RECORD OF TECHNICAL CHANGE

Technical Change No: DOE/NV--1452 CAU 566 CR ROTC-1 Page 1 of 2

Project/Job No: N-I Industrial Sites / IS11-650 Date July 28, 2011

Project/Job Name: Closure Report for Corrective Action Unit 566: EMAD Compound

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

Mark J. Krauss (Name) Industrial Sites Project Manager (Title)

Description of Change:

1. Page ES-1 of ES-3, Executive Summary - Add the following sentence to the end of the first paragraph on page ES-1 "After completion of the CAU 566 Closure Report (CR) in June of 2011, the decision was made to transfer the Manned Control Car (MCC) and Engine Installation Vehicle (EIV) railcars from CAU 566 into CAU 114 as a new CAS so that the ultimate disposition of the cars can be accomplished under CAU 114."

2. Page 46, Section 2.2 Deviations from SAFER Plan as Approved - Add the following paragraph at the end of the first paragraph on page 46 in Section 2.2 "A deviation to the CAU 566 SAFER Plan is necessary in that the MCC and the EIV were included in the CAU 566 SAFER Plan. Though remediation of these two railcars was implemented under the CAU 566 SAFER Plan, the decision was made subsequent to the completion of the CAU 566 CR in June of 2011 to transfer the MCC and EIV railcars from CAU 566 into CAU 114 as a new CAS. This change was made so that the ultimate disposition of the cars can be accomplished under CAU 114."

3. Page 71, Section 5.0 Conclusions and Recommendations - Add the following bullet after the 7th bullet on page 71 "After completion of the CAU 566 CR in June of 2011, the decision was made to transfer the MCC and EIV railcars from CAU 566 into CAU 114 as a new CAS so that the ultimate disposition of the cars can be accomplished under CAU 114."

4. Page 19, Section 2.1.1.4 Removal of Potential Source Materials - Delete the sentence "The MCC and EIV railcars will be inspected as part of the post-closure monitoring implemented with the site UR." and replace with the sentence "After completion of the CAU 566 CR, the decision was made to transfer the MCC and EIV railcars as a new CAS into CAU 114 so that the ultimate disposition of the cars can be accomplished under CAU 114."

5. Page 27, Section 2.1.1.7 CAS Component – Locomotives and Railcars Investigation - Delete the text "The MCC/EIV will remain in place until a museum or other suitable recipient/location is identified for their preservation. If a suitable recipient/location for the MCC/EIV has not been identified before CAU 114 SAFER Plan activities are implemented, disposition of the MCC/EIV railcars and potentially hazardous materials (e.g., lead shielding) present on the railcars will be reevaluated/managed as part of CAU 114" and replace with the sentence "After completion of the CAU 566 CR, the decision was made to transfer the MCC and EIV railcars as a new CAS into CAU 114 so that the ultimate disposition of the cars can be accomplished under CAU 114."

RECORD OF TECHNICAL CHANGE

Technical Change No: DOE/NV--1452 CAU 566 CR ROTC-1 Page 2 of 2

Project/Job No: N-I Industrial Sites / IS11-650 Date July 28, 2011

Project/Job Name: Closure Report for Corrective Action Unit 566: EMAD Compound

6. Page B-22 of B-67 in Appendix B, Section B.3.1.3 Visual Inspections - Delete the sentence "The MCC and EIV railcars will be inspected as part of the post-closure monitoring plan implemented with the site UR." and replace with the sentence "After completion of the CAU 566 CR, the decision was made to transfer the MCC and EIV railcars as a new CAS into CAU 114 so that the ultimate disposition of the cars can be accomplished under CAU 114."

Justification:
The process of approving the CAU 566 CR resulted in the reassignment of the MCC and EIV railcars from the CAU 566 CR to the CAU 114 SAFER Plan as a new corrective action site (CAS 25-99-23). CAU 114 is designated as the Area 25 EMAD Facility and will involve the remediation of EMAD where the MCC and EIV cars are currently stored. The disposition and remediation of the railcars will be addressed in the CAU 114 SAFER Plan. As the cars have been removed from the CAU 566 CR and transferred to CAU 114, it was necessary to make a change to the CAU 566 CR.

The project time will be (Increased) (Decreased) (**Unchanged**) by approximately 0 days.

Applicable Project-Specific Document(s):
Closure Report for Corrective Action Unit 566: EMAD Compound, Nevada National Security Site, Nevada, Revision 0, June 2011

Approved By:

/s/ Kevin J. Cabble Date 8-4-11
NNSA/NSO Federal Sub-Project Director

/s/ Robert F. Boehlecke Date 8/4/11
NNSA/NSO Federal Project Director

/s/ Jeff MacDougall Date 8/4/11
NDEP

Nevada
Environmental
Restoration
Project

DOE/NV--1452

National Nuclear Security Administration

Closure Report for Corrective Action Unit 566: EMAD Compound Nevada National Security Site, Nevada

Controlled Copy No.: ___
Revision No.: 0

June 2011

Approved for public release; further dissemination unlimited.

Environmental Restoration
Project

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

UNCONTROLLED When Printed

Available for sale to the public from:

U.S. Department of Commerce
National Technical Information Service
5301 Shawnee Road
Alexandria, VA 22312
Telephone: 800.553.6847
Fax: 703.605.6900
E-mail: *orders@ntis.gov*
Online Ordering: *http://www.ntis.gov/help/ordermethods.aspx*

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--1452

CLOSURE REPORT FOR CORRECTIVE ACTION UNIT 566: EMAD COMPOUND NEVADA NATIONAL SECURITY SITE, NEVADA

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

Controlled Copy No.: ___

Revision No.: 0

June 2011

Approved for public release; further dissemination unlimited.

CLOSURE REPORT FOR
CORRECTIVE ACTION UNIT 566:
EMAD COMPOUND
NEVADA NATIONAL SECURITY SITE, NEVADA

Approved by: /s/ Kevein Cabble Date: 6-13-11

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

Approved by: /s/ Robert F. Boehlecke Date: 6/13/11

Robert F. Boehlecke
Federal Project Director
Environmental Restoration Project

Table of Contents

Table of Contents *(Continued)*

Table of Contents *(Continued)*

Table of Contents *(Continued)*

List of Figures

List of Figures *(Continued)*

List of Tables

List of Tables *(Continued)*

List of Acronyms and Abbreviations

Ac	Actinium
ACM	Asbestos-containing material
ASTM	ASTM International
bgs	Below ground surface
BMP	Best management practice
BOL	Bill of lading
CAA	Corrective action alternative
CAI	Corrective action investigation
CAS	Corrective action site
CAU	Corrective action unit
CLP	Contract Laboratory Program
CO	Carbon monoxide
COC	Contaminant of concern
COPC	Contaminant of potential concern
CR	Closure report
Cs	Cesium
CSM	Conceptual site model
DOE	U.S. Department of Energy
dpm/100cm^2	Disintegrations per minute per 100 square centimeters
DQA	Data quality assessment
DQI	Data quality indicator
DQO	Data quality objective
DRO	Diesel-range organics
EERF	Eastern Environmental Radiation Facility
EIV	Engine installation vehicle
E-MAD	Engine Maintenance, Assembly, and Disassembly

List of Acronyms and Abbreviations *(Continued)*

EML	Environmental Measurements Laboratory
EPA	U.S. Environmental Protection Agency
FAL	Final action level
FD	Field duplicate
FFACO	*Federal Facility Agreement and Consent Order*
FSL	Field-screening level
FSR	Field-screening result
ft	Foot
ft^2	Square foot
ft^3	Cubic foot
gal	Gallon
GPS	Global Positioning System
H_2S	Hydrogen sulfide
HEPA	High-efficiency particulate air
HSDB	*Hazardous Substances Data Bank*
HVAC	Heating, ventilating, and air conditioning
HWSU	Hazardous waste storage area
ID	Identification
IDW	Investigation-derived waste
in.	Inch
lb	Pound
LEL	Lower explosive limit
LCS	Laboratory control sample
LLW	Low-level waste
LVF	Landfill Load Verification Form
MCC	Manned control car

List of Acronyms and Abbreviations *(Continued)*

MDC	Minimum detectable concentration
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
mi	Mile
MLLW	Mixed low-level waste
M&O	Management and operating
MS	Matrix spike
MSD	Matrix spike duplicate
N/A	Not applicable
NAC	*Nevada Administrative Code*
NAD	North American Datum
Nb	Niobium
ND	Nondetect
NDEP	Nevada Division of Environmental Protection
NERVA	Nuclear Engine for Rocket Vehicle Application
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
N-I	Navarro-Intera, LLC
NNSA/NSO	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office
NNSS	Nevada National Security Site
NRDS	Nuclear Rocket Development Station
NTS	Nevada Test Site
O_2	Oxygen gas
PACM	Presumed asbestos-containing material
PAL	Preliminary action level

List of Acronyms and Abbreviations *(Continued)*

PB	Preparation blank
PCB	Polychlorinated biphenyl
pCi/g	Picocuries per gram
pCi/L	Picocuries per liter
POC	Performance objective criteria
PPE	Personal protective equipment
ppm	Parts per million
PSDR	Package, Storage, and Disposal Request
psi	Pounds per square inch
PSM	Potential source material
Pu	Plutonium
QA	Quality assurance
QAPP	Quality Assurance Project Plan
QC	Quality control
RBCA	Risk-based corrective action
RBSL	Risk-based screening level
RCRA	*Resource Conservation and Recovery Act*
RESRAD	Residual Radioactive
RPD	Relative percent difference
RSL	Regional screening level
RWMC	Radioactive Waste Management Complex
SAFER	Streamlined Approach for Environmental Restoration
SDG	Sample delivery group
SFDP	Spent Fuel Demonstration Program
Sr	Strontium
SSTL	Site-specific target level

List of Acronyms and Abbreviations *(Continued)*

SVOC	Semivolatile organic compound
TBD	To be determined
TC	Toxicity characteristic
TCLP	Toxicity Characteristic Leaching Procedure
Th	Thorium
TPH	Total petroleum hydrocarbons
TSCA	*Toxic Substances Control Act*
U	Uranium
UR	Use restriction
UTM	Universal Transverse Mercator
VOC	Volatile organic compound
yd^3	Cubic yard
%R	Percent recovery

Executive Summary

This Closure Report (CR) presents information supporting the closure of Corrective Action Unit (CAU) 566: EMAD Compound, Nevada National Security Site, Nevada. This CR complies with the requirements of the *Federal Facility Agreement and Consent Order* that was agreed to by the State of Nevada; U.S. Department of Energy (DOE), Environmental Management; U.S. Department of Defense; and DOE, Legacy Management. Corrective Action Unit 566 comprises Corrective Action Site (CAS) 25-99-20, EMAD Compound, located within Area 25 of the Nevada National Security Site.

The purpose of this CR is to provide documentation supporting the completed corrective actions and provide data confirming that the closure objectives for CAU 566 were met. To achieve this, the following actions were performed:

- Review the current site conditions, including the concentration and extent of contamination.
- Implement any corrective actions necessary to protect human health and the environment.
- Properly dispose of corrective action and investigation wastes.
- Document Notice of Completion and closure of CAU 566 issued by the Nevada Division of Environmental Protection.

From October 2010 through May 2011, closure activities were performed as set forth in the *Streamlined Approach for Environmental Restoration Plan for CAU 566: EMAD Compound, Nevada National Security Site, Nevada*. The purposes of the activities as defined during the data quality objectives process were as follows:

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

Analytes detected during the closure activities were evaluated against final action levels (FALs) to determine COCs for CAU 566. Assessment of the data from collected soil samples, and from radiological and visual surveys of the site, indicates the FALs were exceeded for polychlorinated biphenyls (PCBs), semivolatile organic compounds (SVOCs), and radioactivity.

The PCBs (Aroclor 1254 and 1260) were detected in samples exceeding the FAL at the electrical substations and at varying concentrations throughout the EMAD Compound. Due to the discovery of PCBs at multiple locations outside the immediate area surrounding the substations, the conceptual site model was revised to include two sources for the PCB contamination at CAU 566. The source of the PCB contamination at CAU 566 could be partially due to spills or releases from the PCB-containing transformers; however, the contamination outside the immediate areas of the substations is likely due to historical application of PCB-containing oil for soil stabilization, dust suppression, and/or the importing of PCB-contaminated soil. Aroclors 1221, 1232, 1242, 1248, and 1268 failed the sensitivity criteria (for seven samples) defined in the CAU 566 Streamlined Approach for Environmental Restoration Plan. Because it could not be determined that these contaminants are present below their corresponding FALs, it was conservatively assumed they are COCs.

Benzo(a)pyrene was detected above the FAL in one sample near the transformer pad at the southeast substation. Except for this sample, all other SVOCs were detected at concentrations below their respective FALs. However, the sampling of hydrocarbon-stained soil under the two 120-ton locomotives failed the sensitivity criteria for several SVOCs. Because it could not be determined that these contaminants are present below their corresponding FALs, it was conservatively assumed these contaminants are COCs.

Corrective actions were implemented to remove the following:

- Radiologically contaminated soil assumed greater than FAL at two locations
- Radiologically contaminated soil assumed greater than FAL with lead shot
- PCB-contaminated soil
- Radiologically contaminated filters and equipment
- Fuels, lubricants, engine coolants, and oils
- Lead debris
- Electrical and lighting components assumed to be potential source materials, including
  - fluorescent light bulbs
  - mercury switches (thermostats)
  - circuit boards
  - PCB-containing ballasts

Closure of CAU 566 was achieved through a combination of removal activities and closure in place. Corrective actions to remove COCs, and known and assumed potential source materials, were implemented as was practical. The PCBs remaining at the site are bounded laterally, but not

vertically, within CAS 25-99-20 based upon step-out sampling; the sources (e.g., PCB transformer oils, diesel fuel from locomotive reservoirs) have been removed; the practice of the application of PCB-containing oils for soil stabilization has ceased; and the COCs are not readily mobile in the environment. Closure in place is necessary, and future land use of the site will be restricted from intrusive activities. This will effectively eliminate inadvertent contact by humans with the contaminated media.

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

- No further corrective action is required at CAS 25-99-20.
- Closure in place of CAS 25-99-20.
- A use restriction is required at CAU 566.
- A Notice of Completion to the DOE, National Nuclear Security Administration Nevada Site Office, is requested from the Nevada Division of Environmental Protection for closure of CAU 566.
- Corrective Action Unit 566 should be moved 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) 566: EMAD Compound, Nevada National Security Site (NNSS), Nevada. This complies with the requirements of the *Federal Facility Agreement and Consent Order* (FFACO) (1996, as amended) that was agreed to by the State of Nevada; U.S. Department of Energy (DOE), Environmental Management; U.S. Department of Defense; and DOE, Legacy Management. Corrective Action Unit 566 consists of Corrective Action Site (CAS) 25-99-20, located in Area 25 of the NNSS. The NNSS (formerly the Nevada Test Site [NTS]) is located approximately 65 miles (mi) northwest of Las Vegas, Nevada (Figure 1-1).

Note: The acronym used for the Engine Maintenance, Assembly, and Disassembly Facility sometimes appears in documents as "E-MAD" and sometimes as "EMAD." Throughout this document, "E-MAD" will be used except when "EMAD" appears in document titles and FFACO descriptions.

The CAU 566 scope consists of the following releases:

- Various releases to soil associated with CAS components on the exterior of the E-MAD Facility (Building 3900)
- Potential source material that may result in the release of a contaminant of concern (COC) to environmental media

The CAS location is shown on Figure 1-2. Figure 1-3 shows an aerial photograph of Building 3900 and the general locations of the CAS components with the exception of the debris piles and one of the substations, which are beyond the extent of the photograph to the southwest. The original CAS components defined in the CAU 566 Streamlined Approach for Environmental Restoration (SAFER) Plan (NNSA/NSO, 2010) consist of the following:

- Metallurgy Lab Drain System
- Storm Drain System
- Locomotives and Railcars
- Substations
- Storage Casks and Drywells
- Construction Debris Piles

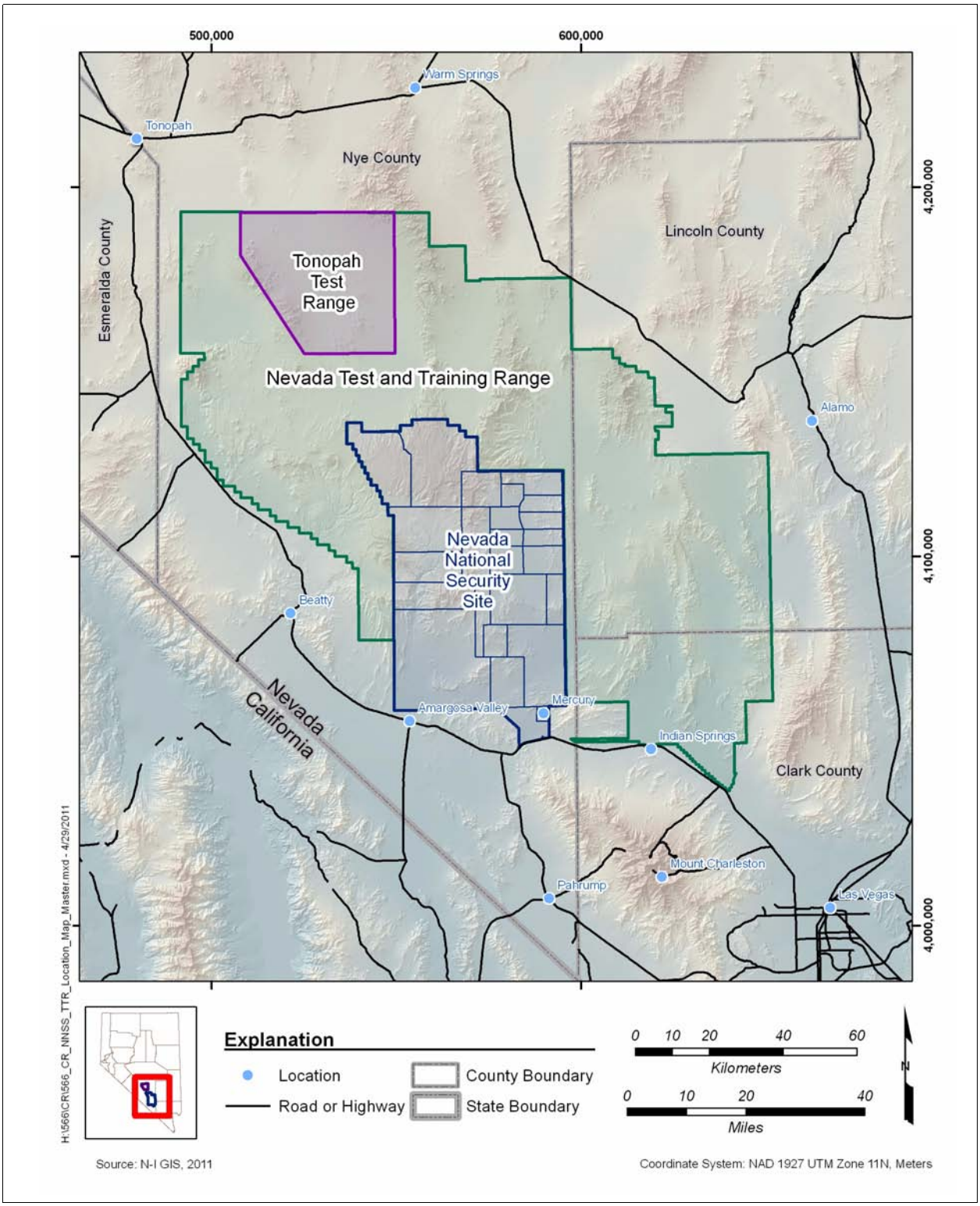


Figure 1-1
Nevada National Security Site

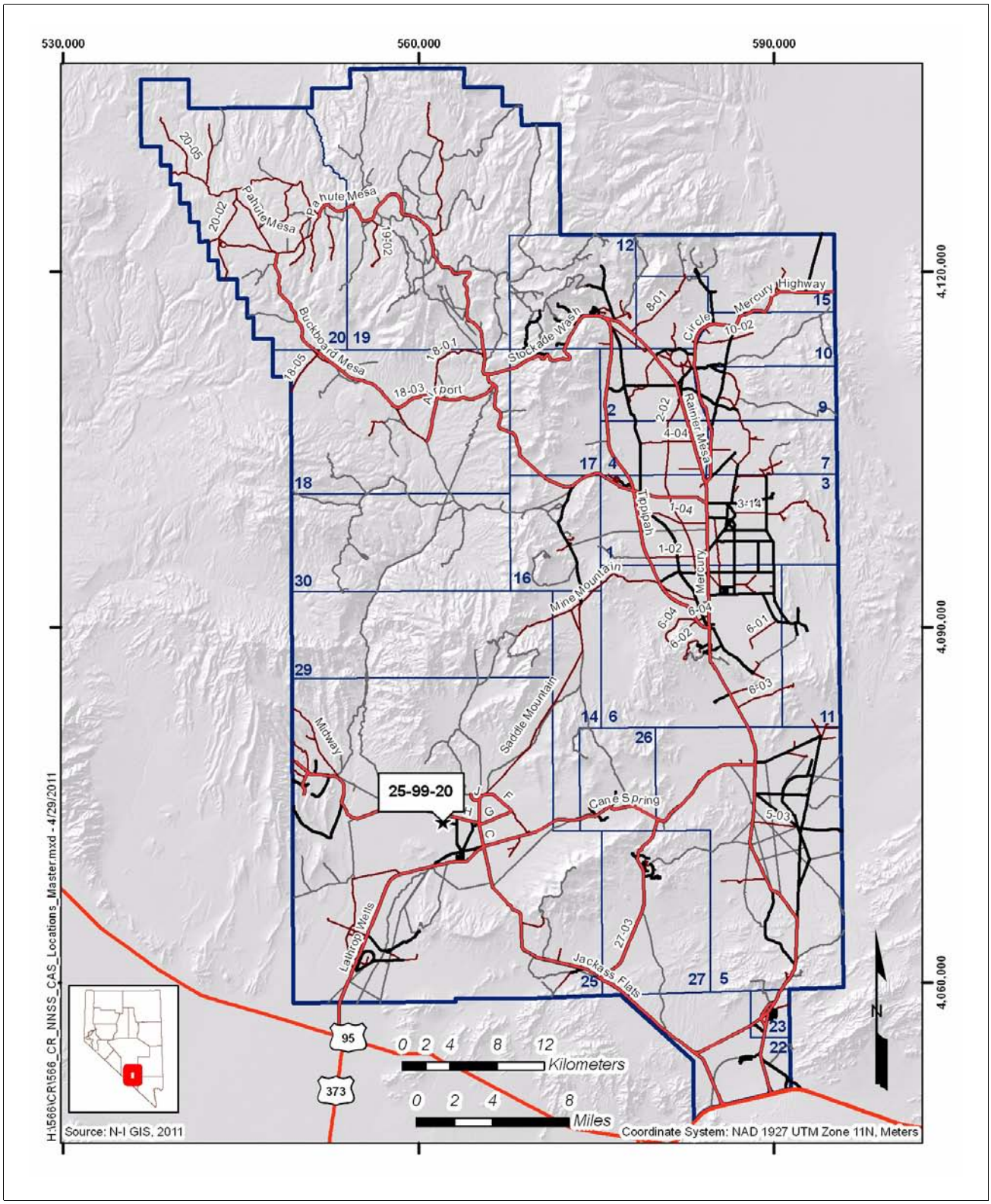


Figure 1-2
CAU 566 CAS Location Map

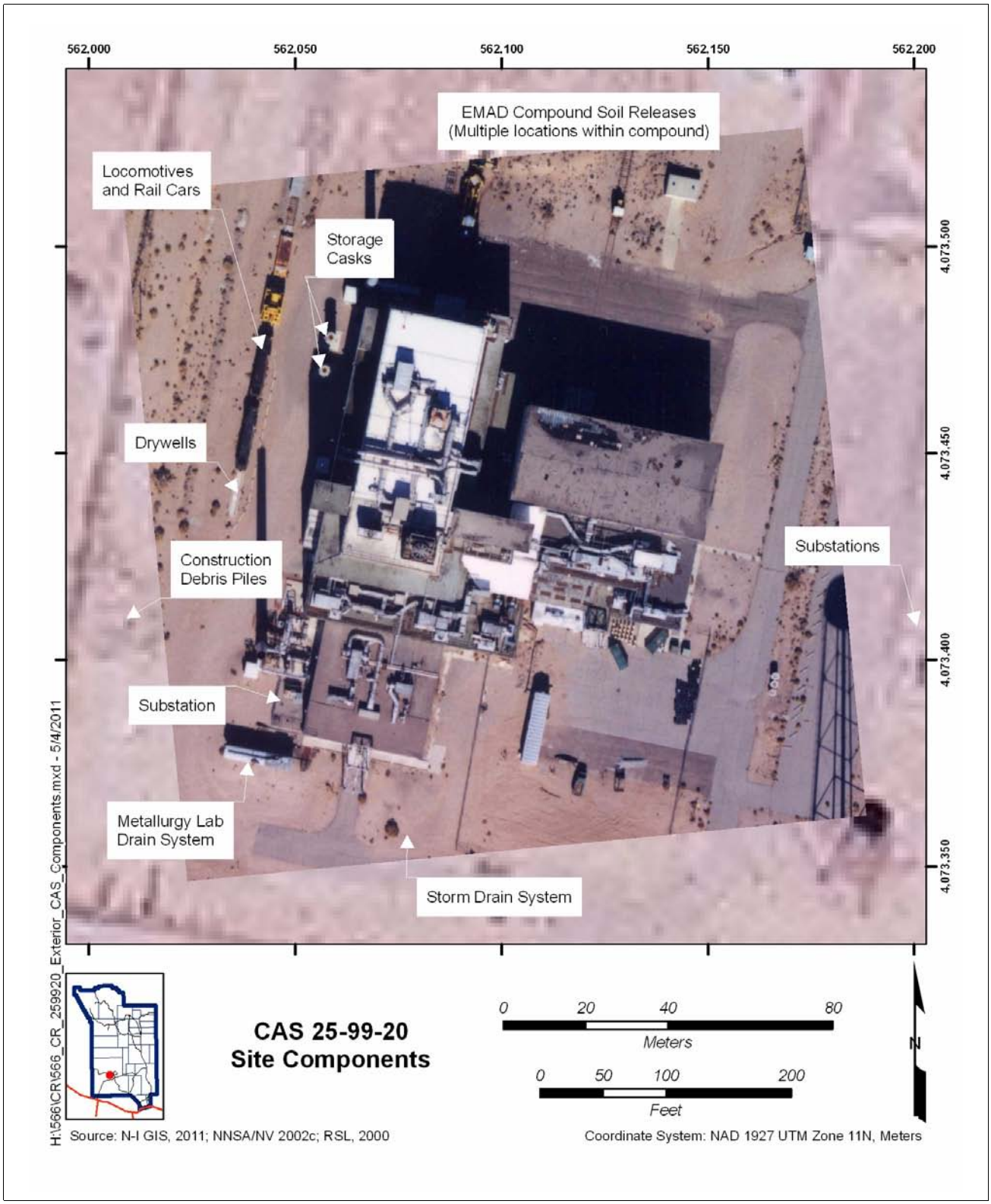


Figure 1-3
CAS Component Locations

During the corrective action investigation (CAI), an additional mechanism for the release of COCs to the environment was identified. This release has been grouped into a seventh CAS component, identified as follows:

- EMAD Compound Soil Releases

1.1 Purpose

This CR provides documentation and justification for the closure of CAU 566 without further corrective action. This justification is based on process knowledge and the results of the investigative activities conducted in accordance with the CAU 566 SAFER Plan (NNSA/NSO, 2010). The SAFER Plan provides information relating to site history as well as the scope and planning of the investigation.

This CR also provides analytical and radiological survey data to confirm that the remediation goals were met as specified in the CAU 566 SAFER Plan, which was approved by the Nevada Division of Environmental Protection (NDEP). The SAFER Plan recommended an evaluation of the corrective action alternatives (CAAs); the recommended corrective action for CAU 566 is closure in place with use restrictions (URs). Use restrictions are specified in Appendix D.

1.1.1 Site Description and History

The E-MAD Facility is one of seven separate but interconnected complexes associated with the Nuclear Rocket Development Station (NRDS) in Area 25 in support of the Rover program, whose goal was the development of nuclear rocket reactors for use in the space program (Beck et al., 1996). The E-MAD Facility supported the second phase of that program consisting of the design and testing of nuclear-powered rockets in the Nuclear Engine for Rocket Vehicle Application (NERVA) project (1965 to 1973). The NERVA engines were assembled in the Cold Bay; transported to the Engine Test Stand for testing; and then returned to E-MAD, where remote handling, inspections, and additional testing activities were conducted in the Hot Bay and post-mortem cells. An aerial photograph of the site is shown in Figure 1-4.

From 1977 to 1982, the Westinghouse Electric Corporation hosted the spent fuel demonstration program (SFDP), which involved testing and development activities related to the dry storage of

Figure 1-4
Historical EMAD Compound Exterior
Source: RSL, 1985

spent nuclear fuel assemblies (DOE/NV, 1983). Primary program activities included receipt of spent fuel assemblies; design and development of sealed canisters for storage demonstrations; and performance of fuel calorimetry and canister gas sampling. The spent fuel program demonstrated three dry spent fuel storage concepts: (1) aboveground storage within two 252-inch (in.) high, 104-in. diameter reinforced concrete silos; (2) near surface drywell storage within five steel casing liners grouted into a shallow hole drilled between the rails on the west set of the railroad tracks; and (3) air-cooled vault (or lag storage pit) located inside the Hot Bay (DOE/NV, 1983). All fuel cores were removed from the site in 1989.

Since the conclusion of the SFDP in the late 1980s, the E-MAD Facility has been mostly inactive with the exception of Fluid Tech, Inc., who occupied portions of the Cold Bay and office areas in the late 1990s. Fluid Tech's primary activities included decontamination of plutonium from a historical XF-90 airplane formerly located in Plutonium Valley of the NTS (Seals, 2004). Other activities included testing of microbial digestion of protective clothing (Geary, 2006). In addition to portions of the Cold Bay, Fluid Tech also used one of the trailers as an office/first-aid station.

Previous studies in the area of the EMAD Compound were addressed in the SAFER Plan (NNSA/NSO, 2010). The locations of the previous E-MAD investigations are listed on Table 1-1.

Additional information relating to the site history, planning, and scope of the closure is presented in the SAFER Plan.

Table 1-1
Previous Investigations Associated with the E-MAD Facility
(Page 1 of 4)

CAU	CAS	CAS Description	Associated Documents
22 Housekeeping CASs Closed under the Clean Closure Strategy			
70	25-24-08	Batteries (2)	U.S. Department of Energy, Nevada Operations Office. 1995a. *Environmental Restoration Sites Inventory - Non-Hazardous Site Cleanup Verification Summary.* (DOE/NV, 1995a)
	25-24-10	Batteries (6)	
	25-26-11	Lead Bricks (30)	
	25-26-12	Lead Bricks (339)	
	25-26-20	Lead Bricks (52)	
74	25-29-10	Chemicals (paint and oil)	U.S. Department of Energy, Nevada Operations Office. 1995b. *Environmental Restoration Sites Inventory - Site Cleanup Verification Summary.* (DOE/NV, 1995b)
119	25-01-14	Contaminated Storage Tank	U.S. Department of Energy, Nevada Operations Office. 2000a. *Housekeeping Closure Report for Corrective Action Unit 119: Storage Tanks, Nevada Test Site, Nevada,* Rev. 0, DOE/NV--626. (DOE/NV, 2000a)
288	25-23-04	Radioactively Contaminated Crates	U.S. Department of Energy, Nevada Operations Office. 2000b. *Housekeeping Closure Report for Corrective Action Unit 288: Area 25 Engine-Maintenance, Assembly, and Disassembly/Treatability Test Facility Chemical Sites, Nevada Test Site, Nevada,* Rev. 0, DOE/NV--590. (DOE/NV, 2000b)
	25-23-10	Contaminated Materials	
	25-29-01	Miscellaneous Chemicals	
	25-29-04	Miscellaneous Chemicals	
	25-29-07	Ethylene Glycol	
	25-29-09	Miscellaneous Chemicals	
297	25-25-01	Vacuum Pump Oil Recovery	U.S. Department of Energy, Nevada Operations Office. 1999. *Closure Report for Housekeeping Category Corrective Action Unit 297: Nevada Test Site, Nevada*, Rev. 0, DOE/NV--11718-289. (DOE/NV, 1999)
354	25-99-15	Highway Flares (fuses)	U.S. Department of Energy, Nevada Operations Office. 1998. *Closure Report for Housekeeping Category Corrective Action Unit 354: Nevada Test Site*, Rev. 0, DOE/NV--11718-169. (DOE/NV, 1998)
381	25-99-14	Gas Cylinders (2)	U.S. Department of Energy, Nevada Operations Office. 1996a. *Corrective Action Unit 381 Gas Cylinder Closure Report*, 07-CAU381-002. (DOE/NV, 1996a)
382	25-22-14	Drums (2)	U.S. Department of Energy, Nevada Operations Office. 1996b. *Corrective Action Unit 382 Housekeeping Closure Report.* (DOE/NV, 1996b)
	25-22-15	Drum	

Table 1-1
Previous Investigations Associated with the E-MAD Facility
(Page 2 of 4)

CAU	CAS	CAS Description	Associated Documents
386	25-26-24	Lead Bricks	U.S. Department of Energy, Nevada Operations Office. 1997. *Closure Report for Housekeeping Category Corrective Action Unit 386, Nevada Test Site,* Rev. 1, DOE/NV--11718-129. (DOE/NV, 1997)
398	25-25-02	Oil Spills	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2003b. *Closure Report for Corrective Action Unit 398: Area 25 Spill Sites, Nevada Test Site, Nevada,* Rev. 1, DOE/NV--873-REV 1. (NNSA/NSO, 2003b) **-and-** U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2008b. *Addendum to the Closure Report for Corrective Action Unit 398: Area 25 Spill Sites, Nevada Test Site, Nevada,* Rev. 0, DOE/NV--873-REV 1-ADD. (NNSA/NSO, 2008b)
	25-25-04	Oil Spills	
	25-25-05	Oil Spills	
6 Additional CASs Closed under the Clean Closure Strategy			
127	25-01-06	Aboveground Storage Tank	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2008c. *Closure Report for Corrective Action Unit 127: Areas 25 and 26 Storage Tanks, Nevada Test Site, Nevada,* Rev. 0, DOE/NV--1248. (NNSA/NSO, 2008c)
135	25-02-01	Underground Storage Tanks	U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office. 2001. *Closure Report for Corrective Action Unit 135: Areas 25 Underground Storage Tanks, Nevada Test Site, Nevada,* Rev. 1, DOE/NV--717-Rev. 1. (NNSA/NV, 2001)
165	25-07-06	Train Decontamination Area	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2005. *Closure Report for Corrective Action Unit 165: Area 25 and 26 Dry Well and Washdown Areas, Nevada Test Site, Nevada,* Rev. 0, DOE/NV--1092. (NNSA/NSO, 2005)
	25-59-01	Septic System	
168	25-16-01	Construction Waste Pile	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2007a. *Closure Report for Corrective Action Unit 168: Area 25 and 26 Contaminated Materials and Waste Dumps, Nevada Test Site, Nevada,* Rev. 0, DOE/NV--1178. (NNSA/NSO, 2007a)
300	25-60-02	Building 3901 Outfall	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2007b. *Closure Report for Corrective Action Unit 300: Surface Release Areas, Nevada Test Site, Nevada*, Rev. 0, DOE/NV--1222. (NNSA/NSO, 2007b)

Table 1-1
Previous Investigations Associated with the E-MAD Facility
(Page 3 of 4)

CAU	CAS	CAS Description	Associated Documents
4 CASs Closed under the Closure in Place Strategy with URs			
127	25-01-07	Aboveground Storage Tank	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2008c. *Closure Report for Corrective Action Unit 127: Areas 25 and 26 Storage Tanks, Nevada Test Site, Nevada,* Rev. 0, DOE/NV--1248. (NNSA/NSO, 2008c)
262	25-02-06	Underground Storage Tank	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2003a. *Closure Report for Corrective Action Unit 262: Area 25 Septic Systems and Underground Discharge Point, Nevada Test Site, Nevada,* Rev. 1, DOE/NV--897-REV 1. (NNSA/NSO, 2003a) **-and-** U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2008a. *Addendum to the Closure Report for Corrective Action Unit 262: Area 25 Septic Systems and Underground Discharge Point, Nevada Test Site, Nevada,* Rev. 0, DOE/NV--897-REV 1-ADD. (NNSA/NSO, 2008a)
143	25-23-03	Contaminated Waste Dump #2	U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office. 2002a. *Closure Report for Corrective Action Unit 143: Area 25 Contaminated Waste Dumps, Nevada Test Site, Nevada*, Rev. 0, DOE/NV--807. (NNSA/NV, 2002a)
556	25-60-03	E-MAD Stormwater Discharge and Piping	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2008d. *Corrective Action Decision Document/Closure Report for Corrective Action Unit 556: Dry Wells and Surface Release Points, Nevada Test Site, Nevada,* Rev. 0, DOE/NV--1285. (NNSA/NSO, 2008d)
1 CAS No Further Action			
557	25-25-18	Train Maintenance Building 3901 Spill Site	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2009. *Corrective Action Decision Document/Closure Report for Corrective Action Unit 557: Spills and Tank Sites, Nevada Test Site, Nevada*, Rev. 0, DOE/NV--1319. (NNSA/NSO, 2009)

Table 1-1
Previous Investigations Associated with the E-MAD Facility
(Page 4 of 4)

CAU	CAS	CAS Description	Associated Documents
2 CASs with URs Removed			
262	25-05-06	Leachfield	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2003a. *Closure Report for Corrective Action Unit 262: Area 25 Septic Systems and Underground Discharge Point, Nevada Test Site, Nevada,* Rev. 1, DOE/NV--897-REV 1. (NNSA/NSO, 2003a) **-and-** U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2008a. *Addendum to the Closure Report for Corrective Action Unit 262: Area 25 Septic Systems and Underground Discharge Point, Nevada Test Site, Nevada,* Rev. 0, DOE/NV--897-REV 1-ADD. (NNSA/NSO, 2008a)
398	25-25-17	Subsurface Hydraulic Oil Spill	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2003b. *Closure Report for Corrective Action Unit 398: Area 25 Spill Sites, Nevada Test Site, Nevada,* Rev. 1, DOE/NV--873 - REV 1. (NNSA/NSO, 2003b) **-and-** U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2008b. *Addendum to the Closure Report for Corrective Action Unit 398: Area 25 Spill Sites, Nevada Test Site, Nevada,* Rev. 0, DOE/NV--873-REV 1-ADD. (NNSA/NSO, 2008b)

1.2 Scope

The objective of the SAFER activities for CAU 566 was to support closure of CAU 566 by collecting additional information and implementing corrective actions.

Corrective actions were completed by removal of potential source material (PSM) and COCs as demonstrated by verification sample analytical results. The corrective actions included the following:

- Removing surface debris and/or materials to facilitate sampling.
- Collecting soil samples to determine whether COCs are present in environmental media.
- Collecting step-out samples to define the lateral extent of COCs.
- Removing soil containing COCs.

- Collecting samples of materials to determine whether PSM exists.
- Performing radiological surveys.
- Removing PSM including:
  - Lead shot and other lead-containing debris, including circuit boards, lead bricks, and lead-acid batteries
  - Mercury-containing items
  - Fluorescent light bulbs
  - Polychlorinated biphenyl (PCB)-containing items, including ballasts and capacitors
  - Radiologically contaminated cast-iron drain pipe at Metallurgy Lab trailer
  - Fuels, lubricants, engine coolants and oils
- Grouting drywells to eliminate pathways to the environment.
- Collecting waste management samples.
- Justifying why no further corrective action is necessary and the technical rationale for implemented closure activities.
- Disposing of correction action waste (low-level waste [LLW])
- Collecting quality control (QC) samples.
- Documenting Notice of Completion and closure of CAU 566.

The corrective action of closure in place was completed for the two remaining CAS components:

- Substations
- EMAD Compound Soil Releases

For the Substations CAS component, a limited soil remediation was performed by removal of contaminated soil exceeding 100 milligrams per kilograms (mg/kg) PCBs. The discovery of area-wide PCB (Aroclor) contamination within CAS 25-99-20 from a source other than the substations, led to the identification of a new CAS component: EMAD Compound Soil Releases. Extent of contamination for both CAS components was bounded laterally, but not vertically, through

sampling and analytical results; implementation of a UR is necessary to protect future workers from inadvertent contact with the remaining contamination. Activities used to implement this corrective action included the following:

- Remediating and removing approximately 145 cubic feet (ft^3) of PCB-contaminated soil.
- Collecting soil samples to determine whether COCs are present in environmental media.
- Collecting step-out samples to define the lateral extent of COCs.
- Collecting QC samples.
- Dispositioning and disposing PCB-contaminated soil from remediation activities.
- Implementing URs.
- Documenting Notice of Completion and closure of CAU 566.

The CAU 566 SAFER Plan (NNSA/NSO, 2010) also addressed best management practices (BMPs) that would be completed outside the FFACO in order to place the facility in a safe configuration for future demolition. The BMP activities completed during the CAI closure activities include asbestos identification and abatement; demolition/removal of guard shack, wood sheds, and trailers; and removal of readily removable wastes.

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 (NNSA/NSO, 2010), the actual schedule, and the site conditions after completion of corrective actions.
- Section 3.0, "Waste Disposition," discusses the wastes generated and entered into an approved waste management system as a result of the corrective action.
- Section 4.0, "Closure Verification Results," describes verification activities and results.
- Section 5.0, "Conclusions and Recommendations," provides the conclusions and recommendations along with the rationale for their determination.
- Section 6.0, "References," provides a list of all referenced documents used in the preparation of this CR.
- Appendix A, *Data Quality Objectives (DQOs)* as Developed in the SAFER Plan, provides the DQOs as presented in Appendix B of the CAU 566 SAFER Plan.

- Appendix B, *Confirmation Sampling Test Results*, provides a description of the project objectives, field closure and sampling activities, and closure results.
- Appendix C, *Waste Disposition Documentation*, documents disposal of items removed during closure activities.
- Appendix D, *Use Restrictions*, documents the URs.
- Appendix E, *Evaluation of Risk*, presents the risk evaluation results.
- Appendix F, *Nevada Division of Environmental Protection Comments*, 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 assurance (QA)/QC procedures were adhered to, all closure activities were performed in accordance with the following documents:

- *Streamlined Approach for Environmental Restoration Plan for CAU 566: EMAD Compound, Nevada National Security Site, Nevada* (NNSA/NSO, 2010)
- *Industrial Sites Quality Assurance Project Plan* (QAPP) (NNSA/NV, 2002b)
- *Federal Facility Agreement and Consent Order* (1996, as amended)

1.3.2 Data Quality Objectives

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

The problem statement for CAU 566 is as follows: "Existing information on the nature and extent of potential contamination is insufficient to validate the assumptions used to select the corrective actions or to verify that closure objectives were met for CAU 566." To address this problem, the resolution of two decision statements is required:

- Decision I: "Is any COC present in environmental media?" Any analytical result for a contaminant of potential concern (COPC) above the final action level (FAL) will result in that COPC being designated as a COC.

- Decision II: "Is sufficient information available to confirm that closure objectives were met?" Sufficient information is defined to include the following:

  - Identifying the lateral extent of COC contamination in media, if present
  - The information needed to characterize investigation-derived waste (IDW) for disposal
  - The information needed to determine remediation waste types

The presence of a COC would require a corrective action. A corrective action may also be necessary if there is a potential for wastes that are present at a site (i.e., PSM) to result in the introduction of COCs into site environmental media. These wastes would be considered PSM, which is defined as waste (solid or liquid) containing contaminants that, if released to soil, would result in soil contamination exceeding a FAL.

1.3.3 Data Quality Assessment Summary

The data quality assessment (DQA) presented in Section 4.5 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 4.5, is composed of the following steps:

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

Based on the results of the DQA presented in Section 4.5, 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 following sections summarize the CAU 566 closure activities and any deviations from the original scope of work. Results of confirmation sampling for individual CAU 566 CAS components are presented in Appendix B of this document.

2.1 Description of Corrective Action Activities

The CAI activities were conducted in accordance with the requirements set forth in the CAU 566 SAFER Plan (NNSA/NSO, 2010). Table 2-1 lists the CAI activities that were conducted at each CAS component.

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

Judgmental sampling schemes were 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 nonselective random locations.

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

Table 2-1
Corrective Action Investigation Activities Conducted at CAU 566 To Meet SAFER Plan Requirements

CAI Activities	CAS 25-99-20 Components						
	Metallurgy Lab Drain System	Storm Drain System	Locomotives and Railcars	Substations	Storage Casks and Drywells	Construction Debris Piles	EMAD Compound Soil Releases
Conducted surface radiological walkover surveys (soil, concrete, debris) using a handheld detector and visual surveys to identify biased sampling locations.	X	X	X	X	X	X	X
Field screened samples for alpha and beta/gamma radiation using a handheld survey instrument.	X	X	X	X	X	X	X
Collected soil samples from biased locations to determine whether COPCs are present (Decision I) and from step-out sample locations to define extent of COPCs (Decision II).	X	X	X	X	X	X	X
Collected liquid, solid, oil, and paint samples from materials and equipment within the facility compound 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	--	X	--	X	X	--
Removed PCB-contaminated, radiologically contaminated, and lead-contaminated soil; and collected verification samples.	--	--	--	X	--	X	--
Removed assumed PSMs without sampling (e.g., lead shielding, mercury-containing thermostats, PCB-containing ballasts).	X	--	X	--	--	X	--
Collected samples to characterize future demolition wastes.	X	--	X	X	X	X	--
Investigated drywells; isolated and sealed potential future pathways to the environment.	--	--	--	--	X	--	--
Submitted select samples for offsite laboratory analysis.	X	X	X	X	X	X	X
Collected beryllium and asbestos samples for characterization.	X	X	X	--	X	X	--
Collected GPS coordinates for samples locations and points of interest.	X	X	X	X	X	X	X

-- = Not applicable

GPS = Global Positioning System

and justification that sampling locations are the most likely locations to contain a COC, if a COC exists.

2.1.1 CAS 25-99-20 Closure Activities

The following sections describe how the approved SAFER Plan (NNSA/NSO, 2010) was implemented for CAU 566, CAS 25-99-20, including the individual CAS components. See Appendix B for a detailed discussion of analytical results.

2.1.1.1 Radiological Surveys

Radiological surveys were performed at various locations within CAS 25-99-20. Radiological surveys were performed to identify the presence, nature, and extent of radiological contaminants at activities statistically distinguishable from background activities.

A site walkover survey of the EMAD Compound within the fenced area was conducted during investigation of CAS 25-99-20. The walkover survey transected approximately 20.8 acres of the EMAD Compound grounds surrounding the exterior of Building 3900. The survey area is shown on Figure 2-1. The walkover surveys were performed using a TSA Systems PRM 470C handheld gamma detector. Results of the walkover survey are discussed in Section 2.1.1.10 and Appendix B.

Radiological surveys were also conducted on the guard shack, wooden sheds, Fluid Tech trailer, Metallurgy Lab trailer, storage casks, and debris piles (mechanical press and other miscellaneous equipment) to characterize wastes for disposal. Accessible surfaces of the drywells, concrete storage casks, and railcars were also radiologically screened for characterization purposes. Results of radiological surveys can be found in Appendix B.

2.1.1.2 Field Screening

Field screening for alpha and beta/gamma radiation was performed on soil samples at CAU 566 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 in CAS 25-99-20. The radiation FSLs are instrument-specific and were established for each

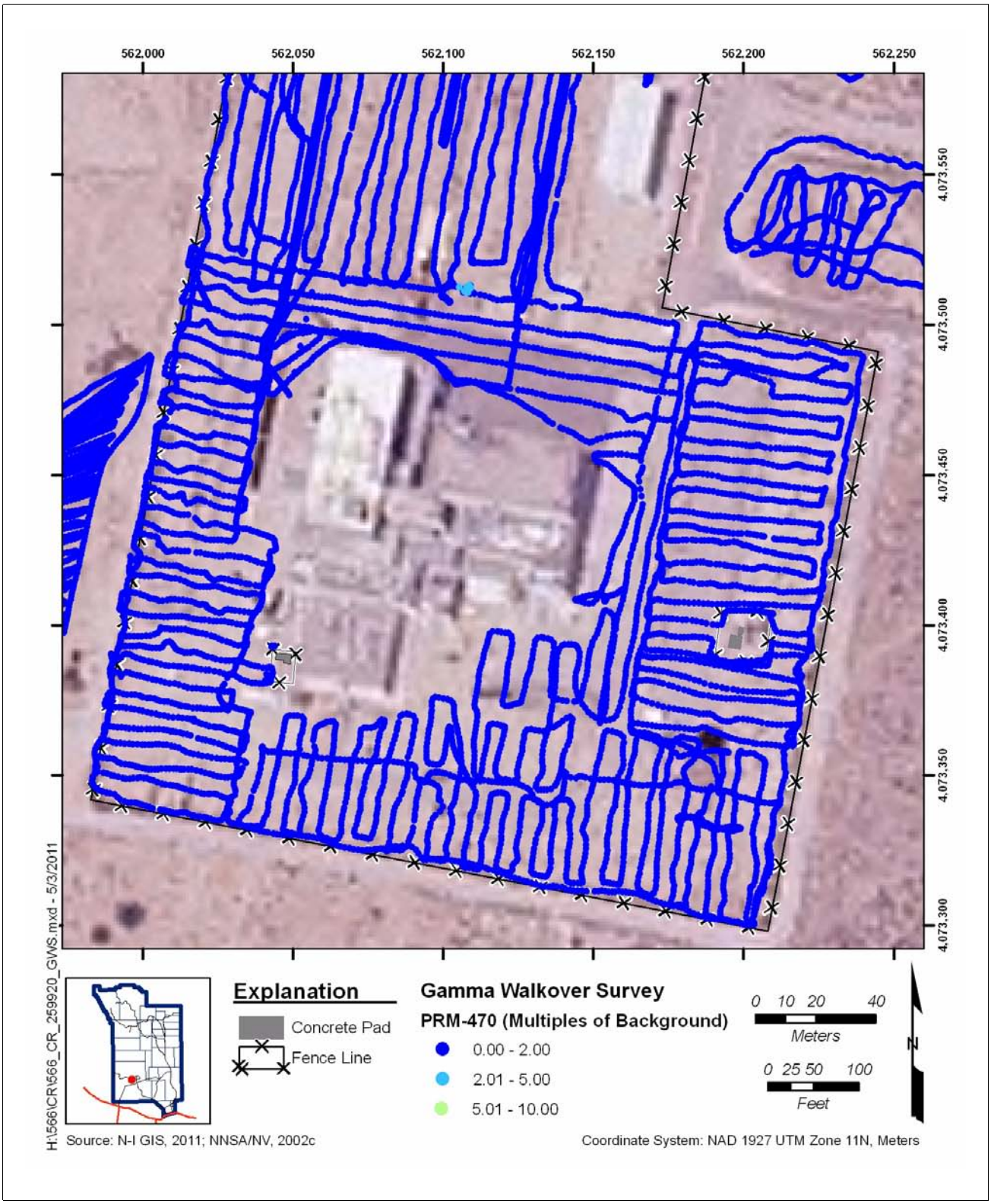


Figure 2-1
Radiological Walkover Survey

instrument before use. Alpha and beta/gamma radiation screening was performed using an NE Technology Electra fitted with a dual-alpha and beta/gamma radiation probe.

2.1.1.3 Sample Collection

Environmental sampling activities included the collection of surface and subsurface soil samples. Soil samples were taken from the surface based on biasing factors such as radiological readings, soil staining, and process knowledge; or at locations where potential wastes could have impacted the soil. A total of 127 environmental soil samples were collected (including 6 field duplicates [FDs]), and a total of 6 PSM samples were collected (see Table B.3-1) during the investigation. See Sections 2.1.1.5 through 2.1.1.11 for additional detail on sampling activities at each CAS component.

2.1.1.4 Removal of Potential Source Materials

Electrical and lighting components, and other building materials assumed to be PSM were removed as a corrective action from the guard shack, wooden sheds, trailers, and railcars as practical, without sampling. These materials include the following:

- Fluorescent light bulbs
- Mercury switches (thermostats)
- Circuit boards
- PCB-containing ballasts
- Fuels, lubricants, engine coolants and oils
- Lead debris
- Lead-acid batteries

See Section B.4.0 and the following CAS component-specific sections for details regarding removal activities, waste characterization, and final disposition of the removed materials.

Approximately 3,200 pounds (lb) of lead-containing debris was removed from the north side of Building 3900. The lead was primarily in the form of two triangular lead-filled housings. Additional lead shielding, lead bricks used for counterweights, and leaded glass windows were identified on the manned control car (MCC) and engine installation vehicle (EIV) railcars (Figure 2-2). However, these items were left in place at this time due to their historical significance. The MCC and EIV railcars will be inspected as part of the post-closure monitoring implemented with the site UR. See Section 2.1.1.7 for additional details on the railcars and locomotives.

Figure 2-2
MCC and EIV Railcars

2.1.1.5 CAS Component - Metallurgy Lab Drain System Investigation

The Metallurgy Lab trailer was used to support E-MAD Facility activities. Exposed sections of the process waste drain system leading from the Metallurgy Lab trailer to the radioactive waste holdup tanks of the E-MAD Facility remained on the surface on the north side of the Metallurgy Lab trailer. During the CAU 135 corrective actions, the Metallurgy Lab drain lines were cut and sealed at several locations. A radiological survey of the exposed process waste drain system was performed during the CAU 566 CAI and indicated elevated radiological contamination on the interior and exterior surfaces of the pipe system. Under a corrective action, the pipe system was disassembled, size reduced, and placed into waste containers. The galvanized steel and cast-iron pipe was packaged and managed as LLW. The cast-iron bell-type fittings were segregated and packaged as mixed low-level waste (MLLW) due to the presence of lead solder in each joint.

Soil samples were taken from surface soils at seven biased locations (Figure 2-3). Analytical results of soil samples from sample locations A15 through A21 confirmed there were no COCs present in the soil.

The Metallurgy Lab trailer was investigated for potential PSMs. Radiological and beryllium swipe surveys were performed. Suspect materials were sampled for the presence of asbestos. The radiological survey identified contamination associated with the fume hood inside the trailer and the high-energy particulate air (HEPA) filter assembly on the roof of the trailer. The HEPA filter assembly on the roof was also found to contain friable asbestos. The friable asbestos-containing materials (ACMs) were encapsulated, and the HEPA filter assembly and the fume hood were removed and dispositioned as LLW. Beryllium surveys of the trailer and components did not identify any elevated readings. As a BMP, the Metallurgy Lab trailer was transported to the NNSS U10c landfill and dispositioned as sanitary debris.

2.1.1.6 CAS Component - Storm Drain System Investigation

This CAS component consists of the potential releases associated with a storm drain system that receives surface water runoff on the south side of Building 3900. The system consists of a single catch basin with an 18-in. corrugated metal pipe outflow that drains to an outfall area located approximately 150 feet (ft) outside the perimeter fence. A 3-in. copper water line from the cooling tower overflow drain on the Building 3900 roof and a separate 4-in. transite clear-water drain both

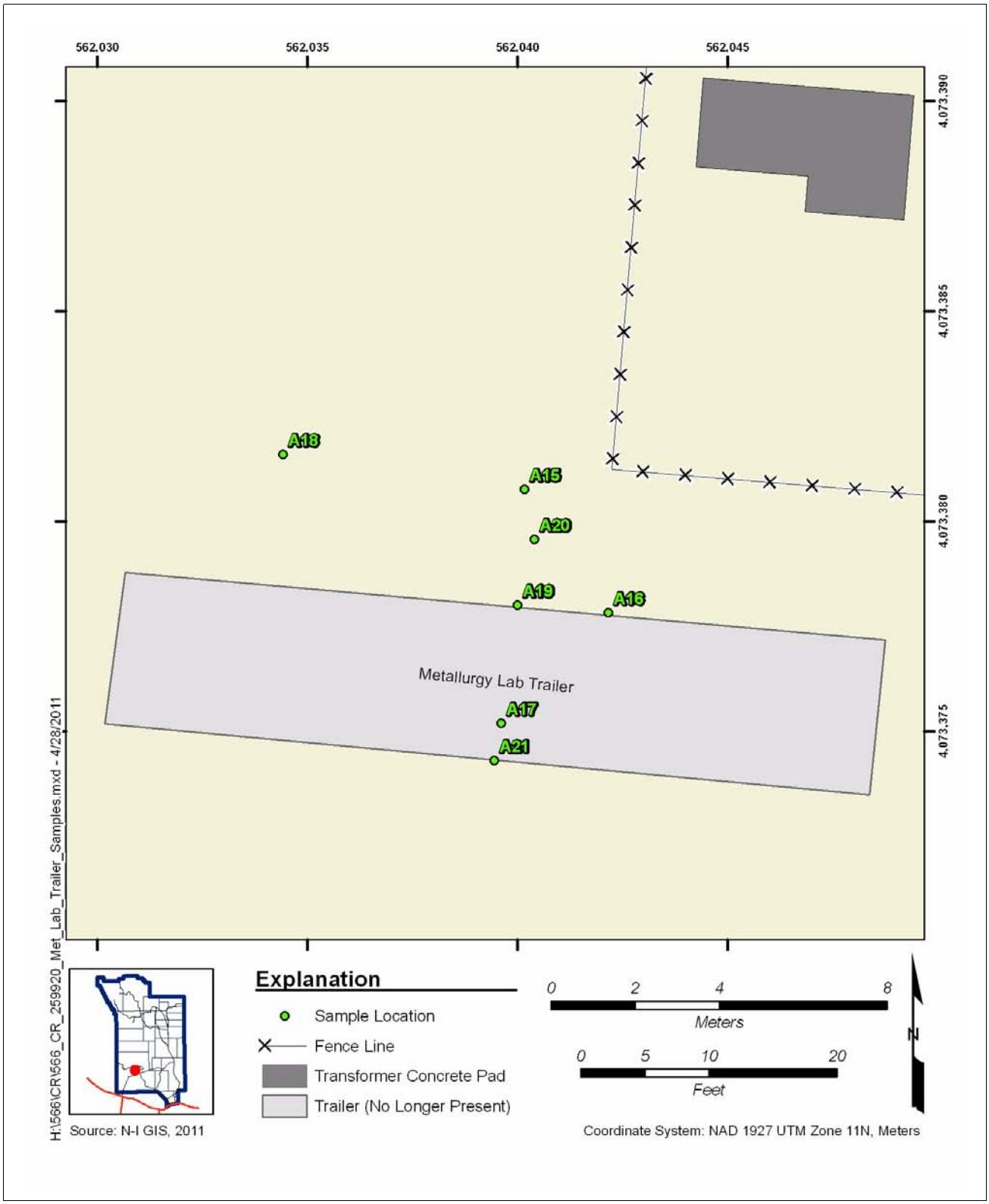


Figure 2-3
Metallurgy Lab Trailer Sample Locations

flow to the catch basin. The catch basin is concrete with a metal grate cover, and is partially filled with sediment and vegetation. A similar storm drainage system (CAU 556) was investigated on the north side of Building 3900, and a UR was placed due to PCB contamination.

Soil sample locations A10, A11, and A12 were collected from the storm drain system on the south side of Building 3900 (Figure 2-4). Sample location A12 was located at the inlet located at the bottom of the grated storm drain. The amount of sediment in the drain was found to be minimal; therefore, only one sample volume was available for analysis. Soil sample locations A10 and A11 were collected at the outlet of the storm drain to determine whether contamination from the site had accumulated at the outfall. Analytical results confirmed no COCs are present above the FAL. The storm drain was left in its current configuration to allow for positive drainage of the Building 3900 storm water run-off (Figure 2-5).

2.1.1.7 CAS Component - Locomotives and Railcars Investigation

The CAU 566 EMAD Compound railcar inventory included two 120-ton diesel-electric locomotives, an MCC connected to an EIV car, one small diesel-electric locomotive/shuttle, a cable spool car, and two utility flatcars. The small locomotive/shuttle, cable car, and utility flat cars were all posted "Caution Contamination Area" before the start of CAU 566 activities. Each railcar was extensively surveyed to ensure personnel were safe and proper postings were in place. After the survey of the cable spool car and two flatcars (Figure 2-6), the railcars were downposted to "Radiological Material Areas" due to fixed contamination. The small locomotive/shuttle was surveyed by the management and operating (M&O) contractor, then released and donated to the Nevada State Railroad Museum in Boulder City, Nevada.

The MCC and EIV railcars (Figure 2-2) were surveyed and verified to have no accessible areas with elevated radiological readings. The two 120-ton locomotives were previously surveyed and verified there are no accessible areas with elevated radiological readings.

The PSM—including batteries, diesel fuel, gear oil, engine oil, and antifreeze—was drained and/or removed as practical from the locomotives, cable spool car, and MCC and EIV railcars. The two 120-ton locomotives were drained of all fluids before the start of CAU 566 field activities by the M&O contractor. Due to safety and accessibility concerns, the MCC and EIV railcars were relocated

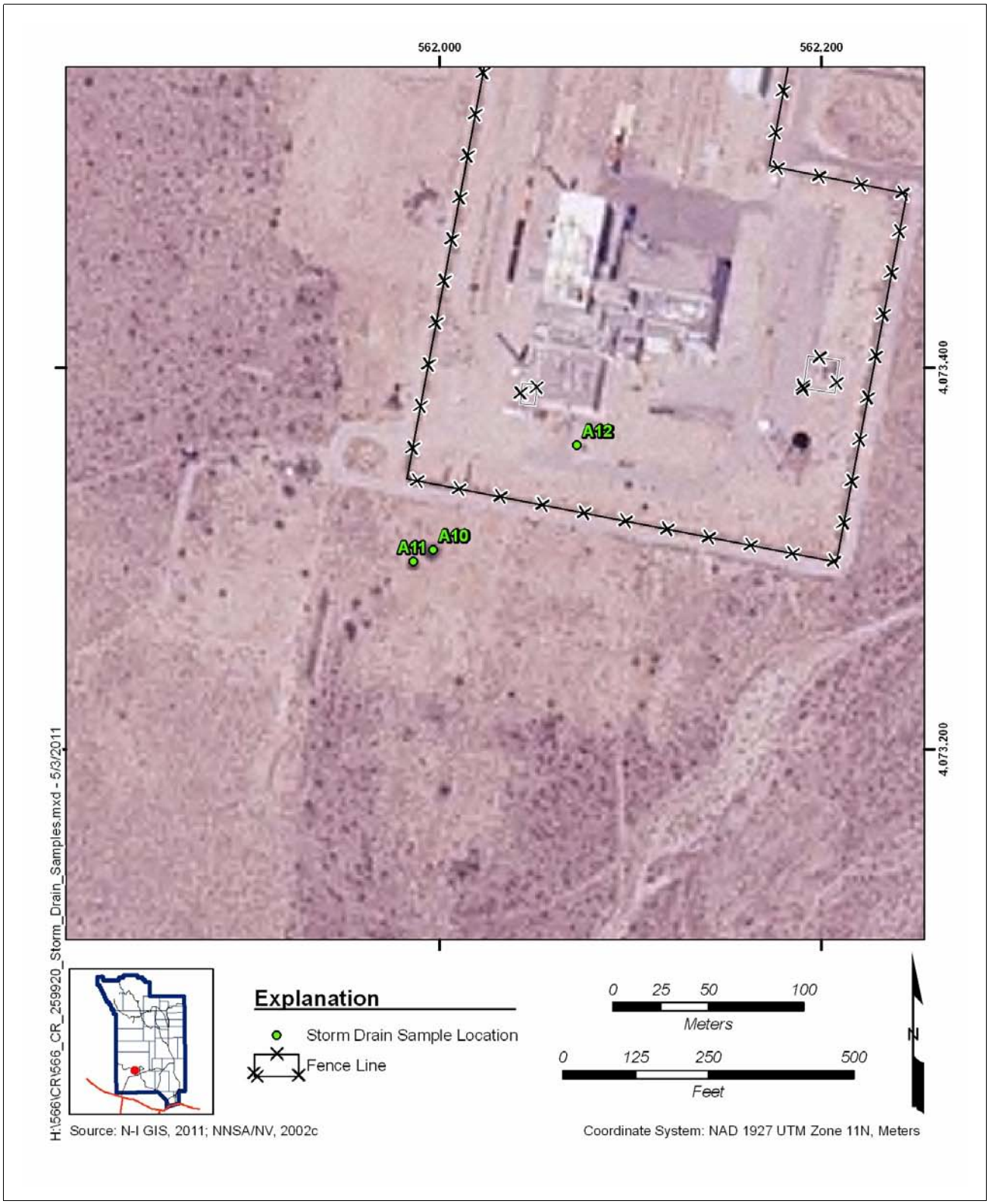


Figure 2-4
Storm Drain System Sample Locations

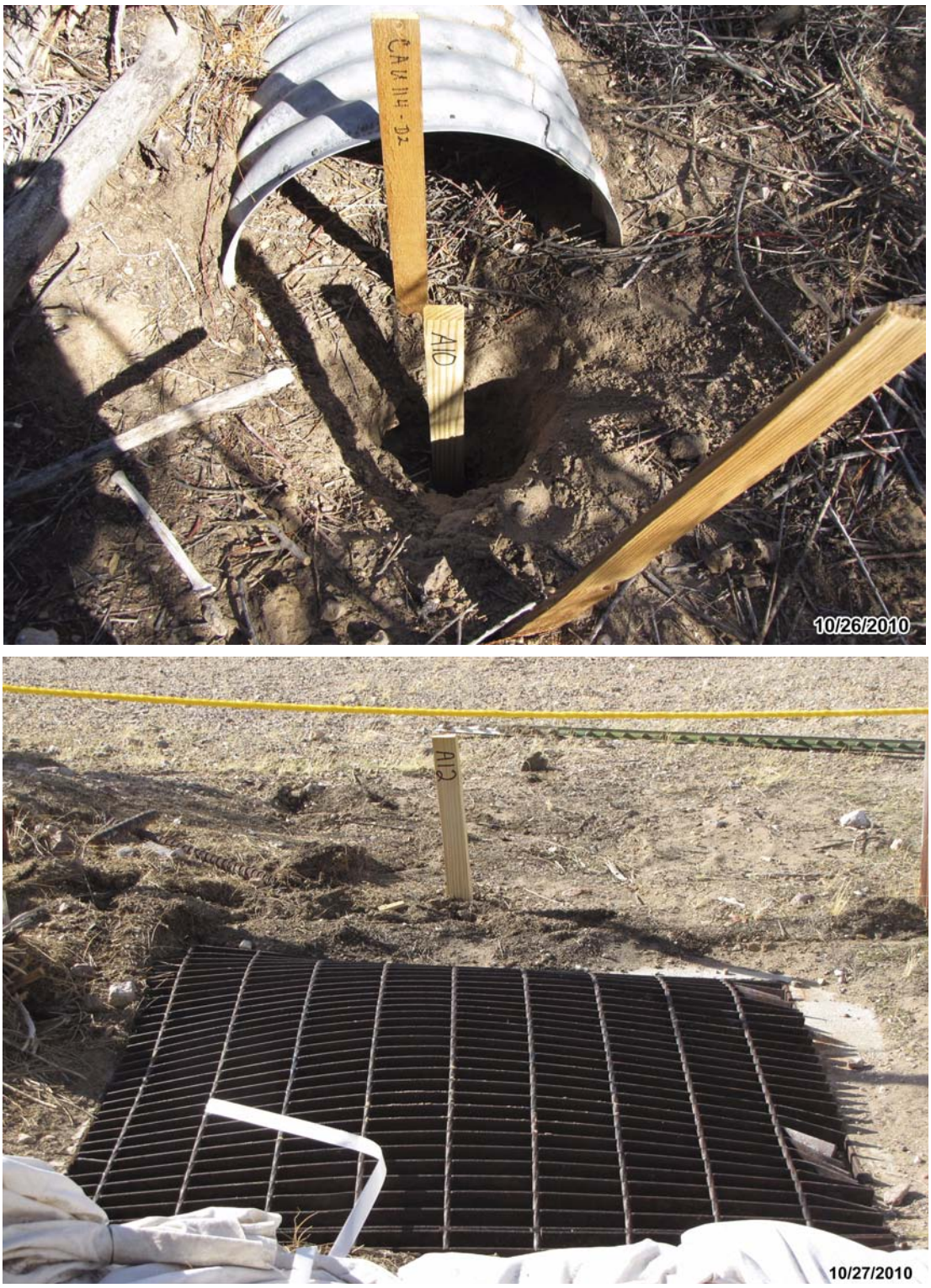


Figure 2-5
EMAD Compound Storm Drain System Outfall (top) and Catch Basin (bottom)

Figure 2-6
EMAD Compound Cable Spool and Flatcar

to the easternmost railspur on the north side of Building 3900 to allow for safe access. As part of a corrective action, diesel, gear oil, engine oil, and coolant were drained from the MCC/EIV reservoirs/tanks. Twenty-four large lead-acid batteries were removed from each 120-ton diesel-electric locomotive, an additional four lead-acid batteries were removed from the MCC (Figure 2-7). Additionally, approximately 200 gallons (gal) of emulsified oil was drained and collected from the gear housing of the cable spool car. See Section B.4.0 for additional details regarding removal activities, waste characterization, and final disposition of the removed materials.

Figure 2-7
Locomotive Batteries

The MCC and EIV railcars have been designated as items of historical significance by the Nevada State Historic Preservation Office (Baldrica, 2006). The MCC/EIV will remain in place until a museum or other suitable recipient/location is identified for their preservation. If a suitable recipient/location for the MCC/EIV has not been identified before CAU 114 SAFER activities are implemented, disposition of the MCC/EIV railcars and potentially hazardous materials (e.g., lead shielding) present on the railcars will be reevaluated/managed as part of CAU 114.

Visual inspection of the area under the two 120-ton diesel-electric locomotives identified an area of stained soil. Environmental sample locations A01 through A04 identify the sample locations from this area (Figure 2-8). Analytical results indicated elevated levels of SVOCs in the stained soil. Samples at locations A01 through A04 failed the sensitivity criteria defined in the SAFER Plan for

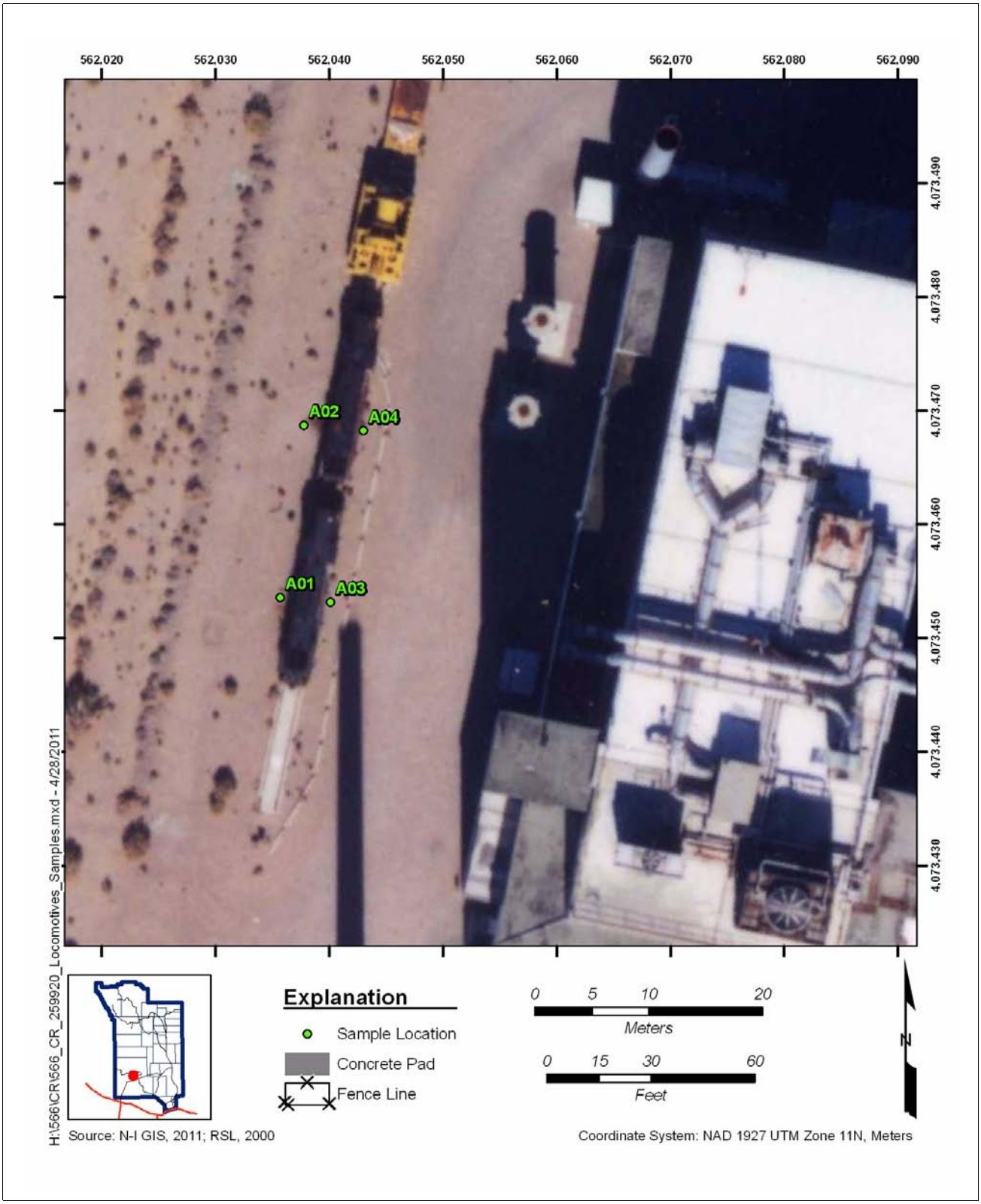


Figure 2-8
Locomotives and Railcars Soil Sample Locations

several SVOCs. Because it cannot be determined that these contaminants are present below the corresponding FALs, it was conservatively assumed that these contaminants are COCs. Diesel-contaminated soil is common along rail lines due to use of diesel-powered locomotives and MCCs. See Appendix B for additional detail.

As a BMP, the stained soil on the tracks in the vicinity of the locomotives was removed and placed into 55-gal drums to clear the rails of the stained sediment before relocating the locomotives and investigating the drywells.

2.1.1.8 CAS Component - Substations Investigation

Two electrical power substations are located within the fenced compound at CAU 566 (Figure 2-9). One substation is located beside the water tower southeast of Building 3900, and the other is located southwest of Building 3900. The transformers are labeled “non PCB”; however, it was unknown whether any historical PCB releases occurred due to leaks or during retrofilling. Collection of environmental soil samples identified PCB-contaminated soil greater than FALs (Aroclor 1254 and 1260) at both substations.

Seven Decision I and 30 Decision II samples were taken at the substation located on the southwest side of Building 3900. Four of seven Decision I samples exceeded the *Toxic Substances Control Act* (TSCA) regulatory limit of 100 mg/kg (CFR, 2010). A corrective action was initiated to excavate and remove PCB-contaminated soil greater than 100 mg/kg. Approximately 145 ft^3 of soil was removed and placed directly into 55-gal drums. Subsequent verification samples (locations A95 through A102) confirmed that no PCB contamination greater than 100 mg/kg remained. Contaminated soil was dispositioned as nonhazardous, nonradioactive TSCA-regulated PCB bulk remediation waste. The area was backfilled with native soil. The PCB-contaminated soil remaining at this CAS component at concentrations exceeding the FAL was closed in place with a UR. Sample locations are shown on Figure 2-10.

Four Decision I and 35 Decision II samples were taken at the substation located southeast of Building 3900 (Figure 2-11). Twenty-three of the 39 samples exceeded the FAL. The PCB contamination exceeding the FAL was also identified extending beyond the fenced area of the substation, indicating a PCB source other than the transformer (see Section 2.1.1.11). Because PCB contamination is

Figure 2-9
Southwest Electrical Substation (top) and Southeast Electrical Substation (bottom)

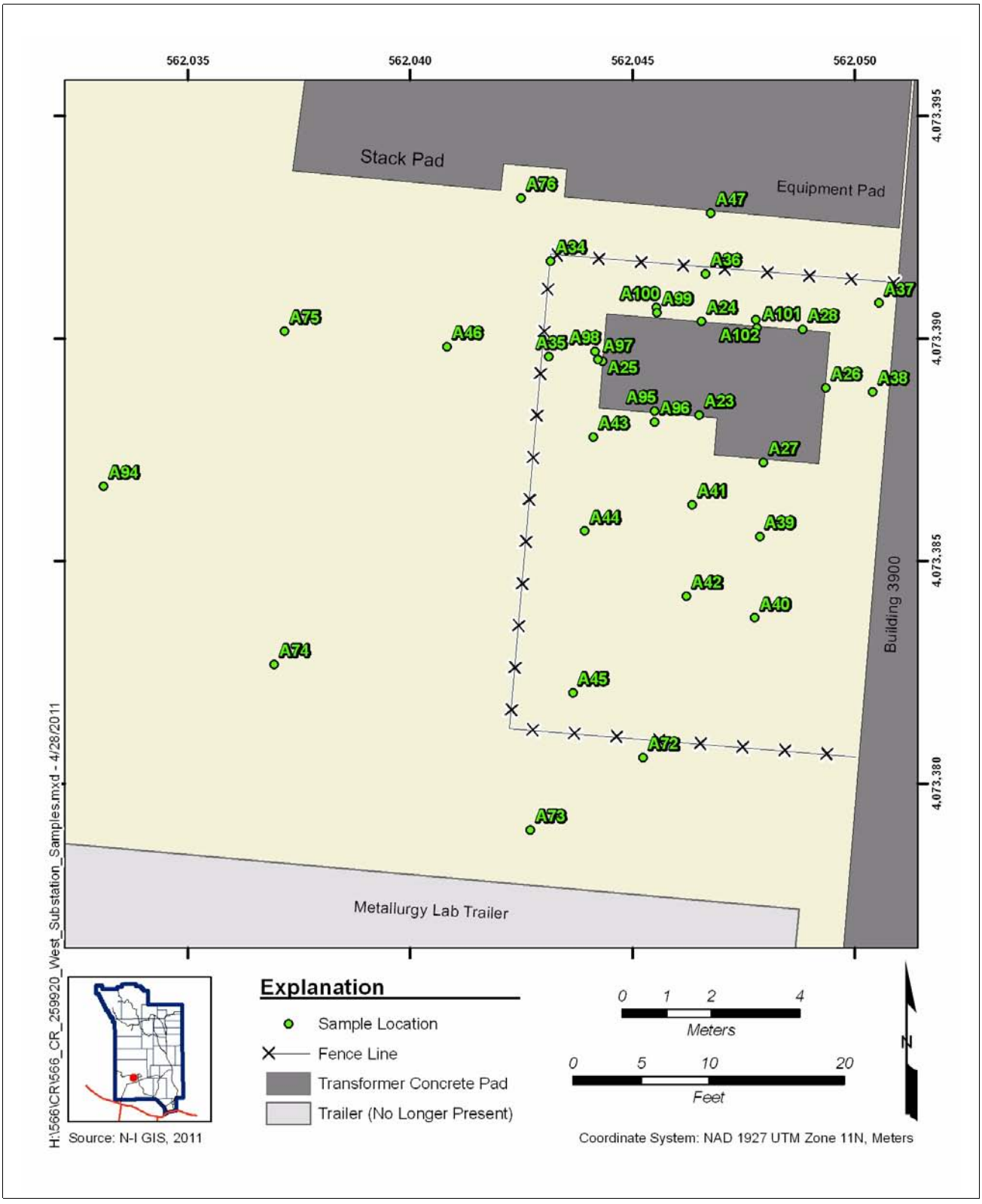


Figure 2-10
Southwest Substation - Decision I and Decision II Samples

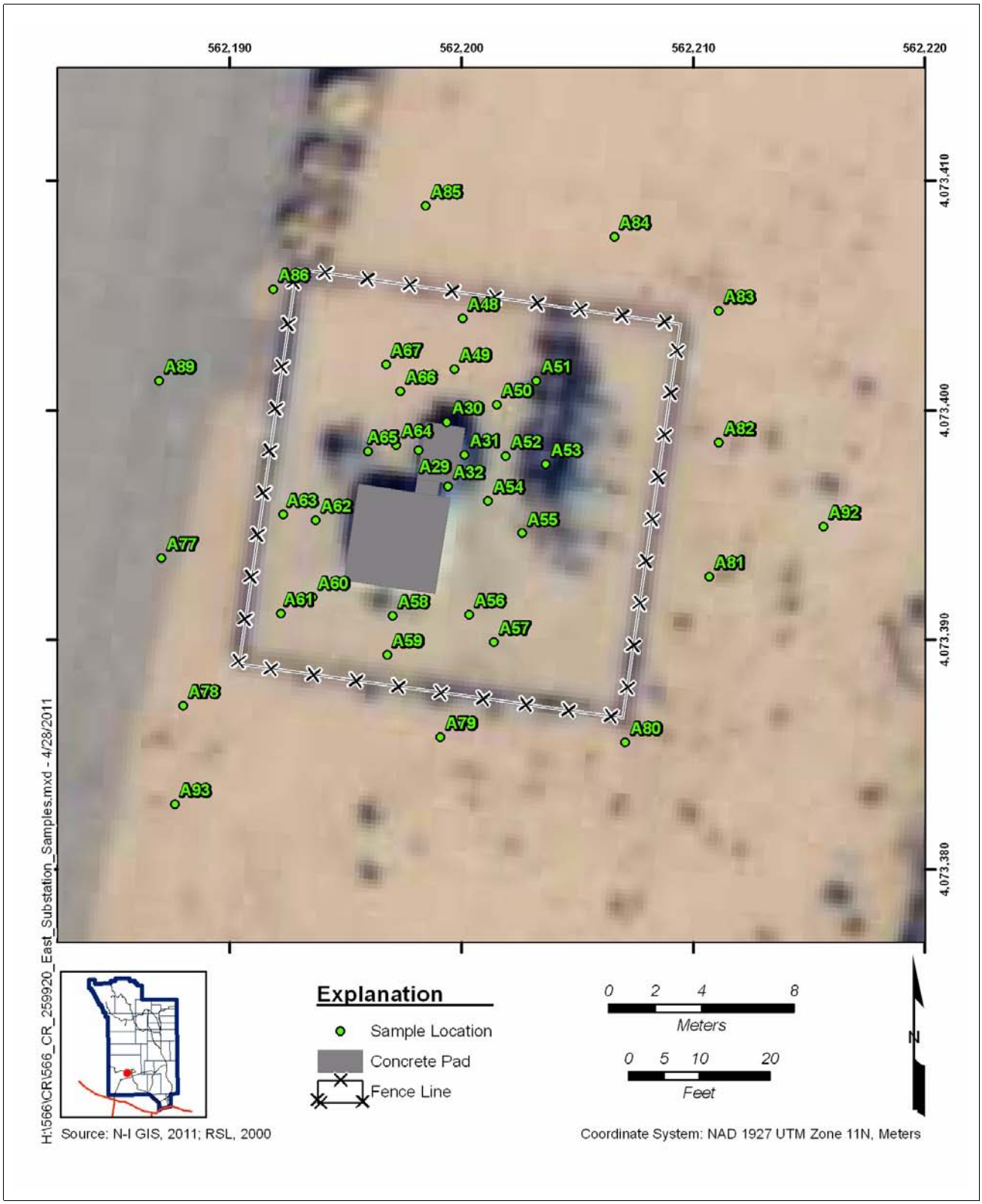


Figure 2-11
Southeast Substation - Decision I and Decision II Samples

present at levels above their corresponding FALs, Aroclor 1254 and 1260 have been identified as COCs. See Appendix B for additional detail.

Benzo(a)pyrene was detected above the FAL at location A32 on the east side of the transformer pad. The source of the benzo(a)pyrene is assumed to be from transformer oils or asphaltic materials in the area. Additionally, samples at seven locations failed the sensitivity criteria for several Aroclors (1221, 1232, 1242, 1248, and 1268) established in the SAFER Plan (NNSA/NSO, 2010). Because it could not be determined that these contaminants are present below their corresponding FALs, it was conservatively assumed they are COCs.

2.1.1.9 CAS Component - Storage Casks and Drywells Investigation

The drywells and casks located within the CAU 566 EMAD Compound were used as part of the SFDP, which involved testing and development activities related to the dry storage of spent nuclear fuel assemblies. Radiological field screening and investigation of the casks and drywells was performed during the CAU 566 CAI to determine the potential for any radiological PSM.

The drywells are located on the railroad spur on the west side of Building 3900 (Figure 1-3). Before investigation of the drywells could proceed, the two 120-ton locomotives, cable spool car, and utility flatcar required relocation. The five railcars were relocated approximately 300 ft to the north on the railspur (Figure 2-12).

The metal lids covering each of the five drywells were removed one at a time for visual inspection using nonsparking tools and a brass pry bar due to the potential for an explosive atmosphere. Upon removal of the lid, each drywell was checked for carbon monoxide (CO), hydrogen sulfide (H_2S), oxygen (O_2) content, and lower explosive level (LEL) using a Q-Rae+Four Gas Meter, Model PGM 2000. All readings were determined to be normal. Radiological survey of each drywell did not indicate any elevated radiological results above background. No radiological contamination was found, and all readings were indistinguishable from background. Beryllium swipe samples taken from interior surfaces did not indicate any elevated results.

During investigation of the drywells, the first drywell contained water. The source of the water is not completely known; however, it was assumed to be from incidental precipitation (i.e., rainwater)

Figure 2-12
Railcar Relocation

infiltration. Analytical results of the liquid at sample location A22 determined the liquid to not be a PSM. The rainwater was pumped out of the drywell and used as dust suppression for the demolition of the concrete cask. A second drywell had been filled with soil. The soil was sampled (location A22-1), and results indicated no exceedances greater than FALs (see Figure 2-13 for sample locations). After the investigation, the drywells were decommissioned and grout-filled (3,000 pounds per square inch [psi] concrete) to eliminate potential future pathways to the environment (Figure 2-14).

The concrete storage casks are located on the west side of Building 3900. Investigation of the casks required removal of the steel bolted manhole covers (Figure 2-15) for access. The covers were opened using nonsparking tools. A Q-Rae+Four Gas Meter, Model PGM 2000, was used to perform air monitoring of the atmosphere within each cask for worker safety and identification of potential contamination sources. All industrial hygiene monitoring levels (CO, H_2S, O_2, and LEL) were normal for each cask. No radiological contamination was found (interior and exterior surfaces), and all readings were indistinguishable from background. Beryllium swipe samples taken from interior surfaces did not indicate any elevated results.

The casks were determined to be free of any PSM and were closed under a corrective action of no further action. One concrete cask (the southernmost) was demolished and dispositioned at the NNSS U10c landfill as a BMP.

2.1.1.10 CAS Component - Construction Debris Piles Investigation

Debris piles consisting of abandoned light fixtures, piles of wood, scrap metal, and abandoned equipment were inspected for PSMs, underlying soil staining, and other potential contaminants. As part of a corrective action, abandoned heating, ventilating, and air conditioning (HVAC) units were drained of freon and compressor oils; radiologically contaminated equipment was packaged as LLW; and nonhazardous, nonradioactive contaminated equipment was dispositioned as sanitary construction debris.

Sample locations A05 through A07 were collected from the soil where light fixtures and ballasts were stored. Locations A08 and A09 along the southeast side of Building 3900 were sampled to characterize the soil where building debris was previously stored. Sample location A13 was collected

Figure 2-13
Drywell Sample Locations

Figure 2-14
Drywell Grouting and Closure

Figure 2-15
Removal of Metal Lids and Investigation of Concrete Casks

from a debris pile containing roofing tile on the west side of the building. The sample at location A14 was collected near the radiological equipment waste pile north of Building 3900. The wood debris pile located at the southwest end of the EMAD Compound and outside the fence was sampled (locations A87 and A88) after removal and disposition of the material as sanitary construction debris (Figure 2-16). Analytical results confirmed that no COCs are present at any debris piles. See Figure 2-17 for sample locations; and Section B.4.0 for additional details regarding removal activities, waste characterization, and final disposition of the removed materials.

Three areas with contaminated soil were identified during visual surveillance and radiological walkover surveys of the site. One area, located near the southwest corner of the Metallurgy Lab trailer, consisted of two 1-square-foot (ft^2) areas with elevated radioactivity based on field instrumentation (Figure 2-18). A corrective action was performed to remove approximately 1.5 ft^3 of soil. The contaminated soil was containerized and dispositioned as LLW. Analytical results from the verification samples (locations A70 and A71) confirmed that the remaining soil did not exceed FALs, and the area was backfilled with native soil. See Figure 2-17 for sample locations; and Section B.4.0

Figure 2-16
Debris Piles at CAU 566

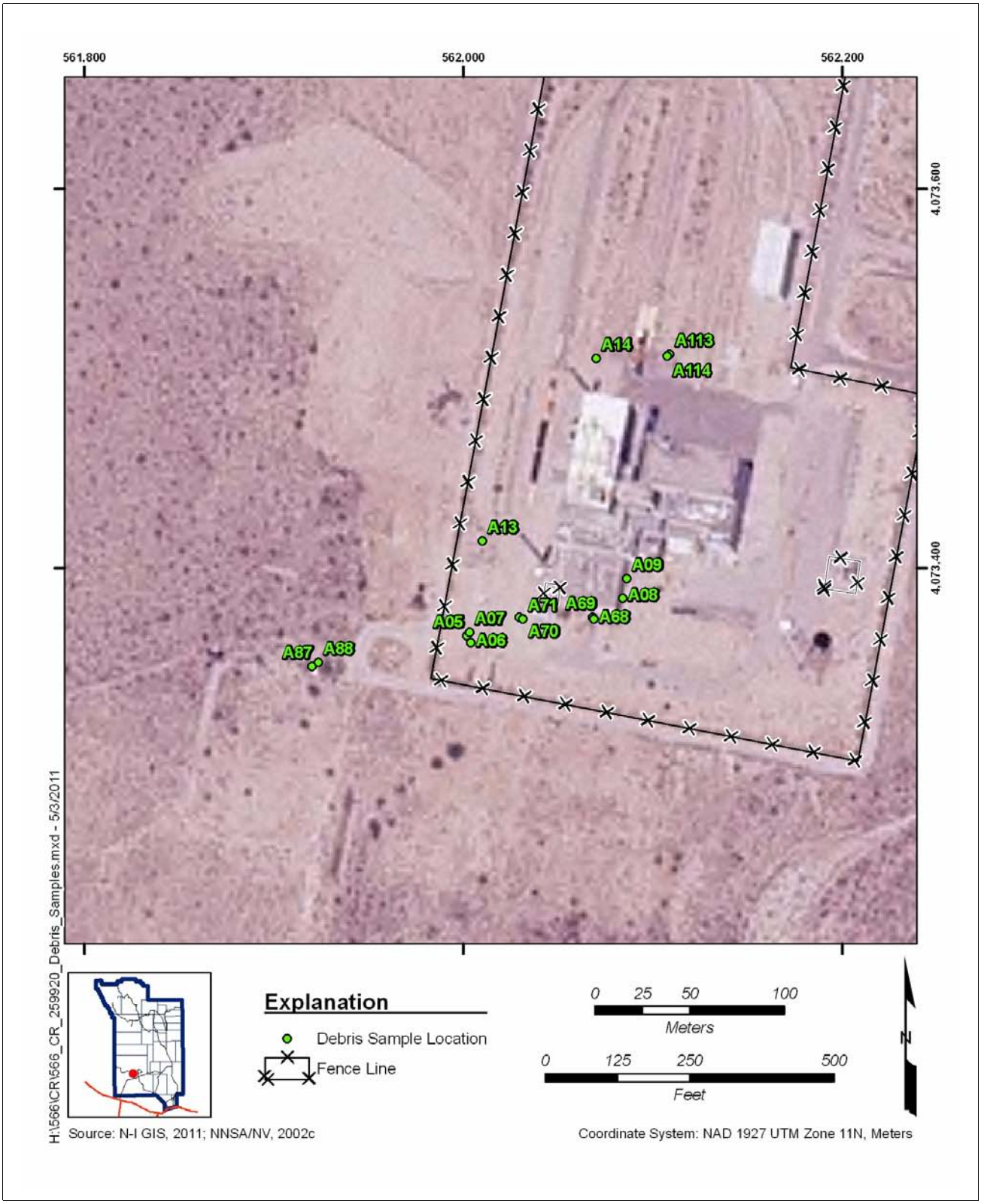


Figure 2-17
Debris Piles Sample Locations

Figure 2-18
Metallurgy Lab Trailer Radiological Area

for additional details regarding removal activities, waste characterization, and final disposition of the removed materials.

The second area was an approximate 5-ft^2 radiologically contaminated area located approximately 100 ft north of Building 3900 (Figure 2-19). A corrective action was performed to remove and package approximately 15 ft^3 of soil. The source of contamination was identified as rusted metal particles approximately 1 to 2 ft below ground surface (bgs). Approximately 15 ft^3 of radiologically contaminated soil was removed and dispositioned as LLW. Analytical results from the verification samples (locations A113 and A114) confirmed that the remaining soil did not exceed FALs. The area was backfilled with native soil. See Figure 2-17 for sample locations, and Section B.4.0 for additional details regarding removal activities, waste characterization, and final disposition of the removed materials.

The third area consisted of a corrective action to remove approximately 90 ft^3 of radiologically contaminated soil and lead shot located on the south side of Building 3900 near the loading dock (Figure 2-20). The area was originally identified during visual survey of the site due to the presence

Figure 2-19
Radiological Area North of Building 3900

of lead shot scattered into the surface soil. The contaminated soil and lead shot was excavated and containerized. Analytical results from the verification samples (locations A68 and A69) confirmed that the remaining soil did not exceed FALs, and the area was backfilled with native soil. See Figure 2-17 for sample locations; and Section B.4.0 for additional details regarding removal activities, waste characterization, and final disposition of the removed materials.

2.1.1.11 CAS Component - EMAD Compound Soil Releases Investigation

During the CAU 566 CAI, PCB soil contamination was identified at various locations throughout the EMAD Compound outside of the previously defined CAS components. The PCB soil contamination above FALs at CAU 566 is partially attributable to PCB-containing transformers located at the electrical substations. However, Decision II step-out soil samples located outside the spatial boundary of the southeast substation identified PCB contamination exceeding the preliminary action level (PAL) (at locations A103, A104, A106, and A108 through A111 on the north and east sides of

Figure 2-20
Radiological Lead-Contaminated Area

the substation. This contamination is assumed to be related to soil stabilization and dust-suppression activities. This is consistent with PCB soil contamination found at several sites at the NNSS. See Figure 2-21 for sample locations.

2.1.1.12 Best Management Practices

According to the CAU 566 SAFER Plan (NNSA/NSO, 2010), BMPs would be performed to mitigate health and safety hazards, provide access to sampling locations, or facilitate future demolition. The following BMPs were completed during the CAI but are considered outside the scope of the FFACO process:

- Removal of readily removable wastes and materials, including the following:
  - Hantavirus cleanup
  - Wood, roofing shingles, metal conduit, wire, wooden utility sheds, and the guard shack
  - Metallurgy Lab trailer
  - Fluid Tech trailer
- Asbestos identification and abatement, including the following:
  - Abatement of friable ACM from the fume hood HEPA filter assembly located on top of the Metallurgy Lab trailer
  - Disposition of nonfriable ACM in floor tiles and roofing materials from the trailers, wood sheds, and guard shack

2.2 Deviations from SAFER Plan as Approved

A deviation to the CSM from the CAU 566 SAFER Plan (NNSA/NSO, 2010) is necessary to resolve questions regarding contaminant sources and release mechanisms. The CSM describes the most probable scenario for current conditions at the site and defines the assumptions that are the basis for identifying the future land use, contaminant sources, release mechanisms, migration pathways, exposure points, and exposure routes. The CSM for the Substations CAS component assumed the transformers to be the primary source of PCB contamination. Due to the discovery of PCBs at multiple locations outside of the immediate area surrounding the substations, other sources are likely. While PCB concentrations in soil are the highest near the substations, PCB contamination has been detected at 103 locations within the CAU 566 fenced compound and in 8 samples located outside the

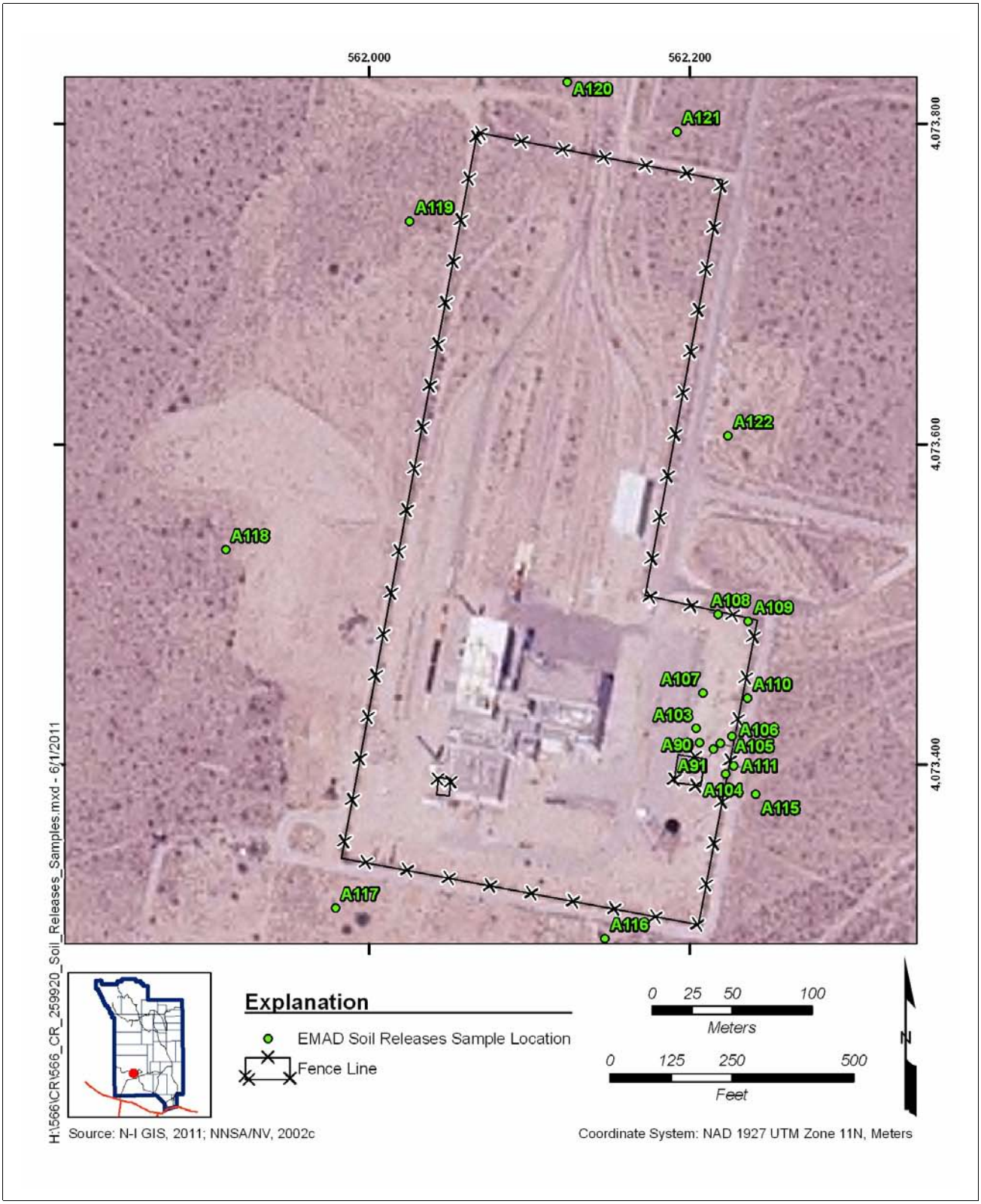


Figure 2-21
EMAD Compound Soil Releases Sample Locations

EMAD Compound perimeter fence. The source of the PCB contamination at CAU 566 could be partially due to spills or releases during retrofilling of the transformers; however, the contamination appears to be dispersed outside the immediate areas of the substations. This contamination is assumed to be related to soil stabilization and dust-suppression activities (HHS, 2000). This is consistent with PCB contamination found at several sites at the NNSS.

2.3 Corrective Action Schedule as Completed

Due to the remediation of the PCB-contaminated soil at the southwest substation and relocation of the MCC and EIV railcars due to potential safety concerns with draining fluids in place, additional time and resources were required to complete the scope of work. The extent of these activities was not anticipated; therefore, the duration of the fieldwork and field demobilization was extended approximately 60 days. Table 2-2 presents a summary of these activities.

Table 2-2
Corrective Action Schedule for CAU 566

Date	Activity
October 14, 2010	Begin pre-site mobilization at EMAD Compound.
October 25, 2010	Begin initial environmental site characterization, soil sampling, and radiological surveying.
November 4, 2010	Begin housekeeping, hazardous materials removal.
November 18, 2010	Begin ACM characterization of debris and structures.
November 30, 2010	Prepare for structure demolition.
December 15, 2010	Prepare for railcar relocation and fluid removal.
January 10, 2011	Begin soil step-out sampling at substations.
May 2011	Begin waste management and site demobilization.

2.4 Site Plans/Survey Plat

No new construction was performed during closure activities at CAU 566. Additionally, there were no surface disturbing activities that significantly altered the grade or surface drainage patterns. Therefore, as-built drawings were not generated. Sample locations are shown in Figures B.3-1 through B.3-5. A UR was established for CAS 25-99-20. Use restriction maps are presented in Appendix D.

3.0 Waste Disposition

This section summarizes the wastes and recyclable materials generated (including volume and mass) during SAFER activities and their final disposition, as presented in Table 3-1. Waste streams included industrial waste, asbestos, used oil, *Resource Conservation and Recovery Act* (RCRA) hazardous waste, RCRA universal waste, PCB waste, LLW, MLLW, and reused/recycled wastes. All wastes and recyclable materials were managed in accordance with applicable state and federal regulations, DOE Orders, and the CAU 566 SAFER Plan (NNSA/NSO, 2010). The waste characterization data as well as details regarding the types, amounts, and disposition of these wastes are presented in Section B.4.0.

Table 3-1
CAU 566 Waste Streams and Disposal Pathways
(Page 1 of 4)

Container Numbers	Waste Item Description	Waste Characterization	Container, Package Type	Waste Volume	Waste Weight (lb)	Disposal Pathway	Disposal Date	Disposal Document
566001	Circuit boards	Hazardous	55-gal drum	55 gal	180	Recycle	Transferred to Area 5 HWSU 03/23/2011	Onsite manifest
566002	PCB-containing items (ballasts)	TSCA	55-gal drum	55 gal	130	Offsite disposal	Transferred to Area 5 HWSU 03/23/2011	Onsite manifest
566003	Industrial waste	Nonhazardous	Various - 30-yd^3 rolloffs 20-yd^3 end dumps	620 yd^3	700,000	Area 9 U10c Industrial Landfill	01/20/2011 through 06/06/2011	LVF
566004	Radiological soil with lead	MLLW	55-gal drum	55 gal	N/A	Consolidated into Container 566006	Refer to Container 566006	N/A
566005	Used oil	Used oil	55-gal drum	55 gal	480	Offsite disposal	Transferred to Area 5 HWSU 05/19/2011	Onsite manifest
566006	Radiological soil with lead	MLLW	B-25 container	90 ft^3	5,970	Area 5 LLMW	03/10/2011	Onsite hazardous material transfer
566007	LLW	Pending analysis	20-ft cargo	60%	10,080	Area 5 RWMC	Transferred to Building 23-153 06/02/2011	Onsite manifest Disposal pending[a]
566008	Aqueous waste	Nonhazardous Nonradioactive	55-gal drum	48 gal	490	Area 23 Lagoon	05/17/2011	BOL
566009	Aqueous waste	Nonhazardous Nonradioactive	55-gal drum	48 gal	510	Area 23 Lagoon	05/17/2011	BOL
566010	Aqueous waste	Nonhazardous Nonradioactive	55-gal drum	45 gal	380	Area 23 Lagoon	05/17/2011	BOL
566011	Aqueous waste	Nonhazardous Nonradioactive	55-gal drum	45 gal	460	Area 23 Lagoon	05/17/2011	BOL
566012	Hydrocarbon soil	Nonhazardous Nonradioactive	55-gal drum	7 ft^3	510	Area 9 U10c Industrial Landfill	05/17/2011	LVF

Table 3-1
CAU 566 Waste Streams and Disposal Pathways
(Page 2 of 4)

Container Numbers	Waste Item Description	Waste Characterization	Container, Package Type	Waste Volume	Waste Weight (lb)	Disposal Pathway	Disposal Date	Disposal Document
566013	Hydrocarbon soil	Nonhazardous Nonradioactive	55-gal drum	7 ft^3	520	Area 9 U10c Industrial Landfill	05/17/2011	LVF
566014	Hydrocarbon soil	Nonhazardous Nonradioactive	55-gal drum	7 ft^3	150	Area 9 U10c Industrial Landfill	05/17/2011	LVF
566015	MLLW cast-iron pipe	MLLW	55-gal drum	7 ft^3	270	Macro, treat on site	Transferred to M&O for onsite treatment 04/14/2011	Onsite hazardous material transfer
566016	MLLW cast-iron pipe	MLLW	55-gal drum	7 ft^3	210	Macro, treat on site	Transferred to M&O for onsite treatment 04/14/2011	Onsite hazardous material transfer
566017	HEPA filter with ACM	Nonhazardous asbestos LLW	B-25 container	90 ft^3	970	Area 5, RWMC (Disposal pending approval of final permit)	06/02/2011	Onsite manifest
566018	Mercury-containing item	Hazardous	5-gal Labpack	0.5 ft^3	10	Hazardous Pad, Area 5	Transferred to Area 5 HWSU 03/23/2011	Onsite manifest
566019	Lead for recycle	Not waste Nonradioactive	2 pallets	Recycle lead; Toxco	3,186	Recycle	Pending	Cert of Recycle
566020	TSCA PCB soil	Nonradioactive PCB	55-gal drum	7 ft^3	580	Area 5 HWSU pending offsite disposal	03/31/2011	Onsite manifest
566021	TSCA PCB soil	Nonradioactive PCB	55-gal drum	7 ft^3	540	Area 5 HWSU pending offsite disposal	03/31/2011	Onsite manifest
566022	TSCA PCB soil	Nonradioactive PCB	55-gal drum	7 ft^3	600	Area 5 HWSU pending offsite disposal	03/31/2011	Onsite manifest
566023	TSCA PCB soil	Nonradioactive PCB	55-gal drum	7 ft^3	520	Area 5 HWSU pending offsite disposal	03/31/2011	Onsite manifest

Table 3-1
CAU 566 Waste Streams and Disposal Pathways
(Page 3 of 4)

Container Numbers	Waste Item Description	Waste Characterization	Container, Package Type	Waste Volume	Waste Weight (lb)	Disposal Pathway	Disposal Date	Disposal Document
566024	TSCA PCB soil	Nonradioactive PCB	55-gal drum	7 ft^3	600	Area 5 HWSU pending offsite disposal	03/31/2011	Onsite manifest
566025	TSCA PCB soil	Nonradioactive PCB	55-gal drum	7 ft^3	660	Area 5 HWSU pending offsite disposal	03/31/2011	Onsite manifest
566026	TSCA PCB soil	Nonradioactive PCB	55-gal drum	7 ft^3	600	Area 5 HWSU pending offsite disposal	03/31/2011	Onsite manifest
566027	TSCA PCB soil	Nonradioactive PCB	55-gal drum	7 ft^3	480	Area 5 HWSU pending offsite disposal	03/31/2011	Onsite manifest
566028	TSCA PCB soil	Nonradioactive PCB	55-gal drum	7 ft^3	650	Area 5 HWSU pending offsite disposal	03/31/2011	Onsite manifest
566029	TSCA PCB soil	Nonradioactive PCB	55-gal drum	7 ft^3	660	Area 5 HWSU pending offsite disposal	03/31/2011	Onsite manifest
566030	TSCA PCB soil	Nonradioactive PCB	55-gal drum	7 ft^3	660	Area 5 HWSU pending offsite disposal	03/31/2011	Onsite manifest
566031	TSCA PCB soil	Nonradioactive PCB	55-gal drum	7 ft^3	650	Area 5 HWSU pending offsite disposal	03/31/2011	Onsite manifest
566032	TSCA PCB soil	Nonradioactive PCB	55-gal drum	7 ft^3	630	Area 5 HWSU pending offsite disposal	03/31/2011	Onsite manifest
566033	TSCA PCB soil	Nonradioactive PCB	55-gal drum	7 ft^3	630	Area 5 HWSU pending offsite disposal	03/31/2011	Onsite manifest

Table 3-1
CAU 566 Waste Streams and Disposal Pathways
(Page 4 of 4)

Container Numbers	Waste Item Description	Waste Characterization	Container, Package Type	Waste Volume	Waste Weight (lb)	Disposal Pathway	Disposal Date	Disposal Document
566034	TSCA PCB soil	Nonradioactive PCB	55-gal drum	7 ft^3	620	Area 5 HWSU pending offsite disposal	03/31/2011	Onsite manifest
566035	TSCA PCB soil	Nonradioactive PCB	55 gal drum	7 ft^3	650	Area 5 HWSU pending offsite disposal	03/31/2011	Onsite manifest
566036	TSCA PCB soil	Nonradioactive PCB	55-gal drum	7 ft^3	650	Area 5 HWSU pending offsite disposal	03/31/2011	Onsite manifest
566037	LLW soil	LLW	55-gal drum	7 ft^3	370	Consolidated into Container 566007	Refer to Container 566007	Pending[a]
566038	LLW soil	LLW	55-gal drum	7 ft^3	120	Consolidated into Container 566007	Refer to Container 566007	Pending[a]
566039	Fluorescent light bulbs	Hazardous universal waste	55-gal fiberboard drum	5 ft^3	50	Recycle	Transferred to Bldg 160 Warehouse	N/A
566040	MCC fluids-diesel, lubricating oil, antifreeze	Diesel and oil-nonhazardous; antifreeze-hazardous	Various	Diesel 180 gal Oil 15 gal Antifreeze 16 gal	N/A	Recycle/onsite reuse	Transferred to Fleet Services 05/04/2011, 05/05/2011, 05/11/2011	Onsite transfer
566041	Lead-acid batteries	RCRA-universal waste	Palletized	28 batteries	N/A	Recycle	TBD	N/A

Note: Copies of waste disposal documents are located in Appendix C of this document.

[a]Disposal of 20-ft cargo container will occur after it is completely full per NDEP approval (Murphy, 2011)

BOL = Bill of lading
HWSU = Hazardous Waste Storage Unit
LVF = Landfill Load Verification Form
N/A = Not applicable
PSDR = Package, Storage, and Disposal Request
RWMC = Radioactive Waste Management Complex
TBD = To be determined
yd^3 = Cubic yard

4.0 Closure Verification Results

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

The CAU 566 SAFER Plan (NNSA/NSO, 2010) 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 4.5 provides a summary of the DQA, and Section 4.6 summarizes the URs for CAU 566.

A summary of verification data from the closure activities as detailed in Appendix B is provided in this section. The CAU 566 sampling locations were accessible, with the exception of subsurface and sampling activities at planned locations within the vicinity of the two electrical substations due to aboveground and underground utilities. Environmental sampling at CAS 25-99-20 identified two CAS components with soil contamination exceeding PALs and several CAS components with PSM. A summary is provided below.

4.1 Substations CAS Component

Aroclor 1260 or 1254 was detected above the PAL in surface and subsurface soil samples at the substation located on the southwest side of Building 3900. Decision II sampling activities included the collection of step-out surface and subsurface samples around the perimeter of the transformer pad (locations A34 through A45 and A95 through A102), and extended outside the fence line surrounding the substation (locations A46, A47, A72 through A76, and A94) to determine the lateral extent of PCB soil contamination. Approximately 145 ft^3 of PCB-contaminated soil with concentrations greater than the TSCA regulatory limit of 100 mg/kg was removed to a depth of approximately 1.5 ft bgs, and the area was backfilled with native soil. Surface samples from locations A73 through A76 and A94 define the lateral extent of PCB contamination to the south, northwest, and west. The substation is bounded laterally on the east by Building 3900 and to the north by concrete equipment pads. Subsurface soil samples at locations A101 and A102 are less than 100 mg/kg but exceed the FAL. The FAL was also exceeded at location A95 based upon a multiconstituent analysis

(see Appendix E). Further excavation and subsurface sampling was discontinued due to the extent of the impacted area, confined work space limitations, and proximity to underground utilities. Clean soil was used as backfill over the excavated area. See Figure 2-10 for sample locations.

4.2 Debris Piles CAS Component

Elevated radiological contamination at three areas within the EMAD Compound were identified during visual and radiological surveys performed at the site. The three areas are as follows:

- Approximately 90 ft^3 of radiologically contaminated soil and lead shot was excavated and containerized on the south side of Building 3900 near the loading dock (Figure 2-20). Analytical results from the verification samples at locations A68 and A69 (Figure 2-17), confirmed the radioactive and lead sources were removed, and the area was backfilled with native soil.

- Approximately 1.5 ft^3 of radiologically contaminated soil near the southwest corner of the Metallurgy Lab trailer (Figure 2-18) was containerized and dispositioned as LLW. Analytical results from the verification samples (locations A70 and A71) confirmed the radioactive source was removed, and the area was backfilled with native soil (Figure 2-17).

- Approximately 7.5 ft^3 of radiologically contaminated soil located approximately 100 ft north of Building 3900 (Figure 2-19) was containerized and dispositioned as LLW. Analytical results from the verification samples (locations A113 and A114) confirmed no remaining radiological contamination (Figure 2-17). The area was backfilled with native soil.

4.3 Metallurgy Lab Trailer CAS Component

The Metallurgy Lab trailer process waste drain pipe was considered as PSM due to the radiological contamination. A radiological survey of the exposed process waste drain system was performed during the CAU 566 CAI and indicated elevated radiological contamination on the interior and exterior of the pipe system. Under a corrective action, the pipe system was disassembled, size reduced, and placed into waste containers. Soil samples collected at locations A15 through A21, (Figure 2-3) were analyzed for any possible waste contamination that may have occurred at the site through leaking drain lines. The soil samples did not have any contaminants that exceeded FALs and therefore did not require any further action.

4.4 PSM Removal

Several of the CAS components had PSM removed. Corrective actions were implemented to remove the PSM or waste debris that was presumed to be potential PSM. The PSM removed consisted of the following:

- Lead shot and other lead-containing debris, including circuit boards, lead bricks, and batteries
- Mercury-containing items
- Fluorescent light bulbs
- PCB-containing items, such as ballasts and capacitors
- Radiologically contaminated waste debris
- Liquids from the locomotive and railcars consisting of coolant, oils, and diesel fuel

4.5 Data Quality Assessment

The DQA process is the scientific evaluation of the actual investigation results to determine whether the DQO criteria established in the CAU 566 SAFER Plan (NNSA/NSO, 2010) 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 helps to ensure that DQO decisions are sound and defensible.

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

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

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

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

Step 4: Verify the Assumptions – Perform tests of assumptions. If data are missing or censored, determine the impact on DQO decision error.

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

4.5.1 Review DQOs and Sampling Design

This section contains a review of the DQO process presented in Appendix A. The DQO decisions are presented with the DQO provisions to limit false negative or false positive decision errors. Special features, potential problems, or any deviations to the sampling design are also presented.

4.5.1.1 Decision I

The Decision I statement as presented in the CAU 566 SAFER Plan (NNSA/NSO, 2010) is as follows: "Is any COC present in environmental media?" Any analytical result for a COPC above the FAL will result in that COPC being designated as a COC.

Decision I Rules

- If the population parameter of any COPC in the Decision I population of interest exceeds the corresponding FAL, then that contaminant is identified as a COC, the contaminated material will be removed, or Decision II samples will be collected until an estimate of the extent of contaminated material has been made.
- If no COC associated with a release from the CAS is detected, then further assessment of the CAS is not required, and the CAA of no further action will be selected. If a COC associated with a release from the CAS is detected, then additional sampling will be conducted to determine the extent of COC contamination. If the extent of the contamination is defined, then clean close the site by removing the contaminated media until all contamination has been removed. If the extent of contamination has been determined and remediation cannot be completed during the SAFER, then a hold point will have been reached and NDEP will be consulted to determine whether the remaining contamination will be closed under the alternative corrective action of closure in place.
- If a waste is present that, if released, has the potential to cause the future contamination of site environmental media, then a corrective action will be determined, else no further action will be necessary.

Population Parameter: 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.

4.5.1.1.1 DQO Provisions To Limit False Negative Decision Error

A false negative decision error (where consequences are more severe) for judgmental sampling 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

To satisfy the first criterion, Decision I samples must be collected in areas most likely to be contaminated by COCs. Sample locations were selected using professional judgment, and based on acceptable knowledge:

- Source and location of release
- Chemical nature and fate properties
- Physical transport pathways and properties
- Hydrologic drivers
- Visual observations (discoloration, etc.)
- Field screening
- Radiological walkover surveys

Criterion 2

All samples were submitted and analyzed for the chemical and radiological parameters listed in Tables 3-1 and 3-2 of the SAFER Plan (NNSA/NSO, 2010). Table 4-1 provides a reconciliation of samples analyzed to the planned analytical program.

Table 4-1
CAU 566 Analyses Performed

CAS	ANALYTES											
	Total VOCs	Total SVOCs	TPH-DRO	PCBs	Total RCRA Metals and Beryllium	Gamma Spectroscopy	Isotopic U	Isotopic Pu	Sr-90	Gross Alpha and Gross Beta	Tritium	TCLP SVOCs
25-99-20	RS	RS	RS	RS	RS	RS	RS	RS	RS	S	S	S

RS = Required and submitted
S = Not required but submitted

DRO = Data quality objective
Pu = Plutonium
Sr = Strontium
SVOC = Semivolatile organic compound
TCLP = Toxicity Characteristic Leaching Procedure
TPH = Total petroleum hydrocarbons
U = Uranium
VOC = Volatile organic compound

Sample results were assessed against the acceptance criterion for the DQI of sensitivity as defined in the Industrial Sites QAPP (NNSA/NV, 2002b). The sensitivity acceptance criterion defined in the 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 that did not meet the sensitivity acceptance criterion were not used in making DQO decisions and were therefore considered as rejected data. Samples highly contaminated by either TPH-DRO or PCB Aroclor 1254 or 1260 were diluted to calibration range, hence raising the detection limit of the COCs. The impact on DQO decisions is addressed in the assessment of completeness.

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

Sample	Constituent	CAS	MDC (mg/kg)	FAL (mg/kg)
566001	Benzo(a)pyrene	25-99-20	0.412	0.21
	Dibenzo(ah)anthracene		0.412	0.21
	Hexachlorobenzene		2.75	1.1
	n-Nitroso di-n-propylamine		2.75	0.25

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

Sample	Constituent	CAS	MDC (mg/kg)	FAL (mg/kg)
566002	2,4-Dinitrotoluene	25-99-20	7.42	5.5
	4-Chloroaniline		14.8	8.6
	Benz(a)anthracene		2.23	2.1
	Benzo(a)pyrene		2.23	0.21
	Benzo(b)fluoranthene		2.23	2.1
	Dibenzo(ah)anthracene		2.23	0.21
	Hexachlorobenzene		14.8	1.1
	Indeno(1,2,3-cd)pyrene		2.23	2.1
	n-Nitroso di-n-propylamine		14.8	0.25
	Pentachlorophenol		18.5	9
566003	Benzo(a)pyrene		0.813	0.21
	Dibenzo(ah)anthracene		0.813	0.21
	Hexachlorobenzene		5.42	1.1
	n-Nitroso di-n-propylamine		5.42	0.25
566004	Benzo(a)pyrene		1.17	0.21
	Dibenzo(ah)anthracene		1.17	0.21
	Hexachlorobenzene		7.77	1.1
	n-Nitroso di-n-propylamine		7.77	0.25
	Pentachlorophenol		9.71	9
566019	n-Nitroso di-n-propylamine		270	0.25
566024	Aroclor 1221		11.4	1.76
	Aroclor 1232		11.4	1.76
	Aroclor 1242		11.4	2.91
	Aroclor 1248		11.4	2.91
	Aroclor 1254		11.4	2.91
	Aroclor 1268		11.4	2.91

Table 4-2
Analytes Failing Sensitivity Criteria
(Page 3 of 4)

Sample	Constituent	CAS	MDC (mg/kg)	FAL (mg/kg)
566026	Aroclor 1221	25-99-20	11.5	1.76
	Aroclor 1232		11.5	1.76
	Aroclor 1242		11.5	2.91
	Aroclor 1248		11.5	2.91
	Aroclor 1254		11.5	2.91
	Aroclor 1268		11.5	2.91
566027	Aroclor 1221		11.4	1.76
	Aroclor 1232		11.4	1.76
	Aroclor 1242		11.4	2.91
	Aroclor 1248		11.4	2.91
	Aroclor 1254		11.4	2.91
	Aroclor 1268		11.4	2.91
566032	Aroclor 1221		11.3	1.76
	Aroclor 1232		11.3	1.76
	Aroclor 1242		11.3	2.91
	Aroclor 1248		11.3	2.91
	Aroclor 1254		11.3	2.91
	Aroclor 1268		11.3	2.91
566033	Aroclor 1221		11.3	1.76
	Aroclor 1232		11.3	1.76
	Aroclor 1242		11.3	2.91
	Aroclor 1248		11.3	2.91
	Aroclor 1254		11.3	2.91
	Aroclor 1268		11.3	2.91

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

Sample	Constituent	CAS	MDC (mg/kg)	FAL (mg/kg)
566034	Aroclor 1221	25-99-20	11.3	1.76
	Aroclor 1232		11.3	1.76
	Aroclor 1242		11.3	2.91
	Aroclor 1248		11.3	2.91
	Aroclor 1254		11.3	2.91
	Aroclor 1268		11.3	2.91
566050	Aroclor 1221		2.27	1.76
	Aroclor 1232		2.27	1.76

MDC = Minimum detectable concentration

Criterion 3

To satisfy the third criterion, the entire dataset, as well as individual sample results, were assessed against the acceptance criteria for the DQIs of precision, accuracy, representativeness, completeness, and comparability, as defined in the Industrial Sites QAPP (NNSA/NV, 2002b). The DQI acceptance criteria are presented in Table 7-1 of the SAFER Plan (NNSA/NSO, 2010).

Precision

The analytical criteria for precision are evaluated using the relative percent difference (RPD), absolute difference, or normalized difference. For the purpose of determining the data precision of chemical analyses, an RPD or absolute difference (if result is less than 5 x reporting limit) was calculated for its sample and duplicate. For radionuclides, the RPD was not calculated unless both the sample and its duplicate had concentrations of the target radionuclide exceeding five times their MDC. Otherwise, radionuclide duplicate results were evaluated using the normalized difference. Table 4-3 provides the chemical and radiological precision analysis results for all contaminants that were qualified for precision. The only contaminants qualified for precision were barium and lead. As shown in Table 4-3, the precision rate for lead was below the SAFER Plan acceptance criterion of 80 percent. Although all 28 measurements of lead provided valid analytical results, paired sample results showed variability exceeding the criterion. However, the maximum concentration for lead in

Table 4-3
Precision Measurements

Contaminant	Analysis	Number of Measurements Qualified	Number of Measurements Performed	Percent within Criteria
Barium	Metals	2	28	92.9
Lead	Metals	22	28	21.4

any sample (46.9 mg/kg) is less than 6 percent of the 800 mg/kg FAL; therefore, the lead results that were qualified for reasons of precision can be confidently used to support DQO decisions.

Accuracy

For the purpose of determining data accuracy of sample analyses, environmental soil samples were evaluated and incorporated into the accuracy calculation. The results qualified for accuracy were associated with matrix spike (MS) recoveries that were outside control limits and could potentially be reported at concentrations lower or higher than actual concentrations. Table 4-4 provides the chemical accuracy analysis results for all contaminants qualified for accuracy. Accuracy rates for all contaminants exceed the SAFER Plan criterion of 80 percent, except for barium, chromium VI, mercury, selenium, and lead. Although all 28 measurement of these contaminants provided valid results, they did not meet the criterion for accuracy. However, as shown in Table 4-5, the maximum concentrations of each of these contaminants is a fraction of their corresponding FAL. As the accuracy rate for all other contaminants exceeds the acceptance criteria for accuracy, the dataset is determined to be acceptable for the DQI of accuracy.

Table 4-4
Accuracy Measurements
(Page 1 of 2)

Contaminant	Number of Measurements Qualified	Number of Measurements Performed	Percent within Criteria
Aroclor 1221	2	124	98.4
Aroclor 1232	2	124	98.4
Aroclor 1242	2	124	98.4
Aroclor 1248	2	124	98.4
Aroclor 1268	2	124	98.4

Table 4-4
Accuracy Measurements
(Page 2 of 2)

Contaminant	Number of Measurements Qualified	Number of Measurements Performed	Percent within Criteria
PCBs (low risk)	2	124	98.4
Bis(2-ethylhexyl)phthalate	1	39	97.4
Pentachlorophenol	1	39	97.4
TPH-DRO	1	28	96.4
Aroclor 1254	5	124	96
Aroclor 1260	6	124	95.2
Barium	10	28	64.3
Chromium VI	14	28	50
Mercury	14	28	50
Selenium	20	28	28.6
Lead	22	28	21.4

Table 4-5
Comparison of Accuracy Results

Contaminant	Maximum Concentration	FAL	Percent of FAL
Barium	122	190,000	0.06
Chromium VI	1.41	5.6	25.2
Mercury	0.044	34	0.13
Selenium	1.05 (ND)	5,100	0.02
Lead	46.9	800	5.86

ND = Nondetect

Representativeness

The DQO process as identified in Appendix A was used to address sampling and analytical requirements for CAU 566. 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 566 CAI are considered representative of the population parameters.

Completeness

The CAU 566 SAFER Plan (NNSA/NSO, 2010) defines acceptable criteria for completeness to be 80 percent of CAS-specific contaminants identified in the SAFER Plan having valid results. Also, the dataset must be sufficiently complete to be able to make the DQO decisions.

Rejected data (data that failed the criterion of sensitivity) were not used in the resolution of DQO decisions and are not counted toward meeting the completeness acceptance criterion. Although none of the analytes were found to be rejected, several failed sensitivity as listed in Table 4-2.

For the purposes of DQO decisions, rejected data cannot be used to demonstrate the absence of a COC. However, it may be conservatively assumed that the rejected contaminants are present when matricies exist that interfere with analytical measurements. Of the contaminants rejected due to sensitivity in Table 4-2, all PCB sample results were taken from areas already identified as containing PCBs exceeding FALs and can, therefore, be assumed to also contain PCBs above the FAL. The contaminants failing sensitivity in samples 566001 through 566004 are associated with hydrocarbon contamination on the railroad tracks. Therefore, in the absence of analytical results, it is assumed that these contaminants are present exceeding FALs in these samples. The n-nitroso-di-n-propylamine listed for sample numbers 566001 through 566004 and 566019 is not assumed to be present in this sample as this contaminant is not a COPC for CAU 566. This contaminant is listed in the *Hazardous Substances Data Bank (HSDB)* of the U.S. National Library of Medicine as used for research purposes and not produced for commercial purposes (NLM, 2011). There is no reason to suspect that this chemical is present at CAU 566. As it was not detected in any sample and is only considered here because of the inability to detect it at a very low action level (0.25 mg/kg), this one rejected measurement is not considered to affect any CAU 566 DQO decision. Therefore, the CAU 566 dataset meets the DQO completeness criterion of providing sufficient data to make the DQO decisions.

Comparability

Field sampling, as described in the CAU 566 SAFER Plan (NNSA/NSO, 2010), was performed and documented in accordance with approved procedures that are in conformance with standard industry practices. Analytical methods and procedures approved by DOE were used to analyze, report, and validate the data. These methods and procedures are in conformance with applicable methods used in industry and government practices. Therefore, project datasets are considered comparable to other datasets generated using standard industry procedures, thereby meeting DQO requirements.

4.5.1.1.2 DQO Provisions To Limit False Positive Decision Error

The false positive decision error was controlled by assessing the potential for false positive analytical results. Quality assurance/QC samples such as field blanks, trip blanks, laboratory control samples (LCSs), and method blanks were used to determine whether a false positive analytical result may have occurred. This provision is evaluated during the validation process, and appropriate qualifications are applied to the data results when applicable.

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

4.5.1.2 Decision II

The Decision II statement as presented in the CAU 566 SAFER Plan (NNSA/NSO, 2010) is as follows: "Is sufficient information available to meet the closure objectives?"

Decision Rules

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

- If the population parameter (the observed concentration of any COC) in the Decision II population of interest exceeds the corresponding FAL, then additional samples will be collected to complete the Decision II evaluation. If sufficient information is available to define the extent of COC contamination and confirm that closure objectives were met, then

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

- If valid analytical results are available for waste characterization samples, then the decision will be that sufficient information exists to characterize the IDW for disposal and determine potential remediation waste types, else collect additional waste characterization samples.

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

4.5.1.2.1 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

The confidence is high because verification samples were less than FALs.

Criterion 2

To satisfy the second criterion for extent, the entire dataset as well as individual samples results were assessed against the DQI of sensitivity (Table 4-2). The DQI discussion is presented under Criterion 2 for Decision I.

Criterion 3

To satisfy the third criterion for extent, the entire dataset, as well as individual sample results, were assessed against the DQIs of precision, accuracy, representativeness, comparability, and

completeness, as defined in the Industrial Sites QAPP (NNSA/NV, 2002b). The DQI discussion is presented under Criterion 3 for Decision I.

4.5.1.2.2 DQO Provisions To Limit False Positive Decision Error

The false positive decision error was controlled by assessing the potential for false positive analytical results. Quality assurance/QC samples such as field blanks, trip blanks, LCSs, and method blanks were used to determine whether a false positive analytical result may have occurred. Of 10 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.

4.5.1.3 Sampling Design

The SAFER Plan (NNSA/NSO, 2010) made the following commitments for sampling:

1. A judgmental sampling design was implemented for CAU 566. A biased sampling strategy was used to target areas with the greatest potential for contamination. Sample locations for the original six CAS components are defined in the CAU 566 SAFER Plan. Biased locations were determined in all cases based upon process knowledge, visual inspection of the site, and other biasing factors (e.g., soil staining, elevated radioactivity).

    - Result: Soil and PSM samples were collected at biased locations based upon the presence of soil and aqueous liquids in drywells, elevated radioactivity, debris piles, and identified potential pathways to the soil such as roof drains and heavy traffic areas.

2. Other releases identified during the field investigation associated with the EMAD Compound operations and support activities will be included in the scope of the CAI.

    - Result: Potential source material samples were collected at biased locations based upon the presence of aqueous liquids and oil, batteries, and other items in locomotives and railcars. Additional surveys and sampling were performed at biased locations based upon field instrumentation, visual evidence, and PCB contamination in soil samples beyond the spatial boundaries of the substations CAS component.

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

4.5.3 Select the Test and Identify Key Assumptions

The test for resolving DQO Decision I for the judgmental sampling design was the comparison of the maximum analyte result from each CAS component 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 4-6.

Table 4-6
Key Assumptions

Exposure Scenario	Site workers are only exposed to COCs through oral ingestion, inhalation, external exposure to radiation, or dermal contact (by absorption) of COCs absorbed onto soils. Exposure to contamination is limited to site workers, construction/remediation workers, and military personnel conducting training.
Affected Media	Surface soil, and shallow subsurface soil. Contaminants migrating to regional aquifers are not considered.
Location of Contamination/Release Points	Release points are those identified in the SAFER Plan.
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.
Preferential Pathways	None.
Lateral 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 extent of COC contamination is assumed to be within the spatial boundaries of CAS 25-99-20.
Groundwater Impacts	None.
Future Land Use	Nonresidential.
Other DQO Assumptions	Contamination may be present in the soils adjacent to a feature due to runoff or intended use (e.g., decontamination pad).

4.5.4 Verify the Assumptions

The results of the investigation support the key assumptions identified in the CAU 566 DQOs and Table 4-6 except as listed below:

Exception: The investigation results identified PCB contamination in soil from a source other than the electrical transformers located at the Substations CAS component. The PCB soil contamination extending beyond the substation boundaries indicates the PCB source to be something other than the transformers. This may be due to the use of PCB-contaminated oil for dust control or soil stabilization, reworking of surface soils in the area, and/or multiple sources of PCBs.

Impact: No impact to the CSM. 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 566 SAFER Plan (NNSA/NSO, 2010), nor did they necessitate revisions to the CSM.

4.5.4.1 Other DQO Commitments

The SAFER Plan (NNSA/NSO, 2010) made the following commitments for sampling:

Decision II sampling will consist of defining the extent of contamination where COCs have been confirmed at 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.

Results: The Decision I sampling of the soil at the Substations CAS component confirmed the presence of total Aroclor (PCBs) and benzo(a)pyrene in one sample (location A32) above the PAL. Removal of approximately 145 ft^3 of soil at the southwest substation removed the bulk of the COC contamination (Aroclor greater than 100 mg/kg). Decision II sampling was performed at both substation locations to define the lateral extent of COC contamination. Decision II sampling was also performed to bound the lateral extent of COC contamination within the spatial boundaries of the CAU 566 site. Samples taken outside the southwest substation fence to the west, and around the

perimeter of the southeast substation on the southern and western sides indicated COC contamination less than the PAL. Samples on the northern and eastern sides of the southeast substation identified PCB contamination greater than the PAL extending beyond the EMAD Compound fence line. Additional step-out sampling (10 to 15 ft laterally) was performed at the southern and western boundaries. These samples indicated COC contamination decreased to less than the FAL approximately 15 to 25 ft outside the existing perimeter fence. See Figures 2-10 and 2-11 for sample locations at each of the substations, and Figure 2-21 for sample locations associated with the EMAD Compound Soil Releases.

4.5.5 Draw Conclusions from the Data

This section resolves the two DQO decisions for CAS 25-99-20.

4.5.5.1 Decision Rules for Decision I

Decision Rule: If the concentration of any COPC exceeds the FAL during the initial investigation, then that COPC is identified as a COC and Decision II sampling will be conducted.

Result: The following COCs were identified as a result of Decision I sampling:

- Polychlorinated biphenyls were identified as a COC at CAS 25-99-20.

4.5.5.2 Decision Rules for Decision II

Decision Rule: 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.

Result: Decision II sampling activities included the collection of step-out surface and subsurface samples around the perimeter of the southwest substation, and step-out surface samples around the perimeter of the southeast substation. Surface samples from locations A73 through A76 and A94 define the lateral extent of contamination at the southwest substation, including the physical boundary of Building 3900 to the east and the concrete pad to the north. The COC contamination in the vicinity of the southeast substation extends beyond the spatial boundaries of the Substations CAS component. This may be due to the use of PCB-contaminated oil for dust control, soil stabilization, reworking of surface soils in the area, and/or multiple sources of PCBs. Surface samples collected just outside the

substation perimeter fence (10 to 15 ft) to the south and west (A77 through A82, A86, A89, A92, and A93), and outside the EMAD Compound perimeter fence to the north and east (A122 and A115) are less than the FAL and define the lateral extent of contamination.

Because PCB contamination levels fluctuated above and below FALs with distance laterally from the assumed source (Substations), additional step-out sampling was performed to ensure COC contamination was bound laterally at CAS 25-99-20. Surface samples from locations A115 through A122 define the lateral extent of contamination at CAS 25-99-20.

Decision Rule: If sufficient information is available to define the extent of COC contamination and confirm that closure objectives were met, the further assessment of the CAS is not required.

Result: The lateral extent of contamination at CAS 25-99-20 has been defined. Surface samples from locations A115 through A122 define the lateral extent of contamination at CAS 25-99-20.

4.6 Use Restrictions

To minimize future potential personnel exposure or mobilization of contaminants, URs have been implemented for CAU 566. The FFACO UR associated with the corrective action of closure in place includes posting and fencing of the EMAD Compound. As a BMP, an administrative UR was implemented for the area extending outside the EMAD Compound fence line.

Future land use related to the FFACO UR is restricted from any intrusive activity unless concurrence is obtained in advance and in writing from NDEP. Future activity that alters and/or modifies any barrier must be restored to an equivalent or more restrictive condition upon completion of the activity. Any future land use within the UR area that is inconsistent with the current land usage will require reevaluation of site controls. Risk evaluations completed for CAS 25-99-20 are in Appendix E.

Because three additional use-restricted CAUs are located within the CAU 566 EMAD Compound, the CAU 566 UR signs will incorporate the information from the co-located CAUs. Based upon future cleanup or additional sampling activities at the site, these URs may be remediated and removed from the site. Specific information and map locations relating to the imposed URs are presented in Appendix D. The UR sign text for CAU 566 is also included in Appendix D.

5.0 Conclusions and Recommendations

Closure activities specified in the CAU 566 SAFER Plan (NNSA/NSO, 2010) 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 566, EMAD Compound. Upon closure approval, CAU 566 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 566.

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

- No further corrective action is required at CAS 25-99-20. Based on analytical results of the environmental samples collected at this CAS, COC contamination has been remediated to the extent practical, and the remaining contamination was closed in place with UR. This corrective action decision was based on a current and future land use assumptions listed in Appendix E. To ensure that future site workers are not incidentally exposed to the site, URs will be established. The URs prohibit intrusive activities (at any depth) at CAS 25-99-20 without approval from NDEP. The URs will be recorded in the NNSA/NSO Facility Information Management System with the coordinates that define the restricted area.
- The proposed UR inside the EMAD Compound fence line will encompass the existing URs at CAUs 127, 539, and 556. This UR proposes to incorporate these existing URs into one overall UR.
- An Administrative UR will be implemented for the area extending outside the EMAD Compound perimeter fence line.
- Post-closure monitoring of UR postings will be performed.
- No Corrective Action Plan is required for CAU 566.
- A Notice of Completion is requested from NDEP for the closure of CAU 566.
- Corrective Action Unit 566 should be moved from Appendix III to Appendix IV of the FFACO, signifying closure.

6.0 References

Baldrica, A.M., Nevada State Historic Preservation Office. 2006. Letter to R.T. Brock (NNSA/NSO) titled "Re: Section 106 Review—Historical Evaluation of Train Cars at the Radioactive Material Storage Facility (RMSF), Area 25, Nevada Test Site, Nye County, Nevada," 10 April. Carson City, NV.

Beck, C.M., H. Drollinger, R. Jones, D. Winslow, and N.G. Goldenberg. 1996. *A Historical Evaluation of the Engine Maintenance Assembly and Disassembly Facility, Area 25, Nevada Test Site, Nye County, Nevada*, SR082696-1. Las Vegas, NV: Desert Research Institute; and San Francisco, CA: Carey & Co., Inc.

CFR, see *Code of Federal Regulations*.

Code of Federal Regulations. 2010. Title 40 CFR, Parts 260 to 282, "Hazardous Waste Management System." Washington, DC: U.S. Government Printing Office.

DOE/NV, see U.S. Department of Energy, Nevada Operations Office.

EPA, see U.S. Environmental Protection Agency.

FFACO, see *Federal Facility Agreement and Consent Order.*

Federal Facility Agreement and Consent Order. 1996 (as amended March 2010). Agreed to by the State of Nevada; U.S. Department of Energy, Environmental Management; U.S. Department of Defense; and U.S. Department of Energy, Legacy Management. Appendix VI, which contains the Industrial Sites Strategy, was last modified May 2011, Revision No. 4.

Geary, K., Peer Consultants. 2006. Telephone interview with T. Thiele (NSTec), J. Myers (SNJV), and S. Engelke (SAIC) regarding CAU 114, CAS 25-41-03, 12 October.

HHS, see U.S. Department of Health and Human Services.

N-I GIS, see Navarro-Intera Geographic Information Systems.

Murphy, T.H., Nevada Division of Environmental Protection. 2011. Letter to R.F. Boehlecke (NNSA/NSO) titled "Approval To Consolidate Soils Sub-Project Low-Level Waste (LLW) into Corrective Action Unit (CAU) 566 Cargo Container," 16 May. Las Vegas, NV.

NLM, see U.S. National Library of Medicine.

NNSA/NSO, see U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office.

NNSA/NV, see U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office.

Navarro-Intera Geographic Information Systems. 2011. ESRI ArcGIS Software.

RSL, see Remote Sensing Laboratory.

Remote Sensing Laboratory. 1985. Aerial photograph "5106-61," 21 August. Las Vegas, NV: EG&G Energy Measurements, Inc.

Remote Sensing Laboratory. 2000. Aerial photograph "10292-254," 2 February. Las Vegas, NV.

Seals, J. 2004. "The Case of the Transuranic-Loving Squirrels, the Decontamination of the XF-90A." In *Radwaste Solutions*, November/December, pp. 41–45.

U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office. 2001. *Closure Report for Corrective Action Unit 135: Areas 25 Underground Storage Tanks, Nevada Test Site, Nevada*, Rev. 1, DOE/NV--717-Rev. 1. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office. 2002a. *Closure Report for Corrective Action Unit 143: Area 25 Contaminated Waste Dumps, Nevada Test Site, Nevada*, Rev. 0, DOE/NV--807. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office. 2002b. *Industrial Sites Quality Assurance Project Plan, Nevada Test Site, Nevada*, Rev. 3, DOE/NV--372. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office. 2002c. *Nevada Test Site Orthophoto Site Atlas*, DOE/NV/11718--604. Aerial photos acquired Summer 1998. Prepared by Bechtel Nevada. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2003a. *Closure Report for Corrective Action Unit 262: Areas 25 Septic Systems and Underground Discharge Point, Nevada Test Site, Nevada*, Rev. 1, DOE/NV--897-REV 1. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2003b. *Closure Report for Corrective Action Unit 398: Area 25 Spill Sites, Nevada Test Site, Nevada*, Rev. 1, DOE/NV--873-REV 1. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2005. *Closure Report for Corrective Action Unit 165: Area 25 and 26 Dry Well and Washdown Areas, Nevada Test Site, Nevada*, Rev. 0, DOE/NV--1092. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2007a. *Closure Report for Corrective Action Unit 168: Area 25 and 26 Contaminated Materials and Waste Dumps, Nevada Test Site, Nevada*, Rev. 0, DOE/NV--1178. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2007b. *Closure Report for Corrective Action Unit 300: Surface Release Areas, Nevada Test Site, Nevada*, Rev. 0, DOE/NV--1222. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2008a. *Addendum to the Closure Report for Corrective Action Unit 262: Area 25 Septic Systems and Underground Discharge Point, Nevada Test Site, Nevada*, Rev. 0, DOE/NV--897-REV 1-ADD. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2008b. *Addendum to the Closure Report for Corrective Action Unit 398: Area 25 Spill Sites, Nevada Test Site, Nevada*, Rev. 0, DOE/NV--873-REV 1-ADD. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2008c. *Closure Report for Corrective Action Unit 127: Areas 25 and 26 Storage Tanks, Nevada Test Site, Nevada*, Rev. 0, DOE/NV--1248. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2008d. *Corrective Action Decision Document/Closure Report for Corrective Action Unit 556: Dry Wells and Surface Release Points, Nevada Test Site, Nevada*, Rev. 0, DOE/NV--1285. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2009. *Corrective Action Decision Document/Closure Report for Corrective Action Unit 557: Spills and Tank Sites, Nevada Test Site, Nevada*, Rev. 0, DOE/NV--1319. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2010. *Streamlined Approach for Environmental Restoration for Corrective Action Unit 566: EMAD Compound, Nevada National Security Site, Nevada*, Rev. 0, DOE/NV--1392. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1983. *Histories of Spent Nuclear Fuel Assemblies While at the E-MAD Facility, December 1978 Through September 1982*, DOE/NV/10250-6. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1995a. *Environmental Restoration Sites Inventory - Non-Hazardous Site Cleanup Verification Summary.* Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1995b. *Environmental Restoration Sites Inventory - Site Cleanup Verification Summary.* Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1996a. *Corrective Action Unit 381 Gas Cylinder Closure Report*, 07-CAU381-002. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1996b. *Corrective Action Unit 382 Housekeeping Closure Report*. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1997. *Closure Report for Housekeeping Category Corrective Action Unit 386, Nevada Test Site*, Rev. 1, DOE/NV--11718-129. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1998. *Closure Report for Housekeeping Category Corrective Action Unit 354: Nevada Test Site*, Rev. 0, DOE/NV--11718-169. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1999. *Closure Report for Housekeeping Category Corrective Action Unit 297: Nevada Test Site, Nevada*, Rev. 0, DOE/NV--11718-289. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 2000a. *Housekeeping Closure Report for Corrective Action Unit 119: Storage Tanks, Nevada Test Site, Nevada*, Rev. 0, DOE/NV--626. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 2000b. *Housekeeping Closure Report for Corrective Action Unit 288: Area 25 Engine-Maintenance, Assembly, and Disassembly/ Treatability Test Facility Chemical Sites, Nevada Test Site, Nevada*, Rev. 0, DOE/NV--590. Las Vegas, NV.

U.S. Department of Health and Human Services. 2000. *Toxicological Profile for Polychlorinated Biphenyls (PCBs)*. November. Atlanta, GA: Agency for Toxic Substances and Disease Registry.

U.S. Environmental Protection Agency. 2006. *Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4)*, EPA/240/B-06/001. Washington, DC: Office of Environmental Information.

U.S. National Library of Medicine. 2011. *Hazardous Substances Data Bank (HSDB)*. As accessed at http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB on 8 April.

Appendix A

Data Quality Objectives as Developed in the SAFER Plan

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

Nevada
Environmental
Restoration
Project

DOE/NV--1392

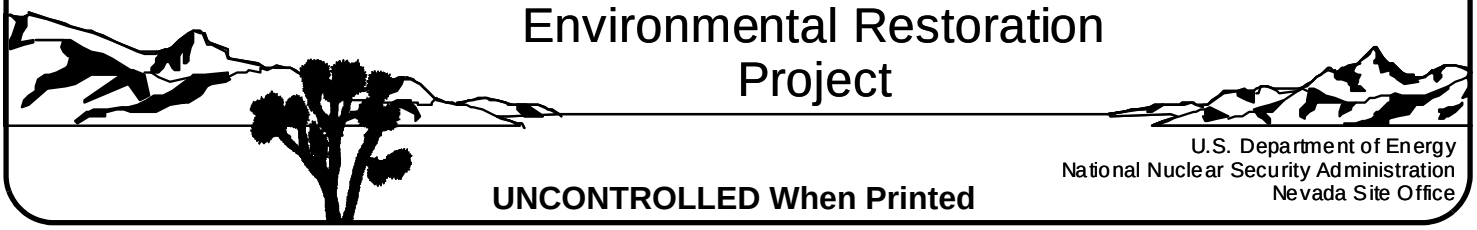
National Nuclear Security Administration

Streamlined Approach for Environmental Restoration (SAFER) Plan for Corrective Action Unit 566: EMAD Compound Nevada Test Site, Nevada

Controlled Copy No.: ___
Revision No.: 0

June 2010

Approved for public release; further dissemination unlimited.



Environmental Restoration
Project

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

UNCONTROLLED When Printed

Available for sale to the public from:

U.S. Department of Commerce
National Technical Information Service
5301 Shawnee Road
Alexandria, VA 22312
Telephone: 800.553.6847
Fax: 703.605.6900
E-mail: *orders@ntis.gov*
Online Ordering: *http://www.ntis.gov/help/ordermethods.aspx*

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*

Appendix B

Data Quality Objective Process

B.1.0 Introduction

The DQO process described in this appendix is a seven-step strategic systematic planning method used to plan data collection activities and define performance criteria for the CAU 566, EMAD Compound, field investigation. The DQOs are designed to ensure that the data collected will provide sufficient and reliable information to determine the appropriate corrective actions, to verify the adequacy of existing information, to provide sufficient data to implement the corrective actions, and to verify that closure was achieved.

The CAU 566 CAI will be based on the DQOs presented in this appendix as developed by representatives of NDEP and NNSA/NSO. The seven steps of the DQO process presented in Sections B.2.0 through B.8.0 were developed in accordance with *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA, 2006) and the CAS-specific information presented in Section B.2.0.

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

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

B.2.0 Step 1 - State the Problem

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

The problem statement for CAU 566 is: "Existing information on the nature and extent of potential contamination is insufficient to evaluate and confirm closure of CAU 566."

Corrective Action Unit 566 comprises CAS 25-99-20, EMAD Compound, which consists of the following:

- Potential current releases to soil associated with CAS components on the exterior of the E-MAD Facility (Building 3900)
- Potential future releases from wastes suspected to contain a material that could cause the release of a COC to environmental media

B.2.1 Planning Team Members

The DQO planning team consists of representatives from NDEP and NNSA/NSO. The DQO meeting was held on April 30, 2009.

B.2.2 Conceptual Site Model

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

The CSM was developed for CAU 566 using information from the physical setting, potential contaminant sources, release information, historical background information, knowledge from similar sites, and physical and chemical properties of the potentially affected media and COPCs.

The CSM consists of:

- Potential contaminant releases associated with CAS components on the exterior of Building 3900, including affected media.
- 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.

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

The applicability of the CSM to each CAS component is summarized in Table B.2-1 and discussed below. Table B.2-1 provides information on CSM elements that will be used throughout the remaining steps of the DQO process. Figure B.2-1 represents site conditions applicable to the CSM and depicts the various potential surface and shallow subsurface releases associated with the EMAD Compound.

Table B.2-1
Conceptual Site Model Description of Elements for Each CAS Component in CAU 566
(Page 1 of 2)

CAS Identifier	25-99-20					
CAS Description/ CAS Components	**Locomotives and Railcars**	**Debris Piles**	**Storm Drain System**	**Metallurgy Lab Drains**	**Storage Casks and Drywells**	**Substations**
Site Status	The cable-spool car, locomotives, and manned control car are currently leaking.	Inactive and abandoned.	Surface water may drain to the catch basin and outfall area during rainfall events.	Inactive and abandoned. The drains have been cut off at the surface and sealed, and all fuel assemblies have been removed from the casks and drywells.		Both substations are currently active.
Exposure Scenario	Occasional Use					
Sources of Potential Soil Contamination	Diesel fuel, oils, and other fluids in equipment reservoirs	Hazardous or radioactive materials contained in debris piles	Hazardous or radioactive materials that have been discharged to the storm drain system	Hazardous or radioactive materials or chemicals related to metallurgical activities that have been discharged to the drain system	Former storage of fuel assemblies, or any remaining hazardous or radioactive items	Transformers used in the past potentially contain PCBs.
Location of Contamination/ Release Point	Surface release points directly below or adjacent to equipment	Surface release points below or adjacent to debris items	Catch basin contents, adjacent to outfall, and sediment accumulation areas downgradient	Directly below drain connections to trailer, adjacent to cut and sealed pipe ends, potential breaches	Internal surface of casks and drywells, adjacent soils if any breaches	Surface release points adjacent to transformer pads

Table B.2-1
Conceptual Site Model Description of Elements for Each CAS Component in CAU 566
(Page 2 of 2)

CAS Identifier	25-99-20					
CAS Description/ CAS Components	**Locomotives and Railcars**	**Debris Piles**	**Storm Drain System**	**Metallurgy Lab Drains**	**Storage Casks and Drywells**	**Substations**
Amount Released	Unknown					
Affected Media	Surface and shallow subsurface soil					
Potential Contaminants	VOCs, SVOCs, TPH-DRO, RCRA Metals + Beryllium, PCBs, Gamma Spectrometry, Isotopic U, Isotopic Pu, Sr-90 (+Pesticides at Building 3900)				Gamma Spectrometry, Isotopic U, Isotopic Pu, Sr-90	PCBs
Transport Mechanisms	Percolation of precipitation through subsurface media served as the major driving force for migration of contaminants. Surface water runoff may provide for the transportation of some contaminants within or outside the footprints of the CAS components (e.g., storm drain system, debris piles). Leaks from fuel tanks and/or oil reservoirs on equipment located outside Building 3900 onto the soil.					
Migration Pathways	Vertical transport is expected to be more dominant than lateral transport due to small surface gradients (with exception of storm drain system).					
Lateral and Vertical Extent of Contamination	Contamination, if present, is expected to be contiguous to the release points. Concentrations are expected to decrease with distance and depth from the source. Groundwater contamination is not expected. Lateral and vertical extent of COC contamination is assumed to be within the spatial boundaries.					
Exposure Pathways	The potential for contamination exposure is limited to industrial and construction workers, and military personnel conducting training. These human receptors may be exposed to COPCs through oral ingestion, inhalation, and dermal contact (absorption) of contaminated soil and/or debris due to inadvertent disturbance of these materials, or irradiation by radioactive materials.					

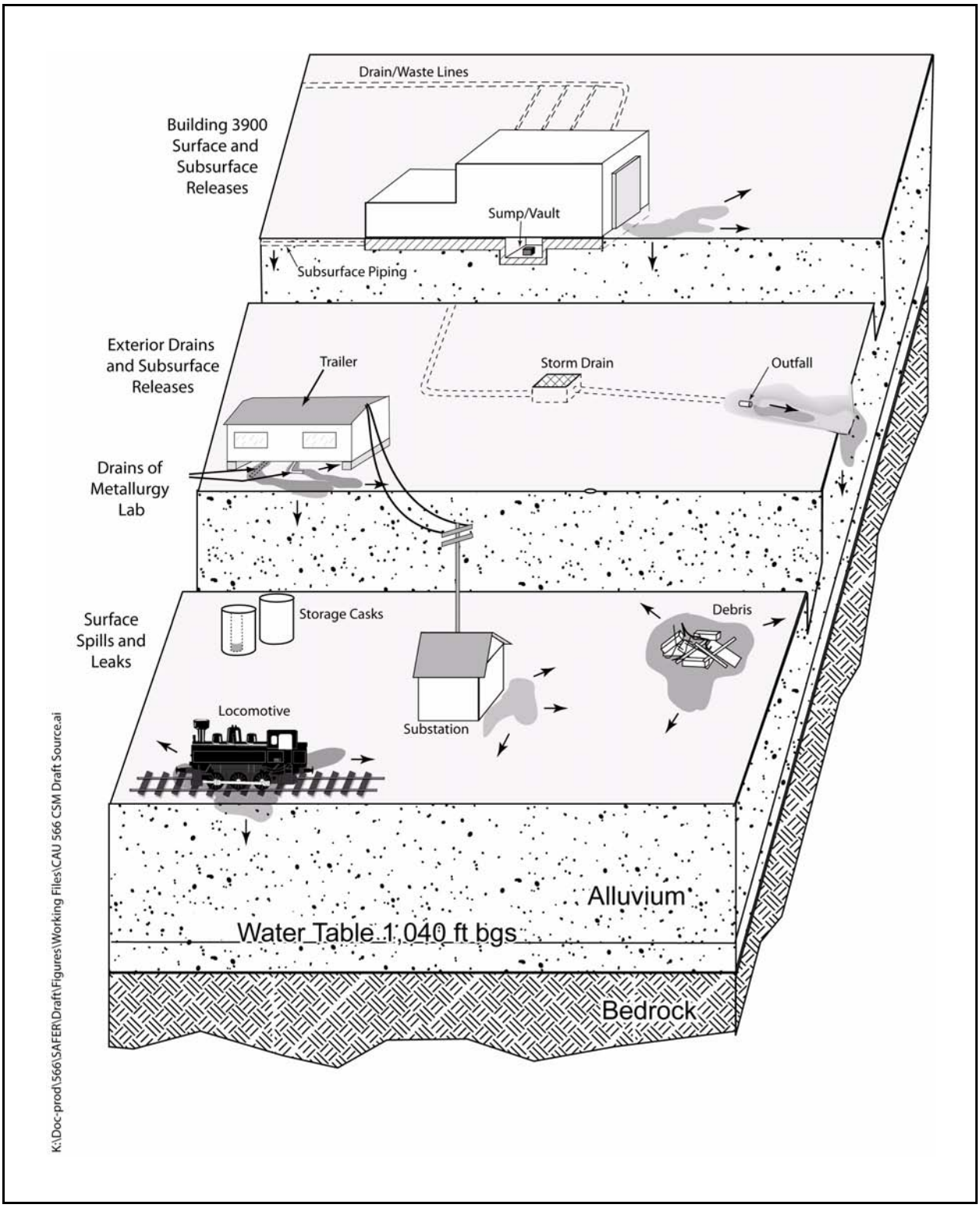


Figure B.2-1
Conceptual Site Model for CAU 566

B.2.2.1 Contaminant Release

Any contaminants released from CAU 566, regardless of physical or chemical characteristics, are expected to exist in the soil adjacent to their sources in lateral and vertical directions. The CAS-specific release points are described below.

For releases from the leaking locomotives and railcars component of CAS 25-99-20, the primary locations for contaminant release are the surface and shallow subsurface soils directly below or adjacent to fuel and oil reservoirs that have leaked, or may currently be leaking. Several areas of stained soil have been observed beneath the fuel reservoirs of each locomotive and below the cable-spool car located on the same set of railroad tracks.

For releases from the debris pile component of CAS 25-99-20, the primary locations for contaminant release are the surface soils directly below or adjacent to debris items. The majority of the debris consists of scrap wood, likely from temporary storage sheds; however, there is a potential for hazardous or radioactive items to be present.

For the storm drain system component of CAS 25-99-20, the primary locations for contaminant release are surface soils adjacent to the outfall pipe and sediment accumulation areas in the drainage channel that formed in the outfall area. Contaminants may also be present in the sediment contained within the concrete catch basin located upgradient of the outfall area.

For the Metallurgy Lab drain system component of CAS 25-99-20, the primary locations for contaminant release are in the surface soils directly below the three locations where the drains connect to the trailer and the locations where the drains have been cut and sealed at the ground surface. There is also the potential for releases to have occurred at elbows, joint connections, or any breaches in the piping. The pipe itself may be radiologically contaminated based on recent radiological surveys.

For the electrical substation component of CAS 25-99-20, the primary locations for contaminant release are the surface soils immediately adjacent to the transformer pads of each substation. The substations currently contain non-PCB-containing transformers; however, there is the potential for PCB-containing transformers to have serviced the substations in the past.

For the storage casks (2) and drywells (4) component of CAS 25-99-20, the primary locations for contaminant release are the interiors of each containment structure. Releases to surface and shallow subsurface soils are not expected based on the design of the storage casks (carbon-steel liner set in concrete) and drywells (steel liner grouted in place); however, each structure will be visually inspected.

B.2.2.2 Potential Contaminants

The COPCs were identified during the planning process through the review of site history, process knowledge, personal interviews, past investigation efforts (where available), and inferred activities associated with each CAS component. Because complete information regarding activities performed at the CAU 566 site is not available, contaminants detected at similar NTS sites were included in the contaminant lists to reduce uncertainty. The list of COPCs is intended to encompass all of the contaminants that could potentially be present. The COPCs applicable to Decision I environmental samples from the CAU 566 CAS components are defined as the constituents reported from the analytical methods stipulated in Table B.2-2. (See Section 4.1 for a description of the potential sources of the listed COPCs.)

During the review of site history documentation, process knowledge information, personal interviews, past investigation efforts (where available), and inferred activities associated with the CAS, some of the COPCs were identified as targeted contaminants. Targeted contaminants are those COPCs for which evidence in the available site and process information suggests that they may be reasonably suspected to be present at a given CAS. The targeted contaminants are required to meet a more stringent completeness criteria than other COPCs, thus providing greater protection against a decision error (see Section B.7.1). Targeted contaminants for CAU 566 have only been identified for the Metallurgy Lab drain system component of CAS 25-99-20. For this system, there is available information regarding elevated radioactivity associated with the drain lines. Therefore, isotopic U, isotopic Pu, Sr-90, and gamma-emitting radionuclides have been identified as targeted contaminants.

B.2.2.3 Contaminant Characteristics

Contaminant characteristics include, but are not limited to, solubility, density, and adsorption potential. In general, contaminants with large particle size, low solubility, high affinity for media, and/or high density can be expected to be found relatively close to release points. Contaminants with

Table B.2-2
Analytical Program[a]

Analyses	CAS 25-99-20 Components					
	Storage Casks and Drywells	Substations	Storm Drain System	Metallurgy Lab Drains	Locomotives and Railcars	Construction Debris Piles
Organic COPCs						
TPH-DRO	--	--	X			
PCBs	--	X	X			
SVOCs	--	--	X			
VOCs	--	--	X			
Pesticides	--	--	--			
Inorganic COPCs						
RCRA Metals	--	--	X			
Total Beryllium	--	--	X			
Radionuclide COPCs						
Gamma Spectroscopy	X	--	X			
Isotopic U	X	--	X			
Isotopic Pu	X	--	X			
Sr-90	X	--	X			

[a]The COPCs are the constituents reported from the analytical methods listed.

X = Required analytical method
-- = Not required

small particle size, high solubility, low affinity for media, and/or low density are found farther from release points or in low areas where evaporation of ponding will concentrate dissolved constituents.

B.2.2.4 Site Characteristics

Site characteristics are defined by the interaction of physical, topographical, and meteorological attributes and properties. Physical properties include permeability, porosity, hydraulic conductivity, degree of saturation, sorting, chemical composition, and organic content. Topographical and

meteorological properties and attributes include slope stability, precipitation frequency and amounts, precipitation runoff pathways, drainage channels and ephemeral streams, and evapotranspiration potential.

The E-MAD Facility and Compound are located in Jackass Flats in Area 25 of the NTS. Jackass Flats is between Yucca Mountain on the west and southwest and Little Skull Mountain to the south. The Calico Hills are directly north, Mid Valley and Lookout Peak are to the northeast, and Skull Mountain is to the southeast. Jackass Flats is a broad alluvial valley with alluvium and colluvium accumulations up to 1,205 ft (USGS, 1964; DOE, 1988). The alluvium in Jackass Flats is underlain by welded and semi-welded ash-flow and ash-fall tuffs of Tertiary age. Beneath the tuff layers lie Paleozoic carbonate and clastic sediments with a depth of up to 22,000 ft in some areas. The Paleozoic rocks are made up of shales, quartzites, and carbonates of lower to middle Cambrian age; carbonate and thin shale layers of middle Cambrian to Devonian age; and argillites, cherty limestones, and conglomerates of Devonian to Permian age (SNPO, 1970).

Elevation of the flats ranges from 3,600 ft in the north to 3,200 ft in the south, with the E-MAD Facility at 3,520 ft. Surface water flow at the north end of the E-MAD Facility drains to the southwest; at the south end of the facility, surface water drains to the south. The nearest natural water source is Topopah Springs at the head of Topopah Wash 8.7 miles to the north. The closest well to the site is J-11 Water Well, which is located approximately 9,500 ft southeast of the E-MAD Facility. The depth to groundwater as measured from this well is approximately 1,040 ft below ground surface (bgs) (DRI, 1996; USGS and DOE, 2009).

B.2.2.5 Migration Pathways and Transport Mechanisms

Migration pathways include the lateral migration of potential contaminants across surface soils/sediments and vertical migration of potential contaminants through subsurface soils.

The E-MAD Compound is toward the middle of Jackass Flats, about 500 ft west of Topopah Wash. Fortymile Wash, the major drainage in the area, meanders along the east base of Yucca Mountain and the west side of Jackass Flats, and eventually joins with the Amargosa River to the south. Topopah Wash, originating in the Calico Hills, bisects Jackass Flats and also joins with the Amargosa River, further to the east (DRI, 1996). Contaminants released into the Topopah Wash are subject to much

higher transport mechanisms than contaminants released to other surface areas. Topopah Wash is generally dry but is subject to infrequent, potentially intense, stormwater flows. These stormwater flow events provide an intermittent mechanism for both vertical and horizontal transport of contaminants. Contaminated sediments entrained by these stormwater events would be carried by the streamflow to locations where the flowing water loses energy and the sediments drop out. These locations are readily identifiable by hydrologists as sedimentation areas.

Infiltration and percolation of precipitation serves as a driving force for downward migration of contaminants. However, due to the low permeability of the alluvium throughout the area, and high potential evapotranspiration rates and low precipitation rates (approximately 5.72 in. per year as measured from station 4JA [ARL/SORD, 2009]), percolation of infiltrated precipitation at the NTS does not provide a significant mechanism for vertical migration of contaminants to groundwater (DOE/NV, 1992). Environmental contamination is, therefore, expected to be limited to the area near release points.

B.2.2.6 Land-Use and Exposure Scenarios

Human receptors 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 land-use and exposure scenarios for CAS 25-99-20 are listed in Table B.2-3. These are based on NTS current and future land use (DOE/NV, 1998). Although CAU 566 is located in an area where structures from past activities exist, no facilities are present that would allow these to be used as an assigned work station for NTS site personnel; therefore, CAU 566 is considered an occasional use area.

Table B.2-3
Land-Use and Exposure Scenarios

CAS	Record of Decision Land Use Zone	Exposure Scenario
25-99-20	**Research Test and Experiment Zone** This area is designated for small-scale research and development projects and demonstrations; pilot projects; outdoor tests; and experiments for the development, QA, or reliability of material and equipment under controlled conditions. This zone includes compatible defense and nondefense research, development, and testing projects and activities.	**Occasional Use Area** Worker will be exposed to the site occasionally (up to 80 hours per year for 5 years). Site structures are not present for shelter and comfort of the worker.

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

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

B.3.1 Decision Statements

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

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

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

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 to result in the introduction of COCs into site environmental media. These wastes would be considered PSM, which is defined as waste (solid or liquid) containing contaminants that, if released to soil, would result in soil contamination exceeding a FAL. To determine whether wastes that are present at CAU 566 meet the criteria for PSM, the following conservative assumptions were made:

- Any containment of waste (e.g., fuel/oil reservoirs, pipe, concrete vaults and walls, drums) would fail at some point, and the waste would be released to the surrounding soil.

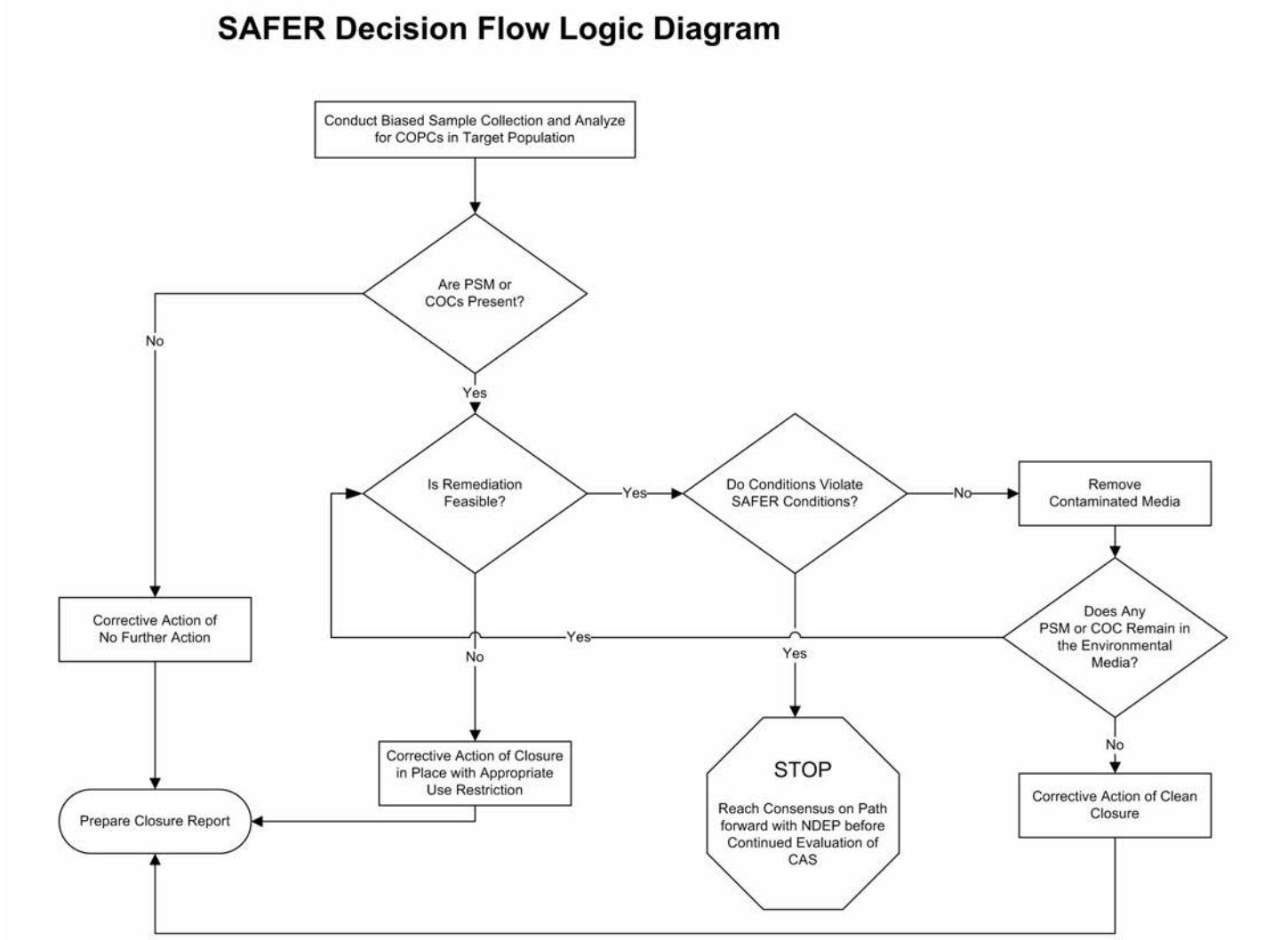


Figure B.3-1
SAFER Closure Decision Process for CAU 566

UNCONTROLLED When Printed

- A waste, regardless of concentration or configuration, may be assumed to be PSM and handled under a corrective action, if appropriate.

- Based on process knowledge and/or professional judgment, a waste may be assumed to not be PSM if it is clear that it could not result in soil contamination exceeding a FAL.

- If assumptions about the waste cannot be justified, then the waste material will be sampled, and the results will be compared to FALs based on the following criteria:

  - For non-liquid wastes, the concentration of any chemical contaminant in soil (following degradation of the waste and release of contaminants into soil) would be equal to the mass of the contaminant in the waste divided by the mass of the waste (no consideration will be given to dilution into the mass of soil).

  - For non-liquid wastes, the dose resulting from radioactive contaminants in soil (following degradation of the waste and release of contaminants into soil) would be calculated using the activity of the contaminant in the waste divided by the mass of the waste (for each radioactive contaminant) and calculating the combined resulting dose using the RESRAD code (Murphy, 2004) (no consideration will be given to dilution into the mass of soil). Note: As an initial screening tool, if building materials are primarily externally contaminated and do not present a dose exceeding the FAL to a nearby worker in its current configuration, it will not be considered to meet PSM criteria.

  - For liquid wastes, the resulting concentration of contaminants in the surrounding soil would be calculated based on the concentration of contaminants in the wastes and the liquid holding capacity of the soil.

For example, sludge containing a contaminant exceeding an equivalent FAL concentration would be considered to be PSM and would require a corrective action. Light ballasts with capacitors are assumed to contain PCBs based on process knowledge. These ballasts/capacitors would be assumed to be PSM without sampling and would require a corrective action.

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 CAI is not exceeded and any CSM assumption has not been shown to be incorrect).

B.3.2 Alternative Actions to the Decisions

This section identifies actions that may be taken to solve the problem depending on the possible outcomes of the CAI.

B.3.2.1 Alternative Actions to Decision I

If no COC associated with a release from a CAS is detected, then further assessment of the CAS is not required, and the CAA of no further action will be selected. If a COC associated with a release from a CAS is detected, then additional sampling will be conducted to determine the extent of COC contamination. If the extent of the contamination is defined, then clean close the site by removing the contaminated media until all contamination has been removed. If the extent of contamination has been determined and additional remediation cannot be completed during the SAFER, then a hold point will have been reached and NDEP will be consulted to determine whether the remaining contamination will be closed under the alternative corrective action of closure in place.

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

B.3.2.2 Alternative Actions to Decision II

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

B.4.0 Step 3 - Identify Information Inputs

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

B.4.1 Information Needs

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

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

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

- Samples must be collected in areas contiguous to the contamination but where contaminant concentrations are below FALs.
- Samples of the waste or environmental media must provide sufficient information to characterize the IDW for disposal.
- Samples of the waste or environmental media must provide sufficient information to determine potential remediation waste types.
- Samples of waste must provide sufficient information to determine whether materials meet PSM criteria.
- The analytical suites selected must be sufficient to detect contaminants at concentrations equal to or less than their corresponding FALs.

B.4.2 Sources of Information

Information to satisfy Decision I and Decision II will be generated by collecting samples using hand sampling (e.g., grab, auger, bailer), power auguring, core drilling, backhoe excavation, or other appropriate sampling methods. Sampling for COCs will be conducted in areas most likely to contain

a COC (judgmental sampling), and will include samples of environmental media and PSM that could cause future environmental contamination. These areas include soils adjacent to or directly below contaminant pathways if it is determined that a pathway from the CAS exists. These samples will be submitted to analytical laboratories meeting the quality criteria stipulated in the Industrial Sites QAPP (NNSA/NV, 2002). Only validated data from analytical laboratories will be used to make DQO decisions. For some materials, it will be assumed that a contaminant is present based on process knowledge and that material will be assumed to meet PSM criteria without the need for sampling. Radiological surveys of surfaces (e.g., locomotives, railcars, casks) will be used to determine the extent of any remaining surface contamination and to assist in evaluating the potential for a receptor to receive a dose greater than 25 mrem/yr.

All waste characterization data must be sufficient to meet the quality requirements of the designated waste acceptance criteria. Waste disposal documentation, field surveys, and other appropriate information may also be used to ensure corrective actions were completed as planned.

B.4.2.1 Sample Locations

Design of the sampling approaches for the CAU 566 CAS components must ensure that the data collected are sufficient for selection of the CAAs. To meet this objective, the samples collected from each component should be from locations that most likely contain a COC, if present. These sample locations, therefore, can be selected by means of biasing factors used in judgmental sampling (e.g., a stain likely containing a spilled substance). Because sufficient data are available to develop a judgmental sampling plan, this approach was used to develop plans for sampling environmental media and PSM at the CAS components. A judgmental sampling design has been developed for CAU 566 due to the presence and significance of biasing factors.

Field-survey techniques may be used to select appropriate sampling locations by providing semiquantitative data. The following field-survey methods and biasing factors may be used to select biased sample locations at CAU 566:

- Walkover surface area radiological surveys: A radiological survey instrument will be used to detect elevated radioactivity of soil, surfaces, piping, and various other materials.
- Stains: Any discolored soil, building, material, or other surfaces.

- Drums, containers, equipment, or debris: Materials that may have been used at, or added to, a location, and that may have contained, or come in contact with, hazardous or radioactive substances at some point during their use.

- Preselected areas based on process knowledge of the site: Locations for which evidence, such as historical photographs, experience from previous investigations, or interviewee's input, exists that a release of hazardous or radioactive substances may have occurred.

- 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.

- Experience and data from investigations of similar sites.

- Other biasing factors: Factors not previously defined for the CAI, but become evident once the investigation of the site is under way.

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

B.4.2.2 Analytical Methods

Analytical methods are available to provide the data needed to resolve the decision statements. The analytical methods and laboratory requirements (e.g., detection limits, precision, and accuracy) are provided in Tables 3-3 and 3-4.

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

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

B.5.1 Target Populations of Interest

The population of interest to resolve Decision I ("Is any COC present in environmental media within the CAS?") is any location within the site that is contaminated with any contaminant above a FAL. The populations of interest to resolve Decision II ("If a COC is present, is sufficient information available to evaluate potential CAAs?") are as follows:

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

B.5.2 Spatial Boundaries

Spatial boundaries are the maximum lateral and vertical extent of expected contamination at each CAS component, as shown in Table B.5-1. Contamination found beyond these boundaries may indicate a flaw in the CSM and may require re-evaluation of the CSM before the investigation could continue. Each CAS component is considered geographically independent, and intrusive activities are not intended to extend into the boundaries of neighboring CASs or CAS components, or existing URs from previously investigated CAUs.

B.5.3 Practical Constraints

Practical constraints, such as military activities, utilities, threatened or endangered animals and plants, unstable or steep terrain, and/or access restrictions, may affect the ability to investigate this site. The practical constraints associated with the CAI are summarized in Table B.5-2.

Table B.5-1
Spatial Boundaries of CAU 566 CAS Components

CAS ID	CAS Name or Component	Lateral Spatial Boundary	Vertical Spatial Boundaries
25-99-20	Locomotives/railcars	25 ft beyond perimeter of stained soil	15 ft bgs
	Debris piles	25 ft beyond perimeter of debris item	15 ft bgs
	Storm drain	15 ft beyond perimeter of catch basin, 200 ft downgradient of outfall pipe	15 ft below bottom of catch basin and associated piping, 15 ft bgs at outfall
	Metallurgy Lab drains	25 ft beyond associated piping	15 ft bgs
	Casks/drywells	15 ft beyond perimeter of casks/drywells	15 ft below bottom of casks/drywells
	Substations	25 ft beyond perimeter of transformer pad	15 ft bgs

Table B.5-2
Practical Constraints for the CAU 566 Field Investigation

CAS/Component	Practical Constraints
All CAS Components	Military exercises; excavation access due to underground utilities; other access issues due to aboveground structures, limited working spaces, etc.
25-99-20 Locomotives/railcars	Railroad ties/bedding may present excavation difficulties. Locomotives and railcars may need to be relocated in order to access sampling locations or conduct remediation activities.
25-99-20 Metallurgy Lab drains	Presence of trailer may limit access to sampling surface and shallow subsurface soils beneath the trailer.
25-99-20 Casks/drywells	Locomotives and railcars will need to be relocated in order to access the four drywells located in the west railroad tracks.

B.5.4 Define the Sampling Units

The scale of decision making in Decision I is defined as the CAS component. This allows for releases associated with the individual components of CAS 25-99-20 to be closed independent of each other. Any COC detected at any location within the CAS (or CAS component) will cause the determination that the CAS (or CAS component) 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 (or CAS component). Resolution of Decision II requires this contiguous area to be bounded laterally and vertically.

B.6.0 Step 5 - Develop the Analytic Approach

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

B.6.1 Population Parameters

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

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

B.6.2 Action Levels

The PALs presented in this section are to be used for site-screening purposes. They are not necessarily intended to be used as cleanup action levels or FALs. However, they are useful in screening out contaminants that are not present in sufficient concentrations to warrant further evaluation and, therefore, streamline the consideration of remedial alternatives. The RBCA process used to establish FALs is described in the *Industrial Sites Project Establishment of Final Action Levels* (NNSA/NSO, 2006). This process conforms with NAC Section 445A.227, which lists the requirements for sites with soil contamination (NAC, 2008a). For the evaluation of corrective actions, NAC Section 445A.22705 (NAC, 2008b) requires the use of ASTM Method E1739 (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 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 petroleum hydrocarbon concentrations will not be used for risk-based decisions under Tier 2 or Tier 3. Rather, the individual chemicals of concern will be compared to the SSTLs.

- Tier 3 evaluation - conducted by calculating Tier 3 SSTLs on the basis of more sophisticated risk analyses using methodologies described in Method E1739 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.

B.6.2.1 Chemical PALs

Except as noted herein, the chemical PALs are defined as the EPA Region 9 Superfund preliminary RSLs for chemical contaminants in industrial soils (EPA, 2009). Background concentrations for RCRA metals and zinc will be used instead of RSLs when natural background concentrations exceed the RSL, as is often the case with arsenic on the NTS. Background is considered the mean plus two standard deviations of the mean 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 RSLs, the protocol used by the EPA Region 9 in establishing RSLs (or similar) will be used to establish PALs (EPA, 2009). If used, this process will be documented in the CR.

B.6.2.2 Total Petroleum Hydrocarbon PALs

The PAL for TPH is 100 mg/kg as listed in NAC 445A.2272 (NAC, 2008c).

B.6.2.3 Radionuclide PALs

The PALs for radiological 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 (Murphy, 2004) and the generic guidelines for residual concentration of radionuclides in DOE Order 5400.5 (DOE, 1993). These PALs are based on the construction, commercial, and industrial land-use scenario provided in the guidance and are appropriate for the NTS based on future land use scenarios as presented in Section B.2.2.6.

B.6.3 Decision Rules

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

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

The decision rules for Decision I are:

- If the population parameter of any COPC in the Decision I population of interest (defined in Section B.5.1) exceeds the corresponding FAL, then that contaminant is identified as a COC, the contaminated material will be removed, or Decision II samples will be collected until an estimate of the extent of contaminated material has been made.

- If no COC associated with a release from the CAS is detected, then further assessment of the CAS is not required, and the CAA of no further action will be selected. If a COC associated with a release from the CAS is detected, then additional sampling will be conducted to determine the extent of COC contamination. If the extent of the contamination is defined, then clean close the site by removing the contaminated media until all contamination has been removed. If the extent of contamination has been determined and remediation cannot be completed during the SAFER, then a hold point will have been reached and NDEP will be consulted to determine whether the remaining contamination will be closed under the alternative corrective action of closure in place.

- If a waste is present that, if released, has the potential to cause the future contamination of site environmental media, then a corrective action will be determined, else no further action will be necessary.

The decision rules for Decision II are:

- If the population parameter (the observed concentration of any COC) in the Decision II population of interest (defined in Section B.5.1) exceeds the corresponding FAL, then additional samples will be collected to complete the Decision II evaluation. If sufficient information is available to define the extent of COC contamination and confirm that closure objectives were met, then further assessment of the CAS is not required. If sufficient information is not available to define the extent of contamination or confirm that closure objectives were met, then additional samples will be collected until the extent is defined.

- If valid analytical results are available for the waste characterization samples defined in Section B.8.0, then the decision will be that sufficient information exists to characterize the IDW for disposal and determine potential remediation waste types, else collect additional waste characterization samples.

B.7.0 Step 6 - Specify Performance or Acceptance Criteria

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

B.7.1 Decision Hypotheses

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

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

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

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

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

- Developing and achieving concurrence of CSMs (based on process knowledge) by stakeholder participants during the DQO process.
- Conducting validity testing of CSMs based on investigation results.
- Evaluating data quality based on DQI parameters.

B.7.2 False Negative Decision Error

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

B.7.2.1 False Negative Decision Error for Judgmental Sampling

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

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

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

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

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

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

To satisfy the second criterion, Decision I samples will be analyzed for the chemical and radiological parameters listed in Section 3.2. Decision II samples will be analyzed only for those chemical and radiological parameters that were identified as 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, 2002) and in Section 7.2 of this 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 QC sample results are not within the established control limits for precision and accuracy. Data qualified as estimated for reasons of precision or accuracy may be considered to meet the constituent performance criteria based on an assessment of the data. The DQI for completeness will be assessed to ensure that all data needs identified in the DQO have been met. The DQI of comparability will be assessed to ensure that all analytical methods used are equivalent to standard EPA methods so that results will be comparable to regulatory action levels that have been established using those procedures. Strict adherence to established procedures and QA/QC protocol protects against false negatives. Site-specific DQIs are discussed in more detail in Section 7.2 of this SAFER Plan.

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

- Field duplicates (1 per 20 environmental samples)
- Laboratory QC samples (1 per 20 environmental samples)

B.7.3 False Positive Decision Error

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

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 in accordance with established and approved procedures, and only clean sample containers will be used. To determine whether a false positive analytical result may have occurred, the following QC samples will be collected as required by the Industrial Sites QAPP (NNSA/NV, 2002):

- Trip blanks (1 per sample cooler containing VOC environmental samples)
- Equipment blanks (1 per sampling event for each type of decontamination method)
- Source blanks (1 per uncharacterized lot of source water)
- Field blanks (minimum of 1 per CAS, additional if field conditions change)

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

Step 7 of the DQO process selects and documents a design that will yield data that will best achieve performance or acceptance criteria. Judgmental sampling schemes will be implemented to select sample locations and evaluate analytical results for CAU 566. Sections B.8.1 and B.8.2 contain general information about collecting Decision I and Decision II samples under a judgmental sampling design, while the subsequent sections provide sampling activities, including proposed sample locations.

B.8.1 Decision I Sampling

A judgmental sampling design will be implemented for CAU 566. Because individual sample results, rather than an average concentration, will be used to compare to the FALs, statistical methods to generate site characteristics will not be used. Adequate representativeness of the entire target population may not be a requirement to developing a sampling design. If good prior information is available on the target site of interest, then the sampling may be designed to collect samples only from areas known to have the highest concentration levels on the target site. If the observed concentrations from these samples are below the action level, then a decision can be made that the site contains safe levels of the contaminant without the samples being truly representative of the entire area (EPA, 2006).

All sample locations will be selected to satisfy the DQI of representativeness in that samples collected from selected locations will best represent the populations of interest as defined in Section B.5.1. To meet this criterion for judgmentally sampled sites, a biased sampling strategy will be used for Decision I samples to target areas with the highest potential for contamination, if it is present anywhere in the CAS. Sample locations will be determined based on process knowledge, previously acquired data, or the field-survey methods and biasing factors listed in Section B.4.2.1. If biasing factors are present in soils below locations where Decision I samples were removed, additional Decision I soil samples will be collected at depth intervals selected by the Site Supervisor based on biasing factors to a depth where the biasing factors are no longer present. The Site Supervisor has the discretion to modify the judgmental sample locations, but only if the modified locations meet the decision needs and criteria stipulated in this DQO.

B.8.2 Decision II Sampling

To meet the DQI of representativeness for Decision II samples (that Decision II sample locations represent the population of interest as defined in Section B.5.1), judgmental sampling locations at each CAS component will be selected based on the outer boundary sample locations where COCs were detected, the CSM, and other field-survey methods and biasing factors listed in Section B.4.2.1. In general, sample locations will be arranged in a triangular pattern around the Decision I location or area at distances based on site conditions, process knowledge, and biasing factors. If COCs extend beyond the initial step-outs, Decision II samples will be collected from incremental step-outs. Initial step-outs will be at least as deep as the vertical extent of contamination defined at the Decision I location, and the depth of the incremental step-outs will be based on the deepest contamination observed at all locations. A clean sample (i.e., COCs less than FALs) collected from each step-out direction (lateral or vertical) will define the extent of contamination in that direction. The number, location, and spacing of step-outs may be modified by the Site Supervisor, as warranted by site conditions.

B.8.3 CAS 25-99-20, EMAD Compound

This section discusses the specific sampling design for CAS 25-99-20, EMAD Compound. Corrective Action Site 25-99-20 consists of the following CAS components:

- Metallurgy Lab trailer drain system
- Storm drain system
- Leaking locomotives and railcars
- Debris piles
- Storage casks and drywells
- Electrical power substations

Any other potential releases identified during the field investigation that are associated with EMAD Compound operations and support activities will be included in the scope of the CAI. Figures showing the planned Decision I sample locations, where applicable, are located in the subsections that follow.

B.8.3.1 Metallurgy Lab Drain System Component of CAS 25-99-20

This CAS component consists of the potential releases to soil associated with a drain system that serviced the Metallurgy Lab trailer that supported activities at the E-MAD Facility (Figure 2-1). Each of the three drains consists of a galvanized steel pipe connected to 4-in. cast-iron pipes using lead and oakum fittings (approximately 20 joints). Some scrap pipes are currently on the ground beside the trailer. During a 2009 walkover survey, the pipes and fittings were determined to contain elevated radioactivity and were subsequently labeled "Caution Radioactive Material."

Figure B.8-1 shows a photograph of the Metallurgy Lab trailer with the proposed sampling locations for the drain system. The following is the Decision I sampling strategy:

- Surface soil samples will be collected at each end of the pipes that have previously been cut off at the ground surface and sealed to account for any releases that may have occurred during piping cutting operations.
- The contents, if any, of drains will be sampled provided there is sufficient volume. Drains may be accessed at joint or elbow locations.
- Surface soil samples will be collected directly below locations where each of three drains connects to the trailer floor to account for any leaks at these connections.
- Additional surface soil samples may be collected based on radiological surveys and other biasing factors identified (e.g., stained soil, pipe breaches).
- Subsurface soil samples may be collected beneath Decision I locations to obtain potential Decision II information.

B.8.3.2 Storm Drain System Component of CAS 25-99-20

This CAS component consists of the potential releases associated with a storm drain system that receives surface water runoff on the south side of Building 3900. The system consists of a single catch basin with an 18-in. corrugated metal pipe outflow that drains the catch basin to an outfall area located approximately 150 ft outside of the perimeter fence (Figure 2-2). A 3-in. copper cooling tower overflow drain and a separate 4-in. transite clear-water drain both flow to the catch basin. The catch basin is concrete with a metal grate cover and is partially filled with sediment and vegetation

Proposed Sample Location

Figure B.8-1
Proposed Decision I Sampling Locations at Metallurgy Lab Drains

UNCONTROLLED When Printed

debris. A small erosional channel has formed at the outfall area and is mostly filled with sediment and vegetation.

Figure B.8-2 shows a conceptual sketch of the storm drain system with the proposed sampling locations. The following is the Decision I sampling strategy:

- Collect a minimum of one sample at the surface of the catch basin contents and one sample of the contents at the interface with the bottom of the catch basin.
- Collect additional samples from each phase change of the contents within the catch basin, or based on other biasing factors (e.g., debris, staining).
- Collect one surface soil sample adjacent to the outfall pipe where the effluent from the catch basin is released.
- Collect one surface soil sample from the first downgradient sediment accumulation area where effluent from the outfall naturally pools.
- Additional surface soil samples may be collected based on radiological surveys and other biasing factors identified (e.g., stained soil, elevated radioactivity, debris).

Subsurface soil samples may be collected beneath Decision I locations to obtain potential Decision II information.

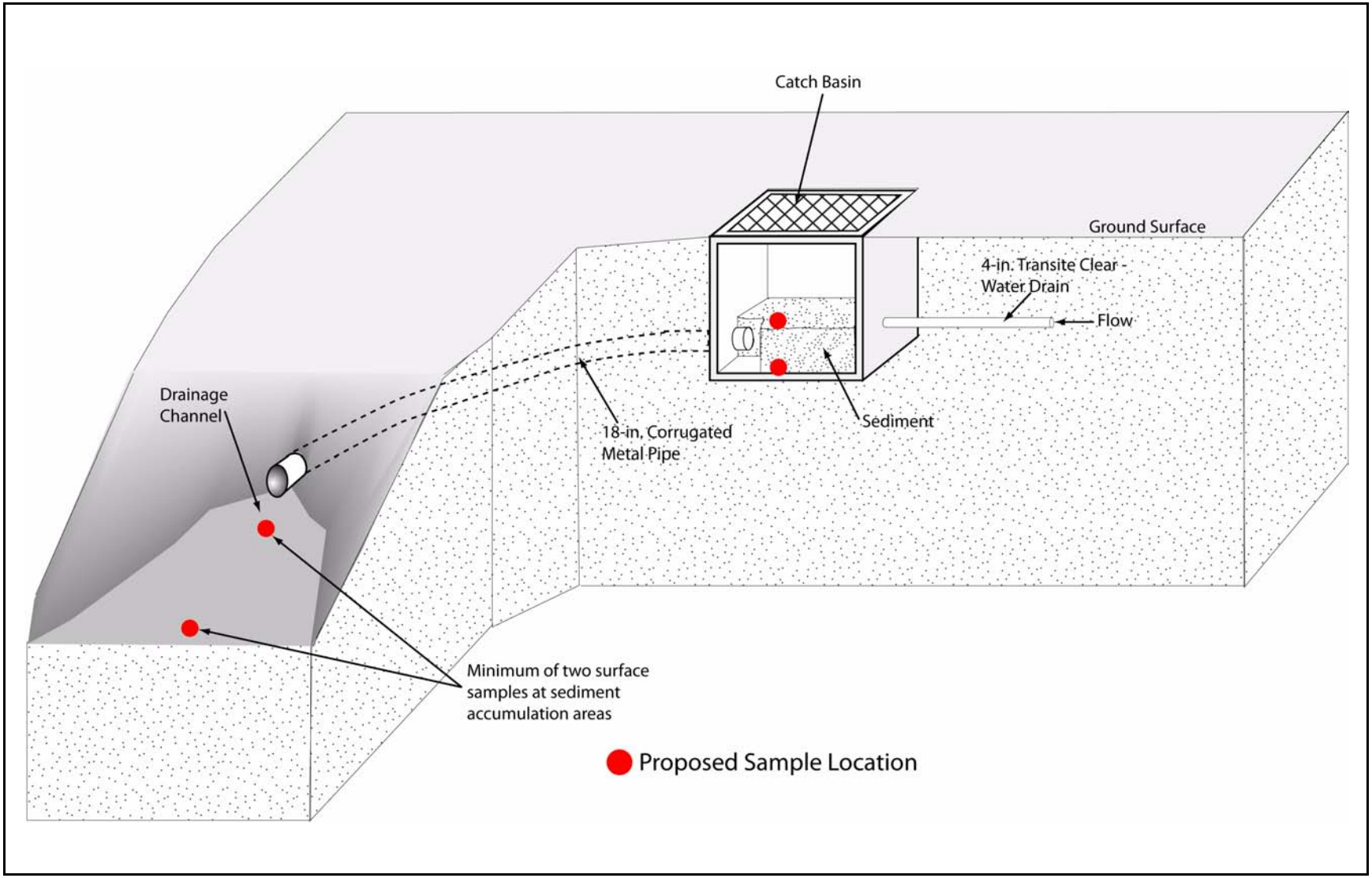


Figure B.8-2
Proposed Decision I Sampling Locations for the Storm Drain System

B.8.3.3 Locomotives and Railcars Component of CAS 25-99-20

This CAS component consists of the releases to soil from leaking locomotives and railcars located on the railroad tracks adjacent to Building 3900 (Figure 2-3). There are currently two 120-ton diesel-electric locomotives, a manned control car (shielded diesel-electric locomotive) connected to an EIV car, a small diesel-electric locomotive/shuttle, and a cable spool car with an attached utility flat car. The small locomotive/shuttle, cable car, and utility flat cars are posted "Caution Radioactive Material." Several areas of heavily stained soil have been identified under the fuel tanks from each of the two locomotives and the railcar with the cable takeup reel. The locomotives and railcars are expected to have remaining fuel, hydraulic and lubricating oils, and potentially other fluids that will be drained and sampled, as necessary, as part of the CAI. Other hazardous materials including lead-acid batteries, light bulbs, and CO_2 tanks have been identified on the locomotives.

Draining liquids from equipment will involve a visual inspection of the equipment as well as a review of engineering drawings in an effort to identify all tanks or reservoirs that may contain liquids or lubricants. This may involve using the skill and experience of various types of engineers and skilled labor personnel to provide a complete evaluation and identification of all potential locations.

Figure B.8-3 shows a photograph of the locomotives and adjacent cable railcar with proposed sampling locations of the stained soil. The following is the Decision I sampling strategy:

- Collect a minimum of one surface soil sample at each distinct area of stained soil.
- Additional surface soil samples may be collected based on radiological surveys and other biasing factors identified.
- Subsurface soil samples may be collected beneath Decision I locations to obtain potential Decision II information.

B.8.3.4 Substations Component of CAS 25-99-20

This CAS component consists of the potential releases to soil adjacent to two power substations within the fenced perimeter of the E-MAD Facility (Figure 2-4). One substation is located beside the water tower on the southeast side of Building 3900, and the other is located on the southwest side of

Proposed Sample Location

Figure B.8-3
Proposed Decision I Sampling Locations at Railcars (top) and Locomotive (bottom)

Building 3900. The current transformers are labeled "non PCB"; however, it is unknown whether any PCB-containing transformers previously serviced the substations.

Figure B.8-4 shows a photograph of the substations with proposed sampling locations. The following is the Decision I sampling strategy:

- Collect a minimum of one surface soil sample at the middle edge of each side of each transformer concrete pad, where soil is present.
- Additional surface soil samples may be collected based on radiological surveys and other biasing factors identified.
- Subsurface soil samples may be collected beneath Decision I locations to obtain potential Decision II information.

B.8.3.5 Storage Casks and Drywells Component of CAS 25-99-20

This CAS component consists of the potential releases from two aboveground dry fuel storage casks adjacent to the west side of Building 3900 and four underground drywells that are located between the railroad tracks on the west side of Building 3900 (Figure 2-5). The configuration of each aboveground cask is a reinforced concrete cylindrical structure, 104 in. in diameter and 252 in. high. Embedded in the structure is a carbon-steel liner with a 36 in. diameter by 13-in.-thick steel and concrete shield welded to the lower end of the liner. Below the bolted cover is an approximate 3-ft-thick concrete-filled shield plug. Each cask has four lifting trunnions. It has been reported that only the storage cask with numerical markings on the outside was used and that all fuel canisters have been removed. The configuration of each of the drywells consists of a steel liner grouted into a 26-in. diameter hole approximately 23 ft deep. The lower section of the liner is 18-in. carbon-steel pipe and the upper section consists of a 52-in. length of 22-in. diameter carbon steel pipe. Below the bolted cover of the drywell is an approximate 3-ft-thick concrete shield plug. An 84-in. square by 27-in. thick concrete shield pad surrounds each drywell liner at the ground surface. Currently, the 120-ton locomotives are located on the tracks directly above the four drywells and will need to be relocated for access and inspection. Access to the casks and drywells will also require the concrete shield plugs to be removed using heavy equipment operations (DOE/NV, 1983).

Decision I surface and subsurface soil samples may be collected if there is evidence of a release from these structures; however, based on their design, breaches and releases are not anticipated. The

Figure B.8-4
Proposed Decision I Sampling Locations at Substations of Building 3900

UNCONTROLLED When Printed

interior of each cask and drywell will be visually inspected and surveyed for radiological contamination. Contents (if any) may be sampled to determine whether materials meet PSM criteria.

B.8.3.6 Debris Piles Component of CAS 25-99-20

This CAS component consists of the potential releases to soil associated with all remaining construction materials and debris piles located inside and in the immediate area outside the E-MAD Facility perimeter fence. One notable debris pile consisting of mostly wood and some scrap metal is located just outside the perimeter fence on the southwest side of the facility (Figure 2-6). Debris piles like this may include items such as lighting fixtures, piles of wood, and scrap metal. Any remaining debris will be inspected for PSM, underlying soil staining, and other signs of contamination.

For this CAS component, the number and locations of Decision I environmental samples to be collected will be based on radiological surveys and visual inspections of the debris and surrounding soil. Surface (0 to 0.5 ft bgs) and shallow subsurface soil samples will be collected where biasing factors are identified. Subsurface samples may be collected beneath Decision I locations to obtain potential Decision II information.

B.9.0 References

ARL/SORD, see Air Resources Laboratory/Special Operations and Research Division.

ASTM, see American Society for Testing and Materials.

Air Resources Laboratory/Special Operations and Research Division. 2009. *NTS Climatological Rain Gauge Data.* As accessed at http://www.sord.nv.doe.gov/home_climate_rain.htm on 4 May.

American Society for Testing and Materials. 1995 (reapproved 2002). *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites,* ASTM E1739 - 95(2002). Philadelphia, PA.

DOE, see U.S. Department of Energy.

DOE/NV, see U.S. Department of Energy, Nevada Operations Office.

DRI, see Desert Research Institute.

Desert Research Institute. 1996. *A Historical Evaluation of the Engine Maintenance Assembly and Disassembly Facility, Area 25, Nevada Test Site, Nye County, Nevada,* SR082696-1. Prepared by C.M. Beck, H. Drollinger, R. Jones, D. Winslow, and N.G. Goldenberg. Las Vegas, NV.

EPA, see U.S. Environmental Protection Agency.

Moore, J., Science Applications International Corporation. 1999. Memorandum to M Todd (SAIC) titled "Background Concentrations for NTS and TTR Soil Samples," 3 February. Las Vegas, NV: IT Corporation.

Murphy, T., Bureau of Federal Facilities. 2004. Letter to R. Bangerter (NNSA/NSO) titled "Review of Industrial Sites Project Document *Guidance for Calculating Industrial Sites Project Remediation Goals for Radionuclides in Soil Using the Residual Radiation (RESRAD) Computer Code*." 19 November. Las Vegas, NV.

NAC, see *Nevada Administrative Code.*

NBMG, see Nevada Bureau of Mines and Geology.

NCRP, see National Council on Radiation Protection and Measurements.

NNSA/NSO, see U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office.

NNSA/NV, see U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office.

National Council on Radiation Protection and Measurements. 1999. *Recommended Screening Limits for Contaminated Surface Soil and Review of Factors Relevant to Site-Specific Studies*, NCRP Report No. 129. Bethesda, MD.

Nevada Administrative Code. 2008a. NAC 445A.227, "Contamination of Soil: Order by Director for Corrective Action; Factors To Be Considered in Determining Whether Corrective Action Required." As accessed at http://www.leg.state.nv.us/nac on 4 May 2009.

Nevada Administrative Code. 2008b. NAC 445A.22705, "Contamination of Soil: Evaluation of Site by Owner or Operator; Review of Evaluation by Division." As accessed at http://www.leg.state.nv.us/nac on 4 May 2009.

Nevada Administrative Code. 2008c. NAC 445A.2272, "Contamination of Soil: Establishment of Action Levels." As accessed at http://www.leg.state.nv.us/nac on 4 May 2009.

Nevada Bureau of Mines and Geology. 1998. *Mineral and Energy Resource Assessment of the Nellis Air Force Range*, Open-File Report 98-1. Reno, NV.

SNPO, see Space Nuclear Propulsion Office.

Space Nuclear Propulsion Office. 1970. *NRDS Master Plan, 1969–1970*. Prepared by IT Corporation. Las Vegas, NV.

USGS, see U.S. Geological Survey.

USGS and DOE, see U.S. Geological Survey and U.S. Department of Energy.

U.S. Department of Energy. 1988. *Environmental Survey Preliminary Report, Nevada Test Site, Mercury, Nevada*, DOE/EH/OEV-15P. April. Washington, DC: Environmental, Safety, and Health Office of Environmental Audit.

U.S. Department of Energy. 1993. *Radiation Protection of the Public and the Environment*, DOE Order 5400.5, Change 2. Washington, DC: U.S. Government Printing Office.

U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office. 2002. *Industrial Sites Quality Assurance Project Plan, Nevada Test Site, Nevada*, Rev. 3, DOE/NV--372. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2006. *Industrial Sites Project Establishment of Final Action Levels*, DOE/NV--1107, Rev. 0. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1983. *Histories of Spent Nuclear Fuel Assemblies While at the E-MAD Facility, December 1978 Through September 1982,* U.S. DOE/NV/10250-6.

U.S. Department of Energy, Nevada Operations Office. 1992. *Remedial Investigation and Feasibility Study for the Plutonium Contaminated Soils at Nevada Test Site, Nellis Air Force Range and Tonopah Test Range*. April. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1998. *Nevada Test Site Resource Management Plan,* DOE/NV--518. Las Vegas, NV.

U.S. Environmental Protection Agency. 2002. *Guidance for Quality Assurance Project Plans,* EPA QA/G5, EPA/240/R-02/009. Washington, DC: Office of Environmental Information.

U.S. Environmental Protection Agency. 2006. *Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4),* EPA/240/B-06/001. Washington, DC: Office of Environmental Information.

U.S. Environmental Protection Agency. 2009. *Region 9: Superfund, Regional Screening Levels (Formerly PRGs) for Chemical Contaminants*. As accessed at http://www.epa.gov/region09/superfund/prg on 4 May. Prepared by EPA Office of Superfund and Oak Ridge National Laboratory.

U.S. Geological Survey. 1964. *Geology of the Jackass Flats Quadrangle, Nye County, Nevada*. Prepared by E.J. McKay and W.P. Williams.

U.S. Geological Survey and U.S. Department of Energy. 2009. "USGS/USDOE Cooperative Studies in Nevada: J-11 WW Web Page." As accessed at http://nevada.usgs.gov/doe_nv/ntsmap.htm on 4 May.

Appendix B

Confirmation Sampling Test Results

B.1.0 Introduction

This appendix presents the CAI activities and analytical results for CAU 566. Corrective Action Unit 566 is located in Area 25 of the NNSS (Figure 1-1) and comprises CAS 25-99-20, EMAD Compound.

Corrective Action Site 25-99-20 consists of the potential releases associated with the CAS components located on the exterior of Building 3900, and is associated with historical operations performed at the E-MAD Facility related to the nuclear weapons program and the national defense of the United States of America during the Cold War. The original six CAS components are as follows:

- Metallurgy Lab Drain System
- Storm Drain System
- Locomotives and Railcars
- Substations
- Storage Casks and Drywells
- Construction Debris Piles

An additional mechanism for the release of COCs to the environment was identified during the CAI. These releases have been grouped into a seventh CAS component, identified as EMAD Compound Soil Releases. The CAS component locations are shown on Figure B.1-1. See the CAU 566 SAFER Plan (NNSA/NSO, 2010b) for additional information regarding the site description and history of CAS 25-99-20.

B.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 CAS 25-99-20. This objective was achieved by determining the presence of COCs and the lateral extent of the COCs. The vertical extent of COC contamination could not be accomplished due to confined work space limitations, and proximity to overhead and underground utilities.

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 566 SAFER Plan (NNSA/NSO, 2010b) (Appendix A). The sampling strategy involved judgmental sample locations

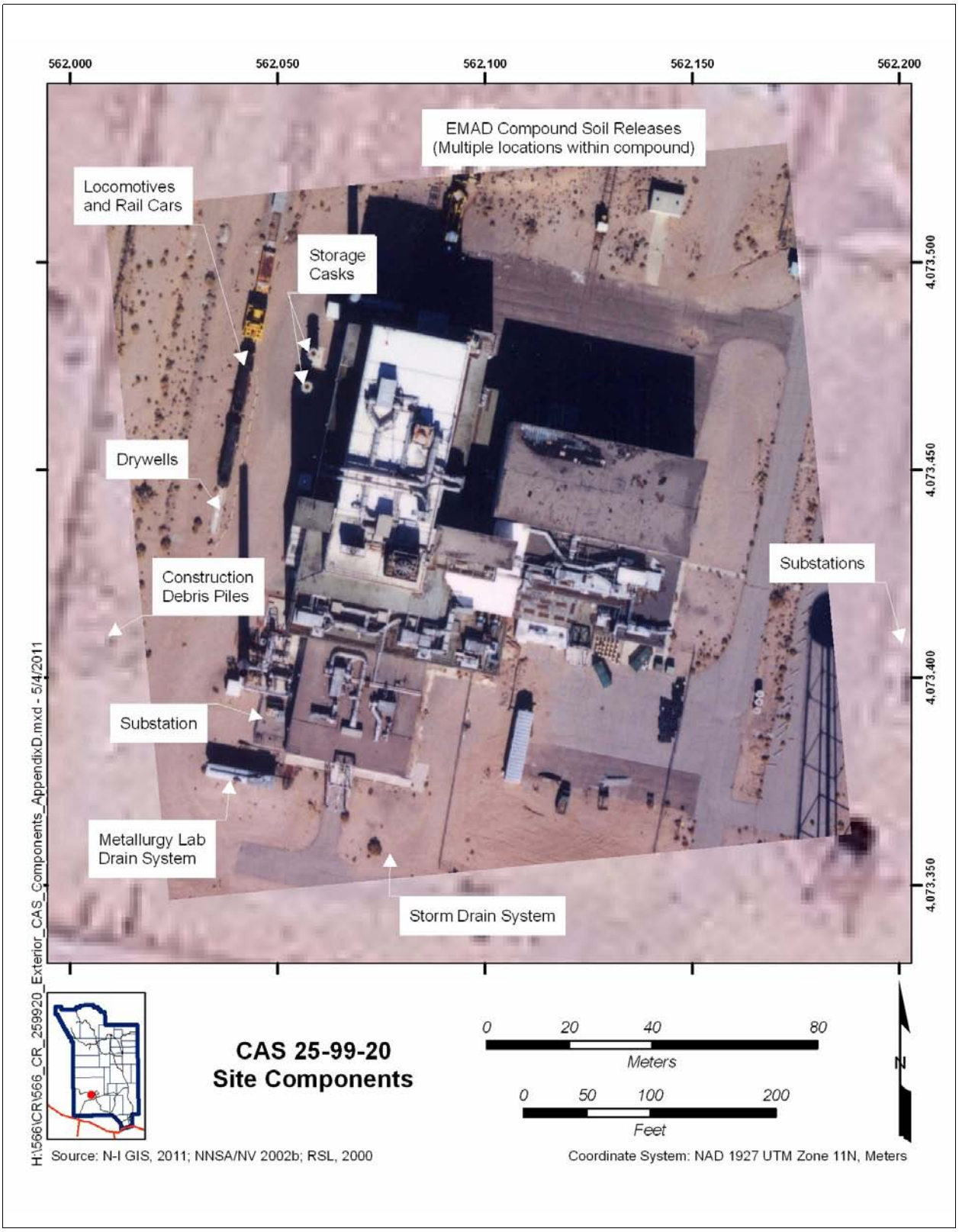


Figure B.1-1
EMAD Compound CAS Component Locations

that were chosen based on visual inspection, radiological screening, and process knowledge of the site.

B.1.2 Contents

This appendix contains information and data in sufficient detail to justify that no further corrective action is required at CAU 566. The contents of this appendix are as follows:

- Section B.1.0 describes the investigation background, objectives, and content.
- Section B.2.0 provides an investigation overview.
- Section B.3.0 provides CAS component-specific information regarding the field activities, sampling methods, and laboratory analytical results from investigation sampling.
- Section B.4.0 summarizes waste management activities.
- Section B.5.0 discusses the QA and QC procedures followed and results of the QA/QC activities.
- Section B.6.0 is a summary of the investigation results.
- Section B.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.

B.2.0 Investigation Overview

Field investigation and sampling activities for the CAU 566 CAI were conducted from October 2010 through March 2011. Table B.2-1 lists the CAI activities that were conducted at CAS 25-99-20.

Table B.2-1
Corrective Action Investigation Activities Conducted at CAS 25-99-20
To Meet SAFER Plan Requirements at CAU 566

CAI Activities	CAS 25-99-20
Conducted scanning radiological walkover surveys using a handheld detector and visual surveys to identify biased sampling locations.	X
Field screened samples for alpha and beta/gamma radiation using handheld survey instruments.	X
Performed swipe sampling for removable radioactivity using a handheld survey instrument and/or gamma scintillator.	X
Collected soil samples from biased locations to determine whether COCs are present (Decision I) and from step-out sample locations to define the extent of COCs (Decision II).	X
Collected liquid, solid, 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
Removed radiologically contaminated, lead-contaminated, and PCB-contaminated soil; and collected verification samples.	X
Removed assumed PSMs without sampling (e.g., lead shielding, mercury-containing thermostats, PCB-containing ballasts).	X
Collected samples to characterize future demolition wastes.	X
Investigated drywells and storage casks. Grouted drywells to eliminate potential future pathway to environment.	X
Collected GPS coordinates for sample locations and points of interest.	X
Performed BMPs (e.g., demolition and disposition of wood sheds, guard shack).	X
Submitted select samples for offsite laboratory analysis.	X

-- = Not applicable

The investigation and sampling program was managed in accordance with the requirements set forth in the CAU 566 SAFER Plan (NNSA/NSO, 2010b). Samples were collected and documented following approved protocols and procedures. Quality control samples (e.g., field blanks, trip blanks, and duplicate samples) were collected as required by the Industrial Sites QAPP (NNSA/NV, 2002a)

and the CAU 566 SAFER Plan (NNSA/NSO, 2010b). 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), above-average rainfall, intermittent cloudiness, and light to strong winds. Rain suspended site operations on several occasions due to the inability to monitor for alpha radiation.

Corrective Action Site 25-99-20 was investigated by conducting radiological surface screening and surveys, sampling potential contaminant sources, and sampling surface and shallow subsurface soils. Surface and shallow subsurface soil samples were collected by hand excavation. The soil samples were field screened at specific locations for alpha and beta/gamma radiation, and gamma-emitting radionuclides. The results were compared against screening levels to guide in the selection of samples to be submitted for analysis. Samples of various media (e.g., concrete, paint, liquid, sediments) were collected to support both environmental and waste characterization using dippers, teflon bailers, scoops, scabbling, and a peristaltic pump with mylar tubing.

Corrective Action Unit 566 Decision I sampling locations were accessible, and sampling activities at planned locations were not restricted. Decision II step-out sample locations for lateral extent were accessible except within the vicinity of the electrical substations and remained within anticipated spatial boundaries with the following exceptions:

- The east side of the southeast substation
- The north side of the southeast substation

Tables B.2-1 and B.2-2 provide the investigation methodology and laboratory analytical information.

B.2.1 Sample Locations

Investigation locations selected for sampling were based on existing engineering drawings, aerial and land photographs, interviews with former site employees, information obtained during site visits, and site conditions as provided in the CAU 566 SAFER Plan (NNSA/NSO, 2010b). Sampling points for each CAS component were selected based on the approach provided in the SAFER Plan. The planned biased locations are discussed in the text and represented on figures in the SAFER Plan.

Table B.2-2
Laboratory Analyses and Methods, CAU 566 Investigation Samples[a]

Analysis	Analytical Method[b]
VOCs	Aqueous/Non-aqueous - EPA SW-846[c] 8260
SVOCs	Aqueous/Non-aqueous - EPA SW-846[c] 8270
TCLP SVOC	EPA SW-846[c] 1311/8270
PCBs	Aqueous/Non-aqueous - EPA SW-846[c] 8082
TPH-DRO	Aqueous/Non-aqueous - EPA SW-846[c] 8015 Modified
Metals	Aqueous - EPA SW-846[c] 6010/6020/7470 Non-aqueous - EPA SW-846[c] 6010/6020/7471
TCLP Metals	EPA SW-846[c] 1311/6010/7470
Bulk Asbestos	NIOSH 9002[d]
Isotopic U	Aqueous/Non-aqueous - DOE EML HASL-300[e] U-02-RC
Isotopic Pu	Aqueous - DOE EML HASL-300[e] Pu-10-RC Non-aqueous - DOE EML HASL-300[e] Pu-02-RC
Gamma Spectroscopy	Aqueous - EPA 901.1[f] Non-aqueous - DOE EML HASL-300[e], Ga-01-R
Sr-90	Aqueous - EPA 905.0[f] Non-aqueous - DOE EML HASL-300[e] Sr-02-RC
Gross Alpha/Beta	Aqueous - EPA 900.0[f] Non-aqueous - SM 7110 Bi Modified
Tritium	Aqueous - EPA 906.0[f] Non-aqueous

[a]Investigation samples include both environmental and waste characterization samples and associated QC samples.
[b]The most current EPA, DOE, ASTM, NIOSH, or equivalent accepted analytical method may be used, including Laboratory Standard Operating Procedures approved by N-I in accordance with industry standards and the N-I Statement of Work requirements (NNES, 2009).
[c]*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (EPA, 2009).
[d]*NIOSH Manual of Analytical Methods (NMAM)* (NIOSH, 1994).
[e]*The Procedures Manual of the Environmental Measurements Laboratory* (DOE, 1997).
[f]*Prescribed Procedures for Measurement of Radioactivity in Drinking Water* (EPA, 1980).

Note: The term "modified" indicates modifications of approved methods. All modifications have been approved by the N-I Analytical Services Department.

ASTM = ASTM International
EERF = Eastern Environmental Radiation Facility
EML = Environmental Measurements Laboratory
EPA = U.S. Environmental Protection Agency
HASL = Health and Safety Laboratory
N-I = Navarro-Intera, LLC
NIOSH = National Institute for Occupational Safety and Health

Actual environmental sample locations are shown on the figures included in Section B.3.0. Some locations were modified slightly from planned positions due to field conditions and observations. In some cases, field-screening results (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 plotted based on visual interpretations from aerial photographs and field measurements. The majority of sample locations were surveyed with a GPS instrument. A Trimble Pathfinder ProXRSTM GPS instrument was used for determining the sample location coordinates as well as CAS points of interest.

B.2.2 Investigation Activities

The investigation activities performed at CAU 566 were based on field investigation activities discussed in the CAU 566 SAFER Plan (NNSA/NSO, 2010b). The technical approach consisted of the activities listed in Table B.2-1. The investigation strategy allowed the nature and extent of contamination associated with each CAS component to be established. The following sections describe the specific investigation activities that took place at CAU 566.

B.2.2.1 Radiological Surveys

Radiological surveys were performed at various locations within CAS 25-99-20. Radiological surveys were performed to identify the presence, the nature, and the extent of radiological contaminants at activities statistically distinguishable from background activities. 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 NTS Radiological Control Manual (NNSA/NSO, 2010a), radiological surveys were performed using an NE Technology Electra with dual-alpha and beta/gamma radiation scintillation probe.

A site walkover survey of the EMAD Compound was conducted using a TSA Systems PRM-470C handheld gamma detector in conjunction with a GPS receiver and datalogger. The walkover survey transected an approximate 665,580-ft^2 area of the EMAD Compound grounds surrounding the exterior of Building 3900 (Figure 2-1).

B.2.2.2 Field Screening

Field-screening activities for alpha and beta/gamma radiation were performed as specified in the CAU 566 SAFER Plan (NNSA/NSO, 2010b). Site-specific FSLs for alpha and beta/gamma radiation were defined as the mean background activity level plus two times the standard deviation of readings from 10 background locations selected near CAS 25-99-20. 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 component using an NE Technology Electra fitted with a dual-alpha and beta/gamma radiation scintillation probe or equivalent. The sections of this document identify where field screening was conducted and how the FSLs were used to aid in the selection of samples to submit for analysis.

B.2.2.3 Surface and Subsurface Soil Sampling

Soil samples were collected using "scoop and trowel" (surface hand-grab sampling). All sample locations were initially field screened for alpha and beta/gamma radiation before the start of sampling.

Surface soil samples were collected from 0.0 to 0.5 ft bgs at biased locations such as aboveground features (i.e., catch basins, pipe fittings), areas with stained soil, areas with elevated radiological measurements, and areas determined by process knowledge. Shallow subsurface soil samples were collected as a continuation at surface soil sample locations where analytical results indicated contamination.

B.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 and determine whether the waste in question could be acting as a source of potential contamination. Investigation methods included visual inspection, radiological surveys, and direct sampling. Waste characterization activities were intended to gather adequate information and data about each CAS component to support decisions regarding the disposal of materials.

Samples were analyzed in accordance with the CAU 566 SAFER Plan (NNSA/NSO, 2010b). The specific analyses from the waste streams generated are listed in Section B.4.0. The analytical results are compared to the federal limits for hazardous waste, landfill acceptance criteria, and the limits in the NNSS performance objective criteria (POC) (BN, 1995). The POC limits have been established for NNSS hazardous waste generators to ensure that all hazardous waste being shipped off site contains no "added radioactivity."

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

- Radiological screening and swipe samples taken from debris and other equipment, and from material that exhibited higher than background levels.
- The presumed asbestos-containing material (PACM) samples collected from pipe insulation, air-duct insulation, flooring tile, roofing materials and mastics, and other materials found on the trailers, wooden sheds, and guard shack.
- Scabbled concrete.
- Used engine fluids, diesel, and aqueous liquids from railcars and drywells.
- Other PSMs.

Asbestos sampling was conducted at CAS 25-99-20 following the EPA Asbestos Hazard Emergency Response Act protocols (CFR, 2010).

B.2.3 Laboratory Analytical Information

Chemical analyses were performed by General Engineering Laboratories, Inc., of Charleston, South Carolina. Industrial hygiene, beryllium, and asbestos samples were analyzed by ALS Laboratory Group (formerly Data Chem Laboratories) of Salt Lake City, Utah. The analytical suites and laboratory analytical methods used to analyze investigation samples are listed in Table B.2-2. Analytical results are reported in this appendix if they were detected above the MDCs. The complete laboratory data packages are available in the project files.

Validated analytical data for CAU 566 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 25-99-20 are presented in Section B.3.0. Waste sample results are provided in Section B.4.0.

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

B.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, 2006). Multiple constituent analyses are presented in Appendix E.

If COCs are present, corrective action must be considered for the CAS. The FALs for the CAU 566 investigation are defined in Appendix E. Results that are equal to or greater than FALs are identified by bold text in the CAS-specific results tables (Section B.3.0).

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

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

- Any physical waste containment (e.g., fuel/oil reservoirs, pipe, concrete vaults and walls, drums) would fail at some point, and the contents would be released to the surrounding soil.
- A waste, regardless of concentration or configuration, may be assumed to be PSM and handled under a corrective action, if appropriate.
- Based on process knowledge and/or professional judgment, a waste may be assumed to not be PSM if it is clear that it could not result in soil contamination exceeding a FAL.

- If assumptions about the waste cannot be justified, then the waste material will be sampled, and the results will be compared to FALs based on the following criteria:

  - For nonliquid wastes, the concentration of any chemical contaminant in soil (after degradation of the waste and release of contaminants into soil) would be equal to the mass of the contaminant in the waste divided by the mass of the waste (no consideration will be given to dilution into the mass of soil).

  - For nonliquid wastes, the dose resulting from radioactive contaminants in soil (after degradation of the waste and release of contaminants into soil) would be calculated using the activity of the contaminant in the waste divided by the mass of the waste (for each radioactive contaminant) and calculating the combined resulting dose using the Residual Radioactive (RESRAD) code (Murphy, 2004) (no consideration will be given to dilution into the mass of soil). Note: As an initial screening tool, if building materials are primarily externally contaminated and do not present a dose exceeding the FAL to a nearby worker in its current configuration, it will not be considered to meet PSM criteria.

  - For liquid wastes, the resulting concentration of contaminants in the surrounding soil would be calculated based on the concentration of contaminants in the wastes and the liquid-holding capacity of the soil.

B.3.0 CAS 25-99-20, EMAD Compound, Investigation Results

Corrective Action Site 25-99-20 is located Area 25 at the NNSS and consists of seven CAS components (Figure B.1-1). The specific closure activities conducted to satisfy the CAU 566 SAFER Plan (NNSA/NSO, 2010b) requirements are described in the following sections.

B.3.1 SAFER Activities

A total of 134 environmental and PSM samples (including 7 FDs) were collected during investigation activities at CAS 25-99-20. The sample IDs, locations, types, and analyses are listed in Table B.3-1. The specific CAI activities conducted to satisfy the SAFER Plan requirements at this CAS are described in the following sections.

B.3.1.1 Field Screening

Investigation samples were field screened for alpha and beta/gamma radiation. The FSRs were compared to FSLs to guide subsequent sampling decisions where appropriate. Gross alpha radiation FSLs were not exceeded. Beta/gamma radiation FSLs were exceeded in 12 samples.

B.3.1.2 Radiological Surveys

Radiological surveys of equipment and building materials were performed periodically throughout closure activities for waste segregation and disposition. Radiological surveys were conducted on the guard shack, wooden sheds, Fluid Tech trailer, Metallurgy Lab trailer, storage casks, and debris piles to characterize wastes for disposal. Accessible surfaces of the drywells, concrete storage casks, and railcars were also radiologically screened for characterization purposes. Swipe samples were also collected for identification of removable contamination. The swipe samples collected at CAS 25-99-20 showed removable contamination on several pieces of equipment (e.g., HEPA filtration system of Metallurgy Lab Trailer, mechanical press). Radiologically contaminated materials and equipment were packaged and dispositioned as LLW.

A site walkover survey of the EMAD Compound was conducted during investigation of CAS 25-99-20. The walkover survey was performed using a TSA Systems PRM 470C handheld gamma detector in conjunction with a GPS receiver and datalogger. The walkover survey transected

Table B.3-1
Samples Collected at CAS 25-99-20, EMAD Compound
(Page 1 of 9)

Sample Location	Sample Number	Depth (ft bgs)	Sample Matrix	Sample Purpose	DRO	Gamma	Gross Alpha/Beta	Hexavalent Chromium	Ignitability	Metals	PCBs	Plutonium	Strontium	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Uranium	VOCs
A01	566001	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A02	566002	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A03	566003	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A04	566004	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A05	566005	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A06	566006	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
	566007	0.0 - 0.5	Soil	FD of #566006	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A07	566008	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A08	566009	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A09	566010	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A10	566011	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A11	566012	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A12	566013	0 - 2 (in.)	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A13	566014	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A14	566015	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A15	566016	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A16	566017	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A17	566018	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A18	566019	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A19	566020	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X

Table B.3-1
Samples Collected at CAS 25-99-20, EMAD Compound
(Page 2 of 9)

Sample Location	Sample Number	Depth (ft bgs)	Sample Matrix	Sample Purpose	DRO	Gamma	Gross Alpha/Beta	Hexavalent Chromium	Ignitability	Metals	PCBs	Plutonium	Strontium	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Uranium	VOCs
A20	566021	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A21	566022	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A22	566023	N/A	Water	PSM	--	X	--	--	--	--	--	X	X	--	--	--	--	X	X	--
A23	566024	0.0 - 0.5	Soil	Environmental	--	X	--	--	--	--	X	--	--	X	--	--	--	--	X	X
A24	566025	0.0 - 0.5	Soil	Environmental	--	X	--	--	--	--	X	--	--	X	--	--	--	--	X	X
	566026	0.0 - 0.5	Soil	FD of #566025	--	--	--	--	--	--	X	--	--	X	--	--	--	--	--	X
A25	566027	0.0 - 0.5	Soil	Environmental	--	X	--	--	--	--	X	--	--	X	--	--	--	--	X	X
A26	566028	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	X	--	--	--	--	--	X
A27	566029	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	X	--	--	--	--	--	X
A28	566030	0.0 - 0.5	Soil	Environmental	--	X	--	--	--	--	X	--	--	X	--	--	--	--	X	X
A29	566031	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	X	--	--	--	--	--	X
A30	566032	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	X	--	--	--	--	--	X
A31	566033	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	X	--	--	--	--	--	X
A32	566034	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	X	--	--	--	--	--	X
A34	566035	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A35	566036	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A36	566037	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A37	566038	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A38	566039	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A39	566040	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--

Table B.3-1
Samples Collected at CAS 25-99-20, EMAD Compound
(Page 3 of 9)

Sample Location	Sample Number	Depth (ft bgs)	Sample Matrix	Sample Purpose	DRO	Gamma	Gross Alpha/Beta	Hexavalent Chromium	Ignitability	Metals	PCBs	Plutonium	Strontium	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Uranium	VOCs
A40	566041	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A41	566042	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A42	566043	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A43	566044	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A44	566045	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A45	566046	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A46	566047	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
	566048	0.0 - 0.5	Soil	FD of #566047	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A47	566049	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A48	566050	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A49	566051	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A50	566052	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A51	566053	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A52	566054	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A53	566055	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A54	566056	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A55	566057	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A56	566058	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A57	566059	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A58	566060	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--

Table B.3-1
Samples Collected at CAS 25-99-20, EMAD Compound
(Page 4 of 9)

Sample Location	Sample Number	Depth (ft bgs)	Sample Matrix	Sample Purpose	DRO	Gamma	Gross Alpha/Beta	Hexavalent Chromium	Ignitability	Metals	PCBs	Plutonium	Strontium	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Uranium	VOCs
A59	566061	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A60	566062	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A61	566063	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A62	566064	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
	566065	0.0 - 0.5	Soil	FD of #566064	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A63	566066	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A64	566067	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A65	566068	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A66	566069	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A67	566070	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A22-1	566071	0.0 - 1.0	Soil	Environmental	--	X	--	--	--	--	--	X	X	--	--	--	--	--	X	--
A68	566072	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A69	566073	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A70	566074	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A71	566075	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A72	566076	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A73	566077	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A74	566078	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A75	566079	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A76	566080	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--

Table B.3-1
Samples Collected at CAS 25-99-20, EMAD Compound
(Page 5 of 9)

Sample Location	Sample Number	Depth (ft bgs)	Sample Matrix	Sample Purpose	DRO	Gamma	Gross Alpha/Beta	Hexavalent Chromium	Ignitability	Metals	PCBs	Plutonium	Strontium	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Uranium	VOCs
A77	566081	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A78	566082	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A79	566083	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A80	566084	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A81	566085	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A82	566086	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A83	566087	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A84	566088	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A85	566089	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A86	566090	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
	566091	0.0 - 0.5	Soil	FD of #566090	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A87	566092	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A88	566093	0.0 - 0.5	Soil	Environmental	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
A89	566094	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A90	566095	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A91	566096	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A92	566097	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A93	566098	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A94	566099	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A95	566100	1.0 - 1.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--

Table B.3-1
Samples Collected at CAS 25-99-20, EMAD Compound
(Page 6 of 9)

Sample Location	Sample Number	Depth (ft bgs)	Sample Matrix	Sample Purpose	DRO	Gamma	Gross Alpha/Beta	Hexavalent Chromium	Ignitability	Metals	PCBs	Plutonium	Strontium	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Uranium	VOCs
A96	566101	0.0 - 1.0	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A97	566102	1.0 - 1.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A98	566103	0.0 - 1.0	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A99	566104	1.0 - 1.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A100	566105	0.0 - 1.0	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A101	566106	1.0 - 1.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
	566107	1.0 - 1.5	Soil	FD of #566106	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A102	566108	0.0 - 1.0	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A103	566109	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A104	566110	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A105	566111	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A106	566112	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A107	566113	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A108	566114	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A109	566115	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A110	566116	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A111	566117	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A113	566118	1.5 - 2.0	Soil	Environmental	--	X	--	--	--	--	--	X	X	--	--	--	--	--	X	--
A114	566119	1.0 - 1.5	Soil	Environmental	--	X	--	--	--	--	--	X	X	--	--	--	--	--	X	--
A115	566120	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--

Table B.3-1
Samples Collected at CAS 25-99-20, EMAD Compound
(Page 7 of 9)

Sample Location	Sample Number	Depth (ft bgs)	Sample Matrix	Sample Purpose	DRO	Gamma	Gross Alpha/Beta	Hexavalent Chromium	Ignitability	Metals	PCBs	Plutonium	Strontium	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Uranium	VOCs
A116	566121	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
	566122	0.0 - 0.5	Soil	FD of #566121	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A117	566123	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A118	566124	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A119	566125	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A120	566126	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A121	566127	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
A122	566128	0.0 - 0.5	Soil	Environmental	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
N/A	566301	N/A	Water	Trip Blank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	X
N/A	566302	N/A	Water	Trip Blank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	X
N/A	566303	N/A	Water	Trip Blank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	X
N/A	566304	N/A	Water	Trip Blank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	X
N/A	566305	N/A	Water	Trip Blank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	X
N/A	566306	N/A	Water	Trip Blank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	X
N/A	566307	N/A	Water	Field Blank	X	X	--	X	--	X	X	X	X	X	--	--	--	--	X	X
N/A	566308	N/A	Water	Trip Blank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	X
N/A	566309	N/A	Water	Trip Blank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	X
N/A	566310	N/A	Water	Trip Blank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	X
Wood Debris Pile	566501	N/A	Solid	Waste Management	--	X	--	--	--	--	--	--	--	--	X	X	--	--	--	--

Table B.3-1
Samples Collected at CAS 25-99-20, EMAD Compound
(Page 8 of 9)

Sample Location	Sample Number	Depth (ft bgs)	Sample Matrix	Sample Purpose	DRO	Gamma	Gross Alpha/Beta	Hexavalent Chromium	Ignitability	Metals	PCBs	Plutonium	Strontium	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Uranium	VOCs
Roofing Debris	566502	N/A	Solid	Waste Management	--	X	--	--	--	--	--	--	--	--	X	X	X	--	--	--
Guard Shack Paint Chips	566503	N/A	Solid	Waste Management	--	--	--	--	--	--	--	--	--	--	X	--	--	--	--	--
Wooden Shack Paint Chips	566504	N/A	Solid	Waste Management	--	--	--	--	--	--	--	--	--	--	X	--	--	--	--	--
SW Substation Scabbled Concrete	566505	N/A	Solid	Waste Management	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
	566506	N/A	Solid	Waste Management	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
SE Substation Scabbled Concrete	566507	N/A	Solid	Waste Management	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
	566508	N/A	Solid	Waste Management	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
SW Transformer	566509	N/A	Wipe	Waste Management	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
Container No. 566004	566510	N/A	Soil	Waste Management	--	X	--	--	--	--	--	X	X	--	X	--	--	--	X	--
Container Nos. 566008 through 566011	566511	N/A	Liquid	PSM	--	X	X	--	--	X	X	--	--	--	--	--	--	X	X	--
Container No. 566005	566512	N/A	Oil	PSM	--	X	--	--	--	X	X	--	--	--	--	--	--	--	X	--

Table B.3-1
Samples Collected at CAS 25-99-20, EMAD Compound
(Page 9 of 9)

Sample Location	Sample Number	Depth (ft bgs)	Sample Matrix	Sample Purpose	DRO	Gamma	Gross Alpha/Beta	Hexavalent Chromium	Ignitability	Metals	PCBs	Plutonium	Strontium	SVOCs	TCLP Metals	TCLP SVOCs	TCLP VOCs	Tritium	Uranium	VOCs
MCC Antifreeze	566513	N/A	Oil	PSM	--	X	--	--	--	X	X	--	--	--	--	--	--	--	X	--
MCC Engine Oil	566514	N/A	Oil	PSM	--	X	--	--	--	X	X	--	--	--	--	--	--	--	X	--
MCC Diesel	566515	N/A	Oil	PSM	--	X	--	--	X	X	X	--	--	--	--	--	--	--	X	--
MCC/EIV Gear Oil	566516	N/A	Oil	PSM	--	X	--	--	--	X	X	--	--	--	--	--	--	--	X	--
Container Nos. 566037 and 566038	566517	0.0 - 0.5	Soil	Waste Management	--	X	--	X	--	X	--	X	X	--	--	--	--	--	X	--

-- = Not required

an approximate 665,580-ft^2 area of the EMAD Compound grounds surrounding the exterior of Building 3900, and within the perimeter fence line. In order to complete the survey, a grid system was established near the building and other structures due to interference with GPS reception. The survey area is shown on Figure 2-1. All readings, except at two locations, were indistinguishable from background. Results indicated the following:

- Alpha and beta/gamma readings of 40 to 48 disintegrations per minute per 100 square centimeters (dpm/100 cm^2) alpha and 1.2 to 2.0 million dpm/100 cm^2 beta/gamma were identified in surface soil adjacent to the railroad tracks near the former railcar decontamination pad, located approximately 100 ft north of Building 3900. As a result of this survey, approximately 15 ft^3 of radiologically contaminated soil was excavated and removed. The soil was containerized and dispositioned as LLW. Analytical results from the verification samples confirmed that remaining soil did not exceed FALs. The area was backfilled with native soil.

- Elevated radiological readings were identified at two co-located soil areas of elevated radioactivity, approximately 1 ft^2 each, within an approximate 4-ft^2 area near the southwest corner of the Metallurgy Lab trailer. Approximately 1.5 ft^3 of soil was containerized and dispositioned as LLW. Analytical results from the verification samples confirmed that remaining soil did not exceed FALs.

B.3.1.3 Visual Inspections

Visual inspections were conducted at all CAS components. The CAS components—including wooden sheds, the guard shack, casks and drywells, railcars, trailers, and debris piles—were inspected for PSM such as lead shielding, electrical components, PCB-containing ballasts, and mercury-containing switches. The PSM was segregated and dispositioned accordingly.

The concrete casks were determined to be free of any PSM. Although one of the drywells was determined to contain incidental rainwater, and another had been filled with soil, analytical results of the liquid and the soil indicated neither the water nor the soil to be a PSM. Visual inspection of the locomotives and railcars identified lead shielding, lead bricks and other instrumentation, lighting, and electrical components potentially containing lead, silver solder, and potentially other metals in *de minimis* quantities. Because the railcars (MCC/EIV) are historically significant, these items will remain in place. The MCC and EIV railcars will be inspected as part of the post-closure monitoring plan implemented with the site UR.

Visual survey of the site also identified an area on the south side of Building 3900 near the loading dock (Figure 2-20) with lead shot scattered into the surface soil. Elevated radiological readings were identified after the visual survey. Approximately 90 ft^3 of contaminated soil and lead shot was excavated and containerized. The soil was dispositioned as MLLW.

B.3.1.4 Sample Collection

Environmental sampling activities included collecting surface and subsurface soil samples at each CAS component, including the following:

- 3 locations (A10 through A12) from the concrete catch basin and the outfall area of the storm drain
- 1 location in soil within one drywell (A22-1), and 1 sample of water within one drywell
- 7 locations (A15 through A21) at the Metallurgy Lab trailer drain system
- 71 locations from soil adjacent to transformers at the Substations; of the 71 locations for the substations, 34 were located at or near the southwest substation (A23 through A28, A34 through A47, A72 through A76, and A94 through A102), and 37 were located at the southeast substation (A29 through A32, A48 through A67, A77 through A86, A89, A92, and A93)
- 4 locations in areas of stained soil adjacent to railcars and locomotives (A01 through A04)
- 15 locations at debris piles (A05 through A09, A13, A14, A68 through A71, A87, A88, A113, and A114)
- 19 locations (A90, A91, A103 through A111, and A115 through A122) for the EMAD Compound Soil Releases CAS component

Sample locations A10 through A12 were collected to characterize the soil collected in the storm drain catch basin and at the drain outlet located approximately 100 ft outside the EMAD Compound perimeter fence on the south side of Building 3900. Sample numbers 566011 and 566012 were collected from sediments at the outlet of the storm drain. Sample 566013 was collected from the sediment accumulated at the bottom of the catch basin. See Figure B.3-1 for sample locations.

During investigation of the drywells, one of the drywells was found to contain water. The source of the water is unknown; however, it is assumed to be from infiltrating rainwater. Analytical results of the liquid at sample location A22 determined the liquid to not be PSM. A second drywell was

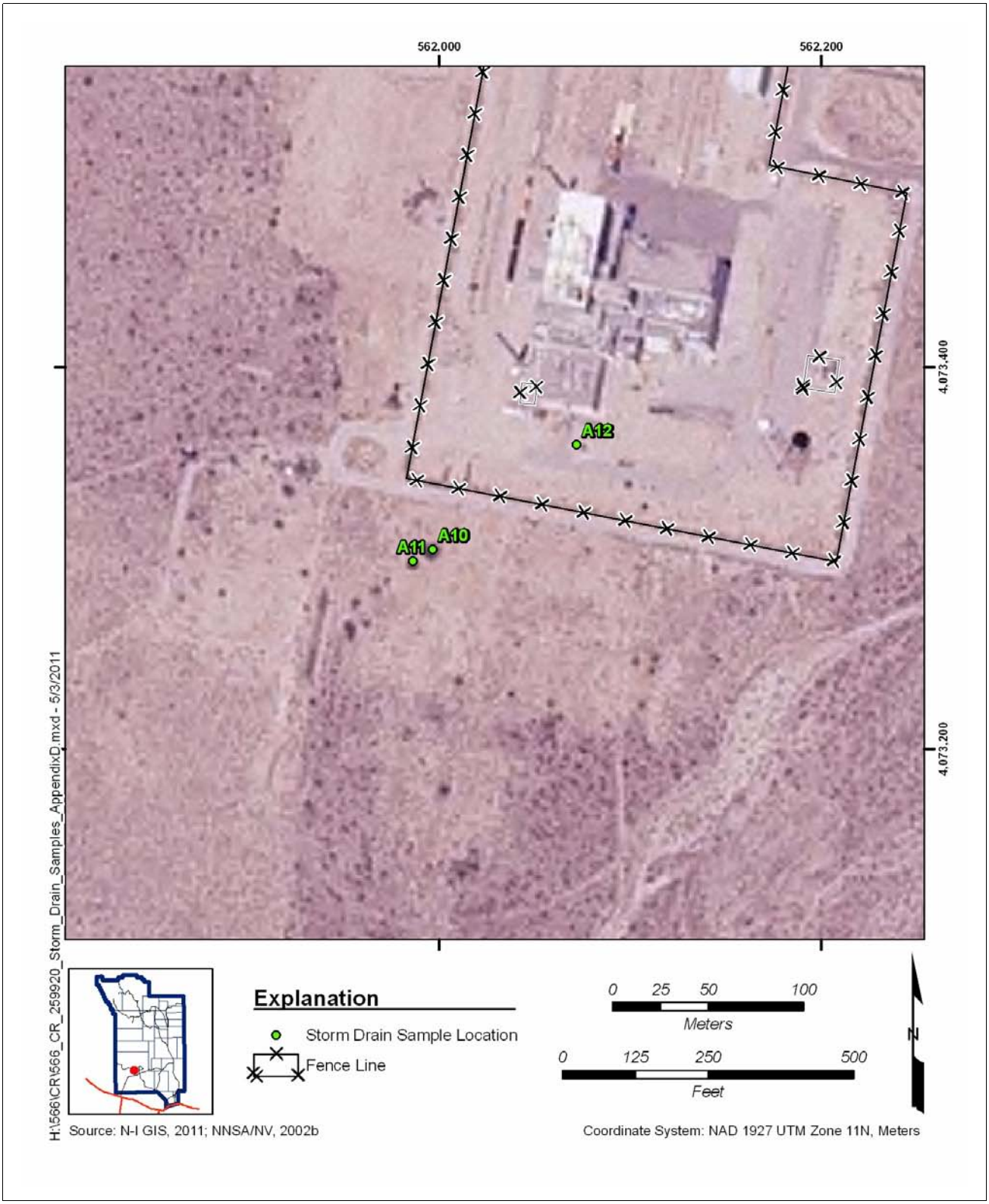


Figure B.3-1
Storm Drain System Sample Locations

identified as containing soil. It is unknown when the drywell had been backfilled. Analytical results from soil sample 566071 determined the soil did not exceed FALs at location A22-1. See Figure B.3-2 for sample locations.

Sample locations A15 through A21 (including one FD) are associated with the Metallurgy Lab trailer process waste drain system (Figure B.3-3). The pipe system had previously been disconnected from the waste holdup tanks and sealed with a grout plug (CAU 135, Area 25 Underground Storage Tanks). The remaining pipe system, consisting of a combination of galvanized and cast-iron pipe, was marked as radiologically contaminated. Soil samples were collected at biased locations under pipe elbows, joints, and trailer connections, and at the plugged end of the drain pipe.

Soil samples were collected at both substation locations to determine whether the transformers were a potential source of PCB contamination. The current transformers are labeled “non PCB”; however, it is unknown whether any PCB-containing transformers previously serviced the substations. Decision I samples were collected from 0 to 0.5 ft bgs (locations A23 through A28) around the perimeter of the substation pad at the southwest corner Building 3900, and at locations A29 through A32 around the transformer pad at the southeast substation.

Decision II sampling at the southwest electrical substation included the collection of step-out surface and subsurface samples to define the lateral extent of PCB soil contamination (Figure B.3-4). The initial step-out samples were taken at approximate 5-ft intervals away from the substation concrete pads (locations A34 through A47), oriented radially around the pad. Additional step-out samples at locations A72 through A76 and A94 through A102 were collected within and outside the high-voltage fence line of the southwest substation. Surface samples from locations A73 through A76 and A94 define the lateral extent of PCB contamination to the south, northwest, and west. The substation is bounded laterally on the east by Building 3900, and to the north by a concrete equipment pad. A corrective action was completed to remove approximately 145 ft^3 of PCB-contaminated soil with concentrations exceeding 100 mg/kg PCBs. Contaminated soil was removed to a depth of approximately 1.5 ft bgs around the north, south, and west sides of the transformer pad. Further excavation and subsurface sampling was discontinued due to the extent of the impacted area, confined work space limitations, and proximity to underground utilities.

Figure B.3-2
Drywell Sample Locations

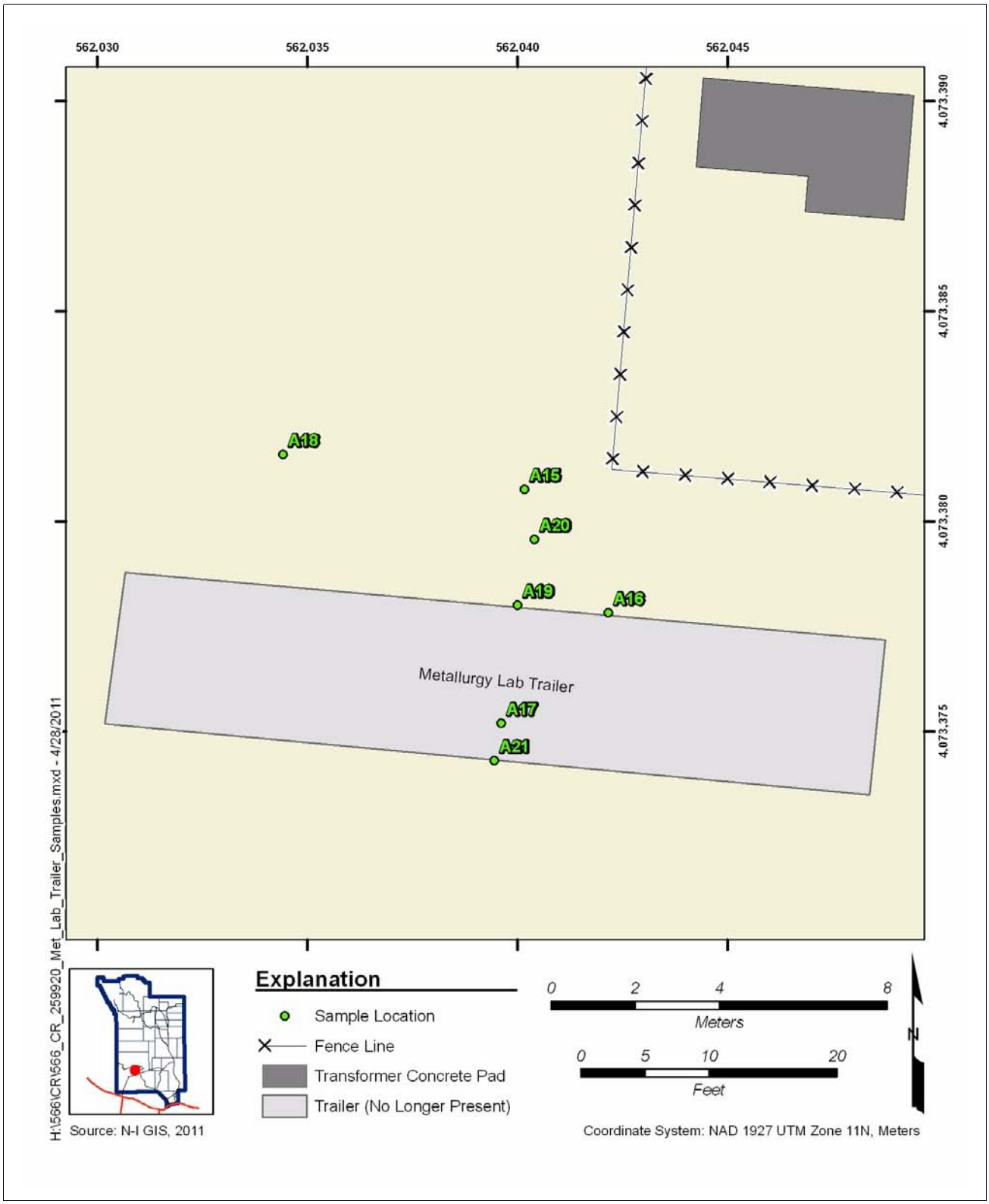


Figure B.3-3
Metallurgy Lab Trailer Sample Locations

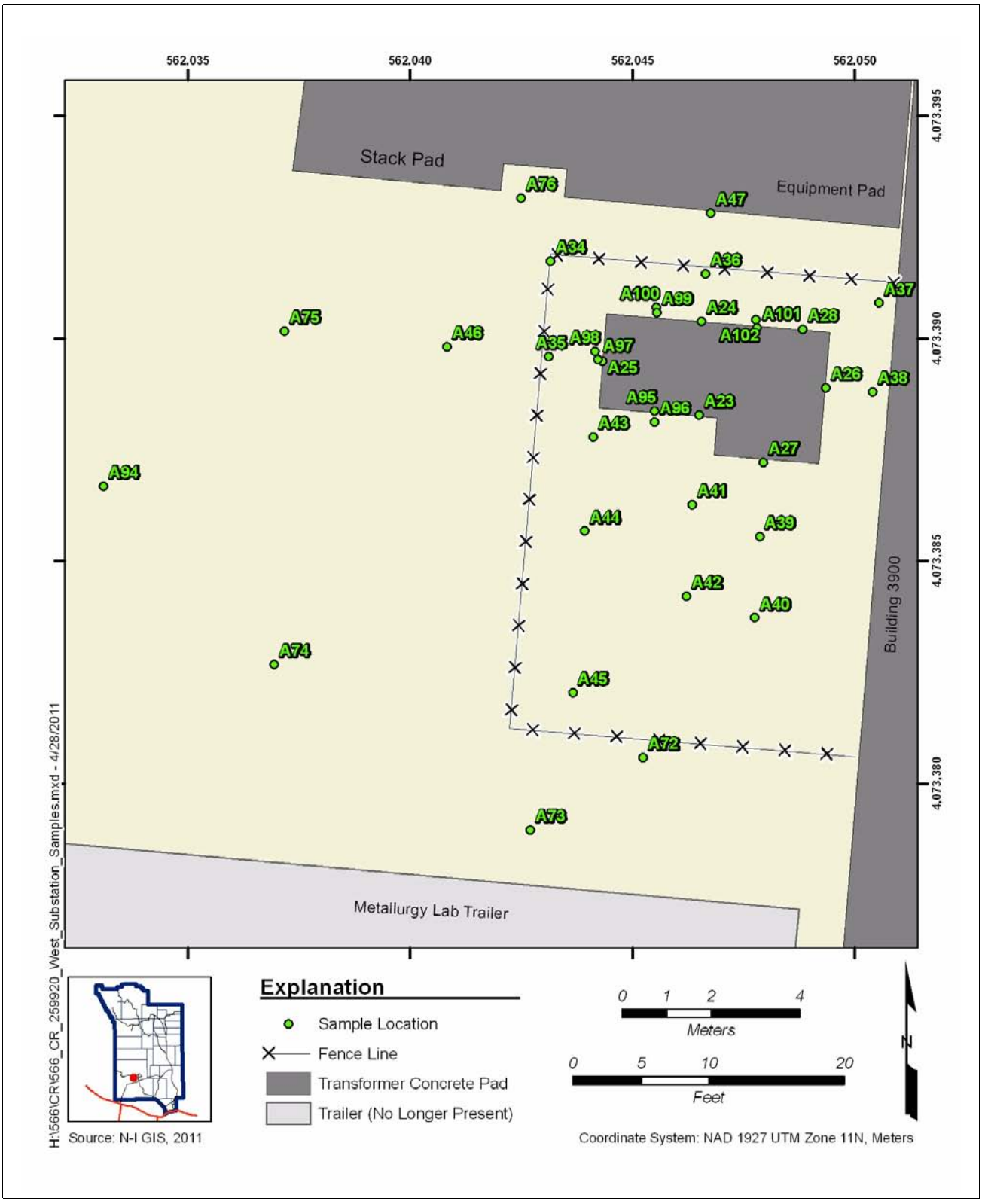


Figure B.3-4
Southwest Substation - Decision I and Decision II Samples

Decision I sampling at the southeast substation identified PCB contamination at locations A29 through A32. Sample number 566034 at location A32 also exceeded the FAL for benzo(a)pyrene. The source of benzo(a)pyrene at this location indicates it could be a constituent of transformer oils or asphaltic materials in the area surrounding the transformer pad. Decision II sampling activities included the collection of step-out surface samples around the southeast substation to define the lateral extent of PCB soil contamination (Figure B.3-5). Step-out samples were collected at locations around the perimeter of the transformer pad, within the high-voltage fence line (A48 through A67). Additional step-out samples were taken outside the high-voltage fence line that included sample locations A77 through A86, A89, A92, and A93. Surface samples from locations A77 through A82, A86, A89, A92, and A93 define the lateral extent of PCB contamination to the west, and south of the substation. The lateral extent of the PCB contamination was not defined north and east of the southeast substation given the spacial boundaries provided in the SAFER Plan (NNSA/NSO, 2010b).

Environmental soil samples at locations A01 through A04 were collected at biased soil stain locations near the locomotives and cable spool car, where it was apparent that either fuel and/or hydraulic oil had been released (Figure B.3-6). At all four locations, analytical results failed sensitivity for several SVOCs (Section 4.5.1.1.1, criterion 2). Due to laboratory matrix interferences, it cannot be determined whether the SVOCs are present below the FALs. As such, diesel fuel leaks and spills are ubiquitous to rail lines due to the use of diesel locomotives, and it assumed the SVOCs are present above their corresponding FALs.

Decision I samples were collected at the surface from 0 to 0.5 ft bgs at existing and known former locations of debris piles. Sample locations A05 through A09, A13, and A14 were selected based on existing waste debris piles on the grounds of the site, or where the debris had been previously stored and removed. The large debris pile consisting primarily of wood debris located outside the perimeter fence on the southwest side of Building 3900 was removed and dispositioned. Two samples (566092 and 566093) were taken from two locations (A87 and A88) to determine whether the debris pile could be a potential source of contamination and release to environmental media. Analytical results from each location confirmed that remaining soil did not exceed FALs.

Three additional areas with elevated radiological readings were identified during visual surveillance and radiological walkover surveys of the site. All three locations were assumed to be former storage

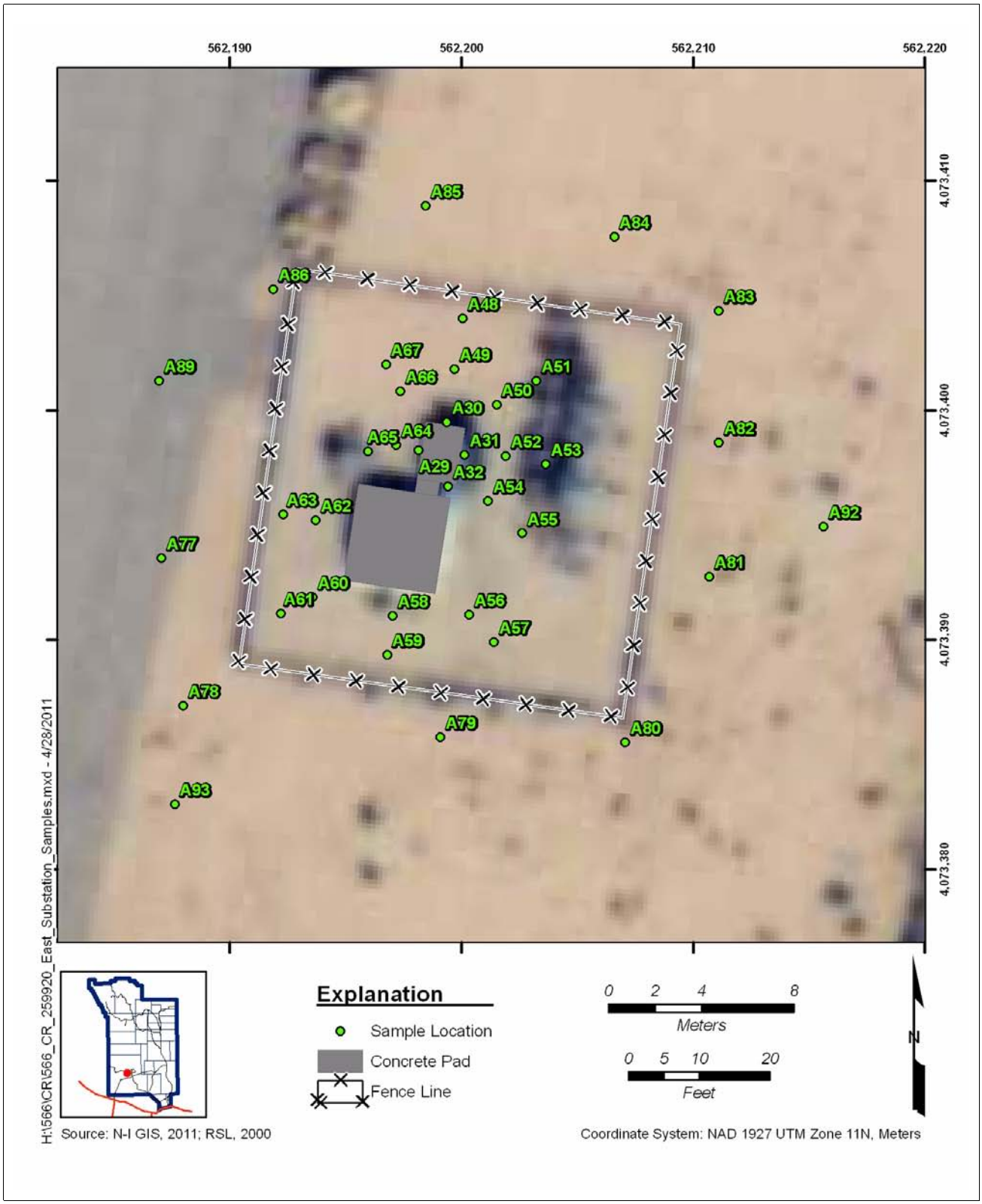


Figure B.3-5
Southeast Substation - Decision I and Decision II Samples

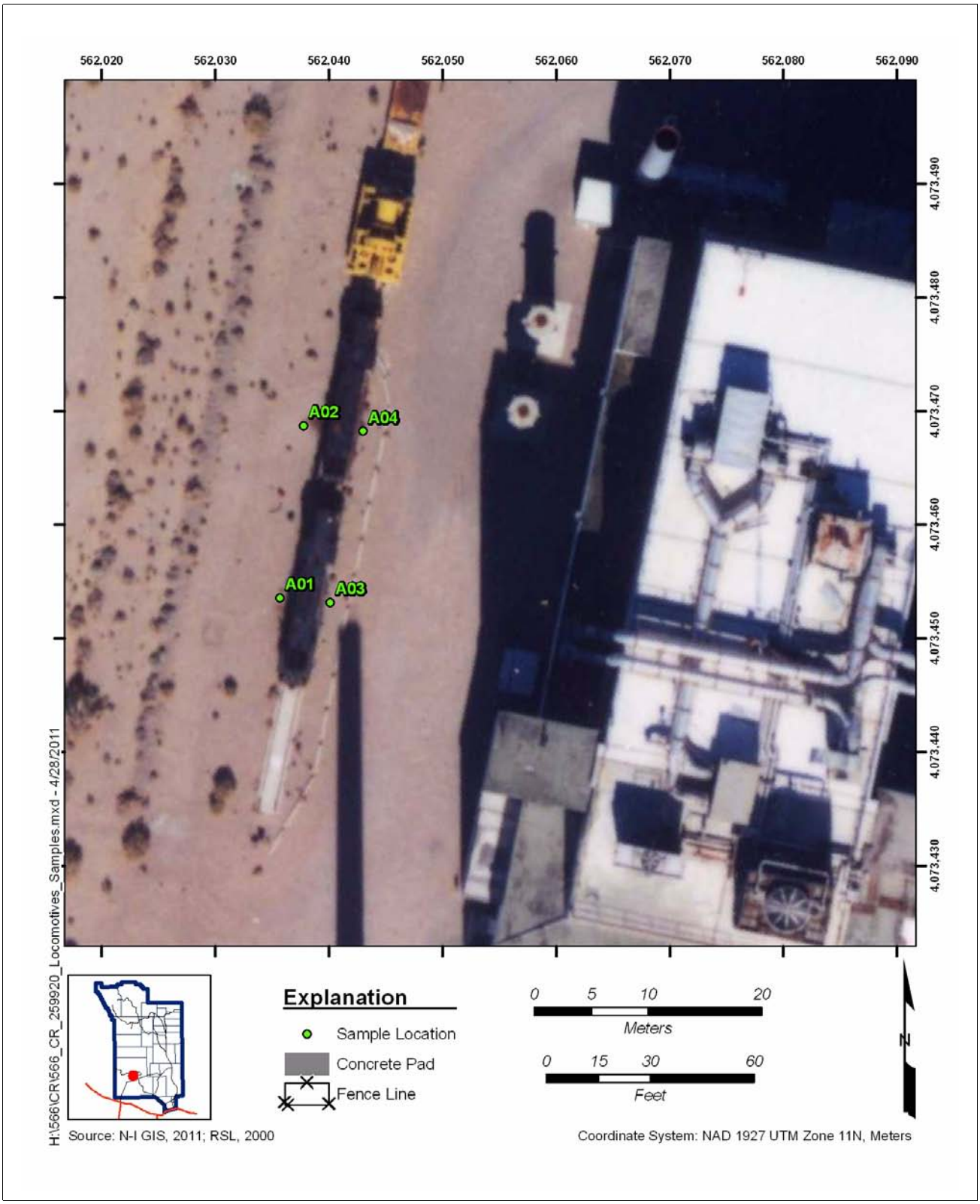


Figure B.3-6
Locomotives and Railcars Soil Sample Locations

or staging areas for equipment or debris. One area consisted of two co-located soil areas of elevated radioactivity, approximately 1 ft^2 each, within an approximate 4-ft^2 area near the southwest corner of the Metallurgy Lab trailer. A corrective action was performed to remove approximately 1.5 ft^3 of soil. The soil was containerized and dispositioned as LLW. Analytical results from the verification samples (locations A70 and A71) confirmed that remaining soil did not exceed FALs, and the area was backfilled with native soil. The second area as an approximate 5-ft^2 radiologically contaminated area located approximately 100 ft north of Building 3900. A corrective action was performed to remove and package approximately 15 ft^3 of radiologically contaminated soil. The soil was containerized and dispositioned as LLW. Analytical results from the verification samples (locations A113 and A114) confirmed that remaining soil did not exceed FALs. The area was backfilled with native soil. The third area consisted of a corrective action to remove approximately 90 ft^3 of radiologically contaminated soil and lead shot located on the south side of Building 3900. The contaminated soil and lead shot was excavated and containerized. Analytical results from verification samples (locations A68 and A69) confirmed that the remaining soil did not exceed FALs, and the area was backfilled with native soil. See Figure B.3-7 for sample locations; and Section B.4.0 for additional details regarding removal activities, waste characterization, and final disposition of the removed materials.

During the CAU 566 investigation, area-wide PCB soil contamination was discovered throughout the EMAD Compound. While the PCB contamination at CAS 25-99-20 is partially attributable to the former PCB-containing transformers at the substations, the PCB-contamination located outside the spatial boundaries of the substations is assumed to be related to soil stabilization and dust-suppression activities at the site. Environmental samples at locations A90, A91, and A103 through A109 identified PCB soil contamination beyond the spatial boundaries of the southeast substation but within the EMAD Compound fence line. Additional Decision II samples (locations A115 through A122) were collected outside the EMAD Compound perimeter fence line to establish the horizontal extent of the PCB contamination at CAS 25-99-20. See Figure B.3-8 for sample locations.

Samples of liquid, sediment, building materials, paint, and concrete were collected at CAS 25-99-20 for the purpose of waste characterization and disposal determination. The analytical results for waste characterization samples are discussed in Section B.4.0.

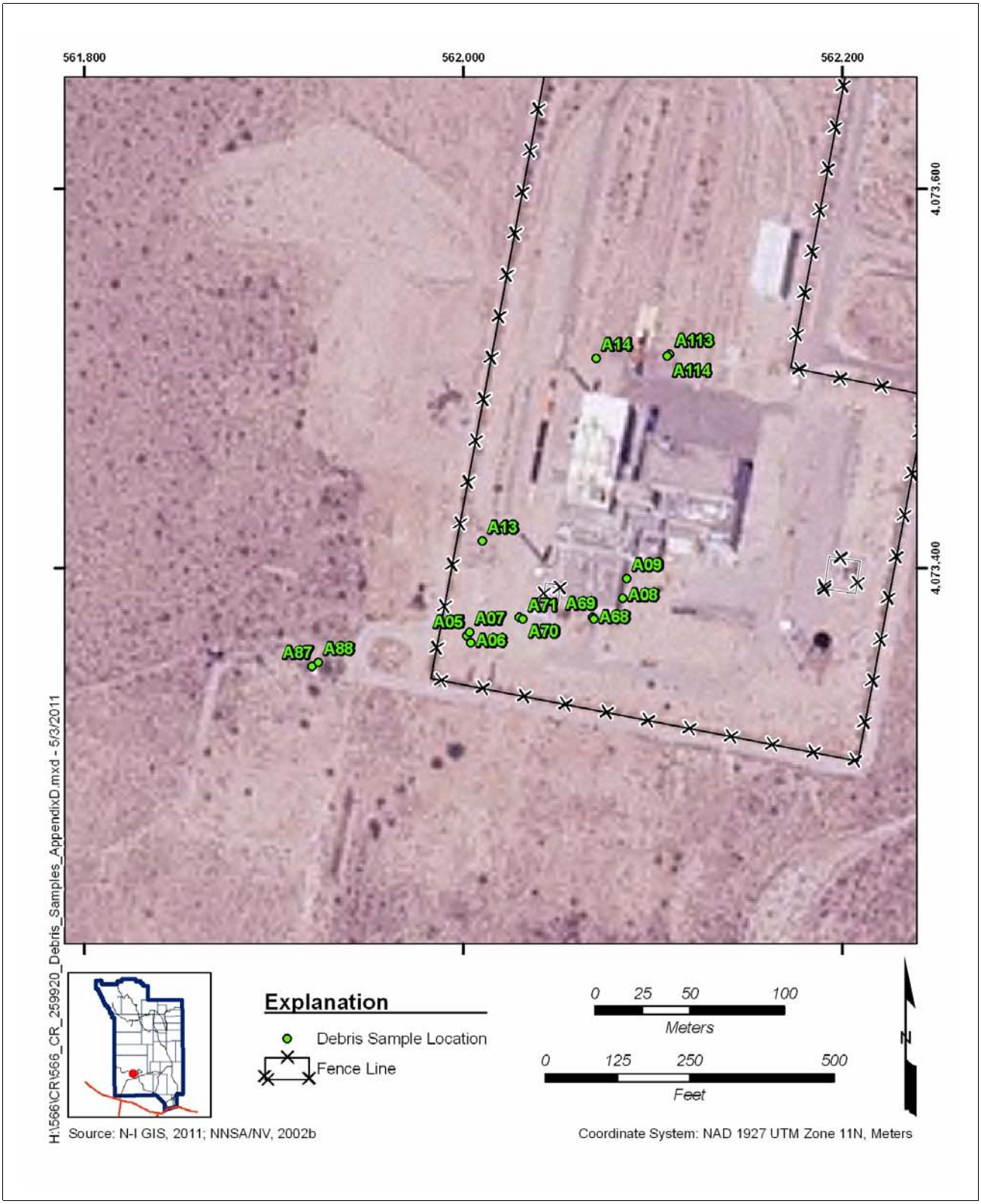


Figure B.3-7
Debris Piles Sample Locations

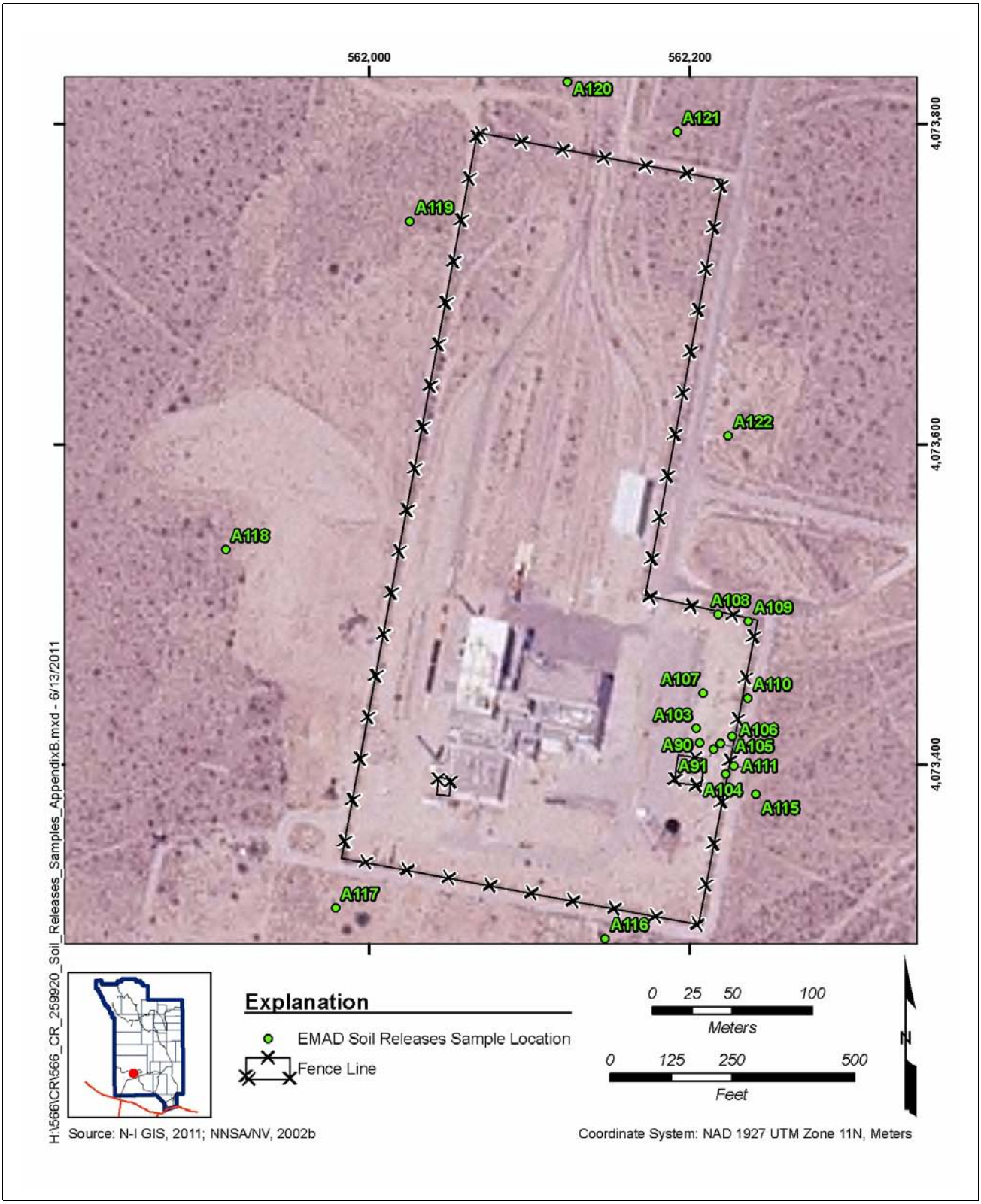


Figure B.3-8
EMAD Compound Soil Releases Sample Locations

B.3.1.5 Deviations

Investigation samples were collected as outlined in the CAU 566 SAFER Plan (NNSA/NSO, 2010b) and submitted for laboratory analysis. The only deviation to planned sampling was that vertical extent sampling for PCB contamination could not be accomplished due to the confined work space limitations, and proximity to overhead and underground utilities.

B.3.2 Investigation Results

The following sections provide analytical results from the samples collected to complete investigation activities as outlined in the SAFER Plan (NNSA/NSO, 2010b). Investigation samples were analyzed for the SAFER Plan-specified COPCs, which included VOCs, SVOCs, TPH-DRO, TCLP SVOCs, TCLP RCRA metals, total RCRA metals plus beryllium, PCBs, gamma-emitting radionuclides, tritium, gross alpha/beta, isotopic U, isotopic Pu, and Sr-90. The analytical parameters and laboratory methods used to analyze the investigation samples are listed in Table B.2-2. Table B.3-1 lists the sample-specific analytical suite for CAS 25-99-20. The waste characterization analytical results are discussed in Section B.4.0. Analytical waste parameters varied based on the sample matrix, process knowledge and analytical soil sample results.

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

B.3.2.1 Volatile Organic Compounds

Analytical results for VOCs in soil samples collected at this CAS that were detected above MDCs are presented in Table B.3-2. No VOCs were detected at concentrations exceeding their respective PALs. The FALs were established at the PAL concentrations.

Table B.3-2
Sample Results for VOCs Detected above MDCs
at CAS 25-99-20, EMAD Compound

Sample Location	Sample Number	Depth (ft bgs)	COPCs (mg/kg)		
			Acetone	Methylene Chloride	Toluene
FALs			630,000	53	45,000
A02	566002	0.0 - 0.5	0.00183 (J)	0.00351 (J)	--
A03	566003	0.0 - 0.5	0.00216 (J)	0.00373 (J)	--
A04	566004	0.0 - 0.5	0.00205 (J)	0.00338 (J)	--
A14	566015	0.0 - 0.5	--	--	0.00132
A15	566016	0.0 - 0.5	--	0.00246 (J)	0.00209
A16	566017	0.0 - 0.5	--	--	0.000597 (J)
A17	566018	0.0 - 0.5	--	--	0.00208
A18	566019	0.0 - 0.5	--	--	0.000741 (J)
A19	566020	0.0 - 0.5	--	--	0.000313 (J)
A21	566022	0.0 - 0.5	--	--	0.000354 (J)
A31	566033	0.0 - 0.5	0.00168 (J)	--	0.000416 (J)

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

B.3.2.2 Semivolatile Organic Compounds

Analytical results for SVOCs in soil samples collected at this CAS that were detected above MDCs are presented in Table B.3-3. Except for one benzo(a)pyrene sample (566034), all other SVOCs were detected at concentrations below their respective FALs. For all SVOCs, the FALs were established at the PAL concentrations. Benzo(a)pyrene is considered a COC. Additionally, sample numbers 566001 through 566004 failed the sensitivity criteria for several SVOCs, including benzo(a)pyrene, dibenzo(ah)anthracene, hexachlorobenzene, 2,4-dinotrotoluene, 4-chloroanaline, benzo(a)anthracene, indeno(1,2,3-cd)pyrene, benzo(b)fluoranthene, and pentachlorophenol. Because it cannot be determined that these contaminants are present below their corresponding FALs, it was conservatively assumed these contaminants are COCs (Section 4.5.1.1.1).

Table B.3-3
Sample Results for SVOCs Detected above MDCs at CAS 25-99-20, EMAD Compound
(Page 1 of 3)

Sample Location	Sample Number	Depth (ft bgs)	COPCs (mg/kg)																	
			2-Methylnaphthalene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(ghi)perylene	Benzo(k)fluoranthene	Benzoic acid	Bis(2-ethylhexyl)phthalate	Carbazole	Chrysene	Dibenzo(ah)anthracene	Di-n-butyl phthalate	Fluoranthene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
FALs			4,100	170,000	2.1	0.21	2.1	17,000	21	2,500,000	120	95.8	210	0.21	62,000	22,000	2.1	18	170,000	17,000
A01	566001	0.0 - 0.5	--	--	--	--	--	--	--	--	7.57 (J)	--	--	--	--	--	--	--	--	--
A02	566002	0.0 - 0.5	--	--	--	--	--	--	--	--	47.3 (J)	--	--	--	--	--	--	--	--	--
A03	566003	0.0 - 0.5	0.704 (J)	--	--	--	--	--	--	--	17 (J)	--	--	--	--	--	--	--	1.65 (J)	--
A04	566004	0.0 - 0.5	--	--	--	--	--	--	--	--	27.3 (J)	--	--	--	--	--	--	--	--	--
A05	566005	0.0 - 0.5	--	--	--	--	--	--	--	--	0.0859 (J)	--	--	--	--	--	--	--	--	--
A07	566008	0.0 - 0.5	--	--	--	--	--	--	--	--	0.16 (J)	--	--	--	--	--	--	--	--	--
A09	566010	0.0 - 0.5	--	--	--	--	--	--	--	--	0.0753 (J)	--	--	--	--	--	--	--	--	--
A12	566013	0 - 2 (in.)	--	--	--	--	--	--	--	--	0.133 (J)	--	--	--	0.0866 (J)	0.0109 (J)	--	--	--	0.0153 (J)
A15	566016	0.0 - 0.5	--	--	--	--	--	--	--	--	1.85	--	--	--	0.211 (J)	--	--	--	--	--
A16	566017	0.0 - 0.5	--	--	--	--	--	--	--	--	--	--	--	--	0.173 (J)	--	--	--	--	--

Table B.3-3
Sample Results for SVOCs Detected above MDCs at CAS 25-99-20, EMAD Compound
(Page 2 of 3)

Sample Location	Sample Number	Depth (ft bgs)	COPCs (mg/kg)																
			2-Methylnaphthalene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(ghi)perylene	Benzo(k)fluoranthene	Benzoic acid	Bis(2-ethylhexyl)phthalate	Carbazole	Chrysene	Dibenzo(ah)anthracene	Di-n-butyl phthalate	Fluoranthene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
FALs			4,100	170,000	2.1	0.21	2.1	17,000	21	2,500,000	120	95.8	210	0.21	62,000	22,000	2.1	18	170,000	17,000
A17	566018	0.0 - 0.5	--	--	0.0336	0.0441	0.0468	0.0256 (J)	--	--	--	--	0.0343	--	--	0.0357	0.0239 (J)	--	0.0151 (J)	0.0377
A18	566019	0.0 - 0.5	--	--	--	0.0743 (J)	0.135	--	--	--	--	--	0.0729 (J)	--	--	0.0743 (J)	--	--	--	0.0797 (J)
A19	566020	0.0 - 0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.0425	--	--
A20	566021	0.0 - 0.5	--	--	0.0794	0.0852	0.112	0.0585 (J)	0.0342	--	0.0958 (J)	0.0127 (J)	0.103	--	--	0.161	0.0537	--	0.0887	0.17
A23	566024	0.0 - 0.5	--	--	--	--	--	--	--	0.52 (J)	0.169 (J)	--	--	--	0.447	0.0154 (J)	--	--	--	0.0109 (J)
A24	566025	0.0 - 0.5	--	--	--	--	0.0186 (J)	--	--	--	0.116 (J)	--	--	--	0.202 (J)	0.0158 (J)	--	--	--	0.0145 (J)
	566026	0.0 - 0.5	--	--	--	--	--	--	--	--	0.56	--	--	--	0.198 (J)	0.0152 (J)	--	0.0348	--	0.0148 (J)
A25	566027	0.0 - 0.5	--	--	0.0322 (J)	0.0274 (J)	0.0418	--	0.0175 (J)	--	0.285 (J)	--	0.0274 (J)	--	0.454	0.0373	0.0243 (J)	--	--	0.0319 (J)
A26	566028	0.0 - 0.5	--	--	--	--	0.0153 (J)	--	--	--	0.148 (J)	--	--	--	0.134 (J)	--	--	0.0108 (J)	--	--

Table B.3-3
Sample Results for SVOCs Detected above MDCs at CAS 25-99-20, EMAD Compound
(Page 3 of 3)

Sample Location	Sample Number	Depth (ft bgs)	COPCs (mg/kg)																
			2-Methylnaphthalene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(ghi)perylene	Benzo(k)fluoranthene	Benzoic acid	Bis(2-ethylhexyl)phthalate	Carbazole	Chrysene	Dibenzo(ah)anthracene	Di-n-butyl phthalate	Fluoranthene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
FALs			**4,100**	**170,000**	**2.1**	**0.21**	**2.1**	**17,000**	**21**	**2,500,000**	**120**	**95.8**	**210**	**0.21**	**62,000**	**22,000**	**2.1**	**18**	**170,000**	**17,000**
A27	566029	0.0 - 0.5	--	--	0.0374	0.0405 (J)	0.0632 (J)	--	0.0316 (J)	--	0.265 (J)	--	0.0453	--	0.379	0.0546	0.0278 (J)	--	0.0179 (J)	0.0756
A28	566030	0.0 - 0.5	--	--	0.0152 (J)	0.0132 (J)	0.0215 (J)	--	--	--	0.103 (J)	--	0.0111 (J)	--	0.0872 (J)	--	--	0.0111 (J)	--	0.0138 (J)
A31	566033	0.0 - 0.5	--	--	--	--	0.0132 (J)	--	--	--	--	--	--	--	--	0.0108 (J)	--	--	--	0.0132 (J)
A32	566034	0.0 - 0.5	--	0.0125 (J)	0.449	**0.397**	0.598	0.161	0.228	--	0.225 (J)	--	0.46	0.0743	--	0.392	0.219	--	0.056	0.474

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

Bold indicates the values exceeding the FALs.

B.3.2.3 Total Petroleum Hydrocarbons

The hazardous constituents of TPH-DRO are evaluated in Sections B.3.2.1 and B.3.2.2.

B.3.2.4 RCRA Metals and Beryllium

Analytical results for RCRA metals and beryllium in soil samples collected at this CAS that were detected above MDCs are presented in Table B.3-4. No metals were detected at concentrations exceeding their PALs. The FALs were established at the PAL concentrations.

Table B.3-4
Sample Results for Metals Detected above MDCs
at CAS 25-99-20, EMAD Compound
(Page 1 of 3)

Sample Location	Sample Number	Depth (ft bgs)	COPCs (mg/kg)								
			Arsenic	Barium	Beryllium	Cadmium	Chromium[a]	Chromium VI	Lead	Mercury	Silver
FALs			23	190,000	2,000	800	N/A	5.6	800	34	5,100
A01	566001	0.0 - 0.5	1.75	69.9	0.262 (J)	2.68	4.83	--	20.5 (J)	0.00572 (J-)	--
A02	566002	0.0 - 0.5	1.3	153	0.546	2.88	5.03	--	18.5 (J)	--	0.227 (J)
A03	566003	0.0 - 0.5	1.62	65.3	0.226 (J)	0.537	4.9	--	10.7 (J)	--	--
A04	566004	0.0 - 0.5	1.36	68.2	0.214 (J)	0.217 (J)	4.38	--	10.2 (J)	--	--
A05	566005	0.0 - 0.5	1.59	92.2	0.254 (J)	0.564	5.48	--	12.4 (J)	0.00937 (J-)	--
A06	566006	0.0 - 0.5	2.44	80.1	0.217 (J)	0.179 (J)	5.7	--	7.69 (J)	0.0187 (J-)	--
	566007	0.0 - 0.5	2.48	87.7	0.307 (J)	0.271 (J)	5.98	0.23 (J-)	8.52 (J)	0.0117 (J-)	--
A07	566008	0.0 - 0.5	1.81	92.8	0.272 (J)	0.225 (J)	4.54	--	8.93 (J)	0.00932 (J-)	--
A08	566009	0.0 - 0.5	1.48	68	0.171 (J)	0.473	17.6	0.129 (J-)	29.7 (J)	0.0438 (J-)	--
A09	566010	0.0 - 0.5	1.82	73.3	0.139 (J)	0.541	9.46	--	29.1 (J)	0.013 (J-)	--
A10	566011	0.0 - 0.5	3	65.5	0.238 (J)	0.137 (J)	14.5	--	6.47 (J)	0.0274 (J-)	--

Table B.3-4
Sample Results for Metals Detected above MDCs at CAS 25-99-20, EMAD Compound
(Page 2 of 3)

Sample Location	Sample Number	Depth (ft bgs)	COPCs (mg/kg)								
			Arsenic	Barium	Beryllium	Cadmium	Chromium[a]	Chromium VI	Lead	Mercury	Silver
FALs			23	190,000	2,000	800	N/A	5.6	800	34	5,100
A11	566012	0.0 - 0.5	2.79	74.2	0.267 (J)	0.123 (J)	14.3	--	7.78 (J)	0.0162 (J-)	--
A12	566013	0 - 2 (in.)	1.34	94.9	0.139 (J)	0.147 (J)	3.21	--	9.93 (J)	0.0104 (J-)	--
A13	566014	0.0 - 0.5	1.52	77.8	0.276 (J)	0.146 (J)	5.05	1.41 (J-)	6.78 (J)	0.00966 (J-)	--
A14	566015	0.0 - 0.5	1.7 (J-)	79.8 (J)	0.269 (J)	0.271 (J)	5.11	--	5.73 (J)	0.00839 (J)	--
A15	566016	0.0 - 0.5	9.56	83 (J)	0.23 (J)	0.577	12.6	--	18.2 (J)	0.00732 (J)	--
A16	566017	0.0 - 0.5	3.11	106 (J)	0.346 (J)	0.492 (J)	13.9	0.303 (J)	13 (J)	0.00793 (J)	--
A17	566018	0.0 - 0.5	4.08	96.9 (J)	0.34 (J)	0.291 (J)	10.2	--	14 (J)	0.0136	--
A18	566019	0.0 - 0.5	1.33 (J-)	85.2 (J)	0.223 (J)	0.323 (J)	4.65	--	46.9 (J)	0.00431 (J)	--
A19	566020	0.0 - 0.5	1.89 (J-)	64.9 (J)	--	1.07	16.6	0.358 (J)	19.8 (J)	0.0105 (J)	--
A20	566021	0.0 - 0.5	1.4 (J-)	122 (J)	0.27 (J)	3.68	28.1	0.997	36.8 (J)	0.00747 (J)	--
A21	566022	0.0 - 0.5	2.68	73.2 (J)	0.358 (J)	6.42	19.5	0.408 (J)	20.9 (J)	0.0256	--
A68	566072	0.0 - 0.5	1.16	60.5	0.349 (J)	--	3.76	--	3.67	0.0126	--
A69	566073	0.0 - 0.5	1.28	69	0.349 (J)	--	3.55	--	4.26	0.0121	--
A70	566074	0.0 - 0.5	2	84.1	0.448 (J)	0.141 (J)	5.56	--	7.72	0.0288	--
A71	566075	0.0 - 0.5	2.49	97.4	0.473 (J)	--	7.06	--	5.71	0.0271	--

Table B.3-4
Sample Results for Metals Detected above MDCs
at CAS 25-99-20, EMAD Compound
(Page 3 of 3)

Sample Location	Sample Number	Depth (ft bgs)	COPCs (mg/kg)								
			Arsenic	Barium	Beryllium	Cadmium	Chromium[a]	Chromium VI	Lead	Mercury	Silver
FALs			23	190,000	2,000	800	N/A	5.6	800	34	5,100
A87	566092	0.0 - 0.5	2.38	60.6 (J)	0.328 (J)	0.144 (J)	4.77	--	5	0.00942 (J-)	--
A88	566093	0.0 - 0.5	--	99.3 (J)	0.289 (J)	--	2.79	--	3.97	--	--

[a]There is no EPA Region 9 screening level for chromium; chromium is evaluated by EPA Region 9 using the chromium VI isomer.

J = Estimated value
J- = Result is an estimated quantity, but may be biased low.
-- = Not detected above MDCs.

B.3.2.5 Polychlorinated Biphenyls

Analytical results for PCBs in soil samples collected at this CAS that were detected above MDCs are presented in Table B.3-5. A total of 79 surface and subsurface soil samples (including 5 FDs), at 60 locations exceeded the PAL of 0.740 mg/kg for Aroclor 1254, and/or Aroclor 1260. Concentrations ranged from 0.740 to 198 mg/kg. Aroclor 1254 and 1260 were moved to a Tier 2 evaluation, and a FAL was established using site specific parameters. The FAL of 2.91 mg/kg was exceeded; therefore, Aroclor 1254 and 1260 are considered COCs.

Sample numbers 566024, 566026, 566027, 566032, 566033, 566034, and 566050 failed the sensitivity criteria for several Aroclors, including Aroclor 1221, 1232, 1242, 1248, and 1268. Because it cannot be determined that these contaminants are present below their corresponding FALs, it was conservatively assumed these contaminants are COCs (Section 4.5.1.1.1). The calculation of the FALs for Aroclors 1221, 1232, 1242, 1248, 1254, 1260, and 1268 is presented in Appendix E.

The PCB soil samples at CAS 25-99-20 suggest the following:

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

Table B.3-5
Sample Results for PCBs Detected above MDCs at CAS 25-99-20, EMAD Compound
(Page 1 of 5)

Sample Location	Sample Number	Depth (ft bgs)	COPCs (mg/kg)		
			Aroclor 1242	Aroclor 1254	Aroclor 1260
FALs			**2.91**	**2.91**	**2.91**
A03	566003	0.0 - 0.5	0.0572 (J)	0.0726	--
A05	566005	0.0 - 0.5	--	0.0265	0.0166 (J)
A06	566006	0.0 - 0.5	--	0.0312	0.0182
	566007	0.0 - 0.5	--	0.025	0.0136 (J)
A07	566008	0.0 - 0.5	--	0.0502	0.0326
A08	566009	0.0 - 0.5	--	0.18	0.114
A09	566010	0.0 - 0.5	--	0.344	0.206
A10	566011	0.0 - 0.5	--	0.111	0.0648 (J)
A11	566012	0.0 - 0.5	--	0.0901	0.053 (J)
A12	566013	0 - 2 (in.)	0.0855	0.171	0.09
A13	566014	0.0 - 0.5	--	0.0313	0.0231
A14	566015	0.0 - 0.5	--	0.0121 (J)	0.0121 (J)
A15	566016	0.0 - 0.5	0.184	0.178	0.126
A16	566017	0.0 - 0.5	0.0321	0.0323	0.0274
A17	566018	0.0 - 0.5	--	0.0239	0.0167 (J)
A18	566019	0.0 - 0.5	--	0.357	0.177
A19	566020	0.0 - 0.5	--	0.0604	0.0525
A20	566021	0.0 - 0.5	0.0637 (J)	0.174	0.142
A21	566022	0.0 - 0.5	--	0.0164 (J)	--
A23	566024	0.0 - 0.5	--	--	**198** (J)
A24	566025	0.0 - 0.5	--	**22.1** (J)	**103** (J)
	566026	0.0 - 0.5	--	--	**158** (J)
A25	566027	0.0 - 0.5	--	--	**163** (J)
A26	566028	0.0 - 0.5	--	**1.88**[a]	**1.05**[a]
A27	566029	0.0 - 0.5	--	1.12	0.92
A28	566030	0.0 - 0.5	--	**6.58** (J)	**3.46** (J)

Table B.3-5
Sample Results for PCBs Detected above MDCs
at CAS 25-99-20, EMAD Compound
(Page 2 of 5)

Sample Location	Sample Number	Depth (ft bgs)	COPCs (mg/kg)		
			Aroclor 1242	Aroclor 1254	Aroclor 1260
FALs			**2.91**	**2.91**	**2.91**
A29	566031	0.0 - 0.5	--	--	**10.6** (J)
A30	566032	0.0 - 0.5	--	--	**72.3** (J)
A31	566033	0.0 - 0.5	--	--	**58.7** (J)
A32	566034	0.0 - 0.5	--	--	**41.1** (J)
A34	566035	0.0 - 0.5	--	1.41	0.851
A35	566036	0.0 - 0.5	--	0.701	0.51
A36	566037	0.0 - 0.5	--	**1.88**[a]	**2.51**[a]
A37	566038	0.0 - 0.5	--	**3.97** (J)	1.33
A38	566039	0.0 - 0.5	--	0.958	0.597
A39	566040	0.0 - 0.5	--	1.23	0.847
A40	566041	0.0 - 0.5	--	0.993	0.651
A41	566042	0.0 - 0.5	--	0.89 (J)	0.713 (J)
A42	566043	0.0 - 0.5	--	0.175	0.251
A43	566044	0.0 - 0.5	--	1.15 (J)	1.3 (J)
A44	566045	0.0 - 0.5	--	0.634	0.552
A45	566046	0.0 - 0.5	--	1.75 (J)	0.956 (J)
A46	566047	0.0 - 0.5	--	0.515	0.362
	566048	0.0 - 0.5	--	**2.23**[a]	**1.27**[a]
A47	566049	0.0 - 0.5	--	1.83	0.846
A48	566050	0.0 - 0.5	--	--	**60.2** (J)
A49	566051	0.0 - 0.5	--	--	**35.9** (J)
A50	566052	0.0 - 0.5	--	--	**37.6** (J)
A51	566053	0.0 - 0.5	--	--	**43** (J)
A52	566054	0.0 - 0.5	--	--	**30.5** (J)
A53	566055	0.0 - 0.5	--	--	**37.4** (J)
A54	566056	0.0 - 0.5	--	--	**37.6** (J)

Table B.3-5
Sample Results for PCBs Detected above MDCs
at CAS 25-99-20, EMAD Compound
(Page 3 of 5)

Sample Location	Sample Number	Depth (ft bgs)	COPCs (mg/kg)		
			Aroclor 1242	Aroclor 1254	Aroclor 1260
FALs			**2.91**	**2.91**	**2.91**
A55	566057	0.0 - 0.5	--	--	**11.8** (J)
A56	566058	0.0 - 0.5	--	--	1.73
A57	566059	0.0 - 0.5	--	--	0.327
A58	566060	0.0 - 0.5	--	--	0.547
A59	566061	0.0 - 0.5	--	--	0.574
A60	566062	0.0 - 0.5	--	--	0.993
A61	566063	0.0 - 0.5	--	--	**7.75** (J)
A62	566064	0.0 - 0.5	--	--	**34.9** (J)
	566065	0.0 - 0.5	--	--	**30.8** (J)
A63	566066	0.0 - 0.5	--	--	**34.8** (J)
A64	566067	0.0 - 0.5	--	--	**33.7** (J)
A65	566068	0.0 - 0.5	--	--	**26** (J)
A66	566069	0.0 - 0.5	--	--	**38.9** (J)
A67	566070	0.0 - 0.5	--	--	**49** (J)
A68	566072	0.0 - 0.5	--	0.0024 (J)	--
A69	566073	0.0 - 0.5	--	0.0036	0.0025 (J)
A70	566074	0.0 - 0.5	--	0.0169	0.0313
A71	566075	0.0 - 0.5	--	0.0032 (J)	--
A72	566076	0.0 - 0.5	--	0.874	0.308
A73	566077	0.0 - 0.5	--	--	0.0026 (J)
A74	566078	0.0 - 0.5	--	0.653	0.339
A75	566079	0.0 - 0.5	--	0.593	0.251
A76	566080	0.0 - 0.5	--	0.151	0.0938
A77	566081	0.0 - 0.5	--	--	0.0819
A78	566082	0.0 - 0.5	--	--	0.88
A79	566083	0.0 - 0.5	--	--	0.302

Table B.3-5
Sample Results for PCBs Detected above MDCs
at CAS 25-99-20, EMAD Compound
(Page 4 of 5)

Sample Location	Sample Number	Depth (ft bgs)	COPCs (mg/kg)		
			Aroclor 1242	Aroclor 1254	Aroclor 1260
FALs			**2.91**	**2.91**	**2.91**
A80	566084	0.0 - 0.5	--	--	0.111
A81	566085	0.0 - 0.5	--	--	0.0859
A82	566086	0.0 - 0.5	--	--	0.827
A83	566087	0.0 - 0.5	--	--	**4.74** (J)
A84	566088	0.0 - 0.5	--	--	**30** (J)
A85	566089	0.0 - 0.5	--	--	**57.4** (J)
A86	566090	0.0 - 0.5	--	--	1.28
	566091	0.0 - 0.5	--	--	1.17
A87	566092	0.0 - 0.5	--	0.0018 (J)	0.0016 (J)
A89	566094	0.0 - 0.5	--	--	0.0205
A90	566095	0.0 - 0.5	--	--	**37.7** (J)
A91	566096	0.0 - 0.5	--	--	**5.16**
A92	566097	0.0 - 0.5	--	--	2.03
A93	566098	0.0 - 0.5	--	--	0.443
A94	566099	0.0 - 0.5	--	0.181	0.294
A95	566100	1.0 - 1.5	--	**1.92**[a]	**1.08**[a]
A96	566101	0.0 - 1.0	--	0.207	0.35
A97	566102	1.0 - 1.5	--	0.0642 (J)	0.0697
A98	566103	0.0 - 1.0	--	0.0254 (J)	0.0264 (J)
A99	566104	1.0 - 1.5	--	0.102	0.15
A100	566105	0.0 - 1.0	--	0.369	1.25
A101	566106	1.0 - 1.5	--	**4.81** (J)	2.32 (J)
	566107	1.0 - 1.5	--	**3.43**	1.71 (J)
A102	566108	0.0 - 1.0	--	**19** (J)	**10.6** (J)
A103	566109	0.0 - 0.5	--	--	**5.71**
A104	566110	0.0 - 0.5	--	--	**5**

Table B.3-5
Sample Results for PCBs Detected above MDCs
at CAS 25-99-20, EMAD Compound
(Page 5 of 5)

Sample Location	Sample Number	Depth (ft bgs)	COPCs (mg/kg)		
			Aroclor 1242	Aroclor 1254	Aroclor 1260
FALs			**2.91**	**2.91**	**2.91**
A105	566111	0.0 - 0.5	--	--	0.128
A106	566112	0.0 - 0.5	--	--	0.782
A107	566113	0.0 - 0.5	--	--	0.713
A108	566114	0.0 - 0.5	--	--	1.91
A109	566115	0.0 - 0.5	--	--	1.28
A110	566116	0.0 - 0.5	--	--	**3.73**
A111	566117	0.0 - 0.5	--	--	1.12
A115	566120	0.0 - 0.5	--	--	0.0435
A116	566121	0.0 - 0.5	--	0.0181 (J)	0.0779
	566122	0.0 - 0.5	--	0.0179 (J)	0.0761
A117	566123	0.0 - 0.5	--	0.0027 (J)	0.0019 (J)
A121	566127	0.0 - 0.5	--	0.0016 (J)	0.0022 (J)
A122	566128	0.0 - 0.5	--	0.0075 (J)	0.0263

[a]Fails FAL based on multiple constituent analysis; see Appendix E.

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

Bold indicates the values exceeding the FALs.

The PCB contamination at CAS 25-99-20 is primarily located around the Substations CAS component; however, further investigation identified PCB contamination outside the spatial boundaries of the Substations. Polychlorinated biphenyls were commonly used as a soil stabilizer for dust suppression (HHS, 2000). Although dust suppression was not considered in the CSM in the SAFER Plan (NNSA/NSO, 2010b), data was collected to define the extent of this contamination.

B.3.2.6 Gamma-Emitting Radionuclides

Analytical results for gamma-emitting radionuclides in soil samples collected at CAS 25-99-20 that were detected above MDCs are presented in Table B.3-6. Three locations with elevated radiological readings were identified during visual and/or radiological survey of the site. Because it was not determined whether the soil had contaminants (gamma-emitting radionuclides) present below their corresponding FALs, it was conservatively assumed the contaminants were potential COCs. A corrective action of soil removal was implemented at all three locations (Section 4.2). No gamma-emitting radionuclide concentrations exceeded their respective PALs. The FALs were established at the PAL concentrations.

Table B.3-6
Sample Results for Gamma-Emitting Radionuclides
Detected above MDCs at CAS 25-99-20, EMAD Compound
(Page 1 of 2)

Sample Location	Sample Number	Depth (ft bgs)	COPCs (pCi/g)			
			Ac-228	Cs-137	Nb-94	Th-234
FALs			5	12.2	4.05	105
A01	566001	0.0 - 0.5	1.47	--	--	--
A02	566002	0.0 - 0.5	1.27	--	--	--
A03	566003	0.0 - 0.5	1.32	--	--	--
A04	566004	0.0 - 0.5	1.31	--	--	--
A05	566005	0.0 - 0.5	1.4	--	--	--
A06	566006	0.0 - 0.5	1.77	--	--	--
	566007	0.0 - 0.5	1.52	--	--	--
A07	566008	0.0 - 0.5	1.28	--	--	--
A08	566009	0.0 - 0.5	1.3	--	--	--
A09	566010	0.0 - 0.5	1.23	--	--	--
A10	566011	0.0 - 0.5	1.34	--	--	--
A11	566012	0.0 - 0.5	1.33	--	--	--
A12	566013	0 - 2 (in.)	1.19	--	--	--
A13	566014	0.0 - 0.5	1.54	--	--	2.01 (J)
A14	566015	0.0 - 0.5	1.44	0.173	--	--
A15	566016	0.0 - 0.5	1.31	--	0.148	--

Table B.3-6
Sample Results for Gamma-Emitting Radionuclides Detected above MDCs at CAS 25-99-20, EMAD Compound
(Page 2 of 2)

Sample Location	Sample Number	Depth (ft bgs)	COPCs (pCi/g)			
			Ac-228	Cs-137	Nb-94	Th-234
FALs			5	12.2	4.05	105
A16	566017	0.0 - 0.5	1.61	--	--	--
A17	566018	0.0 - 0.5	1.76	0.239	0.322	--
A19	566020	0.0 - 0.5	1.44	--	--	--
A20	566021	0.0 - 0.5	1.4	--	--	--
A21	566022	0.0 - 0.5	1.59	0.142	--	--
A22-1	566071	0.0 - 1.0	1.32	--	--	--
A23	566024	0.0 - 0.5	1.55	0.284	--	--
A24	566025	0.0 - 0.5	1.35	0.311	--	--
A25	566027	0.0 - 0.5	1.08	0.301	--	--
A28	566030	0.0 - 0.5	1.53	0.275	--	--
A68	566072	0.0 - 0.5	1.42	--	--	--
A69	566073	0.0 - 0.5	1.21	--	--	--
A70	566074	0.0 - 0.5	1.66	--	0.258	--
A71	566075	0.0 - 0.5	1.69	--	0.123	--
A87	566092	0.0 - 0.5	1.49	--	--	--
A88	566093	0.0 - 0.5	1.36	--	--	--
A113	566118	1.5 - 2.0	1.93	0.536	--	--
A114	566119	1.0 - 1.5	1.8	1.84	1.13	--

J = Estimated value
-- = Not detected above MDCs

Ac = Actinium
Cs = Cesium
Nb = Niobium
pCi/g = Picocuries per gram
Th = Thorium

B.3.2.7 Plutonium, Sr-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 B.3-7. No isotopic Pu or U exceeded the PALs. The FALs were established at the PAL concentrations. See Section 4.2 for information regarding the corrective action of removal of radiologically contaminated soil.

Table B.3-7
Sample Results for Isotopes Detected above MDCs at CAS 25-99-20, EMAD Compound
(Page 1 of 2)

Sample Location	Sample Number	Depth (ft bgs)	COPCs (pCi/g)			
			Sr-90	U-234	U-235	U-238
FALs			838	143	17.6	105
A01	566001	0.0 - 0.5	--	0.49	--	0.525
A02	566002	0.0 - 0.5	--	0.601	--	0.475
A03	566003	0.0 - 0.5	--	0.645	0.055	0.663
A04	566004	0.0 - 0.5	--	0.691	--	0.765
A05	566005	0.0 - 0.5	--	0.646	0.0586	0.551
A06	566006	0.0 - 0.5	--	0.578	--	0.54
	566007	0.0 - 0.5	--	0.925	--	0.886
A07	566008	0.0 - 0.5	--	0.57	0.0535	0.584
A08	566009	0.0 - 0.5	--	0.408	--	0.531
A09	566010	0.0 - 0.5	--	0.665	0.0763	0.646
A10	566011	0.0 - 0.5	--	0.618	--	0.533
A11	566012	0.0 - 0.5	--	0.563	--	0.642
A12	566013	0 - 2 (in.)	--	0.589	--	0.58
A13	566014	0.0 - 0.5	--	0.527	--	0.63
A14	566015	0.0 - 0.5	--	0.686	0.0423	0.756
A15	566016	0.0 - 0.5	--	0.551	--	0.586
A16	566017	0.0 - 0.5	--	0.748	--	0.707
A17	566018	0.0 - 0.5	--	0.674	--	0.626
A18	566019	0.0 - 0.5	--	0.503	--	0.554
A19	566020	0.0 - 0.5	--	0.727	--	0.633

Table B.3-7
Sample Results for Isotopes Detected above MDCs at CAS 25-99-20, EMAD Compound
(Page 2 of 2)

Sample Location	Sample Number	Depth (ft bgs)	COPCs (pCi/g)			
			Sr-90	U-234	U-235	U-238
FALs			838	143	17.6	105
A20	566021	0.0 - 0.5	--	0.665	0.0439	0.682
A21	566022	0.0 - 0.5	--	0.743	--	0.802
A22-1	566071	0.0 - 1.0	--	0.745	--	0.715
A23	566024	0.0 - 0.5	--	0.733	0.0557	0.693
A24	566025	0.0 - 0.5	--	0.672	--	0.711
A25	566027	0.0 - 0.5	--	0.629	0.081	0.686
A28	566030	0.0 - 0.5	--	0.69	0.034	0.721
A68	566072	0.0 - 0.5	--	0.526	--	0.626
A69	566073	0.0 - 0.5	--	0.567	0.0715	0.567
A70	566074	0.0 - 0.5	--	0.846	0.0528	1.02
A71	566075	0.0 - 0.5	--	0.928	0.0617	1.15
A87	566092	0.0 - 0.5	--	0.689	0.0561	0.766
A88	566093	0.0 - 0.5	--	0.68	--	0.597
A113	566118	1.5 - 2.0	--	1.1	0.0887	0.862
A114	566119	1.0 - 1.5	1.13	0.942	0.0766	0.811

-- = Not detected above MDCs.

B.3.2.8 Potential Source Material

Analytical results for PSM samples collected at this CAS that were detected above MDCs are presented in Table B.3-8. Media sampled included oil and aqueous fluids from the cable spool car and MCC/EIV railcars. Analytical data obtained from the samples in Table B.3-8 were also used to determine proper disposal/recycling methods.

Table B.3-8
PSM Results Detected above MDCs for CAS 25-99-20, EMAD Compound

Sample Location	Sample Number	Sample Matrix	Parameter	Result	PSM Criteria	Unit
Container #566005	566512	Oil	Barium	0.469	190,000	mg/kg
			Cadmium	2.75	800	
			Lead	15.8	800	
			Aroclor 1260	**12.5** (J)	2.91	
Composite Drum Nos. 566008 through 566011	566511	Aqueous	Gross Beta	4.47	N/A	pCi/L
			Barium	0.00381 (J)	190,000	mg/L
			Chromium	0.00627	N/A	
			Lead	0.0193	800	
EIV	566516	Oil	Barium	2.17	190,000	mg/kg
			Cadmium	2.61	800	
			Chromium	2.24	N/A	
			Lead	241 (J)	800	
			Mercury	0.0243	34	
			Selenium	3.05	5,100	
MCC	566513	Oil	Arsenic	**639**	23	mg/kg
			Lead	7.92 (J)	800	
MCC	566514	Oil	Barium	0.109 (J)	190,000	mg/kg
			Lead	0.273 (J)	800	
MCC	566515	Oil	Lead	0.141 (J)	800	mg/kg

mg/L = Milligrams per liter
pCi/L = Picocuries per liter

J = Estimated value

Bold indicates the values exceeding the FALs.

B.3.3 Nature and Extent of Contamination

Based on the analytical results for soil samples collected within CAS 25-99-20, PCBs (Aroclor 1254 and 1260) were identified as COCs, and Decision II samples were collected to define the extent of contamination. Environmental samples collected at locations A73 through A76 and A94 were collected to determine the lateral extent of PCB-contaminated soil identified at the southwest

substation (Figure B.3-4). The substation is bounded laterally on the southeast by Building 3900 and to the north by concrete equipment pads. As a limited corrective action, approximately 145 ft^3 of PCB-contaminated soil with concentrations greater than 100 mg/kg was removed to a depth of approximately 1.5 ft bgs around the north, south, and west sides of the transformer pad. Further excavation, remediation, and sampling at the substation location was discontinued due to the extent of contamination in the impacted area, confined work space limitations, and proximity to underground utilities.

Decision II sampling activities included the collection of step-out surface samples around the southeastern substation to define the lateral extent of PCB soil contamination (Figure B.3-5). Surface samples from locations A77 through A82, A86, A89, A92, and A93 define the lateral extent of PCB contamination to the west and south of the substation. However, PCB contamination exceeding the FAL extends beyond the spatial boundaries of the southeast substation to the north and east. These releases are attributable to past uses of PCB-contaminated oil for soil stabilization and dust-suppression activities, and have been grouped into the EMAD Compound Soil Releases CAS component.

Additional Decision II samples (locations A115 through A122) were collected outside the EMAD Compound perimeter fence line to establish the lateral extent of the PCB contamination at CAS 25-99-20 (Figure B.3-8).

B.3.4 Revised Conceptual Site Model

While PCBs were potentially a component of transformer oils formerly used at the site, the PCB contamination in the soil upgradient from the transformers is likely from a separate source. A revision to the CSM was made to include PCB contamination extending beyond the spatial boundaries of the substations (likely due to dust-suppression activities). The CAU 566 SAFER Plan requirements (NNSA/NSO, 2010b) were met at CAS 25-99-20. The proposed UR is adequate for the protection of human health and the environment.

B.4.0 Waste Management

The following sections describe the wastes generated during SAFER activities and their final disposition. For regulated waste, waste management areas were established and managed as specified in the CAU 566 SAFER Plan (NNSA/NSO, 2010b). All wastes were managed in accordance with applicable state and federal regulations, DOE Orders, and the CAU 566 SAFER Plan. A summary of the wastes generated, managed, and dispositioned for CAU 566 is provided in Table 3-1. The major waste streams are also discussed in additional detail below.

B.4.1 Waste Minimization

In an effort to reduce the amount of waste generated during the closure activities, waste minimization techniques were integrated into the field activities. The waste minimization controls included waste segregation, substitution of nonhazardous materials (e.g., water-based marking paint versus solvent-based marking paint), or minimizing the use of hazardous materials to avoid the unnecessary generation of hazardous and/or mixed waste. Recycling techniques were also incorporated into waste disposal activities for CAU 566. Decontamination activities were planned and executed to minimize the volume of rinsate generated.

B.4.2 Waste Characterization

Waste characterization and disposal were based on process knowledge, radiological field surveys, site samples, and direct samples of the waste, as applicable. Characterization and disposal for all waste streams were completed in accordance with state and federal regulations, DOE Orders, and the waste acceptance criteria of the applicable disposal site. The load verification and shipping documentation for CAU 566 are provided in Appendix C. Results of samples above MDCs are provided in Table B.4-1.

B.4.3 Sanitary Waste

Sanitary waste included office trash and discarded packaging materials. The office waste and lunch trash were disposed of in designated sanitary waste bins allocated for disposal at the NNSS sanitary

Table B.4-1
Waste Characterization Results Detected at CAS 25-99-20, EMAD Compound

Sample Location	Sample Number	Depth (in. bgs)	Matrix	Parameter	Result	Criteria (TC Levels)	Units
Container No. 566004	566510	0 - 6	Soil	Arsenic	0.755	5	mg/L
				Barium	0.38	100	
				Lead	**324**	5	
				Silver	0.0122 (J)	5	
Wood Debris Pile	566501	N/A	Solid	Barium	0.171	100	mg/L
				Chromium	0.0104 (J)	5	
Guard Shack Paint Chips	566503	N/A	Solid	Barium	0.21	100	mg/L
				Lead	0.133	5	
				Mercury	0.00443	0.2	
Roofing Debris	566502	N/A	Solid	Barium	0.124	100	mg/L
				Chromium	0.0147 (J)	5	
Wooden Shed Paint Chips	566504	N/A	Solid	Barium	0.267	100	mg/L
				Cadmium	0.0272 (J)	1	
				Lead	**16.9**	5	
				Mercury	0.00172 (J)	0.2	
				Selenium	0.0556 (J)	1	

J = Estimated value
TC = Toxicity characteristic

Bold indicates the values exceeding the TC level.

landfill. Surplus packaging materials (e.g., cardboard boxes, plastic) leftover from equipment/supply deliveries were disposed of in designated sanitary waste bins.

B.4.4 Universal Wastes

The following universal wastes were generated during closure activities at CAU 566:

- Fluorescent light bulbs
- Lead-acid batteries
- Mercury-containing items

B.4.5 Investigation Derived Waste

Investigation-derived waste includes disposable personal protective equipment (PPE) and sampling equipment, and nonhazardous construction debris. Personal protective equipment and disposable sampling equipment generated during the site activities were determined to be nonhazardous waste based on visual inspection and radiological field screening. The waste was bagged, labeled, and placed in a designated sanitary roll-off located at the project site.

The nonhazardous construction debris consisted of concrete, metal, wood, and plastic collected during investigation activities. The debris was visually inspected as generated to verify that it was free of staining or other evidence of hazardous/chemical contamination. Approximately 700,000 lb of nonhazardous construction debris was disposed of at the Area 9 U10c landfill at the NNSS.

B.4.6 Remediation Waste

Remediation waste generated at CAU 566 includes the following waste streams:

- Three drums of soil characterized as hydrocarbon waste.
- Seventeen drums of PCB-containing soil containerized and moved to the NNSS Area 5 Hazardous Pad for disposal to an offsite TSCA waste facility. Soil was generated from hand excavation of soil around the southwest substation pad.
- One drum of used oil and four drums of aqueous waste generated from the draining of the cable spool railcar.
- Two drums of LLW soil generated from an area of soil having elevated radiological readings north of Building 3900.
- Two drums of MLLW consisting of radiologically contaminated cast-iron pipe with lead solder from the Metallurgy Lab trailer process waste drain system.
- One B-25 container with radiologically contaminated HEPA filter assembly with ACM.
- One 20-ft-long cargo container consisting of low-level radioactive contaminated site equipment and debris.
- A B-25 container with MLLW containing remediated soil contaminated with lead shot.

B.5.0 Quality Assurance

This section contains a summary of QA/QC measures implemented during the sampling and analysis activities conducted in support of the CAU 566 CAI. The following sections discuss the data validation process, QC samples, and nonconformances. A detailed evaluation of the DQIs is presented in Section 4.3.

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, 2002a).

B.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 566 were evaluated for data quality in a tiered process described in Sections B.5.1.1 through B.5.1.3. Data were reviewed to ensure that samples were appropriately processed and analyzed, and the results were evaluated using validation criteria. Documentation of the data qualifications resulting from these reviews is retained in project files as a hard copy and electronic media.

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

B.5.1.1 Tier I Evaluation

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

- Sample count/type consistent with chain of custody
- Analysis count/type consistent with chain of custody
- Correct sample matrix

- Significant problems stated in cover letter or case narrative
- Completeness of certificates of analysis
- 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

B.5.1.2 Tier II Evaluation

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

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

- Laboratory control sample %R evaluated and qualifiers applied to laboratory results, as necessary.
- Initial and continuing calibration evaluated and qualifiers applied to laboratory results, as necessary.
- Internal standard evaluation.
- Mass spectrometer tuning criteria.
- Organic compound quantitation.
- Inductively coupled plasma interference check sample evaluation.
- Graphite furnace atomic absorption QC.
- Inductively coupled plasma serial dilution effects.
- Recalculation of 10 percent of laboratory results from raw data.

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

- Correct detection limits achieved.
- Blank contamination evaluated and, if significant, qualifiers applied to sample results.
- Certificate of Analysis consistent with data package documentation.
- Quality control sample results (duplicates, LCSs, laboratory blanks) evaluated and used to determine laboratory result qualifiers.
- Sample results, uncertainty, and MDC evaluated.
- Detector system calibrated with National Institute of Standards and Technology (NIST)-traceable sources.
- Calibration sources preparation was documented, demonstrating proper preparation and appropriateness for sample matrix, emission energies, and concentrations.
- Detector system response to daily or weekly background and calibration checks for peak energy, peak centroid, peak full-width half-maximum, and peak efficiency, depending on the detection system.

- Tracers NIST-traceable, appropriate for the analysis performed, and recoveries that met QC requirements.
- Documentation of all QC sample preparation complete and properly performed.
- Spectra lines, photon emissions, particle energies, peak areas, and background peak areas support the identified radionuclide and its concentration.

B.5.1.3 Tier III Evaluation

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

- Review:
  - case narrative, chain of custody, and sample receipt forms,
  - lab qualifiers (applied appropriately),
  - method of analyses performed as dictated by the chain of custody,
  - raw data, including chromatograms, instrument printouts, preparation logs, and analytical logs,
  - manual integrations to determine whether the response is appropriate,
  - data package for completeness.
- Determine sample results qualifiers through the evaluation of (but not limited to):
  - tracers and QC sample results (e.g., duplicates, LCSs, blanks, MSs) evaluated and used to determine sample results qualifiers,
  - sample preservation, sample preparation/extraction and run logs, sample storage, and holding time,
  - instrument and detector tuning,
  - initial and continuing calibrations,
  - calibration verification (initial, continuing, second source),

- retention times,
- second column and/or second detector confirmation,
- mass spectra interpretation,
- Interference check samples and serial dilutions,
- post-digestion spikes and method of standard additions,
- breakdown evaluations.

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

B.5.2 Field QC Samples

Field QC samples consisted of nine trip blanks, one field blank, and seven FDs collected and submitted for analysis by the laboratory analytical methods shown in Table B.2-2. The QC samples were assigned individual sample numbers and sent to the laboratory "blind." Additional samples were collected to be analyzed as laboratory duplicates.

Review of the field blank analytical data resulted in one acetone result being 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 B.2-2, and trip blanks were analyzed for VOCs only. The field blank did have methylene chloride detected in the sample.

During the CAI, five FDs were sent as blind samples to the laboratory to be analyzed for the investigation parameters listed in Table B.2-2. For these samples, the duplicate results precision

(i.e., RPDs between the environmental sample results and their corresponding FD sample results) were evaluated.

B.5.2.1 Laboratory QC Samples

Analysis of preparation QC blanks (PB) were performed on each sample delivery group (SDG) for inorganics. Analysis for surrogate spikes and method blanks were performed on each SDG for organics only. Initial and continuing calibration and LCSs were performed for each SDG. Documentation of data qualifications resulting from the application of these guidelines is retained in project files as both hard copy and electronic media.

The laboratory included a PB, LCS, and a laboratory duplicate sample with each batch of field samples analyzed for radionuclides.

B.5.3 Field Nonconformances

There were no field nonconformances identified for the CAI.

B.5.4 Laboratory Nonconformances

Laboratory nonconformances are generally due to inconsistencies in the analytical instrumentation operation, sample preparations, extractions, missed holding times, and fluctuations in internal standard and calibration results. Laboratory nonconformances were accounted for and resolved during the data qualification process.

B.6.0 Summary

Organic, inorganic, and radionuclide contaminants detected in environmental samples during the CAI were evaluated against FALs to determine the nature and extent of COCs for CAU 566. Assessment of the analytical data from collected soil samples indicates the FALs were exceeded for PCBs (Aroclors 1221, 1232, 1242, 1248, 1254, 1260, and 1268) and SVOCs [benzo(a)pyrene, dibenzo(ah)anthracene, hexachlorobenzene, 2,4-dinotrotoluene, 4-chloroanaline, benzo(a)anthracene, indeno(1,2,3-cd)pyrene, benzo(b)fluoranthene, and pentachlorophenol].

Aroclor 1254 and 1260 was detected in samples exceeding the FAL at the substations and EMAD Compound Soil Releases CAS components. The CSM for the Substations CAS component assumed the transformers to be the primary source of PCB contamination. Due to the discovery of PCBs at multiple locations outside the immediate area surrounding the substations, the CSM was revised to include two sources for the PCB contamination at CAU 566. While PCB concentrations in soil are the highest near the substations, PCB contamination has been detected at 109 locations within the CAU 566 fenced compound and in 8 samples located outside the fenced compound. The source of the PCB contamination at CAU 566 could be partially due to spills or releases from the PCB-containing transformers; however, the contamination outside the immediate areas of the substations is likely due to historical application of PCB-containing oil for soil stabilization, dust suppression, or the importing of PCB-contaminated soil from other areas at the NNSS.

The remaining Aroclors (1221, 1232, 1242, 1248, and 1268) failed the sensitivity criteria defined in the SAFER Plan (NNSA/NSO, 2010b). Because it cannot be determined that these contaminants are present below their corresponding FALs, it was conservatively assumed they are COCs.

Semivolative organic compound contamination was discovered at CAU 566. Benzo(a)pyrene was detected above the FAL in a single sample (566034) located at the southeast substation. Except for sample 566034, all other SVOCs were detected at concentrations below their respective FALs. However, sample numbers 566001 through 566004 of hydrocarbon-stained soil under the two 120-ton locomotives failed the sensitivity criteria for several SVOCs, including benzo(a)pyrene, dibenzo(ah)anthracene, hexachlorobenzene, 2,4-dinotrotoluene, 4-chloroanaline, benzo(a)anthracene, indeno(1,2,3-cd)pyrene, benzo(b)fluoranthene, and pentachlorophenol. Because it cannot be

determined that these contaminants are present below their corresponding FALs, it was conservatively assumed these contaminants are COCs.

Under a corrective action, the cast-iron pipe drain system associated with the Metallurgy Lab drain system was disassembled, size reduced, and dispositioned. The radiologically contaminated piping was packaged and managed as LLW. The cast-iron bell-type fittings were segregated and packaged as MLLW due to the presence of lead solder in each joint. Corrective actions were also implemented to remove radiologically contaminated soil at three locations assumed to be former storage or staging areas for equipment or debris. The three locations were identified during visual surveillance and radiological walkover surveys of the site, and include the following:

- One area with two co-located soil areas of elevated radioactivity, approximately 1 ft^2 each, within an approximate 4-ft^2 area near the southwest corner of the Metallurgy Lab trailer. A corrective action of removal was performed. Approximately 1.5 ft^3 of radiologically contaminated soil was containerized and dispositioned as LLW. Analytical results from the verification samples confirmed that remaining soil did not exceed FALs, and the area was backfilled with native soil.

- The second area as an approximate 5-ft^2 radiologically contaminated area located approximately 100 ft north of Building 3900. A corrective action of removal was implemented to remove and package approximately 15 ft^3 of radiologically contaminated soil. The soil was containerized and dispositioned as LLW. Analytical results from the verification samples confirmed that remaining soil did not exceed FALs. The area was backfilled with native soil.

- The third area consisted of a corrective action to remove approximately 90 ft^3 of radiologically contaminated soil and lead shot located on the south side of Building 3900. The contaminated soil and lead shot was excavated and containerized. Analytical results from verification samples confirmed that the remaining soil did not exceed FALs, and the area was backfilled with native soil.

During the CAI, electrical and lighting components, and other building materials assumed to be PSM were removed as a corrective action from the guard shack, wooden sheds, trailers, and railcars as practical, without sampling. These materials include the following:

- Fluorescent light bulbs
- Mercury switches (thermostats)
- Circuit boards
- PCB-containing ballasts
- Fuels, lubricants, engine coolants, and oils

- Lead debris
- Lead-acid batteries
- Radiologically contaminated filters and equipment

Closure of CAU 566 was achieved through a combination of removal activities and closure in place. Corrective actions to remove COCs, and known and assumed PSMs were implemented as practical. The PCBs and SVOCs remaining at the site above the FALs are bounded within CAS 25-99-20 and will be Use Restricted. This will effectively eliminate inadvertent contact by humans with the contaminated media.

B.7.0 References

BN, see Bechtel Nevada.

Bechtel Nevada. 1995. *Nevada Test Site Performance Objective for Certification of Nonradioactive Hazardous Waste*, Rev. 0, G-E11/96.01. Las Vegas, NV.

CFR, see *Code of Federal Regulations*.

Code of Federal Regulations. 2010. Title 40 CFR, Part 763, "Asbestos." Washington, DC: U.S. Government Printing Office.

DOE, see U.S. Department of Energy.

EPA, see U.S. Environmental Protection Agency.

HHS, see U.S. Department of Health and Human Services.

Murphy, T., Bureau of Federal Facilities. 2004. Letter to R. Bangerter (NNSA/NSO) titled "Review of Industrial Sites Project Document *Guidance for Calculating Industrial Sites Project Remediation Goals for Radionuclides in Soil Using the Residual Radiation (RESRAD) Computer Code*," 19 November. Las Vegas, NV.

NIOSH, see National Institute for Occupational Safety and Health.

N-I GIS, see Navarro-Intera Geographic Information Systems.

NNES, see Navarro Nevada Environmental Services, LLC.

NNSA/NV, see U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office.

NNSA/NSO, see U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office.

National Institute for Occupational Safety and Health. 1994. *NIOSH Manual of Analytical Methods (NMAM)*, 4th ed. Publication 94-113. August. P.M. Eller and M.E. Cassinelli eds. Cincinnati, OH: U.S. Department of Health and Human Services.

Navarro-Intera Geographic Information Systems. 2011. ESRI ArcGIS Software.

Navarro Nevada Environmental Services, LLC. 2009. *Statement of Work for Analytical Laboratories*, Section C. Las Vegas, NV.

RSL, see Remote Sensing Laboratory.

Remote Sensing Laboratory. 2000. Aerial photograph "10292-254," 2 February. Las Vegas, NV.

U.S. Department of Energy. 1997. *The Procedures Manual of the Environmental Measurements Laboratory*, HASL-300. 28th Ed., Vol. I. February. New York, NY.

U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office. 2002a. *Industrial Sites Quality Assurance Project Plan, Nevada Test Site, Nevada*, Rev. 3, DOE/NV--372. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office. 2002b. *Nevada Test Site Orthophoto Site Atlas*, DOE/NV/11718--604. Aerial photos acquired Summer 1998. Prepared by Bechtel Nevada. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2006. *Industrial Sites Project Establishment of Final Action Levels*, DOE/NV--1107, Rev. 0. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2010a. *Nevada Test Site Radiological Control Manual*, DOE/NV/25946--801, Rev. 1. Prepared by Radiological Control Managers' Council. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2010b. *Streamlined Approach for Environmental Restoration for Corrective Action Unit 566: EMAD Compound, Nevada National Security Site, Nevada*, Rev. 0, DOE/NV--1392. Las Vegas, NV.

U.S. Department of Health and Human Services. 2000. *Toxicological Profile for Polychlorinated Biphenyls (PCBs)*. November. Atlanta, GA: Agency for Toxic Substances and Disease Registry.

U.S. Environmental Protection Agency. 1980. *Prescribed Procedures for Measurement of Radioactivity in Drinking Water*, EPA 600/4-80-032. Cincinnati, OH: Environmental Monitoring and Support Laboratory Office of Research and Development.

U.S. Environmental Protection Agency. 2009. *SW-846 On-Line, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* As accessed at http://www.epa.gov/epawaste/hazard/testmethods/sw846/index.htm on 4 May.

Appendix C

Waste Disposition Documentation

(40 Pages)

NTS On-Site HazMat Transfer - Published

Tracking No: DPM11006 **Mesa Number:**
Carrier: NSTEC
Vehicle: G820657D
Driver: RUSSELL CROZIER

Depart: 02-MAR-2011 Arrival: 02-MAR-2011

From: THERESA HALE
NSTEC
BASE CAMP
E-MAD
MERCURY, NV 89023
Area: 25
Bldg: 3900
Phone: 702-295-1672
Mobile: 702-875-6938

To: LOUIS GREGORY
NSTEC
BASE CAMP
TRU PAD
MERCURY, NV 89023
Area: 05
Bldg: 024
Phone: 702-295-2799
Mobile: 702/596-9414

Entered By: THERESA HALE
Modified By: THERESA HALE

Date Entered: 28-FEB-2011
Date Modified: 28-FEB-2011

Shipped Material(s)	Package(s)	Unit(s)	Guide No.
UN/NA 3077, HAZARDOUS WASTE, SOLID, N.O.S., 9, PG III (LEAD) PACKAGE # 566006	1 BOX, B-25	2737.00 KILOGRAM(S) (GROSS)	171

Emergency Response Number
702-295-0311

Secondary Emergency Response Contact And/Or Comments
WILLIAM NICOSIA 702-630-0223

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

EMERGENCY RESPONSE

By Phone
702-295-0311

By Radio
'MAYDAY - MAYDAY - MAYDAY'

In the event of an incident involving Hazardous Material:

1. Gather HazMat shipping papers and NAER Guidebook
2. Isolate the immediate area
3. Assess the situation:
   a. Fire, Spill, or Leak?
   b. People, Property, or the Environment at risk?
4. Contact On-site Emergency Response Personnel
5. Reference On-Site HazMat Transfer Tracking Number

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

Authorized Signature: /s/ Signature on File Date: 3-2-11 Time: 1355

Received by: /s/ Signature on File Date: 02-MAR-2011 Time: 1455

566006

UNCONTROLLED When Printed

NSTec Form FRM-0266

ONSITE WASTE TRANSPORT MANIFEST

04/10/08 Rev. 01

Manifest Document No.: 1 1 N 1 9

Page 1 of 1

Generation/Out-of-Service Date: 03/23/11

1. Generator's Name, Organization, and Location: (Please Print)
Navarro-Intera / Mark Heser
NNSS A-25 EMAD, CAU 566, CAS 25-99-20
5B1B 7604

Generator's Phone : (295) 2124

2. Receiving Facility, Organization, Location: (Please Print)
Hazardous Waste Storage Unit
WGS/Hazardous Waste Operations, H120
NNSS A-5, Bldg. 5-20

Contact Phone: (630) 0235

3a. Transporter Name: *(Please Print)* C. Carlos Gonzales — Transport Date: 03/23/11

3b. Vehicle I.D. Number: G63-1104D

	4. U.S. D.O.T. Description. Include: EPA Waste Code and Package Tracking Numbers.	HM		5. Containers No.	5. Containers Type	6. Total Quantity	7. Unit Wt./Vol.
a	NA3077, Hazardous Waste, solid, n.o.s. (lead, silver), 9, III D008, D011 # NS-NSS-11-0026 566001	X		1	DM	180	P
b	UN3432, Polychlorinated biphenyls, solid, 9, III #NS-NSS-11-0027 566002	RQ		1	DM	60	K
c	UN2809, Waste Mercury, 8, III D009 #NS-NSS-11-0028 566018	X		1	DF	6	P
d							
e							
f							
g							

Use continuation pages for additional items, as necessary.

8. Special Handling Instructions/Additional Information: 24-Hour emergency contact: 702 - 295-0311 / Secondary: B Bushnell 506-7639 (Name & phone no.)

a) ERG 171. 55-gal DM containing spent printed circuit boards. 1A2/X425/S. NI-SAA-010.
b) ERG 171. 55-gal DM containing intact non-leaking PCB light ballasts. O.S.D. 11/09/10. 140 lbs. 1A2/X425/S.
c) ERG 172. 5-gal DF with Hg containing articles. 1H2/Y30/S. NI-SAA-012

9. Released by: (Signature) /s/ Mark Heser — Date: 3/23/11 03/23/11

10. Received for Transport by: (Signature) /s/ Signature on file — Date: 03/23/11

11. Discrepancy Indication: Item 6b: Actual weight is 154 lbs + 61 K. BSB 3/23/11

12. Disposal/Accumulation Site Signature: *(Acknowledges acceptance of waste)* /s/ Signature on file — Date: 03/23/11

NSTec Form FRM-0266

04/10/08 Rev. 01

ONSITE WASTE TRANSPORT MANIFEST

Manifest Document No.: 1 1 N 2 4

Generation/Out-of-Service Date: See Below

1. Generator's Name, Organization, and Location: (Please Print)
Navarro-Intera / Mark Heser
NNSS A-25 EMAD, CAU 566, CAS 25-99-20
5B1B 7604

Generator's Phone : (295) 2124

2. Receiving Facility, Organization, Location: (Please Print)
Hazardous Waste Storage Unit
WGS/Hazardous Waste Operations, H120
NNSS A-5, Bldg. 5-20

Contact Phone: (630) 0235

3a. Transporter Name: *(Please Print)* Jack Rose

Transport Date: 03/31/11

3b. Vehicle I.D. Number: G82 0657D

		4. U.S. D.O.T. Description. Include: EPA Waste Code and Package Tracking Numbers.	5. Containers No.	5. Containers Type	6. Total Quantity	7. Unit Wt./Vol.
	HM	UN3077, Environmentally hazardous substances, solid, n.o.s., 9, III (PCB) #NS-NSS-11-0032 through NS-NSS-11-0039 O.S.D. 03/03/11	8	DM	2077	K
a	RQ					
b	RQ	UN3077, Environmentally hazardous substances, solid, n.o.s., 9, III (PCB) #NS-NSS-11-0040 through NS-NSS-11-0045 O.S.D. 03/07/11	6	DM	1760	K
c	RQ	UN3077, Environmentally hazardous substances, solid, n.o.s., 9, III (PCB) #NS-NSS-11-0046 through NS-NSS-11-0048 O.S.D. 03/08/11	3	DM	871	K
d						
e						
f						
g						

Use continuation pages for additional items, as necessary.

8. Special Handling Instructions/Additional Information: 24-Hour emergency contact: 702 - 295-0311 / Secondary: B Bushnell 506-7639 (Name & phone no.)

a) ERG 171. 8 ea 55-gal drums of PCB contaminated soil. O.S.D. 03/03/11
b) ERG 171. 6 ea 55-gal drums of PCB contaminated soil. O.S.D. 03/07/11
c) ERG 171. 3 ea 55-gal drums of PCB contaminated soil. O.S.D. 03/08/11

9. Released by: (Signature) /s/ Mark Heser — Date: 03/31/11

10. ~~Received~~ for Transport by: (Signature) /s/ Signature on file — Date: 03/31/11

11. Discrepancy Indication:

12. Disposal/Accumulation Site Signature: *(Acknowledges acceptance of waste)* /s/ Signature on file — Date: 03/31/11

566020 Through 566036

NTS On-Site HazMat Transfer - Published

COPY

Tracking No: 20110412083654 **Mesa Number:**
Carrier: NSTEC
Vehicle: G820657D
Driver: MICHAEL SMITH

Depart: 14-APR-2011 Arrival: 14-APR-2011

From: ROBERT ZION
NSTEC
BASE CAMP
E-MAD
MERCURY, NV 89023
Area: 25
Bldg: 3900
Phone: 702/295-4594
Mobile: 702/466-4231

To: ROBERT ZION
NSTEC
BASE CAMP
MERCURY, NV 89023

Area: 25
Bldg: TEST CELL C
Phone: 702-295-4594
Mobile: 702-466-4231

Entered By: ROBERT ZION
Modified By: ROBERT ZION

Date Entered: 12-APR-2011
Date Modified: 14-APR-2011

Shipped Material(s)	Package(s)	Unit(s)	Guide No.
UN/NA 2910, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE, LIMITED QUANTITY OF MATERIAL, 7 WASTE RADIONUCLIDES: CS-137, SR-90, U-234, U-235, U-238. PHYSICAL FORM: SOLID. CHEMICAL FORM: OXIDE. PACKAGE ACTIVITY: PKG# 556015- 1.06E+07 BQ, PKG# 556016- 7.75E+06 BQ. CATEGORY: FISSILE EXCEPTED. ON-SITE TRANSFER. LEAD (D008)	2 DRUM	480.00 POUND(S) (GROSS)	161

Emergency Response Number
702-295-0311

Secondary Emergency Response Contact And/Or Comments
STEFAN DUKE 702/630-0423

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

EMERGENCY RESPONSE

By Phone
702-295-0311

By Radio
'MAYDAY - MAYDAY - MAYDAY'

In the event of an incident involving Hazardous Material:

1. Gather HazMat shipping papers and NAER Guidebook
2. Isolate the immediate area
3. Assess the situation:
   a. Fire, Spill, or Leak?
   b. People, Property, or the Environment at risk?
4. Contact On-site Emergency Response Personnel
5. Reference On-Site HazMat Transfer Tracking Number

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

Authorized Signature: /s/ Robert H. Zion Date: 4/14/11 Time: 0950

Received by: /s/ Robert H. Zion Date: 4/14/11 Time: 1020

(5)

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

08/23/06 Rev. 0 Page 1 of 2

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.) FAX -5-2241

Waste Generator: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56803 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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:

☐ Asphalt ☒ Metal ☒ Wood ☒ Soil ☐ Rubber (excluding tires) ☒ Empty containers
☒ Plastic ☒ Wire ☐ Cable ☒ Cloth ☒ Insulation (non-Asbestosform) ☒ Demolition debris
☒ Manufactured items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.) ☒ Cement & concrete

Additional waste accepted at the Area 23 Mercury Landfill: ☐ Office Waste ☐ Food Waste ☐ Animal Carcasses
☐ Asbestos ☐ Friable ☐ Non-Friable (contact SWO if regulated load) Quantity: _____

Additional waste accepted at the Area 9 U10c Landfill:

☐ Non-friable asbestos ☐ Drained automobiles and military vehicles ☐ Solid fractions from sand/oil/water
☐ Light ballasts (contact SWO) ☒ Drained fuel filters (gas & diesel) ☐ Deconned Underground and Above
☒ Hydrocarbons (contact SWO) ☐ Other _____ Ground Tanks

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

☐ Septic 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 Managem knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

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

Radiological Survey Release for Waste Disposal
RCT Initials

___ This container/load meets the criteria for no added man-made radioactive material
X 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/ Signature on file DATE: 1-20-11

BN-0646 (10/0

BN-0646 (10/05)

SWO USE ONLY

Load Weight (net from scale or estimate): 9,700 1/20/11 Signature of Certifier: /s/ Signature on file

Shipment # 1 of 30

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

(10)

08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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:

☐ Asphalt ☒ Metal ☒ Wood ☒ Soil ☐ Rubber (excluding tires) ☒ Empty containers
☒ Plastic ☒ Wire ☐ Cable ☒ Cloth ☒ Insulation (non-Asbestosform) ☒ Demolition debris
☒ Paper ☒ Rocks / unaltered geologic materials ☒ 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 _____

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

☐ Septic sludge ☐ Rags ☐ Drained fuel filters (gas & diesel) ☐ Crushed non-teme 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 Manageme knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

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

Radiological Survey Release for Waste Disposal
RCT Initials

____ This container/load meets the criteria for no added man-made radioactive material
__X__ 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/ Signature on file **DATE:** 1-20-11

BN-0646 (10/0

SWO USE ONLY

Load Weight (net from scale or estimate): 5000 1/20/11 Signature of Certifier: /s/ Signature on file

shipment # 2 of 30

(11)

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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 _____	

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

☐ Septic sludge	☐ Rags	☐ Drained fuel filters (gas & diesel)	☐ Crushed non-teme 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 Managem knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

Radiological Survey Release for Waste Disposal

RCT Initials

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

X 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/ Signature on file DATE: 1-20-1

BN-0646 (10/0

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

SWO USE ONLY

Load Weight (net from scale or estimate): 12.220 1/20/11 Signature of Certifier: /s/ Signature on file

shipment # 3 of 30

(1)

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

08/23/06 Rev. 0 Page 1 of 2

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 GENERATOR INFORMATION

(This form is for rolloffs, dump trucks, and other onsite disposal of materials.)

Waste Generator: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

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:

☐ Asphalt ☒ Metal ☒ Wood ☒ Paper ☒ Rocks / unaltered geologic materials ☒ Empty containers
☒ Plastic ☒ Wire ☐ Cable ☒ Soil ☐ Rubber (excluding tires) ☒ Demolition debris
☒ 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 _____

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

☐ Septic sludge ☐ Rags ☐ Drained fuel filters (gas & diesel) ☐ Crushed non-teme 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 Manageme knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

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

Radiological Survey Release for Waste Disposal

RCT Initials

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

X 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/ Signature on file DATE: 1-25-11

BN-0646 (10/05)

SWO USE ONLY

Load Weight (net from scale or estimate): 13400 1/25/11 Signature of Certifier: /s/ Signature on file

Shipment #4 of 30

NSTec Form FRM-0918	NTS LANDFILL LOAD VERIFICATION	08/23/06 Rev. 0 Page 1 of 2

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 GENERATOR INFORMATION

(This form is for rolloffs, dump trucks, and other onsite disposal of materials.)

Waste Generator: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

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:

☐ 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 _____

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

☐ Septic sludge ☐ Rags ☐ Drained fuel filters (gas & diesel) ☐ Crushed non-teme 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 Manag knowledge, does not contain radiological materials.

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

Radiological Survey Release for Waste Disposal
RCT Initials
_____ "This container/load meets the criteria for no added man-made radi[illegible]
X This container/load meets the criteria for Radcon Manual Table 4.2 release limits.
_____ This container/load is exempt from su due to process knowledge and origin.
SIGNATURE: /s/ Signature on file **DATE:** 1-26-11
BN-0646 (10/05)

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

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

SWO USE ONLY

Load Weight (net from scale or estimate): 16,500 lbs 1/25/11 Signature of Certifier: /s/ Signature on file

shipment #5 of 30

NSTec Form FRM-0918	NTS LANDFILL LOAD VERIFICATION	08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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 _____

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

☐ Septic sludge ☐ Rags ☐ Drained fuel filters (gas & diesel) ☐ Crushed non-teme 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 Manage knowledge, does not contain radiological materials.

To the best of my knowledge, the waste described above contains only those mat site. I have verified this through the waste characterization method identified abo prohibited and allowable waste items. I have contacted Property Management an is approved for disposal in the landfill.

Radiological Survey Release for Waste Disposal
RCT Initials
This container/load meets the criteria for no added man-made radioactive material
X This container/load meets the criteria for Radcon Manual Table 2-2 release limits.
This container/load is exempt from survey due to historical knowledge and origin.
/s/ Signature on file DATE 1-25-11
SIGNATURE
BN-3648 (10/06)

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

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

SWO USE ONLY

Load Weight (net from scale or estimate): 15800 1/25/11 Signature of Certifier: /s/ Signature on file

Shipment # 6 of 30

(3)

NSTec Form FRM-0918 | 08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI. WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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 _____	

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

☐ Septic sludge	☐ Rags	☐ Drained fuel filters (gas & diesel)	☐ Crushed non-teme 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 Managem knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

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

Radiological Survey Release for Waste Disposal
RCT Initials
_____ This container/load meets the criteria for no added man-made radioactive material.
X This container/load meets the criteria for Radcon Manual Table 4-2 release limits.
_____ This container/load is exempt from [illegible] due to process knowledge and weight.
SIGNATURE: /s/ Signature on file DATE: 1-25-11
BN-0645 (10/05)

SWO USE ONLY

Load Weight (net from scale or estimate): 8500 Signature of Certifier: 1/25/11 /s/ Signature on file

Shipment #1 of 30

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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:

☐ Asphalt ☒ Metal ☒ Wood ☒ Soil ☐ Rubber (excluding tires) ☒ Empty containers
☒ Plastic ☒ Wire ☐ Cable ☒ Cloth ☒ Insulation (non-Asbestosform) ☒ Demolition debris
☒ Manufactured items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.) ☒ Cement & concrete

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 _____

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 Manageme knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

Radiological Survey Release for Waste Disposal
RCT Initials

____ This container/load meets the criteria for no added man-made radioactive material
X 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/ Signature on file DATE: 1-27-11

BN-0645 (10/0

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

SWO USE ONLY

Load Weight (net from scale or estimate): 15,440 1-27-11 Signature of Certifier: /s/ Signature on file

Shipment # 8 of 30

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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 _____	

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

☐ Septic sludge	☐ Rags	☐ Drained fuel filters (gas & diesel)	☐ Crushed non-teme 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 Manager knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-27-11

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

Radiological Survey Release for Waste Disposal

RCT Initials

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

X 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/ Signature on file **DATE:** 1-27-11

BN-0646 (10/05)

SWO USE ONLY

Load Weight (net from scale or estimate): 15900 1/27/11 Signature of Certifier: /s/ Signature on file

Shipment # 9 of 30

#3

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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:

☐ 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.) ☒ Paper ☒ Rocks / unaltered geologic materials ☒ Empty containers

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 _____

Additional waste accepted at the Area 6 Hydrocarbon Landfill: ☐

☐ Septic sludge ☐ Rags ☐ Drained fuel filters (gas & diesel) ☐ Crushed non-teme 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 Manageme knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser **Date:** 1-7-11

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

Radiological Survey Release for Waste Disposal

RCT Initials

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

X 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/ Signature on file **DATE:** 2-1-11

BN-0646 (10/0

SWO USE ONLY

Load Weight (net from scale or estimate): 10740 2/1/11 Signature of Certifier: /s/ Signature on file

Shipment #12 of 30

11

NSTec Form FRM-0918 | **NTS LANDFILL LOAD VERIFICATION** | 08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 58603 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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:

☐ Asphalt ☒ Metal ☒ Wood ☒ Paper ☒ Soil ☒ Rocks / unaltered geologic materials ☐ Rubber (excluding tires) ☒ Empty containers ☒ 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 _____

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 Manageme knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

Radiological Survey Release for Waste Disposal
RCT Initials

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

X 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/ Signature on file DATE: 2-1-1

BN-0648 (10/0

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

SWO USE ONLY

Load Weight (net from scale or estimate): 12,040 Signature of Certifier: 2/1/11 /s/ Signature on file

Shipment # 11 of 30

(8)

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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:

☐ Asphalt	☒ Metal	☒ Wood	☒ Soil	☐ Rubber (excluding tires)	☒ Empty containers
☒ Plastic	☒ Wire	☐ Cable	☒ Cloth	☒ Insulation (non-Asbestosform)	☒ Demolition debris
☒ Manufactured items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.)					☒ Cement & concrete

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 _____	

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

☐ Septic sludge	☐ Rags	☐ Drained fuel filters (gas & diesel)	☐ Crushed non-teme 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 Manageme knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

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

Radiological Survey Release for Waste Disposal

RCT Initials

X — **This container/load meets the criteria for no added man-made radioactive material**

— **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/ Signature on file **DATE:** 2-1-11

BN-0548 (10/05)

SWO USE ONLY

Load Weight (net from scale or estimate): 31,700 2/1/11 Signature of Certifier: /s/ Signature on file

DPS

Shipment # 18 of 30

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

08/23/06 Rev. 0 Page 1 of 2

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 GENERATOR INFORMATION

(This form is for rolloffs, dump trucks, and other onsite disposal of materials.)

Waste Generator: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

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:

☐ Asphalt ☒ Metal ☒ Wood ☒ Soil ☐ Rubber (excluding tires) ☒ Empty containers
☒ Plastic ☒ Wire ☐ Cable ☒ Cloth ☒ Insulation (non-Asbestosform) ☒ Demolition debris
☒ Manufactured items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.) ☒ Paper ☒ Rocks / unaltered geologic materials ☒ Cement & concrete

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 _____

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 Managem knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

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

Radiological Survey Release for Waste Disposal

RCT Initials

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

X 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/ Signature on file **DATE:** 2-8-11

BN-0646 (10/05)

SWO USE ONLY

Load Weight (net from scale or estimate): 26,100 2-8-11 Signature of Certifier: /s/ Signature on file

2-8-11 MeB

Shipment #13 of 30

NSTec Form FRM-0918	NTS LANDFILL LOAD VERIFICATION	08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 586 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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:

☐ Asphalt	☒ Metal	☒ Wood	☒ Paper	☒ Rocks / unaltered geologic materials		☒ Empty containers
☒ Plastic	☒ Wire	☐ Cable	☒ Soil	☐ Rubber (excluding tires)		☒ Demolition debris
☒ Manufactured items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.)			☒ Cloth	☒ Insulation (non-Asbestosform)		☒ Cement & concrete

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 _____	

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

☐ Septic sludge	☐ Rags	☐ Drained fuel filters (gas & diesel)	☐ Crushed non-teme 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 Managem knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

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

Radiological Survey Release for Waste Disposal
RCT Initials

- ___ This container/load meets the criteria for no added man-made radioactive material
- X 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/ Signature on file **DATE:** 1-7-11

BN-064G (10/05

SWO USE ONLY

Load Weight (net from scale or estimate): 23 340 2-8-11 Signature of Certifier: /s/ Signature on file

2-8-11 MCB

Shipment # 14 of 30

(7)

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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:

☐ Asphalt	☒ Metal	☒ Wood	☒ Soil	☐ Rubber (excluding tires)	☒ Empty containers	
☒ Plastic	☒ Wire	☐ Cable	☒ Cloth	☒ Insulation (non-Asbestosform)	☒ Demolition debris	
☒ Manufactured items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.)					☒ Cement & concrete	

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 _____	

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

☐ Septic sludge	☐ Rags	☐ Drained fuel filters (gas & diesel)	☐ Crushed non-teme 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 Manager knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

Radiological Survey Release for Waste Disposal

RCT Initials

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

X 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/ Signature on file **DATE:** 2-8-11

BN-0648 (10/05)

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

SWO USE ONLY

Load Weight (net from scale or estimate): 35,260 Signature of Certifier: /s/ Signature on file

2-8-11 Load 3
Cask #1 MCB. Shipment #15 of 30

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

08/23/06 Rev. 0 Page 1 of 2

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 GENERATOR INFORMATION

(This form is for rolloffs, dump trucks, and other onsite disposal of materials.)

Waste Generator: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56803 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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:

☐ Asphalt ☒ Metal ☒ Wood ☒ Soil ☐ Rubber (excluding tires) ☒ Empty containers
☒ Plastic ☒ Wire ☐ Cable ☒ Cloth ☒ Insulation (non-Asbestosform) ☒ Demolition debris
☒ 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 _____

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

☐ Septic sludge ☐ Rags ☐ Drained fuel filters (gas & diesel) ☐ Crushed non-teme 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 Manager knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

Radiological Survey Release for Waste Disposal
RCT Initials

___ This container/load meets the criteria for no added man-made radioactive material
X 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/ Signature on file **DATE:** 2-7-11

BN-0648 (10/05)

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

SWO USE ONLY

Load Weight (net from scale or estimate): 26,420 Signature of Certifier: /s/ Signature on file

2-8-11 Load #4
wood debris MCB

shipment #16 of 30

(6)

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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:

☐ Asphalt ☒ Metal ☒ Wood ☒ Paper ☒ Rocks / unaltered geologic materials ☒ Empty containers
☒ Plastic ☒ Wire ☐ Cable ☒ Soil ☐ Rubber (excluding tires) ☒ Demolition debris
☒ 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 _____

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

☐ Septic sludge ☐ Rags ☐ Drained fuel filters (gas & diesel) ☐ Crushed non-teme 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 Manage knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

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

Radiological Survey Release for Waste Disposal
RCT Initials

___ This container/load meets the criteria for no added man-made radioactive material
X 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/ Signature on file **DATE:** 2-8-11

BN-0848 (10/05)

SWO USE ONLY

Load Weight (net from scale or estimate): 37620 Signature of Certifier: /s/ Signature on file

2/8/11 WOOD DEBRIS
MCB

Shipment #12 of 30

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard, Container # 56603 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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:

☐ Asphalt	☒ Metal	☒ Wood	☒ Soil	☐ Rubber (excluding tires)	☒ Empty containers
☒ Plastic	☒ Wire	☐ Cable	☒ Cloth	☒ Insulation (non-Asbestosform)	☒ Demolition debris
☒ Manufactured items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.)					☒ Cement & concrete

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 _____	

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 Managem knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

Radiological Survey Release for Waste Disposal

RCT Initials

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

X 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/ Signature on file **DATE:** 2-10-11

BN-0646 (10/05)

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

SWO USE ONLY

Load Weight (net from scale or estimate): 35,400 2-10-11 Signature of Certifier: /s/ Signature on file

Shipment # 18 of 30

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56803 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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 _____	

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 Managem knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

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

Radiological Survey Release for Waste Disposal

RCT Initials

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

_L_ 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/ Signature on file DATE: 2-10-1

BN-0648 (10/0

SWO USE ONLY

Load Weight (net from scale or estimate): 18,180 2-10-11 Signature of Certifier: /s/ Signature on file

Shipment #19 of 30

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 565 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

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:

☐ Asphalt	☒ Metal	☒ Wood	☒ Soil	☐ Rubber (excluding tires)	☒ Empty containers	
☒ Plastic	☒ Wire	☐ Cable	☒ Cloth	☒ Insulation (non-Asbestosform)	☒ Demolition debris	
☒ Paper	☒ Rocks / unaltered geologic materials				☒ 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 _____	

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 Manageme knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

Radiological Survey Release for Waste Disposal
RCT Initials
_____ This container/load meets the criteria for no added man-made radioactive material
_____ 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/ Signature on file DATE: 1/10/11

BN-0646 (10/05)

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

SWO USE ONLY

Load Weight (net from scale or estimate): 14,640 2-14-11 Signature of Certifier: /s/ Signature on file

Shipment #20 of 30

NSTec Form FRM-0918

Trailer # 067008

NTS LANDFILL LOAD VERIFICATION

08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard, Container # 56603 - Bulk Industrial Debris

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.) (non friable mastic on roof)

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 ____

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

☐ Septic sludge ☐ Rags ☐ Drained fuel filters (gas & diesel) ☐ Crushed non-teme 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 Manage knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

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

Radiological Survey Release for Waste Disposal
RCT Initials
____ This container/load meets the criteria for no added man-made radioactive material
X 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/ Signature on file DATE: 3-8-11

BN-0646 (10/05)

SWO USE ONLY

Load Weight (net from scale or estimate): 23,500 3-8-11 Signature of Certifier: /s/ Signature on file

Shipment # 21 of 30

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)486-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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 _____	

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

☐ Septic sludge	☐ Rags	☐ Drained fuel filters (gas & diesel)	☐ Crushed non-teme 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 Manageme knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

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

Radiological Survey Release for Waste Disposal
RCT Initials

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

X 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/ Signature on file **DATE:** 3-8-11

EN-0845 (10/06

SWO USE ONLY

Load Weight (net from scale or estimate): 31330 Signature of Certifier: 3-8-11 /s/ Signature on file

Shipment # ~~22~~ of ~~30~~ DH 3-8-11
22 of 30

NSTec Form FRM-0918 — License Plate # E-26321, DOE # 407799

NTS LANDFILL LOAD VERIFICATION

08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard, Container # 56603 - Bulk Industrial Debris

Waste Category: (check one) ☐ Commercial ☒ Industrial

Waste Type: (check one) ☐ NTS ☐ Non-Putrescible ☐ Putrescible ☐ Asbestos Containing Material ☒ FFACO-onsite ☐ FFACO-offsite ☐ WAC Exception ☐ 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:

☐ Asphalt ☒ Metal ☒ Wood ☒ Soil ☐ Rubber (excluding tires) ☒ Empty containers
☒ Plastic ☒ Wire ☐ Cable ☒ Cloth ☒ Insulation (non-Asbestosform) ☒ Demolition debris ☒ Cement & concrete
☒ Manufactured items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.) Non Friable Asbestos Roofing Material

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 _____

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

☐ Septic sludge ☐ Rags ☐ Drained fuel filters (gas & diesel) ☐ Crushed non-teme 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 Manage knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

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

Radiological Survey Release for Waste Disposal

RCT Initials

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

XX 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/ Signature on file DATE: 3-15-11

BN-0648 (10/05)

BN-0644 (10/05)

SWO USE ONLY

Load Weight (net from scale or estimate): 28,000 3-15-11 Signature of Certifier: /s/ Signature on ~~file~~

Shipment # 23 of 30

#1

NSTec Form FRM-0918	NTS LANDFILL LOAD VERIFICATION	08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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 _____	

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

☐ Septic sludge	☐ Rags	☐ Drained fuel filters (gas & diesel)	☐ Crushed non-teme 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 Manage knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-1

Radiological Survey Release for Waste Disposal

RCT Initials

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

X **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/ Signature on file **DATE:** 3-29-11

BN-0646 (10/05)

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

SWO USE ONLY

Load Weight (net from scale or estimate): 48440 3/29/11 Signature of Certifier: /s/ Signature on file

(5)

NSTec Form FRM-0918 | 08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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:

☐ Asphalt ☒ Metal ☒ Wood ☒ Soil ☐ Rubber (excluding tires) ☒ Empty containers
☒ Plastic ☒ Wire ☐ Cable ☒ Cloth ☒ Insulation (non-Asbestosform) ☒ Demolition debris
☒ Paper ☒ Rocks / unaltered geologic materials ☒ Cement & concrete
☒ Manufactured items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.)

Additional waste accepted at the Area 23 Mercury Landfill: ☐ Office Waste ☐ Food Waste ☐ Animal Carcasses
☐ Asbestos ☐ Friable ☐ Non-Friable (contact SWO if regulated load) Quantity: _____

Additional waste accepted at the Area 9 U10c Landfill:

☐ Non-friable asbestos ☐ Drained automobiles and military vehicles ☐ Solid fractions from sand/oil/water
☐ Light ballasts (contact SWO) ☒ Drained fuel filters (gas & diesel) ☐ Deconned Underground and Above
☒ Hydrocarbons (contact SWO) ☐ Other _____ Ground Tanks

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

☐ Septic sludge ☐ Rags ☐ Drained fuel filters (gas & diesel) ☐ Crushed non-teme 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 Manageme knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

Radiological Survey Release for Waste Disposal
RCT Initials
____ This container/load meets the criteria for no added man-made radioactive material
X 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/ Signature on file DATE: 3-29-11

BN-0646 (10/05)

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

SWO USE ONLY

Load Weight (net from scale or estimate): 27,260 3/29/11 Signature of Certifier: /s/ Signature on file

(2)

(6)

NSTec Form FRM-0918	NTS LANDFILL LOAD VERIFICATION	08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

Waste Category: (check one) ☐ Commercial ☒ Industrial

Waste Type: (check one) ☐ NTS ☐ Non-Putrescible ☐ Putrescrible ☐ Asbestos Containing Material ☒ FFACO-onsite ☐ FFACO-offsite ☐ WAC Exception ☐ 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:

☐ 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 _____

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

☐ Septic sludge ☐ Rags ☐ Drained fuel filters (gas & diesel) ☐ Crushed non-teme 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 Manage[illegible] knowledge, does not contain radiological materials.

To the best of my knowledge, the waste described above contains only those mat[illegible] site. I have verified this through the waste characterization method identified abo[illegible] prohibited and allowable waste items. I have contacted Property Management an[illegible] is approved for disposal in the landfill.

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-[illegible]

Radiological Survey Release for Waste Disposal
RCT Initials
_____ This container/load meets the criteria for no added man-made radioactive material
✓ 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/ Signature on file **DATE:** 3-29-11

BN-0646 (10/05)

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

SWO USE ONLY

Load Weight (net from scale or estimate): 24500 3/29/11 Signature of Certifier: /s/ Signature on file

NSTec Form FRM-0918	NTS LANDFILL LOAD VERIFICATION	08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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:

☐ Asphalt ☒ Metal ☒ Wood ☒ Soil ☐ Rubber (excluding tires) ☒ Empty containers
☒ Plastic ☒ Wire ☐ Cable ☒ Cloth ☒ Insulation (non-Asbestosform) ☒ Demolition debris
☒ Paper ☒ Rocks / unaltered geologic materials ☒ 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 _____

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

☐ Septic sludge ☐ Rags ☐ Drained fuel filters (gas & diesel) ☐ Crushed non-teme 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 Manage knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

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

Radiological Survey Release for Waste Disposal

RCT Initials

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

_____ 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/ Signature on file **DATE:** 3-7-11

BN-0845 (10/05)

SWO USE ONLY

Load Weight (net from scale or estimate): 41220 3/31/11 Signature of Certifier /s/ Signature on file

Shipment #22 of 30

#5

NSTec Form FRM-0918 | 08/23/06 Rev. 0 | Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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 _____	

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

☐ Septic sludge	☐ Rags	☐ Drained fuel filters (gas & diesel)	☐ Crushed non-teme 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 Manage knowledge, does not contain radiological materials.

To the best of my knowledge, the waste described above contains only those mat site. I have verified this through the waste characterization method identified abo prohibited and allowable waste items. I have contacted Property Management an is approved for disposal in the landfill.

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

Radiological Survey Release for Waste Disposal

RCT Initials

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

_____ 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/ Signature on file DATE: 3/31/11

BN-0646 (10/05)

BN-0646 (10/05)

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

SWO USE ONLY

Load Weight (net from scale or estimate): 40,260 Signature of Certifier: /s/ Signature on file 3/31/11

Shipment # 28 of 30

(7)

NSTec Form FRM-0918	NTS LANDFILL LOAD VERIFICATION	08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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:

☐ Asphalt	☒ Metal	☒ Wood	☒ Soil	☐ Rubber (excluding tires)	☒ Empty containers	
☒ Plastic	☒ Wire	☐ Cable	☒ Cloth	☒ Insulation (non-Asbestosform)	☒ Demolition debris	
☒ Paper	☒ Rocks / unaltered geologic materials				☒ 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 _____	

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 Managem knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

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

Radiological Survey Release for Waste Disposal

RCT Initials

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

X 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/ Signature on file **DATE:** 3-31-11

BN-0646 (10/05

SWO USE ONLY

Load Weight (net from scale or estimate): 35600 3/31/11 Signature of Certifier: /s/ Signature on file

Shipment #29 of 30

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

3

08/23/06 Rev. 0 Page 1 of 2

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 GENERATOR INFORMATION

(This form is for rolloffs, dump trucks, and other onsite disposal of materials.)

Waste Generator: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)495-0150

Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris

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:

☐ Asphalt ☒ Metal ☒ Wood ☒ Soil ☐ Rubber (excluding tires) ☒ Empty containers
☒ Plastic ☒ Wire ☐ Cable ☒ Cloth ☒ Insulation (non-Asbestosform) ☒ Demolition debris
☒ Manufactured items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.) ☒ Cement & concrete

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 _____

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 Managem
knowledge, does not contain radiological materials.

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

Print Name: Mark Heser

Signature: /s/ Mark Heser Date: 1-7-11

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

Radiological Survey Release for Waste Disposal

RCT Initials

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

___ 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/ Signature on file DATE: 1/10/11

SN-0648 (10/05)

SWO USE ONLY

Load Weight (net from scale or estimate): 5,660 Signature of Certifier: 6/6/11 /s/ Signature on file

Shipment # 30 of 30

NSTec Form FRM-0266

ONSITE WASTE TRANSPORT MANIFEST

04/10/08 Rev. 01

Manifest Document No.: 1 1 N 2 9

Page 1 of 1

Generation/Out-of-Service Date: 4/19/11

1. Generator's Name, Organization, and Location: (Please Print)
Navarro-Intera/Mark Heser
NNSS A-25 E-MAD, Drum Storage Area
CAU 566, 5B1B7604

Generator's Phone : (496) 0150

2. Receiving Facility, Organization, Location: (Please Print)
Hazardous Waste Storage Unit
WGS/Hazardous Waste Ops, H120
NNSS A-5, Bldg. 5-20

Contact Phone: (630) 0235

3a. Transporter Name: *(Please Print)* Brett Bushnell

Transport Date: 5/19/11

3b. Vehicle I.D. Number: G63 1104D

	4. U.S. D.O.T. Description. Include: EPA Waste Code and Package Tracking Numbers.	HM	5. Containers No.	5. Containers Type	6. Total Quantity	7. Unit Wt./Vol.
a	UN2315, Waste Polychlorinated biphenyls, liquid, mixture, 9, III NS-NSS-11-0068 D006, D008, D018 thru D043.	X	1	DM	48 218	G K
b						
c						
d						
e						
f						
g						

Use continuation pages for additional items, as necessary.

8. Special Handling Instructions/Additional Information: 24-Hour emergency contact: 702 - 295-0311 / Secondary: C. Gonzales 630-0235 (Name & phone no.)

a) ERG 171. 48-gallons used lubricant removed from A-25 E-MAD railroad cable spool car. CAU 566 drum #566005, sample #566512.

9. Released by: (Signature) /s/ Glenn Hale — Date: 5/19/11

10. Received for Transport by: (Signature) /s/ Signature on file — Date: 5/19/11

11. Discrepancy Indication:

12. Disposal/Accumulation Site Signature: *(Acknowledges acceptance of waste)* /s/ Signature on file — Date: 5/19/11

NSTec Form FRM-0766

WGS/HAZARDOUS WASTE OPERATIONS REQUEST FOR SERVICE

FAX to 5-4815 or send to M/S NNSS110 Project #: 2011-H0066 (HWO Use Only)

03/31/11 Rev. 02 Page 1 of 1

Date of Request: 5/3/11 Date Needed: (see instructions) 5/5/11 Charge #: 5B1B7604
Requester Name: Rebecca King Phone Number: 5-5804 Org. Name/No.: H300
Secondary Contact: Brian Konrad Phone Number: 5-1240 Mail Stop: NNSS306
Facility Manager or Designee: Thomas A Thiele / Reed Poderis

Section A – Services Requested

Check One: ☐ Used Oil ☒ Hazardous Waste ☐ Unknown ☐ Universal Waste ☒ PCB ☐ Other

Check Applicable: ☐ Sampling ☐ Characterization ☑ Pickup ☐ Transport only ☐ Recycling ☑ Disposal
☐ Delivery (i.e., empty packages) ☐ SAA ☐ 90-Day Storage ☐ UWCC ☐ Activate ☐ Deactivate
Indicate SAA#, 90-Day#, or UWCC#, if applicable:

ccs 5/3/11

Location of Service (Area, Bldg., exact directions, attach map if necessary):
EMAD yard

Section B – General Waste Information (Use continuation sheet if necessary)

Generation Date: ☐ One Time Generation ☐ Routine Generation CAU/CAS if applicable: 566
Radiological Clearance provided: ☐ FRM-0121, Clearance Sticker ☑ FRM-0894, Confirmation of Rad Status ccs 5/3/11 accompanied Request
☐ FRM-0002, Nonradioactive Waste Certification ☐ None
Waste Amount (Gallons): 55 Type of Container (i.e., can, drum, carboy, tanker, etc.): 55-gal drum
Number of Containers: 1

Detailed Description/Process Knowledge (i.e., Liquid, Solid, Gas; Name of material; Physical description; How waste was generated, Suspected contaminants, etc.): (Attach applicable MSDSs, analytical summaries, etc.)
Drum #56605 - placed in SAA on 12/14/11. Oil - sample analysis indicates hz for Lead, Cadmium and PCB.

I certify under penalty of law, the above information is correct and additional information required is available as indicated. The material requested for delivery/pickup will only have/has only those materials described on this form. Contents will be verified by process knowledge of origin, MSDS, and/or sampling and analysis.
(specify) ☐ Generator ☒ Requester ☐ Project Supervisor
Printed Name and Signature (required for requested services): Rebecca King /s/ Rebecca King

Section C – Work Location Information

Facility Point of Contact (Name, Phone, Pager):

Facility Access Requirements:

Known hazards in the requested service area:

Acceptable time period to conduct requested services:
Hours (AM/PM): Day(s)

Section D – Services Completed (HWO Use Only)

Waste characterized by: Process knowledge MSDS Sampling & Analysis Other:
Remarks (scheduling, pickup, disposition, etc.): Assigned on-site manifest # 11N29 & Drum ID. NS-NSS-11-0068. BSB 5/18/11. Picked up & Transferred Drum # NS-NSS-11-0068 TO AS HWSA via on-site man. fest # 11N29 for storage pending off site shipment TO TSDF. BSB 5/19/11
Receiving Facility: AS HWSA
Printed Name and Signature: Brett Bushnell /s/ Brett Bushnell Date: 5/19/11

NTS On-Site HazMat Transfer - Published

Tracking No: 566007 **Mesa Number:**
Carrier: NSTEC
Vehicle: G820655D Trailers: E102477
Driver: JACK ~~KAUL~~ ROSE
06-02-2011

Depart: 02-JUN-2011 Arrival: 02-JUN-2011

From: MARK HESER
NAVARRO-INTERA, LLC (N-I)
BASE CAMP
EMAD
MERCURY, NV 89023
Area: 25
Bldg: CAS 25-99-20
Phone: 702-295-2124
Mobile:

To: MARK HESER
NAVARRO-INTERA, LLC (N-I)
BASE CAMP
MERCURY, NV 89023
Area: 23
Bldg: 0153
Phone: 702-295-2124
Mobile: 702-496-0150

Entered By: MARK HESER
Modified By: MARK HESER
Date Entered: 01-JUN-2011
Date Modified: 01-JUN-2011

Shipped Material(s)	Package(s)	Unit(s)	Guide No.
UN/NA 3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7 RADIONUCLIDES: CS-137 PHYSICAL FORM: SOLID CHEMICAL FORM: OXIDE PACKAGE ACTIVITY: 2.26E+10 BQ CATEGORY: RADIOACTIVE WHITE 1 CONTAINER NUMBER 566007 TID NUMBER 0212650	1 SEALAND CONTAINER	10570.00 POUND(S) (GROSS)	162

Emergency Response Number
702-295-0311

Secondary Emergency Response Contact And/Or Comments
MARK HESER 702-496-0150

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

EMERGENCY RESPONSE

By Phone
702-295-0311

By Radio
'MAYDAY - MAYDAY - MAYDAY'

In the event of an incident involving Hazardous Material:

1. Gather HazMat shipping papers and NAER Guidebook
2. Isolate the immediate area
3. Assess the situation:
   a. Fire, Spill, or Leak?
   b. People, Property, or the Environment at risk?
4. Contact On-site Emergency Response Personnel
5. Reference On-Site HazMat Transfer Tracking Number

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

Authorized Signature: /s/ Mark Heser Date: 6-2-11 Time: 10:00

Received by: /s/ Signature on file Date: 6-2-11 Time: 10:00

Shipper: ***NSTec FOR USDOE***

Shipper No.: NSTec

Nevada Test Site, Receiving Warehouse 160, Mercury, NV 89023 Purchase/Customer Order No. **N/A**

Date: 5-17-11

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown) marked, consigned, and destined shown below, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.

Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or tariff which govems the transportation of this shipment and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Consignee:

Navarro-Intera for USDOE,
232 Energy Way
Las Vegas, NV 89030

702-295-2033

Carrier: **NSTec Solid Waste Operations**

PRO NO.:

CAR OR VEHICLE INITIALS & NO.: GB2-0657D **SEAL #:**

Route:

CARRIER NO. **SECTION 13712 TENDER NO.:**

No. PKGS.	HM	Description of Articles (Subject to Correction), Kind of Package, Special Marks and Exemptions (See NMFC Item (Rule) 360)	Weight (Subject to Correction)	Class	Rate	Charges
4		200 gallons aqueous liquid, non-radioactive, non-hazardous, from CAU 566, CAS 25-99-20, EMAD Compound, To: Area 23 Lagoon	1670 lbs. (est)			

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

NSTec
Signature of Consignor

If freight charges are to be prepaid write or stamp here "**TO BE PREPAID**"

TO BE PREPAID

Note: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding

$ **N/A** per lb.

*Job order, reference, account, or work order number

Savings:
$ **N/A**

IN THE EVENT OF AN EMERGENCY, PHONE 702-295-6400, Radio: Mayday, Mayday, M - 24 HOUR

ITEM NO.	NMFC 100-	NPM NO.		

*Label(s) applied
Non-Hazardous Waste

Remarks: (If you receive this shipment damaged, please note on delivery receipt. Contact NSTec Traffic at (702) 295-3266, Reference Shippers Number).

Container numbers: 566008; 566009; 566010; 566011

* **Placard(s) Required**
None

TECHNICAL CONTACT: Mark Heser, 295-2124, Cell (702) 496-0150

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. (Applicable for Hazardous Materials Only.)

Shipper: **NSTec for USDOE**

Acting under contract DCAC0896NV11718 with U.S. Dept of Energy

Per: /s/ Mark Heser Date: 5/17/11

P. O. Box 98521, Las Vegas, NV 89193

TRANSPORTATION DEPT. - Permanent Post Office Address Of Shipper

This shipment is for U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or changes (41 CFR 109-40.50 and 41 CFR 40.3)

☐ YES ☒ NO

* The addition on the face hereof and to the terms and conditions are here by noted:

Carrier: /s/ Signature on file

Per: _____ Date: 5-17-11

FRM-0948 (08/06)

(2)

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

08/23/06 Rev. 0 Page 1 of 2

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: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)5-2124; (c)496-0150

Location / Origin: CAU 566; CAS 25-99-20. 3 ea. 55 gal drums (566012; 013; & 014) with HC impacted soil and debris.

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescrible	☒ 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:

☐ Asphalt	☐ Metal	☐ Wood	☒ Paper	☒ Rocks / unaltered geologic materials	☐ Empty containers
☒ Plastic	☐ Wire	☐ Cable	☒ Soil	☐ Rubber (excluding tires)	☐ Demolition debris
			☒ 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 _____	

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 Ma knowledge, does not contain radiological materials.

To the best of my knowledge, the waste described above contains only those site. I have verified this through the waste characterization method identified prohibited and allowable waste items. I have contacted Property Managemen is approved for disposal in the landfill.

Print Name: Mark Burmeister

Signature: /s/ Mark Burmeister Date: 4-25-11

Radiological Survey Release for Waste Disposal

RCT Initials:

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

_____ **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/ Signature on file **DATE:** 4/27/2011

BN-0646 (10/05)

here. Onsite use only.

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

SWO USE ONLY

Load Weight (net from scale or estimate): 1200 LBS 5-17-11 Signature of Certifier: /s/ Signature on file

NTS On-Site HazMat Transfer - Published

Tracking No: 20110526054035 **Mesa Number:**
Carrier: NSTEC
Vehicle: G820657D
Driver: MICHAEL SMITH

Depart: 26-MAY-2011 Arrival: 26-MAY-2011

From: MARK HESER
NSTEC
CAU 566 EMAD
MERCURY, NV 89023
Area: 25
Bldg: EMAD
Phone: 702-295-2124
Mobile: 702-496-0150

To: BILL COBURN
NSTEC
FLEET SERVICES
MERCURY, NV 89023
Area: 23
Bldg: FLEET SERVICES
Phone: 702-295-6722
Mobile:

Entered By: MARK HESER
Modified By: MARK HESER

Date Entered: 26-MAY-2011
Date Modified: 26-MAY-2011

Shipped Material(s)	Package(s)	Unit(s)	Guide No.
UN/NA 2794, BATTERIES, WET, FILLED WITH ACID, 8, PG III	4 5 PALLET	7340.00 POUND(S) (GROSS)	154

MH 5/26/11
Emergency Response Number
702-295-0311

Secondary Emergency Response Contact And/Or Comments
MARK HESER 702-496-0150

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

EMERGENCY RESPONSE

By Phone
702-295-0311

By Radio
'MAYDAY - MAYDAY - MAYDAY'

In the event of an incident involving Hazardous Material:

1. Gather HazMat shipping papers and NAER Guidebook
2. Isolate the immediate area
3. Assess the situation:
   a. Fire, Spill, or Leak?
   b. People, Property, or the Environment at risk?
4. Contact On-site Emergency Response Personnel
5. Reference On-Site HazMat Transfer Tracking Number

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

Authorized Signature: /s/ Mark Heser Date: 5/26/11 Time: 10:10

Received by: /s/ Signature on file Date: 5/26/11 Time: 10:45

Appendix D

Use Restrictions

D.1.0 Use Restrictions

D.1.1 CAS 25-99-20 Use Restrictions

The following section documents the URs completed for CAU 566 at CAS 25-99-20.

The UR signs will state the following information:

WARNING

RADIOLOGICAL AND CHEMICAL CONTAMINATION

FFACO Site CAU 566/CAS 25-99-20 EMAD Compound
FFACO Site CAU 556/CAS 25-60-03 E-MAD Stormwater Discharge and Piping
FFACO Site CAU 127/CAS 25-01-07 Aboveground Storage Tank
FFACO Site CAU 539/CAS 25-99-21 Area 25 Railroad Tracks

No activities that may alter or modify the containment control,
including excavation or disturbance of material, are permitted in this area
without U.S. Government permission.

Before working in this area,
Contact Real Estate Services at 702-295-2528

Attachment D-1

Use Restriction

(4 Pages)

Use Restriction Information

CAU Number/Description: CAU 566: EMAD Compound

Applicable CAS Number/Description: CAS 25-99-20 / CAU 566:EMAD Compound

Contact (Federal Sub-Project Director/Sub-Project): Kevin Cabble / Industrial Sites

FFACO Use Restriction Physical Description:

Surveyed Area (UTM, Zone 11, NAD 27, meters):

UR Points	Northing	Easting
Southeast	N. 4,073,298.1	E. 562,208.0
Southwest	N. 4,073,341.7	E. 561,982.8
Northwest Corner	N. 4,073,794.5	E. 562,067.8
Northeast Corner	N. 4,073,764.6	E. 562,221.1
East	N. 4,073,505.7	E. 562,172.8
East	N. 4,073,491.1	E. 562,244.8

Depth: No depth limitation for exposed or covered soil.

Survey Method (GPS, GIS, etc): GIS

Basis for FFACO UR(s):

Summary Statement: This FFACO use restriction is to protect site workers from inadvertent exposure to the contaminants listed in the table below. Soil contaminated with PCBs and benzo(a)pyrene is present within the EMAD Compound at concentrations exceeding risk-based action levels. The other contaminants listed in the contaminant table were not detected, but are also assumed to be present above action levels. The analytical results and locations of all samples collected are presented in the CR for CAU 566. The use restriction encompasses the area where soil contamination exceeds risk-based action levels. Personnel are restricted from performing work in this location that would require personnel to be present for more than short term activities. The short-term permissible activities include site visits, maintenance of fence and signs, maintenance of electrical substations and inspection of the railcars. Any activities to be conducted within this area that are not consistent with these defined short-term activities, requires the prior notification and approval of the NDEP. Coordinates for the FFACO Use Restriction exclude the areas within the FFACO Use Restriction that are defined by the perimeter of Building 3900, the perimeter of Building 3901, asphalt and concrete pads, and paved roads.

Contaminants Table:

Maximum Concentration of Contaminants for CAU 566 CAS 25-99-20, EMAD Compound			
Constituent	**Maximum Concentration**	**Action Level**	**Units**
2,4-Dinitrotoluene	7.42 (U)[a]	5.5	mg/kg
4-Chloroaniline	14.8 (U)[a]	8.6	mg/kg
Aroclor 1221	11.5 (UJ)[a]	1.76	mg/kg
Aroclor 1232	11.5 (UJ)[a]	1.76	mg/kg
Aroclor 1242	11.5 (UJ)[a]	2.91	mg/kg
Aroclor 1248	11.5 (UJ)[a]	2.91	mg/kg
Aroclor 1254	**22.1** (J)	2.91	mg/kg
Aroclor 1260	**72.3** (J)	2.91	mg/kg
Aroclor 1268	11.5 (UJ)[a]	2.91	mg/kg
Benz(a)anthracene	2.23 (U)[a]	2.1	mg/kg
Benzo(a)pyrene	**0.397**	0.21	mg/kg

Note: Effective upon acceptance of closure documents by NDEP

Use Restriction Information

Benzo(b)fluoranthene	2.23 (U)[a]	2.1	mg/kg
Dibenzo(ah)anthracene	2.23 (U)[a]	0.21	mg/kg
Hexachlorobenzene	14.8 (U)[a]	1.1	mg/kg
Indeno(1,2,3-cd)pyrene	2.23 (U)[a]	2.1	mg/kg
Pentachlorophenol	18.5 (U)[a]	9.0	mg/kg

[a] Although these contaminants were not detected (and may not be present at CAU 566), their detection limits exceed the FALs. These contaminants are not present at concentrations exceeding the listed values but may be present at concentrations exceeding their FALs.

J = Estimated value
U = Compound was analyzed for, but was not detected ("Non-detect").
UJ = Compound was non-detect, but result is biased low.

Site Controls: The UR is established at the boundary identified by the coordinates listed above (excluding Building 3900, Building 3901, asphalt and concrete pads, and paved roads) and depicted in attached figure D.1.1. Site controls include warning signs placed around the use-restricted area.

Administrative Use Restriction Physical Description*:

Surveyed Area (UTM, Zone 11, NAD 27, meters):

UR Points	Northing	Easting
Southeast	N. 4,073,119.1	E. 562,329.3
Southwest	N. 4,073,220.6	E. 561,805.0
Northwest Corner	N. 4,073,973.1	E. 561,946.1
Northeast Corner	N. 4,073,885.7	E. 562,398.5
East	N. 4,073,604.8	E. 562,346.3
East	N. 4,073,590.1	E. 562,418.7

Depth: No depth limitations.

Survey Method (GPS, GIS, etc): GIS

*Coordinates for the Administrative Use Restriction exclude the area defined by the FFACO Use Restriction coordinates.

Basis for Administrative UR(s):

Summary Statement: This administrative use restriction is to protect site workers from inadvertent exposure to the contaminants listed in the table below. The analytical results and locations of all samples collected are presented in the CR for CAU 566. Site workers under the current land use at this site are not exposed to the contamination present outside the EMAD compound for a sufficient time to exceed risk-based action levels. However, as a best management practice, this administrative use restriction will prevent a future, more intensive use of the area. Personnel are restricted from performing work in this location that would result in a more intensive use of the area than current land use. Activities consistent with the current land use include site visits, maintenance of the fence, radiological surveys, short duration radiological training, and retrieval of objects within the use restricted area. Any activities to be conducted within this area that are not consistent with this defined current land use requires prior notification and approval of the NDEP. This administrative UR boundary may be reevaluated if there is a change in usage of this area.

Use Restriction Information

Contaminants Table:

Maximum Concentration of Contaminants for CAU 566 CAS 25-99-20, EMAD Compound			
Constituent	**Maximum Concentration**	**Action Level**	**Units**
Aroclor 1254	0.0181 (J)	2.91	mg/kg
Aroclor 1260	**3.73**	2.91	mg/kg

Site Controls: The administrative UR is established at the boundary identified by the coordinates listed above and depicted in attached figure D.1.1.

UR Maintenance Requirements (applies to both FFACO and Administrative UR(s) if Administrative UR exists):

Description: The UR is recorded in the FFACO database, NNSA/NSO Facility Management System, and the NNSA/NSO CAU/CAS files. The administrative UR is recorded in the FFACO database, NNSA/NSO Facility Management System, and the NNSA/NSO CAU/CAS files.

Inspection/Maintenance Frequency: Annual post-closure inspections will be conducted to ensure postings are in place, intact, and legible. The railcars and locomotives will be inspected for leaks and other potential releases to the environment within the FFACO UR.

The future use of any land related to this Corrective Action Unit (CAU), 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 CR or other CAU documentation unless appropriate concurrence is obtained in advance.

Comments: _____

Submitted By: /s/ Kevin Cabble **Date:** 6-13-11

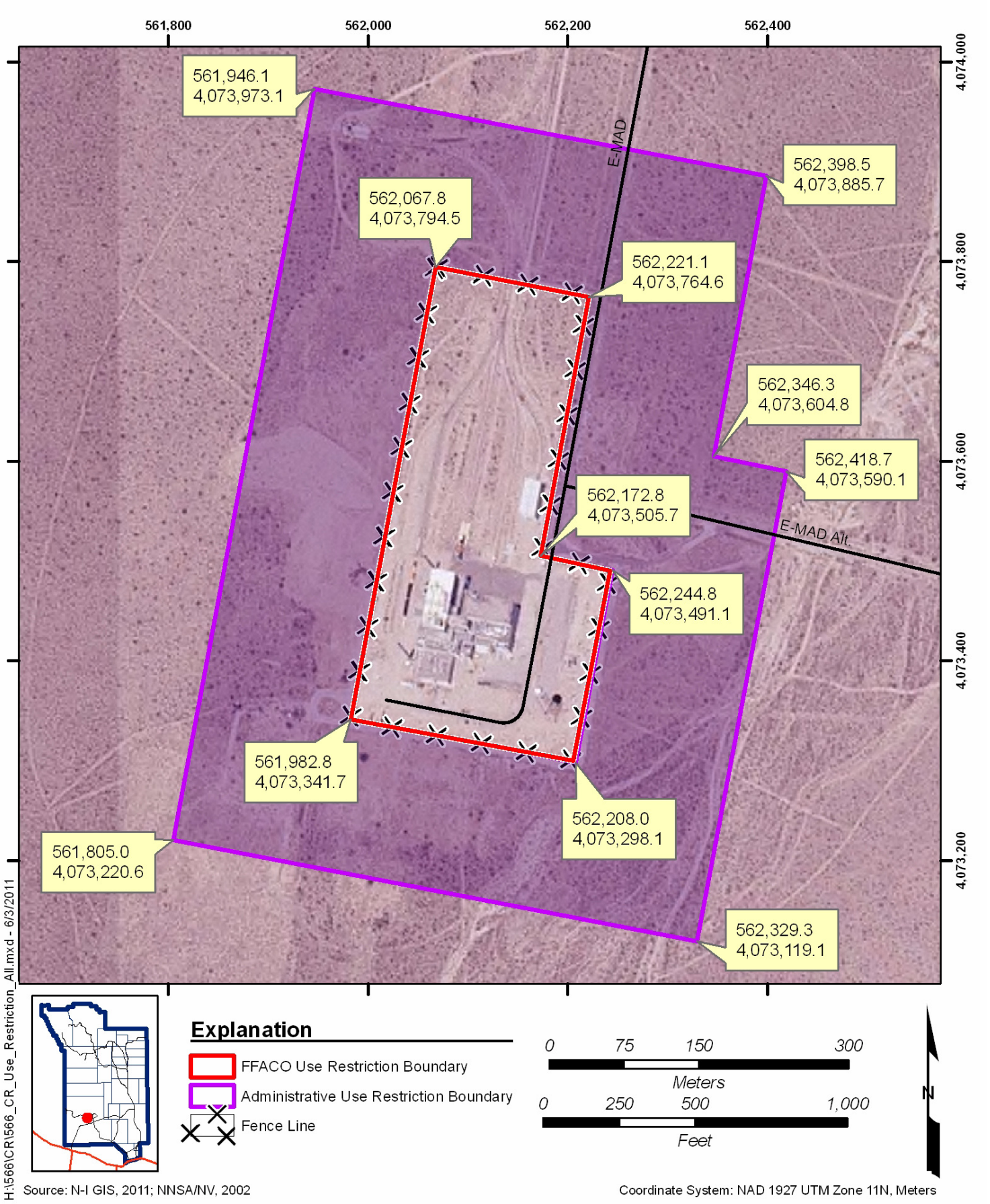


Figure D.1.1
CAU 566/CAS 25-99-20 Use Restriction
UNCONTROLLED When Printed

Appendix E

Risk Evaluation

E.1.0 Risk Assessment

The risk-based corrective action (RBCA) process used to establish FALs is described in the *Industrial Sites Project Establishment of Final Action Levels* (NNSA/NSO, 2006). This process conforms with *Nevada Administrative Code* (NAC) Section 445A.227, which lists the requirements for sites with soil contamination (NAC, 2008a). For the evaluation of corrective actions, NAC Section 445A.22705 (NAC, 2008b) requires the use of ASTM Method E1739 (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 process defines three tiers (or levels) to establish FALs used to evaluate DQO decisions: The ASTM Method 1739 defines three tiers (or levels) of evaluation involving increasingly intricate analyses:

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

E.1.1 A. Scenario

The E-MAD Facility supported the design and testing of nuclear-powered rockets in the NERVA project (1965 to 1973). From 1977 to 1982, Westinghouse Electric Corporation hosted the SFDP, which involved testing and development related to the dry storage of spent nuclear fuel assemblies (DOE/NV, 1983). Since the conclusion of the SFDP in the late 1980s, the E-MAD Facility has been mostly inactive with the exception of Fluid Tech, Inc., who occupied portions of the Cold Bay and office areas in the late 1990s. Two electrical substations in operation at the EMAD Compound supplied power to Building 3900, including its support buildings. Locomotive trains and railcars

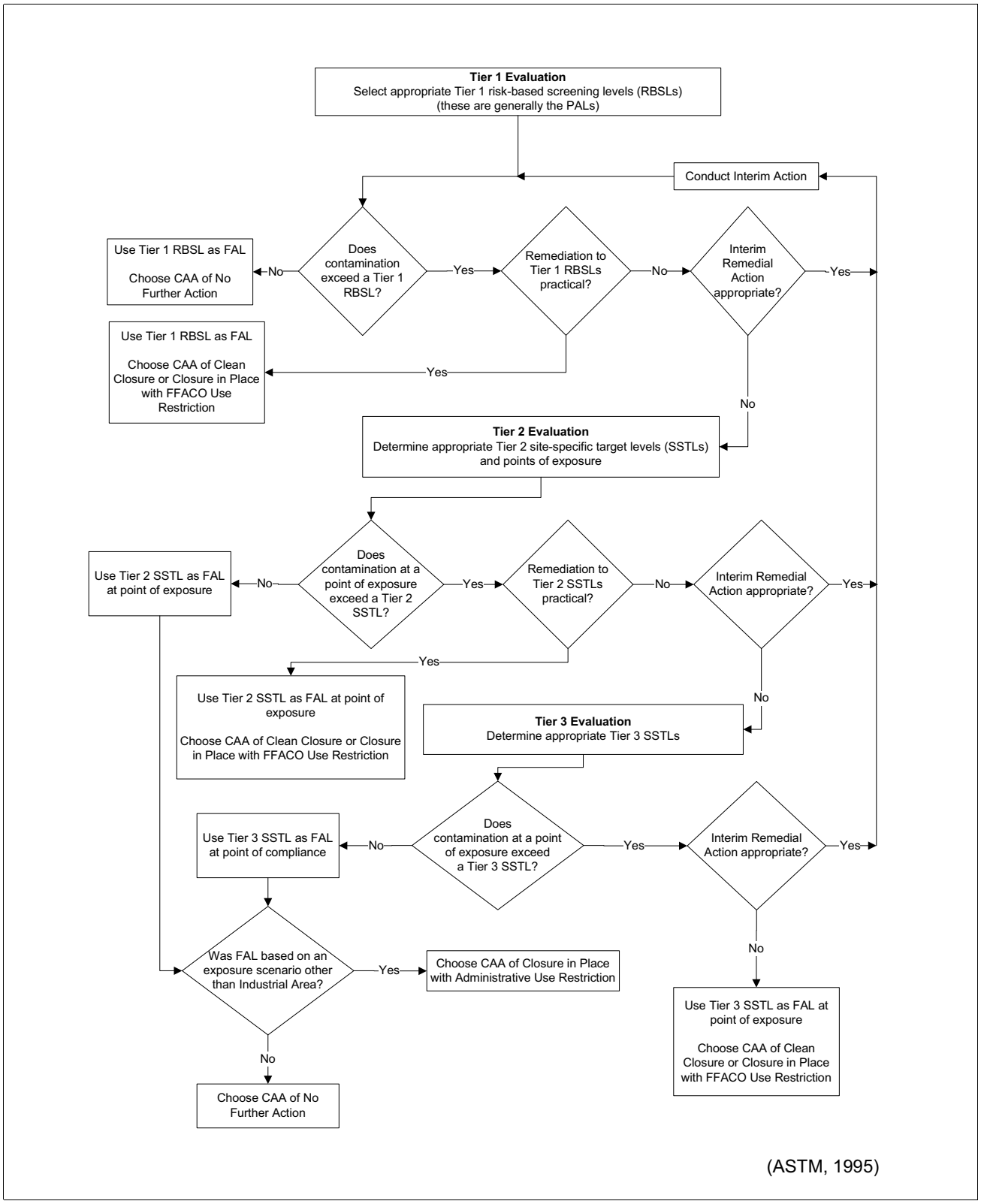


Figure E.1-1
Risk-Based Corrective Action Decision Process

were in operation at the EMAD Compound and once ran between Area 25 facilities. Industrial activities at the E-MAD Facility may have included importing fill materials during facility construction, and using oils for dust-suppression activities and/or weed abatement.

E.1.2 B. Site Assessment

The CAI at CAS 25-99-20 involved a judgemental sampling strategy in which surface and shallow subsurface samples were collected. Samples of wastes (PSM) that could potentially release a COC to environmental media were also collected. Radiological (gamma-detector walk-over) and visual surveys were also performed to support the CAI.

Removal of PSM (e.g., mercury-containing thermostats, PCB-containing light ballasts, lead solder in circuit boards, lead-acid batteries) from the wooden sheds, guard shack, Metallurgy Lab trailer, and Fluid Tech trailer was based on presumed knowledge that hazardous constituents were present. Other PSM, such as the radiologically contaminated HEPA filter assembly on the Metallurgy Lab trailer identified through sampling or radiological surveys, was removed and dispositioned. Corrective actions to remove PSM were performed at the following CAS components:

- Metallurgy Lab Drain System (e.g., HEPA filter assembly, cast-iron drain system)
- Locomotives and Railcars (e.g., batteries, diesel fuel, antifreeze)
- Construction Debris Piles

Identified COCs included SVOCs (chemical constituents of diesel), and PCBs in surface and shallow subsurface soils. The SVOC-contaminated soil extends into the EMAD Compound due to use of diesel-powered locomotives and fuels along the rail lines and spurs. Diesel-contaminated soil identified during soil sampling associated with the Locomotives and Railcars CAS component is believed to be prevalent along the length of the rail line in Area 25. The PCB- and benzo(a)pyrene-contaminated soil at the Substations CAS component is due to releases from PCB-containing transformers; low-level concentrations of PCBs in soil found in disturbed areas inside and outside the EMAD Compound fence line are likely due to importing of contaminated soil and/or use of PCB-contaminated oil for dust suppression/soil stabilization. The discovery of PCB contamination outside the spatial boundaries of the substations CAS component led to the identification of a new CAS component: EMAD Compound Soil Releases.

The Storm Drain System and Storage Casks and Drywells CAS components did not have any COCs or PSM.

With the exception of identification of an additional release mechanism for PCBs, the sources, release points, and nature and extent of the identified COCs are consistent with the CSM presented in the SAFER Plan (NNSA/NSO, 2010).

The maximum concentration of each contaminant identified at CAS 25-99-20, and the corresponding FAL, are presented in Table E.1-1.

Table E.1-1
Maximum Reported Value for Tier 1 Comparison
(Page 1 of 2)

Contaminant	PAL	Units	Maximum Reported Value
			CAS 25-99-20
2-Methylnaphthalene	4,100	mg/kg	0.704 (J)
Ac-228	5	pCi/g	1.93
Acetone	630,000	mg/kg	0.00216 (J)
Anthracene	170,000	mg/kg	0.0125 (J)
Aroclor 1242	0.74	mg/kg	0.184
Aroclor 1254	0.74	mg/kg	**22.1** (J)
Aroclor 1260	0.74	mg/kg	**198** (J)
Arsenic	23	mg/kg	9.56
Barium	190,000	mg/kg	153
Benz(a)anthracene	2.1	mg/kg	0.449
Benzo(a)pyrene	0.21	mg/kg	**0.397**
Benzo(b)fluoranthene	2.1	mg/kg	0.598
Benzo(ghi)perylene	17,000	mg/kg	0.161
Benzo(k)fluoranthene	21	mg/kg	0.228
Benzoic acid	2,500,000	mg/kg	0.52 (J)
Beryllium	2,000	mg/kg	0.546
Bis(2-ethylhexyl)phthalate	120	mg/kg	47.3 (J)
Cadmium	800	mg/kg	6.42
Carbazole	95.8	mg/kg	0.0127 (J)

Table E.1-1
Maximum Reported Value for Tier 1 Comparison
(Page 2 of 2)

Contaminant	PAL	Units	Maximum Reported Value
			CAS 25-99-20
Chromium	N/A	mg/kg	28.1
Chromium VI	5.6	mg/kg	1.41 (J-)
Chrysene	210	mg/kg	0.46
Cs-137	12.2	pCi/g	1.84
Di-n-butyl phthalate	62,000	mg/kg	0.454
Dibenzo(ah)anthracene	0.21	mg/kg	0.0743
Fluoranthene	22,000	mg/kg	0.392
Indeno(1,2,3-cd)pyrene	2.1	mg/kg	0.219
Lead	800	mg/kg	46.9 (J)
Mercury	34	mg/kg	0.0438 (J-)
Methylene chloride	53	mg/kg	0.00373 (J)
Naphthalene	18	mg/kg	0.0425
Nb-94	4.05	pCi/g	1.13
Phenanthrene	170,000	mg/kg	1.65 (J)
Pyrene	17,000	mg/kg	0.474
Silver	5,100	mg/kg	0.227 (J)
Sr-90	838	pCi/g	1.13
Th-234	105	pCi/g	2.01 (J)
Toluene	45,000	mg/kg	0.00209
TPH-DRO	100	mg/kg	**22,900** (J)
U-234	143	pCi/g	1.1
U-235	17.6	pCi/g	0.0887
U-238	105	pCi/g	1.15

J = Estimated value
J- = Result is an estimated quantity, but may be biased low.

Bold indicates the values exceeding the FALs.

E.1.3 C. Site Classification and Initial Response Action

The four major site classifications listed in Table 3 of the ASTM Standard are (1) immediate threat to human health, safety, and the environment; (2) short-term (0 to 2 years) threat to human health, safety, and the environment; (3) long-term (greater than 2 years) threat to human health, safety, or the environment; and (4) no demonstrated long-term threats.

Based on the CAI, none of the CAS components present an immediate threat to human health, safety, and the environment; therefore, no interim response actions are necessary at these sites.

The following CAS components were determined to be Classification 4 sites as defined by ASTM Method E1739 (ASTM, 1995) and pose no demonstrated near- or long-term threats:

- Storm Drain System
- Storage Casks and Drywells

The following CAS components were identified as those that pose long-term threats to human health, safety, or the environment and have been determined to be Classification 2 sites as defined by ASTM Method E1739:

- Metallurgy Lab Drain System
- Locomotives and Railcars
- Substations
- EMAD Compound Soil
- Construction Debris Piles

E.1.4 D. Development of Tier 1 Lookup Table of RBSLs

The Tier 1 RBSLs were defined as the PALs that were established during the DQO process. The PALs are a tabulation of chemical-specific (but not site-specific) screening levels based on the type of media (soil) and potential exposure scenarios (industrial). These are very conservative estimates of risk, are preliminary in nature, and are used for site screening purposes. Although the PALs are not intended to be used as FALs, a FAL may conservatively be defined as the Tier 1 action level

(i.e., PAL) value if it is determined to be reasonable and appropriate. The PALs are defined as the following:

- The EPA Region 9 Risk-Based Regional Screening Levels (RSLs) for Industrial Soils (EPA, 2009).
- Background concentrations for RCRA metals will be evaluated when natural background exceeds the PAL, as is often the case with arsenic. Background is considered the mean plus two times the standard deviation of the mean based on data published in *Mineral and Energy Resource Assessment of the Nellis Air Force Range* (NBMG, 1998; Moore, 1999).
- The TPH concentrations above the action level of 100 mg/kg per NAC 445A.2272 (NAC, 2008c).
- For COPCs without established RSLs, a protocol similar to EPA Region 9 will be used to establish an action level; otherwise, an established RSL from another EPA region may be chosen.
- 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-millirem-per-year-dose constraint (Appenzeller-Wing, 2004) and the generic guidelines for residual concentration of radionuclides in DOE Order 5400.5 (DOE, 1993).

The PALs were developed based on an industrial scenario. Because CAS 25-99-20 is not an assigned work station and is considered to be in a remote or occasional use area, the use of industrial-scenario-based PALs is conservative. The Tier 1 lookup table is defined as the PAL concentrations or activities defined in the SAFER Plan (NNSA/NSO, 2010).

E.1.5 E. Exposure Pathway Evaluation

The DQOs stated that site workers would only be exposed to COCs through oral ingestion, inhalation, or dermal contact (absorption) due to exposure to potentially contaminated media (i.e., soil) at CAS 25-99-20. The results of the CAI showed that the contaminants exceeding Tier 1 RSBLs are present only in surface and near-surface soils within the EMAD Compound. Therefore, inhalation, ingestion, and direct skin contact with surface and shallow subsurface soil contamination are considered complete exposure pathways. Groundwater is not considered to be a significant exposure pathway.

E.1.6 F. Comparison of Site Conditions with Tier 1 RBSLs

All analytical results from CAU 566 samples were less than corresponding Tier 1 action levels (i.e., PALs) except for those listed in Table E.1-2. Four contaminants exceeded the PALs: Aroclor 1254, Aroclor 1260, benzo(a)pyrene, and TPH-DRO. Aroclor 1254 and 1260 were found at several sample locations throughout the EMAD Compound that exceeded their respective PAL concentrations. The PCB Aroclors 1221, 1232, 1242, 1248, and 1268 were found to have also failed sensitivity; therefore, it could not be determined that these contaminants were not present at concentrations that exceeded their respective PALs.

Samples 566001 to 566004 were associated with the hydrocarbon-stained soil under the two 120-ton locomotives. The samples collected from the stained soil failed sensitivity criteria for several SVOCs; thus, it could not be determined that these contaminants were not present at concentrations exceeding their respective PALs. Benzo(a)pyrene was also detected in soil at sample location 566034, which was collected at the southeastern substation. This was the only other sample collected that was found to have exceeded its PAL.

Table E.1-2
Contaminants Exceeding Tier 1 RBSLs
(Page 1 of 2)

Contaminant	PAL	Units	Maximum Reported Value
			CAS 25-99-20
2,4-Dinitrotoluene	5.5	mg/kg	7.42 (U)[a]
4-Chloroaniline	8.6	mg/kg	14.8 (U)[a]
Aroclor 1221	0.54	mg/kg	11.5 (UJ)[a]
Aroclor 1232	0.54	mg/kg	11.5 (UJ)[a]
Aroclor 1242	0.74	mg/kg	11.5 (UJ)[a]
Aroclor 1248	0.74	mg/kg	11.5 (UJ)[a]
Aroclor 1254	0.74	mg/kg	**22.1** (J)
Aroclor 1260	0.74	mg/kg	**198** (J)
Aroclor 1268	0.74	mg/kg	11.5 (UJ)[a]
Benz(a)anthracene	2.1	mg/kg	2.23 (U)[a]
Benzo(a)pyrene	0.21	mg/kg	**0.397**
Benzo(b)fluoranthene	2.1	mg/kg	2.23 (U)[a]

Table E.1-2
Contaminants Exceeding Tier 1 RBSLs
(Page 2 of 2)

Contaminant	PAL	Units	Maximum Reported Value
			CAS 25-99-20
Dibenzo(ah)anthracene	0.21	mg/kg	2.23 (U)[a]
Hexachlorobenzene	1.1	mg/kg	14.8 (U)[a]
Indeno(1,2,3-cd)pyrene	2.1	mg/kg	2.23 (U)[a]
Pentachlorophenol	9	mg/kg	18.5 (U)[a]
TPH-DRO	100	mg/kg	**22,900 (J)**

[a]Although these contaminants were not detected (and may not be present at CAU 566), their detection limits exceed the PALs. These contaminants are not present at concentrations exceeding the listed values but may be present at concentrations exceeding their PALs.

J = Estimated value
U = Compound was analyzed for, but was not detected ("Nondetect").
UJ = Compound was nondetect, but result is biased low.

Bold indicates the values exceeding the Tier 1 RBSLs.

E.1.7 G. Evaluation of Tier 1 Results

For all contaminants at this CAS not listed in Table E.1-2, the FALs were established as the Tier 1 RBSLs. It was determined that no further action is required for these contaminants.

The only exceedance of FALs based on Tier 1 RSBLs was an individual sample (566034) for benzo(a)pyrene. However, the minimum detection limit for several SVOC analytes in samples 566001, 566002, 566003, and 566004 was greater than their corresponding Tier 1-based FALs (Table E.1-2). Therefore, it cannot be determined that these contaminants are not present in these samples at levels below the FALs. It was conservatively assumed that these contaminants are COCs and require corrective action and are included in the FFACO UR.

E.1.8 H. Tier 1 Remedial Action Evaluation

For Aroclor 1254, Aroclor 1260, and TPH-DRO, it was determined that it is not appropriate or reasonable to perform corrective actions based on these RBSLs. Therefore, a Tier 2 SSTL will be evaluated for these contaminants. For the remaining contaminants listed in Table E.1-2, it was

determined that it is appropriate and reasonable to perform correction actions based on the RBSLs; therefore, the FALs were established at the Tier 1 RBSLs.

E.1.9 I. Tier 2 Evaluation

No additional data were needed to complete a Tier 2 evaluation.

E.1.10 J. Development of Tier 2 SSTLs

Evaluation of TPH-DRO SSTLs

Method E1739 stipulates that risk evaluations for TPH-DRO contamination be calculated and evaluated based on the risk posed by the potentially hazardous constituents of TPH-DRO. Section 6.4.3 ("Use of Total Petroleum Hydrocarbon Measurements") of ASTM Method E1739 states: "TPHs should not be used for risk assessment because the general measure of TPH-DRO provides insufficient information about the amounts of individual chemical(s) of concern present" (see also Sections X1.5.4 and X1.42 of Method E1739 in ASTM [1995]). Therefore, the individual potentially hazardous constituents will be evaluated for risk in place of TPH-DRO. These individual constituents are reported in the VOC and SVOC analyses and FALs are established individually in this RBCA process.

Evaluation of PCB SSTLs

The Tier 2 action levels are typically compared to contaminant values that are representative of areas at which an individual or population may come in contact with a COC originating from a CAS. This concept is illustrated in the EPA's Human Health Evaluation Manual (EPA, 1989). This document states that "the area over which the activity is expected to occur should be considered when averaging the monitoring data for a hot spot. For example, averaging soil data over an area the size of a residential backyard (e.g., an eighth of an acre) may be most appropriate for evaluating residential soil pathways." When evaluating industrial receptors, the area over which an industrial worker is exposed may be much larger than for residential receptors. For a site that is limited to industrial uses, the receptor would be a site worker, and patterns of employee activity would be used to estimate the area over which the receptor is exposed. This can be very complicated to calculate, as industrial workers may perform routine activities at many locations where only a portion of these locations may

be contaminated. A more practical measure of integrated risk for an industrial worker is to calculate the portion of total work time that the worker is exposed to COCs. For example, if a site worker had routine activities that required a site exposure of 225 hours per year, the site worker would receive 10 percent of the potential annual dose that they would otherwise receive if exposed to the COCs for the entire work year (2,250 hours per year based on 10 hours per day for 225 days per year as used for the Industrial Area exposure scenario).

The Tier 2 evaluation is based on a receptor exposure time that is more specific to actual site conditions. The maximum potential exposure time for the most exposed worker at CAU 566 was determined based on an evaluation of current and reasonable future activities that may be conducted at the site. In the CAU 566 DQOs, it was conservatively determined that the Occasional Use Area exposure scenario (as listed in Section 3.1.1 of the CAU 566 SAFER Plan [NNSA/NSO, 2010]) would be appropriate in calculating receptor exposure time based on current land use at CAS 25-99-20. This exposure scenario assumes exposure to site workers who are not assigned to the area as a regular work site but may occasionally use the site for intermittent or short-term activities. Site workers under this scenario are assumed to be on the site for an equivalent of 80 hours per year. However, the Tier 2 SSTLs for PCBs were more conservatively calculated based on 336 hours of annual exposure using the remote work area exposure scenario. The Tier 2 SSTLs for Aroclor 1254 and Aroclor 1260 were established at 2.91 mg/kg.

E.1.11 K. Comparison of Site Conditions with Tier 2 SSTLs

The Tier 2 action levels are typically compared to individual sample results from reasonable points of exposure (as opposed to the source areas as is done in Tier 1) on a point-by-point basis. Points of exposure are defined as those locations or areas at which an individual or population may come in contact with a COC originating from a CAS. For CAU 566, the Tier 2 action levels were compared to maximum contaminant concentrations from each sample location. There are several locations where Aroclor 1260 and Aroclor 1254 concentrations in soil exceed their Tier 2 SSTLs. In addition, a multiple constituent analysis was performed for carcinogenic analytes in samples that contained a Tier 2 contaminant (Table E.1-3). These samples are considered to contain COCs even though their individual results are less than the FAL.The maximum concentrations of PCBs (Aroclor 1254 and 1260) along with their respective Tier 2 SSTLs are listed in Table E.1-4.

Table E.1-3
Multiple Constituent Analysis

Sample Number	Aroclor 1254	Aroclor 1260	Aroclor 1254	Aroclor 1260	Sum of Fractions
	FAL		Fraction of FAL		
	2.91 mg/kg				
566028	1.88	1.05	0.6	0.4	**1**
566029	1.12	0.92	0.4	0.3	0.7
566035	1.41	0.85	0.5	0.3	0.8
566037	1.88	2.51	0.6	0.9	**1.5**
566039	0.96	0.6	0.3	0.2	0.5
566040	1.23	0.85	0.4	0.3	0.7
566041	0.99	0.65	0.3	0.2	0.6
566042	0.89	0.71	0.3	0.2	0.6
566044	1.15	1.3	0.4	0.4	0.8
566046	1.75	0.96	0.6	0.3	0.9
566048	2.23	1.27	0.8	0.4	**1.2**
566049	1.83	0.85	0.6	0.3	0.9
566058	--	1.73	N/A	0.6	0.6
566062	--	0.99	N/A	0.3	0.3
566076	0.87	0.31	0.3	0.1	0.4
566082	--	0.88	N/A	0.3	0.3
566086	--	0.83	N/A	0.3	0.3
566090	--	1.28	N/A	0.4	0.4
566091	--	1.17	N/A	0.4	0.4
566097	--	2.03	N/A	0.7	0.7
566100	1.92	1.08	0.7	0.4	**1**
566105	0.37	1.25	0.1	0.4	0.6
566112	--	0.78	N/A	0.3	0.3
566114	--	1.91	N/A	0.7	0.7
566115	--	1.28	N/A	0.4	0.4
566117	--	1.12	N/A	0.4	0.4

-- = Not detected above MDCs.

Bold indicates corrective action required.

Table E.1-4
Contaminants Exceeding Tier 2 SSTLs

Contaminant	Tier 2 SSTLs	Units	Maximum Reported Value
			CAS 25-99-20
Aroclor 1254	2.91	mg/kg	**22.1** (J)
Aroclor 1260	2.91	mg/kg	**198** (J)

J = Estimated value

Bold indicates the values exceeding Tier 2 SSTLs.

E.1.12 L. Tier 2 Remedial Action Evaluation

Based on the Tier 2 evaluation, corrective action is not required for TPH-DRO or benzo(a)pyrene contamination other than the corrective action required for the SVOC contaminants identified in Section E.1.8. Therefore, the FAL for benzo(a)pyrene was established as the Tier 2 SSTL. No FAL was established for TPH-DRO as FALs were established for the individual constituents of TPH-DRO as their corresponding Tier 1 RSBLs.

Based on the Tier 2 evaluation for the PCBs, corrective action would be required for the PCB contamination exceeding Tier 2 SSTLs. Corrective actions of partial removal, and closure in place for the remaining contamination were deemed to be appropriate and reasonable. Therefore, the FALs for Aroclor 1254 and Aroclor 1260 were established as their Tier 2 SSTLs.

As all contaminant FALs were established as Tier 1 or Tier 2 action levels, a Tier 3 evaluation was not considered necessary.

E.2.0 Recommendations

All of the site contaminant concentrations in soils from the analysis of CAU 566 samples were less than the corresponding FALs at all locations with the exception of several SVOCs at the Locomotives and Railcars CAS component location, benzo(a)pyrene at the southwestern substation, and PCBs (Aroclor 1254 and 1260) throughout the EMAD compound area. This also includes those Aroclors that failed sensitivity but could not be determined that their respective FALs were or were not exceeded. Corrective actions are recommended for the areas where these contaminants exceed FALs. Corrective actions (i.e., removal) were also conducted for two locations with elevated radioactivity and at various locations containing PSM. These include removal of the following:

- Fluorescent light bulbs
- Mercury switches (thermostats)
- Circuit boards
- PCB-containing ballasts
- Fuels, lubricants, engine coolants, and oils
- Lead debris
- Lead-acid batteries
- Radiologically contaminated debris (e.g., cast-iron drain system, HEPA filter assembly)

E.3.0 References

ASTM, see ASTM International.

ASTM International. 1995 (reapproved 2010). *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites*, ASTM E1739 - 95(2010)e1. West Conshohocken, PA.

Appenzeller-Wing, J., U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2004. Letter to T.A. Maize (NDEP) titled "Submittal of Proposed Radiological Preliminary Action Levels (PALs) for the Industrial Sites Project," 15 January. Las Vegas, NV.

DOE, see U.S. Department of Energy.

DOE/NV, see U.S. Department of Energy, Nevada Operations Office.

EPA, see U.S. Environmental Protection Agency.

Moore, J., Science Applications International Corporation. 1999. Memorandum to M. Todd (SAIC) titled "Background Concentrations for NTS and TTR Soil Samples," 3 February. Las Vegas, NV.

NAC, see *Nevada Administrative Code*.

NBMG, see Nevada Bureau of Mines and Geology.

NCRP, see National Council on Radiation Protection and Measurements.

NNSA/NSO, see U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office.

National Council on Radiation Protection and Measurements. 1999. *Recommended Screening Limits for Contaminated Surface Soil and Review of Factors Relevant to Site-Specific Studies*, NCRP Report No. 129. Bethesda, MD.

Nevada Administrative Code. 2008a. NAC 445A.227, "Contamination of Soil: Order by Director for Corrective Action; Factors To Be Considered in Determining Whether Corrective Action Required." Carson City, NV. As accessed at http://www.leg.state.nv.us/nac on 8 April 2011.

Nevada Administrative Code. 2008b. NAC 445A.22705, "Contamination of Soil: Evaluation of Site by Owner or Operator; Review of Evaluation by Division." Carson City, NV. As accessed at http://www.leg.state.nv.us/nac on 8 April 2011.

Nevada Administrative Code. 2008c. NAC 445A.2272, "Contamination of Soil: Establishment of Action Levels." Carson City, NV. As accessed at http://www.leg.state.nv.us/nac on 8 April 2011.

Nevada Bureau of Mines and Geology. 1998. *Mineral and Energy Resource Assessment of the Nellis Air Force Range*, Open-File Report 98-1. Reno, NV.

U.S. Department of Energy. 1993. *Radiation Protection of the Public and the Environment*, DOE Order 5400.5, Change 2. Washington, DC.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2006. *Industrial Sites Project Establishment of Final Action Levels*, Rev. 0, DOE/NV--1107. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2010. *Streamlined Approach for Environmental Restoration for Corrective Action Unit 566: EMAD Compound*, Nevada National Security Site, Nevada, Rev. 0, DOE/NV--1392. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1983. *Histories of Spent Nuclear Fuel Assemblies While at the E-MAD Facility, December 1978 Through September 1982*, DOE/NV/10250-6. Las Vegas, NV.

U.S. Environmental Protection Agency. 1989. *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A)*, EPA/540/1-89/002. Washington, DC: Office of Emergency and Remedial Response.

U.S. Environmental Protection Agency. 2009. *Region 9: Superfund, Regional Screening Table (Formerly PRGs), Screening Levels for Chemical Contaminants*. As accessed at http://www.epa.gov/region09/superfund/prg on 4 May. Prepared by EPA Office of Superfund and Oak Ridge National Laboratory.

Appendix F

Nevada Division of Environmental Protection Comments

(4 Pages)

NEVADA ENVIRONMENTAL RESTORATION PROJECT
DOCUMENT REVIEW SHEET

1. Document Title/Number:	Draft Closure Report for Corrective Action Unit 566: EMAD Compound, Nevada National Security Site, Nevada	**2. Document Date:**	5/4/2011
3. Revision Number:	0	**4. Originator/Organization:**	Navarro-INTERA
5. Responsible NNSA/NSO Federal Sub-Project Director:	Kevin J. Cabble	**6. Date Comments Due:**	
7. Review Criteria:	Full		
8. Reviewer/Organization/Phone No:	T.H. Murphy and Jeff MacDougall, NDEP, 702-486-2850	**9. Reviewer's Signature:**	

10. Comment Number/Location	11. Type*	12. Comment	13. Comment Response	14. Accept
1.) Section 2.2	Mandatory	In regard to designation of the Manned Control Car and Engine Implacement Vehicle (MCC/EIV) as items for historical preservation, and the recommendation that the Railroad Transport System (RTS) (including the MCC/EIV), be removed from its present location and placed at the Boulder City Museum in Southern Nevada; Please include details of the deviation from approved SAFER activities, as well as applicable discussion of the established path forward for the RTS, in Section 2.2 of the final Closure Report. (Refer to Memorandum from TH Murphy to RF Boehlecke, entitled Request For Deviation From Planned SAFER Activities For CAU 566: EMAD COMPOUND, NNSS, Nevada, dated May 26, 2011).	Insert the following paragraph in section 2.1.1.7 CAS Component-Locomotives and Railcars, following 1st paragraph on page 27: "The MCC and EIV railcars have been designated as items of historical significance by the Nevada State Historic Preservation Office (Baldrica, 2006). The MCC/EIV will remain in place until a museum or other suitable recipient/location is identified for their preservation. If a suitable recipient/location for the MCC/EIV has not been identified before CAU 114 SAFER activities are implemented, disposition of the MCC/EIV railcars and potentially hazardous materials (e.g., lead shielding) present on the railcars will be reevaluated/managed as part of CAU 114."	

NEVADA ENVIRONMENTAL RESTORATION PROJECT
DOCUMENT REVIEW SHEET

1. Document Title/Number:	Draft Closure Report for Corrective Action Unit 566: EMAD Compound, Nevada National Security Site, Nevada	**2. Document Date:**	5/4/2011
3. Revision Number:	0	**4. Originator/Organization:**	Navarro-INTERA
5. Responsible NNSA/NSO Federal Sub-Project Director:	Kevin J. Cabble	**6. Date Comments Due:**	
7. Review Criteria:	Full		
8. Reviewer/Organization/Phone No:	T.H. Murphy and Jeff MacDougall, NDEP, 702-486-2850	**9. Reviewer's Signature:**	

10. Comment Number/Location	11. Type*	12. Comment	13. Comment Response	14. Accept
2.) General (Executive Summary, Sections 1.2, 2.1.1.7, and other applicable sections	Mandatory	Closure in place with land use restriction has been selected and implemented for CAS 25-99-20. Discuss the activities completed for CAU 566, CAS 25-99-20 (and all CAS components) with respect to ***this*** closure alternative. Modify the discussions of "clean closure" throughout the document with perspective that NSO is ultimately requesting a Notice of Completion for Closure in Place with land use restriction (i.e., perhaps describe the completed activities as removal activities, and remove references to "clean closure"). Also, if post closure monitoring activities apply, include pertinent discussion. As an example, for activities completed for the locomotives and railcars CAS component, there is contrasting information presented with respect to the railcars (i.e., manned control car, engine installation vehicle); in the Closure Report, "clean closure" activities are described; however, in a request for deviation submitted to NDEP on May 2, 2011 (Boehlecke:Murphy), NSO identified lead shielding, lead and silver solder, and other potential hazardous components that may "require" closure in place and post closure monitoring. The status of this CAS component and these items, as well as conditions for post-closure monitoring, must be described somewhere in the closure report, as applicable. If similar discussion is appropriate for other CAS components, modify the corresponding sections of the closure report.	Where applicable the document wording was changed from "clean closure" to "removal activities" as it pertained to specific CAS Components. There were 6 occurrences in the document where this was changed. The document was revised as follows: Page ES-2, revise 1st sentence of last paragraph: "Closure of CAU 566 was achieved through a combination of removal activities and closure in place." Page 5, revise 2nd sentence of 2nd paragraph of section 1.1: "The SAFER Plan recommended an evaluation of the corrective action alternatives (CAAs); the recommended corrective action for CAU 566 is closure in place with use restrictions (URs)." Page 7, delete 2nd sentence and 1st 5 bullets of section 1.2 and revise: "The objective of the SAFER activities for CAU 566 was to support closure of CAU 566 by collecting additional information and implementing corrective actions. Corrective actions were completed by removal of potential source material (PSM) and COCs as demonstrated by verification sample analytical results. The corrective actions included the following: • Removing surface debris and/or materials to facilitate sampling." ..... Page 53, delete 2nd sentence. Page B-65, revise 1st sentence of last paragraph: "Closure of CAU 566 was achieved through a combination of removal activities and closure in place." Page E-13, revise 2nd sentence of 2nd paragraph: "Corrective actions of partial removal, and closure in place for the remaining contamination were deemed to be appropriate and reasonable."	

NEVADA ENVIRONMENTAL RESTORATION PROJECT
DOCUMENT REVIEW SHEET

1. Document Title/Number:	Draft Closure Report for Corrective Action Unit 566: EMAD Compound, Nevada National Security Site, Nevada	**2. Document Date:**	5/4/2011
3. Revision Number:	0	**4. Originator/Organization:**	Navarro-INTERA
5. Responsible NNSA/NSO Federal Sub-Project Director:	Kevin J. Cabble	**6. Date Comments Due:**	
7. Review Criteria:	Full		
8. Reviewer/Organization/Phone No:	T.H. Murphy and Jeff MacDougall, NDEP, 702-486-2850	**9. Reviewer's Signature:**	

10. Comment Number/Location	11. Type*	12. Comment	13. Comment Response	14. Accept
3.) Section 2.1.1.7, Page 24	Mandatory	Provide a discussion in this section which addresses the management of lead components and other potential lead and silver-containing components associated with the railcars [manned control car (MCC) and engine installation vehicle (EIV)]. The discussion should be consistent with activities which were proposed in the approved SAFER Plan (June 2010) and/or the deviation request for these items, submitted to NDEP on May 2, 2011. Also, modify Section 2.2, Table 3-1, and Section 5.0 appropriately, to include discussion of managing the potentially hazardous components associated with the MCC and EIV.	The MCC and EIV railcars will remain in place until a museum or other suitable recipient/location is identified for their preservation. Section 2.1.1.7 has been revised (see response to comment #1). Table 3-1 is a summary of the waste streams generated during SAFER activities, components of the MCC/EIV railcars are not considered waste at this time, therefore inclusion in Table 3-1 does not apply. Section 5.0 of the document refers to the Use Restrictions (UR) placed at CAU 547, risk to workers is controlled through the UR, the UR form in Appendix D specifically includes annual inspection of the railcars for leaks and other potential releases, no change will be made to Section 5.0 of the document.	

NEVADA ENVIRONMENTAL RESTORATION PROJECT
DOCUMENT REVIEW SHEET

1. Document Title/Number:	Draft Closure Report for Corrective Action Unit 566: EMAD Compound, Nevada National Security Site, Nevada	**2. Document Date:**	5/4/2011
3. Revision Number:	0	**4. Originator/Organization:**	Navarro-INTERA
5. Responsible NNSA/NSO Federal Sub-Project Director:	Kevin J. Cabble	**6. Date Comments Due:**	
7. Review Criteria:	Full		
8. Reviewer/Organization/Phone No:	T.H. Murphy and Jeff MacDougall, NDEP, 702-486-2850	**9. Reviewer's Signature:**	

10. Comment Number/Location	11. Type*	12. Comment	13. Comment Response	14. Accept
4.) Executive Summary, Pages ES-2, ES-3	Mandatory	In this section, NSO states "...PCBs...remaining at the site are bounded within CAS 25-99-20..." Explain the validity of this statement given that the vertical extent of PCB contamination was not determined (since samples were not collected vertically, or at depth). In Section 5.0, discuss how not knowing the vertical extent of PCB contamination may affect or impact the associated land use restriction being proposed for CAS 25-99-20.	In order to clarify the document, revise the last sentence on Page ES-2 as follows: "The PCBs remaining at the site are bounded laterally, but not vertically, within CAS 25-99-20 based upon step-out sampling;...." Revise the third sentence of the middle paragraph on Page 12 as follows: "Extent of contamination for both CAS Components was bounded laterally, but not vertically, through sampling and analytical results;....." Revise Page 73, Section 5.0, 5th sentence of first bullet as follows: "The URs prohibit intrusive activities (at any depth) at CAS 25-99-20 without approval from NDEP." Add the following sentence to the end of the 1st paragraph inSection B.1.1: "The vertical extent of COC contamination could not be accomplished due to confined work space limitations, and proximity to overhead and underground utilities."	

Library Distribution List

	Copies
U.S. Department of Energy National Nuclear Security Administration Nevada Site Office Technical Library P.O. Box 98518, M/S 505 Las Vegas, NV 89193-8518	1 (Uncontrolled, electronic copy)
U.S. Department of Energy Office of Scientific and Technical Information P.O. Box 62 Oak Ridge, TN 37831-0062	1 (Uncontrolled, electronic copy)
Southern Nevada Public Reading Facility c/o Nuclear Testing Archive P.O. Box 98521, M/S 400 Las Vegas, NV 89193-8521	2 (Uncontrolled, electronic copies)
Manager, Northern Nevada FFACO Public Reading Facility c/o Nevada State Library & Archives 100 N Stewart Street Carson City, NV 89701-4285	1 (Uncontrolled, electronic copy)