Nevada
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DOE/NV--1248

National Nuclear Security Administration

Closure Report for Corrective Action Unit 127: Areas 25 and 26 Storage Tanks, Nevada Test Site, Nevada

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February 2008

Environmental Restoration
Project

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

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DOE/NV--1248

CLOSURE REPORT FOR CORRECTIVE ACTION UNIT 127: AREAS 25 AND 26 STORAGE TANKS, NEVADA TEST SITE, NEVADA

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

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CLOSURE REPORT FOR CORRECTIVE ACTION UNIT 127: AREAS 25 AND 26 STORAGE TANKS, NEVADA TEST SITE, NEVADA

Approved By: Original signed by: K Cabble Date: 2-13-08
Kevin J. Cabble
Federal Sub-Project Director
Industrial Sites Sub-Project

Approved By: Original signed by: J Jones Date: 2/13/08
John B. Jones
Acting Federal Project Director
Environmental Restoration Project

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ACRONYMS AND ABBREVIATIONS

ACM	asbestos-containing material
AST	aboveground storage tank
BMP	best management practice
CAP	Corrective Action Plan
CAS	Corrective Action Site
CAU	Corrective Action Unit
COC	contaminant of concern
CR	Closure Report
CSM	conceptual site model
DRO	diesel range organics
E-MAD	Engine Maintenance, Assembly, and Disassembly
EPA	U.S. Environmental Protection Agency
ETSM	Engine Transport System Maintenance
FFACO	*Federal Facility Agreement and Consent Order*
ft	foot (feet)
gal	gallon(s)
GRO	gasoline range organics
HW	hazardous waste
LLW	low-level waste
mg/kg	milligram(s) per kilogram
MW	mixed waste
ND	not detected
NDEP	Nevada Division of Environmental Protection
NNSA/NSO	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office
NNSA/NV	U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office
NTS	Nevada Test Site
pCi/g	picocuries(s) per gram
PCB	polychlorinated biphenyl
QA	quality assurance

ACRONYMS AND ABBREVIATIONS (continued)

QAPP	Quality Assurance Project Plan
QC	quality control
RMA	Radioactive Materials Area
RWMS	Radioactive Waste Management Site
TCC	Test Cell C
TPH	total petroleum hydrocarbons
UR	use restriction
UST	underground storage tank
WMA	waste management area
yd^3	cubic yard(s)

EXECUTIVE SUMMARY

Corrective Action Unit (CAU) 127 is identified in the *Federal Facility Agreement and Consent Order* (FFACO) as Areas 25 and 26 Storage Tanks. CAU 127 is located in Areas 25 and 26 of the Nevada Test Site, approximately 65 miles northwest of Las Vegas, Nevada, and consists of the following twelve Corrective Action Sites (CASs):

- CAS 25-01-05, Aboveground Storage Tank
- CAS 25-01-06, Aboveground Storage Tank
- CAS 25-01-07, Aboveground Storage Tank
- CAS 25-02-02, Underground Storage Tank
- CAS 25-02-13, Underground Storage Tank
- CAS 25-12-01, Boiler
- CAS 25-23-11, Contaminated Materials
- CAS 26-01-01, Filter Tank (RAD) and Piping
- CAS 26-01-02, Filter Tank (RAD)
- CAS 26-02-01, Underground Storage Tank
- CAS 26-23-01, Contaminated Liquids Spreader
- CAS 26-99-01, Radioactively Contaminated Filters

CAU 127 closure activities were conducted from January 2007 to January 2008 according to the FFACO (FFACO, 1996; as amended January 2007) and the Corrective Action Plan for CAU 127 (U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office, 2004b). The corrective action alternatives included no further action, clean closure, and closure in place with administrative controls. CAU 127 closure activities are summarized in Table 1.

Closure activities generated the following waste streams: sanitary waste, asbestos-containing material waste, hydrocarbon waste, low-level waste, hazardous waste, and mixed waste. Waste generated was appropriately managed and disposed. Waste that is currently staged onsite is being appropriately managed and will be disposed under approved waste profiles in permitted landfills. Waste minimization activities included segregation of waste streams, field screening, and size reduction. Some wastes exceeded land disposal restriction limits and required offsite treatment prior to disposal. Other wastes meeting land disposal restrictions were disposed of in appropriate onsite or offsite landfills. Waste disposition documentation is included as Appendix C.

TABLE 1. SUMMARY OF CORRECTIVE ACTION UNIT 127 CLOSURE ACTIVITIES

CAS	CAS Name	Closure Method	COC	Closure Activities
25-01-05	Aboveground Storage Tank	Clean Closure	Radiological	• Removed AST and associated aboveground piping for disposal as LLW • Removed cadmium- and asbestos-insulated piping for offsite disposal as MW • Grouted remaining underground piping
25-01-06	Aboveground Storage Tank	Clean Closure	TPH	• Removed and solidified TPH-impacted liquid from AST for disposal as hydrocarbon waste • Removed AST, associated piping, and concrete pad for disposal as sanitary waste • Excavated TPH-impacted soil for disposal as hydrocarbon waste • Collected verification samples and backfilled excavation
25-01-07	Aboveground Storage Tank	Closure in Place with Administrative Controls	TPH	• Removed and solidified TPH-impacted liquid from AST for disposal as hydrocarbon waste • Removed AST, associated piping, and concrete pad for disposal as sanitary waste • Excavated TPH-impacted soil to approximately 5 feet for disposal as hydrocarbon waste • Backfilled excavation • Posted UR warning signs and implemented administrative controls
25-02-02	Underground Storage Tank	Closure in Place with Administrative Controls	Radiological	• Excavated overburden • Removed radiologically contaminated soil and concrete pad for disposal as LLW • Removed piping for offsite disposal as MW • Solidified UST contents and filled USTs with grout • Backfilled excavation • Posted UR warning signs and implemented administrative controls
25-02-13	Underground Storage Tank	No Further Action	None	• None
25-12-01	Boiler	Clean Closure	Asbestos	• Removed cadmium-insulated piping for offsite disposal as HW • Removed boiler for disposal as ACM • Left asbestos-insulated piping in place for removal when asbestos abatement work takes place for CAU 116, as documented in a Record of Technical Change to the Streamlined Approach for Environmental Restoration Plan for CAU 116
25-23-11	Contaminated Materials	Clean Closure	Radiological	• Removed lead bricks, radiologically and lead-impacted soil from vault, concrete pump vault, pump, and piping for offsite disposal as MW • Removed metal shed and radiologically contaminated soil for disposal as LLW • Collected verification samples and backfilled excavation
26-01-01	Filter Tank (RAD) and Piping	Clean Closure	Radiological, Lead	• Removed AST for disposal as LLW • Removed associated piping and radiologically and lead-impacted soil for offsite disposal as MW • Collected verification samples and backfilled excavation
26-01-02	Filter Tank (RAD)	Clean Closure	Radiological	• Removed AST and associated piping for disposal as LLW
26-02-01	Underground Storage Tank	No Further Action	None	• As a BMP, filled UST with grout

TABLE 1. SUMMARY OF CAU 168 CLOSURE ACTIVITIES (CONTINUED)

CAS	CAS Name	Closure Method	COC	Closure Activities
26-23-01	Contaminated Liquids Spreader	Clean Closure	Radiological	• Removed lead shield for offsite disposal as MW • Removed spreader and radiologically contaminated soil for disposal as LLW
26-99-01	Radioactively Contaminated Filters	Clean Closure	Radiological	• Removed filter tanks, associated piping, and wooden shed for disposal as LLW • Removed a PCB ballast for offsite disposal as PCB waste, a lead brick for offsite disposal as MW, a fluorescent light bulb for offsite disposal as universal waste, and a hydraulic jack for disposal as LLW

ACM: asbestos-containing material
AST: aboveground storage tank
BMP: best management practice
CAS: Corrective Action Site
CAU: Corrective Action Unit
COC: contaminant of concern
HW: hazardous waste
LLW: low-level waste
MW: mixed waste
PCB: polychlorinated biphenyl
TPH: total petroleum hydrocarbons
UR: use restriction
UST: underground storage tank

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1.0 INTRODUCTION

This Closure Report (CR) documents closure activities for Corrective Action Unit (CAU) 127, Areas 25 and 26 Storage Tanks, according to the *Federal Facility Agreement and Consent Order* (FFACO) (FFACO, 1996; as amended January 2007) and the Corrective Action Plan (CAP) for CAU 127 (U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office [NNSA/NSO], 2004b). CAU 127 is located in Areas 25 and 26 of the Nevada Test Site (NTS) (Figure 1) and consists of the following twelve Corrective Action Sites (CASs):

- CAS 25-01-05, Aboveground Storage Tank
- CAS 25-01-06, Aboveground Storage Tank
- CAS 25-01-07, Aboveground Storage Tank
- CAS 25-02-02, Underground Storage Tank
- CAS 25-02-13, Underground Storage Tank
- CAS 25-12-01, Boiler
- CAS 25-23-11, Contaminated Materials
- CAS 26-01-01, Filter Tank (RAD) and Piping
- CAS 26-01-02, Filter Tank (RAD)
- CAS 26-02-01, Underground Storage Tank
- CAS 26-23-01, Contaminated Liquids Spreader
- CAS 26-99-01, Radioactively Contaminated Filters

1.1 PURPOSE

CAU 127, Areas 25 and 26 Storage Tanks, consists of twelve CASs located in Areas 25 and 26 of the NTS. The closure alternatives included no further action, clean closure, and closure in place with administrative controls. The purpose of this CR is to provide a summary of the completed closure activities, documentation of waste disposal, and analytical data to confirm that the remediation goals were met.

1.2 SCOPE

The closure strategy for CAU 127 was as follows:

- CAS 25-01-05, Aboveground Storage Tank, was clean closed by removing a 100,000-gallon (gal) aboveground storage tank (AST) and associated aboveground piping for disposal as low-level waste (LLW). Cadmium- and asbestos-insulated piping was removed for offsite disposal as mixed waste (MW).

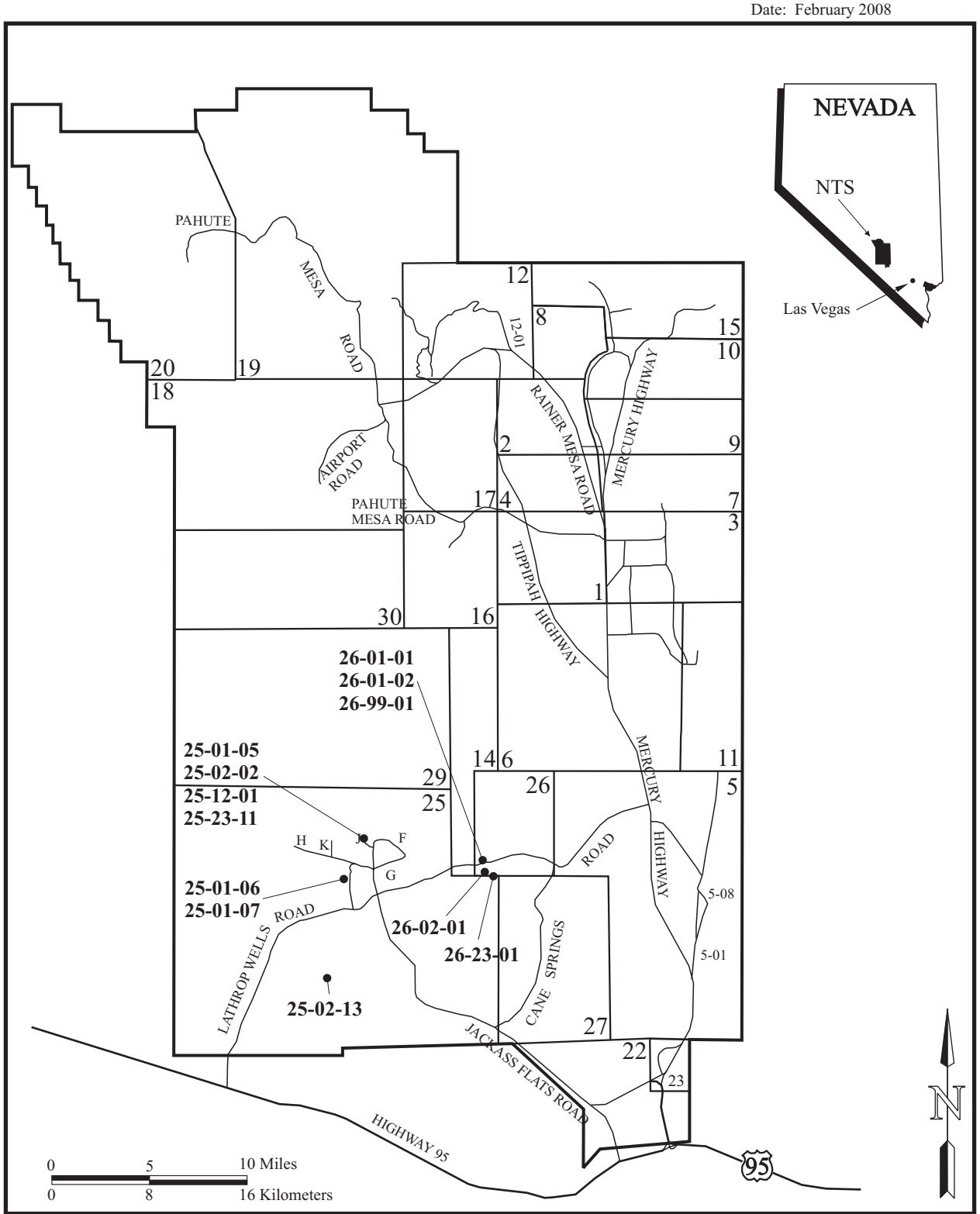


FIGURE 1
CORRECTIVE ACTION UNIT 127 SITE LOCATION MAP

- CAS 25-01-06, Aboveground Storage Tank, was clean closed by removing a 1,000-gal AST and associated piping for disposal as sanitary waste, and total petroleum hydrocarbon (TPH)-impacted soil and AST contents for disposal as hydrocarbon waste.
- CAS 25-01-07, Aboveground Storage Tank, was closed in place with administrative controls. A 1,000-gal AST and associated piping were removed for disposal as sanitary waste, and the top 5 feet (ft) of TPH-impacted soil and AST contents were removed for disposal as hydrocarbon waste. Remaining impacted soil was closed in place, and use restriction (UR) warning signs were posted.
- CAS 25-02-02, Underground Storage Tank, was closed in place with administrative controls. Radiologically contaminated soil and a concrete pad were removed for disposal as LLW, and piping was removed for offsite disposal as MW. Six radiologically contaminated underground storage tanks (USTs) were filled with grout and left in place. UR warning signs were posted.
- CAS 25-02-13, Underground Storage Tank, required no further action, and no work was performed.
- CAS 25-12-01, Boiler, was clean closed by removing cadmium-insulated piping for offsite disposal as hazardous waste (HW) and a boiler for disposal as asbestos-containing material (ACM). Asbestos-insulated piping was left in place for removal when asbestos abatement work takes place for CAU 116, as documented in a Record of Technical Change to the Streamlined Approach for Environmental Restoration Plan for CAU 116.
- CAS 25-23-11, Contaminated Materials, was clean closed by removing radiologically contaminated soil and a metal shed for disposal as LLW. Lead bricks, radiologically and lead-impacted soil, a concrete pump vault, a pump, and piping were removed for offsite disposal as MW.
- CAS 26-01-01, Filter Tank (RAD) and Piping, was clean closed by removing a radiologically contaminated 10,000-gal AST for disposal as LLW. Associated piping and radiologically and lead-impacted soil were removed for offsite disposal as MW.
- CAS 26-01-02, Filter Tank (RAD), was clean closed by removing a radiologically contaminated 5,000-gal AST and associated piping for disposal as LLW.
- CAS 26-02-01, Underground Storage Tank, required no further action. As a best management practice (BMP), the UST was filled with grout.
- CAS 26-23-01, Contaminated Liquids Spreader, was clean closed by removing a spreader and radiologically contaminated soil for disposal as LLW. A lead shield was removed for offsite disposal as MW.
- CAS 26-99-01, Radioactively Contaminated Filters, was clean closed by removing eight radiologically contaminated filter tanks, associated piping, and a wooden shed for disposal as LLW. A polychlorinated biphenyl (PCB) ballast was removed for offsite disposal as PCB waste, a lead brick was removed for offsite disposal as MW, a fluorescent light bulb was removed for offsite disposal as universal waste, and a hydraulic jack was removed for disposal as LLW.

1.3 CLOSURE REPORT CONTENTS

This CR includes the following sections:

- Section 1.0 - Introduction
- Section 2.0 - Closure Activities
- Section 3.0 - Waste Disposition
- Section 4.0 - Closure Verification Results
- Section 5.0 - Conclusions and Recommendations
- Section 6.0 - References
- Appendix A - Data Quality Objectives
- Appendix B - Sample Analytical Results
- Appendix C - Waste Disposition Documentation
- Appendix D - Use Restriction Documentation
- Appendix E - Site Closure Photographs
- Library Distribution List

This report was developed using information and guidance from the following documents:

- CAP for CAU 127 (NNSA/NSO, 2004b)
- Revision 1 of the Corrective Action Decision Document for CAU 127 (NNSA/NSO, 2004a)
- *Industrial Sites Quality Assurance Project Plan* (QAPP) (U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office [NNSA/NV], 2002b)

Data quality objectives developed for site characterization of CAU 127 were presented in Appendix A of the Corrective Action Investigation Plan for CAU 127 (NNSA/NV, 2002a) and are included as Appendix A of this report. Two conceptual site models (CSMs) were developed for CAU 127 based on process knowledge, historical information, and personnel interviews. No variations to the CSMs were identified; the CSMs were confirmed by soil sample results and verified during closure activities. Site closure was verified through inspections, sampling, observations, and documentation of waste disposal.

2.0 CLOSURE ACTIVITIES

This section details the specific activities completed during the closure of CAU 127, deviations from the CAP, the schedule of completed activities, and the final site plan. Photographs in Appendix E document the states of the sites before corrective actions were implemented, field work in progress, and site conditions after completion of work.

2.1 DESCRIPTION OF CORRECTIVE ACTION ACTIVITIES

Closure activities for CAU 127 were completed according to the CAP (NNSA/NSO, 2004b). The following sections detail the closure activities as completed.

2.1.1 Preplanning and Site Preparation

Prior to closure activities, the following documents were prepared:

- *National Environmental Policy Act* Checklist
- Site-Specific Health and Safety Plan
- Field Management Plan
- NNSA/NSO Real Estate/Operations Permits
- Work control packages

2.1.2 Closure Activities

The following sections detail the closure activities completed at each CAS.

2.1.2.1 Corrective Action Site 25-01-05, Aboveground Storage Tank

This site, located at Test Cell C (TCC), consisted of a 100,000-gal AST and associated piping (Figure 2). Clean closure was implemented at the site by removing the AST and associated piping for disposal as LLW.

Removable contamination inside the AST was fixed in place by spraying fixative into the AST. The AST was then demolished and size-reduced using shears. Aboveground piping was cut at the ground surface and removed. The AST debris and piping were packaged in transportainers, are currently being stored and managed onsite, and will be transported to the Area 5 Radioactive Waste Management Site (RWMS) for disposal as LLW. Piping connecting the AST to previously removed pumps is covered by the engineered soil cap of the CAU 262 leachfield. The aboveground piping north of the leachfield was covered with asbestos and cadmium foil. This piping was removed, packaged in a B-25 box, and transported offsite for disposal as MW. The portion of the piping running under the leachfield was grouted.

Two transfer pumps on a concrete pad located north of the leachfield were specified in the CAP for removal. The concrete pad and pumps were not present during closure activities, and it is assumed that they were removed at some date previous to the corrective action investigation.

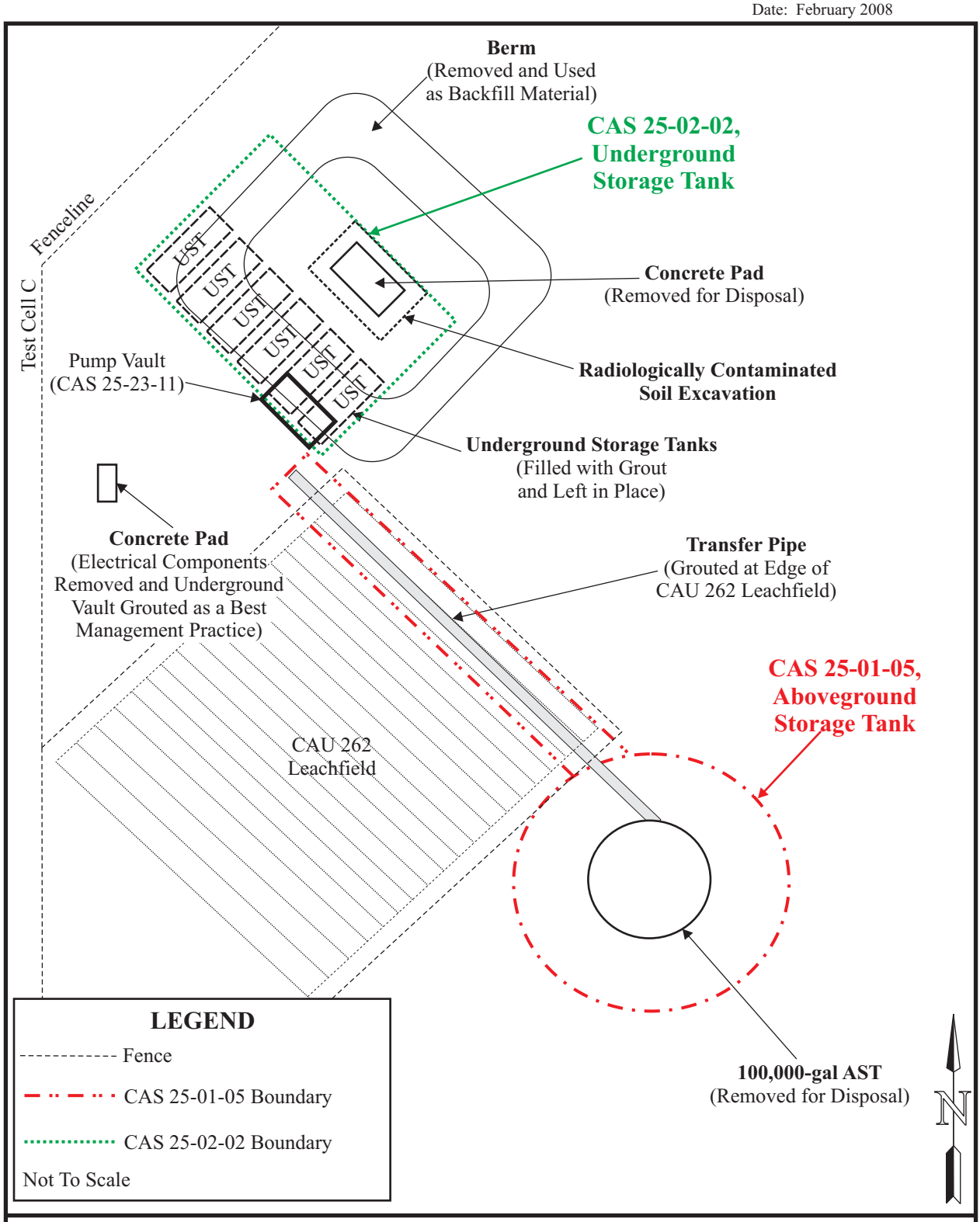


FIGURE 2
CORRECTIVE ACTION SITE 25-01-05, ABOVEGROUND STORAGE TANK, AND CORRECTIVE ACTION SITE 25-02-02, UNDERGROUND STORAGE TANK

A concrete pad housing aboveground electrical components and an underground monitoring vault, components of the TCC waste water treatment system that are not included in any CAU, were discovered north of the leachfield during closure activities. The vault appears to have monitored radiation and volume of effluent passing from the filter tanks to the leachfield. As a BMP, the electrical components located on the concrete pad and piping from the underground vault were removed, and the underground vault was filled with grout. The UR for the adjacent USTs in CAS 25-02-02 was expanded to include the vault.

2.1.2.2 Corrective Action Site 25-01-06, Aboveground Storage Tank

This site, located at the Engine Transport System Maintenance (ETSM) building in the Engine Maintenance, Assembly, and Disassembly (E-MAD) Facility, consisted of a 1,000-gal AST, associated piping, concrete pad, and TPH-impacted soil (Figure 3). Clean closure was implemented at the site by removing the AST, associated piping, and concrete pad for disposal as sanitary waste and TPH-impacted soil for disposal as hydrocarbon waste.

Approximately 10 gal of TPH-impacted liquid were removed from the AST and solidified using clean soil. The AST was removed and compacted using heavy equipment, and the concrete pad was broken up and removed. Approximately 30 cubic yards (yd^3) of TPH-impacted soil were excavated. The AST contents and soil were transported to the Area 6 Hydrocarbon Landfill for disposal. The AST, piping, and concrete pad were transported to the Area 9 U10c Sanitary Landfill for disposal.

TPH field screening kits were used to guide the extent of the excavation. Five verification samples, one from each side wall and one from the floor of the excavation, and one blind duplicate sample were collected and analyzed for TPH. Verification sample results indicated that the remaining soil did not contain TPH at concentrations above the action level; therefore, the excavation was backfilled with clean soil and contoured to the approximate surrounding grade. A summary of the sample data is included in Section 4.0, and the laboratory data reports are included in Appendix B.

2.1.2.3 Corrective Action Site 25-01-07, Aboveground Storage Tank

This site, located at the ETSM building in the E-MAD Facility, consisted of a 1,000-gal AST, associated piping, concrete pad, and TPH-impacted soil (Figure 4). The site was closed in place with administrative controls. The AST, associated piping, and concrete pad were removed for disposal as sanitary waste, and the top 5 ft of soil were removed for disposal as hydrocarbon waste. The remaining impacted soil was left in place.

Approximately 15 gal of TPH-impacted liquid were removed from the AST and solidified using clean soil. The AST was removed and compacted using heavy equipment, and the concrete pad was broken up and removed. Approximately 20 yd^3 of TPH-impacted soil were excavated to a depth of approximately 5 ft. The AST contents and soil were transported to the Area 6 Hydrocarbon Landfill for disposal. The AST, piping, and concrete pad were transported to the Area 9 U10c Sanitary Landfill for disposal.

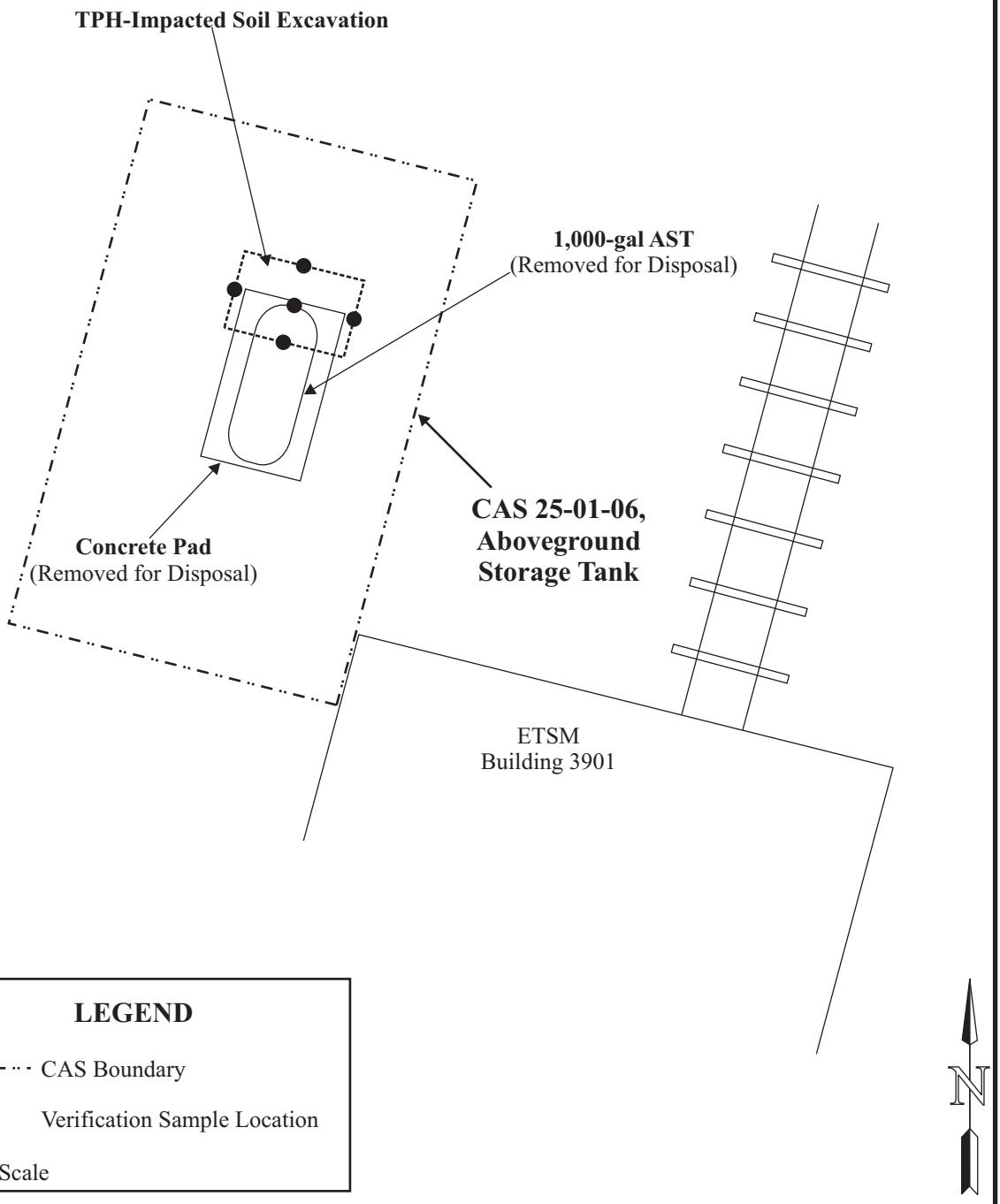


FIGURE 3
CORRECTIVE ACTION SITE 25-01-06,
ABOVEGROUND STORAGE TANK

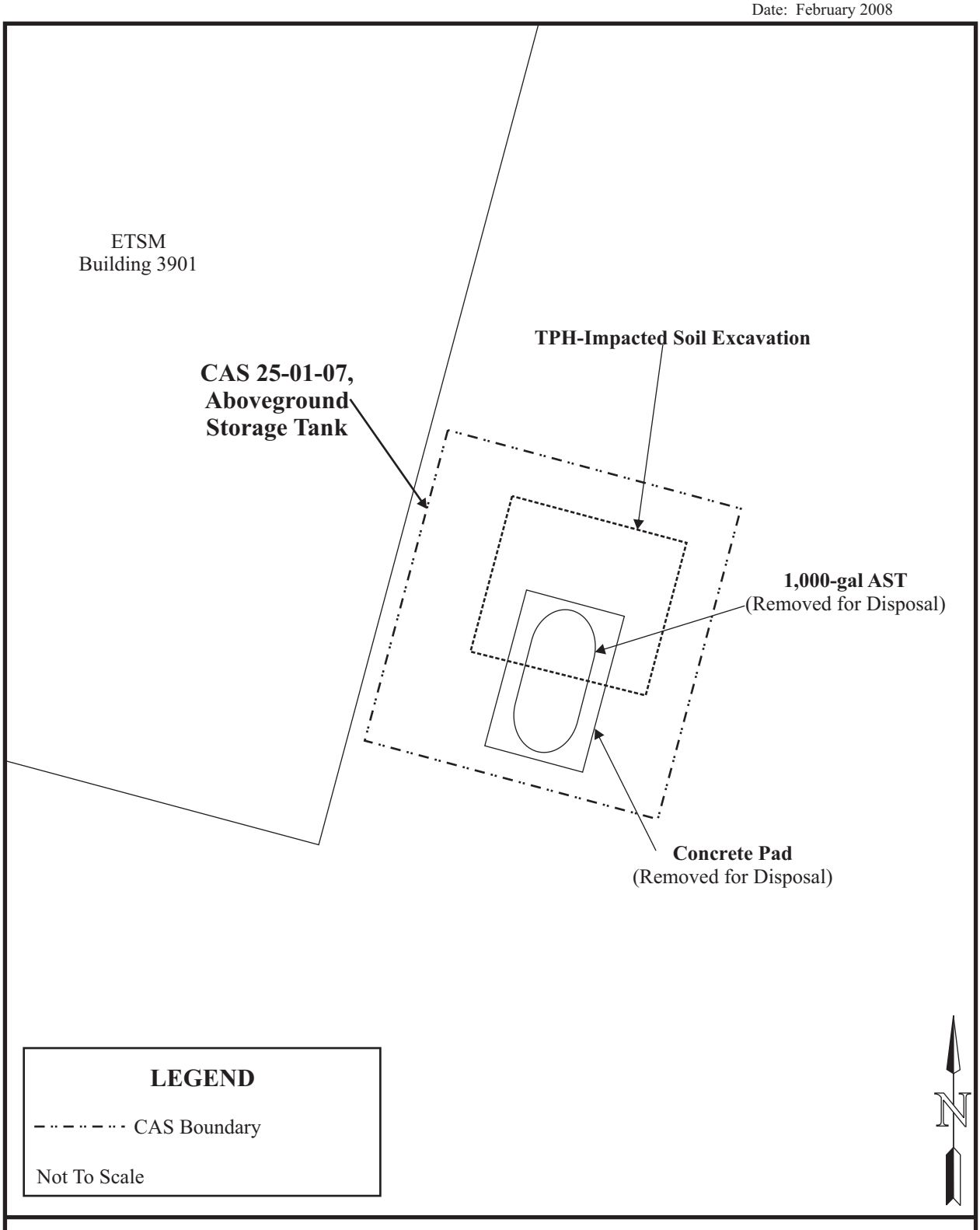


FIGURE 4
CORRECTIVE ACTION SITE 25-01-07,
ABOVEGROUND STORAGE TANK

Due to the close proximity of the AST to the ETSM building and the fact that the impacted soil may extend under its structure, the remaining impacted soil was not excavated and was closed in place with administrative controls. Verification samples were not required, as impacted soil was left in place. The excavation was backfilled with clean soil and contoured to the approximate surrounding grade.

A UR was implemented to prohibit unauthorized intrusive activity. UR warning signs were posted. The CAU Use Restriction Information form and a figure showing the locations of the surveyed points delineating the use-restricted area are included in Appendix D. Annual site inspections will be required to ensure that the signs are intact and legible and that the UR is maintained. Details on the post-closure requirements are included in Section 5.2.

2.1.2.4 Corrective Action Site 25-02-02, Underground Storage Tank

This site, located at TCC, consists of six 10,000-gal USTs, associated piping, a concrete pad, and radiologically contaminated soil (Figure 2). The site was closed in place with administrative controls. The radiologically contaminated soil and concrete pad were removed for disposal as LLW, and piping was removed for offsite disposal as MW. The six USTs were filled with grout and left in place.

The concrete pad was located above and to the east of the USTs in the center of a soil berm that was approximately 85 ft long by 75 ft wide by 11.5 ft high. The soil in the berm was removed in order to access the concrete pad and USTs, radiologically surveyed and found to be clean, and stockpiled onsite for use as backfill material. The concrete pad and approximately 10 yd^3 of radiologically contaminated soil beneath the concrete pad were removed and packaged in a transportainer. The transportainer is currently being stored and managed onsite and will be transported to the Area 5 RWMS for disposal as LLW. Underground piping was removed, packaged in a B-25 box, and transported offsite for disposal as MW.

The depth to the top of each UST was approximately 10 ft; however, the top 2.5 ft of soil was considered part of CAS 25-23-11 and was removed for disposal as part of the closure activities for that CAS. The remaining 7.5 ft of overburden on the USTs was excavated, radiologically surveyed and found to be clean, and stockpiled onsite for use as backfill material. The liquid contents of the six USTs were solidified in place with grout, and the remaining void spaces within the USTs were filled with grout. The excavation was backfilled with clean soil.

A UR was implemented to prohibit unauthorized intrusive activity. UR warning signs were posted. The CAU Use Restriction Information form and a figure showing the locations of the surveyed points delineating the use-restricted area are included in Appendix D. Annual site inspections will be required to ensure that the signs are intact and legible and that the UR is maintained. Details on the post-closure requirements are included in Section 5.2.

2.1.2.5 Corrective Action Site 25-02-13, Underground Storage Tank

This site, located at X-Tunnel, consists of gravel and soil at the former location of a UST. No contaminants of concern (COCs) were identified during characterization; therefore, the site was closed by taking no further action.

2.1.2.6 Corrective Action Site 25-12-01, Boiler

This site, located at TCC, consisted of a boiler, approximately 100 ft of asbestos-insulated piping, and approximately 10 ft of cadmium- and asbestos-insulated piping (Figure 5). Clean closure was implemented at the site by removing the boiler for disposal as ACM and the cadmium-insulated piping for offsite disposal as HW. The asbestos-insulated piping was left in place and will be removed when asbestos abatement work takes place for CAU 116. This agreement was documented in a Record of Technical Change to the Streamlined Approach for Environmental Restoration Plan for CAU 116, which was approved by the Nevada Division of Environmental Protection (NDEP) on October 19, 2007 (NNSA/NSO, 2006).

A support structure was constructed to support the asbestos-insulated piping that would be left in place after the boiler was removed. The cadmium-insulated piping was then removed, packaged in a drum, and transported to the Area 5 HW Storage Pad, where it is currently being stored and managed. The drum will be transported offsite for disposal as HW. The boiler was then filled with sand to prevent collapse and stabilize asbestos tiles present in the tank, removed, and transported to the Area 23 Sanitary Landfill for disposal.

2.1.2.7 Corrective Action Site 25-23-11, Contaminated Materials

This site, located above the USTs associated with CAS 25-02-02 at TCC, consisted of a metal pump shed, concrete pump vault, pump, piping, lead bricks, radiologically and lead-impacted soil, and radiologically contaminated soil (Figure 6). Clean closure was implemented at the site by removing the metal shed and soil for disposal as LLW and the lead bricks, vault, pump, piping, and soil for offsite disposal as MW.

The metal pump shed was removed, size-reduced, and packaged in transportainers. The transportainers are currently being stored and managed onsite and will be transported to the Area 5 RWMS for disposal as LLW. The lead bricks, radiologically and lead-impacted soil, and pump were removed from the concrete pump vault and packaged in a B-25 box as MW. The concrete pump vault was then removed, size-reduced, and packaged in B-25 boxes as MW. The MW was transported offsite for treatment and disposal. Approximately 50 yd^3 of radiologically contaminated soil from around the concrete pump vault were excavated to a depth of approximately 2.5 ft and packaged in transportainers. The soil is currently being stored and managed onsite and will be transported to the Area 5 RWMS for disposal as LLW.

Ten verification samples, two from each side wall and two from the floor of the excavation, were collected and analyzed for cesium-137. Verification sample results indicated that the remaining soil in the side walls of the excavation did not contain cesium-137 at concentrations above the action level; therefore, the excavation was backfilled with clean soil and contoured to the approximate surrounding grade. The two verification samples collected from the floor of the excavation exceeded the action level for cesium-137; however, the floor of the excavation was the interface of CAS 25-02-02, which was closed in place, so no additional excavation was required. A summary of the sample data is included in Section 4.0, and the laboratory data reports are included in Appendix B.

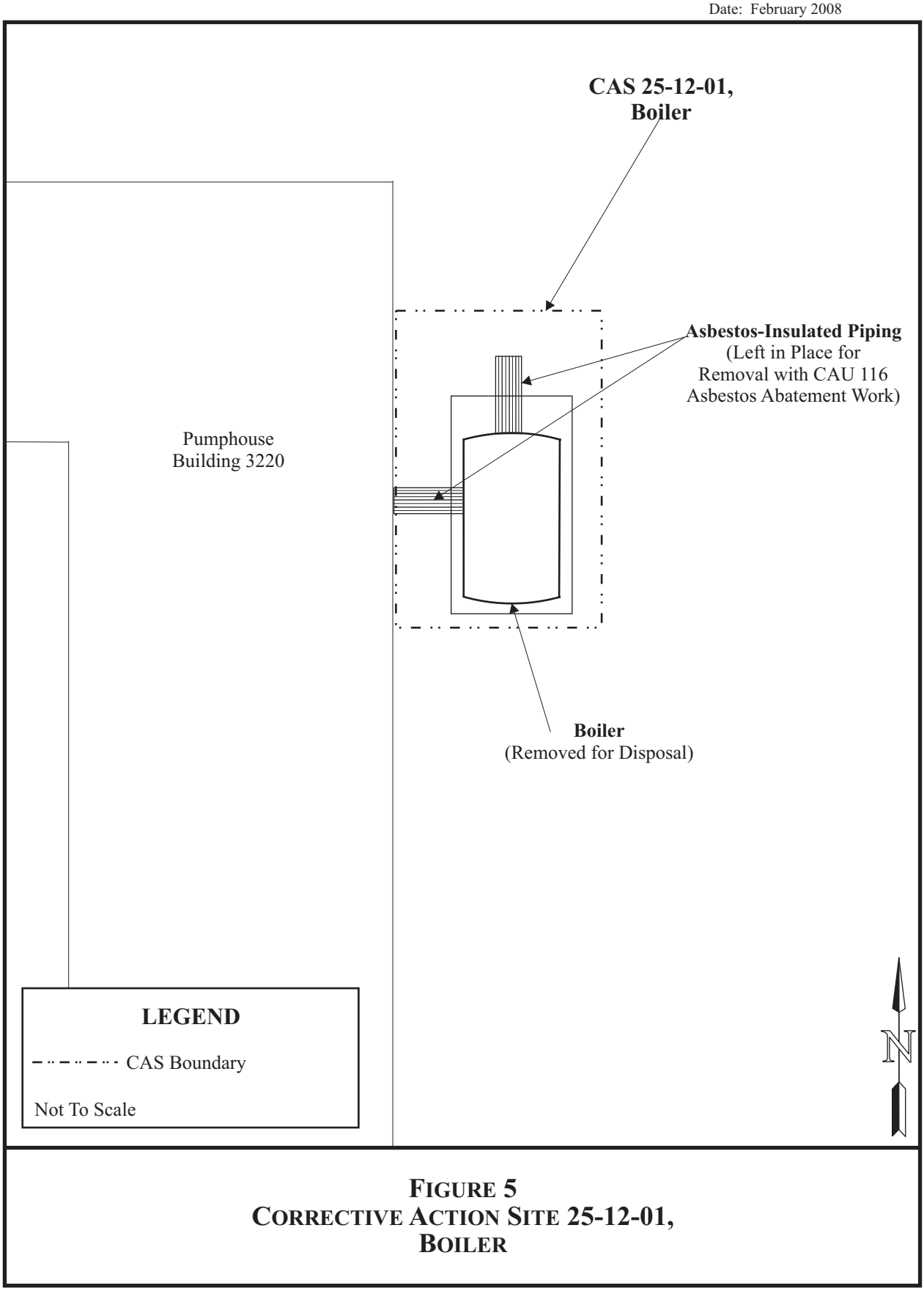


FIGURE 5
CORRECTIVE ACTION SITE 25-12-01,
BOILER

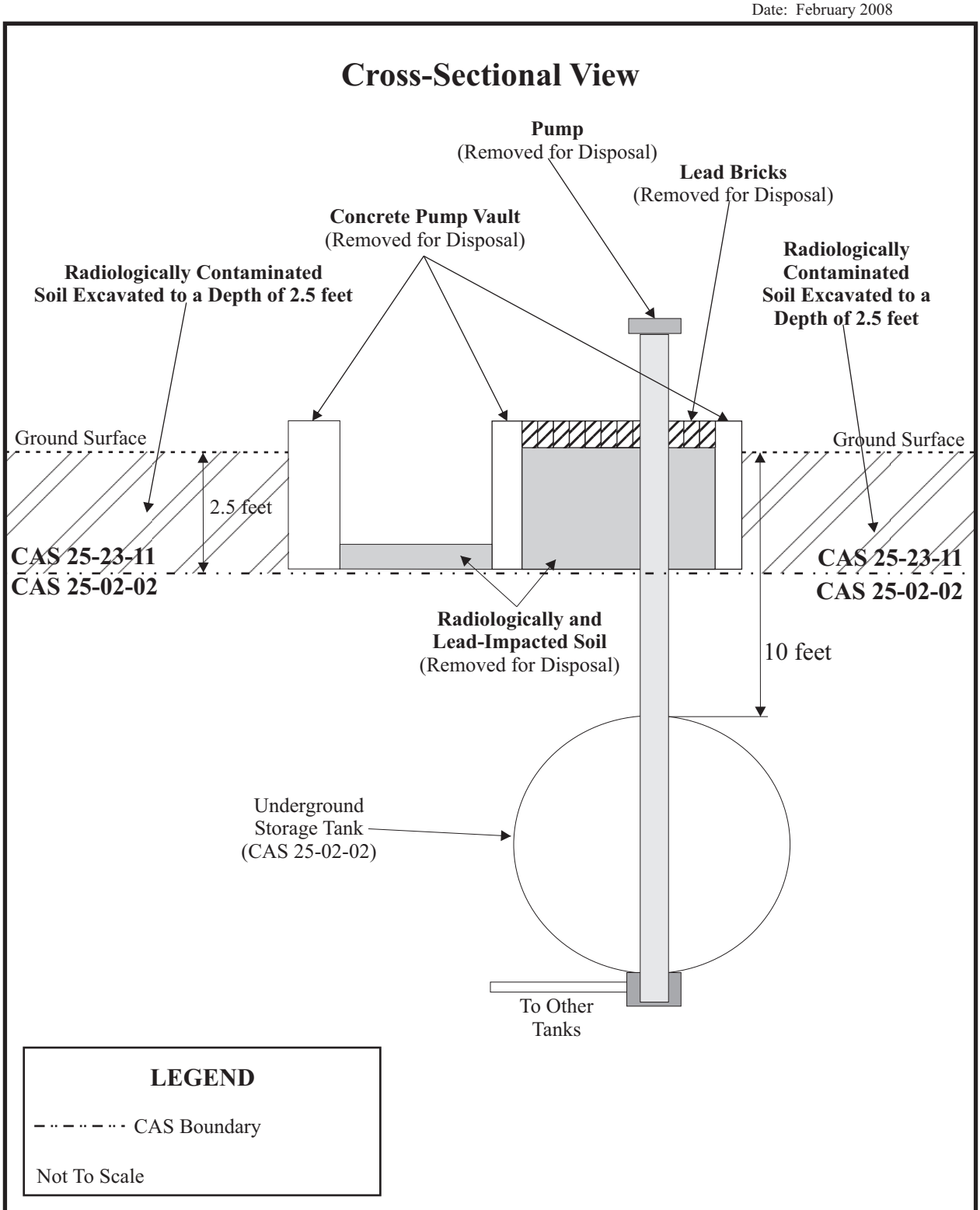


FIGURE 6
CORRECTIVE ACTION SITE 25-23-11,
CONTAMINATED MATERIALS

2.1.2.8 Corrective Action Site 26-01-01, Filter Tank (RAD) and Piping

This site, located at the Pluto Disassembly Facility, consisted of a 10,000-gal AST, associated piping, and radiologically and lead-impacted soil (Figure 7). Clean closure was implemented at the site by removing the AST for disposal as LLW and associated piping and radiologically and lead-impacted soil for offsite disposal as MW.

Approximately 6 yd^3 of radiologically and lead-impacted soil were excavated, packaged in B-25 boxes, and transported offsite for disposal as MW. The aboveground piping, which was found to contain lead components, was removed from the AST, packaged in a B-25 box, and transported offsite for disposal as MW. The AST is currently being stored and managed onsite and will be transported to the Area 5 RWMS, where it will be filled with clean soil and disposed as LLW. Underground piping was grouted.

Five verification samples, one from each side wall and one from the floor of the radiologically and lead-impacted soil excavation, were collected and analyzed for total lead. The samples were not required to be analyzed for radiological isotopes because, although the excavated soil was radiologically contaminated, it did not exceed the action levels for any radiological constituents. Verification sample results indicated that the remaining soil did not contain lead at concentrations above the action level; therefore, the excavation was backfilled with clean soil and contoured to the approximate surrounding grade. A summary of the sample data is included in Section 4.0, and the laboratory data reports are included in Appendix B.

2.1.2.9 Corrective Action Site 26-01-02, Filter Tank (RAD)

This site, located at the Pluto Disassembly Facility, consisted of a 5,000-gal AST and associated piping (Figure 7). Clean closure was implemented at the site by removing the AST and associated piping for disposal as LLW.

The aboveground piping was removed and packaged for disposal. All openings in the AST were sealed, and the AST was removed from its wooden cradle and packaged in a transportainer. The waste is currently being stored and managed onsite and will be transported to the Area 5 RWMS for disposal as LLW. Underground piping was grouted.

2.1.2.10 Corrective Action Site 26-02-01, Underground Storage Tank

This site, located at the Pluto Check Station, consists of a 1,000-gal UST. No COCs were identified, and no further action was required. However, as a BMP, the UST was filled with grout.

2.1.2.11 Corrective Action Site 26-23-01, Contaminated Liquids Spreader

This site, located near the Port Gaston Training Area, consisted of a radiologically contaminated liquid spreader mounted on a trailer (Figure 8). A lead shield was mounted on the spreader. Clean closure was implemented at the site by removing the spreader for disposal as LLW and the lead shield and radiologically contaminated soil for offsite disposal as MW.

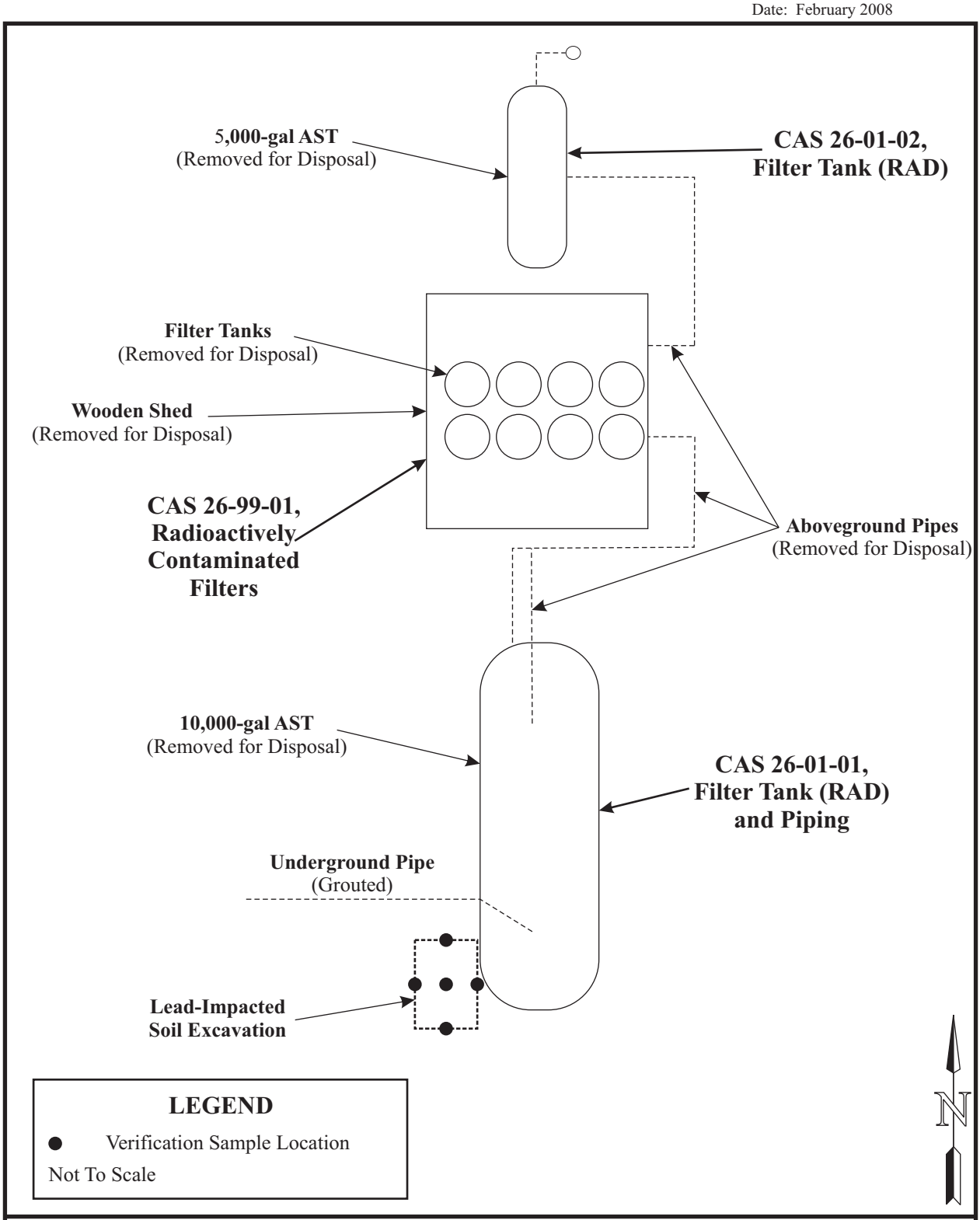
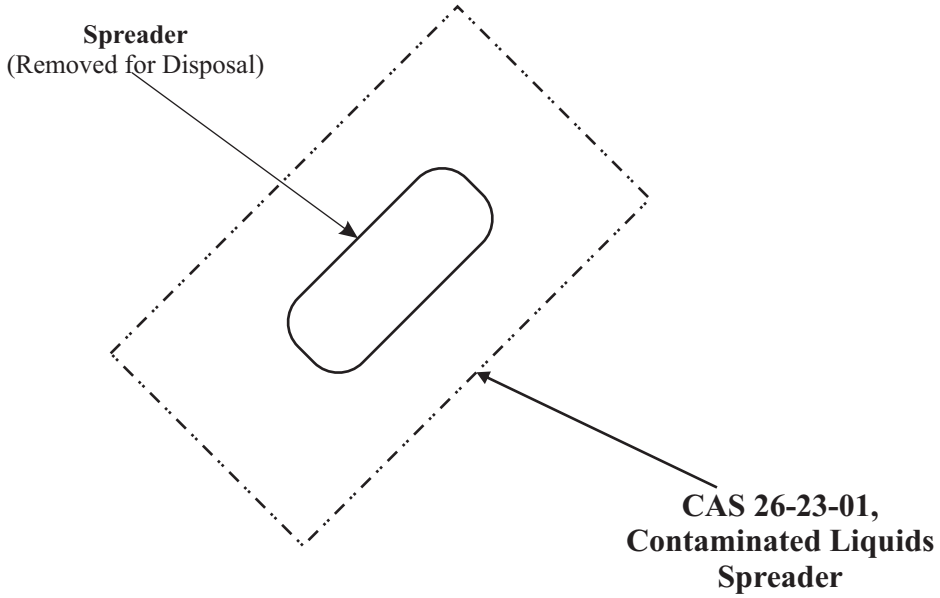


FIGURE 7
CORRECTIVE ACTION SITE 26-01-01, FILTER TANK (RAD) AND PIPING;
CORRECTIVE ACTION SITE 26-01-02, FILTER TANK (RAD); AND
CORRECTIVE ACTION SITE 26-99-01, RADIOACTIVELY CONTAMINATED FILTERS



LEGEND

CAS Boundary

Not To Scale

N

FIGURE 8
CORRECTIVE ACTION SITE 26-23-01,
CONTAMINATED LIQUIDS SPREADER

The lead shield was removed from the spreader, packaged in a B-25 box, and transported offsite for disposal as MW. The spreader was disassembled and packaged in a transportainer. Approximately 2 yd^3 of soil containing radiological isotopes below action levels were excavated as a BMP and packaged in the transportainer with the spreader. The transportainer is currently being stored and managed onsite and will be transported to the Area 5 RWMS for disposal as LLW.

2.1.2.12 Corrective Action Site 26-99-01, Radioactively Contaminated Filters

This site, located at the Pluto Disassembly Facility, consisted of eight 30-gal filter tanks located in a wooden shed and associated piping (Figure 7). Clean closure was implemented at the site by removing the filter tanks, shed, and piping for disposal as LLW.

The piping connecting the tanks was removed and packaged for disposal. The tanks were removed from the shed, and all openings in the tanks were sealed. The wooden shed was demolished and packaged with the tanks in a transportainer. The transportainer is currently being stored and managed onsite and will be transported to the Area 5 RWMS for disposal as LLW.

During demolition of the wooden shed, four previously unidentified items were discovered, including PCB ballast, a lead brick, a fluorescent light bulb, and a hydraulic jack. The PCB ballast was transported to the Area 5 HW Storage Pad and will be sent offsite for disposal as PCB waste. The lead brick was packaged in a B-25 box and transported offsite for disposal as MW. The fluorescent light bulb is being stored at the Area 23 universal waste collection center and will be sent offsite for disposal. The hydraulic jack was placed in the transportainer with the shed and tanks, which will be transported to the Area 5 RWMS for disposal as LLW.

2.2 DEVIATIONS FROM THE CORRECTIVE ACTION PLAN AS APPROVED

The CAP states that radiologically contaminated soil will be removed and verification samples will be collected to verify clean closure at CAS 26-23-01 (Contaminated Liquids Spreader). Revision 1 of the Corrective Action Decision Document was written to clarify that the radionuclides in the soil at were below the action levels, and excavation of the soil and collection of verification samples were not necessary. As a BMP, approximately 2 yd^3 of soil containing radiological isotopes below action levels were excavated and packaged in a transportainer; however, per Revision 1 of the Corrective Action Decision Document, no verification samples were required. The soil is currently being stored and managed onsite and will be transported to the Area 5 RWMS for disposal as LLW.

No other deviations from the CAP (NNSA/NSO, 2004b) were necessary.

2.3 CORRECTIVE ACTION SCHEDULE AS COMPLETED

Closure activities began in January 2007 and were completed in January 2008. Details of the schedule are provided in Table 2.

TABLE 2. CORRECTIVE ACTION UNIT 127 CLOSURE ACTIVITIES SCHEDULE

CORRECTIVE ACTION SITE	START DATE	END DATE
25-01-05, Aboveground Storage Tank	January 11, 2007	August 15, 2007
25-01-06, Aboveground Storage Tank	March 22, 2007	April 4, 2007
25-01-07, Aboveground Storage Tank	March 22, 2007	April 4, 2007
25-02-02, Underground Storage Tank	May 9, 2007	September 25, 2007
25-12-01, Boiler	August 1, 2007	August 8, 2007
25-23-11, Contaminated Materials	May 9, 2007	August 14, 2007
26-01-01, Filter Tank (RAD) and Piping	June 26, 2007	September 13, 2007
26-01-02, Filter Tank (RAD)	June 26, 2007	July 2, 2007
26-02-01, Underground Storage Tank	April 4, 2007	April 4, 2007
26-23-01, Contaminated Liquids Spreader	May 3, 2007	September 13, 2007
26-99-01, Radioactively Contaminated Filters	June 26, 2007	July 10, 2007

2.4 SITE PLAN/SURVEY PLAT

CAS 25-01-07 (Aboveground Storage Tank) and CAS 25-02-02 (Underground Storage Tank) were closed in place with administrative controls, and URs were implemented. Figures showing the locations of the surveyed points delineating the UR areas are included in Appendix D.

3.0 WASTE DISPOSITION

This section describes the waste streams generated during closure activities and their final disposition. Waste streams included sanitary waste, ACM waste, hydrocarbon waste, HW, LLW, and MW. Waste disposition is summarized in Table 3 and discussed in detail in the following sections. Waste disposition documentation is included as Appendix C.

3.1 WASTE MINIMIZATION

Industry standard waste minimization practices were applied throughout the course of closure activities. These practices included the following:

- Radiological surveys of debris to characterize and segregate waste streams
- TPH field screening kits to guide the extents of the excavations for TPH-impacted soil
- Size reduction of debris

3.2 WASTE MANAGEMENT

All waste was managed according to applicable federal and state regulations, U.S. Department of Energy orders, and company procedures. Waste management areas (WMAs) were established throughout the project, as needed. All WMAs were identified with appropriate signs and boundaries to restrict unauthorized access. The WMAs were inspected on a weekly or monthly basis, as required, to ensure that all containers were intact, not leaking, and not exceeding storage duration times. Applicable WMAs were posted as Radioactive Materials Areas (RMAs) whenever radiological waste was stored in the area. Upon removal of radiologically contaminated waste, the RMA was surveyed and de-posted.

Waste containers were purchased either new or reconditioned. Prior to use, all containers were inspected to verify that they were in good condition (e.g., no leaks, rust, or dents), lined or made of material that would not react with the waste, and in compliance with U.S. Department of Transportation requirements. The containers remained closed while stored unless waste was being added. Containers were also handled in such a manner that the integrity of the container was not compromised. Appropriate labels were affixed, and relevant information was marked on the containers with an indelible marker. All information was legible and clearly visible.

3.3 WASTE CHARACTERIZATION

Waste streams were characterized according to company procedures. Waste was screened for radiological contamination using radiological field survey instruments.

TABLE 3. CORRECTIVE ACTION UNIT 127 WASTE DISPOSITION SUMMARY

WASTE STREAM	CORRECTIVE ACTION SITE	DESCRIPTION OF WASTE	WASTE CONTAINER	VOLUME	DISPOSITION
Sanitary Waste	25-01-06, Aboveground Storage Tank	AST, Piping, and Concrete	No waste container necessary	5 yd^3	Disposed of at the Area 9 U10c Sanitary Landfill
	25-01-07, Aboveground Storage Tank	AST, Piping, and Concrete	No waste container necessary	5 yd^3	
ACM Waste	25-12-01, Boiler	Boiler	No waste container necessary	5 yd^3	Disposed of at the Area 23 Sanitary Landfill
Hydrocarbon Waste	25-01-06, Aboveground Storage Tank	Soil and AST Contents	No waste container necessary	30 yd^3	Disposed of at the Area 6 Hydrocarbon Landfill
	25-01-07, Aboveground Storage Tank	Soil and AST Contents	No waste container necessary	20 yd^3	
HW	25-12-01, Boiler	Cadmium-Insulated Piping	55-gal drum	55 gal	Staged at the Area 5 HW Storage Pad for offsite disposal
LLW	25-01-05, Aboveground Storage Tank	AST and Piping Debris	Transportainers	400 yd^3	Staged onsite for disposal at the Area 5 RWMS
	25-02-02, Underground Storage Tank	Soil and Concrete		15 yd^3	
	25-23-11, Contaminated Materials	Soil and Metal Shed		100 yd^3	
	26-01-01, Filter Tank (RAD) and Piping	AST	Self-Contained	10,000 gal	
	26-01-02, Filter Tank (RAD)	AST and Piping	Transportainer	50 yd^3	
	26-23-01, Contaminated Liquids Spreader	Spreader and Soil	Transportainer	50 yd^3	
	26-99-01, Radioactively Contaminated Filters	Filter Tanks, Piping, and Wooden Shed	Transportainer	50 yd^3	
MW	25-01-05, Aboveground Storage Tank	Cadmium- and Asbestos-Insulated Piping	B-25 Box #187073	4 yd^3	Transported to an offsite facility for treatment and disposal
	25-02-02, Underground Storage Tank	Piping			
	25-23-11, Contaminated Materials	Lead Bricks, Vault, Pump, Piping, and Soil	B-25 Box #151444	4 yd^3	
	26-01-01, Filter Tank (RAD) and Piping	Soil	B-25 Box #151474	4 yd^3	
		Soil and Piping	B-25 Box #131092	4 yd^3	
	26-23-01, Contaminated Liquids Spreader	Lead Shield	B-25 Box #151473	4 yd^3	

ACM: asbestos-containing material
AST: aboveground storage tank
gal: gallon(s)
HW: hazardous waste
LLW: low-level waste
MW: mixed waste
RWMS: Radioactive Waste Management Site
yd^3: cubic yard(s)

3.4 WASTE STREAMS AND DISPOSAL

Waste streams generated during closure activities at CAU 127 included sanitary waste, ACM waste, hydrocarbon waste, HW, LLW, and MW. Waste disposition documentation is included as Appendix C.

3.4.1 Sanitary Waste

Sanitary waste was generated at CAS 25-01-06 (Aboveground Storage Tank) and CAS 25-01-07 (Aboveground Storage Tank). The ASTs and concrete pads from CASs 25-01-06 and 25-01-07 were transported in end-dump trucks to the Area 9 U10c Sanitary Landfill for disposal.

3.4.2 Asbestos-Containing Material

ACM waste was generated at CAS 25-12-01 (Boiler). The boiler was considered ACM because asbestos tiles were present in the boiler. The boiler was transported in an end-dump truck to the Area 23 Sanitary Landfill for disposal.

3.4.3 Hydrocarbon Waste

Hydrocarbon waste was generated at CAS 25-01-06 (Aboveground Storage Tank) and CAS 25-01-07 (Aboveground Storage Tank). TPH-impacted soil and AST contents from CASs 25-01-06 and 25-01-07 were transported in end-dump trucks to the Area 6 Hydrocarbon Landfill for disposal.

3.4.4 Hazardous Waste

HW was generated at CAS 25-12-01 (Boiler). Cadmium- and asbestos-insulated piping was packaged in a 55-gal drum and transported to the Area 5 HW Storage Pad, where it is currently being stored and managed. The drum will be transported offsite for disposal.

3.4.5 Low-Level Waste

A total of approximately 700 yd^3 of LLW was generated during closure activities. LLW is currently being staged and managed onsite and will be transported to the Area 5 RWMS for disposal.

3.4.6 Mixed Waste

A total of approximately 20 yd^3 of MW was generated during closure activities. MW was packaged in B-25 boxes and transported to a permitted offsite facility for treatment and disposal.

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4.0 CLOSURE VERIFICATION RESULTS

To verify that CAU 127 closure activities met cleanup criteria, soil verification samples were collected and analyzed at three CASs. The results showed that no COCs above the action levels remained at the sites. Sample results are summarized in Table 4 through Table 6, and the laboratory data reports are included in Appendix B.

4.1 DATA QUALITY ASSESSMENT

Accurate and defensible analytical data were collected to verify that waste and verification samples were properly characterized, managed, and disposed during CAU 127 closure activities. The following sections describe the quality assurance (QA)/quality control (QC) procedures, data validation process, and a reconciliation of the CSM with actual findings during CAU 127 closure activities. More detail on the QA/QC procedures for CAU 127 can be found in the CAP for CAU 127 (NNSA/NSO, 2004b).

4.1.1 Quality Assurance/Quality Control Procedures

Verification and waste characterization samples were collected with disposable polyethylene scoops and placed in appropriately labeled sample containers secured with custody seals. All samples were labeled with a unique sample number, placed on ice, and transported under a chain of custody. Standard QA/QC samples were collected (i.e., one blind duplicate per twenty samples). Samples were analyzed by certified offsite contract laboratories. Analytical results were validated at the laboratory using stringent QA/QC procedures, including matrix spike/matrix spike duplicates, spiked surrogate recovery analysis, verification of analytical results, and data quality indicator requirements. Detailed information regarding the QA/QC program requirements can be found in the Industrial Sites QAPP (NNSA/NV, 2002b).

4.1.2 Data Validation

Data validation was performed according to the Industrial Sites QAPP (NNSA/NV, 2002b), which is based on the U.S. Environmental Protection Agency (EPA) functional guidelines for data quality (EPA, 1994; 1999). Data were reviewed to ensure that samples were appropriately processed and analyzed and that the results are valid. All sample data were internally validated at the Tier I and Tier II levels. No anomalies were discovered in the data that would discredit any of the waste characterization or verification sample results. While only summary laboratory QC data for verification samples are included in Appendix B, the complete data set, including validation reports for waste characterization and verification samples, is maintained in the project files and available upon request.

4.1.3 Conceptual Site Models

Two CAU 127 CSMs were developed and were presented in the approved Corrective Action Investigation Plan for CAU 127 (NNSA/NV, 2002a). A detailed description of the CSMs is presented in Section 1.3.1. All CSMs were confirmed by soil sample results and verified during closure activities.

TABLE 4. CORRECTIVE ACTION SITE 25-01-06, ABOVEGROUND STORAGE TANK, VERIFICATION SAMPLE RESULTS

DATE COLLECTED	SAMPLE DELIVERY GROUP	SAMPLE NUMBER	TPH DRO (mg/kg)	TPH GRO (mg/kg)
			Action Level = 100	Action Level = 100
04/03/2007	V2886	25-01-06-V1	ND	ND
		25-01-06-V2	3.80	ND
		25-01-06-V3	6.90	ND
		25-01-06-V4	3.49	ND
		25-01-06-V5	3.50	ND
		25-01-06-V6	3.90	ND

DRO: diesel range organics
GRO: gasoline range organics
mg/kg: milligram(s) per kilogram
ND: not detected above minimum laboratory detection limits
TPH: total petroleum hydrocarbons

TABLE 5. CORRECTIVE ACTION SITE 25-23-13, CONTAMINATED MATERIALS, VERIFICATION SAMPLE RESULTS

DATE COLLECTED	SAMPLE DELIVERY GROUP	SAMPLE NUMBER	SAMPLE LOCATION	CESIUM-137 (pCi/g)
				Action Level = 7.32
06/21/2007	V2936	252311-V1	Sidewall 1	0.732
		252311-V2	Sidewall 1	0.388
		252311-V3	Sidewall 2	0.088
		252311-V4	Sidewall 2	0.945
		252311-V5	Sidewall 3	0.596
		252311-V6	Sidewall 3	0.692
		252311-V7	Sidewall 4	0.612
		252311-V8	Sidewall 4	1.02
		252311-V9	Floor of Excavation	8.69*
		252311-V10	Floor of Excavation	10.07*

pCi/g: picocurie(s) per gram
* The floor of the excavation is the interface with CAS 25-02-02, which was closed in place with administrative controls.

TABLE 6. CORRECTIVE ACTION SITE 26-01-01, FILTER TANK (RAD) AND PIPING, VERIFICATION SAMPLE RESULTS

DATE COLLECTED	SAMPLE DELIVERY GROUP	SAMPLE NUMBER	LEAD (mg/kg)
			Action Level = 750
07/16/2007	V2948	260101-V1	12.7
		260101-V2	18.0
		260101-V3	7.9
		260101-V4	12.3
		260101-V5	13.0

mg/kg: milligram(s) per kilogram

4.2 USE RESTRICTIONS

URs have been implemented for the following CASs:

- CAS 25-01-07, Aboveground Storage Tank
- CAS 25-02-02, Underground Storage Tank

4.2.1 Corrective Action Site 25-01-07, Aboveground Storage Tank

At this site, a UR was implemented for TPH-impacted soil. UR warning signs were posted to warn against intrusive activity according to the FFACO UR posting guidance (FFACO, 2003). The CAU Use Restriction Information form and a figure showing the locations of the surveyed points delineating the UR area are included in Appendix D. Annual site inspections will be required to ensure that the signs are intact and legible and that the UR is maintained. Details on the post-closure requirements are included in Section 5.2.

4.2.2 Corrective Action Site 25-02-02, Underground Storage Tank

At this site, a UR was implemented for radiologically contaminated USTs. UR warning signs were posted to warn against intrusive activity according to the FFACO UR posting guidance (FFACO, 2003). The CAU Use Restriction Information form and a figure showing the locations of the surveyed points delineating the UR area are included in Appendix D. Annual site inspections will be required to ensure that the signs are intact and legible and that the UR is maintained. Details on the post-closure requirements are included in Section 5.2.

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5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The following site closure activities were performed at CAU 127 and are documented in this CR:

- CAS 25-01-05, Aboveground Storage Tank, was clean closed by removing a 100,000-gal AST and associated aboveground piping for disposal as LLW. Cadmium- and asbestos-insulated piping was removed for offsite disposal as MW.
- CAS 25-01-06, Aboveground Storage Tank, was clean closed by removing a 1,000-gal AST and associated piping for disposal as sanitary waste, and TPH-impacted soil and AST contents for disposal as hydrocarbon waste.
- CAS 25-01-07, Aboveground Storage Tank, was closed in place with administrative controls. A 1,000-gal AST and associated piping were removed for disposal as sanitary waste, and the top 5 ft of TPH-impacted soil and AST contents were removed for disposal as hydrocarbon waste. Remaining impacted soil was closed in place, and UR warning signs were posted.
- CAS 25-02-02, Underground Storage Tank, was closed in place with administrative controls. Radiologically contaminated soil and a concrete pad were removed for disposal as LLW, and piping was removed for offsite disposal as MW. Six radiologically contaminated USTs were filled with grout and left in place. UR warning signs were posted.
- CAS 25-02-13, Underground Storage Tank, required no further action, and no work was performed.
- CAS 25-12-01, Boiler, was clean closed by removing cadmium-insulated piping for offsite disposal as HW and a boiler for disposal as ACM. Asbestos-insulated piping was left in place for removal at a later date.
- CAS 25-23-11, Contaminated Materials, was clean closed by removing radiologically contaminated soil and a metal shed for disposal as LLW. Lead bricks, radiologically and lead-impacted soil, a concrete pump vault, a pump, and piping were removed for offsite disposal as MW.
- CAS 26-01-01, Filter Tank (RAD) and Piping, was clean closed by removing a radiologically contaminated 10,000-gal AST for disposal as LLW. Associated piping and radiologically and lead-impacted soil were removed for offsite disposal as MW.
- CAS 26-01-02, Filter Tank (RAD), was clean closed by removing a radiologically contaminated 5,000-gal AST and associated piping for disposal as LLW.
- CAS 26-02-01, Underground Storage Tank, required no further action. As a BMP, the UST was filled with grout.
- CAS 26-23-01, Contaminated Liquids Spreader, was clean closed by removing a spreader and radiologically contaminated soil for disposal as LLW. A lead shield was removed for offsite disposal as MW.
- CAS 26-99-01, Radioactively Contaminated Filters, was clean closed by removing eight radiologically contaminated filter tanks, associated piping, and a wooden shed for disposal as

LLW. A PCB ballast was removed for offsite disposal as PCB waste, a lead brick was removed for offsite disposal as MW, a fluorescent light bulb was removed for offsite disposal as universal waste, and a hydraulic jack was removed for disposal as LLW.

5.2 POST-CLOSURE REQUIREMENTS

5.2.1 Inspections

Inspections are required for the following CASs:

- CAS 25-01-07, Aboveground Storage Tank
- CAS 25-02-02, Underground Storage Tank

Inspections will be performed annually to verify that UR warning signs at each CAS are in place and legible and that the UR is maintained. The interiors of the UR areas will also be inspected to confirm there have been no disturbances to the areas. Maintenance or repair needs that are identified will be scheduled within 90 working days of discovery and documented in writing at the time the work is done. Inspection results will be documented in the combined NTS post-closure annual letter report. The report will include a discussion of observations and will describe any maintenance activities performed since the last inspection. A copy of the inspection checklists will be provided, and the field notes will be maintained in the project files. A copy of the letter report will be submitted to NDEP.

5.3 RECOMMENDATIONS

Since closure activities for CAU 127 have been completed following the NDEP-approved CAP (NNSA/NSO, 2004b) as documented in this report, NNSA/NSO requests the following:

- A Notice of Completion be provided by NDEP to NNSA/NSO for the closure of CAU 127.
- The transfer of CAU 127 from Appendix III to Appendix IV, Closed Corrective Action Units, of the FFACO (FFACO, 1996; as amended January 2007).

6.0 REFERENCES

EPA, see U.S. Environmental Protection Agency.

Federal Facility Agreement and Consent Order, 1996 (as amended January 2007). Agreed to by the State of Nevada; U.S. Department of Energy, Environmental Management; U.S. Department of Defense; and U.S. Department of Energy, Legacy Management.

Federal Facility Agreement and Consent Order, 2003. Use Restriction Posting Guidance.

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

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

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

U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office, 2002a. *Corrective Action Investigation Plan for Corrective Action Unit 127: Areas 25 and 26 Storage Tanks, Nevada Test Site, Nevada.* DOE/NV--833. Las Vegas, NV.

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

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office, 2004a. *Corrective Action Decision Document for Corrective Action Unit 127: Areas 25 and 26 Storage Tanks, Nevada Test Site, Nevada.* DOE/NV--925-REV.1. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office, 2004b. *Corrective Action Plan for Corrective Action Unit 127: Areas 25 and 26 Storage Tanks, Nevada Test Site, Nevada.* DOE/NV--1002. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office, 2006. *Streamlined Approach for Environmental Restoration Plan for Corrective Action Unit 116: Area 25 Test Cell C Facility, Nevada Test Site, Nevada.* DOE/NV--1132. Las Vegas, NV.

U.S. Environmental Protection Agency, 1994. *Guidance for the Data Quality Objectives Process*. EPA QA/G-4. Washington D.C.

U.S. Environmental Protection Agency, 1999. *Contract Laboratory Program National Functional Guidelines for Organic Data Review*. EPA540/R-99/008. Washington D.C.

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APPENDIX A*

DATA QUALITY OBJECTIVES

As presented and published in Appendix A of the approved *Corrective Action Investigation Plan for Corrective Action Unit 127: Areas 25 and 26 Storage Tanks, Nevada Test Site, Nevada*, 2002, DOE/NV--833. Las Vegas, NV.

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A.1.0 Seven-Step DQO Process for CAU 127 Investigation

The DQO process is a strategic planning approach based on the scientific method that is used to prepare for site characterization data collection. The DQOs are designed to ensure that the data collected will provide sufficient and reliable information to identify, evaluate, and technically defend potentially viable corrective actions (i.e., no further action, close in place, or clean closure).

The CAU 127 investigation will be based on DQOs developed by representatives of the NDEP and the NNSA/NV.

Twelve CASs comprise CAU 127. Seven CASs are in Area 25, and five CASs are in Area 26. The CAS descriptions are:

- CAS 25-01-05, AST (100,000 gal)
- CAS 25-01-06, AST (1,000 gal)
- CAS 25-01-07, AST (1,000 gal)
- CAS 25-02-02, UST (six 10,000-gal each)
- CAS 25-02-13, UST
- CAS 25-12-01, Boiler
- CAS 25-23-11, Contaminated Materials
- CAS 26-01-01, Filter Tank (Rad) and Piping (10,000-gal tank)
- CAS 26-01-02, Filter Tank (Rad) (5,000 gal)
- CAS 26-02-01, UST (1,000 gal)
- CAS 26-23-01, Contaminated Liquids Spreader
- CAS 26-99-01, Radioactively Contaminated Filters

The investigation at all CASs will begin with Phase I activities to determine the nature of potential contamination. If a COPC is detected in any sample at concentrations above PALs, the COPC will be identified as a COC. If a COC is identified, the CAS containing that COC will undergo additional investigation during Phase II to determine the extent of contamination. Field conditions (e.g., elevated field-screening results) may warrant a Phase II investigation prior to confirmation of the presence of COCs.

A.1.1 Step 1 - State the Problem

Step 1 defines the problem that has initiated the CAU 127 investigation. This step identifies the DQO planning team members, describes the problem, and develops the CSMs.

A.1.1.1 Planning Team Members

The DQO planning team consists of representatives from NDEP, NNSA/NV, BN, and ITLV. The primary decision-makers include NDEP and NNSA/NV representatives. Table A.1-1 lists representatives from each organization in attendance for the April 18, 2002, DQO meeting.

Table A.1-1
DQO Meeting Participants

Participant	Affiliation
Tom Fitzmaurice	BN
Michael Foley	ITLV
John Forbes	BN
John Fowler	ITLV
Clem Goewert	NDEP
Bridget Iverson	ITLV
Lynn Kidman	ITLV
Sean Kosinski	NNSA/NV
William Nicosia	ITLV
Kurt Schmidt	ITLV
David Schrock	ITLV
Robert Sobocinski	ITLV
Thomas Thiele	ITLV
Daniel Tobiason	BN
Jeanne Wightman	ITLV

BN – Bechtel Nevada
ITLV – IT Corporation, Las Vegas Office
NDEP – Nevada Division of Environmental Protection
NNSA/NV – DOE, National Nuclear Security Administration Nevada Operations Office

A.1.1.2 Describe the Problem

The overall problem statement for CAU 127 is: "Does sufficient information exist about the nature and extent of contamination at the 12 CASs to evaluate and select preferred corrective actions?" A preliminary assessment has indicated that existing information and data are insufficient, and a corrective action investigation is necessary.

Corrective Action Unit 127 is being investigated because:

- The CASs are abandoned sites that were not properly closed, and may not comply with the requirements of future land use.
- Hazardous and/or radioactive constituents may be present at concentrations and locations that could potentially pose a threat to human health and the environment.

A.1.1.3 Develop Conceptual Site Model

The CSMs describe the most probable scenarios for current conditions at specific sites and define the assumptions that are the basis for identifying the 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.

If additional elements are identified during the investigation that are outside of the scope of the CSMs as presented in this section, the situation will be reviewed and a recommendation will be made as to how to proceed. If this occurs, NDEP will be notified and given the opportunity to comment on, or concur with, the recommendation.

An important element of a CSM is the expected fate and transport of contaminants, which infer how contaminants move through site media and where they can be expected in the environment. The expected fate and transport is based on distinguishing physical characteristics of the contaminants and media. Contaminant characteristics include solubility, density, and particle size. Media characteristics include permeability, saturation, sorting, chemical composition, and adsorption coefficients. In general, contaminants with low solubility, high sorption, and high density can be expected to be found relatively close to release points. Contaminants with high solubility, low sorption, and low density can be expected to be found further from release points.

Future land-use scenarios limit future uses of the CAU 127 CASs to various nonresidential (i.e., industrial) uses (DOE/NV, 1998). The future land-use scenarios for CAU 127 are presented in Table A.1-2. Exposure scenarios for sites located within the NTS boundaries are limited by the future land-use scenarios to site workers who may be exposed via dermal contact (adsorption), oral ingestion, or inhalation of COCs associated with soils and/or objects (e.g., tanks, concrete) due to inadvertent disturbance of these materials. An additional exposure pathway for workers is through

external exposure to gamma radiation at sites containing potential radiological contamination (e.g., CASs associated with Test Cell C).

Table A.1-2
Future Land-Use Scenarios for CASs Within CAU 127

CAS	Land Use Zone	Zone Description
25-01-05 25-02-02 25-02-13 25-12-01 25-23-11 26-01-01 26-01-02 26-02-01 26-23-01 26-99-01	Research, Test, and Experiment	Designated for small-scale research and development projects; demonstrations; pilot projects; outdoor tests; and experiments for the development, quality assurance, or reliability of material and equipment under controlled conditions. Includes compatible defense and nondefense research, development, and testing projects and activities (DOE/NV, 1998).
25-01-06 25-01-07	Yucca Mountain Site Characterization	This area is reserved for support of the characterization of the Yucca Mountain Repository. The Land Use Management Policy under a Memorandum of Agreement with the NTS gives the Yucca Mountain Project technical responsibility independent of, but in coordination with the agreement (DOE, 2002).

A.1.1.3.1 Conceptual Site Models for CAU 127

Two CSMs have been developed for CAU 127 using historical background information, knowledge from studies at similar sites, and data from previous sampling efforts. The CSMs are termed Aboveground Tank/Piping (CSM#1) and Underground Tank/Piping/Structure (CSM#2). The applicability of the CSMs to each CAS is summarized in Table A.1-3. As shown in Table A.1-3, both CSMs apply to several of the CAU 127 CASs.

Table A.1-3
CSMs and Associated CASs

Conceptual Site Model (CSM)	25-01-05	25-02-02	25-23-11	25-12-01	25-01-06	25-01-07	25-02-13	26-01-01	26-01-02	26-99-01	26-02-01	26-23-01
Aboveground Tank/Piping	X	X	X	X	X	X	X	X	X	X		X
Underground Tank/Piping/Structure	X	X	X				X	X	X		X	

X - The CSM applies to this CAS.

Aboveground Tank/Piping Conceptual Site Model (CSM #1)

Eleven CASs are included in the Aboveground Tank/Piping CSM developed for CAU 127 (Table A.1-3). Figure A.1-1 shows a generalized representation of CSM#1. Tanks or other containment vessels have been used at all but one of the CASs within this CAU. If a spill or surface release occurred at one of these sites, the liquid containing COPCs would likely seep into the ground. Lateral migration is possible on the ground surface; however, in subsurface soils, contaminants would be expected to migrate primarily downward, and to a lesser degree horizontally. Concrete or a hardpan layer (i.e., caliche), if present, would limit vertical migration of contaminants or would modify the location, if any, where vertical migration could occur. In the case of a concrete pad, liquid contaminants would have a proclivity to run off, if the concrete was sloped, or would migrate through cracks into the subsurface. Precipitation could accelerate contaminant migration laterally as runoff and vertically as percolation. However, percolation should be limited, due to low precipitation rates and high evapotranspiration rates. This CSM predicts that the concentration of the contaminants would be highest in the immediate vicinity of a release (at the ground surface), and would decrease with distance, both horizontally and vertically. However, due to volatilization and/or weathering, the level of contamination may actually increase with depth in the near-surface soils (less than 6 in. bgs). Since vertical migration is expected to be limited, it is unlikely that any contamination would reach groundwater.

At CASs with insulated aboveground piping, ACM may be present, and the potential exists for friable asbestos. If friable asbestos is present, the asbestos could become airborne. The CASs with observed ACM or the potential for ACM are 25-01-05, 25-02-02, 25-23-11, 25-12-01, 26-01-01, 26-01-02, and 26-99-01.

Underground Tank/Piping/Structure conceptual Site Model (CSM #2)

Seven CAU 127 CASs are included in the Underground Tank/Piping/Structure CSM (Table A.1-3). Figure A.1-2 shows a generalized representation of CSM#2. This CSM is similar to CSM#1 except that lateral migration of contaminants in runoff is not a transport mechanism for CSM#2.

If a release or leak from an underground structure occurred, the liquid containing COPCs would migrate away from the release point, primarily downward, and to a lesser degree horizontally. Capillary action may cause some secondary migration upward, but this would be minimal. Migration

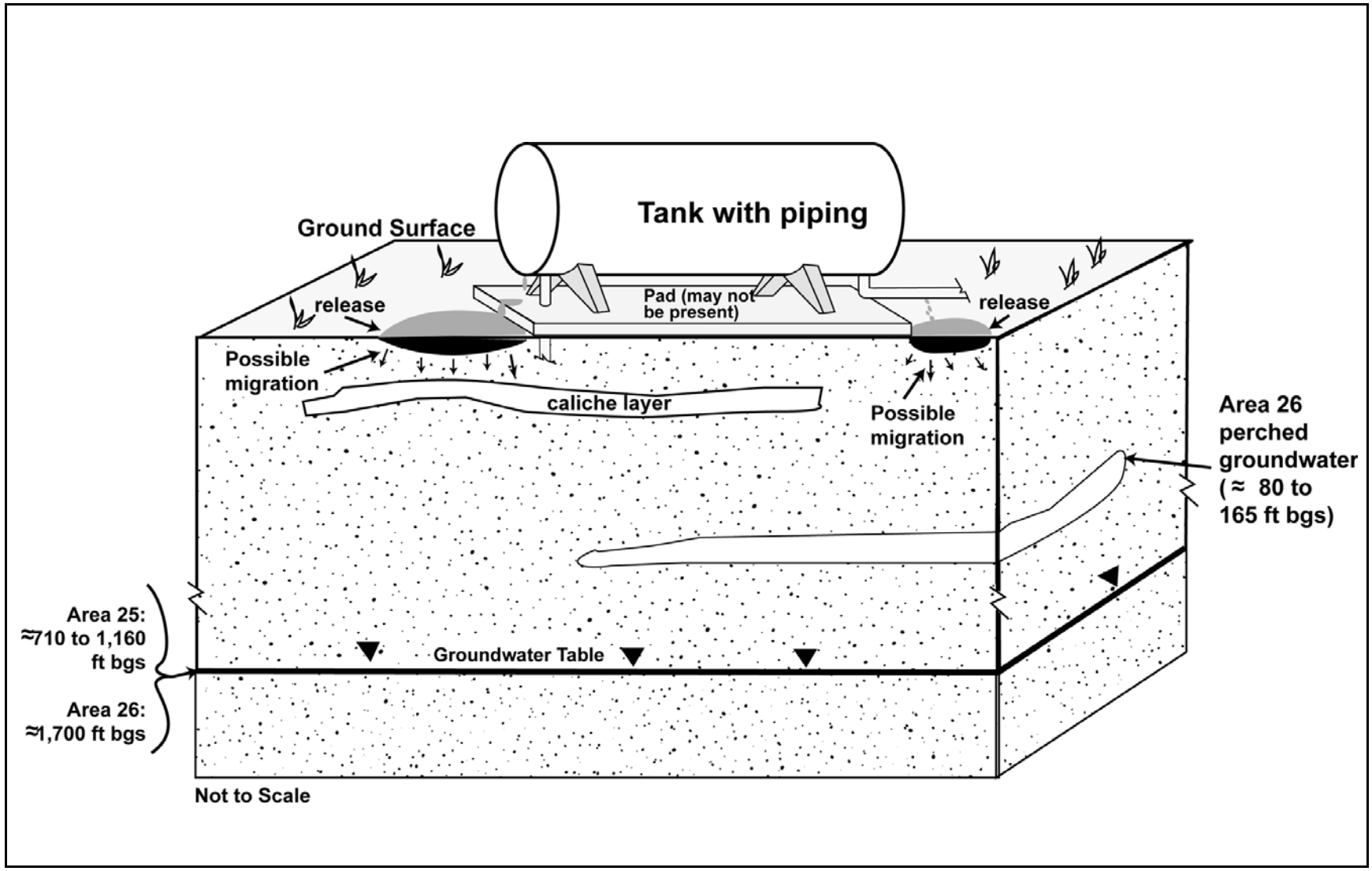

Figure A.1-1
Aboveground Tank/Piping Conceptual Site Model (CSM #1)

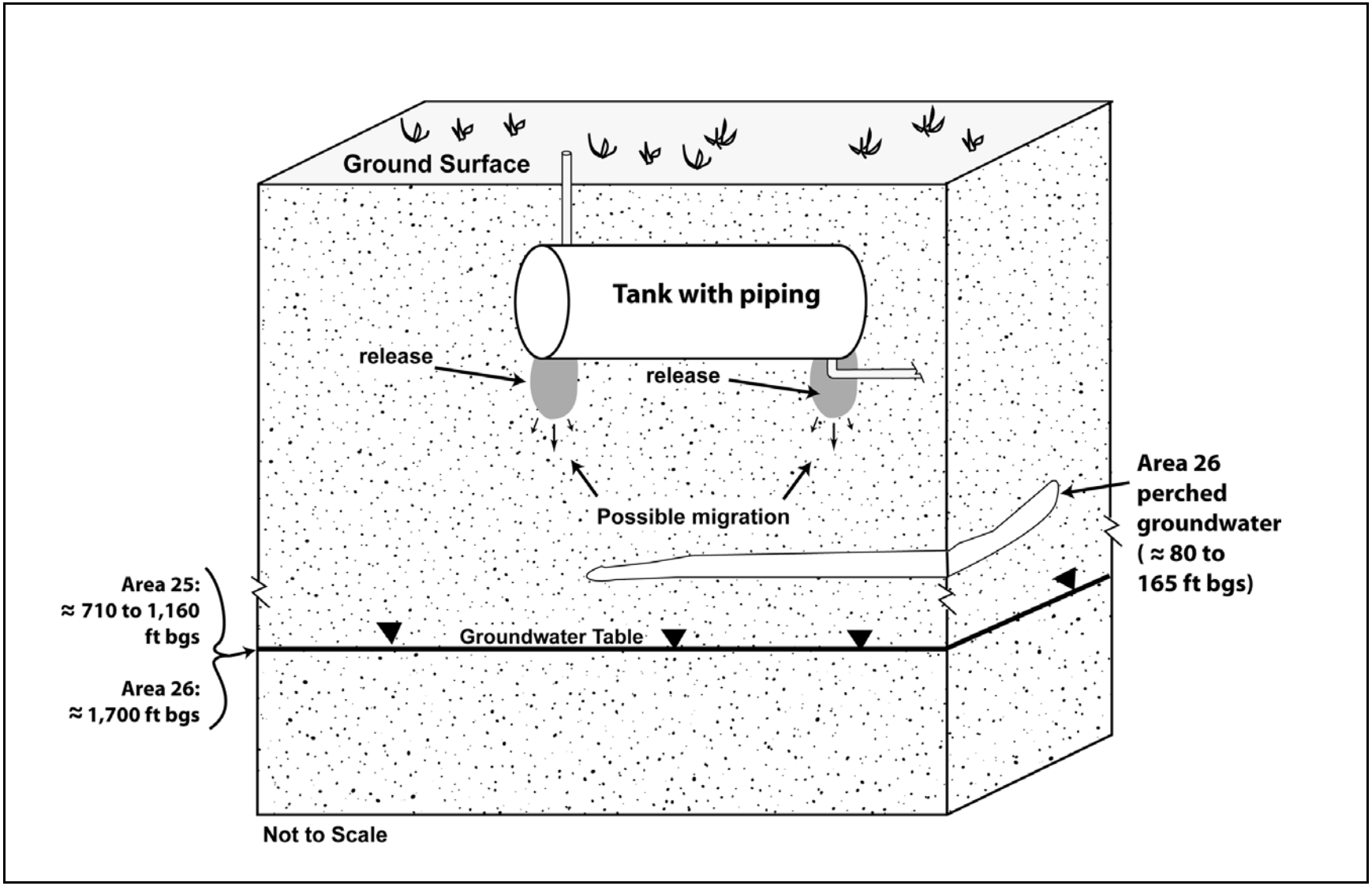

Figure A.1-2
Underground Tank/Piping/Structure Conceptual Site Model (CSM #21)

is predicted to be similar to the subsurface migration discussed in CSM #1. This CSM predicts that the concentration of contaminants would be highest in the immediate vicinity of a subsurface release location, and would decrease with distance, both horizontally and vertically.

The following sections provide additional information on elements of the CSMs.

Affected Media

For CSM #1, Aboveground Tank/Piping, the potentially affected media are surface and subsurface soils. Where ACMs are present, the air may contain asbestos if the materials are disturbed. For CSM #2, Underground Tank/Piping/Structure, the potentially affected medium is subsurface soil.

Any contamination found at these CASs would be attributable to direct release to the surface or subsurface. Insufficient records are available for many of these areas; therefore, much of the information related to COPCs is based upon limited historical information, interviews with current/former site employees, and site visits performed during preliminary assessments of the CASs.

Location of Contamination/Release

Where at- or above-grade features are present (CSM #1), contamination may be found in surface soils, as well as subsurface soils. Where the features are below-grade (CSM #2), surface soil contamination is not expected. Migration of contamination for both CSMs would be expected to be primarily downward, with horizontal migration to a lesser extent. For both CSMs, the presence of relatively impermeable layers (e.g., concrete, bedrock, or caliche) may influence both lateral and vertical migration.

Transport Mechanisms

The degree of contaminant migration at these sites is unknown, but it is assumed to be minimal based on low precipitation and high evapotranspiration rates. Runoff could cause lateral migration of contaminants over the ground surface for CSM #1. Contaminants may also have been transported by infiltration and percolation of precipitation through soil, which would serve as a driving force for downward migration. See “Lateral and Vertical Extent of Contamination” for additional information. Friable asbestos could become airborne, and transported by wind to become an air and surface soil contaminant.

Preferential Pathways

Preferential pathways for contaminant migration are not expected for the CAU 127 CASs. As discussed previously, the presence of relatively impermeable layers could modify transport pathways both on the ground surface (e.g., concrete pads) and in the subsurface (e.g., caliche layers). The potential effect of these layers will be considered in the development of sampling schemes and sampling contingencies discussed in the CAIP.

Lateral and Vertical Extent of Contamination

Contamination, if present, is expected to be generally confined to the site. However, where multiple sites are adjacent, migration from one site may have impacted the immediately adjacent site. For example, the piping for the CAS 26-01-01 tank ends at the filter tank shed (CAS 26-99-01). Lateral migration from one CAS may have contaminated the soil below the adjacent CAS in such a situation. It is expected that lateral contamination will be confined to the CAS and adjacent CAS, if applicable. However, the potential exists for surface soil contamination due to a source unrelated to the CAS under investigation. This may be the case for the CASs located at Test Cell C, where widespread radiological contamination of the ground surface may be present.

Surface migration may occur as a result of a spill or leak and subsequently as runoff of precipitation. Surface migration is a biasing factor considered in the selection of sampling points.

Downward contaminant transport is expected to be very limited due to low precipitation and high evapotranspiration rates. Average annual precipitation is only 3 to 6 in. on valleys and less than 10 in. on ridges and mesas in this region (USGS, 1975), while the potential evaporation rate is almost 66 in. per year (DOE, 2002). Subsurface migration will be influenced by the geophysical properties of the soil, such as permeability, porosity, and conductivity. The presence of a hardpan layer (i.e., caliche) could limit vertical migration of contaminants and enhance lateral migration in some cases. The vertical migration of contaminants is expected to be limited due to the lack of a driving force (minimal infiltration). Migration of certain constituents (i.e., metals, radionuclides) will also be controlled to varying degrees by geochemical processes, such as adsorption, ion exchange, and precipitation of solids from solution.

Groundwater contamination is not considered a likely scenario at CAU 127. The groundwater depth varies between areas from approximately 2,390 to 2,470 ft above mean sea level (amsl) (approximately 710 to 1,040 ft bgs) in Area 25 (USGS, 1995) to approximately 2,700 ft amsl (1,700 ft bgs) in Area 26 (DRI, 1988). A perched water table is present throughout most of Area 26 at depths ranging from approximately 80 to165 ft bgs (USGS, 1964). Additional perched groundwater lenses may exist between the known perched water table and the regional water table.

Contaminant transport by the downward movement of precipitation through the unsaturated zone is not a viable transport mechanism for CAS 25-02-13 at the X-Tunnel. X-Tunnel is located on the southwest flank of Little Skull Mountain at an elevation of approximately 3,540 ft amsl. The unsaturated zone is therefore over 1,000-ft thick at X-Tunnel. Also, no water drainage is reported at X-Tunnel, implying that X-Tunnel does not intersect any water-transmitting faults or fractures, or perched water-bearing units.

A.1.1.3.2 Contaminants of Potential Concern

The CAS-specific list of COPCs was developed based upon process knowledge of the CASs, review of historic documents, past investigations at related CASs, and interviews with former site employees. The COPCs based on existing information are summarized below, with supporting information about how the COPCs were developed for each CAS. Due to uncertainty regarding the existing COPC information, additional constituents have been included as COPCs for the investigation of CAU 127. These COPCs are listed in Section A.1.3.3.

CAS 25-01-05–Aboveground Storage Tank; 25-02-02–Underground Storage Tank(s); 25-23-11–Contaminated Materials: These CASs are part of the WWTS at Test Cell C that was used for the NF-1 test series in 1972. The 100,000-gallon tank was used as back-up to the six 10,000-gallon USTs to store water generated during this series of tests. The water was processed through two filter tanks, which were previously removed, and then discharged to an on-site leachfield. Corrective Action Site 25-23-11 consists of a concrete vault, heat shield, pump, and piping. Historical documentation reports the use of VOCs during previous site remediation activities. Based upon historical information, the COPCs for these three CASs are VOCs, RCRA metals, asbestos (on piping), gamma-emitting radionuclides, Sr-90, plutonium, tritium, and uranium.

Analytical results from previous investigations at the WWTS indicate the presence of Cs-137, Sr-90, U-235, Eu-155, Cd-109, and Sb-125.

CAS 25-12-01–Boiler: This boiler is adjacent to the Test Cell C pumphouse building. The boiler was part of a borated water system that was used as a radiation shield. The boiler ran on propane. According to historical documents, the COPCs are radioisotopes that may have been present (through activation) in the boiler water (Cl-36, Co-60, Eu-154, Eu-155, and K-40). Potential asbestos pipe coverings are also present.

CAS 25-01-06–Aboveground Storage Tank; CAS 25-01-07–Aboveground Storage Tank: These CASs were installed in 1965 and originally contained diesel fuel used to refuel locomotives at the ETSM Building 3901 within the E-MAD Facility. After 1986, these tanks were used to supply fuel to heat the Building 3901. Visible petroleum staining on the ground at the north end of each tank was observed during a site visit conducted as part of the preliminary assessment of the CASs. The COPCs are petroleum hydrocarbons, specifically, diesel and heating oil.

There is a concern that radiological contamination may be present in the soil at this site, although this contamination is not a result of activities at these CASs. Therefore, radiological constituents will be added to the list of analytes.

CAS 25-02-13–Underground Storage Tank: This CAS is located in the X-Tunnel and is the previous location of an underground tank. The tank and gravel from the tank location were removed from the X-Tunnel experiment chamber in June 1996. The site was used by the U.S. Army, sometime between 1985 and 1987, as a catch basin to collect and contain hydraulic fluid from the firing table of a classified project. According to a radiological report for the X-Tunnel, depleted uranium (DU) was used in the tunnel prior to removal of the tank; therefore, it may also be a COPC (Bastian, 1996). The tank was reported to have been left in place until the X-Tunnel remediation was nearly completed, in order to catch any runoff generated during the process. The COPCs for this CAS are DU and hydraulic fluid (petroleum hydrocarbons).

CAS 26-01-01–Filter Tank (RAD) and Piping; CAS 26-01-02–Filter Tank (RAD); CAS 26-99-01–Radioactively Contaminated Filters: These CASs comprised a filter system that may have been used as part of a thin film evaporator system at the Project Pluto Disassembly Facility.

This system may have been used to recover and solidify radioactive wastes from liquid decontamination streams. Based upon a preliminary assessment of the filter system, the COPCs are beryllium, lead, uranium, RCRA metals, PCBs, petroleum hydrocarbons (gasoline and oil), Am-241, Pu-238, Pu-239/240, and asbestos.

CAS 26-02-01–Underground Storage Tank: This CAS was a water supply tank at the Project Pluto Check Station. It is unknown how long the tank was used or if it was used for any other purpose. As there is no information regarding any other use, there are no COPCs identified for this CAS.

CAS 26-23-01–Contaminated Liquids Spreader: The spreader was used to spray liquid intentionally contaminated with short-lived radionuclides throughout the associated exercise area at the Port Gaston Training Area. Two exercises were conducted, one in 1981 and the other in 1983, in which the liquids spreader was used to spray radiologically contaminated water to simulate a nuclear weapon accident. Materials reported to have been used were Ra-223 and Hg-197 in 1981, and Ra-223 and Pd-103 in 1983. Due to their short half-lives, these constituents are not COPCs. However, additional radiological constituents may have been present as impurities in the material used. The COPCs expected to be present include Ra-226, Ac-227, and Th-227. Other impurities may also be present.

A.1.2 Step 2 - Identify the Decision

This step develops the Phase I and Phase II decision statements and defines alternative actions.

A.1.2.1 Develop Decision Statement

Two decision statements are required for this investigation. The decision statement for Phase I of the investigation is: "Determine if a COC is present." The decision statement for Phase II is: "Determine the lateral and vertical extent of a COC."

A.1.2.2 Alternative Actions to the Decisions

If a COC is not present, further assessment of the CAS is not required. If a COC is present and its extent is defined in both the lateral and vertical directions, further assessment of the CAS is not required. If extent is not defined, reevaluate site conditions and collect additional samples.

A.1.3 Step 3 - Identify the Inputs to the Decision

This step identifies the information needed, determines sources for information, determines the basis for establishing the action level, and identifies sampling and analysis methods that can meet the data requirements. To determine if a COC is present, each sample result is compared to the PAL (Section A.1.3.2). If any sample result is greater than the PAL, then the applicable CAS is advanced to a Phase II investigation for that analyte. This approach does not use a statistical mean/average for comparison to the PAL, but rather the individual result, to identify COCs.

A.1.3.1 Information Needs and Information Sources

In order to determine if a COC is present at a particular CAS, sample data must be collected and analyzed following these two criteria: (1) samples must be collected in areas most likely to contain a COC and (2) the analytical suite selected must be sufficient to detect any COCs present in the samples.

Biasing factors to support these criteria include:

- Documented process knowledge on source and location of release
- Field observations
- Field screening
- Radiological surveys
- Historical sample results
- Experience and data from investigations of similar sites
- Professional judgement

In order to determine the extent of a COC, samples must be collected at locations to bound the lateral and vertical extent of COCs. The data required to satisfy the information need for each COC is a sample result that is below the PAL. Three lateral step-out samples and one vertical sample will be collected around and/or below each CAS identified as having exceeded the PAL for one or more COCs. The lateral samples will be located a maximum of 15 ft from the previous location, while the vertical samples will begin 2 ft below the previous location depth with COCs. The lateral step-out distance will generally be based upon the size of the already determined contaminated area. The step-outs for small areas will be just a few feet from the previous contaminated locations, whereas on large contaminated areas, the step-outs will increase to as much as 15 ft. When indicators or biasing factors indicate that the COC concentration at the step-out location may still exceed the PAL, then an

additional step-out distance may be used to collect the analytical sample. If the location where the PAL is exceeded is surrounded by clean locations, then lateral step-outs may not be necessary. In that case, sampling may consist only of sampling from deeper intervals at or near the original location to determine the vertical extent of contamination. Step-out locations may be moved due to access or safety issues; however, the modified locations must meet the decision needs and criteria for Phase II decisions.

Phase II samples will only be analyzed for those parameters that exceeded PALs (i.e., COCs) in Phase I samples. Biasing factors to support selection of Phase II sampling locations may include:

- Geophysical and/or radiological surveys
- Documented process knowledge on source and location of release
- Field observations
- Field-screening results
- Historical sample results
- Experience and data from investigations of similar sites
- Professional judgement
- Previous sample results

Table A.1-4 (Phase I) and Table A.1-5 (Phase II) lists the information needs, the source of information for each need, and the proposed methods to collect the data. The last column addresses the QA/QC data type and associated metric. The data type is determined by the intended use of the resulting data in decision making. Data types are discussed in the following text.

Quantitative Data

Quantitative data measure the quantity or amount of a characteristic or component within the population of interest. These data require the highest level of QA/QC in collection and measurement systems because the intended use of the data is to resolve primary decisions (i.e., rejecting or accepting the null hypothesis) and/or verifying closure standards have been met. Laboratory analytical data are generally considered quantitative.

Semiquantitative Data

Semiquantitative data indirectly measure the quantity or amount of a characteristic or component. Inferences are drawn about the quantity or amount of a characteristic or component because a correlation has been shown to exist between the indirect measurement and the results from a

Table A.1-4
Information Needs to Resolve the Phase I Decision
(Page 1 of 2)

Information Need	Information Source	Collection Method	Biasing Factors to Consider	Data Type/Metric
Decision: Determine if a COC is present. Criteria 1: Samples will be collected in areas most likely to contain a COC.				
Source and location of release points	Process knowledge compiled during the Preliminary Assessment process and previous investigations of similar sites	Information documented in CSM and public reports – no additional data needed	None	Qualitative – CSM has not been shown to be inaccurate
	Site visit and field observations	Conduct site visits and document field observations	View caps, joints, connections of pipes, tanks, etc. and surface soil for potential leaks, spills	Qualitative – CSM has not been shown to be inaccurate
	Radiological surveys	Perform radiological surveys using appropriate methods	Bias locations based upon areas of visible or likely surface spills/leaks	Semiquantitative – Locations based on biasing criteria stipulated in DQO Step 7
	Field screening	Collect soil samples from stained areas, or areas of likely spills/leaks	Bias locations based upon results of process info and field observations	Semiquantitative– Sampling locations based on visual or process knowledge
	Biased samples	Generate sampling points based on results of radiological surveys and field screening	Send samples with highest survey/screening results to laboratory	Semiquantitative – Sampling based on survey and screening results.
	Biased samples	Additional points will be located near CAS features	Bias locations along/around features.	Semiquantitative – Sampling based on CAS features.
Decision: Determine if a COC is present. Criteria 2: Analyses must be sufficient to detect any COCs in samples above action limits.				
Identification of all potential contaminants	Process knowledge compiled during PA process and previous investigations of similar sites	Information documented in CSM and public reports – no additional data needed	None	Qualitative – CSM has not been shown to be inaccurate

Table A.1-4
Information Needs to Resolve the Phase I Decision
(Page 2 of 2)

Information Need	Information Source	Collection Method	Biasing Factors to Consider	Data Type/Metric
Decision: Determine if a COC is present. Criteria 2: Analyses must be sufficient to detect any COCs in samples above action limits.				
Analytical results	Data packages of biased samples	Appropriate sampling techniques and approved analytical methods will be used. MDLs and MDAs are sufficient to provide quantitative results for comparison to PALs	None	Quantitative – Validated analytical results will be compared to PALs
Decision: Determine if sufficient information exists to characterize waste. Criteria: Analyses must be sufficient to allow disposal options to be accurately identified and estimated.				
Radiological data for comparison to Free Release Criteria	Radiological surveys	Perform radiological surveys using appropriate methods	Bias locations based upon areas of visible or likely surface spills/leaks. Areas of accumulation	Semiquantitative – Locations based on biasing criteria stipulated in DQO Step 7
Analytical results	Data packages of tank content samples	Appropriate sampling techniques and approved analytical methods will be used. MDLs and MDAs are sufficient to provide quantitative results for comparison to disposal requirements	Sufficient material must be available for analysis	Quantitative – Validated analytical results will be compared to disposal criteria

quantitative measurement. The QA/QC requirements on semiquantitative collection and measurement systems are high but may not be as rigorous as a quantitative measurement system. Semiquantitative data contribute to decision making but are not used alone to resolve primary decisions. Field-screening data are generally considered semiquantitative. The data are often used to guide investigations toward quantitative data collection.

Qualitative Data

Qualitative data identify or describe the characteristics or components of the population of interest. The QA/QC requirements are the least rigorous on data collection methods and measurement systems. The intended use of the data is for information purposes, to refine conceptual models, and

Table A.1-5
Information Needs to Resolve the Phase II Decision

Information Need	Information Source	Collection Method	Data Type/Metric
Decision: Determine the extent of a COC			
Identification of Applicable Contaminants	Sample data packages	Review analytical results to select COCs.	Quantitative – Only COCs identified will be analyzed in subsequent samples.
Extent of Contamination	Field observations	Document field observations.	Qualitative – CSM has not been shown to be inaccurate.
	Field-screening results	Conduct field screening with appropriate instrumentation.	Semiquantitative – FSRs will be compared to FSLs.
	Analytical results	Appropriate sampling techniques and approved analytical methods will be used to bound COCs.	Quantitative - Validated analytical results will be compared to PALs to determine COC extent.

guide investigations rather than resolve primary decisions. This measurement of quality is typically assigned to historical information and data where QA/QC may be highly variable or not known. Professional judgement is often used to generate qualitative data.

Metrics provide a tool to determine if the collected data support decision making as intended. Metrics tend to be numerical for quantitative and semiquantitative data, and descriptive for qualitative data.

A.1.3.2 Determine the Basis for the Preliminary Action Levels

Site workers may be exposed to contaminants through oral ingestion, inhalation, or dermal contact (absorption) of soil during disturbance of this medium. Laboratory analytical results for soils will be compared to the following PALs to evaluate if COPCs are present at levels that may pose an unacceptable risk to human health and/or the environment:

- *EPA Region 9 Risk-Based Preliminary Remediation Goals for Industrial Soils* (EPA, 2002).
- Background concentrations for metals when natural background exceeds the PRG, as is often the case with arsenic. Background is considered the mean plus two times the standard deviation of the mean for sediment samples collected by the Nevada Bureau of Mines and Geology throughout the Nellis Air Force Range (NBMG, 1998; Moore, 1999).

- TPH action limit of 100 mg/kg, per the NAC 445A.2272 (NAC, 2002).
- The PALs for radionuclides are isotope-specific and defined as the maximum concentration for that isotope found in samples from undisturbed background locations in the vicinity of the NTS (McArthur and Miller, 1989; US Ecology Atlan-Tech, 1992; DOE/NV, 1996).

Solid media such as concrete and/or structures may only pose a potential radiological exposure risk to site workers. Surface radiological surveys of the solid media will be compared to the free-release criteria, as defined in the *NV/YMP Radiological Control Manual* (DOE/NV, 2000), to evaluate if COPCs are present at levels that may pose an unacceptable risk to human health and/or the environment.

A.1.3.3 Potential Sampling Techniques and Appropriate Analytical Methods

Radiological Surveys

Radiological surveys will be used to determine presence/lateral extent of contamination. Radiological surveys will follow standard procedures. Further information is provided in Section A.1.7.1.

Sampling

Augering, direct-push, excavation, drilling, or other appropriate sampling methods will be used to collect soil samples. Sample collection and handling activities will follow standard procedures. The Industrial Sites QAPP (DOE/NV, 2002), unless otherwise stipulated in the CAIP, provides analytical methods and laboratory requirements (e.g., detection limits, precision, and accuracy). Sample volumes are laboratory- and method-specific and will be determined in accordance with laboratory requirements.

At all CASs within CAU 127, both site characterization and waste characterization efforts are proposed. Site characterization sampling and analysis are the focus of the DQO process. However, waste characterization sampling and analysis has been addressed to support the decision-making process for waste management, and also to ensure an efficient field program.

Samples of tank contents, filter medium, or other material may be collected, as appropriate, and submitted for analysis. These samples will assist in profiling media for waste characterization

purposes. Solid media (e.g., concrete or tank walls) will not be analyzed by a laboratory for chemical or radiological parameters. Specific analyses required for the disposal of IDW are identified in Section 5.0 of the CAIP.

Analytical Program

To ensure that laboratory analyses are sufficient to detect contamination in samples at concentrations exceeding the MRL, Phase I chemical and/or radiological parameters of interest have been selected for each CAS. The parameters for each CAS are identified in Table A.1-6. The Phase I analytical program was developed based on the historical COPC information presented in Section A.1.1.3.2. The analytical program also includes other constituents that have been added as COPCs due to uncertainty in existing documentation for the CASs. Analytical methods are specified in the Industrial Sites QAPP (DOE/NV, 2002), unless superseded by the CAIP.

The analytes of interest for the investigation of PCBs, are listed in Table A.1-7. The SVOC and VOC compounds expected to be analyzed for the investigation are included in Table A.1-8 and Table A.1-9, respectively.

Only those COCs identified during Phase I sampling will be analyzed during Phase II, provided that the Phase I analytical results are available. If Phase I results are not available, Phase II samples will be analyzed for all the parameters listed in Table A.1-6 for a given CAS.

A.1.4 Step 4 - Define the Boundaries of the Study

The purpose of this step is to define the target population of interest, specify the spatial and temporal features of the population that are pertinent for decision making, determine practical constraints on data collection, and define the scale of decision making relevant to target populations.

A.1.4.1 Define the Target Population

The target populations are dependent upon the CSM(s) applicable to the CAS. Phase I sampling target populations are identified in Table A.1-10. These target populations represent locations within the CAS that will contain COCs, if present. If it is determined to be necessary to sample additional target populations, they may also be sampled during Phase I of the investigation. While the

Table A.1-6
Analytical Program
(Includes Site and Waste Characterization Analyses)

Analyses[a]	25-01-05	25-02-02	25-23-11	25-12-01	25-01-06	25-01-07	25-02-13	26-01-01	26-01-02	26-99-01	26-02-01	26-23-01
Organics												
TPH (Diesel- and Gasoline- Range Organics, unless specified)	●	●	●	●	●	●	●	●[b]	●[b]	●[b]	●	●
PCBs	●	●	●	●	●	●		●	●	●	●	●
SVOCs	●	●	●	●	●	●		●	●	●	●	●
VOCs	●	●	●	●	●	●		●	●	●	●	●
Metals												
Total RCRA Metals[c]	●	●	●	●	●	●		●	●	●	●	●
Total Beryllium	●	●	●	●				●	●	●	●	●
Total Boron				●								
Asbestos	●	●	●	●				●	●	●		
Radionuclides												
Gamma Spectrometry	●	●	●	●	●	●		●[d]	●[d]	●[d]	●	●
Gross Beta				●								
Isotopic Uranium	●	●	●	●	●	●	●	●	●	●	●	
Tritium	●	●	●									
Isotopic Plutonium	●	●	●	●	●	●		●	●	●	●	
Strontium-90	●	●	●	●	●	●		●	●	●	●	

[a]In addition to the specified samples shown for soils, liquid, sludge, or solid material present in tank, piping, or other container may also be analyzed for the same constituents, with the exclusion of asbestos. If the volume of material is limited, prioritization of the analyses will be necessary.
[b]Add oil-range TPH.
[c]May also include TCLP metals if sample is collected for waste management purposes.
[d]Analysis for isotopic americium may be required for waste management purposes.

Table A.1-7
Proposed PCB Compounds for Analysis

PCB
Aroclor-1016
Aroclor-1221
Aroclor-1232
Aroclor-1242
Aroclor-1248
Aroclor-1254
Aroclor-1260

Table A.1-8
Proposed SVOCs for Analysis

Semivolatile Organic Compounds		
1,2,4-Trichlorobenzene	4-Chloro-3-methylphenol	Dibenzofuran
1,2-Dichlorobenzene	4-Chloroaniline	Diethyl Phthalate
1,3-Dichlorobenzene	4-Chlorophenyl phenyl ether	Dimethyl Phthalate
1,4-Dichlorobenzene	4-Methylphenol	Di-n-butyl Phthalate
2,4,5-Trichlorophenol	4-Nitroaniline	Di-n-octyl Phthalate
2,4,6-Trichlorophenol	4-Nitrophenol	Fluoranthene
2,4-Dichlorophenol	Acenaphthene	Fluorene
2,4-Dimethylphenol	Acenaphthylene	Hexachlorobenzene
2,4-Dinitrophenol	Anthracene	Hexachlorobutadiene
2,4-Dinitrotoluene	Benzo(a)anthracene	Hexachlorocyclopentadiene
2,6-Dinitrotoluene	Benzo(a)pyrene	Hexachloroethane
2-Chloronaphthalene	Benzo(b)fluoranthene	Indeno(1,2,3-cd)pyrene
2-Chlorophenol	Benzo(g,h,i)perylene	Isophorone
2-Methylnaphthalene	Benzo(k)fluoranthene	Naphthalene
2-Methylphenol	Bis(2-chloroethoxy) methane	Nitrobenzene
2-Nitroaniline	Bis(2-chloroethyl)ether	N-nitroso-di-n-propylamine
2-Nitrophenol	Bis(2-ethylhexyl) phthalate	N-nitrosodiphenylamine
3,3'-Dichlorobenzidine	Butyl benzyl phthalate	Pentachlorophenol
3-Nitroaniline	Carbazole	Phenanthrene
4,6-Dinitro-2-methylphenol	Chrysene	Phenol
4-Bromophenyl phenyl ether	Dibenzo(a,h)anthracene	Pyrene

Table A.1-9
Proposed VOCs for Analysis

Volatile Organic Compounds		
1,1,1,2-Tetrachloroethane	2-Hexanone	Dibromomethane
1,1,1-Trichloroethane	4-Methyl-2-pentanone	Dichlorodifluoromethane
1,1,2,2-Tetrachloroethane	Acetone	Ethylbenzene
1,1,2-Trichloroethane	Benzene	Iodomethane
1,1-Dichloroethane	Bromoform	Methylene chloride
1,1-Dichloroethene	Bromomethane	Styrene
1,2,3-Trichloropropane	Carbon disulfide|	Tetrachloroethene
1,2-Dibromo-3-chloropropane	Carbon tetrachloride	Toluene
1,2-Dibromoethane	Chlorobenzene	Trichloroethene
1,2-Dichloroethane	Chloroethane	Trichlorofluoromethane
1,2-Dichloropropane	Chloroform	Vinyl acetate
1,4-Dichlorobenzene	Chloromethane	Vinyl chloride
2-Butanone	Dibromochloromethane	

additional samples may not directly support Phase I decision-making, they will be used if a CAS is elevated to Phase II to define contamination extent.

The potential Phase II sampling target populations for each CAS are:

- COC concentrations in soil at step-out locations
- COC concentrations in soil below the contaminant plume(s)

Phase II target populations will be limited to those related to distinct Phase I target populations with COCs. These target populations represent locations within the system that, when sampled, will provide sufficient data to address the Phase II data needs discussed in Section A.1.3.

A.1.4.2 Identify the Spatial and Temporal Boundaries

The spatial boundaries that apply to each CAS in Phase I are the survey and sample locations selected for Phase I. The spatial boundaries that apply to each CAS for Phase II are shown in Table A.1-11. In general, geographic boundaries are defined by the impacted soil. Intrusive activities are not intended to extend into CASs not in CAU 127.

Temporal boundaries are time constraints due to time-related phenomena, such as weather conditions, seasons, activity patterns, etc. Significant temporal constraints due to weather conditions are not expected. Moist weather may place constraints on sampling and field-screening contaminated soils

Table A.1-10
Target Populations for the Phase I Investigations

CAS	Target Population
25-01-05	COC concentrations in surface soil near tank, especially near overflow pipe. COC concentrations in subsurface soil below tank and below piping running between tank and USTs (CAS 25-02-02). COC concentrations in tank contents for waste characterization.
25-02-02	COC concentrations in surface soil near the aboveground pressure valve and the aboveground piping above the USTs; COC concentrations in subsurface soil at the these locations, as well as soil adjacent to USTs, under piping between USTs and former filter tanks, and adjacent to piping from USTs to pump vault (CAS 25-23-11). COC concentrations in surface and subsurface soil at the former location of the filter tanks (includes berms around location). COC concentrations in tank contents for waste characterization.
25-23-11	COC concentrations in surface and subsurface soil near heat shield and pump vault. COC concentrations of materials in pump vault. Radiological characterization of surfaces of accessible pipes, concrete, pump, and debris for waste characterization.
25-12-01	COC concentrations in materials within boiler for waste characterization. Radiological characterization of surfaces of accessible pipes, pumps, concrete pad, and boiler for waste characterization.
25-01-06	COC concentrations in surface and subsurface soil on north side of concrete pad under tank.
25-01-07	COC concentrations in surface and subsurface soil on north side of concrete pad under tank.
25-02-13	COC concentrations on gravel/soil on the floor of the X-Tunnel experiment chamber over the former location of the underground tank.
26-01-01	COC concentrations in surface and subsurface soil under/adjacent to tank and piping. Radiological characterization of surfaces of pipes and tank for waste characterization. COC concentrations in tank contents for waste characterization.
26-01-02	COC concentrations in surface and subsurface soil under/adjacent to tank and piping. Radiological characterization of surfaces of pipes and tank for waste characterization. COC concentrations in tank contents for waste characterization.
26-99-01	COC concentrations in the surface and subsurface soil under the shed housing the radioactively contaminated filters. Radiological characterization of surfaces of pipes, filter tanks, and shed for waste characterization. COC concentrations in filter media for waste characterization.
26-02-01	COC concentrations in subsurface soil under base of tank. COC concentrations in tank contents for waste characterization.
26-23-01	COC concentrations in surface and possibly shallow subsurface soil from area below and immediately adjacent to spreader. Radiological characterization of inside and outside surfaces of spreader for waste characterization. COC concentrations in tank contents for waste characterization.

Table A.1-11
Spatial Boundaries for Phase II Investigation

CAS	Spatial Boundary	
	Horizontal	Vertical
25-01-05	50-ft buffer around the CAS	30 ft bgs
25-02-02	50-ft buffer around the CAS	50 ft bgs
25-23-11	50-ft buffer around the CAS	30 ft bgs
25-12-01	30-ft buffer around the CAS	0 ft bgs
25-01-06	50-ft buffer around the CAS	30 ft bgs
25-01-07	50-ft buffer around the CAS	30 ft bgs
26-01-01	50-ft buffer around the CAS	30 ft bgs
26-01-02	50-ft buffer around the CAS	30 ft bgs
26-99-01	50-ft buffer around the CAS	30 ft bgs
26-02-01	50-ft buffer around the CAS	30 ft bgs
26-23-01	30-ft buffer around the CAS	10 ft bgs

because of the attenuating effect of moisture in samples. There are no time constraints on collecting samples as environmental conditions at all sites will not significantly change in the near future and conditions would have stabilized over the years since the sites were last used.

A.1.4.3 Identify Practical Constraints

Nevada Test Site-controlled activities may affect the ability to characterize these CASs, although the sites are generally abandoned, without any ongoing activity. The exception to this is the X-Tunnel, location of CAS 25-02-13, which is inactive not abandoned. Also, CAS 26-02-01, the Check Station, has recently been demolished. The aboveground piping associated with this site has been removed, which would have disturbed the nearby surface soils, and impacted the representativeness of data from surface soil samples. Table A.1-12 indicates other practical constraints that may be encountered at each CAS.

Table A.1-12
Practical Constraints Identified for CAU 127

CAS	Utilities Likely to be Encountered[a]	Topography/Site Conditions Likely to Affect Planned Activities	Structures (Tanks/Pipes/Bldgs) Likely to Affect Planned Activities	Area Subject to Access Restrictions[b]	Confined Space, Health & Safety, Structural Integrity Issues
25-01-05	None known	No	No	Yes	Yes
25-02-02	None known	No	No	Yes	Yes
25-23-11	None known	No	Yes	Yes	Yes
25-12-01	None known	No	Yes	Yes	Yes
25-01-06	None known	No	No	Yes	No
25-01-07	None known	No	No	Yes	No
25-02-13	None known	Yes	Yes	Yes	Yes
26-01-01	None known	No	Yes	Yes	Yes
26-01-02	None known	No	Yes	Yes	Yes
26-99-01	None known	No	Yes	Yes	Yes
26-02-01	None known	No	No	No	No
26-23-01	None known	No	No	Yes	No

Source: Site visits.
[a]Utility constraints are subject to change as detailed information is collected prior to commencement of investigation activities and will be appropriately documented. All CASs will be surveyed for utilities prior to field activities in accordance with the SSHASP. Does not include underground piping that is included as part of the CAS.
[b]Access restrictions include both scheduling conflicts on the NTS with other entities and areas posted as contamination areas requiring appropriate work controls, and areas requiring authorized access.

A.1.4.4 Define the Scale of Decision Making

The scale of decision making in Phase I is defined as the CAS. The scale of decision making in Phase II is defined as the maximum extent of COC contamination. The scale of decision making for an unrestricted release determination is the entire object/structure (e.g., tank, pipe) surveyed.

A.1.5 Step 5 - Develop a Decision Rule

This step integrates outputs from the previous steps with the inputs developed in this step into a decision rule ("If..., then...") statement. This rule describes the conditions under which possible alternative actions would be chosen.

A.1.5.1 Specify the Population Parameter

The maximum observed concentration of each COC will be the population parameter. If radiological surveys are performed, radiological sampling results will supersede radiological survey results.

A.1.5.2 Choose an Action Level

Action levels are defined in Section A.1.1.3.2.

A.1.5.3 Measurement and Analysis Methods

The analyses identified in Section A.1.3.3 for each CAS will be used to identify the presence, location, and extent of COCs in the investigation. Indicators (e.g., field conditions, process knowledge) may also be used to identify the presence and location of COCs. At selected CASs, radiological surveys will also be used to identify the presence and location of COCs.

The measurement and analysis methods in the Industrial Sites QAPP (DOE/NV, 2002) are capable of achieving the expected range of values to resolve the Phase I and II decisions. The detection limit of the measurement method to be used is less than the PAL for each COPC, unless specified otherwise in the CAIP.

A.1.5.4 Decision Rule

Phase I Decision: If the concentration of any COPC in a target population exceeds the PAL for that COPC, then that COPC is identified as a COC, and a Phase II investigation will be conducted. If it is determined that sufficient indicators are present, then Phase I can be terminated and a Phase II investigation initiated. If the COPC concentration is less than the PAL, then the decision will be no further action.

Phase II Decision: If the maximum observed concentration of any COC of a target population exceeds the PALs, then additional samples will be collected to define extent. If the observed concentration is less than the PAL, then the decision will be that the extent of contamination has been defined in the vertical and/or horizontal direction.

If contamination is inconsistent with the CSM or extends beyond the spatial boundaries identified in Table A.1-11, then work will be suspended and the investigation strategy will be reevaluated. If contamination is consistent with the CSM and is within spatial boundaries, then the decision will be to continue sampling to define extent.

A.1.6 Step 6 - Specify the Tolerable Limits on Decision Errors

The sampling approach for the CAU 127 investigation relies on biased sampling locations. Only validated analytical results (quantitative data) will be used to determine if COCs are present. The baseline condition (i.e., null hypothesis) and alternative condition for Phase 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 Phase II are:

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

Decisions and/or criteria have an alpha (false negative) or beta (false positive) error associated with their determination (discussed in the following subsections). Since quantitative data are individually compared to action levels, statistical evaluations of the data such as averages or confidence intervals are not appropriate.

A.1.6.1 False Negative Decision Error

The false negative (rejection or alpha) decision error would mean deciding that a COC is not present when it is, increasing risk to human health and environment.

A false negative decision error (where consequences are more severe) is controlled by meeting these criteria: (1) having a high degree of confidence that the sample locations selected will identify COCs if present anywhere within the CAS or that the locations will identify the extent of COCs, and (2) having a high degree of confidence that analyses conducted will be sufficient to detect any COCs present in the samples.

To satisfy the first criterion, Phase I samples will be collected in areas most likely to be contaminated by any COCs and Phase II samples will be collected in areas that represent the lateral and vertical extent of contamination. To accomplish this, the following characteristics are considered:

- 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. The biasing factors listed in Section A.1.3.1 will be used to further ensure that the first criterion is met.

To satisfy the second criterion, all Phase I samples and Phase II samples (when Phase I data are not yet available) will be analyzed for the chemical and radiological parameters listed in Section A.1.3.3 using analytical methods that are capable of producing quantitative data to concentrations below or equal to PALs (unless stated otherwise in the CAIP). For Phase II samples, when Phase I data are available, samples will be analyzed for only those chemical and radiological parameters that have been identified as COCs in the Phase I samples. Strict adherence to established procedures and QA/QC protocol protects against false negatives.

A.1.6.2 False Positive Decision Error

The false positive (acceptance or beta) decision error would mean deciding that a COC is present when it is not, or accepting that the extent of a COC has not been defined when it really has, resulting in increased costs for unnecessary characterization.

The false positive decision error is controlled by protecting against false positive analytical results. False positive results are typically attributed to laboratory and/or sampling/handling errors. Quality assurance/quality control samples such as field blanks, trip blanks, laboratory control samples, and method blanks minimize the risk of a false positive analytical result. Other measures include proper decontamination of sampling equipment and using certified clean sample containers to avoid cross contamination.

A.1.6.3 Quality Assurance/Quality Control

Radiological survey instruments will be calibrated in accordance with manufacturer's instructions and periodic calibrations will be performed in accordance with approved procedures. Quality control samples will be collected as required by established procedures. The required QC samples include:

- Trip blanks (one per sample cooler containing VOC environmental samples)
- Equipment blanks (one per sampling event for each type of decontamination procedure)
- Source blanks (one per source lot per sampling event)
- Field duplicates (minimum of 1 per matrix per 20 environmental samples or 1 per CAS if less than 20 collected)
- Field blanks (minimum of per one CAS)
- Matrix spike/matrix spike duplicate (minimum of 1 per matrix per 20 environmental samples or 1 per CAS if less than 20 collected). The MS/MSD is not needed for some radioanalytical measurements (e.g., gamma spectrometry).

Additional QC samples may be submitted based on site conditions.

Data Quality Indicators of precision, accuracy, comparability, completeness, and representativeness are defined in the Industrial Sites QAPP (DOE/NV, 2002). In addition, sensitivity has been included as a DQI for laboratory analyses. Site-specific DQIs are discussed in more detail in Section 6.0 of the CAIP.

A.1.7 Step 7 - Optimize the Design for Obtaining Data

Radiological surveys and intrusive sampling will be conducted at CAU 127 during Phase I. Radiological surveys will be conducted at eight of the CASs to estimate the lateral extent of contamination and/or identify hot spots for subsequent sampling or swiping. A radiological survey of X-Tunnel floor will be performed at the former location of the CAS 25-02-13 underground tank to confirm the absence of contamination.

Soil sampling locations will be determined based on the results of the surveys and other biasing factors listed in Section A.1.3.1. These locations may be modified, but only if the modified locations

meet the decision needs and criteria stipulated in Section A.1.3. As noted in Section A.1.3.3 and Section A.1.4.1, some sampling will be performed for waste characterization purposes. Section A.1.7.1 and Section A.1.7.2 provide information on general investigation activities. Section A.1.7.3 provides the planned Phase I sampling strategy for each CAS in CAU 127 except CASs 25-01-06 and 25-01-07. The investigation of these two CASs will proceed directly to Phase II, since soil contamination is known to be present. The Phase II strategy is presented in Section A.1.7.4.

A.1.7.1 Radiological Survey Methodologies and Instruments

Radiological surveys will be conducted at eight CASs to define the lateral extent of surficial contamination and/or to locate hot spots for subsequent sampling or swiping. Walk-over surveys using handheld instruments will be performed on those portions of the CASs that are accessible. The walk-over surveys will be conducted on each CAS in such a manner as to ascertain if radiological contamination is present and is decreasing as the distance from the tanks/piping/etc. increases, as CSM #1 would predict. Additionally, if elevated surface readings are encountered, an effort will be made through *in situ* screening techniques to identify the source term as being either a surface/shallow subsurface source term or a subsurface source term. The NE Technology Electra, Eberline E-600, TSA-PRM-470B and Bicron mRem or equivalent instruments will be used in the appropriate capacity as the handheld instruments. As discussed above, a confirmatory walk-over radiological survey of the tunnel floor will be conducted at the former location of the CAS 25-02-13 underground tank.

Some radiological screening, surveying, and swipe collection will take place for waste characterization purposes. These activities will assess the amount of fixed and removable contamination on the surfaces of pipes, tanks, concrete, and possibly other objects. When necessary, detectors or probes on extended cables will be lowered into structures to collect measurements, and swipes will be affixed to extension poles or fish tapes to obtain data from the interior of structures or objects.

Additional equipment and software used in the radiological data collection and processing include a GPS receiver, such as Trimble or Motorola, and associated laptop computers to log and process the

walk-over radiological data. Mapping programs such as ArcView, Surfer, and EarthVision will be used to plot data on site maps or aerial photographs.

A.1.7.2 Intrusive Investigation

Intrusive investigations will be conducted at 10 of the CASs to determine if a COC is present. An intrusive investigation is not planned for the boiler and associated features at Test Cell C (CAS 25-12-01) or the former UST location in the X-Tunnel (CAS 25-02-13). Samples from each of the 10 sites will be collected from biased locations. The sampling locations will be determined based on the results of the radiological surveys and other biasing factors listed in Section A.1.3.1.

Rotary sonic drilling, hollow-stem auger drilling, direct-push, handheld augers, or excavation will be used to access sample intervals for laboratory analysis at select locations to determine if a COC is present. Due to the potentially dangerous nature of buried features (i.e., tanks, piping, utilities, asbestos), sample locations may be biased adjacent to any buried feature, based upon the review of engineering drawings, and information obtained during site walkovers. The locations may also be biased, based upon specific site conditions encountered. Surface soil samples (<0.5 ft bgs) will be collected by hand according to approved procedures.

A.1.7.3 Phase I Sampling Strategy

The planned Phase I sampling strategy for each CAS is listed in Table A.1-13. The biasing factors listed in Section A.1.3.1 will be used to determine sampling locations. Where soil sampling is proposed in Table A.1-13, if FSRs above FSLs or other biasing factors indicate the presence of contamination at levels above the PALs, a Phase II investigation will be instituted.

The collection of samples of tank contents for waste characterization are dependent on the accessibility and availability of the contents. The determination that tank contents can be sampled will be made in the field. If distinct phases are identified, if possible, a sample of each phase will be collected for analysis. If there is evidence of leakage from any of the CAU tanks/piping, any liquids remaining in the tanks will be removed as soon as possible.

Table A.1-13
Planned Phase I Sampling Strategy
(Page 1 of 3)

CAS	Sampling Strategy[a]
25-01-05 Test Cell C 100,000-gal AST	Sample and analyze contents of tank, if sufficient material is present. Perform radiological survey of ground within a 20-ft perimeter of tank and along the length of piping (10 ft either side). Pump pad/vault may still be present at northwest end of pipes. If present, perform radiological survey of pumps and pad/vault. Minimum of two surface soil samples around the base of the tank, locations based on biasing factors. Two subsurface soil samples, using angle boring, under footprint of tank. Minimum of three subsurface soil samples, locations based on biasing factors, along the length of the underground pipe running to CAS 25-23-11. Include pump pad/vault in this area. Sample interval will begin at the base of the pipe. Minimum of one sample of suspected ACM on pipes.
25-02-02 Test Cell C six 10,000-gal USTs	Sample and analyze contents of tanks, if sufficient material is present. Perform radiological survey of ground within 20 ft of approximated outline of tanks, and along the length of piping (10 ft either side). Perform radiological survey around, over, and within bermed area that previously held filter tanks (extend 20 ft beyond outer toe of berms). This survey will also be used for CAS 25-23-11. Conduct downhole radiological survey of tank interior(s) if access is available (e.g., through vent risers) and if tank contents are not sampled. Minimum of one surface soil sample, next to aboveground piping over USTs, locations based upon biasing factors. Minimum of six soil sample locations (surface and subsurface) in soil berms around the filter tank area (outside, top, and inside berm surfaces), locations based upon biasing factors. Locations at top of berm will be surface soil sample locations only. Minimum of one subsurface soil sample within the bermed area, immediately off the concrete pad, location based upon biasing factors. Minimum of two subsurface soil samples adjacent to pump vault, location based upon biasing factors. Sample intervals will be below the base of CAS 25-23-11 pump vault. (Note: Soil above base of vault is addressed in investigation of CAS 25-23-11). Minimum of one subsurface soil sample, below the underground pipe running to CAS 25-23-11, sample interval will begin at the base of the pipe. Subsurface soil samples as near as possible to tanks, minimum of four sample locations, based upon biasing factors. Samples on the northeast side of the tanks will be obtained by extending the depths of the sampling locations inside of the bermed area. Minimum of one sample of suspected ACM on pipes.

Table A.1-13
Planned Phase I Sampling Strategy
(Page 2 of 3)

CAS	Sampling Strategy[a]
25-23-11 Test Cell C Contaminated Materials	Perform radiological survey within 20 ft of pump vault. Perform limited radiological characterization of exterior and accessible interior surfaces of pump, pipes, concrete vault, and heat shield, as appropriate (suspected ACM will not be disturbed to access surfaces). Minimum of two surface soil samples, locations based upon biasing factors. Exact locations will be based upon accessibility, due to piping and heat shield conflict. (Note: subsurface soil at these locations will be addressed by the investigation of CAS 25-02-02.) Minimum of one sample of suspected ACM on pipes.
25-12-01 Test Cell C Boiler	Sample and analyze contents of boiler, if sufficient material is present. Perform radiological survey of ground within 20 ft of boiler, and within 10 ft of other features included in CAS. Perform limited radiological characterization of exterior and accessible interior surfaces of boiler and other features included in CAS, as appropriate (suspected ACM will not be disturbed to access surfaces). Minimum of one sample of suspected ACM on boiler and/or pipes.
25-02-13 X-Tunnel UST	Perform a confirmatory radiological survey of the tunnel experiment chamber floor at the former location of the underground tank. The excavation associated with the tank removal was approximately 10 ft by 8 ft. Due to uncertainty in the precise location of the excavation, the radiological survey will include an area of at least 20 ft by 20 ft.
25-01-06 E-MAD 1,000-gal AST	Proceed to Phase II sampling.
25-01-07 E-MAD 1,000-gal AST	Proceed to Phase II sampling.
26-01-01 Project Pluto Disassembly Facility 10,000-gal Filter Tank (RAD) and Piping	Sample and analyze contents of tank, if sufficient material is present. Perform radiological survey of ground within 20 ft of tank and along the length of piping (5 ft on either side). Perform limited radiological characterization of exterior and accessible interior surfaces of tank and aboveground pipes, as appropriate (suspected ACM will not be disturbed to access surfaces). Minimum of four surface and subsurface soil sample locations beneath and immediately adjacent to the tank and aboveground piping, based upon biasing factors. Minimum of three subsurface soil samples along the length of the underground pipe running from CAS 26-01-01 to the previous location of the CAS 26-02-04 UST. Locations will be based upon biasing factors, and sample intervals will begin at the base of the pipe. Minimum of one sample of suspected ACM on pipes.

Table A.1-13
Planned Phase I Sampling Strategy
(Page 3 of 3)

CAS	Sampling Strategy[a]
26-01-02 Project Pluto Disassembly Facility 5,000-gal Filter Tank	Sample and analyze contents of tank, if sufficient material is present. Perform radiological survey of ground within 20 ft of tank, and along the length of piping (5 ft either side). Perform limited radiological characterization of exterior and accessible interior surfaces of tank and aboveground pipes, as appropriate (suspected ACM will not be disturbed to access surfaces). Minimum of four surface and subsurface soil locations beneath and immediately adjacent to the tank and aboveground piping, based upon biasing factors. Minimum of one sample of suspected ACM on pipes.
26-99-01 Project Pluto Disassembly Facility Radioactively Contaminated Filters	Sample and analyze contents of tanks/filters, if sufficient material is present. Perform radiological survey of ground within 20 ft of shed. Perform limited radiological characterization of exterior and accessible interior surfaces of filter tanks, aboveground pipes, and shed, as appropriate (suspected ACM will not be disturbed to access surfaces). Minimum of three surface and subsurface soil sample locations beneath and immediately adjacent to the building, based upon biasing factors. Minimum of one sample of suspected ACMs on pipes and/or other features.
26-02-01 Project Pluto Check Station 1,000-gal UST	Sample and analyze contents of tank, if sufficient material is present. Two subsurface soil samples, immediately adjacent to the tank, locations based upon biasing factors. Sample interval will begin at the base of the tank.
26-23-01 Port Gaston Contaminated Liquids Spreader	Sample and analyze contents of two tanks (it is suspected tanks are dry). Perform limited radiological characterization of exterior and accessible interior of surfaces of tanks, hoses, pipes, wheels, frames, etc., as appropriate. Perform radiological survey of area within 20 ft radius of spreader. Minimum of three surface soil samples beneath or immediately adjacent to the spreader, locations based upon biasing factors.

[a]The sampling locations may be altered based upon additional information.

A.1.7.4 Phase II Sampling Strategy

Biased soil sampling for laboratory analysis will be conducted at CAU 127 during Phase II. Biased sampling locations will be estimated prior to Phase II, based on process knowledge and analytical results from Phase I, if available. As field data are generated (e.g., radiological surveys, field-screening, and Phase I analytical results), the Phase II locations may be modified as long as they meet the decision needs and criteria stipulated in Section A.1.3.

Lateral step-out sample points will be located a maximum of 15 ft from outer boundary sample locations where COCs were detected. If biasing factors indicate COCs extend beyond the proposed Phase II sample locations, further step-out locations may be necessary. At each Phase II lateral step-out location, soil samples will be collected at the depth(s) where COCs were encountered and at 2-ft intervals below the lowest depth where COCs were encountered. Phase II sampling to define the vertical extent of contamination will begin 2 ft below the depth where COCs were detected. In general, samples submitted for laboratory analysis would be those that define the lateral and vertical extent of COCs. Additional samples may be collected to define the extent of COCs if necessary.

At each sample location, sampling will continue until two consecutive soils samples with screening results below FSLs are collected or a hold point (Table A.1-11) is reached. In addition to screening results below FSLs, these two consecutive sample intervals will also be characterized by the absence of other indicators of contamination (e.g., odors or staining). The extent of contamination will be defined by submitting one of these below-FSL samples (generally, the uppermost sample) for laboratory analysis to confirm the absence of COCs. If the analyzed sample is below PALs, then extent will be considered to be determined. Accordingly, not every interval that is collected for field screening will be submitted for laboratory analysis; the protocol is discussed in the CAIP.

Based on current site conditions, the investigations of CASs 25-01-06 and 25-01-07 will proceed directly to Phase II. The sampling strategy for these CASs is listed in Table A.1-14.

Table A.1-14
Planned Phase II Sampling Strategy

CAS	Sampling Strategy[a]
25-01-06 E-MAD 1,000-gal AST	Minimum of two soil samples within the stained soil area–one surface and one shallow subsurface. Minimum of one surface and one subsurface soil sample in each direction (north, east, and west), approximately 3 ft beyond the visibly stained surface soil. Final sample locations and sample depths will be based upon biasing factors. Analyze samples that do not exceed FSLs in order to confirm delineation of contamination extent. If contamination extends beyond these limits, step-out locations at additional distance and/or depth, as necessary, will be sampled.
25-01-07 E-MAD 1,000-gal AST	Minimum of two soil samples within the stained soil area–one surface and one shallow subsurface. Minimum of one surface and one subsurface soil sample in each direction (north, east, and west), approximately 3 ft beyond the visibly stained surface soil. Final sample locations and sample depths will be based upon biasing factors. Analyze samples that do not exceed FSLs in order to confirm delineation of contamination extent. If contamination extends beyond these limits, step-out locations at additional distance and/or depth, as necessary, will be sampled.

[a]The sampling locations may be altered based upon additional information.

A.2.0 References

Bastian, C.T., Bechtel Nevada. 1996. Memorandum to J.A. Carpenter (LANL) and J.M. Haeberlin (LLNL) entitled, "Final Radiological Report for the X-Tunnel," 12 August. Las Vegas, NV.

Desert Research Institute. 1988. *CERCLA Preliminary Assessment of DOE's Nevada Operations Office Nuclear Weapons Testing Areas*, Vol. 1. Las Vegas, NV: Water Resource Center.

DOE, see U.S. Department of Energy.

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

DRI, see Desert Research Institute.

EPA, see U.S. Environmental Protection Agency.

McArthur, R.D., and F.L. Miller, Jr. 1989. *Off-Site Radiation Exposure Review Project, Phase II Soil Program*, DOE/NV/10384-23. Las Vegas, NV: Desert Research Institute.

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

NAC, see *Nevada Administrative Code*.

NBMG, see Nevada Bureau of Mines and Geology.

Nevada Administrative Code. 1996. NAC 445A.227, "Contamination of Soil: Order by Director for Corrective Action; Factors to be Considered in Determining whether Corrective Action Required." Carson City, NV.

Nevada Administrative Code. 2002. NAC 445A.2272, "Contamination of Soil: Establishment of Action Levels." Carson City, NV.

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

U.S. Department of Energy. 2002. *Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada*, DOE/EIS-0250, Volume 1. Las Vegas, NV: Office of Civilian Radioactive Waste Management.

U.S. Department of Energy, Nevada Operations Office. 1996. *Environmental Data Report for the Nevada Test Site - 1994*. Prepared by S.C. Black and Y.E. Townsend. Las Vegas, NV.

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

U.S. Department of Energy, Nevada Operations Office. 2000. *NV/YMP Radiological Control Manual*, DOE/NV/11718-079, Rev. 4. Prepared by Bechtel Nevada. Las Vegas, NV.

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

US Ecology and Atlan-Tech. 1992. *Environmental Monitoring Report for the Proposed Ward Valley, California, Low-Level Radioactive Waste (LLRW) Facility.* Rosewell, GA.

U.S. Environmental Protection Agency. 2002. *Region IX Preliminary Remediation Goals (PRGs)*. Available at www.epa.gov/region09/waste/sfund/prg, updated 22 November, accessed on 06/03/2002. San Francisco, CA.

USGS, see U.S. Geological Survey.

U.S. Geological Survey. 1964. *Geology of the Pluto Site, Area 401, Nevada Test Site, Nye County, Nevada*, USGS-TEI-841. Prepared by R.B. Johnson and J.R. Ege. Denver, CO.

U.S. Geological Survey. 1975. *Hydrogeologic and Hydrochemical Framework, South-Central Great Basin, Nevada-California, with Special Reference to the Nevada Test Site*, USGS Professional Paper 712-C. Prepared by I.J. Winograd and W. Thordarson. Washington, DC.

U.S. Geological Survey. 1995. *Selected Ground-Water Data for Yucca Mountain Region, Southern Nevada and Eastern California, Calender Year 1993*, USGS-OFR-158. Prepared by G.S. Hale and C.L. Westernburg. Denver, CO.

APPENDIX B

SAMPLE ANALYTICAL RESULTS

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NSTec

ANALYTICAL LABORATORY

SERVICES REQUEST AND CHAIN OF CUSTODY RECORD

Page ____ of ____

PROJECT / CLIENT INFORMATION

Project: CAU 127 | BN Org#: H300

Charge Number: 5B1B05D6

Project Manager: Jeff Smith

Phone: 295-7775 | Fax: 295-7701 | M/S: NTS 306

REPORT & TURNAROUND INFORMATION

Send Report to: Rebecca King

Phone: 295-5804 | Fax: 295-7761 | M/S: NTS 306

Turnaround: ( ) Standard – 14 days HI, 28 days Non-rad Env, 45 days Rad Env
(X) RUSH Preliminary by _____ (HI)
___ 1 ___ 2 X 7 ___ 14 (non-Rad Env)
___ 1 ___ 7 ___ 14 ___ 28 (Radiological Env)

SAMPLE INFORMATION

Sampling Site: CAU 127 CAS 25-01-06

The samples submitted contain (check):
( ) **Hazardous** - *(list)* _____
( ) **Radioactive** - *(list)* _____
( ) **Unknown** contamination. If known, identify contaminants. This information will ensure compliance with applicable regulations and allow for the safe handling of the sample materials.

SAMPLE MANAGEMENT INFORMATION

PG: _____ (HI) V2886 (Non-Rad Env) _____ (Rad Env)

Samples submitted are associated with a signed Project SOW. (X) YES ( ) NO

Analyses entered here agree with the SOW: (X) YES ( ) NO ( ) N.A

If not, identify the variation: _____

Subcontract Lab(s) used for this work: LIONVILLE

DESCRIPTION	SAMPLING DATE	SAMPLING TIME	MATRIX	CONTAINER #	CONTAINER Est. Vol	QC MD	QC MS	QC MSD	Pres - Analysis eg. HCl - VOCs	Pay Item, Analysis, Method: 10.52 TPH
25-01-06-V1	4/3/07	1045	Soil	1	250ml					X
25-01-06-V2		1050								X
25-01-06-V3		1055								X
25-01-06-V4		1100								X
25-01-06-V5		1105								X
25-01-06-V6		1110								X
LAST ITEM										

CUSTODY TRANSFER

Sampled/Relinquished (print)	Signature	DATE / TIME	Received by (print)	Signature	DATE / TIME
Mike FLOYD	/s/ M. Floyd	4/3/07 1630	Rover	No signature	4/3/07 1630
Mike Floyd	/s/ M. Floyd	4/4/07 0830	CQ CASTANEDA	/s/ C Castabeda	4/4/07 @ 0830
CQ CASTANEDA	/s/ C Castaneda	4/4/07 @1300	Fed Ex	7996 1611 6909 94	4/4/07 @ 1300
Fed Ex		4/9/07 @ 0835	VICTOR HERNANDEZ	/s/ V Hernandez	4/5/07 @ 835

FRM-0732 (11/06)

Lionville Laboratory, Inc.

DIESEL RANGE ORGANICS BY GC

Report Date: 04/13/07 08:35

RFW Batch Number: 0704L078 Client: NSTEC V2886 Work Order: 60052001001 Page: 1

	Cust ID:	25-01-06-V1	25-01-06-V1	25-01-06-V1	25-01-06-V2	25-01-06-V3	25-01-06-V4
Sample Information	RFW#:	001	001 MS	001 MSD	002	003	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
p-Terphenyl		52 %	46 %	39 %	22 * %	52 %	44 %
Diesel Range Organics		3280 U	73 %	67 %	3800	6900	3490 U
Motor Oil Range Organics		10100 U	NS	NS	10200 U	19000	10500 U

	Cust ID:	25-01-06-V5	25-01-06-V6	BLK	BLK BS
Sample Information	RFW#:	005	006	07LE0177-MB1	07LE0177-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00
	Units:	ug/kg	ug/kg	ug/kg	ug/kg
p-Terphenyl		38 %	35 %	50 %	45 %
Diesel Range Organics		3500	3900	3330 U	77 %
Motor Oil Range Organics		10300 U	10400 U	10000 U	NS

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Lionville Laboratory, Inc.

GAS RANGE ORGANICS

Report Date: 04/13/07 09:08

RFW Batch Number: 0704L078 Client: NSTEC V2886 Work Order: 60052001001 Page: 1

	Cust ID:	25-01-06-V1	25-01-06-V2	25-01-06-V3	25-01-06-V4	25-01-06-V5	25-01-06-V6
Sample Information	RFW#:	001	002	003	004	005	006
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Fluorobenzene		67 %	66 %	65 %	70 %	68 %	49 %
Gasoline Range Organics (GRO)		90 U	90 U	90 U	90 U	90 U	90 U

	Cust ID:	TBLKCM	TBLKCM BS
Sample Information	RFW#:	07LVJ412-MB1	07LVJ412-MB1
	Matrix:	SOIL	SOIL
	D.F.:	1.00	1.00
	Units:	UG/KG	UG/KG
Fluorobenzene		77 %	74 %
Gasoline Range Organics (GRO)		80 U	93 %

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

0707055

NSTec

ANALYTICAL LABORATORY
SERVICES REQUEST AND CHAIN OF CUSTODY RECORD

Page 1 of 1

PROJECT / CLIENT INFORMATION			*REPORT & TURNAROUND INFORMATION*			*SAMPLE INFORMATION*
Project: CAU 127	BN Org#: H330		Send Report to: REBECCA KING			Sampling Site: CAU 127 CAS 25-23-11
Charge Number: SB1B 0506			Phone: 5-5804	Fax:	M/S: NTS 306	The samples submitted contain (check):
Project Manager: TOM THIELE			Turnaround: ( ) Standard – 14 days IH, 28 days Non-rad Env, 45 days Rad Env			( ) Hazardous - *(list)*
Phone: 295-6711	Fax:	M/S: NTS 306	( ) RUSH Preliminary by _____ (IH)			(X) Radioactive - *(list)* Cs-137
			___ 1 ___ 2 ___ 7 ___ 14 (non-Rad Env)			( ) Unknown contamination. If known, identify contaminants. This information will ensure compliance with applicable regulations and allow for the safe handling of the sample materials.
			___ 1 X 7 ___ 14 ___ 28 (Radiological Env)			

SAMPLE MANAGEMENT INFORMATION

SDG: _____ (IH) _____ (Non-Rad Env) VJ936 (Rad Env)

Samples submitted are associated with a signed Project SOW. (X) YES ( ) NO

Analyses entered here agree with the SOW. (X) YES ( ) NO ( ) N/A

If not, identify the variation: _____

Subcontract Lab(s) used for this work: PARAGON

ID/DESCRIPTION	SAMPLING DATE	SAMPLING TIME	MATRIX	CONTAINER #	CONTAINER Est. Vol	QC MD	QC MS	QC MSD	Pres – Analysis eg. HCl - VOCs	Pay Item, Analysis, Method: NGS-A-002	Pay Item, Analysis, Method: 137-Cs-HASL 300
252311 - V1	06/21/07	1150	SOIL	1	500mL				COOL 4°C	X	
252311 - V2		1152									
252311 - V3		1158									
252311 - V4		1156									
252311 - V5		1206									
252311 - V6		1203									
252311 - V7		1214									
252311 - V8		1210									
252311 - V9		1218									
252311 - V10		1221									

CUSTODY TRANSFER

Sampled/Relinquished (print)	Signature	DATE / TIME	Received by (print)	Signature	DATE / TIME
BEN MCGEE	/s/ B McGee	06/25/07 - 13:45	REFRIGERATOR	/s/ B McGee	06/25/07 - 13:45
REFRIGERATOR	/s/ B McGee	07/05/07 - 08:15	BEN MCGEE	/s/ B McGee	07/05/07 - 08:15
BEN MCGEE	/s/ B McGee	07/05/07 - 08:19	C. CASTANEDA	/s/ C Castaneda	7/5/07 @ 0819
C. CASTANEDA	/s/ C Castaneda	7/5/07 @ 1300	FedEx	791717520130	7/5/07 @ 1300
FEDEX		07/06/07 0930	Andy Freeman	/s/ A. Freeman	07/06/07 0930

FRM-0732 (11/06)

Gamma Spectroscopy Results

PAI 713 Rev 9

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0707033
Client Name: National Security Technologies, LLC
ClientProject ID: CAU 127 V2936

Field ID: 252311-V1
Lab ID: 0707033-1

Library: LNG_GAM-A-001
Analysis ReqCode: NGS-A-002

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 8
Date Collected: 21-Jun-07
Date Prepared: 09-Jul-07
Date Analyzed: 09-Jul-07

Prep Batch: GS070707-1
QCBatchID: GS070707-1-1
Run ID: GS070707-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 419 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 070971d01

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	7.32E-01 +/- 1.27E-01	1.01E-01	LT,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *GSS0707033-1*

Gamma Spectroscopy Results

PAI 713 Rev 9

Sample Duplicate Results

Lab Name: Paragon Analytics
Work Order Number: 0707033
Client Name: National Security Technologies, LLC
ClientProject ID: CAU 127 V2936

Field ID: 252311-V1
Lab ID: 0707033-1DUP
Library: LNG_GAM-A-001

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 8
Date Collected: 21-Jun-07
Date Prepared: 09-Jul-07
Date Analyzed: 09-Jul-07

Prep Batch: GS070707-1
QCBatchID: GS070707-1-1
Run ID: GS070707-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 419 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 070998d02

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	8.14E-01 +/- 1.70E-01	1.34E-01	LT,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

D - DER is greater than Control Limit of 3.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *GSS0707033-1*

Gamma Spectroscopy Results

PAI 713 Rev 9

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0707033
Client Name: National Security Technologies, LLC
ClientProject ID: CAU 127 V2936

Field ID: 252311-V2
Lab ID: 0707033-2

Library: LNG_GAM-A-001
Analysis ReqCode: NGS-A-002

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 8
Date Collected: 21-Jun-07
Date Prepared: 09-Jul-07
Date Analyzed: 09-Jul-07

Prep Batch: GS070707-1
QCBatchID: GS070707-1-1
Run ID: GS070707-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 421 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 070972d01

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	3.88E-01 +/- 8.59E-02	8.70E-02	LT,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *GSS0707033-1*

Gamma Spectroscopy Results

PAI 713 Rev 9

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0707033
Client Name: National Security Technologies, LLC
ClientProject ID: CAU 127 V2936

Field ID: 252311-V5
Lab ID: 0707033-5

Library: LNG_GAM-A-001
Analysis ReqCode: NGS-A-002

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 8
Date Collected: 21-Jun-07
Date Prepared: 09-Jul-07
Date Analyzed: 09-Jul-07

Prep Batch: GS070707-1
QCBatchID: GS070707-1-1
Run ID: GS070707-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 438 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 070975d01

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	5.96E-01 +/- 1.12E-01	1.01E-01	LT

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *GSS0707033-1*

Gamma Spectroscopy Results

PAI 713 Rev 9

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0707033
Client Name: National Security Technologies, LLC
ClientProject ID: CAU 127 V2936

Field ID: 252311-V6
Lab ID: 0707033-6

Library: LNG_GAM-A-001
Analysis ReqCode: NGS-A-002

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 8
Date Collected: 21-Jun-07
Date Prepared: 09-Jul-07
Date Analyzed: 09-Jul-07

Prep Batch: GS070707-1
QCBatchID: GS070707-1-1
Run ID: GS070707-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 431 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 070976d01

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	6.92E-01 +/- 1.20E-01	9.44E-02	LT

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *GSS0707033-1*

Gamma Spectroscopy Results

PAI 713 Rev 9

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0707033
Client Name: National Security Technologies, LLC
ClientProject ID: CAU 127 V2936

Field ID: 252311-V7
Lab ID: 0707033-7

Library: LNG_GAM-A-001
Analysis ReqCode: NGS-A-002

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 8
Date Collected: 21-Jun-07
Date Prepared: 09-Jul-07
Date Analyzed: 09-Jul-07

Prep Batch: GS070707-1
QCBatchID: GS070707-1-1
Run ID: GS070707-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 419 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 070999d02

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	6.12E-01 +/- 1.46E-01	1.32E-01	LT,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *GSS0707033-1*

Gamma Spectroscopy Results

PAI 713 Rev 9

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0707033
Client Name: National Security Technologies, LLC
ClientProject ID: CAU 127 V2936

Field ID: 252311-V8
Lab ID: 0707033-8

Library: LNG_GAM-A-001
Analysis ReqCode: NGS-A-002

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 8
Date Collected: 21-Jun-07
Date Prepared: 09-Jul-07
Date Analyzed: 09-Jul-07

Prep Batch: GS070707-1
QCBatchID: GS070707-1-1
Run ID: GS070707-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 428 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 070883d03

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	1.02E+00 +/- 1.96E-01	1.33E-01	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *GSS0707033-1*

Gamma Spectroscopy Results

PAI 713 Rev 9

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0707033
Client Name: National Security Technologies, LLC
ClientProject ID: CAU 127 V2936

Field ID: 252311-V9
Lab ID: 0707033-9

Library: LNG_GAM-A-001
Analysis ReqCode: NGS-A-002

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 8
Date Collected: 21-Jun-07
Date Prepared: 09-Jul-07
Date Analyzed: 09-Jul-07

Prep Batch: GS070707-1
QCBatchID: GS070707-1-1
Run ID: GS070707-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 394 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 070852d04

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	8.69E+00 +/- 1.11E+00	1.52E-01	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *GSS0707033-1*

Gamma Spectroscopy Results

PAI 713 Rev 9

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0707033
Client Name: National Security Technologies, LLC
ClientProject ID: CAU 127 V2936

Field ID: 252311-V10
Lab ID: 0707033-10

Library: LNG_GAM-A-001
Analysis ReqCode: NGS-A-002

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 8
Date Collected: 21-Jun-07
Date Prepared: 09-Jul-07
Date Analyzed: 09-Jul-07

Prep Batch: GS070707-1
QCBatchID: GS070707-1-1
Run ID: GS070707-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 397 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 070981d06

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	1.07E+01 +/- 1.34E+00	1.56E-01	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *GSS0707033-1*

NSTec

ANALYTICAL LABORATORY

SERVICES REQUEST AND CHAIN OF CUSTODY RECORD

Page 1 of 1

PROJECT / CLIENT INFORMATION

Project: 127/26-01-01 | BN Org#: #300

Charge Number: SB1B05DC

Project Manager: Jeff Smith

Phone: 5-7775 | Fax: 5-7761 | M/S: NTS306

REPORT & TURNAROUND INFORMATION

Send Report to: Rebecca King

Phone: 5-5804 | Fax: 5-7761 | M/S: NTS306

Turnaround: ( ) Standard – 14 days IH, 28 days Non-rad Env, 45 days Rad Env
(X) RUSH Preliminary by: _____ (IH)
__ 1 __ 2 X 7 __ 14 (non-Rad Env)
__ 1 __ 7 __ 14 __ 28 (Radiological Env)

SAMPLE INFORMATION

Sampling Site: ZC-01-01

The samples submitted contain (check):
( ) **Hazardous** - *(list)* _____
( ) **Radioactive** - *(list)* _____
( ) **Unknown** contamination. If known, identify contaminants. This information will ensure compliance with applicable regulations and allow for the safe handling of the sample materials.

SAMPLE MANAGEMENT INFORMATION

SDG: _____ (IH) V2948 (Non-Rad Env) _____ (Rad Env)

Samples submitted are associated with a signed Project SOW. (X) YES ( ) NO

Analyses entered here agree with the SOW. (X) YES ( ) NO ( ) N/A

If not, identify the variation: _____

Subcontract Lab(s) used for this work: LIONVILLE

ID/DESCRIPTION	SAMPLING DATE	SAMPLING TIME	MATRIX	CONTAINER #	CONTAINER Est. Vol	QC MD	QC MS	QC MSD	Pres – Analysis eg HCl - VOCs	Pay Item, Analysis, Method: Total Pb
260101-V1	7-16-07	1530	Soil	1	250ml				None	X
260101-V2	7-16-07	1535		1						X
260101-V3	7-16-07	1540		1						X
260101-V4	7-16-07	1545		1						X
260101-V5	7-16-07	1550		2	~~500ml~~ 250ml			X		X

9.9

MC 7-16-07

MC 7-16-07

CUSTODY TRANSFER

Sampled/Relinquished (print)	Signature	DATE / TIME	Received by (print)	Signature	DATE / TIME
Michael Casselbury	/s/ M Casselbury	7-16-07 1630	ReFer	N/A	7-16-07 1650
ReFer	/s/ K Olsen	7-17-07	Kevin Olsen	/s/ K Olsen	7-17-07
Kev	/s/ K Olsen	7-17-07	/s/ J Dugas	JERRY DUGAS	7-17-07
C Castaneda	/s/ C Castaneda	7/17/07 1531	/s/ K Olsen	Kevin Olsen	7-17-07
Kevin Olsen KEO 7/17/07	/s/ K Olsen	7-17-07	Refer Kevin Olsen Refer	/s/ K Olsen	7-17-07
REFR	/s/ K Olsen	7-18-07	Kevin	/s/ K Olsen	7-18-07

FRM-07.32 (11/06)

U.S. EPA

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

V1

Lab Name: LIONVILLE_LABORATORY Contract: 60052

Lab Code: LVLI Case No.: NSTEC SAS No.: SDG No.: V2948

Matrix (soil/water): SOIL Lab Sample ID: 0707L610-001

Level (low/med): LOW Date Received: 07/19/07

% Solids: 91.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	12.7			P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

260101-V1

U.S. EPA

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

V2

Lab Name: LIONVILLE_LABORATORY_____ Contract: 60052_____

Lab Code: LVLI__ Case No.: NSTEC SAS No.: _____ SDG No.: V2948_

Matrix (soil/water): SOIL_ Lab Sample ID: 0707L610-002

Level (low/med): LOW__ Date Received: 07/19/07

% Solids: _92.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	18.0			P

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

260101-V2

U.S. EPA

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

V3

Lab Name: LIONVILLE_LABORATORY Contract: 60052

Lab Code: LVLI Case No.: NSTEC SAS No.: SDG No.: V2948

Matrix (soil/water): SOIL Lab Sample ID: 0707L610-003

Level (low/med): LOW Date Received: 07/19/07

% Solids: 90.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	7.9			P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

260101-V3

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APPENDIX C

WASTE DISPOSITION DOCUMENTATION

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NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

(2)

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

SWO USE (Select One) AREA ☐ 23 ☒ 6 ☐ 9 ☒ LANDFILL

For waste characterization, approval, and/or assistance, contact Solid Waste Operation (SWO) at 5-7898.

REQUIRED: WASTE GERERATOR INFORMATION

(This form is for rolloffs, dump trucks, and other onsite disposal of materials.)

Waste Generator: M L Floyd Phone Number: 5-6663

Location / Origin: CAU 127 CAS 25-02-01 Soil Applied Lab

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☒ NTS	☐ Putrescible	☒ FFACO-onsite	☐ WAC Exception
	☐ Non-Putrescible	☐ Asbestos Containing Material	☐ FFACO-offsite	☐ Historic DOE/NV
Pollution Prevention Category: (check one)		☒ Environmental management	☐ Defense Projects	☐ YMP
Pollution Prevention Category: (check one)		☒ Clean-Up	☐ Routine	
Method of Characterization: (check one)		☒ Sampling & Analysis	☐ Process Knowledge	☐ Contents

Prohibited Waste at all three NTS landfills: Radioactive waste; RCRA waste; Hazardous waste; Free liquids, PCBs above TSCA regulatory levels, and Medical wastes (needles, sharps, bloody clothing).

Additional Prohibited Waste at the Area 9 U10C Landfill: Sewage Sludge, Animal carcasses, Wet garbage (food waste); and Friable asbestos

REQUIRED: WASTE CONTENTS ALLOWABLE WASTES

Check all allowable wastes that are contained within this load

NOTE: Waste disposal at the Area 6 Hydrocarbon Landfill must have come into contact with petroleum hydrocarbons or coolants, such as: gasoline (no benzene, lead); jet fuel; diesel fuel; lubricants and hydraulics; kerosene; asphaltic petroleum hydrocarbon and ethylene glycol.

Acceptable waste at any NTS landfill:

☐ Asphalt ☐ Metal ☐ Wood ☒ Soil ☐ Rubber (excluding tires) ☐ Empty containers ☐ Demolition debris

☒ Plastic ☐ Wire ☐ Cable ☐ Cloth ☐ Insulation (non-Asbestosform) ☐ Cement & concrete

☐ Manufactured items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.)

Additional waste accepted at the Area 23 Mercury Landfill: ☐ Office Waste ☐ Food Waste ☐ Animal Carcasses

☐ Asbestos ☐ Friable ☐ Non-Friable (contact SWO if regulated load) Quantity: _____

Additional waste accepted at the Area 9 U10c Landfill:

☐ Non-friable asbestos ☐ Drained automobiles and military vehicles ☐ Solid fractions from sand/oil/water

☐ Light ballasts (contact SWO) ☐ Drained fuel filters (gas & diesel) ☐ Deconned Underground and Above Ground Tanks

☐ Hydrocarbons (contact SWO) ☐ Other _____

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

☐ Septic sludge ☐ Rags ☐ Drained fuel filters (gas & diesel) ☐ Crushed non-teme plated oil filters

☐ Plants ☐ Soil ☐ Sludge from sand/oil/water separators ☐ PCBs below 50 parts per million

REQUIRED: WASTE GENERATOR SIGNATURE

Initials: _____ (if initialed, no radiological clearance is necessary.)

The above mentioned waste was generated outside of a Controlled Waste Management Area (CWMA) and to the best of my knowledge, does not contain radiological materials.

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

Print Name: M L Floyd

Signature: /s/ M Floyd Date: 4/3/07

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

Radiation Survey Release for Waste Disposal

RCT Initials

☐ This container/load is free of external radioactive contamination.

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

☐ This container/load is free of radioactive contamination based on radioanalysis.

SIGNATURE: /s/ Cruz DATE: 4/5/07

BN-0646 (09/99)

SWO USE ONLY

Load Weight (net from scale or estimate): 9,000 Signature of Certifier: 4-3-07 /s/ Sandra S

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

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

SWO USE (Select One) AREA ☐ 23 ☒ 6 ☐ 9 ☒ LANDFILL

For waste characterization, approval, and/or assistance, contact Solid Waste Operation (SWO) at 5-7898

REQUIRED: WASTE GERERATOR INFORMATION

(This form is for rolloffs, dump trucks, and other onsite disposal of materials.)

Waste Generator: Mike Floyd Phone Number: E-6653

Location / Origin: CAU 127 CAS 25-01-06 Soil

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☒ NTS	☐ Putrescrible	☒ FFACO-onsite	☐ WAC Exception
	☐ Non-Putrescible	☐ Asbestos Containing Material	☐ FFACO-offsite	☐ Historic DOE/NV
Pollution Prevention Category: (check one)		☒ Environmental management	☐ Defense Projects	☐ YMP
Pollution Prevention Category: (check one)		☒ Clean-Up	☐ Routine	
Method of Characterization: (check one)		☒ Sampling & Analysis	☐ Process Knowledge	☐ Contents

Prohibited Waste at all three NTS landfills: Radioactive waste; RCRA waste, Hazardous waste, Free liquids, PCBs above TSCA regulatory levels, and Medical wastes (needles, sharps, bloody clothing).

Additional Prohibited Waste at the Area 9 U10C Landfill: Sewage Sludge, Animal carcasses, Wet garbage (food waste); and Friable asbestos

REQUIRED: WASTE CONTENTS ALLOWABLE WASTES

Check all allowable wastes that are contained within this load:

NOTE: Waste disposal at the Area 6 Hydrocarbon Landfill must have come into contact with petroleum hydrocarbons or coolants, such as: gasoline (no benzene, lead); jet fuel; diesel fuel; lubricants and hydraulics; kerosene; asphalt; petroleum hydrocarbon; and ethylene glycol.

Acceptable waste at any NTS landfill:

☐ Asphalt	☐ Metal	☐ Wood	☒ Soil	☐ Rubber (excluding tires)	☐ Empty containers	
☐ Plastic	☐ Wire	☐ Cable	☐ Cloth	☐ Insulation (non-Asbestosform)	☐ Demolition debris	☐ Cement & concrete

☐ Manufactured items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.)

Additional waste accepted at the Area 23 Mercury Landfill: ☐ Office Waste ☐ Food Waste ☐ Animal Carcasses

☐ Asbestos ☐ Friable ☐ Non-Friable (contact SWO if regulated load) Quantity: _____

Additional waste accepted at the Area 9 U10c Landfill:

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

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

☐ Septic sludge	☐ Rags	☐ Drained fuel filters (gas & diesel)	☐ Crushed non-leme plated oil filters
☐ Plants	☐ Soil	☐ Sludge from sand/oil/water separators	☐ PCBs below 50 parts per million

REQUIRED: WASTE GENERATOR SIGNATURE

Initials: _____ (if initialed, no radiological clearance is necessary.)

The above mentioned waste was generated outside of a Controlled Waste Management Area (CWMA) and to the best of my knowledge, does not contain radiological materials.

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

Print Name: Mike Floyd

Signature: /s/ M Floyd Date: 4/3/07

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

Radiation Survey Release for Waste Disposal

RCT Initials

☐ This container/load is free of external radioactive contamination.

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

☐ This container/load is free of radioactive contamination based on radioanalysis.

SIGNATURE: /s/ Cruz DATE: 4/3/07

BN-0646 (09/99)

SWO USE ONLY

Load Weight (net from scale or estimate): 17,000 Signature of Certifier: 4-3-07 /s/ see original

#1

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

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

SWO USE (Select One) AREA ☐ 23 ☒ 6 ☐ 9 ☒ LANDFILL

For waste characterization, approval, and/or assistance, contact Solid Waste Operation (SWO) at 5-7898.

REQUIRED: WASTE GERERATOR INFORMATION

(This form is for rolloffs, dump trucks, and other onsite disposal of materials.)

Waste Generator: Mk Floyd Phone Number: 5-6653

Location / Origin: CAU 127 COC 25-01-07 Soil (20.25 Y) 30 mL liner material

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☒ NTS	☐ Putrescrible	☒ FFACO-onsite	☐ WAC Exception
	☐ Non-Putrescible	☐ Asbestos Containing Material	☐ FFACO-offsite	☐ Historic DOE/NV
Pollution Prevention Category: (check one)		☒ Environmental management	☐ Defense Projects	☐ YMP
Pollution Prevention Category: (check one)		☒ Clean-Up	☐ Routine	
Method of Characterization: (check one)		☒ Sampling & Analysis	☐ Process Knowledge	☐ Contents

Prohibited Waste at all three NTS landfills: Radioactive waste; RCRA waste; Hazardous waste; Free liquids, PCBs above TSCA regulatory levels, and Medical wastes (needles, sharps, bloody clothing).

Additional Prohibited Waste at the Area 9 U10C Landfill: Sewage Sludge, Animal carcasses, Wet garbage (food waste); and Friable asbestos

REQUIRED: WASTE CONTENTS ALLOWABLE WASTES

Check all allowable wastes that are contained within this load:

NOTE: Waste disposal at the Area 6 Hydrocarbon Landfill must have come into contact with petroleum hydrocarbons or coolants, such as: gasoline (no benzene, lead); jet fuel; diesel fuel; lubricants and hydraulics; kerosene; asphaltic petroleum hydrocarbon; and ethylene glycol.

Acceptable waste at any NTS landfill:

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

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

Additional waste accepted at the Area 9 U10c Landfill:

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

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

☐ Septic sludge ☐ Rags ☐ Drained fuel filters (gas & diesel) ☐ Crushed non-terne plated oil filters
☐ Plants ☐ Soil ☐ Sludge from sand/oil/water separators ☐ PCBs below 50 parts per million

REQUIRED: WASTE GENERATOR SIGNATURE

Initials: _____ (if initialed, no radiological clearance is necessary.)

The above mentioned waste was generated outside of a Controlled Waste Management Area (CWMA) and to the best of my knowledge, does not contain radiological materials.

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

Print Name: Mk Floyd

Signature: /s/ M Floyd Date: 4/2/07

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

Radiation Survey Release for Waste Disposal

RCT Initials

☐ This container/load is free of external radioactive contamination.
☐ This container/load is exempt from survey due to process knowledge and origin.
☒ H This container/load is free of radioactive contamination based on radioanalysis.

SIGNATURE: /s/ J Hought DATE: 4-2-07

BN-0645 (09/99)

SWO USE ONLY

Load Weight (net from scale or estimate): 11,000 Signature of Certifier: 4-2-07 /s/ See Original

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

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

SWO USE (Select One) AREA ☐ 23 ☐ 6 ☑ 9 ☒ LANDFILL

For waste characterization, approval, and/or assistance, contact Solid Waste Operation (SWO) at 5-7898.

REQUIRED: WASTE GERERATOR INFORMATION

(This form is for rolloffs, dump trucks, and other onsite disposal of materials.)

Waste Generator: Mike Floyd Phone Number: 5-6653

Location / Origin: CAU 127 CAS 25-01-07 / crushed tank, concrete pad, liner mat.

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☒ NTS	☐ Putrescrible	☒ FFACO-onsite	☐ WAC Exception
	☐ Non-Putrescible	☐ Asbestos Containing Material	☐ FFACO-offsite	☐ Historic DOE/NV
Pollution Prevention Category: (check one)		☒ Environmental management	☐ Defense Projects	☐ YMP
Pollution Prevention Category: (check one)		☒ Clean-Up	☐ Routine	
Method of Characterization: (check one)		☒ Sampling & Analysis	☐ Process Knowledge	☐ Contents

Prohibited Waste at all three NTS landfills: Radioactive waste; RCRA waste; Hazardous waste; Free liquids, PCBs above TSCA regulatory levels, and Medical wastes (needles, sharps, bloody clothing).

Additional Prohibited Waste at the Area 9 U10C Landfill: Sewage Sludge, Animal carcasses, Wet garbage (food waste); and Friable asbestos

REQUIRED: WASTE CONTENTS ALLOWABLE WASTES

Check all allowable wastes that are contained within this load:

NOTE: Waste disposal at the Area 6 Hydrocarbon Landfill must have come into contact with petroleum hydrocarbons or coolants, such as: gasoline (no benzene, lead); jet fuel, diesel fuel; lubricants and hydraulics; kerosene; asphaltic petroleum hydrocarbon; and ethylene glycol.

Acceptable waste at any NTS landfill:

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

Additional waste accepted at the Area 23 Mercury Landfill: ☐ Office Waste ☐ Food Waste ☐ Animal Carcasses

☐ Asbestos ☐ Friable ☐ Non-Friable (contact SWO if regulated load) Quantity: _____

Additional waste accepted at the Area 9 U10c Landfill:

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

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

☐ Septic sludge	☐ Rags	☐ Drained fuel filters (gas & diesel)	☐ Crushed non-terne plated oil filters
☐ Plants	☐ Soil	☐ Sludge from sand/oil/water separators	☐ PCBs below 50 parts per million

REQUIRED: WASTE GENERATOR SIGNATURE

Initials: _____ (if initialed, no radiological clearance is necessary.)

The above mentioned waste was generated outside of a Controlled Waste Management Area (CWMA) and to the best of my knowledge, does not contain radiological materials.

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

Print Name: Mike Floyd

Signature: /s/ M. Floyd Date: 3/29/07

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

Radiation Survey Release for Waste Disposal

RCT Initials

☐ This container/load is free of external radioactive contamination.

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

☒ This container/load is free of radioactive contamination based on radioanalysis.

SIGNATURE: /s/ J Haught DATE: 3-29-07

BN-0646 (09/99)

SWO USE ONLY

Load Weight (net from scale or estimate): 1100 3-29-07 Signature of Certifier: /s/ Don B

(4)

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

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

SWO USE (Select One) AREA ☐ 23 ☐ 6 ☒ 9 ☒ **LANDFILL**

For waste characterization, approval, and/or assistance, contact Solid Waste Operation (SWO) at 5-7898.

REQUIRED: WASTE GENERATOR INFORMATION

(This form is for rolloffs, dump trucks, and other onsite disposal of materials.)

Waste Generator: Mike Floyd Phone Number: 5-6653

Location / Origin: CAU 127 CAS 25-01-06 / Crushed Tank, Concrete, Lead, Soil

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☒ NTS	☐ Putrescrible	☒ FFACO-onsite	☐ WAC Exception
	☐ Non-Putrescible	☐ Asbestos Containing Material	☐ FFACO-offsite	☐ Historic DOE/NV
Pollution Prevention Category: (check one)	☒ Environmental management	☐ Defense Projects	☐ YMP	
Pollution Prevention Category: (check one)	☒ Clean-Up	☐ Routine		
Method of Characterization: (check one)	☒ Sampling & Analysis	☐ Process Knowledge	☐ Contents	

Prohibited Waste at all three NTS landfills: Radioactive waste; RCRA waste; Hazardous waste; Free liquids; PCBs above TSCA regulatory levels, and Medical wastes (needles, sharps, bloody clothing).

Additional Prohibited Waste at the Area 9 U10C Landfill: Sewage Sludge, Animal carcasses, Wet garbage (food waste); and Friable asbestos

REQUIRED: WASTE CONTENTS ALLOWABLE WASTES

Check all allowable wastes that are contained within this load:

NOTE: Waste disposal at the Area 6 Hydrocarbon Landfill must have come into contact with petroleum hydrocarbons or coolants, such as: gasoline (no benzene, lead); jet fuel; diesel fuel; lubricants and hydraulics; kerosene; asphaltic petroleum hydrocarbon; and ethylene glycol.

Acceptable waste at any NTS landfill:

☐ Asphalt	☒ Metal	☐ Wood	☒ Soil	☐ Rubber (excluding tires)	☐ Demolition debris
☒ Plastic	☐ Wire	☐ Cable	☐ Cloth	☐ Insulation (non-Asbestosform)	☒ Cement & concrete

☐ Manufactured items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.)

Additional waste accepted at the Area 23 Mercury Landfill: ☐ Office Waste ☐ Food Waste ☐ Animal Carcasses

☐ Asbestos ☐ Friable ☐ Non-Friable (contact SWO if regulated load) Quantity: _____

Additional waste accepted at the Area 9 U10c Landfill:

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

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

☐ Septic sludge	☐ Rags	☐ Drained fuel filters (gas & diesel)	☐ Crushed non-terne plated oil filters
☐ Plants	☐ Soil	☐ Sludge from sand/oil/water separators	☐ PCBs below 50 parts per million

REQUIRED: WASTE GENERATOR SIGNATURE

Initials: _____ (if initialed, no radiological clearance is necessary.)

The above mentioned waste was generated outside of a Controlled Waste Management Area (CWMA) and to the best of my knowledge, does not contain radiological materials.

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

Print Name: Mike Floyd

Signature: /s/ M Floyd Date: 3/28/07

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

Radiation Survey Release for Waste Disposal

RCT Initials

☐ This container/load is free of external radioactive contamination.

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

☒ This container/load is free of radioactive contamination, based on radioanalysis.

SIGNATURE: /s/ J Hought DATE: 3-29-07

BN-0645 (09/99)

SWO USE ONLY

Load Weight (net from scale or estimate): 31000 3-29-07 Signature of Certifier: /s/ Don Bicford

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

Rev. 0
Page 1 of 2

SWO USE (Select One) AREA ☑ 23 ☐ 6 ☐ 9 ☑ LANDFILL

For waste characterization, approval, and/or assistance, contact Solid Waste Operation (SWO) at 5-7898.

REQUIRED: WASTE GERERATOR INFORMATION

(This form is for rolloffs, dump trucks, and other onsite disposal of materials.)

Waste Generator: Rebecca King / Robert Baumert Phone Number: 5804 & 882

Location / Origin: CAU 127 TCL Boiler

Waste Category: (check one)		☐ Commercial	☑ Industrial QS 8/9/07	
Waste Type: (check one)	☑ NTS	☐ Putrescrible	☒ FFACO-onsite	☐ WAC Exception
	☐ Non-Putrescible	☑ Asbestos Containing Material	☐ FFACO-offsite	☐ Historic DOE/NV
Pollution Prevention Category: (check one)		☑ Environmental management	☐ Defense Projects	☐ YMP
Pollution Prevention Category: (check one)		☑ Clean-Up	☐ Routine	
Method of Characterization: (check one)		☑ Sampling & Analysis	☐ Process Knowledge	☐ Contents

Prohibited Waste at all three NTS landfills: Radioactive waste; RCRA waste; Hazardous waste; Free liquids, PCBs above TSCA regulatory levels, and Medical wastes (needles, sharps, bloody clothing).

Additional Prohibited Waste at the Area 9 U10C Landfill: Sewage Sludge, Animal carcasses, Wet garbage (food waste); and Friable asbestos

REQUIRED: WASTE CONTENTS ALLOWABLE WASTES

Check all allowable wastes that are contained within this load:

NOTE: Waste disposal at the Area 6 Hydrocarbon Landfill must have come into contact with petroleum hydrocarbons or coolants, such as: gasoline (no benzene, lead); jet fuel; diesel fuel; lubricants and hydraulics; kerosene; asphaltic petroleum hydrocarbon; and ethylene glycol.

Acceptable waste at any NTS landfill:

☐ Asphalt	☑ Metal	☐ Wood	☐ Soil	☐ Rubber (excluding tires)	☑ Empty containers	☐ Demolition debris
☐ Plastic	☐ Wire	☐ Cable	☐ Cloth	☐ Insulation (non-Asbestosform)		☐ Cement & concrete

☑ Manufactured items: (swamp coolers, furniture, rugs, carpet, electronic components, PPE, etc.)

Additional waste accepted at the Area 23 Mercury Landfill: ☐ Office Waste ☐ Food Waste ☐ Animal Carcasses

☒ Asbestos ☒ Friable ☒ ~~Non-Friable (contact SWO if regulated load)~~ Quantity: _____

QS 8/9/07

Additional waste accepted at the Area 9 U10c Landfill:

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

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

☐ Septic sludge	☐ Rags	☐ Drained fuel filters (gas & diesel)	☐ Crushed non-teme plated oil filters
☐ Plants	☐ Soil	☐ Sludge from sand/oil/water separators	☐ PCBs below 50 parts per million

REQUIRED: WASTE GENERATOR SIGNATURE

Initials: _____ **(if initialed, no radiological clearance is necessary.)**

The above mentioned waste was generated outside of a Controlled Waste Management Area (CWMA) and to the best of my knowledge, does not contain radiological materials.

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

Print Name: Robert Baumert

Signature: /s/ Robert Baumert Date: 8/08/07

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

Radiological Survey Release for Waste Disposal

RCT Initials

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

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

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

SIGNATURE: /s/ D Carter **DATE:** 8-8-0

BN-0646 (10/0

SWO USE ONLY

Load Weight (net from scale or estimate): 30,000 EST 8/8/07 Signature of Certifier: /s/ see original

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

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
NV3890090001	1	(702)295-0311	000956062 FLE

GENERATOR

5. Generator's Name and Mailing Address

NSTEC FOR US DOE
P.O. BOX 98521, M/S NTS110
LAS VEGAS NV 89193
Generator's Phone (702)295-7385

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

NSTEC FOR USDOE
NEVADA TEST SITE, HWY 95, M/S NTS110
MERCURY NV 89023

TRANSPORTER

6. Transporter 1 Company Name: MP ENVIRONMENTAL SERVICES, INC.
U.S. EPA ID Number: CAT000624247

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

DESIGNATED FACILITY

8. Designated Facility Name and Site Address

ENERGYSOLUTIONS, LLC
CLIVE DISPOSAL SITE, US I-80, EXIT 49
CLIVE UT 84029
Facility's Phone (435)884-0155

U.S. EPA ID Number: UTD982598898

9a HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1 UN3321, WASTE RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II),7, SOLID, OXIDE, FISSILE EXCEPTED, Pu-238,Pu-241,Am-241, 2.09E+02 MBq, ID#131092	1	BA	3120	P	D008
X	2 UN2913, WASTE RADIOACTIVE MATERIAL,SURFACE CONTAMINATED OBJECTS (SCO-I),7, SOLID, OXIDE, Cs-137,Sr-90, 5.48 MBq, ID#15-1444	1	CM	5310	P	D008
X	3 UN2913, WASTE RADIOACTIVE MATERIAL,SURFACE CONTAMINATED OBJECTS (SCO-I),7, SOLID, OXIDE, FISSILE EXCEPTED,Cs-137,Ra-226,Sr-90, 1.25E-01 MBq, ID#151473	1	CM	4180	P	D008
X	4 UN2912, WASTE RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I),7, SOLID OXIDE,Cs-137, Sr-90, 4.84E+02 MBq, ID#187073	1	CM	7650	P	D008 D006

14. Special Handling Instructions and Additional Information

EXCLUSIVE USE SHIPMENT
ERG GUIDE 162 APPLIES
SHIPMENT NUMBER #9316-01-0012
UTAH GENERATOR SITE ACCESS PERMIT NO. 0510003453

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

Generator's/Offeror's Printed/Typed Name	Signature	Month	Day	Year
STEFAN DUKE	/s/ Stefan Duke	09	20	07

INT'L

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

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name	Signature	Month	Day	Year
Ray Burton	/s/ Ray Burton	09	27	07
Transporter 2 Printed/Typed Name	Signature	Month	Day	Year

DESIGNATED FACILITY

18. Discrepancy

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

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

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

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

1	2	3	4

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

Printed/Typed Name	Signature	Month	Day	Year

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

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

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

Form Approved OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	NV3890090001	1	(702)295-0311	000956078 FLE

5. Generator's Name and Mailing Address

N C FOR US DOE
P BOX 98521, M/S NTS110
LAS VEGAS NV 89193
Generator's Phone (702)295-7365

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

NSTEC FOR USDOE
NEVADA TEST SITE, HWY 95, M/S NTS110
MERCURY NV 89023

6. Transporter 1 Company Name — U.S. EPA ID Number

MP ENVIRONMENTAL SERVICES, INC. — CAT000624247

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

8. Designated Facility Name and Site Address — U.S. EPA ID Number

ENERGYSOLUTIONS, LLC
CLIVE DISPOSAL SITE, US I-80, EXIT 49
CLIVE UT 84029
Facility's Phone (435)884-0155

UTD982598898

9a HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, HAZARDOUS WASTE SOLID, n.o.s. (Lead), 9, PG-III, ID#151474	1	BA	8750	P	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information

E GUIDE 171 APPLIES
SHIPMENT NUMBER #9316-03-004
UTAH GENERATOR SITE ACCESS PERMIT NO. 0510003453

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

Generator's/Offeror's Printed/Typed Name	Signature	Month	Day	Year
STEFAN DUKE	/s/ Stefan Duke	09	20	07

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

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name	Signature	Month	Day	Year
Ray L Burton	/s/ Ray Burton	09	27	07
Transporter 2 Printed/Typed Name	Signature	Month	Day	Year

18. Discrepancy

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

Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone

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

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

1	2	3	4

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

Printed/Typed Name	Signature	Month	Day	Year

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

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

APPENDIX D

USE RESTRICTION DOCUMENTATION

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CAU Use Restriction Information

CAU Number/Description: CAU 127: Areas 25 and 26 Storage Tanks

Applicable CAS Numbers/Descriptions: CAS 25-01-07, Aboveground Storage Tank

Contact (organization/project): NNSA/NSO Federal Sub-Project Director

Surveyed Area (UTM, Zone 11, NAD 27, meters):

UR Points	Northing	Easting
Point 1	4,073,538.691	562,171.283
Point 2	4,073,544.356	562,172.559
Point 3	4,073,543.335	562,176.244
Point 4	4,073,537.772	562,174.906

Survey Date: 10/29/2007 **Survey Method (GPS, etc):** GPS

Site Monitoring Requirements: Visual Inspections

Required Frequency (quarterly, annually?): Annual

If Monitoring Has Started, Indicate last Completion Date: N/A

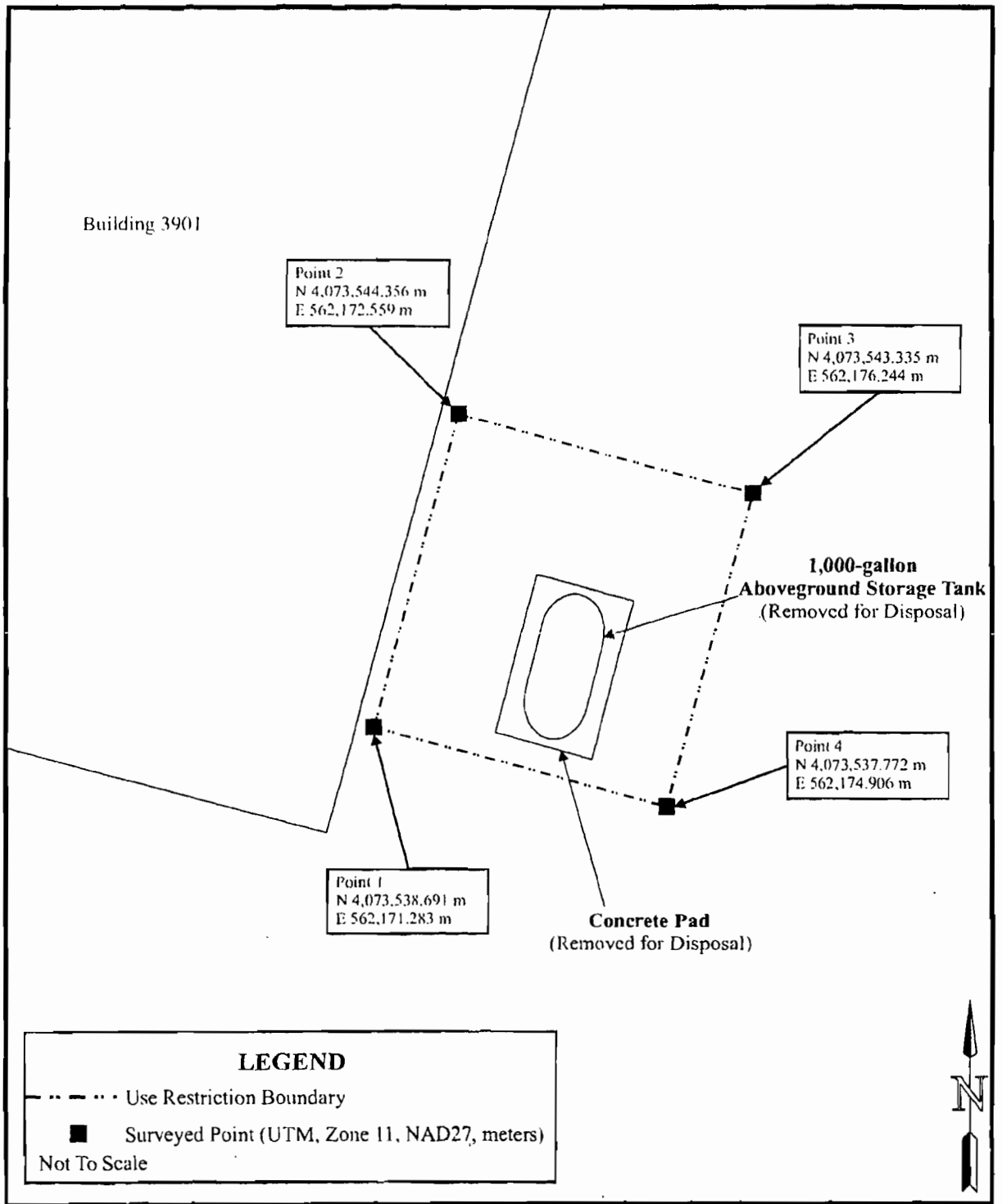
Use Restrictions

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 Closure Report or other CAU documentation unless appropriate concurrence is obtained in advance.

Comments: See the Closure Report for additional information on the condition of the site(s) and any monitoring and/or inspection requirements.

Submitted By: /s/ Kevin Cabble **Date:** 2-13-08

cc with copy of survey map (paper and digital (dgn) formats):
CAU Files (2 copies)



CORRECTIVE ACTION SITE 25-01-07, ABOVEGROUND STORAGE TANK, USE RESTRICTION BOUNDARY

CAU Use Restriction Information

CAU Number/Description: CAU 127: Areas 25 and 26 Storage Tanks

Applicable CAS Numbers/Descriptions: CAS 25-02-02, Underground Storage Tank

Contact (organization/project): NNSA/NSO Federal Sub-Project Director

Surveyed Area (UTM, Zone 11, NAD 27, meters):

UR Points	Northing	Easting
Point 1	4,076,144.044	564,632.679
Point 2	4,076,156.309	564,618.766
Point 3	4,076,139.836	564,601.028
Point 4	4,076,127.547	564,610.633
Point 5	4,076,128.673	564,618.563

Survey Date: 10/29/2007 **Survey Method (GPS, etc):** GPS

Site Monitoring Requirements: Visual Inspections

Required Frequency (quarterly, annually?): Annual

If Monitoring Has Started, Indicate last Completion Date: N/A

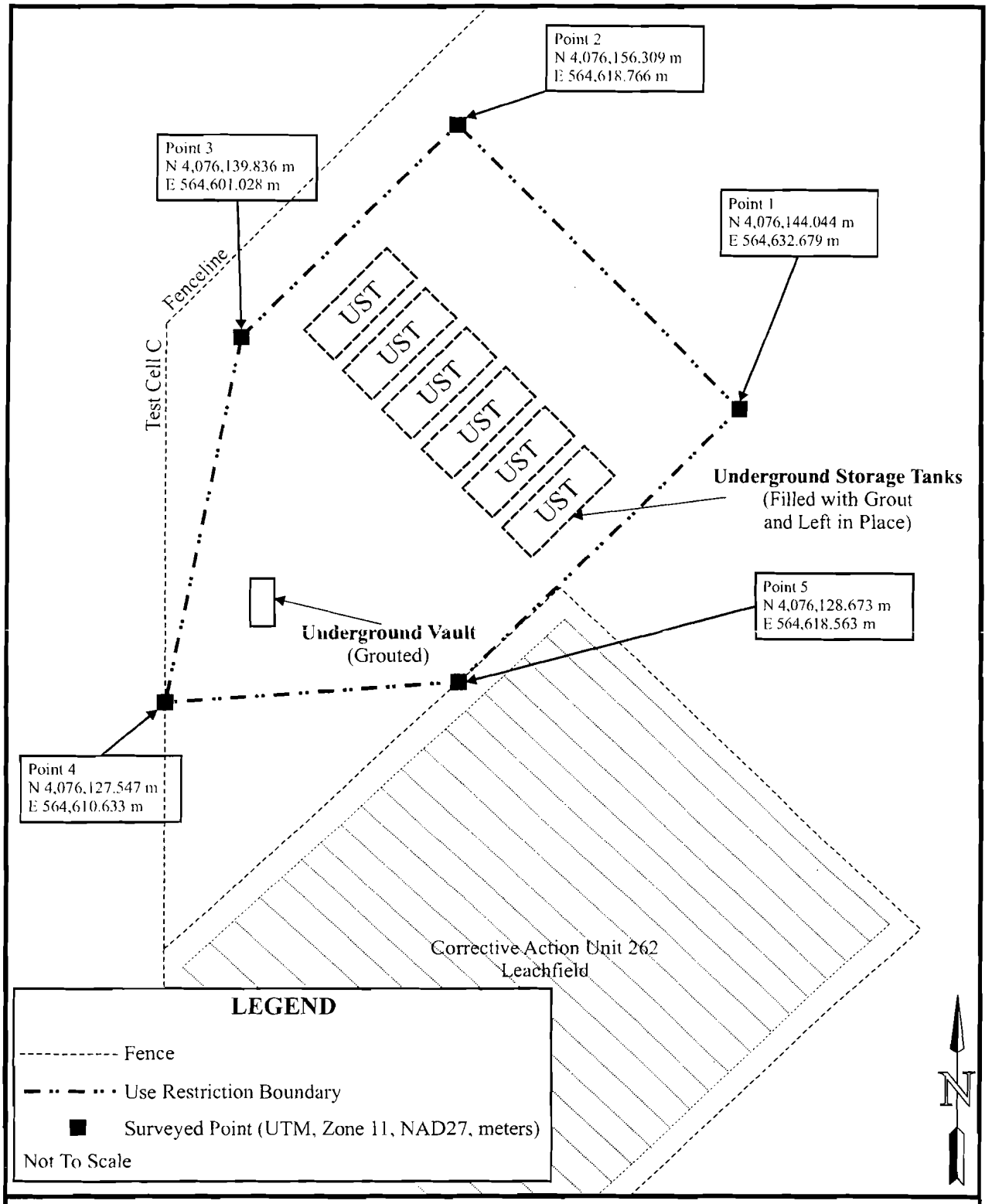
Use Restrictions

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 Closure Report or other CAU documentation unless appropriate concurrence is obtained in advance.

Comments: See the Closure Report for additional information on the condition of the site(s) and any monitoring and/or inspection requirements.

Submitted By: /s/ Kevin Cabble **Date:** 2-13-08

cc with copy of survey map (paper and digital (dgn) formats):
CAU Files (2 copies)



CORRECTIVE ACTION SITE 25-02-02, UNDERGROUND STORAGE TANK, USE RESTRICTION BOUNDARY

APPENDIX E

SITE CLOSURE PHOTOGRAPHS

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PHOTOGRAPH LOG

CORRECTIVE ACTION SITE	PHOTOGRAPH NUMBER	DATE	PERSPECTIVE	DESCRIPTION
25-01-05, Aboveground Storage Tank	1	06/22/1998	Facing Northwest	Aboveground Storage Tank Before Removal
	2	02/01/2007	Facing North	Aboveground Storage Tank During Application of Fixative
	3	02/08/2007	Not Applicable	Fixative on Interior of Aboveground Storage Tank
	4	02/15/2007	Facing Northwest	Demolition of Aboveground Storage Tank
	5	02/20/2007	Facing North	Demolition of Aboveground Storage Tank
	6	03/05/2007	Facing South	Aboveground Storage Tank Debris After Demolition
	7	06/19/2007	Facing South	Covered Pile of Demolition Debris
25-01-06, Aboveground Storage Tank	8	02/24/1998	Facing Northwest	Aboveground Storage Tank Before Removal
	9	04/05/2007	Facing Southeast	After Closure Activities
25-01-07, Aboveground Storage Tank	10	02/24/1998	Facing Northwest	Aboveground Storage Tank Before Removal
	11	09/10/2007	Facing West	After Closure Activities
25-02-02, Underground Storage Tank	12	05/21/2007	Facing Northeast	Stockpiled Soil from Berm
	13	05/21/2007	Facing Northwest	Removal of Concrete Pad
	14	05/21/2007	Facing Northwest	Excavation of Overburden to Access Underground Storage Tanks
	15	05/23/2007	Facing West	Exposed Underground Storage Tanks
	16	06/07/2007	Facing Southeast	Filling Underground Storage Tanks with Grout
	17	06/11/2007	Facing Southeast	Backfilling Underground Storage Tank Area
	18	06/13/2007	Facing West	Underground Storage Tank Area Backfilled
	19	09/10/2007	Facing North	Use Restriction Warning Sign
25-12-01, Boiler	20	02/24/1998	Facing Southwest	Boiler Before Removal
	21	09/12/2007	Facing Southwest	After Boiler Removal
25-23-11, Contaminated Materials	22	06/11/2007	Facing West	Disassembly of Metal Pump Shed
	23	06/12/2007	Not Applicable	Lead Bricks from Pump Vault in B-25 Box
	24	06/12/2007	Facing West	Removal of Radiologically and Lead-Impacted Soil from Pump Vault
	25	06/19/2007	Facing West	Concrete Pump Vault Prior to Removal
	26	06/19/2007	Facing West	Concrete Pump Vault During Removal
	27	06/19/2007	Facing Southeast	Metal Pump Shed and Radiologically Impacted Soil Staged Onsite for Future Disposal
26-01-01, Filter Tank (RAD) and Piping	28	06/28/2001	Facing East	Aboveground Storage Tank Before Removal
	29	06/28/2007	Facing Northeast	Removal of Piping from Aboveground Storage Tank
26-01-02, Filter Tank (RAD)	30	07/02/2007	Facing Southeast	Aboveground Storage Tank Before Removal
	31	07/02/2007	Facing Northwest	Packaging Aboveground Storage Tank in Transportainer

CORRECTIVE ACTION SITE	PHOTOGRAPH NUMBER	DATE	PERSPECTIVE	DESCRIPTION
26-02-01, Underground Storage Tank	32	02/28/2001	Facing Northwest	Underground Storage Tank Before Closure Activities
	33	11/28/2007	Facing North	Underground Storage Tank After Closure Activities
26-23-01, Contaminated Liquids Spreader	34	03/12/1998	Facing Northeast	Spreader Before Removal
	35	11/28/2007	Facing Northeast	After Spreader Removal
26-99-01, Radioactively Contaminated Filters	36	06/28/2001	Facing East	Wooden Shed with Filter Tanks Before Removal
	37	07/03/2007	Facing East	Filter Tanks Before Removal
	38	07/10/2007	Facing Southwest	Demolition of Wooden Shed
	39	07/10/2007	Facing Southwest	After Closure Activities

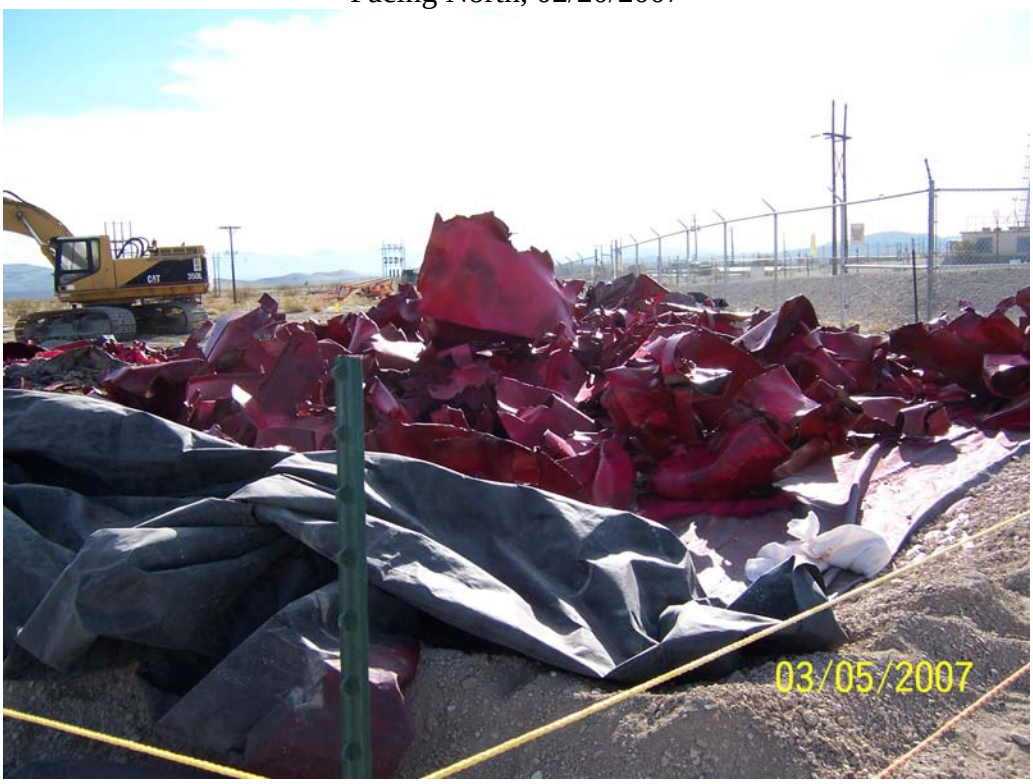
Photograph 1: CAS 25-01-05, Aboveground Storage Tank Before Removal, Facing Northwest, 06/22/1998

Photograph 2: CAS 25-01-05, Aboveground Storage Tank During Application of Fixative, Facing North, 02/01/2007

Photograph 3: CAS 25-01-05, Fixative on Interior of Aboveground Storage Tank, 02/08/2007

Photograph 4: CAS 25-01-05, Demolition of Aboveground Storage Tank, Facing Northwest, 02/15/2007

Photograph 5: CAS 25-01-05, Demolition of Aboveground Storage Tank, Facing North, 02/20/2007



Photograph 6: CAS 25-01-05, Aboveground Storage Tank Debris After Demolition, Facing South, 03/05/2007

Photograph 7: CAS 25-01-05, Covered Pile of Demolition Debris, Facing South, 06/19/2007

Photograph 8: CAS 25-01-06, Aboveground Storage Tank Before Removal, Facing Northwest, 02/24/1998

Photograph 9: CAS 25-01-06, After Closure Activities,
Facing Southeast, 04/05/2007

Photograph 10: CAS 25-01-07, Aboveground Storage Tank Before Removal,
Facing Northwest, 02/24/1998

Photograph 11: CAS 25-01-07, After Closure Activities,
Facing West, 09/10/2007

Photograph 12: CAS 25-02-02, Stockpiled Soil from Berm,
Facing Northeast, 05/21/2007

Photograph 13: CAS 25-02-02, Removal of Concrete Pad, Facing Northwest, 05/21/2007

Photograph 14: CAS 25-02-02, Excavation of Overburden to Access Underground Storage Tanks, Facing Northwest, 05/21/2007

Photograph 15: CAS 25-02-02, Exposed Underground Storage Tanks, Facing West, 05/23/2007

Photograph 16: CAS 25-02-02, Filling Underground Storage Tanks with Grout, Facing Southeast, 06/07/2007

Photograph 17: CAS 25-02-02, Backfilling Underground Storage Tank Area, Facing Southeast, 06/11/2007

Photograph 18: CAS 25-02-02, Underground Storage Tank Area Backfilled, Facing West, 06/13/2007

Photograph 19: CAS 25-02-02, Use Restriction Warning Sign, Facing North, 09/10/2007

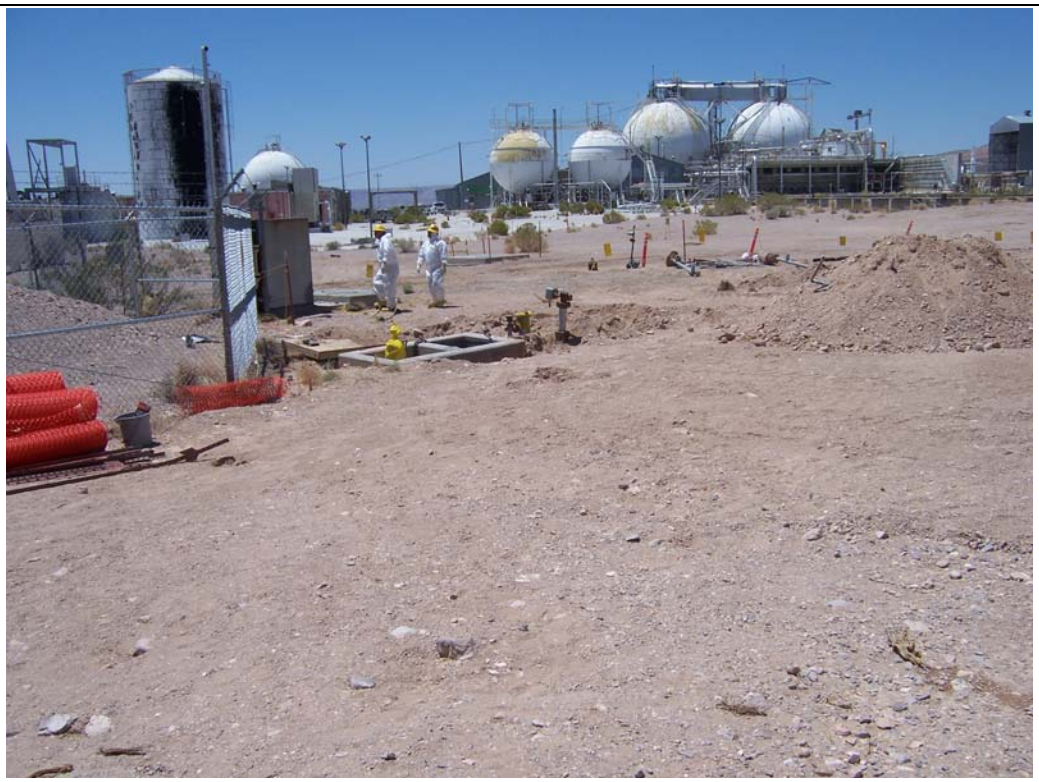
Photograph 20: CAS 25-12-01, Boiler Before Removal, Facing Southwest, 02/24/1998

Photograph 21: CAS 25-12-01, After Boiler Removal,
Facing Southwest, 09/12/2007

Photograph 22: CAS 25-23-11, Disassembly of Metal Pump Shed,
Facing West, 06/11/2007

Photograph 23: CAS 25-23-11, Lead Bricks from Pump Vault in B-25 Box, 06/12/2007

Photograph 24: CAS 25-23-11, Removal of Radiologically and Lead-Impacted Soil from Pump Vault, Facing West, 06/12/2007



Photograph 25: CAS 25-23-11, Concrete Pump Vault Prior to Removal, Facing West, 06/19/2007

Photograph 26: CAS 25-23-11, Concrete Pump Vault During Removal, Facing West, 06/19/2007

Photograph 27: CAS 25-23-11, Metal Pump Shed and Radiologically Impacted Soil Staged Onsite for Future Disposal, Facing Southeast, 06/19/2007

Photograph 28: CAS 26-01-01, Aboveground Storage Tank Before Removal, Facing East, 06/28/2001

Photograph 29: CAS 26-01-01, Removal of Piping from Aboveground Storage Tank, Facing Northeast, 06/28/2007

Photograph 30: CAS 26-01-02, Aboveground Storage Tank Before Removal, Facing Southeast, 07/02/2007

Photograph 31: CAS 26-01-02, Packaging Aboveground Storage Tank in Transportainer, Facing Northwest, 07/02/2007

Photograph 32: CAS 26-02-01, Underground Storage Tank Before Closure Activities, Facing Northwest, 02/28/2001

Photograph 33: CAS 26-02-01, Underground Storage Tank After Closure Activities, Facing North, 11/28/2007

Photograph 34: CAS 26-23-01, Spreader Before Removal, Facing Northeast, 03/12/1998

Photograph 35: CAS 26-23-01, After Spreader Removal,
Facing Northeast, 11/28/2007

Photograph 36: CAS 26-99-01, Wooden Shed with Filter Tanks Before Removal,
Facing East, 06/28/2001

Photograph 37: CAS 26-99-01, Filter Tanks Before Removal, Facing East, 07/03/2007

Photograph 38: CAS 26-99-01, Demolition of Wooden Shed, Facing Southwest, 07/10/2007

Photograph 39: CAS 26-99-01, After Closure Activities,
Facing Southwest, 07/10/2007

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U.S. Department of Energy Office of Scientific and Technical Information P.O. Box 62 Oak Ridge, TN 37831-0062	1 (Uncontrolled, electronic copy)
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Manager, Northern Nevada FFACO Public Reading Facility c/o Nevada State Library & Archives Carson City, NV 89701-4285	1 (Uncontrolled, electronic copy)

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