UNCONTROLLED

FEDERAL FACILITY AGREEMENT AND CONSENT ORDER (FFACO)
RECORD OF TECHNICAL CHANGE (ROTC)

Corrective Action Unit (CAU) Number: 118
CAU Description: Area 27 Super Kukla Facility
CAU Owner: Industrial Sites - Environmental Restoration (ER)

ROTC No. DOE/NV--1223-ROTC 2 **Page** 1 of 9

Document Type Closure Report (CR) **Date** 09/03/2024

The following technical changes (including justification) are requested by:

Jaclyn Petrello
Requestor Name

Long-Term Monitoring Activity Lead
Requestor Title

Description of Change:

1. This ROTC replaces the Use Restriction (UR) information listed in the documentation for CAU 118.

   UR forms have been updated to list all UR requirements, including but not limited to: post-closure site controls (signs, fencing, etc.), inspection and maintenance requirements, and Geographic Information Systems (GIS) coordinate information. The UR requirements and form(s) included in this ROTC represent the current corrective action requirements for each Corrective Action Site (CAS) in this CAU and supersede information concerning corrective action and post-closure requirements in existing documentation.

2. The UR boundary coordinate values changed due to conversion from North American Datum (NAD) 1927 to NAD 1983.

Justification:

1. Some changes in the UR requirements from those found in closure documents have been subsequently modified in letters, memos, and inspection reports. This has resulted in difficulty in determining current post-closure requirements. A review of the post-closure requirements for this CAU has been conducted to ensure that all requirements have been identified and documented on the new UR form. The new UR form was developed to be inclusive of all requirements for long-term monitoring and standardize information contained in the URs consistent with current protocols.

2. UR boundary coordinates need to be in one standardized coordinate system.

FEDERAL FACILITY AGREEMENT AND CONSENT ORDER (FFACO)
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ROTC No. DOE/NV--1223-ROTC 2 **Page** 2 of 9

Document Type Closure Report (CR) **Date** 09/03/2024

Description of Change:

3. Removed requirements for fencing from the UR for CAS 27-41-01.

Justification:

3. Current protocols documented in the *Federal Facility Agreement and Consent Order Nevada National Security Site Use Restriction Management Plan* require fencing at sites with surface contamination where workers would otherwise be frequently present. Workers do not frequent this site as it is remote and no regular work activities are conducted. Also, the bulk of the contaminated media was removed (soil and concrete) and the remaining contamination was covered by clean fill material. Therefore, fencing is not required at this site.

Schedule Impacts:

No impacts to schedule.

ROTC applies to the following document(s):

- U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2007. Closure Report for Corrective Action Unit 118: Area 27 Super Kukla Facility, Nevada Test Site, Nevada, Rev. 0, DOE/NV--1223. Las Vegas, NV.
- ROTC-1 for CAU 118 CR (DOE/NV--1223), dated 6/18/2009.

FEDERAL FACILITY AGREEMENT AND CONSENT ORDER (FFACO)
RECORD OF TECHNICAL CHANGE (ROTC)

Corrective Action Unit (CAU) Number: 118
CAU Description: Area 27 Super Kukla Facility
CAU Owner: Industrial Sites - Environmental Restoration (ER)

ROTC No. DOE/NV--1223-ROTC 2 **Page** 3 of 9

Document Type Closure Report (CR) **Date** 09/03/2024

Approvals:

JACLYN PETRELLO Digitally signed by JACLYN PETRELLO Date: 2024.09.04 12:00:23 -07'00' Date _____

Jaclyn Petrello
Activity Lead
Environmental Management (EM) Nevada Program

WILHELM WILBORN Digitally signed by WILHELM WILBORN Date: 2024.09.04 07:49:04 -07'00' Date _____

Bill Wilborn
Deputy Program Manager, Operations
Environmental Management (EM) Nevada Program

Christine Andres Digitally signed by Christine Andres Date: 2024.09.06 14:24:06 -07'00' Date _____

Christine Andres
Chief, Bureau of Federal Facilities
Nevada Division of Environmental Protection (NDEP)

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

General Information

Use Restriction (UR) Type(s):	FFACO Only
Corrective Action Unit (CAU) Number & Description:	118 - Area 27 Super Kukla Facility
Corrective Action Site (CAS) Number & Description:	27-41-01 - Super Kukla Reactor Building/High Bay and Mechanical Building
CAU/CAS Owner:	Industrial Sites - ER
Note:	N/A

Section I. *Federal Facility Agreement and Consent Order* (FFACO) UR

Basis for FFACO UR

Summary Statement: This FFACO UR is established to protect workers from inadvertent exposure to Radiological and Chemical contaminants that were released at this site. Radiological and Chemical contaminants are present that exceed final action levels.

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

FFACO UR Physical Description

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Boundary	UR Point[1]	Easting[2]	Northing[2]
FFACO Boundary	1	577,961	4,070,964
	2	577,950	4,070,972
	3	577,945	4,070,994
	4	577,953	4,071,011
	5	577,932	4,071,049
	6	577,938	4,071,073
	7	577,974	4,071,095
	8	577,986	4,071,092
	9	578,034	4,071,014
	10	577,983	4,070,983
	11	577,978	4,070,981
	12	577,961	4,070,964

[1]UR Points are listed clockwise beginning at the southernmost point. If multiple points share the southernmost Northing coordinate, the easternmost point is listed as Point 1.

[2]UR coordinate values presented herein were transformed from the North American Datum of 1927, and rounded to the nearest meter; resultant coordinates may not reflect the original precision of values contained within the source GIS data set.

Boundary Applies to: Both Surface and Subsurface

Depth is unknown.

Survey Source: GIS

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

FFACO UR Requirements

Site Controls:

This FFACO UR is recorded as described in **Section IV. Recordation Requirements** to restrict activities within the area by the coordinates listed above and depicted in the attached figure without prior notification of NDEP unless the activities are conducted under the provisions of 10 CFR, Part 835, Occupational Radiation Protection and 10 CFR, Part 851, Worker Safety and Health Program.

Control	Criteria
Signage	Present and legible.

Inspection Frequency: Annual

Additional Considerations:

Consideration	Criteria
None	None

Requirements Comments: N/A

Section II. Administrative UR

An Administrative UR is not identified for this site.

Section III. Supporting Documentation

UR Source Document(s)

ROTC 2 for CAU 118 CR (DOE/NV--1223), dated 09/03/2024.

ROTC-1 for CAU 118 CR (DOE/NV--1223), dated 06/18/2009.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2007. Closure Report for Corrective Action Unit 118: Area 27 Super Kukla Facility, Nevada Test Site, Nevada, Rev. 0, DOE/NV--1223. Las Vegas, NV.

Attachments

- UR Boundary Map (UTM, Zone 11, NAD 83 meters)

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Section IV. Recordation Requirements

Recordation:

The above UR(s) are recorded in the:

- FFACO Database
- NNSA M&O Contractor GIS
- EM Nevada Program CAU/CAS Files

Section V. EM Nevada Program Approval

JACLYN PETRELLO

Digitally signed by JACLYN PETRELLO
Date: 2024.09.04 12:00:55 -07'00'

Date: _____

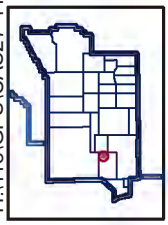
Jaclyn Petrello

Activity Lead

EM Nevada Program

UR is effective upon acceptance by NDEP.

H:\118\GPS\CAS27-41-01_FFACOUR.mxd - 2/18/2021



CAU 118, CAS 27-41-01
Super Kukla Reactor Building/High Bay and Mechanical Building
FFACO UR Boundary

Explanation

FFACO UR

0 10 20 40 Meters

0 30 60 120 Feet

N

Source: Navarro GIS, 2021

Coordinate System: NAD 1983 UTM Zone 11N, Meter

Supplemental Information Figure

Additional supplemental information on site features was not present in previous iterations of this Use Restriction (UR), therefore a supplemental information figure is not attached. If additional information on site features is required for this site, please contact the *Federal Facility Agreement and Consent Order* (FFACO) Database Administrator.

UNCONTROLLED

RECORD OF TECHNICAL CHANGE

Technical Change No. CAU 118 CR ROTC-1 Page 1 of 1

Project/Job No. CAU 118 Date 6/18/09

Project/Job Name CAU 118, Area 27 Super Kukla Facility, Nevada Test Site, Nevada

The following technical changes (including justification) are requested by:

Mark Burmeister (Name) SNJV Task Manager (Title)

Description of Change: Revise Use Restriction Monitoring frequency to Annual instead of Semi-Annual.

Justification: The frequency for site monitoring and inspection of Use Restriction fencing and postings at the CAU 118, CAS 27-41-01 Super Kukla Facility is currently semi-annual. CAU 118, CAS 27-41-01 is use restricted due to radionuclides and lead debris entombed within B-5400 and subsurface PCB-soil contamination. Annual inspection is adequate to ensure fencing and postings are intact, undisturbed, and remain in good condition. An annual inspection requirement for CAU 118 would align it with the balance of site-wide Use Restrictions.

The project time will be (Increased) (Decreased) (Unchanged) by approximately NA days.

Applicable Project-Specific Document(s): DOE/NV--1223 Closure Report for Corrective Action Unit 118; Area 27 Super Kukla Facility Nevada Test Site, Nevada

cc:

Approved By: /s/ Kevin J. Cabble Date 6-24-09
NNSA/NSO Federal Subproject Director

/s/ Robert Boehlecke Date 6/24/09
NNSA/NSO Federal Project Director

NDEP Concurrence Yes X No__ Date 7/2/09
NDEP Signature /s/ Jeff MacDougall
Contract Change Order Required Yes__ No __
Contract Change Order No. _____

Nevada
Environmental
Restoration
Project

DOE/NV--1223

National Nuclear Security Administration

Closure Report for Corrective Action Unit 118: Area 27 Super Kukla Facility Nevada Test Site, Nevada

Controlled Copy No.: UNCONTROLLED
Revision No.: 0

September 2007

Approved for public release; further dissemination unlimited.

Environmental Restoration
Project

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

Available for public sale, in paper, from:

U.S. Department of Commerce
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Phone: 800.553.6847
Fax: 703.605.6900
Email: *orders@ntis.gov*
Online ordering: *http://www.ntis.gov/ordering.htm*

Available electronically at *http://www.osti.gov/bridge*

Available for a processing fee to U.S. Department of Energy and its contractors, in paper, from:

U.S. Department of Energy
Office of Scientific and Technical Information
P.O. Box 62
Oak Ridge, TN 37831-0062
Phone: 865.576.8401
Fax: 865.576.5728
Email: *reports@adonis.osti.gov*

DOE/NV--1223

CLOSURE REPORT
FOR CORRECTIVE ACTION UNIT 118:
AREA 27 SUPER KUKLA FACILITY
NEVADA TEST SITE, NEVADA

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

Controlled Copy No.: ___

Revision No.: 0

September 2007

CLOSURE REPORT
FOR
CORRECTIVE ACTION UNIT 118:
AREA 27 SUPER KUKLA FACILITY
NEVADA TEST SITE, NEVADA

Approved by: /s/ Sabine Curtis Date: 09/05/2007

Kevin J. Cabble
Federal Sub-Project Director
Industrial Sites Sub-Project

Approved by: /s/ John B. Jones Date: 09/05/2007

John B. Jones
Acting Federal Project Director
Environmental Restoration Project

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List of Tables *(Continued)*

List of Acronyms and Abbreviations

ACM	Asbestos-containing material
Am	Americium
ASTM	American Society for Testing and Materials
bgs	Below ground surface
C	Carbon
CAI	Corrective Action Investigation
CAS	Corrective Action Site
CAU	Corrective Action Unit
Cl	Chlorine
CLP	Contract Laboratory Program
Co	Cobalt
COC	Contaminant of concern
COPC	Contaminant of potential concern
CR	Closure Report
Cs	Cesium
CSM	Conceptual site model
Cu	Curium
D&D	Decontamination and decommissioning
DOE	U.S. Department of Energy
DQA	Data quality assessment
DQI	Data quality indicator
DQO	Data quality objective
EPA	U.S. Environmental Protection Agency
Eu	Europium
FAL	Final action level
FD	Field duplicate

List of Acronyms and Abbreviations *(Continued)*

Fe	Iron
FFACO	*Federal Facility Agreement and Consent Order*
FIMS	Facility Information Management System
FSL	Field-screening level
FSR	Field-screening result
ft	Foot
ft^2	Square foot
ft^3	Cubic foot
gal	Gallon
GPS	Global Positioning System
HEPA	High-efficiency particulate air
HVAC	Heating, venting, and air conditioning
HWAA	Hazardous waste accumulation area
IDW	Investigation-derived waste
in.	Inch
lb	Pound
LCS	Laboratory control sample
LLMW	Low-level mixed waste
LLW	Low-level waste
M&O	Management and operating
MDC	Minimum detectable concentration
MDL	Minimum detectable level
mg/kg	Milligrams per kilogram
mi	Mile
mrem/yr	Millirem per year
MS	Matrix spike

List of Acronyms and Abbreviations *(Continued)*

MSD	Matrix spike duplicate
NAC	*Nevada Administrative Code*
NCR	Nonconformance report
NCRP	National Council on Radiation Protection and Measurements
ND	Normalized difference
NDEP	Nevada Division of Environmental Protection
Ni	Nickel
NIST	National Institute for Standards and Technology
NNSA/NSO	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office
NSTec	National Security Technologies, LLC
NTS	Nevada Test Site
NV/YMP	Nevada/Yucca Mountain Project
ORO	Oak Ridge Office
PACM	Presumed asbestos-containing material
PAL	Preliminary action level
PB	Preparation blank
PCB	Polychlorinated biphenyl
pCi/g	Picocuries per gram
pCi/L	Picocuries per liter
pCi/mL	Picocuries per milliliter
PPE	Personal protective equipment
ppm	Parts per million
PRG	Preliminary remediation goal
Pu	Plutonium
QA	Quality assurance
QAPP	Quality Assurance Project Plan

List of Acronyms and Abbreviations *(Continued)*

QC	Quality control
RBCA	Risk-based corrective action
RBSL	Risk-based screening level
RCRA	*Resource Conservation and Recovery Act*
RPD	Relative percent difference
RWMS	Radioactive Waste Management Site
SAFER	Streamlined Approach for Environmental Restoration
SAP	Sampling and analysis plan
SDG	Sample delivery group
SNJV	Stoller-Navarro Joint Venture
SOP	Standard operating procedure
Sr	Strontium
SSTL	Site-specific target level
SVOC	Semivolatile organic compound
TDEC	Tennessee Department of Environmental Compliance
TPH	Total petroleum hydrocarbons
TSCA	*Toxic Substances Control Act*
TSCAI	*Toxic Substances Control Act* Incinerator
TSDF	Treatment, storage, and disposal facility
U	Uranium
UR	Use restriction
VOC	Volatile organic compound
yd^3	Cubic yard
%D	Percent difference

Executive Summary

This Closure Report (CR) presents information supporting the closure of Corrective Action Unit (CAU) 118: Area 27, Super Kukla 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. The corrective action site (CAS) within CAU 118 is located within Area 27 of the Nevada Test Site.

Corrective Action Unit CAU 118 is comprised of the following CAS:

- 27-41-01, Super Kukla Reactor Building/High Bay and Mechanical Building, which consists of the following four structures:

  - Building 5400A, High Bay
  - Building 5400, Reactor Building and access tunnel
  - Building 5410, Mechanical Building
  - Wooden Shed, also known as “Brock House”

The purpose of this CR is to provide documentation supporting the completed corrective actions and data confirming that closure objectives for CAS 27-41-01 within CAU 118 were met. Closure of CAU 118 consisted of the following activities:

- Removal and disposition of oils (polychlorinated biphenyl [PCB] and non-PCB) from hydraulic system and equipment.

- Removal of hazardous and regulated materials including:

  - Lead (electrical components, batteries)
  - Mercury (switches)
  - Asbestos-containing material
  - Polychlorinated biphenyls (fluids/lubricants)
  - Freon from heating, venting, and air conditioning systems

- Placement of debris from Building 5410 and the Wooden Shed into Building 5400.

- Demolition of Buildings 5400A (High Bay) and 5410 (Mechanical Building) to slab and appropriate disposal of construction materials.

- Demolition of the Wooden Shed to grade and appropriate disposal of construction materials.

- Stabilization (Entombment) of Building 5400 (access tunnel, reactor room, basement, and sump) by filling the structure and contents with flowable grout.
- Remediation and removal of PCB contamination source, including PCB-contaminated soil and concrete from Building 5410, and defining the extent of the remaining PCB contamination in the soil.
- Performance of final release and confirmatory radiological surveys to establish proper controls (postings).
- Installation of use restriction postings.

From January 2006 through July 2007, closure activities were performed as set forth in the *Streamlined Approach for Environmental Restoration Plan for CAU 118, Nevada Test Site, Nevada*. The purposes of the activities as defined during the data quality objectives process were:

- Determine whether contaminants of concern (COCs) or potential source material 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 (FALs) to determine COCs for CAU 118. Assessment of the data generated from closure activities indicate the FALs were exceeded at CAS 27-41-01 for PCBs (Aroclor 1248 and Aroclor 1254). Because the PCBs are confined laterally and vertically within the spatial boundary of the site, the source has been removed and PCBs are not readily mobile in the environment, no further action is necessary. Future land use of the site will be restricted from intrusive activities.

Closure activities generated waste streams consisting of asbestos-containing materials, toxic substances control act regulated oils, non-hazardous construction debris/rubble, low-level radioactive, low-level, and recyclable materials. Some wastes exceeded land disposal restrictions and required offsite treatment and disposal. Other wastes, were disposed of in the appropriate onsite landfills.

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

- No further corrective action is required at CAS 27-41-01.

- A use restriction is required at CAS 27-41-01.

- A Notice of Completion to DOE, National Nuclear Security Administration Nevada Site Office is requested from the Nevada Division of Environmental Protection for closure of CAU 118. Corrective Action Unit 118 should be promoted from Appendix III to Appendix IV of the *Federal Facility Agreement and Consent Order.*

1.0 Introduction

This Closure Report (CR) presents information supporting closure of Corrective Action Unit (CAU) 118, Area 27 Super Kukla Facility, Nevada Test Site (NTS), Nevada. This CR 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; and DOE, Legacy Management (FFACO, 1996; as amended August 2006). Corrective Action Unit 118 is located approximately 10 miles (mi) northwest of Mercury, Nevada, in the northwest region of Area 27 at the NTS and is comprised of one Corrective Action Site (CAS), 27-41-01. The NTS is located approximately 65 mi northwest of Las Vegas, Nevada (Figure 1-1). Corrective Action Site 27-41-01 is comprised of the four structures listed below and shown in Figure 1-2:

- Building 5400A (B-5400A), High Bay
- Building 5400 (B-5400), Reactor Building and access tunnel
- Building 5410 (B-5410), Mechanical Building
- Wooden Shed, also known as "Brock House"

Building 5420, the Relay Building, was previously demolished to slab and is not in the scope of CAS 27-41-01.

1.1 Purpose

This CR provides documentation and justification for the closure of CAU 118 without further corrective action. This justification is based on process knowledge and the results of the investigative and closure activities conducted in accordance with the CAU 118 SAFER Plan: *Streamlined Approach for Environmental Restoration (SAFER) Plan for CAU 118: Area 27 Super Kukla Facility, Nevada Test Site, Nevada* (NNSA/NSO, 2006). The SAFER Plan provides information relating to site history as well as the scope and planning of the investigation.

This CR also provides the analytical and radiological survey data to confirm that the remediation goals were met as specified in the CAU 118 SAFER Plan (NNSA/NSO, 2006). The Nevada Division of Environmental Protection (NDEP) approved the CAU 118 SAFER Plan (Murphy, 2006), which

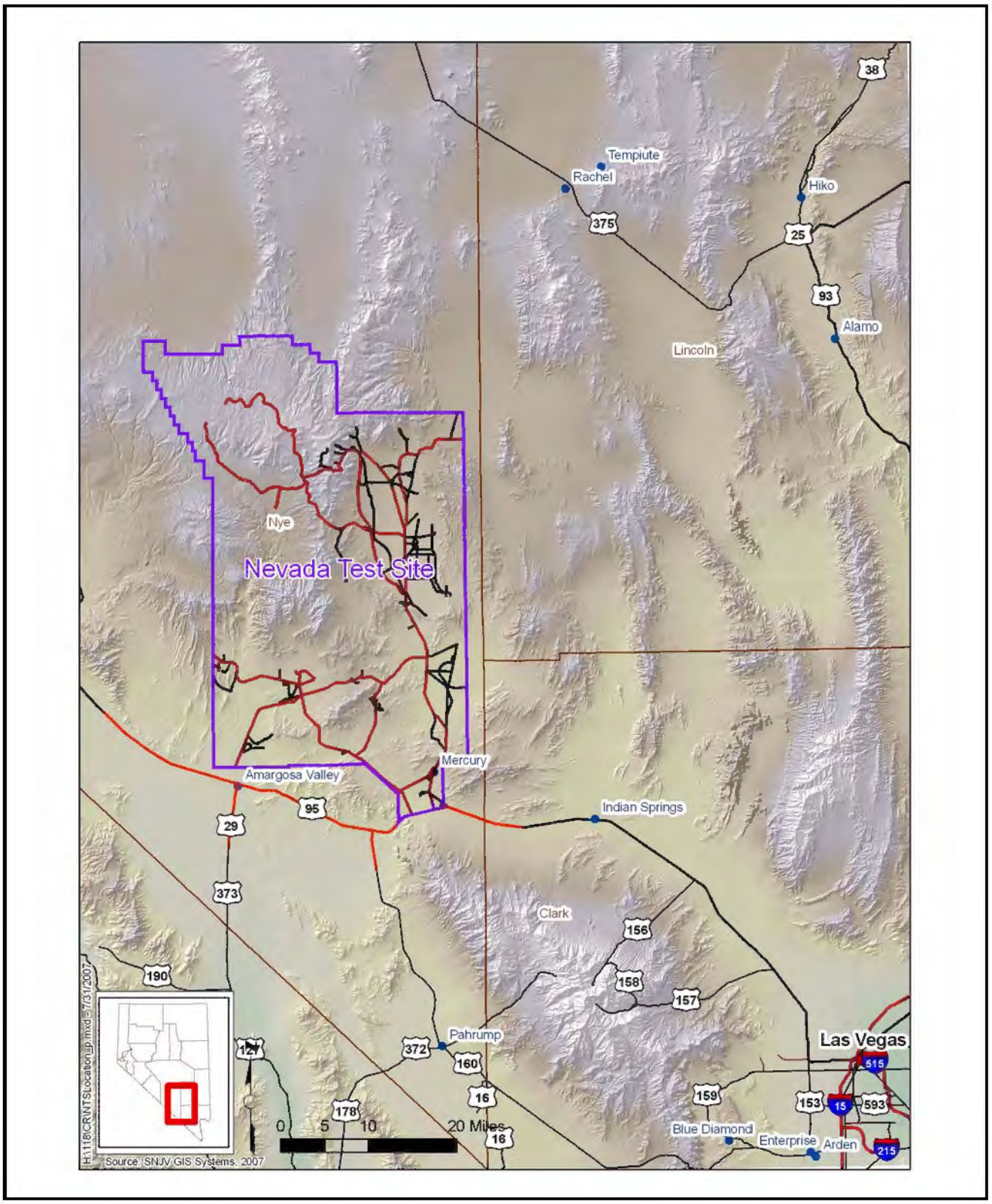

Figure 1-1
Nevada Test Site

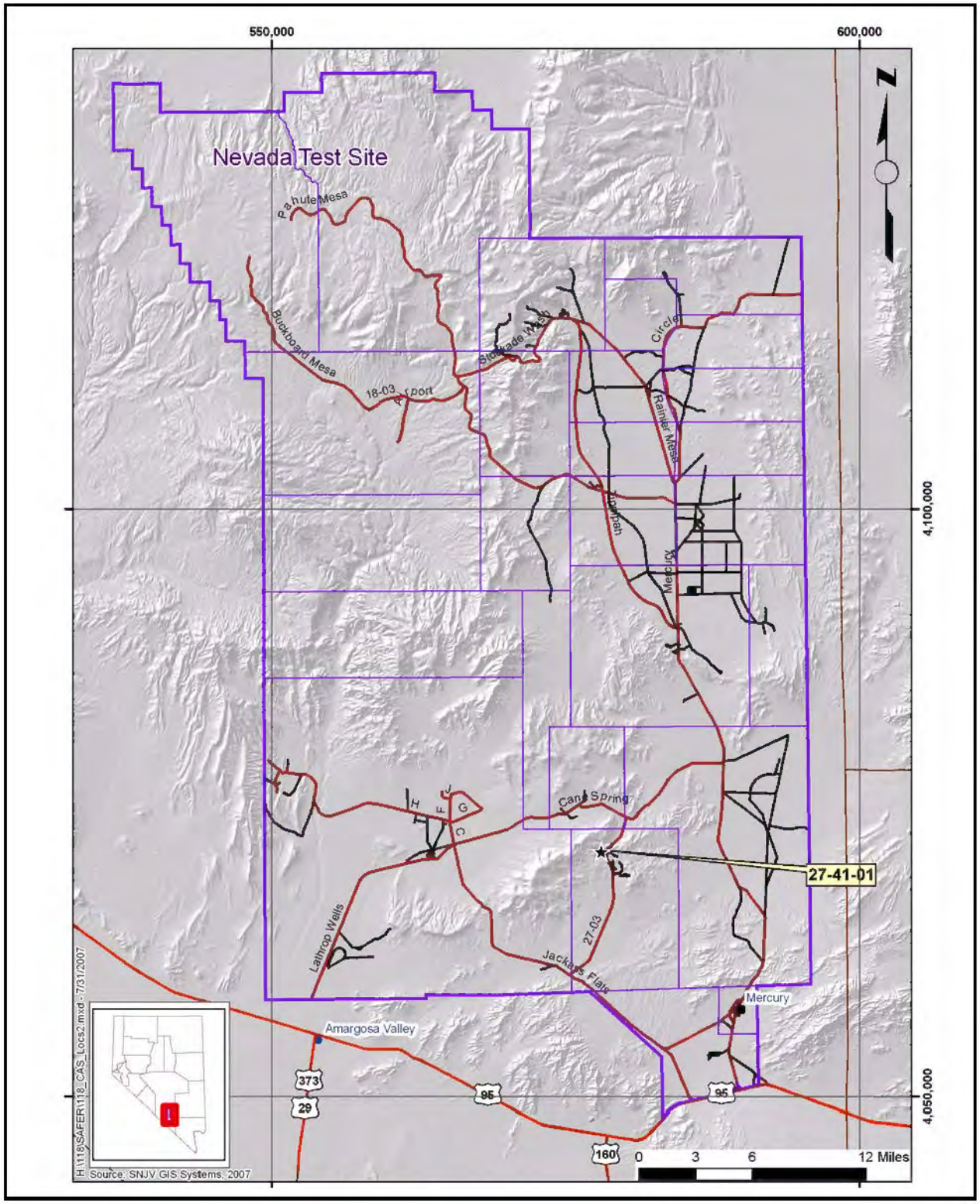

Figure 1-2
CAU 118, CAS Location Map

recommends closure in place with use restrictions (URs). Use restrictions are specified in Section 4.2.

Closure of CAU 118 is required under the FFACO and is listed in Appendix III of the FFACO (FFACO, 1996; as amended August 2006).

1.1.1 Site History

Historical documentation indicates that the Super Kukla Facility was constructed in 1964. Super Kukla was associated with the nuclear weapons program at the NTS and the national defense of the United States during the Cold War. Corrective Action Site 27-41-01 consisted of four structures at the Super Kukla Facility: Building 5400, Building 5400A, Building 5410, and the Wooden Building known as the "Brock House."

Building 5400 (Reactor Building) consisted of a basement pit foundation, reactor containment room, and an access hallway. Building 5400A (High Bay) was located on top of Building 5400 and connected via a hatch located in the concrete slab (floor of 5400A and ceiling of 5400). The Reactor Building extended underground under the footprint of the High Bay. The access tunnel is covered with at least 4 feet (ft) of earth fill.

Building 5400 housed the Super Kukla Reactor, which was used to test the effects of "prompt bursts," or intense pulses of radiation over a brief period of time, on a variety of samples between 1964 and 1979. During this period, samples were stored in the Reactor Building or the High Bay (LRL, 1969).

Building 5410 (Mechanical Building) was utilized to house much of the mechanical equipment for operation of the reactor including the main components of the hydraulic system, air filters, nitrogen tanks, pumps and piping, lubricating and hydraulic oils. The vent system for the Reactor Building was connected to Building 5410 via underground ducts. Due to the unique characteristics of the reactor, the reactor was cooled by air and process piping was minimal. The major components of the reactor were hydraulically driven. Pydraul was the hydraulic fluid used and is known to contain polychlorinated biphenyls (PCBs).

The remaining structure was identified as the Wooden Shed (or Brock House). The building was a two-story structure constructed on skids and located southwest of Buildings 5400 and 5400A.

It housed equipment and materials in support of Super Kukla operations. The structure had a floor area of approximately 460 square feet (ft^2).

In 1979, operation and testing of the reactor ceased. The reactor core and components were disassembled and removed. The reactor fuel was sent for storage at the Y-12 Plant in Oak Ridge, Tennessee. The Super Kukla Facility was identified as a Beryllium Legacy Site, in accordance with the *Consolidated Chronic Beryllium Disease Prevention Program Plan* (NSTec, 2007). Corrective Action Unit 118 is included in the DOE Decontamination and Decommissioning (D&D) Program.

1.2 Scope

The objectives of closure activities for CAU 118 were designed for Closure in Place with URs. Radiological contaminants of concern (COCs) included cobalt (Co)-60, carbon (C)-14, chlorine (Cl)-36, cesium (Cs)-137, europium (Eu)-152, Eu-154, Eu-155, iron (Fe)-55, americium (Am)-241, tritium, nickel (Ni)-63, isotopic plutonium (Pu), strontium (Sr)-90, and isotopic uranium (U). The original list of radiological COCs included Ni-63, and Cl-36, because they are potential activation products associated with a neutron-producing reactor similar to Super Kukla. The primary chemical COCs included PCBs, *Resource Conservation and Recovery Act* (RCRA) metals, and Freon.

Regulated or hazardous materials were removed and dispositioned in accordance with applicable regulations. Aboveground structures were demolished and disposed. Radiologically impacted equipment (primarily activated metals) from Buildings 5400A, 5410, the Wooden Shed, and remaining in B-5400 were entombed in B-5400. The entombed debris and equipment did not increase the space requirements for grouting and entombment. The entombment of B-5400 renders the structure inaccessible, and there are no credible transport mechanisms for migration of contaminants.

The corrective action of close in place was completed by bounding the extent of contamination through sampling and analytical results, and implementing a UR to protect future workers from inadvertent contact with the remaining contamination. Activities used to implement these corrective actions included the following:

- Removal and disposition of oils (PCB and non-PCB) from hydraulic system and equipment.

- Removal of hazardous and regulated materials including:

  - Lead (electrical components, batteries)
  - Mercury (switches)
  - Asbestos-containing material
  - PCBs (fluids/lubricants)
  - Freon from heating, venting, and air conditioning systems
  - Radiological check sources

- Placement of debris from Building 5410 and the Wooden Shed into Building 5400.

- Demolition of Buildings 5400A (High Bay) and 5410 (Mechanical Building) to slab and appropriate disposal of construction materials.

- Demolition of the Wooden Shed to grade and appropriate disposal of construction materials.

- Stabilization (Entombment) of Building 5400 (access tunnel, reactor room, basement, and sump) by filling the structure and contents with flowable grout.

- Remediation and removal of PCB contamination source, including PCB-contaminated soil and concrete from Building 5410, and defining the extent of the remaining PCB contamination in the soil.

- Performance of final release and confirmatory radiological surveys to establish proper controls (postings) of concrete slabs.

- Installation of UR 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, schedule, and 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 the determination.

Section 6.0 - References: Provides a list of 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 Section 3.0 of the CAU 118 SAFER Plan.

Appendix B - *Closure Certification*: Not used in this document.

Appendix C - *As-Built Documentation*: Identifies engineering drawings for CAU 118.

Appendix D - *Closure Activities and 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.

Appendix F - *Modifications to the Post-Closure Plan*: Not used in this document.

Appendix G - *Use Restrictions*: Documents the URs.

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

Appendix I - *Nevada Division of Environmental Protection Comments and Responses:* Contains 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 quality control (QC) procedures were adhered to, all closure activities were performed in accordance with the following documents:

- *Streamlined Approach for Environmental Restoration (SAFER) Plan for Corrective Action Unit 118, Area 27 Super Kukla Facility, Nevada Test Site, Nevada* (NNSA/NSO, 2006)
- *Industrial Sites Quality Assurance Project Plan* (QAPP) (NNSA/NV, 2002)
- *Federal Facility Agreement and Consent Order* (FFACO, 1996; as amended August 2006)
- Approved standard operating procedures

1.3.2 Data Quality Objectives

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

The problem statement for CAU 118 is: "Additional information is required to determine the existence of contamination and/or to characterize waste and verify the closure decision for CAS 27-41-01, CAU 118." To address this question, the resolution of two decision statements is required:

- Decision I: "Does a contaminant of concern exist in environmental media, or does potential source material exist that could impact human health or the environment?"
  - It was assumed that building materials and debris that remain in B-5400 for entombment will have no impact to human health or the environment, because a UR will be implemented, and no transport mechanisms exist for the migration of contamination.
- Decision II: "Is sufficient information available to confirm that closure objectives were met?" Sufficient information is defined to include:
  - Identifying the volume of media containing any COC bounded by analytical sample results in lateral and vertical directions.
  - Characterizing investigation-derived waste (IDW) for disposal.
  - Determining potential remediation waste types.

- Evaluating the feasibility of closure alternatives (evaluation of barriers is considered).

- Identifying actions taken to eliminate exposure pathways.

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., potential source material) to release COCs into site environmental media.

To evaluate potential source material 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 potentially fail 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 was released.

- Any non-liquid waste containing a contaminant exceeding an equivalent final action level (FAL) concentration would cause a COC to be present in the surrounding media.

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.

The DQA process as presented in Section 4.1 is comprised 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 DQA results presented (Section 4.1), the information generated during the investigation supports the conceptual site model (CSM) assumptions, and the data collected meet the DQOs and support their intended use in the decision-making process.

2.0 Closure Activities

The corrective action activities were conducted in accordance with the requirements set forth in the CAU 118 SAFER Plan (NNSA/NSO, 2006). Table 2-1 lists the corrective action activities that were conducted at CAU 118, CAS 27-41-01.

Table 2-1
Corrective Action Activities Conducted at CAU 118
To Meet SAFER Plan Requirements

Closure Activities	CAU 118 Structures			
	Bldg. 5400	Bldg. 5400A	Wooden Shed	Bldg. 5410
Conducted pre-planning and site preparation	X	X	X	X
Installed temporary facilities	X	X	X	X
Hantavirus cleanup	X	X	X	X
Collected soil samples from biased locations	X		X	X
Collected radiological/chemical surveys/swipes	X	X	X	X
Characterized HEPA filtration system	X	X		X
Characterized paint	X	X	X	X
Collected oil samples	X	X		X
Collected potential ACM samples	X	X		X
Drained and diesel flushed hydraulic system and equipment	X	X		X
Remediated concrete slab and surrounding soil				X
Removed equipment		X	X	X
Demolished structure		X	X	X
Grouted/filled void spaces	X			
Performed final verification survey of remaining concrete slab		X		

ACM = Asbestos-containing material
HEPA = High-efficiency particulate air

The following sections summarize the CAU 118 closure activities and deviations from the original scope of work. Results of confirmation sampling for CAU 118 are presented in Appendix D.

2.1 Description of Corrective Action Activities

Closure verification samples were collected from potential contaminant sources, surface, 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. Judgmental sampling allows the methodical selection of sample locations that target the populations of interest (defined in the DQOs) rather than non-selective 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 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.

The following describes how the approved SAFER was implemented for CAU 118, CAS 27-41-01.

2.1.1 Pre-Planning and Site Preparation

Pre-planning and site preparation activities were completed before beginning closure activities. The following documents were prepared before start of field activities:

- Field Work Permit
- Field Management Plan
- *National Environmental Policy Act* checklist
- Real Estate/Operations Permit
- Field Instructions

2.1.2 Installation of Temporary Facilities and Utilities

Before beginning field activities, a temporary portable office trailer was installed at the CAU 118 site. A power drop from an existing overhead power line, and telephone line were provided for the trailer. Temporary lighting was installed within Building 5400, including the tunnel, reactor room, and basement. Ventilation ducting and a blower was installed to ventilate the basement.

2.1.3 Perform Hantavirus Cleanup

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 sanitary waste. Hantavirus cleanups were performed routinely throughout the performance of field activities.

2.1.4 Collection of Building Media/Oil Samples

As part of the investigation process, samples and smears were collected for both radiological and chemical analysis. Radiological samples/surveys were performed before and throughout closure activities to determine the presence/absence of radiological contamination, ensure that radiological contamination had not migrated from the known contamination areas, monitor worker exposure, and determine waste disposition.

Because the Super Kukla Facility was designated a Beryllium Legacy Site, in accordance with the *Consolidated Chronic Beryllium Disease Prevention Program Plan*, smears were collected for

beryllium for worker health and safety monitoring (NSTec, 2007). Other types of building media collected included paint chips, motor oils/gear oils, hydraulic oils, ACMs, concrete, wood and metal.

2.1.5 Removal of Non-Hazardous and Hazardous/Regulated Components

Electrical and lighting components known to contain regulated wastes (i.e., mercury switches, thermometers, batteries, mercury vapor light bulbs) were removed from Buildings 5400, 5400A, and 5410. These components were deemed potentially radiologically impacted due to internal surfaces inaccessible for survey. The Wooden Shed did not have any of these components.

Non-hazardous electrical and lighting components (e.g., conduit, cables, wiring, fuses boxes, motors, control panels, incandescent bulbs) within the Wooden Shed, Buildings 5410 and 5400A were surveyed and determined to meet the Area 9 U10c Landfill acceptance criteria. Non-hazardous components were left in place and demolished with the building structure.

2.1.6 Miscellaneous Items Removal

Radiologically impacted items within the Wooden Shed, and Building 5410 were removed and relocated to Building 5400 for entombment. This included items such as the high-efficiency particulate air (HEPA) pre-filter housing, the empty hydraulic unit from Building 5410, and empty sample containers, drums, and instrumentation from the Wooden Shed.

Three chiller units were identified at the Super Kukla Facility. One was located outside on the north side of B-5410 and two were located (one inside and one outside the building) at the B-5400A High Bay. The Freon was determined to be free of radiological contamination, and will be incinerated by a licensed vendor. Because the Freon is a small volume (less than 50 pounds [lb]), and consists of mixed chlorofluorocarbons (e.g., R-12, R-22), it is more economical to incinerate the Freon, than to recondition and recycle.

Lead bricks and radiological check sources were discovered during investigation within Building 5410, were managed as low-level mixed waste (LLMW), and packaged with the remainder of the LLMW (e.g., batteries, light bulbs). The check sources were determined to be non-accountable sources and disposed as low-level waste (LLW) in the Radioactive Waste Management Complex of Area 5 at the NTS.

2.1.7 Demolition of Aboveground Structures

Buildings 5400A, 5410, and the Wooden Shed were demolished following strip-out and final characterization. Building rubble consisted of metal, wood, painted surfaces, wiring, and plastics, etc.

2.1.8 Remediation of Building 5410 Concrete Pad and Surrounding Soil

Throughout the operational history of Super Kukla, the hydraulic unit located inside B-5410 was known to leak, and there was evidence of staining on the concrete slab. Based upon historical knowledge and discussions with reactor operation personnel, facility operations were very limited after about 1972. It is unlikely that any spills/releases would have occurred after this timeframe. The concrete slab was sampled by scabbling the surface of the concrete in areas identified as potential spills. The results indicated significant PCB contamination at the surface of the concrete pad in the vicinity of the hydraulic unit (a maximum concentration of 49,000 parts per million [ppm] for Aroclor 1248). Soil samples were taken around the perimeter of the concrete pad, and approximately 7 to 7.5 ft below grade, to determine whether the PCB contamination had migrated into the soil and subsurface. The results indicated significant concentrations of PCBs (maximum of 27,000 ppm Aroclor 1248) around the northwest corner of the pad, and below grade (maximum of 290 ppm).

Remediation/removal of the concrete pad and contaminated soil to a depth of approximately 3 to 3.5 ft in the vicinity of the former hydraulic unit was completed in July 2007. Removal of the source of the PCB contamination (PCB oil, hydraulic unit reservoir and piping, contaminated concrete, and bulk of contaminated soil) mitigates further impact to the environment (see Appendix H). Backfill and restoration of the site back to original grade will be completed upon approval from NDEP.

2.1.9 Entombment (Grout Fill) of Building 5400 Reactor Room and Tunnel

Before placement of grout, radiologically impacted material and debris from Building 5400A, Building 5410 and the Wooden Shed were placed into Building 5400 for entombment (see Appendix D). Additionally, the lead shielding wall located in the Reactor Room was left in place. The CAU 118 SAFER Plan provides an analysis of the risks associated with the lead wall. The conclusion of this discussion is that the lead wall would be left in place because risk to workers removing it was determined greater than the risk associated to leave it in place. Additionally, due to

the robustness of the existing concrete structure (i.e., floors, walls and ceiling), and the grouting of void spaces, the lead wall would be sufficiently encapsulated to prevent migration of hazardous material to groundwater. A site visit by DOE, National Nuclear Security Administration Nevada Site Office (NNSA/NSO) and NDEP was conducted before entombment of Building 5400.

Site setup for grouting activities began March 1, 2007. Grouting activities Building 5400 took place March 5 through March 21, 2007. A flowable grout was utilized to complete this task. The flowability of the grout was measured each day to ensure the flowability and consistency and minimize void spaces within the structure. Each load of grout mixture consisted of the following:

- 400 lb of cement
- 1,900 lb of sand
- Air (20 to 30 percent)
- 320 to 500 lb of water

The overpressure well and heating, ventilation, and air conditioning (HVAC) piping were grouted separately before grouting the remainder of the building. The basement of the reactor room was filled utilizing a grout pump and pumping the flowable material into the basement at the top of the stairway. The Reactor Room was filled utilizing an access hole in the B-5400A concrete slab located directly above the reactor stand. The steel doors at the entrance to the B-5400 tunnel were barricaded and an opening was cut through the door for grout placement into the tunnel area. An opening in the roof of the tunnel from a pre-filter unit was also utilized to fill the tunnel area.

2.1.10 Perform Final Verification Surveys

A final radiological verification survey was conducted for the remaining Building 5400A concrete pad. The survey did not identify any radiological contamination requiring posting in accordance with the *NV/YMP Radiological Control Manual* (NNSA/NSO, 2004). The final radiological survey is not presented in this document; however, it is available upon request.

The Building 5410 concrete pad was removed and disposed as described above. Therefore, a final radiological survey of the pad was not performed.

2.2 Deviations from the CAU 118 SAFER Plan as Approved

Closure activities followed the approach specified in the CAU 118 SAFER Plan (NNSA/NSO, 2006), 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, lack of personnel, or equipment resources). Due to the extensive cleanup of the PCB-contaminated soil in the vicinity of the Building 5410 concrete slab, additional resources were mobilized to complete this scope of work. These activities (i.e., removal of the concrete pad and soil) were not included in the original project plan, therefore, extending the duration of the field work and field demobilization approximately 60 days. Table 2-2 presents a summary of the Corrective Action Schedule for CAU 118 D&D activities.

Table 2-2
Corrective Action Schedule for CAU 118 D&D

Date	Activity
October/November 2006	Site setup, mobilization, sampling, remove permanent power
December 2006	Demolish Wooden Shed
January to March 2007	Demolish B-5410 and B-5400A; grout/entomb B-5400
June/July 2007	Remediate B-5410 PCB-contaminated soil/concrete, demobilization

D&D = Decontamination and decommissioning

2.4 Site Plans and Survey Plat

No new construction was performed during closure activities at CAU 118. Additionally, there were no surface disturbing activities that significantly altered the grade or surface water drainage patterns. Therefore, as-built drawings were not generated.

3.0 Waste Disposition

This section describes the waste generated and final disposition during closure activities. Wastes generated during the CAU 118 SAFER Plan field activities include decontamination rinsate water, disposable personnel protective equipment (PPE), sample screening waste, cleanup waste, sanitary waste, and *Toxic Substances Control Act* (TSCA) LLW. The types, amounts, and disposal of the wastes are detailed in the following subsections and in Appendix E. These wastes were removed to mitigate potential hazards to human health and the environment; to comply with state and federal regulations, and DOE Orders. Site controls were in place to prevent the introduction of hazardous constituents to these waste streams.

3.1 Waste Streams and Disposal

This section describes the waste streams generated during closure activities at CAU 118 and the final or anticipated final disposition. Waste streams included LLW, LLMW, PCB-bulk product waste, sanitary waste, low-level-PCB-remediation waste, low-level-TSCA-regulated (PCBs), and used oil. Some materials were determined to not be regulated wastes, and managed as recyclable material.

3.1.1 Demolition Debris

Approximately 253,000 lb of demolition debris were generated during closure activities at CAU 118. Specific materials included galvanized steel, electrical wiring and conduit, discarded equipment, light fixtures, control panels, lumber, non ACM insulation, concrete, and other building materials. Demolition debris were classified as construction debris based upon radiological surveys, site characterization data, and process knowledge. The demolition debris was also classified as PCB bulk product waste due to the potential for PCB-containing paints and coatings, plastics, adhesives, caulking, gaskets, and other common building materials.

3.1.2 Decontamination Water

Approximately 55 gallons of decontamination water was generated during closure activities at CAU 118. This waste originated from equipment decontamination including sampling utensils and tools. Rinsate was collected from pumping from the catch basin on the decontamination pad

constructed at the site and collected in a single 55-gallon steel drum. A composite sample was collected and analyzed. Analytical results were used to classify the waste as sanitary. The rinsate was solidified and disposed at the Area 9 U10c Landfill.

3.1.3 Used Oil

Approximately 10 gallons of used oil were generated during closure activities at CAU 118. The oil originated from the overhead cranes located in Buildings 5400 and 5400A, the manipulator arm in Building 5400, motor-actuated valves in B-5410, HVAC systems, and miscellaneous air oil reservoirs throughout the facility. Oil was drained from each of the reservoirs and sampled. Upon review of the data, the oil was determined to not be radiologically impacted, or RCRA hazardous. Field screening results (FSRs) indicated the presence of chlorinated hydrocarbons within the acceptable limits for recycling. National Security Technologies, LLC (NSTec) removed the oil from CAU 118 and managed it until recycling occurred. Analytical data is available in the project files.

3.1.4 Low-Level Mixed Waste

A single B-25 container of LLMW was generated during closure activities at CAU 118. The waste consisted of lead bricks, lead plate, dry batteries, light bulbs, mercury switches, etc., radiologically or potentially radiologically impacted. This waste was determined to require treatment before disposal. The LLMW was managed at the CAU 118 site within a hazardous waste accumulation area (HWAA) until a waste profile was in place for treatment and disposal. The waste was ultimately shipped to an offsite treatment, storage, and disposal facility (TSDF) for treatment and disposal.

3.1.5 Low-Level Waste

One 55-gallon drum of LLW was generated during closure activities at CAU 118. The waste primarily consisted of PPE, sampling utensils, sealed sources, tools, and contaminated filters.

3.1.6 TSCA-Regulated Waste

3.1.6.1 PCB Hydraulic Oil

Four 55-gallon steel drums (approximately 200 gallons) of PCB-contaminated hydraulic oil and diesel rinsate) was generated during closure activities at CAU 118. This waste was removed from a

hydraulic oil tank and associated piping and building sump, located in the basement of Building 5400, the hydraulic unit reservoir, and associated piping inside Building 5410 (Mechanical Building), and the transfer piping between Buildings 5400 and 5410. All equipment and associated piping was triple-rinsed with diesel fuel. The hydraulic oil and diesel rinsate solutions were packaged and sampled in accordance with a Sampling and Analysis Plan (SAP) approved by the TSCA Incinerator (TSCAI) in Oak Ridge, Tennessee. Analytical results confirmed the hydraulic oil/diesel solution was radiologically impacted. The waste was shipped for incineration in January 2006 to the DOE TSCAI at the Y-12 Plant in Oak Ridge, Tennessee. An additional shipment of excess sample material (approximately 1 gallon of oil returned from laboratories) was also shipped to the TSCAI in March 2006.

3.1.6.2 PCB Remediation Waste

Polychlorinated biphenyl remediation waste consists of soil, rags, and debris generated as the result of a release of PCBs to the environment. The PCB remediation waste generated at CAU 118 during closure activities consisted of cleanup waste, and bulk PCB remediation waste. All PCB remediation waste generated at CAU 118 was determined to be radiologically impacted and was disposed at the Area 5 Radioactive Waste Management Site (RWMS) at the NTS.

3.1.6.2.1 Cleanup Waste

Six 55-gallon drums of cleanup waste was generated during closure activities at CAU 118. The cleanup waste included non-liquid cleaning materials and PPE including rags, booties, gloves, and disposable sampling equipment and supplies. This waste was disposed of at the Area 5 RWMS at the NTS.

3.1.6.2.2 Bulk PCB Remediation Waste

Bulk PCB remediation waste includes non-liquid materials which are contaminated with PCBs such as soil, sediment, and building materials (i.e., concrete). The remediation of the Building 5410 concrete slab and surrounding soil generated approximately 383,550 lb of bulk PCB remediation waste. The waste was packaged into eleven 25-cubic-yard (yd^3)-intermodal-type containers, and was shipped for disposal at the Area 5 RWMS.

3.1.7 Office Waste and Lunch Trash

Office waste and lunch trash was disposed of in designated sanitary waste bins allocated for disposal at the NTS Sanitary Landfill. Sanitary industrial waste was inspected and disposed of in designated sanitary industrial waste bins located at Building 23-153 and allocated for disposal at the NTS Industrial Waste Landfill.

4.0 Closure Verification Results

Closure verification results consist of the analytical results from environmental samples that demonstrate that closure objectives were met. For close in place corrective action, verification results demonstrate that the extent of COC contamination has been bounded.

The CAU 118 SAFER Plan identified that the right type, quality, and quantity of data are 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 DQA summary, and Section 4.2 summarizes URs for CAS 27-41-01.

A summary of verification data from the closure activities (see Appendix D) is provided in this section. Corrective Action Unit 118 sampling locations were accessible and sampling activities at planned locations were not restricted by buildings, storage areas, active operations, or aboveground and underground utilities.

4.1 Data Quality Assessment

Accurate and defensible analytical data were collected to verify that wastes were properly characterized, managed, and disposed appropriately, as required by state and federal regulations. The QC samples were collected and analyzed to determine the validity of environmental sample results. These samples included blind duplicates, matrix spike (MS)/matrix spike duplicates (MSDs), and a trip blank for each shipment containing volatile organic compounds (VOCs). While QC data are not presented in this document, the data are available upon request.

All waste characterization samples were collected in accordance with standard sampling protocols and procedures and analyzed by laboratories contracted and approved by Stoller-Navarro Joint Venture (SNJV). Analytical results were validated by the laboratory using stringent QC procedures. Sample data was also validated by qualified SNJV personnel. No anomalies were discovered in the data.

Field survey instrumentation was calibrated daily to known standards. Calibration data are not presented in this document, but are available upon request.

The DQA process is the scientific evaluation of the actual investigation results to determine whether the DQO criteria established in the CAU 118 SAFER Plan (NNSA/NSO, 2006) 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 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 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 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 the hypotheses. Identify the key underlying assumptions that could cause a change in one of the DQO decisions.

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

This section contains a review of the DQO process presented in the CAU 118 SAFER Plan (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 deviations to the sampling design are also presented.

4.1.1.1 Decision I

The Decision I statement as presented in the CAU 118 SAFER Plan: "Does a COC exist in environmental media, or does potential source material exist that could impact human health or the environment."

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. If a COC is present, is consistent with the CSM, and is within spatial boundaries, then the decision will be to continue sampling to define the extent.
- If a COC exists in environmental media or potential source materials exist that could impact human health or the environment, remove the media or define the extent for the UR.
- If no COCs exist, limit UR to the structure footprints.

Population Parameter: For judgmental sampling results, the population parameter is the maximum observed sample result from each individual sample.

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

Criterion 1:

The following characteristics stipulated in the CAU 118 DQOs (NNSA/NSO, 2006) were used in selecting sample locations:

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

Criterion 2:

All samples were analyzed using the analytical methods listed in Table 3-6 of the CAU 118 SAFER Plan and for the chemical and radiological parameters listed in Section 3.1.1.2.2 of the CAU 118 SAFER Plan. Table 4-1 provides a reconciliation of samples analyzed to the planned analytical program.

Samples were submitted for all of the analytical methods specified in the analytical program specified in Section 3.1.1.2.2 of the CAU 118 SAFER Plan.

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 118 SAFER Plan is that analytical detection limits will be less than the corresponding action level. This criterion was not achieved for the analytical results listed in Table 4-2. Results not meeting the sensitivity acceptance criterion will not be used in making DQO decisions and therefore considered rejected data. The impact on DQO decisions is addressed in the assessment of completeness.

Table 4-1
CAU 118 Analyses Performed

CAS	ANALYTES																
	Total VOCs	Total SVOCs	RCRA Metals; Beryllium	PCBs	Pesticides	TCLP Volatile Organic Compounds	TCLP Semivolatile Organic Compounds	TCLP Metals	Gamma Spectroscopy	Isotopic Uranium	Isotopic Plutonium	Pu-241	Sr-90	Cl-36	Fe-55, Ni-63	Alpha Spectroscopy	C-14
27-41-01	RS	RS	RS	RS	S	S	S	RS	RS	RS	RS	S	RS	S	S	S	S

C = Carbon
Cl = Chlorine
Fe = Iron
Ni = Nickel
PCB = Polychlorinated biphenyl
Pu = Plutonium
RCRA = *Resource Conservation and Recovery Act*
Sr = Strontium
SVOC = Semivolatile organic compound
TCLP = Toxicity Characteristic Leaching Procedure
VOC = Volatile organic compound

RS = Required and submitted
S = Not required but submitted

Table 4-2
Analytes Failing Sensitivity Criteria
(Page 1 of 2)

Sample Number	Parameter	Minimum Detectable Concentration	Unit	Final Action Level
118KG02	Thorium-227	18	pCi/g	17.6
118KG03	Thorium-227	19	pCi/g	17.6
118KG05	Thorium-227	47	pCi/g	17.6
118KG050	Aroclor 1221	5.6	mg/kg	0.74
118KG050	Aroclor 1232	5.4	mg/kg	0.74
118KG050	Aroclor 1242	5.2	mg/kg	0.74
118KG050	Aroclor 1260	2.6	mg/kg	0.74
118KG050	PCBs (high risk)[a]	4.2	mg/kg	0.74
118KG051	Aroclor 1221	11	mg/kg	0.74
118KG051	Aroclor 1232	11	mg/kg	0.74
118KG051	Aroclor 1242	10	mg/kg	0.74
118KG051	Aroclor 1260	5.3	mg/kg	0.74
118KG051	PCBs (high risk)[a]	8.5	mg/kg	0.74
118KG052	Aroclor 1221	55	mg/kg	0.74
118KG052	Aroclor 1232	54	mg/kg	0.74
118KG052	Aroclor 1242	52	mg/kg	0.74
118KG052	Aroclor 1260	26	mg/kg	0.74
118KG052	PCBs (high risk)[a]	42	mg/kg	0.74
118KG052	PCBs (low risk)[b]	41	mg/kg	21
118KG053	Aroclor 1221	5.7	mg/kg	0.74
118KG053	Aroclor 1232	5.5	mg/kg	0.74
118KG053	Aroclor 1242	5.3	mg/kg	0.74
118KG053	Aroclor 1260	2.7	mg/kg	0.74
118KG053	PCBs (high risk)[a]	4.3	mg/kg	0.74
118KG061	Aroclor 1221	1.2	mg/kg	0.74
118KG061	Aroclor 1232	1.2	mg/kg	0.74
118KG061	Aroclor 1242	1.1	mg/kg	0.74
118KG061	PCBs (high risk)[a]	0.93	mg/kg	0.74
118KG062	Aroclor 1221	12	mg/kg	0.74
118KG062	Aroclor 1232	12	mg/kg	0.74
118KG062	Aroclor 1242	11	mg/kg	0.74

Table 4-2
Analytes Failing Sensitivity Criteria
(Page 2 of 2)

Sample Number	Parameter	Minimum Detectable Concentration	Unit	Final Action Level
118KG062	Aroclor 1260	5.7	mg/kg	0.74
118KG062	PCBs (high risk)[a]	9.1	mg/kg	0.74

[a]Aroclor 1254
[b]Aroclor 1016

mg/kg = Milligrams per kilogram
PCB = Polychlorinated biphenyl
pCi/g = Picocuries per gram

Criterion 3:

To satisfy the third criterion, the entire dataset and individual sample results were assessed against the acceptance criteria for the DQIs of precision, accuracy, comparability, completeness, and representativeness as defined in the Industrial Sites QAPP (NNSA/NV, 2002). The DQI acceptance criteria are presented in Table 7-1 of the SAFER Plan. As presented in Tables 4-3 through 4-5, these criteria were met for each of the DQIs.

Precision

Precision is evaluated using relative percent difference (RPD), percent difference (%D), and/or absolute difference for chemical analyses, and normalized difference (ND) for radionuclide analyses. For radionuclides and chemicals, the RPD was not calculated unless both the sample and its duplicate had concentrations of the target radionuclide exceeding five times their minimum detectable concentration (MDC). Otherwise, duplicate results were evaluated using the ND for radionuclides, and absolute difference for inorganic chemical constituents. Table 4-3 provides the chemical and radiological precision analysis results for all constituents that were qualified for precision.

Table 4-3
Precision Measurements

Parameter	CAS Number	Analysis	Number of Measurements Qualified	Number of Measurements Performed	Percent within Criteria
Iron-55	14681-59-5	Iron-55	2	3	33.3

CAS = Chemical Abstracts Service

Table 4-4
Accuracy Measurements

Parameters	CAS Number	Analysis	Number of Measurements Qualified	Number of Measurements Performed	Percent within Criteria
Aroclor 1221	11104-28-2	PCBs	1	17	94.1
Aroclor 1232	11141-16-5	PCBs	1	17	94.1
Aroclor 1242	53469-21-9	PCBs	1	17	94.1
Aroclor 1248	12672-29-6	PCBs	1	17	94.1
Aroclor 1260	11096-82-5	PCBs	1	17	94.1
Aroclor 1268	11100-14-4	PCBs	1	17	94.1
PCBs (high risk)[a]	11097-69-1	PCBs	1	17	94.1
PCBs (low risk)[b]	12674-11-2	PCBs	1	17	94.1
Iron-55	14681-59-5	Iron-55	1	3	66.7

[a]Aroclor 1254
[b]Aroclor 1016

CAS = Chemical Abstracts Service
PCB = Polychlorinated biphenyl

As shown in Table 4-3, two out of three Fe-55 measurements were qualified for precision. The resulting precision rate of 33.3 percent is below the CAU 118 SAFER Plan acceptance criterion of 80 percent. However, as these samples were non-detect or had very low activities, the measurement uncertainties were used in the calculation of precision and very small numbers result in an overestimation of the differences in the numbers. The highest detection for these two samples was 3.65 picocuries per gram (pCi/g) and the preliminary action level (PAL) for Fe-55 is 141,000 pCi/g. Therefore, the imprecision of the two Fe-55 measurements could not have caused a decision error, and the dataset is determined to be acceptable for the DQI of precision.

Table 4-5
Rejected Measurements

Parameter	User Test Panel	Number of Analytes Qualified	Number of Measurements Performed	Percent within Criteria
Cadmium-109	Gamma	1	6	83.3

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 MS, laboratory control sample (LCS), and/or surrogate recoveries that were outside control limits and could potentially be reported at concentrations lower or higher than actual concentrations. Table 4-4 provides the chemical accuracy analysis results for all constituents qualified for accuracy. Accuracy rates met the 118 SAFER Plan criterion of 80 percent (NNSA/NSO, 2006). There was no radiological data qualified for accuracy.

Representativeness

The DQO process (see Appendix A) was used to address sampling and analytical requirements for CAU 118. 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 118 Corrective Action Investigation (CAI) are considered representative of the population parameters.

Comparability

As described in the CAU 118 SAFER Plan (NNSA/NSO, 2006), field sampling 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.

Completeness

The CAU 118 SAFER Plan defines acceptable criteria for completeness to be 80 percent of CAS-specific non-target analytes identified as having valid results and 100 percent of target analytes (including Decision II samples) having valid results (NNSA/NSO, 2006). Also, the dataset must be sufficiently complete to be able to make the DQO decisions. Target analytes for CAU 118 are identified as tritium, Eu-155, and PCBs.

Rejected data were not used in the resolution of DQO decisions and are not counted toward meeting the completeness acceptance criterion. Samples numbers 118KG050, 118KG051, 118KG052, and 118KG061 failed the sensitivity criterion for multiple Aroclors (e.g., Aroclor 1221, Aroclor 1232). For CAS 27-41-01, only Aroclor 1248 and Aroclor 1254 (PCBs-high risk) are COCs. Because each of the samples did result in Aroclor 1248 concentrations exceeding the FAL, and the area represented by these samples will be use restricted, the data should be considered usable and valid. Table 4-5 provides the rejected data for the site.

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, and method blanks were used to determine whether a false positive analytical result may have occurred. Of 15 QA/QC samples submitted, no false positive analytical results were detected.

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

Decision II as presented in the CAU 118 SAFER Plan: “Is sufficient information available to confirm that closure objectives were met?”

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. If a COC is present, is consistent with the CSM, and is within spatial boundaries, then the decision will be to continue sampling to define the extent. 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.

- If sufficient information is available to meet closure objectives, no additional data are needed, and the closure action of close in place will be implemented.

- If sufficient information is not available to meet closure objectives, collect data needed. If wastes are to be generated as part of a corrective action, samples will be collected to sufficiently characterize the potential wastes.

Population Parameters – The population parameters for Decision II data will be the observed concentration of each unbounded COC in any sample or the observed concentration of each sample used to characterize the potential waste streams.

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.

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:

Throughout the operational history of Super Kukla, the hydraulic unit located inside B-5410 was known to leak, and there was evidence of staining on the concrete slab. Sampling of the concrete pad and surrounding soil confirmed the presence of PCBs. The concrete slab was sampled by scabbling

the surface of the concrete in areas identified as potential spills. The results indicated PCB contamination at the surface of the concrete pad in the vicinity of the hydraulic unit (a maximum concentration of 49,000 ppm for Aroclor 1248). Soil samples taken around the perimeter of the concrete pad indicated high levels of PCBs (maximum of 27,000 ppm Aroclor 1248) around the northwest corner of the pad in the soil. Remediation/removal of the concrete pad and contaminated soil to a depth of approximately 3 to 3.5 ft in the vicinity of the former hydraulic unit was completed in July 2007. Sampling to determine the remaining concentrations of PCBs in the soil was conducted in mid-July 2007. Soil samples were also taken to determine both vertical and lateral extent of PCB contamination remaining in the soil. Final backfill and restoration of the B-5410 pad site back to original grade will be completed upon approval from NDEP. Results are summarized below.

Soil sample results demonstrated that the lateral extent of COCs has been bounded. The extent sample locations for the contaminants bounding the extent of contamination are shown in Figure 4-1. Lateral extent sampling was conducted at the CAU 118 site spatial boundary (perimeter fencing,) and beyond the fence in the western and southern quadrants of the site. Vertical extent sampling was conducted within the footprint of the B-5410 concrete pad utilizing a backhoe. Samples were taken at intervals approximately 1 to 2 ft in depth. Excavation and further sampling was ceased because of refusal, due to a hard pan (caliche) confining layer approximately 7 to 7.5 ft below grade. Sample number 118KG062 demonstrates the COC contamination remaining at 7 to 7.5 ft below grade.

Decision II sampling for COCs (PCBs) consisted of two step-out samples collected approximately 10 to15 ft laterally from locations G55 and G58. The lateral extent was defined at these locations for the COC based on these step-out locations. The nature and extent of COCs for these locations are considered representative for all other locations of COCs at the site.

Soil sample results demonstrated that the vertical and lateral extent of PCBs above the FAL was defined. The hard lining of the subgrade defines the vertical extent of the COC and provides a vertical barrier to COC migration. Because the source has been removed, and the caliche layer confines the remaining contaminated media in the shallow subsurface, groundwater impacts are unlikely. The results of additional soil samples at locations G63 and G64 show the PCBs are limited approximately 10 to15 ft laterally from the perimeter fence. Results are provided in Table 4-6.

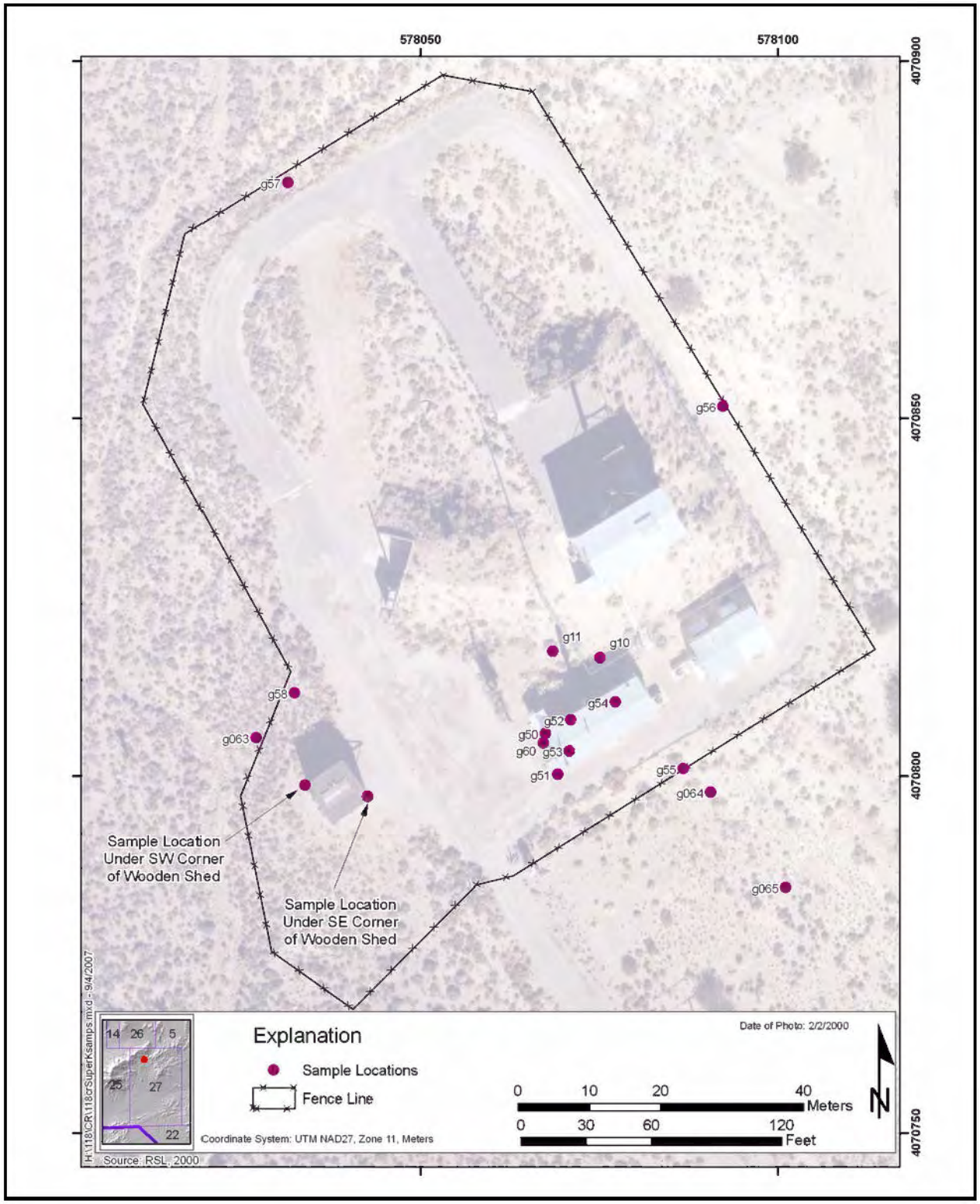

Figure 4-1
Locations and Concentrations of Samples Bounding Contamination at CAU 118

Table 4-6
Results of PCBs Remaining in Soil at CAU 118

Sample Location	Depth of Sample (ft bgs)	Sample Number	Aroclor 1248 (mg/kg)	Aroclor 1254 (mg/kg)
G10	0.0-0.5	118KG29	U (J)	1.5 (J)
G11	0.0-0.5	118KG30	U (J)	1.6 (J)
G50	3.0-3.5	118KG050	130 (J)	U (J)
G51	2.0-2.5	118KG051	310 (J)	U (J)
G52	2.5-3.0	118KG052	1,400 (J)	U (J)
G53	2.5-3.0	118KG053	140 (J)	U (J)
G54	2.5-3.0	118KG054	1.7 (J)	U (J)
G55	0.0-0.5	118KG055	U (J)	10 (J)
G56	0.0-0.5	118KG056	U	0.038
G57	0.0-0.5	118KG057	U	0.28
G58	0.0-0.5	118KG058	13 (J)	U (J)
G60	3.3-4.0	118KG060	0.041	U
G60	5.5-6.0	118KG061	33 (J)	U (J)
G60	7.0-7.5	118KG062	290 (J)	U (J)
G63	0.0-0.5	118KG063	U	0.09
G64	0.0-0.5	118KG064	U	0.290
G65	0.0-0.5	118KG065	U	0.027
Under Wooden Shed, SE Corner	0.0-0.5	118KG06	U	0.25
Under Wooden Shed, SW Corner	0.0-0.5	118KG07	U	U

bgs = Below ground surface
ft = Foot
mg/kg = Milligrams per kilogram
PCB = Polychlorinated biphenyl
J = Estimated value
U = Nondetect

Criterion 2:

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

- 27-41-01: Aroclor 1248, Aroclor 1254

The second criterion for extent (sensitivity) was accomplished for all analyses as demonstrated in Tables 4-2 and 4-3. While sensitivity was not met for each reportable Aroclor, Aroclor 1248 did meet the sensitivity requirement. Aroclor 1248 is the primary contaminant associated with B-5410 due to the chemical composition of the hydraulic oil.

Criterion 3:

To satisfy the third criterion for extent, the entire dataset and individual sample results were assessed against the DQIs of precision, accuracy, comparability, completeness, and representativeness 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, and method blanks were used to determine whether a false positive analytical result may have occurred. Of 15 QA/QC samples submitted, the evaluation of false positives resulted in the following qualifications for field blank contamination:

- 1 waste management sample result of toluene
- 1 environmental sample result of methylene chloride.

The evaluation of false positives resulted in the following qualifications for method blank contamination:

- 6 environmental sample results for arsenic
- 3 environmental and 2 waste management sample results for chromium
- 4 environmental sample results for lead
- 4 environmental and 7 waste management sample results for beryllium

- 1 environmental and 4 waste management results for selenium
- 5 environmental and 2 waste management results for barium
- 3 environmental sample results for mercury
- 2 environmental sample results for methylene chloride
- 1 waste management sample result for iron
- 1 environmental and 3 waste management sample results for cadmium
- 2 waste management sample results for silver
- 2 waste management sample results for acetone

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 CAU 118 SAFER Plan made the following commitments for sampling:

- Biased (judgmental) soil samples will be collected as needed. Locations for samples will be chosen based on process knowledge and visual inspection of the site (e.g., soil staining).

- Result: The lateral and vertical extent of COC contamination was defined.

4.1.2 Conduct a Preliminary Data Review

A preliminary data review was conducted by reviewing QA reports and inspecting the data. The contract analytical laboratories generate a QA non-conformance report when data quality does not meet contractual requirements. All data received from the analytical laboratories met contractual requirements, and a QA non-conformance 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.

4.1.3 Select the Test and Identify Key Assumptions

The test for making DQO Decision I for the judgmental sampling design was the comparison of the maximum analyte result from each CAS 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 4-7.

Table 4-7
Key Assumptions
(Page 1 of 2)

Exposure Scenario	Site workers are only exposed to contaminants of concern (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 conceptual site model (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. Groundwater contamination from remaining polychlorinated biphenyls (PCBs) at the site is not expected (see Appendix H).
Location of Contamination/Release Points	Release points are those identified in the CAU 118 SAFER Plan. The investigation results indicated a potential second source of PCB contamination due to historic dust suppression activities.
Transport Mechanisms	Surface transport may occur as a result of a spill or storm water runoff. Surface transport beyond shallow substrate is not a concern. The investigation results did not reveal any transport mechanisms other than those identified in the CSM.
Preferential Pathways	None. The investigation results did not reveal any preferential pathways.
Lateral and Vertical Extent of Contamination	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. The investigation results did not reveal any lateral and vertical extent of contamination other than those identified in the CSM and potentially PCBs from dust control activities. Vertical extent is defined by the caliche layer 7.5 feet below ground surface. The concentration of the PCB contamination did not always decrease with either lateral or vertical distance from the source (i.e., PCB reservoir in Building 5410). This may be due to reworking of surface soils in the area, multiple sources of PCBs, and/or the contaminant plume contacting the hard pan (caliche).
Groundwater Impacts	None. The investigation results did not reveal any indicators that groundwater could be potentially impacted (see Appendix H).

Table 4-7
Key Assumptions
(Page 2 of 2)

Future Land Use	Nonresidential. The investigation results did not reveal any future land uses other than nonresidential.
Other Data Quality Objective Assumptions	Buried material may exist at Corrective Action Site 27-41-01. Contamination may be present in the soils adjacent to a feature due to run-off or intended use (e.g., B-5410 pad). All detected contaminants were adjacent to features and decreased with distance.

4.1.4 Verify the Assumptions

The results of the investigation support the key assumptions identified in the CAU 118 DQOs and Table 4-7 except as listed below:

- Exception: The concentration of the PCB contamination did not always decrease with either lateral or vertical distance from the source (i.e., PCB reservoir in Building 5410). This may be due to reworking of surface soils in the area, multiple sources of PCBs, and/or the contaminant plume contacting the hard pan (caliche). The contamination levels fluctuated above and below FALs with distance laterally and vertically. The contamination within the spatial boundaries identified for CAS 27-41-01 has been defined vertically and laterally.

- Impact: No impact to the CSM. Although a sample result less than the FAL would not be collected due to refusal, vertical extent is defined by the confining layer (caliche) at 7.5 ft bgs.

All data collected during closure activities supported the CSM with the exceptions noted in this section. These exceptions did not invalidate the CSM presented in the CAU 118 SAFER Plan, nor did they necessitate revisions to the CSM.

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 the 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 UR will be extended to include the contaminated area.

Result: The Decision I sampling of the concrete pad and within the B-5410 footprint confirmed the presence of PCBs above the PAL. Remediation of the contamination source (the entire concrete pad and bulk of the surrounding soil northwest corner of the pad) removed the bulk of the COC contamination. Decision II sampling was performed to define both the lateral and vertical extent of COC contamination. Sampling to bound the vertical extent of PCB contamination was performed within the footprint of the pad. The vertical extent of the COCs are defined by the soil samples collected in the subsurface below the former location of the concrete pad. Although a "clean" PCB sample was not collected to define the vertical extent, the hard lining of the subgrade (i.e., caliche at 7.5 ft bgs) defines the vertical extent of the COC and provides a vertical barrier to COC migration. Decision II sampling was also performed to bound the lateral extent of COC contamination within the spatial boundaries of the CAU 118 site. Samples taken at the perimeter fence indicated COC contamination less than the PAL at the northern and eastern boundaries. Samples at the southern and western fence line identified PCB contamination greater than the PAL. Additional step-out sampling (10 to15 ft laterally) was performed at the southern and western boundaries. These samples indicated COC contamination decreased to less than the PAL within 15 ft of the existing fence.

Sample results demonstrated that the vertical and lateral extent of COCs has been bounded. Lateral extent sampling at the CAU 118 site spatial boundary (perimeter fencing,) and approximately 10 to 15 ft beyond the fence in the western and southern quadrants of the site bound the lateral extent of contamination. Vertical extent sampling within the footprint of the B-5410 concrete pad utilizing a backhoe, reached physical rejection at 7 to 7.5 ft below grade due to the hard lining of the subgrade (i.e., caliche). The hard lining of the subgrade defines the vertical extent of the COC and provides a vertical barrier to COC migration.

4.1.4.2 Decision Rules for Decision I

Decision Rule: 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. If a COC is present, is consistent with the CSM and within spatial boundaries, then the decision will be to continue sampling to define the extent.

Result: The COC contamination extends to the spatial boundaries (fence line) of the site. Decision II step-out sampling collected just outside the fence (10 to 15 ft) were less than the PAL, and define the lateral extent of contamination.

Decision Rule: If a COC exists in environmental media or potential source materials exist that could impact human health or the environment, remove the media or define the extent for the UR.

Result: The following COCs were identified at CAS 27-41-01.

- Aroclor 1248, Aroclor 1254

The PCB-contaminated concrete and soil was remediated/removed to the extent practical. The source of the PCB contamination has been removed, the bulk of the contaminated media has been remediated. Decision II sampling was used to define the lateral and vertical extent of COC contamination.

Decision Rule: If no COCs exist, limit UR to the structure footprints.

Result: The COC contamination within CAS 27-41-01 warrants a UR of the site. Polychlorinated biphenyl contamination exists outside the B-5410 structure footprint; however, its lateral extent is bounded at the facility boundary (fence line). Polychlorinated biphenyl contamination exists in the silty, gravelly shallow subsurface soils; however, it is bounded by the natural hard pan (caliche) layer. The hard pan layer acts as a natural barrier for further vertical migration.

4.1.4.3 Decision Rules for Decision II

If sufficient information is not available to meet closure objectives, collect data needed. If wastes are to be generated as part of a corrective action, samples will be collected to sufficiently characterize the potential wastes.

Decision Rule: 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. If a COC is present, consistent with the CSM and within spatial boundaries, then the decision will be to continue sampling to define the extent.

Result: The COC contamination extends beyond the south and west spatial boundaries of the site. Decision II step-out sampling was used to define the lateral extent of contamination.

Decision Rule: If sufficient information is available to meet closure objectives, no additional data are needed, and the closure strategy of close in place will be implemented.

Result: The vertical and lateral extent of contamination at CAS 27-41-01 was defined.

4.2 Use Restrictions

Closure activities performed at CAU 118 addressed hazard reduction (removal of hazardous materials to the extent practical), demolition and disposal of aboveground structures, and entombment of Building 5400 and its contents. Closure of CAS 27-41-01 included:

- Removal of liquids/gases, and hazardous and mixed wastes.
- Survey and posting of Building 5400A concrete slab.
- Placement of radiological-impacted debris, material, and equipment into Building 5400.
- Remediation of PCB-contaminated soil and concrete associated with Building 5410.
- Grouting of ventilation ducting, piping, etc.
- Grout filling of the overpressure well.
- Grouting of the Building 5400 basement, stairwell, and sump.
- Entombment of the reactor room including reactor stand, lead wall, associated equipment and materials.
- Grouting of the Building 5400 access tunnel.
- Sealing of the access tunnel entrance.

To minimize future potential exposure or mobilization of contaminants, URs have been implemented for Building 5400 and the former location of Building 5410. Site closure restricts access to the structure, use of site facilities, and real estate.

Use restrictions include the following:

- Many of the walls, floors and ceilings within Building 5400 contain residual contamination.

- Radiologically impacted equipment, and materials were left inside the structure and were entombed in place.
- Access to the building has been sealed, and the structure and void spaces have been filled with a flowable grout.
- Ventilation ducting and piping running between B-5410 and B-5400 have been filled with grout and sealed.

A description of each area that contains residual contamination is provided below.

Building 5400 contains residual contamination in the paint applied to the walls, floor, and ceiling. The gadolinium paint contains heavy metals and PCBs. The lead wall was left intact and remains within the building structure. Residual PCB contamination from leaking valves and pipe fittings remains on surfaces of the walls and floor in the basement of Building 5400.

Ventilation ducting and pipe runs between Building 5400 and Building 5410 contains residual radiological contamination and were grouted in place.

The Building 5410 concrete slab contained PCB contamination from historic spills associated with operation of the Super Kukla Reactor. The concrete slab has been removed including soil contamination to a depth of approximately 3.5 ft. Some residual PCB contamination remains in the soil surrounding the former location of the concrete slab.

Future land use related to this CAU or any portion of Building 5400 is restricted from any intrusive activity unless concurrence is obtained in advance and in writing from NDEP. Such intrusive activities would alter and/or modify the established containment controls as approved by NDEP. Future activity that alters and/or modifies any radiological or PCB barrier must be restored to an equivalent or more restrictive condition upon completion of the activity.

Risk evaluations completed for CAS 27-41-01 are in Appendix H. Specific information and map locations relating to the imposed UR is presented in Appendix G.

Use restriction signs for CAU 118 will read: “Warning, Radiological, Lead and PCB Contaminated Area. Contact Environmental Restoration (295-2528) before working in this area. FFACO CAU 118.”

5.0 Conclusions and Recommendations

Closure activities specified in the CAU 118 SAFER Plan were successfully performed. All cleanup activities are documented in this CR. Based upon the completion of closure activities, it is requested that a notice of completion be provided by the NDEP for CAU 118, Area 27 Super Kukla Facility. Upon closure approval, CAU 118 will be promoted from Appendix III to Appendix IV of the FFACO. Based on the results of the closure activities, no further closure activities are necessary for CAU 118.

The NNSA/NSO provides the following recommendations:

- No further corrective action is required at CAS 27-41-01. Based on analytical results of the environmental samples collected at this CAS, COC contamination has been remediated to the extent practical, and therefore, no further corrective action is required at this CAS. This corrective action decision was based on a current and future land use assumption that activities would not be conducted that would expose a site worker to the contaminants for a cumulative duration of more than 50 workdays. To ensure that future site workers are not exposed to the site contaminants for more than this decision-basis exposure duration, UR will be established. A UR will prohibit activities at these CASs that would result in exposures to site workers in excess of the decision-basis exposure duration without NDEP approval. The UR will be recorded in the NNSA/NSO Facility Information Management System with the coordinates that define the restricted area.
- Close in place is required at CAS 27-41-01
- Use restriction is required at CAS 27-41-01.
- Post-closure monitoring of fence line and postings.
- No Corrective Action Plan is required for CAU 118
- A Notice of Completion is requested from the NDEP for the closure of CAU 118.
- Corrective Action Unit 118 should be promoted from Appendix III to Appendix IV of the FFACO.

6.0 References

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Appendix A

Data Quality Objectives as Developed in the SAFER Plan

Note: This appendix contains the DQOs presented in the SAFER Plan and consists of Section 3.0 of the SAFER Plan. Therefore, all cross-references and page numbers in this appendix refer to the original document.

A.1.0 Data Quality Objectives

The DQO process is a seven-step strategic planning method based on the scientific method that was used to plan data collection activities and define performance criteria for the CAU 118, Area 27 Super Kukla 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 seven steps of the DQO process presented in Sections A.1.1.1 through A.1.1.7 were developed in accordance with the U.S. Environmental Protection Agency (EPA) *Guidance for the Data Quality Objectives Process* (EPA, 2000b) and EPA *Guidance for Quality Assurance Project Plans* (EPA, 2002). The DQO process presented herein is based on the EPA Quality System Document for DQOs entitled *Data Quality Objectives Process for Hazardous Waste Site Investigations*, (EPA, 2000a) and the CAS-specific information presented in Section A.1.1.1.

In general, the procedures used in the DQO process provide:

- A scientific basis for making inferences about a site (or portion of a site) based on environmental data or process knowledge.
- A basis for defining decision performance criteria and assessing the achieved decision quality of the data collection design.
- Criteria for knowing when site investigators should stop data collection and to verify the closure decision (i.e., when sufficient information is available to support decisions).
- A basis for demonstrating an acceptable level of confidence in the sampling approach to generate the appropriate quantity and quality of information necessary to minimize the potential for making decision errors.

A.1.1 Summary of DQO Analysis

The presence of many contaminants within building media and associated debris of the CAS have already been verified through process knowledge, historical data, and the samples collected as part of the Site Confirmation. The data from the Site Confirmation will be used for waste management

determinations and to support the selection of closure in place as the corrective action recommended in this SAFER document. Therefore, this DQO section primarily addresses the data needs to determine whether activation/contamination remains in the surrounding soil. The data from the facility's adjacent soils will be used to determine the nature and extent of potential activation and contamination in the environment, if present, in accordance with the DQO process detailed in this section.

A.1.1.1 Step 1 - State the Problem

The problem statement for the CAU 118 CAS is: "Additional information is required to determine the existence of contamination and/or to characterize waste and verify the closure decision for CAS 27-41-01, CAU 118." This information must be verified and presented in order to close CAU 118 under the SAFER process.

There currently exists sufficient data and process knowledge to identify the nature and extent of several known contaminants (e.g., lead in paint, PCBs in hydraulic oil, activation products in concrete and steel). The additional information specified in the problem statement is expected to be obtained through minimal, in-process sampling (i.e., soils) and survey collection to be performed during the closure actions.

A.1.1.1.1 Planning Team Members

The DQO planning team consists of representatives from NDEP, NNSA/NSO, SNJV, and the management and operating (M&O) contractor. The primary decision-makers are the NDEP and NNSA/NSO representatives. Table A.1-1 lists the affiliations of the planning team members and representatives from each organization in attendance at the May 26, 2006, DQO meeting.

A.1.1.1.2 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 each 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.

Table A.1-1
Planning Team Members for CAU 118
May 26, 2006

Participant	Affiliation
*Task Manager	Nevada Division of Environmental Protection
*Task Manager	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office
*Technical Lead	Stoller-Navarro Joint Venture
*Program Manager, Industrial Sites	Stoller-Navarro Joint Venture
*EC/WM Lead	Stoller-Navarro Joint Venture
*RadCon Lead	Stoller-Navarro Joint Venture
RadCon Manager	Stoller-Navarro Joint Venture
QA Lead	Stoller-Navarro Joint Venture
*Technical Lead	Bechtel Nevada
Task Manager	Bechtel Nevada
*Program Manager	Bechtel Nevada
Analytical Services Lead	Stoller-Navarro Joint Venture
*Task Manager	Stoller-Navarro Joint Venture
Health and Safety Manager	Stoller-Navarro Joint Venture

*Present at the May 26, 2006, DQO Meeting.

EC = Environmental Compliance
QA = Quality Assurance
RadCon = Radiological Control
WM = Waste Management

The CSM was developed for CAU 118 using information from the physical setting, potential contaminant sources, release information, historical background information, knowledge from similar sites, personnel interviews, analytical results, and physical and chemical properties of the potentially affected media and contaminants of potential concern (COPCs).

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 the CAS.
- Routes of exposure where contaminants may enter the receptor.

Corrective Action Unit 118 consists of four structures that contain debris and contaminated materials. The debris includes stored equipment, materials, and liquids (e.g., oil, Freon) left over from operation of the Super Kukla prompt burst reactor.

Figure A.1-1 represents site conditions applicable to the CSM. This diagram shows suspected locations of contaminants and potential pathways for physical transport. The CSM contains all applicable contaminated facilities, including hazardous and radioactively impacted materials from reactor operation. The applicability of the CSM to the CAS is summarized in Table A.1-2 and discussed below. Table A.1-2 provides information on CSM elements that will be used throughout the remaining steps of the DQO process.

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.

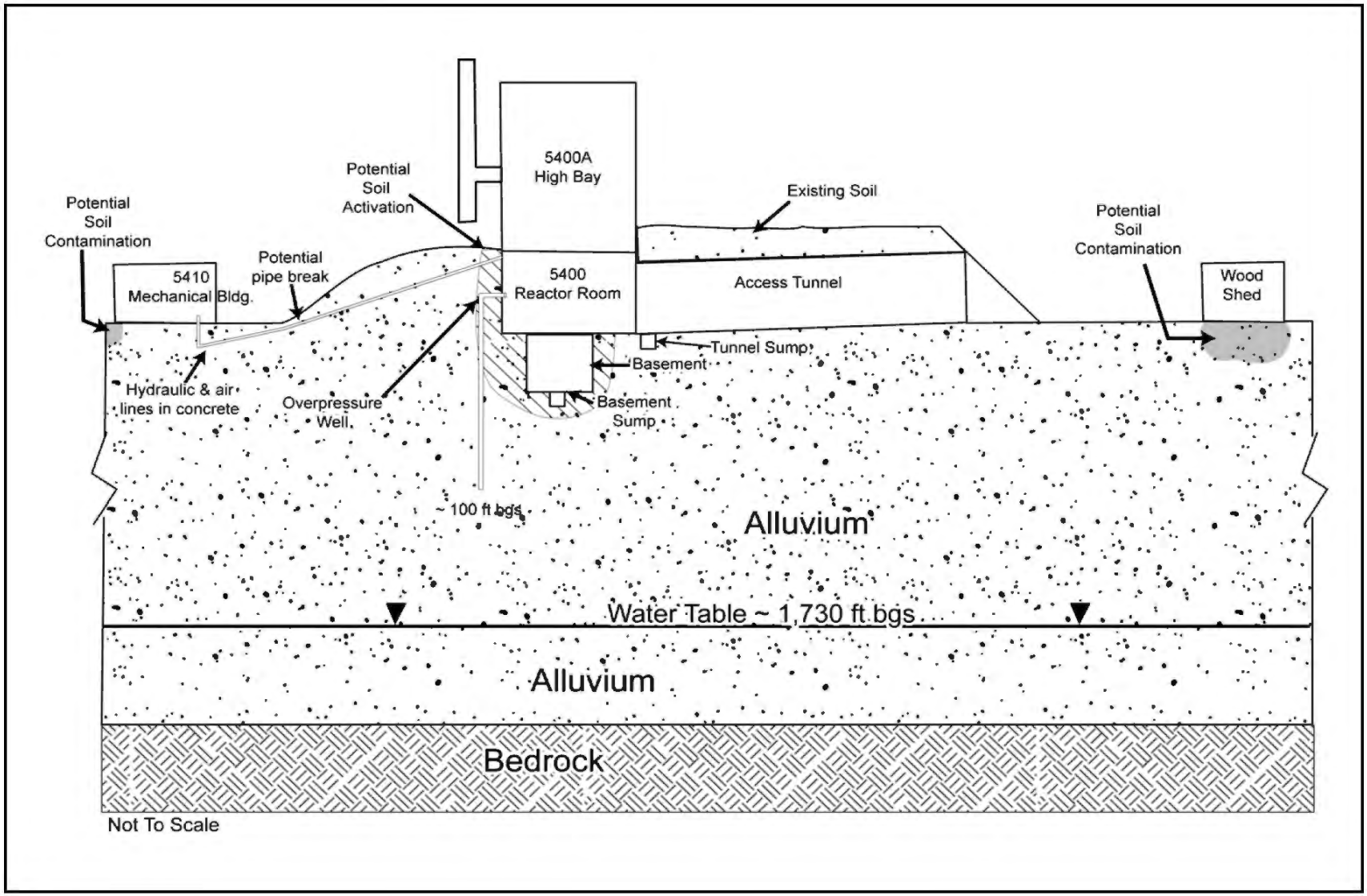

Figure A.1-1
Conceptual Site Model for CAS 27-41-01, CAU 118

Table A.1-2
Conceptual Site Model
Description of Elements CAS 27-41-01, CAU 118

CAS Identifier	27-41-01
CAS Description	**Super Kukla Reactor Building/High Bay**
Site Status	Site is abandoned and partially disassembled.
Exposure Scenario	Occasional Use
Sources of Potential Contamination	Neutron activation products from Buildings 5400, 5400A, and 5410; chemical contaminants from Buildings 5400, 5410, and the Wooden Shed.
Location of Contamination/ Release Point	Buildings 5400, 5400A, and 5410 media, structure, and contents (e.g., oils in hydraulic system, overhead cranes, sump); debris stored in the Wooden Shed.
Amount Released	Unknown
Affected Media	Sump, piping, building structure and media, surface and/or shallow subsurface soil.
Potential Contaminants	See Table A.1-3.
Transport Mechanisms	Infiltration and percolation of precipitation is the primary driving force for downward migration of contaminants that may have reached the soil.
Migration Pathways	For contaminants that may have reached the soil, vertical transport is expected to dominate over lateral transport due to small surface gradients. The final closure strategy assumes that the potential for migration of contaminants from Building 5400 has been eliminated.
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 of CAU 118.
Exposure Pathways	The potential for contamination exposure is limited to industrial and construction workers. 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
PCB = Polychlorinated biphenyl

A.1.1.1.2.1 Contaminant Release

Two potential release scenarios have been identified within CAS 27-41-01: (1) surface or near surface point release of contaminants beneath the Wooden Shed, Building 5400, or Building 5410; or (2) surface and subsurface activation of soils surrounding Building 5400 and the attached access tunnel. Affected or suspected affected media within the CAS include surface and shallow subsurface soils, the Building 5400 sump, piping for the reactor's hydraulic system, and building structure

material (i.e., activated steel, aluminum, and concrete). Sources for potential releases include activated soil surrounding Building 5400, contaminants from Building 5410 and the Wooden Shed, and activated debris. The potential volume of release at each location is unknown. Contaminant concentrations in soil are expected to decrease with horizontal and vertical distance from the source.

The primary source for potential radionuclide contamination is suspected to be from neutron activation of soil that occurred during reactor operation. However, data collected during the site confirmation phase showed insignificant amounts of activation radionuclides in surface soils. Pending further characterization data from soil closer to the reactor room wall, it is assumed that activation of soils surrounding Building 5400 is minimal. Existing data and process knowledge of operations (see Section 2.2.2) of the overpressure line bladder also suggests that no radiological contamination entered the soil from the overpressure well. Further radiological assessment is needed at Building 5410 and the Wooden Shed.

The primary potential source of a chemical contaminant release is suspected to be from sump fluids containing PCBs. However, the extensive thickness of concrete beneath the sump and the presence of standing oil within the sump suggest excellent containment. No evidence of a release from the sump or Building 5400 has been identified. A PCB hydraulic oil (Pydraul) spill was documented to have occurred in Building 5410 (Garcia, 2000). Further characterization is needed to determine the extent of potential contamination from the spill.

A.1.1.1.2.2 Potential Contaminants

The COPCs were identified during the planning process through the review of site history, process knowledge, personal interviews, past investigation efforts (where available), inferred activities associated with the CAS, and analytical data from the Site Confirmation phase. The list of COPCs is intended to encompass all of the contaminants that could potentially be present at the CAS. The COPCs from CAS 27-41-01 are defined as the constituents reported from the analytical methods stipulated in Table A.1-3. Constituents reported for each analytical method are listed in Table A.1-4.

Table A.1-3
CAS 27-41-01, CAU 118 Conceptual Site Model COPCs[a]

Analyses[a]	Bldg. 5400 Overpressure Line	Bldg. 5400A Interior	Bldg. 5400A Exterior	Bldg. 5400 Access Tunnel	Reactor Rm., West of Lead Wall	Reactor Rm., East of Lead Wall	Bldg. 5400 Basement	Soil
Organic Contaminants of Potential Concern (COPCs)								
Polychlorinated Biphenyls[b]	X			X	X	X	X	X
Semivolatile Organic Compounds[b]								X
Volatile Organic Compounds[b]								X
Inorganic COPCs								
Total *Resource Conservation and Recovery Act* Metals[c] plus Beryllium	X		X	X	X	X	X	X
Radionuclide COPCs								
Cobalt-60		X				X		
Cesium-137						X		X
Europium-152					X	X		
Iron-55							X	
Tritium				X	X	X	X	
Nickel-63						X		
Plutonium			X	X				
Strontium-90			X		X	X		
Isotopic Uranium[b]	X	X	X	X	X	X	X	X

X = Required analytical method

[a]If the volume of material is limited, prioritization of the analyses will be necessary.
[b]The contaminants of potential concern are the constituents reported from the analytical methods listed.
[c]Arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver.

Table A.1-4
Analytes Reported by Analytical Methods

VOC		SVOC	PCB	Metals	Pesticides	Radionuclides
1,1,1-Trichloroethane	Methylene chloride	2,3,4,6-Tetrachlorophenol	Aroclor 1016	Arsenic	4,4'-DDD	Carbon-14
1,1,1,2-Tetrachloroethane	N-Butylbenzene	2,4-Dimethylphenol	Aroclor 1221	Barium	4,4'-DDE	Chlorine-36
1,1,2,2-Tetrachloroethane	N-Propylbenzene	2,4-Dinitrotoluene	Aroclor 1232	Beryllium	4,4'-DDT	Iron-55
1,1,2-Trichloroethane	o-Dichlorobenzene (1,2)	2,4,5-Trichlorophenol	Aroclor 1242	Cadmium	Aldrin	Nickel-63
1,1-Dichloroethane	p-Dichlorobenzene (1,4)	2,4,6-Trichlorophenol	Aroclor 1248	Chromium	Alpha-BHC	Plutonium-238
1,1-Dichloroethene	p-isopropyltoluene	2-Chlorophenol	Aroclor 1254	Lead	Alpha-Chlordane	Plutonium-239/240
cis-1,2-Dichloroethene	sec-Butylbenzene	2-Methylnaphthalene	Aroclor 1260	Mercury	Beta-BHC	Plutonium-241
1,2-Dichloroethane	Styrene	2-Methylphenol	Aroclor 1268	Selenium	Chlordane (Technical)	Strontium-90
1,2-Dichloropropane	tert-Butylbenzene	2-Nitrophenol		Silver	Delta-BHC	Uranium-234
1,2,4-Trichlorobenzene	Tetrachloroethene	3-Methylphenol[a]			Dieldrin	Uranium-235
1,2,4-Trimethylbenzene	Toluene	4-Chloroaniline			Endosulfan I	Uranium-238
1,2-Dibromo-3-chloropropane	Total Xylenes	4-Methylphenol[a]			Endosulfan II	
1,3,5-Trimethylbenzene	Trichloroethene	4-Nitrophenol			Endosulfan Sulfate	**Other parameters:**
1,4-Dioxane	Trichlorofluoromethane	Acenaphthene			Endrin	
2-Butanone	Vinyl acetate	Acenaphthylene			Endrin Aldehyde	**Gamma-emitting radionuclides including:**
2-Chlorotoluene	Vinyl chloride	Aniline			Edrin Ketone	
2-Hexanone		Anthracene			Gamma-BHC	
4-Methyl-2-pentanone		Benzo(a)anthracene			Gamma-Chlordane	
Acetone		Benzo(a)pyrene			Heptachlor	Actinium-228
Acetonitrile		Benzo(b)fluoranthene			Heptachlor Epoxide	Aluminum-26
Allyl chloride		Benzo(g,h,i)perylene			Methoxychlor	Americium-241
Benzene		Benzo(k)fluoranthene			Toxaphene	Antimony-125
Bromodichloromethane		Benzoic Acid				Beryllium-7
Bromoform		Benzyl Alcohol				Bismuth-212
Bromomethane		Bis(2-ethylhexyl) phthalate				Bismuth-214
Carbon disulfide		Butyl benzyl phthalate				Cadmium-109
Carbon tetrachloride		Carbazole				Cesium-134
Chlorobenzene		Chrysene				Cesium-137
Chloroethane		Dibenzo(a,h)anthracene				Cobalt-57
Chloroform		Dibenzofuran				Cobalt-58
Chloromethane		Diethyl Phthalate				Cobalt-60
Chloroprene		Dimethyl Phthalate				Curium-243
Dibromochloromethane		Di-n-butyl Phthalate				Europium-152
Dichlorodifluoromethane		Di-n-octyl Phthalate				Europium-154
Ethyl methacrylate		Fluoranthene				Europium-155
Ethylbenzene		Fluorene				Lead-212
Isobutyl alcohol		Hexachlorobenzene				Lead-214
Isopropylbenzene		Hexachlorobutadiene[b]				Manganese-54
m-Dichlorobenzene (1,3)		Hexachloroethane				Niobium-94
Methacrylonitrile		Indeno(1,2,3-cd)pyrene				Protactinium-234m
Methyl methacrylate		Naphthalene[b]				Potassium-40
		Nitrobenzene				Thallium-208
		N-Nitroso-di-n-propylamine				Thorium-227
		Pentachlorophenol				Thorium-234
		Phenanthrene				Uranium-235
		Phenol				Zinc-65
		Pyrene				
		Pyridine				

[a]May be reported as 3,4-methylpenol
[b]May be reported with VOCs

PCB = Polychlorinated biphenyl
SVOC = Semivolatile organic compound
VOC = Volatile organic compound

Target analytes for soil are:

- Radionuclides: Tritium, Eu-155
- PCBs

A.1.1.1.2.3 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.1.1.1.2.4 Site Characteristics

Site characteristics are the site's physical, topographical, and meteorological attributes and properties. All structures at CAS 27-41-01 are located above a layer of alluvium above bedrock at approximately 4,410 ft elevation (NPS, 2000). The CAS is characterized by an essentially flat topography. Rock formation beneath Area 27 is, in general, an extrusive rock called the Oak Spring formation. Rocks are mostly volcanic in origin and of Tertiary age. The area is characterized by a series of northeast-striking faults, of which the Cane Springs Fault is the longest. Numerous small faults can be found throughout the area (Hannon and McKague, 1975).

Groundwater is not expected to be impacted at the CAS for several reasons. Infiltration of precipitation through subsurface media typically serves as the major driving force for migration of contaminants. Low precipitation and high evapotranspiration rates common at the NTS tend to limit this migration. The average annual precipitation in Area 27 ranges from 3 to 4 inches (in.) per year, with flash floods possible from July through September (LRL, 1964). Cement walls that are 14 in. thick and a floor that is 36 in. thick at its widest point (NPS, 2000) provide a significant barrier against potential contaminant leakage from Building 5400. In addition, the depth to groundwater at the CAS is approximately 1,730 ft bgs.

A.1.1.1.2.5 Migration Pathways and Transport Mechanisms

The CSM presents the potential migration pathways and transport mechanisms that could move the contaminants vertically and laterally throughout the various media. The pathways include air, surface water, and groundwater, and are the routes through which possible contamination could migrate from the site to locations where a receptor might receive an exposure. Migration and transport are influenced by physical and chemical characteristics of the contaminants and media described in Sections A.1.1.1.2.3 and A.1.1.1.2.4. Figure A.1-2 illustrates the potential migration pathways for COPCs at CAU 118.

Given the characteristics of the contaminants, reactor containment, alluvium layer, and depth of the water table, contaminant migration through soil is expected to be limited. This is further supported by data collected from surface soils surrounding the reactor facility that indicate no trend of activation of surface soils. Infiltration and percolation of precipitation serves as a driving force for downward migration of contaminants. However, due to high potential evapotranspiration and limited precipitation for this region (3 to 4 in. per year [LRL, 1964]), 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, 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 any soil contamination. Any potential contaminants from the CAS, regardless of physical or chemical characteristics, are expected to be in soil adjacent to the identified sources or release points.

Lateral migration of contaminants through impacted soil is expected to be limited because there is a physical barrier between potential contaminants and potentially affected soil, and the CAS resides on a generally flat topography. Lateral migration may occur as a result of overland flow or erosion, and is largely dependent on the integrity of the reactor room barrier. Without a breach in this barrier, lateral migration through the surrounding soil is expected to be insignificant.

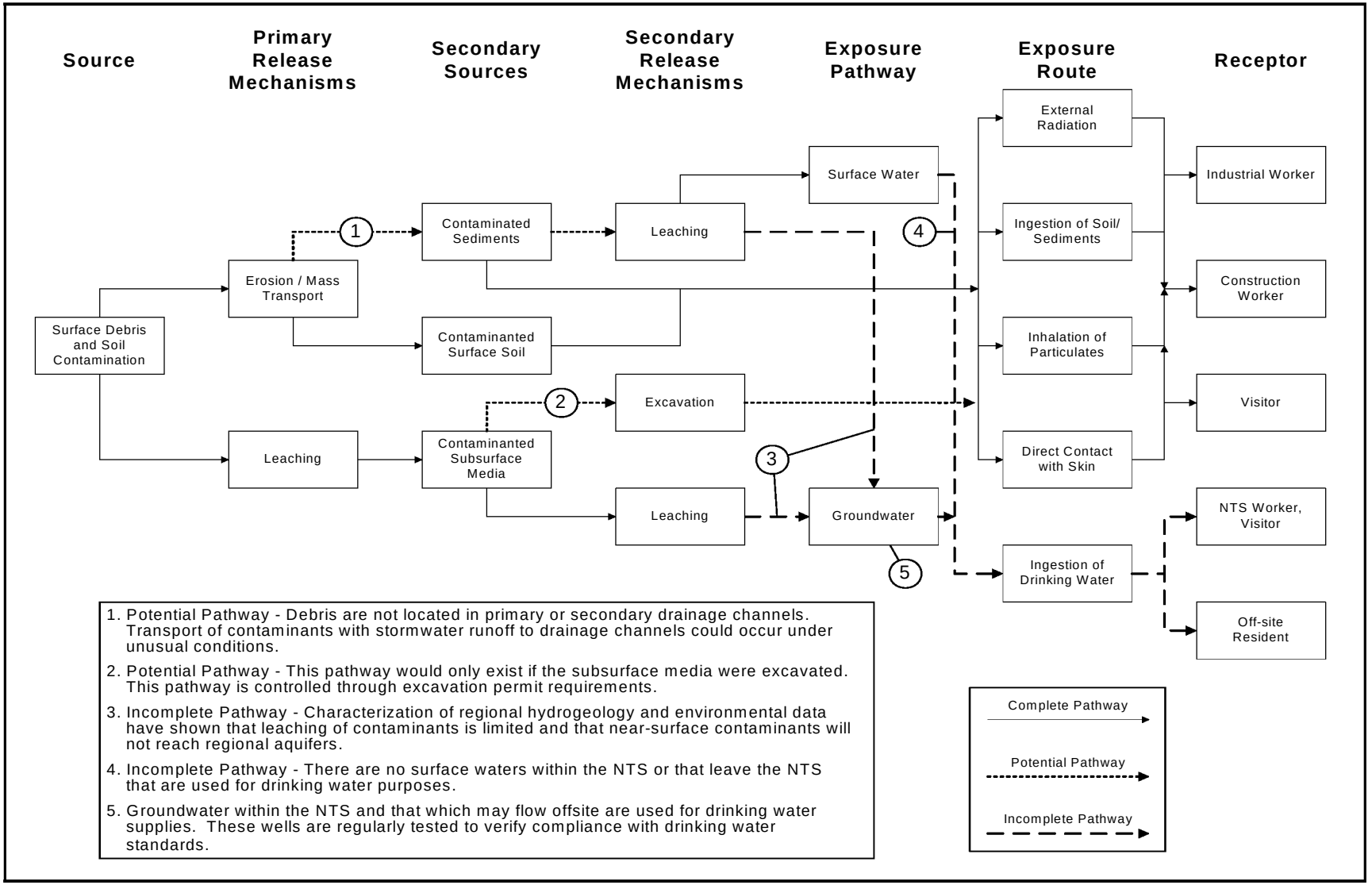

Figure A.1-2
Migration Pathways at CAU 118

Contamination, if present, is expected to be contiguous to the release points, and concentrations are expected to decrease with horizontal and vertical distance from the source. Based on the depth to groundwater, groundwater contamination is not considered a likely scenario. Surface migration may occur as the result of the release or as runoff of precipitation, and is a biasing factor considered in the selection of sampling points.

A.1.1.1.2.6 Exposure Scenarios

Site workers may be exposed to COPCs through oral ingestion, inhalation, dermal contact (absorption) of soil or debris due to inadvertent disturbance of these materials or irradiation by radioactive materials. The exposure of workers and visitors to site contaminants is very dependent upon the activites of the exposed individuals at the site. Based on the *Nevada Test Site Resource Management Plan* (DOE/NV, 1998), the area in which CAU 118 is located is restricted to use as a nuclear and high explosive test zone.

The appropriate exposure scenario for the CAU 118 CAS is Occasional Use because the site is in a remote area with no active improvements, and the future land use designation is for a nuclear and high explosive test zone. There is still the possibility, however, that site workers could occupy these locations on an occasional and temporary basis. Investigation decisions will be based on the future land-use and exposure scenario for CAU 118 provided in Table A.1-5.

Table A.1-5
Land-Use and Exposure Scenarios

CAS	Record of Decision Land-Use Zone	Exposure Scenario
27-41-01	Nuclear and High Explosive Test Zone This area is designated within the Nuclear Test Zone for additional underground nuclear weapons tests and outdoor high-explosive tests. This zone includes compatible defense and nondefense research, development, and testing 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.

Plans for facilities at CAS 27-41-01 include demolition and disposal for Buildings 5400A, 5410 and the Wooden Shed; and filling of the reactor room, basement, sump and access tunnel of Building 5400 with flowable grout. Following closure activities, no facilities will be present for use by NTS site personnel, and Building 5400 will be inaccessible. Because site personnel may periodically perform work at CAU 118, it is considered to be an Occasional Use area.

A.1.1.2 Step 2 - Identify Decisions

Step 2 of the DQO process identifies the decision statements and defines the appropriate actions to be taken based upon the answer to the decision statements. Figure 1-3 depicts the sequential flow of questions, answers, and action alternatives required to fulfill the objectives of the SAFER process.

A.1.1.2.1 Decision Statements

The Decision I statement is: "Does a COC exist in environmental media, or does potential source material exist that could impact human health or the environment?"

Potential source material has already been verified or is assumed to exist within the CAS buildings and media. This includes PCBs, lead, mercury, and various radionuclides including activiation products. For a judgmental sampling design in surrounding soils, 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. It is assumed that building materials and debris that remain in Building 5400 for entombment will not impact human health or the environment because a UR will be in place and no transport mechanisms exist.

The Decision II statement is: "Is sufficient information available to confirm that closure objectives were met?" Sufficient information 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 information needed to evaluate the feasibility of closure alternatives (evaluation of barriers is considered).
- Identifying actions taken to eliminate exposure pathways.

The evaluation of the need for corrective action will include the potential for wastes that are present to cause the future contamination of site environmental media if the wastes were to be released.

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 any CSM assumption has not been shown to be incorrect).

A.1.1.2.2 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.

If no COCs in adjacent soils of the CAS are 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 in soil 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, then the 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 UR will be extended to include the contaminated area.

If the collection of verification samples in soils confirm that all the contaminated media has been removed, then the UR will include only the building area footprints.

A.1.1.3 Step 3 - Identify Inputs to the Decision

This step identifies the information needed, determines sources for information, and identifies sampling and analysis methods that will allow reliable comparisons of analytical results with FALs.

A.1.1.3.1 Information Needs

The following steps will be used to resolve Decision I (determine whether a COC is present):

- Collect samples in areas most likely to contain a COC (judgmental sampling) as determined by site process knowledge (e.g., soil immediately adjacent to the reactor room and underneath the Wooden Shed).
- Assure that the selected analytical suites and minimum detectable levels (MDLs) or minimum detectable concentrations (MDCs) are sufficient to identify any COCs present in the samples.
- Assure collected data are adequate to evaluate the absence of a completed exposure pathway.

To resolve Decision II (determine whether sufficient information is available to confirm that closure objectives were met at the CAS), the following methods will be used:

- Field documentation, including photos, as-built drawings, waste disposal documentation, and final surveys, will be evaluated.
- Additional sampling, as needed, to define the extent of a COC.
  - Samples must be collected in areas contiguous to the contamination but where contaminant concentrations are below FALs.
  - Samples of the debris or the contaminated environmental media must provide sufficient information to characterize for disposal.
  - Samples of the contaminated environmental media must provide sufficient information to determine potential remediation waste types.
  - Samples of the native soil beneath the removed contaminated environmental media must provide sufficient information to verify that all contamination has been successfully removed.
  - The analytical suites selected must be sufficient to detect contaminants at concentrations equal to or less than their corresponding FALs.

A.1.1.3.2 Sources of Information

Information to satisfy Decision I and Decision II will be generated by collecting soil samples, metal coupons, concrete cores, paint samples, oil samples, direct surveys and swipes. These samples will be submitted to analytical laboratories meeting the quality criteria stipulated in the Industrial Sites

Quality Assurance Project Plan (QAPP) (NNSA/NV, 2002a). Only validated data from analytical laboratories will be used to make DQO decisions. Sample collection and handling activities will follow standard procedures.

A.1.1.3.2.1 Sample Locations

Design of the sampling approaches for CAU 118 must ensure that the data collected are sufficient for selection of the corrective action alternatives (EPA, 2002). To meet this objective, the samples collected from the site should be from locations that most likely contain a COC, if present (judgmental). These sample locations, therefore, can be selected by biasing factors used in judgmental sampling (e.g., a stain, likely containing a spilled substance). Because sufficient data were available to develop a judgmental sampling plan, this approach was used to select sample locations for samples taken during site confirmation for CAS 27-41-01. The same approach will be used to select sample locations for samples collected from Building 5410, the Wooden Shed, and additional soil samples surrounding Building 5400. Implementation of the judgmental sampling approach for CAU 118 is discussed below.

Decision I sample locations for samples taken during the site confirmation phase at CAS 27-41-01 were determined based on the likelihood that the sample would contained a COC, if present at the CAS. These locations were selected based on field-screening techniques, biasing factors, the CSM, and existing information. Judgmental sampling techniques will also be used to select sample locations for samples to be taken from Building 5410, the Wooden Shed, and soil surrounding Building 5400. (Analytical suites for Decision I samples include all COPCs identified in Table A.1-3).

Field-screening techniques used to select appropriate sampling locations provide quantitative data that can be used to comparatively select samples to be submitted for laboratory analyses from several screening locations. Field screening may also be used for health and safety monitoring and to assist in making certain health and safety decisions. Field-screening was used to select sampling locations during the site confirmation phase, and will be used to select sample locations for further characterization data. The following field-screening methods may be applied at CAU 118:

Walkover surface area radiological surveys – A radiological survey instrument will be used to detect hot spots of radiological contamination on an as-needed basis (activity dependent).
The field-screening levels are determined by RadCon personnel.

- Alpha and beta/gamma radiation – A radiological survey instrument will be used as needed.
- Gamma emitting radionuclides – A radiological dose rate measurement instrument will be used as needed.

Biasing factors may also be used to select samples to be submitted for laboratory analyses based on existing site information and site conditions discovered during the investigation. The following factors may also be considered in selecting locations for analytical samples at CAU 118:

- Documented process knowledge on source and location of release (e.g., volume of release).
- Stains: Any spot or area on the soil surface that may indicate the presence of a potentially hazardous liquid. Typically, stains indicate an organic liquid such as an oil has reached the soil, and may have spread out vertically and horizontally.
- Elevated radiation: Any location identified during radiological surveys that had alpha/beta/gamma levels significantly higher than surrounding background soil.
- Geophysical anomalies: Any location identified during geophysical surveys that had results indicating surface or subsurface materials existed, and were not consistent with the natural surroundings (e.g., buried concrete or metal, surface metallic objects).
- Drums, containers, equipment or debris: Materials of interest 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.
- 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 indicating that a release of hazardous or radioactive substances may have occurred.
- Preselected areas based on process knowledge of the contaminant(s): Locations that may reasonably have received contamination, selected on the basis of the chemical and/or physical properties of the contaminant(s) in that environmental setting.
- Previous sample results: Locations that may reasonably have been contaminated based upon the results of previous field investigations.
- Experience and data from investigations of similar sites.

- Visual indicators such as discoloration, textural discontinuities, disturbance of native soils, or any other indication of potential contamination.
- Presence of debris, waste, or equipment.
- Odor.
- Physical and chemical characteristics of contaminants.
- Other biasing factors: Factors not previously defined for the CAI, but become evident once the investigation of the site is under way.

If additional sampling data are needed to satisfy Decision II, Decision II sample 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.

A.1.1.3.2.2 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) for soil and aqueous samples are provided in Tables A.1-6 and A.1-7.

A.1.1.4 Step 4 - Define the Boundaries of the Study

The purpose of this step is to define the population of interest, define the spatial boundaries, determine practical constraints on data collection, and define the scale of decision making.

A.1.1.4.1 Populations of Interest

The population of interest to resolve the decisions includes materials that are impacted by a contaminant above the action level.

Table A.1-6
Analytical Requirements for Radionuclides for CAU 118

Parameter/ Analyte	Matrix	Analytical Method	MDC[a]	PAL[b,c]	Laboratory Precision (RPD)	Percent Recovery (%R)
Gamma Spectroscopy						
Cesium-137	Soil	HASL-300[d]	0.5 pCi/g[e]	12.2 pCi/g	Relative Percent Difference (RPD) 35% Normalized Difference -2<ND<2[f]	Laboratory Control Sample Recovery 80-120[g] Percent Recovery (%R)
Cobalt-60	Soil	HASL-300[d]	0.5 pCi/g[e]	2.68 pCi/g		
Europium-152	Soil	HASL-300[d]	4 pCi/g	5.7 pCi/g		
Other Radionuclides						
Chlorine-36	Soil	Lab specific	100 pCi/g		Relative Percent Difference (RPD) 35% Normalized Difference -2<ND<2[f]	Laboratory Control Sample Recovery 80-120[g] Percent Recovery (%R) Chemical Yield 30-105[h] %R (not applicable for tritium)
Iron-55	Soil	Lab specific	20 pCi/g			
Tritium	Soil	Lab specific	400 pCi/L[i]	4.0E+05 pCi/L[i]		
Nickel-63	Soil	Lab specific	10 pCi/g			
Plutonium-239	Soil	ASTM C 1001-00[j]	0.05 pCi/g	12.7 pCi/g		
Strontium-90	Soil	HASL 300[d]	0.5 pCi/g	838 pCi/g		
Uranium-234	Soil	ASTM C 1000-02[k]	0.05 pCi/g	143 pCi/g		
Uranium-235	Soil	ASTM C 1000-02[k]	0.05 pCi/g	17.6 pCi/g		
Uranium-238	Soil	ASTM C 1000-02[k]	0.05 pCi/g	105 pCi/g		

[a] The MDC is the lowest concentration of a radionuclide, if present in a sample, that can be detected with a 95 percent confidence level.
[b] The PALs for soil are based on the National Council for Radiation Protection and Measurement (NCRP) Report No. 129 *Recommended Screening Limits for Contaminated Soil and Review of Factors Relevant to Site-Specific Studies* (NCRP, 1999) scaled to 25 mrem/yr dose and the guidelines for residual concentration of radionuclides in DOE Order 5400.5 (DOE, 1993).
[c] PALs for liquids will be developed as needed.
[d] *The Procedures Manual of the Environmental Measurements Laboratory*, HASL-300 (DOE, 1997).
[e] MDCs vary depending on the presence of other gamma-emitting radionuclides in the sample and are relative to the MDC for cesium-137.
[f] ND is not RPD, 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).
[g] EPA *Contract Laboratory Program Statement of Work for Inorganic Analysis* (EPA, 1988, 1994, and 1995).
[h] *General Radiochemistry and Routine Analytical Services Protocol (GRASP)* (EG&G Rocky Flats, 1991). The chemical yield only applies to plutonium, uranium and strontium.
[i] Units of pCi/L will be reported by the analytical laboratory based on the activity of the tritium in the soil moisture. The PAL for tritium in soil is based on the UGTA Project limit of 400,000 pCi/L for discharge of water containing tritium to an infiltration basin/area (NNSA/NV, 2002b).
[j] *Standard Test Method for Radiochemical Determination of Plutonium in Soil by Alpha Spectroscopy* (ASTM, 2002).
[k] *Standard Test Method for Radiochemical Determination of Uranium Isotopes in Soil by Alpha Spectrometry* (ASTM, 2000).

ASTM = American Society for Testing and Materials
HASL = Health and Safety Laboratory
MDC = Minimum detectable concentration
mrem/yr = Millirem per year
ND = Normalized difference
PAL = Preliminary action level
pCi/g = Picocuries per gram
pCi/L = Picocuries per liter
UGTA = Underground Test Area

Table A.1-7
Analytical Requirements for Chemical COPCs for CAU 118
(Page 1 of 2)

Parameter/Analyte	Medium or Matrix	Analytical Method	Minimum Reporting Limit (MRL)	Laboratory Precision (RPD)[a]	Percent Recovery (%R)[b]
ORGANICS					
Total Volatile Organic Compounds	Aqueous	8260B[c]	Parameter-specific EQLs[d]	Lab-specific[e]	Lab-specific[e]
	Soil				
Total Semivolatile Organic Compounds	Aqueous	8270C[c]	Parameter-specific EQLs[d]	Lab-specific[e]	Lab-specific[e]
	Soil				
Polychlorinated Biphenyls	Aqueous	8082[c]	Parameter-specific EQLs[f]	Lab-specific[e]	Lab-specific[e]
	Soil				
Pesticides	Solid	8081[c]	Parameter-specific EQLs[f]	Lab-specific[e]	Lab-specific[e]
INORGANICS					
Total RCRA Metals, plus Beryllium					
Arsenic	Aqueous	6010B[c]	0.01 mg/L[g, h]	20[h]	Matrix Spike Recovery at 75-125[h] Laboratory Control Sample Recovery at 80-120[h]
	Soil	6010B[c]	1 mg/kg[g, h]	35[g]	
Barium	Aqueous	6010B[c]	0.1 mg/L[g, h]	20[h]	
	Soil	6010B[c]	10 mg/kg[g, h]	35[g]	
Beryllium	Aqueous	6010B[c]	0.005 mg/L[g, h]	20[h]	
	Soil	6010B[c]	0.5 mg/kg[g, h]	35[g]	
Cadmium	Aqueous	6010B[c]	0.005 mg/L[g, h]	20[h]	
	Soil	6010B[c]	0.5 mg/kg[g, h]	35[g]	
Chromium	Aqueous	6010B[c]	0.01 mg/L[g, h]	20[h]	
	Soil	6010B[c]	1 mg/kg[g, h]	35[g]	
Lead	Aqueous	6010B[c]	0.003 mg/L[g, h]	20[h]	
	Soil	6010B[c]	0.3 mg/kg[g, h]	35[g]	

Table A.1-7
Analytical Requirements for Chemical COPCs for CAU 118
(Page 2 of 2)

Parameter/Analyte	Medium or Matrix	Analytical Method	Minimum Reporting Limit (MRL)	Laboratory Precision (RPD)[a]	Percent Recovery (%R)[b]
Mercury	Aqueous	7470A[c]	0.0002 mg/L[g, h]	20[h]	Matrix Spike Recovery at 75-125[h] Laboratory Control Sample Recovery at 80-120[h]
	Soil	7471A[c]	0.1 mg/kg[g, h]	35[g]	
Selenium	Aqueous	6010B[c]	0.005 mg/L[g, h]	20[h]	
	Soil	6010B[c]	0.5 mg/kg[g, h]	35[g]	
Silver	Aqueous	6010B[c]	0.01 mg/L[g, h]	20[h]	
	Soil	6010B[c]	1 mg/kg[g, h]	35[g]	

See Table A.1-6 for the analytical requirements for radionuclides.

[a]Precision is estimated from the RPD of the laboratory or field duplicates MSD and LCSD are spiked. It is calculated by: RPD = 100 x ($|A_1-A_2|$)/[(A_1+A_2)/2], where A_1 = Concentration of the parameter in the initial sample aliquot, A_2 = Concentration of the parameter in the duplicate sample aliquot.
[b]Accuracy is assessed from the percent recovery (%R) of parameters spiked into a blank or sample matrix of interest, or from the recovery of surrogate compounds spiked into each sample. The recovery of each spiked parameter is calculated by: %R = 100 x (A_s-A_u/A_n), where A_s = Concentration of the parameter in the spiked sample, A_u = Concentration of the parameter in the unspiked sample, A_n = Concentration increase that should result from spiking the sample.
[c]EPA *Test Methods for Evaluating Solid Waste Physical/Chemical Methods*, 3rd Edition, Parts 1-4, (SW-846) CD-ROM, Washington, DC (EPA, 1996).
[d]Estimated Quantitation Limit as given in SW-846 (EPA, 1996).
[e]RPD and %R Performance Criteria are developed and generated in-house by the laboratory according to approved laboratory procedures.
[f]EPA *Contract Laboratory Program Statement of Work for Organic Analysis* (EPA, 1999).
[g]Industrial Sites Quality Assurance Project Plan (NNSA/NV, 2002a).
[h]EPA *Contract Laboratory Program Statement of Work for Inorganic Analysis* (EPA, 1994).

EQL = Estimated quantitation limit
LCSD = Laboratory control sample duplicate
mg/L = Milligrams per liter
mg/kg = Milligrams per kilogram
MSD = Matrix spike duplicate
N/A = Not applicable
RCRA = *Resource Conservation and Recovery Act*
RPD = Relative percent difference

The population of interest to resolve Decision I ("Does a COC exist in environmental media, or does potential source material exist that could impact human health or the environment?") is any location within the site that is contaminated with any contaminant above an FAL. The populations of interest to resolve Decision II ("Is sufficient information available to confirm that closure objectives were met?") are:

- Each one of a set of locations bounding contamination in lateral and vertical directions.
- IDW 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.1.1.4.2 Spatial Boundaries

Spatial boundaries are the maximum lateral and vertical extent of each expected contaminant 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. Due to the nature of Area 27 and security, the existing fenced perimeter boundary or facility footprint will be used as the horizontal study boundary, as determined by the DQO process. The vertical boundaries will be 10 ft bgs, or the extent of reach of a backhoe (approximately 15 ft bgs).

A.1.1.4.3 Practical Constraints

Practical constraints that may affect the ability to perform work at the site include unforeseen or unsafe working conditions, worker health and safety, ongoing military activities at the NTS, inclement weather (i.e., high winds, rain, lightning, extreme heat), utilities, threatened or endangered animal and plants, unstable or steep terrain, and/or access restrictions.

A.1.1.4.4 Define the Scale of Decision Making

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.

A.1.1.5 Step 5 - Develop a Decision Rule

This step develops a decision rule (“If..., then...”) statement that defines the conditions under which possible alternative actions will be chosen. This step specifies the parameters that characterize the

population of interest, specifies the FALs, confirms that analytical detection limits are capable of detecting FALs, and presents decision rules.

A.1.1.5.1 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.1.1.5.2 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.1.1.4.2, then work will be suspended and the investigation strategy will be reconsidered. If a COC is present, is consistent with the CSM, and is within spatial boundaries, then the decision will be to continue sampling to define the extent.

The decision rules for Decision I are:

- If a COC exists in environmental media or potential source materials exist that could impact human health or the environment, remove the media or define the extent for the UR (Decision II).
- If no COCs exist, limit UR to the structure footprints.

The decision rules for Decision II are:

- If sufficient information is available to meet closure objectives, no additional data are needed, and the closure strategy of closure in place will be implemented.
- If sufficient information is not available to meet closure objectives, collect data needed.

A.1.1.5.3 Soil Sample Action Levels

The PALs presented in this section are to be used for site screening purposes for soils. 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 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 (NAC, 2006a), which lists the requirements for sites with soil contamination. For the evaluation of corrective actions, NAC Section 445A.22705 (NAC, 2006b) requires the use of American Society for Testing and Materials (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."

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 site-specific target levels (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 concentrations of total petroleum hydrocarbons 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 ASTM 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.1.1.5.3.1 Chemical PALs

Except as noted herein, the chemical PALs are defined as the EPA *Region 9 Risk-Based Preliminary Remediation Goals (PRGs)* for chemical contaminants in industrial soils (EPA, 2004). Background concentrations for RCRA metals 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.1.1.5.3.2 Radionuclide PALs

The PALs for radiological contaminants (other than tritium) are based on the National Council of Radiation Protection and Measurements (NCRP) Report No. 129 recommended screening limits for construction, commercial, industrial land-use scenarios (NCRP, 1999) scaled to 25 millirem per year (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 the future land use scenario as presented in Section A.1.1.1.2. The PAL for tritium is based on the UGTA Project limit of 400,000 picocuries per liter (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.1.1.5.4 Measurement and Analysis Sensitivity

The measurement and analysis methods listed in Section A.1.1.3 and in the Industrial Sites QAPP (NNSA/NV, 2002a) are capable of measuring analyte concentrations at or below the corresponding FAL for each COPC. See Section 7.2 for additional details.

A.1.1.6 Step 6 - Specify the Tolerable Limits on Decision Errors

The purpose of this step is to specify performance criteria for the decision rule. Setting tolerable limits on decision errors requires the planning team to weigh the relative effects of a threat to human health and the environment, expenditure of resources, and consequences of an incorrect decision.

For judgmental sampling designs, Section 7.1 of the EPA QA/G-4HW (EPA, 2000a) guidance states that quantitative statements about data quality will be limited to measurement error. Measurement error is influenced by imperfections in the measurement and analysis system. Random and systematic measurement errors are introduced in the measurement process during physical sample collection, sample handling, sample preparation, sample analysis, and data reduction. If measurement errors are not controlled, they may lead to errors in making the DQO decisions.

This section provides an assessment of the possible outcomes of DQO decisions and the impact of those outcomes if the decisions are in error.

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 and closure objectives were not met.
- Alternative condition – The extent of a COC has been defined and closure objectives were met.

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 CSMs (based on process knowledge) by stakeholder participants during the DQO process.

- Testing the validity of CSMs based on investigation results.
- Evaluating the quality of the data based on Data Quality Indicator (DQI) parameters.

A.1.1.6.1 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. 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 for the site confirmation phase. The field-screening methods and biasing factors listed in Section A.1.1.3.2.1 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.1.1.4.1.

To satisfy the second criterion, Decision I samples will be analyzed for the chemical and radiological parameters listed in Section A.1.1.2. 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 characterization 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 7.0 of the SAFER Plan. 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 quality control (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 quality assurance (QA)/QC protocol protects against false negatives. Site-specific DQIs are discussed in more detail in Section 7.0.

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

- Field duplicates (FDs) (one per 20 environmental samples or one per CAS per matrix, if less than 20 collected)
- Laboratory QC samples (one per 20 environmental samples or one per CAS, if less than 20 collected, not required for all radionuclide measurements)

A.1.1.6.2 False Positive Decision Error

The false positive decision error would mean deciding that a COC is present when it is not, or accepting that the extent of a COC has not been defined when it actually has, resulting in increased costs for unnecessary sampling and analysis.

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 quality control samples will be collected as required by the Industrial Sites QAPP (NNSA/NV, 2002a):

- Trip blanks (one per sample cooler containing volatile organic compound [VOC] environmental samples)
- Equipment blanks (one per sampling event for each type of decontamination procedure)
- Source blanks (one per source lot per sampling event)
- Field blanks (minimum of one per CAS, additional if field conditions change)

A.1.1.7 Step 7 - Optimize the Design

This step is used to evaluate information from the previous steps and choose the most resource-effective design that meets all DQOs. As additional data or information is obtained, this step will be re-evaluated and refined, if necessary, to reduce uncertainty and increase the confidence that the SAFER CAI has met its intended goals. In general, the COCs will be addressed by executing the following closure strategy:

- Site Preparation (completed)
  - Install temporary power, office trailer, lighting, and ventilation (complete).
  - Clean onsite structures for Hantavirus (ongoing, as necessary).
- Site Confirmation (partially completed)
  - Collect building media samples such as concrete and paint chips (ongoing).

- Collect radiological surveys, smears and H&S swipes, and air monitoring data (ongoing).
- Inventory material and debris in each building (ongoing).

- DQO/SAFER process
  - Establish DQO criteria and develop SAFER Plan.
- Hazard Reduction/Waste Management
  - Remove PCB and non-PCB oils, lead and mercury components (e.g., lead sheet, switches, solder), asbestos, and other hazardous materials, as practical.
  - Place debris from Building 5410 and the Wooden Shed in Building 5400 for entombment, as appropriate.
- Demolition, Disposal and Final Investigation
  - Demolish/dispose of Buildings 5400A and 5410 and their contents to their concrete slabs.
  - Demolish/dispose of Wooden Shed to grade.
  - Sample soils adjacent to the Building 5410 slab and from under the Wooden Shed.
  - Survey Building 5400A and Building 5410 concrete slabs.
- Prepare Structure for Final End-State
  - Fill openings/pathways (e.g., ducts, sumps, overpressure well) with grout and/or concrete.
  - Fill/entomb Building 5400, including sumps, basement reactor room, and tunnel with flowable grout.
  - Implement engineering specifications to prevent weathering and precipitation infiltration (i.e., grade surrounding area to ensure surface water flows away from buildings).
  - Apply appropriate UR.

This section provides the general approach for obtaining the information necessary to resolve Decision I and Decision II. A judgmental sampling scheme will be implemented to select sample locations and evaluate analytical results for CAU 118. Sections A.1.1.7.1.1 through A.1.1.7.1.4 describe the proposed corrective actions based on metal, paint, oil, gas, and HEPA filter samples taken from the structures at CAU 118 during the site confirmation phase.

A.1.1.7.1 Corrective Actions for CAS 27-41-01, CAU 118

This section describes specific corrective action activities for each structure located at CAS 27-41-01.

A.1.1.7.1.1 Building 5400A

Closure activities to be completed at Building 5400A, High Bay, are detailed below:

- Remove all liquids and hazardous waste, LLW, and/or mixtures of hazardous and LLW (i.e., MLLW) as required, per *Nevada Test Site Waste Acceptance Criteria* (NNSA/NSO, 2005) for the superstructure.
  - Freon systems and oils from the overhead crane were removed in April 2006.
  - The building contains ACM in the form of one workbench. All ACM will be removed by certified asbestos workers, according to local, state, and federal regulations.
  - Remove all other items identified as hazardous waste, LLW, or mixed waste (e.g., mercury switches, lead-acid batteries, lead sheet attached to plywood board).
- Demolish and dispose of the High Bay superstructure.
  - Demolition and disposal includes the overhead crane, external HVAC system and stacks, and all associated fixtures.
  - Building structure materials will be disposed of in a sanitary landfill on site at the NTS.
  - The High Bay concrete floor will be left in place to aid in the stabilization of Building 5400. Pathways such as holes and pipes leading to Building 5400 will be filled with flowable grout.
- Survey and post (as necessary) the remaining concrete slab following D&D activities as instructed in the NV/YMP RadCon Manual (NNSA/NSO, 2004).
- Apply URs, as required.

A.1.1.7.1.2 Building 5400

Closure activities to be completed at Building 5400, Reactor Building, are detailed below:

- All liquids and gases will be removed, to the extent possible (i.e., tank and process lines will be emptied by commonly employed practices. A sheen or residual material may be left).

- Freon, and oils from the overhead crane and robotic arm were removed in April 2006.

- PCB and radioactively contaminated hydraulic oil was removed in May 2006. Following removal of oil, systems were triple-rinsed with fresh diesel as per TSCA regulations (CFR, 2003). A minimum of 10 percent of the total system volume was achieved per rinse. A total of 60 gallons of diesel was injected into the hydraulic system and subsequently recovered.

- Debris from Building 5410 and the Wooden Shed may be placed in Building 5400 for entombment if it is determined to be compatible (i.e., the debris is not hazardous or mixed waste, consists of the same radionuclides, and will not increase void space after entombment).

- Fill Building 5400 and associated utility voids with flowable grout according to the following plan:

  - Underground ventilation ducts, the hydraulic line chase leading to Building 5410 and the exterior HEPA/stack.

  - Overpressure well.

  - Sump, basement, stairwell, lower portion of reactor stand and associated systems.

  - The reactor room and all associated debris and fixtures will be filled from a 3-ft access port in the ceiling (the High Bay floor). The reactor stand, lead wall and any associated activated or contaminated solid media (e.g., tools, equipment, electronics, test canisters) will be left in the room and filled in place.

  - The access tunnel to Building 5400 and all associated debris and fixtures from the reactor room will be filled to the tunnel entrance. The entrance to the tunnel will be sealed closed.

- Implement engineering controls (i.e., grade the surrounding area to ensure surface water flows away from buildings) as needed to protect the sub-surface filled structure from weathering and infiltration.

A.1.1.7.1.3 Building 5410

Additional information is needed to assess planned corrective action activities at Building 5410.

Currently planned activities are detailed below:

- Characterize internal building structure and contents.
- Remove or stabilize contamination, as appropriate.
- Remove building components and dispose of as waste or, if compatible, place in Building 5400 before stabilization.
- Demolish and dispose of the building structure to the concrete slab. It is anticipated that the structure may be disposed of at an NTS landfill.
- Survey the remaining concrete slab as per instructions in the NV/YMP RadCon Manual (NNSA/NSO, 2004). Decontamination of the slab following building demolition is not anticipated to be needed.
- Apply URs, as required.

A.1.1.7.1.4 Wooden Shed

Closure activities to be completed at the Wooden Shed are detailed below:

- Characterize internal building structure and contents.
- Remove building components and dispose of as waste or, if compatible, place in Building 5400 before stabilization.
- Demolish and dispose of the shed. It is anticipated that the structure may be disposed of at an NTS sanitary landfill.
- Sample any soil stains discovered underneath the shed. Results exceeding FALs will require posting.
- Apply URs, as required.

A.1.1.7.1.5 Ancillary Structures

Closure activities to be completed at the Wooden Shed are detailed below:

- Remove concrete stairs, railings, perimeter fencing, bollards, and turnstiles.

A.1.2 Results of the DQO Analysis

A.1.2.1 Action Level Determination and Basis

Action levels for soil samples are discussed in Section A.1.1.5.3. Action levels for chemicals are defined as the EPA Region 9 risk-based preliminary remediation goals for chemical constituents in industrial soils (EPA, 2004). Action levels for radiological contaminants are based on the NCRP Report No. 129-recommended screening limits for construction, commercial, and industrial land-used scenarios (NCRP, 1999) scaled to a 25 mrem/yr dose constraint (Murphy, 2004), and the generic guidelines for residual concentrations of radionuclides in DOE Order 5400.5 (DOE, 1993). The radiological action level for solid media will be defined as the unrestricted release criteria defined in Table 4-2 of the NV/YMP RadCon Manual (NNSA/NSO, 2004). Remaining radiological contamination will be posed as per the NV/YMP RadCon Manual.

A.1.2.2 Hypothesis Test

Only valid data from radiological surveys and laboratory analytical results will be used to determine if contamination is present. The null hypothesis for Decision I is that a COC is present. The two types of decision errors are false negative and false positive. A false negative decision error would occur if contamination is determined not to be present when it actually is (Decision I), or if it is determined 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 the environment. A false positive decision error would occur if contamination is determined to be present when it is not, or if it is determined that the extent of a COC has not been defined when it actually has. In both cases, the potential consequence is an increase in costs for unnecessary sampling and analysis.

Hypothesis tests for the site are discussed in more detail in Section A.1.1.6.

A.1.2.3 Statistical Model

Because samples will be collected based on a biased (judgmental) sampling scheme, a statistical model for collecting samples is not applicable.

A.1.2.4 Design Description/Option

Section A.1.1.7 describes the closure strategy that will be used to address the presence of any COCs found on site. A judgmental sampling scheme will be implemented to select sample locations and evaluate analytical results. Sampling locations are discussed in more detail in Section A.1.1.3.2.1. Sections A.1.1.7.1.1 through A.1.1.7.1.4 describe specific corrective actions for each structure on site.

Biased (judgmental) soil samples will be collected as needed. Locations for samples will be chosen based on process knowledge and visual inspection of the site (e.g., soil staining). Systematic radiological surveys will be conducted to identify radiological contamination.

A.1.2.5 Conceptual Site Model and Drawing

The CSM is presented in Section A.1.1.1.2. A graphical representation of the CSM is shown in Figure A.1-1.

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Appendix B

Closure Certification

B.1.0 Closure Certification

This section does not apply to CAU 118.

Appendix C

As-Built Documentation

C.1.0 As-Built Documentation

No new construction was performed during closure activities at CAU 118. Additionally, there were no surface disturbing activities that significantly, permanently altered the existing grade or surface water drainage patterns. Therefore, as-built drawings were not generated. Site engineering drawings are available in the CAU 118 SAFER Plan.

Appendix D

Closure Activities and Confirmation Sampling Test Results

D.1.0 Introduction

This appendix presents the closure activities and analytical results for CAU 118. Photographs documenting much of the closure activities are presented at the end of this appendix. Corrective Action Unit 118 is located in Area 27 of the NTS (Figure D.1-1), and is comprised of one CAS:

- 27-41-01, Super Kukla Reactor Building/High Bay and Mechanical Building

Corrective Action Site 27-41-01 consisted of four structures at the Super Kukla Facility; Building 5400, Building 5400A, Building 5410, and the Wooden Building known as "Brock House." Historical documentation indicates that the Super Kukla Facility was constructed in 1964. Super Kukla was associated with the nuclear weapons program at the NTS, and the national defense of the United States during the Cold War.

Building 5400 (Reactor Building) consisted of a basement pit foundation, reactor containment room, and an access hallway. Building 5400A (High Bay) was located on top of Building 5400 and was connected via a hatch located in the concrete slab (floor of 5400A and ceiling of 5400). The Reactor Building extended underground under the footprint of the High Bay. The access hallway is covered with at least 4 ft of earth fill.

Building 5400 housed the Super Kukla Reactor. The reactor was used to test the effects of "prompt bursts" or intense pulses of radiation over a brief period of time on a variety of samples between 1964 and 1979. During this period, samples were stored in the Reactor Building or the High Bay.

Building 5410 (Mechanical Building) was utilized to house much of the mechanical equipment for operation of the reactor, including the main components of the hydraulic system, air filters, nitrogen tanks, pumps and piping, lubricating and hydraulic oils. The vent system for the Reactor Building was connected to Building 5410 via underground ducts. Due to the unique characteristics of the reactor, the reactor was cooled by air and process piping was minimal. The major components of the reactor were hydraulically driven. Pydraul was the hydraulic fluid used and is known to contain PCBs.

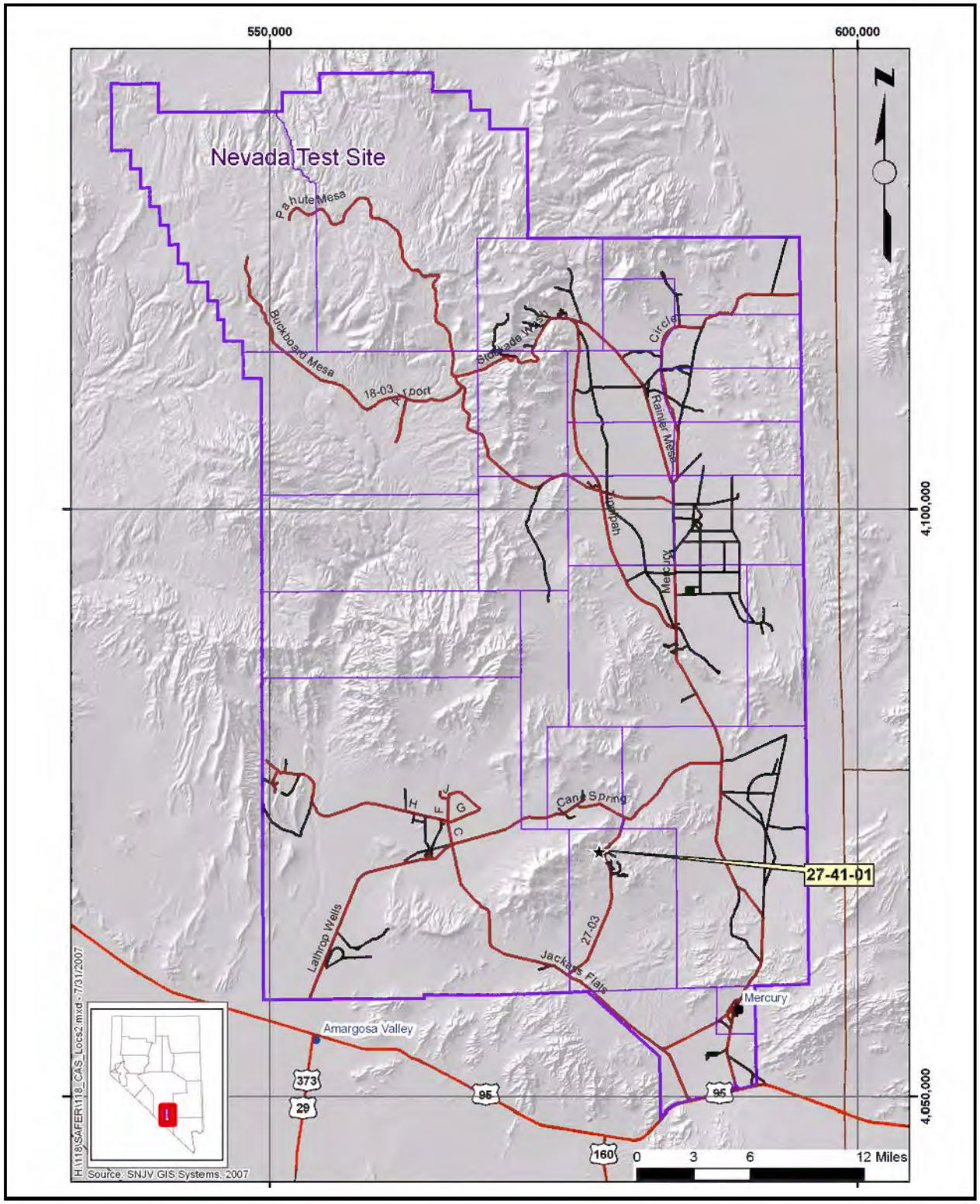

Figure D.1-1
CAU 118, CAS Location Map

The remaining structure was identified as the Wooden Skid ("Brock House"). The building was a two-story structure constructed on skids and was located to the southwest of Buildings 5400 and 5400A. It housed equipment and materials in support of Super Kukla operations. The structure had a floor area of approximately 460 ft^2.

In 1979, operation and testing of the reactor ceased. The reactor core and components were disassembled and removed. The reactor fuel was sent for storage at the Y-12 Plant in Oakridge, Tennessee. The Super Kukla Facility was identified as a Beryllium Legacy Site in accordance with the *Consolidated Chronic Beryllium Disease Prevention Program Plan* (NSTec, 2007). Corrective Action Unit 118 is included in the DOE D&D Program. Additional information regarding the history of the site, planning, and the scope of the investigation is presented in the CAU 118 SAFER Plan (NNSA/NSO, 2006a).

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 118 CAS 27-41-01. This objective was achieved by determining the presence of COCs and the vertical and lateral extent of the COCs, if present.

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 118 SAFER Plan (see Appendix A). The sampling strategy primarily involved bias sample locations. Sample locations were chosen based upon process knowledge and visual inspection of the site (e.g., soil staining).

D.1.2 Contents

This appendix contains information and data in sufficient detail to justify that no further corrective action is required at CAU 118. 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.
- Section D.4.0 summarizes waste management activities.
- 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, sample collection logs, 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 118 CAI were conducted from February 2006 through July 2007. Table D.2-1 lists the closure activities that were conducted at CAS 27-41-01.

Table D.2-1
Corrective Action Investigation Activities Conducted at CAS 27-41-01
To Meet Corrective Action Investigation Plan Requirements for CAU 118

Corrective Action Investigation Activities	Corrective Action Site 27-41-01
Performed swipe sampling for removable radioactivity using a hand-held survey instrument and/or a gamma scintillator (Building 23-153, Mercury, NV).	X
Collected biased soil samples.	X
Collected soil samples from step-out sample locations (Decision II) based on the outer boundary sample locations where contaminants of concern were detected in Decision I soil samples.	X
Field screened samples for alpha and beta/gamma radiation using a hand-held survey instrument.	X
Collected liquid, solid, soil, and sediment 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).	X

The investigation and sampling program was managed in accordance with the requirements set forth in the CAU 118 SAFER Plan (NNSA/NSO, 2006a). 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 118 SAFER Plan (NNSA/NSO, 2006a). During field activities, waste minimization practices were followed according to approved procedures including segregation of waste by waste stream.

Weather conditions at the site varied to include sun (moderate to low temperatures), rainfall, snow, intermittent cloudiness, and light to strong winds. Field operations were generally unaffected by adverse weather conditions.

The CAS was investigated by conducting radiological surface screening and surveys, and sampling potential contaminant sources, surface and subsurface soils. Surface soil samples were collected by hand excavation. Subsurface soil samples were collected using hand augering or a backhoe. Soil samples were field screened for alpha and beta/gamma radiation, and PCBs. The results were compared against screening levels to guide in the investigations. Samples of various media (e.g., concrete, paint, sediments) were collected to support both environmental and waste characterization using teflon bailers and scoops, scrabbling, and concrete core drills. Solid and sediment waste samples were field screened to guide in the selection of the samples shipped to offsite laboratories for analysis. Field screening was also for health and safety controls and to meet transportation requirements.

All CAU 118 Decision I sampling locations were accessible and sampling activities at planned locations were not restricted. Decision II step-out sample locations for lateral and vertical extent were accessible and remained within anticipated spatial boundaries with the following exceptions:

- The southern perimeter fence line
- The western perimeter fence line
- Vertical extent within the footprint of B-5410

Sections D.2.1 through D.2.4 provide the investigation methodology, site geology and hydrology, and laboratory analytical information.

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, information obtained during site visits, and site conditions as provided in the CAU 118 SAFER Plan. Sampling points for each site were selected based on the approach provided in the CAU 118 SAFER Plan. Actual environmental sample locations are shown on the figures included in Section D.3.0. Some locations were modified slightly from planned positions due to field conditions and observations. In some cases, FSRs and/or laboratory analytical results determined the need for step-out sampling locations. Sample locations were staked where appropriate and labeled. The majority of sample locations were surveyed with a Global Positioning System (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 118 were based on field investigation activities discussed in the CAU 118 SAFER Plan (NNSA/NSO, 2006a). 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 each CAS to be established. The following sections describe the specific investigation activities that took place at CAU 118.

D.2.2.1 Radiological Surveys

Radiological surveys (i.e., scanning, static, and swipe collection) 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 greater than background. To conduct radiological static surveys to detect alpha and beta/gamma radiation, a handheld instrument was held within an inch over the sample for one minute. To support unrestricted release determinations per the NV/YMP RadCon Manual (NNSA/NSO, 2004), radiological surveys were performed using an NE Technology Electra with dual-alpha and beta/gamma radiation scintillation probe. Swipe samples were also collected for identification of removable contamination. The swipe samples collected at CAS 27-41-01 showed removable contamination from select areas within the facility. At CAS 27-41-01, removable contamination was detected on swipes taken from field personnel's PPE, and within previously posted contamination areas (e.g., HEPA filtration system, instrumentation in Wooden Shed). The primary contaminant identified in the Reactor Room was uranium.

D.2.2.2 Field Screening

Field-screening activities for beta/gamma radiation, and PCBs was performed at CAU 118 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 each CAS. The radiation FSLs are instrument-specific and were established for each instrument before use. Alpha and beta/gamma radiation screening was

performed at each CAS using a NE Technology Electra or E-600 fitted with a DP6 dual-alpha and beta/gamma radiation scintillation probe.

All field screening for PCBs was conducted using a Chlor-N-Soil field test kit. The test kit was utilized to guide excavation activities during soil remediation activities at Building 5410.

D.2.2.3 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 both guide the investigation and serve as a health and safety control to protect the sample team. Soil was transferred into a stainless-steel bowl, homogenized, and field screened for alpha and beta/gamma radiation. Samples for the various analyses were then collected from the homogenized soil. Excess soil was returned to its original location and the sample containers appropriately disposed (based on field-screening and/or analytical results).

Surface soil samples were collected from 0.0 to 0.5 ft bgs at biased locations focusing on stained soil, aboveground features, and process knowledge. Subsurface soil samples were collected as a continuation at surface soil sample locations where staining was noted, and/or field-screening and analytical results indicated contamination.

D.2.2.4 Waste Characterization Sampling

Characterization of CAS-specific components, objects, materials, and waste was performed to support recommendations for disposal of these items during anticipated closure activities and to 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 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 118 SAFER Plan (NNSA/NSO, 2006a). Specific waste characterization sampling and analysis was conducted on the following potential waste streams:

- Swipe samples collected from debris.
- The presumed asbestos-containing material (PACM) samples collected from insulating materials.
- Oils from the reactor system hydraulic unit, gear boxes, motor operated valves, etc.
- Concrete and paint samples from buildings.
- Soils and sediments.
- Metal and wood debris.

Asbestos sampling was conducted at CAS 27-41-01 following the EPA guidance document, *Asbestos in Buildings: Simplified Sampling Scheme for Friable Surfacing Materials* (EPA, 1985). At CAS 27-41-01, three independently numbered samples were collected from insulation to determine whether PACM was 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 ft^2), 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 Paragon Analytics, Inc., of Fort Collins, Colorado, and Eberline Services of Oak Ridge, Tennessee. Radiological and chemical, and physical parameter analysis of the PCB-contaminated hydraulic oil was performed by General Engineering Laboratories in South Carolina. Asbestos, beryllium, and lead samples were analyzed by Data Chem 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.

Table D.2-2
Laboratory Analytical Parameters and Methods, CAU 118 Investigation Samples[a]
(Page 1 of 2)

Analytical Parameter	Analytical Methodb
Volatile Organic Compounds	EPA SW-846 8260B[c]
Semivolatile Organic Compounds	EPA SW-846 8270C[c]
RCRA Metals[d], Plus Beryllium and Uranium	EPA SW-846 6020/6020M/6010B/7470A/7471A[c]
Polychlorinated Biphenyls	EPA SW-846 8082[c]
Pesticides	EPA SW-846 8081A[c]
TCLP Volatile Organic Compounds	EPA SW-846 1311/8260B[c]
TCLP Semivolatile Organic Compounds	EPA SW-846 1311/8270C[c]
TCLP Metals[d]	EPA SW-846 1311/6010B/7470A[c]
Asbestos	NIOSH 9002[e]
Gamma Spectroscopy	DOE EML HASL 300[f] Approved Laboratory SOPs[g]
Isotopic Uranium	DOE EML HASL-300[f] U-02-RC Modified, Approved Laboratory SOPs[g]
Isotopic Plutonium	DOE EML HASL-300[f] PU-02-RC/PU-10-RC Modified, Approved Laboratory SOPs[g]
Plutonium-241	DOE EML HASL-300[f] PU-02-RC/PU-10-RC Modified, Approved Laboratory SOPs[g]
Strontium-90	EPA 905.0[h] Modified, Approved Laboratory SOPs[g]
Chlorine-36	4500 CLB[i] and 4500 CLB[i] Modified, Approved Laboratory SOPs[g]
Nickel-63	DOE RESL NI-1[j] Modified Approved Laboratory SOPs[g]
Americium-241	DOE EML HASL-300[f] AM-01-RC/AM-03-RC Modified, Approved Laboratory SOPs[g]
Isotopic Thorium	DOE RESL/ID AS-5[k] Modified, Approved Laboratory SOPs[g]
Carbon-14	EPA 520.0 Modified[k], EERF C-01 Modified[j] Approved Laboratory SOPs[g]
Iron-55	DOE RESL FE-1[l] Modified, Approved Laboratory SOPs[g]

Table D.2-2
Laboratory Analytical Parameters and Methods,
CAU 118 Investigation Samples[a]
(Page 2 of 2)

Analytical Parameter	Analytical Methodb
Gross Alpha/Beta	EPA 900.0[h] Modified, Approved Laboratory SOPs[g]
Tritium	EPA 906.0[h] Modified, Approved Laboratory SOPs[g]

[a]Investigation samples include both environmental and waste characterization samples and associated quality control samples.
[b]The most current EPA, DOE, ASTM, or NIOSH or equivalent accepted analytical method may be used.
[c]*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* 3rd edition, Parts 1-4, SW-846 CD-ROM (EPA, 1996).
[d]Arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver.
[e]*NIOSH Manual of Analytical Methods* (NMAM), Fourth Edition (NIOSH, 1994).
[f]*The Procedures Manual of the Environmental Measurements Laboratory*, HASL-300 (DOE, 1997).
[g]Laboratory Standard Operating Procedures approved by SNJV in accordance with industry standards and the SNJV Model Statement of Work requirements (SNJV, 2006).
[h]*Prescribed Procedures for Measurement of Radioactivity in Drinking Water* (EPA, 1980).
[i]*Standard Methods for the Examination of Water and Wastewater*, 20th Edition (APHA, AWWA, and WEF, 1998).
[j]*Radiological and Environmental Sciences Laboratory*, (RESL CHEM-TP-Ni.1U) (DOE 1999a).
[k]Eastern Environmental Radiation Facility: *Radiochemical Procedures Manual*, EPA 520/5-84-006, EPA, Office of Radiation Programs, Eastern Environmental Radiation Facility (renamed the National Air and Radiation Environmental Laboratory [NAREL] in 1989), Montgomery, Alabama (PB84-215581) (EPA, 1989).
[l]*Radiological and Environmental Sciences Laboratory* (RESL CHEM-TP-FE.1) (DOE, 1999b).

Note: The term “modified” indicates modifications of approved methods. All modifications have been approved by the SNJV Analytical Services Department.

ASTM = American Society of Testing and Materials
DOE = U.S. Department of Energy
EML = Environmental Measurements Laboratory
EPA = U.S. Environmental Protection Agency
HASL = Health and Safety Laboratory
NIOSH = National Institute for Occupational Safety and Health
RCRA = *Resource Conservation and Recovery Act*
SOP = Standard Operating Procedure
SNJV = Stoller-Navarro Joint Venture
TCLP = Toxicity Characteristic Leaching Procedure

Validated analytical data for CAU 118 investigation samples have been compiled and evaluated to confirm the presence of contamination and define the extent of contamination, if present. The analytical results for environmental samples collected at CAS 27-41-01 are presented in Section D.3.0. Waste sample results are not provided; however, they are summarized in Section D.4.0 and available in project files.

The analytical parameters were selected through the application of site process knowledge according to the DQOs presented in Appendix A. Samples collected during step-out sampling were only analyzed for the COPCs that exceeded FALs in the original samples.

D.2.4 Comparison to Action Levels

A COC is defined as any contaminant present in environmental media exceeding a FAL. 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, 2006b).

If COCs are present, corrective action must be considered for the CAS. The FALs for the CAU 118 investigation are defined for CAS 27-41-01 in Appendix H. Results that are equal to or greater than FALs are identified by bold text in the results tables (see 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., potential source material) to release COCs into site environmental media.

To evaluate potential source material 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 was released.
- Any non-liquid waste containing a contaminant exceeding an equivalent FAL concentration would cause a COC to be present in the surrounding media.

D.3.0 CAU 118, Super Kukla Facility Investigation Results

Corrective Action Site 27-41-01 is located within Area 27 of the NTS. Corrective Action Site 27-41-01 consisted of four structures within a fenced area at the Super Kukla Facility (Figure D.3-1): Building 5400, Building 5400A, Building 5410, and the Wooden Building known as "Brock House." Historical Documentation indicates that the Super Kukla Facility was constructed in 1964. Super Kukla was associated with the nuclear weapons program at the NTS and the national defense of the United States during the Cold War.

D.3.1 CAU 118 SAFER Plan Activities

A total of 200 samples were collected during investigation activities at CAS 27-41-01. Of the 200 samples, 87 were waste management, and 113 were environmental samples. The sample identifications, locations, types, and analyses are listed in Table D.3-1. The specific closure activities conducted to satisfy the CAU 118 SAFER Plan requirements at this CAS are described in the following sections.

D.3.1.1 Field Screening

Investigation samples were field screened for alpha and beta/gamma radiation, and PCBs. The FSRs were compared to FSLs to guide subsequent sampling decisions where appropriate. Gross alpha radiation FSLs were exceeded in four samples. Beta/gamma radiation FSLs were exceeded in 16 samples.

Field screening samples for PCBs was performed using a Chlor-N-Soil field test kit. The results of the field screening tests were used in the field to guide the excavation at the B-5410 site.

D.3.1.2 Radiological Surveys

Radiological surveys of equipment and building materials were performed periodically throughout closure activities. Radiological surveys were utilized for waste segregation and disposition.

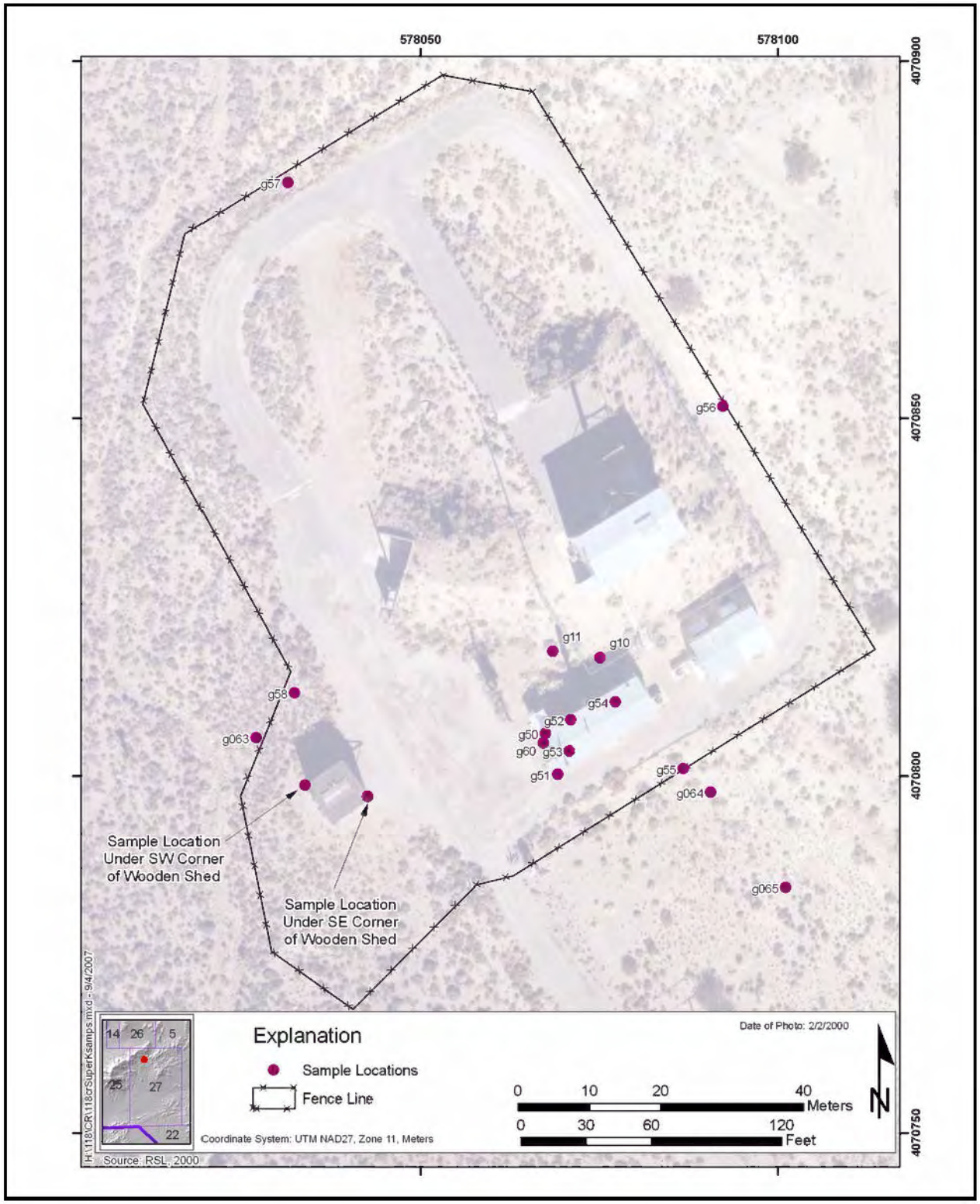

Figure D.3-1
Locations and Concentrations of Samples Bounding Contamination at CAU 118

Table D.3-1
Samples Collected at CAU 118, Area 27 Super Kukla Facility
(Page 1 of 16)

Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	Alpha Spectroscopy	Carbon-14	Chlorine-36	Diesel-Range Organics	Iron-55	Gamma Spectroscopy	Gross Alpha/Beta	Nickel-63	PCBs	Pesticides	pH	Plutonium-241	Isotopic Plutonium	RCRA Metals	Strontium-90	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Isotopic Uranium	VOCs	Physical Parameters
118A18	118KG505	N/A	Soil	Waste Management	X					X			X				X					X			X		
	118KG505A	N/A	Concrete	Waste Management	X					X			X				X					X			X		
118A19	118KG506	N/A	Soil	Waste Management	X					X			X				X					X			X		
	118KG506A	N/A	Concrete	Waste Management	X					X			X				X					X			X		
118A20	118KG507	N/A	Soil	Waste Management	X					X			X				X					X			X		
	118KG507A	N/A	Concrete	Waste Management	X					X			X				X					X			X		
118A21	118KG508	N/A	Soil	Waste Management	X					X			X				X					X			X		
	118KG508A	N/A	Concrete	Waste Management	X					X			X				X					X			X		
118A22	118KG509	N/A	Soil	Waste Management	X					X			X				X					X			X		
	118KG509A	N/A	Soil	Waste Management	X					X			X				X					X			X		
118D06	118DH01	N/A	Filter	Waste Management		X	X		X	X	X	X				X	X	X	X					X	X		
118D07	118DH02	N/A	Filter	Waste Management		X	X		X	X	X	X				X	X	X	X					X	X		

Table D.3-1
Samples Collected at CAU 118, Area 27 Super Kukla Facility
(Page 2 of 16)

Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	Alpha Spectroscopy	Carbon-14	Chlorine-36	Diesel-Range Organics	Iron-55	Gamma Spectroscopy	Gross Alpha/Beta	Nickel-63	PCBs	Pesticides	pH	Plutonium-241	Isotopic Plutonium	RCRA Metals	Strontium-90	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Isotopic Uranium	VOCs	Physical Parameters
118E08	118EP01	N/A	Paint Chip	Environmental						X	X		X					X									
118F08	118FP01	N/A	Paint Chip	Environmental						X	X		X					X									
118G12	118GP01	N/A	Paint Chip	Environmental		X	X		X	X	X	X	X					X	X					X	X		
	118GP01RX1	N/A	Paint Chip	Environmental												X	X										
118H05	118HP01	N/A	Paint Chip	Environmental						X	X		X					X									
15M	118KG01	0.0 - 0.5	Soil	Environmental						X	X																
30M	118KG02	0.0 - 0.5	Soil	Environmental						X	X																
	118KG03	0.0 - 0.5	Soil	Field Duplicate of #118KG02						X	X																
45M	118KG04	0.0 - 0.5	Soil	Environmental						X	X																
60M	118KG05	0.0 - 0.5	Soil	Environmental						X	X																
B-5410 Concrete Pad	118KG501	0.0 - 0.5	Concrete	Waste Management				X					X									X	X				
B-5410 G-01	118KG10	0.0 - 0.5	Soil	Environmental		X	X		X	X	X	X	X			X	X		X					X	X		
B01	118BS02	N/A	Wipe	Environmental		X																					
	118BS07	N/A	Wipe	Environmental			X																				

Table D.3-1
Samples Collected at CAU 118, Area 27 Super Kukla Facility
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Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	Alpha Spectroscopy	Carbon-14	Chlorine-36	Diesel-Range Organics	Iron-55	Gamma Spectroscopy	Gross Alpha/Beta	Nickel-63	PCBs	Pesticides	pH	Plutonium-241	Isotopic Plutonium	RCRA Metals	Strontium-90	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Isotopic Uranium	VOCs	Physical Parameters
B03	118BS03	N/A	Wipe	Environmental					X	X	X	X				X	X		X						X		
B04	118BS04	N/A	Wipe	Environmental														X									
B05	118BS05	N/A	Wipe	Environmental									X														
	118BS06	N/A	Wipe	Environmental																				X			
	118FS04	N/A	Wipe	Environmental																				X			
Bldg. 5410	118LF02	N/A	Oil	Waste Management		X	X		X	X	X	X	X			X	X	X	X	X				X	X	X	
Bldg. 5410	118LF03	N/A	Oil	Waste Management		X	X		X	X	X	X	X			X	X	X	X	X				X	X	X	
Blue Tube Rabbit Shoot	118AS03	N/A	Wipe	Waste Management					X	X	X	X				X	X		X						X		
C01	118CS01	N/A	Wipe	Environmental					X	X	X	X				X	X		X						X		
C02	118CS02	N/A	Wipe	Environmental					X	X	X	X				X	X		X						X		
C03	118CS03	N/A	Wipe	Environmental					X	X	X	X				X	X		X						X		
C04	118CS04	N/A	Wipe	Environmental					X	X	X	X				X	X		X						X		
C05	118CS05	N/A	Wipe	Environmental			X																				
C06	118CS06	N/A	Wipe	Environmental		X																					
	118HC01	N/A	Concrete	Environmental		X			X	X	X	X												X			
C07	118CS07	N/A	Wipe	Environmental																				X			
C08	118CS08	N/A	Wipe	Environmental					X	X	X	X				X	X		X						X		
C09	118CS09	N/A	Wipe	Environmental					X	X	X	X				X	X		X						X		

Table D.3-1
Samples Collected at CAU 118, Area 27 Super Kukla Facility
(Page 4 of 16)

Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	Alpha Spectroscopy	Carbon-14	Chlorine-36	Diesel-Range Organics	Iron-55	Gamma Spectroscopy	Gross Alpha/Beta	Nickel-63	PCBs	Pesticides	pH	Plutonium-241	Isotopic Plutonium	RCRA Metals	Strontium-90	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Isotopic Uranium	VOCs	Physical Parameters
C10	118CM01	N/A	Solid	Environmental			X		X	X	X	X															
Compressor Ext. Surf.	118LS12	N/A	Wipe	Waste Management									X														
Compressor Ext. Surfaces	118LS08	N/A	Wipe	Waste Management					X	X	X	X				X	X		X						X		
Compressor SW Corner	118LF01	N/A	Oil	Waste Management		X	X		X	X	X	X				X	X		X					X	X		
Compressor SW Corner	118LF01	N/A	Solid	Waste Management									X					X		X						X	
Concrete Floor (Composite)	118LS06	N/A	Wipe	Waste Management					X	X	X	X				X	X		X					X	X		
D01	118DS01	N/A	Wipe	Environmental					X	X	X	X				X	X		X						X		
D02	118DS02	N/A	Wipe	Environmental					X	X	X	X				X	X		X						X		
D03	118DS03	N/A	Wipe	Environmental			X																				
D04	118DS04	N/A	Wipe	Environmental		X																					
D05	118DS05	N/A	Wipe	Environmental																				X			
Diesel Tank on Truck	118HF05	N/A	Oil	Waste Management									X														
E01	118ES01	N/A	Wipe	Environmental					X	X	X	X				X	X		X						X		
E02	118ES02	N/A	Wipe	Environmental					X	X	X	X				X	X		X						X		
E03	118ES03	N/A	Wipe	Environmental			X																				

Table D.3-1
Samples Collected at CAU 118, Area 27 Super Kukla Facility
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Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	Alpha Spectroscopy	Carbon-14	Chlorine-36	Diesel-Range Organics	Iron-55	Gamma Spectroscopy	Gross Alpha/Beta	Nickel-63	PCBs	Pesticides	pH	Plutonium-241	Isotopic Plutonium	RCRA Metals	Strontium-90	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Isotopic Uranium	VOCs	Physical Parameters
E05	118ES05	N/A	Wipe	Environmental									X														
	118ES06	N/A	Wipe	Environmental									X														
	118ES08	N/A	Wipe	Environmental																				X			
	118ES10	N/A	Wipe	Environmental		X	X		X	X	X	X				X	X	X	X						X		
E06	118ES07	N/A	Wipe	Environmental																				X			
	118ES09	N/A	Wipe	Environmental					X	X	X	X				X	X		X						X		
E07	118EC01	0.0 - 0.6	Concrete	Environmental		X	X		X	X	X	X												X			
Ext. Paint Swipe	118AS08	N/A	Wipe	Waste Management									X														
Exterior Building	118LS07	N/A	Wipe	Waste Management					X	X	X	X				X	X		X						X		
F01	118FM01	N/A	Solid	Environmental			X		X	X	X	X															
F02	118FS01	N/A	Wipe	Environmental		X			X	X	X	X				X	X		X						X		
	118FS06	N/A	Wipe	Environmental			X																				
F03	118FS02	N/A	Wipe	Environmental					X	X	X	X				X	X		X						X		
F04	118FS03	N/A	Wipe	Environmental									X														
F06	118FS05	N/A	Wipe	Environmental					X	X	X	X				X	X		X						X		
F07	118FC01	N/A	Concrete	Environmental		X	X		X	X	X	X												X			
G01	118GS10	N/A	Wipe	Environmental			X																				
	118KG11	1.0 - 1.5	Soil	Waste Management		X	X		X	X	X	X	X			X	X		X					X	X		

Table D.3-1
Samples Collected at CAU 118, Area 27 Super Kukla Facility
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Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	Alpha Spectroscopy	Carbon-14	Chlorine-36	Diesel-Range Organics	Iron-55	Gamma Spectroscopy	Gross Alpha/Beta	Nickel-63	PCBs	Pesticides	pH	Plutonium-241	Isotopic Plutonium	RCRA Metals	Strontium-90	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Isotopic Uranium	VOCs	Physical Parameters
G02	118GS02	N/A	Wipe	Environmental		X																					
	118KG12	0.0 - 0.5	Soil	Waste Management		X	X		X	X	X	X	X			X	X		X					X	X		
	118KG13	1.0 - 1.2	Soil	Waste Management		X	X		X	X	X	X	X			X	X		X					X	X		
G03	118GS03	N/A	Wipe	Environmental					X	X	X	X				X	X		X						X		
	118KG14	0.0 - 0.5	Soil	Waste Management		X	X		X	X	X	X	X			X	X		X					X	X		
	118KG22	2.0 - 2.5	Soil	Waste Management		X	X		X	X	X	X	X			X	X		X					X	X		
G04	118GS04	N/A	Wipe	Environmental					X	X	X	X				X	X		X						X		
	118KG15	0.0 - 0.5	Soil	Waste Management		X	X		X	X	X	X	X			X	X		X					X	X		
	118KG23	2.0 - 2.5	Soil	Environmental		X	X		X	X	X	X	X			X	X		X					X	X		
G05	118GS05	N/A	Wipe	Environmental		X			X	X	X	X				X	X	X	X						X		
	118GS06	N/A	Wipe	Environmental									X														
	118GS11	N/A	Wipe	Environmental			X																				
	118KG16	0.0 - 0.5	Soil	Waste Management		X	X		X	X	X	X	X			X	X		X					X	X		
	118KG24	1.0 - 1.5	Soil	Waste Management		X	X		X	X	X	X	X			X	X		X					X	X		

Table D.3-1
Samples Collected at CAU 118, Area 27 Super Kukla Facility
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Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	Alpha Spectroscopy	Carbon-14	Chlorine-36	Diesel-Range Organics	Iron-55	Gamma Spectroscopy	Gross Alpha/Beta	Nickel-63	PCBs	Pesticides	pH	Plutonium-241	Isotopic Plutonium	RCRA Metals	Strontium-90	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Isotopic Uranium	VOCs	Physical Parameters
G06	118GM01	N/A	Solid	Environmental			X		X	X	X	X															
	118KG17	0.0 - 0.5	Soil	Waste Management		X	X		X	X	X	X	X			X	X		X					X	X		
	118KG25	2.0 - 2.5	Soil	Waste Management		X	X		X	X	X	X	X			X	X		X					X	X		
G07	118GM02	N/A	Solid	Environmental			X		X	X	X	X															
	118KG18	0.0 - 0.5	Soil	Waste Management		X	X		X	X	X	X	X			X	X		X					X	X		
	118KG26	1.5 - 2.0	Soil	Waste Management		X	X		X	X	X	X	X			X	X		X					X	X		
G08	118GS07	N/A	Wipe	Environmental																				X			
	118KG19	0.0 - 0.5	Soil	Waste Management		X	X		X	X	X	X	X			X	X		X					X	X		
	118KG27	2.0 - 2.5	Soil	Waste Management		X	X		X	X	X	X	X			X	X		X					X	X		
G09	118GS08	N/A	Wipe	Environmental																				X			
	118KG20	0.0 - 0.5	Soil	Waste Management		X	X		X	X	X	X	X			X	X		X					X	X		
	118KG21	0.0 - 0.5	Soil	Field duplicate.		X	X		X	X	X	X	X			X	X		X					X	X		
	118KG28	2.0 - 2.5	Soil	Waste Management		X	X		X	X	X	X	X			X	X		X					X	X		

Table D.3-1
Samples Collected at CAU 118, Area 27 Super Kukla Facility
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Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	Alpha Spectroscopy	Carbon-14	Chlorine-36	Diesel-Range Organics	Iron-55	Gamma Spectroscopy	Gross Alpha/Beta	Nickel-63	PCBs	Pesticides	pH	Plutonium-241	Isotopic Plutonium	RCRA Metals	Strontium-90	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Isotopic Uranium	VOCs	Physical Parameters
G10	118GS09	N/A	Wipe	Environmental					X	X	X	X				X	X		X						X		
	118KG29	0.0 - 0.5	Soil	Environmental									X														
G11	118KG30	0.0 - 0.5	Soil	Environmental									X														
G11A	118KG030	0.0 - 1.0	Soil	Waste Management									X							X		X					
G12	118GC01	N/A	Concrete	Environmental		X	X		X	X	X	X												X			
	118KG031	0.0 - 1.0	Soil	Waste Management									X							X		X					
G13	118KG032	3.0 - 4.0	Soil	Waste Management									X							X		X					
G14	118KG033	2.0 - 3.0	Soil	Waste Management									X							X		X					
G15	118KG034	2.0 - 3.0	Soil	Waste Management									X							X		X					
G16	118KG035	0.0 - 1.0	Soil	Waste Management									X							X		X					
G17	118KG036	3.0 - 3.5	Soil	Waste Management									X							X		X					
G18	118KG037	0.0 - 1.0	Soil	Waste Management									X							X		X					
G19	118KG038	3.0 - 3.5	Soil	Waste Management									X							X		X					

Table D.3-1
Samples Collected at CAU 118, Area 27 Super Kukla Facility
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Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	Alpha Spectroscopy	Carbon-14	Chlorine-36	Diesel-Range Organics	Iron-55	Gamma Spectroscopy	Gross Alpha/Beta	Nickel-63	PCBs	Pesticides	pH	Plutonium-241	Isotopic Plutonium	RCRA Metals	Strontium-90	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Isotopic Uranium	VOCs	Physical Parameters
G20	118KG039	0.0 - 1.0	Soil	Waste Management									X							X		X					
G21	118KG040	2.0 - 2.5	Soil	Waste Management									X							X		X					
G22	118KG041	2.5 - 3.0	Soil	Waste Management									X							X		X					
G23	118KG042	0.0 - 1.0	Soil	Waste Management									X							X		X					
G24	118KG043	0.0 - 1.0	Soil	Waste Management									X							X		X					
G50	118KG050	3.0 - 3.5	Soil	Environmental									X														
G51	118KG051	2.0 - 2.5	Soil	Environmental									X														
G52	118KG052	2.5 - 3.0	Soil	Environmental									X														
G53	118KG053	2.0 - 2.5	Soil	Environmental									X														
G54	118KG054	2.0 - 2.5	Soil	Environmental									X														
G55, S. Perimeter	118KG055	0.0 - 0.5	Soil	Environmental									X														
G56, E. Perimeter	118KG056	0.0 - 0.5	Soil	Environmental									X														
G57, N. Perimeter	118KG057	0.0 - 0.5	Soil	Environmental									X														
G58 W. Perimeter	118KG058	0.0 - 0.5	Soil	Environmental									X														

Table D.3-1
Samples Collected at CAU 118, Area 27 Super Kukla Facility
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Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	Alpha Spectroscopy	Carbon-14	Chlorine-36	Diesel-Range Organics	Iron-55	Gamma Spectroscopy	Gross Alpha/Beta	Nickel-63	PCBs	Pesticides	pH	Plutonium-241	Isotopic Plutonium	RCRA Metals	Strontium-90	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Isotopic Uranium	VOCs	Physical Parameters
G60	118KG060	3.3 - 4.0	Soil	Environmental									X														
	118KG061	5.5 - 6.0	Soil	Environmental									X														
	118KG062	7.0 - 7.5	Soil	Environmental									X														
G63	118KG063	0.0 - 0.5	Soil	Environmental									X														
G64	118KG064	0.0 - 0.5	Soil	Environmental									X														
G65	118KG065	0.0 - 0.5	Soil	Environmental									X														
General Area	118LS03	N/A	Wipe	Waste Management					X	X	X	X				X	X		X						X		
H01	118HF301	N/A	Water	Trip Blank																						X	
	118HS01	N/A	Wipe	Environmental		X	X		X	X	X	X				X	X		X						X		
H02	118HM01	N/A	Solid	Environmental			X		X	X	X	X															
	118HS02	N/A	Wipe	Environmental					X	X	X	X				X	X		X						X		
H03	118HS03	N/A	Wipe	Environmental									X														
	118HS04	N/A	Wipe	Environmental																			X				
H04	118HS05	N/A	Wipe	Environmental					X	X	X	X				X	X		X						X		
Hammer Attachment	118-TH-S-03	N/A	Wipe	Environmental									X														
HEPA Filter Hot Side	118LH02	N/A	Filter	Waste Management		X	X		X	X	X	X				X	X	X	X					X	X		
HEPA Stack Exhaust	118LS04	N/A	Wipe	Waste Management					X	X	X	X				X	X		X						X		

Table D.3-1
Samples Collected at CAU 118, Area 27 Super Kukla Facility
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Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	Alpha Spectroscopy	Carbon-14	Chlorine-36	Diesel-Range Organics	Iron-55	Gamma Spectroscopy	Gross Alpha/Beta	Nickel-63	PCBs	Pesticides	pH	Plutonium-241	Isotopic Plutonium	RCRA Metals	Strontium-90	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Isotopic Uranium	VOCs	Physical Parameters
Hydraulic Tank	118HF02	N/A	Oil	Waste Management		X	X		X	X	X	X	X			X	X	X	X	X				X	X	X	
I01	118I301	N/A	Water	Trip Blank																						X	
	118IF01	N/A	Oil	Waste Management		X	X		X	X	X	X	X	X		X	X	X	X	X				X	X	X	
	118IS01	N/A	Wipe	Environmental																				X			
	118IS02	N/A	Wipe	Environmental									X														
	118IS03	N/A	Wipe	Environmental		X	X		X	X	X	X				X	X	X	X						X		
Int. Metal Plate	118LM01	N/A	Solid	Waste Management														X									
Int. Paint Swipe	118AS07	N/A	Wipe	Waste Management									X														
K01	118K301	N/A	Water	Trip Blank																						X	
	118K501	N/A	Water	Waste Management					X	X	X	X				X	X	X						X	X	X	
	118K501A	N/A	Water	Field Blank		X	X						X						X	X							
K02	118K502	N/A	Liquid	Waste Management					X	X	X	X				X	X	X						X	X	X	
	118K502A	N/A	Liquid	Waste Management		X	X						X		X				X	X							
Main HEPA Duct-Heat Side	118LS05	N/A	Wipe	Waste Management					X	X	X	X				X	X		X					X	X		

Table D.3-1
Samples Collected at CAU 118, Area 27 Super Kukla Facility
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Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	Alpha Spectroscopy	Carbon-14	Chlorine-36	Diesel-Range Organics	Iron-55	Gamma Spectroscopy	Gross Alpha/Beta	Nickel-63	PCBs	Pesticides	pH	Plutonium-241	Isotopic Plutonium	RCRA Metals	Strontium-90	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Isotopic Uranium	VOCs	Physical Parameters
Main HEPA Filter Hot Side	118LH04	N/A	Filter	Waste Management		X	X		X	X	X	X	X			X	X	X	X					X	X		
Main HEPA Filter/Cold Side	118LH03	N/A	Filter	Waste Management		X	X		X	X	X	X				X	X		X					X	X		
Metal Debris/Int. Wooden Shed	118AS04	N/A	Wipe	Waste Management					X	X	X	X				X	X		X						X		
Metal Parts (Misc)	118LM03	N/A	Solid	Waste Management		X	X		X	X	X	X				X	X		X					X	X		
N/A	118HF06	N/A	Oil	Waste Management	X					X	X		X		X			X	X	X					X	X	X
N/A	118HF06A	N/A	Oil	Waste Management	X													X							X		
N/A	118HF06B	N/A	Oil	Waste Management	X													X							X		
N/A	118HF06DL	N/A	Oil	Waste Management																						X	
N/A	118HF06RE	N/A	Oil	Waste Management														X								X	
N/A	118HF07	N/A	Oil	Waste Management	X					X	X		X		X			X	X	X					X	X	X
N/A	118HF07A	N/A	Oil	Waste Management	X													X							X		

Table D.3-1
Samples Collected at CAU 118, Area 27 Super Kukla Facility
(Page 13 of 16)

Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	Alpha Spectroscopy	Carbon-14	Chlorine-36	Diesel-Range Organics	Iron-55	Gamma Spectroscopy	Gross Alpha/Beta	Nickel-63	PCBs	Pesticides	pH	Plutonium-241	Isotopic Plutonium	RCRA Metals	Strontium-90	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Isotopic Uranium	VOCs	Physical Parameters
N/A	118HF07B	N/A	Oil	Waste Management	X													X							X		
N/A	118HF07DL	N/A	Oil	Waste Management																						X	
N/A	118HF07RE	N/A	Oil	Waste Management																						X	
N/A	118HF306	N/A	Water	Trip Blank																						X	
N/A	118HF306DL	N/A	Water	Trip Blank																						X	
N/A	118HF307	N/A	Water	Trip Blank																						X	
N/A	118HF307DL	N/A	Water	Trip Blank																						X	
N/A	118KG301	N/A	Water	Trip Blank																						X	
N/A	118KG306	N/A	Water	Trip Blank																						X	
N/A	118LF301	N/A	Water	Trip Blank																						X	
N/A	118LF302	N/A	Water	Trip Blank																						X	
Old Tank Location	118LS09	N/A	Wipe	Waste Management									X														
Paint Chips Ext Wooden Shed	118AP07	N/A	Paint Chip	Waste Management									X					X									
Paint on Metal Parts	118LM02	N/A	Solid	Waste Management									X														

Table D.3-1
Samples Collected at CAU 118, Area 27 Super Kukla Facility
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Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	Alpha Spectroscopy	Carbon-14	Chlorine-36	Diesel-Range Organics	Iron-55	Gamma Spectroscopy	Gross Alpha/Beta	Nickel-63	PCBs	Pesticides	pH	Plutonium-241	Isotopic Plutonium	RCRA Metals	Strontium-90	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Isotopic Uranium	VOCs	Physical Parameters
Painted Surf./Int Equip.	118LS11	N/A	Wipe	Waste Management									X														
Pre-Filter Cold Side	118LH01	N/A	Filter	Waste Management		X	X		X	X	X	X				X	X		X					X	X		
Pre-Filter Cold Side	118LS02	N/A	Wipe	Waste Management		X	X		X	X	X	X							X					X	X		
Pre-Filter Cold Side	118LS02RE	N/A	Wipe	Waste Management												X	X										
Pre-Filter Hot Side	118LS01	N/A	Wipe	Waste Management					X	X	X	X				X	X		X						X		
S04	118ES04	N/A	Wipe	Environmental		X																					
Scabbled Concrete Floor	118LC01	N/A	Soil	Waste Management									X					X									
Scabbled Concrete Floor	118LC01	N/A	Solid	Waste Management		X	X		X	X	X	X				X	X		X					X	X		
Trackhoe Bucket Ext.	118-TH-S-01	N/A	Wipe	Environmental									X														
Trackhoe Bucket Int.	118-TH-S-02	N/A	Wipe	Environmental									X														
Tunnel	118FF001	N/A	Oil	Waste Management		X	X		X	X	X	X	X			X	X	X	X	X				X	X	X	
Tunnel	118FF301	N/A	Water	Trip Blank																						X	

Table D.3-1
Samples Collected at CAU 118, Area 27 Super Kukla Facility
(Page 15 of 16)

Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	Alpha Spectroscopy	Carbon-14	Chlorine-36	Diesel-Range Organics	Iron-55	Gamma Spectroscopy	Gross Alpha/Beta	Nickel-63	PCBs	Pesticides	pH	Plutonium-241	Isotopic Plutonium	RCRA Metals	Strontium-90	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Isotopic Uranium	VOCs	Physical Parameters
Under Wooden Shed, SE Corner	118KG06	0.0 - 0.5	Soil	Environmental					X	X	X	X	X			X	X		X	X	X			X	X	X	
Under Wooden Shed, SW Corner	118KG07	0.0 - 0.5	Soil	Environmental					X	X	X	X	X			X	X		X	X	X			X	X	X	
Wall Stain Near Old Tank	118LS10	N/A	Wipe	Waste Management									X														
Wooden Shed Int.	118AP06	N/A	Paint Chip	Waste Management		X	X		X	X	X	X	X			X	X	X	X					X	X		
Wood Structure	118AW07	N/A	Paint Chip	Waste Management		X	X		X	X	X	X				X	X		X					X	X		
Wooden Shed Ext.	118AS05	N/A	Wipe	Waste Management		X	X		X	X	X	X				X	X		X					X	X		
Wooden Shed/ Interior	118AS01	N/A	Wipe	Waste Management		X	X		X	X	X	X				X	X		X					X	X		

Table D.3-1
Samples Collected at CAU 118, Area 27 Super Kukla Facility
(Page 16 of 16)

Sample Location	Sample Number	Depth (ft bgs)	Matrix	Purpose	Alpha Spectroscopy	Carbon-14	Chlorine-36	Diesel-Range Organics	Iron-55	Gamma Spectroscopy	Gross Alpha/Beta	Nickel-63	PCBs	Pesticides	pH	Plutonium-241	Isotopic Plutonium	RCRA Metals	Strontium-90	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Isotopic Uranium	VOCs	Physical Parameters
Wooden Shed/ Interior	118AS02	N/A	Wipe	Waste Management					X	X	X	X				X	X		X						X		

bgs = Below ground surface
ft = Foot
HEPA = High-efficiency particulate air
N/A = Not applicable
PCB = Polychlorinated biphenyl
RCRA = *Resource Conservation and Recovery Act*
SVOC = Semivolatile organic compound
TCLP = Toxicity Characteristic Leaching Procedure
TPH = Total petroleum hydrocarbon
TSCAI = *Toxic Substances Control Act* Incinerator
VOC = Volatile organic compound

Note: Physical parameters include anions, ash, corrosive steel, cyanide, specific gravity, heating value, ignitability, liquid scintillation, moisture content, reactive sulfide, reactive cyanide, TPH-Hexane, viscosity. The physical parameters are specific analyses required to meet the TSCAI Waste.

D.3.1.3 Visual Inspections

Initial inspection of the Building 5410 Mechanical Building identified staining of the concrete pad. The staining was located in the vicinity of the hydraulic unit located in the northwest quadrant of the pad. Sampling of the concrete pad, and surrounding soil, indicated the presence of PCBs (Figure D.3-2).

D.3.1.4 Sample Collection

Decision I environmental sampling activities included the collection of surface and subsurface soil samples surrounding the Building 5410 concrete pad (Figure D.3-2) and the Reactor Building (B-5400) (Figure D.3-3).

Fifty-two samples were collected from 38 locations around the B-5410 concrete pad as shown in Figure D.3-2 to determine whether there had been a release of PCBs from the building. Based on the initial analytical results, additional samples were collected from step-out locations to provide additional detail in the delineation of the suspected contamination. Soil sample 118KG062 at location G60 was collected from the soil 7 to 7.5 ft below grade within the footprint of the B-5410 concrete pad to determine vertical extent. Four soil samples (118KG055 through 118KG058) were collected from 0 to 0.5 ft bgs at the site perimeter fence line from random locations G55 through G58 to determine whether any PCB contamination had been released beyond spatial boundaries of the site. The random sample locations are shown in Figure D.3-2.

Environmental samples were collected from the soil surrounding Building 5400 to determine whether there had been neutron activation of the soil due to reactor operations. Composite samples were collected from the surface interval (0 to 0.5 ft bgs) at varying distances (radii of 15, 30, 45, and 60 meters) from the center of the reactor. Sample locations and numbers are shown in Figure D.3-3.

Additional Decision II sampling activities was performed at locations G63 and G64 at the southern and western perimeter fence lines. The step-out sampling was conducted at approximately 10 to 15 ft beyond the initial sample locations (G55 and G58) shown in Figure D.3-2.

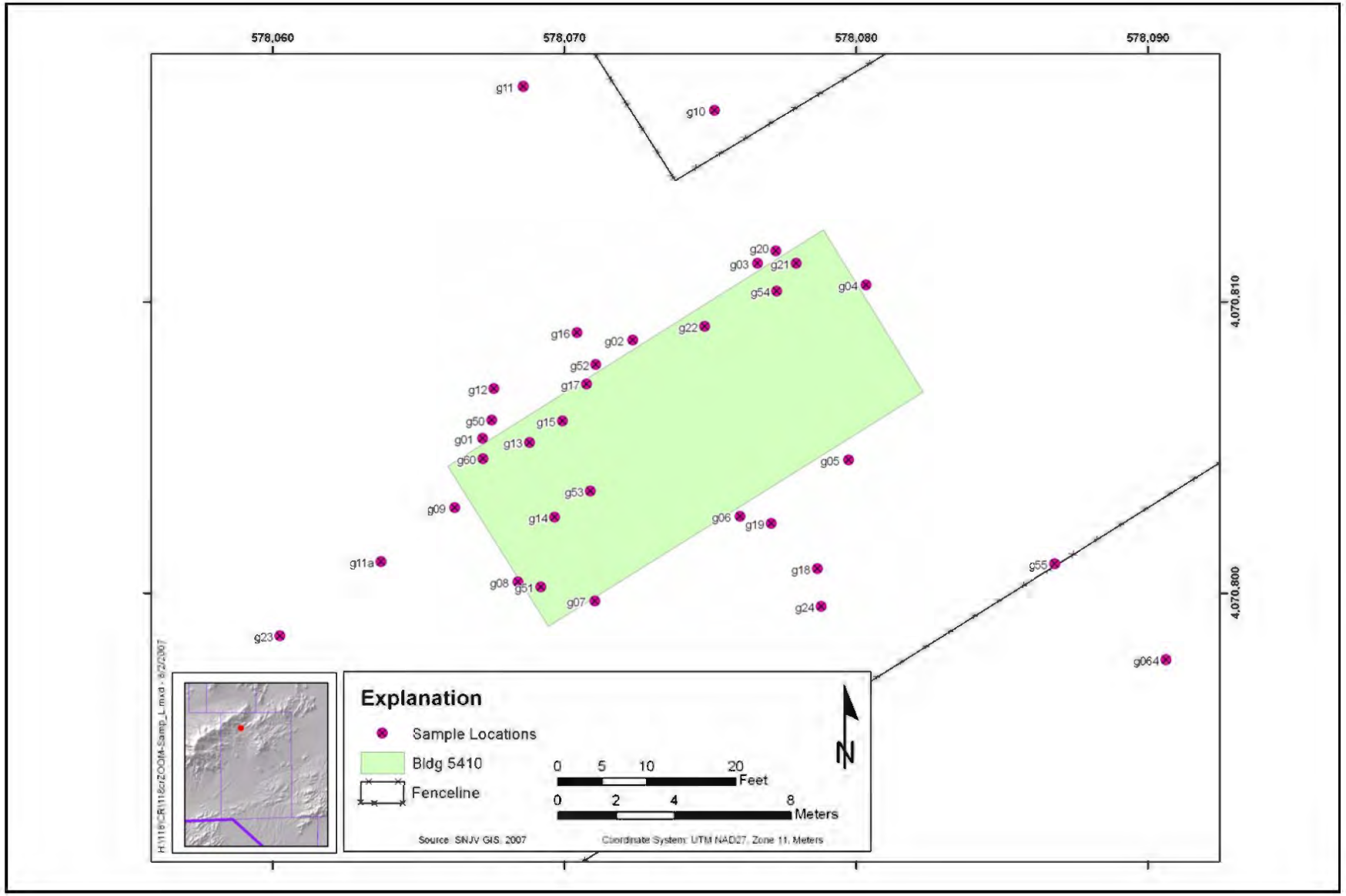

Figure D.3-2
Sample Locations at CAS 27-41-01, Super Kukla Facility

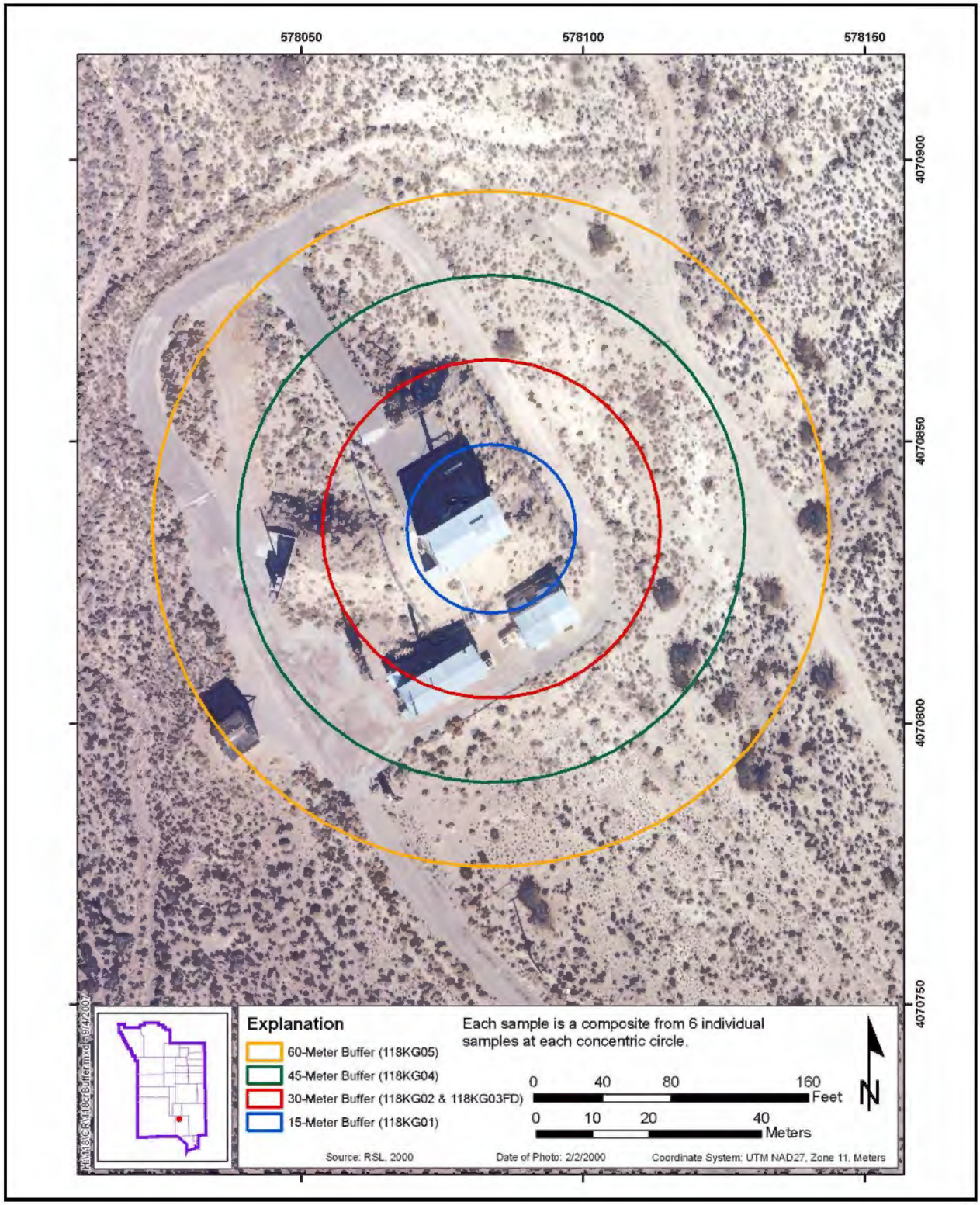

Figure D.3-3
Soil Sample Locations Around Building B-5400

Samples of liquid, sediment, paint, and concrete 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.

D.3.1.5 Deviations

Investigation samples were collected as outlined in the CAU 118 SAFER Plan (NNSA/NSO, 2006a) and submitted for laboratory analysis. The only deviation to planned sampling was that vertical extent sampling could not be collected at planned depths because of refusal. Refusal prevented collection of samples deeper than 7.5 ft bgs at location G60. Although a "clean" sample could not be collected. The caliche layer defines the vertical extent of contamination.

D.3.2 Investigation Results

The following sections provide analytical results from the samples collected to complete investigation activities as outlined in the CAU 118 SAFER Plan. Investigation samples were analyzed for the CAU 118 SAFER Plan-specified COPCs, which included VOCs, semivolatile organic compounds, RCRA metals including beryllium, PCBs, gamma-emitting radionuclides, Fe-55, Ni-63, tritium, U, 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 27-41-01.

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 are 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 Polychlorinated Biphenyls

Polychlorinated biphenyls detected above MDCs are presented in Table D.3-2. A total of 11 surface (0.0 to 0.5 ft bgs) soil samples at ten locations exceeded the PAL of 0.74 milligrams per kilogram (mg/kg) for PCBs. Of the 11 exceedances, 8 were for Aroclor 1248 and 3 were for Aroclor 1254. Concentrations ranged from 0.027 mg/kg Aroclor 1254 to 1,400 mg/kg Aroclor 1248. Because the

FALs for these contaminants were established as the PALs, they are considered to be COCs. The soil sample results suggest that:

- There are at least two sources of the PCB contamination.
- The preferred migration pathway is vertical.

Table D.3-2
Sample Results for PCBs Greater Than Minimum Detectable Concentrations

Sample Location	Sample Number	Depth (ft bgs)	Contaminants of Potential Concern (mg/kg)	Contaminants of Potential Concern (mg/kg)
			Aroclor 1248	Aroclor 1254
Final Action Level[a]			**0.740**	**0.740**
Under Wooden Shed, SE Corner	118KG06	0.0 - 0.5	--	0.250
G10	118KG29	0.0 - 0.5	--	**1.5**(J)
G11	118KG30	0.0 - 0.5	--	**1.6** (J)
G50	118KG050	3.0 - 3.5	**130** (J)	--
G51	118KG051	2.0 - 2.5	**310** (J)	--
G52	118KG052	2.5 - 3.0	**1,400** (J)	--
G53	118KG053	2.0 - 2.5	**140** (J)	--
G54	118KG054	2.0 - 2.5	**1.7** (J)	--
G55	118KG055	0.0 - 0.5	--	**10** (J)
G56	118KG056	0.0 - 0.5	--	0.038
G57	118KG057	0.0 - 0.5	--	0.280
G58	118KG058	0.0 - 0.5	**13** (J)	--
G60	118KG060	3.6 - 4.0	0.041	--
G60	118KG061	5.0 - 5.5	**33** (J)	--
G60	118KG062	7.0 - 7.5	**290** (J)	--
G63	118KG063	0.0 - 0.5	--	0.09
G64	118KG064	0.0 - 0.5	--	0.290
G65	118KG065	0.0 - 0.5	--	0.027

[a]Based on *Region 9 Preliminary Remediation Goals (PRGs)* (EPA, 2004).

bgs = Below ground surface
ft = Foot
mg/kg = Milligrams per kilogram
PCB = Polychlorinated biphenyl
J = Estimated value (due to low laboratory surrogate recovery)
-- = Not detected above minimum detectable concentrations

The PCB contamination around the B-5410 pad is primarily Aroclor 1248. The hydraulic oil used at the Super Kukla Facility consisted primarily of Aroclor 1248. Aroclor 1254 was the primary contaminant detected at the site perimeter fence lines and upgradient of the B-5410 pad. Additionally, Aroclor 1254 was commonly used as a de-dusting agent (DOHHS, 2000). Although, dust suppression was not considered in the CSM in the SAFER, data was collected to define the extent of this contamination.

D.3.2.2 Gamma-Emitting Radionuclides

Gamma-emitting radionuclides analytical results for environmental samples collected at this CAS that were detected above MDCs are presented in Table D.3-3. No gamma-emitting radionuclides were detected at concentrations exceeding their PALs.

D.3.2.3 Plutonium, Strontium-90, and Uranium Isotopes

Isotopic Pu and isotopic U analytical results for environmental samples collected at this CAS that were detected above MDCs are presented in Table D.3-4. No isotopic Pu or U exceeded the PALs. The FALs were established at the PAL concentrations.

Table D.3-3
Sample Results for Gamma Spectroscopy
(Page 1 of 2)

Sample Location	Sample Number	Depth (ft bgs)	Contaminants of Potential Concern (pCi/g)							
			Actinium-228	Bismuth-214	Cesium-137	Europium-155	Iron-55	Lead-212	Lead-214	Thallium-208
Final Action Levels			**5[a]**	**5[a]**	**12.2[b]**	**135[b]**	**141,000[b]**	**5[a]**	**5[a]**	**5[a]**
15M	118KG01	0.0 - 0.5	1.2	1.01 (J)	--	--	--	1.43 (J)	0.98 (J)	0.47
30M	118KG02	0.0 - 0.5	1.32	0.86 (J)	--	--	--	1.75 (J)	0.86 (J)	0.46
	118KG03	0.0 - 0.5	1.27	0.93 (J)	--	--	--	1.63 (J)	0.94 (J)	0.51
45M	118KG04	0.0 - 0.5	1.62	0.99 (J)	--	--	--	1.9 (J)	0.9 (J)	0.77

Table D.3-3
Sample Results for Gamma Spectroscopy
(Page 2 of 2)

Sample Location	Sample Number	Depth (ft bgs)	Contaminants of Potential Concern (pCi/g)							
			Actinium-228	Bismuth-214	Cesium-137	Europium-155	Iron-55	Lead-212	Lead-214	Thallium-208
Final Action Levels			**5[a]**	**5[a]**	**12.2[b]**	**135[b]**	**141,000[b]**	**5[a]**	**5[a]**	**5[a]**
60M	118KG05	0.0 - 0.5	1.84	1.2 (J)	0.37	--	--	1.9 (J)	1.02 (J)	0.54
Under Wooden Shed, SE Corner	118KG06	0.0 - 0.5	--	--	--	--	3.647 (J)	--	--	--
Under Wooden Shed, SW Corner	118KG07	0.0 - 0.5	--	--	--	0.616	--	--	--	--

[a]Taken from the generic guidelines for residual concentrations of actinium-228, bismuth-214, lead-212, lead-214, thallium-208, and thorium-232, as found in Chapter IV of U.S. Department of Energy Order 5400.5, Change 2, *Radiation Protection of the Public and the Environment* (DOE, 1993).
[b]Taken from the construction, commercial, industrial land-use scenario in Table 2.1 of the National Council on Radiation Protection and Measurements 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-millirem-per-year dose.

bgs = Below ground surface
ft = Foot
pCi/g = Picocuries per gram
J = Estimated value
-- = Not detected above minimum detectable concentrations

Table D.3-4
Sample Results for Plutonium and Uranium

Sample Location	Sample Number	Depth (ft bgs)	Contaminants of Potential Concern (pCi/g)			
			Plutonium-238	Uranium-234	Uranium-235	Uranium-238
Final Action Levels[a]			**13**	**143**	**17.6**	**105**
Under Wooden Shed, SE Corner	118KG06	0.0 - 0.5	0.127	0.78	--	0.641
Under Wooden Shed, SW Corner	118KG07	0.0 - 0.5	--	0.821	0.081	0.783

[a]Taken from the construction, commercial, industrial land-use scenario in Table 2.1 of the National Council on Radiation Protection and Measurements 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-millirem-per-year dose.

bgs = Below ground surface
ft = Foot
pCi/g = Picocuries per gram
-- = Not detected above minimum detectable concentrations

D.3.3 Nature and Extent of Contamination

Based on the analytical results for soil samples collected within CAS 27-41-01, the only COC identified are the PCBs (Aroclor 1248) located adjacent to or near the Building 5410 pad, and PCBs (Aroclor 1254) at the west and south perimeter fence lines. As shown by samples collected around the former B-5410 concrete pad (Figure D.3-2 and Tables D.3-5 through D.3-7), the source of the PCBs has been removed and the majority of the contaminated media (concrete and soil) has been removed and packaged as waste. Table D.3-5 shows results of the initial sampling performed around the B-5410 concrete pad. Table D.3-6 displays the sample results of the area after the initial removal/remediation of soil and concrete. Table D.3-7 shows the analytical results of the soil material remaining at the site. Soil samples in the area of the B-5410 pad display both a decrease laterally and vertically from the source of the contamination. While PCB concentrations in the soil do not decrease vertically to concentrations below the FALs, the hard pan (caliche layer) does act as a barrier against further vertical migration. The lateral distribution of PCB contamination in the soil

decreases with distance from the source, however, concentrations exceed the FAL at the west and south perimeters of the site. The two locations G55 and G58 where PCBs exceeded FALs (10 and 13 mg/kg) are only slightly greater than the FAL, and step-out samples 118KG63 and 118KG64 support the conclusion that the extent is limited to within 10 to 15 ft of the existing perimeter fence line. Sample locations G56 and G57 at the east and north perimeter fence lines, respectively, did not contain PCB at concentrations greater than FALs.

Table D.3-5
Analytical Results of PCBs in Soil Following Initial Sampling Around Building 5410
(Page 1 of 2)

Sample Location	Depth of Sample (ft bgs)	Sample Number	Aroclor 1248 (mg/kg)	Aroclor 1254 (mg/kg)
G01	0.0 - 0.5	118KG10	3,900 (J)	U (J)
G01	1.0 - 1.3	118KG11	10,000 (J)	U (J)
G02	0.0 - 0.5	118KG12	14,000 (J)	U (J)
G02	1.0 - 1.2	118KG13	7,400 (J)	U (J)
G03	0.0 - 0.5	118KG14	1,200 (J)	U (J)
G04	0.0 - 0.5	118KG15	U (J)	5.6 (J)
G05	0.0 - 0.5	118KG16	U (J)	29 (J)
G06	0.0 - 0.5	118KG17	73 (J)	U (J)
G07	0.0 - 0.5	118KG18	1.6 (J)	3 (J)
G08	0.0 - 0.5	118KG19	U (J)	22 (J)
G09	0.0 - 0.5	118KG20	27,000 (J)	U (J)
G09	0.0 - 0.5	118KG21	25,000 (J)	U (J)
G03	2.0 - 2.5	118KG22	240 (J)	U (J)
G04	2.0 - 2.5	118KG23	0.7 (J)	U (J)
G05	1.0 - 1.5	118KG24	U (J)	4.8 (J)
G06	2.0 - 2.5	118KG25	5.6 (J)	U (J)
G07	1.3 - 2.0	118KG26	4.7 (J)	2.8 (J)
G08	2.0 - 2.5	118KG27	0.1	U (J)
G09	2.0 - 2.5	118KG28	230 (J)	U (J)
G10	0.0 - 0.5	118KG29	U (J)	1.5 (J)

Table D.3-5
Analytical Results of PCBs in Soil Following Initial Sampling Around Building 5410
(Page 2 of 2)

Sample Location	Depth of Sample (ft bgs)	Sample Number	Aroclor 1248 (mg/kg)	Aroclor 1254 (mg/kg)
G11	0.0 - 0.5	118KG30	U (J)	1.6 (J)

bgs = Below ground surface
ft = Foot
mg/kg = Milligrams per kilogram
PCB = Polychlorinated biphenyl
J = Estimated value
U = Nondetect

Table D.3-6
Analytical Results of PCBs in Soil After Initial Remediation/Removal

Sample Location	Depth of Sample (ft bgs)	Sample Number	Aroclor 1248 (mg/kg)	Aroclor 1254 (mg/kg)
G11A	0.0 - 1.0	118KG030	240 (J)	U (J)
G12	0.0 - 1.0	118KG031	80 (J)	U (J)
G13	3.0 - 4.0	118KG032	22 (J)	U (J)
G14	2.0 - 3.0	118KG033	2,400 (J)	U (J)
G15	2.0 - 3.0	118KG034	1,900 (J)	U (J)
G16	0.0 - 1.0	118KG035	12,000 (J)	U (J)
G17	3.0 - 3.5	118KG036	510 (J)	U (J)
G18	0.0 - 1.0	118KG037	20 (J)	U (J)
G19	3.0 - 3.5	118KG038	6.9 (J)	U (J)
G20	0.0 - 1.0	118KG039	12 (J)	U (J)
G21	2.0 - 2.5	118KG040	61 (J)	U (J)
G22	2.5 - 3.0	118KG041	350 (J)	U (J)
G23	0.0 - 1.0	118KG042	24 (J)	U (J)
G24	0.0 - 1.0	118KG043	23 (J)	U (J)

bgs = Below ground surface
ft = Foot
mg/kg = Milligrams per kilogram
PCB = Polychlorinated biphenyl
J = Estimated value
U = Nondetect

Table D.3-7
Results of PCBs Remaining in Soil at CAU 118

Sample Location	Depth of Sample (ft bgs)	Sample Number	Aroclor 1248 (mg/kg)	Aroclor 1254 (mg/kg)
G50	3.0 - 3.5	118KG050	130 (J)	U (J)
G51	2.0 - 2.5	118KG051	310 (J)	U (J)
G52	2.5 - 3.0	118KG052	1,400 (J)	U (J)
G53	2.5 - 3.0	118KG053	140 (J)	U (J)
G54	2.5 - 3.0	118KG054	1.7 (J)	U (J)
G55	0.0 - 0.5	118KG055	U (J)	10 (J)
G56	0.0 - 0.5	118KG056	U	0.038
G57	0.0 - 0.5	118KG057	U	0.28
G58	0.0 - 0.5	118KG058	13 (J)	U (J)
G60	3.3 - 4.0	118KG060	0.041	U
G60	5.5 - 6.0	118KG061	33 (J)	U (J)
G60	7.0 - 7.5	118KG062	290 (J)	U (J)
G63	0.0 - 0.5	118KG063	U	0.09
G64	0.0 - 0.5	118KG064	U	0.290
G65	0.0 - 0.5	118KG065	U	0.027
Under Wooden Shed, SE Corner	0.0 - 0.5	118KG06	U	0.25
Under Wooden Shed, SW Corner	0.0 - 0.5	118KG07	U	U

bgs = Below ground surface
ft = Foot
mg/kg = Milligrams per kilogram
PCB = Polychlorinated biphenyl
J = Estimated value
U = Nondetect

The distribution of the data suggests that contamination in the soil is the result of:

- Leakage from the hydraulic unit to the concrete pad
- Runoff from the concrete pad to the surrounding soil

- Random distribution of contaminated soil during remediation of the concrete pad and soil media
- Potential other sources such as road construction materials, chemicals used for dust control.

Because the hydraulic unit and PCB-contaminated oil has been removed, in addition to the bulk of the contaminated media, the future release and migration of the PCBs is unlikely. The exceedances above the PAL around the B-5410 pad is primarily due to Aroclor 1248. The hydraulic oil used at the Super Kukla Facility consisted of both Aroclor 1248 and Aroclor 1254; however, it was primarily Aroclor 1248. Aroclor 1254 was the primary contaminant detected at the site perimeter fence line and in areas upgradient of the B-5410 pad. Aroclor 1254, while being a component of the hydraulic oil, was also commonly used as a de-dusting agent (DOHHS, 2000). This suggests the possibility that Aroclor 1254 is present at the fence line and within the fence due to dust suppression activities. Additionally, due to the limited precipitation and high evapotranspiration rates of this region, further migration of PCBs at the site is unlikely. See Appendix H for additional discussion on this subject.

D.3.4 Revised Conceptual Site Model

With the exception of the potential that Aroclor 1254 contamination at the site perimeter is due to de-dusting activities, while Aroclor 1254 was also a component of the hydraulic oil, the Aroclor 1254 contamination in the soil upgradient of the B-5410 site is likely from a separate source. The CAU 118 SAFER Plan requirements were met at CAS 27-41-01 and no revisions are necessary to the CSM. The proposed UR is adequate for the protection of human health, and the environment.

D.4.0 Waste Management

This appendix describes the wastes generated during D&D activities and their final disposition. A table has been provided at the end of this section summarizing all of the waste generated, the volume, mass, and ultimate disposition. The major waste streams are also discussed in additional detail below. All wastes were managed in accordance with applicable state and federal regulations, DOE Orders, and the CAU 118 SAFER Plan.

D.4.1 Demolition Debris

Approximately 253,000 lb of demolition debris was generated during closure activities at CAU 118. Demolition debris consisted of galvanized steel, electrical wiring and conduit, light fixtures, non-ACM insulating materials, concrete, and other building materials. The demolition debris was characterized as industrial sanitary waste, as well as PCB Bulk Product waste due to the potential for PCB-containing paints and coatings, plastics, adhesives, caulking, gaskets, and other building materials.

Approval to dispose of the PCB Bulk Product Waste from CAU 118 closure activities in the Area 9 U10c Landfill was granted from NDEP on December 11, 2006 (see Appendix E). Notification of Demolition Activities was provided to the EPA Region 9 on December 1, 2006, in accordance with 40 CFR Part 61. Table D.4-1 summarizes the disposal pathway for the demolition debris generated at CAU 118.

Table D.4-1
Disposal Pathway for Demolition Debris at CAU 118

Structure	Number of Truckloads of Debris	Mass of Debris (lb)	Disposal Site
Wooden Shed	5	46,162	U10c Landfill
Building 5410	10	105,466	U10c Landfill
Building 5400A	12	100,866	U10c Landfill

lb = Pound

D.4.2 Low-Level Radioactive TSCA Oil

Four 55-gallon, closed-head (bung-style) drums of PCB contaminated hydraulic oil, and diesel rinsate were generated during closure activities at CAU 118. The oil was collected and sampled in accordance with a Sampling and Analysis Plan approved by the TSCA Incinerator (TSCAI) in Oak Ridge, Tennessee. Drum numbers 118A06, 118A07, 118A08, and 118A09 were characterized as LLW due to the presence of low levels of Pu-244, curium (Cm)-247, and Cm-248 in the hydraulic oil. The PCB contamination was due to the presence of Aroclor 1248 and 1254. Total Aroclors in the oil exceeded 4,000 ppm. This waste stream was shipped to the TSCAI in January and March 2007. Batching and incineration of the waste is anticipated in September 2007. Table D.4-2 summarizes the final volumes of PCB hydraulic oil dispositioned at the TSCAI. Table D.4-3 details the actions taken to ensure proper characterization and disposal of this waste stream.

Table D.4-2
Final Volumes of PCB Hydraulic Oil from CAU 118 Dispositioned at TSCAI

Container Number	Container Type	Contents	Approx. Volume (gal)	Mass (lb)	Disposal Site	Incineration Date
118A06	55-gal steel drum	Hydraulic Oil	40	425	TSCAI	Scheduled for September 2007
118A07	55-gal steel drum	Oil/Diesel Mixture	48	490	TSCAI	Scheduled for September 2007
118A08	55-gal steel drum	Oil/Diesel Mixture	42	435	TSCAI	Scheduled for September 2007
118A09	55-gal steel drum	Oil/Diesel Mixture	34	350	TSCAI	Scheduled for September 2007
Sample Returns	10-gal steel drum	Oil/Diesel Mixture	<1	<5	TSCAI	Scheduled for September 2007

gal = Gallon
lb = Pound
PCB = Polychlorinated biphenyl
TSCAI = *Toxic Substances Control Act* Incinerator

Table D.4-3
Timeline for Removal of PCB Hydraulic Oil at CAU 118

Date	Action
October 2005	Request to DOE-ORO to place the PCB-contaminated hydraulic oil from Super Kukla onto 2006 Burn Schedule for TSCAI.
November 2005	Super Kukla hydraulic oil placed on 2006 TSCAI Burn Schedule.
February 2006	Profile submitted for Super Kukla hydraulic oil to TSCAI.
March 2006	Generator Application for treatment of Super Kukla hydraulic oil submitted. Generator Application includes Sampling and Analysis Plan, Waste Certification Instruction, and the Residuals Management Contingency Plan.
May 2006	TSCAI approves Generator Application/Sampling Plan.
June 2006	Drains/flush Super Kukla hydraulic system; four drums of hydraulic oil/diesel rinsate generated and sampled in accordance with approved TSCAI Sampling Plan.
July 2006	Submittal of final data summary to TSCAI for review and approval.
August 2006	TSCAI approves acceptance of Super Kukla waste stream.
September 2006	TSCAI requests approval from TDEC for incineration of Super Kukla waste stream.
January 2007	TDEC approves incineration of Super Kukla waste stream at TSCAI.
January 2007	Submit request and receive authorization to ship Super Kukla waste to TSCAI.
January 2007	Ship 4 drums of Super Kukla hydraulic oil to TSCAI.
February 2007	Discovery of excess samples of hydraulic oil returned from laboratories at laboratory sample holding area.
March 2007	Receive approval to ship excess sample material to TSCAI as second shipment of Super Kukla hydraulic oil waste stream.

DOE = U.S. Department of Energy
ORO = Oak Ridge Office
PCB = Polychlorinated biphenyl
TDEC = Tennessee Department of Environmental Compliance
TSCAI = *Toxic Substance Control Act* Incinerator

D.4.3 PCB Remediation Waste

A total of 11 intermodal-type containers containing PCB remediation waste (soil and concrete) were generated from closure activities conducted at CAU 118. The PCB remediation waste was generated from the remediation of the Building 5410 PCB-contaminated concrete pad and soil. Sampling equipment and PPE generated as a result of this remediation was also packaged into the intermodal containers. Based on process knowledge, the PCB remediation waste was also characterized as

low-level radioactive waste due to the known contaminants (e.g., Pu, Cm) in the PCB-hydraulic oil. The PCB remediation waste will be disposed at the Area 5 RWMS. Table D.4-4 summarizes the volumes and disposal pathway for the PCB remediation waste generated at CAU 118.

Table D.4-4
Volumes and Disposal Pathways for PCB Remediation Waste from CAU 118

Container Number	Container Type	Contents	Approximate Volume (yd^3)	Net Mass (lb)	Disposal Site
118A18	Intermodal container	PCB Remediation waste (soil/concrete)	15	30,300	NTS, Area 5 RWMS
118A19	Intermodal container	PCB Remediation waste (soil/concrete)	17	46,000	NTS, Area 5 RWMS
118A20	Intermodal container	PCB Remediation waste (soil/concrete)	15	31,000	NTS, Area 5 RWMS
118A21	Intermodal container	PCB Remediation waste (soil/concrete)	17	43,400	NTS, Area 5 RWMS
118A22	Intermodal container	PCB Remediation waste (soil/concrete)	17	43,500	NTS, Area 5 RWMS
118A23	Intermodal container	PCB Remediation waste (soil/concrete)	15	28,900	NTS, Area 5 RWMS
118A24	Intermodal container	PCB Remediation waste (soil/concrete)	15	26,250	NTS, Area 5 RWMS
118A25	Intermodal container	PCB Remediation waste (soil/concrete)	15	32,100	NTS, Area 5 RWMS
118A26	Intermodal container	PCB Remediation waste (soil/concrete)	15	30,100	NTS, Area 5 RWMS
118A27	Intermodal container	PCB Remediation waste (soil/concrete)	15	34,400	NTS, Area 5 RWMS
118A28	Intermodal container	PCB Remediation waste (soil/concrete)	15	37,600	NTS, Area 5 RWMS

lb = Pound
NTS = Nevada Test Site
PCB = Polychlorinated biphenyl
RWMS = Radioactive waste management site
yd^3 = Cubic yard

D.4.4 Waste Streams Generated During Closure Activities

Table D.4-5 summarizes all of the containerized wastes generated during CAU 118 closure activities. Waste generated during the field investigation activities of CAU 118 included decontamination rinse water, sampling equipment and disposable PPE cleanup wastes, PCB remediation waste, LLW and LLMW. Controls were in place to minimize the use of hazardous materials and the unnecessary generation of hazardous and/or mixed waste. Decontamination activities were planned and executed to minimize the volume of rinsate generated.

Table D.4-5
CAU 118 Waste Generated
(Page 1 of 3)

Container Number	Container Type	Contents	Estimated Volume	Net Weight (lb)	Disposal Site	Comments
118A01	55-gal drum	LLW	55 gal	133	NTS	Disposed in Area 5 RWMS.
118A02	55-gal drum	Sanitary rinsate	44 gal	373	U10c Landfill	Solidified and disposed in U10c Landfill at the NTS.
118A03	10-gal drum	LL-PCB Remediation waste	5 gal	N/A	N/A	Contents repackaged and placed into 118A17.
118A04	10-gal drum	Used Oil	6 gal	N/A	N/A	Recycled.
118A05	55-gal drum	LL-PCB Remediation waste	55 gal	93	NTS	Disposed in Area 5 RWMS.
118A06	55-gal drum	LL-TSCA oil	40 gal	425	TSCAI	Incineration scheduled for September 2007.
118A07	55-gal drum	LL-TSCA oil	48 gal	490	TSCAI	Incineration scheduled for September 2007.
118A08	55-gal drum	LL-TSCA oil	42 gal	435	TSCAI	Incineration scheduled for September 2007.
118A09	55-gal drum	LL-TSCA oil	34 gal	350	TSCAI	Incineration scheduled for September 2007.
118A10	55-gal drum	LL-PCB Remediation Waste	45 gal	63	NTS	Disposed in Area 5 RWMS.
118A11	55-gal drum	LL-PCB Remediation Waste	55 gal	83	NTS	Disposed in Area 5 RWMS.
118A12	10-gal drum	Used Oil	2.5 gal	N/A	N/A	Recycled.

Table D.4-5
CAU 118 Waste Generated
(Page 2 of 3)

Container Number	Container Type	Contents	Estimated Volume	Net Weight (lb)	Disposal Site	Comments
118A13	B-25 box	LLW	31 ft^3	N/A	NTS	Contents consolidated into 118A24.
118A14	55-gal drum	LL-PCB Remediation Waste	55 gal	43	NTS	Disposed in Area 5 RWMS.
118A15	55-gal drum	LL-PCB Remediation Waste	55 gal	133	NTS	Disposed in Area 5 RWMS.
118A16	55-gal drum	LL-PCB Remediation Waste	55 gal	83	NTS	Disposed in Area 5 RWMS.
118A17	55-gal drum	LL-PCB Remediation Waste	18 gal	N/A	N/A	Contents consolidated into 118A24.
15-1476	B-25 box	LLMW	45 ft^3	1,691	Energy Solutions	This container was generated, managed and dispositioned by NSTec. The container was shipped to Energy Solutions in February 2007.
118A18	Intermodal	LL-PCB Remediation Waste	15 yd^3	30,300	NTS	Disposed in Area 5 RWMS.
118A19	Intermodal	LL-PCB Remediation Waste	17 yd^3	46,000	NTS	Disposed in Area 5 RWMS.
118A20	Intermodal	LL-PCB Remediation Waste	15 yd^3	31,000	NTS	Disposed in Area 5 RWMS.
118A21	Intermodal	LL-PCB Remediation Waste	17 yd^3	43,400	NTS	Disposed in Area 5 RWMS.
118A22	Intermodal	LL-PCB Remediation Waste	17 yd^3	43,500	NTS	Disposed in Area 5 RWMS.
118A23	Intermodal	LL-PCB Remediation Waste	15 yd^3	28,900	NTS	Disposed in Area 5 RWMS.
118A24	Intermodal	LL-PCB Remediation Waste	15 yd^3	26,250	NTS	Disposed in Area 5 RWMS.

Table D.4-5
CAU 118 Waste Generated
(Page 3 of 3)

Container Number	Container Type	Contents	Estimated Volume	Net Weight (lb)	Disposal Site	Comments
118A25	Intermodal	LL-PCB Remediation Waste	15 yd^3	32,100	NTS	Disposed in Area 5 RWMS.
118A26	Intermodal	LL-PCB Remediation Waste	15 yd^3	30,100	NTS	Disposed in Area 5 RWMS.
118A27	25 CY Intermodal	LL-PCB Remediation Waste	15 yd^3	34,400	NTS	Disposed in Area 5 RWMS.
118A28	25 CY Intermodal	LL-PCB Remediation Waste	15 yd^3	37,600	NTS	Disposed in Area 5 RWMS.
N/A	50-lb Canister	Freon	< 50 lb	N/A	TSDF	Transferred to NSTec Waste Storage Unit in August 2007.

ft^3 = Cubic foot
gal = Gallon
lb = Pound
LL = Low level
LLMW = Low-level mixed waste
LLW = Low-level waste
N/A = Not applicable
NSTec = National Security Technologies, LLC
NTS = Nevada Test Site
PCB = Polychlorinated biphenyl
RWMS = Radioactive waste management site
TSCA = *Toxic Substances Control Act*
TSCAI = *Toxic Substances Control Act* Incinerator
TSDF = Treatment, storage, and disposal facility
yd^3 = Cubic yard

One HWAA was established to manage hazardous and potentially hazardous waste generated during the CAI. The amount, type, and source of waste placed into each drum was recorded in waste management logbooks or waste container logs that are maintained in the project file.

Office waste and lunch trash was disposed of in designated sanitary waste bins allocated for disposal at the NTS sanitary landfill. Sanitary industrial waste was inspected and accumulated in designated sanitary industrial waste bins located at Building 23-153 and is destined for disposal at the NTS Industrial Waste Landfill

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 CAU 118 closure activities. 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 118 with the exception of National Institute for Occupational Safety and Health analyses, 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 1 and Tier 2 evaluations. A Tier 3 evaluation was performed on approximately 5 percent of the data analyzed.

D.5.1.1 Tier 1 Evaluation

Tier 1 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 and nonconformances stated in cover letter or case narrative.
- Completeness of certificates of analysis.
- 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 2 Evaluation

Tier 2 evaluation for chemical analysis examines, but is not limited to the assurance of:

- Completeness of Tier 1 evaluation including resolutions, if applicable.
- Analytical/QC batch association for each sample.
- Correctly assigned laboratory reporting and qualification of sample results.
- Reported parameters analyzed by approved methods.
- Proper dilution reporting, including detection limit adjustments.
- Required reporting limits met per project requirements.
- Cooler temperature requirements/criteria met.
- pH preservation criteria met; exceedances evaluated and qualifiers applied to sample results as appropriate.
- Holding time criteria met; exceedances evaluated and qualifiers applied to sample results as appropriate.
- Initial and continuing calibration criteria met; exceedances evaluated and qualifiers applied to sample results, as appropriate.
- Blank criteria met and contamination evaluated and applied to sample results as appropriate.
- Matrix spike criteria met; exceedances evaluated and qualifiers applied to sample results as appropriate.

- Laboratory Control Sample criteria met; exceedances evaluated ensuring corrective actions taken as appropriate.
- Internal standard criteria met exceedances evaluated ensuring corrective actions taken as appropriate.
- Retention time criteria met; exceedances evaluated ensuring corrective actions taken as appropriate.
- Instrument performance check criteria met; exceedances evaluated ensuring corrective actions taken as appropriate.
- Surrogate criteria met; exceedances evaluated and qualifiers applied to sample results as appropriate.
- Column Comparison criteria met; exceedances evaluated and qualifiers applied to sample results as appropriate.
- Headspace criteria met; exceedances evaluated and qualifiers applied to sample results as appropriate
- Interference check criteria met; exceedances evaluated and qualifiers applied to sample results as appropriate.
- Serial Dilution criteria met; exceedances evaluated and qualifiers applied to sample results as appropriate.
- Field duplicate precision evaluated and qualifiers applied to results as necessary.
- Laboratory duplicate criteria met; exceedances evaluated and qualifiers applied to sample results as appropriate.
- Other

Tier 2 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 for 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.

D.5.1.3 Tier 3 Evaluation

The Tier 3 review is an independent examination of the Tier 2 evaluation. A Tier 3 review of 5 percent of the sample analytical data was performed by TLI Solutions, of Lakewood, Colorado. Tier 2 and Tier 3 results were compared, and where differences were noted, data were reviewed and changes made accordingly. This review included the following additional evaluations:

- Review of:
  - Case narrative, chain of custody, and sample receipt forms.
  - Lab qualifiers (applied appropriately).
  - Method of analyses performed as dictated by the chain of custody (COC).
  - Raw data, including chromatograms, instrument printouts, preparation logs, and analytical logs.
  - Manual integrations to determine if 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, laboratory control samples, blanks, matrix spikes) evaluated and used to determine sample results qualifiers.

- Sample preservation, sample preparation/extraction and run logs, sample storage 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.

- Post digestion spikes and method of standard additions.

- Breakdown evaluations.

• Calculation checks of:

  - At least one analyte per QC sample 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 Quality Control Samples

Field QC samples consisted of 11 trip blanks, 1 field blank, 2 FDs and 4 full lab QC samples. The QC samples were assigned individual sample numbers and sent to the laboratory "blind." Additional samples were selected by the laboratory to be analyzed as full laboratory QC samples to meet their analytical batch requirements.

Review of the field blank analytical data resulted in one toluene and one methylene chloride sample was qualified due to possible field blank contamination. Acetone was not detected in the laboratory blanks. Field blanks were analyzed for the applicable parameters listed in Table D.2-2, and trip blanks were analyzed for VOCs only.

During the CAI, two 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, precision was evaluated for inorganic analysis.

D.5.2.1 Laboratory Quality Control Samples

Preparation blanks (PBs) and LCSs were prepared and analyzed in each sample delivery group (SDG) for inorganic analyses, while method blanks and LCSs were prepared and analyzed on each SDG for organic analyses. Additionally, when appropriate full laboratory QC (i.e., matrix spikes, matrix spike duplicates, and/or duplicates) was also prepared and analyzed.

The laboratory prepared and analyzed a PB, 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 nonconformance (NCRs) are generally due to inconsistencies in the analytical instrumentation operation, sample preparations, extractions, missed holding times, and fluctuations in internal standard and calibration results. There were 14 nonconformances issued by the laboratories

for this project. Laboratory NCRs are evaluated for their effect on the data, and when necessary the data is qualified. These laboratory nonconformances have been accounted for and resolved during the data validation process.

D.6.0 Summary

Organic, inorganics, and radionuclide contaminants detected in environmental samples during the CAI were evaluated against FALs to determine the nature and extent of COCs for CAU 118. Assessment of the data generated from investigation activities indicates the FALs were exceeded for PCBs (Aroclor 1248) in the vicinity of the Building 5410 pad, and (Aroclor 1254) at the west and south perimeter fence lines. Because the source of the PCBs has been removed, and the majority of the contaminated media (concrete and soil) has been removed and packaged as waste, further lateral and vertical migration of the COC has been mitigated. Concentrations of PCBs in soil samples in the area of the B-5410 pad display both decrease laterally and vertically from the source of the contamination. While PCB concentrations in the soil do not decrease vertically to concentrations below the FALs, the hard pan (caliche layer) acts as a barrier against further vertical migration. The lateral distribution of PCB contamination in the soil decreases with distance from the source, however, concentrations exceed the FAL in the west and south perimeters of the site. The two locations G55 and G58 where PCBs exceeded FALs (10 and 13 mg/kg) are only slightly greater than the FAL, and step-out samples 118KG63 and 118KG64 support the conclusion that the extent is limited to within 10 to 15 ft of the existing perimeter fence line. Sample locations G56 and G57 at the east and north perimeter fence lines, respectively, did not contain PCB at concentrations greater than FALs.

There could be at least two sources for the PCB contamination. Exceedances above the FAL around the B-5410 pad are due to Aroclor 1248. The hydraulic oil used at the Super Kukla Facility consisted of both Aroclor 1248 and Aroclor 1254; however, the oil was primarily Aroclor 1248. Aroclor 1254 is the primary contaminant detected at the site perimeter fence line and in areas upgradient of the B-5410 pad. Aroclor 1254 while being a component of the hydraulic oil, was also commonly used as a de-dusting agent (DOHHS, 2000).

Because the hydraulic unit and PCB-contaminated oil has been removed, the bulk of the contaminated media (concrete and contaminated soil) has been removed, and the practice of using PCB containing oils for dust suppression has stopped, the source and future release of PCBs has been eliminated. Additionally, due to the limited precipitation and high evapotranspiration rates in this region, and the hard pan shallow subsurface soils, further vertical migration of PCBs at the site is

unlikely. Polychlorinated biphenyls are very immobile in the environment and tend to adhere to soil particles. Without a driving force (e.g., additional PCB oil, rain, surface water), the PCBs remaining at the site above the FALs are bounded within CAS 27-41-01 and will be Use Restricted. This will effectively eliminate inadvertent contact by humans with the contaminated media.

D.6.1 Photographs of Closure Activities at CAS 27-41-01

Figure D.6-1 through D.6-19 depict closure activities at CAS 27-41-01.

Figure D.6-1
CAU 118, Wooden Shed
October 2006

Figure D.6-2
CAU 118, Wooden Shed with Building 5400A (in background)
March 2005

Figure D.6-3
CAU 118, High Bay Building 5400A (right) and Building 5410 Mechanical Building (left)
March 2005

Figure D.6-4
CAU 118, High Bay Building 5400A
March 2005

Figure D.6-5
CAU 118, Mechanical Building 5410
October 2006

Figure D.6-6
CAU 118, Mechanical Building 5410
October 2006

Figure D.6-7
CAU 118, Tunnel to Reactor Room/Basement and Building
October 2006

Figure D.6-8
CAU 118, Basement to Reactor Base
October 2006

Figure D.6-9
CAU 118, Reactor Room and Sealed Lead Wall
October 2006

Figure D.6-10
CAU 118, Wooden Shed Demolition
December 2006

Figure D.6-11
CAU 118, Building 5410 Demolition
December 2006

Figure D.6-12
CAU 118, Building 5400A High Bay Demolition
January 2007

Figure D.6-13
CAU 118, Demolition to Foundations
January 2007

Figure D.6-14
CAU 118, Sealed and Secured Tunnel Doors
March 2007

Figure D.6-15
CAU 118, Flowable Grout Fill in Tunnel
March 2007

Figure D.6-16
CAU 118, Flowable Grout Fill in Tunnel
March 2007

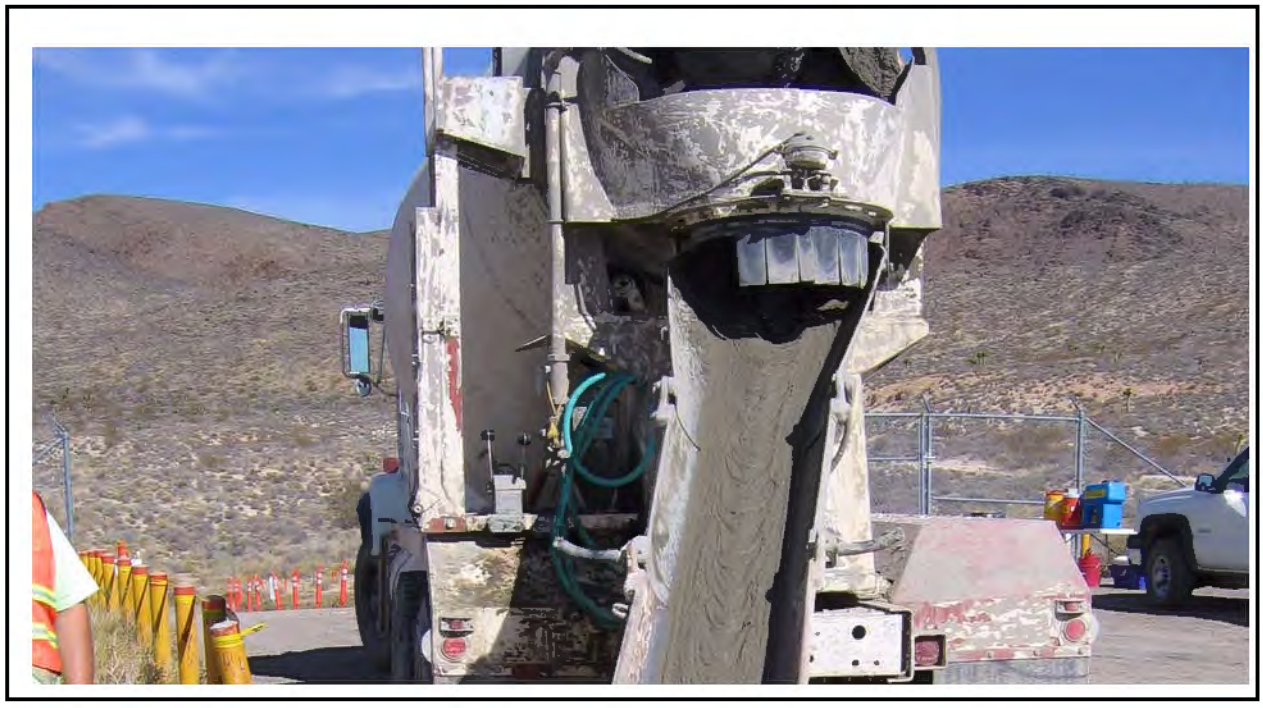

Figure D.6-17
CAU 118, Grout Filling Operations
March 2007

Figure D.6-18
CAU 118, Building 5410 PCB-Contaminated Pad Removal
June 2007

Figure D.6-19
CAU 118, Building 5410 PCB-Contaminated Pad Removal
June 2007

D.7.0 References

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Appendix E

Waste Disposition Documentation

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 118, CAS 27-41-01. All wastes were managed in accordance with all applicable state and federal regulations, DOE Orders, and the CAU 118 SAFER Plan.

Attachment 1

Waste Disposition Records

(69 pages)

Waste Certificate of Disposal
Container Number 118A01

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Rev. 09 shipment number ITL07001, with container number 118A01 was shipped and received at the Nevada Test Site Radioactive Waste Management Site in Area 5 for disposal as stated below.

David Schrock	Stoller-Navarro Joint Venture	LLW Coordinator
Shipped by	Organization	Title
/s/ David Schrock		1-30-07
Signature		Date
ED TAKAHASHI	NSTec RWMC A5	SCIENTIST.
Received by	Organization	Title
/s/ Ed Takahashi		30-Jan-2007
Signature		Date

NTS Landfill Load Verification
Container Number 118A02

NTS LANDFILL LOAD VERIFICATION

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: Stoller-Navarro Joint Venture Phone Number: 295-2033

Location / Origin: CAU 118, NTS; 1 container of solid. Drum #118A02

Waste Category: (check one)	☐ Commercial	☒ Industrial		
Waste Type: (check one)	☐ NTS	☐ Putrescible	☒ FFACO-onsite	☐ WAC Exception
	☐ Non-Putrescible	☐ 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 NTS landfills: Radioactive waste; RCRA waste; Hazardous waste; Free liquids, PCBs above TSCA regulatory 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 Friable 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 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	☐ 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 Ground Tanks
☐ Hydrocarbons (contact SWO)	☒ Other Waste Lock 770	

Additional waste accepted at the Area 6 Hydrocarbon Landfill: ☐ _____

☐ Septic sludge	☐ Rags	☐ Drained fuel filters (gas & diesel)	☐ Crushed non-terne 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 Management Area (CWMA) and to the best of my knowledge, does not contain radiological materials.

To the best of my knowledge, the waste described above contains only those materials that are allowed for disposal at this site. I have verified this through the waste characterization method identified above a prohibited and allowable waste items. I have contacted Property Management and ha is approved for disposal in the landfill.

Print Name: Mark Burmeister

Signature: /s/ MC Burmeister Date: 10/26/06

Note: "Food waste, office trash and animal carcasses do not require a radiological clea must have signed removal certification statement with Load Verification."

Radiological Survey Release for Waste Disposal
RCT initials

____ This container/load meets the criteria for no added man-made radioactive material

_K_ This container/load meets the criteria for Radcon Manual Table 4.2 release limits.

____ This container/load is exempt from survey due to process knowledge and origin.

SIGNATURE: /s/ Mike VanDillen **DATE:** 9-27-06

SR.0648 (10/05)

SWO USE ONLY

Load Weight (net from scale or estimate): _____ Signature of Certifier: _____

Waste Container Log 118A03

Waste Container Log

To Be Filled by Environmental Compliance / Waste Management Staff
Comments:
The contents of drum 118A03 were repackaged into this drum (118A17). 118A03 was a
10-gallon drum containing PCB-remediation waste generated at the Super Kukla D&D
Site. On April 5, 2007, the RWAP advised SNJV that the LLW disposal cell would not
accept 10-gallon drums for disposal. Drum 118A03 was approaching its 1-year clock,
however based upon a telephone conversation later that same day (April 5, 2007)
between John Fowler, Mark Burmeister, and Jim Cebe; Jim Cebe advised SNJV it was
acceptable to repack the 10-gallon drum (118A03). SNJV anticipates generating
additional PCB-remediation waste during soil/concrete remediation of the B-5410 area.
Jim Cebe was also agreeable to restarting the 1 year clock on the newly packaged 55
gallon drum (118A17). Refer to e-mail from Jim Cebe to John Fowler, dated Thursday,
April 5, 2007; cc: Jhon T. Carilli; Subject: RE: LL PCB Remediation Waste. /s/ MC Burmeister 4/19/07
7/16/07 The contents of this drum (118A17) were placed into intermodal
container # 118A24 on this date. The waste types are compatible
(ie. PCB Remediation Waste), and the placement of the contents of
this drum into IM 118A24 will reduce the overall project volume of
waste. /s/ MC Burmeister 7/16/07

Container ID: 118A17 Page 6 of 6

Industrial Sites
Field Activity Report
Waste Container 118A04

STOLLER-NAVARRO

Industrial Sites Field Activity Report

Location:	**CAU 118**	**WBS:**	14131203
Activity Date:	2007/01/16	**Weather:**	Sunny
Winds:		**Temps:**	49

Current Activities: Completed debris removal from B-5410, setup EZ for work at 5400A.

Safety Briefing: Y **Site Inspection/Walkdown:** Y **Pre-Work Briefing:** Y

Post-Work Briefing: Y **QA Review & Initial:** N

Personnel

Name	Function	Activity
Bautista, Abud NSTec	Laborer	NSTec Crew
Burmeister, Mark SN	Task Manager	Task Manager
Casselbury, Mike NSTec	ER Lead	NSTec Crew
Dean, Jeff NSTec	Operator	NSTec Crew
Duhe, Harold SNJV	Communications	Communications
Fisher, James NSTec	Operator	NSTec crew
Gomez, Arno SN	Health and Safety	Health and Safety
Gurrero, Val NSTec	Teamster	NSTec Crew
Henry, Dan SN	Site Supervisor	Site Supervisor
Lee, Roderick NSTec	Laborer	NSTec Crew
Miller, James NSTec	Teamster	NSTec Crew
Rose, John NSTec	Teamster	NSTec Crew
Skinner, B NSTec	Teamster	NSTec Crew
Van Dillon, Mike Navarro	Rad Control Tech	Rad Control Technician

Equipment

Equipment	Identification	Owner	Onsite	Offsite
Truck	Dodge - 1	Rental	1/23	6/6
Truck	Dodge - 2	Rental	1/23	6/6
Truck	G63 1127B	Stoller-	1/23	6/6
Truck	Dodge - 1	Rental	1/23	6/6
Truck	Dodge - 2	Rental	1/23	6/6
Truck	Dodge - 2	Rental	1/23	6/6
John Deere Loader	73287	Stoller-	1/30	6/6
DTRA Sampling Van	SNJV	Stoller-	2/13	6/6
Equipment trailer	SNJV	BN	5/30	6/6

Scissor Lift	BN	BN	5/30	6/6
Equipment trailer	SNJV - 1	Stoller-	10/10	3/22
Trailblazer	Chevy	Stoller-	10/10	10/20
Forklift	NSTec	NSTec	12/7	12/20
Frontend Loader	NSTec	DTRA	12/7	12/20
Fuel Tank	NSTec	NSTec	12/7	3/22
Generator	NSTec	NSTec	12/7	3/22
Manlift	JLG (Man Basket)	DTRA	12/7	12/20
Cat Shears	350L	NSTec	1/9	1/16
End Dumps	NSTec - 2	NSTec	1/9	1/16
Truck	Chevy	Stoller-	2/26	2/26
Truck	Dodge	Rental	2/26	2/26
Truck	Dodge	Rental	2/26	2/26
Truck	Chevy	Stoller-	2/26	2/26
Lab Trailer	SNJV	Stoller-	2/28	3/22
Steak Bed Truck	Sub	Subcontr	2/28	2/28
Tractor and Trailer	SN74002	Subcontr	2/28	2/28
Truck	3 Trucks	Stoller-	2/28	2/28
Cement Truck	3 Trucks	NSTec	3/5	3/5
Concrete Pumper	Subcontractor	Subcontr	3/5	3/22
Truck	5 Pickup Trucks	NSTec	3/5	3/5
Cement Truck	5 Cement Trucks	NSTec	3/6	3/6
Cement Truck	5 Cement Trucks	NSTec	3/6	3/6
Cement Truck	5 Cement Trucks	NSTec	3/6	3/6
Cement Truck	5 Cement Trucks	NSTec	3/6	3/6
Cement Truck	5 Cement Trucks	NSTec	3/6	3/6
Cement Truck	5 Cement Trucks	NSTec	3/6	3/6
Cement Truck	5 Cement Trucks	NSTec	3/6	3/6
Cement Truck	5 Cement Trucks	NSTec	3/6	3/6
Truck	5 Pickup Trucks	NSTec	3/8	3/8
Water Truck	NSTec	NSTec	3/14	3/22
Cement Truck	6 Cement Trucks	NSTec	3/15	3/15
Hose Truck	Thorton Concrete	Subcontr	3/19	3/22
Cement Truck	4 Cement Trucks	NSTec	3/21	3/21
Frontend Loader	NSTec	NSTec	3/22	3/22
Office Trailer	NSTec	NSTec	3/22	3/22
Truck	Mechanics Truck	NSTec	3/22	3/22
Forklift	NSTec	NSTec	5/9	5/9
Fuel Tank	NSTec	Rental	5/9	5/9
Generator	NSTec	NSTec	5/9	5/9
Office Trailer	NSTec	NSTec	5/9	5/9

Stake Bed Truck	NSTec	NSTec	5/9	5/9
Fuel Tank	NSTec	NSTec	6/4	
Generator	NSTec	NSTec	6/4	
Hoe Ram	Track Hoe w/ram	NSTec	6/4	6/4
Office Trailer	NSTec	NSTec	6/4	
Truck	Dodge	Rental	6/4	
Truck	Chevy Tahoe	Stoller-	6/4	6/4
Truck	Ford CC P/U	DTRA	6/4	6/4
Backhoe	NSTec	NSTec	6/11	6/11
Forklift	NSTec	NSTec	6/11	

Site Safety

Function	Performed By
Tailgate Safety	Gomez, Arno SN

Work Log

From	To	Work Performed
530	600	Crew met at Cheyenne Facility and drove to B-153
600	730	Arrive at NTS Bldg.153. Load supplies; H&S and RCT calibrate equipment. Depart for Super Kukla, Area 27, CAS 27-41-01.
730	800	Drive to Area 27
800	1000	Arrive at CAS 27-41-01. POD and TSB given to SNJV and NSTec employees Equipment operators, Laborers, Teamsters and ER Representative. Equipment and vehicle inspections completed. Site walk down of work to begin at B-5400A with ER Rep, Equipment Operators and Teamster. Crew verified the safest access and egress routes for end dumps entering the site to be loaded and subsequently exiting the site.
1000	1200	NSTec oiler on site to service equipment. Loaded last of debris from B-5410 into end dump, B5410 demo is now complete. Set up new EZ for work to be done at 5400A.
1200	1230	Lunch
1230	1420	Equipment operator and Laborer dress out into level C and enter EZ at B-5400A and wet down area to be demolished using water supplied by water truck for dust suppression. Remove HVAC units and stack from in front of B5400 A and loaded into 2 end dumps. End dumps going to U10C landfill to dispose of debris. Removed blue sample pipe from interior of B-5400A using shear and placed in front of building.
1420	1535	NSTec off site going to Diversity Training. SNJV disassembled blue pipe at flanges and RCT performed screening and took swipe samples from interior of pipe. Secure site.
1535	1605	Drive back to B-153
1605	1645	Arrive at B-153 unload supplies.
1645	1745	Drive to Cheyenne Facility

Summary

ESH&Q Action

None

Field Screening

Screening and swipe samples taken from interior of blue pipe removed from interior of B-5400A. All readings were below reportable limits.

Plans

Continue demo of B-5400A and load into end dumps to be disposed of at 10C land fill.

Safety

PPE: Level C and Level D

Summary

Completed removing all debris from B-5410 site and loaded into end dump, all material to be disposed of at U10C landfill. Set up new EZ for work to be done at 5400A. Remove HVAC units and stack from in front of B5400A and loaded into 2 end dumps. End dumps going to U10C landfill to dispose of debris. Remove blue pipe from interior of B-5400A using shear and placed in front of building. Disassembled blue pipe at flanges. RCT performed screening and took swipe samples from interior of pipe.

Waste Management

1 bag of PPE labeled and put into roll off at B-153 and logged into W.M. book. NSTec oiler performed Chlor-Detect test on oil that was drained from overhead Hydraulic cranes and HVAC. Oiler recovered approx. 6 gal. of oil. Drums (118A04 and 118A12) were wiped out and destroyed.

Weather

19 to 49 degrees F., sunny

Prepared by: Henry, Dan SN Reviewed by: Rob Boehlecke

Back

Industrial Sites
Field Activity Report
Waste Container 118A12

STOLLER-NAVARRO

Industrial Sites Field Activity Report

Location: CAU 118 **WBS:** 14131203
Activity Date: 2007/01/16 **Weather:** Sunny
Winds: **Temps:** 49
Current Activities: Completed debris removal from B-5410, setup EZ for work at 5400A.
Safety Briefing: Y **Site Inspection/Walkdown:** Y **Pre-Work Briefing:** Y
Post-Work Briefing: Y **QA Review & Initial:** N

Personnel

Name	Function	Activity
Bautista, Abud NSTec	Laborer	NSTec Crew
Burmeister, Mark SN	Task Manager	Task Manager
Casselbury, Mike NSTec	ER Lead	NSTec Crew
Dean, Jeff NSTec	Operator	NSTec Crew
Duhe, Harold SNJV	Communications	Communications
Fisher, James NSTec	Operator	NSTec crew
Gomez, Arno SN	Health and Safety	Health and Safety
Gurrero, Val NSTec	Teamster	NSTec Crew
Henry, Dan SN	Site Supervisor	Site Supervisor
Lee, Roderick NSTec	Laborer	NSTec Crew
Miller, James NSTec	Teamster	NSTec Crew
Rose, John NSTec	Teamster	NSTec Crew
Skinner, B NSTec	Teamster	NSTec Crew
Van Dillon, Mike Navarro	Rad Control Tech	Rad Control Technician

Equipment

Equipment	Identification	Owner	Onsite	Offsite
Truck	Dodge - 1	Rental	1/23	6/6
Truck	Dodge - 2	Rental	1/23	6/6
Truck	G63 1127B	Stoller-	1/23	6/6
Truck	Dodge - 1	Rental	1/23	6/6
Truck	Dodge - 2	Rental	1/23	6/6
Truck	Dodge - 2	Rental	1/23	6/6
John Deere Loader	73287	Stoller-	1/30	6/6
DTRA Sampling Van	SNJV	Stoller-	2/13	6/6
Equipment trailer	SNJV	BN	5/30	6/6

Scissor Lift	BN	BN	5/30	6/6
Equipment trailer	SNJV - 1	Stoller-	10/10	3/22
Trailblazer	Chevy	Stoller-	10/10	10/20
Forklift	NSTec	NSTec	12/7	12/20
Frontend Loader	NSTec	DTRA	12/7	12/20
Fuel Tank	NSTec	NSTec	12/7	3/22
Generator	NSTec	NSTec	12/7	3/22
Manlift	JLG (Man Basket)	DTRA	12/7	12/20
Cat Shears	350L	NSTec	1/9	1/16
End Dumps	NSTec - 2	NSTec	1/9	1/16
Truck	Chevy	Stoller-	2/26	2/26
Truck	Dodge	Rental	2/26	2/26
Truck	Dodge	Rental	2/26	2/26
Truck	Chevy	Stoller-	2/26	2/26
Lab Trailer	SNJV	Stoller-	2/28	3/22
Steak Bed Truck	Sub	Subcontr	2/28	2/28
Tractor and Trailer	SN74002	Subcontr	2/28	2/28
Truck	3 Trucks	Stoller-	2/28	2/28
Cement Truck	3 Trucks	NSTec	3/5	3/5
Concrete Pumper	Subcontractor	Subcontr	3/5	3/22
Truck	5 Pickup Trucks	NSTec	3/5	3/5
Cement Truck	5 Cement Trucks	NSTec	3/6	3/6
Cement Truck	5 Cement Trucks	NSTec	3/6	3/6
Cement Truck	5 Cement Trucks	NSTec	3/6	3/6
Cement Truck	5 Cement Trucks	NSTec	3/6	3/6
Cement Truck	5 Cement Trucks	NSTec	3/6	3/6
Cement Truck	5 Cement Trucks	NSTec	3/6	3/6
Cement Truck	5 Cement Trucks	NSTec	3/6	3/6
Cement Truck	5 Cement Trucks	NSTec	3/6	3/6
Truck	5 Pickup Trucks	NSTec	3/8	3/8
Water Truck	NSTec	NSTec	3/14	3/22
Cement Truck	6 Cement Trucks	NSTec	3/15	3/15
Hose Truck	Thorton Concrete	Subcontr	3/19	3/22
Cement Truck	4 Cement Trucks	NSTec	3/21	3/21
Frontend Loader	NSTec	NSTec	3/22	3/22
Office Trailer	NSTec	NSTec	3/22	3/22
Truck	Mechanics Truck	NSTec	3/22	3/22
Forklift	NSTec	NSTec	5/9	5/9
Fuel Tank	NSTec	Rental	5/9	5/9
Generator	NSTec	NSTec	5/9	5/9
Office Trailer	NSTec	NSTec	5/9	5/9

Stake Bed Truck	NSTec	NSTec	5/9	5/9
Fuel Tank	NSTec	NSTec	6/4	
Generator	NSTec	NSTec	6/4	
Hoe Ram	Track Hoe w/ram	NSTec	6/4	6/4
Office Trailer	NSTec	NSTec	6/4	
Truck	Dodge	Rental	6/4	
Truck	Chevy Tahoe	Stoller-	6/4	6/4
Truck	Ford CC P/U	DTRA	6/4	6/4
Backhoe	NSTec	NSTec	6/11	6/11
Forklift	NSTec	NSTec	6/11	

Site Safety

Function	Performed By
Tailgate Safety	Gomez, Arno SN

Work Log

From	To	Work Performed
530	600	Crew met at Cheyenne Facility and drove to B-153
600	730	Arrive at NTS Bldg.153. Load supplies; H&S and RCT calibrate equipment. Depart for Super Kukla, Area 27, CAS 27-41-01.
730	800	Drive to Area 27
800	1000	Arrive at CAS 27-41-01. POD and TSB given to SNJV and NSTec employees Equipment operators, Laborers, Teamsters and ER Representative. Equipment and vehicle inspections completed. Site walk down of work to begin at B-5400A with ER Rep, Equipment Operators and Teamster. Crew verified the safest access and egress routes for end dumps entering the site to be loaded and subsequently exiting the site.
1000	1200	NSTec oiler on site to service equipment. Loaded last of debris from B-5410 into end dump, B5410 demo is now complete. Set up new EZ for work to be done at 5400A.
1200	1230	Lunch
1230	1420	Equipment operator and Laborer dress out into level C and enter EZ at B-5400A and wet down area to be demolished using water supplied by water truck for dust suppression. Remove HVAC units and stack from in front of B5400 A and loaded into 2 end dumps. End dumps going to U10C landfill to dispose of debris. Removed blue sample pipe from interior of B-5400A using shear and placed in front of building.
1420	1535	NSTec off site going to Diversity Training. SNJV disassembled blue pipe at flanges and RCT performed screening and took swipe samples from interior of pipe. Secure site.
1535	1605	Drive back to B-153
1605	1645	Arrive at B-153 unload supplies.
1645	1745	Drive to Cheyenne Facility

Summary

ESH&Q Action

None

Field Screening

Screening and swipe samples taken from interior of blue pipe removed from interior of B-5400A. All readings were below reportable limits.

Plans

Continue demo of B-5400A and load into end dumps to be disposed of at 10C land fill.

Safety

PPE: Level C and Level D

Summary

Completed removing all debris from B-5410 site and loaded into end dump, all material to be disposed of at U10C landfill. Set up new EZ for work to be done at 5400A. Remove HVAC units and stack from in front of B5400A and loaded into 2 end dumps. End dumps going to U10C landfill to dispose of debris. Remove blue pipe from interior of B-5400A using shear and placed in front of building. Disassembled blue pipe at flanges. RCT performed screening and took swipe samples from interior of pipe.

Waste Management

1 bag of PPE labeled and put into roll off at B-153 and logged into W.M. book. NSTec oiler performed Chlor-Detect test on oil that was drained from overhead Hydraulic cranes and HVAC. Oiler recovered approx. 6 gal. of oil. Drums (118A04 and 118A12) were wiped out and destroyed.

Weather

19 to 49 degrees F., sunny

Prepared by: Henry, Dan SN Reviewed by: Rob Boehlecke

Back

Certificate of Disposal
Waste Container 118A05

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Revision 10, shipment number ITL07002, with container numbers 118A05, 118A10, 118A11, 118A14, 118A15, 118A16, and 166F01 was shipped and received at the Nevada Test Site Radioactive Waste Management Site in Area 5 for disposal as stated below.

David Schrock	Stoller-Navarro Joint Venture	LLW Coordinator
Shipped by	Organization	Title
/s/ David Schrock		5/9/07
Signature		Date
Nancy E Etheridge	N.S.T.E.C	operation Specialist
Received by	Organization	Title
/s/ Nancy Etheridge		5/9/07
Signature		Date

Uniform Hazardous Waste Manifest
PCB Oils
Waste Container Numbers
118A06, 118A07, 118A08,118A09, and 118A19

JAN-26-2007 10:38 FROM TO 18655765380 P.02/04

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number NEV3890090001	2. Page 1 of 1	3. Emergency Response Phone 702-295-0311	4. Manifest Tracking Number 000218934 FLE

5. Generator's Name and Mailing Address: US DOE, Nevada Office, PO Box 98518, Las Vegas, NV 89193
Generator's Phone: 702-295-2488
Generator's Site Address (if different than mailing address): A27, Nevada Test Site

6. Transporter 1 Company Name: Hittman Transportation Services (HITT)
U.S. EPA ID Number: TND 987783065

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address: US DOE, TSCA Incinerator, ETTP, Highway 58 and Blair Road, Oak Ridge, TN 37831
Facility's Phone: 865-220-0295 241-2100 BP 1/22/07
U.S. EPA ID Number: TN0890090004

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
RQ	1 Polychlorinated Biphenyls, liquid, mixture, Class 9, UN2315, PGII	4	DM	771	K	
	2					
	3					
	4					

14. Special Handling Instructions and Additional Information
Out-of-service 5/30/06, OIL CONTAINS PCBs, TOTAL PCBs 771 K
4 x 55 gallons: Drum 118A06, 193K; 118A07, 222K; 118A08, 197K; 118A09, 159K
ERC 171 0209047 0209027 0209006 0209032
REAR DOOR 0001784
TRACKING 2007012210541 4

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgement of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name	Signature	Month	Day	Year
Barbara Quinn, for US DOE	/s/ Barbara Quinn	1	23	07

16. International Shipments: ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name	Signature	Month	Day	Year
Debbie Collins	/s/ Debbie Collins	01	23	07
Transporter 2 Printed/Typed Name	Signature	Month	Day	Year

18. Discrepancy

18a. Discrepancy Indication Space: ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H040			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name	Signature	Month	Day	Year
On behalf of US DOE William G Melton	/s/ William G. Melton	01	26	07

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete. DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Department of Energy
National Nuclear Security Administration
Nevada Site Office
P.O. Box 98518
Las Vegas, NV 89193-8518

January 31, 2007

Tim Murphy, Chief
Bureau of Federal Facilities
Division of Environment Protection
1771 E. Flamingo Rd., Suite 121-A
Las Vegas, NV 89119-0837

Marlene Huderski
Bureau of Federal Facilities
Division of Environment Protection
1771 E. Flamingo Rd., Suite 121-A
Las Vegas, NV 89119-0837

TRANSMITTAL OF THE UNIFORM HAZARDOUS WASTE MANIFEST # 000218934FLE FOR THE POLYCHLORINATED BIPHENYL (PCB)/RADIOACTIVE OILS SHIPMENT TO THE TOXIC SUBSTANCE CONTROL ACT (TSCA) INCINERATOR

Please find the enclosed copy of the subject manifest. The shipment arrived at the TSCA Incinerator in Oak Ridge, Tennessee on January 26, 2007.

If you have any questions, please contact me at 295-1933

/s/ Jhon T. Carilli

Kenneth M. Small
RCRA Program Manager
Waste Management Project

WMP:2783.KS

cc via e-mail:
B. J. Quinn, SNJV, Las Vegas, NV
W. R. Wilborn, ERP, NNSA/NSO,
Las Vegas, NV

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: NEV3890090001
2. Page 1 of: 1
3. Emergency Response Phone: 702-295-0311
4. Manifest Tracking Number: 000218934 FLE

GENERATOR

5. Generator's Name and Mailing Address:
US DOE, Nevada Office
PO Box 98518
Las Vegas, NV 89193
Generator's Phone: 702-295-2488

Generator's Site Address (if different than mailing address):
A27, Nevada Test Site

6. Transporter 1 Company Name: Hittman Transportation Services (HITT)
U.S. EPA ID Number: TND 987783065

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address:
US DOE, TSCA Incinerator, ETTP
Highway 58 and Blair Road
Oak Ridge, TN 37831
Facility's Phone: 865-~~220-0295~~ 241-2100 BQ1/23/07
U.S. EPA ID Number: TN0890090004

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
RQ	1. Polychlorinated Biphenyls, liquid, mixture, Class 9, UN2315, PGII	4	DM	771	K	
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information:
Out-of-service 5/30/06, OIL CONTAINS PCBS, TOTAL PCBs 771 K
REAR DOOR
4 x 55 gallons: Drum 118A06, 193K; 118A07, 222K; 118A08, 197K; 118A09, 159K
0001784
ERG 171 0209047 0209027 0209006 0209032 TRACKING 200701221054 14

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Barbara Quinn, for US DOE
Signature: /s/ Barbara Quinn
Month: 1 Day: 23 Year: 07

INTL

16. International Shipments: ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Debbie Collins
Signature: /s/ Debbie Collins
Month: 01 Day: 23 Year: 07

Transporter 2 Printed/Typed Name:
Signature:
Month: Day: Year:

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space: ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

19b. Alternate Facility (or Generator)
U.S. EPA ID Number:

Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H040			

20. Designated Facility Owner or Operator Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: On behalf of US DOE William G Melton
Signature: /s/ William G. Melton
Month: 01 Day: 26 Year: 07

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

January 2007

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: NEV3890090001
2. Page 1 of: 1
3. Emergency Response Phone: 702-295-0311
4. Manifest Tracking Number: 000218935 FLE

Form Approved. OMB No. 2050-0039

5. Generator's Name and Mailing Address
US DOE, Nevada Office
PO Box 98518
Las Vegas, NV 89193 702-295-2488

Generator's Site Address (if different than mailing address)
A23, Nevada Test Site

6. Transporter 1 Company Name: Hittman Transportation Services — U.S. EPA ID Number: TND987783065

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address
US DOE, TSCA Incinerator, ETTP
Highway 58 and Blair Road
Oak Ridge, TN 37831 865-241-2100

U.S. EPA ID Number: TN0890090034

9a	9b. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No	Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
1	Polychlorinated Biphenyls, liquid, mixture Class 9, UN2315, PG II	1	DM	11 55 BQ 3/13/07	K	
2						
3						
4						

14. Special Handling Instructions and Additional Information
out-of-service 10/17/06, oil containing PCBs, total PCBs 1.1 K BQ 3/13/07
1 x 10 gal drum, 118A19, TID 0212989 DAC 207995-2 0.01K
ERG 171
TRUCK TID 0210680

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Barbara Quinn for US DOE
Signature: /s/ Barbara Quinn
Month: 03 Day: 13 Year: 07

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Ernest Proctor #43797
Signature: /s/ Ernest Proctor
Month: 3 Day: 19 Year: 07

Transporter 2 Printed/Typed Name — Signature — Month — Day — Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month — Day — Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H040 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: On behalf of US DOE William G. Melton
Signature: /s/ William G. Melton
Month: 3 Day: 19 Year: 07

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete. DESIGNATED FACILITY TO [illegible]

GENERATOR — TRANSPORTER — DESIGNATED FACILITY

Certificate of Disposal
Waste Container 118A10

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Revision 10, shipment number ITL07002, with container numbers 118A05, 118A10, 118A11, 118A14, 118A15, 118A16, and 166F01 was shipped and received at the Nevada Test Site Radioactive Waste Management Site in Area 5 for disposal as stated below.

David Schrock	Stoller-Navarro Joint Venture	LLW Coordinator
Shipped by	Organization	Title
/s/ David Schrock		5/9/07
Signature		Date
Nancy E Theridge	N-S Tec	operation Specialist
Received by	Organization	Title
/s/ Nancy Etheridge		5/9/07
Signature		Date

Certificate of Disposal
Waste Container 118A11

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Revision 10, shipment number ITL07002, with container numbers 118A05, 118A10, 118A11, 118A14, 118A15, 118A16, and 166F01 was shipped and received at the Nevada Test Site Radioactive Waste Management Site in Area 5 for disposal as stated below.

David Schrock	Stoller-Navarro Joint Venture	LLW Coordinator
Shipped by	Organization	Title
/s/ David Schrock		5/9/07
Signature		Date
Nancy E Theridge	N-S Tec	operation Specialist
Received by	Organization	Title
/s/ Nancy Etheridge		5/9/07
Signature		Date

Waste Container Log
Waste Containers 118A13 and 118A17

Waste Container Log

To be filled by Environmental Compliance/Waste Management Staff

Comments:

7-16-07 The contents of Container #5 118A13 and 118A17 were added to this container on Monday, July 16, 2007 to consolidate "like" waste types. This will reduce the overall volume of waste requiring disposal.

/s/ MC Burmeister

7-16-07

Certificate of Disposal
Waste Container 118A14

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Revision 10, shipment number ITL07002, with container numbers 118A05, 118A10, 118A11, 118A14, 118A15, 118A16, and 166F01 was shipped and received at the Nevada Test Site Radioactive Waste Management Site in Area 5 for disposal as stated below.

David Schrock	Stoller-Navarro Joint Venture	LLW Coordinator
Shipped by	Organization	Title
/s/ David Schrock		5/9/07
Signature		Date
Nancy E Theridge	N-S Tec	Operation Specialist
Received by	Organization	Title
/s/ Nancy Etheridge		5/9/07
Signature		Date

Certificate of Disposal
Waste Container 118A15

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Revision 10, shipment number ITL07002, with container numbers 118A05, 118A10, 118A11, 118A14, 118A15, 118A16, and 166F01 was shipped and received at the Nevada Test Site Radioactive Waste Management Site in Area 5 for disposal as stated below.

David Schrock	Stoller-Navarro Joint Venture	LLW Coordinator
Shipped by	Organization	Title
/s/ David Schrock		5/9/07
Signature		Date
Nancy E Etheridge	N.S.T.E.C.	Operation Specialist
Received by	Organization	Title
/s/ Nancy Etheridge		5/9/07
Signature		Date

Certificate of Disposal
Waste Container 118A16

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Revision 10, shipment number ITL07002, with container numbers 118A05, 118A10, 118A11, 118A14, 118A15, 118A16, and 166F01 was shipped and received at the Nevada Test Site Radioactive Waste Management Site in Area 5 for disposal as stated below.

David Schrock	Stoller-Navarro Joint Venture	LLW Coordinator
Shipped by	Organization	Title
/s/ David Schrock		5/9/07
Signature		Date
Nancy E Theridge	N2STeC	Operation Specialist
Received by	Organization	Title
/s/ Nancy Etheridge		5/9/07
Signature		Date

Shipping Manifest for Container Number 151476

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	NV3890090001	1	702-295-0311	000218929 FLE

GENERATOR

5. Generator's Name and Mailing Address
NSTec for US DOE
PO Box 98521, MS NTS 110
Las Vegas, NV. 89193
Generator's Phone 702-295-0311

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: CAST Transportation — U.S. EPA ID Number: COR000005389

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address
Energy Solutions, LLC
Clive Disposal Site (Treatment Facility)
Interstate 80, Exit 49
Clive, UT. 84029
Facility's Phone 435-884-0155
U.S. EPA ID Number: UTD 982598898

9a HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
RQ	1. UN2910, Radioactive Material, excepted package - limited quantity of material, 7, solid, oxides (D008), (U234), (20 MBq)	001	CM	767	K	D008
RQ	2. UN 2912, Radioactive material, low specific activity (LSA-1), Fissile excepted, 7, solid, oxide, (D008), (Am241, Cs137, Pu238, Pu239, Sr90), (9.8MBq)	002	CM	9317	K	D008
	3.					
	4. total			10084	K	

CAU146 / CAU168

14. Special Handling Instructions and Additional Information
Line 1: ERG 161, Profile 9316-01, pkg # 151476, TIO# 0209003, SOLID
Line 2: ERG 162, Profile 9316-01, pkg # 151460 TIO# 401641, pkg # 151467 TIO# 401325, SOLID
EXCLUSIVE USE SHIPMENT
UTAH PERMIT # 0510003453

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Stefan Duke — Signature: /s/ Stefan Duke — Month 02 Day 27 Year 07

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: B & B APPLEGATE — Signature: /s/ Bob Applegate — Month 2 Day 28 Year 07

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1	2	3	4

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name — Signature — Month Day Year

recd 4/10

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

GENERATOR			
UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number: [illegible]	2. Page 1 of	3. Emergency Response Phone: 702-295-[illegible]	4. Manifest Tracking Number: 000218929 FLE

5. Generator's Name and Mailing Address: NSTec for USDOE, P.O. Box 98521, M/S NTS 110, Las Vegas, NV 89193

Generator's Site Address (if different than mailing address)

Generator's Phone: 702-295-[illegible]

6. Transporter 1 Company Name: Chest Transportation — U.S. EPA ID Number: [illegible]

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address: EnergySolutions, LLC (Clive Disposal Site (Treatment Facility)), Interstate 80, Exit 49, Clive, UT 84029 — U.S. EPA ID Number: UTD 982 598 898

Facility's Phone: 435-884-0155

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
RQ	1. [illegible] Radioactive Material, excepted package limited quantity of material, 7, solid, oxide (D008), (U234) (.020 MBq)	001	CM	767	K	D008
RQ	2. UN2912, Radioactive Material, low specific activity (LSA-I), fissile excepted, 7, solid, [illegible] (D008) (Am241, Cs137, Pu238, Pu239, Sr90) (9.5 MBq)	002	CM	9317	K	D008
	3.					
	4. Total			10084	K	

14. Special Handling Instructions and Additional Information:
Line 1: ERC 101, Profile 9316-01, pkg# 15476, TID# 0209002, solid
Line 2: ERC 162, Profile 9316-01, pkg# 15[illegible] TID# 40154, pkg# 15147 TID# 401325, solid
Exclusive use shipment
Utah Permit # 0503003-53

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Stefan Duke — Signature: /s/ Stefan Duke — Month 02 Day 27 Year 07

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Bob B. Applegate — Signature: /s/ Bob Applegate — Month 2 Day 28 Year 07
Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H129			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Justin Lee — Signature: /s/ Justin Lee — Month 03 Day 1 Year 07

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete. DESIGNATED FACILITY TO GENERATOR

UNCONTROLLED when Printed

Transmittal of Notification of Demolition and Renovation to EPA Region 9

December 1, 2006

ESHQ:MCB-CD-06-079

Robert Trotter
U.S. Environmental Protection Agency
Region 9, Mailcode SFD-8-2
75 Hawthorne Street
San Francisco, CA 94105

TRANSMITTAL OF NOTIFICATION OF DEMOLITION AND RENOVATION FORMS

Dear Mr. Trotter:

Enclosed please find the subject forms for three above-ground structures planned for demolition beginning mid December 2006. All three buildings are a part of the Super Kukla Facility Deactivation and Demolition Project at the U.S. Department of Energy's Nevada Test Site.

If you have any questions or need additional information regarding this project, please contact me at (702) 295-1858 or Mark Burmeister, Task Manager, at (702) 295-1816.

Sincerely,

/s/ John M. Fowler

John M. Fowler, Manager
Environmental Compliance/Waste Management

Enclosure:
As stated

cc w/encl.:
M. C. Burmeister, SNJV, Las Vegas, NV
Central Files, SNJV, Las Vegas, NV

FedEx Express
Customer Support Trace
3875 Airways Boulevard
Module H, 4th Floor
Memphis, TN 38116

U.S. Mail: PO Box 727
Memphis, TN 38194-4643

Telephone: 901-369-3600

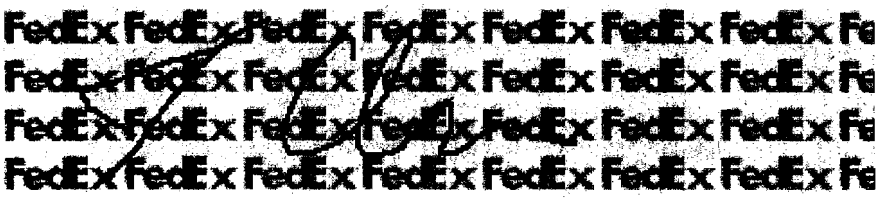
December 6,2006

Dear Customer:

The following is the proof of delivery you requested with the tracking number **859512643581**.

Delivery Information:

Status:	Delivered	**Delivery location:**	75 HAWTHORNE STREET 11FL
Signed for by:	J.CLAROS	**Delivery date:**	Dec 4, 2006 09:06
Service type:	Priority Envelope		



Shipping Information:

Tracking number:	859512643581	**Ship date:**	Dec 1, 2006

Recipient:
BOB TROTTER
U S ENVIRONMENTAL PROTECTION A
75 HAWTHORNE ST REGION 9 MAIL
94105 US

Shipper:
STOLLER-NAVARRO FOR US DOE
7710 W CHEYENNE AVE
891296752 US

Reference 1507-120

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1.800.GoFedEx 1.800.463.3339

NOTIFICATION OF DEMOLITION AND RENOVATION

Operator Project #	Post Mark	Date Received	Notification #

I. TYPE OF NOTIFICATION (O = Original, R = Revised, C = Cancelled):	
O	WPR Notice?

II. FACILITY INFORMATION (Identify owner, removal contractor, and other operator)		
Owner Name: U. S. Department of Energy		
Address: P. O. Box 98518		
City: Las Vegas	State: NV	Zip: 89193-8521
Contact: Kenneth A. Hoar		Tel: (702) 295-1428
Removal Contractor: Stoller-Navarro Joint Venture (SNJV)		
Address: 7710 W. Cheyenne Blvd., Bldg. 3		
City: Las Vegas	State: NV	Zip: 89129
Contact: Mark Burmeister		Tel: 702-295-1816
Other Operator:		
Address:		
City:	State:	Zip:
Contact:		Tel:

III. TYPE OF OPERATION (D = Demo, O = Ordered Demo, R = Renovation, E = Emergency Renovation):
D

IV. IS ASBESTOS PRESENT? (Yes/No)
No

V. FACILITY DESCRIPTION (Include building name, number and floor or room number)		
Building Name: None, (description – single story prefabricated corrugated metal building on concrete slab)		
Address: Nevada Test Site, Area 27		
City: Nevada Test Site	State: NV	County: NYE
Site Location: Building 5400A		
Building Size: 950 ft^2	Number of Floors: 1	Age in Years: approx. 42
Present Use: Abandoned		Prior Use: High Bay with Mechanical Crane

[illegible]
NMAM 9002

[illegible]			
		Ln Ft	Ln m
		Sq Ft	Sq m
		Cu Ft	Cu m

[illegible]			
		Ln Ft	Ln m
		Sq Ft	Sq m
		Cu Ft	Cu m

[illegible]	
Start: N/A	Complete: N/A

[illegible]	
Start: 1/15/07	Complete: 2/23/07

[illegible]
Building to be demolished using mechanical equipment.

XI. DESCRIPTION OF WORK PRACTICES AND ENGINEERING CONTROLS TO BE USED TO PREVENT EMISSIONS OF ASBESTOS AT THE DEMOLITION AND RENOVATION SITE
Nuisance dusts will be mitigated using water spray.

XII. WASTE TRANSPORTER #1		
Name: National Security Technologies, LLC		
Address: P. O. Box 98521		
City: Las Vegas	State: NV	Zip: 89193-8521
Contact Person: Harry Perry	Telephone: (702) 295-0685	
WASTE TRANSPORTER #2		
Name: N/A		
Address:		
City:	State:	Zip:
Contact Person:	Telephone:	

XIII. WASTE DISPOSAL SITE		
Name: 10C Landfill		
Location:		
City: Nevada Test Site	State: NV	Zip: 89193-8521
Telephone: (702) 295-4870		

XIV. IF DEMOLITION ORDERED BY A GOVERNMENT AGENCY, PLEASE IDENTIFY THE AGENCY BELOW:	
Name:	Title:
Authority:	
Date of order (MM/DD/YY):	Date ordered to begin (MM/DD/YY):

XV. FOR EMERGENCY RENOVATIONS
Date and hour of Emergency (MM/DD/YY): N/A
Description of the sudden, unexpected event: N/A
Explanation of how the event caused unsafe conditions or would cause equipment damage of an unreasonable financial burden: N/A

[redacted]
Immediate work stoppage and creation and execution of asbestos abatement measures as required.

XVII. I certify that an individual trained in the provisions of this regulation (40 CFR part 61, subpart M) will be on-site during the demolition or renovation and evidence that the required training has been accomplished by this person will be available for inspection during normal business hours. (Required 1 year after promulgation)

NA – no RACM

Signature of Owner/Operator *Date*

XVIII. I certify that the above information is correct.

/s/ MC Burmeister for US DOE 12-1-06

Signature of Owner/Operator *Date*

NOTIFICATION OF DEMOLITION AND RENOVATION

Operator Project #	Post Mark	Date Received	Notification #

I. TYPE OF NOTIFICATION (O = Original; R = Revised; C = Cancelled)	
O	WPR Notice?

II. FACILITY INFORMATION (Identify owner, removal contractor, and other operator)		
Owner Name: U. S. Department of Energy		
Address: P. O. Box 98518		
City: Las Vegas	State: NV	Zip: 89193-8521
Contact: Kenneth A. Hoar		Tel: (702) 295-1428
Removal Contractor: Stoller-Navarro Joint Venture (SNJV)		
Address: 7710 W. Cheyenne Blvd., Bldg. 3		
City: Las Vegas	State: NV	Zip: 89129
Contact: Mark Burmeister		Tel: 702-295-1816
Other Operator:		
Address:		
City:	State:	Zip:
Contact:		Tel:

III. TYPE OF OPERATION (D = Demo; O = Ordered Demo; R = Renovation; E = Emergency Renovation)
D

IV. IS ASBESTOS PRESENT? (Yes/No)
No

V. FACILITY DESCRIPTION (Include building name, number, and floor or room number)		
Building Name: None, (description – single story prefabricated metal building on concrete slab)		
Address: Nevada Test Site, Area 27		
City: Nevada Test Site	State: NV	County: NYE
Site Location: Building 5410		
Building Size: 912 ft²	Number of Floors: 1	Age in Years: approx. 45
Present Use: Abandoned	Prior Use: Mechanical Equipment Building	

VI. PROCEDURE FOLLOWED FOR ASBESTOS REMOVAL
NMAM 9002

		Ln Ft	Ln m
		Sq Ft	Sq m
		Cu Ft	Cu m

		Ln Ft	Ln m
		Sq Ft	Sq m
		Cu Ft	Cu m

VII. ESTIMATED DATES ASBESTOS REMOVAL WILL START AND END	
Start: N/A	Complete: N/A

VIII. SCHEDULED DATES DEMOLITION/RENOVATION WILL START AND END	
Start: 12/18/06	Complete: 1/18/07

IX. DESCRIPTION OF PLANNED DEMOLITION OR RENOVATION OPERATION AND METHOD(S)
Building to be demolished using mechanical equipment.

XI. DESCRIPTION OF WORK PRACTICES AND ENGINEERING CONTROLS TO BE USED TO PREVENT EMISSIONS OF ASBESTOS AT THE DEMOLITION AND RENOVATION SITE

Nuisance dusts will be mitigated using water spray.

XII. WASTE TRANSPORTER #1

Name: National Security Technologies, LLC		
Address: P. O. Box 98521		
City: Las Vegas	State: NV	Zip: 89193-8521
Contact Person: Harry Perry	Telephone: (702) 295-0685	
WASTE TRANSPORTER #2		
Name: N/A		
Address:		
City:	State:	Zip:
Contact Person:	Telephone:	

XIII. WASTE DISPOSAL SITE

Name: 10C Landfill		
Location:		
City: Nevada Test Site	State: NV	Zip: 89193-8521
Telephone: (702) 295-4870		

XIV. IF DEMOLITION ORDERED BY A GOVERNMENT AGENCY, PLEASE IDENTIFY THE AGENCY BELOW:

Name:	Title:
Authority:	
Date of order (MM/DD/YY):	Date ordered to begin (MM/DD/YY):

XV. FOR EMERGENCY RENOVATIONS

Date and hour of Emergency (MM/DD/YY): N/A

Description of the sudden, unexpected event: N/A

Explanation of how the event caused unsafe conditions or would cause equipment damage of an unreasonable financial burden: N/A

XVI. DESCRIPTION OF PROCEDURES TO BE FOLLOWED IF ADDITIONAL ASBESTOS IS FOUND OR PRESUMED TO BE PRESENT

Immediate work stoppage and creation and execution of asbestos abatement measures as required.

XVII. I certify that an individual trained in the provisions of this regulation (40 CFR part 61, subpart M) will be on-site during the demolition or renovation and evidence that the required training has been accomplished by this person will be available for inspection during normal business hours. (Required 1 year after promulgation)

NA – no RACM

Signature of Owner/Operator *Date*

XVIII. I certify that the above information is correct.

/s/ MC Burmeister for US DOE 12-1-06

Signature of Owner/Operator *Date*

NOTIFICATION OF DEMOLITION AND RENOVATION

Operator Project #	Post Mark	Date Received	Notification #

I. TYPE OF NOTIFICATION (O - Original, R - Revised, C - Cancelled):	
O	WPR Notice?

II. FACILITY INFORMATION (facility owner, removal contractor, and other operator)		
Owner Name: U. S. Department of Energy		
Address: P. O. Box 98518		
City: Las Vegas	State: NV	Zip: 89193-8521
Contact: Kenneth A. Hoar		Tel: (702) 295-1428
Removal Contractor: Stoller-Navarro Joint Venture (SNJV)		
Address: 7710 W. Cheyenne Blvd., Bldg. 3		
City: Las Vegas	State: NV	Zip: 89129
Contact: Mark Burmeister		Tel: 702-295-1816
Other Operator:		
Address:		
City:	State:	Zip:
Contact:		Tel:

III. TYPE OF OPERATION (D - Demo, O - Ordered Demo, R - Renovation, E - Emergency Renovation):
D

IV. IS ASBESTOS PRESENT? (Yes/No):
No

V. FACILITY DESCRIPTION (include building name, number and floor or room number)		
Building Name: None, (description – 2 story skid-mounted Wooden storage shed)		
Address: Nevada Test Site, Area 27		
City: Nevada Test Site	State: NV	County: NYE
Site Location: No bldg number		
Building Size: 460 ft^2	Number of Floors: 2	Age in Years: Not known
Present Use: Abandoned	Prior Use: Storage	

VI. PROCEDURE (EPA/DOE/State/Local/Other)
NMAM 9002

VII. ESTIMATED AMOUNT OF REGULATED ASBESTOS MATERIAL TO BE REMOVED			
		Ln Ft	Ln m
		Sq Ft	Sq m
		Cu Ft	Cu m

VIII. ESTIMATED AMOUNT OF NON-REGULATED ASBESTOS MATERIAL TO BE REMOVED			
		Ln Ft	Ln m
		Sq Ft	Sq m
		Cu Ft	Cu m

IX. SCHEDULED DATES OF ASBESTOS REMOVAL (mm/dd/yy)	
Start: N/A	Complete: N/A

X. SCHEDULED DATES DEMOLITION OR RENOVATION (mm/dd/yy)	
Start: 12/18/06	Complete: 1/18/07

XI. DESCRIPTION OF PLANNED DEMOLITION OR RENOVATION OPERATIONS AND METHOD(S)
Building to be demolished using mechanical equipment.

XI. DESCRIPTION OF WORK PRACTICES AND ENGINEERING CONTROLS TO BE USED TO PREVENT EMISSIONS OF ASBESTOS AT THE DEMOLITION AND RENOVATION SITE

Nuisance dusts will be mitigated using water spray.

XII. WASTE TRANSPORTER #1

Name: National Security Technologies, LLC		
Address: P. O. Box 98521		
City: Las Vegas	State: NV	Zip: 89193-8521
Contact Person: Harry Perry	Telephone: (702) 295-0685	
WASTE TRANSPORTER #2		
Name: N/A		
Address:		
City:	State:	Zip:
Contact Person:	Telephone:	

XIII. WASTE DISPOSAL SITE

Name: 10C Landfill		
Location:		
City: Nevada Test Site	State: NV	Zip: 89193-8521
Telephone: (702) 295-4870		

XIV. IF DEMOLITION ORDERED BY A GOVERNMENT AGENCY, PLEASE IDENTIFY THE AGENCY BELOW:

Name:	Title:
Authority:	
Date of order (MM/DD/YY):	Date ordered to begin (MM/DD/YY):

XV. FOR EMERGENCY RENOVATIONS

Date and hour of Emergency (MM/DD/YY): N/A

Description of the sudden, unexpected event: N/A

Explanation of how the event caused unsafe conditions or would cause equipment damage of an unreasonable financial burden: N/A

XVI. ADDITIONAL REMARKS

Immediate work stoppage and creation and execution of asbestos abatement measures as required.

XVII. I certify that an individual trained in the provisions of this regulation (40 CFR part 61, subpart M) will be on-site during the demolition or renovation and evidence that the required training has been accomplished by this person will be available for inspection during normal business hours. (Required 1 year after promulgation)

NA - no RACM

Signature of Owner/Operator *Date*

XVIII. I certify that the above information is correct.

/s/ MC Burmeister for US DOE 12-1-06

Signature of Owner/Operator *Date*

Request Approval of PCB
Bulk Product Waste Disposal
Into NTS Area 9 U10C Landfill

National Security Technologies LLC

P270-PR-07-0017

November 28, 2006

K. M. Small, RCRA Program Manager
Waste Management Division
U.S. Department of Energy
National Nuclear Security Administration
Nevada Site Office
P.O. Box 98518
Las Vegas, NV 89193-8518

Subject: **PERMIT NUMBER SW 13 097 03 – REQUEST APPROVAL OF POLYCHLORINATED BIPHENYLS (PCB) BULK PRODUCT WASTE DISPOSAL INTO THE AREA 9 U10C LANDFILL**

Stoller-Navarro Joint Venture, with the support of National Security Technologies (NSTec), will be generating waste from an Environmental Restoration project at the Super Kukla Facility, Corrective Action Unit 118 in Area 27 (Corrective Action Site 27-41-01). This demolition project will generate industrial sanitary waste from demolition and cleanup activities. The scope of the project includes; Buildings 5410, 5400A, 5400, and the Wooden Shed. Each building will contain some PCB bulk product waste. The subject waste stream includes PCB-based paint, PCB-coated wiring, and other demolition debris, and will be generated by planned waste generating decommissioning and demolition activities. This waste stream can be disposed in the U10C landfill on the Nevada Test Site, but requires prior case-by-case approval by the Nevada Division of Environmental Protection (NDEP). The debris meets all acceptance criteria for disposal as industrial sanitary waste and will meet the U10C landfill waste acceptance criteria based on radiological and chemical analysis, size reduction, and delivery for disposal.

Based upon the information above, NSTec is requesting the National Nuclear Security Administration Nevada Site Office to formally request approval from NDEP to dispose of PCB bulk product waste from this project's activities in the Area 9 U10C landfill.

If you have any questions or need additional information, please contact Tammy Wallace at (702) 295-6520.

/s/ P. M. Radack

P. M. Radack, Manager
Environmental Services Department

THW:db
Subject Code: ENV 8

cc: See page 2

cc: Correspondence Control, CF008
R. F. Boehlecke, SNJV, 439
M. C. Burmeister, SNJV, 439
J. M. Fowler, SNJV, 439
H. A. Perry, NSTec, NTS110
G. T. Schmett, NSTec, NTS110
D. E. Schrock, SNJV, 439
C. J. Schwartze, NSTec, NTS110

Department of Energy
National Nuclear Security Administration
Nevada Site Office
P.O. Box 98518
Las Vegas, NV 89193-8518

Mr. Tim Murphy, Chief
Bureau of Federal Facilities
Division of Environmental Protection
1771 E. Flamingo, Suite 121A
Las Vegas, NV 89119

LANDFILL PERMIT NUMBER SW 13 097 03: REQUEST TO DISPOSE OF POLYCHLORINATE BIPHENYLS (PCB) BULK PRODUCT WASTE IN THE AREA 9 U10C LANDFILL

Stoller-Navarro Joint Venture, with the support of National Security Technologies (NSTec), will be generating waste from an Environmental Restoration project at the Super Kukla Facility, Corrective Action Unit 118 in Area 27 (Corrective Action Site 27-41-01). This demolition project will generate industrial sanitary waste from demolition and cleanup activities. The scope of the project includes; Buildings 5410, 5400A, 5400, and the Wooden Shed. Each building will contain some PCB bulk product waste. The subject waste stream includes PCB-based paint, PCB-coated wiring, and other demolition debris, and will be generated by planned waste generating decommissioning and demolition activities.

This waste stream can be disposed in the U10C landfill on the Nevada Test Site, but requires prior case-by-case approval by the Nevada Division of Environmental Protection (NDEP). The debris meets all acceptance criteria for disposal as industrial sanitary waste and will meet the U10C landfill waste acceptance criteria based on radiological and chemical analysis, size reduction, and delivery for disposal.

Based upon the information above, the National Nuclear Security Administration Nevada Site Office is requesting approval from NDEP to dispose of PCB bulk product waste from this project's activities in the Area 9 U10C landfill.

If you have any questions or need additional information, please contact me at 295-1933.

/s/ Kenneth M. Small

Kenneth M. Small
RCRA Program Manager

WMP:2625.KS

cc:
T. H. Wallace, NSTec, Las Vegas, NV
P. M. Radack, NSTec, Las Vegas, NV
J. M. Fowler, SNJV, Las Vegas, NV
J. B. Jones, ERP, NNSA/NSO,
Las Vegas, NV

ndep
NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
protecting the future for generations

STATE OF NEVADA
Department of Conservation & Natural Resources
DIVISION OF ENVIRONMENTAL PROTECTION

Kenny C. Guinn, Governor
Allen Biaggi, Director
Leo M. Drozdoff, P.E., Administrator

December 11, 2006

Kenneth M. Small, RCRA Program Manager
Waste Management Project
National Nuclear Security Administration
Nevada Site Office
P.O. Box 98518
Las Vegas, NV 89193-8518

Subject: Approval of Request for Authorization to Dispose of PCB Bulk Product Waste at the U10c Solid Waste Disposal Site (SWDS)

Dear Mr. Small:

The Nevada Division of Environmental Protection, Bureau of Federal Facilities (NDEP), acting as the designated Solid Waste Management Authority (SWMA), has reviewed the December 5, 2006 letter from the National Nuclear Security Administration's Nevada Site Office (NNSA/NSO) and authorizes the requested disposal into the Area 9 U10c landfill of the described bulk product waste from the Super Kukla Facility, Corrective Action Site (CAS) 27-41-01, within the Nevada Test Site Area 27 Corrective Action Unit (CAU) 118. The Permit, including the Permit Application, allows for PCB bulk product waste to be disposed in U10c on a case by case basis with the approval of NDEP. The reference PCB bulk product waste regulation is 40 CFR 761.62(1)(i).

All conditions and procedures described and referred to in the NNSA/NSO letter must be demonstrated and documented to NDEP to insure that the materials to be disposed in the Area 9 U10c Class III Solid Waste Disposal Site (SWDS) meet the landfill requirements and Waste Acceptance Criteria as contained in the Permit Application.

Address any questions regarding this matter to either Ted Zaferatos at (702) 486-2850, ext. 234, Don Elle at (702) 486-2850, ext. 229, or to me at (702) 486-2850, ext. 231.

Sincerely,

/s/ Tim Murphy

T.H. Murphy
Chief
Bureau of Federal Facilities

DRE/TZ

cc: John Jones, ERP, NNSA/NSO
Kevin Cabble, ERP, NNSA/NSO
Sabine Curtis, ERP, NNSA/NSO
John Fowler, SNJV, Las Vegas, NV
Phyllis Radack, NSTec, Mercury, NV
Jeff MacDougall, NDEP, Project Manager CAU 118

Shipping Manifest and Certificate of Disposal for Container Number 151476

CERTIFICATE OF DISPOSAL

3 mi. S. Exit 49, I-80 Clive, Utah
EnergySolutions EPA ID: UT 08 21 98 90

DOE, Nevada, Las Vegas

This Certificate acknowledges that the following manifested shipments:

Shipment	Manifest	Date(s) of Disposal	Cu/Ft	Process	Disposal Location
9316-01-0011	8929	05/08/2007	288	Landfill	Mixed Waste

Representing 288 Cubic feet of waste disposed of at EnergySolutions' above listed Disposal Facility landfill. Disposal is subject to EnergySolutions' Radioactive Material License, all other applicable licenses, permits and regulations, and the Disposal Agreement.

Under civil and criminal penalties of law for the making or submission of false or fraudulent statements or representations (18 U.S.C. 1001 and 15 U.S.C. 2615) I certify that the information contained in or accompanying this document is true, accurate and complete. As to the identified transaction(s) of this document for which I cannot personally verify truth and accuracy, I certify as the company official having supervisory responsibility for the person(s) who, acting under my direct instructions, made the verification that this information is true, accurate and complete.

/s/ J. C. Garcia

Jesse C. Garcia
Mixed Waste Site Manager

5/22/07
Date

423 West 300 South Salt Lake City, Utah 84101 Telephone (801) 649-2000

Shipping Manifest for Freon Canister #NS-NTS-07-0369

NSTec

ONSITE WASTE TRANSPORT MANIFEST

Manifest Document No.: 0 7 N 6 2

Page 1 of 1

Generation Date: 08/23/07

1. Generator's Name, Organization, and Location: (Please Print)
SNJV / Dave Schrock, Jeff Kirkwood
NTS Area 27, CAU 118 CAS ~~03-42-01~~ 27-41-01
Super Kukla Bldg's 5400 & 5400A

Generator's Phone : (702) 295-2147

2. Receiving Facility, Organization, Location: (Please Print)
NSTec HAzardous Waste Storage Unit
Hazardous Waste Operations
NTS Area 5 Bldg 5-20

Facility Phone: (702) 295-4263

3a. Transporter Name: (Please Print)
C. Carlos Gonzales

Transport Date: 08/23/07

3b. Vehicle I.D. Number:
G42 42001

	4. U.S. D.O.T. Description. Include: EPA Waste Code and Package Identification Numbers.	HM	5. Containers No.	5. Containers Type	6. Total Quantity	7. Unit Wt./Vol.
a	UN1078, Refrigerant gases, n.o.s.(Freon R-12, Freon R-22), 2.2 Non-RCRA # NS-NTS-07-0369	X	1	DF	46 69	Oz P
b						
c						
d						
e						
f						
g						

Use continuation pages for additional items, as necessary.

8. Special Handling Instructions and Additional Information: 24 Hour emergency contact: 702 - 295-0311 / Secondary: _____ Name & phone no.

a. ERG 126 ~~155~~ spent refrigerant mixture, Freon R-12 & R-22, from Bldg 5400 and 5400A. SNJV 20-G 1G/X150/S, overpack.
05 Contains 5-gallon equivalent gas cylinder, DOT-4BA400.
8/25/07

9. Released by: (Signature)
/s/ Jeff Kirkwood

Date: 8/23/07

10. Received for Transport by: (Signature)
/s/ C Carlos Gonzales

Date: 8/23/07

11. Discrepancy Indication:

12. Disposal/Accumulation Site Signature: (Acknowledges acceptance of waste)
/s/ C Carlos Gonzales

Date: 8/23/07

Distribution: Original - HWO
Copy - Generator

FRM-0266 (10/06)

Certificate of Disposal
for Waste Container Numbers
118A18 — 118A28

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Rev. 10, shipment number ITL07023, with package number 118A18 was shipped and received at the Nevada Test Site Radioactive Waste Management Site in Area 5 for disposal as stated below.

David Schrock	Stoller-Navarro Joint Venture	Waste Coordinator
Shipped by	Organization	Title
/s/ David Schrock		8/27/07
Signature		Date
Nancy Etheridge	N2STEC	Technical Staff
Received by	Organization	Title
/s/ Nancy Etheridge		8/28/07
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Rev. 10, shipment number ITL07024, with package number 118A19 was shipped and received at the Nevada Test Site Radioactive Waste Management Site in Area 5 for disposal as stated below.

David Schrock	Stoller-Navarro Joint Venture	Waste Coordinator
Shipped by	Organization	Title
/s/ David Schrock		8/28/07
Signature		Date
Nancy Etheridge	NSTec	Technical Staff
Received by	Organization	Title
/s/ Nancy Etheridge		8/28/07
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Rev. 10, shipment number ITL07025, with package number 118A20 was shipped and received at the Nevada Test Site Radioactive Waste Management Site in Area 5 for disposal as stated below.

David Schrock	Stoller-Navarro Joint Venture	Waste Coordinator
Shipped by	Organization	Title
/s/ David Schrock		8/28/07
Signature		Date

Nancy Etheridge	NSTec	Technical Staff
Received by	Organization	Title
/s/ Nancy Etheridge		8/28/07
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Rev. 10, shipment number ITL07026, with package number 118A21 was shipped and received at the Nevada Test Site Radioactive Waste Management Site in Area 5 for disposal as stated below.

David Schrock	Stoller-Navarro Joint Venture	Waste Coordinator
Shipped by	Organization	Title
/s/ David Schrock		8/28/07
Signature		Date
Nancy Etheridge	NSTec	Technical Staff
Received by	Organization	Title
/s/ Nancy Etheridge		8/28/07
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Rev. 10, shipment number ITL07027, with package number 118A22 was shipped and received at the Nevada Test Site Radioactive Waste Management Site in Area 5 for disposal as stated below.

David Schrock	Stoller-Navarro Joint Venture	Waste Coordinator
Shipped by	Organization	Title
/s/ David Schrock		8/28/07
Signature		Date
Nancy Etheridge	NSTec	Technical Staff
Received by	Organization	Title
/s/ Nancy Etheridge		8/28/07
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Rev. 10, shipment number ITL07028, with package number 118A23 was shipped and received at the Nevada Test Site Radioactive Waste Management Site in Area 5 for disposal as stated below.

David Schrock	Stoller-Navarro Joint Venture	Waste Coordinator
Shipped by	Organization	Title
/s/ David Schrock		8/27/07
Signature		Date
Nancy E Theridge	N.S.T.E.C.	Technical Staff
Received by	Organization	Title
/s/ Nancy Etheridge		8/27/07
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Rev. 10, shipment number ITL07029, with package number 118A24 was shipped and received at the Nevada Test Site Radioactive Waste Management Site in Area 5 for disposal as stated below.

David Schrock	Stoller-Navarro Joint Venture	Waste Coordinator
Shipped by	Organization	Title
/s/ David Schrock		8/27/07
Signature		Date
Nancy E. Theridge	NSTec	Technical Staff
Received by	Organization	Title
/s/ Nancy Etheridge		8/27/07
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Rev. 10, shipment number ITL07030, with package number 118A25 was shipped and received at the Nevada Test Site Radioactive Waste Management Site in Area 5 for disposal as stated below.

David Schrock	Stoller-Navarro Joint Venture	Waste Coordinator
Shipped by	Organization	Title
/s/ David Schrock		8/27/07
Signature		Date
Nancy E. Etheridge	NSTec	Technical Staff
Received by	Organization	Title
/s/ Nancy Etheridge		8/27/07
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Rev. 10, shipment number ITL07031, with package number 118A26 was shipped and received at the Nevada Test Site Radioactive Waste Management Site in Area 5 for disposal as stated below.

David Schrock	Stoller-Navarro Joint Venture	Waste Coordinator
Shipped by	Organization	Title
/s/ David Schrock		8/27/07
Signature		Date
Nancy Etheridge	NSTec	Technical Staff
Received by	Organization	Title
/s/ Nancy Etheridge		8/27/07
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Rev. 10, shipment number ITL07032, with package number 118A27 was shipped and received at the Nevada Test Site Radioactive Waste Management Site in Area 5 for disposal as stated below.

David Schrock	Stoller-Navarro Joint Venture	Waste Coordinator
Shipped by	Organization	Title
/s/ David Schrock		8/27/07
Signature		Date
Nancy E. Etheridge	NSTec	Technical Staff
Received by	Organization	Title
/s/ Nancy Etheridge		8/27/07
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Rev. 10, shipment number ITL07033, with package number 118A28 was shipped and received at the Nevada Test Site Radioactive Waste Management Site in Area 5 for disposal as stated below.

David Schrock	Stoller-Navarro Joint Venture	Waste Coordinator
Shipped by	Organization	Title
/s/ David Schrock		8/28/07
Signature		Date
Nancy Etheridge	NSTec	Technical Staff
Received by	Organization	Title
/s/ Nancy Etheridge		8/28/07
Signature		Date

Appendix F

Modifications to the Post-Closure Plan

F.1.0 Modifications to the Post-Closure Plan

This section does not apply to CAU 118.

Appendix G

Use Restrictions

G.1.0 Use Restrictions

G.1.1 CAS 27-41-01 Use Restrictions

The following section documents the URs completed for CAU 118 at CAS 27-41-01.

The UR signs will state the following information:

WARNING

Underground Radiological, Lead and PCB Contaminated Area

FFACO Site CAU 118 / CAS 27-41-01

No activities that may alter or modify the containment control are permitted without U.S. Government permission.

**Before working in this area,
Contact Environmental Restoration at 295-2528**

CAU Use Restriction Information

CAU Number/Description: Corrective Action Unit (CAU) 118

Applicable CAS Numbers/Descriptions: 27-41-01 Super Kukla Reactor Building/High Bay and Mechanical Building

Contact (organization/project): NNSA/NSO Industrial Sites Manager

Surveyed Area (UTM, Zone 11, NAD 27, meters):

f1	E. 578057.89	N. 4070784.60	f7	E. 578017.41	N. 4070875.90
f2	E. 578040.84	N. 4070767.07	f8	E. 578053.32	N. 4070898.14
f3	E. 578029.39	N. 4070775.39	f9	E. 578065.97	N. 4070895.70
f4	E. 578024.91	N. 4070797.13	f10	E. 578113.65	N. 4070817.64
f5	E. 578032.06	N. 4070814.61	f11	E. 578062.90	N. 4070786.00
f6	E. 578011.52	N. 4070851.89			

Survey Date: 7-27-07 **Survey Method (GPS, etc):** GIS

Site Monitoring Requirements: Inspections of fence and postings

Required Frequency (quarterly, annually?): Semi-Annual
If Monitoring Has Started, Indicate last Completion Date: Not applicable.

Use Restrictions

The future use of any land related to CAU 118, CAS 27-41-01, as described by the above surveyed location, is restricted from any DOE or Air Force activity that may alter or modify the containment control as approved by the state and identified in the CAU 118 Closure Report or other CAU 118 documentation unless appropriate concurrence is obtained in advance.

Comments: The use restriction for CAS 27-41-01 is for radionuclides and lead debris entombed within B-5400, and PCB-soil contamination. Radionuclide contaminated debris and the former reactor's lead shielding wall are encapsulated in grout below the surface within the B-5400 building structure. PCB concentrations in the soil exceed the action level (FAL) of 0.74 mg/kg. Visual inspection of the wire fence, T-posts, and signage will be conducted semi-annually to verify that they are intact, undisturbed, and in good condition. Observations (e.g. indications of ground disturbance within the use restriction area) and any modification and/or repairs to the fence or postings will be included in the *Nevada Test Site Post-Closure Inspection Annual Report*. See the Closure Report for additional information on the condition of the site.

Submitted By: /s/ Sabine T. Curtis **Date:** 08/27/07
Sabine T. Curtis
cc with copy of survey map (paper and digital (dgn) formats):
CAU 118 Files (2 copies)

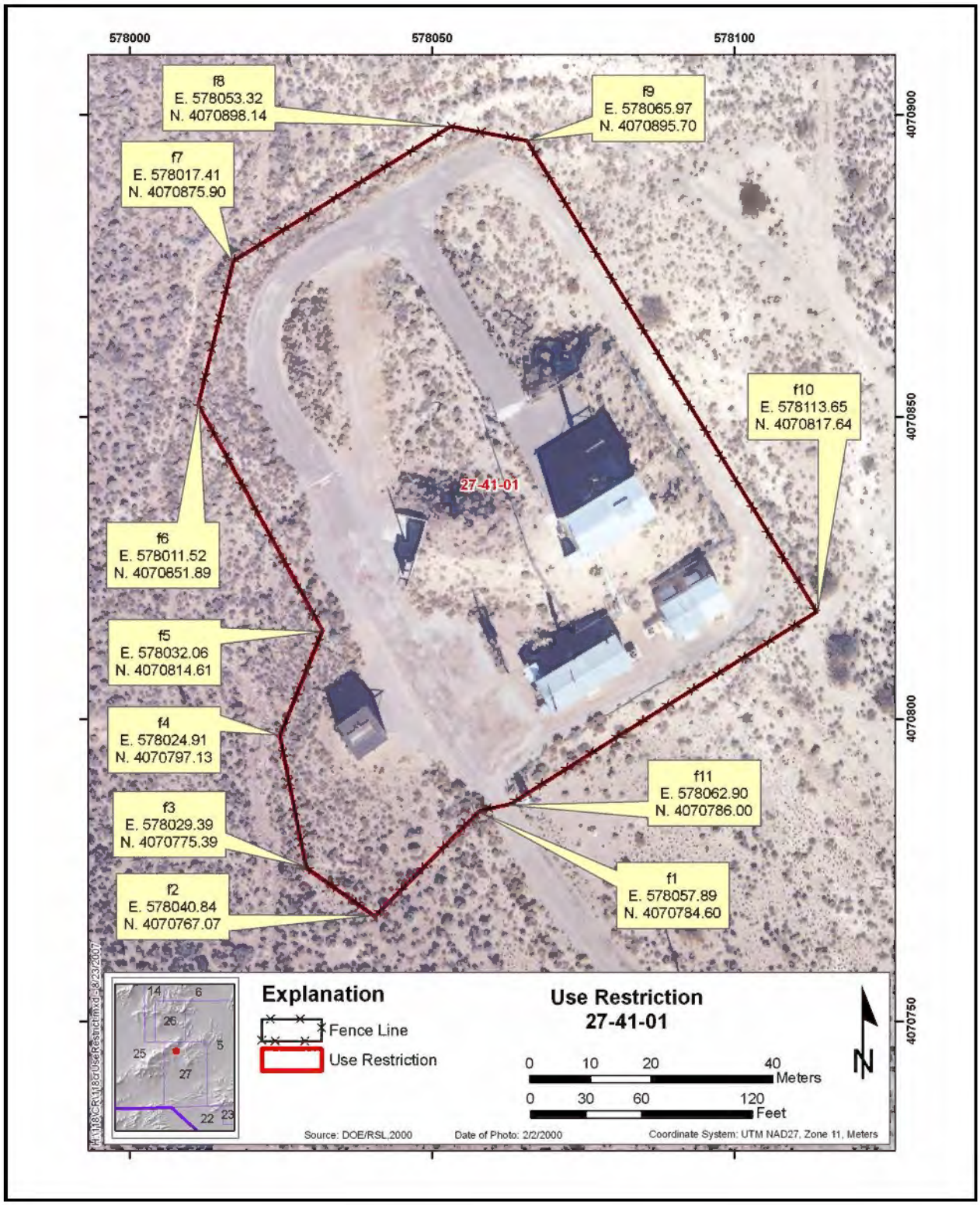

Figure G.1-1
CAS 27-41-01 Use Restriction Map

Appendix H

Risk Evaluation

H.1.0 Introduction

The RBCA process used to establish FALs is described in the *Industrial Sites Project Establishment of Final Action Levels* (NNSA/NSO, 2006a). This process conforms with NAC Section 445A.227 (NAC, 2006a), which lists the requirements for sites with soil contamination. For the evaluation of corrective actions, NAC Section 445A.22705 (NAC, 2006c) 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 may 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., potential source material) to continue to release COCs into surrounding environmental media.

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

- Any 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 was released.
- Any non-liquid waste containing a contaminant exceeding an equivalent FAL concentration would cause a COC to be present in the surrounding media.

Appendices C and D of the CAU 118 Safer Plan (NNSA/NSO, 2006b) address risk associated with closing in place various potential source materials within the remaining subsurface concrete portion of Building 5400, including lead in the form of lead shielding (the lead wall) and minor amounts of Aroclor 1254, U-234, and U-235 present in paint. These materials and contaminants were identified and listed in Table 4-1 of the CAU 118 SAFER Plan. The remaining subsurface concrete portion of

Building 5400 has been filled with concrete grout to form a monolith and will be referred to as the Building 5400 monolith.

An area of Aroclor 1248 soil contamination was found at concentrations up to 27,000 mg/kg in and around the concrete pad associated with the former Building 5410 (Building 5410 pad), and Aroclor 1254 was found at concentrations up to 29 mg/kg in soils within the Super Kukla facility fence line associated with dust suppression activities (dust suppression). No other soil contamination was found during the CAU 118 SAFER investigation. Therefore, the risks associated with the potential source material within the Building 5400 monolith, the Aroclor 1248 contamination associated with the Building 5410 pad, and the Aroclor 1254 contamination associated with dust suppression activities will be addressed separately in this appendix.

This section contains documentation of the RBCA process used to establish FALs described in the *Industrial Sites Project Establishment of Final Action Level*s (NNSA/NSO, 2006a). 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 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 risk-based corrective action decision process stipulated in the *Industrial Sites Project Establishment of Final Action Levels* (NNSA/NSO, 2006a) is summarized in Figure H.1-1.

H.1.1 Scenario

Corrective Action Unit 118, Area 27 Super Kukla Facility, consists of the following four inactive sites within CAS 27-41-01:

- Building 5400A, High Bay
- Building 5400, Reactor Building and access tunnel
- Building 5410, Mechanical Building
- Wooden Shed, also known as “Brock House”

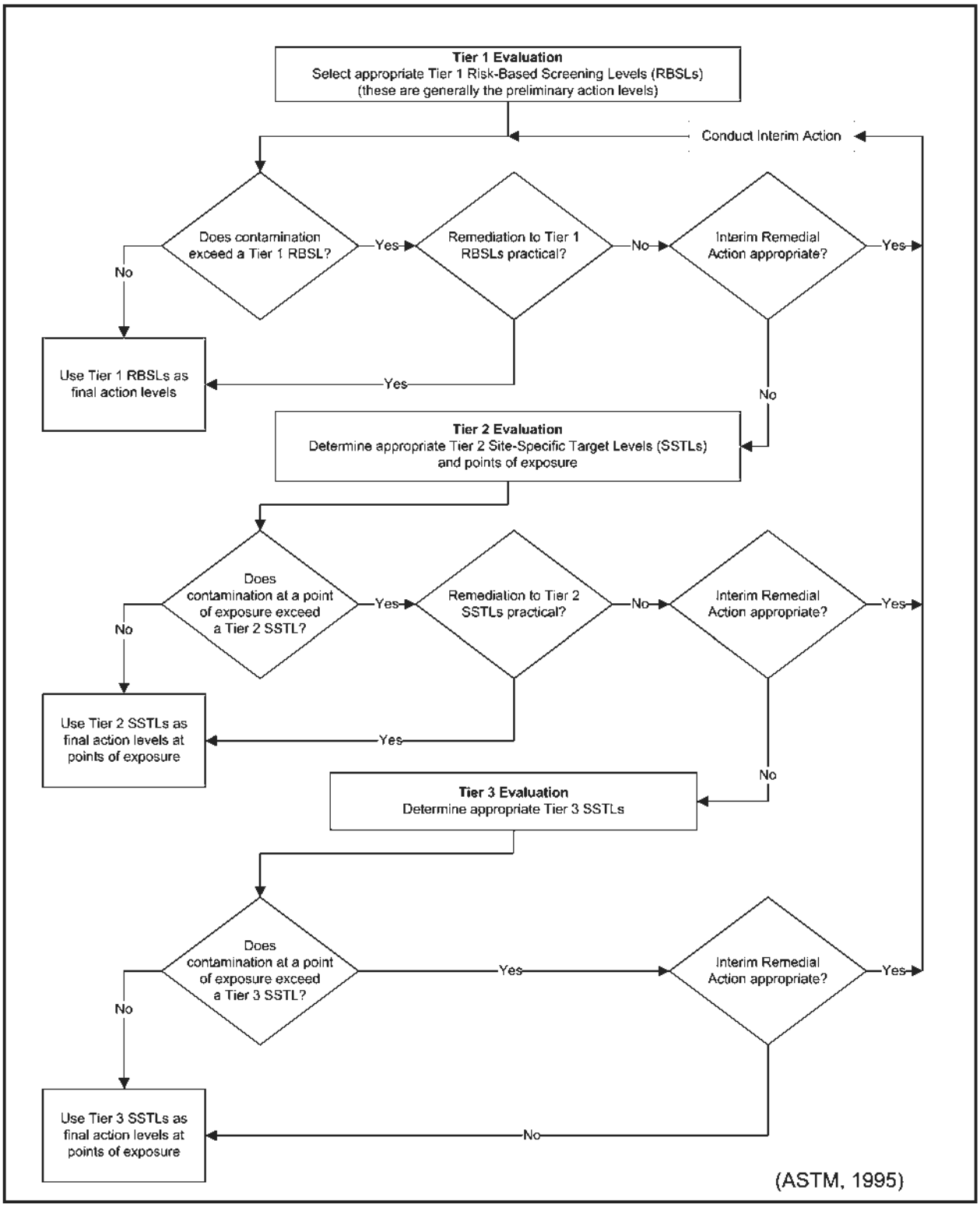

Figure H.1-1
Risk-Based Corrective Action Decision Process

Building 5400A (High Bay) was located on top of Building 5400 and was connected via a hatch located in the concrete slab (floor of 5400A and ceiling of 5400). The Reactor Building extended underground under the footprint of the High Bay. The access hallway is covered with at least 4 ft of earth fill.

Building 5400 housed the Super Kukla Reactor. The reactor was used between 1964 and 1979 to test the effects of "prompt bursts" or intense pulses of radiation over a brief period of time on a variety of samples. During this period, samples were stored in the Reactor Building or the High Bay.

Building 5410 (Mechanical Building) was used to house much of the mechanical equipment for operation of the reactor, including the main components of the hydraulic system, including air filters, nitrogen tanks, pumps and piping, and lubricating and hydraulic oils. The vent system for the Reactor Building was connected to Building 5410 via underground piping. Due to its unique characteristics, the reactor was cooled by air, and process piping was minimal. The major components of the reactor were hydraulically driven. Pydraul was the hydraulic fluid used in the hydraulic system and is known to contain Aroclor 1248.

The remaining structure was identified as the Wooden Shed ("Brock House"). The building was a two-story structure constructed on skids located to the southwest of Buildings 5400 and 5400A. It housed equipment and materials in support of Super Kukla operations. The structure had a floor area of approximately 460 ft^2.

H.1.2 Site Assessment

Analytical results of soil samples demonstrated that no soil contaminants exceeded PAL concentrations at CAU 118 other than the PCBs in and around the Building 5410 pad and the PCBs present due to dust suppression activity within the fence. The Aroclor 1248 contamination at this site exceeded the PAL of 0.74 mg/kg with a maximum concentration of 49,000 mg/kg in concrete and a maximum of 27,000 mg/kg in soil. Aroclor 1254 was also detected at up to 29 mg/kg in soil. The maximum concentration of contaminants and their corresponding PALs are presented in Table H.1-1.

The Building 5400 monolith contains various wastes (consistent with Table 4-1 of the SAFER Plan) that were categorized as potential source materials, thus requiring the CAU 118 SAFER Plan

Table H.1-1
Maximum Reported Soil Sample Contaminants
for Tier I Comparison

CAS 27-41-01				
Constituent	**Maximum Result**	**Sample Number**	**Preliminary Action Levels**	**Units**
Aroclor 1254	29 (J)	118KG16	0.74	mg/kg
Aroclor 1248	27,000 (J)	118KG20	0.74	mg/kg

mg/kg = Milligrams per kilogram
J = Estimated value

specified corrective action of close in place with UR (NNSA/NSO, 2006b). The maximum concentration of contaminants associated with materials encased within the structure and their corresponding PALs are presented in Table H.1-2. In addition to the contaminants listed in Table H.1-2, lead in the form of lead shielding (the lead wall) is a major potential source material and minor amounts of Aroclor 1254, U-234, and U-235 are present in paint as identified and listed in Table 4-1 of the CAU 118 SAFER Plan.

Table H.1-2
Maximum Reported Potential Source Material Contaminants
for Tier I Comparison
(Page 1 of 2)

CAS 27-41-01					
Matrix	**Constituent**	**Maximum Result**	**Sample Number**	**Potential Source Material Criteria**	**Units**
Concrete	Cobalt-60	0.7	118GC01	2.7	pCi/g
Concrete	Europium-152	25	118GC01	5.7	pCi/g
Concrete	Tritium	1,560	118GC01	None	pCi/mL
Metal	Aroclor 1248	32 (J)	118LM02	0.74	mg/kg
Metal	Barium	370	118LM01	67,000	mg/kg
Metal	Cadmium	86	118LM01	450	mg/kg
Metal	Chromium	33,000	118LM01	450	mg/kg
Metal	Cobalt-60	53.6	118GM02	2.7	pCi/g

Table H.1-2
Maximum Reported Potential Source Material Contaminants for Tier I Comparison
(Page 2 of 2)

CAS 27-41-01					
Matrix	**Constituent**	**Maximum Result**	**Sample Number**	**Potential Source Material Criteria**	**Units**
Metal	Iron-55	700 (J)	118HM01	141,000	pCi/g
Metal	Mercury	0.21	118LM01	310	mg/kg
Metal	Nickel-63	290	118GM02	189,000	pCi/g

mg/kg = Milligrams per kilogram
pCi/g = Picocuries per gram
pCi/mL = Picocuries per milliliter
J = Estimated value

H.1.3 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 (ASTM, 1995).

Based on the CAU 118 SAFER Plan (NNSA/NSO, 2006b) and current site exposures, the CAS does not present an immediate threat to human health, safety, and the environment; therefore, no interim response actions are necessary at the site. Based on this information, CAU 118 was determined to be a Classification 3 site as defined by ASTM Method E 1739-95 and may pose long-term threats but no demonstrated near-term threats that would require an initial response action.

In support of the SAFER objectives, the following remedial actions were taken during the SAFER to stabilize and/or remove contamination and potential source materials, at the site:

1. Approximately 170 yd^3 of soil and concrete was excavated and removed from the area of PCB contamination around and under the Building 5410 pad to reduce the remaining Aroclor 1248 concentration (from a maximum of 27,000 mg/kg). The Aroclor 1248 concentrations at the site following removal were below approximately 300 mg/kg except for one location containing

1,400 mg/kg. This sample was collected within the excavation at a depth of 2.5 to 3.0 ft below grade. This area has been backfilled and covered with clean native fill. These completed actions are described in Section 2.1.

2. Potential source material within Building 5400 was stabilized with approximately 1,100 yd^3 of flowable grout. The flowable grout and the containment provided by the Building 5400 concrete structure encapsulated the potential source material to prevent any migration of hazardous constituents. See Section 2.1 for additional information on this activity.

H.1.4 Development of Tier 1 Lookup Table of Risk-Based Screening Levels

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, preliminary in nature, and 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 final action level is practical. The PALs are defined as:

- Region 9 Risk-Based PRGs for Industrial Soils (EPA, 2004).
- 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 based on data published in Mineral and Energy Resource Assessment of the Nellis Air Force Range (NBMG, 1998; Moore, 1999).
- Concentrations of TPH above the action level of 100 mg/kg per NAC 445A.2272 (NAC, 2006b).
- For COPCs without established 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.
- The PALs for material, equipment, and structures with residual surface contamination are the allowable total residual surface contamination values for unrestricted release of material and

equipment listed in the DOE Order 5400.5 (DOE, 1993), which is also Table 4-2 of the NV/YMP RadCon Manual (NNSA/NSO, 2004).

- 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 the CAU 118 site is an abandoned site and no industrial workers are assigned to work at this area (this site is considered to be an occasional use area), the use of industrial reuse based PALs is conservative. The Tier 1 lookup table is defined as the PAL concentrations or activities defined in the SAFER Plan (NNSA/NSO, 2006b).

H.1.5 Exposure Pathway Evaluation

The DQOs stated that site workers would be exposed to COCs only through oral ingestion, inhalation, or dermal contact (absorption) due to exposure to contaminated soil at the CAS (i.e., surface water and groundwater consumption is not considered to be a viable exposure pathway). Stormwater received at the CAU 118 site drains into the Frenchman Flat dry lake, and there are no uses of this surface water for drinking water (or any other) purposes. Also samples collected to define the extent of contamination demonstrated that COCs have not migrated laterally beyond the CAS boundary. Therefore, surface water is not a viable exposure pathway.

The reinforced concrete walls, floor, and roof of Building 5400 as described in Section H.1.8 along with the filling of all voids with a flowable cement grout form a monolith that precludes any migration of contaminants. Therefore, no viable groundwater exposure pathway exists for the potential source material contained within the Building 5400 monolith. Appendix D of the approved CAU 118 SAFER Plan addressed risk to the groundwater pathway associated with the Building 5400 monolith (NNSA/NSO, 2006b).

For the Building 5410 pad, the DQO exposure assumptions were validated. The results of the CAU 118 SAFER investigation show that the Aroclor 1248 contamination was primarily concentrated near the former pad (as demonstrated by the analytical results defining the shallow extent of contamination as presented in Section 4.1.1.2.1). The Building 5410 pad and surrounding

soil was heavily contaminated with Aroclor 1248 at concentrations up to 27,000 mg/kg. Approximately 170 yd^3 of soil and concrete was excavated and removed from the area of contamination in, around, and under the Building 5410 pad to reduce the remaining Aroclor 1248 concentration to approximately 300 mg/kg with one remaining location of 1,400 mg/kg. These results support the determination of the limited migration of Aroclor 1248 from the Building 5410 pad site and that the contamination is limited to surface and shallow subsurface soils.

The revised CSM associated the Aroclor 1254 contamination with former dust suppression activities at the site. Aroclor 1254 was never detected below approximately 2 ft in depth and was not found beyond the facility fence line in concentrations exceeding the FAL. This is consistent with the very limited mobility (highly adsorptive) characteristic of PCBs, and supports the DQO exposure assumptions of limited migration and no viable groundwater pathway for this release.

Therefore, migration to groundwater is not considered to be a viable exposure pathway consistent with the evaluation of migration pathways described in Section 3.0, Data Quality Objectives, of the CAU 118 SAFER Plan (NNSA/NSO, 2006b). Infiltration of precipitation through subsurface media is not significant due to the low precipitation and high evapotranspiration rates common at the NTS and the depth to groundwater (approximately 1,700 ft).

The only viable potential exposure pathway for PCB contamination would be through worker contact with the remaining contaminated soil.

H.1.6 Comparison of Site Conditions with Tier 1 Risk-Based Screening Levels

No analytical results from CAU 118 soil samples exceeded Tier 1 action levels (i.e., PALs) except for PCBs.

However, as listed in the CAU 118 SAFER Plan and confirmed by SAFER investigation samples, materials entombed within the Building 5400 monolith contain or are contaminated with hazardous constituents and are considered potential source material (NNSA/NSO, 2006b). Samples from the material that was entombed within the Building 5400 monolith that exceeded potential source material criteria are listed in Table H.1-3. In addition to the potential source materials listed in

Table H.1-3, lead in the form of lead shielding (the lead wall) is a major potential source material while minor amounts of Aroclor 1254, U-234, and U-235 are present in paint.

Table H.1-3
Contaminants of Potential Concern Detected
Above Potential Source Material Criteria

CAS 27-41-01	
Matrix	**Constituent**
Concrete	Europium-152
Metal	Aroclor 1248
Metal	Chromium
Metal	Cobalt-60
Metal	Lead

H.1.7 Evaluation of Tier 1 Results

Based on factors considered during the DQO process and documented in Section 4.0 and Appendices C and D of the CAU 118 SAFER Plan, it was determined the Building 5400 monolith would be closed in place with a UR based on the potential source materials entombed within the monolith (NNSA/NSO, 2006b). As this decision is not affected by action levels, the potential source material criteria based on Tier 1 RBSLs were accepted as the FALs for the materials entombed within the Building 5400 monolith.

Aroclor 1248 contamination at the Building 5410 pad and Aroclor 1254 contamination from dust suppression activities remain at concentrations exceeding the Tier 1 RSBL of 0.74 mg/kg. Based on the evaluation of remedial actions presented in Section H.1.8, the use of Tier 1 RBSLs or Tier 2 SSTLs do not affect the selection or implementation of the corrective action of close in place with UR. Therefore, the FALs for this site were established as the Tier 1 RBSLs.

As no other analytical results from CAU 118 soil samples exceeded Tier 1 action levels, all FALs were established as the Tier 1 RBSLs.

H.1.8 Tier 1 Remedial Action Evaluation

The only sites that require remedial actions are the Building 5400 monolith (based on the presence of the stabilized potential source material) and the Building 5410 pad (based on exceedances of FALs). All other sites at CAU 118 do not require remedial actions as all environmental sample results were less than the corresponding FALs.

For the Aroclor 1248 contamination at the Building 5410 pad, a corrective action of close in place with UR is the most practical and effective remedial action to control the exposure to the Aroclor 1248 contamination remaining based on the following considerations:

- The source of the contamination has been removed (hydraulic unit and oil)
- The bulk of the Aroclor 1248 contaminated media has been removed (soil and concrete) and remaining contamination has been covered by clean fill material
- Extensive soil removals would not avoid the necessity of a UR as a UR has already been determined to be necessary for CAS 27-41-01 based on the contamination entombed within the Building 5400 monolith
- The UR will prevent inadvertent exposure to the remaining Aroclor 1248 contamination through fencing, signs, and recordation in the NNSA/NSO Facility Information Management System (FIMS), the FFACO database, and the NNSA/NSO CAU/CAS files

For the Aroclor 1254 contamination from dust suppression activities within the Super Kukla facility fence line, a corrective action of close in place with UR is the most practical and effective remedial action to control the exposure to the Aroclor 1254 contamination.

For the potential source materials entombed within the Building 5400 monolith, the only corrective action evaluated was close in place with UR as this corrective action was prescribed by the CAU 118 SAFER Plan (NNSA/NSO, 2006b). This corrective action is a practical and effective remedial action to control the exposure to the remaining contamination based on the following considerations:

- The 14-in.-thick walls, the 24-in.-thick ceiling, and the 36-in.-thick floor slab (constructed of specially designed borated reinforced concrete) comprise a strong, tight monolith for the remaining material contained within the structure (the dimensions and layout of the below-surface structure and tunnel are shown on Figure H.1-2).

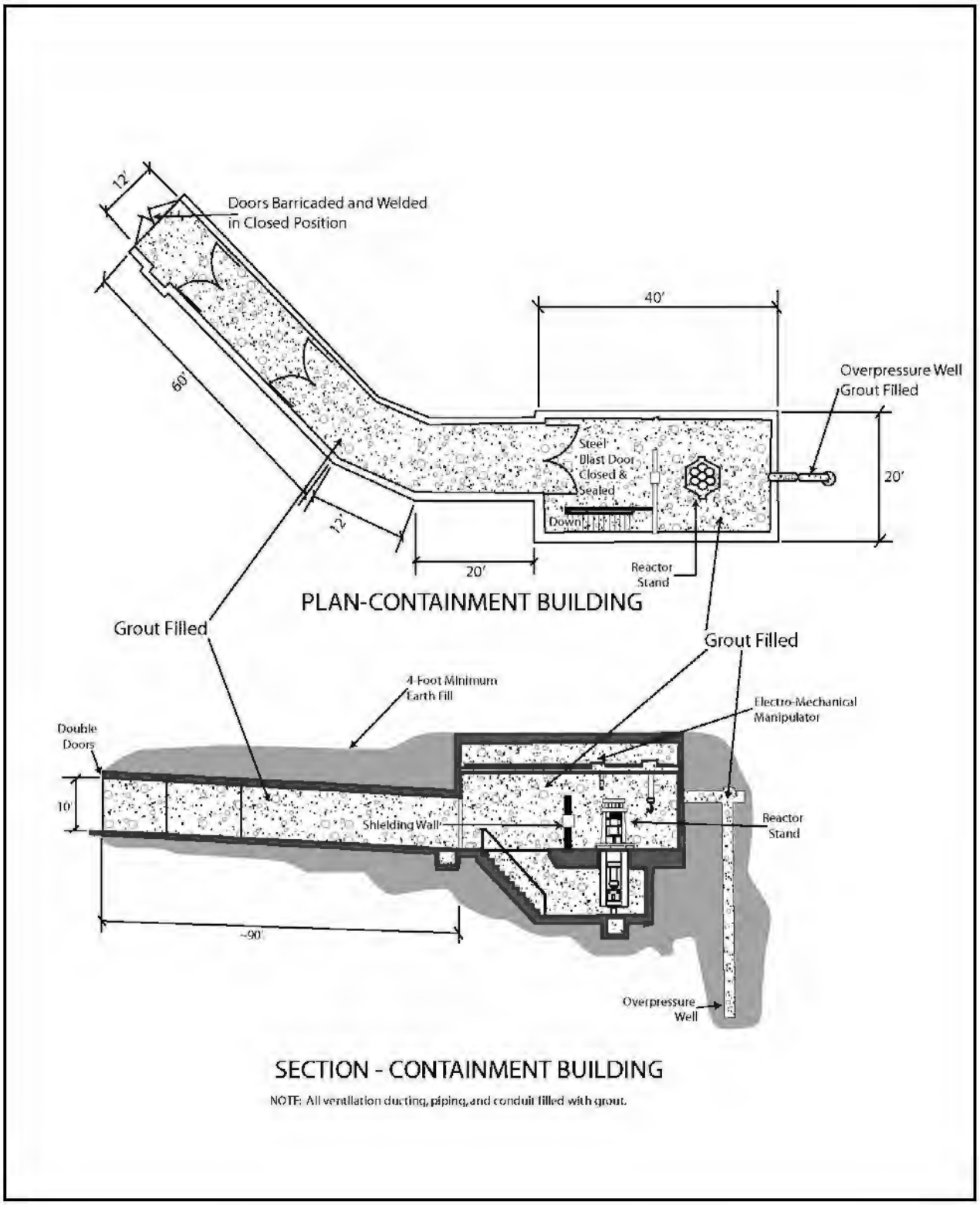

Figure H.1-2
Building 5400 Post-SAFER Configuration

- All potential source materials in the Building 5400 structure were enveloped with a flowable cement grout that filled all void spaces within the remaining structure, preventing the infiltration or accumulation of stormwater and further preventing potential migration of contaminants associated with the materials encased within the structure. The flowable cement grout mixture used 400 lb of Portland cement per yd^3 of material and had a compressive strength of 200 to 300 pounds per square inch in 7 days (according to American Concrete Institute standards).

H.1.9 Tier 2 Evaluation

As no FALs were established based on a Tier 2 evaluation (all contaminant FALs were established as Tier 1 RBSLs), a Tier 2 evaluation was not necessary.

H.2.0 Recommendations

Contamination remains at CAU 118 CAS 27-41-01 in the form of potential source material entombed in the Building 5400 monolith, Aroclor 1248-contaminated soil in the remaining footprint at the Building 5410 pad site, and Aroclor 1254 contamination potentially associated with dust suppression activities within the facility fence line.

Because Aroclor 1248 contamination was identified above the corresponding FAL (Tier 1 SSTL) in remaining soils at the Building 5410 pad site, it was determined that Aroclor 1248 is a COC, and contamination at this site warrants corrective action. The corrective action recommendation for this site is Close in Place with UR.

Because Aroclor 1254 contamination was identified above the corresponding FAL (Tier 1 SSTL) within the Super Kukla facility fence line, it was determined that Aroclor 1254 is a COC, and contamination at this site warrants corrective action. The corrective action recommendation for this site is Close in Place with UR.

Because potential source materials are present in the Building 5400 monolith above the corresponding potential source material criteria, it was determined that contamination at this site warrants corrective action. The corrective action recommendation for this site is Close in Place with UR.

The Close in Place with UR corrective action will prevent inadvertent exposure to CAS 27-41-01 contamination through fencing, signs, and recordation in the NNSA/NSO FIMS, the FFACO database, and the NNSA/NSO CAU/CAS files. Additional controls within CAS 27-41-01 protective of human health, safety, and the environment include:

- The area is located within the physical borders of the NTS, which has controlled access.
- The area is bounded by barbed-wire fencing within Area 27 of the NTS.
- Subsurface Aroclor 1248 contamination at the Building 5410 pad is covered with clean native fill to a depth of 2 to 3 ft.

H.3.0 References

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Moore, J., Science Applications International Corporation. 1999. Memorandum to M. Todd (SAIC) entitled, "Background Concentrations for NTS and TTR Soil Samples," 3 February. Las Vegas, NV: IT Corporation.

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NBMG, see Nevada Bureau of Mines and Geology.

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Appendix I

Nevada Division of Environmental Protection Comments

(1 Page)

NEVADA ENVIRONMENTAL RESTORATION PROJECT

DOCUMENT REVIEW SHEET

1. Document Title/Number: Draft Closure Report for Corrective Action Unit 118: Area 27 Super Kukla Facility, Nevada Test Site, Nevada	**2. Document Date:** 08/21/2007
3. Revision Number: 0	**4. Originator/Organization:** Stoller-Navarro
5. Responsible NNSA/NV ERP Project Manager: Sabine T. Curtis	**6. Date Comments Due:** 08/21/2007
7. Review Criteria: Full	
8. Reviewer/Organization/Phone No: Don Elle and Jeff MacDougall, NDEP, 486-2850	**9. Reviewer's Signature:**

10. Comment Number/Location	11. Type*	12. Comment	13. Comment Response	14. Accept
1.) Section 1.1.1, Page 4 of 45, 3rd Paragraph	Mandatory	Building 5400A should be changed to Building 5400 as that which housed the Super Kukla Reactor.	5400A has been changed to 5400.	
2.) Appendix H, Risk Evaluation	Mandatory	We would like to see significantly more detail in this section since NNSA/NSO is basing the closure strategy for this CAU on the results of the risk evaluation. Specifically, there is a lack of risk evaluation data to support the conclusions cited in the narrative. Also, data in other documents is referenced instead of being displayed in this appendix. Specifically, the Tier 1 lookup table should be listed in this section. In general; we suggest that all risk information (including data and calculations) necessary to make a strong case for the preferred site closure should be presented here, since this document will be used to justify the final closure activities and must therefore be readily defensible. It should be arranged in a manner that paints a clear, unambiguous picture of the decision process and plainly supports the desired outcome.	Appendix H has been revised to provide additional detail and data in regards to the risk evaluation to support the CAU 118 closure strategy.	

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