Nevada
Environmental
Restoration
Project

DOE/NV--1234

National Nuclear Security Administration

Closure Report for Corrective Action Unit 224: Decon Pad and Septic Systems Nevada Test Site, Nevada

Controlled Copy No.:_____

Revision: 0

October 2007

Environmental Restoration
Project

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

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CLOSURE REPORT
FOR CORRECTIVE ACTION UNIT 224:
DECON PAD AND SEPTIC SYSTEMS
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 224:
DECON PAD AND SEPTIC SYSTEMS
NEVADA TEST SITE, NEVADA

Approved By: SIGNATURE APPROVED Date: 10/17/2007
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ACRONYMS AND ABBREVIATIONS

BMP	best management practice
CADD	Corrective Action Decision Document
CAIP	Corrective Action Investigation Plan
CAP	Corrective Action Plan
CAS	Corrective Action Site
CAU	Corrective Action Unit
COC	contaminant of concern
CR	Closure Report
DDE	dichloro-diphenyl-dichloro-ethene
DDT	dichloro-diphenyl-trichloroethane
DQO	data quality objective
FFACO	*Federal Facility Agreement and Consent Order*
gal	gallon(s)
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
NEPA	*National Environmental Policy Act*
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
NSTec	National Security Technologies, LLC
NTS	Nevada Test Site
pCi/g	picocurie(s) per gram
Pu	plutonium
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
RWMC	Radioactive Waste Management Complex

UW	universal waste
yd^3	cubic yard(s)

EXECUTIVE SUMMARY

Corrective Action Unit (CAU) 224 is located in Areas 02, 03, 05, 06, 11, and 23 of the Nevada Test Site, which is situated approximately 65 miles northwest of Las Vegas, Nevada. CAU 224 is listed in the *Federal Facility Agreement and Consent Order* (FFACO) of 1996 as Decon Pad and Septic Systems and is comprised of the following nine Corrective Action Sites (CASs):

- CAS 02-04-01, Septic Tank (Buried)
- CAS 03-05-01, Leachfield
- CAS 05-04-01, Septic Tanks (4)/Discharge Area
- CAS 06-03-01, Sewage Lagoons (3)
- CAS 06-05-01, Leachfield
- CAS 06-17-04, Decon Pad and Wastewater Catch
- CAS 06-23-01, Decon Pad Discharge Piping
- CAS 11-04-01, Sewage Lagoon
- CAS 23-05-02, Leachfield

The Nevada Division of Environmental Protection (NDEP)-approved corrective action alternative for CASs 02-04-01, 03-05-01, 06-03-01, 11-04-01, and 23-05-02 is no further action. As a best management practice, the septic tanks and distribution box were removed from CASs 02-04-01 and 11-04-01 and disposed of as hydrocarbon waste.

The NDEP-approved correction action alternative for CASs 05-04-01, 06-05-01, 06-17-04, and 06-23-01 is clean closure. Closure activities for these CASs included removing and disposing of radiologically and pesticide-impacted soil and debris.

CAU 224 was closed in accordance with the NDEP-approved CAU 224 Corrective Action Plan (CAP). The closure activities specified in the CAP were based on the recommendations presented in the CAU 224 Corrective Action Decision Document (U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office, 2005). This Closure Report documents CAU 224 closure activities.

During closure activities, approximately 60 cubic yards (yd^3) of mixed waste in the form of soil and debris; approximately 70 yd^3 of sanitary waste in the form of soil, liquid from septic tanks, and concrete debris; approximately 10 yd^3 of hazardous waste in the form of pesticide-impacted soil; approximately 0.5 yd^3 of universal waste in the form of fluorescent light bulbs; and approximately 0.5 yd^3 of low-level waste in the form of a radiologically impacted fire hose rack were generated, managed, and disposed of appropriately. Waste minimization techniques, such as the utilization of laboratory analysis and field screening to guide the extent of excavations, were employed during the performance of closure work.

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1.0 INTRODUCTION

Corrective Action Unit (CAU) 224 is listed in the *Federal Facility Agreement and Consent Order* (FFACO) as Decon Pad and Septic Systems (FFACO, 1996, as amended). CAU 224 consists of nine Corrective Action Sites (CASs) located in Areas 02, 03, 05, 06, 11, and 23 of the Nevada Test Site (NTS), which is located approximately 65 miles northwest of Las Vegas, Nevada. Figure 1 depicts the approximate CAS locations within the NTS.

Specifically, CAU 224 includes:

- CAS 02-04-01, Septic Tank (Buried)
- CAS 03-05-01, Leachfield
- CAS 05-04-01, Septic Tanks (4)/Discharge Area
- CAS 06-03-01, Sewage Lagoons (3)
- CAS 06-05-01, Leachfield
- CAS 06-17-04, Decon Pad and Wastewater Catch
- CAS 06-23-01, Decon Pad Discharge Piping
- CAS 11-04-01, Sewage Lagoon
- CAS 23-05-02, Leachfield

The sites reportedly included soil and concrete that exceeded cleanup criteria for pesticides, metals, and radionuclides. Historical details of the CASs are provided in the CAU 224 Corrective Action Investigation Plan (CAIP) (U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office [NNSA/NSO], 2004), and results of site characterization are provided in the CAU 224 Corrective Action Decision Document (CADD) (NNSA/NSO, 2005).

The corrective actions described in the CAU 224 Corrective Action Plan (CAP) (NNSA/NSO, 2006) were implemented from June 2007 through October 2007. This Closure Report (CR) has been prepared for CAU 224 in accordance with the FFACO and the Nevada Division of Environmental Protection (NDEP)-approved CAP.

1.1 PURPOSE

The purpose of this CR is to document that the closure of CAU 224 complied with the NDEP-approved CAP closure requirements (NNSA/NSO, 2006). The closure activities specified in the CAP were based on the approved corrective action alternatives presented in the CAU 224 CADD (NNSA/NSO, 2005).

1.2 SCOPE

The approved closure strategy for CAU 224 was specified in the CAU 224 CADD (NNSA/NSO, 2005). The NDEP-approved closure alternative for CASs 02-04-01, 03-05-01, 06-03-01, 11-04-01, and 23-05-02 is no further action with best management practices (BMPs),

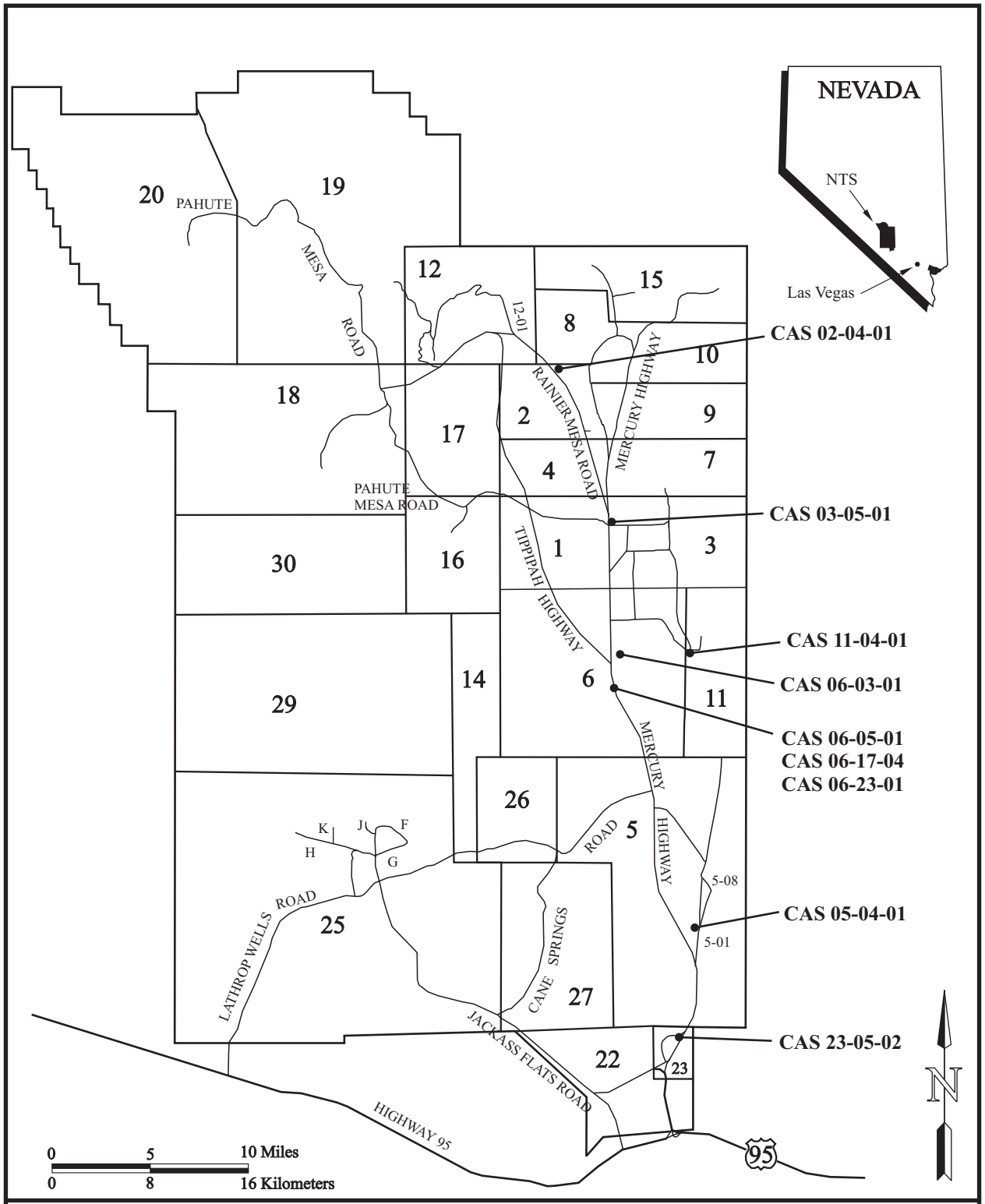


FIGURE 1.
CAU 224 SITE LOCATION MAP

where applicable. The NDEP-approved closure alternative for CASs 05-04-01, 06-05-01, 06-17-04, and 06-23-01 is clean closure. The strategy for implementing this closure was presented in the CAU 224 CAP (NNSA/NSO, 2006).

Closure activities included:

- Removing and disposing of a septic tank and residual liquid within the septic tank, and grouting five drain lines associated with the former trailer drains at CAS 02-04-01 as a BMP.
- Removing and disposing of approximately 10 cubic yards (yd^3) of pesticide-contaminated soil, 16,000 gallons (gal) of liquid from within four septic tanks, the four septic tanks themselves, and associated piping at CAS 05-04-01.
- Backfilling a vault associated with the four septic tanks at CAS 05-04-01 as a BMP.
- Removing and disposing of a concrete sump containing approximately 10 yd^3 of sludge, 1 yd^3 of sediment within trenches on a concrete pad, and a total of approximately 36 yd^3 of plutonium (Pu)-239-impacted soil from three locations at CASs 06-05-01, 06-17-04, and 06-23-01, which together comprised a single decontamination system.
- Removing and disposing of miscellaneous construction debris at the Area 6 decontamination pad area as a BMP.
- Removing and disposing of a septic tank, distribution box, and approximately 500 gal of liquid within the septic tank; sealing all piping left in place; and backfilling a manhole at CAS 11-04-01 as a BMP.
- Collecting verification samples to verify cleanup criteria.
- Backfilling and grading excavations to surrounding topographic contours.

Detailed site-specific closure activities are presented in Section 2.0 of this report.

Data quality objectives (DQOs) were developed for the CAU 224 site characterization (NNSA/NSO, 2004) and are included in Appendix A of this report. Site closure was verified through inspections, sampling, observations, and documentation of waste disposal.

1.3 CLOSURE REPORT CONTENTS

This CR includes the following sections:

- Section 1.0, "Introduction," presents the purpose, general scope, and an overview of report contents.
- Section 2.0, "Closure Activities," describes the corrective actions completed, any deviations from the CAP, and the general closure schedule.
- Section 3.0, "Waste Disposition," describes the waste generated and documents waste disposition.

- Section 4.0, "Closure Verification Results," describes the testing, inspections, and other measures used to confirm the completion of the corrective actions and the quality of results.
- Section 5.0, "Conclusions and Recommendations," describes the results, completion of implementation of the CAP, and the post-closure monitoring requirements.
- Section 6.0, "References," lists the supporting documents.

The following appendices include relevant supporting documents:

- Appendix A, "Data Quality Objectives," presents the DQOs developed in the CAU 224 CAIP (NNSA/NSO, 2004).
- Appendix B, "Analytical Results," presents the summary analytical results for the soil verification samples collected at CASs 05-04-01, 06-05-01, 06-17-04, and 06-23-01.
- Appendix C, "Waste Disposition Documentation," contains copies of the load verification forms.
- Appendix D, "Field Photographs," contains photographs of the CASs taken prior to, during, and after closure activities.
- Appendix E, "*National Environmental Policy Act* (NEPA) Environmental Evaluation Checklist," includes the checklist evaluating the environmental impact of site closure activities.

2.0 CLOSURE ACTIVITIES

This section of the CR details the specific activities involved in the closure of CAU 224.

2.1 DESCRIPTION OF CORRECTIVE ACTION ACTIVITIES

Closure of CAU 224 was completed by the National Security Technologies, LLC (NSTec), Environmental Restoration Project using the approved CAP for CAU 224 (NNSA/NSO, 2006). The CAP was based on the recommendations presented in the CAU 224 CADD (NNSA/NSO, 2005).

Prior to beginning closure activities, the following pre-field activities were completed:

- Preparation of a NEPA Checklist
- Preparation of a Field Management Plan for CAU 224 (NSTec, 2007a)
- Preparation of a Site-Specific Health and Safety Plan for closure activities at CAU 224 (NSTec, 2007b)
- Preparation of the work packages to control work
- Preparation of Real Estate/Operations Permits to authorize the work
- Performance of utility surveys to ensure that all fieldwork would be conducted safely and without disruption of NTS infrastructure

Closure activities began on June 27, 2007, and were completed on October 10, 2007. The following sections detail the closure activities implemented for CAU 224.

2.1.1 CAS 02-04-01, Septic Tank (Buried)

Figure 2 shows the site plan for CAS 02-04-01, which is located in Area 2 of the NTS. The CAS consisted of a buried septic tank and associated piping that serviced the Area 2 Support Facility. Results of the site characterization reported no contaminants of concern (COCs) above action levels. However, as a BMP, the buried septic tank was removed and disposed of as sanitary waste at the NTS Area 9 U10c Sanitary Landfill, residual liquid within the septic tank was solidified with NTS native fill and disposed of as sanitary waste at the NTS Area 9 U10c Sanitary Landfill, and five drain lines associated with the former trailer drains were grouted in place. The septic tank excavation was then backfilled with native material from an approved borrow source and graded to the approximate surrounding topographic contours.

2.1.2 CAS 05-04-01, Septic Tanks (4)/Discharge Area

Figure 3 shows the site plan for CAS 05-04-01, which is located in Area 5 of the NTS. The CAS consisted of four two-chambered septic tanks, associated piping, and an overflow area which serviced the former Area 5 Trailer Park. Preliminary characterization of the site reported pesticides as COCs in the soil at the overflow area. This site was clean closed by removing and disposing of approximately 10 yd^3 of pesticide-impacted soil for offsite disposal as hazardous waste (HW). As a BMP, the contents from each tank, the tanks themselves, and associated piping were removed and disposed of as sanitary waste at the NTS Area 9 U10c Sanitary

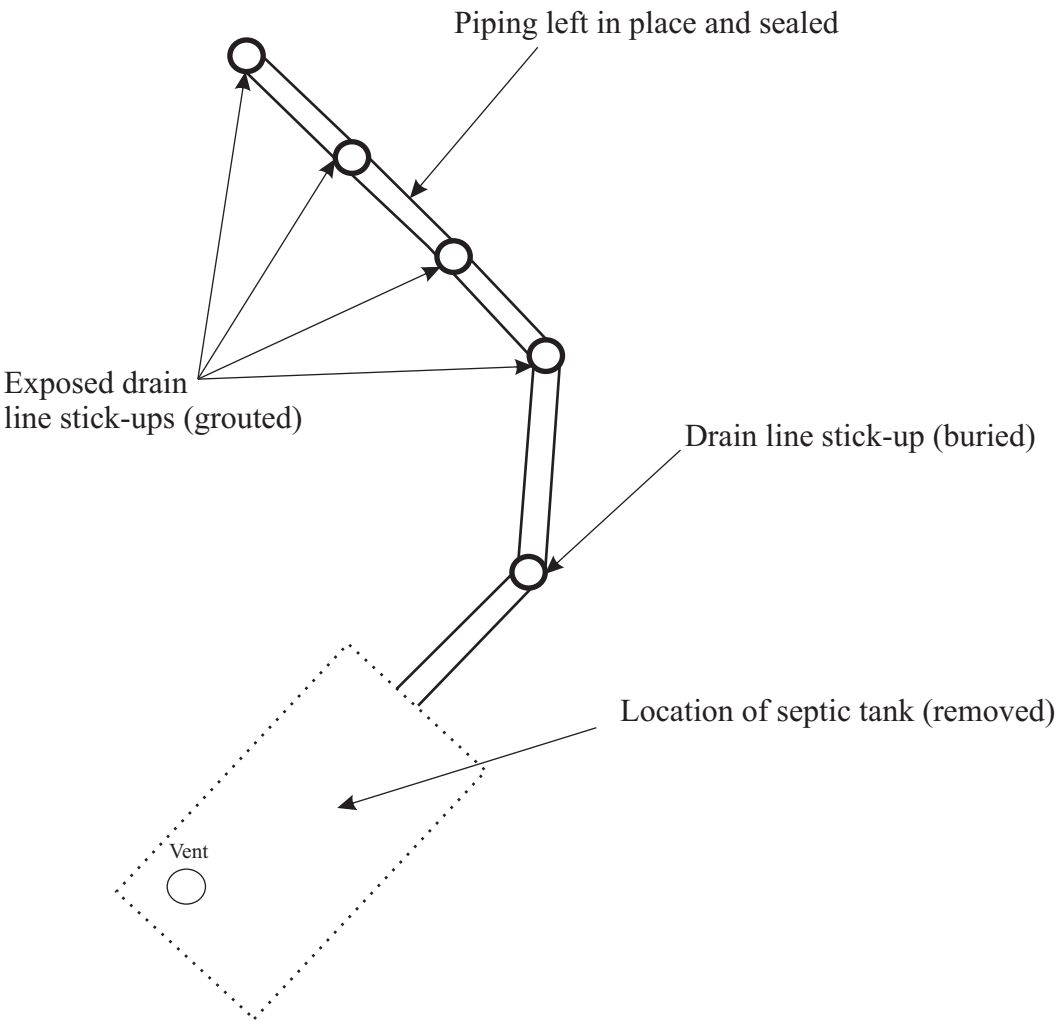


FIGURE 2.
CAS 02-04-01, SEPTIC TANK (BURIED)

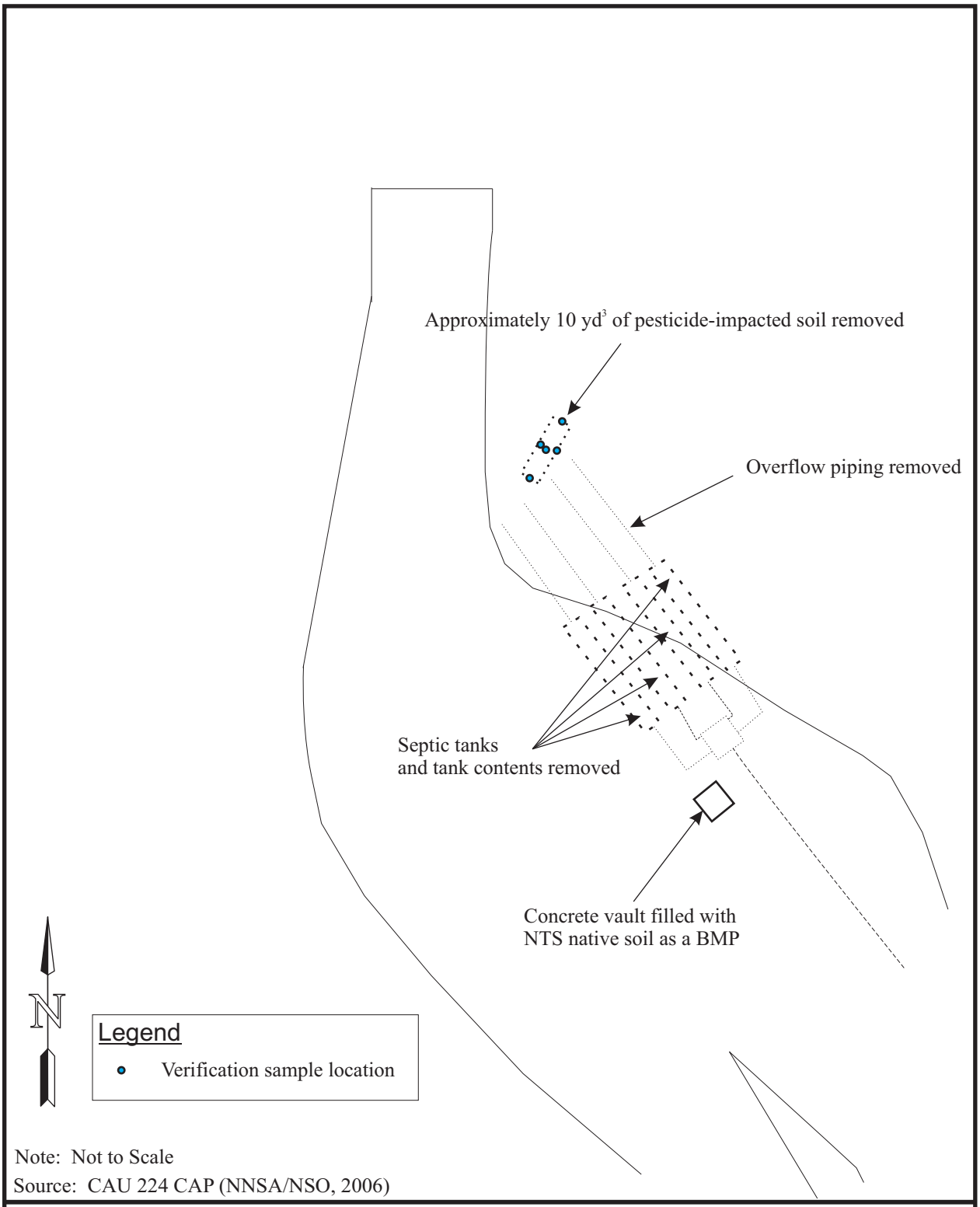


FIGURE 3.
CAS 05-04-01, SEPTIC TANKS (4)/DISCHARGE AREA

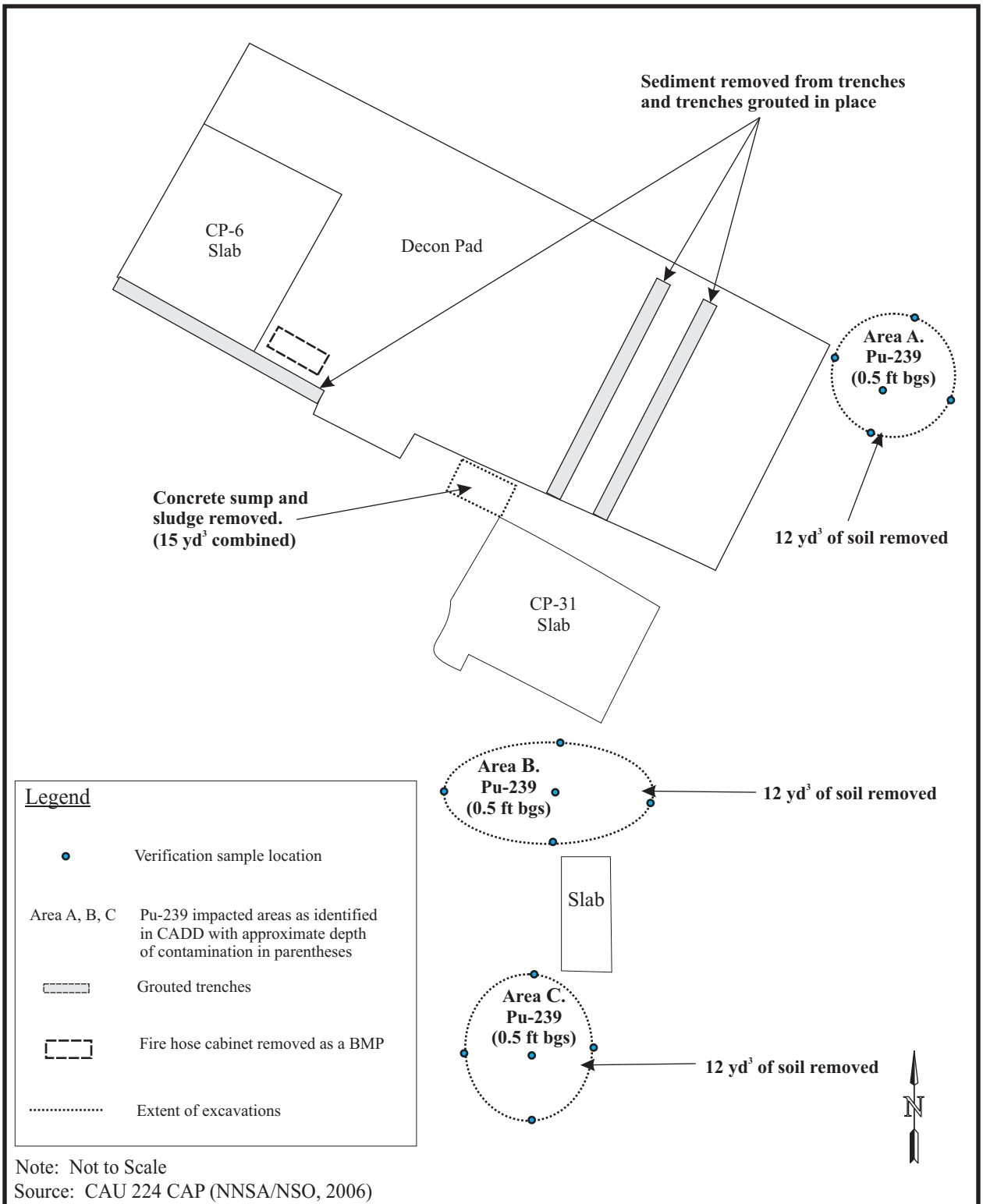
Landfill. After the receipt of analytical result confirming that the cleanup criteria had been met, the excavation and a remnant concrete vault were backfilled and graded to the approximate surrounding topographic contours.

2.1.3 CAS 06-05-01, Leachfield; CAS 06-17-04, Decon Pad and Wastewater Catch; and CAS 06-23-01, Decon Pad Discharge Piping

Figure 4 shows the site plan for CASs 06-05-01, 06-17-04, and 06-23-01, which together comprised a single system used for the decontamination of radiologically contaminated equipment in Area 6 of the NTS. CAS 06-05-01 consists of a leachfield and associated sewage lagoons, CAS 06-17-04 is a decontamination pad used for the decontamination of equipment and the associated wastewater catch, and CAS 06-23-01 consists of piping connecting the other two CASs to each other and to former nearby buildings. Results of site characterization reported a sump impacted with lead and Pu-239 and three areas of soil impacted with Pu-239, which were combined as a single waste stream. This CAS was clean closed by removing 60 yd^3 of contaminated material, including a sludge-containing sump adjacent to the decontamination pad, 1 yd^3 of sediment from within the decontamination pad trenches, and 30 yd^3 of soil from three areas adjacent to the decontamination pad. The material was disposed of as mixed waste (MW) at an offsite facility. Verification samples were collected from the base and sidewalls of the three soil excavations, and after receipt of analytical results confirming that cleanup criteria had been met, the excavations were backfilled with native material from an approved borrow source and graded to the approximate surrounding topographic contours. The trenches on the decontamination pad were then grouted in place, and construction debris on the decontamination pad, such as light poles, steel beams, and wooden pallets were removed as a BMP and disposed of as sanitary waste. All light bulbs were removed and transported to the CAU 116 universal waste (UW) storage area. They will be disposed of with CAU 116 UW. Additionally, during closure work, a fire hose rack was found to be radiologically impacted and was removed and disposed of as low-level waste (LLW) at the NTS Area 5 Radioactive Waste Management Complex (RWMC). During the removal of the fire hose rack, it was discovered that an approximate 3-by-3-ft square of concrete comprising the fire hose rack footprint was radiologically impacted. The concrete was removed and disposed with the previously-approved MW stream as a BMP, and the area was filled with grout.

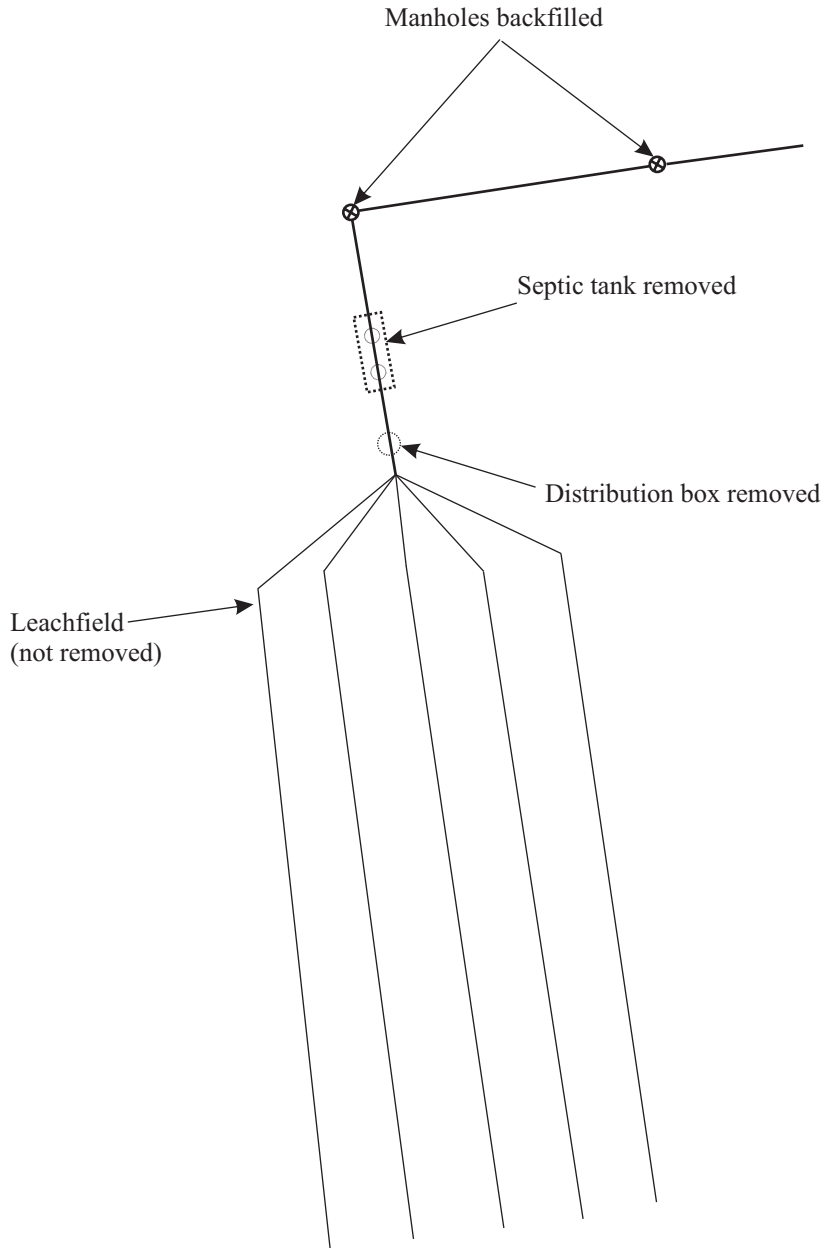
2.1.4 CAS 11-04-01, Sewage Lagoon

Figure 5 shows the site plan for CAS 11-04-01, which is located adjacent to the Tactical Demilitarization Development Facility in Area 11 of the NTS and consists of a former sewage lagoon, evapotranspiration bed, a two-chamber septic tank, and associated piping. Results of site characterization reported no COCs above actions levels. However, as a BMP, the septic tank and distribution box were removed and disposed of as sanitary waste at the NTS Area 9 U10c Sanitary Landfill, approximately 500 gal of liquid from within the septic tank were removed and disposed of at the NTS Area 23 Sewage Lagoons, and all remaining piping was sealed in place. The septic tank excavation was then backfilled with native material from an approved borrow source and graded to the approximate surrounding topographic contours.



Note: Not to Scale
Source: CAU 224 CAP (NNSA/NSO, 2006)

FIGURE 4.
CASs 06-05-01, LEACHFIELD; 06-17-04, DECON PAD AND WASTEWATER CATCH; AND 06-23-01, DECON PAD DISCHARGE PIPING



Note: Not to Scale
Source: CAU 224 CAP (NNSA/NSO, 2006)

FIGURE 5.
CAS 11-04-01, SEWAGE LAGOON

2.2 DEVIATIONS FROM CORRECTIVE ACTION PLAN AS APPROVED

No deviations from the approved CAP were necessary during field activities.

2.3 CORRECTIVE ACTION SCHEDULE AS COMPLETED

The completed closure field activities schedule is presented in Table 1.

TABLE 1. CAU 224 CLOSURE SCHEDULE

SITE	DATE CORRECTIVE ACTIONS COMPLETED*
CAS 02-04-01	August 23, 2007
CAS 05-04-01	July 26, 2007
CAS 06-05-01	October 10, 2007
CAS 06-17-04	October 10, 2007
CAS 06-23-01	October 10, 2007
CAS 11-04-01	August 22, 2007

Notes: * Corrective action activities do not include post-closure photographic documentation site visits. Post-closure site visits were completed on August 31, 2007.

2.4 SITE PLAN / SURVEY PLAT

No engineering "as-built" drawings were required for closure activities conducted at CAU 224.

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3.0 WASTE DISPOSITION

Waste generated during CAU 224 closure activities included HW, LLW, MW, sanitary waste/construction debris, and UW. All waste was managed according to federal and state regulations, U.S. Department of Energy orders, and NSTec procedures. Some waste required sampling to verify the appropriate waste disposition. All waste was containerized, as needed, for proper disposal in an approved landfill. Table 2 summarizes disposition of each waste stream. Waste disposition documentation is included in Appendix C of this report.

TABLE 2. DISPOSITION OF WASTE

CAS	WASTE TYPE	MATERIAL	VOLUME ESTIMATE	DISPOSITION
02-04-01	Sanitary waste	Soil, liquid, and concrete	10 yd^3	NTS Area 9 U10c Sanitary Landfill
05-04-01	Sanitary waste	Soil, liquid, and concrete	20 yd^3	NTS Area 9 U10c Sanitary Landfill
	HW	Soil	10 yd^3	U.S. Ecology, Beatty, NV
06-05-01, 06-17-04, 06-23-01	MW	Soil, concrete, and miscellaneous debris	60 yd^3	Energy Solutions, Clive, UT
	Sanitary waste	Miscellaneous debris	20 yd^3	NTS Area 9 U10c Sanitary Landfill
	LLW	Miscellaneous debris	0.5 yd^3	NTS Area 5 RWMC
	UW	Light bulbs	0.5 yd^3	Currently staged at the CAU 116 UW storage area
11-04-01	Sanitary waste	Soil and concrete	20 yd^3	NTS Area 9 U10c Sanitary Landfill

Notes:
CAS = corrective action site
HW = hazardous waste
LLW = low-level waste
MW = mixed waste
RWMC = Radioactive Waste Management Complex
UW = universal waste
yd^3 = cubic yard(s)

3.1 WASTE MINIMIZATION

Industry standard waste minimization practices were applied throughout the course of field activities. These practices included using laboratory analysis and field screening to guide the extent of excavation at each CAS, as necessary.

3.2 HAZARDOUS WASTE

Approximately 10 yd^3 of pesticide-impacted soil were excavated and removed from CAS 05-04-01, which were transported to an offsite facility for disposal as HW. Waste disposal documentation is included in Appendix C of this report.

3.3 LOW-LEVEL WASTE

Approximately 0.5 yd^3 of LLW in the form of a radiologically impacted fire hose rack were removed from the Area 6 decontamination pad and disposed of at the NTS Area 5 RWMC as a BMP. Waste disposal documentation is included in Appendix C of this report.

3.4 MIXED WASTE

Approximately 60 yd^3 of MW in the form of soil, sludge, and concrete were excavated and removed from the Area 6 decontamination pad, which were transported to an offsite facility for disposal as MW. Waste disposal documentation is included in Appendix C of this report.

3.5 SANITARY WASTE

Approximately 70 yd^3 of sanitary waste, including sanitary trash, personal protective equipment, soil, and concrete construction debris, was disposed of at the NTS Area 9 U10c Sanitary Landfill. Waste disposal documentation is included in Appendix C of this report.

3.6 UNIVERSAL WASTE

Approximately 0.5 yd^3 of universal waste in the form of light bulbs were removed from the Area 6 decontamination pad and transferred to the UW stream associated with CAU 116 for storage and disposal.

4.0 CLOSURE VERIFICATION RESULTS

Site closure was verified by the collection and analysis of verification samples, photographic documentation, and visual inspections.

At CAS 05-04-01, five verification samples and one blind duplicate were collected from the bottom and base of the sidewalls of the pesticide-impacted soil excavation (see Figure 3). Samples were collected on June 28, 2007, and were analyzed for pesticides. Results were below action levels, verifying that the CAS was clean closed.

At the Area 6 CASs, 15 verification samples and one blind duplicate were collected from the bottom and base of the Pu-impacted soil excavations (see Figure 4). Samples were collected from the excavations from July 19–31, 2007, and were analyzed for isotopic Pu. Results were below action levels, verifying that the CAS was clean closed.

All samples were handled according to the Industrial Sites Quality Assurance Project Plan (QAPP) (U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office [NNSA/NV], 2002). The samples were shipped under chain of custody to an approved offsite laboratory for analysis of pesticides and isotopic Pu. Table 3 and Appendix B summarize the results. The analytical results for soil verification samples collected from the excavations were below the action levels.

Critera for verification sampling and backfilling were provided in the approved CAU 224 CAP (NNSA/NSO, 2006).

4.1 DATA QUALITY ASSESSMENT

Accurate and defensible analytical data were collected to verify that waste was properly characterized, managed, and disposed, and to verify that cleanup criteria were met. The following sections describe the quality assurance/quality control (QA/QC) procedures, data validation process, and reconciliation of the conceptual site model with the observations and findings during the closure activities.

4.1.1 Quality Assurance/Quality Control Procedures

Detailed information about the QA/QC program can be found in the Industrial Sites QAPP (NNSA/NV, 2002). One blind duplicate verification sample per 20 samples or one blind duplicate sample per sampling event was collected and submitted blind to the laboratory for analysis. Results showed no contamination resulted from the decontaminated sampling equipment. Analytical results for waste characterization samples were validated by the laboratory with respect to the data quality indicators. Matrix spikes, matrix spike duplicates, recoveries, and other standard QA/QC procedures were followed. The laboratory reports and validation reports indicate no problems with the usability of the data.

TABLE 3. VERIFICATION SAMPLE ANALYTICAL RESULTS

SAMPLE ID	DATE COLLECTED	RESULTS			
		Pu-239 (pCi/g)	Chlordane (mg/kg)	4,4' - DDE (mg/kg)	4,4' - DDT (mg/kg)
		Action Level = 168.1	Action Level = 6.5	Action Level = 7.0	Action Level = 7.0
061704-AV1A	07/30/2007	ND	--	--	--
061704-AV2	07/19/2007	ND	--	--	--
061704-AV3A	07/30/2007	ND	--	--	--
061704-AV4	07/19/2007	ND	--	--	--
061704-AV5A	07/30/2007	0.969	--	--	--
061704-BV1B	07/31/2007	1.71	--	--	--
061704-BV2B	07/31/2007	2.54	--	--	--
061704-BV3B	07/31/2007	10.1	--	--	--
061704-BV4B	07/31/2007	0.196	--	--	--
061704-BV5B	07/31/2007	12.4	--	--	--
061704-CV1	07/19/2007	7.55	--	--	--
061704-CV2A	07/30/2007	19.4	--	--	--
061704-CV3A	07/30/2007	3.54	--	--	--
061704-CV4	07/19/2007	2.92	--	--	--
061704-CV5A	07/30/2007	3.54	--	--	--
061704-CV6	07/19/2007	3.14	--	--	--
050401-V1	06/28/2007	--	ND	0.0094	0.0085
050401-V2	06/28/2007	--	0.320	0.260	0.440
050401-V3	06/28/2007	--	0.0018	0.022	0.035
050401-V4	06/28/2007	--	0.270	0.380	0.400
050401-V5	06/28/2007	--	ND	ND	ND
050401-V6	06/28/2007	--	ND	ND	ND

Notes:
-- = not analyzed
DDE = dichloro-diphenyl-dichloro-ethene
DDT = dichloro-diphenyl-trichloroethane
ND = not detected above analytical limits
pCi/g = picocurie(s) per gram
mg/kg = milligram(s) per kilogram

4.1.2 Data Validation

Data validation was performed according to the Industrial Sites QAPP (NNSA/NV, 2002). All sample data were internally validated using Tier I criteria. No anomalies were discovered in the data that would discredit any of the waste classification or verification samples collected and analyzed for CAU 224. Summary laboratory QA/QC data for verification samples are presented in Appendix B of this report. The complete data set and verification reports are available on request. These data are maintained in NSTec project files located in the Environmental Restoration project offices at the NTS.

4.1.3 Conceptual Site Model

There were no discrepancies between the conceptual site model presented in the DQOs (Appendix A of this report) and that observed in the field.

4.2 USE RESTRICTIONS

The preferred closure alternatives for all CASs requiring remediation activities were no further action or clean closure, and as a result, no use restrictions were required or implemented during the closure of CAU 224.

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5.0 CONCLUSIONS AND RECOMMENDATIONS

CAU 224 was closed according to the FFACO and the NDEP-approved CAP for CAU 224 (NNSA/NSO, 2006). Closure of CAU 224 was accomplished by completing the following tasks:

- Removing and disposing of a septic tank and residual liquid within the septic tank, and grouting five drain lines associated with the former trailer drains at CAS 02-04-01 as a BMP.
- Removing and disposing of approximately 10 yd^3 of pesticide-contaminated soil, 16,000 gal of liquid from within four septic tanks, the four septic tanks themselves, and associated piping at CAS 05-04-01.
- Backfilling a vault associated with the four septic tanks at CAS 05-04-01 as a BMP.
- Removing and disposing of a concrete sump containing approximately 10 yd^3 of sludge; 1 yd^3 of sediment within trenches on the concrete pad; and a total of approximately 36 yd^3 of Pu-239-impacted soil from three locations at CASs 06-05-01, 06-17-04, and 06-23-01, which together comprised a single decontamination system.
- Removing and disposing of miscellaneous construction debris at the Area 6 decontamination pad area as a BMP.
- Removing and disposing of a septic tank, distribution box, and approximately 500 gal of liquid within the septic tank; sealing all piping left in place; and backfilling a manhole at CAS 11-04-01 as a BMP.
- Collecting verification samples to verify cleanup criteria.
- Backfilling and grading excavations to surrounding topographic contours.

5.1 POST-CLOSURE MONITORING REQUIREMENTS

5.1.1 Inspections

Since no use restrictions were implemented, no post-closure inspections or monitoring is required for any CAU 224 CASs.

5.2 NOTICE OF COMPLETION

Based upon the completion of site activities, it is requested that a "Notice of Completion" be provided by NDEP for CAU 224. Upon closure approval, CAU 224 will be moved from Appendix III to Appendix IV, "Closed Corrective Action Units," of the FFACO.

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6.0 REFERENCES

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

Federal Facility Agreement and Consent Order. 1996 (as amended August 2006). Agreed to by the State of Nevada; the U.S. Department of Energy, Environmental Management; the U.S. Department of Defense; and the U.S. Department of Energy, Legacy Management.

National Security Technologies. LLC, 2007a. *Field Management Plan for Corrective Action Unit 224: Decon Pad and Septic Systems, Nevada Test Site, Nevada.* Las Vegas, NV.

National Security Technologies. LLC, 2007b. *Site-Specific Site Health and Safety Plan for Corrective Action Unit 224: Decon Pad and Septic Systems, Nevada Test Site, Nevada.* Las Vegas, NV.

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.

NSTec, see National Security Technologies, LLC.

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

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office, 2004. *Corrective Action Investigation Plan for Corrective Action Unit 224: Decon Pad and Septic Systems, Nevada Test Site, Nevada,* Rev. 0. DOE/NV--965. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office, 2005. *Corrective Action Decision Document for Corrective Action Unit 224: Decon Pad and Septic Systems, Nevada Test Site, Nevada,* Rev. 0. DOE/NV--1050. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office, 2006. *Corrective Action Plan for Corrective Action Unit 224: Decon Pad and Septic Systems, Nevada Test Site, Nevada,* Rev. 0. DOE/NV--1143. Las Vegas, NV.

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APPENDIX A

DATA QUALITY OBJECTIVES*

* As previously published in the approved *Corrective Action Investigation Plan for Corrective Action Unit 224: Decon Pad and Septic Systems, Nevada Test Site, Nevada*, Rev. 0. DOE/NV--965. Las Vegas, NV. All cross-references and page numbers in this appendix refer to the original document.

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ACRONYMS AND ABBREVIATIONS

bgs	Below ground surface
BN	Bechtel Nevada
CAI	Corrective action investigation
CAIP	Corrective Action Investigation Plan
CAS	Corrective Action Site
CAU	Corrective Action Unit
CFR	*Code of Federal Regulations*
CI	Cast iron
COC	Contaminant of concern
COPC	Contaminant of potential concern
CSM	Conceptual site model
DOE	U.S. Department of Energy
DQI	Data quality indicator
DQO	Data quality objective
DRO	Diesel-range organics
EG&G	Edgerton, Germeshausen, and Grier, Inc.
EPA	U.S. Environmental Protection Agency
FFACO	*Federal Facility Agreement and Consent Order*
FSL	Field-screening level
FSR	Field-screening result
ft	Foot (feet)
gal	Gallon
GRO	Gasoline-range organics
in.	Inch
LANL	Los Alamos National Laboratory
LLNL	Lawrence Livermore National Laboratory
mg/kg	Milligram per kilogram
mrem	Millirem
MRL	Minimum reporting limit
MWF	Metal working fluid
NAC	*Nevada Administrative Code*

ACRONYMS AND ABBREVIATIONS (continued)

NCRP	National Council on Radiation Protection and Measurement
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
PA	Preliminary assessment
PAL	Preliminary action level
PCB	Polychlorinated biphenyl
pCi/g	Picocuries per gram
PAH	Polynuclear aromatic hydrocarbons
PID	Photoionization detector
ppm	Parts per million
PRG	Preliminary remediation goal
QA	Quality assurance
QAPP	Quality Assurance Project Plan
QC	Quality control
RCRA	*Resource Conservation and Recovery Act*
REECo	Reynolds Electric & Engineering Co., Inc.
SNJV	Stoller-Navarro Joint Venture
SVOC	Semivolatile organic compound
TaDD	Tactical Demilitarization Development
TPH	Total petroleum hydrocarbon
VCP	Vitrified Clay Pipe
VOC	Volatile organic compound
µCi/mL	Microcuries per milliliter
µg/kg	Micrograms per kilogram
µg/L	Micrograms per liter

Appendix A.1

Data Quality Objectives

A.1 Seven-Step DQO Process for CAU 224 Investigation

The Data Quality Objective process described in this appendix is a seven-step strategic planning approach based on the scientific method that is used to plan data collection activities at CAU 224, Decon Pad and Septic Systems. The DQOs are designed to ensure that the data collected will provide sufficient and reliable information to identify, evaluate, and technically defend the recommended corrective actions (i.e., no further action, closure in place, or clean closure). Existing information about the nature and extent of contamination at each CAS in CAU 224 is insufficient to evaluate and select preferred corrective actions; therefore, a CAI will be conducted.

The CAU 224 investigation will be based on the DQOs presented in this appendix as developed by representatives of the NDEP and NNSA/NSO. The seven steps of the DQO process for CAU 224 are presented in Section A.1.2 through Section A.1.8 and developed based on the CAS-specific information presented in Section A.1.1. This document identifies and references the associated EPA Quality System Documents entitled *Guidance for Quality Assurance Project Plans EPA QA/G-5* (EPA, 2002a), *Data Quality Objectives for Hazardous Waste Site Investigation EPA QA/G-4HW* (EPA, 2000) and *Guidance on Choosing a Sampling Design for Environmental Data Collection EPA QA/G-5S* (EPA, 2002b) upon which the DQO process presented herein is based.

A.1.1 CAS-Specific Information

Corrective Action Unit 224, Decon Pad and Septic Systems, consists of the following nine CASs:

- 02-04-01, Septic Tank (Buried)
- 03-05-01, Leachfield
- 05-04-01, Septic Tanks (4)/Discharge Area
- 06-03-01, Sewage Lagoons (3)
- 06-05-01, Leachfield
- 06-17-04, Decon Pad and Wastewater Catch
- 06-23-01, Decon Pad Discharge Piping
- 11-04-01, Sewage Lagoon
- 23-05-02, Leachfield

The CASs are located in six areas of the NTS as shown in Figure A.1-1. The following sections present CAS-specific information on the physical setting, operational history, sources of potential

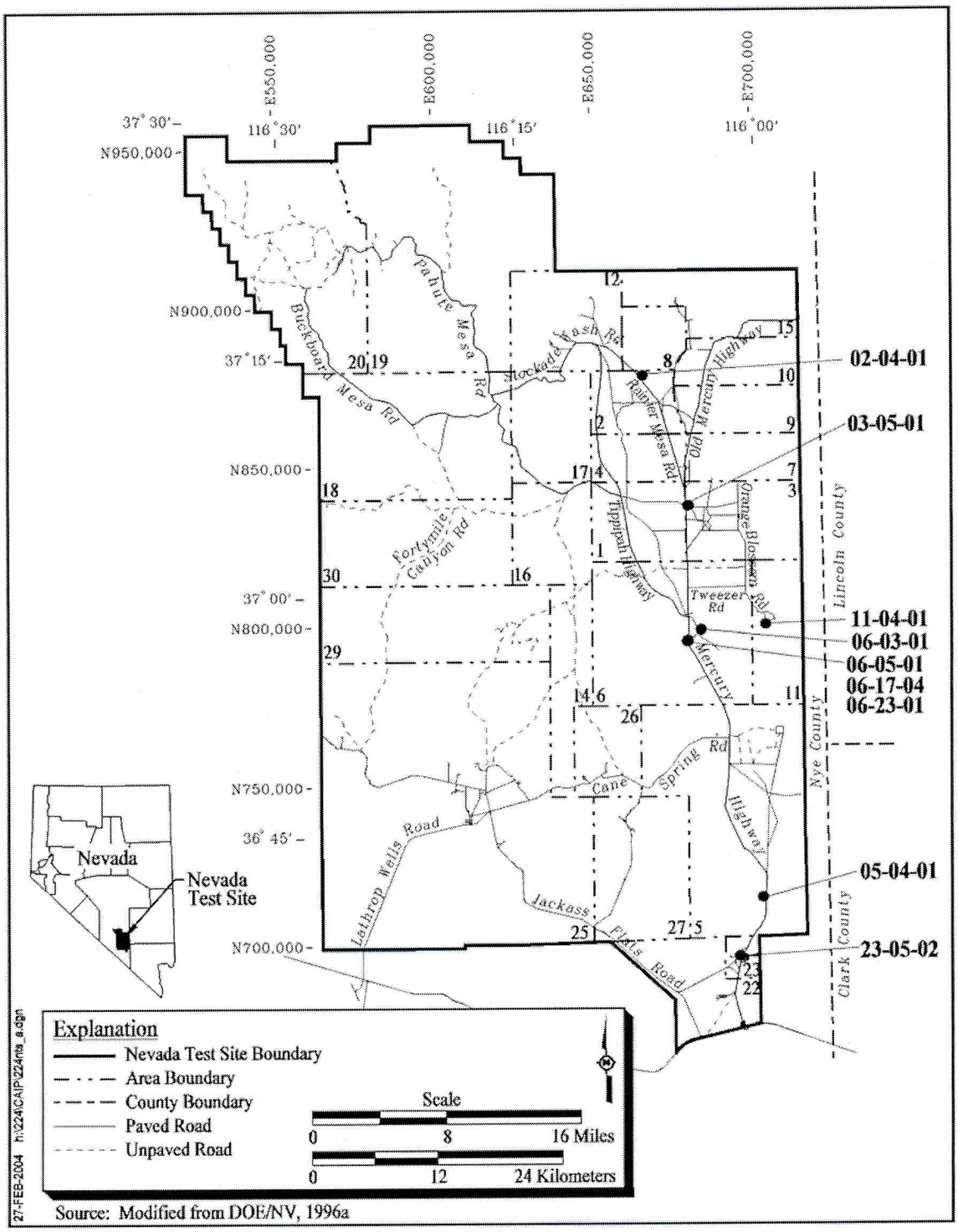

Figure A.1-1
CAU 224 Location Map

contamination, previous investigation results, and COPCs. Of the nine CAU 224 CASs listed above, three (CASs 06-05-01, 06-17-04, and 06-23-01) have been combined for discussion purposes because each represents a component of the same system. Septic tank contents and residuals will be characterized for waste disposal purposes.

Previous investigation data for the CAU 224 CASs are limited. Additionally, many of the COPCs are based on knowledge of activities conducted rather than specific knowledge of a release. As a result, all of the analytes reported by each of the analytical methods requested are considered to be COPCs. Polychlorinated biphenyls and beryllium, and the radionuclides uranium-234, uranium-235, uranium-238, americium-241, cesium-137, strontium-90, plutonium-238, and plutonium-239/-240 are included as COPCs for all CASs because of common concerns for the NTS. Other COPCs (e.g., aluminum and cobalt) have been identified in the following subsections if they were specifically mentioned in the operational history documentation. Table A.1-1 lists the COPCs per CAS.

A.1.1.1 Corrective Action Site 02-04-01, Septic Tank (Buried)

Physical Setting and Operational History - Corrective Action Site 02-04-01 consists of a buried septic tank and its associated piping located along side of 2-07 Road in the Area 2 Support Facility (Figure A.1-2). The septic tank is estimated to be approximately 24 by 13 ft and has a main vent line protruding from the tank. There are six yellow, traffic barrier poles with a posted sign reading "Caution - Buried Septic Tank." Based on site reconnaissance activities, there is no evidence of an associated leachfield or lagoon nearby. Two small-diameter pipes located northeast of the tank were identified and could potentially be connected to the tank. The exact nature, extent, and layout of subsurface piping, if present, is unknown.

The Area 2 Support Facility was constructed in the 1960s to support drilling operations in the Yucca Flat testing basin. The Area 2 Facility was closed in the 1990s. The surrounding buildings and concrete slabs have been demolished and/or removed since the closure of the facility. Historical or operational information has not been located that could identify which facilities may have been directly associated with the septic tank. As a consequence, the associated facility waste streams

discharged to the septic tank are unknown. Four surrounding facilities have been identified that could potentially be associated with the septic tank through subsurface piping systems. These facilities are

Table A.1-1
Decision I Contaminants of Potential Concern Per CAS[a]

COPC	CAS 02-04-01	CAS 03-05-01	CAS 05-04-01	CAS 06-03-01	CASs 06-05-01, 06-17-04, 06-23-01	CAS 11-04-01	CAS 23-05-02
Organics							
VOCs[a]	X	X	X	X	X	X	X
SVOCs[a]	X	X	X	X	x	X	X
PCBs[a]	X	X	X	X	X	X	X
Total Petroleum Hydrocarbons [C_6 - C_{10}]	X	X	X	X	X	X	X
Total Petroleum Hydrocarbons [C_{10} - C_{38}]	X	X	X	X	X	X	X
Methanol[b]					X		
Hydroquinone						X	X
Metals							
RCRA metals[a]	X	X	X	X	X	X	X
Antimony							X
Aluminum[b]	X			X		X	X
Beryllium	X	X	X	X	X	X	X
Cobalt	X			X		X	
Copper							X
Manganese	X			X		X	
Molybdenum							X
Nickel	X			X		X	
Zinc[b]	X			X		X	
Other Parameters							
Cyanide				X			X
Sulfide							X
Radionuclides							
Gamma Emitting to include:							
Americium-241	X	X	X	X	X	X	X
Cesium-137	X	X	X	X	X	X	X
Cobalt-60							X
Strontium-90	X	X	X	X	X	X	X
Plutonium-238 and -239/240	X	X	X	X	X	X	X
Uranium-234, -235, -238	X	X	X	X	X	X	X

[a]For those COPCs identified that include multiple parameters, the parameters with Preliminary Action Levels will be evaluated using EPA *Region IX Risk-Based Preliminary Remediation Goals (PRGs)* for chemical contaminants in industrial soils (EPA, 2002c)
[b]The PRG for this COPC is a non-risk based maximum (EPA, 2002c)

X = COPCs

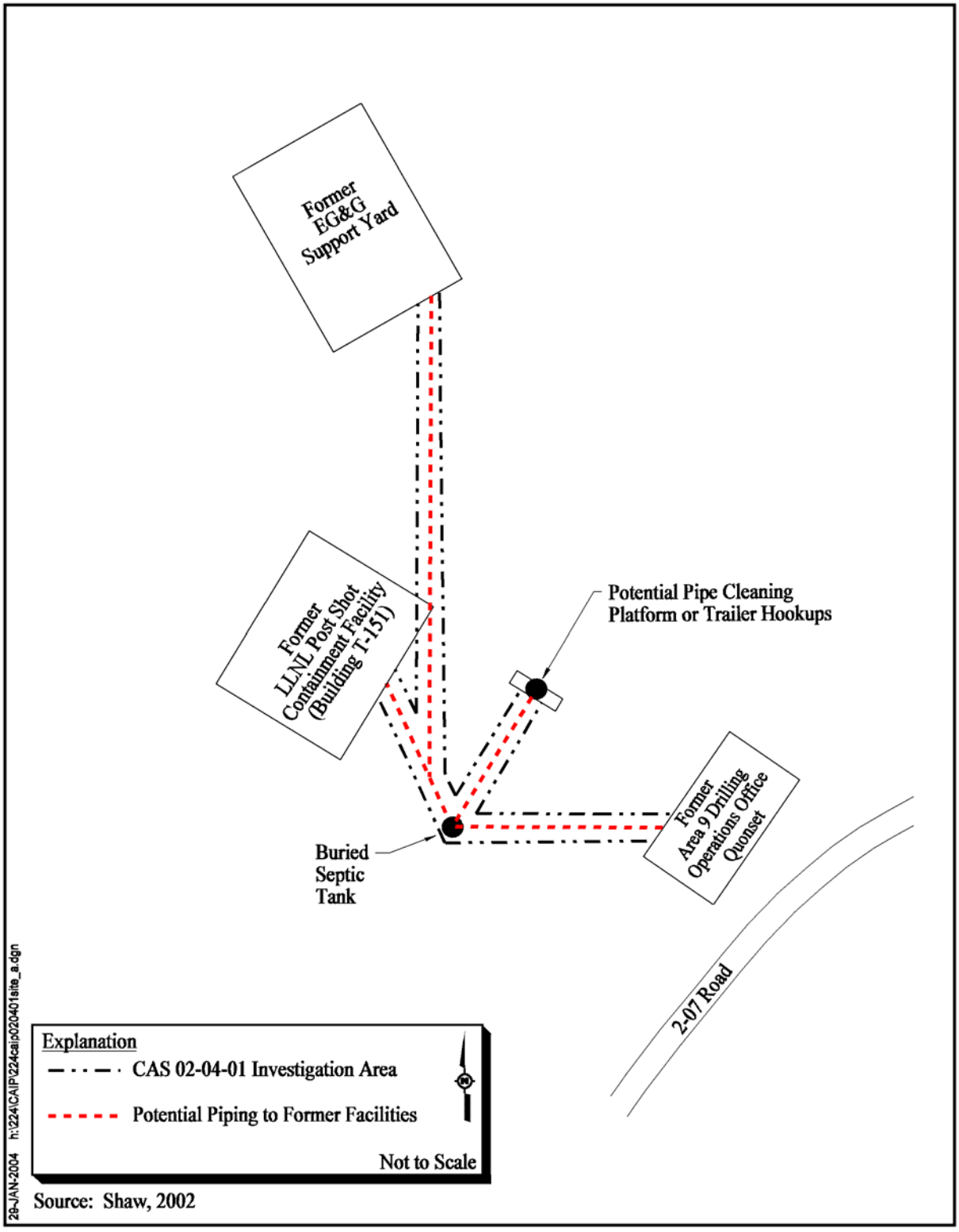

Figure A.1-2
CAU 224, CAS 02-04-01 Site Map

the Area 9 Drilling Operations Office Quonset; the EG&G Support Yard; the LLNL Post Shot Containment Shop (Building T-151); a pipe cleaning platform; and unidentified trailers. Figure A.1-2 shows the facility locations in relation to the tank and how these facilities may possibly be linked through subsurface piping.

Sources of Potential Contamination - The sources of potential contamination at CAS 02-04-01 are based on the assumption that subsurface piping connected drains, sumps, and/or lines from the former surrounding facilities to the buried septic tank. A geophysical survey is proposed to provide additional information. Pending the geophysical survey results, the operational activities at these facilities are considered sources of potential contamination in the event contaminants were disposed down the facility drains. The sources include the following:

- The Area 9 Drilling Operations Office was located east of the tank and was used as an office. It is expected only domestic waste was generated within this facility. The COPCs associated with domestic waste (People for Puget Sound, 2001) should be detected by the following analyses: VOCs, SVOCs, TPH, and RCRA metals.

- The EG&G Support Yard was a 100- by 250-ft fenced area located northwest of the tank. The Yard consisted of a machine shop, skid structures, brock houses, a substation, trailers, and sheds. Historical documentation states the yard and associated structures were used for maintenance and repairing drill rigs and drilling-related equipment where typical wastes such as MWFs (e.g., coolants, cutting oils, lubricants, and machining fluid), metals, petroleum products, solvents, cleaning fluids, and polynuclear aromatic hydrocarbons [PAHs] may have been generated. The PCBs from the storage yard substation may be present based on process knowledge. Machine shop metals could include aluminum, zinc, manganese, chromium, lead, nickel, cadmium, beryllium, and cobalt. (HHS, 1998; Haz-Map, 2002). If subsurface piping leading to the septic tank is identified during the geophysical survey, COPCs from these operations should be detected by the following analyses: VOCs, SVOCs, TPH, PCBs, and RCRA metals (i.e., chromium, lead, and cadmium. Additional metals include aluminum, beryllium, zinc, manganese, nickel, and cobalt).

- The LLNL Post Shot Containment Shop was located to the north/northwest of the septic tank and was used to repair and clean drilling-related equipment. This facility had a sump and injection well located inside the building that was used to capture steam cleaning rinsate and other fluids generated by facility maintenance and cleaning operations. Closure activities performed on the sump and injection well in 1996 consisted of removing liquid and sludge waste from the well, backfilling the well casing with grout, and capping the well with concrete. Closure activities described in the RCRA Closure Report Area 2 Bitcutter and Postshot Containment Shops Injection Wells, Corrective Action Unit 90 (DOE/NV, 1996b) do not suggest any extraneous subsurface piping or drains present between the injection well

system and the septic tank. Samples taken from materials removed during closure activities were analyzed for VOCs, SVOCs, TPH, RCRA metals, and gamma spectroscopy. Analytical results show TPH was present above NDEP action levels with values ranging from 16,300 to 303,000 mg/kg. If subsurface piping leading to the septic tank is identified during the geophysical survey, TPH from these operation would be the COPC, which is consistent with the COCs identified at well closure.

- The pipe cleaning platform was located between the LLNL Postshot Containment Shop and the Area 9 Drilling Operations Office. The platform was likely used for steam cleaning and degreasing drilling pipe. It is unknown if the platform floor contained a french drain or sump for capturing rinsate. The platform location may be the same location as the two protruding, small-diameter pipes identified during a site visit. The two pipes may be remnants of the former platform or trailer hookups. Typical wastes generated from similar operations would include oil, grease, lead, solvents, degreasers, and radionuclides (REECo, 1983). Domestic waste would have been associated with the trailer complex if the trailers were connected to the system (Haworth, 2003). If subsurface piping leading to the septic tank is identified during the geophysical survey, COPCs from these operations should be detected by the following analyses VOCs, SVOCs, TPH, RCRA metals, and radionuclides.

Previous Investigation Results - No previous investigation results are available for CAU 224, CAS 02-04-01.

Potential Contamination - The COPCs for CAS 02-04-01 based on assumed connections to the surrounding facilities, the operations conducted therein, and common NTS concerns are:

- VOCs, SVOCs, PCBs, TPH (gasoline-range organics [GRO] and diesel-range organics [DRO]), RCRA metals, aluminum, zinc, manganese, nickel, beryllium, cobalt, and radionuclides.

Residual tank contents will also be analyzed for fecal coliform bacteria for health and safety purposes.

A.1.1.2 Corrective Action Site 03-05-01, Leachfield

Physical Setting and Operational History - Corrective Action Site 03-05-01 consists of a leach pit within the Area 3 Subdock Complex (Figure A.1-3). The Area 3 Subdock Complex operated from the 1970s to 1985 primarily for cleaning and repairing worn drill bits and bent drilling rods. Site reconnaissance activities and historical document/aerial photograph review indicate the leach pit is located in a shallow depression and appears to have been leveled or graded. The estimated dimensions are 60 by 60 by 2 ft.

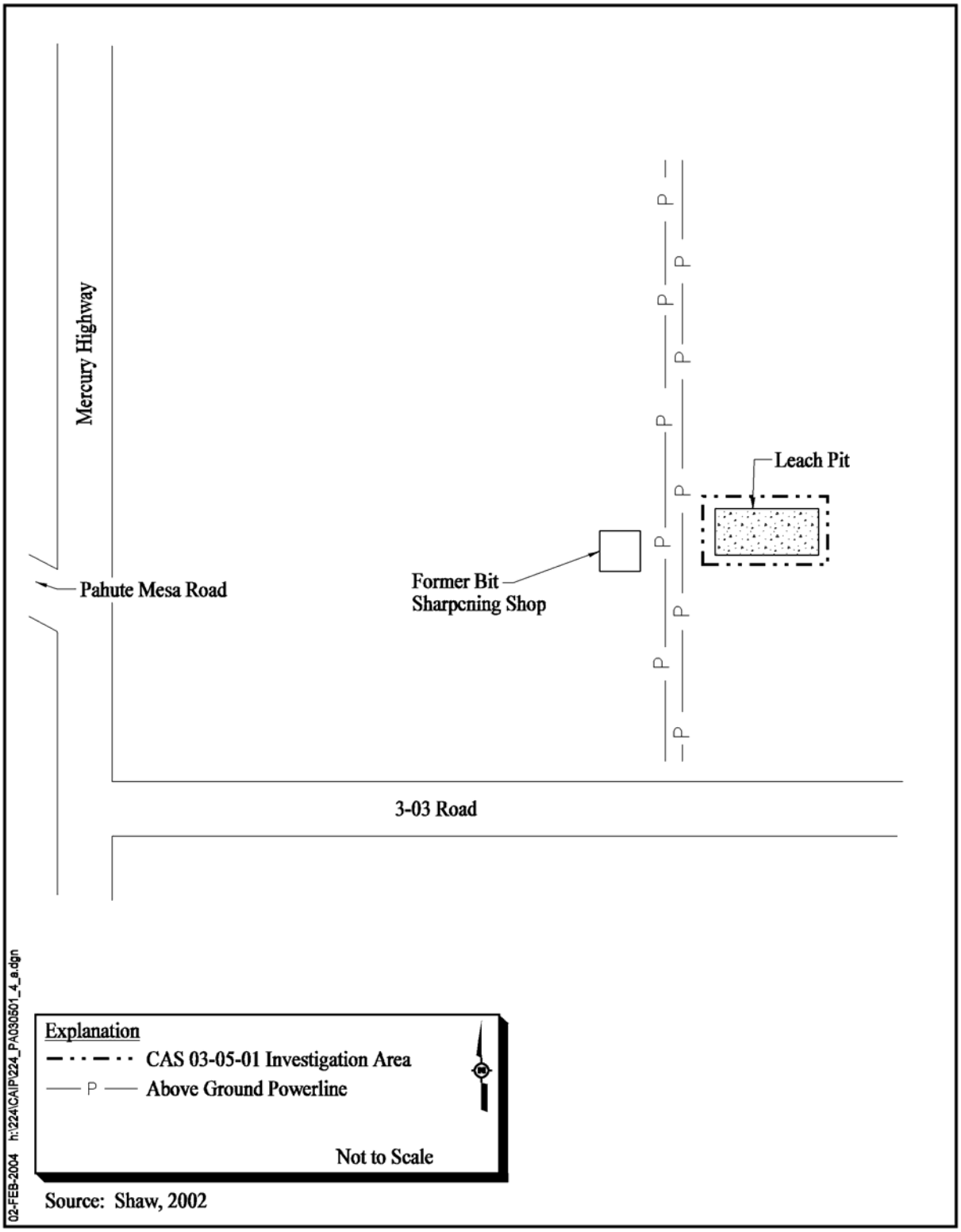

Figure A.1-3
CAU 224, CAS 03-05-01 Site Map

Sources of Potential Contamination - The sources of potential contamination at CAS 03-05-01 include bit retipping activities associated with the Bit Sharpening Shop. The former Bit Sharpening Shop was located west of the leach pit. Results of the geophysical survey (Shaw, 2003) indicates there is no piping leading from the foundation of the shop to the leach pit; however, based on interviews, contamination associated with activities conducted in the Bit Sharpening Shop is expected in the leach pit. Activities in the shop primarily included degreasing and cooling the drill bits undergoing repair. Interviews indicated that waste entering the leach pit would not have been via a drain but possibly "dumped" directly. Materials used for retipping include standard drilling lubricants, oils, greases, solvents, petroleum hydrocarbons, and degreasing agents. Other suspected contaminants include metals, tungsten carbide used in cutting, drilling mud, diesel fuel, and transmission fluid associated with generators (McNeil, 2003; Haworth, 2003; McGlothin, 2003). Based on the interviews, suspected COPCs from these activities should be detected by analyses for VOCs, SVOCs, TPH, and RCRA metals. There is no PRG (EPA, 2002c) for tungsten or tungsten carbide.

Additionally, it is unknown if the leach pit received domestic waste; however, the possibility of such disposal is noted in Fiore (1992). The COPCs associated with domestic waste (People for Puget Sound, 2001) should be detected by analyses for VOCs, SVOCs, TPH, and RCRA metals.

Previous Investigation Results - The previous investigation for CAS 03-05-01 includes a geophysical survey indicating piping heading west and southeast of the leachfield. It is unknown where the piping leads (Shaw, 2003). The survey results will be modified based on the 2004 survey results when interpretation is complete.

Potential Contamination - Based on the information provided by the interviewees (McNeil, 2003; Haworth, 2003; McGlothin, 2003) and common concerns for the NTS, the COPCs for 03-05-01 include VOCs, SVOCs, TPH (GRO and DRO), PCBs, RCRA metals plus beryllium, and radionuclides.

Tungsten is considered for health and safety purposes.

A.1.1.3 Corrective Action Site 05-04-01, Septic Tanks (4)/Discharge Area

Physical Setting and Operational History - Corrective Action Site 05-04-01 is located approximately 1,180 ft northwest of a former trailer park in Area 5 of the NTS (Figure A.1-4). The CAS consists of four 7,500-gal septic tanks encompassing a 34- by 18-ft area, the associated piping, a 7- by 5-ft distribution box, and the desert wash that potentially received overflow from the septic tanks. The site is an abandoned septic system that serviced a former trailer park. The trailer park consisted of a kitchen, recreation hall, and residential complex. Review of drawings indicate there were 35 sewer connections within the complex. The sewer lines were constructed of 6-in. vitrified clay pipe (VCP). Four manholes are present along the length of the connection from the former trailer complex to a distribution box and four septic tanks.

Sources of Potential Contamination - The sources of potential contamination at CAS 05-04-01 include activities conducted in the kitchen, recreation hall, and residential complex.

Previous Investigation Results - A preliminary characterization was conducted in 1995 to support closure of the septic tank and overflow/outfall area of the CAS. The results are summarized in *Preliminary Characterization of Abandoned Septic Tank Systems* (REECo, 1995). In 1995 approximately 3,600 gal of clear liquid was present in each tank with a minimal amount of sediment. The samples that were collected included four liquids (one from each tank), one soil 1 ft bgs from below the effluent discharge pipe, and one soil (designated as background) from an area approximately 60 ft southeast of the septic tanks. The liquid samples were analyzed for TPH, VOCs, SVOCs, RCRA metals, pH, PCBs, oil and grease, and radionuclides. The soil samples were analyzed for TPH, pH, PCBs, oil and grease, and radionuclides. The soil samples were also extracted and the extract analyzed for VOCs, SVOCs, and RCRA metals. The approach to the characterization appears to be consistent with the requirements for *Closure Plan for Recently Abandoned and/or Inactive Septic Tank/Holding Tank Systems* (Kendall, 1995). Barium was detected in both the liquid and soil at levels below regulatory concern. Di-n-butylphthalate and di-n-octylphthalate were also detected, but are attributable to laboratory contamination. Based on the analytical results, it was recommended that the tanks be closed as a domestic sewer system under Nevada State Health Division guidelines (REECo, 1995). Documentation has not been found to verify closure of the system.

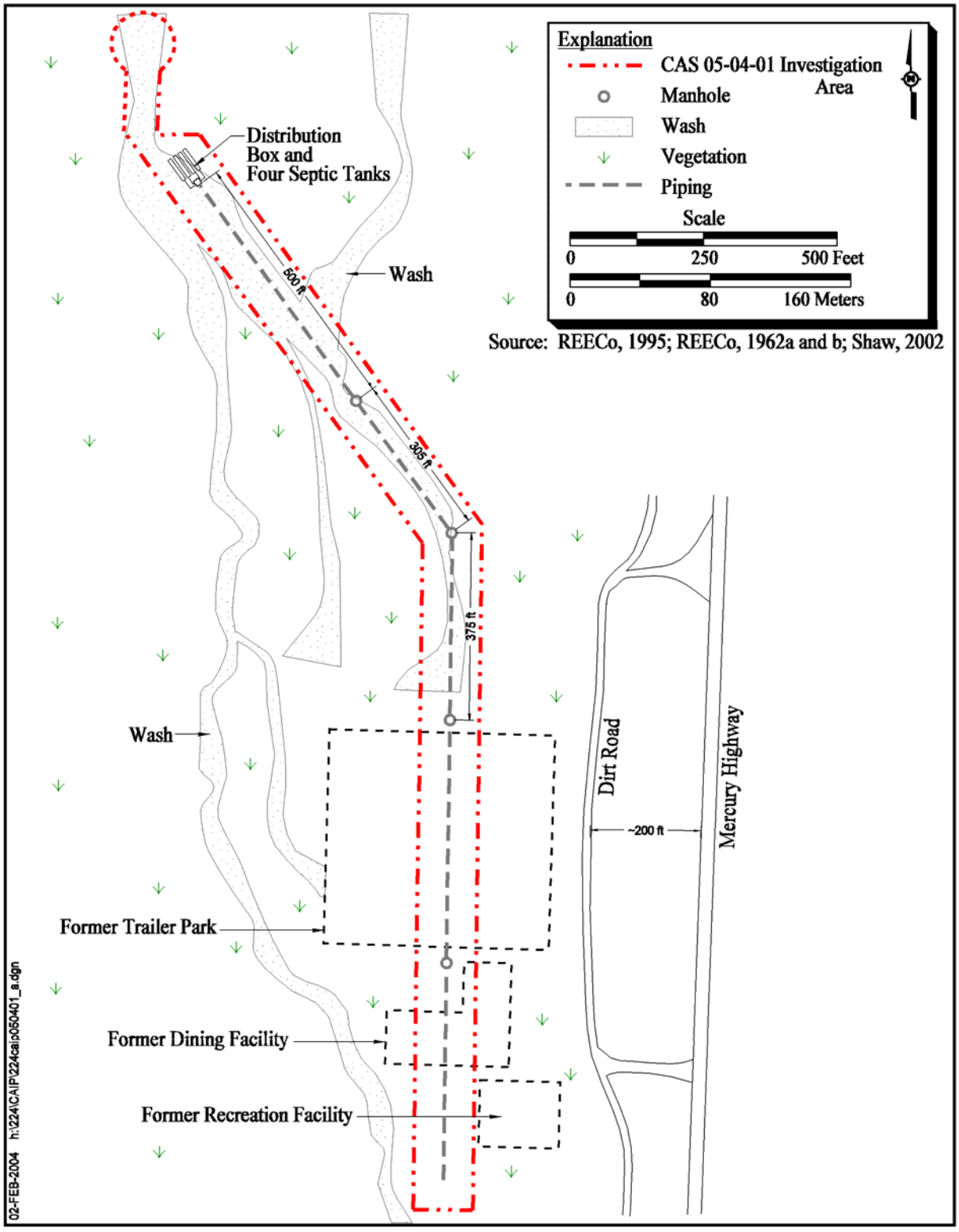

Figure A.1-4
CAU 224, CAS 05-04-01 Site Map

Potential Contamination - Based on the 1995 characterization results, there are no COPCs for the septic tank contents and overflow area of the CAS. Residual liquid present in the tanks in 1995 and soil collected from immediately below the tank overflow/discharge area showed no contamination above regulatory thresholds. The residual tank contents, if present, and soil in the overflow/discharge area will be characterized to confirm the previous findings. Manholes will be inspected and residual, if present, will also be characterized. The COPCs considered are associated with domestic waste (People for Puget Sound, 2001). The COPCs, if present, should be detected by the analyses for VOCs, SVOCs, TPH (GRO and DRO), PCBs, RCRA metals, and radionuclides.

Fecal coliform bacteria analysis will be conducted for health and safety purposes and the contents characterized for waste disposal purposes.

A.1.1.4 Corrective Action Site 06-03-01, Sewage Lagoons (3)

Physical Setting and Operational History - Corrective Action Site 06-03-01 consists of the former Yucca Lake sewage lagoon systems in Area 6 of the NTS. The CAS includes Sewage Lagoons I and II and distribution box, the Domestic Lagoons, and the associated piping (Figure A.1-5). The dates of construction and operation of the Domestic Lagoons and Sewage Lagoons I and II were estimated as 1972 and 1974, respectively, from engineering drawings. According to the *Nevada Operations Office First Quarterly Compliance Action Report* (DOE/NV, 1990) the Area 6 lagoons were dug out and backfilled. Both lagoon systems are covered to grade and marked with four monuments that state, "Closed Sewage Lagoons." Signage placed in the middle of the Domestic Lagoons indicates a closure date of August 29, 1989. The combined area for Sewage Lagoons I and II is 135 by 90 ft and a distribution box was in the center. Dimensions for the Domestic Lagoons are 148 by 96 ft.

Sources of Potential Contamination - There is no documentation that indicates sources of potential contamination at CAS 06-03-01 other than domestic waste. However, based on engineering drawings, the piping leading to each lagoon system contains asbestos. Sources of potential contamination to the systems is based on possible releases from activities conducted in the facilities serviced by the two lagoon systems as described below:

- Sewage Lagoons I and II serviced Building 6-623, the Machine and Welding Shop. Based on general process knowledge, shop wastes from these activities may have been discharged to the system containing including solvents, MWFs, degreasers, petroleum hydrocarbons, hydraulic

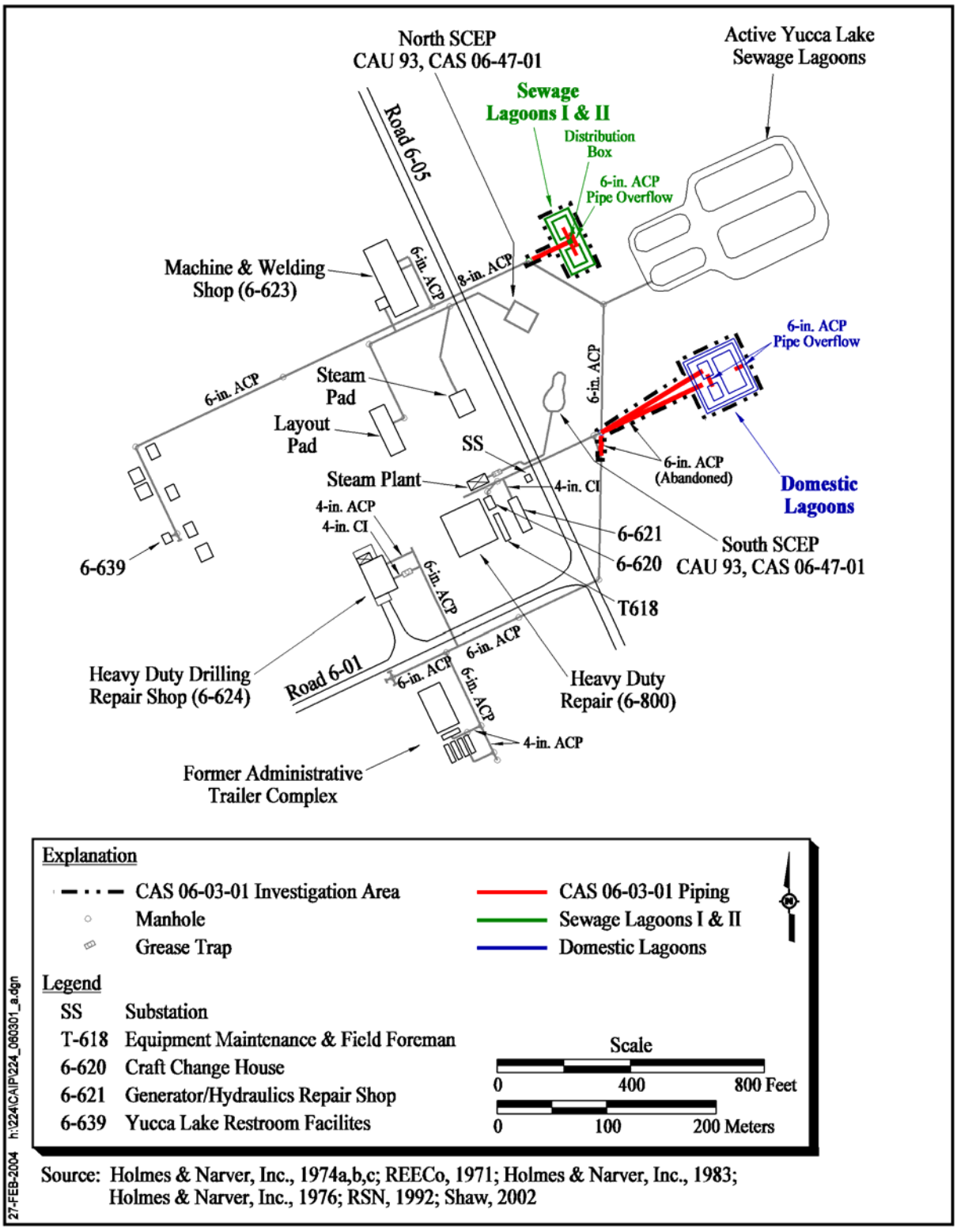

Figure A.1-5
CAU 224, CAS 06-03-01 Site Map

fluids and oils, various metals including aluminum, zinc, manganese, chromium, lead, nickel, cadmium, beryllium, and cobalt, and oils (HHS, 1998; Haz-Map, 2002).

- The Domestic Lagoons serviced Buildings 6-620, 6-621, 6-624 and an administrative trailer complex. Activities in these various facilities included generator and hydraulic repair, welding, and drilling repair. Similar to Sewage Lagoons I and II, wastes containing various contaminants may have been discharged to the system including solvents, MWFs, degreasers, petroleum hydrocarbons, hydraulic fluids and oils which could potentially be PCB contaminated, various metals, and oils (HHS, 1998; Haz-Map, 2002).

Asbestos is associated with the piping leading to both lagoon systems.

Previous Investigation Results - Three liquid samples were collected from the Yucca Lake Sewage Lagoon System in the first quarter of 1989. Data from one sample from the Northwest System (assumed to be Sewage Lagoon I and II) and two samples from the Southeast System (assumed to be the Domestic Lagoons) were summarized by Haworth (1989). Cyanide and pyrene were detected in the Northwest System at 160 and 13 µg/L, respectively. Also, a combined result for 1,2-dichlorobenzene and 1,4-dichlorobenzene was reported at 21 µg/L. For the Southeast System, the combined result for 1,2-dichlorobenzene and 1,4-dichlorobenzene was 14.0 µg/L.

Radiological samples were collected at an Area 6 sewage lagoon in 1989; however, it is indeterminate from the documentation which lagoon effluent was sampled. Samples were analyzed for plutonium-238 and -239/-240, gross beta, and tritium in water. The results were presented in NTS Annual Site Environmental Report - 1989 (REECo, 1990). The range of activities observed were as follows:

- plutonium-238: -5.4×10^{-11} to 5.5×10^{-11} microcuries per milliliter (µCi/mL)
- plutonium-239/-240: -4.9×10^{-12} to 1.0×10^{-12} µCi/mL
- gross beta: 1.0×10^{-8} to 6.1×10^{-8} µCi/mL
- tritium: -1.0×10^{-7} to 3.0×10^{-7} µCi/mL

Radiological samples were also collected at an Area 6 sewage lagoon in 1990; however, it is indeterminate from the documentation which lagoon effluent was sampled. Samples were analyzed for strontium-90, plutonium-238 and plutonium-239/-240, gross beta, and tritium in water. Results were presented in NTS Annual Site Environmental Report - 1990 (REECo, 1991) as follows:

- strontium-90: 1.3×10^{-10} µCi/mL

- plutonium-238: -2.1×10^{-11} to 3.3×10^{-11} µCi/mL
- plutonium-239/-240: -3.6×10^{-12} to 5.1×10^{-12} µCi/mL
- gross beta: 3.5×10^{-8} to 5.2×10^{-8} µCi/mL
- tritium: -1.1×10^{-7} to 2.5×10^{-7} µCi/mL

Potential Contamination **-** Based on general process knowledge, low levels of contamination identified in effluent samples, and common concern for the NTS, the COPCs for CAS 06-03-01 include:

- VOCs, SVOCs, TPH (GRO and DRO), PCBs, RCRA metals plus aluminum, zinc, manganese, nickel, beryllium, and cobalt, cyanide, and radionuclides.

Asbestos is associated with the lagoon system piping and considered for health and safety purposes. Sewage sludge, if encountered in the piping, will also be analyzed for fecal coliform bacteria for health and safety purposes.

A.1.1.5 Corrective Action Sites 06-05-01, Leachfield; 06-17-04, Decon Pad and Wastewater Catch; and 06-23-01, Decon Pad Discharge Piping

Physical Setting and Operational History **-** Corrective Action Sites 06-05-01, 06-17-04, and 06-23-01 comprise a system that received wastewater from Buildings CP-2 and CP-6 (Figure A.1-6). Building CP-2 was used for the decontamination of potentially radioactive contaminated laundry. Building CP-6 was a radioactive decontamination facility, which had an equipment decontamination pad located to the east. Radioactively contaminated equipment was decontaminated at the CP-6 decontamination pad using high-pressure water and various solvents, degreasers, and detergents. Additionally, Building CP-6 was used as a shower area for workers exposed to surface contamination. The CP-2 Leachfield operated from 1951 to 1971 and it is believed that the waste lagoons, drainage ditch, outfall area, and leachfield were all in operation simultaneously until the late 1960s or early 1970s.

Operationally, the Building CP-2 laundry facilities discharged wastewater to a buried 6-in. VCP (CAS 06-23-01). The Building CP-6 decontamination pad discharged wastewater to a 4- by 4- by 4-ft wastewater catch located at the southeastern end of the decontamination pad. Wastewater discharged to this wastewater catch eventually discharged to buried 6-in. VCP (CAS 06-23-01). The buried 6-in. VCPs from CP-2 and CP-6 are connected to a common distribution box. This wastewater travelled

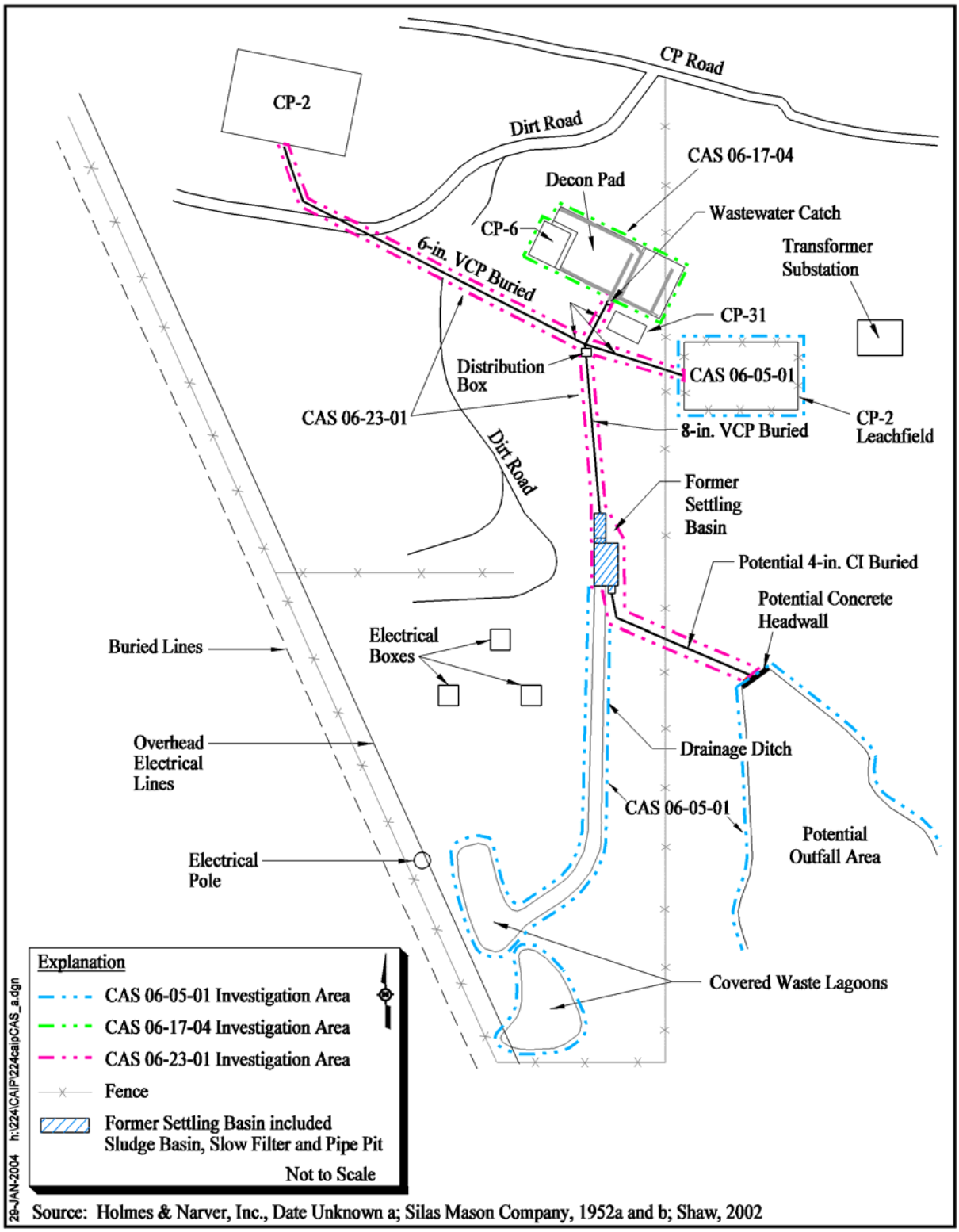

Figure A.1-6
CAU 224, CAS 06-05-01, CAS 06-17-04 and CAS 06-23-01 Site Map

from this distribution box to either the CP-2 Leachfield (CAS 06-05-01) via buried 6-in. VCP; or to a settling basin, sludge basin, slow filter, and pipe pit (settling basin) (CAS 06-17-04) via buried 8-in. VCP. Wastewater from the settling basin (CAS 06-17-04) travelled to the potential outfall area (CAS 06-05-01) via buried 4-in. cast-iron (CI) pipe; or to the waste lagoons (now covered [CAS 06-05-01]) via a drainage ditch (CAS 06-05-01).

Sources of Potential Contamination - The source of potential contamination at CASs 06-05-01, 06-17-04, and 06-23-01 include laundry decontamination activities conducted at CP-2 and the equipment decontamination activities conducted at CP-6. In addition to radionuclides, various other contaminants or materials have the potential to impact this site based on their relationship to activities in Buildings CP-2, CP-6, and/or the decontamination pad. Based on process knowledge and assumed similarities between the CP-2 and CP-6 decontamination processes, the potential contaminants for the site are those identified by Shugart (1985), including:

- Acids - Hydrochloric acid, sulfuric acid, Keecham-215 Rust Remover
- Caustics - Sodium hydroxide (Alk Rust), 152A Cherokee Chemical, Laundry Soap
- Solvents - 182 Degreaser Cherokee, Stoddard solvent (petroleum distillate), trichloroethane, acetone, ILD-1 Laundry Degreaser
- Alcohols - Isopropanol, methanol
- Miscellaneous - Sodium hypochlorite (Clorox), fabric softener, freon, and San Del Technical Cleaner

The composition of the cited tradename chemicals was not identified other than the category as listed above. In addition, the potential hazardous components associated with acids, caustics, and sodium hypochlorite are assumed to be negligible under the present environmental condition. Methanol and isopropanol are not routinely reported; however, the output for these will be requested along with the VOC analytical suite. The PRG for methanol in soil is 100,000 mg/kg which is a non-risk based maximum. Isopropanol does not have a PRG (EPA, 2002c).

Previous Investigation Results - The *Nevada Test Site Contaminated Land Areas Report* (DOE/NV, 2000) presents posting information for the Area 6 Old Decon Pad, Old Leach Pond, and Decon Pad Pond. The requirements were based on a radiological survey conducted in 1998. The

radiological information presented indicates that subsurface soils contain unknown levels of radionuclide activity but the surface soils removable activity is below CFR (1999) guidelines for all radionuclide categories (DOE/NV, 2000).

The CP-2 Leachfield sampling results were reported in the *Hazardous Waste Installation Assessment Report* (REECo, 1986). Cadmium and silver were detected in the EP Toxicity extract at 0.04 and 0.05 mg/L, respectively. The values are below RCRA regulatory limits of 1 and 5 mg/L for these metals. Cesium-137 results were also summarized and activities reported ranged from 0.34 to 1.07 picocuries per gram (pCi/g). The cesium-137 activities are below the present PAL of 7.3 pCi/g. The *CERCLA Preliminary Assessment of DOE's Nevada Operations Office Nuclear Weapons Testing Areas* (DRI, 1988) elaborated on the results presenting the cesium-137 results from REECo (1986) along with the observed activities for potassium-40, radium-226, thorium-228, thorium-232. Data for a total of nine samples from 0 to 122 cm deep were presented. Further review of these data by Adams (2002) indicated that the activities of the radionuclides observed were not above background; however, a detailed radiological land area survey will be performed.

Potential Contamination - Based on the process knowledge and common NTS concerns, the COPCs for 06-05-01, 06-17-04, and 06-23-01 include VOCs (including methanol), SVOCs, TPH (GRO and DRO), PCBs, RCRA metals plus beryllium, and radionuclides. Isopropanol is considered for health and safety purposes.

A.1.1.6 Corrective Action Unit 11-04-01, Sewage Lagoon

Physical Setting and Operational History - Corrective Action Site 11-04-01 consists of a former sewage lagoon and associated discharge piping (Figure A.1-7). A two-compartment septic tank and distribution box with removable covers leading to an evapotranspiration bed is also a component of the CAS. The sewage system is located in Area 11 at the Technical Facilities Complex, currently referred to as the TaDD Facility and the Los Alamos National Laboratory (LANL) Technical Facility. The portion of the sewage system leading to the evapotranspiration bed is currently inactive, but remains operable.

Documentation indicates that CAS 11-04-01 contains two sewage systems. The older sewage system contained a sewage lagoon that became inactive sometime in the late 1980s and is currently covered.

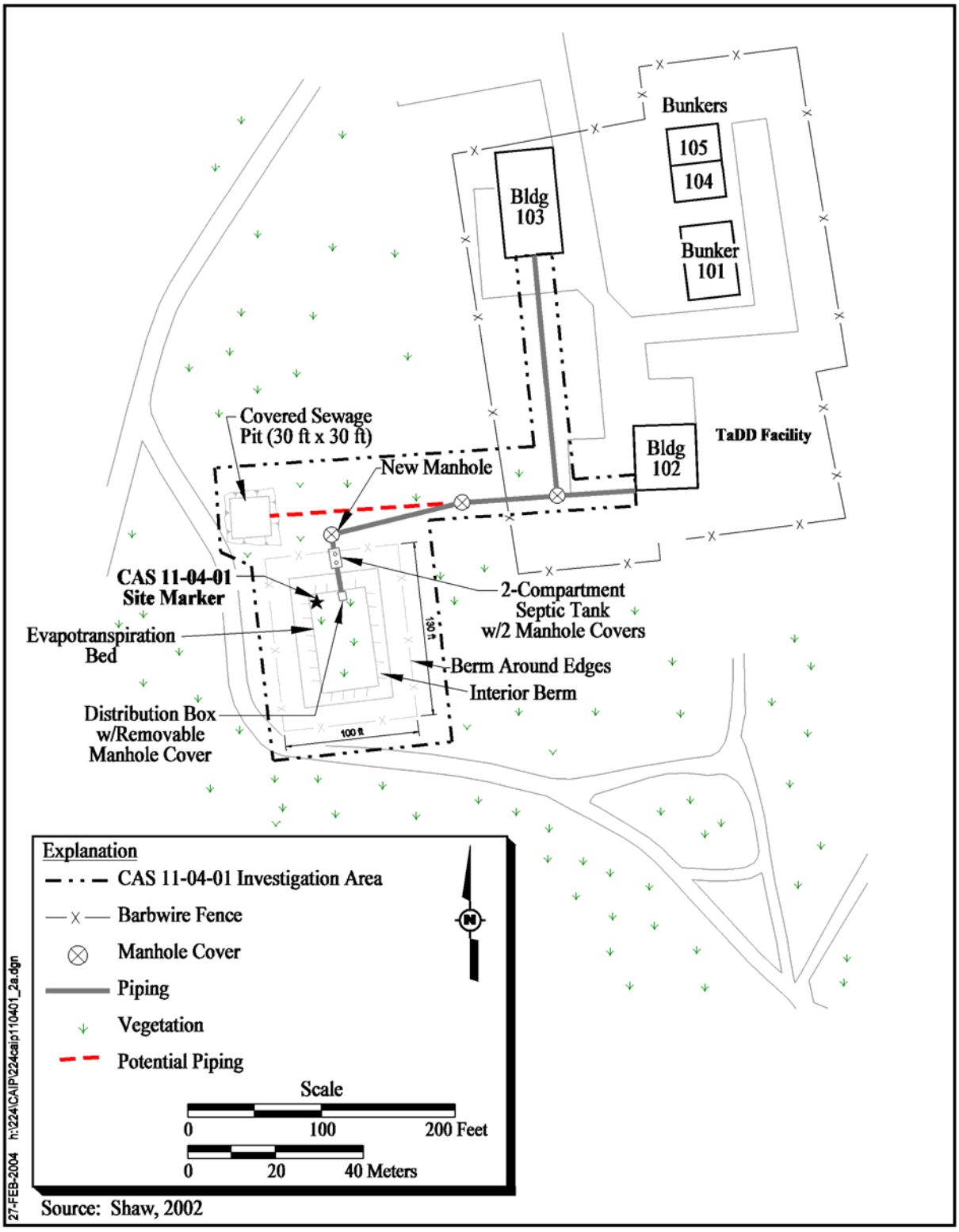

Figure A.1-7
CAU 224, CAS 11-04-01 Site Map

A review of engineering drawings indicate that the lagoon measured approximately 30 by 30 ft and was 3 ft deep. The old sewage lagoon was backfilled by 1990 and the replacement system used a portion of the original discharge piping connected to a new sewer manhole. At this manhole, new discharge piping was angled south to the new evapotranspiration bed. Also, a two-compartment septic tank and distribution box with removable access cover was installed. The evapotranspiration bed is approximately 130 by 100 ft and 28 in. deep. Engineering drawings of the evapotranspiration bed show that the bed is not lined.

Sources of Potential Contamination - The source of potential contamination to CAS 11-04-01 is domestic sewage from the surrounding facilities. There is no documentation that indicates sources of potential contamination to CAS 11-04-01 other than domestic waste; however, based on activities conducted in the facilities serviced by the two lagoon systems, it is possible that releases of contamination to the system occurred. The facilities connected to the system include Building 102, the LANL Assembly Building (used for device assembly, maintenance, and repair) and Building 103, the LANL Shop and Photo Lab (which included a machine shop, a darkroom, and other various equipment storage rooms). The darkroom contains a developing tank equipped with a faucet potentially used to develop radiographics and film, based on the facility activities possible contaminants include photoprocessing chemicals (e.g., developers and fixers containing hydroquinone, aluminum, silver, chromium), MWFs, and solvents (HHS, 1998; Haz-Map, 2002).

Previous Investigation Results - No Previous Investigation Results are available for CAU 224, CAS 11-04-01.

Potential Contamination - Based on process knowledge for activities in the facilities serviced by the system and general concerns for the NTS, the COPCs for CAS 11-04-01 include VOCs, SVOCs including hydroquinone, PCBs, TPH (GRO and DRO), RCRA metals, aluminum, zinc, manganese, nickel, beryllium, cobalt, and radionuclides.

Sewage sludge, if encountered, will be analyzed for fecal coliform bacteria for health and safety purposes.

A.1.1.7 Corrective Action Site 23-05-02, Leachfield

Physical Setting and Operational History - Corrective Action Site 23-05-02 consists of a leachfield and the associated discharge piping (Figure A.1-8). The leachfield serviced former Building 155 located in Area 23 in Mercury. The leachfield is now completely covered by asphalt and gravel and is a motor pool parking lot. The estimated dimensions are 20 by 33 ft and the depth is unknown (DRI, 1988). Based on engineering drawings, a CI and an orangeburg pipe lead 130 ft from Building 155 northeast to the leachfield (REECo, 1968).

The leachfield was operational between 1959 and 1973 and received wastewater from the Radiological Safety and Industrial Hygiene laboratories (Building 155). Building 155 was built in 1959 and was used as the radiological safety laboratory until 1964. In 1964, the laboratory was relocated to trailers near Building 155. The trailers were connected to the same leachfield as Building 155. In 1965, the laboratory was relocated to Building 650, which was serviced by a separate sewage system. Building 155 continued in operation as the Industrial Hygiene laboratory until 1973. The leachfield became inactive at that time. However, one sink remained operable and drained to the leachfield until discovered in 1983 and disconnected. The leachfield was completely covered by the Mercury motor pool parking lot in the 1980s.

The facility housed a hot, cold, and standards laboratory as well as a darkroom. Engineering drawings indicate that the rest rooms were serviced by a separate sewage system.

Sources of Potential Contamination - The sources of potential contamination at CAS 23-05-02 include chemicals and waste generated by activities conducted in Building 155 laboratories. Photoprocessing chemicals such as developers and fixers may have introduced contaminants such as hydroquinone, aluminum, silver, and chromium into the system. Review of *Analytical Procedures of the Radiological Safety Laboratory* (REECo, 1961) provided insight into the chemicals that were likely used in the course of operation as well as the waste handling/disposal practices. These chemicals include the following:

- Acids- acetic acid, hydrocyanic acid, hydrofluoric acid, hydrochloric acid, chromic acid, nitric acid, oxalic acid, perchloric acid, phosphoric acid, sulfuric acid
- Caustics- ammonium hydroxide, potassium hydroxide, sodium hydroxide

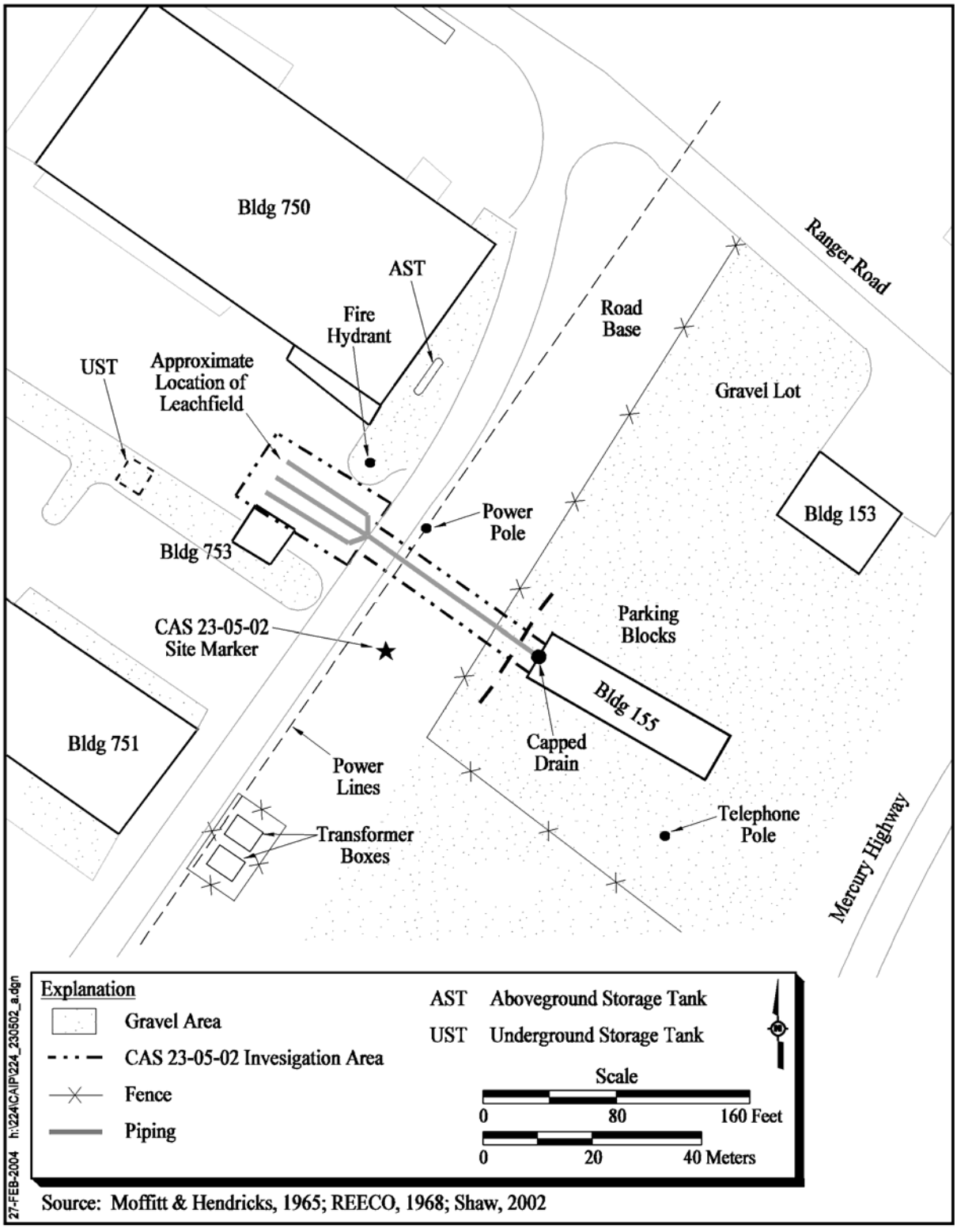

Figure A.1-8
CAU 224, CAS 23-05-02 Site Map

- Metals- arsenic, arsenic compounds, antimony, antimony compounds, barium compounds, cadmium, copper, lead, molybdenum, beryllium, potassium, mercury

- Solvents- benzene, chloroform, ethers, methanol, methyl ethyl ketone, tetrachloroethylene, toluene, trichloroethylene, carbon tetrachloride

- Reactive/Oxidizers- carbon disulfide, chlorates, perchlorates, chromates, cyanide, hydrogen peroxide, other peroxides, sodium hydrosulfide

- Radioactive materials (analysis of bioassay and environmental samples)- plutonium, enriched uranium, fission products (i.e, cesium-137, strontium-90), activation products (cobalt-60), strontium-89/-90, strontium-90

- Gases/Halogens- carbon monoxide, hydrogen sulfide, ozone, sulfur dioxide, chlorine, fluorine;

- Miscellaneous- amino compounds, liquid bromine, flourides, iodine, silver nitrate, ethyl acetate

Chemical handling and disposal practices procedurally controlled for the laboratories indicate that acids and caustics were diluted prior to disposal down the facility drains, flammable and volatiles (e.g., ether, methylethyl ketone) were air evaporated or disposed of in a designated waste solvent container, and volatile solvents that were immiscible in water were retained in a designated waste solvent container as well. The procedure also indicated that carbon tetrachloride was not permitted for use on the NTS without approval, and chlorates and perchlorates were limited to special authorization use. However, according to REECo (1961), materials capable of liberating poisonous or flammable gases were to be handled in a ventilation hood and not to be emptied down the drain. Interviewees stated it was not uncommon to dispose of acids and bases down the facility drains. Silver and carbon tetrachloride were specifically mentioned (Friedrichs, 1999; Hatcher, 1999).

The gases listed are assumed not to have impacted the leachfield. The potential hazardous components associated with acids, caustics, and peroxides are assumed to be negligible under the present environmental condition. However, the potential degradation of the bituminous orangeburg pipe by exposure to the chemicals and solvents identified may have introduced SVOCs into the leachfield system. The COPCs for CAS 23-05-02 should be detected by the analyses for VOCs, SVOCs, RCRA metals, antimony, copper, molybdenum, beryllium, cyanide, sulfide, and radionuclides including cobalt-60.

As noted in the operational history, the radiological component of the Building 155 laboratory relocated to Building 650 in 1965. The results reported in the *Characterization Report for Area 23, Building 650 Leachfield* (DOE/NV, 1998a) were reviewed and are summarized below. The maximum radionuclide activities observed were:

- Cobalt-60: 1.57 pCi/g
- Strontium-89/-90: 2.75 pCi/g
- Plutonium-238: 4.26 pCi/g
- Plutonium- 239/-240: 77.1 pCi/g.

The results were from samples at the base of the distribution box located 9 ft bgs to a depth of 22 ft. Contamination within the leachfield contamination was observed to a depth of 11 ft bgs which is approximately 2 ft below the leachfield distribution lines. Total petroleum hydrocarbons were detected in one sample at 570 mg/kg and PCBs were observed in samples near the distribution box at 91 to 155 µg/kg. Acetone was also observed at approximately 10 µg/kg.

Previous Investigation Results - Geophysical survey results for CAU 224, CAS 23-05-02 were reported in *Surface Geophysical Survey Final Report Corrective Action Units Nevada Test Site* (SAIC, 2003). Conclusions from the survey indicated a variety of features; however, none typified a leachfield.

Potential Contamination - Based on the process knowledge and common concerns for the NTS, the COPCs for CAS 23-05-02 include VOCs, SVOCs including hydroquinone, PCBs, TPH (GRO and DRO), RCRA metals, aluminum, antimony, copper, molybdenum, beryllium, cyanide, sulfide, and radionuclides including cobalt-60.

A.1.2 Step 1 – State the Problem

This initial step of the DQO process identifies the planning team members and decision makers, describes the problem that has initiated the CAU 224 CAI, and develops the CSM.

A.1.2.1 Planning Team Members

The DQO planning team consists of representatives from NDEP, NNSA/NSO, Stoller-Navarro Joint Venture (SNJV), and Bechtel Nevada (BN). The primary decision-makers include NDEP and

NNSA/NSO representatives. Table A.1-2 lists representatives from each organization in attendance at the January 29, 2004, DQO planning meeting.

Table A.1-2
DQO Meeting Participants

Participant	Affiliation
Sabine Curtis	NNSA/NSO
Jack Ellis	SNJV
John Fowler	SNJV
Brian Hoenes	SNJV
Joe Hutchinson	SNJV
Lynn Kidman	SNJV
Laura Pastor	SNJV
Barbara Quinn	SNJV
Marko Suput	SNJV
Glen Richardson	BN
Jeanne Wightman	SNJV
Greg Raab	NDEP

BN – Bechtel Nevada
SNJV – Stoller-Navarro Joint Venture
NDEP – Nevada Division of Environmental Protection
NNSA/NSO – U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office

A.1.2.2 Describe the Problem

Corrective Action Unit 224, Decon Pad and Septic Systems, is being investigated because effluent potentially contaminated with hazardous and/or radioactive constituents may have discharged to the various systems which comprise the unit. Designed releases to leachfields and lagoons could have resulted in contamination of the native soils associated with the CASs. Additionally, accidental releases caused by breaches in distribution system or potential spills could result in surface or subsurface soils contamination. The problem statement for CAU 224 is:

"Existing information on the nature of potential contaminants and, if present, the extent of contamination is insufficient to evaluate and recommend corrective action alternatives for CASs 02-04-01, 03-05-01, 05-04-01, 06-03-01, 06-05-01, 06-17-04, 06-23-01, 11-04-01, and 23-05-02."

A.1.2.3 Develop A Conceptual Site Model

The CSMs are used to describe the most probable scenario for current conditions at a CAS and define the assumptions that are the basis for identifying appropriate sampling strategy and data collection methods.

The graphical CSM for CAU 224, Figure A.1-9, is consistent with the general model presented in the Leachfield Work Plan (DOE/NV, 1998c) and captures the commonalities of the CASs. The graphical CSM is based on process knowledge potential contaminant release mechanisms gained from investigations of similar systems on the NTS. The CAU 224 CASs are divided based on the function of the system components and the varying potential for contamination. As shown in Table A.1-3, the general components of the CAU 224 CASs are septic and/or collection, leachfields, lagoons/leach pits and decontamination pad.

The septic and/or collection component of the CSM applies to all the CASs within CAU 224 with the exception of CAS 06-05-01. The component includes elements such as the tank itself, sumps, distribution boxes, settling basins, and associated piping. Within the component of the CSM, the effluent, (upon release from the source [e.g., floor drain]), travels through discharge lines and is routed into the various system elements (e.g., septic tank).

The leachfield component of the CSM applies to CASs 06-05-01, 11-04-01, and 23-05-02. Effluent was dispersed throughout the leachfield or evapotranspiration bed by way of distribution pipes located in the subsurface. The general configuration of the distribution pipes for CASs 11-04-01 and 23-05-02 is shown on engineering drawings; however, the exact configuration of distribution piping for 06-05-01 is unknown. Leachfields were designed to disperse effluent within the leachfield and allow liquid to percolate down into the underlying native soil.

The lagoon/leach pit component of the CSM applies to CASs 03-05-01, 05-04-01, 06-03-01, and 06-05-01 and shows conceptually that effluent is released to a lagoon, leach pit, or an outfall or via a

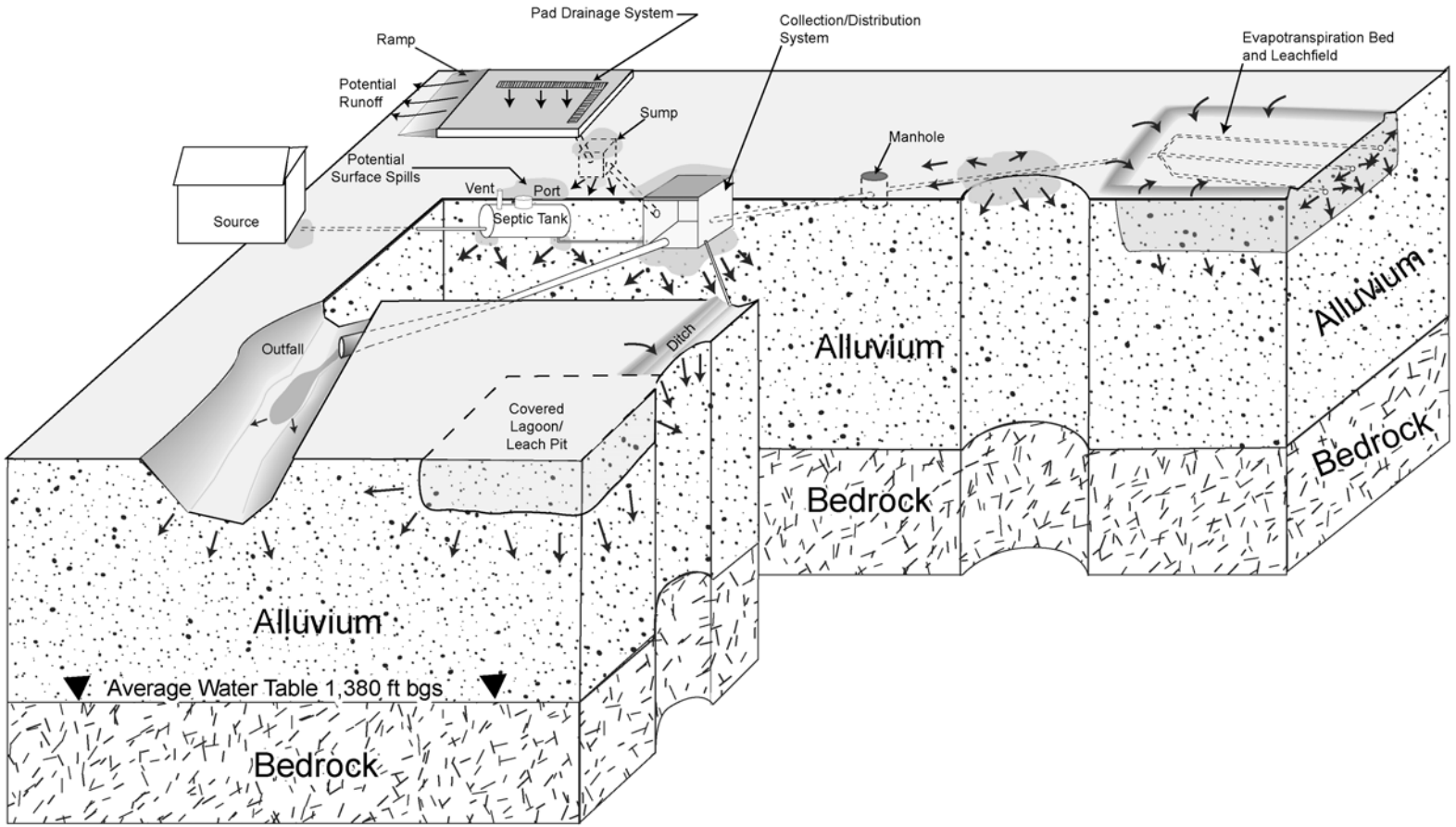

Figure A.1-9
Conceptual Site Model for CAU 224

Table A.1-3
Conceptual Site Model Components, Elements, and Applicable CASs

CSM Component	Elements	02-04-01	03-05-01	05-04-01	06-03-01	06-05-01	06-17-04	06-23-01	11-04-01	23-05-02
Septic and/or Collection	Piping	X	X	X	X			X	X	
	Manhole			X	X				X	
	Septic Tank	X		X					X	
	Distribution Box			X	X				X	
	Sump		X							
Leachfield	Distribution Piping									X
	Leachfield					X				X
Lagoon/Leach Pit/Outfall	Leach Pit		X							
	Lagoons				X	X				
	Outfall			X						
Decontamination Pad	Wastewater Catch						X			
	Concrete Trench						X			

drainage ditch or piping directed to the lagoon. These systems were designed to release effluent to the lagoon and allow liquid to evaporate as well as percolate down into the underlying native soil.

The decontamination pad component of the CSM applies to CAS 06-17-04 illustrates that effluent, upon release from the source activities, travels through the drains in the pad and is collected in a trench that discharges to a wastewater catch.

If components are identified during the CAI that are not covered by the CSM or if the investigation extends beyond the spacial boundaries for the CAS(s), the planned approach will be evaluated against the CSM strategy and revised as appropriate. The DQOs will be reviewed and any significant deviations and corrective recommendations will be presented to the decision makers for approval.

Affected media - For the septic and/or collection component of the CSM, the affected media are the residual sludge and/or liquid in the underground storage tank, associated piping, and tank/box contents which came in direct contact with the effluent. The subsurface soil beneath these structures may be impacted if a breach or rupture of the system occurred. Surface soils adjacent to the tank or distribution box structure may be impacted if an overflow or accidental spill occurred. Affected media associated with the leachfield component are subsurface soil beneath the distribution lines and the soil covering the lines. Affected media for the lagoon/leach pit component are subsurface soil immediately beneath the effluent pipe or discharge point and the extent of the affected area (e.g., lagoon bottom, outfall). Berms and/or the surface soil adjacent to the lagoon may have been impacted if an overflow of the lagoon occurred. It is not known if the soil covers placed over the lagoons are affected. Affected media for the decontamination pad component includes the concrete structures, drain and sump components that directly contacted the effluent, soil beneath the pad drains, trench, or sump if a breach in the system occurred. Surface soil adjacent to the pad may have been impacted if an overflow occurred (e.g., if a pad drain were accidently blocked or from runoff).

Location of Contamination/Release Points - For the CAU 224 CASs, the presence of COPCs in soils may have resulted from designed or accidental releases as previously discussed and depicted on the CSM (Figure A.1-9). The location of contamination at the CAU 224 CASs is unknown and potential release points are assumed consistent with the CSM.

Transport Mechanisms - An important element of a CSM is the expected fate and transport of contaminants in the environment, which infers 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 and chemical characteristics of the suspected contaminants and media. Contaminant characteristics include biodegradation potential, solubility, density, and affinity for nonmobile particles (adsorption). Media characteristics include permeability, porosity, hydraulic conductivity, total organic carbon content, and adsorption coefficients. In general, contaminants with low solubility and high density can be expected to be found relatively close to release points. Contaminants with high solubility and low density are more susceptible to factors that can move them through various media; therefore, can be expected to be found further from release points.

Migration of potential contamination is assumed to be minimal based on the affinity of the COPCs for soil particles, and the low precipitation and high evapotranspiration rates typical of the NTS environment. Runoff could cause lateral migration of contaminants over the ground surface for the release scenarios described. Contaminants may also have been transported by infiltration and percolation of precipitation through soil, which would serve as the primary driving force for downward migration. Mixing of the surface soil as a result of grading or construction activities could also move the COPCs into deeper intervals (e.g., the lagoons within CAS 06-05-01). The migration of organic constituents (e.g., petroleum hydrocarbons, PCBs) can be controlled to some extent by their affinity for organic material present in soil. However, this mechanism is considered insignificant because of the lack of organic carbon in the desert soil. Migration of certain inorganic constituents (e.g., metals in waste oil) is controlled by geochemical processes, such as adsorption, ion exchange, and precipitation of solids from solution.

It is assumed that groundwater is not impacted because of its significant depth at the NTS. The groundwater level for CAU 224 ranges from approximately 700 ft bgs in Area 5 to 2,053 ft in Area 2 and the average annual precipitation is 6.62 in. Also, the environmental conditions at the NTS (i.e., arid climate, relatively low permeability soils) are not conducive to significant downward migration.

Airborne release subsequent to the initial contaminant release is not considered a significant release pathway. The main process of migration through the air would be through windblown dust. The COPCs adsorbed to the fine soil particles and migration could occur via the airborne pathway and this process could result in the deposition of contaminants beyond the CAS boundaries. For all transport mechanisms, it would be expected that contaminant levels decrease with distance from the point of release and distributed consistent with the prevailing wind direction.

Preferential Pathways - Preferential pathways for contaminant migration at the CAU 224 CASs are not expected to be present or have only had a minor impact on contaminant migration. The presence of relatively impermeable layers (e.g., caliche layers, concrete pads) may modify transport pathways both on the ground surface and in the shallow subsurface. Small gullies, if present, could channelize runoff and increase lateral transport prior to infiltration. Rain may wash COPCs off the concrete pad onto the surrounding soil (CAS 06-17-04). When the systems were operational, a breach in

distribution piping may have allowed liquids to contaminate soils preferentially along the pipeline due to the disturbed nature of the subsurface soils. Contamination could travel laterally to a small degree under these scenarios. Although the preferential pathways for contaminant migration will be considered in the development of sampling strategies and sampling contingencies discussed in the CAIP, primary consideration will be given to the release and transport mechanisms.

Lateral and Vertical Extent of Contamination - If contamination is present at a CAS, it is expected to be confined to the surface and shallow subsurface at the site. Concentrations of contaminants are expected to decrease with distance (both horizontally and vertically) from the release point(s). For releases at the surface, migration may occur as a result of storm events when precipitation rates exceed infiltration (stormwater runoff). However, these events are infrequent. Also, for CAS 06-17-04, Decontamination Pad, overflow of the drain system caused by blockage or from a stormwater event may have moved contamination laterally off the concrete pad to soils adjacent to the entrance to pad. Surface migration is a biasing factor considered in the selection of sampling locations. As stated previously, downward contaminant transport is expected to be limited but is unknown because the quantities of hazardous material released is unknown.

Potential Receptors - The CSM development includes an evaluation of land use. The land-use description helps define exposure scenarios. Table A.1-4 summarizes the land-use designations and associated descriptions for the CAU 224 CASs (DOE/NV, 1998b). The land use is the basis for assessing how contaminants could reach potential receptors both in the present and future. Based on the land use, current and future receptors are industrial and construction workers and military personnel in training.

A.1.3 Step 2 – Identify the Decision

Step 2 of the DQO process identifies the decisions statements and defines alternative actions. Also presented is this section is the decision logic for the entire process.

Table A.1-4
Land Use

Land-Use Designation	Land-Use Description	CASs
Nuclear and High Explosive Test Zone	The area is designated within the Nuclear Test Zone for additional underground nuclear weapons tests and outdoor high explosive tests. This zone includes compatible defense and nondefense research, development, and testing activities.	02-04-01 and 03-05-01
Defense Industrial Zone	This area is designated for stockpile management of weapons, including production, assembly, disassembly or modification, staging, repair, retrofit, and surveillance. Also included in this zone are permanent facilities for stockpile stewardship operations involving equipment and activities such as radiography, lasers, material processing, and pulsed power.	06-03-01, 06-05-01, 06-17-04, and 06-23-01
Reserved Zone	This area includes land and facilities that provide widespread flexible support for diverse short-term testing and experimentation. The reserved zone is also used for short duration exercises and training such as nuclear emergency response and Federal Radiological Monitoring and Assessment Central Training and U.S. Department of Defense land-navigation exercises and training.	11-04-01, 05-04-01, and 23-05-02

A.1.3.1 Develop Decision Statements

The primary problem statement is: "Existing information on the nature of potential contaminants and, if present, the extent of contamination is insufficient to evaluate and recommend corrective action alternatives for CAS (s)."

Therefore, the following two decision statements have been established as criteria for determining the adequacy of the data collected during the CAI to resolve the problem statement.

Decision I: "Is a COPC present at a concentration that could pose an unacceptable risk to human health and the environment?" Any contaminant analytically detected at a CAS at a concentration exceeding the corresponding PAL, as defined in Section A.1.4.2, will be considered a COC for that CAS. Samples used to resolve Decision I are referred to as Decision I samples.

Decision II: "If a COC is present, is sufficient information available to evaluate appropriate corrective action alternatives?" Sufficient information is defined as the data needs identified in this

DQO to include the lateral and vertical extent all COCs associated with a CAS. Samples used to resolve the decision are identified as Decision II samples.

A.1.3.2 Alternative Actions to the Decisions

For each decision identified in the previous section there is an alternate action.

Alternate action for Decision I: If a COC is not present, further assessment of the CAS is not required. If a COC is present, resolve Decision II.

Alternate action for Decision II: If the extent of the COC is defined in both the lateral and vertical direction, further characterization of the CAS is not required. If the extent of a COC is not defined, re-evaluate site conditions and collect additional samples.

A.1.4 Step 3 – Identify the Inputs to the Decisions

The objectives of Step 3 are to identify the information needed, determine sources for information, determine the basis for establishing action levels, and identify sampling and analysis methods that can meet the data requirements.

A.1.4.1 Information Needs and Information Sources

Table A.1-5 lists the information needs, the source of information for each need, and the proposed methods to collect the data needed to resolve Decisions I and II, as well as the QA/QC data type. The data type is determined by the intended use of the resulting data in decision making. Data types are discussed in the *Industrial Sites Quality Assurance Project Plan* (NNSA/NV, 2002). All data to be collected are classified into one of three measurement quality categories: quantitative, semiquantitative, and qualitative. Additionally, the status of obtaining the data needed is presented in the last column of Table A.1-5.

In order to determine if a COC is present, the Decision I samples must be collected and analyzed following these criteria: (1) samples must be collected in areas most likely to be contaminated, and (2) the analytical suites selected and associated method detection limits must be sufficient to detect a COC below its corresponding PAL. In order to determine the extent of contamination for a COC,

Table A.1-5
Information Needs and Status to Resolve Decisions I and II
(Page 1 of 2)

Information Need	Information Source	Collection Method	Data Type/Metric	Status
Decision I: Determine if a COC is present. Criterion 1: Samples must 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. Complete for all CASs with the exception of CASs 06-03-01 and 11-04-01.	Qualitative – At present, CSM is assumed to be accurate	CAS 06-03-01: Information or data documenting the closure of Sewage Lagoon I and II and the Domestic Lagoons is presently being researched. CAS 11-04-01: Confirmation of CAS boundary/components is needed. In addition to the former sewage lagoon and piping, CAS boundaries include the septic tanks and evapotranspiration bed (installed in 1990 and presently operational). At present, the TaDD facility is on operational standby. Findings from the research has the potential to affect the sampling strategy for both CASs.
	Site visit and field observations	Conduct site visits and document field observations	Qualitative - At present, CSM is assumed to be accurate	Complete with the following exceptions: CASs 02-04-01, 03-05-01, and 23-05-02.
	Aerial photographs	Review and interpret aerial photographs	Semiquantitative	Complete
	Radiological Survey	Review and interpret radiological surveys	Semiquantitative	Complete with the exception of review and interpretation of data.
	Geophysical Survey	Review and interpret survey results	Semiquantitative	Complete with the exception of review and interpretation of data.
	Video Mole Survey	Review and interpret to identify breaches in the systems	Semiquantitative	CAIP Implementation. At present assuming 100% coverage of abandoned lines. Piping currently in use will not be surveyed.
	Field screening during sampling	Review and interpret field-screening results	Semiquantitative	CAIP Implementation
Decision I: Determine if a COC is present. Criterion 2: Analyses must be sufficient to detect any COCs in samples.				
Identification of all potential contaminants	Process knowledge compiled during PA process and previous investigations of similar sites	Information reported in CSM and public reports - no additional data needed	Qualitative -At present, CSM is assumed to be accurate	Complete
Analytical results	Data packages	Appropriate sampling techniques and approved analytical methods will be used	Quantitative - Detection limits will be less than PALs	Post-CAIP Implementation

Table A.1-5
Information Needs and Status to Resolve Decisions I and II
(Page 2 of 2)

Information Need	Information Source	Collection Method	Data Type/Metric	Status
Decision II: Determine the extent of a COC.				
Identification of applicable COCs	Data packages	Review analytical results to select COCs	Quantitative	Post-CAIP Implementation
Extent of Contamination	Field observations	Document field observations	Qualitative – At present, CSM is assumed to be accurate	CAIP Implementation
	Field screening	Conduct field screening with appropriate instrumentation	Semiquantitative – FSRs will be compared to FSLs	CAIP Implementation
	Decision I 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	Post-CAIP Implementation

Decision II samples will be collected to assess the lateral and vertical extent. The data required to satisfy the information needs for Decision II for each COC is a sample concentration that is below the corresponding PAL.

Both Decision I and Decision II sample locations will be selected based on the CSM and biasing factors. Biasing factors for sample collection include the following:

- Previous sample results, if available
- Documented process knowledge on source and location of release
- Experience and data from investigations of similar sites
- Field observations
- Aerial photograph review
- Radiological survey results
- Geophysical survey results
- Field-screening data including VOC, TPH, and radiological (Section A.1.4.3.2)
- Professional judgement

When field-screening results (FSRs) or other biasing factors suggest that the COC concentrations at step-out location(s) may still exceed the PAL, additional step-out distances will be used to define the lateral extent of contamination. If a location where the PAL is exceeded is surrounded by clean locations, 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.

Vertical extent samples will be collected from depth intervals that will meet DQOs and in a manner that will conserve resources during possible remediation. Biasing factors to support depth interval sampling will primarily based on FSRs and professional judgement. Sampling locations may be moved due to access problems, underground utilities, or safety issues; however, the modified locations must meet the decision requirements and criteria necessary to fulfill the information needs.

A.1.4.2 Determine the Basis for the Preliminary Action Levels

Industrial Sites staff, construction/remediation workers, and military personnel (i.e., ground troops) may be exposed to contaminants through ingestion, inhalation, external exposure, or dermal contact with contaminated soil. Laboratory analytical results for soil will be compared to the following PALs to determine if COCs are present:

- EPA Region 9 Risk-Based PRGs for chemical constituents in industrial soils (EPA, 2002c).
- Background concentrations for RCRA metals will be used instead of PRGs when natural background exceeds the PRG, as is often the case with arsenic on the NTS. 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 Nevada Test and Training Range (NBMG, 1998; Moore, 1999).
- The TPH action limit of 100 ppm per the *Nevada Administrative Code* (NAC) 445A.2272 (NAC, 2002).
- The PALs for radionuclides are derived from the NCRP recommended screening limits for construction, commercial, and industrial land use (NCRP, 1999) scaled from 25 to 15 mrem per year dose and the generic guidelines for residual concentrations of radionuclides in DOE Order 5400.5 Change 2 (DOE, 1993).

The selected PALs are based on the EPA Region 9 Industrial Land Use PRGs. In general, the PRGs are risk-based screening tools for evaluating and cleaning up contaminated sites. The values are estimates of contaminant concentrations in environmental media that EPA considers protective of humans over a lifetime. The toxicity-based PALs for Industrial Soils are calculated based on soil ingestion for and outdoor worker. The selected PALs are applicable to sites at the NTS based on future land-use scenarios as presented in Table A.1-3 and agreements between NDEP and NNSA.

The conservative level of 100 ppm for TPH is based on a regulatory mandate from the State of Nevada and is used as a “clean-up” level.

As indicated above, the radiochemistry PALs are based on a scaling of the NCRP 25 mrem per year dose-based levels (NCRP, 1999) to a conservative 15 mrem per year and the recommended levels for certain radionuclides in DOE Order 5400.5 Change 2 (DOE, 1993). These PALs are based on the Construction, Commercial, Industrial land-use scenario provided in the guidance and are appropriate for the NTS based on future Land-Use scenarios as presented in Table A.1-3.

A.1.4.3 Potential Sampling Techniques and Appropriate Analytical Methods

As discussed in Section A.1.4.1, the collection, measurement, and analytical methods are selected so the results will be generated for all potential contaminants at CAU 224. Sampling and analysis of residual materials such as hold-up in piping and tank contents are is included to support the decision-making process for waste management and to ensure an efficient field program. Tank distribution box and/or residuals will be analyzed for the full suite of analytes to ensure full characterization for future waste disposal.

A.1.4.3.1 Video Mole Survey

A video mole survey of discharge and outfall lines may be conducted to inspect the current physical condition and layout of the CAS distribution systems, as necessary. Video mole surveys allow a visual assessment of the system's integrity and can be used to identify breaches which may have resulted in a release. Subsurface features may be excavated to gain additional access for inspection or sampling or to introduce the video system. Piping that is currently in use will not be subject to video mole surveys.

A.1.4.3.2 Field Screening

Field-screening activities will be conducted for the following analytes and/or parameters:

- Alpha and Beta/Gamma Radiation - a handheld radiological survey instrument or method will be used based on the possibility that radiologically contaminated or elevated measurements (i.e., hot spots) are present in soil, concrete, or other materials. If determined appropriate, on-site gamma spectrometry or an equivalent instrument or method, may also be used to screen samples. The FSL for samples is the mean background activity plus two times the standard deviation of the mean background activity.

- VOCs - a photoionization detector (PID), or equivalent instrument or method, will be used for headspace analysis of subsurface samples because VOCs have not been ruled as COPCs for the CAU 224 CASs. The FSL for the headspace analysis is 20 ppm or 2.5 times background, whichever is greater.

- TPH - a gas chromatograph, or equivalent equipment or method, may be used at all the CASs because TPH is representative of general characteristics of sewage and may be in decontamination rinsate. The FSL for TPH is 75 ppm.

The techniques and FSLs are based on the applications for other CAU investigations and common NTS practices. These field-screening techniques will provide semiquantitative data that can be used to guide confirmatory soil sampling activities and waste management decisions.

A.1.4.3.3 Sampling Methods

Based on the results of the video mole survey, piping will be excavated at points of suspected residual hold-up or breaches and visually inspected. Samples will be collected if an adequate volume of residual material is present and accessible. Soil beneath detectable breaches will also be sampled.

Liquid and solid material in septic tanks will be sampled using an appropriate sampling technique that includes a bailer, bacon bomb sampler, or similar device. An attempt will be made to collect a column sample that represents the entire depth of the liquid phase. A separate column sample representing the entire depth of the solid phase will also be collected, if possible. In the event that the tank contents are dry, a long-handled tool such as a rake or shovel may be used. Contents in distribution boxes will be sampled in a similar manner. Sumps will be sampled at the lowest point.

Hand sampling, augering, direct-push, excavation, drilling, or other appropriate sampling methods will be used to collect soil samples. Sample collection and handling activities will only be conducted in accordance with approved Standard Quality Practices. It may be appropriate to use excavation in selected areas to determine if contaminated soil has been covered with clean fill.

For waste management purposes, the concrete structure of the decontamination pad and wastewater catch (CAS 06-17-04) will be sampled by coring or other appropriate method.

A.1.4.3.4 Analytical Methods

The analytical program for CAU 224 CASs shown in Table A.1-6 has been developed based on the COPC information presented in Section A.1.1 and summarized in Table A.1-1. Section 3.0 and Section 6.0 of the CAIP provide the analytical methods and laboratory requirements (e.g., detection limits, precision, and accuracy) to be followed during this CAI. Sample volumes are laboratory- and method-specific and will be determined in accordance with laboratory requirements. Analytical requirements (e.g., methods, detection limits, precision, and accuracy) are specified in the Industrial Sites QAPP (NNSA/NV, 2002), unless superseded by the CAIP. These requirements will ensure that laboratory analyses are sufficient to detect contamination in samples at concentrations exceeding the MRL.

A.1.5 Step 4 - Define the Study Boundaries

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

A.1.5.1 Define the Target Population

Decision I target populations represent locations that are most likely to contain COCs and residual materials in piping, tanks, and other structures for waste management. The target population for Decision II step-out locations are COC concentrations in samples adjacent to contaminated areas that are less than PALs. Table A.1-7 summarizes the target populations for the CASs based on the CSM and the spatial boundaries (Section A.1.5.2).

A.1.5.2 Identify the Spatial and Temporal Boundaries

The spatial boundaries (geographic) boundaries are defined as the vertical or horizontal extent of impacted soil beyond which the investigation will be rescoped. Intrusive sampling activities are not intended to extend into the boundaries of neighboring areas of environmental concern (e.g., other CASs). The horizontal boundaries at each CAS reflect the investigation area (i.e., the suspected

Table A.1-6
Analytical Methods for Laboratory Analysis

Analytical Parameter	Analytical Method	
	Liquid	Soil/Sediment/Sludge
Volatile Organic Compounds	SW-846 8260B[a]	SW-846 8260B[a]
Semivolatile Organic Compounds	SW-846 8270C[a]	SW-846 8270C[a]
RCRA Metals plus antimony, aluminum, beryllium, cobalt, copper, manganese, molybdenum, nickel, zinc	SW-846 6010B[a] (mercury - 7470A[a])	SW-846 6010B[a] (mercury - 7471A[a])
Polychlorinated Biphenyls	SW-846 8082[a]	SW-846 8082[a]
Total Petroleum Hydrocarbons (C_6 - C_{38})	SW-846 8015B[a] (modified)	SW-846 8015B[a] (modified)
Methanol	SW-846 8260B[a]	SW-846 8260B[a]
Hydroquinone	SW 846-8270C[a]	SW-846 8270C[a]
Cyanide	SW-846 9010	SW-846 9010
Sulfide	SW-846 9030B	SW-846 9030B
Asbestos	NA	Visual Inspection of Piping
Gamma Spectrometry (to include Cesium-137, Americium-241, Cobalt-60)	EPA Procedure 901.1[b]	HASL-300[c]
Strontium-90	ASTM D5811-00[d]	HASL-300[c]
Isotopic Plutonium	ASTM D3865-02[e]	ASTM C1001-00[f]
Isotopic Uranium	ASTM D3972-02[g]	ASTM E1000-02[h]

ASTM = American Society of Testing and Materials
RCRA = *Resource Conservation and Recovery Act*
SW = Solid Waste

[a]*EPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, 3rd Edition, Parts 1-4, SW-846* (EPA, 1996)
[b]*Prescribed Procedure for Measurements of Radioactivity in Drinking Water* (EPA, 1980)
[c]*The Procedures Manual of the Environmental Measurements Laboratory* (DOE, 1997)
[d]*Standard Test Method for Strontium-90 in Water* (ASTM, 2000a)
[e]*Standard Test Method for Plutonium in Water* (ASTM, 2002a)
[f]*Standard Test Method for Radiochemical Determination of Plutonium in Soil by Alpha Spectroscopy* (ASTM, 2000b)
[g]*Standard Test Method for Isotopic Uranium in Water by Radiochemistry* (ASTM, 2002b)
[h]*Standard Test Method for Radiochemical Determination of Uranium Isotopes in Soil by Alpha Spectrometry* (ASTM, 2002c)

Table A.1-7
Decision I and II Target Populations and Spatial Boundaries
(Page 1 of 6)

CSM Component - CSM Element	CAU 224 CAS	Decision I Target Populations	Decision II Target Populations	Spatial Boundaries for Decision II	
				Horizontal	Vertical
Septic and/or Collection - Piping	CAS 02-04-01	(1) Residual materials in piping (2) Soil beneath detectable breaches in piping	Decision II soil samples to vertically and laterally define extent of suspected contamination at detected breaches based on visual observations, FSL exceedances, and other biasing factors.	Maximum of 30 ft in any direction to encompass a detected breach.	Maximum of 25 ft bgs from the base of the piping. Depth of the piping is unknown.
	CAS 03-05-01				Maximum of 25 ft bgs from the base of the piping. Depth is approximately 2 ft based on a cited depth of the leach pit of 2 ft.
	CAS 05-04-01	None based on process knowledge. If the results of the residual tank content samples are inconsistent with the 1995 characterization results, Decision I and II Target Populations consistent with the other CASs will apply along with the spatial boundaries indicated.			Maximum of 25 ft bgs from the base of the piping. Depth to piping likely varies. Inlet piping to the distribution box is approximately 10 ft bgs.
	CAS 06-03-01	(1)Residualmaterialsinpiping (2) Soil beneath detectable breaches in piping	Decision II soil samples to vertically and laterally define extent of suspected contamination at detected breaches based on visual observations, FSL exceedances, and other biasing factors.		Maximum of 25 ft bgs from the base of the piping. Depth of the piping is unknown.
	CAS 06-23-01			Maximum of 30 ft in any direction to encompass a detected breach with the following exception. The spatial boundary for piping leading from CP-2 and the decontamination pad sump to the distribution box and from the distribution box to the leachfield is limited to the north by CAS 06-17-04 and east by the leachfield portion of CAS 06-05-01.	Maximum of 25 ft bgs from the base of the piping. Depth to piping is unknown.
	CAS 11-04-01			Maximum of 30 ft in any direction around a detected breach with the following exception. The spatial boundary is limited to the south by the evapotranspiration bed and the east by the facility fence/boundary.	Maximum of 25 ft bgs from the base of the piping. Depth to inlet piping appears to be approximately 3 to 4 ft bgs at the manhole/septic tank and outlet piping to the leachfield is 1 ft bgs.
	CAS 23-05-02			Maximum of 30 ft in any direction to encompass a detected breach.	Maximum of 25 ft bgs from the base of the piping. Depth to piping is unknown.

Table A.1-7
Decision I and II Target Populations and Spatial Boundaries
(Page 2 of 6)

CSM Component - CSM Element	CAU 224 CAS	Decision I Target Populations	Decision II Target Populations		Spatial Boundaries for Decision II	
					Horizontal	Vertical
Septic and/or Collection - Piping with manhole access	CAS 05-04-01	(1) Residual materials in manhole	None based on process knowledge. If the results of the residual material analysis are inconsistent with the 1995 characterization results, Decision I and II Target Populations consistent with the other CASs will apply.		Not applicable unless a breach is detected at the manhole. If so, guidance for the Piping Element applies.	
	CAS 06-03-01 CAS 11-04-01	(1) Residual materials in manhole/piping	Decision II soil samples to vertically and laterally define extent of suspected contamination at detected breaches based on visual observations, FSL exceedances, and other biasing factors.			
Septic and/or Collection - Septic Tank	CAS 02-04-01	(1) Residual Tank Contents (2) Soil horizon at the base of the tank and inlet piping (3) Surface/shallow subsurface soil beneath the outlet ends and/or overflow piping	Decision II samples to vertically and laterally define extent of suspected contamination at Decision I sample locations based on visual observations, FSL exceedances, and other biasing factors.	(1) Decision II sample locations oriented around the tank and approximately 15 ft from Decision I sample locations. (2) Additional step-out locations if biasing factors indicate COCs extend beyond the proposed Decision II sample locations.	Maximum of 45 ft in any direction to encompass the tank.	Maximum of 25 ft bgs from the base of the tank. Depth to the base of the tank is unknown.
	CAS 05-04-01	(1) Residual Tank Contents	None based on process knowledge. If the results of the residual tank content samples are inconsistent with 1995 characterization results, Decision I and II Target Populations consistent with the other CASs will apply along with the spatial boundaries indicated.			
	CAS 11-04-01	(1) Residual Tank Contents (2) Soil horizon at the base of the tank and inlet piping (3) Surface/shallow subsurface soil beneath the outlet ends and/or overflow piping	Decision II samples to vertically and laterally define extent of suspected contamination at Decision I sample locations based on visual observations, FSL exceedances, and other biasing factors.	(1) Decision II sample locations oriented around the tank and approximately 15 ft from Decision I sample locations not to encroach upon the leachfield portion of the CAS. (2) Additional step-out locations if biasing factors indicate COCs extend beyond the proposed Decision II sample locations.	Maximum of 45 ft encompassing the tank to the north, east and west. The spatial boundary is limited to the south by the evapotranspiration bed.	Maximum of 25 ft bgs from the base of the tank. Depth to the base of the tank is 4 ft bgs.

Table A.1-7
Decision I and II Target Populations and Spatial Boundaries
(Page 3 of 6)

CSM Component - CSM Element	CAU 224 CAS	Decision I Target Populations	Decision II Target Populations		Spatial Boundaries for Decision II	
					Horizontal	Vertical
Septic and/or Collection - Distribution Box	CAS 05-04-01	None based on process knowledge. If the results of the residual tank content samples are inconsistent with the 1995 characterization results, Decision I and II Target Populations consistent with the other CASs will apply along with the spatial boundaries indicated.			Maximum of 45 ft to encompass the distribution box. The spatial boundary is limited to the north by the septic tanks.	Maximum of 25 ft bgs from the base of the distribution box. Depth to the base of the distribution box is 7 ft bgs.
	CAS 06-03-01	(1) Residual material in distribution box (2) Soil horizon at the base of the distribution box and inlet/outlet piping	Decision II samples to vertically and laterally define extent of suspected contamination at Decision I sample locations based on visual observations, FSL exceedances, and other biasing factors.	Additional Decision II sample locations specific to the distribution box will not be collected. Potential contamination from the distribution box will be captured by the Decision II sampling for the sewage lagoons. See Lagoons/Leach Pit/Outwash CSM component.	Not applicable. Spatial boundaries associated with the distribution box are included in the Lagoon/Leach Pit/Outfall CSM Component	
	CAS 06-23-01			(1) Decision II sample location oriented around the distribution box approximately 15 ft from Decision I sample locations. Decision II sample locations may also support Decision II for the decontamination pad (06-17-04) and leachfield (06-05-01). (2) Additional step-out locations if biasing factors indicate COCs extend beyond the proposed Decision II sample locations will be limited in a manner that does not encroach upon the decontamination pad and leachfield CASs.	Maximum of 45 ft in any direction to encompass the distribution box with the following exception. The spatial boundary for the distribution box and from the distribution box to the leachfield is limited to the north by CAS 06-17-04 and east by the leachfield portion of CAS 06-05-01.	Maximum of 25 ft bgs from the base of the distribution box. Depth to the base of the distribution box is unknown.
	CAS 11-04-01			Decision II sample locations specific to the distribution box will not be collected. Potential contamination from the distribution box will be captured by the Decision II sampling for the evapotranspiration bed. See Leachfield CSM component below.	Not applicable. Spatial boundaries associated with the distribution box are included in the Leachfield CSM Component	
Septic and/or Collection Sump	CAS 03-05-01	(1) Residual material/sediment at lowest point (2) Soil horizon at the base of the sump	Decision II samples to vertically and laterally define extent of suspected contamination at Decision I sample locations based on visual observations, FSL exceedances, and other biasing factors.	(1) Decision II sample locations oriented around the sump approximately 15 ft from Decision I sample location. (2) Additional step-out locations if biasing factors indicate COCs extend beyond the proposed Decision II sample locations.	Maximum of 45 ft in any direction to encompass the sump.	Maximum of 25 ft bgs from the base of the sump. Depth to the base of the sump is 1.5 ft bgs.

Table A.1-7
Decision I and II Target Populations and Spatial Boundaries
(Page 4 of 6)

CSM Component - CSM Element	CAU 224 CAS	Decision I Target Populations	Decision II Target Populations		Spatial Boundaries for Decision II	
					Horizontal	Vertical
Leachfield - Distribution Piping	CAS 06-05-01 CAS 11-04-01 CAS 23-05-02	(1) Residual material at the midpoint and proximal and distal ends	Decision II sample locations specific to the leachfield distribution piping are not planned. Potential contamination of the leachfield will be captured by the Decision II sampling for each CAS. See Leachfield CSM component below.		Not applicable.	
Leachfield	CAS 06-05-01	(1) Soil/cover material above distribution piping at the midpoint, proximal and distal ends (2) Soil/cover material below distribution piping at the midpoint, proximal and distal ends (3) Native soil at the leachrock/ native soil interface below distribution piping at the midpoint, proximal and distal ends	Decision II samples to vertically and laterally define extent of suspected contamination at Decision I sample locations based on visual observations, FSL exceedances, and other biasing factors.	(1) Decision II sample locations oriented on the leachfield perimeter. (2) Additional step-out locations if biasing factors indicate COCs extend beyond the proposed Decision II sample locations.	Maximum of 45 ft in any direction to encompass the leachfield with the following considerations. The spatial boundary to the northwest of the leachfield is limited by CAS 06-17-04, to the east by a transformer pad, and to the southeast by CP-72.	Maximum of 25-ft bgs from the leachrock/native soil interface. Depth to the interface is not known.
	CAS 11-04-01			(1) Decision II sample locations oriented on the evapotranspiration bed perimeter. (2) Additional step-out locations if biasing factors indicate COCs extend beyond the proposed Decision II sample locations.	Maximum of 45 ft encompassing the evapotranspiration bed. The spatial boundary is limited to the east by the facility fence/boundary.	Maximum of 25 ft bgs from the leachrock/native soil interface. Depth to the interface is appears to be 2.5 ft.
	CAS 23-05-02			(1) Decision II sample locations oriented on the leachfield perimeter. (2) Additional step-out locations if biasing factors indicate COCs extend beyond the proposed Decision II sample locations.	Maximum of 45 ft in any direction to encompass the leachfield. The spatial boundary may be limited to the southwest by Building 753.	Maximum of 25 ft bgs from the leachrock/native soil interface. Depth to the interface is not known.

Table A.1-7
Decision I and II Target Populations and Spatial Boundaries
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CSM Component - CSM Element	CAU 224 CAS	Decision I Target Populations	Decision II Target Populations		Spatial Boundaries for Decision II	
					Horizontal	Vertical
Lagoon/Leach Pit/Outfall	CAS 03-05-01	(1) Sediment deemed representative of the lagoon or leach pit bottom if discernible (2) Native soil at the lagoon bottom/native soil interface at the point of discharge, midpoint and end	Decision II samples to vertically and laterally define extent of suspected contamination at Decision I sample locations based on visual observations, FSL exceedances, and other biasing factors.	(1) Decision II sample locations oriented on the leach pit perimeter. (2) Additional step-out locations if biasing factors indicate COCs extend beyond the proposed Decision II sample locations.	Maximum of 45 ft in any direction encompassing the leach pit.	Maximum of 25 ft bgs from the leachpit sediment/native soil interface. Depth to the interface is 2 ft.
	CAS 05-04-01	(1) Surface/Near Surface Soil in outfall		None based on process knowledge. If the results of the outfall samples are inconsistent with 1995 characterization results, Decision II Target Populations consistent with the other CASs will apply along with the spatial boundaries indicated		
	CAS 06-03-01	(1) Sediment deemed representative of the lagoon or leach pit bottom if discernible (2) Native soil at the lagoon bottom/native soil interface at the point of discharge, midpoint and end		(1) Decision II sample locations oriented on the perimeter for each of the sewage lagoon systems. (2) Additional step-out locations if biasing factors indicate COCs extend beyond the proposed Decision II sample locations.	Maximum of 45 ft in any direction encompassing each of the sewage lagoon systems.	Maximum of 25 ft bgs from the lagoon bottom/native soil interface if discernible. Depth to the interface is unknown. The lagoons have potentially been dug-out and closed.
	CAS 06-05-01	(1) Surface/Near Surface Soil in potential outfall		(1) Decision II sample locations oriented on the lagoon perimeters. (2) Additional step-out locations if biasing factors indicate COCs extend beyond the proposed Decision II sample locations.	Maximum of 45 ft in any direction to encompass the lagoons and the potential outfall.	Maximum of 25 ft bgs from the lagoon bottom/native soil interface if discernible. depth to the interface is unknown. With respect to the potential outfall, maximum of 25 ft bgs.
	CAS 11-04-01	(1) Sediment deemed representative of the lagoon or leach pit bottom if discernible (2) Native soil at the lagoon bottom/native soil interface at the point of discharge, midpoint and end		(1) Decision II sample locations oriented on the lagoon perimeter. (2) Additional step-out locations if biasing factors indicate COCs extend beyond the proposed Decision II sample locations.	Maximum of 45 ft in any direction to encompass the lagoon.	Maximum of 25 ft bgs from the lagoon bottom/native soil interface if discernible. Depth to the interface is 3 ft. The lagoon has potentially been dug-out.

Table A.1-7
Decision I and II Target Populations and Spatial Boundaries
(Page 6 of 6)

CSM Component - CSM Element	CAU 224 CAS	Decision I Target Populations	Decision II Target Populations		Spatial Boundaries for Decision II	
					Horizontal	Vertical
Decontamination Pad	CAS 06-17-04	(1) Concrete samples for waste characterization (2) Soil underlying the pad at the pad/soil interface (3) Soil adjacent to the pad	Decision II samples to vertically and laterally define extent of suspected contamination at Decision I sample locations based on visual observations, FSL exceedances, and other biasing factors.	(1) Decision II sample locations oriented on the decontamination pad perimeter. (2) Additional step-out locations if biasing factors indicate COCs extend beyond the proposed Decision II sample locations.	Maximum of 45 ft in any direction around the pad with the following considerations. The spatial boundary to the southeast of the decontamination pad is limited by the leachfield portion of CAS 06-05-01 and south by the piping leading from CP-2 to the distribution box and from the distribution box to the leachfield.	25 ft bgs from the pad/native soil interface. With respect to soil samples on the perimeter of the pad, 25 ft bgs.
Wastewater Catch		(1) Residual material/sediment at the lowest point (2) Soil horizon at the base of the wastewater catch		Additional Decision II sample locations specific to the wastewater catch are not planned. Potential contamination from the wastewater catch will be captured by the Decision II sampling for the decontamination pad element. See above.	Not applicable. Spatial boundaries associated with the wastewater catch and concrete trench are included in the Decontamination Pad CSM Component	
Concrete Trench		(1) Concrete samples for waste characterization (2) Soil underlying the concrete trench (3) Soil adjacent to the concrete trench				

lateral extent of contamination) where COCs potentially exist. The spatial boundaries as presented in Table A.1-7 may be further refined based on visual inspection of the CASs.

Temporal boundaries are time constraints due to time-related phenomena, such as weather conditions, seasons, and activity patterns. Significant temporal constraints due to weather conditions are not expected; however, snow events may affect site activities during winter months. Moist weather may place constraints on sampling and field screening of contaminated soils because of the attenuating effect of moisture in samples. There are no time constraints on collecting samples.

A.1.5.3 Identify Practical Constraints

The primary practical constraints anticipated at the CASs are the presence of underground utilities, posted contamination area requirements, physical barriers (e.g., fences) and areas requiring access authorization. Utility surveys will be conducted at each CAS prior to the start of investigation activities to determine if utilities exist and, if so, determine the limit of spatial boundaries for intrusive activities. Additionally, piping that is still in use will not be video surveyed or sampled. No other practical constraints have been identified.

A.1.5.4 Define the Scale of Decision Making

For CAU 224, the scale of decision making for Decision I is defined as each CAS. The scale of decision making for Decision II is defined as the extent of COC contamination originating from individual CASs.

A.1.6 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 decision rule describes the conditions under which possible alternative actions would be chosen.

A.1.6.1 Specify the Population Parameter

The population parameter for Decision I data collected from biased sample locations is the maximum observed concentration of each COPC within the target population. For radiological surveys, the maximum observed activity of each COPC is considered the population parameter. If radiological

sampling and analysis is performed to support the radiological survey results, the maximum observed activity of each COPC identified in the sample will be the population parameter. Radiological sampling and analysis will supersede radiological survey results.

The population parameter for Decision II data is the observed concentration of each unbounded COC in any sample.

A.1.6.2 Choose an Action Level

Action levels are defined as the PALs, which are specified in Section A.1.4.2.

A.1.6.3 Decision Rule

If the concentration of any COPC in a target population exceeds the corresponding PAL in a Decision I or Decision II sample, that COPC is identified as a COC. If all COPC concentrations are less than the corresponding PALs, then the decision will be no further action.

If the observed population parameter of any COC in a Decision II sample exceeds the PALs, samples will be collected to define the extent of contamination. If all observed COC population parameters are less than PALs, the decision will be that the extent of contamination has been defined in the lateral and vertical directions.

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

A.1.7 Step 6 – Specify the Tolerable Limits on Decision Errors

The sampling approach for the investigation relies on biased sampling locations (judgemental data collection); therefore, statistical analysis is not appropriate. Only validated analytical results (quantitative data) will be used to determine if COCs are present (Decision I) or the extent of a COC (Decision II), unless otherwise stated. The baseline condition (i.e., null hypothesis) and alternative condition for Decision I are:

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

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

- 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 a false negative or false positive error associated with their determination (discussed in the following subsections). Since quantitative data are compared to action levels on a point-by-point basis, statistical evaluations of the data such as averages or confidence intervals are not appropriate.

A.1.7.1 False Negative (Rejection) Decision Error

The false negative (rejection of the null hypothesis) decision error would mean:

- Decision I: Deciding that a COC is not present when it actually is.
- Decision II: Deciding that the extent of a COC has been defined when it actually has not.

In both cases, this would result in an increased risk to human health and environment.

For Decision I, a false negative decision error (where the consequences are more severe) is controlled by meeting the following criteria:

- Having a high degree of confidence that the Decision I sample locations selected will identify COCs if present anywhere within a CAS.

- Having a high degree of confidence that Decision I analyses selected (both field screening and confirmatory laboratory) will be sufficient to detect any COCs present in the sampled media and that the detection limits are adequate to ensure an accurate quantification of the COCs.

For Decision II, the false negative decision error is reduced by:

- Having a high degree of confidence that the Decision II sample locations selected will identify the extent of COCs.

- Having a high degree of confidence that Decision II analyses conducted will be sufficient to detect any COCs present in the samples.

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

To satisfy the first criterion for both decisions, Decision I samples will be collected in areas most likely to be contaminated by COPCs and Decision II samples will be collected in areas that potentially represent the lateral and vertical extent of COCs. The following characteristics are considered to accomplish the first criterion:

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

These characteristics were considered during the development of the CSM. The biasing factors listed in Section A.1.4.1 will be used to further ensure that these criteria are met.

To satisfy the second criterion, all samples used to define the nature and extent of contamination will be analyzed for the parameters listed in Section A.1.4.3.4 using analytical methods that are capable of producing quantitative data at concentrations equal to or below PALs.

To satisfy the third criterion for Decision II, the entire dataset, as well as individual sample results, will be assessed against the DQIs of precision, accuracy, comparability, completeness, and representativeness defined in the Industrial Sites QAPP (NNSA/NV, 2002). Consistent with the QAPP, the goal for the completeness DQI is that 80 percent of the COPC results are valid for every sample. The COPCs are defined as those contaminants that may realistically be present within a CAS (Section A.1.4.3.4). 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. Strict adherence to established procedures and QA/QC protocols also protects against false negatives.

A.1.7.2 False Positive Decision Error

The false positive (acceptance of the null hypothesis or beta) decision error would mean:

- Deciding that a COC is present when it actually is not (Decision I)
- Accepting that the extent of a COC has not been defined when it really has (Decision II)

These errors result in increased costs for unnecessary characterization or corrective actions.

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 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.1.7.3 Quality Assurance/Quality Control

Field-screening equipment will be calibrated and checked in accordance with the manufacturer's instructions or approved procedures.

Quality control samples will be collected as required by the Industrial Site QAPP (NNSA/NV, 2002) and in accordance with established procedures. The required QC field samples include:

- Trip blanks (1 per sample cooler containing environmental VOC samples)
- Equipment blanks (1 per sampling event for each type of decontamination procedure)
- Source blanks (1 per source lot per sampling event)
- Field duplicates (minimum of 1 per matrix per 20 environmental samples or 1 per CAS if event if less than 20 collected)
- Field blanks (1 per CAS if less than 20 collected or change in field conditions)
- Matrix spike/matrix spike duplicate (minimum of 1 per matrix per 20 environmental samples or 1 per CAS if less than 20 collected as required by the analytical method)

Additional QC samples may be submitted based on site-specific conditions.

A.1.8 Step 7 – Optimize the Design for Obtaining Data

This section presents an overview of the resource-effective strategy planned to obtain the data required to meet the project DQOs. As additional data or information is obtained (identified as inputs to the decision in Table A.1-5) this step will be reevaluated and refined, as necessary, to reduce uncertainty and increase the confidence that the nature and extent is accurately defined.

A.1.8.1 General Investigation Strategy

Intrusive soil sampling for field-screening and laboratory analysis will be conducted at the CAU 224 CASs with the exception of CAS 05-04-01. The Decision I locations are determined based on biasing factors listed in Section A.1.4.1, the CSM, and the target populations as detailed in Section A.1.5. The selected biased locations may be modified during the CAI, but only if the modified locations meet the decision needs and criteria stipulated in Section A.1.4.1.

Decision II sampling locations at each CAS are based on an assumed perimeter of the CAS. If biasing factors indicate COCs extend beyond the proposed Decision II sample locations, further incremental step out locations will be selected and samples may be collected without support of analytical results. In the event that step out locations from different components or elements in a CAS approach each other, the area will be considered as one area and samples would be collected only in an outward direction.

With respect to CAS 05-04-01, the tank contents along with residual material in manholes will be sampled and analyzed to confirm conclusions from 1995 that indicated the contents were nonhazardous. Surface/near surface soil beneath the overflow piping for each tank and two samples in the wash will be collected to confirm the previous characterization results.

A.1.8.2 Detailed Investigation Strategy

The following sections discuss the approach for obtaining the information necessary to resolve the DQOs. The strategy may be further revised based on upcoming field inspections and interpretation of geophysical and radiological survey results. Target populations to be sampled are detailed in Table A.1-7. The proposed sampling locations are illustrated for each CAS in Figure A.1-10 through Figure A.1-16, located at the end of the section.

A.1.8.2.1 Septic and/or Collection

Piping is common in all the CASs with the exception of CAS 06-05-01. Sampling activities at these CASs will consist of video mole survey of abandoned piping to identify breaches or residual material, excavating to locate the piping, and collecting Decision I and II samples for laboratory analysis as

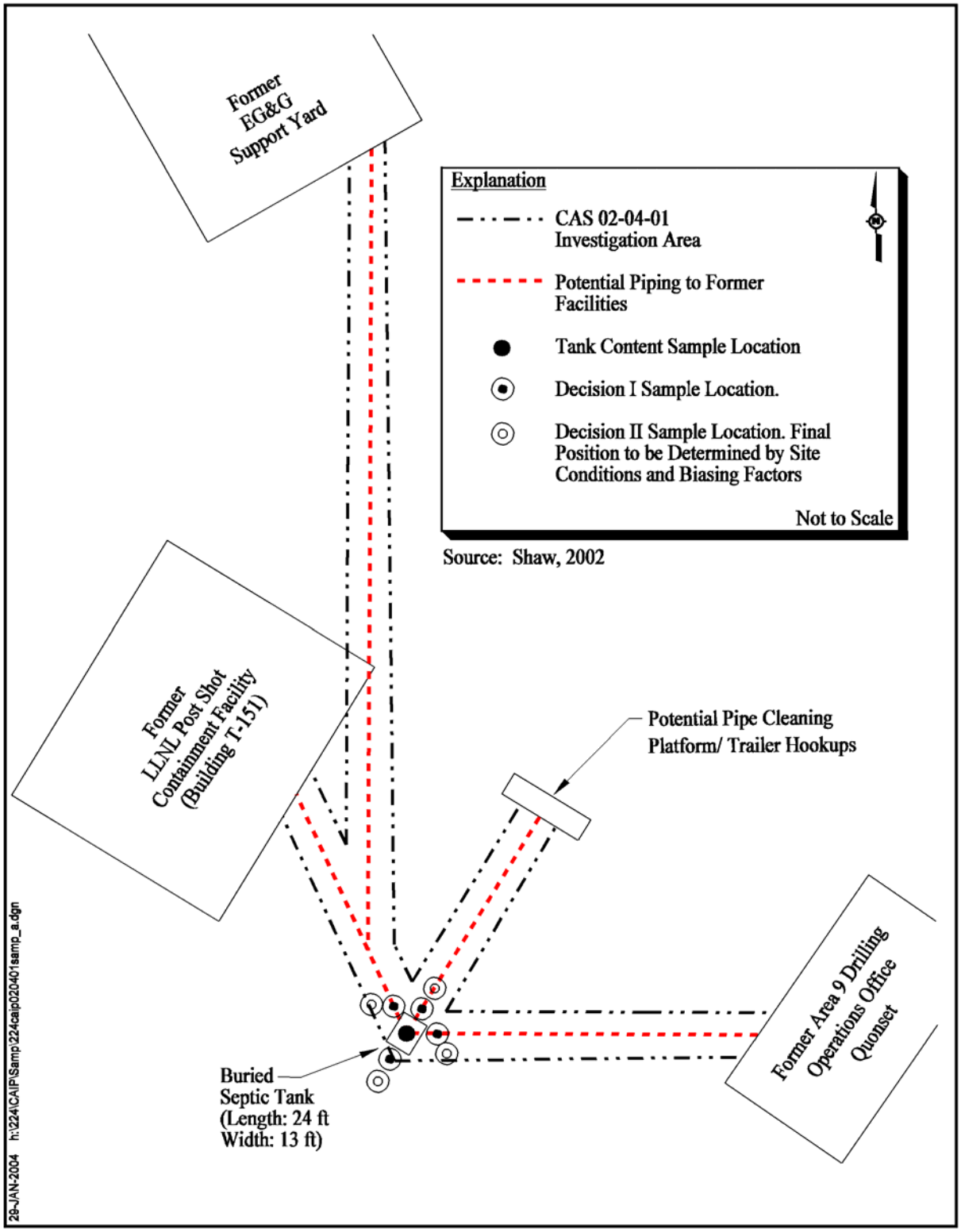

Figure A.1-10
CAU 224, CAS 02-04-01 Sample Locations

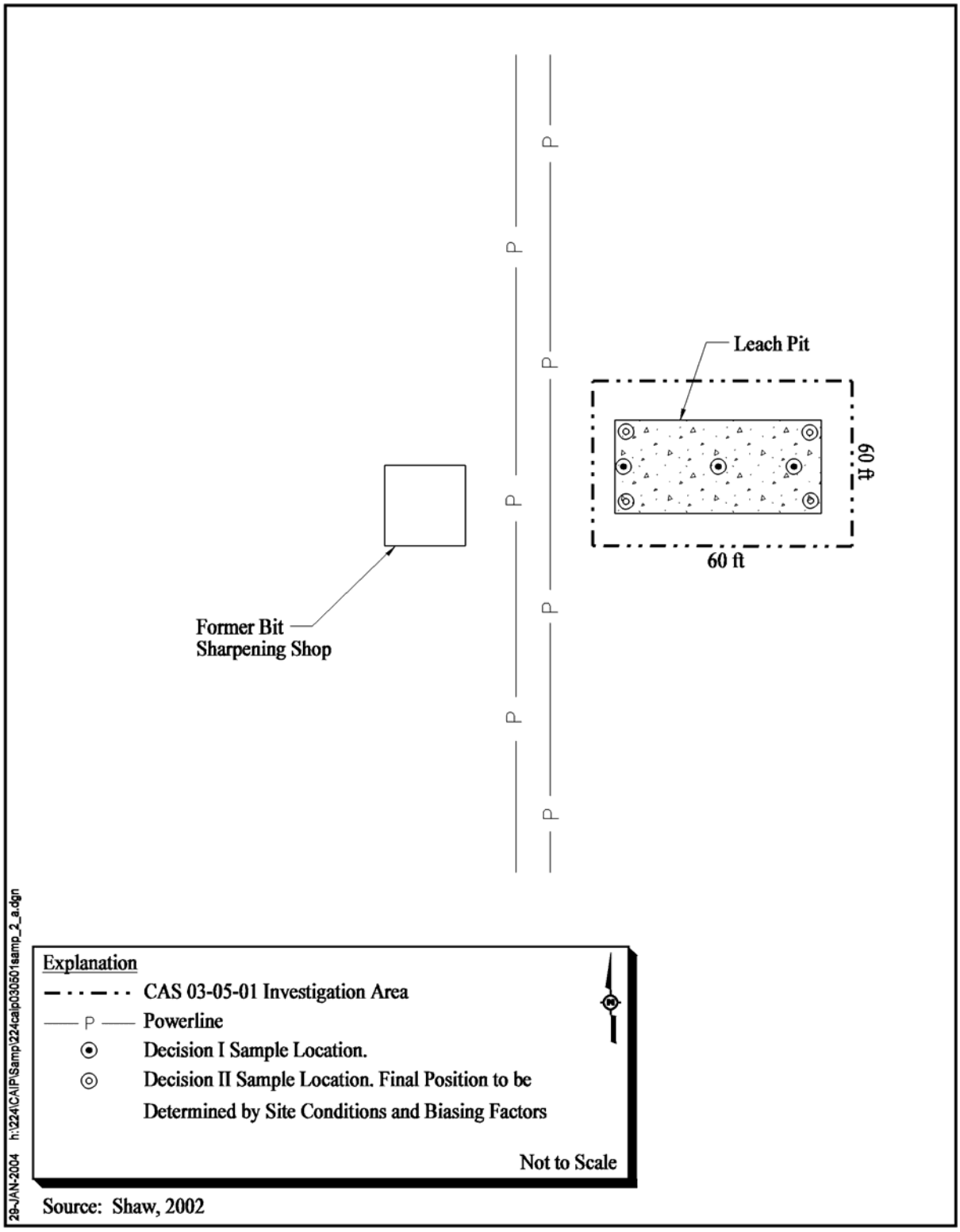

Figure A.1-11
CAU 224, CAS 03-05-01 Sample Locations

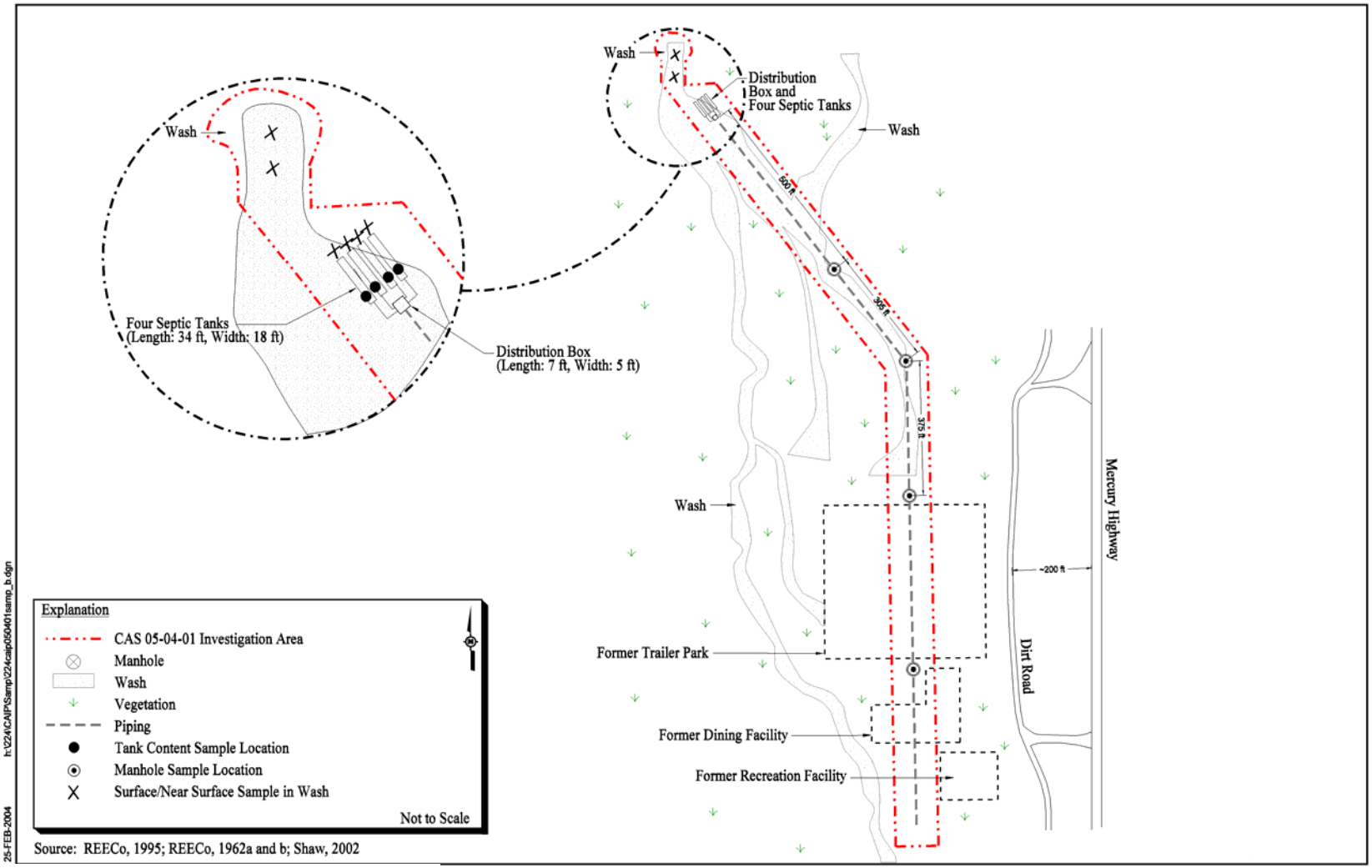

Figure A.1-12
CAU 224, CAS 05-04-01 Sample Locations

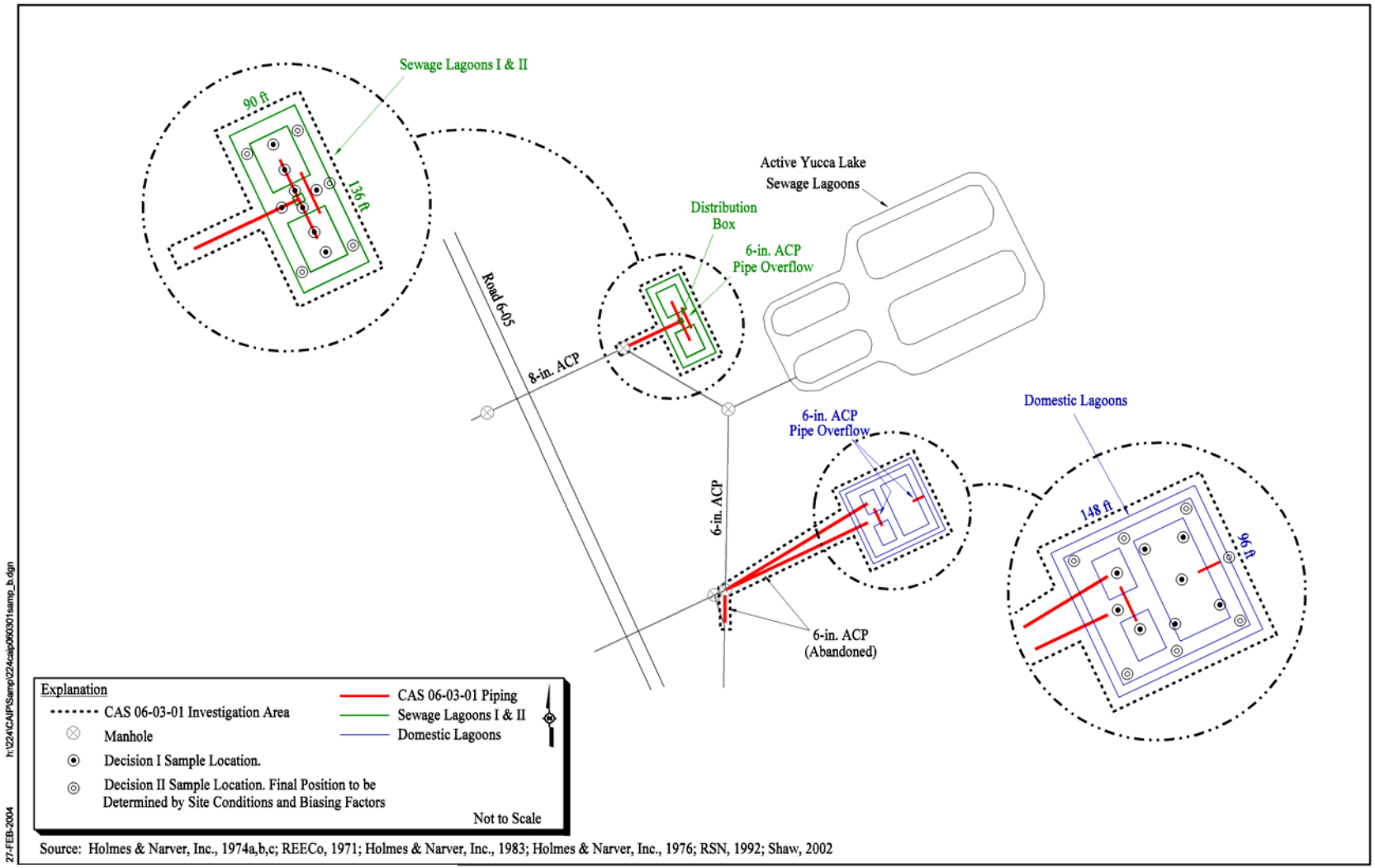

Figure A.1-13
CAU 224, CAS 06-03-01 Sample Locations

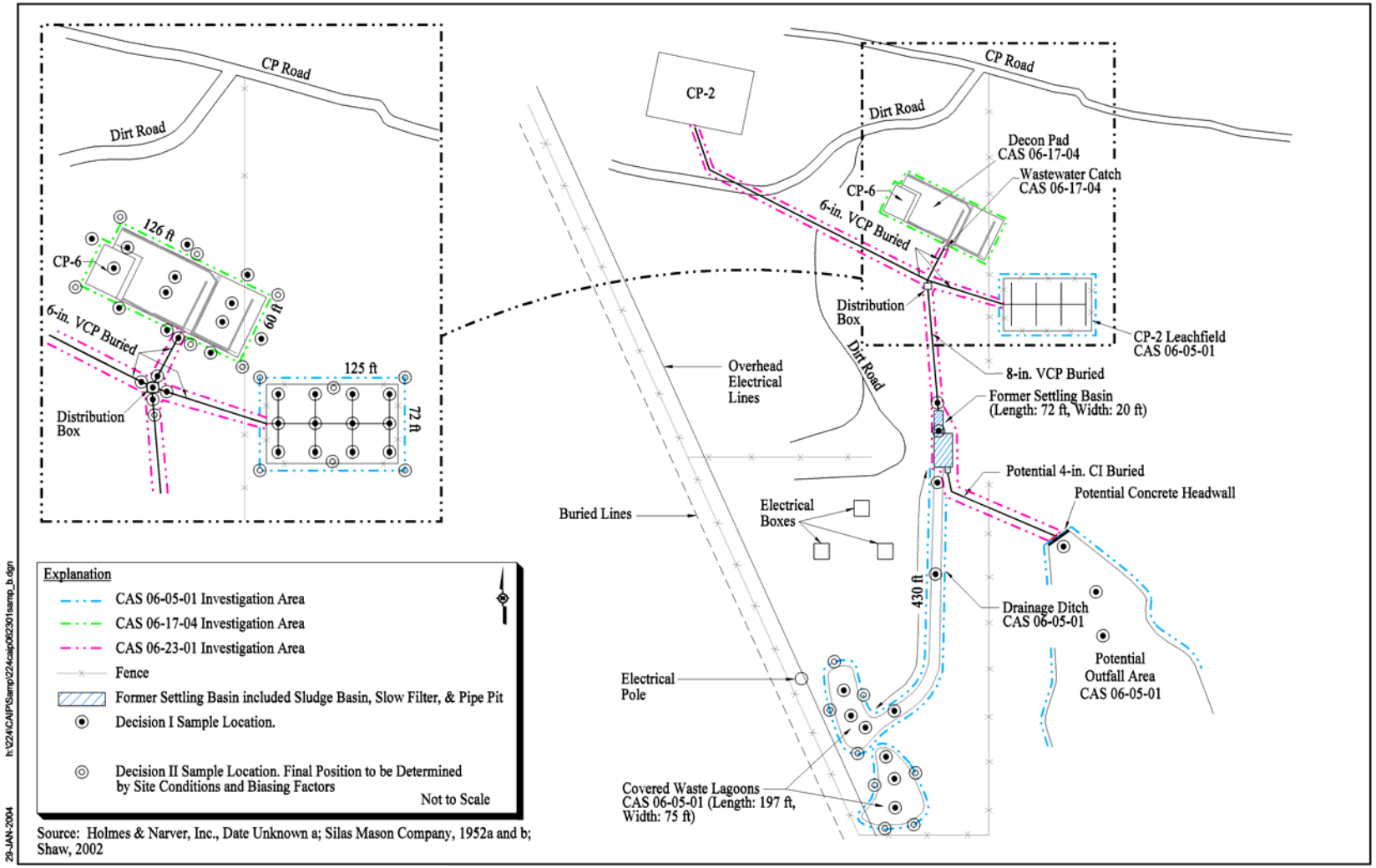

Figure A.1-14
CAU 224, CAS 06-05-01, CAS 06-17-04 and CAS 06-23-01 Sample Locations

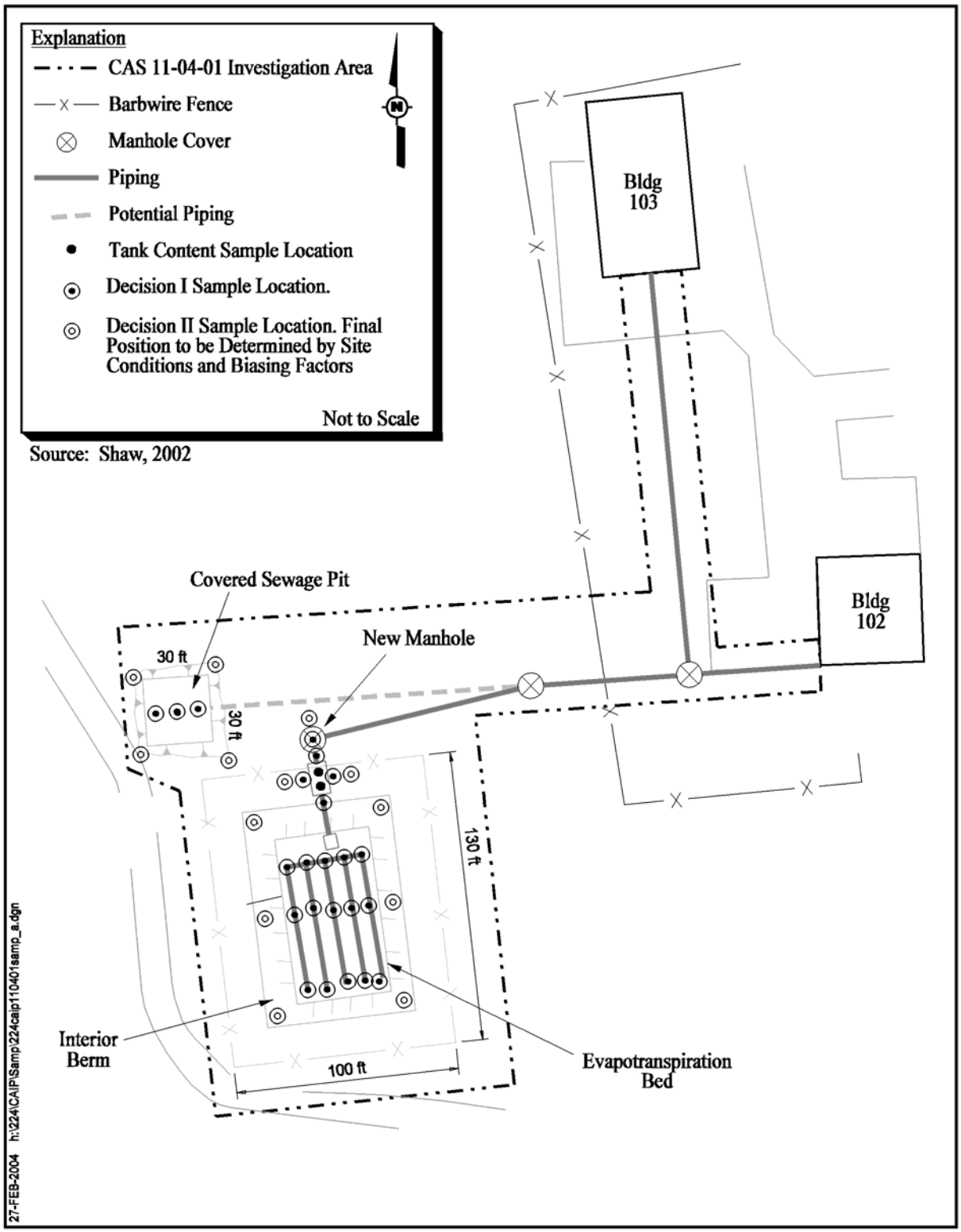

Figure A.1-15
CAU 224, CAS 11-04-01 Sample Locations

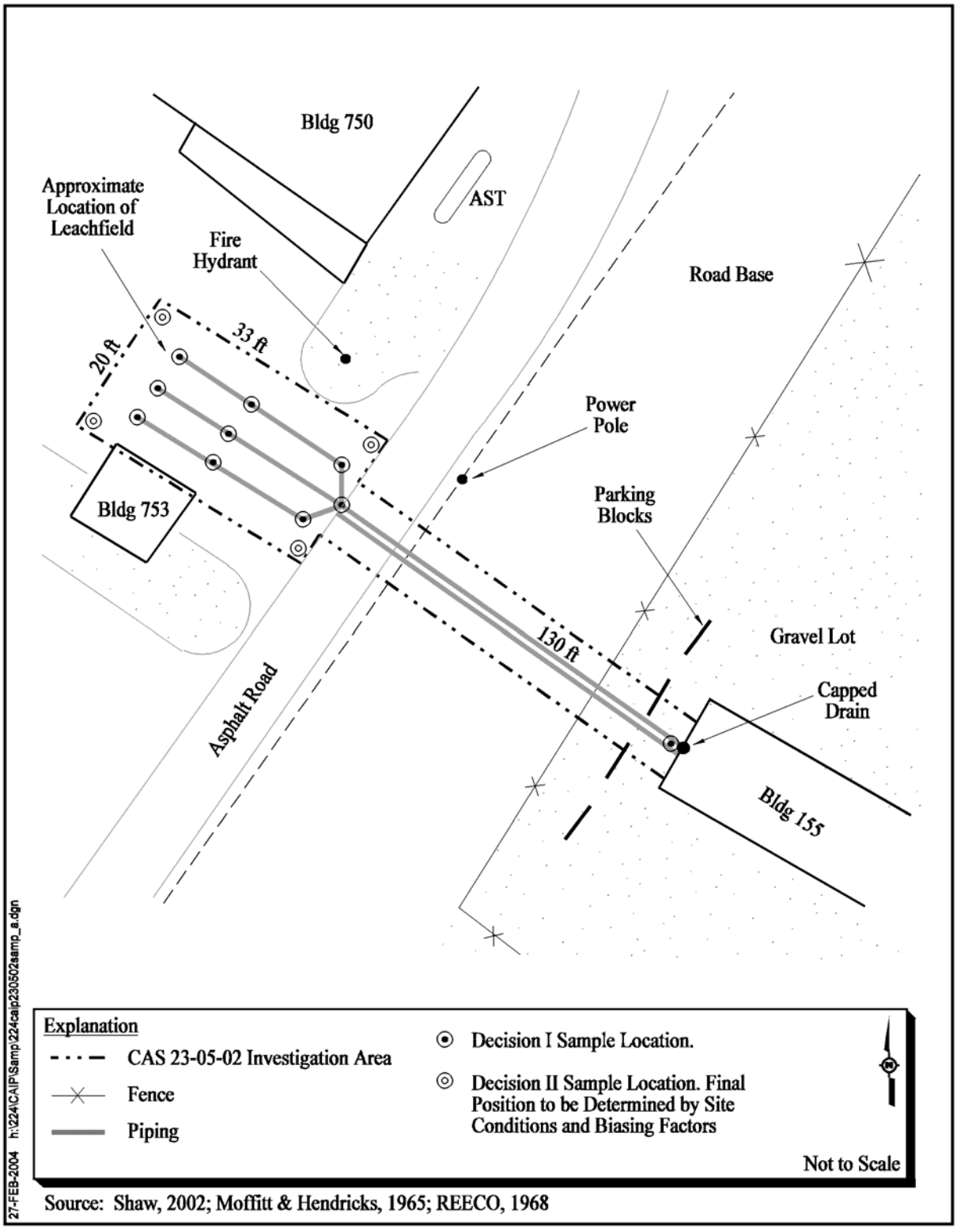

Figure A.1-16
CAU 224, CAS 23-05-02 Sample Locations

necessary. Manhole access to piping is also present for CASs 06-03-01 and 11-04-01. Residual material in manholes will also be sampled, if present.

Each of the CASs 02-04-01, 05-04-01, and 11-04-01 has at least one septic tank. Intrusive activities at CAS 02-04-01 may be necessary to locate the tank. Activities at CAS 02-04-01, 05-04-01, and 11-04-01 include visual inspection of the inside of the septic tank and collecting Decision I samples for laboratory analysis from each matrix the tank residual if present. Decision I soil samples will be collected for CASs 02-04-01 and 11-04-01 beneath the inlet and outlet end pipes, in the soil horizon underlying the base of the septic tanks, and in areas of potential overflow. Decision II samples in the area encompassing the tanks will be collected as detailed on Table A.1-7.

Corrective Action Sites 06-23-01 and 11-04-01 each have a covered distribution box that directed effluent to the leachfield and evapotranspiration bed, respectively. Decision I activities at these CASs will consist of excavating (as appropriate) to locate the distribution box, inspecting inside the distribution box, and collecting Decision I samples for laboratory analysis of residual contents in the distribution boxes (if present). Decision I soil samples will be collected beneath the inlet and outlet piping of the distribution boxes if breaches are suspected and the soil horizon underlying the base of the box. As detailed in Table A.1-7, Decision II samples vertically from the base will be collected based on FSL exceedances and at additional locations encompassing the distribution box. There is presumably a distribution box associated with CAS 06-03-01 within covered Sewage Lagoons I and II. Samples will be collected if the box can be located.

A.1.8.2.2 Leachfield

Corrective Action Sites 06-05-01 and 23-05-02 each have a leachfield and CAS 11-04-01 has an evapotranspiration bed constructed very similar to a leachfield. Decision I activities at these CASs will consist of excavating or other intrusive method to locate the boundaries of each leachfield, exposing the proximal and distal ends of the associated perforated distribution pipes, and collection of Decision I samples of residuals in the distribution piping at the proximal, midpoint, and distal ends. Decision I samples will be collected from soil above and below the distribution pipes at the proximal, midpoint and distal ends. Native soil beneath the leachfield at the proximal, midpoint, and distal ends of the distribution pipes will also be sampled. If the interface cannot be identified, samples will be collected directly beneath the distribution pipes. Decision II samples will be collected vertically at

Decision I locations if FSLs are exceeded. This process will continue until FSRs are less than FSLs and at locations encompassing the CAS as described in Table A.1-7.

A.1.8.2.3 Lagoons/Leach Pit

Corrective Action Sites 03-05-01, 06-03-01, 06-05-01, and 11-04-01 each have a lagoon or lagoon like component (i.e., the leach pit). Decision I activities at these CASs will consist of locating the distribution pipe or discharge area for each lagoon and collecting Decision I samples of lagoon sediments and in soil beneath the lagoon at the native soil interface at the proximal, midpoint, and distal ends. As indicated in Table A.1-7, Decision II samples will be collected vertically at Decision I locations if FSLs are exceeded and until FSRs are less than FSLs and at locations encompassing the CAS. Decision II samples will also be collected at the perimeter locations of the lagoons.

A.1.8.2.4 Decontamination Pad

Corrective Action Site 06-17-04 includes a decontamination pad, drain, and wastewater catch. CAS 03-05-01 potentially has a sump associated with the CAS. Activities at these CASs will consist of collecting Decision I samples at the pad/native soil interface (i.e., under the pad); surface soil adjacent to the edges of the decontamination pad; soil beneath the concrete trench leading from the pad to the sump; and soil at the base of the sump. Decision II samples will be collected vertically at Decision I locations if FSLs are exceeded and until FSRs are less than FSLs and at locations encompassing the CAS.

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APPENDIX B

ANALYTICAL RESULTS

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Lionville Laboratory, Inc.

Pesticides/PCB by GC, Special List — Report Date: 07/17/07 11:44

RFW Batch Number: **0707L511** Client: **NSTEC V2935** Work Order: 60052001001 Page: 1

	Cust ID:	050401-V1	050401-V1	050401-V1	050401-V2	050401-V3	050401-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	5.00	1.00	2.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Decachlorobiphenyl	97 %	91 %	91 %	112 %	94 %	112 %
	Tetrachloro-m-xylene	89 %	95 %	94 %	117 %	93 %	114 %
4,4'-DDE		9.4	111 %	98 %	260	22	380
4,4'-DDT		8.5	118 %	95 %	440	35	400
Chlordane		0.34 J	103 %	104 %	320	1.8 .I	270

	Cust ID:	050401-V5	050401-V6	PBLKCX	PBLKCX BS
Sample Information	RFW#:	005	006	07LE0369-MB1	07LE0369-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
Surrogate:	Decachlorobiphenyl	93 %	84 %	97 %	98 %
	Tetrachloro-m-xylene	84 %	62 %	91 %	94 %
4,4'-DDE		0.70 J	0.70 J	1.7 U	110 %
4,4'-DDT		1.7 U	1.7 U	1.7 U	108 %
Chlordane		1.7 U	1.7 U	1.7 U	105 %

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

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Certificate of Analysis Report
for

NEVA002 National Security Technologies, LLC (30018)

Client SDG: V2959 GEL Work Order: 190677

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a surrogate compound

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

ND The analyte concentration is not detected above the detection limit.

The above sample is reported on a dry weight basis except where prohibited by the analytical procedure.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Stacy Calloway.

Reviewed by Stacy J. Calloway

GEL LABORATORIES LLC
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Certificate of Analysis

Company : National Security Technologies, LLC
Address : 2621 Losee Road
M/S NTS273
North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID:	061704−CV2A	Project:	NEVA00306
Sample ID:	190677001	Client ID:	NEVA002
Matrix:	Soil		
Collect Date:	30−JUL−07		
Receive Date:	03−AUG−07		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd
Rad Alpha Spec Analysis													
Alphaspec Pu, Solid 2pCi / g													
Plutonium−238	U	0.316	+/−0.332	0.403	+/−0.335	2.00	pCi/g		GXR1	08/09/07	0829	657253	1
Plutonium−239/240		19.4	+/−2.51	0.554	+/−3.66	2.00	pCi/g						

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL−300, Pu−11−RC Modified
2	DOE EML HASL−300, Pu−11−RC Modified

Surrogate/Tracer recovery	Test	Recovery%	Acceptable Limits
Plutonium−242 Tracer	Alphaspec Pu, Solid 2pCi / g	63	(15%−125%)

Notes:

The Qualifiers in this report are defined as follows :

** Analyte is a surrogate compound
< Result is less than value reported
> Result is greater than value reported
A The TIC is a suspected aldol−condensation product
B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
BD Results are either below the MDC or tracer recovery is low
C Analyte has been confirmed by GC/MS analysis
D Results are reported from a diluted aliquot of the sample
H Analytical holding time was exceeded
J Value is estimated
M M if above MDC and less than LLD
N/A RPD or %Recovery limits do not apply.
ND Analyte concentration is not detected above the detection limit
R Sample results are rejected
U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UI Gamma Spectroscopy−−Uncertain identification
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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Certificate of Analysis

Company : National Security Technologies, LLC
Address : 2621 Losee Road
M/S NTS273
North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−CV2A
Sample ID: 190677001

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst Date	Time	Batch	Mtd

Y QC Samples were not spiked with this compound
^ RPD of sample and duplicate evaluated using +/−RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h Preparation or preservation holding time was exceeded
The above sample is reported on a dry weight basis.

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Certificate of Analysis

Company : National Security Technologies, LLC
Address : 2621 Losee Road
M/S NTS273
North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−CV3A
Sample ID: 190677002
Matrix: Soil
Collect Date: 30−JUL−07
Receive Date: 03−AUG−07
Collector: Client

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd
Rad Alpha Spec Analysis													
Alphaspec Pu, Solid 2pCi / g													
Plutonium−238	U	−0.0161	+/−0.135	0.321	+/−0.135	2.00	pCi/g		GXR1	08/09/07	0829	657253	1
Plutonium−239/240		3.54	+/−0.954	0.201	+/−1.06	2.00	pCi/g						

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL−300, Pu−11−RC Modified
2	DOE EML HASL−300, Pu−11−RC Modified

Surrogate/Tracer recovery	Test	Recovery%	Acceptable Limits
Plutonium−242 Tracer	Alphaspec Pu, Solid 2pCi / g	78	(15%−125%)

Notes:

The Qualifiers in this report are defined as follows :

** Analyte is a surrogate compound
< Result is less than value reported
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A The TIC is a suspected aldol−condensation product
B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
BD Results are either below the MDC or tracer recovery is low
C Analyte has been confirmed by GC/MS analysis
D Results are reported from a diluted aliquot of the sample
H Analytical holding time was exceeded
J Value is estimated
M M if above MDC and less than LLD
N/A RPD or %Recovery limits do not apply.
ND Analyte concentration is not detected above the detection limit
R Sample results are rejected
U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UI Gamma Spectroscopy−−Uncertain identification
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y QC Samples were not spiked with this compound

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Certificate of Analysis

Company : National Security Technologies, LLC
Address : 2621 Losee Road
M/S NTS273
North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−CV3A
Sample ID: 190677002

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst Date	Time	Batch	Mtd

^ RPD of sample and duplicate evaluated using +/−RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h Preparation or preservation holding time was exceeded
The above sample is reported on a dry weight basis.

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Certificate of Analysis

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North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−CV5A
Sample ID: 190677003
Matrix: Soil
Collect Date: 30−JUL−07
Receive Date: 03−AUG−07
Collector: Client

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd
Rad Alpha Spec Analysis													
Alphaspec Pu, Solid 2pCi / g													
Plutonium−238		0.210	+/−0.238	0.210	+/−0.240	2.00	pCi/g		GXR1	08/09/07	0829	657253	1
Plutonium−239/240		3.54	+/−0.982	0.388	+/−1.09	2.00	pCi/g						

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL−300, Pu−11−RC Modified
2	DOE EML HASL−300, Pu−11−RC Modified

Surrogate/Tracer recovery	Test	Recovery%	Acceptable Limits
Plutonium−242 Tracer	Alphaspec Pu, Solid 2pCi / g	74	(15%−125%)

Notes:

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A The TIC is a suspected aldol−condensation product
B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
BD Results are either below the MDC or tracer recovery is low
C Analyte has been confirmed by GC/MS analysis
D Results are reported from a diluted aliquot of the sample
H Analytical holding time was exceeded
J Value is estimated
M M if above MDC and less than LLD
N/A RPD or %Recovery limits do not apply.
ND Analyte concentration is not detected above the detection limit
R Sample results are rejected
U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UI Gamma Spectroscopy−−Uncertain identification
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y QC Samples were not spiked with this compound

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Certificate of Analysis

Company : National Security Technologies, LLC
Address : 2621 Losee Road
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North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−CV5A
Sample ID: 190677003

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst Date	Time	Batch	Mtd

^ RPD of sample and duplicate evaluated using +/−RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h Preparation or preservation holding time was exceeded
The above sample is reported on a dry weight basis.

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Certificate of Analysis

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North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−AV1A
Sample ID: 190677004
Matrix: Soil
Collect Date: 30−JUL−07
Receive Date: 03−AUG−07
Collector: Client

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd
Rad Alpha Spec Analysis													
Alphaspec Pu, Solid 2pCi / g													
Plutonium−238	U	0.00	+/−0.133	0.204	+/−0.133	2.00	pCi/g		GXR1	08/09/07	0829	657253	1
Plutonium−239/240	U	0.103	+/−0.194	0.376	+/−0.194	2.00	pCi/g						

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL−300, Pu−11−RC Modified
2	DOE EML HASL−300, Pu−11−RC Modified

Surrogate/Tracer recovery	Test	Recovery%	Acceptable Limits
Plutonium−242 Tracer	Alphaspec Pu, Solid 2pCi / g	81	(15%−125%)

Notes:

The Qualifiers in this report are defined as follows :

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< Result is less than value reported
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A The TIC is a suspected aldol−condensation product
B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
BD Results are either below the MDC or tracer recovery is low
C Analyte has been confirmed by GC/MS analysis
D Results are reported from a diluted aliquot of the sample
H Analytical holding time was exceeded
J Value is estimated
M M if above MDC and less than LLD
N/A RPD or %Recovery limits do not apply.
ND Analyte concentration is not detected above the detection limit
R Sample results are rejected
U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UI Gamma Spectroscopy−−Uncertain identification
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y QC Samples were not spiked with this compound

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Certificate of Analysis

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North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−AV1A
Sample ID: 190677004

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst Date	Time	Batch	Mtd

^ RPD of sample and duplicate evaluated using +/−RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h Preparation or preservation holding time was exceeded
The above sample is reported on a dry weight basis.

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North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−AV3A
Sample ID: 190677005
Matrix: Soil
Collect Date: 30−JUL−07
Receive Date: 03−AUG−07
Collector: Client

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd
Rad Alpha Spec Analysis													
Alphaspec Pu, Solid 2pCi / g													
Plutonium−238	U	−0.0183	+/−0.0358	0.365	+/−0.0359	2.00	pCi/g		GXR1	08/09/07	0829	657253	1
Plutonium−239/240	U	0.00	+/−0.149	0.228	+/−0.149	2.00	pCi/g						

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL−300, Pu−11−RC Modified
2	DOE EML HASL−300, Pu−11−RC Modified

Surrogate/Tracer recovery	Test	Recovery%	Acceptable Limits
Plutonium−242 Tracer	Alphaspec Pu, Solid 2pCi / g	75	(15%−125%)

Notes:

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< Result is less than value reported
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A The TIC is a suspected aldol−condensation product
B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
BD Results are either below the MDC or tracer recovery is low
C Analyte has been confirmed by GC/MS analysis
D Results are reported from a diluted aliquot of the sample
H Analytical holding time was exceeded
J Value is estimated
M M if above MDC and less than LLD
N/A RPD or %Recovery limits do not apply.
ND Analyte concentration is not detected above the detection limit
R Sample results are rejected
U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UI Gamma Spectroscopy−−Uncertain identification
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y QC Samples were not spiked with this compound

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Certificate of Analysis

Company : National Security Technologies, LLC
Address : 2621 Losee Road
M/S NTS273
North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−AV3A
Sample ID: 190677005

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst Date	Time	Batch	Mtd

^ RPD of sample and duplicate evaluated using +/−RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h Preparation or preservation holding time was exceeded
The above sample is reported on a dry weight basis.

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Certificate of Analysis

Company : National Security Technologies, LLC
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North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−AV5A
Sample ID: 190677006
Matrix: Soil
Collect Date: 30−JUL−07
Receive Date: 03−AUG−07
Collector: Client

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd
Rad Alpha Spec Analysis													
Alphaspec Pu, Solid 2pCi / g													
Plutonium−238	U	0.0679	+/−0.133	0.204	+/−0.133	2.00	pCi/g		GXR1	08/09/07	0829	657253	1
Plutonium−239/240		0.969	+/−0.518	0.414	+/−0.533	2.00	pCi/g						

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL−300, Pu−11−RC Modified
2	DOE EML HASL−300, Pu−11−RC Modified

Surrogate/Tracer recovery	Test	Recovery%	Acceptable Limits
Plutonium−242 Tracer	Alphaspec Pu, Solid 2pCi / g	78	(15%−125%)

Notes:

The Qualifiers in this report are defined as follows :

** Analyte is a surrogate compound
< Result is less than value reported
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A The TIC is a suspected aldol−condensation product
B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
BD Results are either below the MDC or tracer recovery is low
C Analyte has been confirmed by GC/MS analysis
D Results are reported from a diluted aliquot of the sample
H Analytical holding time was exceeded
J Value is estimated
M M if above MDC and less than LLD
N/A RPD or %Recovery limits do not apply.
ND Analyte concentration is not detected above the detection limit
R Sample results are rejected
U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UI Gamma Spectroscopy−−Uncertain identification
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y QC Samples were not spiked with this compound

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Certificate of Analysis

Company : National Security Technologies, LLC
Address : 2621 Losee Road
M/S NTS273
North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−AV5A
Sample ID: 190677006

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst Date	Time	Batch	Mtd

^ RPD of sample and duplicate evaluated using +/−RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h Preparation or preservation holding time was exceeded
The above sample is reported on a dry weight basis.

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Certificate of Analysis

Company : National Security Technologies, LLC
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M/S NTS273
North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−AV2
Sample ID: 190677007
Matrix: Soil
Collect Date: 19−JUL−07
Receive Date: 03−AUG−07
Collector: Client

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd
Rad Alpha Spec Analysis													
Alphaspec Pu, Solid 2pCi / g													
Plutonium−238	U	−0.0338	+/−0.0468	0.390	+/−0.047	2.00	pCi/g		GXR1	08/09/07	0829	657253	1
Plutonium−239/240	U	−0.031	+/−0.160	0.520	+/−0.160	2.00	pCi/g						

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL−300, Pu−11−RC Modified
2	DOE EML HASL−300, Pu−11−RC Modified

Surrogate/Tracer recovery	Test	Recovery%	Acceptable Limits
Plutonium−242 Tracer	Alphaspec Pu, Solid 2pCi / g	73	(15%−125%)

Notes:

The Qualifiers in this report are defined as follows :

** Analyte is a surrogate compound
< Result is less than value reported
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A The TIC is a suspected aldol−condensation product
B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
BD Results are either below the MDC or tracer recovery is low
C Analyte has been confirmed by GC/MS analysis
D Results are reported from a diluted aliquot of the sample
H Analytical holding time was exceeded
J Value is estimated
M M if above MDC and less than LLD
N/A RPD or %Recovery limits do not apply.
ND Analyte concentration is not detected above the detection limit
R Sample results are rejected
U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UI Gamma Spectroscopy−−Uncertain identification
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y QC Samples were not spiked with this compound

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Certificate of Analysis

Company : National Security Technologies, LLC
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North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−AV2
Sample ID: 190677007

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst Date	Time	Batch	Mtd

^ RPD of sample and duplicate evaluated using +/−RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h Preparation or preservation holding time was exceeded
The above sample is reported on a dry weight basis.

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North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−AV4
Sample ID: 190677008
Matrix: Soil
Collect Date: 19−JUL−07
Receive Date: 03−AUG−07
Collector: Client

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd
Rad Alpha Spec Analysis													
Alphaspec Pu, Solid 2pCi / g													
Plutonium−238	U	−0.0357	+/−0.0494	0.412	+/−0.0497	2.00	pCi/g		GXR1	08/09/07	0829	657253	1
Plutonium−239/240	U	0.0773	+/−0.217	0.490	+/−0.218	2.00	pCi/g						

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL−300, Pu−11−RC Modified
2	DOE EML HASL−300, Pu−11−RC Modified

Surrogate/Tracer recovery	Test	Recovery%	Acceptable Limits
Plutonium−242 Tracer	Alphaspec Pu, Solid 2pCi / g	70	(15%−125%)

Notes:

The Qualifiers in this report are defined as follows :

** Analyte is a surrogate compound
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A The TIC is a suspected aldol−condensation product
B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
BD Results are either below the MDC or tracer recovery is low
C Analyte has been confirmed by GC/MS analysis
D Results are reported from a diluted aliquot of the sample
H Analytical holding time was exceeded
J Value is estimated
M M if above MDC and less than LLD
N/A RPD or %Recovery limits do not apply.
ND Analyte concentration is not detected above the detection limit
R Sample results are rejected
U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UI Gamma Spectroscopy−−Uncertain identification
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y QC Samples were not spiked with this compound

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Certificate of Analysis

Company : National Security Technologies, LLC
Address : 2621 Losee Road
M/S NTS273
North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−AV4
Sample ID: 190677008

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst Date	Time	Batch	Mtd

^ RPD of sample and duplicate evaluated using +/−RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h Preparation or preservation holding time was exceeded
The above sample is reported on a dry weight basis.

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Certificate of Analysis

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North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−CV1
Sample ID: 190677009
Matrix: Soil
Collect Date: 19−JUL−07
Receive Date: 03−AUG−07
Collector: Client

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd
Rad Alpha Spec Analysis													
Alphaspec Pu, Solid 2pCi / g													
Plutonium−238	U	0.106	+/−0.239	0.506	+/−0.240	2.00	pCi/g		GXR1	08/09/07	0829	657253	1
Plutonium−239/240		7.55	+/−1.56	0.506	+/−1.86	2.00	pCi/g						

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL−300, Pu−11−RC Modified
2	DOE EML HASL−300, Pu−11−RC Modified

Surrogate/Tracer recovery	Test	Recovery%	Acceptable Limits
Plutonium−242 Tracer	Alphaspec Pu, Solid 2pCi / g	64	(15%−125%)

Notes:

The Qualifiers in this report are defined as follows :

** Analyte is a surrogate compound
< Result is less than value reported
> Result is greater than value reported
A The TIC is a suspected aldol−condensation product
B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
BD Results are either below the MDC or tracer recovery is low
C Analyte has been confirmed by GC/MS analysis
D Results are reported from a diluted aliquot of the sample
H Analytical holding time was exceeded
J Value is estimated
M M if above MDC and less than LLD
N/A RPD or %Recovery limits do not apply.
ND Analyte concentration is not detected above the detection limit
R Sample results are rejected
U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UI Gamma Spectroscopy−−Uncertain identification
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y QC Samples were not spiked with this compound

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Certificate of Analysis

Company : National Security Technologies, LLC
Address : 2621 Losee Road
M/S NTS273
North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−CV1
Sample ID: 190677009

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst Date	Time	Batch	Mtd

^ RPD of sample and duplicate evaluated using +/−RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h Preparation or preservation holding time was exceeded
The above sample is reported on a dry weight basis.

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Certificate of Analysis

Company : National Security Technologies, LLC
Address : 2621 Losee Road
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North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID:	061704−CV6	Project:	NEVA00306
Sample ID:	190677010	Client ID:	NEVA002
Matrix:	Soil		
Collect Date:	19−JUL−07		
Receive Date:	03−AUG−07		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd
Rad Alpha Spec Analysis													
Alphaspec Pu, Solid 2pCi / g													
Plutonium−238	U	0.0241	+/−0.183	0.526	+/−0.183	2.00	pCi/g		GXR1	08/09/07	0829	657253	1
Plutonium−239/240		3.14	+/−1.03	0.476	+/−1.10	2.00	pCi/g						

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL−300, Pu−11−RC Modified
2	DOE EML HASL−300, Pu−11−RC Modified

Surrogate/Tracer recovery	Test	Recovery%	Acceptable Limits
Plutonium−242 Tracer	Alphaspec Pu, Solid 2pCi / g	64	(15%−125%)

Notes:

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B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
BD Results are either below the MDC or tracer recovery is low
C Analyte has been confirmed by GC/MS analysis
D Results are reported from a diluted aliquot of the sample
H Analytical holding time was exceeded
J Value is estimated
M M if above MDC and less than LLD
N/A RPD or %Recovery limits do not apply.
ND Analyte concentration is not detected above the detection limit
R Sample results are rejected
U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UI Gamma Spectroscopy−−Uncertain identification
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y QC Samples were not spiked with this compound

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North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−CV6
Sample ID: 190677010

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst Date	Time	Batch	Mtd

^ RPD of sample and duplicate evaluated using +/−RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h Preparation or preservation holding time was exceeded
The above sample is reported on a dry weight basis.

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North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−CV4
Sample ID: 190677011
Matrix: Soil
Collect Date: 19−JUL−07
Receive Date: 03−AUG−07
Collector: Client

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd
Rad Alpha Spec Analysis													
Alphaspec Pu, Solid 2pCi / g													
Plutonium−238	U	0.0683	+/−0.134	0.205	+/−0.134	2.00	pCi/g		GXR1	08/09/07	0829	657253	1
Plutonium−239/240		2.92	+/−0.878	0.328	+/−0.939	2.00	pCi/g						

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL−300, Pu−11−RC Modified
2	DOE EML HASL−300, Pu−11−RC Modified

Surrogate/Tracer recovery	Test	Recovery%	Acceptable Limits
Plutonium−242 Tracer	Alphaspec Pu, Solid 2pCi / g	79	(15%−125%)

Notes:

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A The TIC is a suspected aldol−condensation product
B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
BD Results are either below the MDC or tracer recovery is low
C Analyte has been confirmed by GC/MS analysis
D Results are reported from a diluted aliquot of the sample
H Analytical holding time was exceeded
J Value is estimated
M M if above MDC and less than LLD
N/A RPD or %Recovery limits do not apply.
ND Analyte concentration is not detected above the detection limit
R Sample results are rejected
U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UI Gamma Spectroscopy−−Uncertain identification
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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Certificate of Analysis

Company : National Security Technologies, LLC
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North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−CV4
Sample ID: 190677011

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst Date	Time	Batch	Mtd

Y QC Samples were not spiked with this compound
^ RPD of sample and duplicate evaluated using +/−RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h Preparation or preservation holding time was exceeded
The above sample is reported on a dry weight basis.

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North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−BV1B
Sample ID: 190677012
Matrix: Soil
Collect Date: 31−JUL−07
Receive Date: 03−AUG−07
Collector: Client

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd
Rad Alpha Spec Analysis													
Alphaspec Pu, Solid 2pCi / g													
Plutonium−238	U	0.0525	+/−0.139	0.331	+/−0.139	2.00	pCi/g		GXR1	08/09/07	0829	657253	1
Plutonium−239/240		1.71	+/−0.677	0.331	+/−0.713	2.00	pCi/g						

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL−300, Pu−11−RC Modified
2	DOE EML HASL−300, Pu−11−RC Modified

Surrogate/Tracer recovery	Test	Recovery%	Acceptable Limits
Plutonium−242 Tracer	Alphaspec Pu, Solid 2pCi / g	77	(15%−125%)

Notes:

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B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
BD Results are either below the MDC or tracer recovery is low
C Analyte has been confirmed by GC/MS analysis
D Results are reported from a diluted aliquot of the sample
H Analytical holding time was exceeded
J Value is estimated
M M if above MDC and less than LLD
N/A RPD or %Recovery limits do not apply.
ND Analyte concentration is not detected above the detection limit
R Sample results are rejected
U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UI Gamma Spectroscopy−−Uncertain identification
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y QC Samples were not spiked with this compound

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North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−BV1B
Sample ID: 190677012

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst Date	Time	Batch	Mtd

^ RPD of sample and duplicate evaluated using +/−RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h Preparation or preservation holding time was exceeded
The above sample is reported on a dry weight basis.

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North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−BV2B
Sample ID: 190677013
Matrix: Soil
Collect Date: 31−JUL−07
Receive Date: 03−AUG−07
Collector: Client

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd
Rad Alpha Spec Analysis													
Alphaspec Pu, Solid 2pCi / g													
Plutonium−238	U	−0.0169	+/−0.0331	0.338	+/−0.0332	2.00	pCi/g		GXR1	08/09/07	0829	657253	1
Plutonium−239/240		2.54	+/−0.842	0.464	+/−0.891	2.00	pCi/g						

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL−300, Pu−11−RC Modified
2	DOE EML HASL−300, Pu−11−RC Modified

Surrogate/Tracer recovery	Test	Recovery%	Acceptable Limits
Plutonium−242 Tracer	Alphaspec Pu, Solid 2pCi / g	74	(15%−125%)

Notes:

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B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
BD Results are either below the MDC or tracer recovery is low
C Analyte has been confirmed by GC/MS analysis
D Results are reported from a diluted aliquot of the sample
H Analytical holding time was exceeded
J Value is estimated
M M if above MDC and less than LLD
N/A RPD or %Recovery limits do not apply.
ND Analyte concentration is not detected above the detection limit
R Sample results are rejected
U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UI Gamma Spectroscopy−−Uncertain identification
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y QC Samples were not spiked with this compound

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Certificate of Analysis

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Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−BV2B
Sample ID: 190677013

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst Date	Time	Batch	Mtd

^ RPD of sample and duplicate evaluated using +/−RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h Preparation or preservation holding time was exceeded
The above sample is reported on a dry weight basis.

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Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−BV3B
Sample ID: 190677014
Matrix: Soil
Collect Date: 31−JUL−07
Receive Date: 03−AUG−07
Collector: Client

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd
Rad Alpha Spec Analysis													
Alphaspec Pu, Solid 2pCi / g													
Plutonium−238	U	0.00	+/−0.204	0.313	+/−0.204	2.00	pCi/g		GXR1	08/09/07	0829	657253	1
Plutonium−239/240		10.1	+/−2.01	0.313	+/−2.39	2.00	pCi/g						

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL−300, Pu−11−RC Modified
2	DOE EML HASL−300, Pu−11−RC Modified

Surrogate/Tracer recovery	Test	Recovery%	Acceptable Limits
Plutonium−242 Tracer	Alphaspec Pu, Solid 2pCi / g	56	(15%−125%)

Notes:

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C Analyte has been confirmed by GC/MS analysis
D Results are reported from a diluted aliquot of the sample
H Analytical holding time was exceeded
J Value is estimated
M M if above MDC and less than LLD
N/A RPD or %Recovery limits do not apply.
ND Analyte concentration is not detected above the detection limit
R Sample results are rejected
U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UI Gamma Spectroscopy−−Uncertain identification
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y QC Samples were not spiked with this compound

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Certificate of Analysis

Company : National Security Technologies, LLC
Address : 2621 Losee Road
M/S NTS273
North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−BV3B
Sample ID: 190677014

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst Date	Time	Batch	Mtd

^ RPD of sample and duplicate evaluated using +/−RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h Preparation or preservation holding time was exceeded
The above sample is reported on a dry weight basis.

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Certificate of Analysis

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North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−BV4B
Sample ID: 190677015
Matrix: Soil
Collect Date: 31−JUL−07
Receive Date: 03−AUG−07
Collector: Client

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd
Rad Alpha Spec Analysis													
Alphaspec Pu, Solid 2pCi / g													
Plutonium−238	U	−0.0155	+/−0.0304	0.310	+/−0.0305	2.00	pCi/g		GXR1	08/09/07	0829	657253	1
Plutonium−239/240	U	0.196	+/−0.261	0.426	+/−0.262	2.00	pCi/g						

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL−300, Pu−11−RC Modified
2	DOE EML HASL−300, Pu−11−RC Modified

Surrogate/Tracer recovery	Test	Recovery%	Acceptable Limits
Plutonium−242 Tracer	Alphaspec Pu, Solid 2pCi / g	80	(15%−125%)

Notes:

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BD Results are either below the MDC or tracer recovery is low
C Analyte has been confirmed by GC/MS analysis
D Results are reported from a diluted aliquot of the sample
H Analytical holding time was exceeded
J Value is estimated
M M if above MDC and less than LLD
N/A RPD or %Recovery limits do not apply.
ND Analyte concentration is not detected above the detection limit
R Sample results are rejected
U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UI Gamma Spectroscopy−−Uncertain identification
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y QC Samples were not spiked with this compound

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Certificate of Analysis

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North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−BV4B
Sample ID: 190677015

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst Date	Time	Batch	Mtd

^ RPD of sample and duplicate evaluated using +/−RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h Preparation or preservation holding time was exceeded
The above sample is reported on a dry weight basis.

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Address : 2621 Losee Road
M/S NTS273
North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−BV5B
Sample ID: 190677016
Matrix: Soil
Collect Date: 31−JUL−07
Receive Date: 03−AUG−07
Collector: Client

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd
Rad Alpha Spec Analysis													
Alphaspec Pu, Solid 2pCi / g													
Plutonium−238	U	0.184	+/−0.228	0.319	+/−0.229	2.00	pCi/g		GXR1	08/09/07	0829	657253	1
Plutonium−239/240		12.4	+/−1.78	0.200	+/−2.40	2.00	pCi/g						

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL−300, Pu−11−RC Modified
2	DOE EML HASL−300, Pu−11−RC Modified

Surrogate/Tracer recovery	Test	Recovery%	Acceptable Limits
Plutonium−242 Tracer	Alphaspec Pu, Solid 2pCi / g	72	(15%−125%)

Notes:

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B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
BD Results are either below the MDC or tracer recovery is low
C Analyte has been confirmed by GC/MS analysis
D Results are reported from a diluted aliquot of the sample
H Analytical holding time was exceeded
J Value is estimated
M M if above MDC and less than LLD
N/A RPD or %Recovery limits do not apply.
ND Analyte concentration is not detected above the detection limit
R Sample results are rejected
U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UI Gamma Spectroscopy−−Uncertain identification
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y QC Samples were not spiked with this compound

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Certificate of Analysis

Company : National Security Technologies, LLC
Address : 2621 Losee Road
M/S NTS273
North Las Vegas, Nevada 89030−−4134
Contact: Mr. Ted Redding
Project: Environmental Rad Analysis − No EDD

Report Date: August 9, 2007

Client Sample ID: 061704−BV5B
Sample ID: 190677016

Project: NEVA00306
Client ID: NEVA002

Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	DF	Analyst Date	Time	Batch	Mtd

^ RPD of sample and duplicate evaluated using +/−RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h Preparation or preservation holding time was exceeded
The above sample is reported on a dry weight basis.

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QC Summary

Report Date: August 9, 2007

Client : **National Security Technologies, LLC**
2621 Losee Road
M/S NTS273
North Las Vegas, Nevada
Contact: **Mr. Ted Redding**

Workorder: **190677**

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date Time
Rad Alpha Spec										
Batch 657253										
QC1201389420 190677001 DUP										
Plutonium-238	U	0.316		0.408	pCi/g	0.375		(0% - 100%)	GXR1	08/09/0708:29
	Uncert:	+/-0.332		+/-0.341						
	TPU:	+/-0.335		+/-0.345						
Plutonium-239/240		19.4		37.7	pCi/g	5.27		(0% - 20%)		
	Uncert:	+/-2.51		+/-3.07						
	TPU:	+/-3.66		+/-5.74						
QC1201389421 LCS										
Plutonium-238			U	0.280	pCi/g			(75%-125%)		
	Uncert:			+/-0.259						
	TPU:			+/-0.262						
Plutonium-239/240	23.5			21.0	pCi/g		90	(75%-125%)		
	Uncert:			+/-2.18						
	TPU:			+/-3.43						
QC1201389419 MB										
Plutonium-238			U	0.00	pCi/g					
	Uncert:			+/-0.121						
	TPU:			+/-0.121						
Plutonium-239/240			U	0.0789	pCi/g					
	Uncert:			+/-0.178						
	TPU:			+/-0.178						

Notes:
The Qualifiers in this report are defined as follows:

**	Analyte is a surrogate compound
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>	Result is greater than value reported
A	The TIC is a suspected aldol-condensation product
B	For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
BD	Results are either below the MDC or tracer recovery is low
C	Analyte has been confirmed by GC/MS analysis
D	Results are reported from a diluted aliquot of the sample
H	Analytical holding time was exceeded
J	Value is estimated
M	M if above MDC and less than LLD
N/A	RPD or %Recovery limits do not apply.
ND	Analyte concentration is not detected above the detection limit
R	Sample results are rejected
	Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

QC Summary

Workorder: **190677**

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time

U

UI Gamma Spectroscopy--Uncertain identification

X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

Y QC Samples were not spiked with this compound

^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.

h Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
** Indicates analyte is a surrogate compound.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

APPENDIX C

WASTE DISPOSITION DOCUMENTATION

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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: Glenn Richardson Phone Number: 5-5361

Location / Origin: CAU 224 CP Hill

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)	☐ 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-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 materials that are allowed for disposal at this site. I have verified this through the waste characterization method identified above prohibited and allowable waste items. I have contacted Property Management and I is approved for disposal in the landfill.

Print Name: Mick Fiore

Signature: _____ Date: 10/2/07

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

Radiological Survey Release for Waste Disposal

RCT Initials

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

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

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

SIGNATURE: _____ DATE: 10/2/07

FRM-0646 (08/06

SWO USE ONLY

Load Weight (net from scale or estimate): 5840 10-3-07 Signature of Certifier: _____

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 224 // A-6 CP 50

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type:	☒ NTS	☐ Putrescrible	☒ FFACO-onsite	☐ WAC Exception
(check one)	☐ Non-Putrescible	☐ Asbestos Containing Material	☐ FFACO-offsite	☐ Historic DOE/NV
Pollution Prevention Category: (check one)		☒ Environmental management	☐ Defense 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	☐ Paper	☐ Rocks / unaltered geologic materials	☐ Empty containers
☐ Plastic	☐ Wire	☐ Cable	☐ Cloth	☐ Rubber (excluding tires)	☐ Insulation (non-Asbestosform)	☒ Demolition debris
☐ Manufactured items: (swamp coolers, furniture, rugs, carpel, electronic components, PPE, etc.)						☐ Cement & concrete

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

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

Additional waste accepted at the Area 9 U10c Landfill:

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

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

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

REQUIRED: WASTE GENERATOR SIGNATURE

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

The above mentioned waste was generated outside of a Controlled Waste 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 h is approved for disposal in the landfill.

Print Name: Mike Floyd

Signature: _____ Date: 8/16/07

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

Radiation Survey Release for Waste Disposal

RCT Initials

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

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

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

SIGNATURE: _____ DATE: 8-16-

BN-0646 (09/99)

SWO USE ONLY

Load Weight (net from scale or estimate): 8460 8-16-07 Signature of Certifier _____

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 224 / ~~CAS 05-04-01~~ CAS 02-04-01 Bld A-2 Camp

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

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

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

REQUIRED: WASTE CONTENTS ALLOWABLE WASTES

Check all allowable wastes that are contained within this load:

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

Acceptable waste at any NTS landfill:

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

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

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

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

Additional waste accepted at the Area 9 U10c Landfill:

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

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

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

REQUIRED: WASTE GENERATOR SIGNATURE

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

The above mentioned waste was generated outside of a Controlled Waste 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 ma
site. I have verified this through the waste characterization method identified abo
prohibited and allowable waste items. I have contacted Property Management an
is approved for disposal in the landfill.

Print Name: Mike Floyd

Signature: _____ Date: 8/15/07

Note: "Food waste, office trash and animal carcasses do not require a radiological
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: _____ **DATE:** 8-15-07

BN-0646 (10/05)

SWO USE ONLY

Load Weight (net from scale or estimate): 8320 Signature of Certifier: _____ 8-15-07

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 NSF Phone Number: 5-6653

Location / Origin: CAU 224 / CAS 05-04-01 ~~A-5~~ A-5 Top of 200 hill.

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 GS 7-26-07	☐ Routine		
Method of Characterization: (check one)	☒ Sampling & Analysis	☐ Process Knowledge	☐ Contents	
Prohibited Waste at all three NTS landfills:	Radioactive waste; RCRA waste; Hazardous waste; Free liquids, PCBs above TSCA regulatory levels, and Medical wastes (needles, sharps, bloody clothing).			
Additional Prohibited Waste at the Area 9 U10C Landfill:	Sewage Sludge, Animal carcasses, Wet garbage (food waste); and Friable asbestos			

REQUIRED: WASTE CONTENTS ALLOWABLE WASTES

Check all allowable wastes that are contained within this load:

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

Acceptable waste at any NTS landfill:

☐ Paper ☐ Rocks / unaltered geologic materials ☒ Empty containers

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

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

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

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

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

Additional waste accepted at the Area 9 U10c Landfill:

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

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

☐ Hydrocarbons (contact SWO) ☐ Other _____

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

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

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

REQUIRED: WASTE GENERATOR SIGNATURE

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

The above mentioned waste was generated outside of a Controlled Waste 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, prohibited and allowable waste items. I have contacted Property Management and is approved for disposal in the landfill.

Print Name: Mike Floyd

Signature: _____ Date: 7/26/07

Note: "Food waste, office trash and animal carcasses do not require a radiological survey but 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: _____ DATE: 7/26/07

BN-0646 (09/99)

SWO USE ONLY

Load Weight (net from scale or estimate): 16,000 Signature of Certifier: _____ 7-26-07

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 224 / CAS 05-04-01 Area 6 Sec Hill

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 95 7-26-07	☐ 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

☐ Paper ☐ Rocks / unaltered geologic materials

☐ 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 materials that are allowed for disposal at this site. I have verified this through the waste characterization method identified ab prohibited and allowable waste items. I have contacted Property Management a is approved for disposal in the landfill.

Print Name: Mike Floyd

Signature: _____ Date: 7/26/07

Note: "Food waste, office trash and animal carcasses do not require a radiologica 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. _____ DATE 7/26/07

BN-0646 (09/99)

SWO USE ONLY

Load Weight (net from scale or estimate): 40,100 7-26-07 Signature of Certifier: _____

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 224 / CAS 05-04-01 *No S. side of 200 Hill Bleachers, CJS*

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 *CJS 7/26/07*	☐ 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 ☐ Paper ☐ Rubber (excluding tires) ☐ Rocks / unaltered geologic materials ☐ Insulation (non-Asbestosform) ☒ Empty containers ☐ Demolition debris ☐ Plastic ☐ Wire ☐ Cable ☐ Cloth ☐ 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 materi site. I have verified this through the waste characterization method identified above prohibited and allowable waste items. I have contacted Property Management and h is approved for disposal in the landfill.

Print Name: Mike Floyd

Signature: _____ Date: 7/25/07

Note: "Food waste, office trash and animal carcasses do not require a radiological cle 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: _____ DATE: 7-25-07

BN-0646 (09/99)

SWO USE ONLY

Load Weight (net from scale or estimate): 4000 7-26-07 Signature of Certifier: _____

NSTec Form FRM-0918

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NTS LANDFILL LOAD VERIFICATION

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

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

REQUIRED: WASTE GERERATOR INFORMATION

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

Waste Generator: Mike Floyd Phone Number: 5-6653

Location / Origin: CAU 224 / CAS 05-04-01 no. side of 200 Hill Bleachers, CJS

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 CJS 7-26-07	☐ Routine	
Method of Characterization: (check one)		☒ Sampling & Analysis	☐ Process Knowledge	☐ Contents

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

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

REQUIRED: WASTE CONTENTS ALLOWABLE WASTES

Check all allowable wastes that are contained within this load:

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

Acceptable waste at any NTS landfill:

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

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

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

Additional waste accepted at the Area 9 U10c Landfill:

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

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

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

REQUIRED: WASTE GENERATOR SIGNATURE

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

The above mentioned waste was generated outside of a Controlled Waste 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 ... site. I have verified this through the waste characterization method identified above ... prohibited and allowable waste items. I have contacted Property Management and ha... is approved for disposal in the landfill.

Print Name: Mike Floyd

Signature: _____ Date: 7/25/07

Note: "Food waste, office trash and animal carcasses do not require a radiological clea... 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 _____ DATE: 7-26-07

BN-0646 (09/9...

SWO USE ONLY

Load Weight (net from scale or estimate): 16,000 7-26-07 Signature of Certifier: _____

UNIFORM HAZARDOUS WASTE MANIFEST

4. Manifest Tracking Number: 000356030 FLE

Form Approved. OMB No. 2050-0039

Emergency Response Phone: (702) 295-0311

Generator's Name and Mailing Address:
NSTEC FOR USDOE
P.O. BOX 98521, M/S NTS110
LAS VEGAS NV 89193

Generator's Site Address (if different than mailing address):
NSTEC FOR USDOE
NEVADA TEST SITE HWY 95
MERCURY NV 89023

Transporter 1 Company Name: ... ENVIRONMENTAL SERVICES

15 ... 0020

Special Handling Instructions and Additional Information: ... PROFILE #14.4248 ... 7/3/07
SHIPMENT ORIGIN: NSTEC FOR USDOE, NEVADA TEST SITE ... MERCURY, NV
24 HOUR EMERGENCY CONTACT (702) 295-0311 (CALL COLLECT).
... WHEN HANDLING CONTAINER.

GENERATOR'S/OFFEROR'S CERTIFICATION.

ON BEHALF OF USDOE

7 5 07

Transporter 1 Printed/Typed Name: CHES JETER

07 05 07

Designated Facility to Generator

RECEIVED AUG 06 2007

RECEIVED AUG 06 2007

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

DESIGNATED FACILITY TO GENERATOR

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	000956053 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)295-7365

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: MP ENVIRONMENTAL SERVICES, INC. — U.S. EPA ID Number: CAT000624247

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

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. NA3077, Hazardous waste solid, n.o.s.(Lead, Trichloroethylene),9, PG-III, ID#07M031	1	BA	6000	P	D008	D007	F001
						F002		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
ERG GUIDE 171 APPLIES
SHIPMENT NUMBER #9316-03-0013
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: STEFAN DUKE — Signature — Month/Day/Year: 09/20/07

INTL

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

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: CHES JETER — Signature — Month/Day/Year: 09/27/07

Transporter 2 Printed/Typed Name: TODD JETER — Signature — Month/Day/Year: 09/27/07

18. Discrepancy

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

Manifest Reference Number:

DESIGNATED FACILITY

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

Facility's Phone:

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

RECEIVED
Month Day Year
OCT 11 2007

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

1.	2.	3.	4.
H129			

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

Printed/Typed Name: Justin Lee — Signature — Month/Day/Year: 9/28/07

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

DESIGNATED FACILITY TO GENERATOR

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	000956080 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)295-7565

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: MP ENVIRONMENTAL SERVICES, INC. — U.S. EPA ID Number: CAT000624247

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

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		
RQ	1. UN2912, WASTE RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I),7, SOLID, OXIDE, FISSILE EXCEPTED,Am-241,Cs-137, Pu-239, Pu-241, Sr-90, 1.18E+02 MBq, (D008) ID#07M029	1	BA	13000	P	D008	D007	F001
						F002		
RQ	2. UN2912, WASTE RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I),7, SOLID, OXIDE, FISSILE EXCEPTED,Am-241,Cs-137, Pu-239, Pu-241, Sr-90, 7.22E+01 MBq, (D008) ID#07M030	1	BA	8000	P	D008	D007	F001
						F002		
RQ	3. UN2912, WASTE RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I),7, SOLID, OXIDE, FISSILE EXCEPTED,Am-241, Cs-137,Pu-239, Pu-241, Sr-90, 1.67E+02 MBq, (D008) ID#07M033	1	BA	18400	P	D008	D007	F001
						F002		
	4.							

14. Special Handling Instructions and Additional Information

EXCLUSIVE USE SHIPMENT
ERG GUIDE 162 APPLIES
SHIPMENT NUMBER #9316-03-0005
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: STEFAN DUKE — Signature — Month/Day/Year: 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: TODD JETER — Signature — Month/Day/Year: 09/27/07

Transporter 2 Printed/Typed Name: CHES JETER — Signature — Month/Day/Year: 09/27/07

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.
H131	H131	H131	

RECEIVED OCT 11 2007

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: J. Gardner — Signature — Month/Day/Year: 09/28/07

e 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 NV3890090001	2. Page 1 of 1	3. Emergency Response Phone (702)295-0311	4. Manifest Tracking Number 000956082 FLE

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)295-7366

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
MP ENVIRONMENTAL SERVICES, INC.
U.S. EPA ID Number CAT000624247

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

8. Designated Facility Name and Site Address
ENERGYSOLUTIONS, LLC
CLIVE DISPOSAL SITE, US 1-80, EXIT 49
CLIVE UT 84029
Facility's Phone: (435)884-0155
U.S. EPA ID Number UTD982598898

a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
RQ	1. UN2912, WASTE RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I), 7, SOLID, OXIDE, FISSILE EXCEPTED, Am-241, Cs-137, Pu-239, Pu-241, Sr-90, 1.54E+02 MBq, (D008) ID#07M027	1	BA	17000	P	D008	D007	F001
						F002		
RQ	2. UN2912, WASTE RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I), 7, SOLID, OXIDE, FISSILE EXCEPTED, Am-241, Cs-137, Pu-239, Pu-241, Sr-90, 1.58E+02 MBq, (D008) ID#07M028	1	BA	17400	P	D008	D007	F001
						F002		
	3.							
	4.							

14. Special Handling Instructions and Additional Information
EXCLUSIVE USE SHIPMENT
49 CFR GUIDE 162 APPLIES
SHIPMENT NUMBER #9316-03-0008
UTAH GENERATOR SITE ACCESS PERMIT NO. 0510003453 M10273

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

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

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

Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Gregory Snelson
Signature:
Month Day Year: 09 27 07

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

Discrepancy

17. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

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

Facility's Phone:
Signature of Alternate Facility (or Generator)
Month Day Year

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

1.	2.	3.	4.
H131	H121		

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OCT 11 2007

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

Printed/Typed Name: J. Gardner
Signature:
Month Day Year:

8700-22 (Rev. 3-05) Previous

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	000956084 FLE

GENERATOR

5. Generator's Name and Mailing Address

NSTEC FOR US DOE
P.O. BOX 98521, MS NTS110
LAS VEGAS NV 89193
Generator's Phone: (702)295-7366

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

NSTEC FOR USDOE
NEVADA TEST SITE, HWY 95, MS NTS110
MERCURY NV 89023

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

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		
RQ	1. UN2912, WASTE RADIOACTIVE MATERIAL, LSA-I, 7, SOLID, OXIDE, FISSILE EXCEPTED, Am-241, Cs-137, Pu-239, Pu-241, Sr-90, 1.65E+02 MBq, (D008) ID#07NC32	1	BA	18200	P	D008	D007	F001
						F002		
RQ	2. UN2912, WASTE RADIOACTIVE MATERIAL, LSA-I, 7, SOLID, OXIDE, FISSILE EXCEPTED, Am-241, Cs-137, Pu-239, Pu-241, Cs-137, 9.73E+01 MBq, (D008) ID#07MC36	1	BA	13200	P	D008	D007	F001
						F002		
	3.							
	4.							

14. Special Handling Instructions and Additional Information

EXCLUSIVE USE SHIPMENT
ENG GUIDE USP APPLIES
SHIPMENT NUMBER WSIE-07-0006
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: STEVEN KUNZ — Signature: [signature] — Month: 09 Day: 20 Year: 07

TRANSPORTER

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: CHES JETER — Signature: [signature] — Month: 09 Day: 27 Year: 07

Transporter 2 Printed/Typed Name: TODD JETER — Signature: [signature] — Month: 09 Day: 27 Year: 07

18. Discrepancy

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

Manifest Reference Number:

DESIGNATED FACILITY

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

Facility's Phone:

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

RECEIVED
Month: OCT Day: 11 Year: 2007

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

1.	2.	3.	4.
H129			

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

Printed/Typed Name: Justin Lee — Signature: [signature] — Month: 9 Day: 28 Year: 07

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

DESIGNATED FACILITY TO GENERATOR

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APPENDIX D

FIELD PHOTOGRAPHS

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PHOTOGRAPHIC LOG

PHOTO-GRAPH NUMBER	DATE	CORRECTIVE ACTION SITE	DESCRIPTION
1	08/14/2007	CAS 02-04-01	Septic tank exposed during excavation
2	08/15/2007	CAS 02-04-01	Drain line pipe grouted after excavation
3	08/15/2007	CAS 02-04-01	Septic tank area after backfill and grading
4	07/10/2007	CAS 05-04-01	Fluid pumping and delivery to lagoon
5	07/12/2007	CAS 05-04-01	Septic tanks exposed prior to removal
6	07/25//2007	CAS 05-04-01	Septic tanks during removal
7	07/25/2007	CAS 05-04-01	Pesticide soil area during excavation
8	08/01/2007	CAS 05-04-01	Septic tank area after backfill and grading
9	04/19/2007	Area 6 Decon System	Pad drain trenches prior to corrective action
10	07/19/2007	Area 6 Decon System	Pad drain trenches with grating removed
11	07/20/2007	Area 6 Decon System	Pad drain trenches during sediment removal
12	07/23/2007	Area 6 Decon System	Pad train trenches after sediment removal
13	07/19/2007	Area 6 Decon System	Sump location during excavation
14	08/08/2007	Area 6 Decon System	Sump location after excavation
15	07/20/2007	Area 6 Decon System	Sump trenches after sediment removal
16	08/16/2007	Area 6 Decon System	Sump location after backfill and grading
17	08/06/2007	Area 6 Decon System	Light-post and bulb removed as a BMP
18	07/19/2007	Area 6 Decon System	Pu-impacted soil area during excavation
19	07/20/2007	Area 6 Decon System	Pu-soil during loading for disposal transport
20	08/16/2007	Area 6 Decon System	Pu-impacted soil area B after backfill
21	08/16/2007	Area 6 Decon System	Pu-impacted soil area C after backfill
22	08/16/2007	Area 6 Decon System	Concrete pad location after corrective action
23	08/08/2007	CAS 11-04-01	Tank distribution box exposed
24	08/08/2007	CAS 11-04-01	Tank distribution box removed
25	08/08/2007	CAS 11-04-01	Tank piping grouted in place

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Photograph 1: CAS 02-04-01, Septic tank exposed during excavation (08/14/2007)

Photograph 2: CAS 02-04-01, Drain line pipe grouted after excavation (08/15/2007)

Photograph 3: CAS 02-04-01, Septic tank area after backfill and grading (08/15/2007)

Photograph 4: CAS 05-04-01, Fluid pumping and delivery to lagoon (07/10/2007)

Photograph 5: CAS 05-04-01, Septic tanks exposed prior to removal (07/12/2007)

Photograph 6: CAS 05-04-01, Septic tanks during removal (07/25/2007)

Photograph 7: CAS 05-04-01, Pesticide soil area during excavation (07/25/2007)

Photograph 8: CAS 05-04-01, Septic tank area after backfill and grading (08/01/2007)

Photograph 9: Area 6 Decon System, Pad drain trenches prior to corrective action (04/19/2007)

Photograph 10: Area 6 Decon System, Pad drain trenches with grating removed (07/19/2007)

Photograph 11: Area 6 Decon System, Pad drain trenches during sediment removal (07/20/2007)

Photograph 12: Area 6 Decon System, Pad drain trenches after sediment removal (07/23/2007)

Photograph 13: Area 6 Decon System, Sump location during excavation (07/19/2007)

Photograph 14: Area 6 Decon System, Sump location after excavation (08/08/2007)

Photograph 15: Area 6 Decon System, Sump trenches after sediment removal (07/20/2007)

Photograph 16: Area 6 Decon System, Sump location after backfill and grading (08/16/2007)

Photograph 17: Area 6 Decon System, Light-post and bulb removed as a BMP (08/06/2007)

Photograph 18: Area 6 Decon System, Pu-impacted soil area during excavation (07/19/2007)

Photograph 19: Area 6 Decon System, Pu-soil during loading for disposal transport (07/20/2007)

Photograph 20: Area 6 Decon System, Pu-impacted soil area B after backfill (08/16/2007)

Photograph 21: Area 6 Decon System, Pu-impacted soil area C after backfill (08/16/2007)

Photograph 22: Area 6 Decon System, Concrete pad location after corrective action (08/16/2007)

Photograph 23: CAS 11-04-01, Tank distribution box exposed (08/08/2007)

Photograph 24: CAS 11-04-01, Tank distribution box removed (08/08/2007)

Photograph 25: CAS 11-04-01, Tank piping grouted in place (08/08/2007)

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APPENDIX E

NATIONAL ENVIRONMENTAL POLICY ACT ENVIRONMENTAL EVALUATION CHECKLIST

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NV-16
(Rev. 11/2003)

Other Editions Obsolete

NV-2007-044

U.S. DEPARTMENT OF ENERGY
NATIONAL NUCLEAR SECURITY ADMINISTRATION NEVADA SITE OFFICE
NEPA ENVIRONMENTAL EVALUATION CHECKLIST

FOLLOW ATTACHED PROCEDURES FOR COMPLETING CHECKLIST

A. Project/Activity Title (Attach a brief description of proposed project)
CAU 224: Decon Pad and Septic Systems

Date
02/26/2007

Anticipated Start Date
03/29/2007

Project Location
NTS

Proposed By (if other than NNSA/NSO)

NNSA/NSO Line Management Organization

NNSA/NSO Project/Program Manager
Kevin Cabble

ENVIRONMENTAL CONSIDERATIONS: If any phase of the project/activity involves any of the following considerations, check yes and explain in project description. See NV-16A for consideration guidelines and examples.

CONSIDERATION	YES	NO	UNK	CONSIDERATION	YES	NO	UNK
WASTE				**AIR EMISSIONS**			
1 Non-Rad Solid Waste	X			1 Biological Material/Chemical Release		X	
2 Hazardous Waste	X			2 Dust/Particulate Matter	X		
3 Low-level Rad Waste	X			3 Explosives		X	
4 Mixed Waste		X		4 Diesel Generators		X	
5 TRU/Mixed TRU Waste		X		5 Open Burning		X	
6 Wastewater (domestic/industrial)		X					
				SITE LOCATION/OTHER			
HAZARDOUS MATERIALS				1 Environmental Restoration Site (CAU)	X		
1 Petroleum/Fuel (storage/use)	X			2 Excavation/Land Surface Disturbance	X		
2 Underground Storage Tanks		X		3 Off road travel	X		
3 Aboveground Storage Tanks		X		4 Biological/Tortoise Resource Area	X		
4 PCBs/Asbestos		X		5 Cultural/Historic Resource Area		X	
5 Pesticides/Herbicides	X			6 Change in Existing Drainage Pattern		X	
6 Radioactive Materials	X			7 Impact to Environmental Monitoring System		X	
7 Biological Materials/Simulants		X		8 Unexploded Ordnance Area	X		
8 Beryllium	X			9 Noise	X		
9 Chemical storage/use		X		10 Radiation controlled area		X	
10 Use of explosives/firearms		X		11 Drinking water system involvement		X	

DO NOT TYPE OR WRITE BELOW THIS LINE. FOR ESHD USE ONLY.

B. Is the project/activity included in the final NTS EIS and the ROD or other NEPA document?
Yes __X__ (complete Sections C, D, and E) No ____ (complete Sections D, E, and F)

C. This project/activity is included in the NTS EIS/ROD (or other NEPA document) under the following section and page no.:
NTS EIS, Expanded Use Alternative, Environmental Restoration Program

D. Does the proposed project/activity require any local, state, or federal permits or notifications? Yes ___ No __X__

E. If, based on the project description and the preliminary environmental considerations noted above, the proposed action fits within a class of action listed in Subpart D of 10 CFR 1021, write in the space below, the paragraph number and short title from the appropriate table of contents of Subpart D, Appendix B, C, or D, for a CX, EA, or EIS. If the proposed action does not fit within any class of action, write "Not Listed" below.

F. **NEPA COMPLIANCE OFFICER DETERMINATION OR RECOMMENDATION:**
I have determined that the impacts of the proposed action, described in item A, are adequately addressed in the NTS EIS. No further analysis or documentation is required pursuant to NEPA. If changes are made in the proposed action, additional NEPA review may be required.

Michael R. Anderson
NNSA/NSO NEPA Compliance Officer

27 February 2007
Date

CAU 224: DECON PAD AND SEPTIC SYSTEMS, NEVADA TEST SITE

Project Description

Corrective Action Unit (CAU) 224, Decon Pad and Septic Systems, is located approximately 65 miles northwest of Las Vegas, Nevada at the Nevada Test Site (NTS). CAU 224 includes nine Corrective Action Sites (CASs) located along the eastern portion of the NTS in Areas 02, 03, 05, 06, 11, and 23:

- 02-04-01, Septic Tank (Buried)
- 03-05-01, Leachfield
- 05-04-01, Septic Tanks (4)/Discharge Area
- 06-03-01, Sewage Lagoons (3)
- 06-05-01, Leachfield
- 06-17-04, Decon Pad and Wastewater Catch
- 06-23-01, Decon Pad and Discharge Piping
- 11-04-01, Sewage Lagoon
- 23-05-02, Leachfield

The recommended closure alternative for CASs 02-04-01, 03-05-01, 06-03-01, 11-04-01, and 23-05-02 is No Further Action, and the recommended closure alternative for CASs 05-04-01, 06-05-01, 06-17-04, and 06-23-01 is Clean Closure. Remediation activities at CAS 02-04-01 include removing and disposing of a septic tank and distribution box, sealing any open piping left in place, and backfilling any manholes as a best management practice (BMP). CAS 05-04-01 will be clean-closed by removing and disposing of approximately 2 cubic yards (yd^3) of pesticides-contaminated soil, 3,500 gallons of liquid from four septic tanks, and the septic tanks themselves. Piping left in place at CAS 05-04-01 will be sealed, all manholes will be backfilled, and as a BMP, approximately 20 yd^3 of concrete slab supporting the four septic tanks will be removed and disposed of appropriately. CASs 06-05-01, 06-17-04, and 06-23-01, which together comprise a single decontamination system, will be clean closed by removing and disposing of a concrete sump (approx. 4 yd^3), approx. 5 yd^3 of sludge contained within the sump, a concrete decontamination pad (approx. 150 yd^3), TPH-contaminated soil (approx. 340 yd^3), plutonium-239 contaminated soil (approx. 45 yd^3), and an area of TPH and Pu-239 contaminated soil (approx. 11 yd^3). As a BMP, the septic tank and distribution box at CAU 11-04-01 will be removed and appropriately disposed, any piping left in place will be sealed, and any manholes will be backfilled to prevent future accumulation of waste.

Environmental Considerations

Waste

1. **Non-Rad Solid Waste:** Non-rad solid waste will be generated at CAU 224 as pipe and concrete debris, some of which being contaminated with TPH-DRO. All TPH-impacted debris will be disposed of at the Area 6 Hydrocarbon Landfill, and all other non-rad solid waste will be disposed of at the Area 9 U-10c Construction Landfill.

2. **Hazardous Waste:** Hazardous waste will be generated in the form of impacted soil contaminated with pesticides above the action level. Hazardous waste will be managed and disposed of appropriately.

3. **Low-Level Rad Waste:** Low-level waste will be generated as impacted soil contaminated with radionuclides above the action level. Low-level waste will be packaged and disposed of appropriately.

Hazardous Materials

1. **Petroleum/Fuel (storage/use):** Heavy equipment utilized on site for the excavation of soil will use petroleum fuel. No fuel will be stored on site outside of the equipment. Absorbent pads will be used if equipment appears to be leaking petroleum.

5. **Pesticides/Herbicides:** Two cubic yards of soil contaminated with a mixture of pesticides above the action level will be excavated and disposed of appropriately.

6. **Radioactive Materials:** Radioactive materials may be encountered in the form of contaminated soil. Any material contaminated above action levels will be removed, packaged, and disposed of as low-level waste. An RWP will be obtained if required by Health Physics.

8. **Beryllium:** All work will be reviewed for Beryllium and Legacy Metals, and work control measures as detailed in the Toxic Metals Work Permit(s) and/or Beryllium Work Permit(s) will be in place to control exposures to potential airborne beryllium or toxic metals. IH will be consulted prior to performing any work regarding legacy metal hazards.

Air Emissions

2. **Dust/Particulate Matter:** Dust will be controlled during soil excavation by the use of water sprays.

Site Location/Other

1. **Environmental Restoration Site:** CAU 224 is included in the Federal Facility Agreement and Consent Order between the Department of Energy and the state of Nevada.

2. **Excavation/Land Surface Disturbance:** Excavation will be required to remove contaminated soil at CAU 224. All excavations will be backfilled with clean fill from an approved borrow source and contoured to the surrounding topographic contours.

3. **Off road travel:** Off road travel may be necessary, but will be kept to a minimum and at slow speeds.

4. **Tortoise:** Sites associated with CAU 224 are located in desert tortoise habitat.Pre-activity tortoise surveys will be conducted at all sites located in desert tortoise habitat in accordance with the NTS Biological Opinion. If a desert tortoise is encountered in a work area not considered to be a roadway, and it is determined that the tortoise is not in immediate harm's way, the tortoise is to be left undisturbed. The sighting must be immediately reported to the NSTec Site Superintendent, NSTec Ecological Services, and the "NTS Biological Opinion Form" must be completed.

8. **UXO:** There exists the potential to come into contact with some type of Unexploded Ordinance (UXO) during remediation activities at CAU 224. If UXO is discovered, mark off the area to identify the location of the item, leave the immediate area to a minimum distance of 1000 ft, notify Field Operations and ER management, notify Operations Coordination Center (OCC), and follow directions from OCC for securing the area.

9. **Noise:** Elevated noise levels may result from the operation of heavy equipment associated with CAU 224 closure activities. Personnel not directly involved with operation of this equipment will be kept back at least 15 feet while equipment is in use. The equipment operator will follow the instructions as directed in the CAU 224 Site Specific Health and Safety Plan.

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