RECORD OF TECHNICAL CHANGE

Technical Change No: DOE/NV1452 CAU 566 CR ROTC	-1	Page <u>1 of 2</u>
Project/Job No: N-I Industrial Sites / IS11-650	Date	July 28, 2011
Project/Job Name: Closure Report for Corrective Action Unit 5	566: EMAD Compound	
The following technical changes (including justification) are re	equested by:	
Mark J. Krauss	Industrial Sites Project Manager	
(Name)	(Title)	

Description of Change:

- 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. <u>Page 27, Section 2.1.1.7 CAS Component Locomotives and Railcars Investigation</u> 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/NV1452 CAU 566 CR ROTC-1		Page _ 2 of 2
Project/Job No: N-1 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 Arca 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	vill be (Increased) (Decreased) (Unchanged) by approximately0	da				0		ely_	oximate	appro) by	hange) (Un	creased	D)	creased)	be (will	ject time	The pr
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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 NNSA/NSO Federal Sub-Project Director	Date <u>\$-4-11</u>
	/s/ Robert F. Boehlecke	Date 8/4/11
	/s/ Jeff MacDougall	Date 8411

Nevada Environmental Restoration Project



DOE/NV--1452

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

Controlled Copy No.: ____ Revision No.: 0

June 2011

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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

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Derivative Classifier:	eph P. Johnston/N-I CO
Signature: /s/ Joseph Date:	

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

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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
СО	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

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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

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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

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

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).

<u>Note</u>: 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

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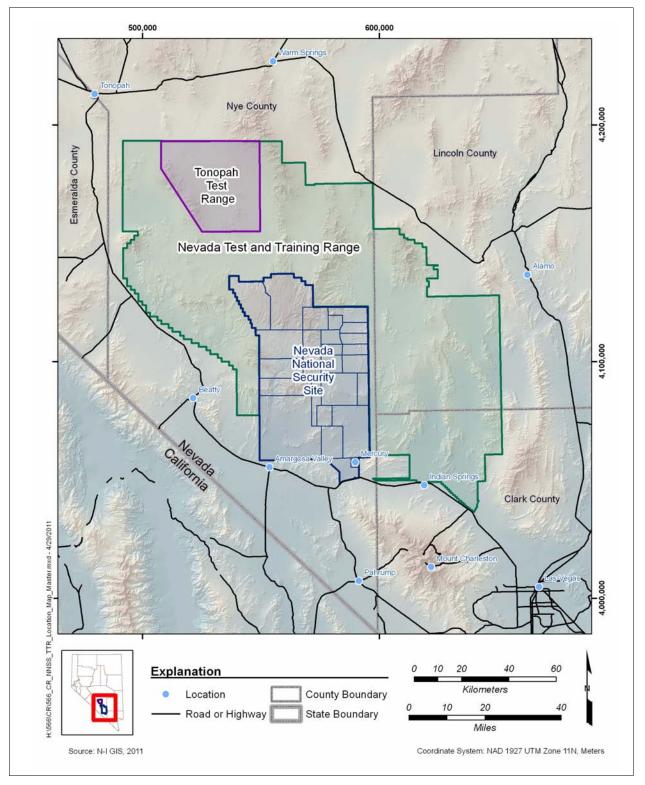


Figure 1-1 Nevada National Security Site

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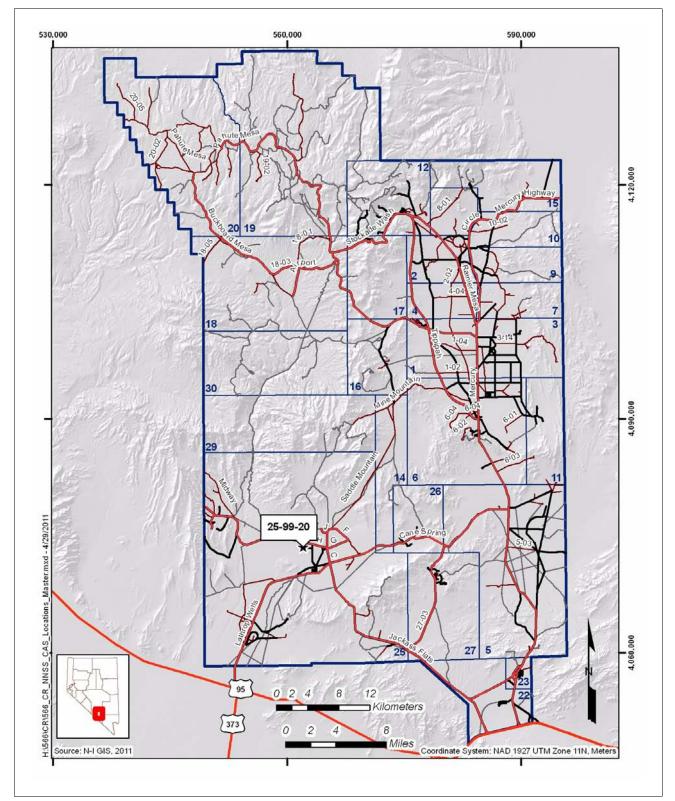


Figure 1-2 CAU 566 CAS Location Map

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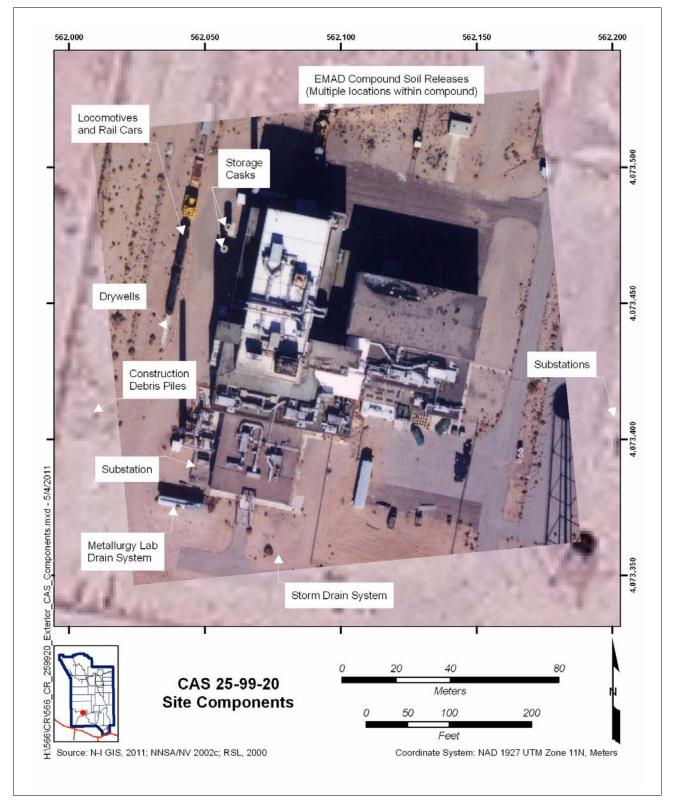


Figure 1-3 CAS Component Locations

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

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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 und	ler the Clean Closure Strategy
	25-24-08	Batteries (2)	
	25-24-10	Batteries (6)	U.S. Department of Energy, Nevada Operations Office.
70	25-26-11	Lead Bricks (30)	1995a. Environmental Restoration Sites Inventory - Non-Hazardous Site Cleanup Verification Summary.
	25-26-12	Lead Bricks (339)	(DOE/NV, 1995a)
	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/NV626. (DOE/NV, 2000a)
	25-23-04	Radioactively Contaminated Crates	LLC Department of Engravity Neurode On eventions Office
	25-23-10	Contaminated Materials	U.S. Department of Energy, Nevada Operations Office. 2000b. <i>Housekeeping Closure Report for Corrective</i>
288	25-29-01	Miscellaneous Chemicals	Action Unit 288: Area 25 Engine-Maintenance,
200	25-29-04	Miscellaneous Chemicals	Assembly, and Disassembly/Treatability Test Facility Chemical Sites, Nevada Test Site, Nevada, Rev. 0, DOE/NV590. (DOE/NV, 2000b)
	25-29-07	Ethylene Glycol	
	25-29-09	Miscellaneous Chemicals	DOE/NV390. (DOE/NV, 2000b)
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/NV11718-289. (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/NV11718-169. (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)
	25-22-14	Drums (2)	U.S. Department of Energy, Nevada Operations Office.
382	25-22-15	Drum	1996b. Corrective Action Unit 382 Housekeeping Closure Report. (DOE/NV, 1996b)

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/NV11718-129. (DOE/NV, 1997)
398	25-25-02	Oil Spills	U.S. Department of Energy, National Nuclear Security
	25-25-04	Oil Spills	Administration Nevada Site Office. 2003b. Closure Report for Corrective Action Unit 398: Area 25 Spill Sites, Nevada Test Site, Nevada, Rev. 1, DOE/NV873-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/NV873-REV 1-ADD. (NNSA/NSO, 2008b)
	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. <i>Closure</i> <i>Report for Corrective Action Unit 127: Areas 25 and 26</i> <i>Storage Tanks, Nevada Test Site, Nevada</i> , Rev. 0, DOE/NV1248. (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/NV717-Rev. 1. (NNSA/NV, 2001)
	25-07-06	Train Decontamination Area	U.S. Department of Energy, National Nuclear Security
165	25-59-01	Septic System	Administration Nevada Site Office. 2005. <i>Closure</i> <i>Report for Corrective Action Unit 165: Area 25 and 26</i> <i>Dry Well and Washdown Areas, Nevada Test Site,</i> <i>Nevada,</i> Rev. 0, DOE/NV1092. (NNSA/NSO, 2005)
168	25-16-01	Construction Waste Pile	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2007a. <i>Closure</i> <i>Report for Corrective Action Unit 168: Area 25 and 26</i> <i>Contaminated Materials and Waste Dumps, Nevada</i> <i>Test Site, Nevada,</i> Rev. 0, DOE/NV1178. (NNSA/NSO, 2007a)
300	25-60-02	Building 3901 Outfall	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2007b. <i>Closure</i> <i>Report for Corrective Action Unit 300: Surface Release</i> <i>Areas, Nevada Test Site, Nevada</i> , Rev. 0, DOE/NV1222. (NNSA/NSO, 2007b)

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

CAS CAS						
CAU	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/NV1248. (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/NV897-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/NV897-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/NV807. (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/NV1285. (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/NV1319. (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. <i>Closure</i> <i>Report for Corrective Action Unit 262: Area 25 Septic</i> <i>Systems and Underground Discharge Point, Nevada</i> <i>Test Site, Nevada,</i> Rev. 1, DOE/NV897-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/NV897-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. <i>Closure</i> <i>Report for Corrective Action Unit 398: Area 25 Spill</i> <i>Sites, Nevada Test Site, Nevada,</i> Rev. 1, DOE/NV873 - REV 1. (NNSA/NSO, 2003b) -and- U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2008b. <i>Addendum</i> <i>to the Closure Report for Corrective Action Unit 398:</i> <i>Area 25 Spill Sites, Nevada Test Site, Nevada,</i> Rev. 0, DOE/NV873-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 (ft³) 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

	CAS 25-99-20 Components							
CAI Activities	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.	х	х	х	х	х	х	х	
Field screened samples for alpha and beta/gamma radiation using a handheld survey instrument.	х	Х	Х	х	х	х	х	
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).	х	х	х	х	x	х	х	
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.				х		х		
Removed assumed PSMs without sampling (e.g., lead shielding, mercury-containing thermostats, PCB-containing ballasts).	х		Х			х		
Collected samples to characterize future demolition wastes.	Х		Х	Х	Х	Х		
Investigated drywells; isolated and sealed potential future pathways to the environment.					х			
Submitted select samples for offsite laboratory analysis.	Х	Х	Х	Х	Х	Х	Х	
Collected beryllium and asbestos samples for characterization.	Х	Х	Х		Х	Х		
Collected GPS coordinates for samples locations and points of interest.	Х	Х	Х	Х	Х	Х	Х	

-- = 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

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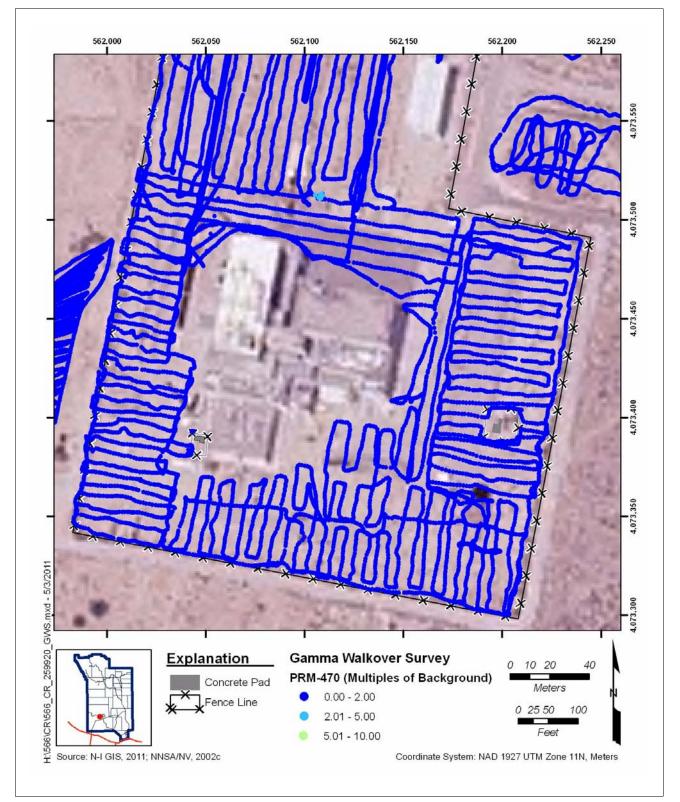


Figure 2-1 Radiological Walkover Survey

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.

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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

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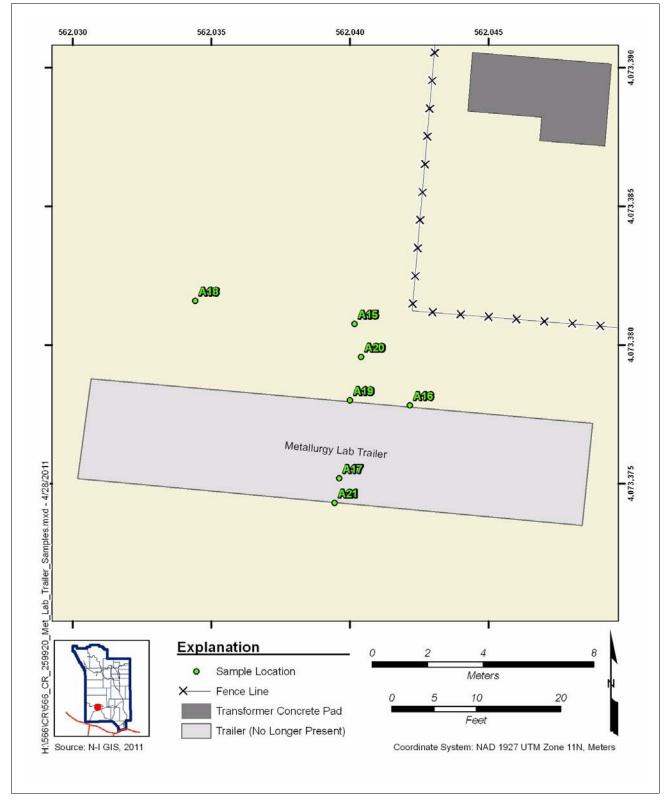


Figure 2-3 Metallurgy Lab Trailer Sample Locations

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

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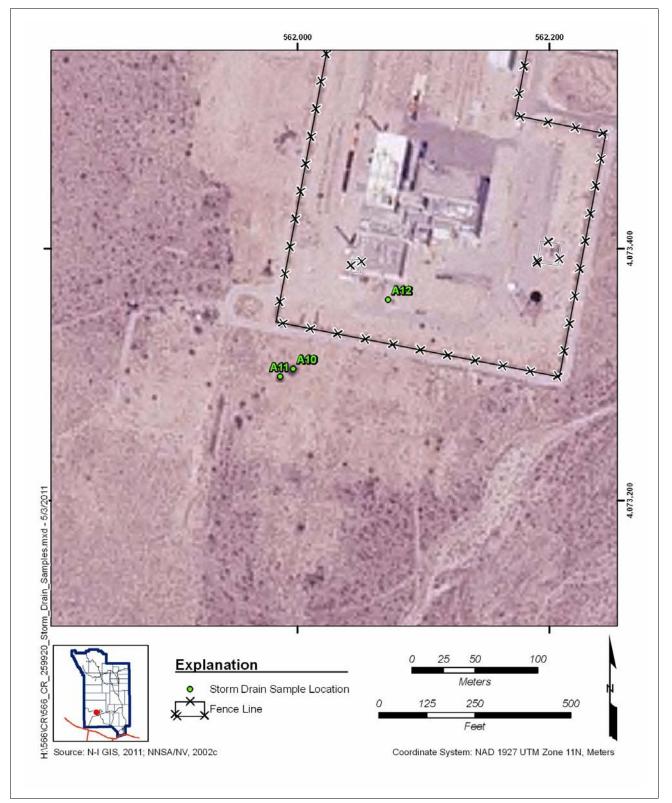


Figure 2-4 Storm Drain System Sample Locations

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

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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

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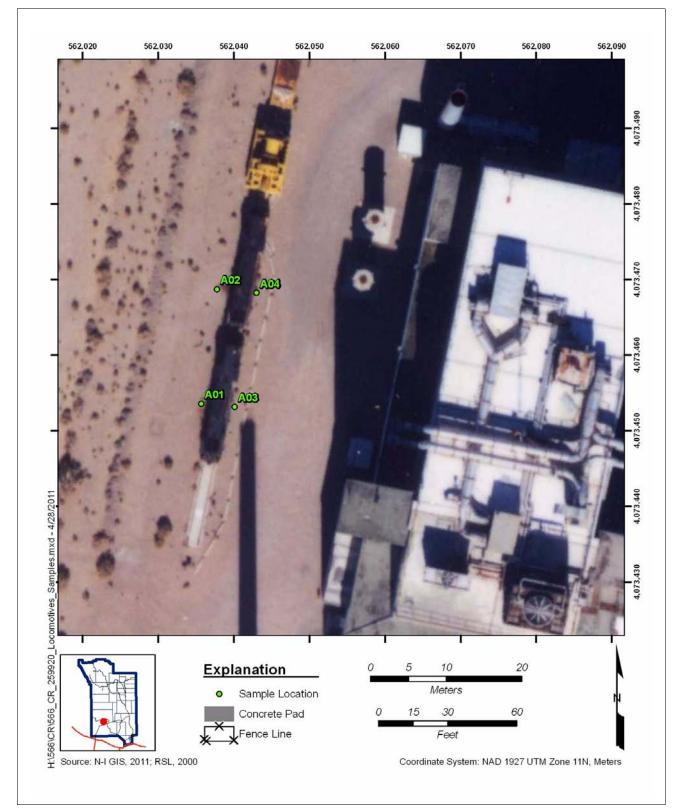


Figure 2-8 Locomotives and Railcars Soil Sample Locations

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 ft³ 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

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

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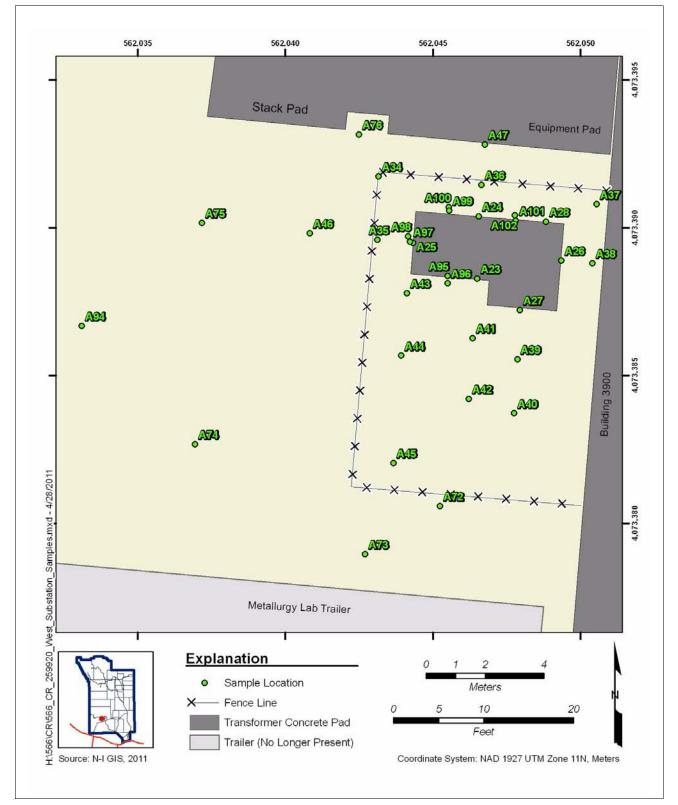


Figure 2-10 Southwest Substation - Decision I and Decision II Samples

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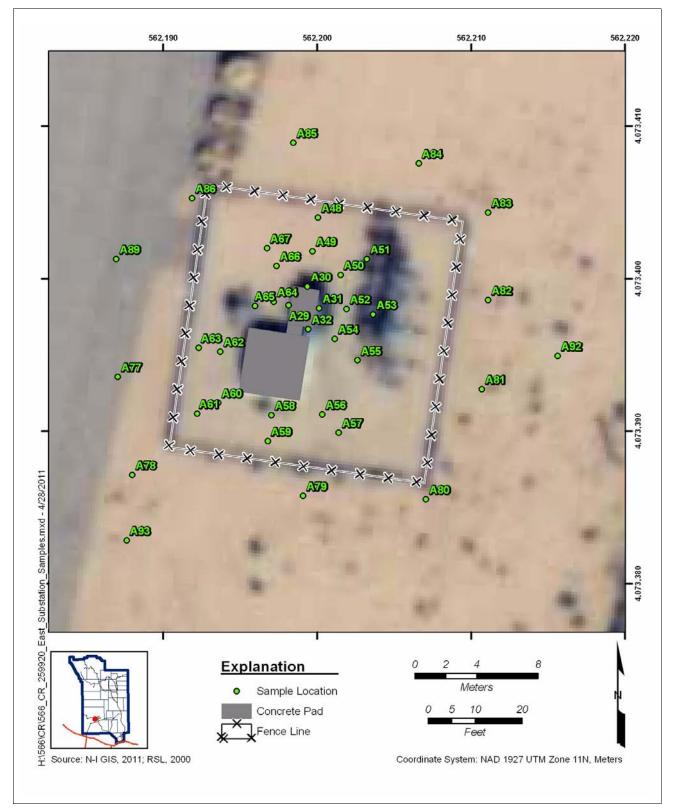


Figure 2-11 Southeast Substation - Decision I and Decision II Samples

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)

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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

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Figure 2-13 Drywell Sample Locations

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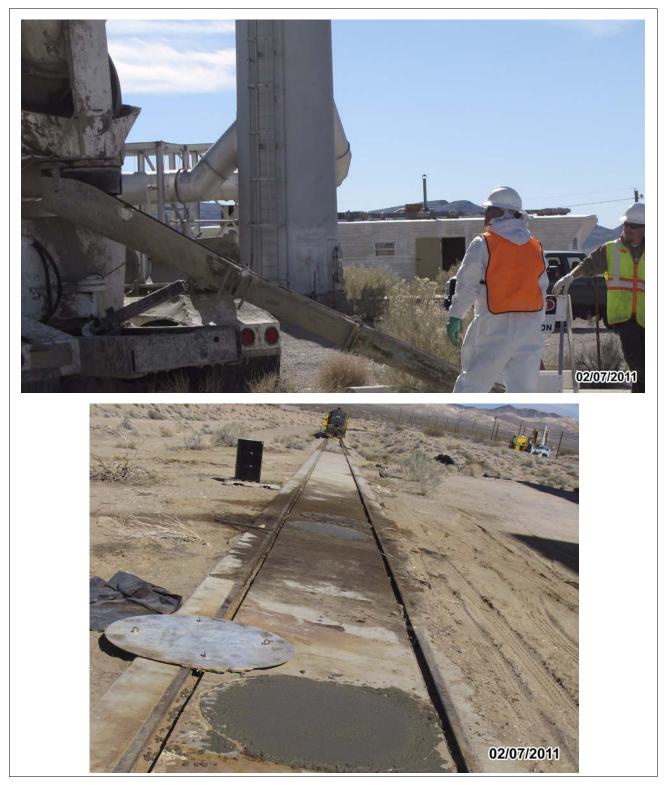


Figure 2-14 Drywell Grouting and Closure

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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 (ft²) areas with elevated radioactivity based on field instrumentation (Figure 2-18). A corrective action was performed to remove approximately 1.5 ft³ 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

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Figure 2-16 Debris Piles at CAU 566

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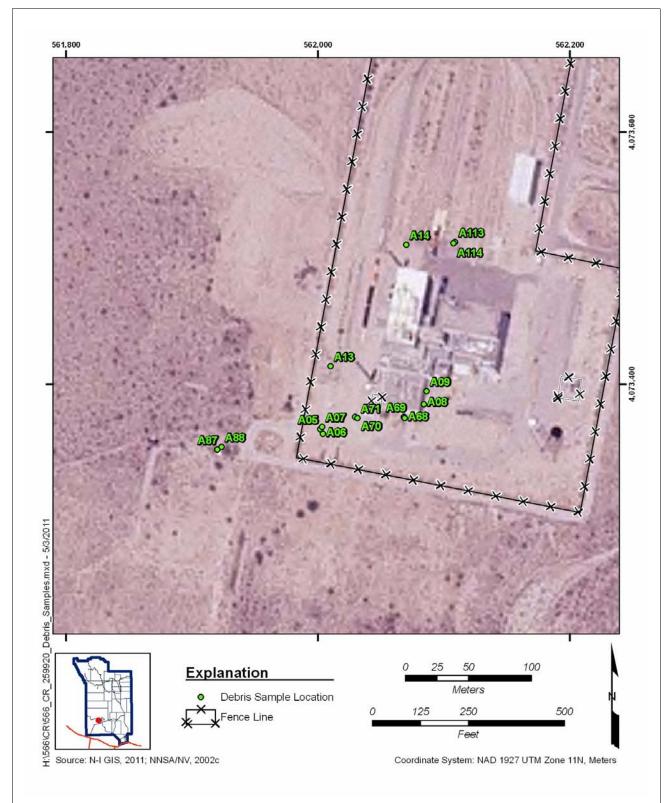


Figure 2-17 Debris Piles Sample Locations



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-ft² 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 ft³ of soil. The source of contamination was identified as rusted metal particles approximately 1 to 2 ft below ground surface (bgs). Approximately 15 ft³ 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 ft³ 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

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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

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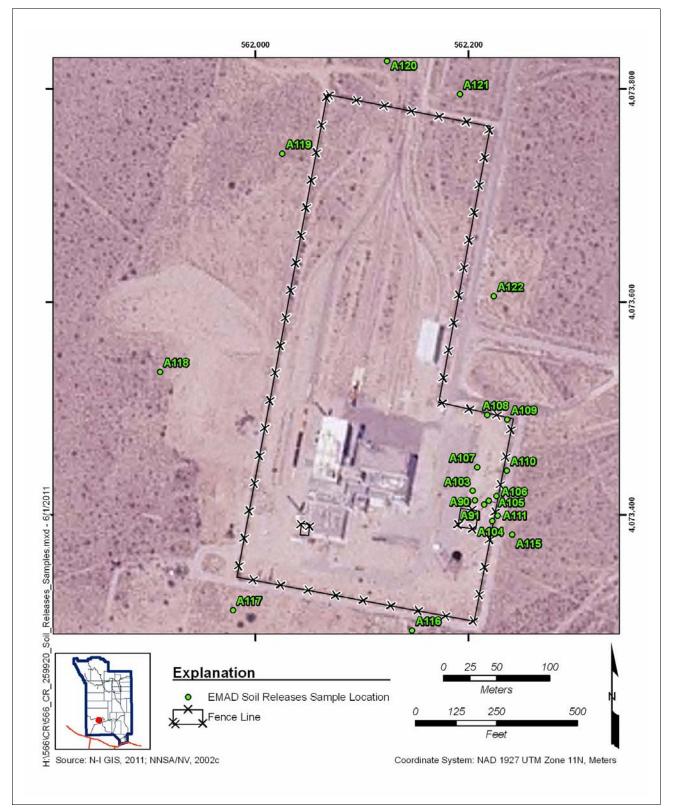


Figure 2-21 EMAD Compound Soil Releases Sample Locations

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.

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.

Table 2-2Corrective Action Schedule for CAU 566

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.

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

Container Numbers	Waste Item Description	Waste Characterization	Container, Package Type	Waste Volume	Waste Weight (Ib)	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

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

Container Numbers	Waste Item Description	Waste Characterization	Container, Package Type	Waste Volume	Waste Weight (Ib)	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

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

Container Numbers	Waste Item Description	Waste Characterization	Container, Package Type	Waste Volume	Waste Weight (Ib)	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

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

Container Numbers	Waste Item Description	Waste Characterization	Container, Package Type	Waste Volume	Waste Weight (Ib)	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.

^aDisposal 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 yd³ = 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 ft³ 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 ft³ 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 ft³ 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 ft³ 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:

<u>Step 1</u>: 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.

<u>Step 2</u>: 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.

<u>Step 3</u>: 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.

<u>Step 4</u>: 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.

<u>Population Parameter</u>: 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.

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						ANAL	YTES					
CAS	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

Table 4-1 CAU 566 Analyses Performed

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)
	Benzo(a)pyrene		0.412	0.21
566001	Dibenzo(ah)anthracene	25-99-20	0.412	0.21
	Hexachlorobenzene	23-99-20	2.75	1.1
	n-Nitroso di-n-propylamine		2.75	0.25

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

Sample	Constituent	CAS	MDC (mg/kg)	FAL (mg/kg)
	2,4-Dinitrotoluene		7.42	5.5
	4-Chloroaniline		14.8	8.6
	Benz(a)anthracene		2.23	2.1
	Benzo(a)pyrene		2.23	0.21
566002	Benzo(b)fluoranthene		2.23	2.1
500002	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
	Benzo(a)pyrene		0.813	0.21
566003	Dibenzo(ah)anthracene		0.813	0.21
500003	Hexachlorobenzene	25-99-20	5.42	1.1
	n-Nitroso di-n-propylamine	25-99-20	5.42	0.25
	Benzo(a)pyrene		1.17	0.21
	Dibenzo(ah)anthracene		1.17	0.21
566004	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
	Aroclor 1221		11.4	1.76
	Aroclor 1232	1	11.4	1.76
566024	Aroclor 1242	1	11.4	2.91
000024	Aroclor 1248]	11.4	2.91
	Aroclor 1254	1	11.4	2.91
	Aroclor 1268	1	11.4	2.91

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Sample	Constituent	CAS	MDC (mg/kg)	FAL (mg/kg)
	Aroclor 1221		11.5	1.76
	Aroclor 1232		11.5	1.76
566026	Aroclor 1242		11.5	2.91
500020	Aroclor 1248		11.5	2.91
	Aroclor 1254		11.5	2.91
	Aroclor 1268		11.5	2.91
	Aroclor 1221		11.4	1.76
	Aroclor 1232		11.4	1.76
566027	Aroclor 1242		11.4	2.91
500027	Aroclor 1248		11.4	2.91
	Aroclor 1254		11.4	2.91
	Aroclor 1268	25-99-20	11.4	2.91
	Aroclor 1221	25-39-20	11.3	1.76
	Aroclor 1232		11.3	1.76
566032	Aroclor 1242		11.3	2.91
300032	Aroclor 1248		11.3	2.91
	Aroclor 1254		11.3	2.91
	Aroclor 1268		11.3	2.91
	Aroclor 1221		11.3	1.76
	Aroclor 1232		11.3	1.76
566033	Aroclor 1242		11.3	2.91
500055	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 3 of 4)

Sample	Constituent	CAS	MDC (mg/kg)	FAL (mg/kg)
	Aroclor 1221		11.3	1.76
	Aroclor 1232		11.3	1.76
566034	Aroclor 1242 Aroclor 1248 25-99-20		11.3	2.91
500034			11.3	2.91
	Aroclor 1254	23-99-20	11.3	2.91
	Aroclor 1268		11.3	2.91
566050	Aroclor 1221		2.27	1.76
500030	Aroclor 1232		2.27	1.76

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

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

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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

Table 4-3Precision Measurements

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.

<u>Accuracy</u>

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

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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 4-5Comparison 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

<u>Representativeness</u>

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.

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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.

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

4.5.1.2.1 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).
 - <u>Result</u>: 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.
 - <u>Result</u>: 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.

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).

Table 4-6 Key Assumptions

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:

<u>Exception</u>: 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.

<u>Impact</u>: 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.

<u>Results</u>: 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 ft³ 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

<u>Decision Rule</u>: 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.

<u>Result</u>: 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

<u>Decision Rule</u>: If the observed concentration of any COC in a Decision II sample exceeds the PALs, then additional samples will be collected to complete the determination of the extent.

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

<u>Decision Rule</u>: 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.

<u>Result</u>: 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.

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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

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

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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.

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.2-1Conceptual 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- Isotopic U, Isotopic P	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.								

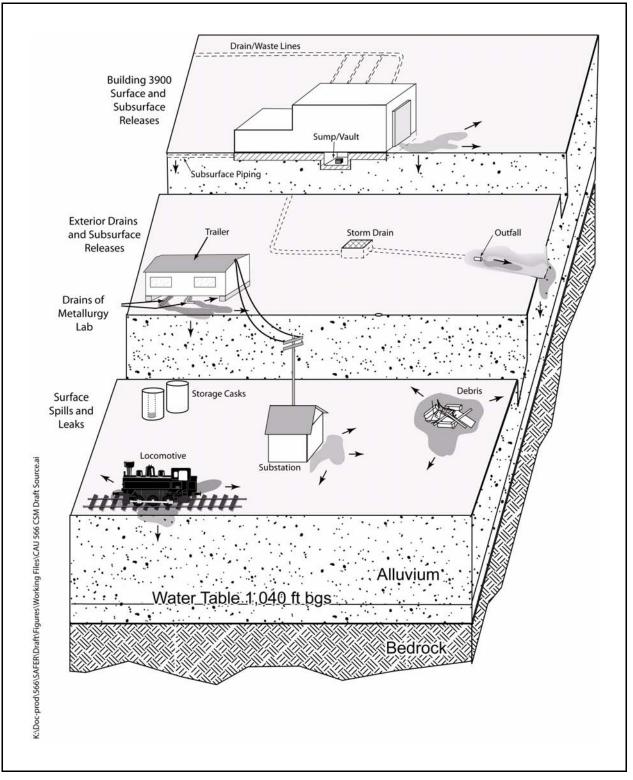


Figure B.2-1 Conceptual Site Model for CAU 566

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

, maly loar riogram						
		CAS 25-99-20 Components				
Analyses	Storage Casks and Drywells	Substations	Storm Drain System	Metallurgy Lab Drains	Locomotives and Railcars	Construction Debris Piles
Organic COPCs						
TPH-DRO		X				
PCBs		Х	Х			
SVOCs			Х			
VOCs			Х			
Pesticides						
Inorganic COPCs						
RCRA Metals)	X	
Total Beryllium			Х			
Radionuclide COPCs						
Gamma Spectroscopy	Х			2	X	
Isotopic U	Х)	X	
Isotopic Pu	Х		Х			
Sr-90	Х)	X	

Table B.2-2Analytical Program^a

^aThe 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.

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.

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

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.

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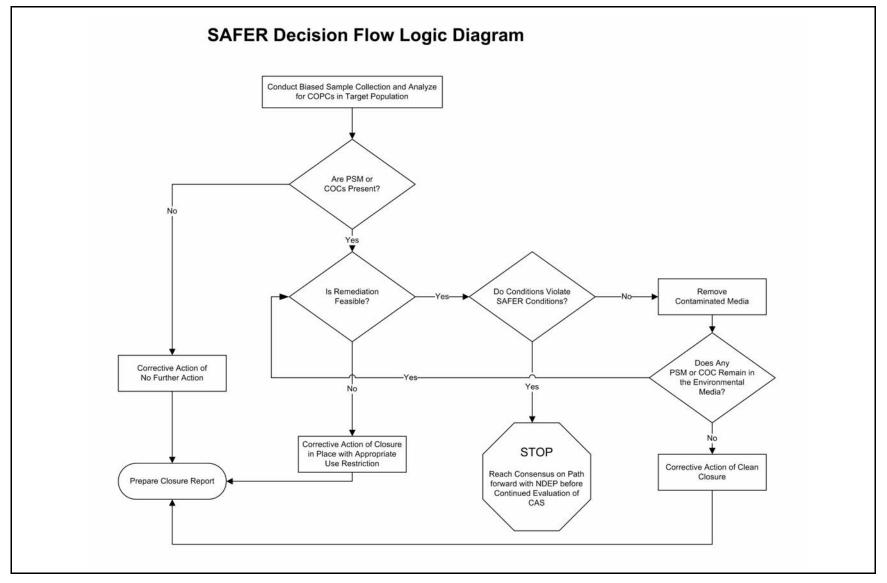


Figure B.3-1 SAFER Closure Decision Process for CAU 566

- 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.

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CAS ID	CAS Name or Component	Lateral Spatial Boundary	Vertical Spatial Boundaries	
	Locomotives/railcars	25 ft beyond perimeter of stained soil	15 ft bgs	
	Debris piles	25 ft beyond perimeter of debris item	15 ft bgs	
25-99-20	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.5-1
Spatial Boundaries of CAU 566 CAS Components

Table B.5-2Practical 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

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

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.

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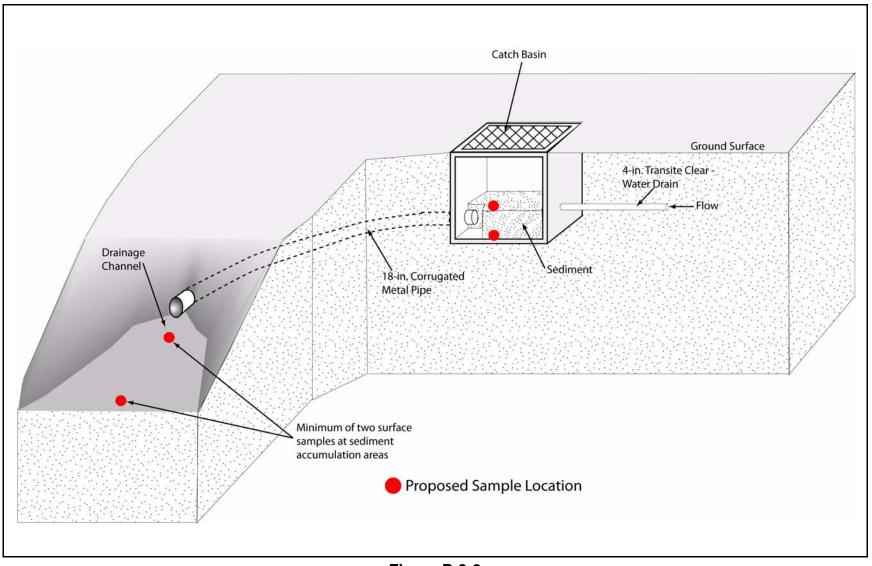


Figure B.8-2 Proposed Decision I Sampling Locations for the Storm Drain System

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

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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

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

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.

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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

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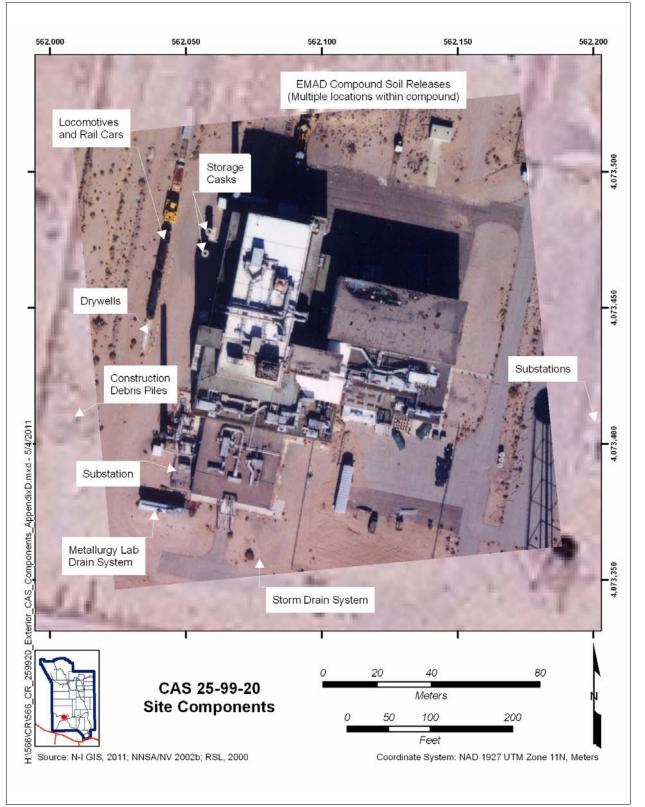


Figure B.1-1 EMAD Compound CAS Component Locations

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.

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.2-1Corrective Action Investigation Activities Conducted at CAS 25-99-20To 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.	Х
Field screened samples for alpha and beta/gamma radiation using handheld survey instruments.	Х
Performed swipe sampling for removable radioactivity using a handheld survey instrument and/or gamma scintillator.	х
Collected soil samples from biased locations to determine whether COCs are present (Decision I) and from step-out sample locations to define the extent of COCs (Decision II).	х
Collected liquid, solid, 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).	х
Removed radiologically contaminated, lead-contaminated, and PCB-contaminated soil; and collected verification samples.	х
Removed assumed PSMs without sampling (e.g., lead shielding, mercury-containing thermostats, PCB-containing ballasts).	х
Collected samples to characterize future demolition wastes.	Х
Investigated drywells and storage casks. Grouted drywells to eliminate potential future pathway to environment.	х
Collected GPS coordinates for sample locations and points of interest.	Х
Performed BMPs (e.g., demolition and disposition of wood sheds, guard shack).	Х
Submitted select samples for offsite laboratory analysis.	Х

-- = 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.

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

Analysis	Analytical Method ^b
VOCs	Aqueous/Non-aqueous - EPA SW-846° 8260
SVOCs	Aqueous/Non-aqueous - EPA SW-846° 8270
TCLP SVOC	EPA SW-846° 1311/8270
PCBs	Aqueous/Non-aqueous - EPA SW-846° 8082
TPH-DRO	Aqueous/Non-aqueous - EPA SW-846° 8015 Modified
Metals	Aqueous - EPA SW-846° 6010/6020/7470 Non-aqueous - EPA SW-846° 6010/6020/7471
TCLP Metals	EPA SW-846° 1311/6010/7470
Bulk Asbestos	NIOSH 9002 ^d
Isotopic U	Aqueous/Non-aqueous - DOE EML HASL-300° U-02-RC
Isotopic Pu	Aqueous - DOE EML HASL-300° Pu-10-RC Non-aqueous - DOE EML HASL-300° Pu-02-RC
Gamma Spectroscopy	Aqueous - EPA 901.1 ¹ 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 ^r Non-aqueous - SM 7110 Bi Modified
Tritium	Aqueous - EPA 906.0 ^f Non-aqueous

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

°Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (EPA, 2009).

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

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

^tPrescribed 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-ft² 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). <u>Note</u>: 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

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Table B.3-1
Samples Collected at CAS 25-99-20, EMAD Compound
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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	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A02	566002	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A03	566003	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A04	566004	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A05	566005	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A06	566006	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
AUG	566007	0.0 - 0.5	Soil	FD of #566006	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A07	566008	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A08	566009	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A09	566010	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A10	566011	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A11	566012	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A12	566013	0 - 2 (in.)	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A13	566014	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A14	566015	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A15	566016	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A16	566017	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A17	566018	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A18	566019	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A19	566020	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х

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Table B.3-1
Samples Collected at CAS 25-99-20, EMAD Compound
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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	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A21	566022	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A22	566023	N/A	Water	PSM		Х						Х	Х					Х	Х	
A23	566024	0.0 - 0.5	Soil	Environmental		Х					Х			Х					Х	Х
A24	566025	0.0 - 0.5	Soil	Environmental		Х					Х			Х					Х	Х
AZ4	566026	0.0 - 0.5	Soil	FD of #566025							Х			Х						Х
A25	566027	0.0 - 0.5	Soil	Environmental		Х					Х			Х					Х	Х
A26	566028	0.0 - 0.5	Soil	Environmental							Х			Х						Х
A27	566029	0.0 - 0.5	Soil	Environmental							Х			Х						Х
A28	566030	0.0 - 0.5	Soil	Environmental		Х					Х			Х					Х	Х
A29	566031	0.0 - 0.5	Soil	Environmental							Х			Х						Х
A30	566032	0.0 - 0.5	Soil	Environmental							Х			Х						Х
A31	566033	0.0 - 0.5	Soil	Environmental							Х			Х						Х
A32	566034	0.0 - 0.5	Soil	Environmental							Х			Х						Х
A34	566035	0.0 - 0.5	Soil	Environmental							Х									
A35	566036	0.0 - 0.5	Soil	Environmental							Х									
A36	566037	0.0 - 0.5	Soil	Environmental							Х									
A37	566038	0.0 - 0.5	Soil	Environmental							Х									
A38	566039	0.0 - 0.5	Soil	Environmental							Х									
A39	566040	0.0 - 0.5	Soil	Environmental							Х									

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Table B.3-1
Samples Collected at CAS 25-99-20, EMAD Compound
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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							Х									
A41	566042	0.0 - 0.5	Soil	Environmental							Х									
A42	566043	0.0 - 0.5	Soil	Environmental							Х									
A43	566044	0.0 - 0.5	Soil	Environmental							Х									
A44	566045	0.0 - 0.5	Soil	Environmental							Х									
A45	566046	0.0 - 0.5	Soil	Environmental							Х									
A46	566047	0.0 - 0.5	Soil	Environmental							Х									
A40	566048	0.0 - 0.5	Soil	FD of #566047							Х									
A47	566049	0.0 - 0.5	Soil	Environmental							Х									
A48	566050	0.0 - 0.5	Soil	Environmental							Х									
A49	566051	0.0 - 0.5	Soil	Environmental							Х									
A50	566052	0.0 - 0.5	Soil	Environmental							Х									
A51	566053	0.0 - 0.5	Soil	Environmental							Х									
A52	566054	0.0 - 0.5	Soil	Environmental							Х									
A53	566055	0.0 - 0.5	Soil	Environmental							Х									
A54	566056	0.0 - 0.5	Soil	Environmental							Х									
A55	566057	0.0 - 0.5	Soil	Environmental							Х									
A56	566058	0.0 - 0.5	Soil	Environmental							Х									
A57	566059	0.0 - 0.5	Soil	Environmental							Х									
A58	566060	0.0 - 0.5	Soil	Environmental							Х									

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Table B.3-1
Samples Collected at CAS 25-99-20, EMAD Compound
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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							Х									
A60	566062	0.0 - 0.5	Soil	Environmental							Х									
A61	566063	0.0 - 0.5	Soil	Environmental							Х									
4.00	566064	0.0 - 0.5	Soil	Environmental							Х									
A62	566065	0.0 - 0.5	Soil	FD of #566064							Х									
A63	566066	0.0 - 0.5	Soil	Environmental							Х									
A64	566067	0.0 - 0.5	Soil	Environmental							Х									
A65	566068	0.0 - 0.5	Soil	Environmental							Х									
A66	566069	0.0 - 0.5	Soil	Environmental							Х									
A67	566070	0.0 - 0.5	Soil	Environmental							Х									
A22-1	566071	0.0 - 1.0	Soil	Environmental		Х						Х	Х						Х	
A68	566072	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A69	566073	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A70	566074	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A71	566075	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A72	566076	0.0 - 0.5	Soil	Environmental							Х									
A73	566077	0.0 - 0.5	Soil	Environmental							Х									
A74	566078	0.0 - 0.5	Soil	Environmental							Х									
A75	566079	0.0 - 0.5	Soil	Environmental							Х									
A76	566080	0.0 - 0.5	Soil	Environmental							Х									

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Table B.3-1
Samples Collected at CAS 25-99-20, EMAD Compound
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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							Х									
A78	566082	0.0 - 0.5	Soil	Environmental							Х									
A79	566083	0.0 - 0.5	Soil	Environmental							Х									
A80	566084	0.0 - 0.5	Soil	Environmental							Х									
A81	566085	0.0 - 0.5	Soil	Environmental							Х									
A82	566086	0.0 - 0.5	Soil	Environmental							Х									
A83	566087	0.0 - 0.5	Soil	Environmental							Х									
A84	566088	0.0 - 0.5	Soil	Environmental							Х									
A85	566089	0.0 - 0.5	Soil	Environmental							Х									
A86	566090	0.0 - 0.5	Soil	Environmental							Х									
Add	566091	0.0 - 0.5	Soil	FD of #566090							Х									
A87	566092	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
A88	566093	0.0 - 0.5	Soil	Environmental	Х	Х		Х		Х	Х	Х	Х	х					Х	Х
A89	566094	0.0 - 0.5	Soil	Environmental							Х									
A90	566095	0.0 - 0.5	Soil	Environmental							Х									
A91	566096	0.0 - 0.5	Soil	Environmental							Х									
A92	566097	0.0 - 0.5	Soil	Environmental							Х									
A93	566098	0.0 - 0.5	Soil	Environmental							Х									
A94	566099	0.0 - 0.5	Soil	Environmental							Х									
A95	566100	1.0 - 1.5	Soil	Environmental							Х									

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Samples Collected at CAS 25-99-20, EMAD Compound
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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							Х									
A97	566102	1.0 - 1.5	Soil	Environmental							Х									
A98	566103	0.0 - 1.0	Soil	Environmental							Х									
A99	566104	1.0 - 1.5	Soil	Environmental							Х									
A100	566105	0.0 - 1.0	Soil	Environmental							Х									
A101	566106	1.0 - 1.5	Soil	Environmental							Х									
ATUT	566107	1.0 - 1.5	Soil	FD of #566106							Х									
A102	566108	0.0 - 1.0	Soil	Environmental							Х									
A103	566109	0.0 - 0.5	Soil	Environmental							Х									
A104	566110	0.0 - 0.5	Soil	Environmental							Х									
A105	566111	0.0 - 0.5	Soil	Environmental							Х									
A106	566112	0.0 - 0.5	Soil	Environmental							Х									
A107	566113	0.0 - 0.5	Soil	Environmental							Х									
A108	566114	0.0 - 0.5	Soil	Environmental							Х									
A109	566115	0.0 - 0.5	Soil	Environmental							Х									
A110	566116	0.0 - 0.5	Soil	Environmental							Х									
A111	566117	0.0 - 0.5	Soil	Environmental							Х									
A113	566118	1.5 - 2.0	Soil	Environmental		Х						Х	Х						Х	
A114	566119	1.0 - 1.5	Soil	Environmental		Х						Х	Х						Х	
A115	566120	0.0 - 0.5	Soil	Environmental							Х									

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Table B.3-1
Samples Collected at CAS 25-99-20, EMAD Compound
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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							Х									
Allo	566122	0.0 - 0.5	Soil	FD of #566121							Х									
A117	566123	0.0 - 0.5	Soil	Environmental							Х									
A118	566124	0.0 - 0.5	Soil	Environmental							Х									
A119	566125	0.0 - 0.5	Soil	Environmental							Х									
A120	566126	0.0 - 0.5	Soil	Environmental							Х									
A121	566127	0.0 - 0.5	Soil	Environmental							Х									
A122	566128	0.0 - 0.5	Soil	Environmental							Х									
N/A	566301	N/A	Water	Trip Blank																Х
N/A	566302	N/A	Water	Trip Blank																Х
N/A	566303	N/A	Water	Trip Blank																Х
N/A	566304	N/A	Water	Trip Blank																Х
N/A	566305	N/A	Water	Trip Blank																Х
N/A	566306	N/A	Water	Trip Blank																Х
N/A	566307	N/A	Water	Field Blank	Х	Х		Х		Х	Х	Х	Х	Х					Х	Х
N/A	566308	N/A	Water	Trip Blank																Х
N/A	566309	N/A	Water	Trip Blank																Х
N/A	566310	N/A	Water	Trip Blank																Х
Wood Debris Pile	566501	N/A	Solid	Waste Management		Х									х	Х				

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Table B.3-1
Samples Collected at CAS 25-99-20, EMAD Compound
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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		Х									х	Х	х			
Guard Shack Paint Chips	566503	N/A	Solid	Waste Management											x					
Wooden Shack Paint Chips	566504	N/A	Solid	Waste Management											x					
SW Substation	566505	N/A	Solid	Waste Management							х									
Scabbled Concrete	566506	N/A	Solid	Waste Management							х									
SE Substation Scabbled	566507	N/A	Solid	Waste Management							х									
Concrete	566508	N/A	Solid	Waste Management							х									
SW Transformer	566509	N/A	Wipe	Waste Management							х									
Container No. 566004	566510	N/A	Soil	Waste Management		Х						х	х		х				Х	
Container Nos. 566008 through 566011	566511	N/A	Liquid	PSM		х	х			х	х							х	х	
Container No. 566005	566512	N/A	Oil	PSM		Х				Х	х								Х	

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Table B.3-1
Samples Collected at CAS 25-99-20, EMAD Compound
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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		Х				х	х								х	
MCC Engine Oil	566514	N/A	Oil	PSM		Х				х	х								х	
MCC Diesel	566515	N/A	Oil	PSM		Х			Х	Х	Х								Х	
MCC/EIV Gear Oil	566516	N/A	Oil	PSM		Х				х	х								х	
Container Nos. 566037 and 566038	566517	0.0 - 0.5	Soil	Waste Management		х		х		х		х	х						х	

-- = Not required

an approximate 665,580-ft² 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 cm²) alpha and 1.2 to 2.0 million dpm/100 cm² 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 ft³ 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 ft² each, within an approximate 4-ft² area near the southwest corner of the Metallurgy Lab trailer. Approximately 1.5 ft³ 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 ft³ 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

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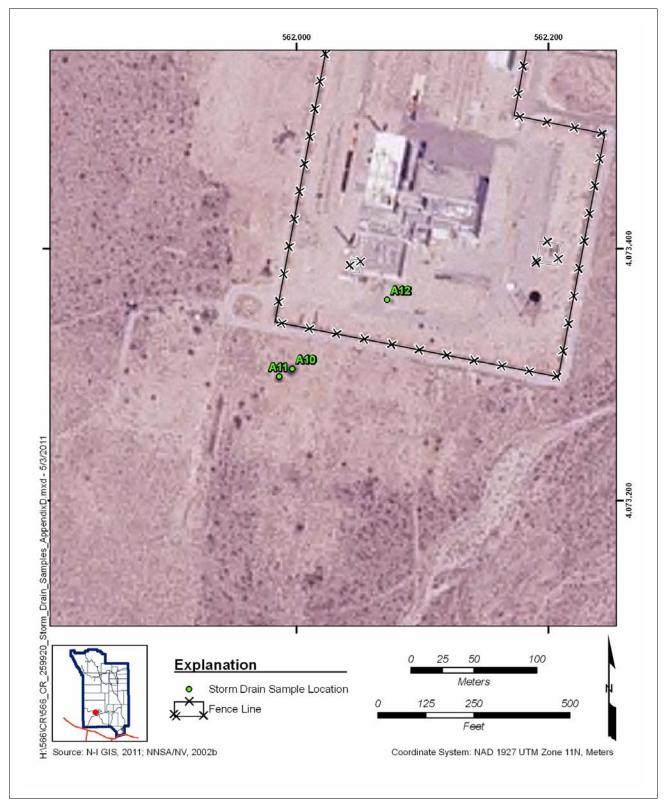


Figure B.3-1 Storm Drain System Sample Locations

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 ft³ 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.

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Figure B.3-2 Drywell Sample Locations

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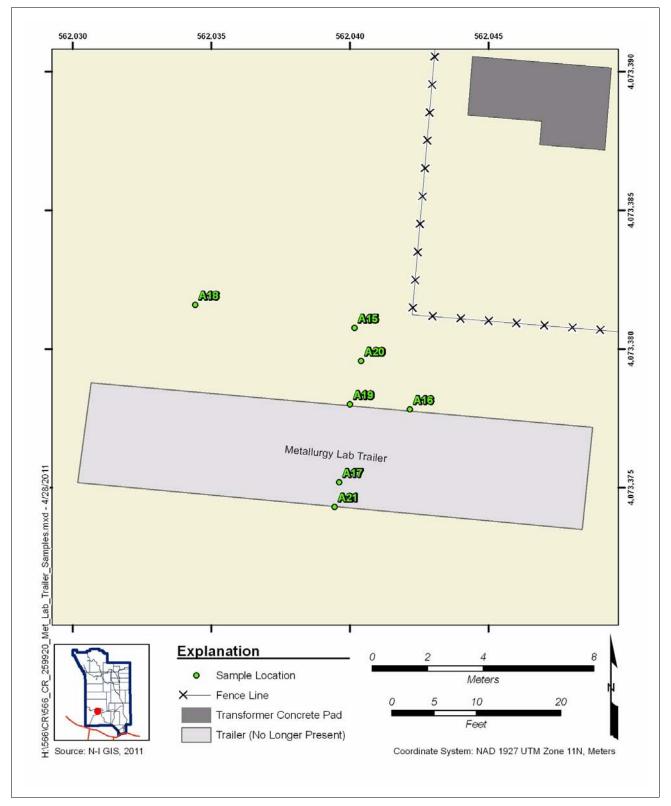


Figure B.3-3 Metallurgy Lab Trailer Sample Locations

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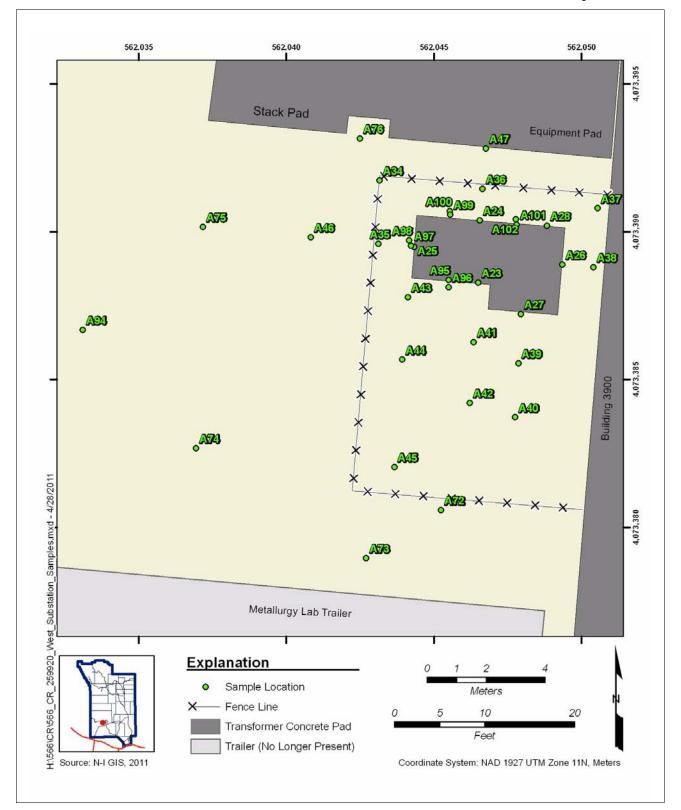


Figure B.3-4 Southwest Substation - Decision I and Decision II Samples

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

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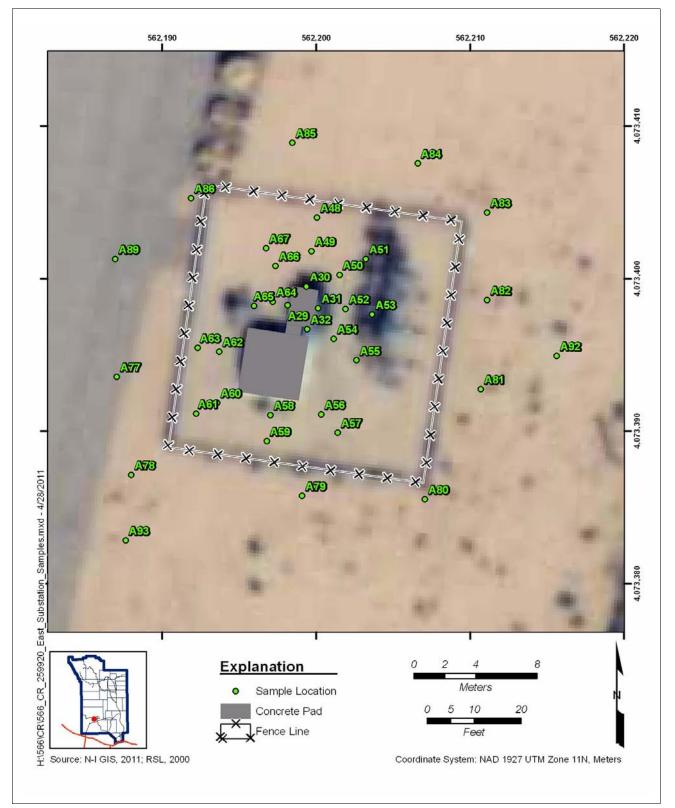


Figure B.3-5 Southeast Substation - Decision I and Decision II Samples

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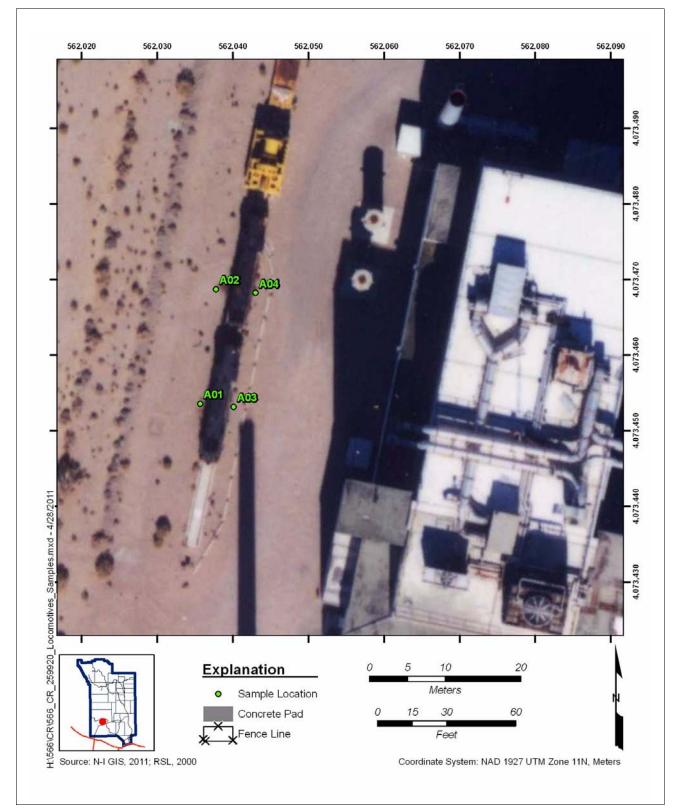


Figure B.3-6 Locomotives and Railcars Soil Sample Locations

or staging areas for equipment or debris. One area consisted of two co-located soil areas of elevated radioactivity, approximately 1 ft² each, within an approximate 4-ft² area near the southwest corner of the Metallurgy Lab trailer. A corrective action was performed to remove approximately 1.5 ft³ 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-ft² radiologically contaminated area located approximately 100 ft north of Building 3900. A corrective action was performed to remove and package approximately 15 ft³ 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 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.

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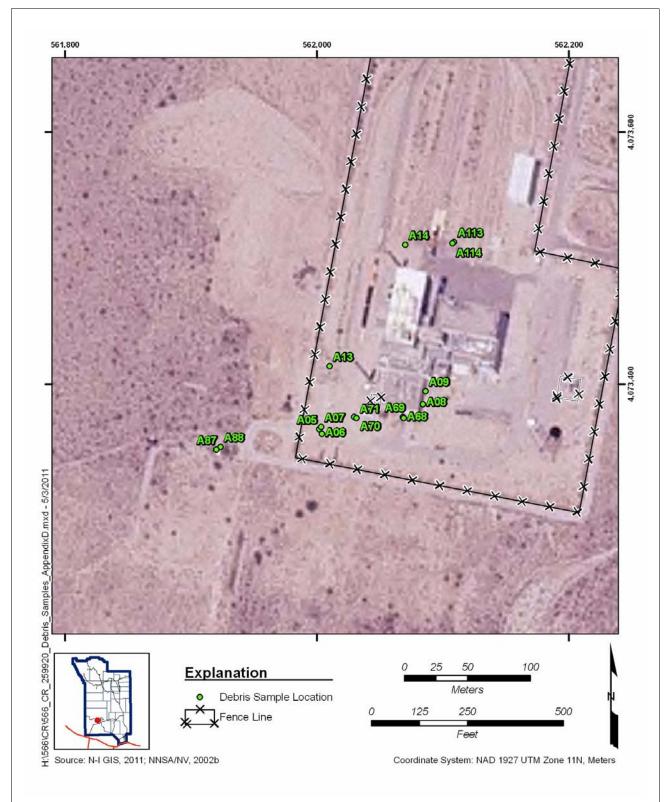


Figure B.3-7 Debris Piles Sample Locations

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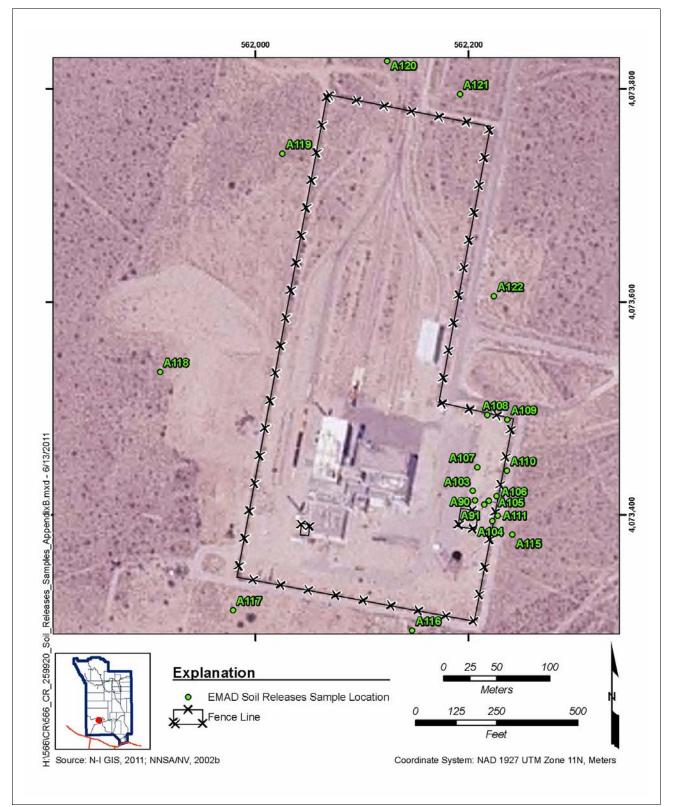


Figure B.3-8 EMAD Compound Soil Releases Sample Locations

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.

Sample	Sample	Depth	COPCs (mg/kg)										
Location	Number	(ft bgs)	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)								

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

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).

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Table B.3-3Sample Results for SVOCs Detected above MDCs at CAS 25-99-20, EMAD Compound
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											COPCs	(mg/kg)								
Sample Location	Sample Number	Depth (ft bgs)	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)		-			

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

											COPCs	(mg/kg)								
Sample Location	Sample Number	Depth (ft bgs)	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)
A∠4	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)		

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

				COPCs (mg/kg)																
Sample Location	Sample Number	Depth (ft bgs)	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.

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

Table B 2-4

uo	er					CC)PCs (mg/l	kg)			
Sample Location	Sample Number	Depth (ft bgs)	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-)	
700	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-)	

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

ion	ber					cc)PCs (mg/	kg)			
Sample Location	Sample Number	Depth (ft bgs)	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)

ion	ber					CC	OPCs (mg/l	(g)			
Sample Location	Sample Number	Depth (ft bgs)	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		

^aThere 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

Sample	Sample	Depth		COPCs (mg/kg)	s (mg/kg)			
Location	Number	(ft bgs)	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)			
4.00	566006	0.0 - 0.5		0.0312	0.0182			
A06	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)			
<u>7724</u>	566026	0.0 - 0.5			158 (J)			
A25	566027	0.0 - 0.5			163 (J)			
A26	566028	0.0 - 0.5		1.88 ª	1.05ª			
A27	566029	0.0 - 0.5		1.12	0.92			
A28	566030	0.0 - 0.5		6.58 (J)	3.46 (J)			

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

Sample	Sample	Depth		COPCs (mg/kg)		
Location	Number	(ft bgs)	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	
7140	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	Sample	Depth		COPCs (mg/kg))
Location	Number	(ft bgs)	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)
7.02	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	Sample	Depth		COPCs (mg/kg))
Location	Number	(ft bgs)	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
Aoo	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	1.08ª
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	Sample	Depth		COPCs (mg/kg)		
Location	Number	(ft bgs)	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	
ATTO	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	

^aFails 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	Sample	Depth		COPCs	i (pCi/g)	
Location	Number	(ft bgs)	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			
AUU	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	

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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	Sample	Depth		COPCs	(pCi/g)	
Location	Number	(ft bgs)	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	4 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.

Sample Sample Depth COPCs (pCi/g)							
Location	Number	(ft bgs)	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	
AUb	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 1 of 2)						

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

Sample	Sample	Depth		COPCs	s (pCi/g)	
Location	Number	(ft bgs)	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	25 566027 0.0 - 0.5	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.

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Sample Location	Sample Number	Sample Matrix	Parameter	Result	PSM Criteria	Unit		
			Barium	0.469	190,000			
Container #566005	566512	Oil	Cadmium	2.75	800	mg/kg		
Container #300003	500512	Oli	Lead	15.8	800	шу/ку		
			Aroclor 1260	12.5 (J)	2.91			
			Gross Beta	4.47	N/A	pCi/L		
Composite Drum	566511	Aquoous	Barium	0.00381 (J)	190,000	mg/L		
Nos. 566008 through 566011	11000	Aqueous	Chromium	0.00627	N/A			
			Lead	0.0193	800			
	566516	Oil	Barium	2.17	190,000			
			Cadmium	2.61	800	. mg/kg		
EIV			Chromium	2.24	N/A			
	500510		Lead	241 (J)	800			
			Mercury	0.0243	34			
			Selenium	3.05	5,100			
MCC	566513	Oil	Arsenic	639	23	mg/kg		
MOO	000010		Lead	7.92 (J)	800	iiig/kg		
MCC	566514	Oil	Barium	0.109 (J)	190,000	mg/kg		
MOO	500514		OII	Lead	0.273 (J)	800	ш <u>в</u> / №8	
MCC	566515	Oil	Lead	0.141 (J)	800	mg/kg		

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

mg/L = Milligrams per literpCi/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 ft³ 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

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Sample Location	Sample Number	Depth (in. bgs)	Matrix	Parameter	Result	Criteria (TC Levels)	Units										
				Arsenic	0.755	5											
Container	566510	0 - 6	Soil	Barium	0.38	100											
No. 566004	01 6006	0-6	501	Lead	324	5	mg/L										
				Silver	0.0122 (J)	5											
Wood	566501	N/A	Solid	Barium	0.171	100	ma/l										
Debris Pile		N/A So	Solid	Chromium	0.0104 (J)	5	mg/L										
Guard	566503													Barium	0.21	100	
Shack Paint		N/A	/A Solid	Lead	0.133	5	mg/L										
Chips				Mercury	0.00443	0.2											
Roofing	566502	N/A	N/A	Solid	Barium	0.124	100	mg/l									
Debris				N/A	N/A	Solid	Chromium	0.0147 (J)	5	mg/L							
				Barium	0.267	100											
Wooden				Cadmium	0.0272 (J)	1											
Shed Paint	566504	N/A	Solid	Lead	16.9	5	mg/L										
Chips				Mercury	0.00172 (J)	0.2											
				Selenium	0.0556 (J)	1											

 Table B.4-1

 Waste Characterization Results Detected at CAS 25-99-20, EMAD Compound

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

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- 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 ft² each, within an approximate 4-ft² area near the southwest corner of the Metallurgy Lab trailer. A corrective action of removal was performed. Approximately 1.5 ft³ 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-ft² radiologically contaminated area located approximately 100 ft north of Building 3900. A corrective action of removal was implemented to remove and package approximately 15 ft³ 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 ft³ 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

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Appendix C

Waste Disposition Documentation

(40 Pages)

NTS On-Site HazMat Transfer - Published

	esa Number:			
Carrier: NSTEC				
Vehicle: G820657D				
Driver: RUSSELL CROZIER				
Depart: 02-MAR-2011			Arrival: 02-MAR-2011	
From: THERESA HALE	***************************************		To: LOUIS GREGORY	
NSTEC			NSTEC	
BASE CAMP			BASE CAMP	
E-MAD			TRU PAD	
MERCURY, NV 89023			MERCURY, NV 89023	
Area: 25			Area: 05	
Bldg: 3900			Bldg: 024	
Phone: 702-295-1672			Phone: 702-295-2799	
Mobile: 702-875-6938			Mobile: 702/596-9414	
Intered By: THERESA HALE Modified By: THERESA HALE			Date Entered: 28-FEB-2011 Date Modified: 28-FEB-2011	
hipped Material(s)		Package(s)	Unit(s)	Guide No
N/NA 3077, HAZARDOUS WASTI EAD) PACKAGE # 566006	E, SOLID, N.O.S., 9, PG III	1 BOX, B-25	2737.00 KILOGRAM(S) (GROSS)	17
		Response Nui -295-0311	mber	
condary Emergency Response (WILLIAM NICOSIA 702-630-0223				
			tions Coordination Center (OCC) De	
				10000000000000000000000000000000000000
		ICY RESPONSE		

By Phone 702-205-0311

By Radio 'MAYDAY - MAYDAY - MAYDAY'

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 on File	 1355
Received by: /s/ Signature on File	 1455.
27	

566006

NSTec

FRM-0266

ONSITE WASTE TRANSPORT MANIFEST

.

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	No.:					Page	<u>1</u> of <u>1</u>		
l	1 1 N 1 9 Generation/Out-of-Service Date: 03/23/11								
1	N	tor's Name, Organization, and Location: (Please Print) avarro-Intera / Mark Heser NSS A-25 EMAD, CAU 566, CAS 25-99-20 B1B 7604	Hazardous	Waste Stora rdous Waste	age Unit	Location: (Pleas ons, H120	e Print)		
l	G	enerator's Phone : (_295) _2124	Contact Phone	: (_630) 0235				
3	a. Transpo (Please		ort Date:	3b. Ve	hicle I.D.	Number:			
L	C. Car	os Gonzales 03/23/1	1	G63-11	104D				
4	. U.S. D.	D.T. Description. Include: EPA Waste Code and Package	Tracking Numbers.	5. Cor No.	ntainers Type	6. Total Quantity	7. Unit Wt./Vol.		
a	HM X	NA3077, Hazardous Waste, solid, n.o.s. (lead, silver), 9 D008, D011), IU	1	DM	180	Р		
Ļ		# NS-NSS-11-0026 566001					· · ·		
ь	RQ	UN3432, Polychlorinated biphenyls, solid, 9, III #NS-NSS-11-0027 566002		1	DM	60	к		
c	x	UN2809, Waste Mercury, 8, 111 D009 #NS-NSS-11-0028 566018		1	DF	6	Р		
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: <u>B Bushnell 506-7639</u> 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 3/23/11 03/23/11									
10	10. Received for Transport by: (Signature) /S/ Signature on file 03/23/11								
11	JTEM	repancy Indication: b. Actual weish pis TS4165+61 K	. BSB 3/27/	11					
12	. Disposal	Accumulation Site Signature: (Acknowledges acceptance		Date;					
		/s/ Signature on file	e			03/23/11			

NSTec

Form

FRM-0266

ONSITE WASTE TRANSPORT MANIFEST

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Rev. 01

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1.	Na Ni	or's Name, Organization, and Location: (Please Pri avarro-Intera / Mark Heser NSS A-25 EMAD, CAU 566, CAS 25-99-20 31B 7604	rint)	2. Receiving F Hazardous WGS/Haza NNSS A-5,	Waste S ardous W	Stora	ige Unit	Location: (Pleas	e Print)
	G	enerator's Phone : (_295) _2124		Contact Phone	e: (<u>630</u>	_) 0235		
3a.	(Please)	Print)		ort Date:	3b.	Vet	nicie I.D.	Number:	
	Jack Ro		3/31/11	1	G8	2 06	57D		
4.	U.S. D.C	D.T. Description. Include: EPA Waste Code and Pa	ickage	Tracking Numbers.		5. Containers		6. Total Quantity	7. Unit Wt./Vol.
	HM				N	0.	Туре	Quantity	VVL/VOI.
a	RQ	UN3077, Environmentally hazardous substances, #NS-NSS-11-0032 through NS-NSS-11-0039 O.S.D. 03/03/11	, solid,	n.o.s., 9, III (PCB)	8		DM	2077	к
ь	RQ	UN3077, Environmentally hazardous substances, #NS-NSS-11-0040 through NS-NSS-11-0045 O.S.D. 03/07/11			6	;	DM	1760	к
c	RQ	UN3077, Environmentally hazardous substances, #NS-NSS-11-0046 through NS-NSS-11-0048 O.S.D. 03/08/11	, solid,	n.o.s., 9, III (PCB)	3	;	DM	871	к
d									
e									
f									
g									
8. S a) b)	Special Har ERG 171 ERG 171	ion pages for additional items, as necessary. ndling Instructions/Additional Information: 24-Hour 1. 8 ea 55-gal drums of PCB contaminated soil. 0 1. 6 ea 55-gal drums of PCB contaminated soil. 0 1. 3 ea 55-gal drums of PCB contaminated soil. 0	0.S.D. 0.S.D.	03/03/11 03/07/11	295-031	1/5	Secondary	y: <u>B Bushnell 5</u> Name & phon	
9. Released by: (Signature) /s/ Mark Heser				Date: 03/31/11					
10	Received	for Transport by: (Signature) /s/ Signature or	n fil	e	Date:		· ,	03/31/11	
11.	Disc	repancy Indication:							
12.	Disposal/	Accumulation Site Signature: (Acknowledges acception) /s/ Signature or			Date:			02/24/44	
		U					-	03/31/11	

566020 Through 566036

NTS On-Site HazMat Transfer - Published

Carrier: Vehicle;	g No: 20110412083654 NSTEC G820657D AICHAEL SMITH	Mesa Number:				Ó
Depart:	14-APR-2011		Arriva	l: 14-A	PR-2011	
From: F	OBERT ZION		To:	ROBERT	ZION	n Britan Balancia Barancia (1998)
١	ISTEC			NSTEC		
	BASE CAMP			BASE CA		
	E-MAD			MERCUR	Y, NV 89023	
	MERCURY, NV 89023 Area: 25			Area: 25		
-	Bldg: 3900				T CELL C	
	Phone: 702/295-4594			•	02-295-4594	
٨	lobile: 702/466-4231			Mobile: 70	02-466-4231	
intered E	By: ROBERT ZION		Data	Entered:	12-APR-2011	
lodified	and the second se			Modified:	14-APR-2011	
hipped	Material(s)			Pack	age(s) Unit(s)	Guide No.
ORM: O	XIDE. PACKAGE ACTIVI	, U-234, U-235, U-238. PHYSICAL TY: PKG# 556015- 1.06E+07 BQ, F . ON-SITE TRANSFER. LEAD (D00	KG# 556016- 7.75E+06 BQ.		(GROSS)	
ORM: O	XIDE. PACKAGE ACTIVI	TY: PKG# 556015- 1.06E+07 BQ, F . ON-SITE TRANSFER. LEAD (DOC	KG# 556016- 7.75E+06 BQ.		(GROSS)	
ORM: C	XIDE. PACKAGE ACTIVI RY: FISSILE EXCEPTED	TY: PKG# 556015- 1.06E+07 BQ, F . ON-SITE TRANSFER. LEAD (DOC	esponse Number		(GROSS)	
ORM: C ATEGO condar STEFA the eve	XIDE. PACKAGE ACTIVI RY: FISSILE EXCEPTED y Emergency Response N DUKE 702/630-0423	TY: PKG# 556015- 1.06E+07 BQ, F ON-SITE TRANSFER. LEAD (Doc Emargonary R 7ຄ2-4	295-0317	dination (Manager at
ORM: C ATEGO econdar STEFA the eve	XIDE. PACKAGE ACTIVI RY: FISSILE EXCEPTED y Emergency Response N DUKE 702/630-0423 nt of an emergency on t	TY: PKG# 556015- 1.06E+07 BQ, F ON-SITE TRANSFER. LEAD (DOC Emergency R 702-5 Contact And/Or Comments	295-0317	dination (Manager at
ORM: C ATEGO econdar STEFA the eve	XIDE. PACKAGE ACTIVI RY: FISSILE EXCEPTED y Emergency Response N DUKE 702/630-0423 nt of an emergency on t 311 for assistance.	TY: PKG# 556015- 1.06E+07 BQ, F ON-SITE TRANSFER. LEAD (DOC Emergency R 702-5 Contact And/Or Comments he Nevada Test Site, immediately EMERGENC	PKG# 556016- 7.75E+06 BQ. 18) USPONSE Number 295-0317 contact the Operations Coor	unit (10.1) anno 11.1 - 1 gairtí 1 1 An Faith anns	Center (OCC) Duty A	Manager at
ORM: C ATEGO econdar STEFA the eve	XIDE. PACKAGE ACTIVI RY: FISSILE EXCEPTED y Emergency Response N DUKE 702/630-0423 nt of an emergency on t 311 for assistance. By F	TY: PKG# 556015- 1.06E+07 BQ, F ON-SITE TRANSFER. LEAD (DOC Emergency R 702-5 Contact And/Or Comments	PKG# 556016- 7.75E+06 BQ. 18) USPONSE Number 295-0317 contact the Operations Coor CY RESPONSE In the event of an incident inv 1. Gather HazMat shipping p 2. Isolate the immediate area 3. Assess the situation:	olving Ha	Center (OCC) Duty M zardous Material:	Manager at
ORM: C ATEGO econdar STEFA the eve	XIDE. PACKAGE ACTIVI RY: FISSILE EXCEPTED y Emergency Response N DUKE 702/630-0423 nt of an emergency on t 311 for assistance. By F 702-33 By F	TY: PKG# 556015- 1.06E+07 BQ, F ON-SITE TRANSFER. LEAD (DOC Emergency R 702-5 Contact And/Or Comments he Nevada Test Site, immediately EMERGENC	PKG# 556016- 7.75E+06 BQ. 18) SEPONSE Number 295-031 ? contact the Operations Coor CY RESPONSE In the event of an incident inv 1. Gather HazMat shipping p. 2. Isolate the immediate area	olving Ha apers and Environm y Respon	Center (OCC) Duty M zardous Material: NAER Guidebook	Manager at
ORM: C ATEGO condar STEFA the eve 2/295-0	XIDE. PACKAGE ACTIVI RY: FISSILE EXCEPTED y Emergency Response N DUKE 702/630-0423 nt of an emergency on t 311 for assistance. By F 702:: By F 702:: By F 702::	TY: PKG# 556015- 1.06E+07 BQ, F ON-SITE TRANSFER. LEAD (DOC Emergency R 76%-4 Contact And/Or Comments ne Nevada Test Site, immediately EMERGENC	PKG# 556016- 7.75E+06 BQ. 18) USPONSE Number 295-0317 contact the Operations Coor CY RESPONSE In the event of an incident inv 1. Gather HazMat shipping p 2. Isolate the immediate area 3. Assess the situation: a. Fire, Spill, or Leak? b. People, Property, or the 4. Contact On-site Emergence 5. Reference On-Site HazMa , described, packaged, marked, e U.S Department of Transport	olving Ha apers and Environn y Respons Transfer placarded ation. As a	Center (OCC) Duty M zardous Material: NAER Guidebook nent at risk? se Personnel Tracking Number d, and labeled and an	e in proper
ORM: C ATEGO econdar STEFA the eve 2/295-0	XIDE. PACKAGE ACTIVI RY: FISSILE EXCEPTED y Emergency Response N DUKE 702/630-0423 nt of an emergency on t 311 for assistance. By F 702-33 By F 702-33 By F 702-33 By F	TY: PKG# 556015- 1.06E+07 BQ, F ON-SITE TRANSFER. LEAD (DOC Emergency R 702-5 Contact And/Or Comments he Nevada Test Site, immediately EMERGENC bone 5-0310 Radio DAY - MAYDAY ed materials are properly classified g to the applicable regulations of th	PKG# 556016- 7.75E+06 BQ. 18) USPONSE Number 295-0317 contact the Operations Coor CY RESPONSE In the event of an incident inv 1. Gather HazMat shipping p 2. Isolate the immediate area 3. Assess the situation: a. Fire, Spill, or Leak? b. People, Property, or the 4. Contact On-site Emergence 5. Reference On-Site HazMa , described, packaged, marked, e U.S Department of Transport	environm Pers and Environm y Respons Transfer placarded ation. As a TSD.	Center (OCC) Duty M zardous Material: NAER Guidebook nent at risk? se Personnel Tracking Number d, and labeled and an	e in proper at I have

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NSTec								08/23/06 Rev. 0
Form FRM-0918	NTS						Pa	ge 1 of 2
SWO USE (Selec	t One) ARE		23	6		⊠ 9		FILL
For waste c	haracterization, ap	proval, and/or UIRED: WA	assistance	, contact Soli	d Waste	Operation (SW		
	REC (This form is for	rolloffs, dump	s i e Gerei) trucks, and	d other onsite	dispose	of materials.)	FAX -5-2	2241
Waste Generator: Ma	ark Heser (NI, WO					one Number: _(96-0 <u>150</u>
	AU 566 - E-MAD C				 603 - Bi	ulk Industrial De	bris	
Waste Category: (cher	_					dustrial		
The second data base of the second data and the se	NTS			- Abstrat		ACO-onsite	WAC I	Exception
	Non-Putrescible			ning Material		ACO-offsite		c DOE/NV
Pollution Prevention			we wanted and the second state of the second s	anagement		efense Projects	<u>YMP</u>	
Pallution Prevention			ASSOCIATION OF THE OWNER OWNER OF THE OWNER			ocess Knowled		nte
Method of Characteri Prohibited Waste at a			RA waste:					
NTS landfills;	levels, a	nd Medical wa	astes (need	es, sharps, b	loody cl	othing).		
Additional Prohibited at the Area 9 U10C La		Sludge, Anim	al carcasse	s, Wet garba	ge (food	waste); and Fri	able asbestos	
at the might 5 0100 to	AUGUISHI.	RED: WASTE						
	Check a	all allowable w	astes that a	re contained	within th	nis load:		
NOTE: Waste dispose coolants, such	it at the Area 6 Hyd) as: gasoline (no	benzene, lead	dfill must ha	ive come into iesel fuel: lub	ricants a	and hydraulics:	kerosene: asp	haitic
petroleum hyd	rocarbon; and ethy	lene glycol.						
Acceptable waste at a	-	Paper			_	ogic materials	Empty o	
☐ Asphalt ⊠ Met ⊠ Plastic		🖾 Soil 🖾 Cloth		ubber (exclud sulation (non-	-		Demoliti	an debris & concrete
Manufactured item						-	A Generic	
Additional waste acc				Office Wa		Food Waste	🗌 Animal (Carcasses
🛄 Asbestos 🛛 🔲 F	riable 🗌 N	on-Friable (con	ntact SWO	if regulated lo	ad) (Quantity:		
Additional waste acc								
Non-friable asbesto								
 Light ballasts (contained) Hydrocarbons (contained) 			s (gas & die	sel)		conned Underg ound Tanks	round and Ap	ove
Additional waste acco			on Landfill				Langer	
		Drained fuel				Crushed non	-teme plated	oli filters
Plants [Sludge from					50 parts per n	nillion
		QUIRED: W			INATUR	RE		
Initials: (if initia	aled, no radiologi	çal clearance	is necess;	ary.)				or Waste Di
The above mentioned			a Controlle	d Waste Man	agem	DOT Initials	urvey Release f	
knowledge, does not c	ontain radiologica	materials.				This c	ontainer/load m man-made radi	oactive mat
To the best of my know site. I have verified th						V This c	ontainer/load m	eots the cri
prohibited and allowat	le waste items. []	have contacte	d Property	Management	and h	This o	on Manual Table ontainer/load la	exempt fro
is approved for dispos	ai in the landfill.					due to	nrocess koowle	dgo ana orig
Print Name: Mark He						SIGNATURE	is signature of the	
Signature: /S/	<u>Mark Heser</u>			Date: 1-3	2~11			B
Note: "Food waste, off	ice trash and anim	al carcasses o	to not requi	re a radiologi	cal clea	rance, Freon-co	ontaining appli	ances
	ed removal certifica	ation statemen	t with Load	Verification.*				
SWO USE ONLY	\frown	9.100		20/11		/s/ Signati	ire on file	2
Load Weight (net from	scale or estimate):	1.1.	Signa	ture of Certifi	er.z_	Signall		

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SWO USE (S	elect One)	AREA		3	6	X	9	X	LAND	FILL
	aste characteriz	ation, appro						(SWO)	at <u>5-7898</u>	
			RED: WAST					~(~)		
			loffs, dump tr							100 0450
Waste Generator										496-0150
Location / Origin:	CAU 566 - E	-MAD Com	oound exterio	r yard. Conta	ainer <u># 566</u>	503 - Bull	< Industri	al Debris	<u> </u>	
Waste Category:			Comme			🛛 Indu				
Waste Type:		11-1	Putresc				CO-onsi			Exception ric DOE/NV
(check one) Pollution Preven	Non-Putre			s Containing mental mana	*****	the state of the s	CO-offsit			IC DOENNY
Pollution Prever		************	Clean-L		gement					
Method of Chara				g & Analysis				wledge	Conte	ents
Prohibited Wast	e at all three	Radioactive	waste; RCR/	A waste; Haz	ardous wa	ste; Free	Fiquids,	PCBs al	ove TSC	A regulatory
NTS landfills:		levels, and I	Medical wast	es (needles,	sharps, blo	oody clot	ning).			
Additional Prohi at the Area 9 U1		Sewage Slu	dge, Animal	carcasses, V	let garbag	e (food w	rastē); ar	d Friabl	e asbesto	ŝ
			D: WASTE C							
	entered at the fi		llowable was					lours bu	dennehad	
NOTE: Waste di coolants,	sposal at the Ar such as: gaso									
petroleun	n hydrocarbon;	and ethylene	glycol.							
Acceptable was					/ unaltere	-	ic materi			containers tion debris
			⊠ Soil ⊠ Cloth		er (excludia tion (non-A		form)			t & concrete
Manufactured							-	<u>~</u>	3 Q QQ.	
Additional waste			the second s	** ****	Office Was		Food W		Animal	Carcasses
🗋 Asbestos	🔲 Friable	🔲 Non-F	riable (conta	ct SWO if reg	julated loa	ad) Qu	antity:			
Additional waste	•									
Non-friable as			automobiles	-					and/oil/wa	
Light ballasts Hydrocarbons	(contact SWO)		l fuel filters (¢	(as & diesel)				_	nd and Al	oove
						Gial	Ind Tank	5		
Additional waste	-		varocarbon rained fuel fill				Crusher	i non-te	me plated	oil filters
Plants			udge from sa						parts per	
			IRED: WAS							
	initialed, no ra	adiological	clearance is	necessary.)						
initials: (if		-					Radiat	alas! 5		·
	mod waata waa			volucioned W	aste mana	Jens	NGT INIT	ia(ş		e for Waste Di
initials: (if The above mention knowledge, does							<u> </u>	This coni	ainer/ioad	meets the crit
The above mention knowledge, does	not contain rad	ilological ma		containe on	v those m	aterit			amar/load	dioactive mate meets the crite
The above mention knowledge, does To the best of my site. I have verifi	not contain rad knowledge, the ed this through	llological ma e waste desc i the waste c	cribed above haracterizatio	on method id	entified at	ove		I NIS CON		B 4.2 released
The above mention knowledge, does To the best of my site. I have verific prohibited and all	not contain rad knowledge, the ed this through lowable waste i	llological ma e waste desc the waste c items, <u>Lhave</u>	cribed above haracterizatio	on method id	entified at	ove	I	Radcon N Radcon N This cont	anual Tab almer/load	
The above mention knowledge, does To the best of my site. I have verifing prohibited and all is approved for d	not contain rad knowledge, the ed this through lowable waste i isposal in the la	llological ma e waste desc the waste c items, <u>Lhave</u>	cribed above haracterizatio	on method id	entified at	nd hr		This cont Radcon A This cont due to pro	anual Tab ainer/load cess know	adge and origin
The above mention knowledge, does To the best of my site. I have verifing prohibited and all is approved for d Print Name: <u>Man</u>	not contain rad knowledge, the ed this through lowable waste i isposal in the la rk Heser	diological ma e waste desc i the waste c items. <u>Lhave</u> andfili.	cribed above haracterizatio	on method id roperty Man	entified at agement a	nd hr		This cont Radcon A This cont due to pro	anual Tab almer/load	adge and origin
The above mention knowledge, does To the best of my site. I have verifing prohibited and all is approved for d Print Name: <u>Man</u> Signature:	not contain rad knowledge, the ed this through lowable waste i isposal in the la rk Heser /s/ Mark He	diological ma e waste desc the waste c items, <u>i have</u> andfili, eser	cribed above haracterization contacted P	on method id Property Man	entified al agement a e: _1-7	nd hr		This cont Radcon M This cont due to pro E: $\angle \frac{ s s }{ s }$	farual Tab aliter/load Cess know gnature on file	adge and origin
The above mention knowledge, does To the best of my site. I have verifing prohibited and all is approved for d Print Name: <u>Man</u> Signature: Note: "Food was	not contain rad knowledge, the ed this through lowable waste i isposal in the la rk Heser /s/ Mark He te, office trash a	diological ma e waste desc the waste c items, <u>i have</u> andfili, eser and animal c	cribed above haracterization contacted P arcasses do	on method id roperty Man	entified at agement a e: <u>1-7</u> radiologic	nd hr		This cont Radcon M This cont due to pro E: $\angle \frac{ s s }{ s }$	farual Tab aliter/load Cess know gnature on file	adge and origin
The above mention knowledge, does To the best of my site. I have verifing prohibited and all is approved for d Print Name: <u>Man</u> Signature: Note: "Food was must have	not contain rad knowledge, the ed this through lowable waste i isposal in the la rk Heser /s/ Mark He te, office trash a signed remova	diological ma e waste desc the waste c items, <u>i have</u> andfili, eser and animal c	cribed above haracterization contacted P arcasses do	on method id roperty Man Date Date not require a ith Load Ver	entified al accoment a e: <u>1-7</u> radiologic lfication."	nd hr		This cont Radcon M This cont due to pro E: $\angle \frac{ s s }{ s }$	farual Tab aliter/load Cess know gnature on file	adge and origin
The above mention knowledge, does To the best of my site. I have verifing prohibited and all is approved for d Print Name: <u>Man</u> Signature: Note: "Food was	not contain rad knowledge, the ed this through lowable waste i isposal in the la rk Heser /s/ Mark He te, office trash a signed remova	diological ma e waste desc ithe waste c items, <u> have</u> andfill, eser and animal c il certification	cribed above haracterization contacted P arcasses do a statement w	Date Date	entified at agement a e: <u>1-7</u> radiologic	ai cleara	IGNATUR	This cont Radcon A This cont due to pro E: / /s/ S Din-conta	farual Tab aliter/load Cess know gnature on file	adge and origin DATE Biances

NSTec Form FRM-0918	NTS		DFILL		/ERIFIC	ATION			23/06 tev. (1 of 2
SWO USE (Sel		REA	23		6	9 🛛	\boxtimes		L _
For wash	e characterization,	approval,	and/or ass	istance, col	tact Solid W	aste Operation	(SWO)	at 5-7898.	
	This form is	for rolloffs	, dump truc	ks, and oth	er onsite dis	osal of materi	als.)		
Waste Generator:	Mark Heser (NI, W	/O)(M/S -	NSF167) (ax 5-2241)		Phone Numb	er: (0)5-	2124; (c)496-0	150
Location / Origin:	CAU 566 - E-MAD	Campou	nd exterior	yard. Conta	iner # 56603	- Bulk Industri	al Debris	_	
Waste Category: (c	heck one)		Commerc	ial	×	Industrial			
] NTS		Putrescrit			FFACO-onsi			
Concerning the second by Provide States	Non-Putrescible		SALS LEADERS	Containing		Defense Pro		Historic DO)E/N/
Pollution Prevention Pollution Prevention	A.L.L		Clean-Up	ental mana		Routine	BCAS		
Method of Characte	ways provide the second s			& Analysis		Process Kno	wiedge	⊠ Contents	
Prohibited Waste a	t all three Radio	active was	ste: RCRA	waste; Haz	ardous waste	; Free liquids,	PCBs ab	ove TSCA reg	ulator
NTS landfills: Additional Prohibit	1 19/				harps, blood				
at the Area 9 U10C		ge Sludge	, Animal ca	ircasses, W	et garbage (f	food waste); ar	nd Friable	e asbestos	
					LLOWABLE				
NOTE: Waste dispo	Chec Isal at the Area 6 H	k all allow Ivdrocarb	able waste on Landfill	s that are co must have d	ontained with come into cor	in this load: ntact with petro	leum hyd	irocarbons or	
coolants, su	uch as: gasoline (n	io benzen	e, lead); jet	fuel; diese	fuel; lubrica	nts and hydrau	lics; kero	sene; asphalti	¢
Acceptable waste a	ydrocarbon; and et		<u>/col.</u> Paper	X Rocks	/unaltered o	eologic materi	als 🛛	Empty conta	iners
Asphalt M	-		Soil		r (excluding	-		Demolition d	
🛛 Plastic 🖾 V	lire 🗌 Cabl	e 🛛	Cloth	🛛 Insulat	ion (non-Asb	estosform)		Cement & co	oncret
Manufactured ite		THE REAL PROPERTY OF			the second se	PERSON & R PROPERTY 1			
Additional waste ad	-		-	_	Diffice Waste	Food W Quantity:	aste	Animal Carc	asses
Additional waste a				SWO BIE	utated load)				
Non-friable asbe				and military	vehicles 🖵	Solid fraction	s from sa	ind/oil/water	
Light ballasts (co				s & diesel)		Deconned U	ndergrou	nd and Above	
Hydrocarbons (c						Ground Tank	\$		
Additional waste a					<u> </u>				
Septic sludge Plants				rs (gas & di d/oil/water :				ne plated oil fil parts per millio	
					TOR SIGNA			tallo por finina	
Initials: (if in	itialed, no radiolo	gical clea	arance is n	ecessary.)					
The above mentione	d waste was nene	rated outs	uide of a Cr	introlled W	ete Manade	Radiolog	Ical Surve	y Release for W	aste D
knowledge, daes no						RCT Initia	als	Iner/load meets	
To the best of my kn	owledge, the wast	e describ	ed above c	ontains onl	y those mate	ni 🗔 🕯	dded mar	n-made radioacti	ive ma
site. I have verified prohibited and allow								inor/load meets anual Table 4.2 r	
is approved for disp	osal in the landfill.	<u></u>				<u> </u>		iner/load is exer less knowledge a	
Print Name: Mark	leser ,					SIGNATUR		ignature on file	DA'
	s/ Mark Hese	r		Date	1-7-1				
Note: "Food waste,	· · · · · · · · · · · · · · · · · · ·		asses do no				on-conta	ining appliance	ðs
must have sig	ned removal certif	ication sta	tement wit	h Load Veri	fication."				
SWO USE ONLY	\frown	. 3	7 10	1/2	זין	lel Cian	atura	on filo	
Load Weight (net fro	ní scale) or estimat	e): <u>1</u> 2	.0.0	Signature	of Certifier:	isi sign			
				the second se					_

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L.	۰.	/

08/23/06 Day A

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Deee		4	-	2	-	

SWO USE (Select One)	AREA 23	6		
For waste characteriza	tion, approval, and/or assistar	ce, contact Solid Was	ste Operation (SW	O) at 5-7898.
(This for	REQUIRED: WASTE GER m is for rolloffs, dump trucks, d	RERATOR INFORMA	TION	
	NI, WO)(M/S - NSF167) (Fax £	-		15 0404- /11 400 0450
<u></u>) <u>5-2124; (c)496-0150</u>
Waste Category: (check one)	MAD Compound exterior yard			
Waste Type: INTS		The second secon	ndustrial	
(check one) INon-Putres	cible Asbestos Cont	_	FFACO-onsite FFACO-offsite	WAC Exception
Pollution Prevention Category: (Defense Projects	
Pollution Prevention Category: (check one) 🛛 Clean-Up		Routine	
Method of Characterization: (che		alysis 🛛 I	rocess Knowledg	e 🛛 Contents
Prohibited Waste at all three R NTS landfills: le	adioactive waste; RCRA waste	e; Hazardous waste; F	ree liquids, PCBs	above TSCA regulatory
Additional Prohibited Waste	vels, and Medical wastes (nee			
at the Area 9 U10C Landfill: S	ewage Sludge, Animal carcas	ses, Wet garbage (foo	d waste); and Fria	ble asbestos
	REQUIRED: WASTE CONTE	VTS ALLOWABLE W	ASTES	
NOTE: Waste disposal at the Area	heck all allowable wastes that 6 Hydrocarbon (andfill must	are contained within	this load:	
coolants, such as: gasoin	ie (no denzene, lead); let fuel:	diesel fuel; lubricants	and hydraulics; ke	rosene; asphaitic
petroleum hydrocarbon; an Acceptable waste at any NTS lan	ia euryiene giycol.			
Asphalt 🛛 Metal 🕅 V		Rocks / unaltered geo		Empty containers
Plastic Wire C		Rubber (excluding tire nsulation (non-Aspest		Demolition debris
Manufactured items: (swamp co		electronic component		Cement & concrete
Additional waste accepted at the	Area 23 Mercury Landfill:			Animal Carcasses
	Non-Friable (contact SWC		Quantity:	
Additional waste accepted at the	Area 9 U10c Landfill:		***************************************	
Non-friable asbestos	Drained automobiles and mi	litary vehicles 🔲 S	olid fractions from :	sand/oil/water
Light ballasts (contact SWO) Hydrocarbons (contact SWO)	Drained fuel filters (gas & di	·	econned Undergro	und and Above
			round Tanks	
Additional waste accepted at the Septic sludge Rags	Area 6 Hydrocarbon Landfil Drained fuel filters (ga			
Plants Soil	Sludge from sand/oil/w			me plated oil filters
	REQUIRED: WASTE GET	ERATOR SIGNATU	RE	parts per million
nitials: (if initialed, no radi	ological clearance is necess			
The above mentioned waste was ge mowiedge, does not contain radio	enerated outside of a Controll ogical materials.	ed Waste Manageme	Radiological Sur	vey Release for Waste Dis
			RCT initials	The sublements the crite
to the best of my knowledge, the w ite. I have verified this through the	9 Waste charactorization moto	od Idon (Kad abase	The babbs	IAN-TRACIO (CONCAL AND CONTA
rohibited and allowable waste iten approved for disposal in the land	15. I have contacted Property	Management and h	X This con	tainentoata ta tainata
	<u></u> ,			AMITAL/1080 IS BAUNTE
Print Name: Mark Heser			SIGNATURE:	Signature on file
Signature: /s/ Mark Hese	<u> </u>	Date: 1-7-/1		BNO
lote: "Food waste, office trash and must have signed removal ce	animal carcasses do not requ rtification statement with Load	ire a radiological clear Verification."	ance. Freon-conta	aining appliances
WO USE ONLY		- 11</td <td></td> <td></td>		
oad Weight (net from scale or estin	nate): Syll Signa	ature of Certifier:	/s/ Signatur	e on file

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SWO USE (Select One) ARE For waste characterization, app REQ (This form is for Waste Generator: Mark Heser (NI, WO) Location / Origin: CAU 586 - E-MAD Co Waste Category: (check one) Waste Type: NTS (check one) Non-Putrescible Pollution Prevention Category: (check on Pollution Prevention Category: (check on Method of Characterization: (check one) Prohibited Waste at all three Radioacti NTS (andfilfs: Levels, an	A 2 proval, and/or as pulked: WASTE rolloffs, dump tru (M/S - NSF167) Compound exterior Commer Putresor Asbestos ne) Z Environn ne) Z Clean-U Z Sampling	sistance, contact So GERERATOR INF Icks, and other onsite (Fax 5-2241) r yard. Container # 5 rcial ible s Containing Materia mental management p	X 9 Id Waste Operation (StormAtion ORMATION e disposal of materials. Phone Number: \$603 - Bulk Industrial X Industrial X FFACO-onsite) (0)5-2124; (c)496-0150 Debris WAC Exception Historic DOE/NV
SWO USE (Select One) ARE For waste characterization, app REQ (This form is for Waste Generator: Mark Heser (NI, WO) Location / Origin: CAU 586 - E-MAD Co Waste Category: (check one) Waste Type: NTS (check one) Non-Putrescible Pollution Prevention Category: (check on Pollution Prevention Category: (check on Method of Characterization: (check one) Prohibited Waste at all three Radioacti Intervention Standfills: Intervention Standfi	A 2 proval, and/or as pulked: WASTE rolloffs, dump tru (M/S - NSF167) Compound exterior Commer Putresor Asbestos ne) Z Environn ne) Z Clean-U Z Sampling	3 6 sistance, contact So GERERATOR INF icks, and other onsite (Fax 5-2241) r yard. Container # 5 cial ible s Containing Materia nental management p	Image: Second state of the se	LANDFILL WO) at 5-7898.) (0)5-2124; (c)496-0150 Debris WAC Exception Historic DOE/NV
For waste characterization, app REQ (This form is for Waste Generator: <u>Mark Heser (NI, WO)</u>) Location / Origin: <u>CAU 586 - E-MAD Co</u> Waste Category: (check one) Waste Type: <u>NTS</u> (check one) <u>Non-Putrescible</u> Pollution Prevention Category: (check one) Pollution Prevention Category: (check one) Method of Characterization: (check one) Prohibited Waste at all three Radioacti NTS Iandfills: Ievels, and	proval, and/or as QUIRED: WASTE rolloffs, dump tru (M/S - NSF167) Compound exterior Commer Putresor Asbestos ne) I Environn ne) I Clean-Uj Sampling	sistance, contact So GERERATOR INF Icks, and other onsite (Fax 5-2241) r yard. Container # 5 rcial ible s Containing Materia mental management p	id Waste Operation (S ORMATION e disposal of malerials, Phone Number; 6603 - Bulk Industrial D industrial FFACO-onsite FFACO-offsite Defense Projects	WO) at 5-7898.) (o)5-2124; (c)496-0150 Debris WAC Exception Historic DOE/NV
For waste characterization, app REQ (This form is for Waste Generator: <u>Mark Heser (NI, WO)</u>) Location / Origin: <u>CAU 586 - E-MAD Co</u> Waste Category: (check one) Waste Type: <u>NTS</u> (check one) <u>Non-Putrescible</u> Pollution Prevention Category: (check one) Pollution Prevention Category: (check one) Method of Characterization: (check one) Prohibited Waste at all three Radioacti NTS Iandfills: Ievels, and	UIRED: WASTE rolloffs, dump true (M/S - NSF167) Ompound exterior Ompound exterior <th>GERERATOR INF icks, and other onsite (Fax 5-2241) r yard. Container # 5 rcial ible s Containing Materia mental management p</th> <th>id Waste Operation (S ORMATION e disposal of malerials, Phone Number; 6603 - Bulk Industrial D industrial FFACO-onsite FFACO-offsite Defense Projects</th> <th>WO) at 5-7898.) (o)5-2124; (c)496-0150 Debris WAC Exception Historic DOE/NV</th>	GERERATOR INF icks, and other onsite (Fax 5-2241) r yard. Container # 5 rcial ible s Containing Materia mental management p	id Waste Operation (S ORMATION e disposal of malerials, Phone Number; 6603 - Bulk Industrial D industrial FFACO-onsite FFACO-offsite Defense Projects	WO) at 5-7898.) (o)5-2124; (c)496-0150 Debris WAC Exception Historic DOE/NV
REQ (This form is for Waste Generator: <u>Mark Heser (NI, WO)</u>) Location / Origin: <u>CAU 586 - E-MAD Co</u> Waste Category: (check one) Waste Type: <u>NTS</u> (check one) <u>Non-Putrescible</u> Pollution Prevention Category: (check on Pollution Prevention Category: (check one) Pollution Prevention Category: (check one) Pollution Prevention Category: (check one) Prohibited Waste at all three Radioacti Int's Iandfills: Investigation: (check one)	UIRED: WASTE rolloffs, dump true (M/S - NSF167) Ompound exterior Ompound exterior <td>GERERATOR INF icks, and other onsite (Fax 5-2241) r yard. Container # 5 rcial ible s Containing Materia mental management p</td> <td>DRMATION a disposal of malerials. Phone Number: 3603 - Bulk Industrial X Industrial X FFACO-onsite FFACO-offsite Defense Projects</td> <td>) (0)5-2124; (c)496-0150 Debris WAC Exception Historic DOE/NV</td>	GERERATOR INF icks, and other onsite (Fax 5-2241) r yard. Container # 5 rcial ible s Containing Materia mental management p	DRMATION a disposal of malerials. Phone Number: 3603 - Bulk Industrial X Industrial X FFACO-onsite FFACO-offsite Defense Projects) (0)5-2124; (c)496-0150 Debris WAC Exception Historic DOE/NV
Waste Generator: <u>Mark Heser (NI, WO)</u> Location / Origin: <u>CAU 566 - E-MAD Co</u> Waste Category: (check one) Waste Type: <u>NTS</u> (check one) <u>Non-Putrescible</u> Pollution Prevention Category: (check on Pollution Prevention Category: (check on Method of Characterization: (check one) Prohibited Waste at all three Radioacti Isvels, an	(M/S - NSF167) mpound exterior Commer Putreson Asbestos ne) X Environn ne) X Clean-U X Sampling	(Fax 5-2241) r yard. Container # 5 cial ible s Containing Materia nental management p	Phone Number: 5603 - Bulk Industrial D Industrial FFACO-onsite FFACO-offsite Defense Projects	(o)5-2124; (c)496-0150 Debris
Location / Origin: CAU 586 - E-MAD Co Waste Category: (check one) Waste Type: NTS (check one) Non-Putrescible Pollution Prevention Category: (check on Pollution Prevention Category: (check one) Pollution Prevention Category: (check one) Prohibited Waste at all three Radioacti International Internations: (check one)	Compound exterior □ Commer □ Putrescri □ Asbestos ne) ⊠ Environn ne) ⊠ Clean-Uj ⊠ Sampling	r yard. Container # 5 icial ible s Containing Materia nental management p	6603 - Bulk Industrial	WAC Exception
Waste Type: NTS (check one) Non-Putrescible Pollution Prevention Category: (check on Pollution Prevention Category: (check on Method of Characterization: (check one) Prohibited Waste at all three Radioacti Intervention: Intervention: Rethod of Characterization: (check one) Prohibited Waste at all three Radioacti Intervention: Revels, and	Putrescri Asbestos ne) Z Environn ne) Z Clean-Uj Z Sampling	ible s Containing Materia nental management p	FFACO-onsite	Historic DOE/NV
(check one) Non-Putrescible Pollution Prevention Category: (check on Pollution Prevention Category: (check on Method of Characterization: (check one) Prohibited Waste at all three Radioact NTS landfills: levels, an	□ Asbestos ne) ⊠ Environn ne) ⊠ Clean-U ⊠ Sampling	s Containing Materia nental management p	FFACO-offsite	Historic DOE/NV
Pollution Prevention Category: (check on Pollution Prevention Category: (check on Method of Characterization: (check one) Prohibited Waste at all three Radioacti NTS landfills: levels, an	ne) 🛛 Environn ne) 🖾 Clean-Uj 🖄 Sampling	nental management p	Defense Project	
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Method of Characterization: (check one) Prohibited Waste at all three Radioact NTS landfills: levels, and	Sampling		Routine	
Prohibited Waste at all three Radioacti NTS landfills: levels, and		a O Amelica's		
NTS landfills: levels, an	We waste RCRA	g & Analysis	Process Knowle	dge 🛛 Contents
		waste: Hazardous v s (needles, sharps, t	aste; Free liquids, PCI	Bs above TSCA regulatory
Additional Prohibited Waste Sewage State of the Area 9 U10C Landfill:	Sludge, Animal c	arcasses, Wet garba	ge (food waste); and F	riable asbestos
	RED: WASTE CO	ONTENTS ALLOWA	BLE WASTES	
Check al	ll allowable waste	as that are contained	within this load:	
NOTE: Waste disposal at the Area 6 Hydr	rocarbon Landfill	must have come into	contact with petroleur	m hydrocarbons or
coolants, such as: gasoline (no b	enzene, lead); je	t fuel; diesel fuel; lub	ricants and hydraulics;	kerosene; asphaltic
petroleum hydrocarbon; and ethyle Acceptable waste at any NTS landfill:				
	Paper		ed geologic materials	Empty containers
	Soil	Rubber (exclud		Demolition debris
🛛 Plastic 🖾 Wire 🔲 Cable	Cloth	Insulation (non		Cement & concrete
Manufactured items; (swamp coolers, t	turniture, rugs, ca	arpet, electronic com		····
Additional waste accepted at the Area 2				Animal Carcasses
Asbestos 🔲 Friable 🗌 Nor	n-Friable (contac	t SWO if regulated (c	ad) Quantity:	
Additional waste accepted at the Area 9	U10c Landfill:			
🔲 Non-friable asbestos 👘 🔲 Drain	ned automobiles a	and military vehicles	Solid fractions fro	om sand/oil/water
🗋 Light ballasts (contact SWO) 🛛 Drain	red fuel filters (ga	as & diesel)	Deconned Under	ground and Above
🛛 Hydrocarbons (contact SWO) 🔲 Other	r		Ground Tanks	•
Additional waste accepted at the Area 6	Hydrocarbon	andfill:		
		rs (gas & diesel)	Crushed no	n-teme plated oil filters
		id/oil/water separato		v 50 parts per million
		E GENERATOR SK		v oo pans per minion
			MAIORE	
Initials: (if initialed, no radiologica	al clearance is n	lecessary.)		
The above mentioned waste was generate	d outside of a Co	ontrolled Waste Man		
knowledge, does not contain radiological	materials,		Radiological Sulw	ey Nelsase for Waste Dispos
To the bast of my brouded at the state of the			RCT Initials	
To the best of my knowledge, the waste de site. I have verified this through the waste	escribed above c	contains only those r	ne added ma	allier/load incels the criteria (in-made radiate the criteria)
wohibited and allowable waste items, I ha	ave contacted Pro	operty Management	This gont	alner/load meets, and iterat
a approved for disposal in the landfill.	2		Radcen M	lanual Table 4.2 reinase limite
Print Name- Mark Hoson		,	fills donta	alnei/load is compatizing all
Print Name: Mark Heser			SIGNATURE: /s/ S	Signature on file
Signature: /s/ Mark Heser		Date:		UALEY 2
Note: "Food waste, office trash and animal must have signed removal certificati	l carcasses do no	ot require a radiologi	cal clearance. Freon-c	containing appliances
SWO USE ONLY	STATISTICS WIL	1		
Load Weight (net from scale or estimate):/	16500	//z.5//// Signature of Certifi	s/ Signatu	re on file

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SWO L	ISE (S	elect	One	ARE	A		23		6		9	\boxtimes	LAND	FILL
	For wa	aste che	aracteri								ste Operation (SM	/0) at	5-7898.	
			(This i			D: WAS					TION sal of materials.)			
Waste Ge	nerator	Mari		(NI, WO)						-	Phone Number: _(015-21	24- (0)4	08-0150
Location /											Bulk Industrial De		27. (4)7	00-0100
								Contai	IEI # 000			uns		
Waste Ca Waste Ty					<u> </u>	Putres					Industrial FFACO-onsite		MAC F	xception
(check on	-	=		escible		Asbest		tainina i	laterial	_	FFACO-offsite	Ē		DOE/NV
Pollution					1e) 🛛	Enviro	TABLE IN THE OWNER.		310660 # Warman		Defense Projects		YMP	
Pollution						Clean-			·····		Routine			
Method o			*********	STREET BALLANDER		Sampli					Process Knowledg			
NTS land	u waste fills:	ः वर वा। १	uiree	levels, ar	ive wa: id Med	ste: RCF lical was	ka waste tes (nee	e; Haza edles st	idous wa larps, bla	aste; oodv	Free liquids, PCB: clothing).	s aboy	e TSCA	regulatory
Additiona	al Prohil											able c	ch cat-r	
at the Are	a 9 U10	IC Land	ifil):								od waste); and Fri	ablea	SDeSIOS	
											VASTES this load:			
NOTE: W	aste dis	posal a	t the A	'ea 6 Hyd	rocarbo	on Landf	fill must	have co	me into	conta	act with petroleum	hydro	carbons	or
CC	polants,	such a	s: gase	and ethyl	enzen	e, lead);	jet fuel;	diesel f	uel; lubri	icants	and hydraulics; k	erose	ne; asph	altic
Acceptab	le wast	at any	NTS I	and ettiji andfill:		Paper	X	Rocks /	unaltere	d aêd	ologic materials		Empty co	ntainers
Aspha		Metal		Wood	-	Soil			(excludir					n debris
Plastic	_	Wire		Cable		Cloth					stosform)	Ø	ement &	& concrete
Manuf	actured	items: (swamp	coolers,	furnitu	re, rugs,					ts, PPE, etc.)			
Additiona		accept				cury Lar ble (conta			fice Was		Food Waste		Animal C	arcasses
Additiona	-				-			2 II legu			Quantity:			
	iable asl	-				omobile		ilitary ve	hicles		Solid fractions from	1 sand	/oil/wate	r
	oaliasts (🛛 Drain	ed fue						Deconned Underg			
Hydro											Fround Tanks			
Additiona	l waste							II:	[
Septic	sludge	_	Rags			ed fuel fil					Crushed non-		-	
		<u> </u>	Soil			e from s					PCBs below !	50 par	ts per m	illion
initials:	/if :	initiala	d no r						UK SIGI	1476				
_				adiologic							_			
The above knowledge	mentio	ned was	ste was	generate	d outs	ide of a f	Control	led Was	te Manaş	97 -	Radiological Survey	Reion	an for Wa	ate Dispos
											RCT Initials	1. Sec. 1		he criteria.
To the bes site. I hav	t of my l e verifie	knowles d this fi	dge, the brough	e waste di the wast	escribe	d above	Contain	ns only	litose ma	al I	This contain	neraca made	cadioacti	va material
prohibited	and allo	wable	waste i	terns, <u> h</u> a	IVe cor	ntacted F	Property	/ Manag	ementa	<u>n</u> .	* XHETHIS CONTA	III BITH		Nanco limit
s approve	a tor als	posal (nafill,							Radcon M	nerfici	d is axer	npt from su
Print Name			-					-			dila tribit	2065-04	Manual -	DATE /
Signature:	/s	/ Mar	k Hes	ser				Date:	1-7-	-14	IGNATURE	_		BN-9
Note: "Foo mus	od waste st have s	, office	trash a emoval	nd anima certificat	l carca ion stat	sses do tement v	not required	uire a ra d Verific	diologica ation."	al cies	arance. Freon-co	ntainin	g applia	nces
SWO USE							_	1/2011	1					
				stimate):	15	800		ature of	1		/s/ Signatu	re or	file	

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SWO USE				d/or ass		ontact So	lid Wa	Ste Operation (SV		LANDFILL	
			UIRED:		_				, .		_
	(Th	is form is for	rolloffs, di	ump truc	cks, and o	ther onsit	e disp	osal of materials.)			
Waste General	or: Mark Her	ser (NI, WO)	(M/S - NS	F167) (F	ax 5-224	1)		Phone Number: _	(o)5-	2124; (c)496-01	50
Location / Origi	n: CAU 566	- E-MAD Co	mpound	exterior	vard. Con	tainer # 5	6603	- Bulk Industrial D	ebris		
Waste Catego				ommerc				Industrial			
Waste Type:		*********************		utrescrib				FFACO-onsite		WAC Except	ion
(check one)		utrescible		sbestos	Containin	g Materia		FFACO-offsite	i	Historic DOE	
Pollution Prev				nvironm	ental man	agement		Defense Projects	;		
Pollution Prev				lean-Up				Routine			
Method of Cha					& Analys			Process Knowled			
Prohibited Wa NTS landfills:	ste at all torec		ive waste; id Medica	RCRA 1	vaste; Ha (neadles	sharos l	Nâsië; bloody	Free liquids, PCE clothing).	ls ab	ove TSCA regula	atory
Additional Pro								_			~
at the Area 9 L	10C Landfill:							od waste); and Fr	hable	aspestos	
		REQUI	RED: WAS	STE CO	NTENTS	ALLOWA	BLE	WASTES			
NOTE: Waste	disposal at the	Area 6 Hvd	rocarbon l	e wastes _andfill n	nust have	contained	i withir o cont	n this load: act with petroleum	1 hvd	tocarbons or	
coolant	s, such as: ga	asoline (no b	enzene, k	ead); jet	fuel; dies	el fuel; lui	oricant	ts and hydraulics;	kero	sene; asphaltic	
Acceptable wa	um hydrocarbo ste at anv NT	s landfill	ene giycol 🖾 Paj		N Deal			ologic materials		Emphy acatai	
_		Wood	🖾 Faj			s / unaite er (exclud				Empty containe Demolition deb	
		Cable				•	-	stosform)		Cement & cond	
Manufactur	ed items: (swa	mp coolers,									
Additional was	ite accepted a	t the Area 2	3 Mercur	y Landf		Office W		Food Waste	Π	Animal Carcas	ses
Asbestos	Friable		n-Friable (-	_			Quantity:			
Additional was	te accepted a	t the Area S	U10c La	ndfill;						***************************************	
🗌 Non-friable	asbestos	🗒 Drair	ed autom	obiles a	nd militan	vehicles		Solid fractions from	m sái	nd/oil/water	
	ts (contact SWO	,	ed fuel filt	lers (gaa	& diesel			Deconned Underg	roun	d and Above	
Hydrocarbo							_ '	Ground Tanks			
Additional was						П					
Septic sludg Plants	je ☐ Rag ☐ Soil		Drained f					Crushed nor			5
			Sludge fr	ULASTE	CENED	separato	IS CNAT	PCBs below	50 p	arts per million	
initials:	if initialad a										
	(if initialed, no				-						
The above men knowledge, doe	loned waste w	as generate	d outside	of a Co	ntrolled W	laste Man	agen	Padlelogical St	inve'r.	Release for Waste	Tile
kitowieuge, doe	S HOL CONTAIN I	radiological	materials.	•				RCT Intigits			· · ·
To the best of a	ly knowledge,	the waste de	scribed a	bove co	ntains or	ly those i	matel	This co	man-r	en/load mosts the	criter aater
site. I have veri prohibited and a	allowable wast	gn tne waste Te items. I ha	ve contacte	ted Pro	method a perty Mar	dentified ; acèment	and		intaln	nacio reclevente a	
a approved for	disposal in the	a landfill.						Radcor This co	n Mar Intain	eral-Jable 4.2 rolog er/load is solarde	
Print Name: _M	ark Heser			_			1	due to	procei	ss knowledge and b	Rgm-
Signature:	/s/ Mar	k Hese	r		Dat	e: /- 3	2	and a second	Sigr	ature on file	ATE
Note: "Food wa	ste, office trasl e signed remo	h and anima val certificati	carcasse	s do not	require a	radiologi		arance. Freon-co	ontair	ning appliances	
SWO USE ONL			Stotett	COLUMN AND							
	~		850	0	1/25			/s/ Signat	ure	on file	
Load Weight (ne	a nom scale of	estimate);	050		Signature	of Certif	ier:				
					+ *]						

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For waste characterization, approval, and/or assistance, contact Solid Waste Operation (SYOU) in SYRety REDURED: WASTE GERERATOR INFORMATION (This form is for rolloffs, dump trucks, and other onsite disposal of materials.) Naste Generator: Mark (Heser (NL, WO)(MVS - NSF167) (Fax 5-2241) Phone Number: (0)5-2124; (0)496-0150. Accelerator: Mark (Heser (NL, WO)(MVS - NSF167) (Fax 5-2241) Phone Number: (0)5-2124; (0)496-0150. Asset Category: (check one) Commercial Industrial WAC Exception Maste Type: INTS Putrescrible Industrial Historic DOE/NV Maste Type: INTS Putrescrible Industrial Historic DOE/NV Industrial Non-Putrescrible Sampling & Analysis Process Knowledge © Contents Probibited Waste at all three Reduines waste; RecRa wate; Hazandous waste; Fiee Ilquids, PCBs above TSCA regulatory itevels, and Medical wastes (needles, shamps, bloody clothing). Additional Probibited Waste Additional Prohibited Waste Sewage Sludge, Aninal carcasses, Wet garbage (root waste); and Friable asbestos REQUIRED: WASTE CONTENTS ALLOWABLE WASTES Check all allowable wastes that are contained within this load: NOT: Waste disposal at the Area 8 Hydrocarthon Landfill must have come into contact with periodown hydrocarbons of coclants, such as: gasoline (no berzene, lead) [af tuck] dised f	SWO USE (Selec	ct One)	AREA] 23]6					NDFILL	
(This fam is for rolloffs, dump trucks, and after ansite disposed of materinal) Waste Generator: (Aut Keser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (o)(5-2124; (c)496-0150) Cacation / Origin: (CAU 565 - E-MAD Compound exterior yard. Container # 5650 - Buk Industrial Debris Industrial Waste Category: (check one) Commercial Industrial Name Type: NTS Putrescrible FACC-onsite WAC Exception Pollution Prevention Category: (check one) Environmental management Defense Projects YMP Pollution Prevention Category: (check one) Sampling & Analysis Prozess Knowledge Contents Wethod of Characterization: (check one) Sampling & Analysis Prozess Knowledge Contents Write and fills: Levels, and Medical wastes (needles, struck, blody dothing). Additional Prohibited Waste Servage Studge, Animal carcasses, Wet garbage (food waste); and Friable asbestos REQUIRED: WASTE CONTENTS ALLOWABLE WASTES Check all allowable wastes that are contained within lins toad: NOTE: Waste disposal at the Area 3 UNC wastes that are contained within lins toad: Check all allowable wastes that are contained with periodem hydrocarbons or colaris, such as: gasoline (no berzene, lead); jet ficel, dicescluding tires) Deminition dehr	For waste o	characteriz	ation, appro	val, and/o	r assistar	nce, cont	act Solio	Waste C	peration	(SWO)	ar ə-	/090,	-1
Waste Generator: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (c)(5-2124: (c)496-0150 Accelor / Origin: CAU 565 - E-MAD Compound exterior yard. Container # 56503 - Bulk Industrial Debris Maste Type: MTS Pattescrible Master Type: Master Type: MTS Pattescrible FFACO-onsite WAC Exception Asbet Type: MTS Pattescrible FFACO-onsite WAC Exception Pollution Prevention Category: (check one) Z Environmental management Defense Projects YMP Pollution Prevention Category: (check one) Z Environmental management Defense Projects YMP Pollution Prevention Category: (check one) S Sampling & Analysis Process Knowledge & Contents Prolibited Waste at all three Radioactive waste: (PEA flucture waste; PEA flucture) Revels, and Medical wastes (needles, sharps, bloody clothing). Additional Prohibited Waste Sewage Studge, Animal carcasses, Wet garbage (food waste); and Friable asbestos at the Area 5 U/OC L andfill: Cocheck all allowable wastes that are contained within this toad: NOTE: Waste disposal the Area 6 Hydrocarbon tandfill must have come into contact with periodeum hydrocarbons or coolants, such as: gasoline (no bercance), eabylis fit end, disel fitter, disel fitter, disel fitter, lichorani, and hydraulics; kerosene; asphalic		(This fo	REQUII arm is for rol	RED: WA loffs. dumi	STE GEI b trucks,	and othe	r onsite	disposal	of materi	als.)			
cocelion / Origin: CAU 565 - E-MAD Compound exterior yard. Container # 65603 - Bulk Industrial Debris Maste Category: (maste Category: (maste Category: (maste Category: (master) Maste Category: (master) Commercial (master) (master) Maste Category: (master) (master) (Master) (Master) (Master) Maste Category: (master) (master) (Master) (Master) (Master) Pollution Prevention Category: (check one) (master) (Environmental management) Defense Projects (MAP) Pollution Check one) Sempling & Analysis Process Knowledge Contents Prohibited Waste at all three Radidical wastes (needles, amaster), blody dobling). Addidical wastes (master) Northibite). Addidical and the medical wastes Keady and the exterior of the medical wastes (master) withon (master). Northibite). Addidical and the medical wastes Check of all and must have come into contact with petroleum hydrocarborns or coolants. Northibite). Addidical wastes Master accepted at the Area 6 Hydrocarborn Landfill must have come into contact with petroleum hydrocarborn and ethylene glycel. Northical estical estropy of the estical estical estropy of thy	Marta Ganarator M							Pho	ne Numb	er: (0)	5-212 <u>4</u>	4 <u>: (c)496-0150</u>	
Waste Category: (check one) Commercial Industrial Waste Type: NTS Putrescrible FFACO-onsite WAC Exception Check one) Non-Putrescrible Astestos Containing Material FFACO-onfiste Historic DOENV Pollution Prevention Category: (check one) Environmental management Defense Projects YMP Pollution Prevention Category: (check one) Samping & Analysis Process Knowledge Contents Prohibited Waste at all three Radioactive waste: RCRA waste: Hazandous waste; Free liquids, PCBs above TSCA regulatory 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 toat: NOTE: Waste at any NTS landfill: Paper Rocks / unaltered geologic materials Empty containers Acceptable waste at any NTS landfill: Paper Rocks / unaltered geologic materials Empty containers Apshalt Metal Wood Soil Insulation (non-Asbestosform) Cernent & concrete Mathital waste accepted at the Area 3 Uf0 Clandfill: Probatics (constorm) Carcasses Concrets Animal Carcasses Asbestos Friable (contact SWO If regulated load) <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>ner # 566</td> <td></td> <td>Industri</td> <td>al Debr</td> <td>is</td> <td></td> <td>_ 1</td>							ner # 566		Industri	al Debr	is		_ 1
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	NOTE: Waste disposi	al at the Ar	ea 6 Hydroc	arbon La	ndfill mus	t have o	ome into	contact v	vith petro d hydrau	lics: ke	ydroca	arbons or e: asphaltic	
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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 Managemet knowledge, does not contain radiological materials. Radiological Survey Release for Waste Dia added man-made radioactive materials To the best of my knowledge, the waste described above contains only those materials. This container/load meets the critication method identified above Print Name: Mark Heser Date: 1-7-11 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." Fact-7/1			🛛 Draine					Dec		-	ound a	and Above	
□ 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:								Gro	und Tan	k S			
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Signature: /s/ Mark Heser Date: 1-7-11 i/ E 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." E <td></td> <td></td> <td></td> <td></td> <td></td> <td>·</td> <td></td> <td></td> <td></td> <td>due to p</td> <td>rocess</td> <td>knowledge and</td> <td>origin.</td>						·				due to p	rocess	knowledge and	origin.
Signature: ////////////////////////////////////							·	Ļ	SIGNATU	RE: //S/	Signat		DATE
must have signed removal certification statement with Load Verification." SWO USE ONLY	Signature: /s/	Mark He	ser			Date	: 1-3	7-11				1/	B1
	Note: "Food waste, o must have sign	ffice trash	and animal al certificatio	carcasses in stateme	do not n int with L	equire a oad Veri	radiologi fication.*	cal clear	ance. Fr	eon-cor	ntainin	g appliances	
	SWO USE ONLY					1-27-	11						
Load Weight (net from scale or estimate): 15, 44.0 Signature of Certifier.			3	6 (11					/s/ Si	gnature	e on t	file	

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Form FRM-0918	NTS LAI	NDFILL LOA				Rev. 0	
			DVERIFI	ICA	ION	Page 1 of 2	
SWO USE (Select One)	AREA	23	6		39 🛛		
For waste characteriz	ation, approva	al, and/or assistance	, contact Solid	Waste	Operation (SWO) at 5-7898.	
	REQUIR	ED: WASTE GERE	RATOR INFOR	RMATI	DN		
Waste Generator: Mark Heser	(NI, WO)(M/S	- NSF167) (Fax 5-2	241)	Ph	one Number: (o)	5-2124; (c)496-0150	
Location / Origin: CAU 566 - E	-MAD Compo	ound exterior yard. C	ontainer # 5 <u>66</u>	503 - BL	lik Industrial Deb	nis	
Waste Category: (check one)		Commercial			tustrial		1
Waste Type: 🗌 NTS		Putrescrible		_	ACO-onsite	WAC Exception	1
(check one) 🗌 Non-Putre	scible	Asbestos Contai	ning Material	77 🔲	ACO-offsite	Historic DOE/NV	
Pollution Prevention Category:	(check one)	Environmental n	nanagement		fense Projects		
Pollution Prevention Category:		Clean-Up			outine		
Method of Characterization: (ch		Sampling & Ana	lvsis		ocess Knowledge	Contents	1
A design of the second s	levels, and M	vaste; RCRA waste; edical wastes (need lge, Animal carcasse	les, sharps, blo	oody clo	othing).	•	1
NOTE: Waste disposal at the Arc coolants, such as: gaso petroleum hydrocarbon; a	Check all allo ea 6 Hydroca aline (no benz and ethylene	еле, lead); jet fuel; d glycol.	ire contained w ave come into liesel fuel; lubri	vithin (h contact icants a	is load: with petroleum h and hydraulics; ke	rosene; asphaltic	
Acceptable waste at any NTS is			ocks / unaltere	_		Empty containers	
			ubber (excludi	-		Demolition debris	
🖾 Plastic 🖾 Wire 🗌	Cable D	🗹 Cloth 🛛 🖾 In	sulation (non-A	Asbesto	storm)	Cement & concrete	
Manufactured items: (swamp	coolers, fum	iture, rugs, carpet, e	lectronic comp	onents	PPE, etc.)		
Additional waste accepted at th	ne Area 23 M	lercury Landfill:	Office Was	ste 🗌	Food Waste	Animal Carcasses	
Asbestos 🔲 Friable	💭 Non-Fr	iable (contact SWO	if regulated loa	ad) · C	Quantity:		1
Additional waste accepted at th							
Non-friable asbestos		automobiles and mili	itary vehicles	So So	lid fractions from	sand/oil/water	1
		fuel filters (gas & die			conned Undergro		
Hydrocarbons (contact SWO)		inei miers (Ada of ne	501)		ound Tanks		
Additional waste accepted at th	-						
🔲 Septic sludge 🛛 Rags		ained fuel filters (gas				eme plated oil filters	1
Plants Soil		idge from sand/oil/w				0 parts per million	-
	REQU	RED: WASTE GEN	ERATOR SIG	NATUP	Æ		
Initials: (if initialed, no ra	adiologicai c	learance is necess	ary.)				
The above mentioned waste was knowledge, does not contain rad			d Waste Mana	iger [Radiological Surv RCT Initials	oy Release for Waste Dis	posal
To the best of my knowledge, the	a wasta dana	ribod above contain	a only those w	nate		ainer/load moots the crite	
site. I have verified this through						n-made radioactive mate ainer/load meets the crite	
prohibited and allowable waste i	tems. I have					lanual Table 4.2 release li	
is approved for disposal in the la	<u>indfilí</u> .					ainer/load is exempt from	
Print Name: Mark Heser						cess knowledge and origin. Jignature on file	
/o/ Montelloo	or		_		IGNATURE: //s/ S		
Signature: /s/ Mark Hes			Date:7	-1.		84	-0646
Note: "Food waste, office trash a must have signed remova				cieal	rance. Freon-cor	ntaining appliances	
SWO USE ONLY			1/27/11				
Load Weight (net from scale or e	etimata):	5900	Territ	or	/s/ Signature	e on file	
LOHD VVERING (DBT TOM/SCRIP AT P	sumater: 🖌 .	Sign	ature of Certific				

JAN-31-2011 08:21AM From: +702NGONTROLLED When Printed

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+702 295 9673 T-367 P.001/003 F-370

SWO USE (Sele				23	6	_	29		LANDFILI	
For waste	characteriz	ation, appr	oval, and/	or assistant	e, contact S	olid Wa	ste Operation (S	NO) at	5-7898.	
	This H	REQU in in for m	IRED: W	ASTE GER	ERATOR IN	FORM/	TION osal of materials.			
Waste Generator:										
	Mark Heser						Phone Number:		24; (c)496-0	150
		-MAD Con	pound ex	terior yard,	Container #	56603 -	Bulk Industrial D	ebris		
Waste Category: (ch	TTT TTT TTT TTT TTT		THE REAL PROPERTY AND INCOME.	nmercial		\boxtimes	Industrial			
	NTS			escrible			FFACO-onsite		WAC Excep	
Transferrance in the second seco	Non-Putre			estos Conta	aining Materi		FFACO-offsite		Historic DO	E/NV
Pollution Prevention Pollution Prevention	Category:	(check one)			management		Defense Projects Routine		YMP	
Method of Character	ization: (ch	ack one)		pling & Ana	alveie		Process Knowled		Contonto	
Prohibited Waste at	all three	Radioactive	waste; R	CRA waste	Hazardous	waste:	Free liquids PC	is above	e TSCA recu	latory
and tandims.		evels, and	Medical w	astes (need	iles, sharps,	bloody	clothing).		a raaviisitu	atory
Additional Prohibite at the Area 9 U10C L	d Waste	Sewage Sit	udge, Anin	nal carcass	es, Wet garb	age (for	od waste); and F	riable av	shestos	
					TS ALLOW					
)	Check all a	llowable v	fedd optop	am containe	d with in	this lood			
NOTE: Waste dispos	at at the Are	a 6 Hydroc	carbon Lar	dfill must h	ave come in	to cont:	not with noticity the	n hydrod	carbons or	
petroleum hyd	ii da, yasu	ne (no ber	izene. lea	d); jet fuel; (liesel fuel; lu	bricants	s and hydraulics;	keraser	ne; asphaltic	
Acceptable waste at	any NTS la	ndfill:			ocks / unalte	red aed	logic materials	X F	mpty contain	ere
🗌 Asphalt 🖾 Me	_	Wood	Soil Soil		ubber (exclu				emolition del	
Plastic 🛛 Wir			Cloth		sulation (not	n-Asbes	stosform)		ement & con	
Manufactured item	is: (swamp i	colers, fur	niture, rug				ts, PPE, etc.)			
Additional waste acc	epted at the riable				Office W		Food Waste		nimal Carcas	Ses
					if regulated l	oad)	Quantity:			-
Additional waste acc										
Light ballasts (cont		_ Drained	l automob	lies and mil	itary vehicles		olid fractions from			
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Additional waste acc		-	udracarbu	and Landfill			sound ranks			
Septic sludge	Rags		ained fuel	filters (gas	& diesel)		Crushed nor	tomor	lated all film	-
Plants	Soll		udge from	sand/oil/wa	ter separato	rs	PCBs below			s I
		REQU	RED: W	ASTE GEN	ERATOR SI	GNATU	IRE	oo puit	a per minort	
nitials: (if initia	aled, no rac	lological	learance	is necess:	ary.)					
The above mentioned a (nowledge, does not c	ontain radio	logical ma	terials.	a controlle	d waste Mar	lageme	Radiological	Survey	Release for W	aste Di
the best of my know	vierine the	unte dese	منام امعطات				RCT initials		er/load meets t	
	s through t	18 Waste ci	ISFACIONIZ	tion mothe	d Manifind	ah au a	adde	nan-n	hade radioactiv	ve mat
prohibited and allowab s approved for dispos	le waste ite	ms. I have	contacted	Property I	Management	and h	This	containe	ar/load meats (ual Table 4.2 m	ho crit
		<u>uilli</u> .			•		This	containe	r/load is exem	ipt from
Print Name: Mark Her							aue i	o proces	s knowledee an	rd origin
	Mark He		_		Date: 1-1	2-11	SIGNATURE:			DAT
lote: "Food waste, offi must have signe	ce trash an	animal ca	ircasses d	o not requir	a radiologi		rance. Freen-co	ntainin	appliances	Ĩ
	d removal c	entification	statement	with Load	Verification."				whenences	i I
WO USE ONLY	_		~	_ 2/	110					
oad Weight (net from							/s/ Signa		C 1	

RM-0918 NTS LANDFILL LOAD VERIFICATION Page WO USE (Select One) AREA 23 6 9 LANDFIL 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.) aste Generator: Mark Heser (NI, WO)(MS - NSF167) (Fax 5-2241) Phone Number: (0)5-2124; (c)496-4 cation / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris aste Category: (check one) Commercial Industrial aste Type: INTS Putrescrible FFACO-onsite Historic DO aste forppe: INTS Putrescrible Standing Material FFACO-onfisite Historic DO aste forppe: INTS Putrescrible Asbestos Containing Material FFACO-onfisite Historic DO aste for type: INTS Standing & Analysis Process Knowledge Contents abilition Prevention Category: (check one) Sampling & Analysis Process Knowledge Contents abilition Prevention Category: (check one) Sampling & Analysis Process Knowledge Contents	D150
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.) aste Generator: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (0)5-2124; (c)496-4 cation / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris aste Category: (check one) Commercial Industrial aste Tate of the Category: (check one) Commercial Industrial aste Type: NTS Putrescrible Asbestos Containing Material FFACO-onfiste Historic Dd Industrial aste Category: (check one) Check one) Check one) Sampling & Analysis Process Knowledge Contents ohibited Waste at all three Radioactive waste; RCRA waste; Hazardous waste; Free liquids, PCBs above TSCA reg <td< th=""><th>0150 </th></td<>	0150
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.) aste Generator: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (0)5-2124; (c)496-4 cation / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris aste Category: (check one) Cammercial Industrial aste Category: (check one) NDS Putrescrible FFACO-onsite WAC Exce WAC Exce waste state Type: NTS Putrescrible FFACO-onsite WAC Exce WAC Exce Portescrible Betweet one intervention Category: (check one) Chean-Up Routine Historic Dd Betweet at all three Ratioactive waste; RCRA waste; Hazardous waste; Free liquids, PCBs above TSCA reg Standfills: Isewage Sludge, Animal carcasses, Wet garbage (food waste); and Friable asbestos REQUIRED: WASTE CONTENTS ALLOWABLE WASTES Check all allowable wastes	0150
(This form is for rolloffs, dump trucks, and other onsite disposal of materials.) aste Generator: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (0)5-2124; (c)496-4 cation / Origin: _CAU 566 - E-MAD Compound exterior yard. Container # 58603 - Bulk Industrial Debris aste Category: (check one) Commercial Industrial aste Category: (check one) NTS Putrescrible FFACO-onsite WAC Excertation Mon-Putrescible Asbestos Containing Material FFACO-onsite Historic Division Illution Prevention Category: (check one) Environmental management Defense Projects YMP Illution Prevention Category: (check one) Sampling & Analysis Process Knowledge Contents Shibited Waste at all three Radioactive waste; RCRA waste; Hazardous waste; Free liquids, PCBs above TSCA reg Sewage Sludge, Animal carcases, Wet garbage (food waste); and Friable asbestos NTE: Waste disposal at the Area 6 Hydrocarbon Landfill must have come into contact with petroleum hydrocarbons or coolarits, such as: gasoline (no benzene, lead); jet fuel; diesel fuel; lubricants and hydraulics; kerosene; asphaltion petroleum hydrocarbons: and ethylene glycol. Compating Rocks / unaltered geologic materials Demolition d Semale gas (in	eption
aste Generator. Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: (0)5-2124; (c)496-4 cation / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 58603 - Bulk Industrial Debris aste Category: (check one) Commercial Industrial aste Type: NTS Putrescrible FFACO-onsite WAC Excellates eeck one) Non-Putrescible Asbestos Containing Material FFACO-offsite Historic Debris illution Prevention Category: (check one) Environmental management Defense Projects YMP illution Prevention Category: (check one) Sampling & Analysis Process Knowledge Contents ohibited Waste at all three Radioactive waste; RCRA waste; Hazardous waste; Free liquids, PCBs above TSCA regilevels, and Medical wastes (needles, sharps, bloody clothing). Sewage Sludge, Animal carcasses, Wet garbage (food waste); and Friable asbestos OTE: 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; asphaltitic petroleum hydrocarbon: and ethylene glycol. Empty contai ceptable waste at any NTS Isandfill: Paper Rocks / unaltered geologic materials Empty contai Asphalt Metal Wood Soil	eption
cation / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 58603 - Bulk Industrial Debris aste Category: (check one) Commercial Industrial aste Type: NTS Putrescrible FFACO-onsite WAC Exce beek one) Non-Putrescible Asbestos Containing Material FFACO-onfisite Historic Dr bilution Prevention Category: (check one) Environmental management Defense Projects YMP bilution Prevention Category: (check one) Clean-Up Routine Routine athod of Characterization: (check one) Sampling & Analysis Process Knowledge Contents childitional Prohibited Waste Radioactive waste; RCRA waste; Hazardous waste; Free liquids, PCBs above TSCA reg levels, and Medical wastes (needles, sharps, bloody clothing). bilditional Prohibited Waste Sewage Sludge, Animal carcases, Wet garbage (food waste); and Friable asbestos <i>REQUIRED: WASTE CONTENTS ALLOWABLE WASTES</i> Check all allowable wastes that are contained within this load: OTE: 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. ceptable waste at any NTS landfill: Paper Rocks /	eption
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Illution Prevention Category: (check one) Invironmental management Defense Projects YMP Illution Prevention Category: (check one) Invironmental management Defense Projects YMP Individual Problem Check one) Invironmental management Defense Projects YMP Individual Prohibited Waste Radioactive waste; RCRA waste; Hazardous waste; Free liquids, PCBs above TSCA regulational Prohibited Waste Sewage Sludge, Animal carcasses, Wet garbage (food waste); and Friable asbestos Inditional Prohibited Waste 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 toad: OTE: Waste disposal at the Area 6 Hydrocarbon Landfill must have come into contact with petroleum hydrocarbons or coolants, such as: gasoline (no berzene, lead); jet fuel; diesel fuel; lubricants and hydraulics; kerosene; asphaltion petroleum hydrocarbon; and ethylene glycol. ceptable waste at any NTS landfill: Paper Rocks / unaltered geologic materials Empty contail Asphalt Metal Wood Soil Rubber (excluding tires) Demolition due Plastic Wire Cable Cloth Insulation (non-Asbestosform) Cement & co	
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Check all allowable wastes that are contained within this load: DTE: 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. ceptable waste at any NTS landfill: Asphalt Asphalt Metal Wood Soil Plastic Wire Cable Cloth Manufactured items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.)	
 TE: 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. ceptable waste at any NTS landfill: X Paper X Rocks / unaltered geologic materials X Empty contain Asphalt X Metal X Wood X Soil □ Rubber (excluding tires) X Demolition de Plastic X Wire □ Cable X Cloth X Insulation (non-Asbestosform) X Cement & contact X Manufactured items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.) 	
petroleum hydrocarbon; and ethylene glycol. ceptable waste at any NTS landfill; Paper Rocks / unaltered geologic materials Empty contain the contained second	
ceptable waste at any NTS landfill; Image: Paper Image: Rocks / unaltered geologic materials Image: Empty contain the second seco	2
Asphalt Image: Metal Image: Wood Image: Soil Image: Rubber (excluding tires) Image: Demolition de constraints Plastic Image: Wire Image: Cable Image: Cloth Image: Image: Rubber (excluding tires) Image: Cloth	ners
Manufactured items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.)	
mendiactured items. (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.)	ncrete
ditional waste accepted at the Area 23 Mercury Landfill: 🔲 Office Waste 🔲 Food Waste 🔲 Animal Carca	
Asbestos	12262
ditional 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) I Drained fuel fitters (gas & diesel) I Deconned Underground and Above Ground Tanks	
ditional waste accepted at the Area 6 Hydrocarbon Landfill:	_
Plants Soil Sludge from sand/oil/water separators PCBs below 50 parts per million	
REQUIRED: WASTE GENERATOR SIGNATURE	·
ials: (if initialed, no radiological clearance is necessary.)	
above mentioned waste was generated outside of a Controlled Waste Manageme Radiological Survey Rolease for W	Jacto F
wiedge, does not contain radiological materials. RCT Initials	
the best of my knowledge, the waste described above contains only those materit added man-made radioact	lve ma
L have verified this through the waste characterization method identified above This container/load meets hibited and allowable waste items. <u>I have contacted Property Management and his</u> Radcon Manual Table 4.2 is	the cri
pproved for disposal in the landfill This container/load is exer	mpt fro
due to_process knowledge a SIGNATURE: //s/ Signature on file	
nature: /s/ Mark Heser Date: 1-7-//	and orig
e: "Food waste, office trash and animal carcasses do not require a radiological clearance. Freon-containing appliance must have signed removal certification statement with Load Verification."	and orig
	DA
d Weight (net from scale or estimate): <u>12,040</u> Signature of Certifier: /s/ Signature on file	DA

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SMO USE /Roleat On					
SWO USE (Select One For waste characte		23	6	9	
· · ·	REQUIR	ED: WASTE GE	RERATOR INF	ORMATION	
				e disposal of mater	rials.)
		- NSF167) (Fax			ber: (0)5-2124; (c)496-0150
	E-MAD Compo	und exterior yar	d. Container # 5	6603 - Bulk Industr	ial Debris
Waste Category: (check one)		Commercial		🖾 industriai	
Waste Type: NTS (check one) Non-Put		Putrescrible		FFACO-onsi	
Pollution Prevention Categor		Asbestos Co		78.84	
Pollution Prevention Categor	Y: (check one)	Clean-Up	armanagement	Defense Pro	ojects 🛄 YMP
Method of Characterization: (check one)	Sampling & A	Inalysis	X Process Kno	wiedge 🛛 Contents
Prohibited Waste at all three NTS landfills:	Radioactive w	aste: RCRA was	te; Hazardous y	aste: Free liquids	PCBs above TSCA regulator
Additional Prohibited Waste		idical wastes (ne		-	
at the Area 9 U10C Landfill:					nd Friable asbestos
	REQUIRED:	WASTE CONTE	ENTS ALLOWA	BLE WASTES	
NOTE: Waste disposal at the A coolants, such as: gas	vea 6 Hydrocar	wable wastes that bon Landfill mus	thave como inte	mantant with a star	leum hydrocarbons or
coolants, such as: gas petroleum hydrocarbon		119 (6201) 191116	; diesel fuel; lub	ricants and hydrau	lics; kerosene; asphaltic
Acceptable waste at any NTS	and entriene g	IVCOL		ed geologic materia	
🗌 Asphalt 🖾 Metal	-		Rubber (exclud		als I Empty containers
Plastic 🖾 Wire	Cable 🛛	Cloth 🖂	Insulation (non-	Ashastastam	Coment 8
Manufactured items: (swam	p coolers, furniti	ure, rugs, carpet	electronic com	oonents, PPE, etc.))
Additional waste accepted at	the Area 23 Me	rcury Landfill:	Office Wa	ste 🗍 Food Wa	aste 🔲 Animal Carcasses
	U Non-Fria	ble (contact SW	O if regulated to	ad) Quantity:	
Additional waste accepted at Non-friable asbestos		c Landfill: .tomobiles and n			
Light ballasts (contact SWO)	Drained fu	el filters (gas & c	liesel)		s from sand/oil/water
Hydrocarbons (contact SWO)				Ground Tanks	derground and Above
Additional waste accepted at I	he Area 6 Hyd	rocarbon Landf			
Septic sludge 🔲 Rags	🗌 Drain	ed fuel filters (g	as & diesel)	Crushed	non-teme plated oil filters
Plants Soil	Siude	ge from sand/oil/	water separator	B PCBs be	elow 50 parts per million
-10-1		ED: WASTE GE		NATURE	
nitials: (if initial ed , no r	adiological clea	arance is neces	загу.)		
The above mentioned waste was	generated out	side of a Control	led Waste Mana	geme! Redicion	
anotherage, aces not contain fat	nological mater	Ta 15.		RCT Initia	
o the best of my knowledge, th	e waste describ	ed above contai	ns only those m		his container/load moots the crit
ite. I have verified this through prohibited and allowable waste i	Cerris, I have co	acterization metion intacted Property	hod identified al		dded man-made radioactive mate his container/load meets the crib
approved for disposal in the la	ndfill.		- management a		adcon Manual Table 4.2 release his container/load is exempt from
Print Name: Mark Heser ,					to process knowledge and origin
Signature: /s/ Mark He	eser		 Date:	SIGNATURE	: /s/ Signature on file DATE
lote: "Food waste, office trash a must have signed removal	ind animal carca	asses do not requ	lito a mdialasta		B
	certification sta	tement with Loa	d Verification."		-containing appliances
WO USE ONLY	31	700 -	2111n		
oad Weight (net from scale or e			ature of Certifie	/s/ Signa	ature on file

+702 295 9673 T-373 P 002/007 F-379

NSTec Form FRM-0918		NTS LAN	DFILL LO	AD VERI	FICATION	08/23/ Rev Page 1 o
SWO USE	(Select One)	AREA	23	6	9 🛛	
For	waste characterize	REOURED	and/or assista	nce, contact Soli RERATOR INFO	ld Waste Opera	tion (SWO) at 5-7898.
Waste Generat	or: Mark Heser (rm is for rolloffs, <u>NI, WO)(M/S - N</u>	dump trucks, ISF167) (Fax (and other onsite 5-2241)	disposal of ma Phone Nu	mber: (0)5-2124; (c)496-0150
Location / Origi	n: <u>CAU 566 - E</u> -	MAD Compound	exterior yard	. Container # 56	5603 - Bulk Indu	strial Debris
Waste Categor	y: (check one)		Commercial		Industrial	
Waste Type: (check one)	NTS		Putrescrible		FFACO-o	
THE R. P. LEWIS CO., LANSING MICH.	ention Category:			taining Material	THE REAL PROPERTY AND ADDRESS OF A DESCRIPTION OF A DESCR	
Pollution Preve	ention Category;		Clean-Up	I management	Defense F	Projects YMP
Method of Cha	racterization: (che	ck one) 🔀	Sampling & A	nalvsis	M D	nowledge 🛛 Contents
Prohibited Was	ite at all three R	adloactive wast	E: RCRA wast	e' Hazardoue w	acto: Eran linula	nowledge 🛛 Contents is, PCBs above TSCA regulate
Additional Pro		evels, and Medic	al wastes (nee	edles, sharps, bl	loody clothing).	
at the Area 9 U	10C Landfill: S	ewage Sludge, /	Animal carcas	ses, Wet garbag	ge (food waste);	and Friable asbestos
		REQUIRED: W				
NOTE: Masta						
coolants	nguugan al line Are;				· · · · ·	troleum hydrocarbons or aulics; kerosene; asphaltic
petroleu	m hydrocarbon; ar	nd ethylene alvo		Diesel Tuel; IUDr	ricants and hydra	aulics; kerosene; asphaltic
Acceptable was	ste at any NTS lar	ndfill: 🛛 Pa	aper 🛛	Rocks / unaltere	ed geologic mate	erials X Empty containers
		Nood 🖾 So	oil 🗌	Rubber (excludi	ng tires)	Demolition debris
		Cable 🛛 Ci	oth 🛛	Insulation (non-/	Asbestosform)	
Additional wast	d items: (swamp c accepted at the	Area 72 Manuture,	rugs, carpet,	electronic comp	onents, PPE, et	c.)
Asbestos	Friable	Non-Friable	ry Landfill;	U Office Was		
Additional was	e accepted at the	Area 9 1110a 1	Contact Offic	> Integrated tos	ad) Quantity:	
Non-friable a		Drained autor		ilitany vahieles	Solid fraction	
Light ballasts	(contact SWO)	Drained fuel fi	Iters (gas & di	esel)		ons from sand/oil/water
Hydrocarbon	s (contact SWO)	Other		0000	Ground Tar	Underground and Above
Additional wast	e accepted at the	Area 6 Hydroc	arbon Landfil			
Septic sludge	🗧 🗌 Rags	Drained	fuel filters (ga	s & diesel)	[] Crush	ed non-teme plated oil filters
Plants	Soil Soil	Sludge f	rom sand/oil/w	vater separators		below 50 parts per million
				NERATOR SIG	NATURE	
initiale: (i	f initialed, no radi	ological cleara	nce is necess	sary.)		
The above menti	oned waste was ge	enerated outside	of a Controll	od Waste Mana		
knowledge, does	not contain radio	ogical materials	•	en maste manag	RCT Init	gical Survey Rolease for Waste D
To the best of my	knowledge, the w	aste described :	above contain	e only these as		This container/load masta the cri
						added man-mado radioactive met
	lowable waste iten isposal in the land		cted Property	Management an		This container/load meets the crit Radcon Manual Table 4.2 release
Print Name: Ma						Ris container/load is exempt from
	/s/ Mark Heser					the to process knowledge and origi
Signature;	The second second	`		Date: 1-7-		
tote: "Food wast	e, office trash and	animal carcasse	s do not requ		d clearance. Fre	eon-containing appliances
must have		auncation statem	ent with Load	Verification."		termaning applications
				1-8-11		
WO USE ONLY		·) (, ,		
WO USE ONLY	from scale or estin	nate): <u>26</u> ,		ature of Cartifier	/s/ Si	gnature on file
WO USE ONLY		Cr Cry	Signa	, ,		gnature on file

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	elect One)	AREA	23	6		⊴ 9	
For was	ste characteriza		ويستجرب والباري بالمتنا المتكار المتكار المرابع	ance, contact Solic			VO) at 5-7898.
	(This for			ERERATOR INFO s, and other onsite			
Waste Generator:			5 - NSF167) (Fax			-	(0)5-2124; (c)496-0150
Location / Origin:				rd. Container # 56			
Waste Category: (tustrial	
			Putrescrible			ACO-onsite	WAC Exceptio
	Non-Putres		Asbestos Co	ontaining Material	🗋 FF	ACO-offsite	Historic DOE/
Pollution Prevent				ital management		fense Projects	
Pollution Prevent Method of Charac			Clean-Up	Applycie	brent maximum.	outine	ige 🖾 Contents
AD DO THE OWNER AND A DATE OF THE OWNER OF THE OWNER.	THE REAL PROPERTY AND ADDRESS OF THE REAL PROPERTY ADDR						is above TSCA regulat
NTS landfills:	le	evels, and M	ledical wastes (r	needles, sharps, bl	oody clo	othing).	
Additional Prohib at the Area 9 U100		Sewage Sluc	lge, Animal carc	asses, Wet garbag	je (food	waste); and Fr	iable asbestos
	- carranti			TENTS ALLOWAE			
NOTE: Manto dia	(Check all all	owable wastes th	hat are contained v	within th	is load	
NOTE: Waste disp coolants, s	such as: gasoli	ne (no benz	ene, lead); jet fu	ist nave come into iel: diesel fuel: lubr	contact ricants a	with petroleum and hydraulics:	n hydrocarbons or kerosene; asphaltic
petroleum	hydrocarbon; a	nd ethylene	glycol.				AT MILETYANIN I SANATAN KATA SI UP
Acceptable waste				Rocks / unaltere Rubber (excludi			Empty container
							Demolition debri
Manufactured i	items: (swamp c			et, electronic comp	ponents,	PPE, etc.)	
Additional waste a	accepted at the	e Area 23 M	lercury Landfill	: 🗌 Office Was	ste 🗌		Animal Carcass
	Friable			WO if regulated loa	ad) C	uantity:	
Additional waste a							
				d military vehicles			m sand/oil/water ground and Above
Light ballasts (c			an man (and a			ound Tanks	Jound and Above
Light ballasts (d Hydrocarbons (
Hydrocarbons ((contact SWO)		drocarbon Lan	dfill: · 🗆			
Additional waste :	(contact SWO) [accepted at the B Rags	e Area 6 Hy	ained fuel filters ((gas & diesel)] Crushed nor	n-teme plated oil filters
Additional waste :	(contact SWO) [e Area 6 Hy Dra Slu	ained fuel filters (Idge from sand/o	(gas & diesel) bil/water separators	s [PCBs below	n-teme plated oil filters 50 parts per million
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SWO LISE /	Select One)		DFILL LO			Page 1 of 2
		AREA	23	6	⊠ 9	
		REQUIRE	D: WASTE GER	CE, CONTACT SOM	d Waste Operation (S	SWO) at 5-7898.
	(This for	m is for rolloff.	s, dump trucks, a	ind other onsite	disposal of materials.	.)
Waste Generator	: <u>Mark Heser (I</u>	1, WO)(M/S -	NSF167) (Fax 5	-2241)		(c)5-2124; (c)496-0150
Location / Origin:					603 - Bulk Industrial	Jehris
Waste Category:	(check one)		Commercial		Industrial	
Waste Type:			Putrescrible		S FFACO-onsite	WAC Exception
(check one)	Non-Putres		Asbestos Cont	aining Material	FFACO-offsite	Historic DOE/NV
Pollution Preven	tion Category: (Environmental	management	Defense Project	
Pollution Preven Method of Chara	cterization: (che	and	Clean-Up		Routine	
Prohibited Waste	at all three R	adioactive way	Sampling & An	alysis	Process Knowle	dge 🖾 Contents Bs above TSCA regulatory
		vels, and Med	lical Wastes (nee	dies, sharps, bid	aste; Free liquids, PCI body clothing).	es above TSCA regulatory
Additional Prohil at the Area 9 U10					e (food waste); and F	Webt tout-
						hable aspestos
		Decv oli allam	VASTE CONTEN able wastes that			
Coolants.	Nuosai al ule Area					n hydrocarbons or
petroleum	hydrocarbon: an	d ethviene oly		diesel fuel; lubri	contact with petroleum cants and hydraulics;	kerosene; asphaltic
Acceptable waste	e at any NTS lan	dfill: 🛛	Paper 🖾 F	locks / unaltere	d geologic materials	Empty containers
	Metal 🛛 V		Soil 🔲 F	lubber (excludir	ng tires)	Demolition debris
	Wire 🗋 C		Cloth 🛛 ir	nsulation (non-A	sbestosform)	Cement & concrete
Additional work	items: (swamp co	olers, fumitur	e, rugs, carpet, e	lectronic comp	onents, PPE, etc.)	
Auditional waste	accepted at the	Area 23 Men	cury Landfill:	Office Was	te T Food Waste	Animal Carcasses
			le (contact SWO	if regulated loa	d) Quantity:	
Additional waste	estos					
	contact SWO)	Drained fuel	omobiles and mil		Solid fractions fro	
Hydrocarbons	(contact SWO)	Other	These (gas & die	seij	Deconned Underg Ground Tanks	ground and Above
Additional waste	accepted at the	Area 6 Hydro	carbon Landfill	,		MAA
Septic sludge	🗋 Rags	🔲 Draine	d fuel filters (gas	& diesel)	Crushed nor	-teme plated oil filters
Plants	Soil Soil	Sludge	e from sand/oil/w	ater separators	PCBs below	50 parts per million
			D: WASTE GEN		ATURE	
nitials: (if i	nitialed, no radi	ological clea	rance is necess	ary.)		
The above mention	ned waste was ge	nerated outsi	de of a Controlle	d Waste Manac		I _
mowledge, does n	ot contain radio	ogical materia	als.		Radiological Su RCT initials	rvey Release for Waste Dispos
to the best of my l	nowledge, the w	aste describe	d above contains	only those ma	This cor	ntainer/load moots the criteria i
wohibited and allo	wable waste iten	waste chara	Atomization math		adaba 1	nan-made radioactive material ntainer/load meets the criteria
s approved for dis	posal in the land	<u>riji</u> .	decise roperty	wanagement ar	RadLoi	Manual Table 4.2 release limit:
rint Name: Mark	Heser			•	due to p	ntainer/load is exempt from sur rocess knowledge and origin.
	/s	/ Mark He	ser		SIGNATURE: /s	
Signature:	1			Date: <u>1-7-</u>	-/1	BN-06-
	office trach and		sses do not requi	re a radiologica	clearance. Freon-co	ontaining appliances
lote: "Food waste	, office trash and igned removal ce	rtification stat	ement with Load	Verification "		
lote: "Food waste must have s	, office trash and igned removal ce	rtification stat	ement with Load	Ventication,"		, ——
Signature: Note: "Food waste must have s SWO USE ONLY Load Weight (net fr	and removal ce	Tuncation stat	ement with Load	Ventication,"		ture on file

Feb-14-2011	12:21	From-SOLID	WASTE	WORK	MANAGEMEMT
100 14 2011	14.41	FT UIII-SULTD	WV21E	NAAN	MANAGEMENT

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Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial De Waste Category: (check one) Commercial Industrial Waste Category: (check one) Putrescrible Several FFACO-onsite Pollution Prevention Category: (check one) Environmental management Defense Projects Pollution Prevention Category: (check one) Sampling & Analysis Process Knowled Prohibited Waste at all three Radioactive waste; RCRA waste; Hazardous waste; Frae liquids, PCS Process Knowled Prohibited Waste at all three Radioactive waste; RCRA waste; Hazardous waste; Frae liquids, PCS Process Knowled NTS landfills: RedureED: WASTE CONTENTS ALLOWABLE WASTES Process Knowled Additional Prohibited Waste at all three Area 8 Ul0C Landfill: Sewage Sludge. Animal carcases, Wet garbage (food waste); and Fr 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 indic contact with petroleum coolants, such as: gasoline (no benzene, lead); jet fuel; diesel fuel; tubricants and hydraulics; petroleum bydrocarbon, and ethylene glycol. Acceptable waste at any NTS landfill: Paper Rocks / unaltered geologic materials Asph	57
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:	
Waste Generator: Mark Heser (NI, WO)(M/S - NSF167) (Fax 5-2241) Phone Number: Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56803 - Bulk Industrial Defense Projects Waste Category: (check one) Commercial Industrial Waste Category: (check one) Commercial Industrial Waste Type: NTS Putrescrible FFACO-Onsite Check one) Non-Putrescible Asbestos Containing Material FFACO-Onfite Pollution Prevention Category: (check one) Clean-Up Routine Method of Characterization: (check one) Sampling & Analysis Process Knowled Prohibited Waste at all three Radioactive waste: RCRA waste; Hazardous waste; Free liquids, PCB Additional Prohibited Waste sewage Sludge. Animal carcasses, Wet garbage (food waste); and Fr RCDIRED: WASTE CONTENTS ALLOWABLE WASTES Check all allowable wastes that are contained within this load: NOTE: Waste disposal at the Area 8 Hydrocarbon Landfill must have come into contact with petroleum coolants, such as: gasoline (no benzene, lead); lef the; thereat geologic materials Acceptable waste at any NTS landfill: Paper Rocks / unaltered geologic materials Astestos Friable Non-Friable (contact SWO frequlated load) Countity:	
Location / Origin: CAU 566 - E-MAD Compound exterior yard. Container # 56803 - Bulk Industrial De Waste Category: Check one) Commercial Industrial Waste Category: (check one) Putrescrible Asbestos Containing Material FFACO-onsite Pollution Prevention Category: (check one) Environmental management Defense Projects Pollution Prevention Category: (check one) Sampling & Analysis Process Knowled Prohibited Waste at all three Radioactive waste: RCRA waste: Hazardous waste; Free liquids, PCS Additional Prohibited Waste Radioactive waste: RCRA waste; Hazardous waste; Free liquids, PCS Industrial Defense Projects NOTE: Waste disposal at the Area 8 Hydrocarbon Landfill must have come intic contact within this load: NOTE: Waste disposal at the Area 8 Hydrocarbon Landfill must have come intic contact with petroleum coolants, such as: gasoline (no benzene, lead); jet fuel; diesel fuel; tubricants and hydraulics; petroleum hydrocarbon, and ethylene glycol. Acceptable waste at any NTS landfill: Paper Rocks / unaitered geologic materials Asphalt Wetal Wood Soil Ruber (excluding three) Additional waste accepted at the Area 3 Mercury Landfill: Office Waste Food Waste Asphalt<	
Waste Category: (check one) Commercial Industrial Waste Type: NTS Putrescrible Asbestos Containing Material FFACO-onsite (check one) Non-Putrescible Asbestos Containing Material EFACO-onsite Pollution Prevention Category: (check one) Environmental management Defense Projects Pollution Prevention Category: (check one) Sampling & Analysis Process Knowled Method of Characterization: (check one) Sampling & Analysis Process Knowled Prohibited Waste at all three Radioactive waste: RCRA waste: Hazardous waste; Free liquids, PCB NTS landfills: RedUiRED: 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 coolants, such as: gasoline (no benzene, lead); jet fuel; diesel fuel; tubricants and hydraulics; petroleum hydrocarbon; and ethylene glycol. Acceptable waste at any NTS landfill: Paper Rocks / unaitered geologio materials Aspheit Metal Wood Soil Industrial Food Waste Aspheit Metal Wood Soil Industrial Group of the second of	0)5-2124; (c)496-0150
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(check one) Non-Putrescible Asbestos Containing Material FFACC-offsite Pollution Prevention Category: (check one) Environmental management Defense Projects Pollution Prevention Category: (check one) Clean-Up Routine Method of Characterization: (oheck one) Sampling & Analysis Process Knowled Prohibited Waste at all three Radioactive waste: RCRA waste; Hazardous waste; Free Ilquids, PCB NTS landfills: Reduinactive waste: RCRA waste; Hazardous waste; Free Ilquids, PCB Additional Prohibited Waste Sewage Sludge, Animal carceases, Wet garbage (food waste); and Fr At the Area 9 U10C Landfill: Sewage Sludge, Animal carceases, Wet garbage (food waste); and Fr 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 coolarits, such as: gasoline (no benzene, lead); jet fuel; dissel fuel; tubricants and hydraulics; petroleum hydrocarbon; and ethylene glycol. Acceptable waste at any NTS landfill: Paper Rocks / unaltered geologic materials Asphalt Metod Soil Rubber (excluding tires) Plastic Wire Cable Cloth Insulation (non-Asbestosform) Manufactured items: (swamp	
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is approved for disposal in the landfill This co- duo to p	ntainer/load meets the criteri
duo to s	Manual Table 4.2 release lim ntainor/load is exempt from a
I STOL INFILING INFORMATION (C)	Signature on file
Signature:	Signature on file DATE:
Note: "Food waste, office trash and animal carcasses do not require a radiological clearance. Freon-c must have signed removal certification statement with Load Verification."	titran m.R. alkhirances
SWO USE ONLY	
Load Weight (net from scale or estimate): 26, 420 Signature of Certifier: /s/ Signature	-

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FRM-0918	NTS		L LOAD	VERIF	ICATIO	N	Page	e 1 of 2
SWO USE (Se	elect One) AF	REA	23	6	9 🕅	Ď		
For was	ste characterization,	approval, and/or	assistance, co	ontact Solid	Waste Oper	ration (SWO)	at 5-7898.	
	ĸ	EQUIRED: WAS	STE GERERA	TOP INFO	PMATION			
Waste Generator:		for rolloffs, dump	trucks, and o	ther onsite (disposal of m	aterials.)		1
	Mark Heser (NI, W				Phone N	lumber; (o)	-2124; (c)496	-0150
Location / Origin:	CAU 566 - E-MAD	Compound exter	tior yard. Cont	lainer # 566	03 - Bulk Inc	lustrial Debri	5	
Waste Category: (The state of the second st	Comr			🖾 Industria	el	1	
Waste Type: (check one)	NTS	D Putres			S FFACO		WAC Ex	ception
	Dn Category: (check		tos Containing		FFACO-		🔲 Historic 🛛	DOE/NV
Pollution Preventi	on Category: (check	one) 🛛 Enviro	nmental man	agement	A REAL FRAME AND A PROPERTY OF	Projects	YMP	
Method of Charact	terization: (check one	a) 🕅 Samp	ing & Analysis	5	Routine	Knowladaa	Contents	
Prohibited Waste :	at all three Radioa	ictive waste; RCI	RA waste: Haz	ardous wa	ste: Free line	ide DCBe al		
N 18 landfills: Additional Prohibi	·••••,	and Medical was	tes (needles,	sharps, blo	ody clothing)			guiatory
at the Area 9 U100	Landfill: Sewag	e Sludge, Anima	l carcasses, V	Vet garbage	e (food waste); and Friabl	e asbestos	1
		IRED: WASTE						
	Cherv	Oll Ollowabio www.	A		*** * ** * *			
coolants, s	uch as: dasoline (no	benzena laad)	the must have	AAAAA Int		at a day of the second	drocarbons or	
			ler indi' diezé	i illel; illoriq	cants and hyd	draulics; kerc	sene; asphali	tic
	at any NTS landfill:		Rocks	/ unaltered	geologic ma	aterials 🕅	Empty conta	ainers
🗋 Asphait 🖾 M 🖾 Plastic 🖾 V	Metal 🛛 Wood			er (excludin		\boxtimes		
		Cloth	🖾 Insula	tion (non-A	sbestosform)) Ř	Cement & c	oncrete
Additional waste a	ems: (swamp coolers ccepted at the Area	23 Morrison La	carpet, electro	onic compo				
Asbestos	Friable	on-Friable (cont	act SWO If rec	Office Wast	e 🗌 Foor I) Quantity	-	Animal Car	Casses
Additional waste a	ccepted at the Area	9 U10c Landfill			a) Quantity			
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Light ballasts (co	ontact SWO) 🛛 Dra	ined fuel filters (gas & diesel)	[nd and Above	
	ontact SWO) 📋 Oth				Ground T			
Additional waste an	ccepted at the Area	6 Hydrocarbon	Landfill:					
] Plants	□ Rags [□ Soll Γ	Drained fuel fi	ters (gas & di	esei)			ne plated oil fil	
		Sludge from s	and/oil/waters	separators		s below 50 p	parts per millio	n
nitlals; (if in	itialed, no radiologi				A I UKE			
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ne above mentione nowledge, does no	d waste was genera t contain radiologica	ted outside of a il materials.	Controlled Wa	iste Managi	ent Radiol RCT In	ogical Survey itials	Rolease for Wa	ste Dispos
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the summer sounded i	uns urouan me was	Te charactorizati	An mothed ld.	the family and the		This contain	nade radioactiv er/load meets ti	ne criteria f
approved for disp		nave contacted	roperty Mana	igement an	व.	Radcon Man	ual Table 4.2 ra or/load is exem	leaso limite
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	/s/ Mark Hes	or			SIGNATU	RE: /s/ Signa		DATE: 2
lignature:			Date	1-7-	1.			BN-084
iote: "Food waste, o must have sig	office trash and anim ned removal certifica	al carcasses do ation statement w	not require a r vith Load Verif	radiological lication."	clearance. I	Freon-contai	ning appliance	35
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SWO USE (S	elect One	ARE	A [23	6		⊠ 9	
For w	aste characteri	zation, app	roval, and/o	assista	nce, contact S	iolid Wa	aste Operation (SV	VO) at 5-7898.
	(This				RERATOR IN			
Waste Generator						ate aisp	osal of materials.)	
		•	M/S - NSF16					(0)5-2124; (c)496-0150
Location / Origin:		E-MAD Co			. Container #	56603	- Bulk Industrial De	ebris
Waste Category:							Industrial	
Waste Type: (check one)	NTS	anaibla	Putre				FFACO-onsite	WAC Exception
Pollution Preven					Itaining Mater	TRACTOR DATE	FFACO-offsite	Historic DOE/N
Pollution Preven	tion Category	Check on	e) 🛛 Clear		i managemer		Defense Projects Routine	
Method of Chara	PERSONAL PROPERTY AND A COMMAN		Samp		nalvsis		Process Knowled	ae 🕅 Contents
Prohibited Wast	e at all three	Radioactiv	ve waste; RC	RA was	te; Hazardous	waste	Free liquids, PCB	s above TSCA regulato
NTS landfills: Additional Prohi		levels, and	d Medical wa	istes (ne	edles, sharps	, bloody	clothing).	-
at the Area 9 U1		Sewage S	ludge, Anim	al carcas	sses, Wet gar	bage (fo	ood waste); and Fr	iable asbestos
		REQUIR	ED: WASTE	CONTE	NTS ALLON	ABLE	WASTES	
	sporal at the A	Check all	allowable w	astes the	at are containe	ed withi	n this load: tact with petroleum	. h
coolants,	such as: gas	pline (no ba	enzene, lead); iet fuel	t nave come i I: diesel fuel: l	ubrican	tact with petroleum	kerosene; asphaltic
petroleun	n hydrocarbon:	and ethyle	ne glycol.					
Acceptable wast						-	sologic materials	Empty containers
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Manufactured					Insulation (no			Cement & concret
Additional waste	accepted at 1	he Area 2	3 Mercury L	andfill:		Naste	Food Waste	Animal Carcasses
	🗂 Friable				O if regulated			
Additional waste	accepted at f	he Area 9	U10c Landf	111:				
Non-friable as					nilitary vehicle	s 🛛	Solid fractions from	m sand/oil/water
	(contact SWO)		ed fuel filters	(gas & d	diesel)		Deconned Underg	ground and Above
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Additional waste								to the state of the second sec
Plants	Soil		Drained fuel		as & diesei) Iwater separa	tore		n-teme plated oil filters 50 parts per million
					ENERATOR S			oo parta per minion
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					.,			,—
The above mentio knowledge, does	ned waste was not contain ra	s generate diological i	d outside of materials.	a Contro	lied Waste M	anagan	. Kadiological Si	urvey Release for Waste D
							RCT Initials	ontainer/load meets the cri
To the best of my site. I have verifi	ed this through	the waste	characteriza	ation me	thod identifie	d above	V addod	man-mado radioactivo ma
prohibited and al	lowable waste	items. <u>I ha</u>	ve contacter	Proper	ty Manageme	nt and		ontainer/load meets the or n Manual Table 4.2 release
is approved for d		aunim'					This co	ontainer/load is exempt fro
Print Name: Ma	rk Høser							s/ Signature on file
Signature:	/s/ Mark Hes	er			Date:	-7-11		
Note: "Food was must have	te, office trash	and animal al certificati	l carcasses o ion statemen	to not re t with Lo	quire a radiolo ad Verlficatio	ogical c n."	earance. Freon-c	ontaining appliances
SWO USE ONLY					2-10-11			
			35,400	-	gnature of Ce		/s/ Sigr	nature on file

SWO USE (Sele		AREA	23	6			
For waste	characterizatio	n, approval, ar	nd/or assistan	ce, contact Solid	d Waste (Operation (SW	O) at 5-7898.
	(This form	REQUIRED: is for rolloffs, d	WASTE GER iumo trucks. a	RERATOR INFO	disposal	of materials.)	
Waste Generator: N	Aark Heser (NI,		-		-)5 <u>-2124;</u> (c)496-0 <u>150</u>
_				Container # 56			
Waste Category: (che			Commercial		🕅 Indi		
ALL AND A DESCRIPTION OF THE REAL PROPERTY OF THE R	NTS	183773107	Putrescrible			CO-onsite	WAC Exception
	Non-Putrescib	ble 🗌 A	Asbestos Con	taining Material		CO-offsite	Historic DOE/N
Pollution Prevention	THE OWNER AND ADDRESS OF THE OWNER ADDRESS OF THE O	ARABASIAN AND AND AND AND AND AND AND AND AND A		management		ense Projects	C YMP
Pollution Prevention					C Rou	The later warden and the second second	
Method of Character Prohibited Waste at	Station of the second second second second		Sampling & An			ARRANGE WERE AND THE PARTY OF T	e Contents
NTS landfills:				e; Hazardous w edles, sharps, b			anote Loov legular
Additional Prohibite	d Waste Sou		-	ses, Wet garba			able asbestos
at the Area 9 U10C L	anon.						
				NTS ALLOWA			
NOTE: Waste dispos	al at the Area 6	5 Hydrocarbon	Landfill must	have come into	contact v	with petroleum	hydrocarbons or
	ch as: gasoline drocarbon; and			diesel fuel; lub	ricants an	d hydraulics; k	erosene; asphaltic
Acceptable waste at				Rocks / unalter	ed geolog	ic materials	Empty containers
🗌 Asphalt 🛛 Me				Rubber (exclud			Demolition debris
🛛 Plastic 🖾 Wi				insulation (non-			Cement & concre
Manufactured iter						Food Waste	Animal Carcasse
Additional waste act				Office Wa 🗋 Office Wa		rood waste	
Additional waste ac							
Non-friable asbes				nilitary vehicles	🗋 Soli	d fractions from	n sand/oil/water
Light ballasts (con			filters (gas & d	liesel)			round and Above
Hydrocarbons (co	ntact SWO)	Other			Gro	und Tanks	
Additional waste ac		_				(Jaughand and	inmo eleted ail filtere
Septic sludge Plants	Rags Soil		fuel filters (g	as & diesel) /water separato	re ["		-teme plated oil filters 50 parts per million
				ENERATOR SIG			
Initials: (if init	tialed, no radio	ological clear	ance is nece	searv.)			
		•			r		Dalarra Sak Mosto
The above mentioned knowledge, does not				iled waste man	agem	RCT Initials	urvey Release for Waste
		-		ing only theory	matauti	This c	ontainer/load meets the man-made radioactive r
To the best of my known site. I have verified t	his through the	waste charac	terization me	thad identified a	above	X This c	ontainer/load meets the
prohibited and allows	able waste item	s. I have cont	tacted Proper	ty Management	and h	Radeo This c	n Manual Table 4.2 reloa ontainer/load is exempt
					1	due to	process knowledge and c
Print Name: <u>Mark H</u>						SIGNATURE:	s/ Signature on file
Cignetore.	s/ Mark Hese	-		Date:			
ht_has Here and some here is	office trash and ned removal co	animal carcas artification state	sses do not re ement with Lo	quire a radiolog ad Verification.	ical clean	ance. Freon-c	ontaining appliances
must have sig							· /
Note: Food waste, o must have sig SWO USE ONLY		1-1		2-10-11		1	
must have sig		mate): 18	180 si	<i> /~/احچ</i> gnature of Certi	fier;	/s/ Signatu	re on file

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Form FRM-0918		NTS LA	NDFIL	L LO	AD VER	FICA	NTION			Rev. ge 1 of
SWO USE (Se	elect One)	AREA		23	6		⊠9	X	LAND	FILL
For via:	ste characteriz	ation, appro	al, and/or	assistan	e, contact S	olid Wat	te Operation (S	WO) (t 5-7898.	
	This f	REQUIE	ED: WAS	TE GER	ERATOR IN	FORMA ite disoc	non sal of materials)		
	Mark Heser						Phone Number:	(0)5-	2124; (c)4	96-0150
Waste Generator:							Bulk Industrial I			
Location / Origin:		-MAD Com			Container #		Incustrial			
Waste Category:	The second secon					and its statements	FFACQ-onsite		WAC	Exceptio
	NTS Non-Putre	anible	Putres Asbes		aining Materi		FFACO-offsite			BOE/
(check one) Pollution Prevent		A REAL PROPERTY AND INCOME.			managemen		Defense Project	5		
Pollution Prevent			X Clean		······		Routine			
Nothod of Charge	tedastion' (c	herk one)	Samp.	ling & An	alysis	X	Process Knowle	dge	Conte	nts
Prohibited Waste	at all three	Radioactive	waste; RC	RA waste	; Hazardous	waste:	Free liquids, PC	8s ab	ove TSCA	regulate
NTS landfills:					dies, sharps,					
Additional Prohib at the Area 9 U10	C Landfills	Sewage Slu	dge, Anima	al carcas	ses, Wet gart	oage (fo	od wasto); and I	fiable	aspestos	
		REQUIRE	: WASTE	CONTE	NTS ALLON	ABLE	NASTES			
NOTE: Waste dis	menal of the A	Check all al	lowable wa	istes that (fill must	t <i>are containe</i> bave come is	nto cont) <i>this load:</i> act with petroleu	m hve	irocarbon	SOF
coolants.	such as: gase	oline (no ben	zene, iead)	; jet fuel;	diesel fuel; l	ubricant	s and hydraulics	: kero	sene; asp	haltic
petroleum	hydrocarbon;	and ethylena	s glycol.						Empty o	
Acceptable waste			Paper		Rocks / unall Rubber (excl	-	ologic materials		Demoliti	
			🛛 Sail 🛛 Cloth		Insulation (Re				Cement	
X Plastic X Manufactured	itome: (swam	n coolers, fur	niture, ruos							
Additional waste	accepted at f	the Area 23	Mercury La	undfill:	Office \	Nasle	E Food Wast	e 🗆	Animal	Carcasse
	Frlable	Non-F	riable (con	fact SW	D If regulatod	load)	Quantity:			
Additional waste	accepted at !	the Arca 9 U	10c Landi							
Non-friable asi	bestos	Drained	automobil	es and m	ullitary vehicle		Solid fractions fr			
Light ballasts (fuel filters	(gas & d	iesel)		Deconned Unde Ground Tanks	grou	nd and Ab	ave
Hydrocarbons										
Additional waste			ydrocarbo	n Landfi Altern (a	ll: ∟) as¨≞el)		Crushed n	no-ten	ne plated	oll fillers
Septic sludge	🔲 Rags 🗂 Seil	_		-	water separa	tora	PCBs belo			
Plants		REQU	IRED: W	ISTE GE	NERATOR	SIGNAT				
Initials:(if	initlaled, no i									
The above mentio knowledge, does i	ned waste wa not contain ra	s generated diological m	outside of a sterials.	Contro	neo waste m	susâcu	Radiological RCT (nitiols	SULVO	y Release f	or Waste I
To the best of my					ng any thay	a mater	This		nar/load m	
site. I have verifie	d this through	h the waste c	harscteriza	ation mot	hod identitie	d above	1 100		-made radi	
prohibited and all is approved for di	owable weste	Items, I have	e contacter	I Propert	y Managemo	nt and 1	Rad	mn Ma	Table Laite	4.2 14485
		anatin					due	lo proc	nor/load is	ger and of
Print Nome: Mar					_		SIGNATUSE	/s/ Si	gnature on fil	<u>e</u> _D/
	/s/ Mark He				Date: 1					
Note: "Food wast must have	e, office trash signed remov	and animal o al certificatio	arcecses d statemen	t with Los	uire a radiol ad Venificatio	ogical ci n."	earance. Freen	-conta	ining appl	iances
SWO USE ONLY					2-14-11					
Load Weight (net	from scale of	estimate):	14,6	// =	nature of Ce	rifier	/s/ Si	gnati	ure on fi	le
and reagin (inter							1.00			
			ship	ment	* 20 g	30	· ·			
					,					

orm RM-0918	•		E 067008		ATION	•		8/23/06 Rev. 0 e 1 of 2
	Select One)	AREA	23	6	⊠ 9	\boxtimes	LANDF	ILL
Forw	aste characteriz	ation, approva	l, and/or assistance,	contact Solid W	aste Operation	(SWO) a	at 5 <u>-78</u> 98.	
	(This fo	REQUIRE orm is for rolloft	D: WASTE GEREI fs, dump trucks, and	RATOR INFORM I other onsite dis	ATION posal of materia	ıls.)		
Vaste Generator			NSF167) (Fax 5-2		Phone Numbe		2124; (c)49	6-0150
ocation / Origin:			und exterior yard, C		- Bulk Industria	al Debris		
Vaste Category			Commercial		Industrial			
Vaste Type:	D NTS		Putrescrible	×	FFACO-onsit	e		
check one)	Non-Putre		Asbestos Contai	***************************************	FFACO-offsit	***-		DOE/NV
	ntion Category		Environmental m Clean-Up		Defense Proj Routine	ects		
	ntion Category: acterization: (cl		Sampling & Anal		Process Know	viedge	Content	ls
Prohibited Was	te at all three	Radioactive w	aste; RCRA waste;	Hazardous waste	; Free liquids,			
TS landfills:		levels, and Me	dical wastes (need)	es, sharps, blood	ly clothing).			
Additional Proh at the Area 9 U1		Sewage Sludg	e, Animal carcasse	s, Wet garbage (food waste); an	d Friable	asbestos	
			WASTE CONTENT					
NOTE: Waste d	isposal at the Ar	Check all allow rea 8 Hydrocar	wable wastes that a bon Landfill must ha	re contained with ave come into co	in this load: ntact with pelro	leum hyd	lrocarbons	or
coolants	, such as: gase	line (no benze	ne, lead); jet fuel; d	iesel fuel; lubrica	nts and hydrau	ics; kero	sene; asph	altic
	m hydrocarbon: ite at any NTS I			ocks / unaltered g	eologic materia	als 🕅	Empty co	ntainers
				ubber (excluding			Demolitio	
				sulation (non-Ast			Cement 8	
Manufacture	d items: (swamp	coolers, furnit	ure, rugs, carpet, el ercury Landfill:	ectronic compon	ents, PPE, etc.	C C LL	Animal C	ASTIC
Additional was	Friable		able (contact SWO					¢1683363
	a accepted at f	he Area 9 U10			ALL DESCRIPTION OF THE OWNER OWNER OF THE OWNER			
Additional was	te accepted at t							
Non-friable a	sbestos		utomobiles and mili					
Non-friable a	asbestos s (contact SWO)	🖾 Drained fo	utomobiles and mili uet filters (gas & die		Deconned Ur	dergrou		
Non-friable a Light ballast Hydrocarbor	asbestos s (contact SWO) h\$ (contact SWO)	Drained for	utomobiles and mili uel filters (gas & die	sel)		dergrou		
Non-friable a Light ballasts Hydrocarbor	asbestos s (contact SWO) h\$ (contact SWO) te accepted at t	Drained fr Dther he Area 6 Hyc	utomobiles and mili uel filters (gas & die trocarbon Landfill	sel) []	Deconned Ur Ground Tank	s	nd and Abo	
Non-friable a Light ballasts Hydrocarbor Additional was	asbestos s (contact SWO) hs (contact SWO) te accepted at t e Rags	Drained for Other he Area 6 Hyc Drained	utomobiles and mili uel filters (gas & die drocarbon Landfill ined fuel filters (gas	sel) [Deconned Ur Ground Tank	ndergrou s non-ter		il filters
Non-friable a Light ballasts Hydrocarbor	asbestos s (contact SWO) h\$ (contact SWO) te accepted at t	Drained for Other he Area 6 Hyc Drai Stuc	utomobiles and mili uel filters (gas & die trocarbon Landfill	sel)	Deconned Ur Ground Tank	ndergrou s non-ter	nd and Abo	il filters
Non-friable a Light ballasts Hydrocarbor Additional was Septic sludg Plants	asbestos s (contact SWO) hs (contact SWO) te accepted at t e Rags Soil	Drained fr Other he Area 6 Hyc Drai Stuc REQUIF	utomobiles and mili uel filters (gas & die drocarbon Landfill ined fuei filters (gas dge from sand/oil/wa	sel)	Deconned Ur Ground Tank	dergrou s d non-ter elow 50	nd and Abo ne plated of parts per m	il filters illion
Non-friable a Light ballast: Hydrocarbor Additional was Septic sludg Plants	asbestos s (contact SWO) hs (contact SWO) te accepted at t e	Drained fr	utomobiles and mili uet filters (gas & die drocarbon Landfill ined fuei filters (gas dge from sand/oil/wa RED: WASTE GEN earance is necess	sel)	Deconned Ur Ground Tank	dergrou s d non-ter elow 50	nd and Abo	il filters illion
Non-friable a Light ballast: Hydrocarbor Additional was Septic sludg Plants Initials:(asbestos s (contact SWO) hs (contact SWO) te accepted at t e	Drained for Other the Area 6 Hyc Drai Drai Stuc REQUIF radiological closes s generated out	utomobiles and mili uel filters (gas & die drocarbon Landfill ined fuel filters (gas dge from sand/oil/wa RED: WASTE GEN earance is necess utside of a Controlle	sel)	Deconned Ur Ground Tank	adergrou s d non-ter elow 50	nd and Abo ne plated of parts per m Release for perfload mee	il filters illion Waste Dis ts the crite
Non-friable a Light ballast: Hydrocarbor Additional was Septic sludg Plants Initials:(The above ment knowledge, doe To the best of m	asbestos s (contact SWO) h\$ (contact SWO) te accepted at t e	Drained for Other he Area 6 Hyc Drained Draine	utomobiles and mili uel filters (gas & die drocarbon Landfill) ined fuei filters (gas dge from sand/oil/wa RED: WASTE GEN earance is necess utside of a Controlle erials.	sel)	Deconned Ur Ground Tank	al Survey s al Survey s is contain ded man-	nd and Abo ne plated of parts per m Release for made radioa per/load mee	we il filters illion Waste Dis ts the crite ctive mate ts the crite
Non-friable a Light ballast: Hydrocarbor Additional was Septic sludg Plants Initials:(The above ment knowledge, doe To the best of m site. I have veri	asbestos s (contact SWO) is (contact SWO) te accepted at t e Rags Soil if initialed, no r tioned waste was s not contain ra hy knowledge, th fied this through	Drained fr Other Other Drai Drai Sluc REQUIF adiological class s generated ou diological mate he waste descr the waste chaste	utomobiles and mili uel filters (gas & die drocarbon Landfill; ined fuel filters (gas dge from sand/oil/wa RED: WASTE GEN earance is necess itside of a Controlle erials. ibed above contain aracterization metho	sel)	Deconned Ur Ground Tank	dergrou s d non-ter elow 50 al Survey s is contain ded man- is contain refoon Man	nd and Abo ne plated of parts per m Release for made radioa made radioa her/load mee bual Table 4.	we il filters illion Waste Dis ts the crite ctive mate ts the crite 2 release II
Non-friable a Light ballast: Hydrocarbor Additional was Septic sludg Plants Initials:(The above ment knowledge, doe To the best of m site. I have veri prohibited and a	asbestos s (contact SWO) is (contact SWO) te accepted at t e Rags Soil if initialed, no r tioned waste was s not contain ra hy knowledge, th fied this through	Drained fr Other Other Drai Drai Sluc REQUIF adiological classical s generated out diological material the waste description the waste chain items. <u>Thave</u>	utomobiles and mili uel filters (gas & die drocarbon Landfill) ined fuei filters (gas dge from sand/oil/wa RED: WASTE GEN earance is necess utside of a Controlle erials.	sel)	Deconned Ur Ground Tank	dergrou s d non-ter elow 50 al Survey s is contain ded man- is contain te contain fis contain fis contain fis contain	nd and Abo ne plated of parts per m Release for made radioa meriload mee- nual Table 4. meriload is ex- ses knowledge	We il filters illion Waste Dis ts the crite ccivo mate ts the crite 2 release II campt from 9 and origin
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Non-friable a Light ballast: Light ballast: Hydrocarbor Additional was Septic sludg Plants Initials:	asbestos s (contact SWO) is (contact SWO) te accepted at t e	Drained fr Other Other Drai Drai Sluc REQUIF adiological classical s generated out diological material the waste description the waste chain items. <u>Thave</u>	utomobiles and mili uel filters (gas & die drocarbon Landfill; ined fuei filters (gas dge from sand/oil/wa RED: WASTE GEN earance is necess itside of a Controlle erials. ibed above contain aracterization metho	sel)	Deconned Ur Ground Tank	dergrou s d non-ter elow 50 al Survey s is contain ded man- is contain te contain fis contain fis contain fis contain	nd and Abo ne plated of parts per m Release for made radioa meriload mee- nual Table 4. meriload is ex- ses knowledge	We il filters illion Waste Dis ts the crite ccivo mate ts the crite 2 release II campt from 9 and origin
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Non-friable a Light ballast: Light ballast: Hydrocarbor Additional was Septic sludg Plants Initials:(The above ment knowledge, doe To the best of m site. I have veri prohibited and a is approved for Print Name: _M Signature: Note: "Food wa must have	asbestos s (contact SWO) hs (contact SWO) te accepted at t e	Drained fr Cher	utomobiles and mili uel filters (gas & die drocarbon Landfill; ined fuei filters (gas dge from sand/oil/wa RED: WASTE GEN earance is necess tiside of a Controlle erials. ibed above contains aracterization metho contacted Property. rcasses do not requi	sel)	Deconned Ur Ground Tank	dergrou s d non-ter elow 50 al Survey s is contain ded man- ls contain ded man- ls contain is contain is contain de to proce s s s contain de to proce	nd and Abo ne plated of parts per mi Release for made radioa mer/load mee mual Table 4. ner/load is ex sis knowledge ure on file	We il filters illion Waste Dis ts the crite ctivo mate ts the crite 2 release II campt from § and origin DATI
Non-friable a Light ballasts Hydrocarbor Additional wast Septic sludg Plants Initials:	asbestos s (contact SWO) hs (contact SWO) te accepted at t e	Drained fr Other	utomobiles and mili uel filters (gas & die drocarbon Landfill; ined fuei filters (gas dge from sand/oil/wa RED: WASTE GEN earance is necess tiside of a Controlle erials. ibed above contains aracterization metho contacted Property. rcasses do not requi	sel)	Deconned Ur Ground Tank	dergrou s d non-ter elow 50 al Survey s is contain ded man- ls contain ded man- ls contain is contain is contain de to proce s s s contain de to proce	nd and Abo ne plated of parts per m Release for made radioa her/load mee hual Table 4. her/load is eo siss knowledge ure on file	We il filters illion Waste Dis ts the crite ctivo mate ts the crite 2 release II campt from § and origin DATI

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Mar-29-2011 09:15 From-SOLID WASTE WORK MANAGEMENT

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FRM-0918	NISI			FICATION	Page 1 of 2
SWO USE (Sel				X 9	
For waste	characterization, ap		Istance, contact So GERERATOR INF		n (SWO) at <u>5-7898.</u>
				e disposal of materi	ials.)
Naste Generator:	Mark Heser (NI, WO)	(M/S - NSF167) (ax 5-2241)	Phone Numb	oer. (0)5-2124; (c)496-0150
ocation / Origin:	CAU 566 - E-MAD C	ompound exterior	yard. Container # 5	6603 - Bulk Industri	al Debris
Waste Category: (ch		Commerc		Industrial	
Waste Type:	NTS Non-Putrescible	D Putrescri	ole Containing Materia	FFACO-onsi	
	n Category: (check of	******	ental management		
Pollution Prevention	n Category: (check o			Routine	
	rization: (check one)	Sampling	TO MODELAND DE CONTRACTOR DE LA CONTRACTOR DE CONTRACTOR D	PARAMETERS AND ADDRESS OF THE PARAMETERS AND ADDRESS A	wiedge 🛛 Contents
Prohibited Waste at NTS landfills:			waste; Hazardous v (needles, sharps, l		PCBs above TSCA regulator
Additional Prohibite	ed Waste				nd Friable asbestos
at the Area 9 U10C	Lanum	_	NTENTS ALLOWA		
•	Check a	Il allowable waste	s that are contained	i within this load;	
NOTE: Waste disco coolants su	sal at the Area 6 Hyd och as:	rocarbon Landfill	must have come int	o contact with pelic	bleum hydrocarbons or Ilics; kerosene; asphaltic
petroleum hy	drocarbon; and ethy	ene glycol.			
Acceptable waste a		🛛 Paper		red geologic materi	•
🗋 Asphalt 🛛 M 🖾 Plastic 🖾 W		🖾 Soil	Rubber (exclu	aing tires) 1-Asbestosform)	Demolition debris
	ms: (swamp coolers,				
	cepted at the Area				
🗆 Asbestos 🛛	Friable 🗌 No	on-Friable (contac	SWO if regulated	oad) Quantity:	
Additional waste ad	cepted at the Area	9 U10c Landfill:			
Non-friable asbe			and military vehicles		is from sand/oil/water
Light ballasts (co	ontact SWO) 🔯 Drai ontact SWO) 🔲 Othe	ned fuel filters (ga	s & diesel)	Ground Tank	nderground and Above
	cepted at the Area		aprifili		
Septic sludge				Crushe	d non-teme plated oil filters
Plants	🗋 Soil 📃		d/oil/water separate		pelow 50 parts per million
	,		E GENERATOR SI	GNATURE	-
initials: (if ini	itialed, no radiologi	cal clearance is r	ecessary.)	. ī <u> </u>	- <u></u>
	d waste was generat t contain radiologica		ontrolled Waste Ma	nageme Radiolo RCT Inft	Bical Survey Release for Weste I
					This container/load meets the co
	lowledge, the waste (this through the was			material	added man-made radioactive ma This container/load meets the cr
prohibited and allow	able waste items. 11	ave contacted Pr	operty Managemen	fandhí	Raucon Manual Table 4.2 minan
is approved for disp			• ,		This container/load is exompt fro
Print Name: Mark I			<u> </u>	· · · · · · · · · · · · · · · · · · ·	RE: /s/ Signature on file
	/s/ Mark Heser		Date: _ /		
Note: "Food waste, must have sid	office trash and anim aned removal certification	al carcasses do nation statement wi	ot require a radiolog	gical clearance. Fre	eon-containing appliances
SWO USE ONLY		the second s	3-8-11		i
		2/370	5-6-11	se /s/ Sic	gnature on file
Load Weight (net fro	m/scale of estimate)	1 1 1 1	Signature of Carl	mer.	

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SWO USE (Sel	ect One)	AREA	2	3	6	Þ	39	Z	LA	NDFILL	
For wast	e characteriz	ation, appro	val, and/or as	sistanc o ,	contact Solid	d Waste	Operatio	on (SWO)) at 5-7	898.	
		REQUI	RED: WAST	E GERER	ATOR INFO	RMATIC	N				_ !
	-		offs, dump tr								20
			S - NSF167)							(c)496-015	<u>w</u>
Location / Origin:	CAU 566 - 6	E-MAD Com	pound exterio	r yard. Co	ontainer # 56	603 - <u>Bu</u>	lk Indusi	trial Debr	is		-
Waste Category: (c	heck one)		Commé	rcial		🖾 Ind	ustrial				
and in severery	NTS		D Putresc	rible			ACO-on			AC Except	
(check one)	Non-Putr	escible	Asbesto	os Contair	Ing Material		ACO-off			Istoric DOE	/NV
Pollution Prevention					anagement		fense Pi	rojects		MP	
Pollution Preventic	and forester.							nowledge		Antonis	
Method of Charact Prohibited Waste	erization: (c	heck one)	Samplin Samplin	ng & Analy	SIS						atory
Prohibited Waste a NTS landfills:	t all three	levels, and	Medical wast	a waste; i es (need)	azardous w es. sharps, b	loody clo	se ngulu thing).	o, F 003 (oon logu	
Additional Prohibi	ed Waste		udge, Animal					and Frial	hle ash	estos	
at the Area 9 U10C											
	,	REQUIRE	D: WASTE C	CONTENT	S ALLOWA	BLE WA	STES				1
NOTE: Waste disp	ncal of the A	Check all a	llowable was	ill must ha	re contained ve come into	o contact	with pe	troleum h	ydroca	rbons or	
coolants, s	uch as: gas	oline (no ber	zene, lead);	jet fuel; di	esel fuel; lub	pricants a	and hydr	aulics; ke	rosene	; asphaltic	- 1
petroleum t	ydrocarbon	; and ethylen	e giycol.								
Acceptable waste					ocks / unalter	-		enais		pty contain molition del	
		Wood Cable	🖾 Soil 🖾 Cloth		ubber (exclud sulation (non					ment & con	
Plastic X V Manufactured it		u coolers fu			ectronic com	nonents	PPE.e				
Additional waste a	cconted at	the Area 23	Mercury 1 a	ndfill:	Office W	aste	Food	Waste	An	imal Carca	SSES
	Friable	Non-	Friable (cont				Quantity:				_
Additional waste	ccented at										1
Non-friable asb			d automobile		tary vehicles			ions from			
Light ballasts (d	ontact SWO)					🗋 De			ound a	nd Above	
Hydrocarbons (contact SWO) 🗌 Other				Gr	ound Ta	inks			
Additional waste	accepted at	the Area 6	Hydrocarbor	Landfill							_
🔲 Septic sludge	Rags		Drained fuel f			1				lated oil filte per million	
Plants	🔲 Soil		Sludge from s	and/oil/W	ater separato			s below :	o paris		
	•					GRATO					
initia)s: (if i	nitialed, no	radiologica	l clearance i	s necess	ary.)			deal Rupp	v Roles	se for Waste	Dispos
The above mention	ed waste w	as generated	i outside of a	Controlie	d Waste Ma	nage	DOT Indial	410			
knowledge, does t	ot contain r	adiological n	naterials.			1		em hobbs	n-marie	id meets the radioactive i	material
To the best of my	knowledge,	the waste de	scribed abov	e contain	s only those	mat	V.	This conts	alner/loa	nd moets the	criteria
site. I have verifie prohibited and allo	d this throug	ah the waste	characteriza	tion meth	od identified	abo		Dadcon N	tamual T	able 4.2 related is exempt	ase umi
is approved for dis	posal in the	andf <u>ill</u> .	VE CONLOGUE		wana south	- 1		due to pro	cess RD	swied the and	origin.
_						i	SIGNATU	/s/ Sign	ature on fi	le	DATE:
Print Name: Mad	-					· -					BN-0
Signature:	· I Franklind	rk Heser			Date: <u>1-</u>		•• ••			a appliance	
Note: "Food wast	a, office tras	h and animal	l carcasses d	t not requ	line a radiolo	gical clea	arance.	r1600-00	ntainin	g appaance	15
									-	·	
SWU USE UNLY			2800	0 3	-15-11		/s/	Signatu	ire on-	file	
SWO USE ONLY Load Weight (net	from scale o	r estimate):		Sigr	nature of Cer	uner:					
· · · ·						1-					
				man at 3	* <u>2</u> 3 of	30					

					#1
NSTec					08/23/06
Form					Rev. 0
FRM-0918	NTS LAN	DFILL LOA	AD VERIF	ICATION	Page 1 of 2
SWO USE (Select One)		23	6	⊠ 9	
For waste characteriz		and/or assistance			WO) at 5-7898.
(This f				disposal of materials	.)
Naste Generator: Mark Heser	(NI, WO)(M/S -	NSF167) (Fax 5-	2241)	Phone Number:	(o)5-2124; (c)496-0150
				603 - Bulk Industrial	
Waste Category: (check one)		Commercial		Industrial	
Waste Type: INTS		Putrescrible		S FFACO-onsite	WAC Exception
check one) 🗌 Non-Putre	escible	Asbestos Conta	aining Material	FFACO-offsite	Historic DOE/NV
Pollution Prevention Category		Environmental r	management	Defense Projec	ts 🗌 YMP
Pollution Prevention Category		Clean-Up	*****	Routine	
ethod of Characterization: (ch		Sampling & Ana		Process Knowle	
Prohibited Waste at all three ITS landfills: Additional Prohibited Waste	Radioactive was levels, and Med	ste; RCRA waste; ical wastes (need	; Hazardous wa iles, sharps, bl	aste; Free liquids, PC oody clothing).	Bs above TSCA regulatory
t the Area 9 U10C Landfill:	Sewage Sludge	, Animal carcasse	es, Wet garbag	e (food waste); and I	riable asbestos
• .		VASTE CONTEN			
OTE: Waste disposal at the Ar	ea 6 Hydrocarbo	able wastes that a on Landfill must h	are contained v ave come into	<i>vithin this load:</i> contact with petroleu	m hydrocarbons or
coolants, such as: gaso	line (no benzene	e, lead); jet fuel; o	liesel fuel; lubri	icants and hydraulics	; kerosene; asphaltic
petroleum hydrocarbon; cceptable waste at any NTS la				d anala dia mataniala	
			ubber (excludir	d geologic materials	 Empty containers Demolition debris
			sulation (non-A	• /	Cement & concrete
Manufactured items: (swamp				,	_
dditional waste accepted at th	ne Area 23 Mero	ury Landfill:	Office Was	te 🔲 Food Waste	Animal Carcasses
Asbestos 🔲 Friable	Non-Friab	le (contact SWO	if regulated loa	d) Quantity:	
dditional waste accepted at the	ne Area 9 U10c	Landfill:			
Non-friable asbestos		omobiles and mili		-	om sand/oil/water
• • • •		l filters (gas & die	sel)		rground and Above
				Ground Tanks	
dditional waste accepted at th] Septic sludge 🛛 🔲 Rags		ed fuel filters (gas	_		on-teme plated oil filters
Plants		e from sand/oil/wa			v 50 parts per million
		D: WASTE GEN			
itials: (if initialed, no ra	diological clea	rance is necessa	ary.)		1
he above mentioned waste was nowledge, does not contain radi			d Waste Manag	RCT Initials	rvey Release for Waste Disposa
o the best of my knowledge, the	waste describe	d above containe	only three me	This co	ntainer/load meets the criteria for nan-made radioactive material
te. I have verified this through	the waste charac	cterization metho	d identified ab	o X This co	ntainer/load meets the criteria fo
ohibited and allowable waste it approved for disposal in the la		tacted Property I	Management a		Manual Table 4.2 release limits ntainer/load is exempt from surv
				due to t	rocess knowledge and origin.
int Name: <u>Mark Heser</u>				SIGNATURE:	s/ Signature on file DATE:3
gnature: /s/ Mark Hes			Date: <u>1-7-</u>	-1	BN-064
ote: "Food waste, office trash ar must have signed removal	nd animal carcas certification stat	sses do not requir ement with Load	re a radiologica Verification.*	l clearance. Freon-o	containing appliances
WO USE ONLY		31	129/11		
bad Weight (net from scale or es	timate): <u>48,4</u>	440 Signa	ture of Certifier	/s/ Signature of	on file
			34/I	• f • • •	

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				(5)
NSTec Form FRM-0918	NTS LANDFILL L	OAD VERIFI	CATION	08/23/06 Rev. 0 Page 1 of 2
SWO USE (Select One)	AREA 23	6	8 🛛	
For waste characteriza	ation, approval, and/or assis REQUIRED: WASTE G			NO) at 5-7898.
(This for	m is for rolloffs, dump truck)
Waste Generator: Mark Heser ((NI, WO)(M/S - NSF167) (Fa	ix <u>5-</u> 2241)	Phone Number:	(o)5-2124; (c)496-0150
Location / Origin: CAU 566 - E-	-MAD Compound exterior ya	ard. Container # 5660	03 - Bulk Industrial D	ebris
Waste Category: (check one)	Commercia	1	Industrial	
Waste Type: INTS	D Putrescrible		FFACO-onsite	WAC Exception
(check one) Non-Putres			FFACO-offsite	Historic DOE/NV
Pollution Prevention Category: Pollution Prevention Category:			Defense Projects Routine	S YMP
Method of Characterization: (che			Process Knowled	ae 🛛 Contents
		aste; Hazardous was	te: Free liquids, PCE	
Additional Prohibited Waste S at the Area 9 U10C Landfill:	Sewage Sludge, Animal carc	asses, Wet garbage	(food waste); and Fi	riable asbestos
petroleum hydrocarbon; a Acceptable waste at any NTS iau □ Asphalt ⊠ Metal ⊠ M ⊠ Plastic ⊠ Wire □ 0 ⊠ Manufactured items: (swamp o	ine (no benzene, lead); jet fu ind ethylene glycol. ndfill: I Paper I Wood I Soil I Cable I Cloth I coolers, furniture, rugs, carp	uel; diesel fuel; lubric Rocks / unaltered Rubber (excluding Insulation (non-As et, electronic compor	ants and hydraulics; geologic materials g tires) sbestosform) nents, PPE, etc.)	kerosene; asphaltic
Additional waste accepted at the	e Area 23 Mercury Landfill		e Food Waste Quantity:	Animal Carcasses
Additional waste accepted at the			, duality.	
Non-friable asbestos	 Drained automobiles and Drained fuel filters (gas & 		 Solid fractions fro Deconned Underg Ground Tanks 	
Additional waste accepted at the				
Septic sludge Rags Plants Soil	Drained fuel filters Sludge from sand/c			n-teme plated oil filters 50 parts per million
	REQUIRED: WASTE			
	diological clearance is nec		<i>p</i>	
The above mentioned waste was g knowledge, does not contain radio	ological materials.		This	Survey Release for Waste Dispo
To the best of my knowledge, the site. I have verified this through the prohibited and allowable waste ite is approved for disposal in the lan	he waste characterization memory in the master characterization memory is the second sec	nethod identified abo	dh This This	d man-made radioactive materia container/load meets the criteria on Manual Table 4.2, release limit container/load is exempt from su process knowledge and origin.
Print Name: Mark Heser	<u> </u>	· · · · ·	SIGNATURE: /s/	
Signature: /s/ Mark Hes	ser	Date:	<u>11</u>	BN-06
Note: "Food waste, office trash an	id animal carcasses do not r		clearance. Freon-c	ontaining appliances
	certification statement with L	oad Verification."		

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NSTec Form FRM-0918	NTS LAN		D VERIFI	CATION	08/23/06 Rev. 0 Page 1 of 2
SWO USE (Select		23	6	9	
For waste ch	aracterization, approva				WO) at 5-7898.
	REQUIRE (This form is for rollofi	D: WASTE GEREN)
Waste Generator: Mar	k Heser (NI, WO)(M/S			•	(o)5-2124; (c)496-0150
				-	
	566 - E-MAD Compou				
Waste Category: (check	***************************************			Industrial	
Waste Type: 🗌 N (check one) 🗍 N		Putrescrible Asbestos Contair		FFACO-onsite	WAC Exception Historic DOE/NV
Pollution Prevention Ca		Environmental ma		Defense Project	***************************************
Pollution Prevention Ca		Clean-Up		☐ Routine	
lethod of Characteriza	tion: (check one)	Sampling & Analy	/sis	Process Knowle	dge 🛛 Contents
TS landfills:	levels, and Me	aste; RCRA waste; H dical wastes (needle			Bs above TSCA regulatory
Additional Prohibited W It the Area 9 U10C Land		e, Animal carcasses	, Wet garbage	(food waste); and F	riable asbestos
	Image: Wood Image: Cable Image: Cable Image: Cable	ycol. Paper X Rod Soil Rul Cloth X Insu Ire, rugs, carpet, ele rcury Landfill: ble (contact SWO if	cks / unaltered ober (excluding ulation (non-As ctronic compon] Office Waste regulated load)	geologic materials (tires) bestosform) nents, PPE, etc.) Pood Waste	Empty containers Demolition debris Cement & concrete Animal Carcasses
Light ballasts (contact		el filters (gas & diese		Deconned Under	ground and Above
Hydrocarbons (contact	SWO) 🗍 Other			Ground Tanks	
dditional waste accept					
		ed fuel filters (gas &			n-teme plated oil filters
] Plants		ge from sand/oil/wate ED: WASTE GENE			50 parts per million
itials: (if initiale	d, no radiological clea				
he above mentioned was nowledge, does not cont o the best of my knowled ite. I have verified this the rohibited and allowable to approved for disposal i	tain radiological materi dge, the waste describ prough the waste chara waste items. <u>I have co</u>	ials. ed above contains c acterization method	only those mat identified abo	Radiological Sur RCT Initials This con added m This con Badcon	vey Release for Waste Disposal tainer/load meets the criteria fo an-made radioactive material tainer/load meets the criteria fo Manual Table 4.2 release limits. tainer/load is exempt from surv
rint Name: Mark Heser				due to pr	ocess knøwledge and origin.
ignature: /s/ N	lark Heser	D;	ate: <u>1-7-</u>	SIGNATURE: /s/ Sig	
ote: "Food waste, office must have signed r	trash and animal carca emoval certification sta			0000101005. F18011-0	
WO USE ONLY		3/2	9/11		,
oad Weight (net from sca	le or estimate): 243	Signatu	re of Certifier:	/s/ Signature	on file
·					

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NSTec				08/23/06
Form				Rev. 0
				Page 1 of 2
SWO USE (Select One) AREA			<u> </u>	
For waste characterization, appl		GERERATOR INF		SWO) at 5-7898.
			disposal of materials	r.)
Waste Generator: <u>Mark Heser</u> (NI, WO)(N				(o)5-2124; (c)496-0150
Location / Origin: CAU 566 - E-MAD Cor				
Waste Category: (check one)	Commerci		Industrial	
Waste Type: INTS	Putrescrib		I FFACO-onsite	WAC Exception
(check one) Onn-Putrescible		Containing Material	FFACO-offsite	Historic DOE/NV
Pollution Prevention Category: (check one		ental management	Defense Projec	ts 🗌 YMP
Pollution Prevention Category: (check one			C Routine	
Method of Characterization: (check one)	Sampling		Process Knowl	
Prohibited Waste at all three Radioactiv NTS landfills: levels, and	e waste; RCRA v	waste; Hazardous w	vaste; Free liquids, PC	Bs above TSCA regulatory
Additional Prohibited Waste		(needles, sharps, b		
at the Area 9 U10C Landfill: Sewage Si	ludge, Animal car	rcasses, Wet garba	ge (food waste); and	Friable asbestos
REQUIR	ED: WASTE CO	NTENTS ALLOWA	BLE WASTES	
Check all	allowable wastes	that are contained	within this load:	
NOTE: Waste disposal at the Area 6 Hydro coolants, such as: gasoline (no be	nzene, lead); iet	fuel: diesel fuel: lub	contact with petroleu	im hydrocarbons or s: kerosene: asphaltic
petroleum hydrocarbon; and ethyle	ne glycol.			
Acceptable waste at any NTS landfill:			ed geologic materials	Empty containers
Asphait 🛛 Metal 🖾 Wood		Rubber (exclud	_	Demolition debris
Image: Second state Image: Second state Image: Second state Image: Second state	Cloth	Insulation (non	Asbestosform)	Cement & concrete
Manufactured items: (swamp coolers, functional waste accepted at the Area 23	irniture, rugs, car	pet, electronic com		
		III: Office Was SWO if regulated to		e 🔲 Animal Carcasses
Additional waste accepted at the Area 9		SVVO II regulated to		
				an and/ail/ustor
		ad militany vehicles	I Solid fractions fr	
			Solid fractions fr	
Light ballasts (contact SWO) X Draine	d fuel filters (gas		Deconned Unde	rground and Above
Light ballasts (contact SWO) X Draine Hydrocarbons (contact SWO) C Other	d fuel filters (gas	& diesel)		
Light ballasts (contact SWO) Draine Hydrocarbons (contact SWO) Other Additional waste accepted at the Area 6	d fuel filters (gas Hydrocarbon La	a diesel)	Deconned Unde Ground Tanks	erground and Above
Light ballasts (contact SWO) Draine Hydrocarbons (contact SWO) Other Additional waste accepted at the Area 6 Septic sludge Rags C	d fuel filters (gas Hydrocarbon La Drained fuel filters	a diesel) ndfill: s (gas & diesel)	Deconned Unde Ground Tanks Ground Tanks Crushed no	rground and Above
Light ballasts (contact SWO) Draine Hydrocarbons (contact SWO) Other Additional waste accepted at the Area 6 I Septic sludge Rags I Plants Soil Soil	d fuel filters (gas Hydrocarbon La Drained fuel filters Sludge from sand	a diesel)	Deconned Unde Ground Tanks Orushed no Crushed no PCBs belo	erground and Above
Light ballasts (contact SWO) Drained Hydrocarbons (contact SWO) Other Additional waste accepted at the Area 6 I Septic sludge Rags D Plants Soil Soil REQ	d fuel filters (gas Hydrocarbon La Drained fuel filters Sludge from sand UIRED: WASTE	a diesel) adfill: s (gas & diesel) //oil/water separator GENERATOR SIG	Deconned Unde Ground Tanks Orushed no Crushed no PCBs belo	rground and Above
Light ballasts (contact SWO) Drained Hydrocarbons (contact SWO) Other Additional waste accepted at the Area 6 I Septic sludge Rags D Plants Soil Soil REQ Initials: (if initialed, no radiological	d fuel filters (gas Hydrocarbon La Drained fuel filters Sludge from sand UIRED: WASTE I clearance is ne	a diesel) adfill: s (gas & diesel) //oil/water separator GENERATOR SIG cessary.)	Deconned Unde Ground Tanks Crushed n PCBs belo GNATURE	on-teme plated oil filters w 50 parts per million
Light ballasts (contact SWO) Drained Hydrocarbons (contact SWO) Other Additional waste accepted at the Area 6 I Septic sludge Rags D Plants Soil Soil REQ Initials; (if initialed, no radiological The above mentioned waste was generated	d fuel filters (gas Hydrocarbon La Drained fuel filters Sludge from sand UIRED: WASTE I clearance is ne outside of a Cor	a diesel) adfill: s (gas & diesel) //oil/water separator GENERATOR SIG cessary.)	Deconned Unde Ground Tanks Crushed n PCBs belo GNATURE	rground and Above
Light ballasts (contact SWO) Drained Hydrocarbons (contact SWO) Other Additional waste accepted at the Area 6 I Septic sludge Rags I Plants Soil Soil REQ Initials; (if initialed, no radiological The above mentioned waste was generated Knowledge, does not contain radiological means	d fuel filters (gas Hydrocarbon La Drained fuel filters Sludge from sand UIRED: WASTE I clearance is ne outside of a Com materials.	a diesel) andfill: s (gas & diesel) l/oil/water separator GENERATOR SIG cessary.) htrolled Waste Man	Deconned Unde Ground Tanks	on-teme plated oil filters w 50 parts per million urvey Release for Waste Dispos
Light ballasts (contact SWO) Draine Hydrocarbons (contact SWO) Other Additional waste accepted at the Area 6 I Septic sludge Rags Plants Soil REQ Initials: (if initialed, no radiological moviedge, does not contain radiological moviedge, the waste destination of the best of my knowledge, the waste destination of the best of my knowledge, the waste destination of the best of my knowledge, the waste destination of the best of my knowledge, the waste destination of the best of my knowledge, the waste destination of the best of my knowledge, the waste destination of the best of my knowledge, the waste destination of the best of my knowledge.	Ad fuel filters (gas Hydrocarbon La Drained fuel filters Sludge from sand UIRED: WASTE I clearance is ne outside of a Con naterials.	a diesel) ndfill: s (gas & diesel) l/oil/water separator GENERATOR SIG cessary.) htrolled Waste Man	Deconned Unde Ground Tanks	on-teme plated oil filters w 50 parts per million urvey Release for Waste Dispos ontainer/load, meets the criteria man-mage radioactive material
□ Light ballasts (contact SWO) ☑ Draine ☑ Hydrocarbons (contact SWO) □ Other Additional waste accepted at the Area 6 I □ Septic sludge □ Rags □ 0 □ Plants □ Soil □ 5 □ REQ Initials: (if initialed, no radiological moviedge, does not contain radiological moviedge, does not contain radiological moviedge, the waste desite. I have verified this through the waste or prohibited and allowable waste items. I have	Ad fuel filters (gas Hydrocarbon La Drained fuel filters Sludge from sand UIRED: WASTE I clearance is ne outside of a Con naterials. Scribed above co	a diesel) ndfill: s (gas & diesel) l/oil/water separator GENERATOR SIG cessary.) htrolled Waste Man intains only those n method identified a	Deconned Unde Ground Tanks	on-teme plated oil filters w 50 parts per million urvey Release for Waste Dispos ontainer/load, meets the criteria man-mage failing the criteria ontainer/load meets the criteria ontainer/load meets the criteria n Manual Table 4.2 release limit
□ Light ballasts (contact SWO) ☑ Draine ☑ Hydrocarbons (contact SWO) □ Other Additional waste accepted at the Area 6 I □ Septic sludge □ Rags □ 0 □ Plants □ Soil □ 5 □ REQ Initials: (if initialed, no radiological moviedge, does not contain radiological moviedge, does not contain radiological moviedge, the waste desite. I have verified this through the waste or prohibited and allowable waste items. I have	Ad fuel filters (gas Hydrocarbon La Drained fuel filters Sludge from sand UIRED: WASTE I clearance is ne outside of a Con naterials. Scribed above co	a diesel) ndfill: s (gas & diesel) l/oil/water separator GENERATOR SIG cessary.) htrolled Waste Man intains only those n method identified a	Deconned Unde Ground Tanks Crushed no SNATURE age Radiological St RCT Initials This co added This co Radiological St RCT Initials This co Radiological St RCT Initials This co Radiological St RCT Initials This co Radiological St RCT Initials	on-teme plated oil filters w 50 parts per million urvey Release for Waste Dispos ontainer/load meets the criteria man-mage radio ctive material ontainer/load meets the criteria on Manual Table 4.2 release limit ontainer/load is exempt from su
Light ballasts (contact SWO) Draine Hydrocarbons (contact SWO) Other Additional waste accepted at the Area 6 I Septic sludge Rags Plants Soil REQ Initials: (if initialed, no radiological The above mentioned waste was generated knowledge, does not contain radiological To the best of my knowledge, the waste des site. I have verified this through the waste i terms. Lhave approved for disposal in the landfill.	Ad fuel filters (gas Hydrocarbon La Drained fuel filters Sludge from sand UIRED: WASTE I clearance is ne outside of a Con naterials. Scribed above co	a diesel) ndfill: s (gas & diesel) l/oil/water separator GENERATOR SIG cessary.) htrolled Waste Man intains only those n method identified a	Deconned Unde Ground Tanks	on-teme plated oil filters w 50 parts per million urvey Release for Waste Dispos ontainer/load, meets the criteria man-mage radio ctive material ontainer/load meets the criteria n Manual Table 4.2 release limit ontainer/load is exempt from su process knowledge and origin.
Light ballasts (contact SWO) Drained Hydrocarbons (contact SWO) Other Additional waste accepted at the Area 6 I Septic sludge Rags I Plants I REQ nitials: (if initialed, no radiological The above mentioned waste was generated cnowledge, does not contain radiological To the best of my knowledge, the waste deside. I have verified this through the waste deside. I have verified the verified the verified the verified. Print Name: Mark Heser	Ad fuel filters (gas Hydrocarbon La Drained fuel filters Sludge from sand UIRED: WASTE I clearance is ne outside of a Con naterials. Scribed above co	a diesel) andfill: s (gas & diesel) //oil/water separator GENERATOR SIG cessary.) atrolled Waste Man antains only those m method identified a perty Management	Deconned Unde Ground Tanks Crushed no s PCBs belo ENATURE age Radiological S RCT Initials This co added Add This co This co SIGNATURE:	on-teme plated oil filters w 50 parts per million urvey Release for Waste Dispos ontainer/load, meets the criteria man-made radio ctive material ontainer/load meets the criteria in Manual Table 4.2 release limit ontainer/load is exempt from su process knowledge and origin. /s/ Signature on file DATE:
Light ballasts (contact SWO) Drained Hydrocarbons (contact SWO) Other Additional waste accepted at the Area 6 I Additional waste accepted at the Area 6 I Septic sludge Rags O Plants O REQ Initials: (if initialed, no radiological The above mentioned waste was generated knowledge, does not contain radiological methods of my knowledge, the waste destate. I have verified this through the waste of approved for disposal in the landfill. Print Name: /s/ Mark Heser Note: "Food waste, office trash and animal of the set of the best of the landfill.	d fuel filters (gas Hydrocarbon La Drained fuel filters Sludge from sand UIRED: WASTE I clearance is ne outside of a Com naterials. Scribed above co characterization re contacted Prop Carcasses do not	a diesel) Indfill: (gas & diesel) (oil/water separator GENERATOR Side cessary.) Introlled Waste Manif Intains only those method identified a Date: Date: require a radiologic	Deconned Unde Ground Tanks	on-teme plated oil filters w 50 parts per million urvey Release for Waste Dispos ontainer/load, meets the criteria man-made radio ctive material ontainer/load is exempt from su process knowledge and origin. /s/ Signature on file DATE:
Light ballasts (contact SWO) Draine Hydrocarbons (contact SWO) Other Additional waste accepted at the Area 6 I Septic sludge Rags C Plants Soil Soil REQ Initials: (if initialed, no radiological moviedge, does not contain radiological moviedge, does not contain radiological moviedge, does not contain radiological moviedge, the waste desite. I have verified this through the desite. I have the desite. I have verified this through the ver	d fuel filters (gas Hydrocarbon La Drained fuel filters Sludge from sand UIRED: WASTE I clearance is ne outside of a Com naterials. Scribed above co characterization re contacted Prop Carcasses do not	a diesel) Indfill: (gas & diesel) (oil/water separator GENERATOR Side cessary.) Introlled Waste Manif Intains only those method identified a Date: Date: require a radiologic	Deconned Unde Ground Tanks	on-teme plated oil filters w 50 parts per million urvey Release for Waste Dispos ontainer/load, meets the criteria man-made radio ctive material ontainer/load is exempt from su process knowledge and origin. /s/ Signature on file DATE:
Light ballasts (contact SWO) Drained Hydrocarbons (contact SWO) Other Additional waste accepted at the Area 6 I Additional waste accepted at the Area 6 I Septic sludge Rags O Plants O REQ Initials: (if initialed, no radiological The above mentioned waste was generated knowledge, does not contain radiological methods of my knowledge, the waste destate. I have verified this through the waste of approved for disposal in the landfill. Print Name: /s/ Mark Heser Note: "Food waste, office trash and animal of the set of the best of the landfill.	d fuel filters (gas Hydrocarbon La Drained fuel filters Sludge from sand UIRED: WASTE I clearance is ne outside of a Com naterials. Scribed above co characterization re contacted Prop Carcasses do not n statement with	a diesel) Indfill: (gas & diesel) (oil/water separator GENERATOR Side cessary.) Introlled Waste Manif Intains only those m method identified a Date: Date:	Deconned Unde Ground Tanks Ground Tanks Crushed m PCBs belo PCBs PCBs belo PCBs PC	erground and Above on-teme plated oil filters w 50 parts per million urvey Release for Waste Dispose ontainer/load, meets the criteria man-made radio ctive material ontainer/load is exempt from su process knowledge and origin. /s/ Signature on file DATE:

NSTec 00/23/06 Form Rev. 39 NTS LANDFILL LOAD VERIFICATION Page 1 of 2 SWO USE (Select One) AREA 23 6 9 LANDFILL For waste characterization, approval, and/or assistance, contract 3old Waste Operation (SWO) at 5-7898. Recurrent WASTE GENERATOR INFORMATION Recurrent WASTE GENERATOR INFORMATION Chais Generator: Mark Heaser (N, WO)(MS - NSF 167) (Fax 5-2241) Phone Number: (0)5-2124; (c)496-0150 Location / Olin; CAL 595 - FAMD Compound activity and their at 178 Phone Number: (0)5-2124; (c)496-0150 Location / Olin; Contents of their anagement Delation to their anagement Delation to their anagement Pollution Prevention Category: (check one) Environmental management Delation to their anagement Delation to their anagement Pollution Prevention Category: (check one) Environmental management Delation to their anagement Delation to their anagement Pollution Prevention Category: (check one) Environmental management Delation to their anagement Delation to their anagement Pollution Prevention Category: (check one) Environmental management Delation to their anagement Delation to their anagement Pollution Prevention Category: (check one) Environmental manag			·			
PRM-0913 NTS LANDFILL LOAD VERIFICATION Page 1 of 2 SWO USE (Select One) AREA 23 6 X LANDFILL For waste characterization. agenzval, and/or assistance, contact Sulid Waste Operation (SWO) at 5-7898. REGUIRED: WASTE GEREARTOR INFORMATION (This form is for rolloffs, dump trucks, and other onsite disposal of materials.) Waste Generator: Mark Heaser (NI, WO)(MS - NSF167) (Fax 5-2241) Phone Number: (0)5-2144; (c)496-0150 Location / Origin: CAU 586 - SHAD Compound actegic yard. Container # 56603 - Bulk Industrial Waste Type: (c)5-214; (c)496-0150 Maste Type: NTS Duramerial Industrial Historic DOE/NV Pollution Prevention Catagory: (check one) Commendal management Defense Projects. YMP Pollution Prevention Catagory: (check one) Sampling & Analysis Process Knowledge Contents Prolibition Prevention Catagory: (check one) Sampling & Analysis Process Knowledge Contents Prolibition Prevention Catagory: (check one) Sampling & Analysis Process Knowledge Contents NTS tandfills: Sewage Sludge, Animal carcasses, Wetg garbage (tood waste); and Friable asbestos Edu/HED: WASTE GOT/HED & Mastes Mather Arabitist Beduge C. Chotoch Aladito Mastes Demositi	NSTec					08/23/06
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Waste Generator: Mark Heser (N, WO)(M/S - NSF167) (Fax 6-2241) Phone Number: (0)5-2124; (c)496-0150 Jocation / Origin: CAU 565 - E-MAD Compound exterior yard. Container # 56603 - Bulk Industrial Debris Waste Category: Check one) Commercial Industrial Modularial Waste Type: NTS Putrescrible FFACO-onsite Historic DOE/NV Pollution Prevention Category: (check one) Clean-Up Routine Historic DOE/NV Pollution Prevention Category: (check one) Sampling & Analysis Process Knowledge Contents Prohibited Waste at all three Raddecicle waste; RCRA waste; Hazardous waste; Free liquids, PCBs above TSCA regulatory levels, and Medical wastes (needdes, sharps, bloody clothing). Matter at all three Raddecicle waste; RCRA waste; Hazardous waste; real liquids, PCBs above TSCA regulatory levels, and Medical wastes (needdes, sharps, bloody clothing). Additional Prohibited Waste RecourRED CONTENTS ALLOWABLE WASTES Cocheck al all bree, lead; jet luc; disel disch waste; may and hydracarbons or coclants, such as; gastion (no barse, lead; jet luc; disel disch within this load: OTE: Waste disposal at the Area 6 Hydrocarbon Landfill must have come into contact with petroleum hydrocarbons or coclants; such as; gastion (nor hydrocarbon; and ethylene glycol. Cocreptable waste at any NTS landfill: O The all all Motod Soil <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
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2/10 -2 (a 3/3/1/1 /c/ Signature on file	Note: "Food waste, office trash an	nd animal carcasses	do not require	a radiologica		BN
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NSTec Form FRM-0918	NTS LA	NDFILL LOAD VER	FICATION	08/23/06 Rev. 0 Page 1 of 2
SWO USE (Select		23 6	8 🛛	
Waste Generator: <u>Mark</u>	REQUIR (This form is for rollo Heser (NI, WO)(M/S 566 - E-MAD Compo	al, and/or assistance, contact S ED: WASTE GERERATOR IN fifs, dump trucks, and other ons - NSF167) (Fax 5-2241) ound exterior yard. Container #	FORMATION ite disposal of material Phone Number 56603 - Bulk Industrial	s.) r: (0)5-2124; (c)496-0150
Waste Type: 🔲 NTS	S [-Putrescible]	Commercial Putrescrible Asbestos Containing Mater		Historic DOE/NV
Pollution Prevention Cat Method of Characterizati	egory: (check one)	 Environmental managemer Clean-Up Sampling & Analysis 	Routine	edge 🛛 Contents
	ree Radioactive w levels, and Me	aste; RCRA waste; Hazardous adical wastes (needles, sharps ge, Animal carcasses, Wet gart	waste; Free liquids, Po bloody clothing).	CBs above TSCA regulatory
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	(This fo	is for rolloff	s, dump trucks, and	a i OR INFORM other onsite dis	IATION MSBI of maloria	le 1		
Waste Generator:	Mark Heser	NI. WOMAS -	NSF167) (Fax 5-22		Phone Numbe		104. (-) (00	
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NSTec							
Form					04/10/08		
FRM-0266 ONSITE WASTE TR			FOT		Rev. 01		
			LUI				
Manifest Document							
No.:				Page	<u>1</u> of <u>1</u>		
1 1 N 2 9	Ge	neration/O	ut-of-Serv	ice Date: 4/19/	11		
1. Generator's Name, Organization, and Location: (Please Print)	2. Receiving Fa	cility, Orga	nization, I				
Navarro-Intera/Mark Heser NNSS A-25 E-MAD, Drum Storage Area CAU 566, 5B1B7604	Hazardous V WGS/Hazar NNSS A-5, I	dous Waste	age Unit e Ops, H1	20			
Generator's Phone : (_496 _)_0150	Contact Phone:	(_630) 0235				
3a. Transporter Name: Transpo (Please Print)	ort Date:	3b. Ve	hicle I.D. I	Number:			
Brett Bushnell 5/19/11		G63 11	04D				
4. U.S. D.O.T. Description. Include: EPA Waste Code and Package	Tracking Numbers	5. Cor	ntainers	6. Total	7. Unit		
		No.	Туре	Quantity	Wt./Vol.		
A X NS-NSS-11-0068 D006, D008, D018 thru D043.	ıre, 9, III	1	DM	48 218	G K		
b							
c							
	<i>x</i>						
d							
e		_			-		
f							
g							
Use continuation pages for additional items, as necessary.				•	L		
8. Special Handling Instructions/Additional Information: 24-Hour emer	gency contact: 702 - 2	295-0311/	Secondary	: C. Gonzales	630-0235		
a) ERG 171. 48-gallons used lubricant removed from A-25 E-MAD ra				Name & phon	e no.		
		. 040 300	urum #30	ooos, sample #	500512.		
9. Keleased by: (Signature)		Date:	-				
/s/ Glenn Hale				5/19/11			
10. Received for Transport by: (Signature)							
/s/ Signature on file				5/19/11			
11. Discrepancy Indication:				•			
12. Disposal/Accumulation Site Signature: (Acknowledges acceptance	e of waste)	Date:					
/s/ Signature on file				5/19/11			

UNCONTROLLED When Printed

NSTec Form

WGS/HAZARDOUS WASTE OPERATIONS REQUEST FOR SERVICE

FRM-0766

FAX to 5-4815 or send to M/S NNSS110

HWO Use Only

Rev. 02 Page 1 of /

03/31/11

Date of Request: 5/3/11 Date Needed: (see in Requester Name: Requester Name: Rebecca King Phone Number: Secondary Contact: Brian Konrad Phone Number: Facility Manager or Designec: Thomas A Thiele / Reed Pod	5-5804 0 5-1240	Charge #: 5B1B7604 Org. Name/No.: H300 Mail Stop: NNSS306
Section A Services Requested		
Check One: Used Oil X Hazardous Waste	Unknown 🗌 Universa	Waste PCB Other
Check Applicable: Sampling Characterization Pic Delivery (i.e., empty packages) SAA Indicate SAA#, 90-Day#, or UWCC#, if app	kup 🔲 Transport only 90-Day Storage 🔲 U	Recycling Disposal
Location of Service (Area, Bldg., exact directions, attach map if nec EMAD yard	essary):	
Section B - General Waste Information (Use continuation sheet if ne	cessary)]
Radiological Clearance provided: LI FRM-0121, Clearance Slid	Waste Certification	CAU/CAS if applicable: <u>566</u> firmation of Rad Status $C \leq \frac{5}{3}$ /II None $C \leq \frac{5}{3}$ /II y, tanker, etc.): <u>55-gal drum</u>
Detailed Description/Process Knowledge (i.e., Liquid, Solid, Gas; Na generated, Suspected contaminants, etc.): (Attach applicable MSD: Drum #56605 - placed in SAA on 12/14/11. Oil - sample analysis in I certify under penalty of law, the above Information is correct a indicated. The material requested for delivery/pickup will only in Contents will be verified by process knowledge of origin, MSDS	Ss, analytical summaries, i dicates hz for Lead, Cadm nd additional information	elc.) ium and PCB. n required is available as
(specify) Generator Requester	Project S	uperxisor
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):	and the second se	1
Facility Access Requirements:		
Known hazards in the requested service area:		
Acceptable time period to conduct requested services:		
Hours (AM/PM):	Day(s)	40 A
Section D - Services Completed (HWO Use Only)		
Waste characterized by: Process knowledge MSDS (S	ampling & Analysis) C	ther:
A Drum ID. NS-NSS-11-0068 bst Orum # NS-NSS-11-0068 TO AS HW 11N29 for STOROSC PENDINS OFF SITE Receiving Facility: AS HWSLA	stigment To	en: (ast# 11N)9
Printed Name and Signature: Breft Bushnell /	s/ Brett Bushnell	Date: 5/19/11

NTS On-Site HazMat Transfer - Published

Tracking No Carrier: NST	Construction of the second sec			
Vehicle: G82				
Driver: JACK	KANE ROSE XROG-02-2011			
Depart: 02	2-JUN-2011	Arrival: 02-JUN-	2011	
From: MAR	KHESER	To: MARK HESE	२	
NAVA	ARRO-INTERA, LLC (N-I)	NAVARRO-IN	TERA, LLC (N-I)	
BASE CAMP EMAD		BASE CAMP		
		MERCURY, NV 89023		
MER	CURY, NV 89023			
Area:	25	Area: 23		
Bldg:	CAS 25-99-20	Bldg: 0153		
Phon	e: 702-295-2124	Phone: 702-2	95-2124	
Mobil	e:	Mobile: 702-4	96-0150	
Entered By:	MARK HESER	Date Entered: 01	-JUN-2011	
Modified By:	MARK HESER	Date Modified: 01	-JUN-2011	
Shipped Mat	erial(s)	Pack	age(<mark>s) Unit(</mark>	(s) Guide No.
UN/NA 3321,	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVIT IDES: CS-137 PHYSICAL FORM: SOLID CHEMICAL	TY (LSA-II), 7 1 SE/	ALAND 1057	
ACTIVITY: 2.2	26E+10 BQ CATEGORY: RADIOACTIVE WHITE 1 CO IUMBER 0212650	ONTAINER NUMBER	FAINER POUR (GRC	ND(S) DSS)

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 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/ Mark Heser	Date: 6-2-11	
Received by:	/s/ Signature on file	Date: 6-2-11	

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Shipper: NSTec FOR USDOE

Shipper No.:	NSTEC
Date: 5	17-11

Nevada Test Site, Receiving Warehouse 160, Mercury, NV 89023 Purchase/Customer Order No. N/A

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 contrad) 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 Unform 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.

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 governs 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	Carrier: NSTec Solid Waste Operations PRO NO.:
702-295-2033	CAR OR VEHICLE INITIALS & NO.: 682-0657 D SEAL #:

Route:				CARRIER NO.		SECTI	ON 13712 TEI	NDER NO .:	
No. PKGS.	НМ	Description of Articles (Subj Special Marks and Exempt	ect to Correction), Kind of Package ions (See NMFC Item (Rule) 360)	3,	Weight (Subject to Correction)	Class	Rate	Charges	Subject to Section 7 of conditions, if this
4		200 gallons aqueous liquid non-hazardous, from CAU Compound, To: Area 23 Lagoon		EMAD	1670 lbs. (est)				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. <u>NSTec</u> 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 <u>S N/A</u> per Ib.
									*Job order, referenæ, account, or work order number
		700.005.040							Savings: \$ N/A
ITEM NO.	INT OF	AN EMERGENCY, PHONE 702-295-640	NPM NO.	<u>IV, M</u> - 24 HOUR					
11211110.			NEWING.					(4)	*Label(s) applied Non-Hazardous Waste
	(70	vou receive this shipment damag 2) 295-3266, Reference Shippers umbers: 566008; 566009; 5	Number).	ery receipt. C	ontact NSTec	Traffic	at 🛛		-
									* Placard(s) Required None
TECHNICA	L CONT	ACT: Mark Heser, 295-2124, Cell	(702) 496-0150						
marked, and regulations	d labele of the D	t the above named materials are properly class d, and are in proper condition for transportation epartment of Transportation. (Applicable for H	according to the applicable	carrier(s) by the co and is subject to th	onsignor or consign te terms and condit	ee are assions set fo	signable to, an orth in the star	d shall be reimburs dard form of the U. 0.50 and 41 CFR 40	
Shipper: NS	200	STATISTICS AND		-					NO
Per:	/s/	d DCAGO896NV11718 with U.S. Dept of Ene		* The addition on the Carrier:/S	/ Signature	on fil	e and conditio		
P. O. BO	X 985	21, Las Vegas, NV 89193	, ,	Per					Date: 5-17-11

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Page_1_of_1_

FRM-0948 (08/06)

NSTec	08/23/06
Form	
FRM-0918 NTS LANDFILL LOAD VERIFICATION	Rev. 0
TRIM-0916 NTO LANDTILL LOAD VERIFICATION	Page 1 of 2
SWO USE (Select One) AREA 23 6 89	
For waste characterization, approval, and/or assistance, contact Solid Waste Operation	
REQUIRED: WASTE GERERATOR INFORMATION	511 (SWO) at 5-7898.
(This form is for rolloffs, dump trucks, and other onsite disposal of mate	erials.)
Washs Constant M. 1.11. All stars and	nber: (o)5-2124; (c)496-0150
Weste Category (d	impacted soil and debris.
Waste Category: (check one) Commercial Industrial Waste Type: NTS Putrescrible M EFACO one	
Ballution 2	
Dellation Dellation Dellation	ojects 🗌 YMP
Mathed of Observation in the second s	
Prohibited Waste at all three Radioactive waste; RCRA waste; Hazardous waste; Free liquids	owledge Contents
NTS landfills: levels, and Medical wastes (needles, sharps, bloody clothing).	, PCBs above TSCA regulatory
Additional Prohibited Waste at the Area 9 U10C Landfill: Sewage Sludge, Animal carcasses, Wet garbage (food waste); a	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 petro	oleum hydrocarbons or
coolants, such as: gasoline (no benzene, lead); jet fuel; diesel fuel; lubricants and hydrau petroleum hydrocarbon; and ethylene glycol.	ulics; kerosene; asphaltic
Acceptable waste at any NTS landfill: X Paper X Rocks / unaltered geologic mater	ials D Empty containers
Asphalt Metal Wood Soil Rubber (excluding tires)	Demolition debris
Plastic Ure 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 W	aste 🔲 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 fraction	s from sand/oil/water
Light ballasts (contact SWO) Drained fuel filters (gas & diesel) Deconned Ur	nderground and Above
Ground Tank	
Additional waste accepted at the Area 6 Hydrocarbon Landfill:	
	d non-teme plated oil filters
Plants Soil Sludge from sand/oil/water separators PCBs but	elow 50 parts per million
REQUIRED: WASTE GENERATOR SIGNATURE	
Initials: (if initialed, no radiological clearance is necessary.)	L
	ey Release for Waste Disposal
	ainer/load meets the criteria for no
To the best of my knowledge, the waste described above contains only those	n-made radioactive material
site. I have verified this through the waste characterization method identified	alner/load meets the criteria for anual Table 4.2 release limits.
	ainer/load is exempt from survey
Print Names_Mark By@meister SIGNATURE: /s/S	ignature on file DATE: 427/2011
Signature: /s/ Mark Burmeister · Date: 4-25-11 he	BN-0646 (10/05)
Note: "Food waste, office trash and animal carcasses do not require a radiological clearance. Free must have signed removal certification statement with Load Verification."	
SWO USE ONLY	
oad Weight (net from scale or estimate): 1200 LBS 5-17-11 Signature of Certifier: /s/ Signature	on file
Signature of Certimer:	

5

NTS On-Site HazMat Transfer - Published

Tracking No: 201105: Carrier: NSTEC	26054035 Mesa Number:				
Vehicle: G820657D					
Driver: MICHAEL SMIT	TH				
Depart: 26-MAY-201	11			Arrival: 26-MAY-2011	an a rain an
From: MARK HESER			and a subsection of the particular section of the s	To: BILL COBURN	19 - 1 - 19 - 19 - 19 - 19 - 19 - 19 -
NSTEC				NSTEC	
CAU 566 EMAI	ס			FLEET SERVICES	
MERCURY, N	/ 89023			MERCURY, NV 89023	
Area: 25				Area: 23	
Bldg: EMAD				Bldg: FLEET SERVICES	
Phone: 702-29				Phone: 702-295-6722	
Mobile: 702-49	6-0150		3	Mobile:	
Entered By: MARK H	ESER			Date Entered: 26-MAY-2011	
Modified By: MARK H	HESER			Date Modified: 26-MAY-2011	
Shipped Material(s)			Package(s)	Unit(s)	Guide No
UN/NA 2794, BATTERI	ES, WET, FILLED WITH ACID, 8, PG III	4	5 PALLET	7340.00 POUND(S) (GROSS)	154
econdary Emergency MARK HESER 702-4	Response Contact And/Or Comments	94H (Respo 12-295-(5/26/11 onse Num 0311	ber	
MARK HESER 702-4	7(Response Contact And/Or Comments	/ Respo)2-295-(onse Num 0311		/ Manager at
MARK HESER 702-4	7(Response Contact And/Or Comments 96-0150 gency on the Nevada Test Site, immedia ance.	/ Respo 02-295-(ately conta	onse Num 0311		/ Manager at
MARK HESER 702-4	7(Response Contact And/Or Comments 96-0150 gency on the Nevada Test Site, immedia ance. EMERGI	A Respo 2-295-(ately conta	onse Num 0311 ct the Operatio		/ Manager at
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MARK HESER 702-4	7(Response Contact And/Or Comments 96-0150 gency on the Nevada Test Site, immedia ance. EMERGI	Ately contained ENCY RE	ct the Operation SPONSE e event of an in ather HazMat sl plate the immed	ons Coordination Center (OCC) Duty cident involving Hazardous Material: hipping papers and NAER Guidebook liate area	/ Manager at
MARK HESER 702-4	7(Response Contact And/Or Comments 96-0150 gency on the Nevada Test Site, immedia ance. EMERGI By Phone 702-295-0311	A Respond 2-295-(ately contain ENCY RE In the 1. Gr 2. Iso 3. As	ct the Operatic SPONSE e event of an in ather HazMat sl olate the immed ssess the situati	ons Coordination Center (OCC) Duty cident involving Hazardous Material: hipping papers and NAER Guidebook liate area	/ Manager at
MARK HESER 702-4 n the event of an emer 02/295-0311 for assist	7(Response Contact And/Or Comments 96-0150 gency on the Nevada Test Site, immedia ance. EMERGI	Ately contained ENCY RE In the 1. Gr 2. Iso 3. As a. b.	ct the Operation SPONSE e event of an in ather HazMat sl plate the immed issess the situati . Fire, Spill, or L . People, Prope	cident involving Hazardous Material: hipping papers and NAER Guidebook liate area lon: .eak? rty, or the Environment at risk?	/ Manager at
MARK HESER 702-4 n the event of an emer 02/295-0311 for assist	7(Response Contact And/Or Comments 96-0150 gency on the Nevada Test Site, immedia ance. EMERGI By Phone 702-295-0311 By Radio	A Respond 2-295-(ately contain ENCY RE In the 1. Ga 2. Iso 3. As a. b. 4. Co	ct the Operation SPONSE e event of an in ather HazMat sl plate the immed ssess the situati . Fire, Spill, or L . People, Prope ontact On-site E	ons Coordination Center (OCC) Duty cident involving Hazardous Material: hipping papers and NAER Guidebook liate area ion: .eak?	/ Manager at
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MARK HESER 702-4 In the event of an emer 02/295-0311 for assist 'MAY This is to certify that the condition for transportat been trained and tested	Response Contact And/Or Comments 96-0150 gency on the Nevada Test Site, immedia ance. By Phone 702-295-0311 By Radio 'DAY - MAYDAY' above-named materials are properly class ion according to the applicable regulations	A Respond 2-295-(ately contain ENCY RE In the 1. Ga 2. Iso 3. As a. b. 4. Co 5. Re iffied, descri of the U.S I	ct the Operation SPONSE ct the Operation SPONSE e event of an in ather HazMat sl plate the immed ssess the situati . Fire, Spill, or L . People, Prope ontact On-site E eference On-site bed, packaged Department of T ompliant with the	cident involving Hazardous Material: hipping papers and NAER Guidebook liate area ion: .eak? rty, or the Environment at risk? imergency Response Personnel e HazMat Transfer Tracking Number , marked, placarded, and labeled and fransportation. As a signatory I cerfify ie NTS OTSD.	are in proper that I have
MARK HESER 702-4 In the event of an emer 02/295-0311 for assist 'MAY This is to certify that the condition for transportat	Response Contact And/Or Comments 96-0150 gency on the Nevada Test Site, immedia ance. By Phone 702-295-0311 By Radio 'DAY - MAYDAY' above-named materials are properly class ion according to the applicable regulations to the requirements of 49 CFR, Part 172-7	A Respond 2-295-(ately contain ENCY RE In the 1. Ga 2. Iso 3. As a. b. 4. Co 5. Re iffied, descri of the U.S I	ct the Operation SPONSE ct the Operation SPONSE e event of an in ather HazMat sl plate the immed ssess the situati . Fire, Spill, or L . People, Prope ontact On-site E eference On-site bed, packaged Department of T ompliant with the	cident involving Hazardous Material: hipping papers and NAER Guidebook liate area ion: .eak? rty, or the Environment at risk? imergency Response Personnel e HazMat Transfer Tracking Number , marked, placarded, and labeled and fransportation. As a signatory I cerfify ie NTS OTSD.	are in proper that I have
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Appendix D

Use Restrictions

CAU 566 CR Appendix D Revision: 0 Date: June 2011 Page D-1 of D-1

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 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 UNCONTROLLED When Printed

Page 1 of 3

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: <u>The UR is established at the boundary identified by the coordinates listed above (excluding Building 3900,</u> <u>Building 3901, asphalt and concrete pads, and paved roads) and depicted in attached figure D.1.1. Site controls include</u> 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:

Maxim	um Concentration of Contan CAS 25-99-20, EMAD Co				
Constituent Maximum Action Level Units Concentration					
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

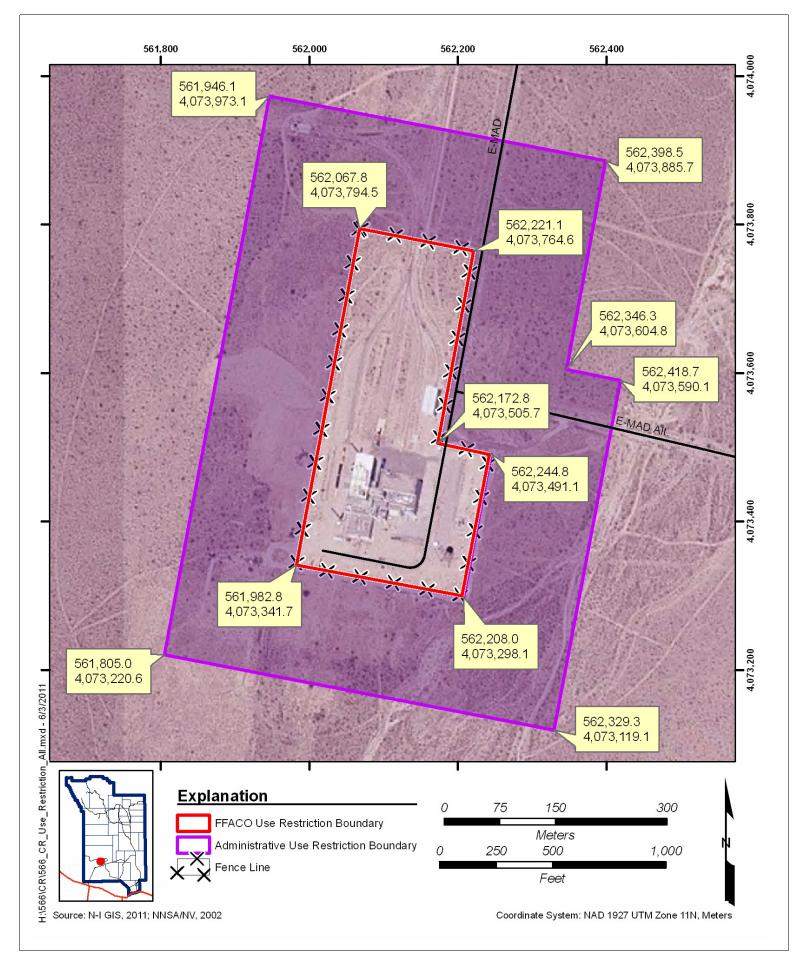


Figure D.1.1 CAU 566/CAS 25-99-20 Use Restriction UNCONTROLLED When Printed

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

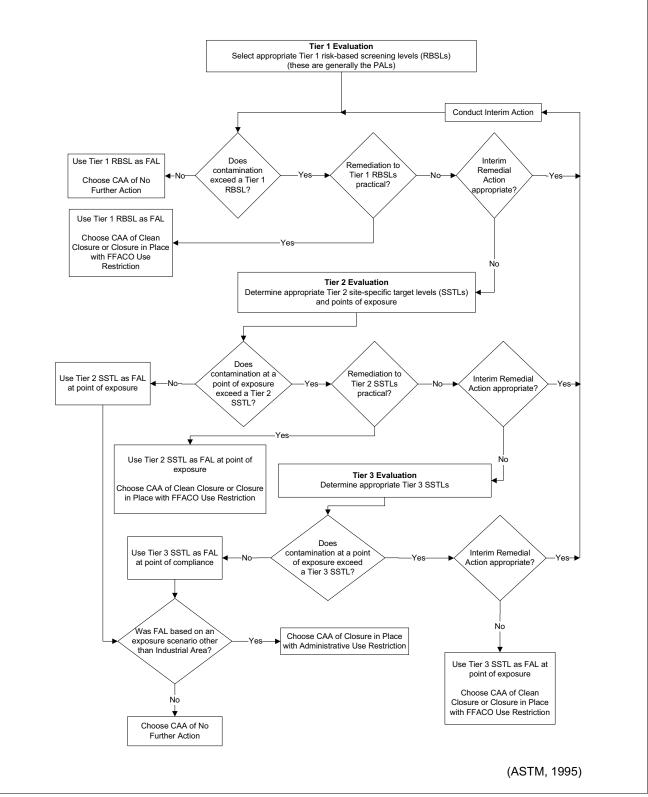


Figure E.1-1 Risk-Based Corrective Action Decision Process

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.

Contaminant	PAL Units		Maximum Reported Value
Containmant	FAL	Units	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.1-1Maximum Reported Value for Tier 1 Comparison(Page 1 of 2)

Table E.1-1					
Maximum Reported Value for Tier 1 Comparison					
(Page 2 of 2)					

Contaminant	PAL Units		Maximum Reported Value
Contaminant	PAL	Units	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.

Contaminant		Units	Maximum Reported Value
Contaminant	PAL	Units	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 1 of 2)

Table E.1-2
Contaminants Exceeding Tier 1 RBSLs
(Page 2 of 2)

Contaminant	PAL	Units	Maximum Reported Value	
Containinain	FAL	Units	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)	

^aAlthough 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.

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	Aroclor 1254	Aroclor 1260	Aroclor 1254	Aroclor 1260		
Sample Number	F/	AL	Fraction of FAL		Sum of Fractions	
	2.91 r	ng/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	

Table E.1-3Multiple Constituent Analysis

-- = Not detected above MDCs.

Bold indicates corrective action required.

Contaminant	Tier 2	Units	Maximum Reported Value		
Containmant	SSTLs	Units	CAS 25-99-20		
Aroclor 1254	2.91	mg/kg	22.1 (J)		
Aroclor 1260	2.91	mg/kg	198 (J)		

Table E.1-4Contaminants Exceeding Tier 2 SSTLs

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)

ASTM, see ASTM International.

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- DOE/NV, see U.S. Department of Energy, Nevada Operations Office.
- EPA, see U.S. Environmental Protection Agency.
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Appendix F

Nevada Division of Environmental Protection Comments

(I Pages)

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 NNS Sub-Project Directo	ble NNSA/NSO Federal Kevin J. Cabble 6. Date Comments Due: Director: 0					
7. Review Criteria:		Full				
8. Reviewer/Organiz	ation/Phone No:	T.H. Murphy and Jeff MacDougall, NDEP, 702-486-2850		9. Reviewer's Signature:		
10. Comment Number/Location		12. Comment	13. Comment F	it Response		14. Accept
1.) Section 2.2		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).	Component-Loc paragraph on p "The MCC and of historical sign Preservation Of remain in place recipient/locatio suitable recipien identified before implemented, d potentially haza	ving paragraph in section 2.1.1.7 CAS comotives and Railcars, following 1st page 27: EIV railcars have been designated as items nificance by the Nevada State Historic ffice (Baldrica, 2006). The MCC/EIV will e until a museum or other suitable on is identified for their preservation. If a nt/location for the MCC/EIV has not been e CAU 114 SAFER activities are disposition of the MCC/EIV railcars and ardous materials (e.g., lead shielding) railcars will be reevaluated/managed as part		

1. Document Title/Number:		Draft Closure Report for Corrective Action Unit 566: EMAD Compound, Nevada 2. Docu National Security Site, Nevada		2. Document Date:	5/4/2011	
3. Revision Number:		0		4. Originator/Organization:	Navarro-INTERA	
5. Responsible NNS/ Sub-Project Director		Kevin J. Cabble		6. Date Comments Due:		
7. Review Criteria:		Full				
8. Reviewer/Organiza	ation/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 R	esponse		14. Accept
2.) General (Executive Summary, Sections 1.2, 2.1.1.7, and other applicable sections		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 <i>this</i> 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 report, as applicable. If similar discussion is appropriate for other CAS components, modify the corresponding sections of the closure report.	"clean closure" f specific CAS Co the document w Page ES-2, revi of CAU 566 was removal activitie Page 5, revise 2 1.1: "The SAFEI corrective action corrective action restrictions (URS Page 7, delete 2 1.2 and revise: ' CAU 566 was to additional inform Corrective action source material verification samp included the foll • Removing suff sampling." Page 53, delete Page B-65, revis of CAU 566 was removal activitie Page E-13, revis "Corrective action	2nd sentence and 1st 5 bulk The objective of the SAFER o support closure of CAU 56 nation and implementing co ns were completed by remo (PSM) and COCs as demo ple analytical results. The c owing: ace debris and/or materials	ertained to ccurrences in graph: "Closure nation of aph of section raluation of the commended blace with use ets of section activities for 6 by collecting rrective actions. val of potential nstrated by prrective actions to facilitate graph: "Closure nation of agraph: closure in	

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 NNS Sub-Project Directo		Kevin J. Cabble		6. Date Comments Due:		
7. Review Criteria:		Full				
8. Reviewer/Organiz	ation/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 F	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.	museum or othe their preservation response to com- waste streams of waste at this tim apply. Section & Restrictions (UF controlled throw specifically inclu- leaks and other	MCC and EIV railcars will remain in place until a sum or other suitable recipient/location is identified for preservation. Section 2.1.1.7 has been revised (see onse to comment #1). Table 3-1 is a summary of the e streams generated during SAFER activities, ponents of the MCC/EIV railcars are not considered e at this time, therefore inclusion in Table 3-1 does not . Section 5.0 of the document refers to the Use ictions (UR) placed at CAU 547, risk to workers is olled through the UR, the UR form in Appendix D fically includes annual inspection of the railcars for and other potential releases, no change will be made ction 5.0 of the document.		

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10. Comment Number/Location	<i>,</i>	12. Comment	13. Comment I	nent Response		14. Accept
4.) Executive Summary, Pages ES-2, ES-3		In this section, NSO states "PCBsremaining 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.	Page ES-2 as f "The PCBs rem not vertically, w sampling;" Revise the thiro 12 as follows: "Extent of conta bounded lateral analytical result Revise Page 73 follows: "The URs prohi 25-99-20 without Add the followin inSection B.1.1 "The vertical ex accomplished of	ise the third sentence of the middle paragraph on Page as follows: eent of contamination for both CAS Components was nded laterally, but not vertically, through sampling and lytical results;" ise Page 73, Section 5.0, 5th sentence of first bullet as ws: e URs prohibit intrusive activities (at any depth) at CAS 39-20 without approval from NDEP." the following sentence to the end of the 1st paragraph		14. Accept

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