in the waste.
- Any liquid waste containing a contaminant exceeding the RCRA toxicity characteristic concentration would cause a COC to be present in the surrounding media if the liquid were released.
- Any nonliquid waste containing a contaminant exceeding an equivalent FAL concentration would cause a COC to be present in the surrounding media.

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D.3.0 CAU 117, Area 26 Pluto Disassembly Facility, Investigation Results

D.3.1 CAU 117 SAFER Plan Activities

A total of 48 environmental samples (including 4 FDs) and 33 waste characterization samples (including 6 that were characterized for PSM purposes) were collected during investigation activities at CAS 26-41-01. The sample IDs, locations, types, and analyses are listed in Table D.3-1. The specific closure activities conducted to satisfy the CAU 117 SAFER Plan requirements (NNSA/NSO, 2007) are described in the following sections.

D.3.1.1 Field Screening

Field-screening for alpha and beta/gamma radiation was performed at CAU 117 to support closure activities. Site-specific FSLs for alpha and beta/gamma radiation were defined as the mean background activity level plus two times the standard deviation of readings from 10 background locations selected near CAS 26-41-01. The radiation FSLs are instrument-specific and were established for each instrument before use. Alpha and beta/gamma radiation screening was performed using an NE Technology Electra fitted with a DP6BD dual-alpha and beta/gamma radiation probe.

Environmental soil samples were field screened for alpha and beta/gamma radiation. The FSRs were compared to FSLs to guide subsequent sampling decisions where appropriate. The gross alpha radiation FSL of 102 disintegrations per minute per 100 square centimeters (dpm/100cm²) and beta/gamma radiation FSL of 2,991 dpm/100cm² were exceeded in one surface (0 to 0.5 ft bgs) sample (117AF028) at location AF18 with FSRs of 1,002 dpm/100cm² alpha and 14,500 dpm/100cm² beta/gamma. Therefore, a subsurface (1.0 to 1.5 ft bgs) sample was collected (117AF044), and the FSRs were below the FSLs.

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Table D.3-1 Samples Collected at CAS 26-41-01, Pluto Disassembly Facility

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Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	DRO	Gamma Spectroscopy	Gross Alpha/Beta	Metals + Beryllium	PCBs	Plutonium	Strontium	SVOCs	TCLP Metals	TCLP SVOCs	Tritium	Uranium	VOCs
AF01	117AF008	0.0 - 0.5	Soil	Environmental	Х	Х		Х	Х	Х	Х	Х				Х	Х
AF02	117AF009	0.0 - 0.5	Soil	Environmental	Х	Х		Х	Х	Х	Х	Х				Х	Х
AF03	117AF010	0.0 - 0.5	Soil	Environmental	Х	Х		Х	Х	Х	Х	Х				Х	Х
AF04	117AF011	0.0 - 0.5	Soil	Environmental	Х	Х		Х	Х	Х	Х	Х				Х	Х
AF05	117AF012	0.0 - 0.5	Soil	Environmental	Х	Х		Х	Х	Х	Х	Х				Х	Х
AF06	117AF013	0.0 - 0.5	Soil	Environmental	Х	Х		Х	Х	Х	Х	Х				Х	Х
AFOO	117AF014	0.0 - 0.5	Soil	FD of 117AF013	Х	Х		Х	Х	Х	Х	Х				Х	Х
AF06A	117AF015	1.0 - 1.5	Soil	Environmental					Х								
AFUGA	117AF016	1.0 - 1.5	Soil	FD of 117AF015					Х								
AF06B	117AF031	2.0 - 2.5	Soil	Environmental					Х								
	117AF017	0.0 - 0.5	Soil	Environmental					Х								
AF07	117AF032	1.0 - 1.5	Soil	Environmental					Х								
AFU7	117AF033	2.0 - 2.5	Soil	Environmental					Х								
	117AF034	2.0 - 2.5	Soil	FD of 117AF033					Х								
	117AF018	0.0 - 0.5	Soil	Environmental					Х								
AF08	117AF035	1.0 - 1.5	Soil	Environmental					Х								
	117AF036	2.0 - 2.5	Soil	Environmental					Х								
AF09	117AF019	0.0 - 0.5	Soil	Environmental					Х								
AF10	117AF020	0.0 - 0.5	Soil	Environmental					Х								

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Table D.3-1 Samples Collected at CAS 26-41-01, Pluto Disassembly Facility

(Page 2 of 6)

Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	DRO	Gamma Spectroscopy	Gross Alpha/Beta	Metals + Beryllium	PCBs	Plutonium	Strontium	SVOCs	TCLP Metals	TCLP SVOCs	Tritium	Uranium	VOCs
AF11	117AF021	0.0 - 0.5	Soil	Environmental					Х								
AF12	117AF023	0.0 - 0.5	Soil	Environmental					Х								
AF13	117AF024	0.0 - 0.5	Soil	Environmental					Х								
AF14	117AF025	0.0 - 0.5	Soil	Environmental					Х								
AF15	117AF026	0.0 - 0.5	Soil	Environmental	Х	Х		Х	Х	Х	Х	Х				Х	Х
AF15	117AF030	2.0 - 2.5	Soil	Environmental	Х	Х		Х	Х	Х	Х	Х				Х	Х
AF16	117AF027	0.0 - 0.5	Soil	Environmental	Х	Х		Х	Х	Х	Х	Х				Х	Х
AF17	117AF029	3.0 - 3.5	Soil	Environmental	Х	Х		Х	Х	Х	Х	Х				Х	Х
AF18	117AF028	0.0 - 0.5	Soil	Environmental		Х				Х	Х					Х	
AFIO	117AF044	1.0 - 1.5	Soil	Environmental		Х											
AF19	117AF037	0.0 - 0.5	Soil	Environmental					Х								
AF19	117AF038	1.0 - 1.5	Soil	Environmental					Х								
AF20	117AF039	0.0 - 0.5	Soil	Environmental					Х								
AF20	117AF040	1.0 - 1.5	Soil	Environmental					Х								
AF21	117AF041	0.5 - 1.0	Soil	Environmental					Х								
AF22	117AF042	0.5 - 1.0	Soil	Environmental					Х								
AFZZ	117AF043	0.5 - 1.0	Soil	FD of 117AF042					Х								
AF23	117AF045	3.0 - 3.5	Soil	Environmental					Х								
AF24	117AF046	3.0 - 3.5	Soil	Environmental					Х								

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Table D.3-1 Samples Collected at CAS 26-41-01, Pluto Disassembly Facility

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Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	DRO	Gamma Spectroscopy	Gross Alpha/Beta	Metals + Beryllium	PCBs	Plutonium	Strontium	SVOCs	TCLP Metals	TCLP SVOCs	Tritium	Uranium	VOCs
AF25	117AF047	3.0 - 3.5	Soil	Environmental					Х								
AF26	117AF048	3.0 - 3.5	Soil	Environmental					Х								
AF27	117AF049	0.0 - 0.5	Soil	Environmental					Х								
AF28	117AF050	5.0 - 5.5	Soil	Environmental					Х								
AF29	117AF051	5.0 - 5.5	Soil	Environmental					Х								
AF30	117AF052	5.0 - 5.5	Soil	Environmental					Х								
AF31	117AF053	5.0 - 5.5	Soil	Environmental					Х								
AF32	117AF054	0.0 - 0.5	Soil	Environmental					Х								
AF33	117AF055	5.0 - 5.5	Soil	Environmental					Х								
AF34	117AF056	5.0 - 5.5	Soil	Environmental					Х								
N/A	117AF302	N/A	Water	Field Blank	Х	Х		Х	Х	Х	Х	Х				Х	Х
Sample Area	117AF306	N/A	Water	Field Blank.	Х	Х		Х	Х	Х	Х	Х				Х	Х
N/A	117AJ301	N/A	Water	Trip Blank													Х
Sample Table	117A301	N/A	Water	Trip Blank													Х
Sample Table	117A302	N/A	Water	Trip Blank													Х
Sample Table	117AF301	N/A	Water	Trip Blank													Х
Sample Table	117AF304	N/A	Water	Trip Blank													Х
Sample Table	117AF305	N/A	Water	Trip Blank													Х
Sample Table	117AH303	N/A	Water	Trip Blank													Х

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Table D.3-1 Samples Collected at CAS 26-41-01, Pluto Disassembly Facility

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Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	DRO	Gamma Spectroscopy	Gross Alph <i>a</i> /Beta	Metals + Beryllium	PCBs	Plutonium	Strontium	SVOCs	TCLP Metals	TCLP SVOCs	Tritium	Uranium	VOCs
Sample Area	117AF307	N/A	Water	Equipment rinsate	Х	Х		Х	Х	Х	Х	Х				Х	Х
Basement E. Filter Bank	117AF01	N/A	Solid	PSM/Waste Management		Х	Х			Х	Х					Х	
Basement W. Filter Bank	117AF02	N/A	Solid	PSM/Waste Management		Х	Х			Х	Х					Х	
Composite of Drums	117AH501	N/A	Solid	PSM/Waste Management	Х	Х	ı	Х	Х	Х	Х	Х				Х	Х
Room 103 Filter Media	117GF01	N/A	Solid	PSM/Waste Management		х	Х	1		Х	Х					Х	
Room 107	117L003	N/A	Solid	PSM/Waste Management		Х		Х		Х	Х					Х	
Wood Shed	117AH502	N/A	Solid	PSM/Waste Management		Х		Х		Х	Х					Х	
Basement Chiller Unit	117A512	N/A	Oil	Waste Management		Х	ı	1									
Bldg. 2201	117A501	N/A	Liquid	Waste Management		Х	Х	Х		Х	Х	Х			Х	Х	Х
Drum #117A57	117AF501	N/A	Oil	Waste Management		Х		Х	Х	Х	Х					Х	
Drum #117A39	117A502	N/A	Liquid	Waste Management			Х										
Leaded-Glass Windows	117M501	N/A	Oil	Waste Management		Х		Х	Х	Х	Х					Х	
Algaecide Tablets	117A504	N/A	Solid	Waste Management		Х											
Pm-290 Lubricant	117A505	N/A	Solid	Waste Management		Х											
Vibra-Tite Liquid	117A506	N/A	Liquid	Waste Management		Х											

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Table D.3-1 Samples Collected at CAS 26-41-01, Pluto Disassembly Facility

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Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	DRO	Gamma Spectroscopy	Gross Alpha/Beta	Metals + Beryllium	PCBs	Plutonium	Strontium	SVOCs	TCLP Metals	TCLP SVOCs	Tritium	Uranium	VOCs
Unknown Powder	117A507	N/A	Solid	Waste Management		Х		Х		Х	Х					Х	
Thrice Liquid	117A508	N/A	Liquid	Waste Management		Х											
Flourinert Liquid	117A509	N/A	Liquid	Waste Management		Х		Х		Х	Х					Х	
Unknown Putty	117A510	N/A	Solid	Waste Management	Х	Х		Х	Х	Х	Х	Х				Х	Х
Zep-Flo Liquid	117A511	N/A	Liquid	Waste Management		Х											
Water Tower	117AGP01	N/A	Paint Chip	Waste Management									Х				
Contents of HEPA Vacuum	117AJ501	N/A	Solid	Waste Management	х	Х	ı	Х	Х	Х	Х	Х	Х			Х	х
Contents of HEPA Vacuum	117AJ502	N/A	Solid	Waste Management	х	Х		Х	Х	Х	Х	Х	Х			Х	х
Contents of HEPA Vacuum	117AJ503	N/A	Solid	Waste Management	х	Х		Х	Х	Х	Х	Х	Х			Х	Х
Concrete Core Water	117AJ504	N/A	Liquid	Waste Management		Х	Х	Х		Х	Х				Х	Х	
Process Water	117A503	N/A	Liquid	Waste Management		Х	Х	Х		Х	Х	Х			Х	Х	Х
R-107	117L501	N/A	Liquid	Waste Management					Х								
Room 104 Paint from Walls	117HP02	N/A	Paint Chip	Waste Management		Х											
Room 104 Wall Peeling Paint	117HP01	N/A	Paint Chip	Waste Management		Х	Х		Х	Х	Х		Х		Х	Х	-
Room 106 Paint from Walls	117KP01	N/A	Paint Chip	Waste Management		Х	Х			Х	Х				Х	Х	

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Table D.3-1 Samples Collected at CAS 26-41-01, Pluto Disassembly Facility

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Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	DRO	Gamma Spectroscopy	Gross Alpha/Beta	Metals + Beryllium	PCBs	Plutonium	Strontium	SVOCs	TCLP Metals	TCLP SVOCs	Tritium	Uranium	VOCs
Room 107 Floor	117LF01	N/A	Solid	Waste Management		Х	Х			Х	Х				Х	Х	
Room 107 Peeling Paint	117LP01	N/A	Paint Chip	Waste Management		х	Х	-	Х	Х	Х		Х		Х	Х	
Room 108 Cold Cell Window	117MF01	N/A	Oil	Waste Management		Х	Х	Х	Х	Х	Х				Х	Х	
Sample Table	117A513	N/A	Solid	Waste Management									Х	Х			

^{-- =} Not required

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D.3.1.2 Radiological Surveys

Building 2201 is located within a fenced area that is posted as a "Controlled Area" due to historical operations. Radiological walkover surveys included an approximate 1,000-m² area within the fenced area surrounding the exterior of Building 2201, Main Disassembly Bay (Room 102), and the hot cells (Rooms 104, 106, and 107). A grid system was used to facilitate the area survey with a 100 percent surface scan performed on each 1-m² grid. Radiological conditions were collected from 1,008 points. The results can be segregated into two groups: the paved and the unpaved surfaces. All readings, except at two locations, are indistinguishable from background. The two locations with elevated radiological readings are located outside the Main Assembly Bay (Room 102). One location, less than 100 square centimeters in size on the concrete pad, has fixed contamination up to 16,700 dpm/100cm² alpha and 30,700 dpm/100cm² beta/gamma. While there is no posting requirement for this level of contamination, the spot has been conspicuously marked for easy identification. The second location is near the southeast corner of the building outside the bi-parting door on the edge of the pavement and extending into the adjacent soil. As a result of this survey, the soil was sampled, and approximately 1 ft³ of soil was subsequently removed based on the presence of Ra-226 contamination (see Section D.3.1.6). A portion of the asphalt surface was also removed by scabbling. The radiological walkover surveys were performed using an NE Technology Electra fitted with a DP6BD dual-alpha and beta/gamma radiation probe.

Radiological surveys inside Building 2201 were conducted commensurate to the level of concern based upon known historical uses and available operational knowledge. In addition to a grid survey of each room using an NE Technology Electra, swipes were taken from the administration support areas (Rooms 103, 105, 109, 110, 112, 118), the Cold Bay (Room 101), Rooms 201 and 301 on the upper levels, and the basement area. The radiological measurements for all of these area are at or below background.

More detailed radiological surveys were conducted in the Main Assembly Bay (Room 102), the hot cells (Rooms 104, 106, and 107), and the HEPA ventilation and ducting systems due to the known and unknown historical radiological-related operations. Floor and wall surfaces (up to 8 ft high) were scanned on 1-m² grids on all accessible areas within Rooms 102, 104, 106, and 107 using an Electra. Swipes were taken to identify removable radiological contamination. The surveys did not identify any removable contamination on the wall surfaces in any of the rooms; however, several spots on the

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false floor (wood/linoleum) in Rooms 106 and 107, and the concrete floor in Room 102 showed minor fixed contamination (up to 831 dpm/100cm² alpha and 33,200 dpm/100cm² beta/gamma). No PSM was identified as a result of this survey; however, some spot removals of the radiologically contaminated flooring materials and surfaces in Room 102 were completed as a BMP. Following removal of sections of the wood/linoleum flooring in Rooms 106 and 107, and scabbling of contaminated concrete surfaces in Room 102, only minor elevated fixed readings were found.

Low levels of fixed (up to 250 dpm/100cm²) and removable (up to 93 dpm/100cm²) alpha contamination were found in Rooms 102, 104, 106, and 107 on elevated horizontal surfaces of cranes, beams, and other fixtures. As a result of this survey, fixtures and walls above 8 ft in these rooms were posted as Contamination Areas.

The HEPA ventilation system in Building 2201 is interconnected and, when operational, exhausted through the stack located on the northwest corner of Building 2201 (Figure D.3-1). Before closure activities began, pre-filters and 2-by-2-by-1-ft box-type HEPA filters were still in place in many locations (Figure D.3-2). The intake filter banks in Rooms 102 and 106 were posted as internally contaminated, and the filter bank in Room 103 as potentially internally contaminated.

During closure activities, a thorough survey of all accessible portions of the HEPA ventilation system revealed that all HEPA banks/plenums in Rooms 102, 103, 104, 106, and 107 showed varying levels of removable and fixed alpha contamination (Table D.3-2). Therefore, a spray fixative was applied to all of the filter frames in Rooms 102, 104, 106, and 107 to fix in place removable contamination (Figure D.3-3). After the application of the fixative, no contamination was detected. The intake plenums were covered with plastic and posted as "Radioactive Material present under encapsulation." The filter banks in Room 103, and the basement are enclosed behind a set of double doors. The doors have been closed and sealed with radiological postings in place. While no contamination was detected in the filter banks located in the basement, it was decided to post the entire HEPA ventilation system as "Radioactive Material present under encapsulation" due to the potential for contamination beyond the reach of the survey. Radiological survey of the filter banks/plenums in the basement did not identify any radiological contamination. The metal framework on the intake pre-filter banks in Rooms 106 and 107 were loose and posed a potential physical safety hazard to personnel (Figure D.3-4). As such, the framework was removed and disposed during closure activities (see

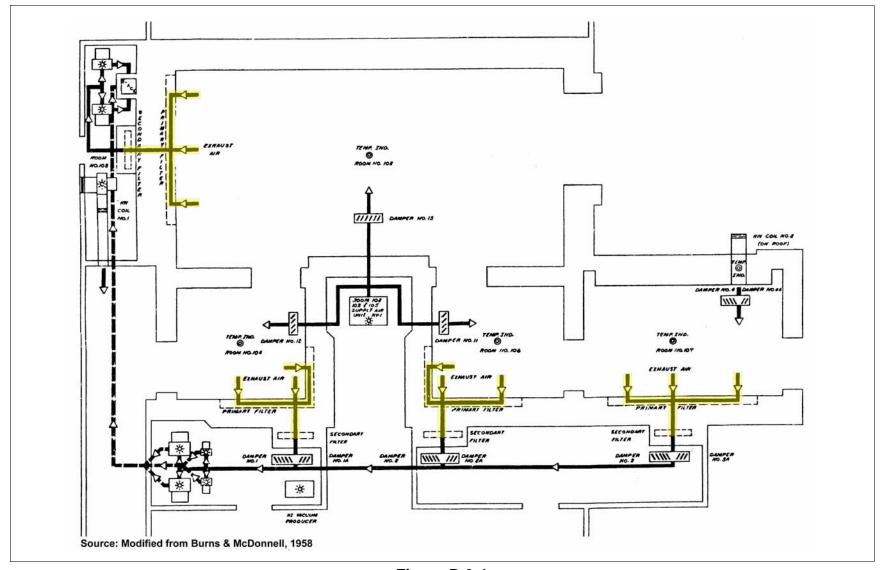


Figure D.3-1 CAU 117, Building 2201 Schematic of HEPA Ventilation System

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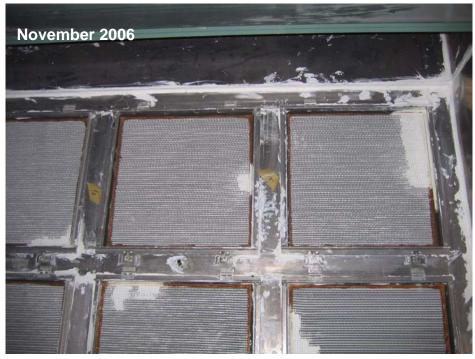


Figure D.3-2
Building 2201 HEPA Filter Banks (typical) with Filters Removed (above) and Filters in Place (below)

Table D.3-2 Maximum Radioactive Contamination Detected by Survey on the HEPA Filter Frames at CAS 26-41-01 (dpm/100cm²)

Location	Fixed + R	emovable	Removable							
Location	Alpha	Beta/Gamma	Alpha	Beta/Gamma						
Room 102 W	855	101	214	42						
Room 104 S	1,695	203	232	56						
Room 104 E	1,199	693	105	0						
Room 106 S	1,779	2,243	120	189						
Room 106 W	3,939	5,425	244	268						
Room 107 SW	408	110	0	0						
Room 107 SE	31	63	0	1						

Section D.4.1.7). All pre-filters and primary filters were removed from Building 2201 during closure activities as a PSM through a corrective action, or as a BMP (for uncontaminated filters).

D.3.1.3 Visual Inspections

Visual inspection of Building 2201 and the surrounding area within the perimeter fence did not identify any staining on concrete, asphalt, or soil surfaces. All surface drains were visually inspected, and there were no recoverable sediments observed in any of the floor drains.

D.3.1.4 Isolated and Sealed Utility Systems and Floor Drains

Building 2201 was served by two separate drain systems, a sanitary waste system, and a hot or radioactive waste system. The sanitary waste system was tied to a sanitary leachfield and septic system (CAU 271, CAS 26-05-04) located to the south of Building 2201. The floor drains associated with the sanitary waste system are primarily located in the basement and the main operating floor (administrative area). The remaining floor drains within Building 2201 are connected to the hot waste system. The hot waste drainage system was connected to a radioactive leachfield (CAU 271, CAS 26-05-01) located approximately 1,600 ft southeast of Building 2201 via an 8-in. pipe system. The hot waste floor drains within the building are primarily located with the Main Disassembly Bay (Room 102), the hot cells (Rooms 104, 106, and 107), and the Cold Bay (Room 101). Additional surface drains tied to the hot waste system are located at the bottom of the bi-parting door pit and approximately 100 ft east of Building 2201 along the railroad tracks under drainage grates.

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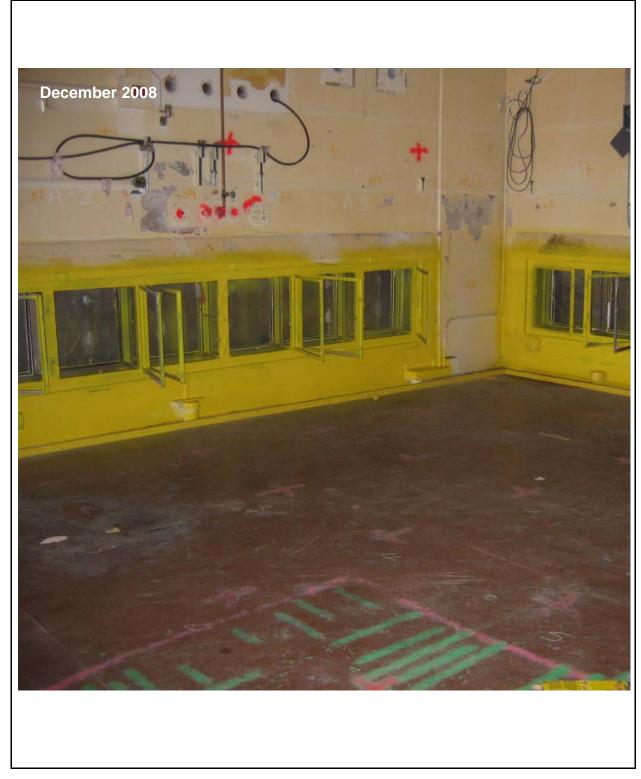


Figure D.3-3
Building 2201 HEPA Ventilation Intakes with Fixative Applied

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Figure D.3-4
HEPA Ventilation Pre-Filter Intake Frame in Extended (down) Position

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Radiological surveys using an Electra were performed to identify any fixed or removable contamination. There were no elevated radiological readings or recoverable sediments observed in either drain system. All floor and surface drains were sealed with grout to prevent future infiltration of surface water. All floor drains were sealed with grout. The surface drains located at the bottom of the bi-parting door pit were inaccessible due to the pit being considered a confined space and the associated hazards with personnel entry. The drains below the bi-parting door were sealed by placing approximately 12 yd³ (two concrete truck loads) of grout into the pit.

D.3.1.5 Vault Investigation

Building 2201 contains four underground vaults located in Rooms 104, 106, and 107 (Figure 2-4). Rooms 104 and 106 each contain a single vault, and Room 107 contains two vaults. Because no specific information was available regarding the present status of the vaults, the vault interiors were investigated.

The vaults are 5-ft-square and 10-ft-deep pits constructed of high-density barite concrete. Each vault is covered by three 1-ft-thick barite concrete lids, for a total depth of 13 ft bgs (Figure 2-5). Barite concrete is a barium sulfate based cement used for shielding of ionizing radiation X-rays. Due to the potential for discovery of contamination or other source materials within the vaults, the investigation was designed to minimize/eliminate exposure of potential contamination to workers. The following methods were used to complete investigation of the four vaults:

- A lightweight portable containment tent with nuclear grade HEPA filtration system was used to maintain air quality and control potential airborne contamination. The containment tent and HEPA system were transported from vault to vault and placed on top of the vault for each investigation. The HEPA filters were tested and certified at the DOE Filter Test Facility in Baltimore, Maryland, and performance tested before use at the NTS to ensure protection of human health and the environment.
- A portable concrete core drill was used to penetrate the concrete lids into the vaults. The core
 drill was equipped with a water deluge system for lubrication and cooling. At completion of
 the investigation, the core holes in the lids were grouted to eliminate a migration pathway into
 the vaults. The deluge water was collected and sampled at the end of the drilling activity.
- Radiological and environmental monitoring was performed within each vault to identify
 potential sources of contamination, and personnel safety. A Ludlum 2221 scaler with 4421
 and 4410 probes were lowered into the vault to monitor for potential radiological

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contamination. A Q-Rae+ Four Gas Meter, Model PGM 2000 was used to perform air monitoring within the underground vaults for worker safety and identification of potential contamination sources. The Four Gas meter was used to monitor the atmosphere within the vaults for oxygen content, hydrogen sulfide, LEL, and carbon monoxide.

• Video surveys were conducted within each vault using a video camera to identify residual material, PSMs, or breaches that may serve as a release pathway.

No radiological contamination was found, and all readings were indistinguishable from the background. Readings using a Ludlum 2221 scaler from inside the vault ranged between 561 and 1,290 counts per minute (cpm), while the background at the surface ranged between 606 and 1,040 cpm. All industrial hygiene monitoring levels were normal (e.g., oxygen content, hydrogen sulfide, LEL, and carbon monoxide).

Video survey of the vaults identified a multishelved metal storage rack in three of the four vaults (Figure D.3-5). In each of the three vaults with the metal rack, each shelf of the rack was penetrated until the bottom of the vault was reached. The video survey revealed no breaches or residual materials in the vaults with the following exception. The video survey within the east vault in Room 107 identified several small paper sacks of a mineral-like substance. A sample (117L003) of the material was retrieved from the vault and analyzed for PSM purposes (see Section D.3.1.6). This material did not contain any COCs. Video survey of the vault located in Room 104 identified two small metal boxes located on the bottom shelf of the metal storage rack. One metal box was breached during the drilling operations and determined to be empty. The second metal box was observed to be identical to the first box and was assumed to be empty. No further investigation of the second box was attempted.

D.3.1.6 Sample Collection

Decision I environmental sampling activities included the collection of surface and subsurface soil samples. A total of 37 soil samples (including 3 FDs) were collected from 6 locations (AF01 through AF06) around Building 2201; 16 locations (AF07 through AF09, AF11 through AF14, AF20 and AF21, AF23 through AF27, and AF33 and AF34) on the south side of Building 2201; 3 locations (AF15 through AF17) from the service pit within the Cold Bay (Room 101); and 1 location (AF18) on the east side of Building 2201 near the entrance to the Main Disassembly Bay (Room 102). Decision I environmental sample locations are shown on Figure D.3-6.

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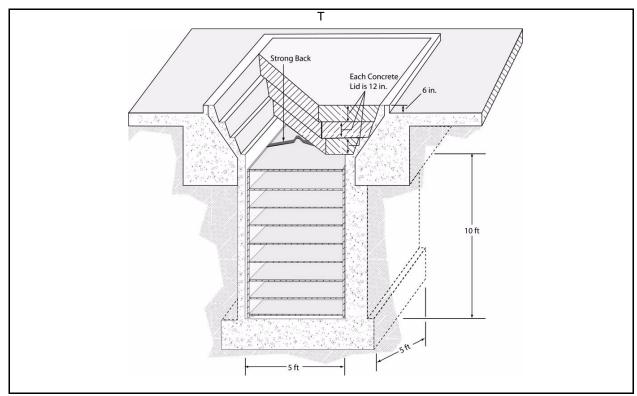


Figure D.3-5
Diagram of Multishelved Metal Storage Rack in Vaults
at the Pluto Disassembly Facility

Samples at locations AF01 through AF06 were collected based upon locations of roof drains, heavy-traffic areas, and other potential likely sources of contamination. Samples at locations AF07 through AF09, AF11 through AF14, AF20 and AF21, AF23 through AF27, and AF33 and AF34 were collected to determine the extent of PCB-contaminated soil that was identified at location A06 (Figure D.3-7). Samples at locations AF15 through AF17 were selected based upon the historical use of the service pit located in Room 101 for maintenance and repair of railcars and locomotives during facility operations (Figure D.3-8). The sample at location AF18 was collected due to elevated radiation readings recorded during the site walkover survey. The sample was collected in a narrow utility trench between an area of asphalt and concrete (Figure D.3-9).

Six PSM samples were collected to determine whether wastes could be a potential source of contamination and release to environmental media. Media sampled included unknown solid material, solid filter materials, and solid absorbent material. Thirty-one drums that were located inside the wood shed contained an unknown white, powdery material from which a composite sample was

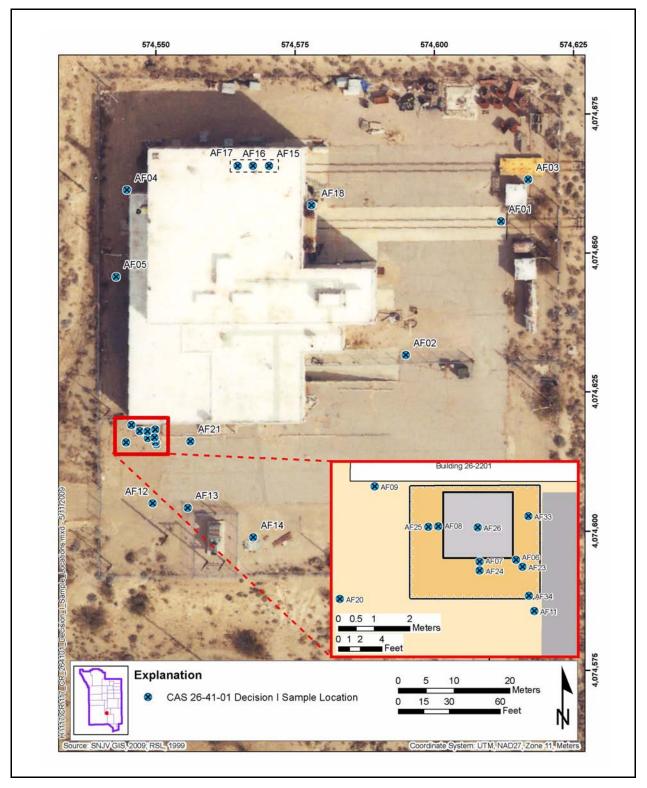


Figure D.3-6
Decision I Environmental Sample Locations

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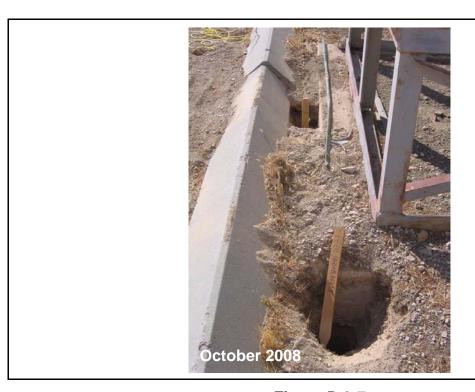


Figure D.3-7
Soil Sample Locations at Base of Cooling Tower, South Side of Building 2201



Figure D.3-8
Room 101 Service Pit, Sample Locations AF15, AF16, and AF17

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Figure D.3-9
Area of Ra-226 Soil Contamination

collected (117AH501). Also located in the wood shed were box filters containing a yarn-like filter material from which a composite sample was collected (sample 117AH502). Sample 117GF01 was collected from HEPA pre-filters located in the Room 103 filter bank, and samples 117AF01 and 117AF02 were collected from HEPA filters in the basement east and west filter banks, respectively. The HEPA filters were suspected to contain radiological contamination. The video survey within the east vault in Room 107 identified several small paper sacks of a mineral-like substance that was also sampled (117L003). See Section D.4.0 for final disposition of wastes sampled for PSM purposes.

Decision II sampling activities included the collection of step-out surface and subsurface samples from two areas to define the lateral and vertical extent of PCB (Figure D.3-10) and Ra-226 (Figure D.3-11) soil contamination. Decision II samples were collected around the perimeter of the cooling tower to determine the lateral and vertical extent of PCB soil contamination identified at location AF06. Surface samples from locations AF10, AF19, AF22, and AF32 define the lateral extent of PCB contamination, and subsurface samples from locations AF28, AF29, AF30, and AF31 define the vertical extent of contamination to be approximately 5.0 to 5.5 ft bgs. Approximately 50 yd³ of soil was removed as part of the corrective action (Figure D.3-12), and analytical results

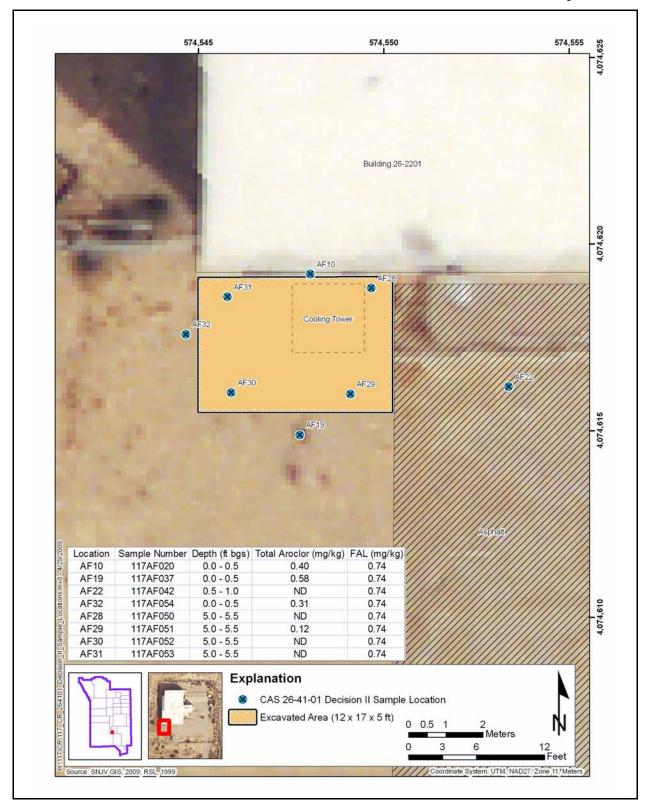


Figure D.3-10

Decision II Environmental Sample Locations Associated with PCB Soil Contamination

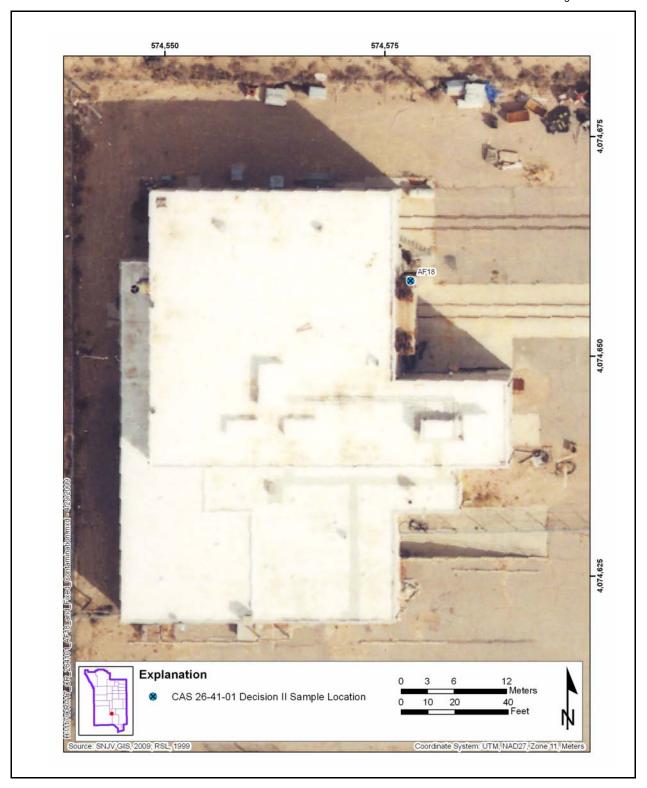


Figure D.3-11
Decision II Environmental Sample Location
Associated with Ra-226 Contaminated Soil



Figure D.3-12
Area of Excavated PCB-Contaminated Soil

from the final verification samples were all below the FAL for total Aroclor. A subsurface vertical step-out sample (117AF044) was also collected at location AF18 to define the vertical extent of radiologically contaminated (Ra-226) soil that was located in a narrow trench and bound laterally by asphalt and concrete. Scabbled parts of the asphalt surface and contaminated soil to approximately 1 ft below grade was removed as part of the corrective action. Analytical results from the verification sample were below the FAL for Ra-226, confirming that the contaminated soil had been removed. Both excavated areas were backfilled with native soil.

Samples of liquid, oil, paint, and various solid materials were collected at this CAS for the purpose of waste characterization and disposal determination. The analytical results for waste characterization samples are discussed in Section D.4.0.

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D.3.1.7 Deviations

Investigation samples were collected as outlined in the CAU 117 SAFER Plan (NNSA/NSO, 2007) and submitted for laboratory analysis. There were no deviations to the planned sampling activities.

D.3.2 Investigation Results

The following sections provide analytical results from the samples collected to complete investigation activities as outlined in the SAFER Plan (NNSA/NSO, 2007). Investigation samples were analyzed for the SAFER Plan-specified COPCs, which included VOCs, SVOCs, TPH-DRO, RCRA metals, PCBs, gamma-emitting radionuclides, isotopic U, isotopic Pu, and Sr-90. The analytical parameters and laboratory methods used to analyze the investigation samples are listed in Table D.2-2. Table D.3-1 lists the sample-specific analytical suite for CAS 26-41-01. The waste characterization analytical results are discussed in Section D.4.0.

Analytical results from the soil samples with concentrations exceeding MDCs are summarized in the following sections. An evaluation was conducted on all contaminants detected above MDCs by comparing individual concentration or activity results against the FALs. Establishment of the FALs is presented in Appendix H. The FALs were established as the corresponding PAL concentrations or activities if the contaminant concentrations were below their respective PALs.

D.3.2.1 Volatile Organic Compounds

Analytical results for VOCs in soil samples collected at this CAS that were detected above MDCs are presented in Table D.3-3. No VOCs were detected at concentrations exceeding their respective PALs; therefore, the FALs were established at the PAL concentrations.

D.3.2.2 Semivolatile Organic Compounds

Analytical results for SVOCs in soil samples collected at this CAS that were detected above MDCs are presented in Table D.3-4. No SVOCs were detected at concentrations exceeding the respective PALs; therefore, the FALs were established at the PAL concentrations.

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Table D.3-3
Sample Results for Total VOCs Detected above MDCs at CAS 26-41-01, Pluto Disassembly Facility
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								C	OPCs (mg/	kg)					
Sample Location	Sample Number	Depth (ft bgs)	1,2,4-Trimethylbenzene	2-Butanone	Acetone	Acetonitrile	Benzene	Chloroform	Ethylbenzene	Methylene Chloride	p-isopropyltoluene	Styrene	Toluene	Total Xylenes	Trichlorofluoromethane
	FALs		170	110,000	54,000	1,800	1.4	0.47	400	21	2,000	1,700	520	420	2,000
AF01	117AF008	0.0 - 0.5	0.00035 (J)	0.0052 (J)	0.00833	0.0362	-		0.00145	0.00529		0.000712 (J)	0.00756	0.016	
AF02	117AF009	0.0 - 0.5	0.000302 (J)	0.0047 (J)	0.00508	0.015 (J)			0.000633 (J)	0.00335 (J)		0.000334 (J)	0.00371	0.00716	
AF03	117AF010	0.0 - 0.5								0.00226 (J)			0.000393 (J)	0.00247	
AF04	117AF011	0.0 - 0.5	0.00044 (J)	0.00413 (J)	0.00449 (J)	0.0229 (J)			0.00128	0.0044 (J)			0.00552	0.0152	
AF05	117AF012	0.0 - 0.5	0.00044 (J)	0.00456 (J)	0.00387 (J)	0.0262			0.00118	0.0036 (J)			0.00588	0.0136	
AF06	117AF013	0.0 - 0.5	0.000565 (J)	0.00917 (J)	0.0373	0.0438	0.000336 (J)		0.00276	0.00874	0.000628 (J)		0.0166	0.0292	0.00281
AI 00	117AF014	0.0 - 0.5		0.00264 (J)	0.00835	0.0132 (J)			0.00102	0.00591		0.000446 (J)	0.00631	0.0106	0.000793 (J)
AF15	117AF026	0.0 - 0.5						0.0052						0.000393 (J)	
	117AF030	2.0 - 2.5						0.0026							

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Table D.3-3
Sample Results for Total VOCs Detected above MDCs at CAS 26-41-01, Pluto Disassembly Facility (Page 2 of 2)

								C	OPCs (mg/	kg)					
Sample Location	Sample Number	Depth (ft bgs)	1,2,4-Trimethylbenzene	2-Butanone	Acetone	Acetonitrile	Benzene	Chloroform	Ethylbenzene	Methylene Chloride	p-isopropyltoluene	Styrene	Toluene	Total Xylenes	Trichlorofluoromethane
	FALs		170	110,000	54,000	1,800	1.4	0.47	400	21	2,000	1,700	520	420	2,000
AF16	117AF027	0.0 - 0.5	-			1		0.0042		1					
AF17	117AF029	3.0 - 3.5						0.0066							

^{-- =} Not detected above MDCs.

J = Estimated value

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Table D.3-4
Sample Results for Total SVOCs Detected above MDCs at CAS 26-41-01, Pluto Disassembly Facility

							С	OPCs (mg/k	g)				
Sample Location	Sample Number	Depth (ft bgs)	2-Methylnaphthalene	Acenaphthylene	Anthracene	Benzo(b)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Chrysene	Di-n-butyl phthalate	Fluoranthene	Phenanthrene	Pyrene
	FALs		190	29,000	100,000	2.1	100,000	120	210	62,000	22,000	100,000	29,000
AF01	117AF008	0.0 - 0.5		0.0132 (J)	0.0303 (J)		0.389 (J)		0.136	0.249 (J)	0.361	0.164	0.195
AF02	117AF009	0.0 - 0.5								0.445			
AF03	117AF010	0.0 - 0.5						0.181 (J)	0.0142 (J)	0.397	0.0671	0.0411	0.0509
AF04	117AF011	0.0 - 0.5								0.205 (J)			
AF05	117AF012	0.0 - 0.5								0.114 (J)			
AF06	117AF013	0.0 - 0.5				0.0144 (J)							
AFOO	117AF014	0.0 - 0.5				0.0203 (J)			0.0128 (J)		0.0149 (J)		0.0129 (J)
AF15	117AF026	0.0 - 0.5	0.0105 (J)					0.169 (J)		0.0375 (J)			
AF16	117AF027	0.0 - 0.5						0.348		0.158 (J)			

^{-- =} Not detected above MDCs.

J = Estimated value

D.3.2.3 Total Petroleum Hydrocarbons

Analytical results for TPH-DRO in soil samples collected at this CAS that were detected above MDCs are presented in Table D.3-5. Two surface samples exceeded the PAL of 100 mg/kg for TPH-DRO. The TPH-DRO was moved on to a Tier II evaluation and FALs were established for the hazardous constituents of diesel. Concentrations of the hazardous constituents of diesel did not exceed FALs; therefore, TPH-DRO is not considered a COC. The calculation of the FALs for the hazardous constituents of diesel is presented in Appendix H.

D.3.2.4 RCRA Metals and Beryllium

Analytical results for RCRA metals and beryllium in soil samples collected at this CAS that were detected above MDCs are presented in Table D.3-6. No metals were detected at concentrations exceeding their PALs; therefore, the FALs were established at the PAL concentrations.

Table D.3-5
Sample Results for TPH-DRO Detected above MDCs at CAS 26-41-01, Pluto Disassembly Facility

Sample	Sample	Depth	COPCs (mg/kg)
Location	Number	(ft bgs)	DRO
	PALs		100
AF01	117AF008	0.0 - 0.5	486 (J)
AF03	117AF010	0.0 - 0.5	14.1
AF04	117AF011	0.0 - 0.5	11.7
AF06	117AF014	0.0 - 0.5	21.7
AF15	117AF026	0.0 - 0.5	111
ALIS	117AF030	2.0 - 2.5	4.05
AF16	117AF027	0.0 - 0.5	48.3
AF17	117AF029	3.0 - 3.5	2.78 (J)

Bold indicates the value exceeds the PAL.

J = Estimated value

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Table D.3-6
Sample Results for Metals Detected above MDCs at CAS 26-41-01, Pluto Disassembly Facility

Sample	Sample	Depth				(COPCs (mg/kg)			
Location	Number	(ft bgs)	Arsenic	Barium	Beryllium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
	FALs		23	67,000	1,900	450	450	800	310	5,100	5,100
AF01	117AF008	0.0 - 0.5	13.3	299	0.68	0.37 (J)	12.9	42.3	0.02 (J-)	2.7 (J)	0.52
AF02	117AF009	0.0 - 0.5	5.6	292	0.46 (J)	0.48 (J)	8	82.9	0.021 (J-)	1.3 (J)	0.2 (J)
AF03	117AF010	0.0 - 0.5	10.6	185	0.64	0.24 (J)	9.5	26.8	0.025	2.8 (J)	0.41 (J)
AF04	117AF011	0.0 - 0.5	12.3	209	0.52	0.18 (J)	10.1	21.2	0.07	5.7 (J)	0.78
AF05	117AF012	0.0 - 0.5	14.4	237	0.7	0.15 (J)	35.1	16.4	0.012 (J-)	8.5 (J)	0.98
AF06	117AF013	0.0 - 0.5	13.4	195	0.54	0.65	18.4	76.4	0.026	7.1 (J)	0.98
Al 00	117AF014	0.0 - 0.5	13.9	186	0.49	0.87	21.6	85.6	0.038	2.5 (J-)	1.3
AF15	117AF026	0.0 - 0.5	4.7	103	0.41 (J)	1.2	109 (J)	70.1 (J)	0.04		
AFIS	117AF030	2.0 - 2.5	10.8 (J)	95.1 (J)	0.4 (J)	0.26 (J)	6.9 (J)	10.7	0.018		
AF16	117AF027	0.0 - 0.5	2.7 (J-)	141	0.72	5.5	256 (J)	130 (J)	0.72		1.1 (J)
AF17	117AF029	3.0 - 3.5	8.2 (J)	108 (J)	0.37 (J)	0.19 (J)	6.6 (J)	7.3	0.042	0.61 (J)	

^{-- =} Not detected above MDCs.

J = Estimated value

J- = The result is an estimated quantity, but the result may be biased low.

D.3.2.5 Polychlorinated Biphenyls

Analytical results for PCB constituents in soil samples collected at this CAS that were detected above MDCs are presented in Table D.3-7. A total of 12 surface and subsurface soil samples at nine locations exceeded the PAL of 0.74 mg/kg for total Aroclor (sum of Aroclor 1242, 1248, 1254, 1260, and 1268), with Aroclor 1248 being the driver constituent. These samples contained PCB concentrations up to 8.36 mg/kg. Because the FAL for total Aroclor was established at the PAL concentration, PCBs are considered to be a COC.

Table D.3-7
Sample Results for PCBs Detected above MDCs at CAS 26-41-01,
Pluto Disassembly Facility

(Page 1 of 2)

Sample	Sample	Depth			COPCs	(mg/kg)		
Location	Number	(ft bgs)	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1268	Total Aroclor
	FALs		0.74	0.74	0.74	0.74	0.74	0.74
AF01	117AF008	0.0 - 0.5				0.0168 (J)		0.0168 (J)
AF02	117AF009	0.0 - 0.5			0.0178 (J)	0.0173		0.0351 (J)
AF03	117AF010	0.0 - 0.5			0.0385	0.0491		0.0876
AF04	117AF011	0.0 - 0.5			0.0076	0.0108		0.0184
AF05	117AF012	0.0 - 0.5	0.0102 (J)		0.0092	0.0046		0.0240
AF06	117AF013	0.0 - 0.5		6.45				6.45
AFOO	117AF014	0.0 - 0.5		4.92		0.138 (J)		5.06
AF06A	117AF015	1.0 - 1.5		2.84				2.84
AFOOA	117AF016	1.0 - 1.5		1.76				1.76
AF06B	117AF031	2.0 - 2.5		2.9 (J)				2.9 (J)
	117AF017	0.0 - 0.5		8.36				8.36
AF07	117AF032	1.0 - 1.5		2.8 (J)				2.8 (J)
AFO	117AF033	2.0 - 2.5			0.05 (J)			0.05 (J)
	117AF034	2.0 - 2.5			0.072 (J)			0.072 (J)
	117AF018	0.0 - 0.5		2.73				2.73
AF08	117AF035	1.0 - 1.5		0.31 (J)				0.31 (J)
	117AF036	2.0 - 2.5		0.18 (J)				0.18 (J)

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Table D.3-7 Sample Results for PCBs Detected above MDCs at CAS 26-41-01, Pluto Disassembly Facility (Page 2 of 2)

Sample	Sample	Depth			COPCs	(mg/kg)		
Location	Number	(ft bgs)	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1268	Total Aroclor
	FALs		0.74	0.74	0.74	0.74	0.74	0.74
AF09	117AF019	0.0 - 0.5		0.659				0.659
AF10	117AF020	0.0 - 0.5		0.403				0.403
AF11	117AF021	0.0 - 0.5		0.246				0.246
AF13	117AF024	0.0 - 0.5				0.002 (J)		0.002 (J)
AF15	117AF026	0.0 - 0.5				0.141		0.141
AFIS	117AF030	2.0 - 2.5				0.0165	0.0152	0.0317
AF16	117AF027	0.0 - 0.5				0.0783		0.0783
AF17	117AF029	3.0 - 3.5	0.0138			0.0183	0.0138	0.0459
AF19	117AF037	0.0 - 0.5		0.58				0.58
AFT9	117AF038	1.0 - 1.5		0.077				0.077
AF20	117AF039	0.0 - 0.5		0.048				0.048
AF20	117AF040	1.0 - 1.5		0.0086 (J)				0.0086 (J)
AF23	117AF045	3.0 - 3.5		0.34				0.34
AF24	117AF046	3.0 - 3.5		1.1 (J)				1.1 (J)
AF25	117AF047	3.0 - 3.5		0.74 (J)				0.74 (J)
AF26	117AF048	3.0 - 3.5		1.5 (J)				1.5 (J)
AF27	117AF049	0.0 - 0.5		2.6 (J)				2.6 (J)
AF29	117AF051	5.0 - 5.6		0.12				0.12
AF32	117AF054	0.0 - 0.5		0.31				0.31
AF34	117AF056	5.0 - 5.6		0.044	-			0.044

Bold indicates the value exceeds the FAL.

J = Estimated value

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D.3.2.6 Gamma-Emitting Radionuclides

Analytical results for gamma-emitting radionuclides in soil samples collected at this CAS that were detected above MDCs are presented in Table D.3-8. The radionuclide Ra-226 was detected above the PAL of 5 pCi/g in surface sample 117AF028 with a result of 245 pCi/g at location AF18. This result identifies Ra-226 as a COC. Following remediation of surface soils down to 1 ft in depth (described in Section D.3.3), the activity of Ra-226 in subsurface (1.0 to 1.5 ft bgs) sample 117AF044 was 7.1 pCi/g. The generic guidelines for residual concentrations of Ra-226 in soil per DOE 5400.5 (DOE, 1993) are 5 pCi/g, averaged over the first 15 centimeters (cm) (or 6 in.) of soil below the surface; and 15 pCi/g, for soil more than 15 cm below the surface. Therefore, the activity of 7.1 pCi/g Ra-226 in sample 117AF044 is less than the FAL and meets the generic guideline. The FALs were established at the PAL activities for Ra-226 and the other isotopes in Table D.3-8.

As shown in Table D.3-8, Pb-214 was present in samples 117AF028 and 117AF044 at activities approximately equal to the Ra-226 activities. Because U-238 was essentially not detected in these samples (Table D.3-9), the similar activities of Pb-214 to Ra-226 indicate that the source of the Pb-214 is in-growth as a daughter in secular equilibrium with Ra-226. Because the PAL for Ra-226 includes the contributions from the in-growth of daughters, the Pb-214 in sample 117AF044 does not need to be compared to a FAL.

D.3.2.7 Plutonium, Uranium, and Sr-90 Isotopes

Analytical results for isotopic Pu, isotopic U, and Sr-90 in soil samples collected at this CAS that were detected above MDCs are presented in Table D.3-9. No isotopic Pu, isotopic U, or Sr-90 results exceeded the PALs; therefore, the FALs were established at the PAL concentrations.

D.3.2.8 Potential Source Material Sample Results

Analytical results for PSM samples collected at this CAS that were detected above MDCs are presented in Table D.3-10. Media sampled included an unknown white, powdery material (117AH501), yarn-like filter material (117AH502), HEPA filter media (117GF01, 117AF01, and

Table D.3-8
Sample Results for Gamma-Emitting Radionuclides Detected above MDCs at CAS 26-41-01, Pluto Disassembly Facility

Sample	Sample	Depth			COPCs	(pCi/g)		
Location	Number	(ft bgs)	Ac-228	Cs-137	Pb-212	Pb-214	Ra-226	TI-208
	FALs		5ª	12.2 ^b	5ª	N/A°	5/15 ^d	5ª
AF01	117AF008	0.0 - 0.5	1.31		1.37	1.01		0.501
AF02	117AF009	0.0 - 0.5	1.8		1.44 (J-)	0.928 (J-)		0.478
AF03	117AF010	0.0 - 0.5	1.52	0.152	1.51 (J-)	1.02 (J-)		0.427
AF04	117AF011	0.0 - 0.5	1.32		0.942 (J-)	0.85 (J-)		0.396
AF05	117AF012	0.0 - 0.5	1.67		1.49 (J-)	1.09 (J-)		0.489
AF06	117AF013	0.0 - 0.5	1.37	0.403	1.31	0.939		0.518
AI 00	117AF014	0.0 - 0.5	1.1	0.479	1.25	0.792		0.392
AF15	117AF026	0.0 - 0.5	1.08		1.06 (J)	0.766 (J)		0.317
Ai is	117AF030	2 - 2.5			1.1	0.844 (J)		0.322
AF16	117AF027	0.0 - 0.5			0.558 (J)	0.416 (J)		0.161
AF17	117AF029	3 - 3.5	1.24		1.18	1.03 (J)		0.32
AF18	117AF028	0.0 - 0.5				265 (J)	245	1
Airo	117AF044	1.0 - 1.5			1.7 (J)	5.38 (J)	7.1 (J)	

^aTaken from the general guidelines for residual concentration of Ac-228, Bi-213, Pb-212, Pb-214, Tl-208, and Th-232, as found in Chapter IV of DOE Order 5400.5, Change 2, "Radiation Protection of the Public and Environment." (DOE, 1993).

Bi = Bismuth

NCRP = National Council on Radiation Protection and Measurements

Th = Thorium

TI = Thallium

Bold indicates the value exceeds the FAL.

- -- = Not detected above MDCs.
- J = Estimated value

^bTaken from the construction, commercial, industrial land-use scenario in Table 2.1 of the NCRP Report No. 129, *Recommended Screening Limits for Contaminated Surface Soil and Review Factors Relevant to Site-Specific Studies* (NCRP, 1999). The values provided in this source document were scaled to a 25-mrem/yr dose.

^c The presence of Pb-214 is due to the presence of its natural parent (Ra-226). Because the PAL for Ra-226 includes the contributions from the in-growth of daughters, Pb-214 does not need to be compared to a PAL. See also Section D.3.3.

^d The generic guidelines for residual concentrations of Ra-226 in soil per DOE 5400.5 are 5 pCi/g, averaged over the first 15 cm (6 in.) of soil below the surface; and 15 pCi/g, averaged over 15-cm-thick layers of soil more than 15 cm below the surface.

Table D.3-9 Sample Results for Isotopes Detected above MDCs at CAS 26-41-01, Pluto Disassembly Facility

				С	OPCs (pCi/	g)	
Sample Location	Sample Number	Depth (ft bgs)	Pu-238	Pu-239/240	Sr-90	U-234	U-238
	FALs		13	12.7	838	143	105
AF01	117AF008	0.0 - 0.5				0.89	0.869
AF02	117AF009	0.0 - 0.5		0.0995		0.827	0.82
AF03	117AF010	0.0 - 0.5				1.04	0.711
AF04	117AF011	0.0 - 0.5				0.784	0.712
AF05	117AF012	0.0 - 0.5				0.924	0.815
AF06	117AF013	0.0 - 0.5				1.04	0.771
Al 00	117AF014	0.0 - 0.5				0.959	0.735
AF15	117AF026	0.0 - 0.5				1.06	0.465
Al 13	117AF030	2.0 - 2.5				0.556 (J)	0.474
AF16	117AF027	0.0 - 0.5				0.624	
AF17	117AF029	3.0 - 3.5				0.552 (J)	0.387
AF18	117AF028	0.0 - 0.5	0.0828	0.294	0.298	0.808 (J)	0.53

^{-- =} Not detected above MDCs.

Table D.3-10
Potential Source Material Results at CAS 26-41-01, Pluto Disassembly Facility
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Sample Location	Sample Number	Matrix	Parameter	Result	Units	Meets Criteria for PSM
Basement	117AF01	Solid	U-234	0.075	pCi/g	No
E. Filter Bank	IIIAFUI	Solid	U-238	0.04	pCi/g	No
Basement W. Filter Bank	117AF02	Solid	U-234	0.154	pCi/g	No

J = Estimated value

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Table D.3-10 Potential Source Material Results at CAS 26-41-01, Pluto Disassembly Facility (Page 2 of 3)

Sample Location	Sample Number	Matrix	Parameter	Result	Units	Meets Criteria for PSM
			U-234	3.15	pCi/g	No
			U-238	2.97	pCi/g	No
			Ac-228	0.537	pCi/g	No
			Th-234	4.66 (J+)	pCi/g	No
			Pb-214	3.09 (J+)	pCi/g	No
			Pb-212	0.379 (J+)	pCi/g	No
Composite of	117AH501	Solid	Arsenic	2.2	mg/kg	No
Drum	117411301	Solid	Barium	5.3	mg/kg	No
			Cadmium	0.21 (J)	mg/kg	No
			Chromium	13.9	mg/kg	No
			DRO	24.3	mg/kg	No
			2-Hexanone	0.0833 (J)	mg/kg	No
			Acetone	0.0437	mg/kg	No
			2-Butanone	0.144	mg/kg	No
			Barium	0.8	mg/kg	No
Wood Shed	117AH502	Solid	Chromium	0.35 (J)	mg/kg	No
			Selenium	2.7	mg/kg	No
			Pu-238	0.242	pCi/g	No
			Pu-241	14.53	pCi/g	No
			Pu-239/240	16.91	pCi/g	Yes
Room 103 Filter Media	117GF01	Solid	U-234	0.263	pCi/g	No
			U-235	0.053	pCi/g	No
			U-238	0.095	pCi/g	No
			Am-241	5.336	pCi/g	No

Table D.3-10
Potential Source Material Results at CAS 26-41-01, Pluto Disassembly Facility
(Page 3 of 3)

Sample Location	Sample Number	Matrix	Parameter	Result	Units	Meets Criteria for PSM
			U-234	2.98	pCi/g	No
			U-238	3.05	pCi/g	No
			Ac-228	5.06	pCi/g	No
			TI-208	1.78	pCi/g	No
			Th-234	2.8	pCi/g	No
			Pb-214	2.9	pCi/g	No
			Pb-212	5.07	pCi/g	No
			Lead	372	mg/kg	No
Room 107	117L003	Solid	Silver	10.1	mg/kg	No
			Barium	3,420	mg/kg	No
			Beryllium	0.6	mg/kg	No
			Boron	106	mg/kg	No
			Cadmium	0.2 (J)	mg/kg	No
			Chromium	239	mg/kg	No
			Silica	6,650 (J)	mg/kg	No
			Selenium	13.5 (J)	mg/kg	No
			Mercury	0.23 (J)	mg/kg	No

Am = Americium

117AF02), and an unknown mineral-like substance (117L003). Based on the results, the following item was considered PSM:

• Plutonium 239/240 was detected at an activity of 16.9 pCi/g, exceeding the FAL of 12.7 pCi/g in sample 117GF01. Therefore, the HEPA filter media meets the criteria of a PSM and was subsequently removed under a corrective action.

J = Estimated value

J+ = The result is an estimated quantity, but the result may be biased high.

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In sample 117L003, actinium (Ac)-228 and Pb-212 were detected at activities of 5.06 pCi/g and 5.07 pCi/g, respectively, which slightly exceed the PAL of 5 pCi/g (for both radionuclides) for soil. Sample 117L003 was collected from one of several small sacks that was retrieved from the bottom of the 13-ft-deep concrete vault in Room 107. The sack contained an unknown mineral-like substance. Thorium-232 is the likely source of the Ac-228 and Pb-212, and Th-232 is explicitly called out in DOE Order 5400.5 to meet the generic guidelines of 5 pCi/g for the first 15 cm of soil below the surface, and 15 pCi/g for soil more than 15 cm below the surface (DOE, 1993). Although the material sampled is not soil, the assumption is that the concrete vault containing the substance will eventually fail and release the material to the underlying soil. If this were to occur, the Ac-228 and Pb-212 would be released to soil that is greater than 15 cm in depth, and the PAL of 15 pCi/g would apply. Because Ac-228 and Pb-212 were detected at activities below the PAL of 15 pCi/g, they would not be considered COCs. Therefore, the material from which sample 117L003 was collected does not meet the criteria of a PSM, and no corrective action is required for the remaining sacks in the Room 107 vault. Also, there is also no pathway to a human receptor because the vaults are covered with three 1-ft-thick, reinforced concrete lids, and the core hole drilled during the investigation was plugged.

All other materials sampled are not considered PSM; however, they were removed and disposed (see Section D.4.0) as waste under a BMP. The analytical data from the samples in Table D.3-10 were also used to determine proper disposal methods.

D.3.3 Nature and Extent of Contamination

Based on the analytical results for soil samples collected within CAS 26-41-01, PCBs (as total Aroclor) and Ra-226 were identified as COCs and Decision II samples were collected to define the extent of contamination. One PSM sample (117GF01) from a HEPA filter found in Room 103 contained plutonium contamination and was therefore removed as a corrective action.

Environmental samples collected at locations AF07 through AF09, AF11 through AF18, AF20 and AF21, AF23 through AF27, and AF33 and AF34 were collected to determine the extent of PCB-contaminated soil that was first identified at location A06 near the cooling tower. The analytical results of Decision II samples collected around and under the cooling tower are below the FAL for total Aroclor and show that the extent of PCB contamination is defined laterally by locations AF10,

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AF19, AF22, and AF32 and vertically by locations AF28, AF29, AF30, and AF31. These results define the extent of PCB contamination vertically to approximately 5.0 ft bgs and laterally in the surface soil to an approximate 17-by-12-ft area. The distribution of the data suggests that the contamination may have resulted from a spill or release in the vicinity of the cooling tower. The contaminated media (soil and concrete pad) was excavated and removed as a corrective action and was subsequently disposed as waste.

A surface soil sample collected at location AF18 identified a small area of Ra-226 contaminated soil that was located in a narrow utility trench between an area of asphalt and concrete. The contaminated area was discovered during a radiological walkover survey of the facility exterior. The surface sample (117AF028) indicated Ra-226 activity in the soil at 245 pCi/g, which is above the FAL of 5 pCi/g. Approximately 1-ft² area of soil to a depth of 1 ft bgs and some scabbled asphalt were removed as a corrective action. The area was resurveyed using the Electra, and readings indicated the Ra-226 contamination was confined to the area within the trench. The Ra-226 activity of the Decision II sample 117AF044 collected from 1.0 to 1.5 ft bgs is below the FAL of 15 pCi/g. Therefore, the vertical extent of the Ra-226 contaminated soil is defined vertically to 1 ft bgs. As shown in Table D.3-8, Pb-214 was present in samples 117AF028 and 117AF044 at activities similar to the Ra-226 activities.

D.3.4 Revised Conceptual Site Model

The SAFER Plan requirements were met at this CAS, and no revisions were necessary to the CSM.

D.4.0 Waste Management

D.4.1 Waste Streams and Disposal

The following sections describe the waste management activities completed during closure activities at CAU 117 and the final or anticipated final disposition of the waste. Waste streams generated include industrial waste, asbestos waste, used oil, RCRA hazardous, RCRA universal waste, PCB waste, LLW, and reused/recycled wastes. All wastes and recyclable materials were managed in accordance with applicable state and federal regulations, DOE Orders, and the CAU 117 SAFER Plan (NNSA/NSO, 2007).

Some materials were determined not to be regulated wastes, and were managed as recyclable or reusable material. The SNJV Pollution Prevention program uses the concepts of waste minimization and affirmative procurement in all aspects of the management, execution, and planning of work. Stoller-Navarro Joint Venture is committed to operating in a manner that protects and restores the environment and that promotes efficient use of natural resources, reduces waste generation at the source, encourages procurement of recycled products, and promotes the reuse and recycling of materials to the greatest extent that is technically feasible and practical. As such, 90,000 lb (approximately 35 percent) of the total mass of waste generated during closure activities was dispositioned for beneficial use.

D.4.1.1 Industrial Waste

Industrial wastes were characterized based upon radiological surveys, site characterization data, and process knowledge. Industrial wastes generated at CAU 117 consisted of bulk construction debris, aqueous liquids, drummed powdered material found in the wood shed, bulk soil, and ACM.

Approximately 60 yd³ of bulk debris-type industrial waste was generated during closure activities at CAU 117 and disposed at the Area 9 U10c Landfill. Bulk materials consisted of:

- Personal protective equipment
- Building debris (e.g., drywall, acoustic ceiling tiles, wood)
- Disposable sampling equipment
- Plastic sheeting

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- Empty containers and drums
- Vegetation
- Other debris such as wood, boxes, etc.

Twenty-one drums containing approximately 900 gal of aqueous liquids were generated during tap and drain activities of potable and process water systems at CAU 117. Liquids generated during tapping and draining activities were segregated into two categories: nonradiologically contaminated and potentially radiologically contaminated. The potential radiologically contaminated systems included the process water, facility air sampling, and high vacuum systems due to the potential to contain radiological contamination. The nonradiologically contaminated systems included the domestic hot and cold water systems, and the distilled water systems. Composite samples were collected from each category of collected liquid. Upon review of the data, both categories of liquids were determined to be nonradiologically impacted and non-RCRA regulated waste. The aqueous liquids were disposed via evaporation at the Area 23 Lagoon, and the emptied drums were disposed at the Area 9 U10C Landfill.

Thirty-one drums (Figure D.4-1) containing approximately 930 gal of an unidentified material were discovered within the wood shed. Each of the drums was opened and inspected. The drums contained a white, powdery material. A composite sample was taken, and the drums were determined to be nonradiologically impacted and non-RCRA regulated. The drums and contents were transported to the Area 9 U10c Landfill for disposal.

Approximately 55 yd³ of soil and 2.4 yd³ of concrete were excavated and removed from the south side of Building 2201. The soil surrounding the small cooling tower on the southwest corner of the building contained total Aroclor at levels exceeding the PAL of 0.74 mg/kg but less than PCB regulatory limits. Analytical data for the PCB-contaminated soil ranged from 0.74 mg/kg to 8.3 mg/kg. Because the PCBs were determined not to be a new release, and the levels do not exceed 50 mg/kg, the soil is not *Toxic Substances Control Act* (TSCA) regulated in accordance with 40 *Code of Federal Regulations* 761.50(a)(4) (CFR, 2008b). The soil was excavated and loaded into bulk end dumps and roll-off containers, and transported to the Area 9 U10C Landfill for disposal as non-PCB-regulated industrial waste.



Figure D.4-1
Drums in Wood Shed

D.4.1.2 Industrial Asbestos Waste

Three bulk loads (one roll-off, one end dump, one stake bed truck) containing a total of 41 yd³ of ACM (including insulation, HEPA filters, wall-board, PPE, and floor tile) were generated during asbestos abatement and post-abatement activities. Additionally, several cartons of new unused box-type asbestos-containing HEPA filters were discovered in the basement (Figure D.4-2). All industrial asbestos-containing waste generated at CAU 117 was transported to and disposed at the Area 23 Landfill.

With the exception of seven insulated pipe elbows remaining in Rooms 101 and 103, all regulated friable ACM has been removed from the facility. For safety/logistic reasons, the ACM on the five elbows in Room 103 and two elbows in Room 101 will be removed before or during the building demolition. Additionally, Category I/II nonfriable ACM (e.g., gaskets, asphaltic roofing products) will remain in place within Building 2201 and be managed/disposed during demolition. Approximately 41 yd³ of industrial-asbestos waste were generated and dispositioned at the Area 23 Landfill.



Figure D.4-2
Box HEPA Filter

D.4.1.3 Used Oil

Approximately 37 gal of used oil was generated during draining of overhead cranes, the manipulators, pump and motor reservoirs, and miscellaneous air oil reservoirs. The oil was drained from each of the reservoirs, composited, and sampled. Upon review of the data, the oil was determined not to be radiologically impacted or RCRA hazardous, and it was managed in accordance with used oil regulations. Field-screening results indicated the presence of chlorinated hydrocarbons within acceptable limits for recycling. National Security Technologies, LLC removed the oil from CAU 117 and will manage it pending offsite shipment for recycling.

A total of 567 gal of mineral oil was drained from the six leaded-glass shielding windows located within Building 2201 (Figure D.4-3). Each of the windows contained approximately 95 gal each of the mineral oil.

The mineral oil is an optical grade mineral oil used to fill the voids between the leaded-glass slabs in the window assembly. The oil also has gamma- and neutron-shielding ability. The mineral oil also



Figure D.4-3
Oil-Filled Leaded-Glass Window in Building 2201

minimizes surface reflection of the individual glass components, increases the index of refraction, increases the light transmission, and acts as a dielectric against potential dielectric discharge. The mineral oil was sampled and determined not to be radiologically impacted or RCRA hazardous. The mineral oil was transferred off site by Evergreen Environmental, Inc. for recycle via re-refining.

D.4.1.4 RCRA Hazardous Waste

Several items containing RCRA hazardous constituents were generated during closure activities at CAU 117. These wastes include waste chemicals, circuit boards, contents of discarded HEPA vacuums, and mercury-containing items. The following waste streams were characterized as RCRA-hazardous, and nonradioactive for disposal, and were transferred to NSTec for management on site, pending subsequent offsite shipment to the appropriate commercial hazardous waste treatment and disposal facility:

 Waste and excess chemicals identified at the CAU 117 site were collected and managed within a RCRA satellite accumulation area (SAA). The chemicals collected included drain-cleaning solvents, fluorinated heat transfer liquid, industrial cleaning compounds,

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lubricants, algicide tablets, and an unknown brown putty-like material. All of the chemicals were of small volume, and the characterization sample consumed the entire volume with the exception of the brown putty-like material. The putty material was characterized as nonradiologically contaminated; however, it failed the TCLP regulatory limit for lead and therefore was declared a hazardous waste for disposal. The waste (approximately 8 gal) was packaged into a 10-gal drum.

- Printed circuit boards were removed from equipment and electrical panels located within Building 2201, and characterized and managed as RCRA hazardous waste due to the lead and silver content. The items were surveyed and determined to be nonradioactive for disposal. One 10-gal drum of circuit boards was collected and managed in an SAA at CAU 117.
- Four abandoned HEPA vacuums (Figure D.4-4) were found within Building 2201. The contents of each of the vacuums was sampled to determine proper characterization and disposition. The results indicated that two of the vacuums had contents with RCRA constituents requiring management as hazardous waste. One vacuum failed the TCLP for arsenic; the other failed for cadmium. The contents and filters from these two vacuums were removed, packaged into a 10-gal drum, and dispositioned as RCRA regulated waste. All four vacuum canisters, including the nonhazardous contents of the remaining two vacuums, were surveyed and determined to be nonradiologically contaminated and disposed as industrial waste at the Area 9 U10c Landfill via roll-off container 117A92.



Figure D.4-4
Abandoned HEPA Vacuum at Building 2201

- One 55-gal drum containing approximately 15 gal of rinsate water from coring activities associated with the vault investigation was generated, sampled and characterized. The analytical data indicated the rinsate water was not radiologically contaminated; however, it failed the TCLP for chromium. The source of the chromium was most likely from the metal core bits used for drilling through the 3-ft-thick concrete lids. The drum was transferred from CAU 117 to NSTec pending final offsite treatment and disposal as a hazardous waste.
- Approximately 185 lb of mercury-containing items were collected at CAU 117 (Figures D.4-5 and D.4-6). The mercury-containing items consisted of thermometers and thermostats found throughout Building 2201. All mercury-containing items were packaged into a 10-gal drum and managed in an SAA until transferred to NSTec for management. Although required to be managed as hazardous waste, the mercury will be recovered for reuse by a commercial mercury retort facility.

D.4.1.5 RCRA Universal Waste

Two types of RCRA Universal Waste streams were collected and managed during closure activities at CAU 117. The universal wastes generated at CAU 117 that were managed for recycle reclamation in lieu of management as hazardous waste included lead-acid batteries and electric lighting lamps.



Figure D.4-5
Mercury-Containing Thermometer

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Figure D.4-6
Mercury-Containing Thermostat

Approximately one dozen lead-acid batteries were collected from Building 2201. The batteries were primarily associated with emergency lighting systems located inside the building. The batteries were surveyed and released to the NSTec motor pool for management and recycling.

Approximately 70 ft³ (100 lb) of Universal Waste lamps were transferred to the Building 23-160 Collection Center. Several types of lighting were used within Building 2201, including fluorescent, mercury-vapor, sodium-vapor, and incandescent lamps (Figure D.4-7). Incandescent bulbs were segregated and disposed as industrial waste. Fluorescent, mercury-vapor, and sodium-vapor lamps were managed as Universal Waste. All lamps were surveyed for radiological release, and transferred to the NSTec Universal Waste Collection Center for sorting, accumulation, and eventual shipment to an offsite recycler.

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Figure D.4-7
Incandescent and Mercury-Vapor Light Bulbs at Building 2201

D.4.1.6 Polychlorinated Biphenyl-Contaminated Waste

The following waste streams were characterized as nonradioactive, PCB-contaminated waste for disposal and were transferred to NSTec for management on site, pending subsequent offsite shipment to the appropriate TSCA-permitted treatment and disposal facility:

- Polychlorinated biphenyl-containing ballasts and capacitors associated with lighting fixtures
 throughout the facility were removed and collected. All ballasts and capacitors were surveyed
 and released as nonradiologically contaminated. Two 55-gal drums containing nonleaking
 small PCB-containing capacitors and ballasts was collected and managed as PCB waste. The
 drums were transferred to NSTec for onsite management, offsite shipment, and final disposal
 at US Ecology in Beatty, Nevada.
- One PCB-containing capacitor was found to be leaking (assumed to be PCB liquids) and
 was packaged into a 10-gal drum. The drum was transferred to NSTec for management in
 a PCB storage area until offsite shipment for treatment and disposal via
 TSCA-permitted incineration.

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D.4.1.7 Low-Level Radioactive Waste

The following LLWs were generated during SAFER Plan activities at CAU 117:

- Two B-25 containers of LLW consisting of radioactive-contaminated soil, PPE and sampling supplies, and pre-filter frame assemblies from the HEPA ventilation system at Building 2201. The waste (approximately 180 ft³) was shipped to the Area 5 RWMC in March 2009 for disposal.
- Two B-25 containers of asbestos-contaminated LLW consisting of tools, plastic, and used HEPA ventilation system filters. The waste (approximately 180 ft³) was shipped to the Area 5 RWMC in March 2009 for disposal.

D.4.1.8 Materials Reused in lieu of Disposition as Waste

In an effort to reduce the volume and minimize the disposal cost of materials generated and dispositioned as hazardous and regulated waste, the following materials in Building 2201 were instead recycled via reuse or other beneficial use:

- A compressed gas cylinder labeled as "Freon R-22" was found in the basement of Building 2201. The gas cylinder was surveyed for radiological contamination and released to NSTec for final disposition. The freon will be reused for other refrigeration/cooling purposes at the NTS.
- Lead shielding and leaded glass is typically removed and managed as hazardous waste due to its characteristic of toxicity in accordance with 40 *Code of Federal Regulations* 261.24 (CFR, 2008a). Six leaded-glass radiation shielding window assemblies, weighing 11,000 to 13,000 lb each, were removed from the hot cells (Rooms 104, 106, and 107) in Building 2201 (Figure D.4-8). The window assemblies were drained of mineral oil before removal, as noted above. The windows were transferred to the FERMI Laboratory near Chicago, Illinois, for reuse.
- Approximately 21,000 lb of elemental lead shielding was removed from Building 2201 (Figure D.4-9). The lead shielding was segregated for radiological survey, characterization, and potential release. Lead shielding with painted surfaces was managed as potentially radiologically contaminated; lead shielding without painted surfaces could be adequately surveyed and confirmed free of radiological contamination. The lead shielding was packaged and transported to TOXCO, Inc. in Oak Ridge, Tennessee, for recycle and reuse within the DOE and NRC-licensed community only, as radiation shielding material.
- Approximately 1 yd³ (200 lb) of computer components and equipment was found abandoned in Building 2201. Many of the components were manufactured with lead, silver, and other metals which, if disposed as waste, would require characterization and management as

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Figure D.4-8
Leaded-Glass Window Removal in Room 102 at Building 2201



Figure D.4-9
Lead Shielding Plugs Accumulated for Reuse

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RCRA-hazardous. The collected components were surveyed and released as nonradioactively contaminated, and transferred to NSTec Property Management for evaluation for reuse or other materials reclamation.

D.4.2 Waste Characterization

Characterization of waste generated at CAS 26-41-01 was based on samples of the waste, radiological surveys and swipes, associated media, and process knowledge. The analytical suite was tailored to characterize the waste for disposal and to support recommended actions. Results were reviewed against federal and state regulations, DOE directives/policies/guidance, and waste disposal criteria for NTS and offsite facilities. Results above MDCs are provided in Table D.4-1. Complete results (including nondetect results) for all samples are maintained in the project files.

Table D.4-1
Waste Management Results Detected at CAS 26-41-01
(Page 1 of 8)

Sample Location	Sample Number	Matrix	Parameter	Result	Units
			Lead	0.13	mg/L
			Arsenic	0.055	mg/L
			Barium	0.089	mg/L mg/L mg/L mg/L
			Cadmium	0.0047 (J)	
			Chromium	0.0037 (J)	mg/L
			Selenium	0.078	mg/L
			Mercury	0.0053 (J)	mg/L
		Liquid	Ethylbenzene	0.257 (J)	μg/L
			Styrene	0.293 (J)	μg/L
Bldg. 2201	117A501		4-Methyl-2-Pentanone	1.35 (J)	μg/L
			Toluene	1.35	μg/L
			Chlorobenzene	0.901	μg/L
			Total Xylenes	1.29	μg/L
			Acetone 333	333	μg/L
			Benzene	27.9	μg/L
			Acetonitrile	191	μg/L
			2-Butanone	229	μg/L
			1,2,4-Trimethylbenzene	0.341 (J)	μg/L
			Aniline	173 (J)	μg/L
Drum #117A39	117A502	Liquid	Gross Beta	20,800	pCi/L

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Table D.4-1 Waste Management Results Detected at CAS 26-41-01 (Page 2 of 8)

Sample Location	Sample Number	Matrix	Parameter	Result	Units
			Gross Beta	31.7	pCi/L
			Lead	0.14	mg/L
			Barium	0.056	mg/L
			Cadmium	0.0018 (J)	·
Process Water	117A503	Liquid	Selenium	0.0057 (J)	mg/L
Process water	117A503	Liquid	Toluene	0.352	μg/L
			Chlorobenzene	1.58	μg/L
			Total Xylenes	0.276 (J)	μg/L
			Benzene	3.44	μg/L
			Aniline	22.6	μg/L
	117A507	Solid	U-234	0.132	pCi/g
			U-238	0.14	pCi/g
Unknown Powder			Barium	6.6 (J)	mg/kg
Ulikilowii Powdei			Cadmium	0.27 (J)	mg/kg
			Chromium	1.7 (J)	mg/kg
			Mercury	0.0092 (J-)	mg/kg
			Barium	1.8 (J)	mg/kg
			Chromium	1 (J)	mg/kg
			DRO	18,300 (J)	mg/kg
Unknown Putty	117A510	Solid	Ethylbenzene	26.8 (J)	μg/kg
Olikilowii Fully	1174510	Solid	Toluene	1,830	μg/kg
			Total Xylenes	43.5 (J)	μg/kg
			Benzene	227	μg/kg
			Trichloroethene	62.1 (J)	μg/kg
Sample Table	117A513	Solid	Lead	5.1	mg/L
			Lead	151 (J)	mg/kg
Drum #117A57	117AF501	Oil	Barium	2.5	mg/kg
			Cadmium	0.66	mg/kg

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Table D.4-1 Waste Management Results Detected at CAS 26-41-01 (Page 3 of 8)

Sample Location	Sample Number	Matrix	Parameter	Result	Units
			U-234	0.411	pCi/g
			U-238	0.458	pCi/g
			Lead	97,900 (J)	mg/kg
			Silver	39.2 (J)	mg/kg
			Barium	` '	mg/kg
			Beryllium	0.3 (J)	mg/kg
			Cadmium	346 (J)	mg/kg
			Chromium	6,450 (J)	mg/kg
			Lead	1.4 (J)	mg/L
HEPA Vacuum	117AJ501	Solid	Cadmium	9.1 (J)	mg/L
TIEFA Vacuum	117/45501		Chromium	0.11 (J)	mg/L
			Mercury	0.14 (J-)	mg/kg
			DRO	936 (J)	mg/kg
			Aroclor 1260	139	μg/kg
			Aroclor 1254	298	μg/kg
			Aroclor 1242	1242 160 (J)	μg/kg
			Bis(2-Ethylhexyl)Phthalate	19,800 (J)	μg/kg
			Di-N-Octylphthalate	5,440 (J)	μg/kg
			Di-N-Butyl Phthalate	1,260 (J)	μg/kg
			Butyl Benzyl Phthalate	2,060 (J)	μg/kg
			Pu-239/240	0.219	pCi/g
			U-234	0.595	pCi/g
			U-238	0.365	pCi/g
HEPA Vacuum	117AJ502	Solid	Sr-90	1.35	pCi/g
TILI A VACUUIII	117/40002	Joliu	Cs-137	2.83	pCi/g
			Pb-214	0.733 (J)	pCi/g
			Pb-212	0.46 (J)	pCi/g
			Lead	404 (J)	mg/kg

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Table D.4-1 Waste Management Results Detected at CAS 26-41-01 (Page 4 of 8)

Sample Location	Sample Number	Matrix	Parameter	Result	Units
			Silver	2.2 (J)	mg/kg
			Arsenic	5,460 (J)	mg/kg
			Barium	2,200 (J)	mg/kg
			Beryllium	0.2 (J)	mg/kg
			Cadmium	24.1 (J)	mg/kg
			Chromium	319 (J)	mg/kg
			Lead	0.16 (J)	mg/L
			Arsenic	35 (J)	mg/L
			Barium	2.4 (J)	mg/L
	117AJ502 (continued)	Solid	Cadmium	0.26 (J)	mg/L
			Chromium	0.16 (J)	mg/L
HEPA Vacuum			Selenium	0.059 (J)	mg/L
TIEFA Vacuum			Mercury	0.44 (J-)	mg/kg
			DRO	696 (J)	mg/kg
			Aroclor 1260	2,210	μg/kg
			Aroclor 1254	3,010	μg/kg
			Aroclor 1268	540	mg/kg mg/kg mg/kg mg/L mg/L mg/L mg/L mg/L mg/L mg/kg mg/kg µg/kg
			Aroclor 1242	2,720	μg/kg
			Bis(2-Ethylhexyl)Phthalate	60,600	μg/kg
			Di-N-Octylphthalate	2,760 (J)	μg/kg
			Anthracene	148 (J)	μg/kg
			Benzoic Acid	11,700 (J)	μg/kg
			Di-N-Butyl Phthalate	2,670 (J)	μg/kg
			Butyl Benzyl Phthalate	8,770	μg/kg
			Pu-239/240	0.511	pCi/g
HEPA Vacuum	117AJ503	Solid	U-234	0.624	pCi/g
TILI A VACUUIII	117/43503	Soliu	U-238	0.289	pCi/g
			Sr-90	1.49	pCi/g

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Table D.4-1 Waste Management Results Detected at CAS 26-41-01 (Page 5 of 8)

Sample Location	Sample Number	Matrix	Parameter	Result	Units
			Cs-137	3.51	pCi/g
			Lead	91.7 (J)	mg/kg
			Silver	1.7 (J)	mg/kg
			Barium	577 (J)	mg/kg
			Cadmium	104 (J)	mg/kg
			Chromium	17.2 (J)	mg/kg
			Lead	0.32 (J)	mg/L
			Barium	3.5 (J)	mg/L
			Cadmium	0.89 (J)	mg/L
			Chromium	0.15 (J)	mg/L
			Selenium	0.076 (J)	mg/L
		Solid	Mercury	0.27 (J-)	mg/kg
	117AJ503 (continued)		DRO	3,040 (J)	mg/kg
HEPA Vacuum			Aroclor 1260	623 (J)	μg/kg
			Aroclor 1254	999	μg/kg
			Aroclor 1242	4,260	μg/kg
			Ethylbenzene	200 (J)	μg/kg
			Toluene	6,490	μg/kg
			Tetrachloroethene	106 (J)	μg/kg
			Total Xylenes	489 (J)	μg/kg
			Benzene	1,420	μg/kg
			Methylene Chloride	1,580 (J)	μg/kg
			Trichloroethene	687	μ g/kg
			Bis(2-Ethylhexyl)Phthalate	188,000	μg/kg
			Di-N-Octylphthalate	36,800 (J)	μg/kg
			Anthracene	1,700 (J)	μ g/kg
			Benzoic Acid	73,000 (J)	μ g /kg
			U-234	0.166	pCi/g
			U-238	0.144	pCi/g
			Gross Beta	1,200	pCi/L
			Lead	0.31 (J)	mg/L
Concrete Core Water	117AJ504	Liquid	Silver	2.9 (J)	mg/L
			Barium	94.2 (J)	mg/L
			Beryllium	0.022 (J)	mg/L
			Cadmium	0.24 (J)	mg/L
			Chromium	203 (J)	mg/L

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Table D.4-1 Waste Management Results Detected at CAS 26-41-01 (Page 6 of 8)

Sample Location	Sample Number	Matrix	Parameter	Result	Units
			U-234	5.7 (J)	pCi/Sample
			Pu-238	2.5 (J)	pCi/Sample
Room 102 Surfaces	117F004	Wipe	Pu-239/240	221 (J)	pCi/Sample
Canadoo			U-235	0.27 (J)	pCi/Sample
			U-238	0.27 (J)	pCi/Sample
Room 102	117501	Mino	Aroclor 1254	7.7	μg/Sample
Drips under Arm	117FS01	Wipe	Aroclor 1248	13	μg/Sample
Room 102	117500	Mino	Aroclor 1254	19	μg/Sample
Floor under Arm	117FS02	Wipe	Aroclor 1248	12	μg/Sample
			U-234	0.127 (J)	pCi/g
			U-238	0.111 (J)	pCi/g
			TI-208	1.433	pCi/g
Room 104	117HP01	Paint Chip	Tritium	15.16	pCi/g
Wall Peeling Paint	117HPU1		Barium	0.347 (J)	mg/L
			Chromium	0.0183 (J)	mg/L
			Aroclor 1260	1,300 (J)	μg/kg
			Aroclor 1254	3,600 (J)	μg/kg
D 404		Wipe	Aroclor 1260	28	μg/Sample
Room 104 under Stairs	117HS01DL		Aroclor 1254	55 (J)	μg/Sample
andor stand			Aroclor 1248	30	μg/Sample
D 404			Aroclor 1260	10	μg/Sample
Room 104 Floor under Arm	117HS02	Wipe	Aroclor 1254	20	μg/Sample
Tion and Tim			Aroclor 1248	27	μg/Sample
D 404			Aroclor 1260	9.1	μg/Sample
Room 104 Floor below Crane	117HS03	Wipe	Aroclor 1254	13 (J)	μg/Sample
l loor bolow Grand			Aroclor 1248	18	μg/Sample
Room 105 Northeast Window Gasket	117JS01	Wipe	Aroclor 1254	9.4	μg/Sample
			U-234	1,360 (J)	pCi/Sample
Room 106	4471/005	NA/in a	Pu-239/240	2.97	pCi/Sample
Filter Plenum	117K005	Wipe	U-235	48.5 (J)	pCi/Sample
			U-238	8.9 (J)	pCi/Sample

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Table D.4-1 Waste Management Results Detected at CAS 26-41-01 (Page 7 of 8)

Sample Location	Sample Number	Matrix	Parameter	Result	Units
			U-234	0.191	pCi/g
			U-238	0.174 (J)	pCi/g
Room 106	117KP01	Paint Chip	Ac228	0.89	pCi/g
Paint from Walls	III/KFUI	Faint Chip	Pb-214	0.542	pCi/g
			Pb-212	0.766	pCi/g
			Tritium	7.68	pCi/g
B 400			Aroclor 1260	1.7	μg/Sample
Room 106 Floor under Crane	117KS01	Wipe	Aroclor 1254	3.6	μg/Sample
r loor andor orang			Aroclor 1248	5.2	μg/Sample
D 400			Aroclor 1260	21 (J)	μg/Sample
Room 106 Under Arm	117KS02DL	Wipe	Aroclor 1254	54 (J)	μg/Sample
Chidol 7 tilli			Aroclor 1248	120 (J)	μg/Sample
	117KS03	Wipe	Sr-90	102.2	pCi/Sample
			Pu-239/240	7.671	pCi/Sample
			U-234	3,466	pCi/Sample
			U-235	121.5	pCi/Sample
Room 106			U-238	37.6	pCi/Sample
Filter Plenum			Cs-137	1,037	pCi/Sample
			Co-60	123	pCi/Sample
			Eu-155	71.01	pCi/Sample
			Gross Alpha	3,128	pCi/Sample
			Gross Beta	1,214	pCi/Sample
			Sr-90	38.08	pCi/Sample
			Pu-239/240	3.379	pCi/Sample
			U-234	1,349	pCi/Sample
D 400			U-235	45.49	pCi/Sample
Room 106 Filter Plenum	117KS04	Wipe	U-238	17.27	pCi/Sample
			Cs-137	696.3	pCi/Sample
			Co-60	112.5	pCi/Sample
			Gross Alpha	1,342	pCi/Sample
			Gross Beta	714.4	pCi/Sample
Room 107	117L502	Wipe	Aroclor 1242	728,000 (J)	μg/Sample

Table D.4-1 Waste Management Results Detected at CAS 26-41-01 (Page 8 of 8)

Sample Location	Sample Number	Matrix	Parameter	Result	Units
			Pu-238	0.058	pCi/g
			Pu-239/240	5.459	pCi/g
Room 107	117LF01	Solid	U-234	0.126 (J)	pCi/g
Floor	II/LFUI	Solid	U-238	0.091 (J)	pCi/g
			Am-241	1.131	pCi/g
			Gross Alpha	7.044	pCi/g
			U-234	0.241 (J)	pCi/g
			U-238	0.165 (J)	pCi/g
			Ac-228	1.193	pCi/g
			TI-208	1.183	pCi/g
		Paint Chip	Pb-214	0.626	pCi/g
D 407	117LP01		Pb-212	1.324	pCi/g
Room 107 Peeling Paint			Tritium	12.05	pCi/g
l comig r ame			Gross Alpha	3.736	pCi/g
			Lead	0.51	mg/L
			Barium	0.477 (J)	mg/L
			Chromium	0.0146 (J)	mg/L
			Aroclor 1260	360	μ g/kg
			Aroclor 1254	930	μ g/kg
D 407			Aroclor 1260	2	μg/Sample
Room 107 Stain under Arm	117LS01	Wipe	Aroclor 1254	5.8	μg/Sample
			Aroclor 1248	9.7	μg/Sample
Danie 407			Aroclor 1260	4	μg/Sample
Room 107 Drips under Crane	117LS02	Wipe	Aroclor 1254	8.8	μg/Sample
2.100 4.1401 0.14110			Aroclor 1248	13	μg/Sample
Leaded-Glass Window	117M501	Oil	Lead	9.3	mg/kg
Leaueu-Giass William	I I / IVIOU I		Barium	0.36 (J)	mg/kg
Room 108	117MF01	Oil	Gross Beta	12.76	pCi/g
Cold Cell Window	I I I IVIFU I		Lead	12.8	mg/kg

Co = Cobalt Cs = Cesium Eu = Europium
$$\begin{split} &mg/L = Milligrams \ per \ liter \\ &pCi/L = Picocuries \ per \ liter \\ &\mu g/kg = Micrograms \ per \ kilogram \\ &\mu g/L = Micrograms \ per \ liter \end{split}$$

J = Estimated value

J- = The result is an estimated quantity, but the result may be biased low.

D.5.0 Quality Assurance

This section contains a summary of QA/QC measures implemented during the sampling and analysis activities conducted in support of the CAU 117 CAI. The following sections discuss the data validation process, QC samples, and nonconformances. A detailed evaluation of the DQIs is presented in Section 4.1.

Laboratory analyses were conducted for samples used in the decision-making process to provide a quantitative measurement of any COPCs present. Rigorous QA/QC was implemented for all laboratory samples including documentation, verification and validation of analytical results, and affirmation of DQI requirements related to laboratory analysis. Detailed information regarding the QA program is contained in the Industrial Sites QAPP (NNSA/NV, 2002).

D.5.1 Data Validation

Data validation was performed in accordance with the Industrial Sites QAPP and approved protocols and procedures. All laboratory data from samples collected and analyzed for CAU 117 were evaluated for data quality in a tiered process described in Sections D.5.1.1 through D.5.1.3. Data were reviewed to ensure that samples were appropriately processed and analyzed, and the results were evaluated using validation criteria. Documentation of the data qualifications resulting from these reviews is retained in project files as a hard copy and electronic media.

One hundred percent of the data analyzed as part of this investigation were subjected to Tier I and Tier II evaluations. A Tier III evaluation was performed on approximately 5 percent of the data analyzed.

D.5.1.1 Tier I Evaluation

Tier I evaluation for chemical and radiochemical analysis examines, but is not limited to:

- Sample count/type consistent with chain of custody.
- Analysis count/type consistent with chain of custody.
- Correct sample matrix.
- Significant problems stated in cover letter or case narrative.
- Completeness of certificates of analysis.

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- Completeness of Contract Laboratory Program (CLP) or CLP-like packages.
- Completeness of signatures, dates, and times on chain of custody.
- Condition-upon-receipt variance form included.
- Requested analyses performed on all samples.
- Date received/analyzed given for each sample.
- Correct concentration units indicated.
- Electronic data transfer supplied.
- Results reported for field and laboratory QC samples.
- Whether or not the deliverable met the overall objectives of the project.

D.5.1.2 Tier II Evaluation

Tier II evaluation for chemical analysis examines, but is not limited to:

- Correct detection limits achieved.
- Sample date, preparation date, and analysis date for each sample.
- Holding time criteria met.
- Quality control batch association for each sample.
- Cooler temperature upon receipt.
- Detection limits properly adjusted for dilution, as required.
- Blank contamination evaluated and applied to sample results/qualifiers.
- Matrix spike/matrix spike duplicate (MSD) percent recoveries (%R) and RPDs evaluated and qualifiers applied to laboratory results, as necessary.
- Field duplicate RPDs evaluated using professional judgment and qualifiers applied to laboratory results, as necessary.
- Laboratory duplicate RPDs evaluated and qualifiers applied to laboratory results, as necessary.
- Surrogate %R evaluated and qualifiers applied to laboratory results, as necessary.
- Laboratory control sample %R evaluated and qualifiers applied to laboratory results, as necessary.
- Initial and continuing calibration evaluated and qualifiers applied to laboratory results, as necessary.

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- Internal standard evaluation.
- Mass spectrometer tuning criteria.
- Organic compound quantitation.
- Inductively coupled plasma interference check sample evaluation.
- Graphite furnace atomic absorption QC.
- Inductively coupled plasma serial dilution effects.
- Recalculation of 10 percent of laboratory results from raw data.

Tier II evaluation for radiochemical analysis examines, but is not limited to:

- Correct detection limits achieved.
- Blank contamination evaluated and, if significant, qualifiers are applied to sample results.
- Certificate of Analysis consistent with data package documentation.
- Quality control sample results (duplicates, LCSs, laboratory blanks) evaluated and used to determine laboratory result qualifiers.
- Sample results, uncertainty, and MDC evaluated.
- Detector system calibrated with National Institute of Standards and Technology (NIST)traceable sources.
- Calibration sources preparation was documented, demonstrating proper preparation and appropriateness for sample matrix, emission energies, and concentrations.
- Detector system response to daily or weekly background and calibration checks for peak energy, peak centroid, peak full-width half-maximum, and peak efficiency, depending on the detection system.
- Tracers NIST-traceable, appropriate for the analysis performed, and recoveries that met QC requirements.
- Documentation of all QC sample preparation complete and properly performed.
- Spectra lines, photon emissions, particle energies, peak areas, and background peak areas support the identified radionuclide and its concentration.

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D.5.1.3 Tier III Evaluation

The Tier III review is an independent examination of the Tier II evaluation. A Tier III review of 5 percent of the sample analytical data was performed by TechLaw, Inc., of Lakewood, Colorado. Tier II and Tier III results were compared and where differences are noted, data were reviewed and changes were made accordingly. This review included the following additional evaluations:

Review:

- Case narrative, chain of custody, and sample receipt forms
- Lab qualifiers (applied appropriately)
- Method of analyses performed as dictated by the chain of custody
- Raw data, including chromatograms, instrument printouts, preparation logs, and analytical logs
- Manual integrations to determine whether the response is appropriate
- Data package for completeness
- Determine sample results qualifiers through the evaluation of (but not limited to):
 - Tracers and QC sample results (e.g., duplicates, LCSs, blanks, MSs) evaluated and used to determine sample results qualifiers
 - Sample preservation, sample preparation/extraction and run logs, sample storage, and holding time
 - Instrument and detector tuning
 - Initial and continuing calibrations
 - Calibration verification (initial, continuing, second source)
 - Retention times
 - Second column and/or second detector confirmation
 - Mass spectra interpretation
 - Interference check samples and serial dilutions

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- Post digestion spikes and method of standard additions
- Breakdown evaluations
- Perform calculation checks of:
 - At least one analyte per QC sample and its recovery
 - At least one analyte per initial calibration curve, continuing calibration verification, and second source recovery
 - At least one analyte per sample that contains positive results (hits); radiochemical results only require calculation checks on activity concentrations (not error)
- Verify that target compound detects identified in the raw data are reported on the results form.
- Document any anomalies for the laboratory to clarify or rectify. The contractor should be notified of any anomalies.

D.5.2 Field QC Samples

Field QC samples consisted of seven trip blanks, one equipment rinsate blank, two field blanks, and four FDs collected and submitted for analysis by the laboratory analytical methods shown in Table D.2-2. The QC samples were assigned individual sample numbers and sent to the laboratory "blind." Four samples were selected by the laboratory to be analyzed for full laboratory QC. Field blanks, source blanks, and equipment rinsates were analyzed for the applicable parameters listed in Table D.2-2 and trip blanks were analyzed for VOCs only.

During the CAI, five FDs were sent as blind samples to the laboratory to be analyzed for the investigation parameters listed in Table D.2-2. For these samples, the analytical criteria for precision (i.e., RPDs between the environmental sample results and their corresponding FD sample results) were evaluated.

D.5.2.1 Laboratory QC Samples

Analysis of preparation QC blanks were performed on each sample delivery group (SDG) for inorganics. Analysis for surrogate spikes and method blanks were performed on each SDG for organics only. Initial and continuing calibration and LCSs were performed for each SDG. The results of these analyses were used to qualify associated environmental sample results. Documentation of

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data qualifications resulting from the application of these guidelines is retained in project files as both

hard copy and electronic media.

The laboratory included a preparation blank, LCS, and a laboratory duplicate sample with each batch

of field samples analyzed for radionuclides.

D.5.3 Field Nonconformances

There were no field nonconformances identified for the CAI.

D.5.4 Laboratory Nonconformances

Laboratory nonconformances are generally due to inconsistencies in the analytical instrumentation operation, sample preparations, extractions, missed holding times, and fluctuations in internal

standard and calibration results. Laboratory nonconformances were accounted for and resolved

during the data qualification process.

D.6.0 Summary

Polychlorinated biphenyl, organic, inorganic, and radionuclide contaminants detected in environmental samples during the CAI were evaluated against FALs to determine the nature and extent of COCs for CAU 117. Based on the assessment of the analytical data from collected soil samples, PCBs (total Aroclor) and Ra-226 were identified as COCs. The lateral and vertical extent of the PCB and Ra-226 contamination was defined by the Decision II samples.

The analytical results of the Decision II samples from under and near the cooling tower show that the PCB concentrations are below the FAL for total Aroclor, defining the contamination to an approximate 17-by-12-ft area that is 5 ft deep. The analytical results from sample locations located beyond the PCB-contaminated area indicate that migration of the PCBs is limited laterally and decreases away from the cooling tower pad and building foundation. The source of the PCB contamination is unknown but is presumably the result of a historical spill. Based upon the analytical results, the extent of the PCB contamination was confined to the area around the cooling tower. There is no known source or evidence of PCBs associated with operation of the cooling tower, or cooling water system in Building 2201. The only other possible source of PCBs associated with Building 2201 operations is the fuel oil system. An oil-fired boiler located in the basement was once used as the heat source for Building 2201 operations. Tapping and draining activities during closure resulted in collection of residual oil in the fuel supply lines. The sampled oil did not contain PCBs.

The analytical result of the Decision II sample collected from 1.0 to 1.5 ft bgs at location AF18, where Ra-226 contamination was identified in surface soil, show that the Ra-226 activity is below the FAL, therefore defining the vertical extent of contamination to 1 ft bgs. The contaminated soil is located within a narrow electrical utility trench between a concrete slab and asphalt surface that define the lateral extent of contamination. Field radiological instrumentation determined there was minor contamination extending onto the surface of the asphalt that was removed by scabbling. The source of the Ra-226 contamination is likely a very limited spill or release from a radiological check source used during past operations.

A corrective action was implemented to remove approximately 50 yd³ of PCB-contaminated soil, approximately 1 ft³ of Ra-226 contaminated soil (and scabbled asphalt), and a HEPA filter that was

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determined to meet the criteria of a PSM. Electrical and lighting components, and other building materials assumed to be PSM were also removed from Building 2201, as practical, without the need for sampling. These materials include:

- Mercury-containing switches, thermometers, and vapor light bulbs
- Fluorescent and sodium-vapor light bulbs
- Circuit boards
- PCB-containing ballasts and capacitors
- Leaded glass windows and various lead shielding (e.g., plugs, bricks)
- Lead-acid batteries

Because the COC contamination and PSMs have been removed, clean closure of CAS 26-41-01 is recommended.

In addition to the implemented corrective action, the following BMPs were completed that would place Building 2201 in a safe interim configuration for future demolition. These activities were completed outside of the FFACO scope for CAU 117.

- Site preparation activities (e.g., securing bi-parting door, cleaning up potential Hantavirus)
- Asbestos identification and abatement
- Removal of readily removable wastes including:
 - HEPA filters and frames
 - Radiologically contaminated flooring materials
 - Abandoned excess chemicals located throughout the facility
 - Abandoned HEPA vacuums located within the facility
 - Lubricants/fluids from equipment/systems via tap and drain
 - Mineral oil from shielding windows
- Performance of final release and confirmatory radiological surveys to establish proper controls (postings)

D.7.0 References

BN, see Bechtel Nevada.

Burns & McDonnell, see Burns & McDonnell Engineering Co.

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Appendix E Waste Disposition Documentation

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E.1.0 Waste Disposition Documentation

Attachment 1 of this appendix provides waste disposition documentation for the various waste streams generated during closure activities at CAU 117, CAS 26-41-01. All wastes were managed in accordance with all applicable state and federal regulations, DOE orders, and the CAU 117 SAFER Plan (NNSA/NSO, 2007).

Attachment 1 Waste Disposition Documentation

(49 Pages)



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Form			•			Rev. 0
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SWO USE (Select One) AREA 23 6 🗵 9 🗵 LANDFILL
For waste characterization, approval, and/or assistance, contact Solid Waste Operation (SWO) at 5-7898.
REQUIRED: WASTE GERERATOR INFORMATION (This form is for rolloffs; dump trucks, and other onsite disposal of materials.)
Waste Generator: Joe Molter, SNJV Waste Ops. Phone Number: 295-1578, C 630-0188
Location / Origin: ATS CAU-117; CAS 28-41-01; Phile Stdg 2201: 31/30-gallon dnume; #117A01 thru 117A31
Waste Category: (check one) ☐ Commercial ☐ Industrial
Waste Type: ☐ NTS ☐ Putrescrible ☐ FFACO-onsite ☐ WAC Exception
(check one)
Pollution Prevention Category: (check one) 🗵 Environmental management 🔲 Defense Projects 🗀 YMP
Pollution Prevention Category: (check one) Clean-Up Routine
Method of Characterization: (check one) Sampling & Analysis Process Knowledge Contents
Prohibited Waste at all three Radioactive waste; RCRA waste; Hazardous waste; Free Ilquids, PCBs above TSCA regulato NTS landfills; levels, and Medical wastes (needles, sharps, bloody clothing).
Additional Prohibited Waste at the Area 9 U10C Landfill: Sewage Sludge, Animal carcasses, Wel garbage (food waste); and Friable aspestos
REQUIRED: WASTE CONTENTS ALLOWABLE WASTES
Check all allowable wastes that are contained within this load: NOTE: Waste disposal at the Area 6 Hydrocarbon Landfill must have come into contact with petroleum hydrocarbons or
coolanis, such as: gasoline (no benzene, lead); jet fuel; diesel fuel; lubricants and hydraulics; kerosene; asphaltic
petroleum hydrocarbon; and ethylene glycol.
Acceptable waste at any NTS landfill: Paper Rocks / unaltered geologic materials Empty containers
☐ Asphalt ☐ Metal ☐ Wood ☐ Soil ☐ Rubber (excluding tires) ☐ Demolition debris
☐ Plastic ☐ Wire ☐ Cable ☐ Cloth ☐ Instillation (non-Asbestosform) ☐ Cement & concre
Manufactured Items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.)
Additional waste accepted at the Area 23 Mercury Landfill: Office Waste Food Waste Animal Carcasse
Asbestos Friable Non-Friable (contact SWO if regulated load) Quantity:
Additional waste accepted at the Area 9 U10c Landfill:
☐ Non-frieble asbestos ☐ Drained automobiles and military vehicles ☐ Solid fractions from sand/oil/water
☐ Light ballasts (contact SWO) ☐ Drained fuel filters (gas & diesel) ☐ Deconned Underground and Above
☐ Hydrocarbons (contact SWO) ☒ Other drums of powdered material Ground Tanks
Additional waste accepted at the Area 6 Hydrocarbon Landfill:
☐ Septic sludge ☐ Rags. ☐ Drained fuel filters (gas & diesel) ☐ Crushed non-terme plated oil filters
☐ Plants ☐ Soil ☐ Sludge from sand/oil/water separators ☐ PCBs below 50 parts per million
REQUIRED: WASTE GENERATOR SIGNATURE
Initials: (if initialed, no radiological clearance is necessary.)
The above mentioned waste was generated outside of a Controlled Waste I' knowledge, does not contain radiological materials. Radiological Survey Release for Waste Disposal
knowledge, does not contain radiological materials. Radiological Survey Release for Waste Disposal RCT initials
To the best of my knowledge, the waste described above contains only the Latter This contains rios ments the criteria for no
site. I have verified this through the waste characterization method identifi added man-made radioactive material prohibited and allowable waste items. I have contacted Property Managem. This contained made the order for
is approved for disposal in the landfill. Radson Manual Table 42 release limits.
Print Name: Jehn 17 toward origin.
SIGNATURE: /s/ Chao-Hslung Tung DATE, 4/T/A
W- HN-0846 (1002)
Note: "Food waste, office trash and animal carcasses do not require a radiological clearance. Freon-containing appliances must have signed removal certification statement with Load Verification."
SWO USE ONLY
Load Weight (net from scale or estimate): Signature of Certifier / /S/ Don Bickford

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Waste Category Definitions					
Commercial Waste:	Office waste, putrescible waste				
Industrial Waste:	Waste generated from activities associated with the fabrication or demolition of on-site structures. Solid waste derived from industrial manufacturing processes (i.e., construction and demolition waste).				
	Waste Types Definitions				
NTS:	Waste generated from construction, demolition, and/or routine activities within the Nevada Test Site boundaries. Waste that does not meet another waste type definition listed below.				
Non-Putrescible:	Waste that is not directly associated with construction or demolition activities, such as office waste				
Putrescible:	Waste that will decompose, decay, and become putrid (i.e. food waste and animal carcasses).				
Asbestos Containing Material:	Waste that contains asbestos. Regulated asbestos (friable) will not be accepted without a shipping paper.				
FFACO-onsite:	Waste generated, within the NTS boundaries, from activities directed by the Federal Facilities Agreement and Consent Order.				
FFACO-offsite:	Waste generated, outside of the NTS boundaries, from activities directed by the Federal Facilities Agreement and Consent order (e.g., CNTA, TTR, NLV, and some UGTA project locations).				
WAC exception	Waste that does not meet the waste acceptance criteria, as defined within the current NTS landfill permits, and has been given approval from the NDEP for disposal into an NTS landfill.				
Historic DOE/NV	Waste generated from historical releases associated with the DOE/NV Waste Management Project Office (precursor to the Yucca Mountain Project Office), which occurred prior to November 30, 1989.				
,	Pollution Prevention Category Definitions				
Environmental Management:	Waste generated from an Environmental Management project (e.g., waste generated from Environmental Restoration or International Technologies projects).				
Industrial Waste:	Defense Projects: Waste generated from Defense Projects (e.g., waste generated from DTRA, LANL, Sandia, and/or any other non-Environmental Management directed project.				
Routine:	Routine operations waste generated from: any type of production, analytical, and/or research and development laboratory operation; "work-for-others," and/or any periodic and recurring work that is considered on-going processes, are also considered routine operations.				
Clean-up:	Clean-up/stabilization waste generated from one-time operations. Waste generated from: environmental restoration projects-, decontamination and decommissioning/ transition operations-, and TSCA regulated wastes. Clean-up/stabilization activities may span several years. The waste is a direct result of past operations and activities, rather than a current process. Newly generated wastes produced during clean-up operations (usually resulting from common activities such as handling, sampling, treatment, repackaging, shipping, etc.) are considered clean-up waste.				
Radiological Limitations					
Area 23 Landfill:	See "Performance Objective for Certification of Non-Radioactive Hazardous Waste".				
Area 6 and Area 9 Landfills:	See permit limits.				

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SWO USE (Select One) AREA 23 6 89 LANDFILL
For waste characterization, approval, and/or assistance, contact Solid Waste Operation (SWO) at 5-7898.
. REQUIRED: WASTE GERERATOR INFORMATION (This form is for rolloffs, dump trucks, and other onsite disposal of materials.)
Waste Generator: Joe Molter, SNJV Waste Ops Phone Number: X5,1578, c 630-0188
Location / Origin: Area 28, CAS 26-41-01, "Pluto", 30 cubic yard roll-off bin (SNJV Tracking #117A34) CAV-117 (35)
Waste Category: (check one)
Waste Type: NTS □ Putrescrible □ FFACO-ohsite □ WAC Exception □ Charles □ Charles □ WAC Exception □ Charles □
(check one) Non-Pulrescible Asbestos Containing Material FFACO-offsite Historic DOE/NV
Pollution Prevention Category: (check one) Environmental management Defense Projects YMP Pollution Prevention Category: (check one) Clean-Up Routine
Method of Characterization: (check one) ☐ Sampling & Analysis ☐ Process Knowledge ☐ Contents
Prohibited Waste at all three Radioective waste; RCRA waste; Hazardous waste; Free figulds, PCBs above TSCA regulatory NTS landfills: levels, and Medical wastes (needles, sharps, bloody clothing).
Additional Prohibited Waste at the Area 9 U10C Landfill: Sewage Sludge, Animal carcasses, Wet garbage (food waste); and Fnable asbestos
REQUIRED: WASTE CONTENTS ALLOWABLE WASTES
Check all allowable wastes that are contained within this load: NOTE: Waste disposal at the Area 6 Hydrocarbon Landfill must have come into contact with petroleum hydrocarbons or
coolants, such as: gasoline (no beпzene, lead); jet fuel; diesel fuel; lubricants and hydraulics; kerosene; asphaltic
рetroieum hydrocarbon; aлd ethylene glycol.
Acceptable waste at any NTS landfill: Paper Rocks / unaltered geologic materials Empty containers Asphall Metal Wood Rocks Rubber (excluding lires) Demolition debris
☐ Asphalt ☑ Metal ☑ Wood ☐ Soil ☐ Rubber (excluding lires) ☑ Demolition debris ☐ Plastic ☐ Wire ☐ Cable ☑ Cloth ☑ Insulation (non-Asbestosform) ☐ Cement & concrete
☐ Manufactured items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.)
Additional waste accepted at the Area 23 Mercury Landfill: Office Waste Food Waste Animal Carcasses
Asbestos Friable Non-Friable (contact SWO if regulated load) Quantity:
Additional waste accepted at the Area 9 U10c Landfill;
☐ Non-friable asbestos ☐ Drained automobiles and military vehicles ☐ Solid fractions from sand/oil/water
☐ Light ballasts (contact SWO) ☐ Drained fuel filters (gas & diesel) ☐ Deconned Underground and Above .
☐ Hydrocarbons (contact SWO) ☐ Other Ground Tanks
Additional waste accepted at the Area 6 Hydrocarbon Landfill:
☐ Septic studge ☐ Rags ☐ Drained fuel filters (gas & diesel) ☐ Crushed non-teme plated oil filters
Plants Soll Studge from sand/oil/water separators PCBs below 50 parts per million REQUIRED: WASTE GENERATOR SIGNATURE
Initials: (if initialed, no radiological clearance is necessary.)
The above mentioned waste was generated outside of a Controlled Waste Mans Region of Survey Refers a for Waste Disposal knowledge, does not contain radiological materials.
To the best of my knowledge, the waste described above contains only those negative metaltic forms site. I have verified this through the waste characterization method identified a prohibited and allowable waste items. I have contacted Property Management is approved for disposal in the landfill. A This contains probable waste items. I have contacted Property Management is approved for disposal in the landfill.
Print Name:). h ~ // Fow/ - Signatures/s/Chao-Hslung Tung-Date 43/20
Signature: /s/ John M. Fowler Date:
Note: "Food waste, office trash and animal carcasses do not require a radiological clearance. Freon-containing appliances must have signed removal certification statement with Load Verification."
SWO USE ONLY 10/14/08
SWO USE ONLY 10/14/08 Load Weight (net from scale or estimate): 6400 Signature of Certifier: /s/Dennis Pfeifer

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	Waste Category Definitions
Commercial Waste:	Office waste, putrescible waste
Industrial Waste:	Waste generated from activities associated with the fabrication or demolition of on-site structures. Solid waste derived from industrial manufacturing processes (i.e., construction and demolition waste).
	Waste Types Definitions
NTS:	Waste generated from construction, demolition, and/or routine activities within the Nevada Test Site boundaries. Waste that does not meet another waste type definition listed below.
Non-Putrescible:	Waste that is not directly associated with construction or demolition activities, such as office waste
Putrescible:	Waste that will decompose, decay, and become putrid (i.e. food waste and animal carcasses).
Asbestos Containing Material:	Waste that contains asbestos. Regulated asbestos (friable) will not be accepted without a shipping paper.
FFACO-onsite:	Waste generated, within the NTS boundaries, from activities directed by the Federal Facilities Agreement and Consent Order.
FFACO-offsite:	Waste generated, outside of the NTS boundaries, from activities directed by the Federal Facilities Agreement and Consent order (e.g., CNTA, TTR, NLV, and some UGTA project locations).
WAC exception	Waste that does not meet the waste acceptance criteria, as defined within the current NTS landfill permits, and has been given approval from the NDEP for disposal into an NTS landfill.
Historic DOE/NV	Waste generated from historical releases associated with the DOE/NV Waste Management Project Office (precursor to the Yucca Mountain Project Office), which occurred prior to November 30, 1989.
	Pollution Prevention Category Definitions
Environmental Management:	Waste generated from an Environmental Management project (e.g., waste generated from Environmental Restoration or International Technologies projects).
Industrial Waste:	Defense Projects: Waste generated from Defense Projects (e.g., waste generated from DTRA, LANL, Sandia, and/or any other non-Environmental Management directed project.
Routine:	Routine operations waste generated from: any type of production, analytical, and/or research and development laboratory operation; "work-for-others," and/or any periodic and recurring work that is considered on-going processes, are also considered routine operations.
Clean-up:	Clean-up/stabilization waste generated from one-time operations. Waste generated from: environmental restoration projects-, decontamination and decommissioning/ transition operations-, and TSCA regulated wastes. Clean-up/stabilization activities may span several years. The waste is a direct result of past operations and activities, rather than a current process. Newly generated wastes produced during clean-up operations (usually resulting from common activities such as handling, sampling, treatment, repackaging, shipping, etc.) are considered clean-up waste.
	Radiological Limitations
Area 23 Landfill:	See "Performance Objective for Certification of Non-Radioactive Hazardous Waste".
Area 6 and Area 9 Landfills:	See permit limits.

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SWO USE (Select One) AREA	A	1 6	⊠ 9	X LANDFILL
For waste characterization, app		, contact Solid Wast	e Operation (SW	O) at 5-7898.
	JIRED: WASTE GEREI		<u> </u>	
(This form is for r	rolloffs, dump trucks, and	d other onsite dispos	al of materials.)	
Waste Generator: <u>Joe Molter, SNJV Was</u>	ste Ops (AU-//	7 PI	hone Number: X	5-1578, c 630-0188
Location / Origin: Area 26, CAS 26-41-0	1, "Pluto", End-dump of	bulk soil, load #1, S	NJV Tracking # 1	17A104
Waste Category: (check one)	☐ Commercial	⊠ Ir	dustrial	
Waste Type: X NTS	☐ Putrescrible	⊠F	FACO-onsite	☐ WAC Exception
(check one) Non-Putrescible	Asbestos Contair	ning Material 🔲 F	FACO-offsite	☐ Historic DOE/NV
Pollution Prevention Category: (check one	e) 🖾 Environmental m	anagement 🔲 D	efense Projects	☐ YMP
Pollution Prevention Category: (check one	e) 🛛 Clean-Up	□R	ouline	
Method of Characterization: (check one)	Sampling & Analy		rocess Knowledg	
Prohibited Waste at all three Radioactive NTS landfills: Revels, and	re waste; RCRA waste; I I Medical wastes (needle			above TSCA regulatory
Additional Prohibited Waste at the Area 9 U10C Landfill: Sewage S	ludge, Animal carcasses	s, Wet garbage (food	d waste); and Fria	ble asbestos
	ED: WASTE CONTENT	_ , , , , ,		-
	allowable wastes that ar			
NOTE: Waste disposal at the Area 6 Hydro coolants, such as: gasoline (no be				
petroleum hydrocarbon; and ethyle		coci idoi, idoitodhib i	ara riyaraanaa, k	erosene, aspirance
Acceptable waste at any NTS landfill:	☐ Paper ☐ Ro	cks / unaltered geok	ogic materials	☐ Empty containers
Asphalt Metal Wood	⊠ Soil ☐ Ru	bber (excluding tires	5)	Demotition debris
☐ Plastic ☐ Wire ☐ Cable	☐ Cloth ☐ Ins	ulation (non-Asbesto	osform)	□ Cement & concrete
Manufactured items: (swamp coolers, for	rniture, rugs, carpet, ele	ctronic components	, PPE, etc.)	
Additional waste accepted at the Area 23	Mercury Landfill:	Office Waste	Food Waste	☐ Animal Carcasses
Asbestos Friable Non-	-Friable (contact SWO if	regulated load) (Quantity:	
Additional waste accepted at the Area 9	U10c Landfill:			
☐ Non-friable asbestos ☐ Draine	ed automobiles and milita	ary vehicles 🛚 So	lid fractions from	sand/oil/water
☐ Light ballasts (contact SWO) ☐ Draine	ed fuel filters (gas & dies	el) 🗌 De	conned Undergra	ound and Above
☐ Hydrocarbons (contact SWO) ☐ Other		Gr	ound Tanks	
Additional waste accepted at the Area 6	Hydrocarbon Landfill:	—		
	Drained fuel filters (gas 8	k diesel)	Crushed non-t	eme plated oil filters
	Sludge from sand/oil/wat		PCBs below 5	0 parts per million
REQ	UIRED: WASTE GENE	RATOR SIGNATUR	RE	
Initials: (if initialed, no radiological	l clearance is necessar	ry.)		, , <u>, , , , , , , , , , , , , , , , , </u>
The above mentioned waste was geлerated		Waste Management	t Area (CWMA) aı	nd to the best of mv
knowledge, does not contain radiological m	naterials.		Radiological Sur	vey Release for Waste Dispos
To the best of my knowledge, the waste des	scribed above contains	only those materia	ROT Initials	fotos allos de sociales de la caritacia de
site. I have verified this through the waste	characterization method	l identified above i		rtainer/load meets the criteria t agn-made-radioactive material
prohibited and allowable waste items. <u>I hav</u>	ve contacted Property M	anagement and ha	This cor	stainer/load meets the criteria i
is approved for disposal in the landfill.				Manual Table 4.2 release limit: tainer/load is exèmpt from sui
Print Name: John M. Fowler	•	, ,	due to pi	rocess knowledge and origin.
Signature: /s/ John M. Fowler	D	ate: 11/24/08	l .	hao-Hsiung Tung DATE:
Note: "Food waste, office trash and animal must have signed removal certification			ance. rreon-con	talhing appliances
SWO USE ONLY				
Load Weight (net from scale or estimate):	11710 8/2001	2/9/08 ure of Certifier. <u>/S/</u>	Don Rickfo	rd
was weight (het nom geals of eaningle).	i i i i i i i i i i i i i i i i i i i	11.5 OL OCIONS(1. <u>) (3)</u>	DIVIDIONIO	14

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	Waste Category Definitions
Commercial Waste:	Office waste, putrescible waste
Industrial Waste:	Waste generated from activities associated with the fabrication or demolition of on-site structures. Solid waste derived from industrial manufacturing processes (i.e., construction and demolition waste).
	Waste Types Definitions
NTS:	Waste generated from construction, demolition, and/or routine activities within the Nevada Test Site boundaries. Waste that does not meet another waste type definition listed below.
Non-Putrescible:	Waste that is not directly associated with construction or demolition activities, such as office waste
Putrescible:	Waste that will decompose, decay, and become putrid (i.e. food waste and animal carcasses).
Asbestos Containing Material:	Waste that contains asbestos. Regulated asbestos (friable) will not be accepted without a shipping paper.
FFACO-onsite:	Waste generated, within the NTS boundaries, from activities directed by the Federal Facilities Agreement and Consent Order.
FFACO-offsite:	Waste generated, outside of the NTS boundaries, from activities directed by the Federal Facilities Agreement and Consent order (e.g., CNTA, TTR, NLV, and some UGTA project locations).
WAC exception	Waste that does not meet the waste acceptance criteria, as defined within the current NTS landfill permits, and has been given approval from the NDEP for disposal into an NTS landfill.
Historic DOE/NV	Waste generated from historical releases associated with the DOE/NV Waste Management Project Office (precursor to the Yucca Mountain Project Office), which occurred prior to November 30, 1989.
	Pollution Prevention Category Definitions
Environmental Management:	Waste generated from an Environmental Management project (e.g., waste generated from Environmental Restoration or International Technologies projects).
Industrial Waste:	Defense Projects: Waste generated from Defense Projects (e.g., waste generated from DTRA, LANL, Sandia, and/or any other non-Environmental Management directed project.
Routine:	Routine operations waste generated from: any type of production, analytical, and/or research and development laboratory operation; "work-for-others," and/or any periodic and recurring work that is considered on-going processes, are also considered routine operations.
Clean-up:	Clean-up/stabilization waste generated from one-time operations. Waste generated from: environmental restoration projects-, decontamination and decommissioning/ transition operations-, and TSCA regulated wastes. Clean-up/stabilization activities may span several years. The waste is a direct result of past operations and activities, rather than a current process. Newly generated wastes produced during clean-up operations (usually resulting from common activities such as handling, sampling, treatment, repackaging, shipping, etc.) are considered clean-up waste.
	Radiological Limitations
Area 23 Landfill:	See "Performance Objective for Certification of Non-Radioactive Hazardous Waste".
Area 6 and Area 9 Landfills:	See permit limits.

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SWO USE (S	elect One) AREA		23	□ 6		⊠ 9	\boxtimes	LANDFILL
Forwa	aste character	ization, appro	val, and	i/or assista	nce, contact	Solid W	aste Operation (SV	VO) at	5-7898.
	(This				RERATOR II and other on		ATION cosal of materials.)		
Waste Generator:	Joe Molter	, SNJV Waste	Ops	CAV	-117		Phone Number: _	X5-157	78, c 630-0188
Location / Origin:	Area 26, C	AS 26-41-01,	"Pluto",	End-dump	of bulk soil,	load # 2	2, SNJV Tracking #	117A	105
Waste Category:	(check one)		☐ Co	mmercial			Industrial		
Waste Type:	NTS	Ċ.	☐ Pu	trescrible			FFACO-onsite		WAC Exception
(check one)	Non-Putr		********	****	ntaining Mate		**********************		Historic DOE/NV
Pollution Preven		******************	********		al manageme		Defense Projects) YMP
Pollution Preven			****	ean-Up		***********	Routine		
Method of Chara		*****************		mpling & A	ARREST STATE OF THE PARTY OF TH		Process Knowled	*********	***********************
Prohibited Waste NTS landfills:					te; Hazardou edles, sharps			s abov	e TSCA regulatory
Additional Prohil at the Area 9 U10		Sewage Slu	dge, An	imal carcas	sses, Wet gar	rbage (f	ood waste); and Fr	iable a	sbestos
coolants,		Check all al rea 6 Hydroc oline (no ben	lowable arbon Li zene, le	wastes the andfill must ad); jet fuel		ed with			
Acceptable wast	e at any NTS	landfill:	☐ Pap	er 🗌	Rocks / unal	Itered g	eologic materials		Empty containers
☐ Asphalt ☐	Metal [Wood	Soil Soil		Rubber (exc	7,377	3.05	-	Demolition debris
☐ Plastic ☐			Clot		Insulation (n		(5)	\boxtimes	Cement & concrete
☐ Manufactured			**********	*******	*************	*******	***********		
Additional waste	accepted at t				Office Office		☐ Food Waste Quantity:		Animal Carcasses
Additional waste	accepted at	the Area 9 U	10c Lan	dfill:					(************************
☐ Non-friable as	Section of the sectio				military vehicl	es 🗆	Solid fractions from	m sand	l/oil/water
☐ Light ballasts ((contact SWO)	☐ Drained	fuel filte	ers (gas & d	diesel)		Deconned Underg	round	and Above
☐ Hydrocarbons	(contact SWO)	☐ Other _	77.70.408.4	≟t Afterovirusok			Ground Tanks		The second secon
Additional waste	accepted at	the Area 6 Hy	drocar	bon Landf	fill:				
☐ Septic sludge	The second state of the se				as & diesel)	-	☐ Crushed nor	-teme	plated oil filters
☐ Plants	☐ Soil	to be a second of the second			water separa	ators	☐ PCBs below	50 par	ts per million
		REQU	RED:	WASTE GE	ENERATOR .	SIGNA	TURE		
Initials: (if	initialed, no r	radiological o	learand	ce is neces	ssary.)				
The above mention knowledge, does it				of a Contro	lled Waste M	anagen	nent Area (CWMA)	V	Secretary Comments (1996)
To the best of my site. I have verifie prohibited and allo is approved for dis	d this through owable waste sposal in the l	n the waste ch items. <u>I have</u> andfill.	contac	ization met	thod identifie	d above	RCT Initials Far This adde	contain	Release for Waste Disp ner/load meets the criter made radioactive mater ner/load meets the criter nual Table 4.2 release in
Print Name:		7. Fowle	~		- ,	1.1.	This	contair to proce	ner/load is exempt from ass browledge and origin.
Signature: /S/	John M.	Fowler			Date: 1/	24/00	SIGNATURE:	/s/ Cha	o-Hsiung Tung DATE
Note: "Food waste must have:	e, office trash								- · · · · · · · · · · · · · · · · · · ·
SWO USE ONLY					12/9/08				7
Load Weight (net f	from scale on	estimate): 2/	2.14			rtifier	/s/ Don Bick	ford	
in But (not)	(110	A		0-			~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~

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	Waste Category Definitions
Commercial Waste:	Office waste, putrescible waste
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Asbestos Containing Material:	Waste that contains asbestos. Regulated asbestos (friable) will not be accepted without a shipping paper.
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FFACO-offsite:	Waste generated, outside of the NTS boundaries, from activities directed by the Federal Facilities Agreement and Consent order (e.g., CNTA, TTR, NLV, and some UGTA project locations).
WAC exception	Waste that does not meet the waste acceptance criteria, as defined within the current NTS landfill permits, and has been given approval from the NDEP for disposal into an NTS landfill.
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Environmental Management:	Waste generated from an Environmental Management project (e.g., waste generated from Environmental Restoration or International Technologies projects).
Industrial Waste:	Defense Projects: Waste generated from Defense Projects (e.g., waste generated from DTRA, LANL, Sandia, and/or any other non-Environmental Management directed project.
Routine:	Routine operations waste generated from: any type of production, analytical, and/or research and development laboratory operation; "work-for-others," and/or any periodic and recurring work that is considered on-going processes, are also considered routine operations.
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	Radiological Limitations
Area 23 Landfill:	See "Performance Objective for Certification of Non-Radioactive Hazardous Waste".
Area 6 and Area 9 Landfills:	See permit limits.

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

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SWO USE (Select	One) AREA	23	□ 6	. [⊠ 9	
For waste cha	racterization, appro	oval, and/or assis	stance, contact So	lid Waste	Operation (SW	O) at 5-7898.
	(This form is for ro	lloffs, dump truck	1)Sha	e disposa	of materials.)	*
Waste Generator: Joe M	Molter, SNJV Wast 26, CAS 26-41-01	Ops State	bed, Controle	Stelo	one Number: X	5-1578, c 630-0188
Location / Origin: Area	26, CAS 26-41-01	, "Pluto", End-du	mp of bulk soil, loa	ad # 1, SN	IJV Tracking # 1	117A106
Waste Category: (check o	ne)	☐ Commercia	al	⊠ Inc	fustrial	
Waste Type: NT	S	☐ Putrescrible	В	⊠ FF	ACO-onsite	☐ WAC Exception
(check one) No	n-Putrescible	☐ Asbestos C	containing Materia	I ☐ FF	ACO-offsite	☐ Historic DOE/NV
Pollution Prevention Cat	tegory: (check one)		ntal management	☐ De	fense Projects	☐ YMP
Pollution Prevention Cat	tegory: (check one)			☐ Ro	utine	
Method of Characterizat	ion: (check one)	Sampling 8	Analysis	⊠ Pro	ocess Knowledg	e Contents
Prohibited Waste at all to NTS landfills:			aste; Hazardous v needles, sharps, b			above TSCA regulatory
Additional Prohibited Wa at the Area 9 U10C Land	Sawaga Si	idge, Animal care	casses, Wet garba	ige (food	waste); and Fria	able asbestos
petroleum hydroca	Check all a the Area 6 Hydroc gasoline (no ben arbon; and ethylen	llowable wastes carbon Landfill m zene, lead); jet fi e glycol.	uel; diesel fuel; lub	within the contact oricants a	is load: with petroleum l nd hydraulics; k	erosene; asphaltic
Acceptable waste at any	NTS landfill:	☐ Paper [Rocks / unalter			☐ Empty containers
Asphalt Metal	☐ Wood	⊠ Soil	Rubber (exclud			☐ Demolition debris
☐ Plastic ☐ Wire	☐ Cable	☐ Cloth [Insulation (non	-Asbesto	sform)	□ Cement & concrete
☐ Manufactured items: (a)	swamp coolers, fur	niture, rugs, carp	et, electronic com	**********		
Additional waste accepte	ed at the Area 23	Mercury Landfil	I: Office Wa	aste	Food Waste	☐ Animal Carcasses
☐ Asbestos ☐ Friab	ole Non-F	riable (contact S	WO if regulated lo	oad) Q	uantity:	
Additional waste accepte	ed at the Area 9 U	10c Landfill:				
☐ Non-friable asbestos	☐ Drained	automobiles an	d military vehicles	☐ Sol	d fractions from	sand/oil/water
☐ Light ballasts (contact S	(SWO) Drained	fuel filters (gas	& diesel)	☐ Dec	conned Undergre	ound and Above
☐ Hydrocarbons (contact	SWO) Other	1277	1.0	Gro	und Tanks	
Additional waste accepte	ed at the Area 6 H	vdrocarbon Lan	dfill:		***************************************	
		rained fuel filters			Crushed non-	teme plated oil filters
☐ Plants ☐ :			oil/water separator	rs 🗀	[[] [[] [[] [[] [] [] [] [] [] [] [] []	0 parts per million
			GENERATOR SIG			
Initials: (if initialed	I, no radiological				54	9 .
The above mentioned was knowledge, does not conti			trolled Waste Man	agemen	Radiological S	Survey Release for Waste Disp
Anomicage, aces not cont	ani radiological illa	con raid.			RCT Initials	
To the best of my knowled					The second of th	ontainer/load meets the criteri man-made radioactive materi
site. I have verified this th					79.25.00.00	ontainer/load meets the criteri
prohibited and allowable v is approved for disposal in		contacted Prop	erty Management	and nav	Radco	on Manual Table 4.2 release lim
- A	Anto	9)			This q	ontainer/load is exempt from a process kandwiede and origin.
Print Name: Joy /\ Signature: /s/ Joe N	Molter	7 - 1 W (Date: 12/8	108		Chao-Hsiung Tung DATE
Note: "Food waste, office	trash and animal c		require a radiologi	cal cleara	nce. Freon-con	ataining appliances
must have signed re	anovai cerincation					
11) (12/9/0 8 Signature of Certifi	0.20	D D'-I (-	and the same of th
Load Weight (net from sca	le or estimate): 7	4608	Signature of Certifi	er, /S/	DOU RICKLO	ord

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	Waste Category Definitions
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	Radiological Limitations
Area 23 Landfill:	See "Performance Objective for Certification of Non-Radioactive Hazardous Waste".
Area 6 and Area 9 Landfills:	See permit limits.

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Form
FRM-091

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SWO USE (Select One) AREA 🗌 23 📗 6 🔯 9 🔯 LANDFILI	
For waste characterization, approval, and/or assistance, contact Solid Waste Operation (SWO) at 5-7898.	
REQUIRED: WASTE GERERATOR INFORMATION	
(This form is for rolloffs, dump trucks, and other onsite disposal of materials.)	
Vaste Generator: Joe Molter, SNJV Waste-Ops 20 yard 1011 Cft Phone Number: X5-1578, c 630-018	8
ocation / Origin: Area 26, CAS 26-41-01, "Pluto", End-dump of bulk soil, load # 4, SNJV Tracking # 117A107 (AB-III	7 6
Vaste Category: (check one)	
Vaste Type: ☑ NTS · ☐ Putrescrible ☑ FFACO-onsite ☐ WAC Exce	otion
check one) Non-Putrescible Asbestos Containing Material FFACO-offsite Historic DO	E/NV
Pollution Prevention Category: (check one) 🗵 Environmental management 🔲 Defense Projects 🔲 YMP	
Pollution Prevention Category: (check one) Clean-Up Routine	
Method of Characterization: (check one) 🛛 Sampling & Analysis 🖾 Process Knowledge 🔲 Contents	
rohibited Waste at all three Radioactive waste; RCRA waste; Hazardous waste; Free liquids, PCBs above TSCA regu	latory
ITS landfills: levels, and Medical wastes (needles, sharps, bloody clothing).	
Additional Prohibited Waste Sewage Sludge, Animal carcasses, Wet garbage (food waste); and Friable asbestos	- 1
REQUIRED: WASTE CONTENTS ALLOWABLE WASTES	
Check all allowable wastes that are contained within this load:	- 1
IOTE: Waste disposal at the Area 6 Hydrocarbon Landfill must have come into contact with petroleum hydrocarbons or	- 1
coolants, such as: gasoline (no benzene, lead); jet fuel; diesel fuel; lubricants and hydraulics; kerosene; asphaltic petroleum hydrocarbon; and ethylene glycol.	
acceptable waste at any NTS landfill: Paper Rocks / unaltered geologic materials Empty contain	ers
Asphalt ☐ Metal ☐ Wood ☒ Soil ☐ Rubber (excluding tires) ☐ Demolition de	
☐ Plastic ☐ Wire ☐ Cable ☐ Cloth ☐ Insulation (non-Asbestosform) ☐ Cement & con	crete
Manufactured items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.)	-0.00
Additional waste accepted at the Area 23 Mercury Landfill: Office Waste Food Waste Animal Carca	sses
Asbestos Friable Non-Friable (contact SWO if regulated load) Quantity:	- 1
dditional waste accepted at the Area 9 U10c Landfill:	
☐ Non-friable asbestos ☐ Drained automobiles and military vehicles ☐ Solid fractions from sand/oil/water	- 1
☐ Light ballasts (contact SWO) ☐ Drained fuel filters (gas & diesel) ☐ Deconned Underground and Above	- 1
Hydrocarbons (contact SWO) Other Ground Tanks	
dditional waste accepted at the Area 6 Hydrocarbon Landfill:	
☐ Septic sludge ☐ Rags ☐ Drained fuel filters (gas & diesel) ☐ Crushed non-teme plated oil filter	rs
Plants Soil Sludge from sand/oil/water separators PCBs below 50 parts per million	
REQUIRED: WASTE GENERATOR SIGNATURE	
nitials: (if initialed, no radiological clearance is necessary.)	- 1
	- 1
he above mentioned waste was generated outside of a Controlled Waste Manageme Radiological Survey Release for Water and Controlled Waste Manageme Radiological Survey Release for Water and Controlled Waste Manageme Radiological Survey Release for Water and Controlled Waste Manageme	te Dispos
RCT Initials	
o the best of my knowledge, the waste described above contains only those materia This container/load meets the ite. I have verified this through the waste characterization method identified above:	
rohibited and allowable waste items. I have contacted Property Management and hi This container/load meets the	
approved for disposal in the landfill. Radcon Manual Table 4.2 rel X This container/load is exempt	
rint Name: July M. Fowler due to process knowledge age	origin.
The Hallet Country of the Country of	
SIGNATURE: /s/ Chao-Hsiung Tung	DATE!
ignature: /S/ John M. Fowler Date: 12/19/c8	DATE!
ignature: /S/ JOhn M. FOWIEr Date: 12/19/c8 lote: "Food waste, office trash and animal carcasses do not require a radiological clearance. Freon-containing appliances	DATE!
ignature: /S/ JOhn M. FOWIEr Date: 12/19/c8 lote: "Food waste, office trash and animal carcasses do not require a radiological clearance. Freon-containing appliance must have signed removal certification statement with Load Verification."	DATE!
ignature: /S/ JOhn M. FOWIEr Date: 12/19/c8 lote: "Food waste, office trash and animal carcasses do not require a radiological clearance. Freon-containing appliances	DATE!

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Area 6 and Area 9 Landfills:	See permit limits.

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	elect One) AREA	23 6	⊠ 9	X LANDFILL
ror wa		oval, and/or assistance, contact Sol	id Waste Operation (SWC	O) at 5-7898.
	REQUI	RED: WASTE GERERATOR INFO	ORMATION	
	(This form is for ro	lloffs, dump trucks, and other onsite		TITTON CONTRACTOR OF
Waste Generator:	Joe Molter, SNJV Waste	e Ops, Mailstop 505	Phone Number: X	5-1578, c 630-0188 CAU-117 Penmel
Location / Origin:	Area 26, CAS 26-41-01,	, "Pluto", End-dump of bulk soil, SN	JV Tracking # 117A109	CAU-117 Peamer
Waste Category:	(check one)	☐ Commercial		
Waste Type:	⊠ NTS	☐ Putrescrible		☐ WAC Exception
(check one)	Non-Putrescible ■	☐ Asbestos Containing Material	☐ FFACO-offsite	☐ Historic DOE/NV
	tion Category: (check one)		□ Defense Projects	☐ YMP
	tion Category: (check one)	Principles of the Control of the Con	Routine	
	cterization: (check one)	Sampling & Analysis	☑ Process Knowledg	The state of the s
Prohibited Wast NTS landfills:	levels, and	waste; RCRA waste; Hazardous v Medical wastes (needles, sharps, b		above TSCA regulatory
Additional Prohi at the Area 9 U10	Courses Sh	udge, Animal carcasses, Wet garba	ge (food waste); and Fria	ble asbestos
coolants,	Check all a sposal at the Area 6 Hydro	ED: WASTE CONTENTS ALLOWA allowable wastes that are contained carbon Landfill must have come into nzene, lead); jet fuel; diesel fuel; lub ne glycol.	within this load: contact with petroleum l	
Acceptable wast Asphalt	te at any NTS landfill: Metal	☐ Paper ☐ Rocks / unalter ☐ Soil ☐ Rübber (exclud	red geologic materials	☐ Empty containers ☐ Demolition debris
Plastic			-Asbestosform)	☐ Cement & concrete
		rniture, rugs, carpet, electronic com	The state of the s	— ••••••••••••••••••••••••••••••••••••
THE RESERVE OF THE PERSON NAMED IN COLUMN TWO	The same of the sa	The state of the s	harrant ml arad	
Auditional waste	accepted at the Area 23	Mercury Landfill: Office Wa	aste Food Waste	☐ Animal Carcasses
Asbestos		Friable (contact SWO if regulated to	전 전경경원 - 1 등 대한 시점 회에 대한 경험 (2017년 대한 전)	Animal Carcasses
☐ Asbestos Additional waste ☐ Non-friable as ☐ Light ballasts ☐ 'Hydrocarbons Additional waste	Friable Non-leaccepted at the Area 9 Usbestos Drained (contact SWO) Drained (contact SWO) Other eaccepted at the Area 6 H	Friable (contact SWO if regulated to J10c Landfill: d automobiles and military vehicles d fuel filters (gas & diesel)	Oad) Quantity: Solid fractions from Deconned Undergr Ground Tanks	sand/oil/water ound and Above
☐ Asbestos Additional waste ☐ Non-friable as ☐ Light ballasts ☐ Hydrocarbons Additional waste ☐ Septic sludge	Friable Non-le accepted at the Area 9 Usbestos Drained (contact SWO) Drained (contact SWO) Other accepted at the Area 6 H	Friable (contact SWO if regulated to J10c Landfill: d automobiles and military vehicles d fuel filters (gas & diesel)	Oad) Quantity:	sand/oil/water
☐ Asbestos Additional waste ☐ Non-friable as ☐ Light ballasts ☐ Hydrocarbons Additional waste ☐ Septic sludge	Friable Non-le accepted at the Area 9 Usbestos Drained (contact SWO) Drained (contact SWO) Other accepted at the Area 6 H	Friable (contact SWO if regulated to J10c Landfill: d automobiles and military vehicles d fuel filters (gas & diesel) Hydrocarbon Landfill:	Oad) Quantity:	sand/oil/water ound and Above terne plated oil filters
Asbestos Additional waste Non-friable as Light ballasts Hydrocarbons Additional waste Septic sludge	Friable Non-le accepted at the Area 9 Usbestos Drained (contact SWO) Drained (contact SWO) Other accepted at the Area 6 H	Friable (contact SWO if regulated to J10c Landfill: d automobiles and military vehicles d fuel filters (gas & diesel) Hydrocarbon Landfill: Drained fuel filters (gas & diesel) Sludge from sand/oil/water separato UIRED: WASTE GENERATOR SIG	Oad) Quantity:	sand/oil/water ound and Above terne plated oil filters
Asbestos Additional waste Non-friable as Light ballasts Hydrocarbons Additional waste Septic sludge Plants (if	Friable Non-leaccepted at the Area 9 Usbestos Drained (contact SWO) Drained (contact SWO) Other Rags DRags DSOil SOil SOil SEREQU	Friable (contact SWO if regulated to J10c Landfill: d automobiles and military vehicles d fuel filters (gas & diesel) Hydrocarbon Landfill: Drained fuel filters (gas & diesel) Sludge from sand/oil/water separato UIRED: WASTE GENERATOR SIG	Oad) Quantity:	sand/oil/water ound and Above terne plated oil filters 50 parts per million
☐ Asbestos Additional waste ☐ Non-friable as ☐ Light ballasts ☐ Hydrocarbons Additional waste ☐ Septic sludge ☐ Plants Initials:(if	Friable Non-leaccepted at the Area 9 Usbestos Drained (contact SWO) Drained (contact SWO) Other Rags DSOII SOII SOII SOII SOII SOII SOII SOI	Friable (contact SWO if regulated to J10c Landfill: d automobiles and military vehicles d fuel filters (gas & diesel) Hydrocarbon Landfill: Drained fuel filters (gas & diesel) Sludge from sand/oil/water separato UIRED: WASTE GENERATOR SIGNIFICATION OF CLEARANCE IS necessary.)	Oad) Quantity: Solid fractions from Deconned Undergr Ground Tanks Crushed non- rs PCBs below 5	sand/oil/water ound and Above terne plated oil filters 50 parts per million
Asbestos Additional waste Non-friable as Light ballasts Hydrocarbons Additional waste Septic sludge Plants Initials: (if	Friable Non-leaccepted at the Area 9 Usbestos Drained (contact SWO) Drained (contact SWO) Other Rags DSOII SOII SECOND SOII SE	Friable (contact SWO if regulated to J10c Landfill: d automobiles and military vehicles d fuel filters (gas & diesel) Hydrocarbon Landfill: Drained fuel filters (gas & diesel) Sludge from sand/oil/water separato UIRED: WASTE GENERATOR SIGNIFICATION OF CLEARANCE IS necessary.)	GNATURE Radiological Surpassore Radiological	sand/oil/water ound and Above terne plated oil filters 50 parts per million
Asbestos Additional waste Non-friable as Light ballasts Hydrocarbons Additional waste Septic sludge Plants Initials: (if The above mentic knowledge, does To the best of my site. I have verifi prohibited and all is approved for d	Friable Non-leaccepted at the Area 9 Usbestos Drained (contact SWO) Drained (contact SWO) Other Rags DSOII SOII SOII SOII SOII SOII SOII SOI	Friable (contact SWO if regulated to J10c Landfill: d automobiles and military vehicles d fuel filters (gas & diesel) Hydrocarbon Landfill: Drained fuel filters (gas & diesel) Sludge from sand/oil/water separato UIRED: WASTE GENERATOR SIGNIFICATION OUTSIDE OF a Controlled Waste Manuaterials. Scribed above contains only those scharacterization method identified in the same contains only those scharacterization method identified.	GNATURE Radiological Suration of the control of th	terne plated oil filters for parts per million and to the best of my rvey Release for Waste Disponentainer/load meets the criterinan-made redioactive material manual Tably 7.2 release limitainer/load in table 7.2 release limitainer
☐ Asbestos Additional waste ☐ Non-friable as ☐ Light ballasts ☐ Hydrocarbons Additional waste ☐ Septic sludge ☐ Plants Initials: (if The above mentic knowledge, does To the best of my site. I have verifi prohibited and all is approved for d Print Name:	Friable Non-leaccepted at the Area 9 Usbestos Drained (contact SWO) Drained (contact SWO) Other Rags DSOII SOII SOII SOII SOII SOII SOII SOI	Friable (contact SWO if regulated to J10c Landfill: d automobiles and military vehicles d fuel filters (gas & diesel) Hydrocarbon Landfill: Drained fuel filters (gas & diesel) Sludge from sand/oil/water separato UIRED: WASTE GENERATOR SIGNIFICATION OUTSIDE OF A Controlled Waste Manaterials. Scribed above contains only those to characterization method identified are contacted Property Management	Ground Tanks Ground Tanks Ground Tanks Ground Tanks Ground Tanks GRATURE Radiological Surement And Added to added to a the conduct of t	sand/oil/water ound and Above terme plated oil filters 50 parts per million rvey Release for Waste Dispontainer/load meets the criterinan-made radioactive materiantainer/load meets the criterinal manual Table 3.2 release lim
Asbestos Additional waste Non-friable as Light ballasts Hydrocarbons Additional waste Septic sludge Plants Initials: (if The above mentic knowledge, does To the best of my site. I have verifiprohibited and all is approved for d Print Name: Signature: /Signature: /Signatu	Friable Non-leaccepted at the Area 9 Usbestos Drained (contact SWO) Drained (contact SWO) Drained (contact SWO) Other Rags DSOII SOII SWEQUE Initialed, no radiological more waste was generated not contain radiological more knowledge, the waste desired this through the waste of lowable waste items. I have isposal in the landfill.	Friable (contact SWO if regulated to J10c Landfill: d automobiles and military vehicles d fuel filters (gas & diesel) Hydrocarbon Landfill: Drained fuel filters (gas & diesel) Sludge from sand/oil/water separato UIRED: WASTE GENERATOR SIGnerance is necessary.) outside of a Controlled Waste Manuaterials. Scribed above contains only those otheracterization method identified the contacted Property Management of th	GNATURE Radiological Surations Radions And Surations Radiological Surations Radions Radiological Surations Radiological	sand/oil/water ound and Above terne plated oil filters 50 parts per million rvey Release for Waste Disponentainer/load meets the criterinan-made radioactive materiantainer/load meets the criterinal mainer/load is exempt from stroces in children and origin. Chao-Hsiung Tung DATE:
Asbestos Additional waste Non-friable as Light ballasts Hydrocarbons Additional waste Septic sludge Plants Initials: (if The above mentic knowledge, does To the best of my site. I have verific prohibited and all is approved for d Print Name: Signature: /Signature: /	Friable Non-leaccepted at the Area 9 Usbestos Drained (contact SWO) Drained (contact SWO) Other Rags DSOII SOII SOII SOII SOII SOII SOII SOI	Friable (contact SWO if regulated to J10c Landfill: d automobiles and military vehicles d fuel filters (gas & diesel) Hydrocarbon Landfill: Drained fuel filters (gas & diesel) Sludge from sand/oil/water separato UIRED: WASTE GENERATOR SIGnerance is necessary.) outside of a Controlled Waste Manuaterials. Scribed above contains only those of the contacted Property Management	GNATURE Radiological Surations Radions And Surations Radiological Surations Radions Radiological Surations Radiological	sand/oil/water ound and Above terne plated oil filters 50 parts per million rvey Release for Waste Disponentainer/load meets the criterinan-made radioactive materiantainer/load meets the criterinal mainer/load is exempt from stroces in children and origin. Chao-Hsiung Tung DATE:

NTS LANDFILL LOAD VERIFICATION

08/23/06 Rev. 0 Page **2** of **2**

	Waste Category Definitions
Commercial Waste:	Office waste, putrescible waste
Industrial Waste:	Waste generated from activities associated with the fabrication or demolition of on-site structures. Solid waste derived from industrial manufacturing processes (i.e., construction and demolition waste).
	Waste Types Definitions
NTS:	Waste generated from construction, demolition, and/or routine activities within the Nevada Test Site boundaries. Waste that does not meet another waste type definition listed below.
Non-Putrescible:	Waste that is not directly associated with construction or demolition activities, such as office waste
Putrescible:	Waste that will decompose, decay, and become putrid (i.e. food waste and animal carcasses).
Asbestos Containing Material:	Waste that contains asbestos. Regulated asbestos (friable) will not be accepted without a shipping paper.
FFACO-onsite:	Waste generated, within the NTS boundaries, from activities directed by the Federal Facilities Agreement and Consent Order.
FFACO-offsite:	Waste generated, outside of the NTS boundaries, from activities directed by the Federal Facilities Agreement and Consent order (e.g., CNTA, TTR, NLV, and some UGTA project locations).
WAC exception	Waste that does not meet the waste acceptance criteria, as defined within the current NTS landfill permits, and has been given approval from the NDEP for disposal into an NTS landfill.
Historic DOE/NV	Waste generated from historical releases associated with the DOE/NV Waste Management Project Office (precursor to the Yucca Mountain Project Office), which occurred prior to November 30, 1989.
	Pollution Prevention Category Definitions
Environmental Management:	Waste generated from an Environmental Management project (e.g., waste generated from Environmental Restoration or International Technologies projects).
Industrial Waste:	Defense Projects: Waste generated from Defense Projects (e.g., waste generated from DTRA, LANL, Sandia, and/or any other non-Environmental Management directed project.
Routine:	Routine operations waste generated from: any type of production, analytical, and/or research and development laboratory operation; "work-for-others," and/or any periodic and recurring work that is considered on-going processes, are also considered routine operations.
Clean-up:	Clean-up/stabilization waste generated from one-time operations. Waste generated from: environmental restoration projects-, decontamination and decommissioning/ transition operations-, and TSCA regulated wastes. Clean-up/stabilization activities may span several years. The waste is a direct result of past operations and activities, rather than a current process. Newly generated wastes produced during clean-up operations (usually resulting from common activities such as handling, sampling, treatment, repackaging, shipping, etc.) are considered clean-up waste.
	Radiological Limitations
Area 23 Landfill:	See "Performance Objective for Certification of Non-Radioactive Hazardous Waste".
Area 6 and Area 9 Landfills:	See permit limits.



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Form	
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NTS LANDFILL LOAD VERIFICATION

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STEC OSE (S	elect One) AREA		23	□ 6		⊠ 9	\boxtimes	LANDFIL	L
For wa	aste character	ization, appro	val, and/or	assistance,	contact Sol	id W	aste Operation ((SWO)	at 5-7898.	
	cont. I			STE GERER						
	(This	form is for roll	offs, dump	trucks, and	other onsite	disp	posal of material	ls.)		1
Waste Generator:	Joe Molter	, SNJV Waste	Ops.			_	Phone Numbe	r: 295-	1578, C 630-0	188
Location / Origin:	NTS CAU	117, CAS 26-	41-01, Plut	to Bldg 2201	: 21 empty 8	55-ga	allon drums, #11	7A35-3	8, 40-53, 55,5	6,73
Waste Category:	(check one)		☐ Comr	nercial		Ø	Industria			
Waste Type:	⊠ NTS		☐ Putre	scrible	**************	******	FFACO-onsite		☐ WAC Exce	eption
(check one)	☐ Non-Puti	rescible		stos Contain	ing Material	777	FFACO-offsite		☐ Historic DC	
Pollution Preven	tion Categor	y: (check one)		onmental ma			Defense Proje		YMP	
Pollution Preven	****************	**************	***********		T		Routine			
Method of Chara	cterization: (check one)	⊠ Samp	ling & Analy	sis		Process Know	ledge	Contents	
Prohibited Waste	at all three	Radioactive levels, and N						CBs ab	ove TSCA reg	ulatory
Additional Prohil at the Area 9 U10				Check the Mark Control of the Control			ood waste); and	Friable	asbestos	
petroleum Acceptable wastr ☐ Asphalt ☑ ☐ Plastic ☐	such as: gas hydrocarbon; at any NTS Metal Wire	oline (no benz ; and ethylene landfill:] Wood] Cable	arbon Land zene, lead) glycol. Paper Soil	dfill must have get fuel; die le Roce le Roce le Rut	e come into esel fuel; lub eks / unalten ober (exclud ulation (non-	contrican ed ge ing ti Asbe	tact with petrole ts and hydraulic eologic materials ires) estosform)	s; keros		ners ebris
Manufactured				****************						
Additional waste Asbestos					Office Wa		☐ Food Was	te 📋	Animal Carca	asses
	☐ Friable			tact SWO if	regulated to	au)	Quantity:			
Additional waste Non-friable asi Light ballasts (Hydrocarbons	contact SWO)	☐ Drained ☐ Drained	automobile fuel filters	es and milita (gas & diese			Solid fractions f Deconned Undo Ground Tanks			
Additional waste	accepted at	the Area 6 Hy	drocarbo	n Landfill:						
Septic sludge Plants	☐ Rags	12000		filters (gas & sand/oil/wate		s			e plated oil filte arts per million	77775
				STE GENE	AND DESCRIPTION OF THE PARTY OF	_		т оо р	arto per minor	
nitials: (if	initialed, no r	adiological c	learance i	s necessar	y.)					
The above mention knowledge, does r				Controlled	Waste Mana	gem	ent Area (CWM	A) and t	to the best of r	my
o the best of my	knowledge, th	e waste desc	ribed abov	e contains o	only those m	ateri	ale that are allo	aund for	dienneal at th	ale
site. I have verifie prohibited and allow approved for disprint Name:	d this through wable waste sposal in the l	the waste ch items. I have andfill.	aracteriza	tion method	identified a	bove	Radiologic RCT Initial	al Surve s ls contai ded man	y Release for Wa ner/load meets t -made radioactiv	aste Dispos the criteria f ve material
The state of the s	John M	7 72 7	r		ate: /9/15/	40	Ra	doon Ma	ner/load meets t	elease limits
nutiature. / Ci				1.7	ale. / W/)	00	The Park	le eentel	marlland to form	
lote: "Foot waste	, office trash		rcasses do	not require	a radiologic		es du	e jo broc	ner/load is exemess knowledge an no-Hsiung Tung	nd origin.

Load Weight (net from scale or estimate): 43,00

NTS LANDFILL LOAD VERIFICATION

08/23/06 Rev. 0 Page **2** of **2**

	Waste Category Definitions
Commercial Waste:	Office waste, putrescible waste
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Routine:	Routine operations waste generated from: any type of production, analytical, and/or research and development laboratory operation; "work-for-others," and/or any periodic and recurring work that is considered on-going processes, are also considered routine operations.
Clean-up:	Clean-up/stabilization waste generated from one-time operations. Waste generated from: environmental restoration projects-, decontamination and decommissioning/ transition operations-, and TSCA regulated wastes. Clean-up/stabilization activities may span several years. The waste is a direct result of past operations and activities, rather than a current process. Newly generated wastes produced during clean-up operations (usually resulting from common activities such as handling, sampling, treatment, repackaging, shipping, etc.) are considered clean-up waste.
	Radiological Limitations
Area 23 Landfill:	See "Performance Objective for Certification of Non-Radioactive Hazardous Waste".
Area 6 and Area 9 Landfills:	See permit limits.

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NSTec
Form
FRM-091

NTS LANDFILL LOAD VERIFICATION

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	Select One) AREA		23	6		□9 □	⊠ LANDFILL
Forw	aste characteri	zation, appro	val, and/or a	ssistance, cont	lact Solid	Was	ste Operation (SWC)) at 5-7898
	(This			TE GERERATO rucks, and othe			TION sal of materials.)	3.7
Waste Generator	Joe Molter,	SNJV Waste	Ops			_ 1	Phone Number: X5	-1578, c 630-0188
Location / Origin:	Area 26, C	AS 26-41-01.	"Pluto", 20 d	cubic yard roll-o	ff bin (SN	JV.	Tracking # 117A94)	CAU-117
Waste Category:	: (check one)		☐ Comme	ercial		Ø.	Industrial	1
Waste Type:	⊠ NTS		☐ Putreso	rible		X	FFACO-onsite	☐ WAC Exception
(check one)	⊠ Non-Putre	escible		os Containing M	Aaterial		FFACO-offsite	☐ Historic DOE/NV
Pollution Preven	tion Category	(check one)	⊠ Enviror	mental manage	ement		Defense Projects	☐ YMP
Pollution Preven	ition Category	: (check one)		Jp			Routine	
Method of Chara	cterization: (c		The section of the last	ng & Analysis			Process Knowledge	**************************************
Prohibited Waste NTS landfills:				A waste; Hazar es (needles, sh				above TSCA regulatory
Additional Prohi at the Area 9 U10	TT - TT	Sewage Slu	dge, Animal	carcasses, We	t garbage	(foc	od waste); and Frial	ole asbestos
coolants, petroleum	such as: gase n hydrocarbon;	Check all all rea 6 Hydroci oline (no benz and ethylene	lowable was arbon Landfi zene, lead); e glycol.	jet fuel; diesel fi	ntained wit me into co uel; lubrica	thin onta ants	this load: act with petroleum has and hydraulics; ke	rosene; asphaltic
Acceptable wast			□ Paper			-	ologic materials	Empty containers
	1520.00 Maria	Wood	☐ Soil	00000 OI 0000	(excluding			□ Demolition debris
	Wire		⊠ Cloth		n (non-As			☐ Cement & concrete
			-	OR NATIONAL VALUE OF PROPERTY OF	-			
Additional waste Asbestos					fice Waste	770	THE RESERVE OF THE PROPERTY OF THE PARTY OF	☐ Animal Carcasses
				ct SWO if regul	iated load)	Quantity: 20 cubi	c yards
Additional waste						7.0	alid frantisms franc	and dellinator
Non-friable as				and military ve	ehicles L		Solid fractions from	residence de la
	(contact SWO)		tuel filters (g	gas & diesel)	-		econned Undergro	und and Above
	(contact SWO)					G	Fround Tanks	
Additional waste	The state of the s				_			
Septic sludge	110000000000000000000000000000000000000			ters (gas & dies			And the second second second	eme plated oil filters
Plants	☐ Soil			ind/oil/water se		ATI		parts per million
	initialed on a	adiological o			OK 310N/	M / U	AL.	
Initials: (if	inidaled, no f			necessary.				
	155 56	generated o	utside of a (te Manage	emi		
Initials: (if The above mentio knowledge, does	ned waste was				te Manage	emi	Radiological Surv	ey Release for Waste Dispo
The above mentio	oned waste was not contain rac	diological ma	terials, .	Controlled Was	5		RCT Initials	
The above mentio knowledge, does To the best of my	oned waste was not contain rac knowledge, th	diological ma e waste desc	terials, . ribed above	Controlled Was	those mat	eri	RCT Initials This cont	ainer/load meets the criteria n-made radioactive materia
The above mention knowledge, does to the best of my site. I have verified prohibited and allowed to the best of th	oned waste was not contain rac knowledge, the ed this through lowable waste i	e waste desc the waste ch items. I have	terials, . ribed above paracterization	Controlled Wast	those mat	eri	RCT Initials This cont added ma This cont	ainer/load meets the criteria in-made radioactive materia ainer/load meets the criteria
The above mention knowledge, does to the best of my site. I have verified prohibited and allowed to the best of th	oned waste was not contain rac knowledge, the ed this through lowable waste i	e waste desc the waste ch items. I have	terials, . ribed above paracterization	Controlled Wast	those mat	eri	RCT initials This cont added ma This cont Radcon N	ainer/load meets the criteria n-made radioactive materia
The above mention knowledge, does not not be best of my site. I have verified prohibited and allows approved for diest approved	ned waste was not contain rad knowledge, the ed this through lowable waste is isposal in the la	diological ma te waste desc the waste ch items. I have andfill.	terials, . ribed above paracterization	Controlled Wast	those mat	eri	RCT initials This cont added ma This cont Radcon N This cont due to loro	einer/load meets the criteria in-made radioactive materia alner/load meets the criteria tenual Table 4.2 release limi alner/load is exempt from si cess shealadde and origin.
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NTS On-Site HazMat Transfer - Published

Tracking N	o: 20081212153915 Mesa	Number:	OFFICIAL USE ONLY May be exempt from publishing asset up to the Freedom of					
Carrier: NST Vehicle: E10								
	IS TOLLADAY				n number and of Statute."			
		-	-		de la colonia	-		
	727		Departm	nent of Energy review and be	efore public release	- "		
	9		Name/C Guidano	re (7 applicable 5-SS-4 (3154)	Date: 12/22/	28.		
Depart: 22	2-DEC-2008		Arrival: 22-	DEC-2008				
From: JOE	MOLTER	JIP. M. JII.	To: GREG S	CHMETT				
3777	LLER-NAVARRO		NSTEC					
200	E CAMP CAU 117 ·		BASE C					
	CURY, NV 89023			RY, NV 89023				
Area			Area: 23	10511				
	2201		Bldg: LA					
	ne: 702-295-1578 N/A		Mobile:	02-295-4870				
WOO	le: 702-630-0188		MODILE.		.*			
Entered By:	MARK HESER		Date Entered:	12-DEC-2008	2			
Modified By:	MARK HESER	17	Date Modified:					
Shipped Mat	terial(s)	Package(s)		Unit(s)	3	Gulde No.		
WASTE	212, ASBESTOS, 9, PG III KING NUMBER 117A94	1 ROLL ON/F	ROLL OFF BOX	4000.00 POUND(S) (G	ROSS)	171		
WASTE	STORY OF SACRONS CONTACTOR SERVICE	Emergency	ROLL OFF BOX Response N 2-295-0311		ROSS)	171		
WASTE SNJV TRACI	STORY OF SACRONS CONTACTOR SERVICE	Emergency 702	Response N		ROSS)	17		
WASTE SNUV TRACE	KING NUMBER 117A94	Emergency 702 and/Or Comments	Response N	lumber	ROSS)	171		
WASTE SNJV TRACI	KING NUMBER 117A94	Emergency 702 and/Or Comments	Response N 2-295-0311	lumber		171		
WASTE SNJV TRACI	KING NUMBER 117A94	Emergency 702 and/Or Comments	Response N 2-295-0311 NCY RESPONS In the event o	SE fan incident involving Hazan Mat shipping papers and NA mmediate area	dous Material;	17		
WASTE SNJV TRACI	mergency Response Contact A SER 702-495-0150	Emergency 702 and/Or Comments	Response N 2-295-0311 NCY RESPONS In the event o 1. Gather Haz 2. isolate the 3. Assess the	SE fan incident involving Hazar Mat shipping papers and NA mmediate area situation:	dous Material;	17		
WASTE SNJV TRACI	mergency Response Contact A SER 702-496-0150 By Phone 702-295-0311 By Radio	Emergency 702 and/Or Comments EMERGE	Response N 2-295-0311 NCY RESPONS In the event of 1. Gather Haz 2. Isolate the 3. Assess the a. Fire, Spine Spine Price Spine	SE fan incident involving Hazan Mat shipping papers and NA mmediate area	dous Material; NER Guidebook	171		
WASTE SNJV TRACI	mergency Response Contact A SER 702-495-0150 By Phone 702-295-0311	Emergency 702 and/Or Comments EMERGE	Response N 2-295-0311 NCY RESPONS In the event o 1. Gather Haz 2. isolate the a. Fire, Spi b. People, 4. Contact On	SE fan incident involving Hazan Mat shipping papers and NA mmediate area situation: II, or Leak?	dous Material; NER Guidebook It at risk? Personnel	171		
WASTE SNJV TRACE	mergency Response Contact A SER 702-496-0150 By Phone 702-295-0311 By Radio	Emergency 702 And/Or Comments EMERGE	Response N 2-295-0311 NCY RESPONS In the event of 1. Gather Haz 2. Isolate the 3. Assess the a. Fire, Sp. b. People, 4. Contact On 5. Reference of the U.S Department of the U	SE fan incident involving Hazar Mat shipping papers and NA mmediate area situation: II, or Leak? Property, or the Environmen site Emergency Response i On-Site HazMat Transfer Tra kaged, marked, placarded, a nt of Transportation. As a signal	dous Material; NER Guidebook It at risk? Personnel acking Number	proper		
WASTE SNJV TRACK Secondary E MARK HES	mergency Response Contact A SER 702-495-0150 By Phone 702-295-0311 By Radio 'MAYDAY - MAYDAY - MA	Emergency 702 And/Or Comments EMERGE YDAY als are properly classif opticable regulations of 49 CFR, Part 172-70	Response N 2-295-0311 NCY RESPONS In the event of 1. Gather Haz 2. Isolale the 3. Assess the a. Fire, Spib. People, 4. Contact On 5. Reference of the U.S Departme to and is compliant.	SE fan incident involving Hazar Mat shipping papers and NA mmediate area situation: II, or Leak? Property, or the Environmen site Emergency Response i On-Site HazMat Transfer Tra kaged, marked, placarded, a nt of Transportation. As a signal	dous Material; NER Guidebook It at risk? Personnel acking Number and labeled and are in	proper		





NSTec Form

Load Weight (net from scale or estimate): 8000

NTS LANDELL LOAD VERIFICATION

08/23/06

Rev. 0

SWO USE (Select One) AREA 23 6 9 For waste characterization, approval, and/or assistance, contact Solid Waste Operation (Section 1) REQUIRED: WASTE GERERATOR INFORMATION (This form is for rolloffs, dump trucks, and other onsite disposal of materials)	SWO) at 5-7898.
REQUIRED: WASTE GERERATOR INFORMATION	577.5) Bt 5-1000.
	s.)
Waste Generator: Joe Molter, SNJV Waste Ops, MS 505 Phone Number:	: X5-1578, c 630-0188
Location / Origin: Area 26, CAS 26-41-01, "Pluto", End-dump truck of friables asbestos waste, SN.	JV Tracking # 117A97
Waste Category: (check one)	
Waste Type: ☐ NTS ☐ Putrescrible ☐ FFACO-onsite	☐ WAC Exception
check one) 🗵 Non-Putrescible 🖾 Asbestos Containing Material 🗌 FFACO-offsite	☐ Historic DOE/NV
Pollution Prevention Category: (check one) 🛛 Environmental management 🔲 Defense Project	cts YMP
Pollution Prevention Category: (check one) Clean-Up Routine	
	edge Contents
Prohibited Waste at all three Radioactive waste; RCRA waste; Hazardous waste; Free liquids, PC ITS landfills: levels, and Medical wastes (needles, sharps, bloody clothing).	CBs above TSCA regulatory
Additional Prohibited Waste	i
t the Area 9 U10C Landfill: Sewage Sludge, Animal carcasses, Wet garbage (food waste); and it	Friable asbestos
REQUIRED: WASTE CONTENTS ALLOWABLE WASTES	
Check all allowable wastes that are contained within this load:	um burder each ear as
OTE: Waste disposal at the Area 6 Hydrocarbon Landfill must have come into contact with petroleu coolants, such as: gasoline (no benzene, lead); jet fuel; diesel fuel; lubricants and hydraulics	
petroleum hydrocarbon; and ethylene glycol.	o, worsons, soprious
cceptable waste at any NTS landfill: 🛛 Paper 🔲 Rocks / unaltered geologic materials	☐ Empty containers
Asphalt Metal Wood Soil Rubber (excluding tires)	□ Demolition debris
Plastic Wire Cable Cloth Insulation (non-Asbestosform)	☐ Cement & concrete
Manufactured items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.)	
Additional waste accepted at the Area 23 Mercury Landfill: Office Waste Food Waste Asbestos Friable Non-Friable (contact SWO if regulated load) Quantity: 20 c	
Additional waste accepted at the Area 9 U10c Landfill:	2 12/20/20
Non-friable asbestos	rom sand/oil/water
[[[] [[[] [[] [[] [[] [[] [[] [[] [[] [erground and Above
Hydrocarbons (contact SWO) Other Ground Tanks	
dditional waste accepted at the Area 6 Hydrocarbon Landfill:	
프로인트등에게 보고 보고 보고 있다면 하는데 보고 있는데 보고 있다면 보고 있다면 되었다. 그는데 보고 있다면 보고 있다면 보고 있다면 보고 있다면 보고 있다면 보고 있다면 없다면 보고 있다면 보고 보고 있다면 보고 되었다면 보고 있다면 보	on-teme plated oil filters
	w 50 parts per million
REQUIRED: WASTE GENERATOR SIGNATURE	11
itials: (if initialed, no radiological clearance is necessary.)	
ne above mentioned waste was generated outside of a Controlled Waste Managemer	
nowledge, does not contain radiological materials. Radiological	al Survey Release for Waste Disposa
the best of my knowledge, the waste described above contains only those material This	s Is container/load meets the criteria fo
te. I have verified this through the waste characterization method identified above a A add	ded man-made radioactive material
	is container/load meets the criteria for doon Manual Table 4.2 release limits.
Thi	s contained had as exempt from surve to process knowledge and origin.
The eventual of the state of th	7.101 11.1 7 12.
gnature: /s/ Joe Molter Date: 12/17/68 SIGNATURE:	/s/ Chao-Hsiung Tung DATE: ///
ote: "Food waste, office trash and animal carcasses do not require a radiological clearance. Freon- must have signed removal certification statement with Load Verification."	containing appliances
ote: "Food waste, office trash and animal carcasses do not require a radiological clearance. Freon-	containing appliances

NTS On-Site HazMat Transfer - Published

Tracking No: 20081212150049 Mesa Number: Carrier: NSTEC Vehicle: G820652D Trailers: E103534 Driver: MIKE SMITH	May be exempt from public case up to the Freedom of Information Act (5 U.S.C. 55 Exemptor in number and category: Exemption 2 "Circul core of Statute." Department of Energy reviews with before public release
	Nume/Org: SP Date: 12/17/68 Guidance (Mapplicable) SS-4 (3154). Momber, 2000
Depart: 17-DEC-2008	Arrival: 17-DEC-2008
From: JOE MOLTER	To: GREG SCHMETT
STOLLER-NAVARRO	NSTEC
BASE CAMP CAU 117	BASE CAMP
MERCURY, NV 89023	MERCURY, NV 89023
Area: 26 Bldg: 2201	Area; 23 Bidg: LANDFILL
Phone: 702-295-1578 N/A	Phone: 702-295-4870
Mobile: 702-630-0188	Mobile:
Entered By: MARK HESER	Date Entered: 12-DEC-2008
Modified By: MARK HESER	Date Modified: 16-DEC-2008
Shipped Material(s)	Package(s) Unit(s) Guide No.
RQ, UN/NA 2212, ASBESTOS, 9, PG III	1 TRUCK LOAD 8000.00 POUND(S) (GROSS) 171
Emer	gency Response Number 702-295-0311
Secondary Emergency Response Contact And/Or Con MARK HESER 702-496-0150	nments
	MERGENCY RESPONSE
Security	In the event of an incident involving Hazardous Material:
By Phone 702-295-0311	Gather HazMat shipping papers and NAER Guidebook Isolate the immediate area Assess the situation:
By Radio 'MAYDAY - MAYDAY'	a. Fire, Spill, or Leak? b. People, Property, or the Environment at risk? 4. Contact On-site Emergency Response Personnel 5. Reference On-Site HazMat Transfer Tracking Number
'MAYDAY - MAYDAY - MAYDAY' This is to certify that the above-named materials are propondition for transportation according to the applicable re-	b. People, Property, or the Environment at risk? 4. Contact On-site Emergency Response Personnel 5. Reference On-Site HazMat Transfer Tracking Number erly classified, described, packaged, marked, placarded, and labeled and are in proper gulations of the U.S Department of Transportation. As a signatory I certify that I have eart 172-700 and is compliant with the NTS OTSD,
'MAYDAY - MAYDAY - MAYDAY' This is to certify that the above-named materials are prop	b. People, Property, or the Environment at risk? 4. Contact On-site Emergency Response Personnel 5. Reference On-Site HazMat Transfer Tracking Number erly classified, described, packaged, marked, placarded, and labeled and are in proper gulations of the U.S Department of Transportation. As a signatory I certify that I have



DOES NOT CONTAIN OFFICIAL USE ONLY INFORMATION Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

	elect One		\boxtimes	23			9	-	LAND.	4
For we	iste characteri	The same of the sa	THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER, THE OW				aste Operation (SV	VO) at	5-7898,	
	(This			STE GERE			ATION cosal of materials.)			
Vaste Generator.	Kevin Olse	n					Phone Number:	5-2941		
ocation / Origin:	Area 26 Pl	uto 26-2201	CAU	-117						
Vaste Category:	(check one)		☐ Comr	nercial		Ø	Industrial			
Vaste Type:	☐ NTS		☐ Putre	scrible			FFACO-onsite		WAC Exce	ption
check one)	☐ Non-Putr	escible	Asbes	stos Contair	ning Mat	erial 🔲	FFACO-offsite		Historic DC	E/NV
ollution Prevent	tion Category	: (check one)	⊠ Enviro	onmental m	anagem	ent 🗆	Defense Projects		YMP	
ollution Prevent	tion Category	(check one)	⊠ Clear	-Up		. 0	Routine	and the		
Method of Chara-	cterization: (c	check one)	⊠ Samp	ling & Anal	ysis		Process Knowled	ge 🗆	Contents	
Prohibited Waste NTS landfills: Additional Prohib at the Area 9 U10	oited Waste	levels, and f	Medical wa	stes (needle	es, shar	os, blood	; Free liquids, PCB y clothing). ood waste); and Fr			ulatory
coolants,	sposal at the A such as: gas hydrocarbon;	Check all al rea 6 Hydroc oline (no ben	lowable wa arbon Land zene, lead)	tfill must ha	re contai	ned withi	THE RESERVE OF THE PARTY OF THE	hydro kerose	ocarbons or one; asphaltic	:
Acceptable wast	e at any NTS	landfill:	Paper	☐ Ro	cks / un	altered g	eologic materials	. 🗆 8	Empty contain	ners
Asphalt	Metal [Wood	Soil	☐ Ru	ibber (ex	cluding t	ires)		Demolition de	bris
Plastic	Wire _	Cable	Cloth	☐ Ins	sulation (non-Asb	estosform)		Cement & cor	ncrete
] Manufactured	items: (swam)	p coolers, fun	niture, rugs	, carpet, ele	ectronic	сотроле	nts, PPE, etc.)			S 701
dditional waste				The Aller Property	Office		☐ Food Waste		Animal Carca	15585
	⊠ Friable			tact SWO if	regulati	ed load)	Quantity:			
Additional waste Non-friable asi Light ballasts (Hydrocarbons	bestos (contact SWO)	☐ Drained	automobil	es and milit		eles 🗆	Solid fractions from Deconned Underg Ground Tanks			
dditional waste	accepted at 1	the Area 6 H	ydrocarbo	n Landfill:				-		***************************************
Septic sludge	☐ Rags	□ Dr	ained fuel	filters (gas	& dlesel)	4	Crushed non	-tome	plated oil filte	ers
Plants	☐ Soil			sand/oil/wat			☐ PCBs below	50 par	ts per million	0
he above mention	initialed, no r	adiological o	clearance		ry.)		ner' '	561		
mowledge, does not the best of my	knowledge, the d this through	ne waste desc the waste cl items. I have	ribed abov	tion method	d identifi	ed above	rial RCT Initials side This sadde Rado	contain d man-r contain on Man contain	Release for Wa or/load meets made radioacti or/load meets wal Table 4.2 re or/load is exen	the crit ve mat the crit aleaso apt fro
rohibited and allo s approved for dis	sposal in the l					. ,	C11162110		bert Moore	
rohibited and allo s approved for dis rint Name: Kevi	in Olsen		_	19.		1	SIGNATURE	3/ 131.0		
rohibited and alloss approved for district Name: Kevingnature: /S/	Kevin Olse, office trash	and animal ca	arcasses d	o not require	pate: 2	logical cl	earance. Freon-co	9		, ,
Print Name: Kevi Signature: /S/ Note: "Food waste must have s	n Olsen Kevin Ol	and animal ca	arcasses de	o not require	e a radio	logical cl	1	9		
rohibited and allos approved for dis rint Name: Kevi signature: /S/	Kevin Olsen Kevin Olse, office trash signed remova	and animal call certification	arcasses de etatement	o not require with Load	e a radio Verificati	logical cl	1	ntainin		

ONSITE WASTE TRANSPORT MANIFEST

No.	LE	0 9		Gene	eration/O	ut-of-Serv	Page	
1.	Gener	ator's Name, Organization, and Location: (Please R SNJV/Joe Molter Waste Operations A-26 Pluto Facility, CAU 117 581868W6 Generator's Phone: (630) 0188		Receiving Facil NSTec/ Hazar WGS/Hazardo A-5 Bldg.5-20 Contact Phone: (lity, Orga dous Wa ous Waste	nization, I ste Storag e Operatio	Location: (Pleas ge Unit	
За.	(Pleasi	orter Name: e Print) rlos Gonzales	Transport Date 2/3/09	e;	3b. Ve	hicle I.D.	Number:	
4.	120,000	O.T. Description. Include: EPA Waste Code and P	Package Track	ing Numbers.	5. Cor No.	tainers Type	6, Total Quantity	7. Unit Wt./Vol.
а	HM RQ	UN2315, Polychlorinated biphenyst, liquid, 9, III NS-NTS-09-0055 (OSD 10/6/08) & -0056 (OSD		***************************************	2	DM	102	G
b	RQ	UN2809, Waste Mercury, 8, III NS-NTS-09-0057 D009		9,0	1	DM	6	G
c	RQ	UN2315, Polychlorinated biphenyls, liquid, 9, III NS-NTS-09-0058. OSD 8/9/08.				DM	2	G
d	×	NA3082, Hazardous waste, liquid, n.o.s. (chrom NS-NTS-09-0059. D007	nlum), 9, III		1	DM	15	G
e		Non-RCRA, Non-DOT, Liquid (used oil contami NS-NTS-09-0060	inated with CF	Cs)	1	DM	40	G
f	×	NA3077, Hazardous waste, solid, n.o.s. (lead, s NS-NTS-09-0061 D006, D011	silver), 9, III	250 10	1	DM	4	G
9	x	NA307 Hazardous waste, solid, n.o.s. (lead), 9 NS-NTS-09-0062 D008	9, III		1	DM	5	G
8. S	Special F) ERG 1) ERG 1) ERG 1) ERG 17) ERG 1	ation pages for additional items, as necessary. Iandling Instructions/Additional Information: 24-Ho 71. Non-leaking PCB ballasts & capacitors; drum 1 72. Hg thermometers & thermostats; DM 117A80; 71. Drill quench water with cement fines; DM 117A 11. Printed circuit boards from electronic equipmen 71. Putty-like chemical from five 1-gallon paint can	117A90 (10/6/0 10/27/08. c) E A79. Gen Date at; drum 117A9	08) & 117A91 (10/ ERG 171. One lea 8/27/08. e) Used 3, Gen. date 10/2 72. Gen. date 8/6/	7/08), king PCB oil with 0 7/08.	capacito CFCs (refi	Name & phore r; drum 117A74 igerant system)	(8/9/08).
9.		ed by: (Şignature)			ate: Z	13/09	,	
10,	Receive	loe Molter ed for Transport by: (Signature) C. Carlos Gonzales	74	E	pate://3/6	/ 09 c.c	Carlos Gonzales	•
11.	Di	screpancy indication.	115-22	7		2 2		17
	2000	All/Acoumulation Site Signature: (Acknowledges ac	cceptance of w	aste) D	Pate:	3/09	Carlos Gonzales	

NSTec Form FRM-0267

ONSITE WASTE TRANSPORT MANIFEST (CONTINUATION PAGE)

04/10/08 Rev. 01

Do	anifest ocument						
No	0 9 N	0 9			P	age <u>2</u> of	2
13	Generat	or's Name, Organization, and Location: (Plea	se Print)	14. Ge	neration/C	Out-of-Service Da	le:
		oe Molter			٥.	a balaw	
		Operations uto Facility, CAU 117			56	e below.	
		tor's Phone: (<u>630</u>) <u>0188</u>	 .	-	·		-
15	a. Transpo (Please		Transport Date:	15b. \	/ehicle I.D	. Number:	
	(, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	C. Carlos Gonzales	2/3/09			G63 1104D	
		T Description to the EDANA - to Code	.d Dankara Tarakira Manakara	17. Co	ontainers	18. Total	19. Unit
16	. U.S. D.C	.T. Description. Include: EPA Waste Code ar	io Package Tracking Numbers.	No.	Туре	Quantity	Wt./Vol.
	HM	NA3077, Hazardous waste, solid, n.o.s. (ars	enic, cadmium), 9, III				
а	Х	「NS-NTS-09-0063 「D004, D005, D006, D007, D008, D010, D03	0, D032	1	DM	6	G
Ь							
С							
d							
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g							
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		ion pages for additional items, as necessary.					
20.	Special H	andling Instructions/Additional Information: 24-l	lour emergency contact: 702 - 295	-0311 / Seco	ondary: <u>P</u>	en Courville 630- Name & ph	
,	a) ERG 171	. Contents (fines, debris, filter cloth) from two	vacuum canisters from CAU 11	7, Pluto Fac	ility, drum		
21.	Released	by: (Signature)		Date:			
22.	Received	for Transport by: (Signature)		Date:	C. C	Carlos Gonzales	
23.	Discrepa	ncy Indication:		L			
24	Disposal	Accumulation Site Signature: (Acknowledges	acceptance of waste)	Date;			
"	5,00011			-	C. C	Carlos Gonzales	
<u> </u>				<u></u>			

NSTec Form

FRM-0766

WGS/HAZARDOUS WASTE OPERATIONS

REQUEST FOR SERVICE or send to M/S NTS110 Project #: 2009-HocaS FAX to 5-4815 or send to M/S NTS110

HWO Use Only

04 10/08 R W. 01 Page 1 of 2

and Balance V a road	-
Date of Request: 12/1/08 Date Needed: (see instructions) 12/10/08 Charge #: 5B/B, Requester Name: Joe Molter, SNJV Phone Number: x1578, c630-0188 Org. Name/No.: SNJV Was Secondary Contact: Dan Henry Phone Number: x5-3596 Mail Stop: 505 Facility Manager or Designee: Mark Burmeister, X5-1816, cell 335-6134	
Section A - Services Requested	
Check One: ☐ Used Oil ☐ Hazardous Waste ☐ Unknown ☐ Universal Waste ☒ PCB ☐ Oth	if .
	osal ctivate
Location of Service (Area, Bldg., exact directions, attach map if necessary): See continuation page for driving directions.	West Act
Section B - General Waste Information (Use continuation sheet if necessary)	
Generation Date: 10/6/08 One Time Generation Routine Generation CAU/CAS if applicable: CAI Radiological Clearance provided: FRM-0121. Clearance Sticker FRM-0894, Confirmation of Rad Status FRM-0002, Nonradioactive Waste Certification None Waste Amount (Gallons): 2 X 55 gallons Type of Container (i.e., can, drum, carboy, tanker, etc.): drum	117
Number of Containers: two	
Non-leaking, PCB light ballasts and capacitors, by process knowledge. SNJV Drum Numbers 117A90 & 117A91. Let 48-5 2 19 kg 159kg SNJV Form SN-026, "Radiological Status For Release or Disposal" provided for non-rad release. Sy-50 1A2 x425 S I certify under penalty of law, the above information is correct and additional information required is available as indicated. The material requested for delivery/pickup will only have/has only those materials described on this for Contents will be verified by process knowledge of origin, MSDS, and/or sampling and analysis. (specify) Generator Requester Project Supervisor Signature (required for requested services): S Joe Molter 2 10 8 9 9 9 9 9 9 9 9 9	
Section C - Work Location Information	
Facility Point of Contact (Name, Phone, Pager): Joe Molter, X5-1578, Cell 630-0188 Who will sign the Work Package Traveler? (Name, Phone, 3) M Burmeister, SNJV Task Manager, X5-1816, Cell 335-6; 3	
Facility Access Requirements: Coordinate waste pick-up with Facility Point of Contact	
Known hazards in the requested service area: None	
Acceptable time period to conduct requested services: Hours (AM/PM): 7:30 AM to 4:30 PM Day(s) M-F	
Section D - Services Completed (HWO Use Only)	
Waste characterized by: Process knowledge, MSDS Sampling & Analysis Other: 6P Remarks (scheduling, pickup, disposition, etc.): Assigned #NS-NTS-09-0058 to drum# 117A90 and #NS-NTS-09-0058 to drum# 117A90 and #NS-NTS-09-0058 to drum# 117A90, for transfer to Area Svia Onsite Manifest # 09N09. 117A90 = 12/1/18/150, SS-G DM. 117A91 = 1AD/1/150, SS-G DM. Drums were retrieved and transferred to Area S for starage. cof 2/3/09	_
Receiving Facility: Area 5 HWSU	- 1
Signature: /s/ C. Carlos Gonzales Date: 2/3/09	- 1

WGS / Hazardous Waste Operations

Request for Service FAX to 5-4815 or send to M/S NTS110

Project #:		
	HWO Use	Inly

ate of Request: 12-1-08	Continuation Page 2 of 2
om Mercury Highway, take Cane Springs Road wes	a 26, CAU 117, CAS 26-41-01, "Pluto" Facility, Building 2 1:01, st, turn right off Cane Spring Road across the road from Fart 1:90 & 117A91) will need loaded and transported to NSTe: is
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12 50	
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n e	0 8
	12-09-08F
6	
Generator ⊠ Requester □ Project Supervis	ear Signature: /s/ Joe Molter /2/1/0-7

NSTec Form

WGS/HAZARDOUS WASTE OPERATIONS REQUEST FOR SERVICE

Project # 2009-H0026

04 10/08 R W. 01

FRM-0766

FAX to 5-4815 or send to M/S NTS110

Page 1 of 2

Date of Request: 12/1/08 Of Date Nee Requester Name: Joe Molter, SNJV Phone	ABLA KINS S-5804 ded: (see instructions) 12/10/08 Charge #: 5B/B . 8 W Number: x1578, c630-0188 Org. Name/No.: SNJV We te ops Number: x2124, c496-0150 Mail Stop: X5-1816 X5-1816
Section A - Services Requested	
Check One; ☐ Used Oil ☑ Hazardous W	/aste 🗌 Unknown 🔲 Universal Waste 🔲 PCB 🔲 Oti :r
Location of Service (Area, Bldg., exact directions, attac See continuation page for driving directions.	h map if necessary):
Section B - General Waste Information (Use continual	ion sheet if necessary)
☐ FRM-0002, N	earance Sticker FRM-0894, Confirmation of Rad Status onradioactive Waste Certification None
Number of Containers: one	pe of Container (i.e., can, drum, carboy, tanker, etc.): _drum
generated, Suspected contaminants, etc.): (Attach app Mercury waste (thermometers, thermostats, etc.), by pro- SNJV Form SN-026, "Radiological Status For Release of Light under penalty of law, the above information	ocess knowledge. SNJV Drum Number 117A80. From 50 10 22 5 10 0 10 10 10 10 10 10 10 10 10 10 10 1
Contents will be verified by process knowledge of of (specify) ☐ Generator ☒ Reque	ster Project Supervisor
Signature (required for requested services):/S/JO	e Molter 12/1/08
Section C - Work Location Information	
Facility Point of Contact (Name, Phone, Pager): Joe Molter, X5-1578, Cell 630-0188	Who will sign the Work Package Traveler? (Name, Phone, 'ager): M Burmeister, SNJV Task Manager, X5-1816, Cell 335-61 14
Facility Access Requirements:	steet .
Coordinate waste pick-up with Facility Point of Coi Known hazards in the requested service area:	nact
None	
Acceptable time period to conduct requested servi Hours (AM/PM): 7:30 AM to 4:30 PM	ces: Day(s) M-F
Section D - Services Completed (HWO Use On	(y)
Waste characterized by: Process knowledge) Remarks (scheduling, pickup, disposition, etc.): A	MSDS Sampling & Analysis Other.
Receiving Facility: See 5 Hose	
Signature: /s/ C. Carlos Gonzales	Date: 2/3/09

WGS / Hazardous Waste Operations

Request for Service FAX to 5-4815 or send to M/S NTS110

Project #:		
	HWO Us	Daly

mments and additio	nal information fo	or requirement	envice/s):			Page 2 of	
iving directions to wa om Mercury Highway eston. One 10-gallor orage Unit.	ste pick-up local	tion. NTS Are	ea 26, CAU 1 est, turn right	off Cane Sp	ring Road a	cross the road from	1 ort
rage one.							
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NSTec

FRM-0766

Form

WGS/HAZARDOUS WASTE OPERATIONS REQUEST FOR SERVICE FAX to 5-4815 or send to M/S NTS110

Project #: 2009-Ho

04/10/08 Rev. 01 Page 1 of 1

[1] [1] [1] [1] [1] [1] [1] [1] [1] [1]	eded: (see instructions) 12/22/08 Charge #: 58/868
	e Number: X1578, c 630-0188 Org. Name/No.: SNJV Wst Ops
	e Number: X5-3596 Mail Stop: 505
Facility Manager or Designee: Mark Burmeister,	X5-1816, Cell 335-6134
Section A - Services Requested	
Check One: Used Oll Hazardous	
	ation Pickup Transport only Recycling Disposal SAA 90-Day Storage UWCC Activate Deactivate WCC#, if applicable:
Location of Service (Area, Bldg., exact directions, atta NTS Area 26, CAU 117, CAS 26-41-01, "Pluto" Facilit turn right off Cane Spring Road across the road from I	y, Building 2201. From Mercury Highway, take Cane Springs Road west,
Section B - General Waste Information (Use continu	
Generation Date: 8-9-08 Some Time Good Radiological Clearance provided: FRM-0121, 0 FRM-0002, 1	eneration
Waste Amount (Gallons): 2 gallons T Number of Containers: two	ype of Container (i.e., can, drum, carboy, tanker, etc.): drum, 10-gallon
	on is correct and additional information required is available as kup will only have/has only those materials described on this form. Forigin, MSDS, and/or sampling and analysis. Project Supervisor
Section C - Work Location Information	
Facility Point of Contact (Name, Phone, Pager): Joe Molter, X5-1578, Cell 630-0188	Who will sign the Work Package Traveler? (Name, Phone, Pager): M Burmeister, SNJV Task Manager, X5-1816, Cell 335-6134
Facility Access Requirements: Coordinate waste pick-up with Facility Point of Co	
Known hazards in the requested service area: None	
Acceptable time period to conduct requested ser Hours (AM/PM): 7:30 AM to 4:30 PM	vices: Day(s) Mon - Fri
Section D - Services Completed (HWO Use O	nly) Rec2 (2/11/08
Waste characterized by: Process knowledge	MSDS Sampling & Analysis Other:
Remarks (scheduling, pickup, disposition, etc.):	Sasign 8# NS-NTS-09-0058 to Dan # 117474 1-
transfer to Suc 5 for storage. 1:2/4 Drum was retigized and transfer	Saaign 8# NS-NTS-05-0058 to Down # 117 A74 for 1/2/100, 8-6 DM. Cg 1/29/07. ned to See S for storage via Ensite # CGNC9 = 4
Receiving Facility: Arca 5 Hass U	73/09
Signature: /s/ C. Carlos Gonzales	Date: 2/3/09

Signature: /s/ C. Carlos Gonzales

702-295-7918

T-435 P.002/002 F-145

WGS / Hazardous Waste Operations Request for Service FAX to 5-4815 or send to M/S NTS110

Project #2009-Hc 029

ate of Request: 12-18-08	_		- 3	Conunuation	Page 2	of2
comments and additional informativing directions to waste pick from Mercury Highway, take Claston. One 55-gallon drum, (torage Unit.	-up location. NTS Are	ea 26, CAU 1	off Cane S	Spring Road	across the roa	ad from Port
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NSTec Form

WGS/HAZARDOUS WASTE OPERATIONS REQUEST FOR SERVICE

Project #: 2009-H004

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FRM-0766

FAX to 5-4815 or send to M/S NTS110 HWO Use, Only

9 4 Rebicaking 5-5804 Date of Request: 1/29/09 Date Needed: (see instructions) 1/29/09 Charge #: 581868W6 c Requester Name: Joe Molter, SNJV --Phone Number: x1578, c630-0188 Org. Name/No.: SNJV Waste ops Secondary Contact: Mark Heser Phone Number: x2124, c496-0150 Mail Stop: 505 Facility Manager or Designee: Mark Burmeister, X5-1816 Section A - Services Requested Check One: Used Oil Hazardous Waste Unknown ☐ Universal Waste Other ☐ Characterization ☐ Pickup ☐ Transport only ☐ Recycling Check Applicable: Sampling ☐ Disposal ☐ Delivery (i.e., empty packages) ☐ SAA ☐ 90-Day Storage ☐ UWCC ☐ Activate ☐ Deactivate Indicate SAA#, 90-Day#, or UWCC#, if applicable: Location of Service (Area, Bldg., exact directions, attach map if necessary): See continuation page for driving directions. Section B - General Waste Information (Use continuation sheet if necessary) Routine Generation CAU/CAS if applicable: CAU 117 Generation Date: 9/15/08 □ One Time Generation Radiological Clearance provided: FRM-0121, Clearance Sticker FRM-0894, Confirmation of Rad Status ☐ FRM-0002, Nonradioactive Waste Certification None Waste Amount (Gallons): 40 gallons Type of Container (i.e., can, drum, carboy, tanker, etc.): drum Number of Containers: one Detailed Description/Process Knowledge (i.e., Liquid, Solid, Gas; Name of material; Physical description; How waste was generated, Suspected contaminants, etc.): (Attach applicable MSDSs, analytical summaries, etc.) Consolidated oils from equipment, piping tap & drain, characterized by sampling & analysis. SNJV Drum Number 117A57. Oil contains halogens/chloroflouorocarbons from refridgeration systems (not-RCRA spent solvent contaminated). SNJV Form SN-026, "Radiological Status For Release or Disposal" provided for non-rad release. I certify under penalty of law, the above information is correct and additional information required is available as indicated. The material requested for delivery/pickup will only have/has only those materials described on this form. Contents will be verified by process knowledge of origin, MSDS, and/or sampling and analysis. Generator (specify) Project Supervisor Signature (required for requested services): /s/ Joe Molter Section C - Work Location Information Facility Point of Contact (Name, Phone, Pager); Who will sign the Work Package Traveler? (Name, Phone, Pager): Joe Molter, X5-1578, Cell 630-0188 M Burmeister, SNJV Task Manager, X5-1816, Cell 335-6134 Facility Access Requirements: Coordinate waste pick-up with Facility Point of Contact Known hazards in the requested service area: None Acceptable time period to conduct requested services: Hours (AM/PM): 7:30 AM to 4:30 PM Day(s) M-F Section D - Services Completed (HWO Use Only) 01-29-09 18:49 RCVD Waste characterized by: Process knowledge MSDS Sampling & Analysis Remarks (scheduling, pickup, disposition, etc.): Assigned dumiting NIS-09-0060 for dumit 117A57 Mon-RCRA Used Oil contaminated of CFCs, for eventual register spice recyclibrat not incode to lead content. 2/2/09 of Drum was retrieved and transferred to Asse 5 for 51 via Onsite #09N09, and placed in the Hussy east store Receiving Facility: Area 5 HWSU Signature: /s/ C. Carlos Gonzales

WGS / Hazardous Waste Operations

Request for Service FAX to 5-4815 or send to M/S NTS110

Project #: 2009-Hoo44

Date of Request: 1-29-09	Continuation Page 2 of 2
Comments and additional information for requested service(s): Driving directions to waste pick-up location. NTS Area 26, CAU 11 From Mercury Highway, take Cane Springs Road west, turn right o Gaston. One 55-gallon drum, (SNJV Number 117A57) will need to used oil recycling facility or vendor, either on site or commercial off to be pumped and transferred to same, and empty drum subsequent Landfill or Area 6 Hydrocarbon Landfill.	ff Cane Spring Road across the road from Port be loaded and transported to an "off'specification" site facility or vendor, OR drum contents will need
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☐ Generator ☒ Requester ☐ Project Supervisor Signature	: /s/ Joe Molter 1/29/69
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NSTec Form FRM-0766

WGS/HAZARDOUS WASTE OPERATIONS REQUEST FOR SERVICE or send to M/S NTS110 Project #: 2009-H0041

FAX to 5-4815 or send to M/S NTS110

HWO'Use'Only

04/10/08 Rev. 01 Page 1 of 2

C	nd Reduces. King S-Sicot
	eded: (see instructions) 1/15/09 Charge #: 55/568 Wil
Requester Name: Joe Molter, SNJV / Phone	Number: x1578, c530-0188 Org, Name/No.: SNJV WasteOps
	Number: x2124, c496-0150 Mail Stop: 505
Facility Manager or Designee: Mark Burmeister.	
Section A - Services Requested	
Check One: ☐ Used Oil ※ Hazardous V	Vaste Unknown Universal Waste PCB Other
	ion ☑ Pickup ☐ Transport only ☐ Recycling ☑ Disposal ☐ SAA ☐ 90-Day Storage ☐ LWCC ☐ Activate ☐ Deactivate
Location of Service (Area, Bldg., exact directions, attac See continuation page for driving directions.	ch map if necessary):
Section B - General Waste Information (Use continua	tion sheet if necessary)
☐ FRM-0002, N	Ineration Routine Generation CAU/CAS if applicable:
	is correct and additional Information required is available as up will only have/has only those materials described on this form. origin, MSDS, and/or sampling and analysis.
Section C - Work Location Information	GE WORLET
	TWhe will size the Work Bookson Travelors Alema Bhase Based
Facility Point of Contact (Name, Phone, Pager): Joe Molter, X5-1578, Cell 630-0188	Who will sign the Work Package Traveler? (Name, Phone, Pager): M Burmeister, SNJV Task Manager, X5-1816, Cell 335-6134
Facility Access Requirements: Coordinate waste pick-up with Facility Point of Co	ntact
Known hazards in the requested service area: None	
Acceptable time period to conduct requested serv Hours (AM/PM): 7:30 AM to 4:30 PM	Day(s) M-F
Section D - Services Completed (HWO-Use On	ly)
Waste characterized by: Process knowledge Remarks (scheduling, pickup, disposition, etc.): SM世 SN N 070年, Fin	MSDS Sampling & Analysis Other. Assigned #N5-NTS-09-006/to drum 117493. um was retrieved and transferred to Ara. 5 or Storage Nie Ens. 4 # 09NO9. cap 2/3/04.
Receiving Facility: Ana 5 Hal5U	
Signature: /s/ C. Carlos Gonzales	Date: 2/3/09

WGS / Hazardous Waste Operations Request for Service FAX to 5-4815 or send to M/S NTS110

Project #: 2019-Hoo4

ate of Request: 1/7/09	napana da kada a	600	Continua	tion Page _2	of _	2
comments and additional information for requiriving directions to waste pick-up location. No rom Mercury Highway, take Cane Springs Rome 10-gallon will need loaded and transported	TS Area 26, CA	AU 117, CA	Cane Spring	Road, oppos	lity, Building site Port Gast	2201 lon.
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NSTec Form FRM-0766

WGS/HAZARDOUS WASTE OPERATIONS

FAX to 5-4815 or send to M/S NTS110

REQUEST FOR SERVICE

Project #: 2009-H0042 HWO Use Only

04/10/08 Rev. 01 Page 1 of 2

and Rebecca Kine 5-5804 Date Needed: (see instructions) 1/29/09 Charge #: 581868W6 Date of Request: 1/21/09 Org. Name/No.: SNJV WasteOps Requester Name: Joe Molter, SNJV -Phone Number: x1578, c630-0188 Phone Number: x2124, c496-0150 Mail Stop: 505 Secondary Contact: Mark Heser Facility Manager or Designee: Mark Burmeister, X5-1816 Section A - Services Requested Check One: Used Oil ☐ Other ☐ Characterization ☒ Pickup ☐ Transport only ☐ Recycling Disposal Check Applicable: Sampling ☐ Delivery (i.e., empty packages) ☐ SAA ☐ 90-Day Storage ☐ UWCC ☐ Activate Deactivate Indicate SAA#, 90-Day#, or UWCC#, if applicable: SNN0829 Location of Service (Area, Bldg., exact directions, attach map if necessary): See continuation page for driving directions. Section B - General Waste Information (Use continuation sheet if necessary) One Time Generation Routine Generation CAU/CAS if applicable: CAU 117 Generation Date: 8/6/08 ☐ FRM-0121, Clearance Sticker ☐ FRM-0894, Confirmation of Rad Status Radiological Clearance provided: ☐ FRM-0002, Nonradioactive Waste Certification None Type of Container (i.e., can, drum, carboy, tanker, etc.): drum Waste Amount (Gallons): 10 gallons Number of Containers: one Detailed Description/Process Knowledge (i.e., Liquid, Solid, Gas; Name of material; Physical description; How waste was generated, Suspected contaminants, etc.): (Attach applicable MSDSs, analytical summaries, etc.) Waste chemicals (urjused solid putty-like contents of five unmarked one-gallon paint cans), by analytical data. SNJV Drum Number 117A72. SNJV Form SN-926, "Radiological Status For Release or Disposal" provided for non-rad release. I certify under penalty of law, the above information is correct and additional information required is available as indicated. The material requested for delivery/pickup will only have/has only those materials described on this form. Contents will be verified by process knowledge of origin, MSDS, and/or sampling and analysis. Project Supervisor (specify) Generator □ Requester Signature (required for requested services): /S/ Joe Molter Section C - Work Location Information Facility Point of Contact (Name, Phone, Pager): Who will sign the Work Package Traveler? (Name, Phone, Pager): M Burmeister, SNJV Task Manager, X5-1816, Cell 335-6134 Joe Molter, X5-1578, Cell 630-0188 Facility Access Requirements: Coordinate waste pick-up with Facility Point of Contact Known hazards in the requested service area: None Acceptable time period to conduct requested services: Hours (AM/PM): 7:30 AM to 4:30 PM Day(s) M-F 01-29-09 18:19 RCVD Section D - Services Completed (HWO Use Only) Waste characterized by: Process knowledge MSDS Sampling & Analysis) Other: Remarks (scheduling, pickup, disposition, etc.): Assigned & NS-NTS-09-0062 to dum 117472. 10.6 1 Ail X100/s. Retrieved drum and transferred to Area 5 for storage vin Smite # 0911/09. Receiving Facility: A 100 5 14WSCP Signature: /s/ C. Carlos Gonzales

WGS / Hazardous Waste Operations

Request for Service FAX to 5-4815 or send to M/S NTS110

Project #: 1009-H0042 HWO Use Only

Date of Request: 1/21/09			Continua	tion Page 2	of 2
comments and additional information for repriving directions to waste pick-up location	. NTS Area 2	6, CAU 117, C	CAS 26-41-01	, "Pluto" Facility	, Building 22
rom Mercury Highway, take Cane Springs 0-gallon drum, (SNJV Number 117A72) w	vill need loade	d and transpor	rted to Area 5	, Hazardous W	aste Storage
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NSTec Form FRM-0766

WGS/HAZARDOUS WASTE OPERATIONS REQUEST FOR SERVICE

FAX to 5-4815 or send to M/S NTS110 Project #: 2009-Hcc43
HWO Use Only

04/10/08 Rev. 01 Page 1 of 2

Date of Request: 1/21/09 Date Ne	eded: (see instructions) 1/29/09 Charge #: 58(86866
Requester Name: Joe Molter, SNJV Phon	
	e Number: x2124, c496-0150 Mail Stop: 505
Facility Manager or Designee: Mark Burmeister	
Facility Manager of Designee. Mark Burmeister	, 73-1816
Section A - Services Requested	
Check One: ☐ Used Oil ☑ Hazardous	Waste ☐ Unknown ☐ Universal Waste ☐ PCB ☐ Other
Check Applicable: Sampling Characteriza	ation 🛛 Pickup 🗌 Transport only 🗌 Recycling 🖾 Disposal
Delivery (i.e., empty packages)	☐ SAA ☐ 90-Day Storage ☐ UWCC ☐ Activate ☐ Deactivate
Indicate SAA#, 90-Day#, or U	WCC#, if applicable: SNN0907
The special state of the state	
Location of Service (Area, Bldg., exact directions, atta	ch map if necessary).
See continuation page for driving directions.	
Section B - General Waste Information (Use continu	
Generation Date: 1/12/09 🔲 One Time G	가장 하나 아이들이 아이들이 가는 아이들이 가게 살아가고 있다면 가게 되었다면 하는데 그리네요요요 하는데
	Clearance Sticker FRM-0894, Confirmation of Rad Status
	Nonradioactive Waste Certification None
	Type of Container (i.e., can, drum, carboy, tanker, etc.):drum
Number of Containers: one	
	Solid, Gas; Name of material; Physical description; How waste was
generated, Suspected contaminants, etc.): (Attach ap	
	ilding 2201, RCRA-hazardous by analytical data. SNJV Drum Number
117A103. SNJV Form SN-026, "Radiological Status For Release	or Disposal" provided for non-rad release
indicated. The material requested for delivery/pick Contents will be verified by process knowledge of	
(specify) Generator 🛛 Requ	The state of the s
Signature (required for requested services): /S/ J	loe Molter
Section C - Work Location Information	
Facility Point of Contact (Name, Phone, Pager):	Who will sign the Work Package Traveler? (Name, Phone, Pager):
Joe Molter, X5-1578, Cell 630-0188	M Burmeister, SNJV Task Manager, X5-1816, Cell 335-6134
Facility Access Requirements:	A CONTRACTOR OF THE PARTY OF TH
Coordinate waste pick-up with Facility Point of Co	ontact
Known hazards in the requested service area:	
None	
Acceptable time period to conduct requested sen	vices:
Hours (AM/PM): 7:30 AM to 4:30 PM	Day(s) M-F
Section D - Services Completed (HWO-Use Or	
Waste characterized by: Process knowledge	MSDS Sampling & Analysis Other:
Remarks (scheduling, pickup, disposition, etc.): 1 to drum #117103. Drum wer returned and transferred	1006,0007,0008. Assigne Oft NSNTS-09-0063 04,0005,0010,0050,0032 due to high persett to Acce 5 for storage via On to #09NO9. reg 2/3/
Receiving Facility: Aua 5 HUSU	2 2) orage Orage # 09N 04. reg 2/3/9
	Date: 2/3/09
Signature: /s/ C. Carlos Gonzales	Date. 2/3/01

WGS / Hazardous Waste Operations Request for Service FAX to 5-4815 or send to M/S NTS110

Project #: 2009-Hcc 43 HWO Use Only

Comments and additional information for requested service(s): Driving directions to waste pick-up location. NTS Area 26, CAU 117, CAS 26-41-01, "Pluto" Facility, Building 220 From Mercury Highway, take Cane Springs Road west, turn right off Cane Spring Road opposite Port Gaston. Or 10-gallon drum, (SNJV Number 117A103) will need loaded and transported to Area 5, Hazardous Waste Storage Unit.	е
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☐ Generator ☑ Requester ☐ Project Supervisor Signature: /S/ Joe Molter	_

HAZTRAK ENTRY CONFIRMATION

On-Site Shipment (From NTS at NEVADA to NTS at NEVADA)

Tracking No: 09N09

Mesa Number:

Carrier: NSTEC

Vehicle: G631104D

Driver: C. CARLOS GONZALES

Depart: 03-FEB-2009 Arrival: 03-FEB-2009

From: JOE MOLTER

STOLLER-NAVARRO BASE CAMP CAU 117 MERCURY, NV 89023

Area: 26 Bldg: 2201

Phone: 702-295-1578 N/A

Alt Phone: Pager:

Mobile: 702-630-0188

CARLOS GONZALES

Entered By: Modified By: CARLOS GONZALES

To: CARLOS GONZALES

NSTEC BASE CAMP

HAZ WASTE STORAGE UNIT

MERCURY, NV 89023

Area: 05 Bldg: 020

Date Entered:

Date Modified:

Phone: 702/295-6757 Alt Phone: 702/295-4263 Pager: 702/794-1784 Mobile: 702/630-0235

02-FEB-2009

02-FEB-2009

Secondary Emergency Response Contact And/Or Comments KEN COURVILLE 630-4862

DOES NOT CONTAIN OFFICIAL USE ONLY INFORMATION

Name/Org.: J. Molter/SNJV Date 06/23/2009

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7. Transporter 2 Company Na	me		1.			U.S. EPAID	Number		
B. Designated Facility Name a	and Site Address		16.			U.S. EPAID	Number		11111
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NSTec Form FRM-0766

WGS/HAZARDOUS WASTE OPERATIONS REQUEST FOR SERVICE or send to M/S NTS110 Project #: 2008-H0148

FAX to 5-4815 or send to M/S NTS110

HWO Use Only

04/10/08 Rev. 01 Page 1 of 2

Date Needed: (see instructions) 9/22/08 Charge #: 5818 1.8106 Date of Request: 9/18/08 Phone Number: 5-5804 Org. Name/No.: H300 Requester Name: Rebecca King Secondary Contact: Phone Number: Mail Stop: Facility Manager or Designee: Mark Burmeister Section A - Services Requested Check One: Used Oil ☐ Hazardous Waste ☐ Unknown ☐ Universal Waste ☐ PCB Other ☐ Characterization ☐ Pickup ☐ Transport only ☒ Recycling □ Disposal Check Applicable: Sampling ☐ Delivery (i.e., empty packages) ☐ SAA ☐ 90-Day Storage ☐ UWCC ☐ Activate ☐ Deactivate Indicate SAA#, 90-Day#, or UWCC#, if applicable: Location of Service (Area, Bldg., exact directions, attach map if necessary): Drums are at CAU 117, building 2201 in area 26. Will be staged there until Evergreen can pick up Section B - General Waste Information (Use continuation sheet if necessary) Routine Generation CAU/CAS if applicable: 117 One Time Generation Generation Date: Aug 2008 ☐ FRM-0121, Clearance Sticker ☐ FRM-0894, Confirmation of Rad Status Radiological Clearance provided: ☐ FRM-0002, Nonradioactive Waste Certification ☐ None Type of Container (i.e., can, drum, carboy, tanker, etc.): 55 gallon drum Waste Amount (Gallons): 600 Number of Containers: 12 Detailed Description/Process Knowledge (i.e., Liquid, Solid, Gas; Name of material; Physical description; How waste was generated, Suspected contaminants, etc.): (Attach applicable MSDSs, analytical summaries, etc.) mineral oil drained from shield windows sample analysis was provided by email I certify under penalty of law, the above information is correct and additional information required is available as indicated. The material requested for delivery/pickup will only have/has only those materials described on this form. Contents will be verified by process knowledge of origin, MSDS, and/or sampling and analysis. Requester ☐ Project Supervisor ☐ Generator (specify) Signature (required for requested services): /s/ R. A. King Section C - Work Location Information Facility Point of Contact (Name, Phone, Pager): Who will sign the Work Package Traveler? (Name, Phone, Pager): Mark Burmeister 5-1816 Facility Access Requirements: call 5-3596 Known hazards in the requested service area: be legacy site Acceptable time period to conduct requested services: Day(s) M-Th Hours (AM/PM): 8-4 Section D - Services Completed (HWO Use Only) Waste characterized by: Process knowledge MSDS Sampling & Analysis Other: Remarks (scheduling, pickup, disposition, etc.): An estimated 567 gellow were pumped from 12 down and shipped offite via Evergreen Env. Services menifest #004961217 JJK, MESA # 2089881, Load # 09004. The load was also shipped out with used oil from 23.750 Fleet Operations, ccg 415/09 Receiving Facility: Suggest Surianmental Services Date: 1/15/09 Signature: /s/ C. Carlos Gonzales

WGS / Hazardous Waste Operations

Request for Service FAX to 5-4815 or send to M/S NTS110

Project #: 2008-H0148

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1.25.09

with U.S. Dept. of Energy // Date: 01/28/2009 JOE MOLTER

/S/ JOE Molter

TRANSPORTATION DEPT. - Permanent Post Office Address of Shipper

Page 1 of 1.2 **NSTec** Form FRM-0869

EXCESS OF NON-ACCOUNTABLE ITEMS

02/07/07 Rev. 01 Page 1 of 1

Area: 2		The second secon	MESA No.: _	3-0057-0228
Contact	ts: Joe Molter Phone No.: 295	5-1578	Date: _	7-14-08
Line Item#	Nomenclature / Mfg. / Model # / Serial #	Quantity	Condition Code	Acquisition Cost
1	Keyboards	7	4	15
2	Gateway 2000 386DX/33 computer	1	4	2000
3	Digital Vaxastation 3100 M76	1	4	500
4	NIS NO20958 HP Scanjet 4c\T	1	4	150
5	NIS NO20991 HP LaserJet III Printer	1	4	100
6	NIS NO 20728 Danka Omnifax L535	1	4	200
7	NIS 20959 HP Fax Machine	1	4	200
8	NIS NO20961 HP Laserjet.4P printer	1	4	500
	Readiness Representative: (UGT Readiness Property Only) (P	rint Name and Sign)		Date
N/A			15.	Dete
N/A				·
Departr	ment Manager: (Experimentation Support Dept. Property Centers	Only) (Print Name ar	nd Sign)	Date
N/A				
Propert	y Center Representative: (Print Name and Sign)			Date
Joe Mo	lter /s/ Joe Molter	332-37	17	1/7/08
Custodi	ian: (Print Name and Sign)		7	Date
h	Illian Brown			2-8-09
	up by: (Print Name and Sign)	51 (12 k2	18	Date
Steven	Burns		C	
	Representative: (Print Name and Sign)	ASSESSED OF THE PROPERTY OF TH		Date
Comme SNJV C	ents: Continer ID (tracking) # 117A76	N		
Condit	ion Code:			

- New or unused property that can be put to use without repair,
 X Property with excess value but is impractical to repair.
 - 4 Property showing some wear but can be used without repair,
- 7 Unusable property that can be economically repaired.

- 5 Property with no value except basic material content.

Certificate of Disposal

This is to certify that Waste Stream number LITN-000000006, Rev 12, Shipment number ITL09001, with SNJV container numbers 117A100 and 117A101 were shipped and received at the Nevada Test Site's Area 5, Radioactive Waste Management Complex for disposal as stated below.

Stoller-Navarro Joint Venture	LLW Waste Coordinator	
Shipped By	Organization	Title
Signature	April 13, 2009	
Date	Date	
Stoller-Navarro Joint Venture	LLW Waste Coordinator	
Title	April 13, 2009	
Date	Date	
Date	Date	Date
Stoller-Navarro Joint Venture	LLW Waste Coordinator	
Title	April 13, 2009	
Date	Date	
Date	Date	
Stoller-Navarro Joint Venture	LLW Waste Coordinator	
Title	April 13, 2009	
Date	Date	
Date		

NTS On-Site HazMat Transfer - Published

Tracking No: ITL09001

Mesa Number:

Carrier: NSTEC Vehicle: G820657D

Driver: RUSSELL CROZIER

Depart, 13-APR-2009 Arrival: 13-APR-2009

From: JOE MOLTER

STOLLER-NAVARRO BASE CAMP CAU 117 MERCURY, NV 89023

Area: 26 Bldg: 2201

Phone: 702-295-1578 N/A Mobile: 702-630-0188

To: KATTE ENOCKSON

NSTEC BASE CAMP

MERCURY, NV 89023

Area: 05 Bldg: 007

Phone: 702/295-9306 Mobile: 702/465-4116

Entered By:

ROBERT MOLTER Modified By: ROBERT MOLTER Date Entered:

13-APR-2009

Date Modified:

13-APR-2009

Packago(s) Unit(s)

Shipped Material(s)

UN/NA ---, NON-REGULATED WASTE RADIONUCLIDES: AM-241, PU-239, PU-240, PU-241, PHYSICAL FORM: SOLID, CHEMICAL FORM:

OXIDE; PACKAGE, ACTIVITY: 3.0E+05, CONTAINER NUMBER 117A100 (AKA 117100) TIDS 0211804, 0211900

1 BOX B-25

1120.00 POUND(\$) Guide

No.

181

(GROSS)

UNNA 2910, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE, LIMITED QUANTITY OF MATERIAL. 1 BOX. RADIONUCLIDES: AM-241, PU-239, PU-240, PU-241, RA-226, U-234 PHYSICAL FORM: SOLID

B-25

1160.00 POUND(S)

(GROSS)

CHEMICAL FORM: OXIDE, SOIL PACKAGE ACTIVITY: 6.21E+05 CATEGORY: RADIOACTIVE WHITE I CONTAINER NUMBER 117A101 (AKA 117101), TIDS 0211801, 0211803

Emergency Response Number 702-295-0311

Secondary Emergency Response Contact And/Or Comments

JOE MOLTER (702) 630-0188 SNJV CONTAINERS 117A100 (AKA 117100) & 117A101 (AKA 117101)

in the event of an emergency on the Nevada Test Site, immediately contact the Operations Coordination Center (OCC) Duty Managor at 702/295-0311 for assistance.

EMERGENCY RESPONSE

By Phone 702-295-0311

By Radio 'MAYDAY - MAYDAY - MAYDAY' In the event of an incident involving Hazardous Material:

Gather HazMat shipping papers and NAER Guldebook

2. Isolate the immediate area

3. Assess the situation: a. Fire, Spill, or Leak?

b. People, Property, or the Environment at risk?

Contact On-site Emergency Response Personnel

5. Reference On-Site HazMat Transfer Tracking Number

I his is to certify that the apove-named materials are properly classified, described, packaged, marked, piacarded, and labeled and are in proper condition for transportation according to the applicable regulations of the U.S Department of Transportation. As a signatory I certify that I have been trained and tested to the requirements of 49 CFR, Part 172-700 and is compliant with the NTS OTSD.

Authorized Signature: /s/ Joe Molter	Date: 4/13/09 Time: 11:15
Received by: /s/ Laura Kinstad	Date: 4 13/49 Time: 636

Certificate of Disposal

This is to certify that Waste Stream number LITN-000000011, Rev 0, Shipment number ITL09002, with SNJV container numbers 117A99 and 117A100 were shipped and received at the Nevada Test Site's Area 5, Radioactive Waste Management Complex for disposal as stated below.

Joe Molter	Stoller-Navarro Joint Venture	LLW Waste Coordinator
Shipped By	Organization	Title
/s/ Joe Molter Signature		April 13, 2009 Date
Received By	Organization	Waste Handler Title
/s/ Laura Kinstad		4.13.09 Date

NTS On-Site HazMat Transfer - Published

Carrier: NST Vehicle: G8:		Mesa Numbor:	5				
······	3-APR-2009			Arrivat: 13	APR-2009	- The second	
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	LLER-NAVARRO			NSTEC			
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Entered By: Modified By:	ROBERT MOLT			Date Entered: Date Modified			
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			ency Response Nun 702-295-0311	nber			
JOE MÔLT	ER (702) 630-6186		A99 & 117A102 (AKA 117102)	ions Coordin	ation Cente	or (OCC) Duty Ma	nager at
02/295-0311	for assistance.						
		EM	In the event of an i	neldent launh	ina Hazarda	us Materials	
		y Phone -295-0311	Gather HazMat Isolate the imme Assess the situa	shipping pape diate area tion:			
		By Radio	a. Fire, Spill, or b. People, Prop 4, Contact On-site 5, Reference On-S	erty, or the En Emergency Ri	esponse Pe	rsonnel*	
condition for to	ransportation acco	rding to the applicable regul	y classified, described, package ations of the U.S Department of 172-700 and is compliant with	Transportation the NTS OTS	n. As a sign O,	atory I certify that	have
Authorized Sig	gnature: /s/ Jo	e Molter	Darl	e: 4/13/0	79_Time	1234	-
Received by:	/s/ Laura K	instad	Date	e:4.13.4	9_Time	1236	_

Appendix F Modifications to the Post-Closure Plan

CAU 117 CR Appendix F Revision: 0 Date: June 2009 Page F-1 of F-1

F.1.0 Modifications to the Post-Closure Plan

This appendix does not apply to CAU 117.

Appendix G Use Restrictions

CAU 117 CR Appendix G Revision: 0 Date: June 2009 Page G-1 of G-1

G.1.0 Use Restrictions

This appendix does not apply to CAU 117, as there are no use restrictions required.

Appendix H Evaluation of Risk

H.1.0 Risk Assessment

The risk-based corrective action (RBCA) process used to establish FALs is described in the *Industrial Sites Project Establishment of Final Action Levels* (NNSA/NSO, 2006). This process conforms with *Nevada Administrative Code* (NAC) Section 445A.227, which lists the requirements for sites with soil contamination (NAC, 2008a). For the evaluation of corrective actions, NAC Section 445A.22705 (NAC, 2008b) requires the use of ASTM Method E 1739-95 (ASTM, 1995) to "conduct an evaluation of the site, based on the risk it poses to public health and the environment, to determine the necessary remediation standards (i.e., FALs) or to establish that corrective action is not necessary."

The presence of a COC would require a corrective action. A corrective action may also be necessary if there is a potential for wastes that are present at a site (i.e., PSM) to release COCs into site environmental media.

The evaluation of the need for corrective action will include the potential for wastes that are present at a site to cause the future contamination of site environmental media if the wastes were to be released. To evaluate the potential for the introduction of a COC to the surrounding environmental media, the following conservative assumptions were made:

- Any physical containment of the waste would fail at some point, and the contents would be released to the surrounding media.
- The resulting concentration of contaminants in the surrounding media would be equal to the concentration of contaminants in the waste.
- Any liquid waste containing a contaminant exceeding the RCRA toxicity characteristic concentration can result in the introduction of a COC into the surrounding environmental media.
- Any nonliquid waste containing a contaminant exceeding its associated FAL concentration can result in the introduction of a COC into the surrounding environmental media.

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At CAS 26-41-01, electrical and lighting components, and other building materials assumed to be PSM were removed from Building 2201, as practical, without the need for sampling. These materials include:

- Mercury-containing switches, thermometers, and vapor light bulbs
- Fluorescent and sodium-vapor light bulbs
- Circuit boards
- PCB-containing ballasts and capacitors
- Leaded-glass windows and various lead shielding (e.g., plugs, bricks)
- Lead-acid batteries

Other solid materials that were sampled and contained a contaminant exceeding an equivalent FAL concentration would be considered to be PSM and would require a corrective action. Container liquids with contaminant concentrations exceeding an equivalent toxicity characteristic action level would be considered to be PSM and would require a corrective action.

This section contains documentation of the RBCA process used to establish FALs described in the *Industrial Sites Project Establishment of Final Action Levels* (NNSA/NSO, 2006). This process defines three tiers (or levels) to establish FALs used to evaluate DQO decisions:

- Tier 1 Sample results from source areas (highest concentrations) compared to risk-based screening levels (RBSLs) (i.e., PALs) based on generic (non-site-specific) conditions.
- Tier 2 Sample results from exposure points compared to site-specific target levels (SSTLs) calculated using site-specific inputs and Tier 1 formulas.
- Tier 3 Sample results from exposure points compared to SSTLs and points of compliance calculated using chemical fate/transport and probabilistic modeling.

The RBCA decision process stipulated in the *Industrial Sites Project Establishment of Final Action Levels* (NNSA/NSO, 2006) is summarized in Figure H.1-1.

H.1.1 A. Scenario

Corrective Action Unit 117, Area 26 Pluto Disassembly Facility, consists of a single inactive CAS (26-41-01) within Area 26 of the NTS.

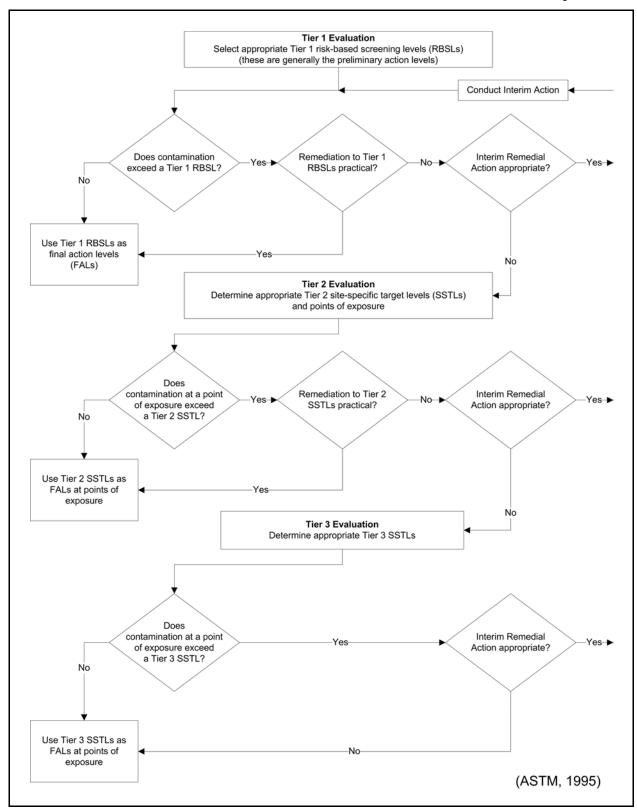


Figure H.1-1
Risk-Based Corrective Action Decision Process

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Corrective Action Site 26-41-01 is located in the southwestern portion of Area 26 north of Cane Spring Road. It consists of Building 2201 (Pluto Disassembly Facility), the facility water tower, and a nearby wood shed. Building 2201 was built to house Project Pluto, with the objective to design a nuclear reactor to propel missiles through the atmosphere. Two reactors were built at this facility, and cores of these reactors incorporated fuel elements consisting of a mixture of uranium dioxide and beryllium oxide (AEC, Date Unknown). The Tory II reactor was stored in Building 2201 until 1974, when it was moved to the R-MAD building. A drainage system from the Building 2201 disassembly bay and postmortem cell area collected rinsate from gross decontamination efforts. The point of discharge for this system is not associated with this CAU. From 1972 through 1998, Building 2201 was used for a series of classified experiments, after which it was deactivated (DOE/NV, 1998).

H.1.2 B. Site Assessment

The CAI for CAS 26-41-01 involved a judgmental sampling strategy in which surface and shallow subsurface soil samples were collected. Samples of wastes (PSM) that could potentially release a COC to environmental media were also collected. Radiological and visual surveys (including video surveys) were also performed to support the CAI. Identified COCs included PCBs in surface and shallow subsurface soils around the facility cooling tower, and Ra-226 in surface soil on the east side of Building 2201. Depth of contamination for PCBs is approximately 5 ft bgs and for Ra-226 is approximately 1 ft bgs. The only PSM identified through sampling within Building 2201 was a radiologically contaminated HEPA filter that was located in Room 103. Electrical and lighting components (i.e., PCB-containing ballasts and capacitors) and other materials (e.g., mercury-containing thermostats and switches, lead plugs and bricks) assumed to be PSM were also removed from Building 2201, as practical, without the need for sampling. The sources, release points, and nature and extent of the identified COCs are consistent with the CSM presented in the SAFER Plan (NNSA/NSO, 2007).

The maximum concentration of each contaminant identified at CAS 26-41-01, and the corresponding FAL, are presented in Table H.1-1.

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Table H.1-1 Maximum Concentration of Detected Contaminants for CAS 26-41-01, Pluto Disassembly Facility

(Page 1 of 2)

Contaminant	Maximum Result	Sample Number	Depth (ft bgs)	Location	FAL	Units
1,2,4-Trimethylbenzene	0.000565 (J)	117AF013	0.0 - 0.5	AF06	170	mg/kg
2-Butanone	0.00917 (J)	117AF013	0.0 - 0.5	AF06	110,000	mg/kg
2-Methylnaphthalene	0.0105 (J)	117AF026	0.0 - 0.5	AF15	190	mg/kg
p-isopropyltoluene	0.000628 (J)	117AF013	0.0 - 0.5	AF06	2,000	mg/kg
Acenaphthylene	0.0132 (J)	117AF008	0.0 - 0.5	AF01	29,000	mg/kg
Acetone	0.0373	117AF013	0.0 - 0.5	AF06	54,000	mg/kg
Acetonitrile	0.0438	117AF013	0.0 - 0.5	AF06	1,800	mg/kg
Ac-228	1.8	117AF009	0.0 - 0.5	AF02	5	pCi/g
Anthracene	0.0303 (J)	117AF008	0.0 - 0.5	AF01	100,000	mg/kg
Aroclor 1242	0.0138	117AF029	3.0 - 3.5	AF17	0.74	mg/kg
Aroclor 1248	8.36	117AF017	0.0 - 0.5	AF07	0.74	mg/kg
Aroclor 1254	0.072 (J)	117AF034	2.0 - 2.5	AF07	0.74	mg/kg
Aroclor 1260	0.141	117AF026	0.0 - 0.5	AF15	0.74	mg/kg
Aroclor 1268	0.0152	117AF030	2.0 - 2.5	AF15	0.74	mg/kg
Arsenic	14.4	117AF012	0.0 - 0.5	AF05	23	mg/kg
Barium	299	117AF008	0.0 - 0.5	AF01	67,000	mg/kg
Benzene	0.000336 (J)	117AF013	0.0 - 0.5	AF06	1.4	mg/kg
Benzo(b)fluoranthene	0.0203 (J)	117AF014	0.0 - 0.5	AF06	2.1	mg/kg
Benzoic acid	0.389 (J)	117AF008	0.0 - 0.5	AF01	100,000	mg/kg
Beryllium	0.72	117AF027	0.0 - 0.5	AF16	1,900	mg/kg
Bis(2-ethylhexyl)phthalate	0.348	117AF027	0.0 - 0.5	AF16	120	mg/kg
Cadmium	5.5	117AF027	0.0 - 0.5	AF16	450	mg/kg
Cs-137	0.479	117AF014	0.0 - 0.5	AF06	12.2	pCi/g
Chloroform	0.00521	117AF026	0.0 - 0.5	AF15	0.47	mg/kg
Chromium	256 (J)	117AF027	0.0 - 0.5	AF16	450	mg/kg
Chrysene	0.136	117AF008	0.0 - 0.5	AF01	210	mg/kg
Di-n-butyl phthalate	0.445	117AF009	0.0 - 0.5	AF02	62,000	mg/kg
DRO	486 (J)	117AF008	0.0 - 0.5	AF01	100	mg/kg

Table H.1-1 Maximum Concentration of Detected Contaminants for CAS 26-41-01, Pluto Disassembly Facility

(Page 2 of 2)

Contaminant	Maximum Result	Sample Number	Depth (ft bgs)	Location	FAL	Units		
Ethylbenzene	0.00276	117AF013	0.0 - 0.5	AF06	400	mg/kg		
Fluoranthene	0.361	117AF008	0.0 - 0.5	AF01	22,000	mg/kg		
Lead	130 (J)	117AF027	0.0 - 0.5	AF16	800	mg/kg		
Pb-212	1.7 (J)	117AF044	0.0 - 0.5	AF18	5	pCi/g		
Pb-214 ^a	265 (J)	117AF028	1.0 - 1.5	AF18	N/A	pCi/g		
Mercury	0.72	117AF027	0.0 - 0.5	AF16	310	mg/kg		
Methylene chloride	0.00874	117AF013	0.0 - 0.5	AF06	21	mg/kg		
Phenanthrene	0.164	117AF008	0.0 - 0.5	AF01	100,000	mg/kg		
Pu-238	0.0828	117AF028	0.0 - 0.5	AF18	13	pCi/g		
Pu-239/240	0.294	117AF028	0.0 - 0.5	AF18	12.7	pCi/g		
Pyrene	0.195	117AF008	0.0 - 0.5	AF01	29,000	mg/kg		
Ra-226 ^b	245	117AF028	0.0 - 0.5	AF18	5/15	pCi/g		
Selenium	8.5 (J)	117AF012	0.0 - 0.5	AF05	5,100	mg/kg		
Silver	1.3	117AF014	0.0 - 0.5	AF06	5,100	mg/kg		
Sr-90	0.298	117AF028	0.0 - 0.5	AF18	838	pCi/g		
Styrene	0.000712 (J)	117AF008	0.0 - 0.5	AF01	1,700	mg/kg		
TI-208	0.518	117AF013	0.0 - 0.5	AF06	5	pCi/g		
Toluene	0.0166	117AF013	0.0 - 0.5	AF06	520	mg/kg		
Total Xylenes	0.0292	117AF013	0.0 - 0.5	AF06	420	mg/kg		
Trichlorofluoromethane	0.00281	117AF013	0.0 - 0.5	AF06	2,000	mg/kg		
U-234	1.06	117AF026	0.0 - 0.5	AF15	143	pCi/g		
U-238	0.869	117AF008	0.0 - 0.5	AF01	105	pCi/g		

^aThe presence of Pb-214 is due to the presence of its natural parent (Ra-226). Because the PAL for Ra-226 includes the contributions from the in-growth of daughters, Pb-214 does not need to be compared to a PAL. See also Section D.3.3.
^bThe generic guidelines for residual concentrations of Ra-226 in soil per DOE 5400.5 (DOE, 1993) are 5 pCi/g, averaged over the first 15 cm (6 in.) of soil below the surface; and 15 pCi/g, averaged over 15-cm-thick layers of soil more than 15 cm below the surface.

J = Estimated value

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H.1.3 C. Site Classification and Initial Response Action

The four major site classifications listed in Table 3 of the ASTM Standard are (1) immediate threat to human health, safety, and the environment; (2) short-term (0 to 2 years) threat to human health, safety, and the environment; (3) long-term (greater than 2 years) threat to human health, safety, or the environment; and (4) no demonstrated long-term threats.

At CAS 26-41-01, COCs and PSM were identified that may pose long-term threats to human health, safety, and the environment. Therefore, this CAS is determined to be a Classification 3 site as defined by ASTM Method E 1739-95 (ASTM, 1995).

H.1.4 D. Development of Tier 1 Lookup Table of RBSLs

Tier 1 RBSLs have been defined as the PALs established during the DQO process. The PALs are a tabulation of chemical-specific (but not site-specific) screening levels based on the type of media (soil) and potential exposure scenarios (industrial). These are very conservative estimates of risk, are preliminary in nature, and are used as action levels for site screening purposes. Although the PALs are not intended to be used as FALs, a FAL may be defined as the Tier 1 action level (i.e., PAL) value if individual contaminant analytical results are below the corresponding Tier 1 action level value. The FAL may also be established as the Tier 1 action level value if individual contaminant analytical results exceed the corresponding Tier 1 action level value and implementing a corrective action based on the FAL is practical. The PALs are defined as:

- The EPA Region 9 Risk-Based PRGs for Industrial Soils (EPA, 2008).
- Background concentrations for RCRA metals will be evaluated when natural background exceeds the PAL, as is often the case with arsenic. Background is considered the mean plus two times the standard deviation of the mean based on data published in *Mineral and Energy Resource Assessment of the Nellis Air Force Range* (NBMG, 1998; Moore, 1999).
- The TPH concentrations above the action level of 100 mg/kg per NAC 445A.2272 (NAC, 2006c).
- For COPCs without established Preliminary Remediation Goals (PRGs), a protocol similar to EPA Region 9 will be used to establish an action level; otherwise, an established PRG from another EPA region may be chosen.

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• The PALs for radioactive contaminants are based on the NCRP Report No. 129 recommended screening limits for construction, commercial, industrial land-use scenarios (NCRP, 1999) scaled to 25-mrem/yr-dose constraint (Appenzeller-Wing, 2004) and the generic guidelines for residual concentration of radionuclides in DOE Order 5400.5 (DOE, 1993).

The PALs were developed based on an industrial scenario. Because CAS 26-41-01 is not assigned work stations and is considered to be in a remote or occasional use area, the use of industrial scenario based PALs is conservative. The Tier 1 lookup table is defined as the PAL concentrations, or activities defined in the SAFER Plan (NNSA/NSO, 2007).

H.1.5 E. Exposure Pathway Evaluation

The DQOs stated that site workers would only be exposed to COCs through oral ingestion, inhalation, or dermal contact (absorption)/external irradiation due to exposure to potentially contaminated media (i.e., soil) at the CAS. The results of the CAI showed that the PCB-contaminated soil is localized near the release point and is limited vertically to a depth of 5 ft bgs and laterally to an approximate 12-by-17-ft area, based on analytical results from Decision II soil samples. The area of Ra-226 contaminated soil is also localized to the release point in the narrow trench and is limited vertically to 1 ft bgs and laterally to a 1-ft-square area between an asphalt surface and a concrete pad, based on analytical results from Decision II soil samples. Because COCs were only identified in the surface and shallow subsurface soil, the only potential exposure pathway to a receptor would be through contact with the contaminated soil. The limited migration demonstrated by the analytical results, elapsed time since the suspected release, and depth to groundwater support the selection and evaluation of surface and shallow subsurface contact as the only complete exposure pathway.

Groundwater is not considered to be a an exposure pathway.

H.1.6 F. Comparison of Site Conditions with Tier 1 RBSLs

All analytical results from CAS 26-41-01 samples were less than corresponding Tier 1 action levels (i.e., PALs) except for total Aroclor (PCBs), Ra-226 (and daughter product Pb-214), Pu-239/240, and TPH-DRO.

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H.1.7 G. Evaluation of Tier 1 Results

The FAL for total Aroclor (sum of Aroclor 1242, 1248, 1254, 1260, and 1268) was established as the Tier 1 RBSL. It was determined that a corrective action is appropriate and practical for the PCB contamination at this CAS. Therefore, a correction action is proposed for this site.

The FALs for Ra-226 were established as the Tier 1 RBSLs because it was determined that a corrective action is appropriate and practical for the Ra-226 contamination at this CAS. Therefore, a correction action is proposed for this site. According to DOE Order 5400.5 (DOE, 1993), the generic guideline for residual concentrations of Ra-226 in soil is 5 pCi/g averaged over the first 15 cm (6 in.) of soil bgs, and 15 pCi/g averaged over 15 cm-thick layers of soil more than 15 cm bgs. Therefore, the two-part PAL of 5 and 15 pCi/g was used for comparison to analytical results of soil samples. Lead-214 was present in soil sample 117AF044 at activities approximately equal to the Ra-226 activities. Because U-238 was essentially not detected in these samples, the similar activities of Pb-214 to Ra-226 indicate that the source of the Pb-214 is in-growth as a daughter in secular equilibrium with Ra-226. Because the PAL for Ra-226 includes the contributions from the in-growth of daughters, the Pb-214 in sample 117AF044 does not need to be compared to a FAL and is not considered further in this appendix.

The FAL for Pu-239/240 was established as the Tier 1 RBSL because it was determined that a corrective action is appropriate and practical for the contaminated HEPA filter in Room 103, which met the criteria for a PSM.

It was determined by NNSA/NSO that remediation of the soil to the Tier 1 action level for TPH-DRO is not practical; therefore, a Tier 2 SSTL will be calculated for the hazardous constituents of diesel. For all other contaminants at this CAS, the FALs were established as the Tier 1 RBSLs, and it was determined that no further action is required.

H.1.8 H. Tier 1 Remedial Action Evaluation

The lateral and vertical extent of the PCB and Ra-226 contamination was defined by the Decision II samples. The analytical results of the Decision II samples from under and near the cooling tower show that the PCB concentrations are below the FAL for total Aroclor, defining the contamination to an approximate 17-by-12-ft area that is 5 ft deep. The analytical result of the Decision II sample

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collected from 1.0 to 1.5 ft bgs at location AF18, where Ra-226 contamination was identified in

surface soil, shows that the Ra-226 activity is below the FAL, therefore defining the vertical extent of

contamination to 1 ft bgs. The contaminated soil is located within a narrow electrical utility trench

between a concrete slab and asphalt surface, which define the lateral extent of contamination.

A corrective action was implemented to remove approximately 50 yd3 of PCB-contaminated soil,

approximately 1 ft³ of Ra-226 contaminated soil (and scabbled asphalt), and the HEPA filter from

Room 103 that was determined to meet the criteria of a PSM.

It was determined that remediation of TPH-DRO contamination to Tier 1 action levels is not

practical; therefore, a Tier 2 evaluation was completed to establish SSTLs for the hazardous

constituents of diesel.

H.1.9 I. Tier 2 Evaluation

No additional data were needed to complete a Tier 2 evaluation.

H.1.10 J. Development of Tier 2 SSTLs

Evaluation of TPH-DRO SSTLs

Method E 1739-95 stipulates that risk evaluations for TPH-DRO contamination be calculated and

evaluated based on the risk posed by the potentially hazardous constituents of TPH-DRO.

Section 6.4.3 ("Use of Total Petroleum Hydrocarbon Measurements") of ASTM Method E 1739-95

states: "TPHs should not be used for risk assessment because the general measure of TPH-DRO

provides insufficient information about the amounts of individual chemical(s) of concern present"

(see also Sections X1.5.4 and X1.42 of Method E 1739-95 in ASTM [1995]). Therefore, the

individual potentially hazardous constituents will be evaluated for risk in place of TPH-DRO. The

SSTLs were established for the individual potentially hazardous constituents in TPH-DRO at the

corresponding PAL concentrations. (Note: The PALs were based on an industrial use scenario in the

SAFER Plan [NNSA/NSO, 2007].) These SSTLs and the maximum reported level for each diesel

constituent per CAS are presented in Table H.1-2.

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Table H.1-2
Tier 2 SSTLs and CAU 117 Results for Hazardous Constituents of Diesel

Constituent	SSTL	Maximum Reported Value (mg/kg) CAS 26-41-01			
Constituent	(mg/kg)				
1,3,5-Trimethylbenzene	70	ND			
2-Methylnaphthalene ^a	190	ND			
Benz(a)anthracene	2.1	ND			
Benzene	1.4	ND			
Benzo(a)pyrene	0.2	ND			
Ethylbenzene	400	ND			
Naphthalene	190	ND			
Toluene	520	ND			
Xylenes ^b	420	ND			
n-Butylbenzene	240	ND			
n-Propylbenzene	240	ND			
Benzo(k)fluoranthene	21	ND			
Benzo(b)fluoranthene	21	0.0203 (J)			
Fluorene	26,000	ND			
Phenanthrene	100,000	0.164			
Fluoranthene	22,000	0.361			
Pyrene	29,000	0.195			
Chrysene	210	0.136			
Anthracene	100,000	ND			
Benzo(g,h,i)perylene	29,000	ND			

^aUses PRG for napthalene as surrogate

ND = Nondetect

H.1.11 K. Comparison of Site Conditions with Tier 2 SSTLs

The Tier 2 action levels are typically compared to individual sample results from reasonable points of exposure (as opposed to the source areas as is done in Tier 1) on a point-by-point basis. Points of exposure are defined as those locations or areas at which an individual or population may come in

^bTotal of m-, o-, and p-xylenes

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contact with a COC originating from a CAS. For CAU 117, the Tier 2 action levels were compared to

the maximum contaminant concentrations from each sample location.

As shown in Table H.1-2, the maximum concentrations of the hazardous constituents of diesel were

compared against the corresponding Tier 2 SSTLs. None of the hazardous constituents of diesel were

detected at concentrations above the Tier 2 SSTLs; therefore, the FALs were established as the

Tier 2 SSTLs.

H.1.12 L. Tier 2 Remedial Action Evaluation

Based on the Tier 2 evaluation of the hazardous constituents of diesel, the TPH-DRO does not pose

an unacceptable risk to human health and the environment. Therefore, no further action concerning

TPH-DRO is required at CAU 117.

As all contaminant FALs were established as the Tier 1 or Tier 2 action levels, a Tier 3 evaluation was

not considered necessary.

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H.2.0 Recommendations

As PCBs and Ra-226 were identified above corresponding FALs in surface and shallow subsurface soil at CAS 26-41-01, it was determined that a corrective action is required. A corrective action was implemented to remove approximately 50 yd³ of PCB-contaminated soil and approximately 1 ft³ of Ra-226 contaminated soil (and scabbled asphalt). The PSM evaluation identified a HEPA filter to be contaminated with Pu-239/240. Because the filter media contains constituents that could potentially release to environmental media, a corrective action to remove the filter from Room 103 was required. Other materials assumed to be PSM were removed from Building 2201 without the need for sampling. These materials include, but are not limited to, PCB-containing items, mercury-containing items, and lead-containing items. Because the COC contamination and PSMs have been removed from Building 2201, a recommendation of clean closure of CAS 26-41-01 is recommended that is protective of human health, safety, and the environment.

H.3.0 References

AEC, see Atomic Energy Commission.

ASTM, see American Society for Testing and Materials.

American Society for Testing and Materials. 1995. *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites*, ASTM E 1739-95 (Reapproved 2002). Philadelphia, PA.

Appenzeller-Wing, J., U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2004. Letter to T.A. Maize (NDEP) entitled, "Submittal of Proposed Radiological Preliminary Action Levels (PALs) for the Industrial Sites Project," 15 January. Las Vegas, NV.

Atomic Energy Commission. Date Unknown. Pluto Fact Sheet Summary. Las Vegas, NV.

DOE, see U.S. Department of Energy.

DOE/NV, see U.S. Department of Energy, Nevada Operations Office.

EPA, see U.S. Environmental Protection Agency.

Moore, J., Science Applications International Corporation. 1999. Memorandum to M. Todd (SAIC), "Background Concentrations for NTS and TTR Soil Samples," 3 February. Las Vegas, NV.

NAC, see Nevada Administrative Code

NBMG, see Nevada Bureau of Mines and Geology.

NCRP, see National Council on Radiation Protection and Measurements.

NNSA/NSO, see U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office.

National Council on Radiation Protection and Measurements. 1999. *Recommended Screening Limits* for Contaminated Surface Soil and Review of Factors Relevant to Site-Specific Studies, NCRP Report No. 129. Bethesda, MD.

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- U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2006. Industrial Sites Project Establishment of Final Action Levels, Rev. 0, DOE/NV--1107. Las Vegas, NV.
- U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2007. Streamlined Approach for Environmental Restoration for Corrective Action Unit 117: Area 26 Pluto Disassembly Facility, Nevada Test Site, Nevada, Rev. 0, DOE/NV--1228. Las Vegas, NV.
- U.S. Department of Energy, Nevada Operations Office. 1998. *Decontamination and Decommissioning Program Surveillance & Maintenance master Plan Nevada Test Site*, March. Prepared by Bechtel Nevada. Las Vegas, NV.
- U.S. Environmental Protection Agency. 2008. *Region 9: Superfund, Preliminary Remediation Goals, Screening Levels for Chemical Contaminants*. As accessed at http://www.epa.gov/region09/waste/sfund/prg/index.html on 10 April 2009. Prepared by EPA Office of Superfund and Oak Ridge National Laboratory.

Appendix I

Nevada Division of Environmental Protection Comments

NEVADA ENVIRONMENTAL RESTORATION PROJECT DOCUMENT REVIEW SHEET

Document Title/Number: Revision Number: Responsible NNSA/NSO Federal Sub-Project Director:		Draft Closure Report for Corrective Action Unit 117: Area 26 Pluto Disassembly Facility, Nevada Test Site, Nevada		2. Document Date:	5/14/2009	
		0	ogato., o.gaato	Stoller-Navarro		
		Kevin Cabble		6/30/2009		
7. Review Criteria:		Full				
8. Reviewer/Organiz	zation/Phone No	D: Tim Murphy, NDEP, 486-2850	9. Reviewer's Signature:			
10. Comment Number/Location	11. Type*	12. Comment	13. Comment	3. Comment Response		14. Accept
1.) Page 24, Section 2.1.7	Mandatory	In the last paragraph, identify mineral-like substance as non-hazardous and/or provide reference to Table D.3-10	Section 2.17, revised and added "This material did not contain any hazardous constituents that would qualify it as Potential Source Material (PSM)". Additionally, references to Table D.3-10 and Section D.3.2.8 were added.			Yes
2.) Page D-18, Section D.3.1.2	Mandatory	In last paragraph, were all HEPA filters removed during closure activities? Explain why or why not all HEPA filters were removed.	Yes, all HEPA filters were removed. The following sentence was added to Section D.3.1.2, "All pre-filters and primary filters were removed from Building 2201 during closure activities as a Potential Source Material (PSM) through a corrective action, or as a Best Management Practice (BMP) (for uncontaminated filters)".			Yes
3.) Page D-49, Section D.4.1.1	Mandatory	The last paragraph appears to be incorrect for PCB remediation waste. PCB remediation waste can be TSCA regulated below 50 ppm but eligible for disposal in a municipal landfill.	In this case, the PCB-contaminated soil was managed in its as found concentration, and not as PCB-remediation waste (since the source of the contamination was unknown). A reference to 40 CFR 761.50 a(4) was added to the end of the sentence.		Yes	
4.) Page H-5, Table H.1-1	Mandatory	Highlight maximum results that exceed the FALs	Table H.1-1 corrected as suggested.			Yes
5.) Page H-5, Table H.1-2	Mandatory	A list of 20 underlying hazardous constituents has been used in recent documents but only 11 are listed here. Use the complete list or at a minimum the UHCs listed in ASTM E 1739 for diesel range organics.		corrected to include complete list of 20 azardous constituents.		Yes

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