Nevada
Environmental Management
Operations Activity

DOE/NV--1480

National Nuclear Security Administration

Closure Report for Corrective Action Unit 547: Miscellaneous Contaminated Waste Sites, Nevada National Security Site, Nevada

Controlled Copy No.:_____

Revision: 0

July 2012

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

DISCLAIMER

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CLOSURE REPORT FOR CORRECTIVE ACTION UNIT 547: MISCELLANEOUS CONTAMINATED WASTE SITES, NEVADA NATIONAL SECURITY 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 547:
MISCELLANEOUS CONTAMINATED WASTE SITES,
NEVADA NATIONAL SECURITY SITE, NEVADA

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ACRONYMS AND ABBREVIATIONS

CA	Contamination Area
CADD/CAP	Corrective Action Decision Document/Corrective Action Plan
CAS	Corrective Action Site
CAU	Corrective Action Unit
CR	Closure Report
DOE	U.S. Department of Energy
DQO	data quality objective
FFACO	*Federal Facility Agreement and Consent Order*
ft	foot (feet)
LLW	low-level waste
m^3	cubic meter(s)
HW	hazardous waste
NDEP	Nevada Division of Environmental Protection
NNSA/NSO	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office
NNSS	Nevada National Security Site
NSTec	National Security Technologies, LLC
RMA	Radioactive Material Area
RWMS	Radioactive Waste Management Site
UR	use restriction
URMA	Underground Radioactive Material Area
WMA	waste management area

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EXECUTIVE SUMMARY

This Closure Report (CR) presents information supporting closure of Corrective Action Unit (CAU) 547, Miscellaneous Contaminated Waste Sites, and provides documentation supporting the completed corrective actions and confirmation that closure objectives for CAU 547 were met. This CR complies with the requirements of the *Federal Facility Agreement and Consent Order* (FFACO) that was agreed to by the State of Nevada; the U.S. Department of Energy (DOE), Environmental Management; the U.S. Department of Defense; and DOE, Legacy Management (FFACO, 1996 as amended). CAU 547 consists of the following three Corrective Action Sites (CASs), located in Areas 2, 3, and 9 of the Nevada National Security Site:

- CAS 02-37-02, Gas Sampling Assembly
- CAS 03-99-19, Gas Sampling Assembly
- CAS 09-99-06, Gas Sampling Assembly

Closure activities began in August 2011 and were completed in June 2012. Activities were conducted according to the Corrective Action Decision Document/Corrective Action Plan (CADD/CAP) for CAU 547 (U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office [NNSA/NSO], 2011). The recommended corrective action for the three CASs in CAU 547 was closure in place with administrative controls. The following closure activities were performed:

- Open holes were filled with concrete.
- Steel casings were placed over vertical expansion joints and filled with cement.
- Engineered soil covers were constructed over piping and exposed sections of the gas sampling system components.
- Fencing, monuments, Jersey barriers, radiological postings, and use restriction (UR) warning signs were installed around the perimeters of the sites.
- Housekeeping debris was picked up from around the sites and disposed.
- Radiological surveys were performed to confirm final radiological postings.

UR documentation is included in Appendix D. The post-closure plan was presented in detail in the CADD/CAP for CAU 547 and is included as Appendix F of this report. The requirements are summarized in Section 5.2 of this report. The proposed post-closure requirements consist of visual inspections to determine the condition of postings and radiological surveys to verify contamination has not migrated.

NNSA/NSO requests the following:

- A Notice of Completion from the Nevada Division of Environmental Protection to NNSA/NSO for closure of CAU 547
- The transfer of CAU 547 from Appendix III to Appendix IV, Closed Corrective Action Units, of the FFACO

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1.0 INTRODUCTION

This Closure Report (CR) documents closure activities for Corrective Action Unit (CAU) 547, Miscellaneous Contaminated Waste Sites, according to the *Federal Facility Agreement and Consent Order* (FFACO) that was agreed to by the State of Nevada; the U.S. Department of Energy (DOE), Environmental Management; the U.S. Department of Defense; and DOE, Legacy Management (FFACO, 1996 as amended). CAU 547 consists of the following three Corrective Action Sites (CASs), located in Areas 2, 3, and 9 of the Nevada National Security Site (NNSS) (Figure 1):

- CAS 02-37-02, Gas Sampling Assembly (associated with the MULLET safety experiment in emplacement hole U2ag)
- CAS 03-99-19, Gas Sampling Assembly (associated with the TEJON safety experiment in emplacement hole U3cg)
- CAS 09-99-06, Gas Sampling Assembly (associated with the PLAYER safety experiment in emplacement hole U9cc)

The gas sampling assembly at each CAS consists of the piping, valves, equipment, and associated instrumentation.

1.1 PURPOSE

This CR provides justification for closure of CAU 547 without further corrective action based on implementation of corrective actions in accordance with the Corrective Action Decision Document/Corrective Action Plan (CADD/CAP) for CAU 547 (U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office [NNSA/NSO], 2011). The CADD/CAP evaluates potential corrective actions, provides rationale for the selection of the recommended corrective action, presents the scope of work, and details the post-closure plan. This CR provides a summary of completed closure activities, documentation supporting the completed corrective actions, and confirmation that the closure objectives were met.

1.2 SCOPE

The three CASs in CAU 547 were closed in place with administrative controls, and the scope of closure included the following activities:

- Filling open holes with concrete.
- Placing steel casings over vertical expansion joints and filling them with cement.
- Constructing engineered soil covers over piping and exposed sections of the gas sampling system components.
- Installing fence, monuments, Jersey barriers, radiological postings, and use restriction (UR) warning signs around the perimeters of the sites.
- Picking up and disposing of housekeeping debris from around the sites.
- Performing radiological surveys to confirm final radiological postings.

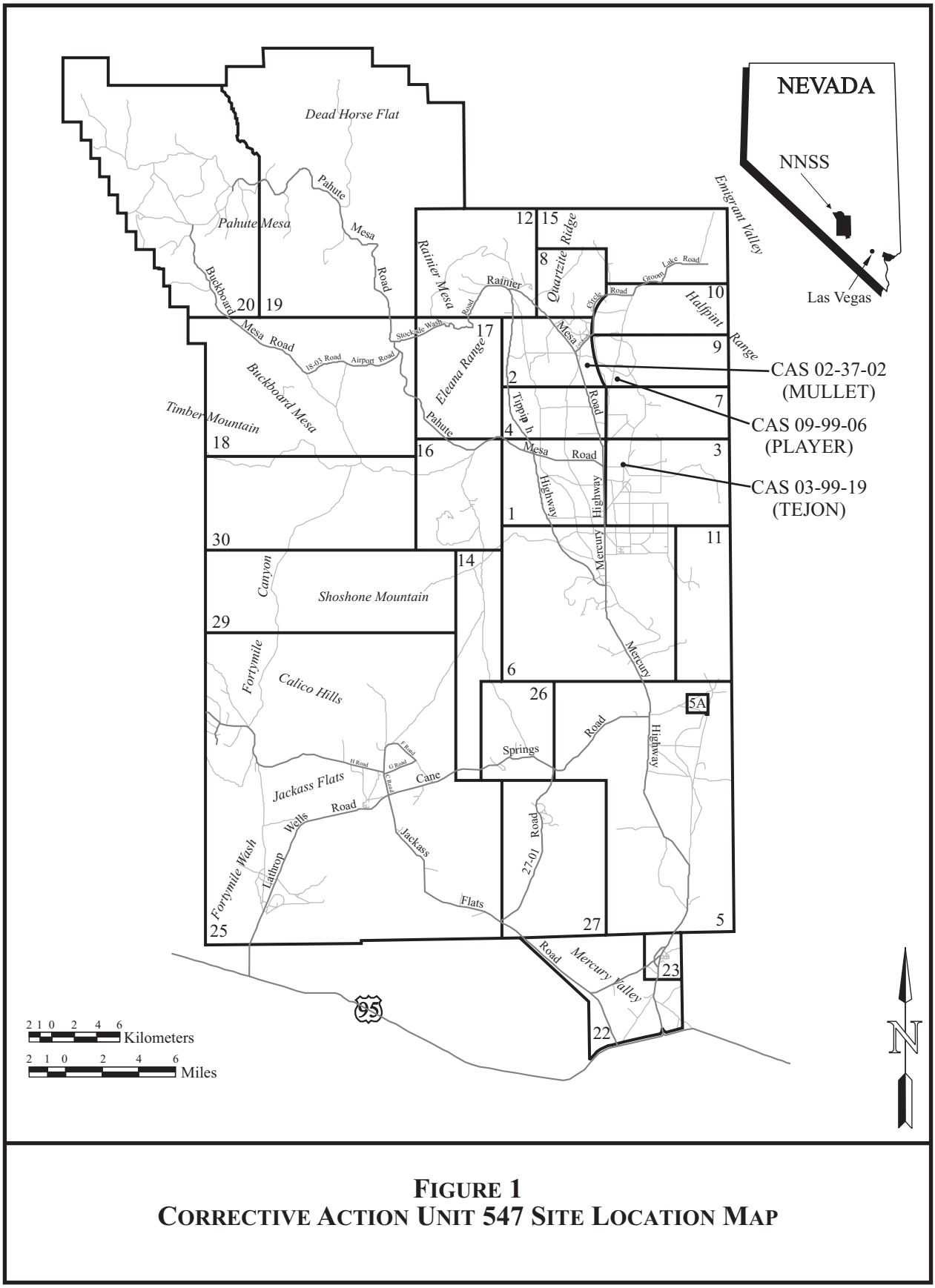

FIGURE 1
CORRECTIVE ACTION UNIT 547 SITE LOCATION MAP

1.3 CLOSURE REPORT CONTENTS

This CR includes the following sections:

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

1.3.1 Applicable Programmatic Plans and Documents

Closure activities were performed in accordance with the following documents:

- CADD/CAP for CAU 547 (NNSA/NSO, 2011)
- FFACO (1996, as amended March 2010)
- *Nevada Test Site Radiological Control Manual* (National Security Technologies, LLC [NSTec], 2010)

1.3.2 Data Quality Objectives

Data quality objectives (DQOs) were developed for CAU 547 in the CADD/CAP (NNSA/NSO, 2011) and are included as Appendix A of this report. Based on historical knowledge of the three safety experiments and existing radiological survey data, there is sufficient data to resolve the problem statement defined in the DQOs without additional investigation. The gas sampling assemblies at CAS 02-37-02 (MULLET), CAS 03-99-19 (TEJON), and CAS 09-99-06 (PLAYER) are known to be internally contaminated with plutonium, and a future release of contamination is possible; therefore, a corrective action was recommended. Based on the evaluation of corrective action alternatives, the preferred corrective action at each CAS is closure in place with administrative controls.

1.3.3 Data Quality Assessment

The data quality assessment is presented in Section 4.1. Construction samples were collected according to the approved engineering specifications.

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2.0 CLOSURE ACTIVITIES

This section summarizes the closure activities performed for CAU 547.

2.1 DESCRIPTION OF CORRECTIVE ACTION ACTIVITIES

The three CASs in CAU 547 were closed in place with administrative controls by placing steel casings over vertical expansion joints and constructing engineered soil covers over piping and exposed sections of the gas sampling assembly components according to the engineering drawings and specifications provided in the CADD/CAP (NNSA/NSO, 2011). The following sections describe the closure activities completed for CAU 547.

2.1.1 Corrective Action Site 02-37-02, Gas Sampling Assembly (MULLET)

At CAS 02-37-02, the fence was removed, clean fill was placed in the work area, and a radiological survey was performed. The results of this survey allowed the Contamination Area (CA) to be downposted to a Radioactive Material Area (RMA). The site remained posted as an RMA throughout closure activities. The 15-foot (ft) deep open hole and other voids located under the concrete pad at U2ag (MULLET) were filled with concrete. The pad was then raised and leveled with concrete to accommodate placement of the steel casing.

A steel casing with a lid was fabricated and placed over the vertical expansion joint at U2ag (MULLET). The casing was filled with cement, penetrations were welded closed, and "Entombed Radioactive Material" signs were welded on the casing. A 2-ft soil cover was constructed over the loose pipes and pipe run from U2ag (MULLET) to the end of the pipe assembly at the lip of the U2am (COMMODORE) crater according to the engineering design.

A three-strand wire fence was installed around the site. Concrete barriers were installed around the steel casing to prevent vehicle access. Six upright concrete monuments were placed along the fence in conspicuous locations. UR warning signs were installed along the fence. Based on placement of soil over radiologically contaminated piping and the results of radiological surveys conducted throughout closure activities, the site was downposted to an Underground Radioactive Material Area (URMA). The final radiological posting of the fenced area is an URMA.

Housekeeping debris was picked up around the site and packaged in a 6-cubic meter (m^3) intermodal container. The waste was transported to the Area 5 Radioactive Waste Management Site (RWMS) for disposal as low-level waste (LLW).

2.1.2 Corrective Action Site 03-99-19, Gas Sampling Assembly (TEJON)

At CAS 03-99-19, portions of the fence that delineated the CA near U3cg (TEJON) were removed, clean fill was placed in the work area, and the work area was downposted to an URMA. The existing concrete pad at U3cg (TEJON) was repaired and leveled with concrete. The valve handles on either side of the underground sampling can near U3cg (TEJON) were cut at the ground surface, and the valve stems were grouted. A steel casing was placed over the sample can, filled with soil, and covered with a welded steel lid. A concrete apron was placed around the base of the casing.

Loose piping, a pipe collar, and vertical vent pipe near U3n (BERNALILLO) were removed and packaged as LLW. The exposed portion of the 4-inch pipe that entered the site from the east was also cut at the ground surface and capped. After removal of these items, a radiological survey was performed. The results of this survey allowed the CA near U3n (BERNALILLO) to be downposted to an RMA.

Clean fill was placed and compacted to fill animal burrows along the buried pipe run between U3cg (TEJON) and the end of the existing berm. Animal burrows in the existing berm were also filled. The remaining exposed piping near U3n (BERNALILLO) was covered with a minimum of 2 ft of soil and compacted according to the engineering design.

A three-strand wire fence was installed around the site. Concrete barriers were installed around the soil cover at U3n (BERNALILLO) to prevent vehicle access. Six upright concrete monuments were placed along the fence in conspicuous locations. UR warning signs were installed along the fence. Based on placement of soil over radiologically contaminated piping and the results of radiological surveys conducted throughout closure activities, the final radiological posting of the fenced area is an URMA.

Housekeeping debris was picked up around the site and packaged in a 6-m^3 intermodal container. The waste was transported to the Area 5 RWMS for disposal as LLW. In addition, an asbestos-containing pipe gasket found in the work area was disposed at the Area 5 RWMS as asbestiform LLW, and several circuit boards were sent off site for disposal as hazardous waste (HW).

2.1.3 Corrective Action Site 09-99-06, Gas Sampling Assembly (PLAYER)

At CAS 09-99-06, the fence was removed, and a radiological survey was performed that confirmed the area should remain posted as an RMA throughout closure activities. An access road was constructed into the YORK crater to allow for heavy equipment access. The existing road into the crater was closed when the cover was built over it. A series of access benches were cut into the crater slope to allow access to the pipe during cover construction.

Voids under the concrete pad at U9cc (PLAYER) were filled with concrete. The pad was then raised and leveled with concrete to accommodate placement of the steel casing. The concrete pad at the U9z PS#2 wellhead in the YORK crater was also raised and leveled with concrete to accommodate placement of the steel casing. Additional soil was placed on the existing soil mound at the accelerometer and compacted to level the area for placement of the steel casing.

Three steel casings with lids were fabricated and placed over the U9cc (PLAYER) vertical expansion joint, the accelerometer, and the U9z PS#2 wellhead. The casings were filled with cement, penetrations were welded closed, and “Entombed Radioactive Material” signs were welded on the casings.

Concrete pipe anchors were placed on the YORK crater slope to stabilize the pipe during construction of the cover and prevent future movement of the pipe. A 2-ft soil cover was constructed over the pipe from the U9cc (PLAYER) emplacement hole, down the slope of the YORK crater, and to the U9z PS#2 wellhead according to the engineering design.

A three-strand wire fence was installed around the site. The configuration of the fence will accommodate heavy equipment for future cover repairs. Concrete barriers were installed around the metal casings and two horizontal expansion joints to prevent vehicle access. Six upright concrete monuments were placed along the fence in conspicuous locations. UR warning signs

were installed along the fence. Based on placement of soil over radiologically contaminated piping and the results of radiological surveys conducted throughout closure activities, the site was downposted to an URMA. The final radiological posting of the fenced area is an URMA.

Housekeeping debris, including a partial filter unit, an empty drum, an abandoned military fuel transfer pump trailer, and loose cables and wires, was removed. Approximately 10 m^3 of debris were collected, surveyed, and disposed as sanitary waste at the Area 9 U10c Landfill. Residual oil and gasoline was drained from the fuel transfer pump trailer and recycled.

2.2 DEVIATIONS FROM THE PLAN AS APPROVED

Deviations from the CADD/CAP for CAU 547 (NNSA/NSO, 2011) were not required.

2.3 CORRECTIVE ACTION SCHEDULE AS COMPLETED

Closure activities began in August 2011 and were completed in June 2012. Details of the schedule are provided in Table 1.

TABLE 1. CORRECTIVE ACTION UNIT 547 CLOSURE ACTIVITIES SCHEDULE

CORRECTIVE ACTION SITE	START	END
02-37-02, Gas Sampling Assembly (MULLET)	August 2011	September 2011
03-99-19, Gas Sampling Assembly (TEJON)	October 2011	November 2011
09-99-06, Gas Sampling Assembly (PLAYER)	January 2012	June 2012

2.4 SITE PLAN/SURVEY PLAT

The three CASs in CAU 547 were closed in place with administrative controls (i.e., URs were implemented). Engineered soil covers were constructed, and the completed covers were surveyed. The as-built drawings are included in Appendix B.

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3.0 WASTE DISPOSITION

This section describes the waste generated during closure activities and its final disposition.

3.1 WASTE MANAGEMENT

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

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

3.2 WASTE DISPOSAL

Two intermodal containers of housekeeping debris removed from CAU 547 were transported to the Area 5 RWMS for disposal as LLW. The intermodal from CAS 02-37-02 (MULLET) was disposed on October 25, 2011. The intermodal from CAS 03-99-19 (TEJON) was disposed on December 14, 2011. One drum containing an asbestos-containing gasket from CAS 03-99-19 (TEJON) was disposed at the Area 5 RWMS as asbestiform LLW on March 12, 2012. One drum of circuit boards from CAS 03-99-19 (TEJON) was sent off site on June 7, 2012, to U.S. Ecology in Beatty, Nevada, for disposal as HW. A total of approximately 10 m^3 of housekeeping debris removed from CAS 09-99-06 (PLAYER) was disposed at the Area 9 U10c Landfill on March 22, 2012. Approximately 1 gallon of motor oil and 1 gallon of gasoline that were removed from the abandoned fuel transfer pump trailer at CAS 09-99-06 (PLAYER) were recycled. Waste disposition documentation is included in Appendix C.

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4.0 CLOSURE VERIFICATION RESULTS

Site closure was verified by visual inspection and photographic documentation of final site conditions, and the covers were as-built surveyed to verify the minimum thickness of 2 ft was met. The final cover thickness was verified by comparing final grade elevations to known pre-construction elevations.

At CAS 02-37-02 (MULLET), the final grade elevations of the cover were verified to be at least 2 ft above the pre-construction pipe elevations in the locations were the pipe was initially exposed. In locations where the pipe was initially buried, the final grade elevations of the cover were verified to be at least 2 ft above the original soil grade. The pipe location, pre-construction grade, and finish grade elevation profiles are shown on the as-built drawing for MULLET.

At CAS 03-99-19 (TEJON), field instruments and as-built drawings were used to verify that the existing berm was a minimum of 2 ft thick above the buried pipe. The only portion of the pipe that was exposed was near U3n (BERNALILLO). The final grade elevation of the cover that was constructed near U3n (BERNALILLO) was verified to be at least 2 ft above the pre-construction pipe elevation. The pre-construction and finish grade elevation profiles are shown on the as-built drawing for TEJON.

At CAS 09-99-06 (PLAYER), known pipe elevations of exposed sections were used to interpolate the depth of the buried portions of the pipe. The final grade elevations of the cover were verified to be at least 2 ft above the pre-construction pipe elevations. The top of pipe elevations at the surveyed locations where the pipe was initially exposed and top of fill elevations at those locations are listed in a table on the as-built drawing for PLAYER.

The as-built drawings are included in Appendix B. Photographs are included in Appendix E.

4.1 DATA QUALITY ASSESSMENT

Construction samples, consisting of in situ density tests, were collected according to the approved engineering specifications. Density tests were performed once per 6-inch lift for every 250 linear ft of fill placed. The soil cover was compacted to a minimum of 90 percent relative compaction in accordance with engineering specifications.

4.2 USE RESTRICTION

Engineered soil covers were constructed over piping and exposed sections of the gas sampling assembly components at the three CASs in CAU 547, and UR warning signs were posted to warn against intrusive activity according to the FFACO UR posting guidance (FFACO, 2003). The Use Restriction Information forms and figures showing the boundaries of the UR areas are included in Appendix D. The post-closure plan was presented in detail in the CADD/CAP and is included as Appendix F of this report. The requirements are summarized in Section 5.2 of this report.

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5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The following closure activities were performed at CAU 547 as documented in this CR:

- Open holes were filled with concrete.
- Steel casings were placed over vertical expansion joints and filled with cement.
- Engineered soil covers were constructed over piping and exposed sections of the gas sampling system components.
- Fencing, monuments, Jersey barriers, radiological postings, and UR warning signs were installed around the perimeters of the sites.
- Housekeeping debris was picked up from around the sites and disposed.
- Radiological surveys were performed to confirm the final radiological postings.

5.2 POST-CLOSURE REQUIREMENTS

The post-closure requirements for CAU 547, including inspection and monitoring activities, are summarized in the following sections. The post-closure plan, as presented in the CADD/CAP (NNSA/NSO, 2011), is included in Appendix F of this report.

5.2.1 Inspections

The covers will be periodically inspected for cracks, animal burrows, or other evidence of erosion, to verify that the UR warning signs are in place and readable, and to verify that the UR has been maintained. Quarterly inspections will be conducted at each CAS for the first 2 years after the completion of closure activities. After the initial 2-year period, inspections will be conducted annually.

In addition, inspections will be conducted if precipitation occurs in excess of 1.0 inch in a 24-hour period to verify the continued integrity of the cover and document any ponding or erosion. Precipitation will be measured at the rain gauge nearest to each site. The MEDA 9 meteorology station is currently the closest rain gauge to CAS 02-37-02 (MULLET) and is located approximately 1.2 miles from the site. The M17, or Buster Jangle Y, meteorology station is currently the closest rain gauge to CAS 03-99-19 (TEJON) and is located approximately 1.8 miles from the site. The MEDA 9 meteorology station is currently the closest rain gauge to CAS 09-99-06 (PLAYER) and is located approximately 1.2 miles from the site.

Inspection results will be documented in the annual combined NNSS post-closure letter report. The report will include a discussion of observations and will describe any maintenance activities performed since the last inspection. A copy of the inspection checklist will be provided, and the field notes will be maintained in the project files. The letter report will be submitted to the Nevada Division of Environmental Protection (NDEP).

5.2.2 Monitoring

Radiological surveys completed at each CAS documented radiological conditions and were used to determine the final radiological postings. The final radiological posting at each CAS is an URMA.

Radiological surveys will be conducted during repair and maintenance activities to determine if there has been a potential release of radioactive material from these sites. If survey results indicate that radioactive contamination is present above CA limits, progressive monitoring will be implemented as described in the post-closure plan.

Periodic radiological surveys will also be conducted according to approved Radiological Control Department procedures and technical basis documents. The current frequency of surveys for URMAs is once every 4 years. Contamination migration outside of the posted areas will trigger additional posting of the area(s), notification to NDEP, and further evaluation as described in the progressive monitoring approach in the post-closure plan.

The post-closure plan outlines a progressive monitoring approach based on the extent and source of contamination that may be identified during post-closure activities. This progressive approach presents a range of monitoring responses specific to the circumstances presented. These responses include additional radiological surveys for small areas of contamination, air sampling for larger areas of contamination, and evaluation of design effectiveness and recommended changes in the case of design failure. The plan details the provisions and circumstances for each progressive monitoring step. The post-closure plan is included as Appendix F of this report.

5.2.3 Maintenance and Repair

Any identified maintenance or repair requirements will be reported to NDEP and completed before the next scheduled inspection. Repair work will preserve the original “as-built” cover design. If the cover repair requires the modification of the cover design, NNSA/NSO shall present a formal design modification request to NDEP prior to making the design modification.

Animal burrows greater than 6 inches deep or erosion/subsidence greater than 6 inches deep and 3 ft long will require NDEP notification. These impacted areas will be radiologically surveyed and repaired within 90 days of discovery. Fencing, monuments, Jersey barriers, radiological postings, and UR warning signs will be replaced or repaired as necessary.

5.3 RECOMMENDATIONS

Because closure activities for CAU 547 have been completed following the CADD/CAP for CAU 547 (NNSA/NSO, 2011) as documented in this CR, NNSA/NSO requests the following:

- A Notice of Completion from NDEP to NNSA/NSO for closure of CAU 547
- The transfer of CAU 547 from Appendix III to Appendix IV, Closed Corrective Action Units, of the FFACO

6.0 REFERENCES

Federal Facility Agreement and Consent Order, 1996 (as amended March 2010). Agreed to by the State of Nevada; U.S. Department of Energy, Environmental Management; U.S. Department of Defense; and U.S. Department of Energy, Legacy Management.

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

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

National Security Technologies, LLC, 2010. *Nevada Test Site Radiological Control Manual*, Rev. 1. DOE/NV/25946--801. Las Vegas, NV.

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

NSTec, see National Security Technologies, LLC.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office, 2011. *Corrective Action Decision Document/Corrective Action Plan for Corrective Action Unit 547: Miscellaneous Contaminated Waste Sites, Nevada National Security Site, Nevada*. DOE/NV--1463. Las Vegas, NV.

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APPENDIX A*

DATA QUALITY OBJECTIVES

*As presented and published in the approved *Corrective Action Decision Document/Corrective Action Plan for Corrective Action Unit 547: Miscellaneous Contaminated Waste Sites, Nevada National Security Site, Nevada*, 2011, DOE/NV--1463. Las Vegas, NV.

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B.1.0 Introduction

This appendix details the DQO process for CAU 547. The DQO process is a strategic planning approach based on the scientific method that is designed to ensure that existing data and/or data collected provide sufficient and reliable information to identify, evaluate, and technically defend the recommendation of viable CAAs (e.g., no further action, clean closure, or closure in place). The DQOs were developed in accordance with the *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA, 2006).

Corrective Action Unit 547 comprises the following three CASs:

- CAS 02-37-02, Gas Sampling Assembly – located in Area 2 of the NNSS and associated with the Mullet safety experiment in emplacement hole U2ag.
- CAS 03-99-19, Gas Sampling Assembly – located in Area 3 of the NNSS and associated with the Tejon safety experiment in emplacement hole U3cg.
- CAS 09-99-06, Gas Sampling Assembly – located in Area 9 of the NNSS and associated with the Player safety experiment in emplacement hole U9cc.

The gas sampling assembly at each CAS consists of the piping, valves, equipment, and associated instrumentation.

B.1.1 Summary of DQO Analysis

Based on historical knowledge of the three safety experiments and existing radiological survey data, there is sufficient data to resolve the problem statement defined in the DQOs without additional investigation. The gas sampling assemblies at CASs 02-37-02 (Mullet), 03-99-19 (Tejon), and 09-99-06 (Player) contain PSM (i.e., the pipes are known to be internally contaminated with Pu) that may cause the future release of COCs; therefore, a corrective action is recommended. Based on the evaluation of CAAs presented in Section 3.0, the preferred corrective action at each of the CAU 547 CASs is closure in place with a soil cover and URs.

B.2.0 Step 1 - State the Problem

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

B.2.1 Problem Statement

The problem statement for CAU 547 is: "Is the preferred CAA of closure in place the most protective based on risk and future land use?"

B.2.2 Planning Team Members

The DQO planning team consisted of representatives from NDEP; NNSA/NSO; Navarro-Intera, LLC; and National Security Technologies, LLC. The initial DQO meeting for CAS 09-99-06 (Player) was held on January 9, 2008; the meeting for CAS 02-37-02 (Mullet) and CAS 03-99-19 (Tejon) was held on July 20, 2011. The primary decision-makers are the NDEP and NNSA/NSO representatives.

B.2.3 Conceptual Site Model

The conceptual site model (CSM) is used to organize and communicate information about site characteristics. It reflects the best interpretation of available information at any point in time. The CSM is the primary vehicle for communicating assumptions about release mechanisms, potential migration pathways, or specific constraints. It provides a summary of how and where contaminants are expected to move and the impacts of such movement. It is the basis for assessing how contaminants could reach receptors both in the present and future.

The CSM consists of the following:

- Potential contaminant releases associated with the gas sampling assemblies and debris components, including affected media.
- Release mechanisms (the conditions associated with the release).

- Potential contaminant source characteristics including contaminants suspected to be present and contaminant-specific properties.
- Site characteristics including physical, topographical, and meteorological information.
- Migration pathways and transport mechanisms that describe the potential for migration and where the contamination may be transported.
- The locations of points of exposure where individuals or populations may come in contact with a COC associated with a CAS.
- Routes of exposure where contaminants may enter the receptor.

The CSM was developed for the gas sampling assemblies of CAU 547 using information from the physical setting, potential contaminant sources, release information, historical background information, knowledge from similar sites, modeling, monitoring data, and physical and chemical properties of the potentially affected media and COCs.

Based on available process knowledge and existing data, the assemblies are known to be internally contaminated with radionuclides. Therefore, the gas sampling assemblies contain PSM with the potential to cause the future release of COCs. Although the contamination is currently contained within the piping systems, with the exception of the release to the soil at CAS 02-37-02 (Mullet), the CSM for each CAS assumes the future release of COCs adjacent to and beneath the assembly piping/equipment.

A graphical representation of the CSM for CAS 02-37-02 (Mullet) is presented in Figure B.3-1; for CAS 03-99-19 (Tejon) in Figure B.3-2; and for CAS 09-99-06 (Player) in Figure B.3-3. Site characteristics (e.g., geography, geology, groundwater, surface water), modeling, and monitoring data have been evaluated to support the CSM. The CSMs for all three CASs at CAU 547 demonstrate that migration of contaminants is not occurring and that the preferred CAA of closure in place with a 2-ft soil cover is protective of human health and the environment.

B.2.4 Site Contaminants

The COCs were identified during the planning process through the review of site history, process knowledge, personal interviews, past investigation efforts (where available), and inferred activities associated with the CASs. Based on radiological swipes and ISOCS data, Pu, Am, and other fission

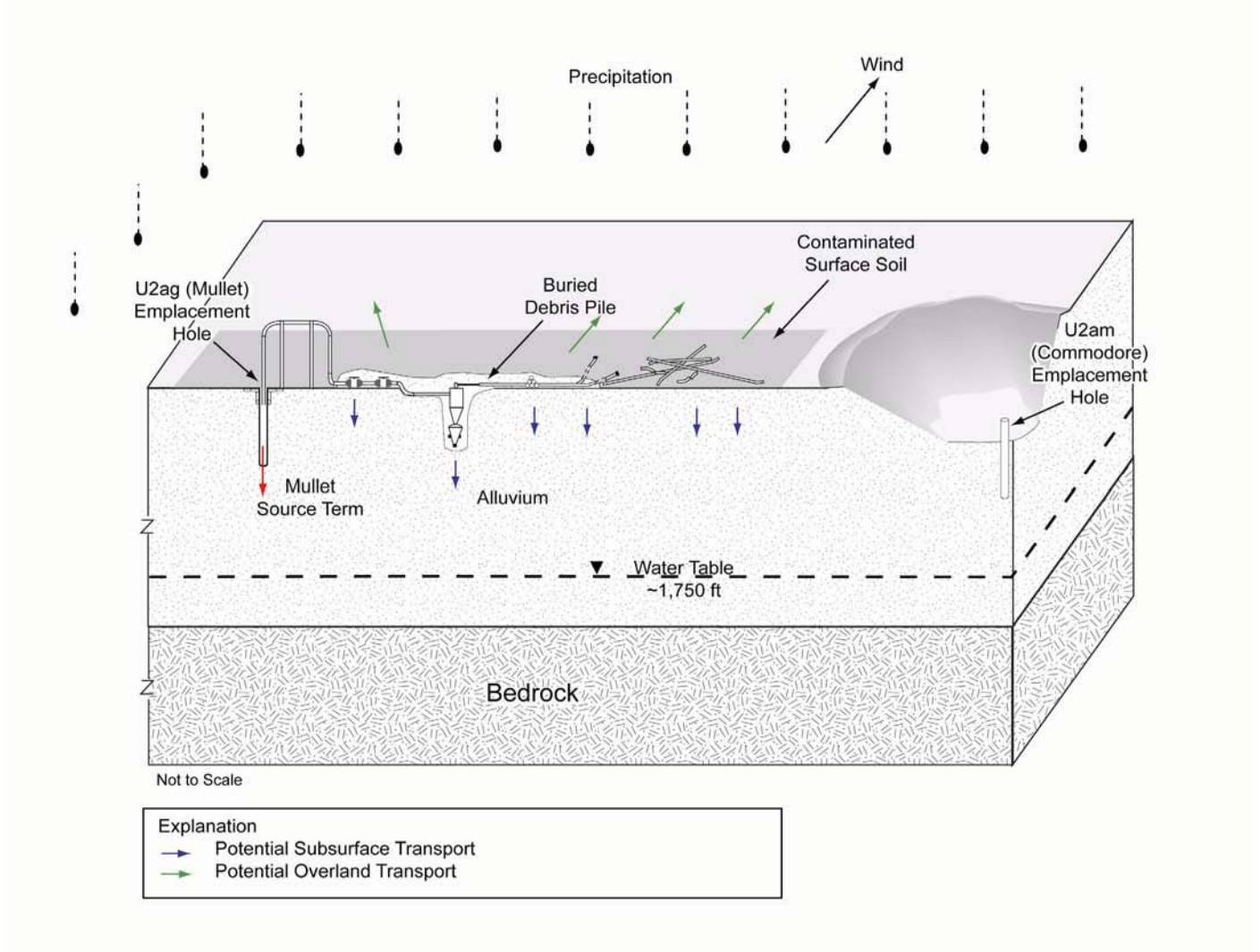

Figure B.3-1
Conceptual Site Model for CAU 547, CAS 02-37-02 (Mullet)

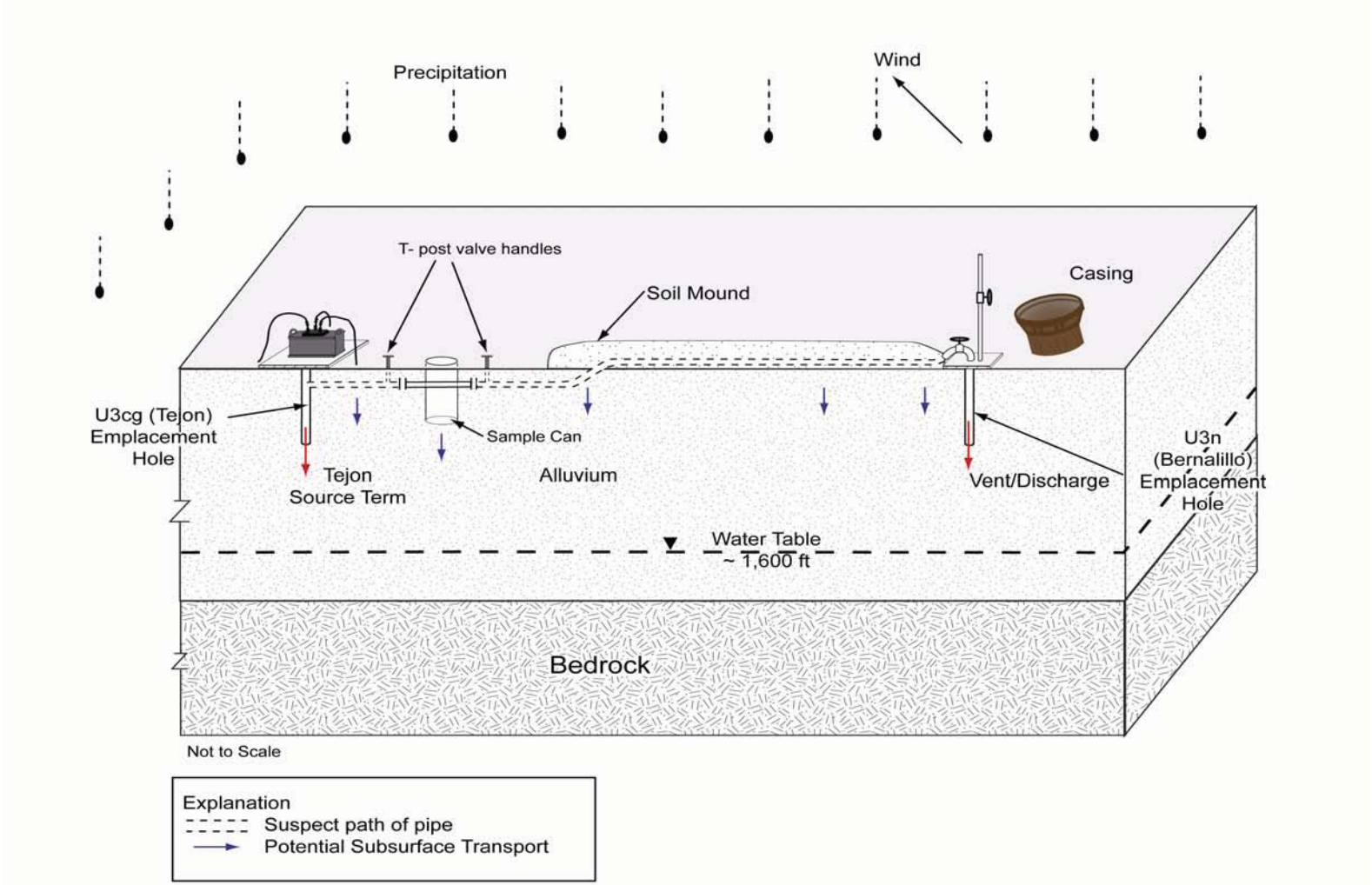

Figure B.3-2
Conceptual Site Model for CAU 547, CAS 03-99-19 (Tejon)

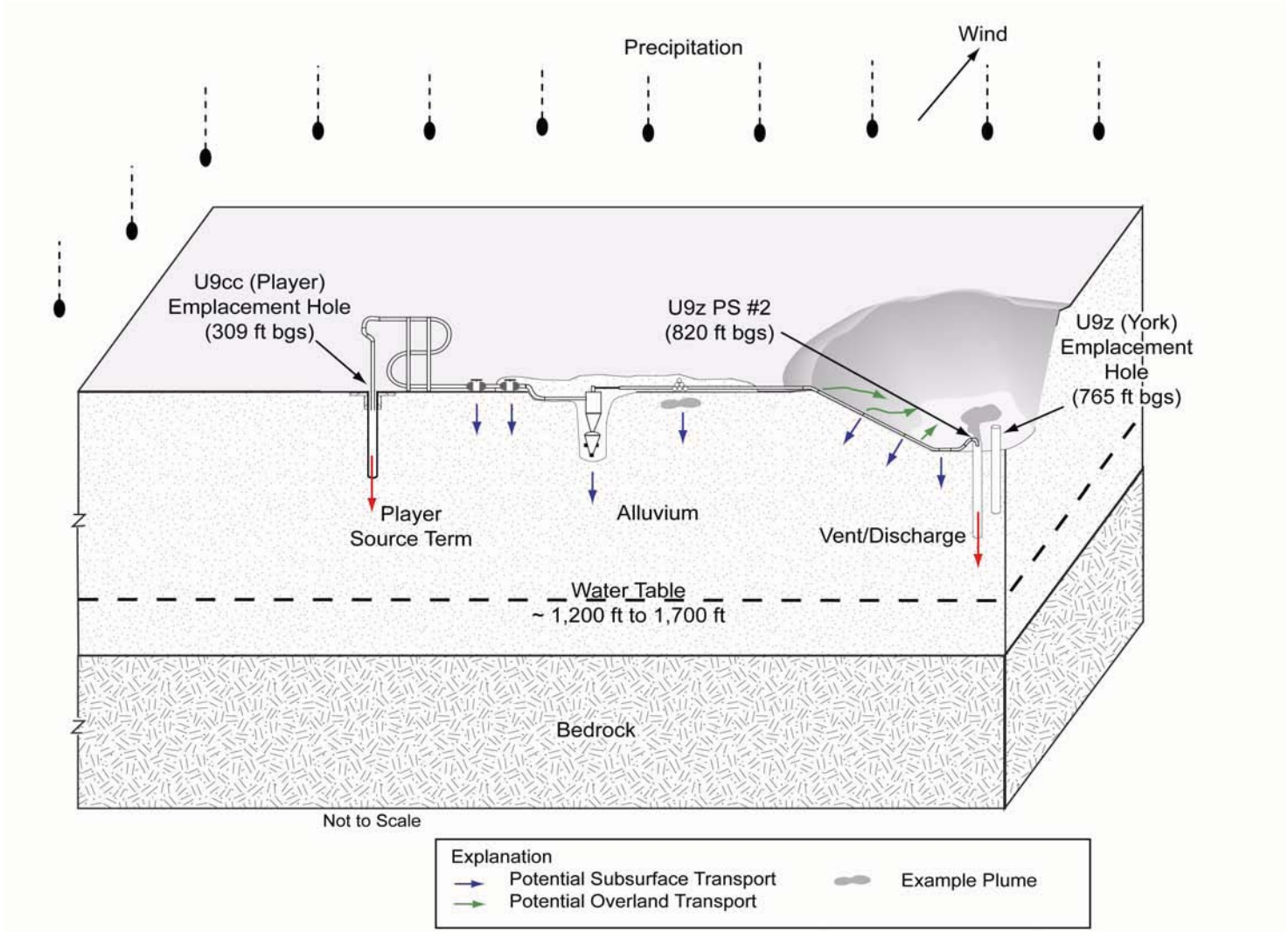

Figure B.3-3
Conceptual Site Model for CAU 547, CAS 09-99-06 (Player)

products inside the gas sampling assemblies at all three CASs are confirmed COCs. Because of the potential for future release, these radionuclides are also considered PSM.

B.2.5 Contaminant Characteristics

Contaminant characteristics include, but are not limited to, solubility, density, and adsorption potential. In general, contaminants with large particle size, low solubility, high affinity for media, and/or high density can be expected to be found relatively close to release points. Contaminants with small particle size, high solubility, low affinity for media, and/or low density are typically found further from release points or in low areas where evaporation of ponding will concentrate dissolved constituents.

The major contaminants (Pu and Am) identified in the gas sampling assemblies strongly adsorb to soil particles and would generally only be translocated as soils are translocated through erosion or with soil colloids as they are moved downward through the soil profile with infiltrating stormwater.

B.2.6 Site Characteristics

Site characteristics are defined by the interaction of physical, topographical, and meteorological attributes and properties. Physical properties include permeability, porosity, hydraulic conductivity, degree of saturation, sorting, chemical composition, and organic content. Topographical and meteorological properties and attributes include slope stability, precipitation frequency and amounts, precipitation runoff pathways, drainage channels and ephemeral streams, and evapotranspiration potential. The site characteristics as they apply to the CASs in CAU 547 are discussed below.

B.2.6.1 CAS 02-37-02 (Mullet)

Corrective Action Site 02-37-02 is located in north-central Yucca Flat, a hydrographically closed basin that is bounded on all sides by low hills and ranges of volcanic and sedimentary rocks (Laczniak et al., 1996). The subsurface geology of Yucca Flat is dominated by volcanic rocks, consisting mainly of ashflow tuffs with interbedded nonwelded and bedded tuffs. The tuffs are overlain by younger alluvial sediment eroded from the surrounding mountains.

Groundwater depth measurements were collected recently at two wells located within 0.5 mi of CAS 02-37-02. The depth to groundwater at these wells was recorded on March 17, 2011, as follows: 1,775 ft bgs (U2gk southwest of site) and 1,725 ft bgs (ER-2-1 southeast of site) (USGS and DOE, 2011).

The average annual precipitation at the closest rain gauge station, Buster Jangle Wye (BJY), is 6.34 in. for the observation period of 1960 to 2010 (ARL/SORD, 2011). This station is located in Yucca Flat approximately 4.8 mi southeast of CAS 02-37-02, near the intersection of Mercury Highway and Rainier Mesa Road.

B.2.6.2 CAS 03-99-19 (Tejon)

Corrective Action Site 03-99-19 lies within the Yucca Flat Hydrographic Area of the NNSS (Laczniak et al., 1996). Uplift and erosion of the surrounding mountains has resulted in the accumulation of more than 1,000 ft of alluvial deposits in some areas of Yucca Flat. Carbonate rocks primarily underlie the alluvium in parts of Yucca Flat and form much of the surrounding mountains in this area. The surrounding soil is typical desert alluvium composed of mostly fine soil and rock particles and includes loose rocks measuring up to 3 in. diameter.

Groundwater occurs in Yucca Flat within alluvial and volcanic aquifers that overlie a carbonate aquifer. This carbonate aquifer underlies large areas of the NNSS and is part of a regional groundwater flow system. Within the overlying alluvial and volcanic aquifers in Yucca Flat, lateral groundwater flow occurs from the margins to the center of the basin. Groundwater flows downward from these aquifers into the carbonate aquifer (Laczniak et al., 1996). The direction of groundwater flow in this region of the carbonate aquifer is generally from the northeast to southwest.

Groundwater depth measurements were collected recently at three wells located within 1 mi of CAS 03-99-19. The depth to groundwater at these wells was recorded on March 17, 2011 as follows: 1,599 ft bgs (Water Well-A south of site), 1,645 ft bgs (Test Well-7 north of site), and 1,619 ft bgs (U3cn#5 northeast of site) (USGS and DOE, 2011).

The average annual precipitation at the closest rain gauge station, BJY, is 6.34 in. for the observation period of 1960 to 2010 (ARL/SORD, 2011). This station is located in Yucca Flat approximately

1.5 mi northwest of CAS 03-99-19, near the intersection of Mercury Highway and Rainier Mesa Road.

B.2.6.3 CAS 09-99-06 (Player)

Corrective Action Site 09-99-06 is located in the southwest region of Area 9 in the Yucca Flat Hydrographic Area, where the estimated recharge is 0.043 in./yr (Rush, 1971). The CAS is located within the Aqueduct Mesa drainage basin, approximately 1,400 ft east of the nearest wash, which drains south to the Yucca Flat dry lake bed.

The soil at CAS 09-99-06 is native and consists of silt to cobble-sized alluvium of various lithologies. Soil thickness is estimated to be more than 10 ft in Yucca Flat (Hevesi et al., 2003). The depth of the alluvium is approximately 750 ft (BN, 2006) as measured from the nearest borehole, U9aw, drilled 525 ft east of CAS 09-99-06. The topography from the U9cc SGZ to the edge of the U9z crater is relatively flat, with no nearby drainages. The walls of the U9z crater are steep, and soil erosion into the crater is expected, especially during storm events.

Groundwater depth measurements were collected recently at three wells located within 2 mi of CAS 09-99-06. The depth to groundwater at these wells was recorded on March 17, 2011, as follows: 1,775 ft bgs (U2gk west of site), 1,725 ft bgs (ER-2-1 northwest of site), and 1,240 ft bgs (UE-4t#2 south of site) (USGS and DOE, 2011).

The average annual precipitation at the closest rain gauge station, BJY, is 6.34 in. for the observation period of 1960 to 2010 (ARL/SORD, 2011). This station is located in Yucca Flat approximately 3.8 mi from CAS 09-99-06, near the intersection of Mercury Highway and Rainier Mesa Road.

B.2.7 Migration Pathways and Transport Mechanisms

An important element of the CSM is the expected fate and transport of contaminants (i.e., how contaminants migrate through media and where they can be expected in the environment). Fate and transport of contaminants are presented in the CSM as the migration pathways and transport mechanisms that could potentially move the contaminants laterally and vertically through the various media. The pathways include air, surface water, and groundwater, and are the routes through which contamination could migrate from the site(s) to locations where a receptor might receive an exposure.

Fate and transport are influenced by physical and chemical characteristics of the contaminants and media described in Section B.2.5.

B.2.8 Air Pathway

Releases to the air may result from resuspension of contaminated surface soil particles from strong winds, or evaporation of the volatile components of contaminants potentially released from soil or debris.

At the Mullet site, wind is a potential transport mechanism for the surface contaminated soil in the posted CAs and HCAs. According to historical documents, oil was sprayed on the contaminated soil to limit airborne distribution of contamination after the release, and may currently provide some level of protection against windborne migration. It is not known whether the oil contained PCBs. Contaminated debris was buried at the Mullet site after completion of the test. Some of this debris is exposed (i.e., sticking out of or on top of the soil mounds), which may be the result of wind, soil erosion, or the settling of buried debris over time. Except for whatever protection the oil affords, there is currently no protection against the windborne migration of surface soil contamination or contamination on exposed debris at the Mullet site. In addition, there are several open-ended pipes lying exposed on the ground surface at the Mullet site in which the presence of Pu and Am contamination has been confirmed. The contents of these pipes is potentially subject to migration via the air pathway.

At the Tejon site, wind is not expected to be a transport mechanism for releases from the gas sampling assembly because the majority of the assembly is underground or currently covered by a soil mound.

At the Player site, wind is not expected to be a transport mechanism for releases along the exposed segment of piping within the U9z crater due to the presence of steep crater walls. A release of contaminants to the air is not considered to be a transport mechanism along the piping from the U9cc borehole to the U9z crater edge because this segment is covered by a dirt berm. The only areas potentially subject to windborne migration are the exposed portions of the assembly (i.e., sample bottles, piping at SGZ).

B.2.9 Surface Water Pathway

As Pu and Am are essentially immobile in soil, the migration of these contaminants is limited to the movement of the soil. Therefore, migration pathways include the lateral and vertical migration of potential contaminants with surface soils. Potential receptors could be exposed to contamination at the soil surface through the surface exposure pathway.

At the Mullet site, the earth was disturbed by neighboring underground tests, including the Commodore test (U2am). This resulted in the creation of uneven terrain in the form of hills and troughs that run roughly parallel to the gas sampling assembly near the edge of the U2am crater. Cracks or fissures in the earth created by the neighboring tests present a potential vertical migration pathway for contamination; however, the extent of such migration cannot be predicted because the depths of the cracks are unknown. The ground surface at the Mullet site slopes from the U2ag emplacement borehole toward the U2am crater, presenting a pathway for surface migration of contamination to the crater.

The Tejon site is relatively flat with the existing soil mound near the Bernalillo emplacement hole (U3n), the only surface feature presenting a potential for soil erosion. Based on the engineering drawing (Figure 1-8), the majority of the gas sampling assembly is underground. Therefore, a potential release of contamination from underground piping would not result in a surface exposure but could result in an exposure if the area were excavated.

The Player site is relatively flat from the U9cc emplacement borehole to the edge of the U9z crater. The crater slope presents the potential for soil erosion and lateral surface migration of contamination into the U9z crater. The surface soil within the U9z crater is gradually increasing in depth through windborne deposition and soil erosion, which tends to bury current surface materials (soil containing radiological or chemical contamination) with additional layers of surface soil over time. If contaminated soil from the slope of the crater migrates to the bottom of the crater, with time, it will be buried as the crater bottom slowly fills with additional uncontaminated soil.

B.2.10 Groundwater Pathway

At the CAU 547 CASs, infiltration and percolation of precipitation serve as a driving forces for the downward vertical migration of contaminants through soil. Due to the high evaporative demand (annual potential evapotranspiration at the Area 3 RWMS has been estimated at 62.6 in. [Shott et al., 1997]) and limited precipitation for this region (6.4 in./yr [Winograd and Thordarson, 1975]), percolation of infiltrated precipitation at the NNSS does not provide a significant mechanism for vertical migration of contaminants to groundwater (DOE/NV, 1992). Also, the radiological contaminants are strongly attached to soil particles and would only be subject to vertical migration through the soil profile with soil colloids that may be translocated with infiltrating stormwater. Migration of these colloids would be sufficiently slow to preclude consideration of this pathway to groundwater through the 1,200 to 1,700 ft of overlying material.

There is also the potential for vertical migration at the Mullet and Player sites through surface cracks or fissures created by nearby ground disturbances.

B.2.11 Land-Use and Exposure Scenarios

Human receptors may be exposed to contaminants of potential concern (COPCs) through oral ingestion, inhalation, dermal contact (absorption) of soil or debris due to inadvertent disturbance of these materials, or irradiation by radioactive materials.

The land-use and exposure scenarios for CAU 547 are based on NNSS current and future land use (DOE/NV, 1998). The three CASs are located within the Nuclear Test Zone land-use category. This category is reserved for dynamic experiments, hydrodynamic tests, and underground nuclear weapons and weapons-effects tests. This zone includes compatible defense and nondefense research, development, and testing activities. Based on the identified future land use, an Occasional Use Area exposure scenario is appropriate. The criteria for this exposure scenario is that it is a remote area with no active site improvements and where no regular work is performed. However, there is a possibility that site workers could occupy these locations on an occasional and temporary basis such as a military exercise. A site worker under this scenario is assumed to be exposed to the site for an equivalent of 80 hours per year for 5 years (NNSA/NSO, 2006).

B.2.12 Conclusions

Corrective Action Unit 547 is well suited for isolation and closure in place of the gas sampling assemblies at the following locations:

- CAS 02-37-02 (Mullet)
- CAS 03-99-19 (Tejon)
- CAS 09-99-06 (Player)

The sites are located on an access-controlled government facility, many miles from residential populations. Land use is restricted to industrial or occasional use. The sites have a windy, arid climate.

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

Step 2 of the DQO process indicates how environmental data will be used in meeting objectives and solving the problem, and identifies the questions or decision statement(s) the study will attempt to resolve.

B.3.1 Decision Statements

The Decision I question is: "Do historical information and existing data allow for the development and evaluation of CAAs?" If yes, then develop and evaluate CAAs, and identify the risks and costs associated with each. If no, proceed with Decision II.

The Decision II question is: "If historical information and data are not sufficient to allow for the development and evaluation of CAAs, then an investigation strategy to obtain the necessary information will be developed."

Sufficient information is defined to include the following:

- Identification of sites where safety experiments were conducted and prompt gas sampling assemblies were used for the collection and sampling of post-test gases and particulates.
- Quantity and nature of COCs at each site.
- Extent of contamination at each site.
- Information required to characterize wastes resulting from corrective action implementation for disposal.
- Information required to evaluate the feasibility of potential CAAs.

B.4.0 Step 3 - Identify Information Inputs

Step 3 of the DQO process identifies the information, and determines sources for information needed to address the goals of the study.

B.4.1 Information Needs

To resolve Decision I, information sources, historical information and other pertinent data need to be collected and analyzed. Data collected in association with various studies, preliminary investigations, historical information and modeling have been compiled to support the development of a closure strategy. The information needed to develop and evaluate CAAs is summarized below.

- Closure in place data needs:
  - CSM developed in sufficient detail to allow for all pathways modeling to be completed.
  - Sufficient information to estimate and develop design for soil cover, estimate costs for installation of the cover, worker dose, and dose to the public.
  - Understanding of operational history.
  - Sources of potential contamination and inventories.
- Clean closure data needs:
  - Sufficient information regarding waste volumes and inventory to estimate cost, worker dose, transportation risk, and dose to the public.
  - Identification of disposal capacity sufficient for the projected waste streams that will be generated in the event of a clean closure option.

To resolve Decision II, additional data must be collected and/or additional investigations performed.

B.4.2 Sources of Information

Information to satisfy Decision I and Decision II will be generated by review of historical information, personnel interviews, site process knowledge, photographs, and previous field investigations and analytical results.

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

Step 4 of the DQO process defines the target population of interest and its relevant spatial boundaries, and specifies temporal and other practical constraints associated with data collection.

B.5.1 Target Populations of Interest

The population of interest for which corrective actions will be developed include the following three CAS locations:

- CAS 02-37-02, Gas Sampling Assembly (Mullet)
- CAS 03-99-19, Gas Sampling Assembly (Tejon)
- CAS 09-99-06, Gas Sampling Assembly (Player)

B.5.2 Spatial Boundaries

Spatial boundaries are the maximum lateral and vertical extent of expected contamination at each site based on the CAS-specific CSM. The lateral boundary is 50 ft from any component, and the vertical boundary is 15 ft bgs. Contamination found beyond these boundaries may indicate a flaw in the CSM and may require reevaluation of the CSM before the investigation could continue. Each CAS is considered geographically independent, and intrusive activities are not intended to extend into the boundaries of neighboring CASs.

B.5.3 Practical Constraints

Common practical constraints—such as military activities at the NNSS, the presence of utilities, and unstable or steep terrain—may affect the ability to implement corrective actions at CAU 547.

B.5.4 Time Constraints

The time necessary to evaluate the study data, develop appropriate CAAs, and obtain concurrence from the NDEP on the selection of a CAA must be considered. The time required to prepare the CADD/CAP and develop field implementation documents (e.g., engineering designs, construction specifications) must also be considered.

B.6.0 Step 5 - Develop the Analytic Approach

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

B.6.1 Decision Rules

Decision I:

- If closure in place is the most feasible closure option, then a closure design will be developed ensuring that the corrective action is protective of human health and the environment.

Decision II:

- If clean closure is the most feasible closure option, then a closure plan will be prepared outlining the remediation plans.

B.7.0 Step 6 - Specify Performance or Acceptance Criteria

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

B.7.1 Decision Errors

The bounding CAAs have been identified as clean closure and closure in place. In order to facilitate discussion of decision errors, closure in place will be defined as the baseline condition.

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

- Developing and gaining concurrence of CSMs (based on process knowledge) by stakeholder participants during the DQO process.
- Testing the validity of CSMs based on investigation results.

B.7.1.1 False Negative Decision Error

The false negative decision error would mean deciding that the baseline condition is false when, in fact, it is true. This error means deciding that clean closure is the most advantageous option, when closure in place is actually the best alternative. The possible consequences of this decision error are increased worker dose during removal, packaging, and transportation of waste; increased short-term risk to the public during transportation of waste; and increased cost. This error will be controlled by having a high degree of confidence in the data, such as waste inventory, contamination levels, and the CSM.

B.7.1.2 False Positive Decision Error

The false positive decision error would mean deciding that the baseline condition is true when, in fact, it is false. This error means deciding that closure in place is the most advantageous option, when clean closure is actually the best alternative. The potential consequence is an increased risk to human health and the environment due to leaving the gas sampling assemblies in place. This error will be controlled by having a high degree of confidence in the data such as waste inventory, contamination levels, and the CSM. Additionally, as all sites within CAU 547 are currently controlled for radiological purposes, and there is no proximal public receptor, the impact of this error is minimized.

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

Step 7 of the DQO process selects and documents a design that will yield data that will best achieve performance or acceptance criteria. Historical information, and other pertinent data collected to date will be used to resolve the decisions outlined in the previous sections.

B.8.1 Process Knowledge

Historical operations, drawings, and photographs associated with CAU 547 are well documented through multiple sources.

B.8.2 Radiological Inventory

Information regarding the radiological inventory within the gas sampling assemblies was collected between 2007 and 2011. The ISOCS sampling of the gas sampling assemblies at each CAS has been redundant, and sample locations were biased at locations presumed to contain the highest activities.

B.8.3 Conceptual Site Model

Historical information, modeling data, and other information have been collected to accurately describe the CSM, and to identify the risks and benefits associated with each of the proposed CAAs.

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APPENDIX B

AS-BUILT DOCUMENTATION

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NATIONAL NUCLEAR SECURITY ADMINISTRATION

NEVADA SITE OFFICE LAS VEGAS, NEVADA

CORRECTIVE ACTION UNIT 547
CONTAMINATED WASTE SITES
TEJON, MULLET, AND PLAYER

DRAWING INDEX

DRAWING NUMBER	DRAWING TITLE
TITLE	
00424-G-0001	TITLE SHEET
CIVIL	
00424-C-1002	TEJON SITE GRADING PLAN
00424-C-1003	MULLET SITE GRADING PLAN
00424-C-1004	PLAYER SITE GRADING PLAN
00424-C-1005	PLAYER SITE GRADING PLAN
00424-C-3001	TEJON SITE & MULLET SITE BERM PROFILE
00424-C-3002	PLAYER SITE BERM PROFILE - STA 1+00 TO STA 4+75
00424-C-3003	PLAYER SITE BERM PROFILE - STA 4+75 TO STA 7+00

Reviewed and determined to be UNCLASSIFIED. This review does not constitute clearance for public release.

Derivative Classifier /s/: Signature on File (Name / Organization)

Date 07/11/12

GS

NO.	DATE	REVISIONS	DRAWN	PREPARER	CHECKER	PROJ. ENGR.	APPROVER / USER
1	7/6/12	AS CONSTRUCTED	JMS	JMS	SCG	RC	TMT

NATIONAL NUCLEAR SECURITY ADMINISTRATION
NEVADA SITE OFFICE LAS VEGAS, NEVADA

NEVADA NATIONAL SECURITY SITE — AREA 2,3,9
CORRECTIVE ACTION UNIT 547 CONTAMINATED WASTE SITES
TEJON, MULLET AND PLAYER

TITLE SHEET

DRAWN	PREPARER	CHECKER	PROJECT ENGINEER	APPROVER / USER
S. DOMBOVARY 6/6 DATE	S. DOMBOVARY 6/6 DATE	J. GOODRICH 7/19 DATE	G. NGUYEN 6/6 DATE	T. THIELE 7/21/11 DATE

National Security Technologies LLC
Vision • Service • Partnership
NEVADA OPERATIONS
P.O. BOX 98521 LAS VEGAS, NV 89193-8521

ENGINEERING NO. 00424
ORIGINAL SIGNATURES ON FILE

DRAWING NUMBER / WORK ORDER NUMBER 00424-G-0001

REVISION 1

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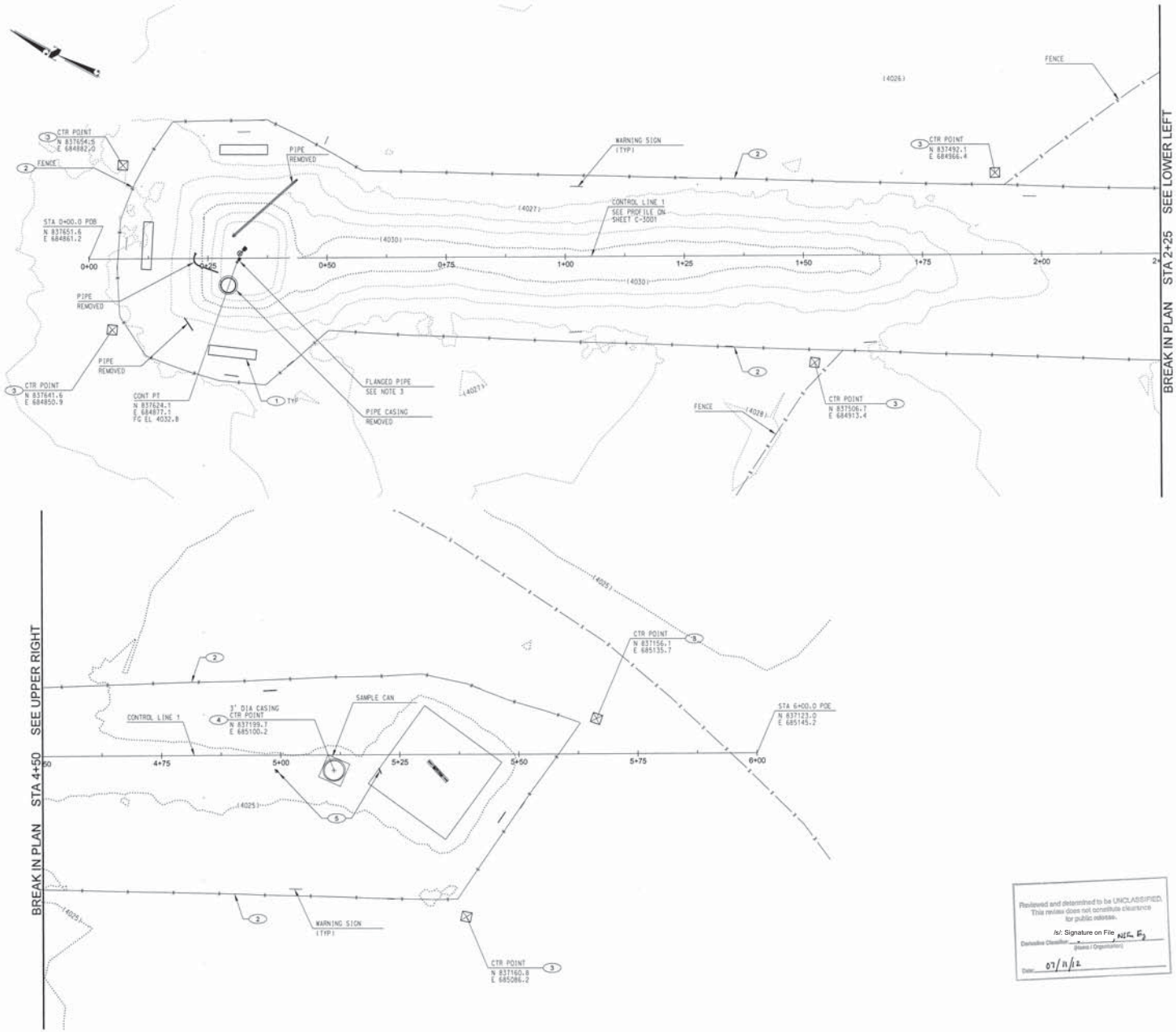

GENERAL NOTES

1. MINIMUM DEPTH OF COVER OVER CONTAMINATED PIPE AND/OR APPURTANENCES IS 2.0 FEET.
2. CONTOURS SHOWN ARE FINAL GRADES.
3. VERTICAL PIPE REMOVED AT FLANGE.

CONSTRUCTION NOTES

1. TYPE F CONCRETE BARRIER PER NEVADA DEPARTMENT OF TRANSPORTATION (NDOT).
2. 3-STRAND PLASTIC COATED WIRE FENCING WITH T-POSTS.
3. BOUNDARY MONUMENT.
4. 3" DIA X 4' HIGH X 1/2" THICK WELDED STEEL PIPE CASING WITH EARTHFILL (NO COMPACTION).
5. EXISTING VALVE HANDLES REMOVED FLUSH W/ GROUND AND FILLED W/ GROUT.

CONTROL POINTS

POINT #	NORTHING	EASTING	ELEVATION
500	837658.854	684842.052	4027.084
501	837413.317	685105.600	4025.353
502	837037.248	685155.299	4024.830

BASIS OF HORIZONTAL CONTROL IS THE NORTH AMERICAN DATUM (NAD) OF 1927. BASIS OF VERTICAL CONTROL IS THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1929. NORTHINGS, EASTINGS, AND ELEVATIONS INDICATED ON THESE DRAWINGS ARE ACCURATE TO WITHIN +/- 0.1 FOOT.

GRAPHIC SCALE
0 5 10 20 30 FEET
1" = 10'

GS

NO	DATE	REVISIONS	DRAWN	PREPARED	CHECKED	PROJ ENGR	APPROVED USER
1	7/12/12	AS CONSTRUCTED	DJS	DJS	SGS	RC	TT

NATIONAL NUCLEAR SECURITY ADMINISTRATION
NEVADA SITE OFFICE — LAS VEGAS, NEVADA

NEVADA NATIONAL SECURITY SITE — AREA 2,3,9
CORRECTIVE ACTION UNIT 547 CONTAMINATED WASTE SITES
TEJON, MULLET AND PLAYER

TEJON SITE GRADING PLAN

DRAWN	PREPARED	CHECKED	PROJECT ENGINEER	APPROVER / USER
S. DOMBOVARY 6/6 [DATE]	S. DOMBOVARY 6/6 [DATE]	J. GOODRICH 7/19 [DATE]	G. NGUYEN 6/6 [DATE]	T. THIELE 7/21/11 [DATE]

National Security Technologies, LLC
Vision • Service • Partnership
NEVADA OPERATIONS
P.O. BOX 98521 LAS VEGAS, NV 89193-8521

ENGINEERING NO: 00424
ORIGINAL SIGNATURES ON FILE
DRAWING NUMBER / WORK ORDER NUMBER: 00424-C-1002
REVISION: 1

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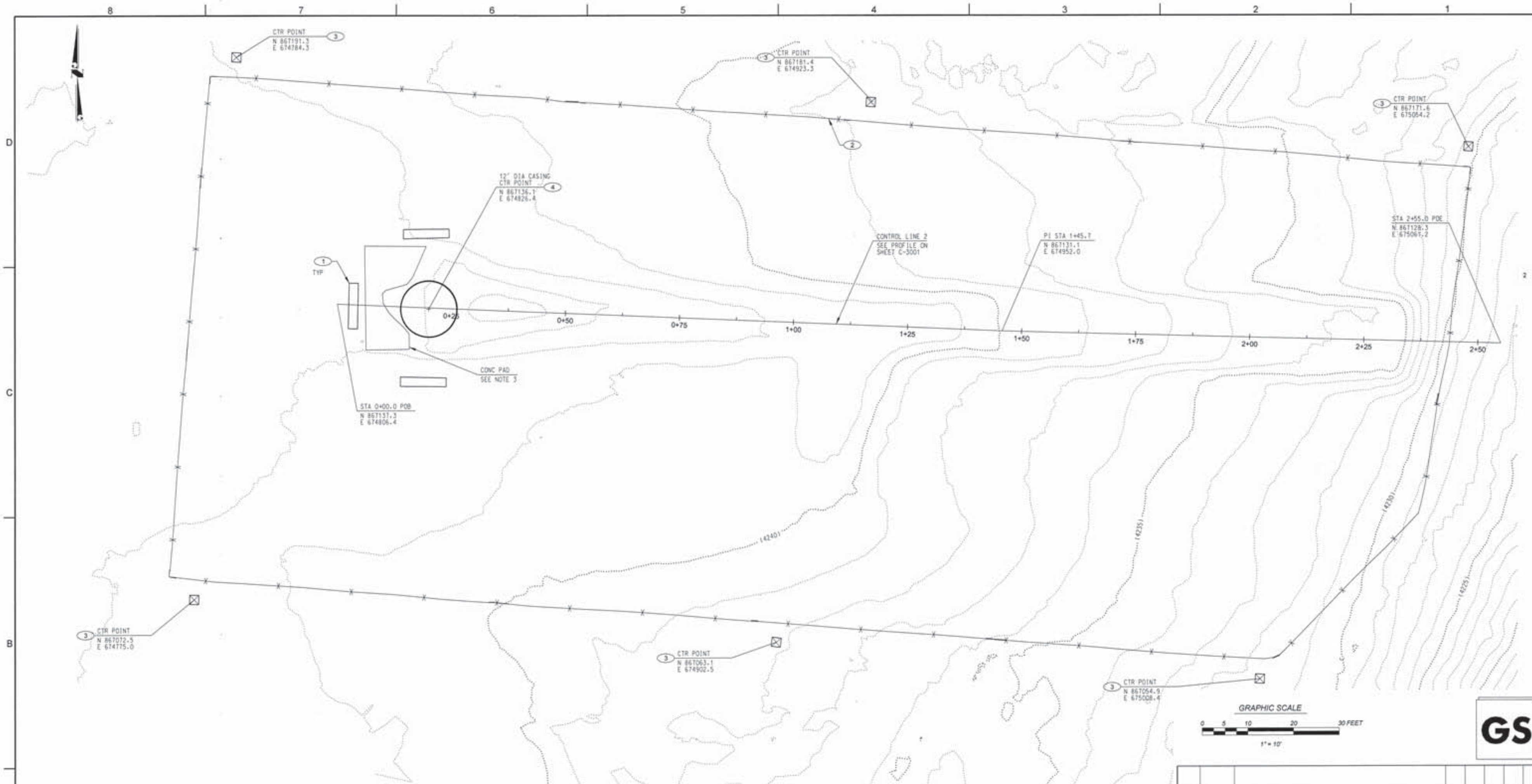

GS

GENERAL NOTES

1. MINIMUM DEPTH OF COVER OVER CONTAMINATED PIPE AND/OR APPURTANENCE IS 2.0 FEET.
2. CONTOURS SHOWN ARE FINAL GRADES.
3. CONC PAD WAS REPAIRED AND EXTENDED PRIOR TO INSTALLATION OF PIPE CASING.

CONSTRUCTION NOTES

(1) TYPE F CONCRETE BARRIER PER NEVADA DEPARTMENT OF TRANSPORTATION (NDOT).

(2) 3-STRAND PLASTIC COATED WIRE FENCING WITH T-POSTS.

(3) BOUNDARY MONUMENT.

(4) 12' DIA X 12' HIGH X 1/2" THK WELDED STEEL PIPE CASING WITH CONCRETE BACKFILL AND 1/2" STEEL COVER WITH 2" OVERHANG WELDED TO CASING.

CONTROL POINTS			
POINT #	NORTHING	EASTING	ELEVATION
504	867052.622	674890.704	4238.368
509	867015.058	674835.794	4240.125
510	867377.279	674802.292	4242.723

BASIS OF HORIZONTAL CONTROL IS THE NORTH AMERICAN DATUM (NAD) OF 1927. BASIS OF VERTICAL CONTROL IS THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1929. NORTHINGS, EASTINGS, AND ELEVATIONS INDICATED ON THESE DRAWINGS ARE ACCURATE TO WITHIN +/- 0.1 FOOT.

Reviewed and determined to be UNCLASSIFIED. This review does not constitute clearance for public release.

Derivative Classifier: /s/: Signature on File, NSTec Cy
(Name / Organization)

Date: 07/11/12

NO.	DATE	REVISIONS	DRAWN	PREPARER	CHECKER	PROJ. ENGR	APPROVER/USER
2	7/12/12	AS CONSTRUCTED	JAS	JAS	SCG	RL	TBT
1	09/01/2011	REVISED STATION & COORDINATE CALLOUTS	SD	SD	JG	GN	TT

NATIONAL NUCLEAR SECURITY ADMINISTRATION
NEVADA SITE OFFICE — LAS VEGAS, NEVADA

NEVADA NATIONAL SECURITY SITE — AREA 2,3,9
CORRECTIVE ACTION UNIT 547 CONTAMINATED WASTE SITES
TEJON, MULLET AND PLAYER

MULLET SITE GRADING PLAN

DRAWN	PREPARER	CHECKER	PROJECT ENGINEER	APPROVER / USER
S. DOMBOVARY 6/6	S. DOMBOVARY 6/6	J. GOODRICH 7/19	G. NGUYEN 6/6	T. THIELE 7/21/11

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P.O. BOX 98521 LAS VEGAS, NV 89193-8521

ENGINEERING NO. 00424
ORIGINAL SIGNATURES ON FILE
DRAWING NUMBER / WORK ORDER NUMBER: 00424-C-1003
REVISION 2

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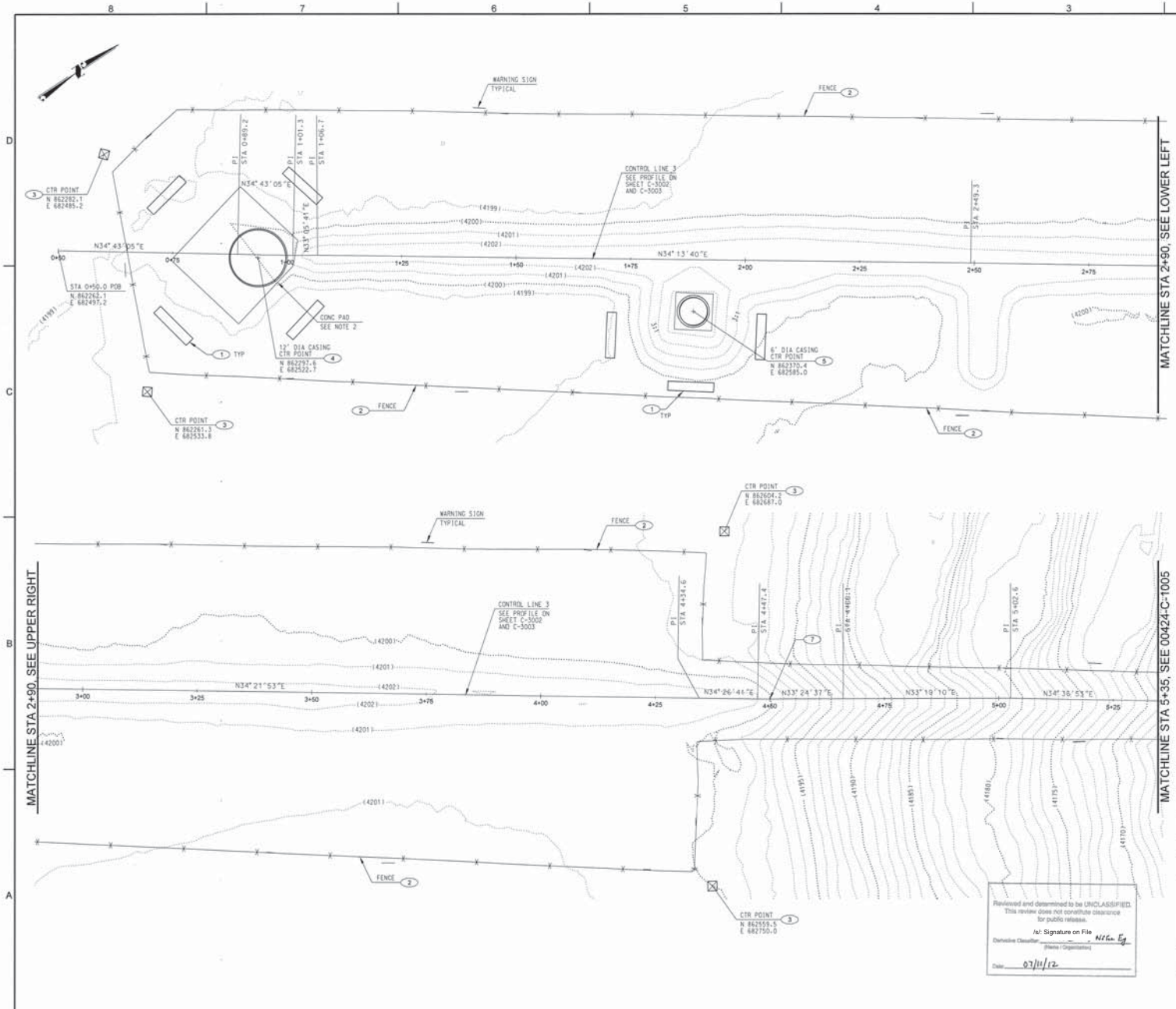

GENERAL NOTES

1. CONTOURS SHOWN ARE FINAL GRADES.
2. CONC PAD REPAIRED AND EXTENDED PRIOR TO INSTALLATION OF PIPE CASING.

CONSTRUCTION NOTES

1. TYPE F CONCRETE BARRIER PER NEVADA DEPARTMENT OF TRANSPORTATION (NDOT).
2. 3-STRAND PLASTIC COATED WIRE FENCING WITH T-POSTS
3. BOUNDARY MONUMENT.
4. 12" DIA X 12' HIGH X 1/2" THK WELDED STEEL PIPE CASING WITH CONCRETE BACKFILL. 1/2" STEEL COVER WITH 2" OVERHANG WELDED TO TOP OF CASING.
5. 6' DIA X 5' HIGH X 1/2" THK WELDED STEEL PIPE CASING WITH CONCRETE BACKFILL. 1/2" STEEL COVER WITH 2" OVERHANG WELDED TO TOP OF CASING.
6. ~~12" DIA X 12' HIGH X 1/2" THK WELDED STEEL PIPE CASING WITH CONCRETE BACKFILL. 1/2" STEEL COVER WITH 2" OVERHANG WELDED TO TOP OF CASING.~~ SEE DRAWING C-1005.
7. PIPE ANCHOR. SEE DRAWING C-3002 & C-3003 FOR SPACING.

CONTROL POINTS			
POINT #	NORTHING	EASTING	ELEVATION
505	862635.716	682440.632	4197.847
507	862292.832	682705.020	4198.100
508	862814.981	682829.681	4140.016

BASIS OF HORIZONTAL CONTROL IS THE NORTH AMERICAN DATUM (NAD) OF 1927. BASIS OF VERTICAL CONTROL IS THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1929. NORTHINGS, EASTINGS, AND ELEVATIONS INDICATED ON THESE DRAWINGS ARE ACCURATE TO WITHIN +/- 0.1 FOOT.

GRAPHIC SCALE
0 5 10 20 30 FEET
1" = 10'

GS

Reviewed and determined to be UNCLASSIFIED. This review does not constitute clearance for public release.
/s/: Signature on File
Derivative Classifier (Name / Organization)
Date 07/11/12

NO	DATE	REVISIONS	DRAWN	PREPARED	CHECKED	PROJ ENGR	APPROVER / USER
1	7/12/12	AS CONSTRUCTED	JMS	JMS	SMG	RL	TMT

NATIONAL NUCLEAR SECURITY ADMINISTRATION
NEVADA SITE OFFICE — LAS VEGAS, NEVADA

NEVADA NATIONAL SECURITY SITE — AREA 2,3,9
CORRECTIVE ACTION UNIT 547 CONTAMINATED WASTE SITES
TEJON, MULLET AND PLAYER

PLAYER SITE GRADING PLAN

DRAWN	PREPARED	CHECKED	PROJECT ENGINEER	APPROVER / USER
S. DOMBOVARY 6/6 DATE	S. DOMBOVARY 6/6 DATE	J. GOODRICH 7/19 DATE	G. NGUYEN 6/6 DATE	T. THIELE 7/21/11 DATE

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ENGINEERING NO 00424
ORIGINAL SIGNATURES ON FILE
DRAWING NUMBER / WORK ORDER NUMBER 00424-C-1004
REVISION 1

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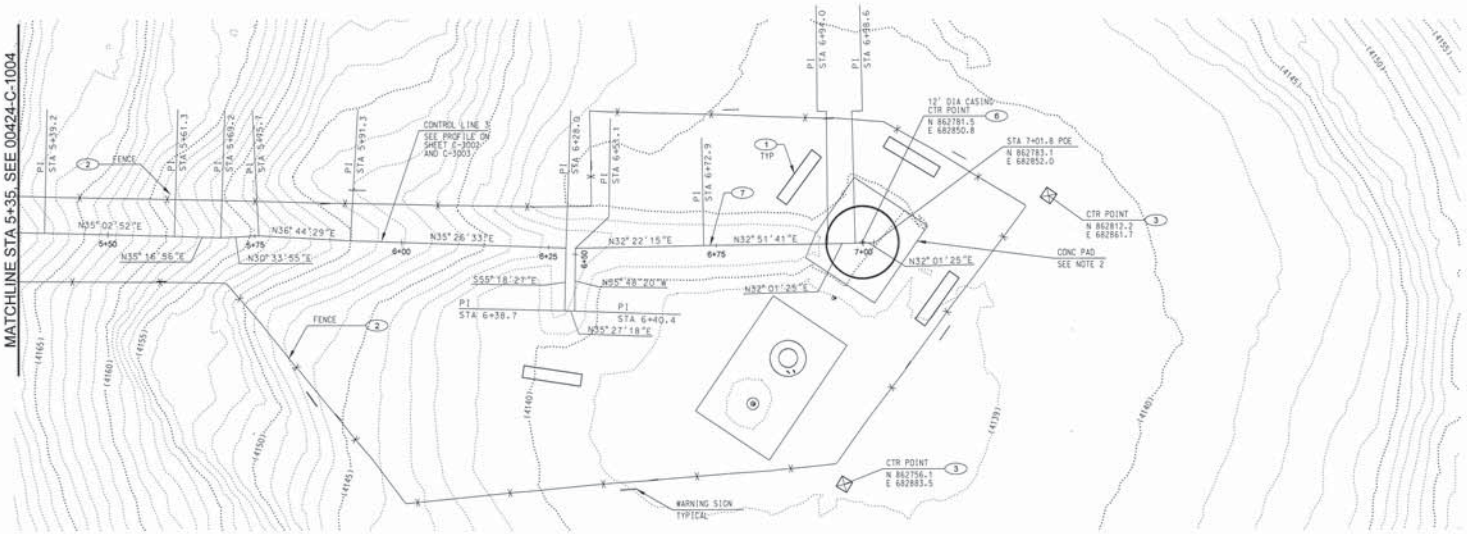

GENERAL NOTES

1. CONTOURS SHOWN ARE FINAL GRADES.
2. EXIST CONC PAD REPAIRED AND EXTENDED PRIOR TO INSTALLATION OF PIPE CASING.

CONSTRUCTION NOTES

1. TYPE F CONCRETE BARRIER PER NEVADA DEPARTMENT OF TRANSPORTATION (NDOT).
2. 3-STRAND PLASTIC COATED WIRE FENCING WITH T-POSTS.
3. BOUNDARY MONUMENT.
4. ~~INSTALL CASING PER DETAIL B ON DRAWING C-5001.~~ SEE DRAWING C-1004.
5. ~~INSTALL CASING PER DETAIL B ON DRAWING C-5001.~~ SEE DRAWING C-1004.
6. 12" DIA X 12' HIGH X 1/2" THK WELDED STEEL PIPE CASING WITH CONCRETE BACKFILL. 1/2" STEEL COVER WITH 2" OVERHANG WELDED TO TOP OF CASING.
7. PIPE ANCHOR. SEE DRAWING C-3002 & C-3003 FOR SPACING.

CONTROL POINTS			
POINT #	NORTHING	EASTING	ELEVATION
506	862236.716	682440.692	4197.847
507	862534.832	682703.020	4198.100
508	862814.981	682829.681	4140.016

BASIS OF HORIZONTAL CONTROL IS THE NORTH AMERICAN DATUM (NAD) OF 1927. BASIS OF VERTICAL CONTROL IS THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1929. NORTHINGS, EASTINGS, AND ELEVATIONS INDICATED ON THESE DRAWINGS ARE ACCURATE TO WITHIN +/- 0.1 FOOT.

GRAPHIC SCALE
0 5 10 20 30 FEET
1" = 10'

GS

NO	DATE	REVISIONS	DRAWN	PREPARED	CHECKED	PROJ ENGR	APPROVER/USER
		AS-CONSTRUCTED. DRAWING CREATED FROM 00424-C-1004					

Reviewed and determined to be UNCLASSIFIED. This review does not constitute clearance for public release.
/s/: Signature on File NSTec Ev
Derivative Classifier (Name / Organization)
Date: 07/11/12

NATIONAL NUCLEAR SECURITY ADMINISTRATION
NEVADA SITE OFFICE — LAS VEGAS, NEVADA

NEVADA NATIONAL SECURITY SITE — AREA 2,3,9
CORRECTIVE ACTION UNIT 547 CONTAMINATED WASTE SITES
TEJON, MULLET AND PLAYER

PLAYER SITE GRADING PLAN

Drawn	Prepared	Checked	Project Engineer	Approver/User
/s/: Signature on File	/s/: Signature on File	/s/: Signature on File	/s/: Signature on File	/s/: Signature on File 7/11/12

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Environmental No.	Drawing Number / Work Order Number
00424	00424-C-1005
Original Signatures on File	Revision 0

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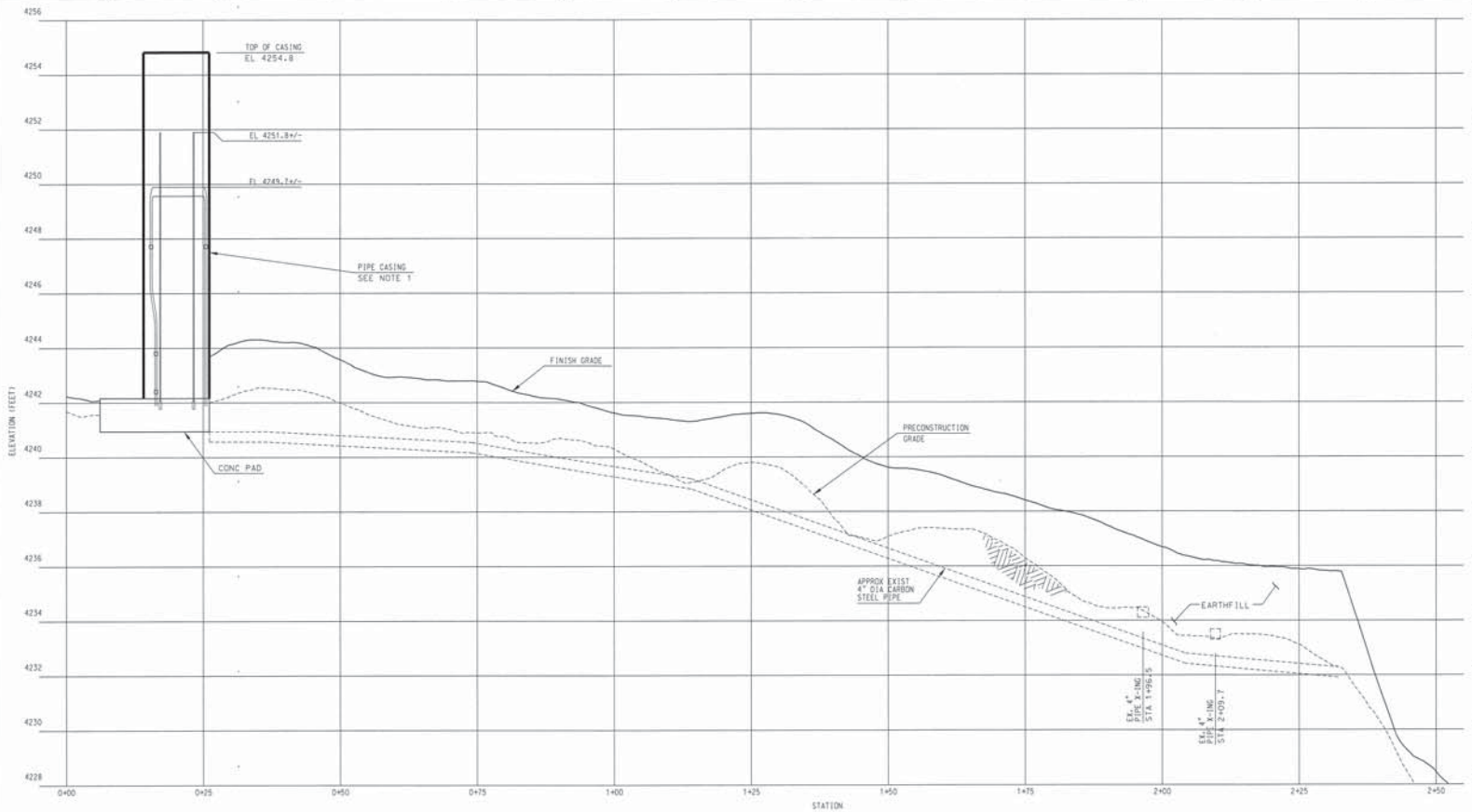


BERM PROFILE ALONG CONTROL LINE 2

SCALE : HORIZ 1"=10' VERT 1"=2' (1) C-1003

NOTES

1. 12" DIA X 12" HIGH X 1/2" THK WELDED STEEL PIPE CASING WITH CONCRETE BACKFILL AND 1/2" STEEL COVER WITH 2" OVERHANG WELDED TO CASING.

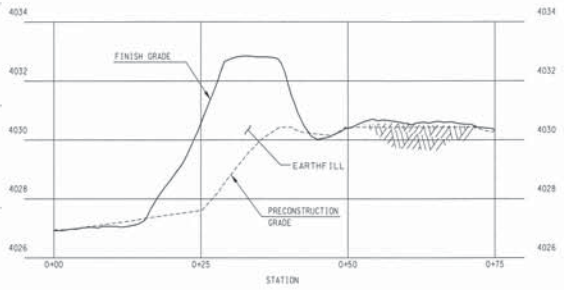
MULLET CONTROL POINTS

POINT #	NORTHING	EASTING	ELEVATION
504	867052.622	674830.704	4238.368
505	867015.088	674835.794	4240.145
510	867317.919	674802.492	4242.424

BASIS OF HORIZONTAL CONTROL IS THE NORTH AMERICAN DATUM (NAD) OF 1927. BASIS OF VERTICAL CONTROL IS THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1929. NORTHINGS, EASTINGS, AND ELEVATIONS INDICATED ON THESE DRAWINGS ARE ACCURATE TO WITHIN +/- 0.1 FOOT.

VERTICAL GRAPHIC SCALE
0 1 2 4 6 FEET
1" = 2'

HORIZONTAL GRAPHIC SCALE
0 5 10 20 30 FEET
1" = 10'



BERM PROFILE ALONG CONTROL LINE 1
STA 0+00.00 TO STA 0+75.00

SCALE : HORIZ 1"=10' VERT 1"=2' (2) C-1002

BERNALILLO CONTROL POINTS

POINT #	NORTHING	EASTING	ELEVATION
500	837658.864	684842.052	4047.084
501	837413.577	685105.600	4035.283
502	837097.248	685159.219	4024.230

BASIS OF HORIZONTAL CONTROL IS THE NORTH AMERICAN DATUM (NAD) OF 1927. BASIS OF VERTICAL CONTROL IS THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1929. NORTHINGS, EASTINGS, AND ELEVATIONS INDICATED ON THESE DRAWINGS ARE ACCURATE TO WITHIN +/- 0.1 FOOT.

Reviewed and determined to be UNCLASSIFIED. This review does not constitute clearance for public release.
/s/: Signature on File
Derivative Classifier, (Name / Organization)
Date: 07/11/12

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2	7/12/12	AS CONSTRUCTED	SD	SD	JG	GN	TT
1	9/1/2011	REVISED PROFILE NO. 1					
NO	DATE	REVISIONS	DRAWN	PREPARER	CHECKER	PROJ ENGR	APPROVER / USER

NATIONAL NUCLEAR SECURITY ADMINISTRATION
NEVADA SITE OFFICE — LAS VEGAS, NEVADA

NEVADA NATIONAL SECURITY SITE — AREA 2,3,9
CORRECTIVE ACTION UNIT 547 CONTAMINATED WASTE SITES
TEJON, MULLET AND PLAYER

TEJON SITE & MULLET SITE BERM PROFILE

DRAWN	PREPARER	CHECKER	PROJECT ENGINEER	APPROVER / USER
S. DOMBOVARY 6/6 DATE	S. DOMBOVARY 6/6 DATE	J. GOODRICH 7/19 DATE	G. NGUYEN 6/6 DATE	T. THIELE 7/21/11 DATE

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NEVADA OPERATIONS
P.O. BOX 98521 LAS VEGAS, NV 89193-8521

ENGINEERING NO. 00424
ORIGINAL SIGNATURES ON FILE
DRAWING NUMBER / WORK ORDER NUMBER 00424-C-3001
REVISION 2

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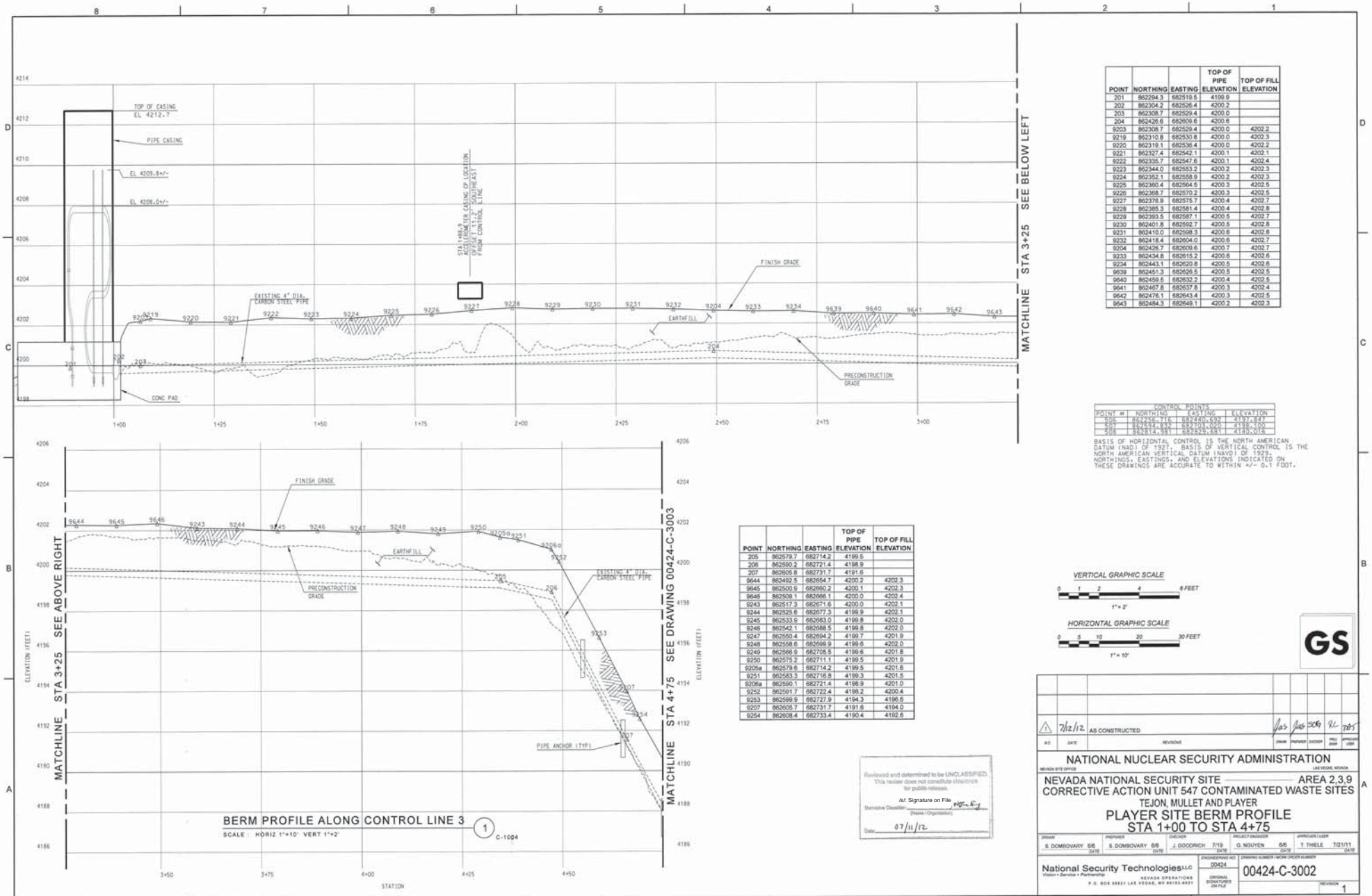

BERM PROFILE ALONG CONTROL LINE 3

SCALE : HORIZ 1"=10' VERT 1"=2'

1 C-1004

POINT	NORTHING	EASTING	TOP OF PIPE ELEVATION	TOP OF FILL ELEVATION
201	862294.3	682519.5	4199.9	
202	862304.2	682526.4	4200.2	
203	862308.7	682529.4	4200.0	
204	862426.6	682609.6	4200.6	
9203	862308.7	682529.4	4200.0	4202.2
9219	862310.8	682530.8	4200.0	4202.3
9220	862319.1	682536.4	4200.0	4202.2
9221	862327.4	682542.1	4200.1	4202.1
9222	862335.7	682547.6	4200.1	4202.4
9223	862344.0	682553.2	4200.2	4202.3
9224	862352.1	682558.9	4200.2	4202.3
9225	862360.4	682564.5	4200.3	4202.5
9226	862368.7	682570.2	4200.3	4202.5
9227	862376.9	682575.7	4200.4	4202.7
9228	862385.3	682581.4	4200.4	4202.8
9229	862393.5	682587.1	4200.5	4202.7
9230	862401.8	682592.7	4200.5	4202.8
9231	862410.0	682598.3	4200.6	4202.8
9232	862418.4	682604.0	4200.6	4202.7
9204	862426.7	682609.6	4200.7	4202.7
9233	862434.8	682615.2	4200.6	4202.6
9234	862443.1	682620.8	4200.5	4202.6
9639	862451.3	682626.5	4200.5	4202.5
9640	862459.5	682632.2	4200.4	4202.5
9641	862467.8	682637.8	4200.3	4202.4
9642	862476.1	682643.4	4200.3	4202.5
9643	862484.3	682649.1	4200.2	4202.3

CONTROL POINTS			
POINT #	NORTHING	EASTING	ELEVATION
205	862579.715	682480.592	4197.823
207	862554.832	682703.020	4198.100
208	862814.981	682829.681	4140.016

BASIS OF HORIZONTAL CONTROL IS THE NORTH AMERICAN DATUM (NAD) OF 1927. BASIS OF VERTICAL CONTROL IS THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1929. NORTHINGS, EASTINGS, AND ELEVATIONS INDICATED ON THESE DRAWINGS ARE ACCURATE TO WITHIN +/- 0.1 FOOT.

POINT	NORTHING	EASTING	TOP OF PIPE ELEVATION	TOP OF FILL ELEVATION
205	862579.7	682714.2	4199.5	
206	862590.2	682721.4	4198.9	
207	862605.8	682731.7	4191.6	
9644	862492.5	682654.7	4200.2	4202.3
9645	862500.9	682660.2	4200.1	4202.3
9646	862509.1	682666.1	4200.0	4202.4
9243	862517.3	682671.6	4200.0	4202.1
9244	862525.6	682677.3	4199.9	4202.1
9245	862533.9	682683.0	4199.8	4202.0
9246	862542.1	682688.5	4199.8	4202.0
9247	862550.4	682694.2	4199.7	4201.9
9248	862558.6	682699.9	4199.6	4202.0
9249	862566.9	682705.5	4199.6	4201.8
9250	862575.2	682711.1	4199.5	4201.9
9205a	862579.6	682714.2	4199.5	4201.6
9251	862583.3	682716.8	4199.3	4201.5
9206a	862590.1	682721.4	4198.9	4201.0
9252	862591.7	682722.4	4198.2	4200.4
9253	862599.9	682727.9	4194.3	4196.6
9207	862605.7	682731.7	4191.6	4194.0
9254	862608.4	682733.4	4190.4	4192.6

VERTICAL GRAPHIC SCALE
0 1 2 4 6 FEET
1" = 2'

HORIZONTAL GRAPHIC SCALE
0 5 10 20 30 FEET
1" = 10'

GS

Reviewed and determined to be UNCLASSIFIED. This review does not constitute clearance for public release.
Derivative Classifier: /s/: Signature on File (Name / Organization)
Date: 07/11/12

NO	DATE	REVISIONS	DRAWN	PREPARER	CHECKER	PROJ ENGR	APPROVED USER
1	7/12/12	AS CONSTRUCTED	jas	jas	SCG	VL	TDT

NATIONAL NUCLEAR SECURITY ADMINISTRATION
NEVADA SITE OFFICE — LAS VEGAS, NEVADA

NEVADA NATIONAL SECURITY SITE — AREA 2,3,9
CORRECTIVE ACTION UNIT 547 CONTAMINATED WASTE SITES
TEJON, MULLET AND PLAYER

PLAYER SITE BERM PROFILE STA 1+00 TO STA 4+75

DRAWN	PREPARER	CHECKER	PROJECT ENGINEER	APPROVER / USER
S. DOMBOVARY 6/6 (DATE)	S. DOMBOVARY 6/6 (DATE)	J. GOODRICH 7/19 (DATE)	G. NGUYEN 6/6 (DATE)	T. THIELE 7/21/11 (DATE)

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P.O. BOX 98521 LAS VEGAS, NV 89193-8521

ENGINEERING NO: 00424
ORIGINAL SIGNATURES ON FILE
DRAWING NUMBER / WORK ORDER NUMBER: 00424-C-3002
REVISION: 1

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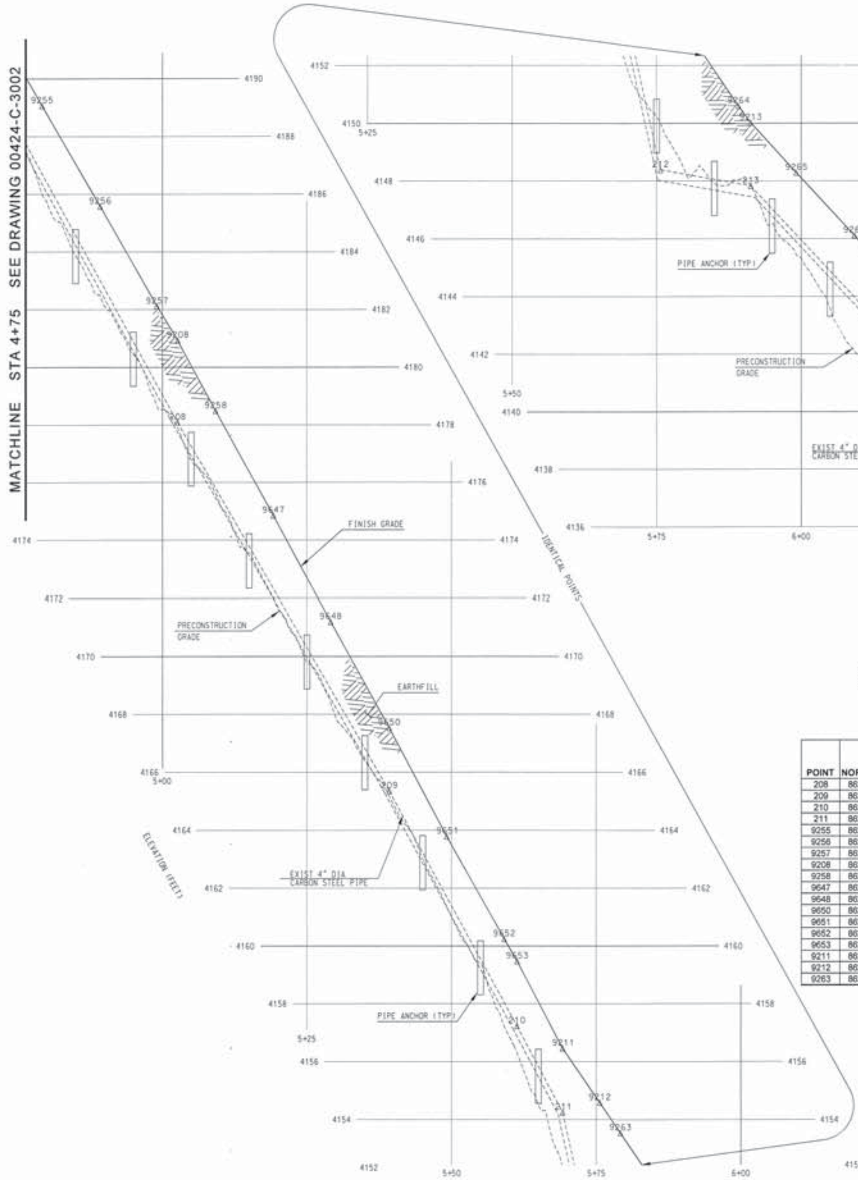

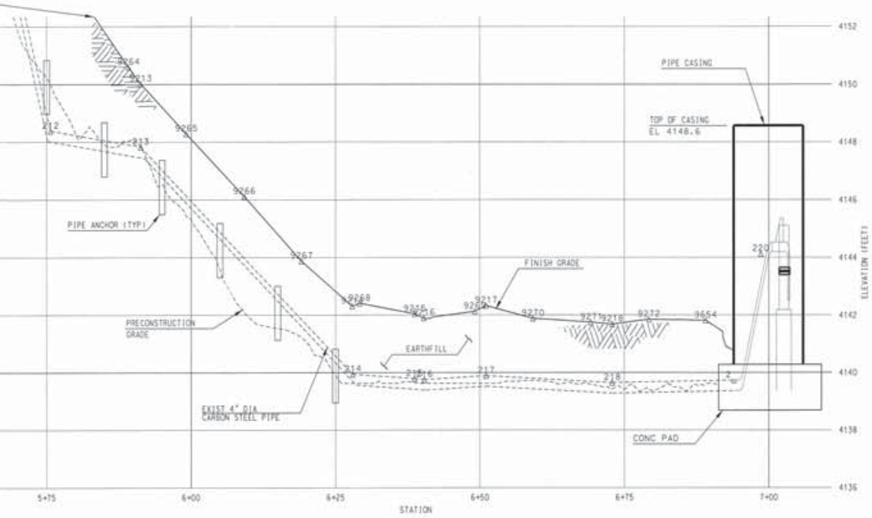

POINT	NORTHING	EASTING	TOP OF PIPE ELEVATION	TOP OF FILL ELEVATION
212	862696.5	682793.1	4148.4	
213	862709.0	682802.5	4147.8	
214	862738.9	682823.7	4139.9	
215	862732.9	682832.5	4139.8	
216	862734.2	682833.5	4139.8	
217	862740.3	682824.7	4139.9	
218	862758.7	682836.3	4139.7	
219	862776.4	682847.8	4139.7	
220	862780.4	682850.3	4144.1	
9264	862707.4	682801.2	4147.9	4150.6
9213	862709.0	682802.5	4147.8	4150.0
9265	862715.4	682807.1	4146.1	4148.3
9266	862723.7	682812.8	4144.0	4146.1
9267	862731.8	682818.6	4141.9	4143.9
9214	862738.9	682823.7	4140.0	4142.3
9268	862738.3	682824.7	4139.9	4142.4
9215	862732.9	682832.6	4139.8	4142.0
9216	862734.2	682833.5	4139.8	4141.9
9269	862739.1	682826.3	4139.9	4142.1
9217	862740.2	682824.6	4139.9	4142.3
9270	862747.1	682829.0	4139.8	4141.9
9271	862755.6	682834.3	4139.7	4141.8
9218	862758.7	682836.3	4139.7	4141.7
9272	862764.0	682839.8	4139.7	4141.9
9654	862772.3	682845.1	4139.7	4141.8

CONTROL POINTS			
POINT #	NORTHING	EASTING	ELEVATION
506	862256.716	682440.692	4197.847
507	862594.832	682703.020	4198.100
508	862814.981	682829.681	4140.016

BASIS OF HORIZONTAL CONTROL IS THE NORTH AMERICAN DATUM (NAD) OF 1927. BASIS OF VERTICAL CONTROL IS THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1929. NORTHINGS, EASTINGS, AND ELEVATIONS INDICATED ON THESE DRAWINGS ARE ACCURATE TO WITHIN +/- 0.1 FOOT.

BERM PROFILE ALONG CONTROL LINE 3 (1) C-1004

SCALE : HORIZ 1"=10' VERT 1"=2'

POINT	NORTHING	EASTING	TOP OF PIPE ELEVATION	TOP OF FILL ELEVATION
208	862636.3	682751.8	4178.1	
209	862666.4	682772.6	4165.4	
210	862684.5	682785.3	4157.2	
211	862691.0	682789.8	4154.3	
9255	862616.8	682738.9	4186.7	4189.1
9256	862625.2	682744.4	4183.0	4185.6
9257	862633.4	682749.9	4179.4	4182.1
9208	862636.3	682751.8	4178.1	4180.9
9258	862641.7	682755.5	4175.8	4178.5
9647	862649.9	682761.3	4172.4	4174.9
9648	862658.1	682766.8	4168.8	4171.2
9650	862666.5	682772.5	4165.4	4167.5
9651	862674.5	682778.3	4161.7	4163.8
9652	862682.7	682784.0	4158.0	4160.3
9653	862684.5	682785.3	4157.2	4159.5
9211	862690.9	682789.8	4154.3	4156.5
9212	862696.5	682793.1	4148.5	4154.6
9263	862699.3	682795.3	4148.3	4153.5

VERTICAL GRAPHIC SCALE
0 1 2 4 6 FEET
1" = 2'

HORIZONTAL GRAPHIC SCALE
0 5 10 20 30 FEET
1" = 10'

GS

Reviewed and determined to be UNCLASSIFIED. This review does not constitute clearance for public release.
Derivative Classifier: /s/: Signature on File
(Name / Organization)
Date: 07/11/12

NO	DATE	REVISIONS	DRAWN	PREPARER	CHECKER	PROJ ENGR	APPROVER USER
1	7/12/12	AS CONSTRUCTED	JES	JES	SCG	2L	TMS

NATIONAL NUCLEAR SECURITY ADMINISTRATION
NEVADA SITE OFFICE — LAS VEGAS, NEVADA

NEVADA NATIONAL SECURITY SITE — AREA 2,3,9
CORRECTIVE ACTION UNIT 547 CONTAMINATED WASTE SITES
TEJON, MULLET AND PLAYER
PLAYER SITE BERM PROFILE
STA 4+75 TO STA 7+00

DRAWN	PREPARER	CHECKER	PROJECT ENGINEER	APPROVER / USER
S. DOMBOVARY 6/6	S. DOMBOVARY 6/6	J. GOODRICH 7/19	G. NGUYEN 6/6	T. THIELE 7/21/11

National Security Technologies LLC
Vision • Service • Partnership
NEVADA OPERATIONS
P.O. BOX 98521 LAS VEGAS, NV 89193-8521

ENGINEERING NO. 00424
ORIGINAL SIGNATURES ON FILE
DRAWING NUMBER / WORK ORDER NUMBER: 00424-C-3003
REVISION 1

7/11/2012 11:22:12 AM sorolaja
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APPENDIX C

WASTE DISPOSITION DOCUMENTATION

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NSTec Form RM-2217	CERTIFICATE OF DISPOSAL (LOW LEVEL WASTE)	03/01/10 Rev. 01 Page 1 of 1

Nevada Test Site

This Certificate acknowledges that the following shipment(s) of waste have been disposed at the Nevada Test Site Radioactive Waste Management Complex.

Shipment Number	Waste Stream Identification #	Package #	Date of Disposal
DPL12004	LRY5LLFY07002	12L001	10/25/11

This certification is provided as a courtesy to the waste generator for information purposes only.

/s/: Robert Zion
WGS Signature

10/25/11
Date

Waste Inspector
Title

/s/: Burton Ford
RWMC Signature

25-Oct-2011
Date

Waste Specialist
Title

NSTec Form FRM-2217	CERTIFICATE OF DISPOSAL (LOW LEVEL WASTE)	03/01/10 Rev. 01 Page 1 of 1

Nevada Test Site

This Certificate acknowledges that the following shipment(s) of waste have been disposed at the Nevada Test Site Radioactive Waste Management Complex.

Shipment Number	Waste Stream Identification #	Package #	Date of Disposal
DPL12009	LRY5LLFY07002	12L019	12/14/11

This certification is provided as a courtesy to the waste generator for information purposes only.

/s/: Robert Zion
WGS Signature

12/14/11
Date

Waste Inspector
Title

/s/: Burton Ford
RWMC Signature

14-Dec-2011
Date

Waste Specialist
Title

inter modal

(Reference: OP-2151.304)

NSTec Form FRM-2217	CERTIFICATE OF DISPOSAL (LOW LEVEL WASTE)	03/01/10 Rev. 01 Page 1 of 1

Nevada Test Site

This Certificate acknowledges that the following shipment(s) of waste have been disposed at the Nevada Test Site Radioactive Waste Management Complex.

Shipment Number	Waste Stream Identification #	Package #	Date of Disposal
DPL12016	LRY5LLFY07003	12L025 (114164-34)	3/12/12

This certification is provided as a courtesy to the waste generator for information purposes only.

/s/: Robert Zion
WGS Signature

3/12/12
Date

WASTE INSPECTOR
Title

/s/: Jon Tanaka
RWMC Signature

03/12/2012
Date

WASTE SPECIALIST
Title

Asbestos

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	4	(702)295-0311	000956279 FLE

GENERATOR

5. Generator's Name and Mailing Address
NSTEC FOR USDOE
P.O. BOX 98521, M/S NNSS-110
LAS VEGAS NV 89193
Generator's Phone: (702)295-7365

Generator's Site Address (if different than mailing address)
NSTEC FOR USDOE
NEVADA NATIONAL SECURITY SITE, M/S NNSS-110
MERCURY NV 89023

6. Transporter 1 Company Name
CAST TRANSPORTATION
U.S. EPA ID Number COR000005389

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

8. Designated Facility Name and Site Address
U.S. ECOLOGY
HWY 95, 12 MI. SOUTH OF BEATTY
BEATTY NV 89003
Facility's Phone: (800)239-3943
U.S. EPA ID Number NVT330010000

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. UN1208, Waste Hexanes, 3, II	1	DF	1	K	D001		
RQ	2. UN1263, Waste Paint related material, 3, II (D001, D018)	1	DM	251	P	D001	D018	D035
						F003	F005	
X	3. UN1726, Waste Aluminum chloride, anhydrous, 8, II. Labpack.	1	DF	4	P	D003		
X	4. UN2929, Waste Toxic liquids, flammable, organic, n.o.s., 6.1, (3), II. Labpack.	1	DF	5	P	D001	D019	

14. Special Handling Instructions and Additional Information
1. ERG 128; PKGE 12-0052; PCB OSD 3/26/12; LP 13-1015. 2. ERG 128; 12-0038; 13-0955. 3. ERG 137; 12-0039; LP 13-1015. 4. ERG 131; 12-0040; LP 13-1015. LOAD #12009.

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: CIRILO CARLOS GONZALES ON BEHALF OF USDOE
Signature: /s/: Cirilo Carlos Gonzales
Month Day Year: 06 07 12

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: Eric Chernin
Signature: /s/: Eric Chernin
Month Day Year: 6 7 12
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year:

DESIGNATED FACILITY

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

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

1.	2.	3.	4.

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

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

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

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

Form Approved. OMB No. 2050-0039

...IFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)	21. Generator ID Number	22. Page of	23. Manifest Tracking Number
	NV3890090001	2 of 4	000956279 FLE

24. Generator's Name: NSTEC FOR USDOE
P.O. BOX 98521, M/S NNSS-110
LAS VEGAS NV 89193

25. Transporter _____ Company Name — U.S. EPA ID Number

26. Transporter _____ Company Name — U.S. EPA ID Number

GENERATOR

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes		
X	5. UN2924, Waste Flammable liquids, corrosive, n.o.s., 3, (8), II. Labpack.	1	DF	10	P	D001	D002	U220
X	6. UN1760, Waste Corrosive liquids, n.o.s., 8, II. Labpack.	1	DF	260	P	D002		
X	7. UN1593, Waste Dichloromethane, 6.1, III. Toxic. Labpack.	1	DF	20	P	U080		
X	8. UN1993, Waste Flammable liquids, n.o.s., 3, II. Labpack.	1	DM	56	P	D001	D008	D018
						D019	D021	D022
X	9. UN1992, Waste Flammable liquid, toxic, n.o.s., 3, (6.1), II. Labpack.	1	DM	153	P	D001	D019	D028
						U154		
X	10. NA3082, Hazardous waste, liquid, n.o.s. (epinephrine), 9, III.	1	DF	10	P	P042		
X	11. NA3077, Hazardous waste, solid, n.o.s. (benzene), 9, III.	1	DM	12	P	D018		
X	12. NA3077, Hazardous waste, solid, n.o.s. (chromium, lead), 9, III.	1	DF	5	P	D004	D006	D007
						D008	D009	D011
X	13. NA3077, Hazardous waste, solid, n.o.s. (cadmium, lead), 9, III.	3	DM	747	P	D005	D006	D007
						D008		
X	14. NA3082, Hazardous waste, liquid, n.o.s. (cadmium, lead), 9, III.	1	DF	54	P	D005	D006	D007
						D008		

32. Special Handling Instructions and Additional Information
5. ERG 132; 12-0042; LP 13-1015. 6. ERG 154; 12-0060; LP 13-1015. 7. ERG 160; 12-0047; LP 13-1015. 8. ERG 128; 12-0053; CODES D028, D029, D035, D039, D040, D043, U002, U154; LP 13-1015. 9. ERG 131; 12-0056; LP 13-1015. 10. ERG 171; 12-0055; 13-1065. 11. ERG 171; 12-0026; 14-5295. 12. ERG 171; 12-0028; 14-5295. 13. ERG 171; 12-0029,-0030,-0031; 070191191-1. 14. ERG 171; 12-0032; 070191190-0. LOAD #12009.

TRANSPORTER

33. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

34. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

35. Discrepancy

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

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

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

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)	21. Generator ID Number	22. Page 3 of 4	23. Manifest Tracking Number
	NV3890090001		000956279 FLE

24. Generator's Name: NSTEC FOR USDOE
P.O. BOX 98521, M/S NNSS-110
LAS VEGAS NV 89193

25. Transporter _____ Company Name — U.S. EPA ID Number

26. Transporter _____ Company Name — U.S. EPA ID Number

GENERATOR

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes
X	15. NA3077, Hazardous waste, solid, n.o.s. (lead), 9, III.	2	DM	155	P	D008
X	16. NA3077, Hazardous waste, solid, n.o.s. (benzene, methyl ethyl ketone), 9, III.	2	DM	168	P	D018 D035 F003 F005
X	17. NA3082, Hazardous waste, liquid, n.o.s. (silver), 9, III.	1	DF	6	P	D011
RQ	18. NA3082, Hazardous waste, liquid, n.o.s. (lead), 9, III (D008).	1	DF	43	P	D008
X	19. UN3028, Batteries, dry, containing potassium hydroxide solid, 8, III. Universal Waste - Nickel-Cadmium Batteries.	2	DF	263	P	
X	20. UN2800, Batteries, wet, non-spillable, 8, III. Universal Waste - Sealed Lead-Acid Batteries.	2	DF	87	P	
X	21. UN3090, Lithium batteries, 9, II. Universal Waste - Lithium Batteries.	1	DF	110	P	
	22. Universal Waste - Fluorescent Lamps.	11	DF	962	P	
	23. Universal Waste - Broken Fluorescent Lamps.	2	DF	28	P	
	24. Universal Waste - Mercury Vapor Lamps.	1	CF	2	P	

32. Special Handling Instructions and Additional Information

15. ERG 171;12-0033,-0048;14-5295. 16. ERG 171;12-0036,-0037;14-5295. 17. ERG 171;12-0046;070186618-12. 18. ERG 171;12-0057;13-1024. 19. ERG 154;12-0084,-0086;UW 13-0169. 20. ERG 154;12-0087,-0088;UW 070165670-0. 21. ERG 138;12-0085;1202 EA;UW 13-1079. 22. PKGS 12-0073 TO -0078,12-0092 TO -0096;5403 LF;UW 13-0167. 23. PKGS 12-0082,-0089;UW 13-0168. 24. PKG 12-0079;5 EA;UW 13-1083. LOAD #12009.

TRANSPORTER

33. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name | Signature | Month | Day | Year

34. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name | Signature | Month | Day | Year

DESIGNATED FACILITY

35. Discrepancy

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

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

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

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)	21. Generator ID Number	22. Page 4 of 4	23. Manifest Tracking Number
	NV3890090001		000956279 FLE

24. Generator's Name: NSTEC FOR USDOE
P.O. BOX 98521, M/S NNSS-110
LAS VEGAS NV 89193

25. Transporter _____ Company Name — U.S. EPA ID Number

26. Transporter _____ Company Name — U.S. EPA ID Number

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes
	25. Universal Waste - Sodium Lamps.	3	DF	60	P	
	26. Universal Waste - Metal Halide Lamps.	2	DF	36	P	
	27. Non-DOT, Non-RCRA Regulated, Liquids.	1	DM	369	P	
	28. Non-DOT, Non-RCRA Regulated, Liquids.	1	DM	175	P	
	29. Non-DOT, Non-RCRA Regulated, Liquids.	1	DF	104	P	

32. Special Handling Instructions and Additional Information
25. PKGS 12-0080, -0083, -0091; 52 LAMPS; UW 13-1080. 26. PKGS 12-0081, -0090; 71 LAMPS; UW 13-1074. 27. PKG 12-0062; LP 13-7747. 28. PKG 12-0063; LP 13-7747. 29. PKG 12-0065; LP 13-7747. LOAD #12009.

GENERATOR

TRANSPORTER

33. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

34. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

35. Discrepancy

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

(3)

NSTec Form FRM-0918

NTS LANDFILL LOAD VERIFICATION

10/07/09 Rev. 01 Page 1 of 2

SWO USE (Select One) AREA ☐ 23 ☐ 6 ☒ 9/10C 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: Reed Poderis Phone Number: 5-0847

Location / Origin: CAU 547 CAS 09-99-06

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	☐ 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, carpet, electronic components, PPE, etc.)						☐ Cement & concrete

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

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

Additional waste accepted at the Area 9 U10c Landfill:

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

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

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

REQUIRED: WASTE GENERATOR SIGNATURE

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

The above mentioned waste was generated outside of a Controlled Waste Management A knowledge, does not contain radiological materials.

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

Print Name: Brian Konrad

Signature: /s/: Brian Konrad Date: 3/22/12

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

Radiological Survey Release for Waste Disposal
RCT Initials

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

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

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

SIGNATURE: /s/: Signature on File DATE: 3-22-12

BN-0646 (10/05)

SWO USE ONLY

Load Weight (net from scale or estimate): 1460 ✓ Signature of Certifier: /s/: Signature on File

APPENDIX D

USE RESTRICTION DOCUMENTATION

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Use Restriction Information

CAU Number/Description: CAU 547/Miscellaneous Contaminated Waste Sites

Applicable CAS Number/Description: CAS 02-37-02/Gas Sampling Assembly

Contact (Activity Lead/Activity): Tiffany A. Lantow/Industrial Sites

FFACO Use Restriction Physical Description:

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

UR Point	Northing	Easting
1	4,109,769.903	582,868.126
2	4,109,757.604	582,858.475
3	4,109,762.400	582,782.030
4	4,109,800.155	582,785.212
5	4,109,794.336	582,870.551

Depth: 2 feet

Survey Source (GPS, GIS, etc): GIS

Basis for FFACO UR:

Summary Statement: This FFACO use restriction (UR) was implemented to protect site workers from inadvertent exposure to radiological contaminants. Based on available process knowledge and existing radiological survey data, the gas sampling assembly at the MULLET site is known to be internally contaminated with radionuclides. The site was closed in place with administrative controls by placing a steel casing over vertical expansion joint and constructing an engineered soil cover over piping and exposed sections of the gas sampling assembly components.

Contaminants Table:

Maximum Concentration of Contaminants for CAU 547 CAS 02-37-02, Gas Sampling Assembly		
Constituent	**95th Upper Confidence Limit Activity (curies)**	**95th Upper Confidence Limit Mass (grams)**
Pu-238	2.68E-03	1.57E-04
Pu-239	1.29E-01	2.08E+00
Pu-240	2.88E-02	1.26E-01
Pu-241	9.93E-02	9.65E-04
Am-241	2.93E-02	8.54E-03
Total	2.89E-01	2.21E+00

Site Controls: Three-strand wire fence, concrete barriers, concrete monuments, use restriction warning signs

UR Maintenance Requirements:

Description: Quarterly visual inspections will be performed for 2 years and annually thereafter. In addition, inspections will be conducted if precipitation occurs in excess of 1.0 inch in a 24-hour period. Progressive monitoring will be performed according to the post-closure plan if contamination is identified. This UR must be entered into the NNSA/NSO Facility Information Management System (FIMS) and FFACO databases.

Inspection/Maintenance Frequency: Quarterly for 2 years, annually thereafter

The future use of any land related to this Corrective Action Unit (CAU), as described by the above surveyed location, is restricted from any DOE or Air Force activity that may alter or modify the containment control as approved by the State and identified in the CAU CR or other CAU documentation unless appropriate concurrence is obtained in advance.

Comments: See the Closure Report for additional information on the condition of the site.

Submitted By: /s/: Tiffany Lantow **Date:** 7/17/2012

Note: Effective upon acceptance of closure documents by NDEP

CORRECTIVE ACTION SITE 02-37-02, GAS SAMPLING ASSEMBLY (MULLET)
USE RESTRICTION BOUNDARY

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Use Restriction Information

CAU Number/Description: CAU 547/Miscellaneous Contaminated Waste Sites

Applicable CAS Number/Description: CAS 03-99-19/Gas Sampling Assembly

Contact (Activity Lead/Activity): Tiffany A. Lantow/Industrial Sites

FFACO Use Restriction Physical Description:

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

UR Point	Northing	Easting
1	4,100,661.223	585,975.038
2	4,100,661.504	585,959.027
3	4,100,792.853	585,891.883
4	4,100,795.128	585,886.524
5	4,100,802.756	585,883.778
6	4,100,806.444	585,886.409
7	4,100,810.528	585,895.261
8	4,100,809.149	585,901.500
9	4,100,803.749	585,905.112
10	4,100,795.974	585,904.301

Depth: 2 feet

Survey Source (GPS, GIS, etc): GIS

Basis for FFACO UR:

Summary Statement: This FFACO use restriction (UR) was implemented to protect site workers from inadvertent exposure to radiological contaminants. Based on available process knowledge and existing radiological survey data, the gas sampling assembly at the TEJON site is known to be internally contaminated with radionuclides. The site was closed in place with administrative controls by placing a steel casing over the sampling can and constructing an engineered soil cover over piping and exposed sections of the gas sampling assembly components.

Contaminants Table:

Maximum Concentration of Contaminants for CAU 547 CAS 03-99-19, Gas Sampling Assembly		
Constituent	**95th Upper Confidence Limit Activity (curies)**	**95th Upper Confidence Limit Mass (grams)**
Pu-238	2.03E-01	1.19E-02
Pu-239	9.79E+00	1.57E+02
Pu-240	1.67E-01	7.31E-01
Pu-241	3.11E+00	3.02E-02
Am-241	5.06E-01	1.48E-01
Total	1.38E+01	1.58E+02

Site Controls: Three-strand wire fence, concrete barriers, concrete monuments, use restriction warning signs

UR Maintenance Requirements:

Description: Quarterly visual inspections will be performed for 2 years and annually thereafter. In addition, inspections will be conducted if precipitation occurs in excess of 1.0 inch in a 24-hour period. Progressive monitoring will be performed according to the post-closure plan if contamination is identified. This UR must be entered into the NNSA/NSO Facility Information Management System (FIMS) and FFACO databases.

Note: Effective upon acceptance of closure documents by NDEP

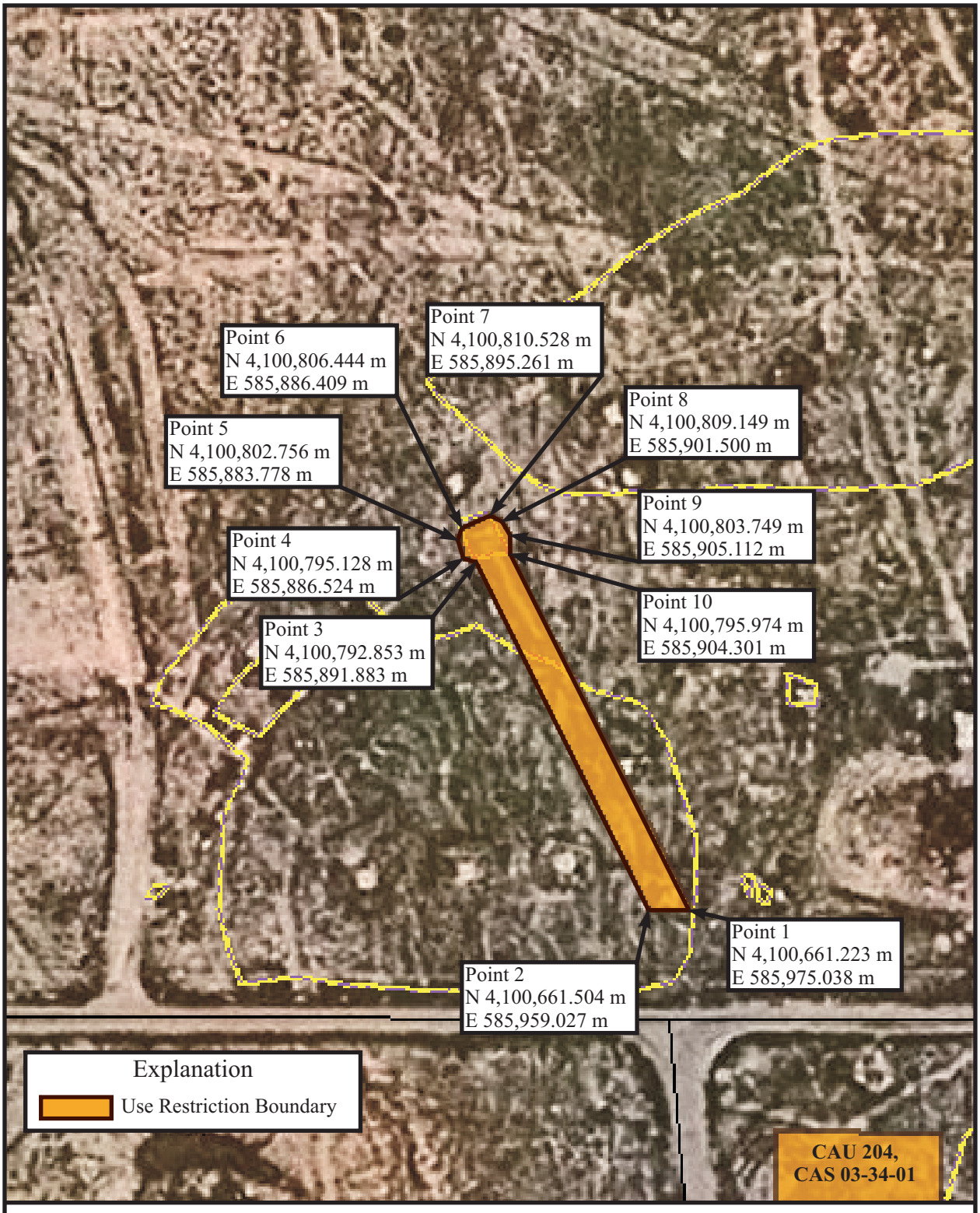
Inspection/Maintenance Frequency: Quarterly for 2 years, annually thereafter

The future use of any land related to this Corrective Action Unit (CAU), as described by the above surveyed location, is restricted from any DOE or Air Force activity that may alter or modify the containment control as approved by the State and identified in the CAU CR or other CAU documentation unless appropriate concurrence is obtained in advance.

Comments: See the Closure Report for additional information on the condition of the site.

Submitted By: /s/: Tiffany Lantow **Date:** 7/17/2012

Note: Effective upon acceptance of closure documents by NDEP



CORRECTIVE ACTION SITE 03-99-19, GAS SAMPLING ASSEMBLY (TEJON)
USE RESTRICTION BOUNDARY

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Use Restriction Information

CAU Number/Description: CAU 547/Miscellaneous Contaminated Waste Sites

Applicable CAS Number/Description: CAS 09-99-06/Gas Sampling Assembly

Contact (Activity Lead/Activity): Tiffany A. Lantow/Industrial Sites

FFACO Use Restriction Physical Description:

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

UR Point	Northing	Easting
1	4,108,307.006	585,151.624
2	4,108,312.336	585,140.544
3	4,108,318.557	585,138.764
4	4,108,405.169	585,206.065
5	4,108,454.620	585,240.256
6	4,108,457.160	585,235.986
7	4,108,469.830	585,244.846
8	4,108,473.531	585,252.286
9	4,108,457.540	585,258.206
10	4,108,438.340	585,247.716
11	4,108,437.140	585,232.816
12	4,108,402.109	585,210.345
13	4,108,397.309	585,217.406
14	4,108,409.459	585,200.235

Depth: 2 feet

Survey Source (GPS, GIS, etc): GIS

Basis for FFACO UR:

Summary Statement: This FFACO use restriction (UR) was implemented to protect site workers from inadvertent exposure to radiological contaminants. Based on available process knowledge and existing radiological survey data, the gas sampling assembly at the PLAYER site is known to be internally contaminated with radionuclides. The site was closed in place with administrative controls by placing steel casings over the vertical expansion joint, the accelerometer, and the wellhead, and constructing an engineered soil cover over piping and exposed sections of the gas sampling assembly components.

Contaminants Table:

Maximum Concentration of Contaminants for CAU 547 CAS 09-99-06, Gas Sampling Assembly		
Constituent	**Nominal Activity (curies)**	**Nominal Mass (grams)**
Am-241	2.04E+00	1.96E-02
Pu-238	2.24E-01	1.30E-02
Pu-239	1.08E+01	1.72E+02
Pu-240	2.41E+00	1.05E+01
Pu-241	8.32E+00	7.99E-02
Pu-242	2.24E-04	5.71E-02
Total	2.38E+01	1.83E+02

Site Controls: Three-strand wire fence, concrete barriers, concrete monuments, use restriction warning signs

Note: Effective upon acceptance of closure documents by NDEP

UR Maintenance Requirements:

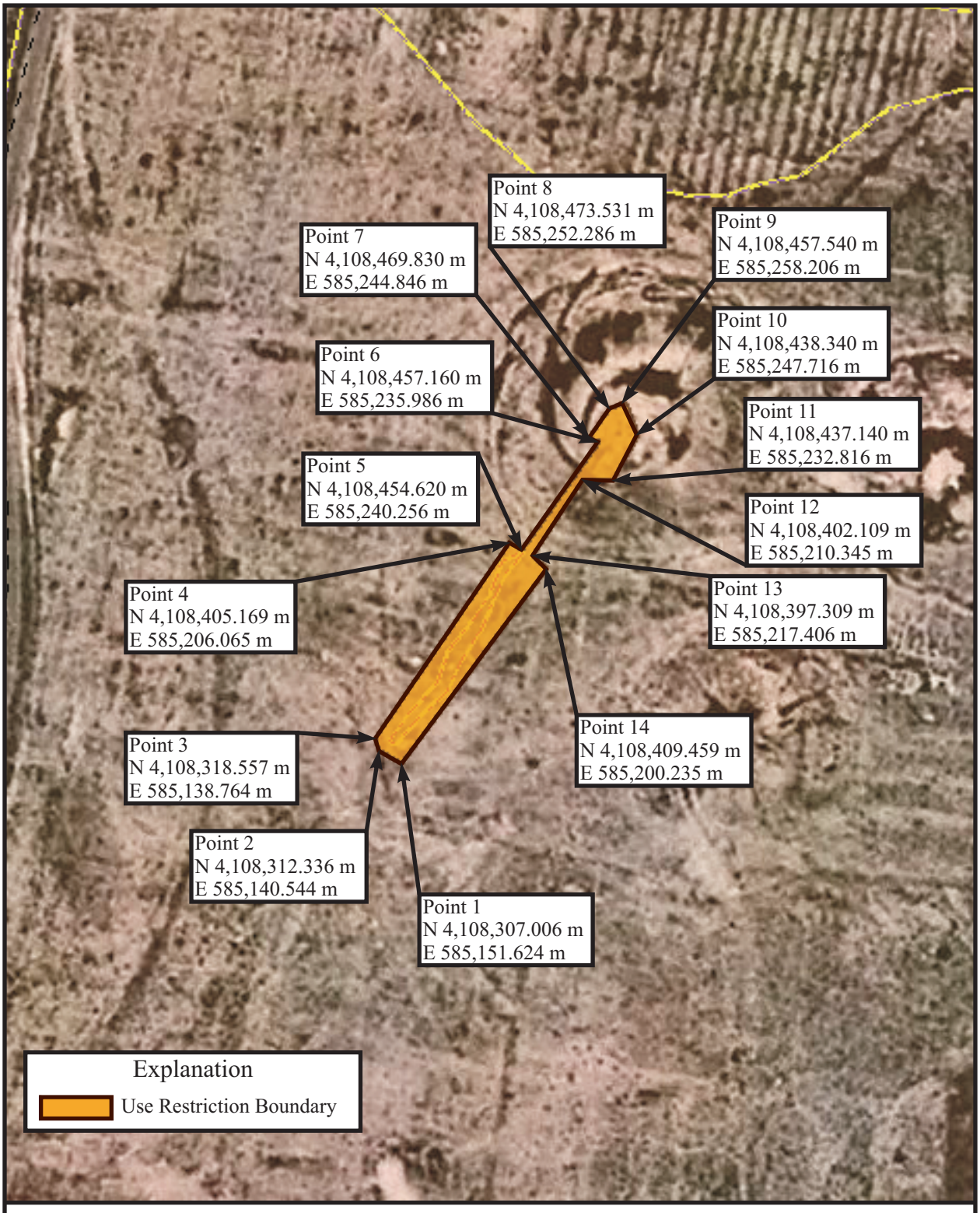
Description: Quarterly visual inspections will be performed for 2 years and annually thereafter. In addition, inspections will be conducted if precipitation occurs in excess of 1.0 inch in a 24-hour period. Progressive monitoring will be performed according to the post-closure plan if contamination is identified. This UR must be entered into the NNSA/NSO Facility Information Management System (FIMS) and FFACO databases.

Inspection/Maintenance Frequency: Quarterly for 2 years, annually thereafter

The future use of any land related to this Corrective Action Unit (CAU), as described by the above surveyed location, is restricted from any DOE or Air Force activity that may alter or modify the containment control as approved by the State and identified in the CAU CR or other CAU documentation unless appropriate concurrence is obtained in advance.

Comments: See the Closure Report for additional information on the condition of the site.

Submitted By: /s/: Tiffany Lantow **Date:** 7/17/2012



CORRECTIVE ACTION SITE 09-99-06, GAS SAMPLING ASSEMBLY (PLAYER)
USE RESTRICTION BOUNDARY

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APPENDIX E

SITE CLOSURE PHOTOGRAPHS

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PHOTOGRAPH LOG

PHOTOGRAPH NUMBER	DATE	DESCRIPTION
1	03/02/2011	CAS 02-37-02 (MULLET), Before Closure Activities, Looking East
2	08/29/2011	CAS 02-37-02 (MULLET), Placement of Clean Fill, Looking East
3	08/31/2011	CAS 02-37-02 (MULLET), Voids and Hole in Concrete Pad Filled with Concrete, Looking Southeast
4	09/02/2011	CAS 02-37-02 (MULLET), Delivery of Soil, Looking Southeast
5	09/09/2011	CAS 02-37-02 (MULLET), Compaction of Soil Cover, Looking East
6	09/12/2011	CAS 02-37-02 (MULLET), Raised and Leveled Concrete Pad, Construction of Soil Cover, Looking East
7	09/14/2011	CAS 02-37-02 (MULLET), Placement of Casing, Looking Northeast
8	09/19/2011	CAS 02-37-02 (MULLET), Construction of Soil Cover, Looking Southeast
9	09/26/2011	CAS 02-37-02 (MULLET), Placement of Jersey Barrier, Looking Southwest
10	09/26/2011	CAS 02-37-02 (MULLET), Fence, Jersey Barriers, Use Restriction Warning Sign, and Radiological Posting, Looking East
11	09/26/2011	CAS 02-37-02 (MULLET), Completed Soil Cover, Looking Southeast
12	10/04/2011	CAS 02-37-02 (MULLET), After Closure Activities, Looking East
13	03/02/2011	CAS 03-99-19 (TEJON), BERNALILLO before Closure Activities, Looking South
14	03/02/2011	CAS 03-99-19 (TEJON), TEJON before Closure Activities, Looking North
15	11/08/2011	CAS 03-99-19 (TEJON), Sampling Can at TEJON
16	11/08/2011	CAS 03-99-19 (TEJON), Placement of Casing Over the Sampling Can at TEJON, Looking North
17	11/08/2011	CAS 03-99-19 (TEJON), Soil in Casing Over the Sampling Can at TEJON
18	11/09/2011	CAS 03-99-19 (TEJON), Compaction of Soil at TEJON, Looking South
19	11/16/2011	CAS 03-99-19 (TEJON), Removal of the Vertical Vent Pipe at BERNALILLO, Looking South
20	11/17/2011	CAS 03-99-19 (TEJON), Raised and Leveled Concrete Pad at TEJON, Looking Northeast
21	11/22/2011	CAS 03-99-19 (TEJON), Construction of Soil Cover at BERNALILLO, Looking South
22	11/23/2011	CAS 03-99-19 (TEJON), Completed Soil Cover at BERNALILLO, Looking Southeast
23	03/15/2012	CAS 03-99-19 (TEJON), TEJON after Closure Activities, Looking North
24	03/15/2012	CAS 03-99-19 (TEJON), After Closure Activities, Looking Northwest
25	03/15/2012	CAS 03-99-19 (TEJON), BERNALILLO after Closure Activities, Looking Southwest

PHOTOGRAPH NUMBER	DATE	DESCRIPTION
26	03/02/2011	CAS 09-99-06 (PLAYER), PLAYER Vertical Expansion Joint before Closure Activities, Looking South
27	03/02/2011	CAS 09-99-06 (PLAYER), Accelerometer before Closure Activities, Looking East
28	03/02/2011	CAS 09-99-06 (PLAYER), YORK Crater before Closure Activities, Looking North
29	03/02/2011	CAS 09-99-06 (PLAYER), YORK Wellhead before Closure Activities, Looking North
30	01/18/2012	CAS 09-99-06 (PLAYER), Construction of Access Road in YORK Crater, Looking East
31	01/30/2012	CAS 09-99-06 (PLAYER), Construction of Soil Cover, Looking Northwest
32	02/01/2012	CAS 09-99-06 (PLAYER), Raised and Leveled Concrete Pad at PLAYER, Looking Southeast
33	02/08/2012	CAS 09-99-06 (PLAYER), Placement of Casing at PLAYER, Looking South
34	02/08/2012	CAS 09-99-06 (PLAYER), Placement of Casing Over YORK Wellhead, Looking South
35	02/09/2012	CAS 09-99-06 (PLAYER), Casing Over Accelerometer and Soil Cover, Looking Northeast
36	02/13/2012	CAS 09-99-06 (PLAYER), Soil Cover near YORK, Looking South
37	02/14/2012	CAS 09-99-06 (PLAYER), Benches on YORK Crater Slope, Looking South
38	02/22/2012	CAS 09-99-06 (PLAYER), Construction of Soil Cover on YORK Crater Slope, Looking Southeast
39	02/28/2012	CAS 09-99-06 (PLAYER), Construction of Soil Cover on YORK Crater Slope, Looking Southwest
40	03/07/2012	CAS 09-99-06 (PLAYER), Compaction of Soil Cover on YORK Crater Slope, Looking South
41	03/08/2012	CAS 09-99-06 (PLAYER), Construction of Soil Cover, Looking West
42	03/14/2012	CAS 09-99-06 (PLAYER), Construction of Soil Cover on YORK Crater Slope, Looking South
43	04/25/2012	CAS 09-99-06 (PLAYER), After Closure Activities, Looking Southwest
44	04/25/2012	CAS 09-99-06 (PLAYER), After Closure Activities, Looking Northeast
45	06/28/2012	CAS 09-99-06 (PLAYER), Completed Soil Cover on YORK Crater Slope, Looking South
46	06/28/2012	CAS 09-99-06 (PLAYER), Completed Soil Cover, Looking South

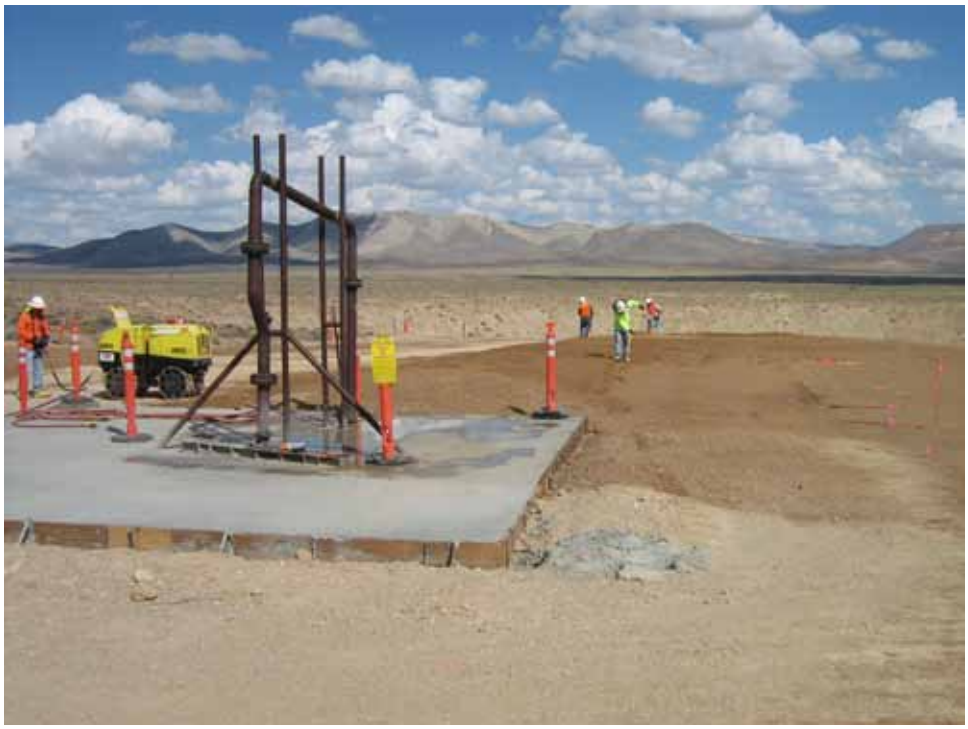
Photograph 1: CAS 02-37-02 (MULLET), Before Closure Activities, Looking East, 03/02/2011

Photograph 2: CAS 02-37-02 (MULLET), Placement of Clean Fill, Looking East, 08/29/2011

Photograph 3: CAS 02-37-02 (MULLET), Voids and Hole in Concrete Pad Filled with Concrete, Looking Southeast, 08/31/2011

Photograph 4: CAS 02-37-02 (MULLET), Delivery of Soil, Looking Southeast, 09/02/2011

Photograph 5: CAS 02-37-02 (MULLET), Compaction of Soil Cover, Looking East, 09/09/2011



Photograph 6: CAS 02-37-02 (MULLET), Raised and Leveled Concrete Pad, Construction of Soil Cover, Looking East, 09/12/2011

Photograph 7: CAS 02-37-02 (MULLET), Placement of Casing, Looking Northeast, 09/14/2011

Photograph 8: CAS 02-37-02 (MULLET), Construction of Soil Cover, Looking Southeast, 09/19/2011

Photograph 9: CAS 02-37-02 (MULLET), Placement of Jersey Barrier, Looking Southwest, 09/26/2011

Photograph 10: CAS 02-37-02 (MULLET), Fence, Jersey Barriers, Use Restriction Warning Sign, and Radiological Posting, Looking East, 09/26/2011

Photograph 11: CAS 02-37-02 (MULLET), Completed Soil Cover, Looking Southeast, 09/26/2011

Photograph 12: CAS 02-37-02 (MULLET), After Closure Activities, Looking East, 10/04/2011

Photograph 13: CAS 03-99-19 (TEJON), BERNALILLO before Closure Activities, Looking South, 03/02/2011

Photograph 14: CAS 03-99-19 (TEJON), TEJON before Closure Activities, Looking North, 03/02/2011

Photograph 15: CAS 03-99-19 (TEJON), Sampling Can at TEJON, 11/08/2011

Photograph 16: CAS 03-99-19 (TEJON), Placement of Casing Over the Sampling Can at TEJON, Looking North, 11/08/2011

Photograph 17: CAS 03-99-19 (TEJON),
Soil in Casing Over the Sampling Can at TEJON, 11/08/2011

Photograph 18: CAS 03-99-19 (TEJON), Compaction of Soil at TEJON,
Looking South, 11/09/2011

Photograph 19: CAS 03-99-19 (TEJON), Removal of the Vertical Vent Pipe at BERNALILLO, Looking South, 11/16/2011

Photograph 20: CAS 03-99-19 (TEJON), Raised and Leveled Concrete Pad at TEJON, Looking Northeast, 11/17/2011

Photograph 21: CAS 03-99-19 (TEJON), Construction of Soil Cover at BERNALILLO, Looking South, 11/22/2011

Photograph 22: CAS 03-99-19 (TEJON), Completed Soil Cover at BERNALILLO, Looking Southeast, 11/23/2011

Photograph 23: CAS 03-99-19 (TEJON), TEJON after Closure Activities, Looking North, 03/15/2012

Photograph 24: CAS 03-99-19 (TEJON), After Closure Activities, Looking Northwest, 03/15/2012

Photograph 25: CAS 03-99-19 (TEJON), BERNALILLO after Closure Activities, Looking Southwest, 03/15/2012

Photograph 26: CAS 09-99-06 (PLAYER), PLAYER Vertical Expansion Joint before Closure Activities, Looking South, 03/02/2011

Photograph 27: CAS 09-99-06 (PLAYER), Accelerometer before Closure Activities, Looking East, 03/02/2011

Photograph 28: CAS 09-99-06 (PLAYER), YORK Crater before Closure Activities, Looking North, 03/02/2011

Photograph 29: CAS 09-99-06 (PLAYER), YORK Wellhead before Closure Activities, Looking North, 03/02/2011

Photograph 30: CAS 09-99-06 (PLAYER), Construction of Access Road in YORK Crater, Looking East, 01/18/2012

Photograph 31: CAS 09-99-06 (PLAYER), Construction of Soil Cover, Looking Northwest, 01/30/2012

Photograph 32: CAS 09-99-06 (PLAYER), Raised and Leveled Concrete Pad at PLAYER, Looking Southeast, 02/01/2012

Photograph 33: CAS 09-99-06 (PLAYER), Placement of Casing at PLAYER, Looking South, 02/08/2012

Photograph 34: CAS 09-99-06 (PLAYER), Placement of Casing Over YORK Wellhead, Looking South, 02/08/2012

Photograph 35: CAS 09-99-06 (PLAYER), Casing Over Accelerometer and Soil Cover, Looking Northeast, 02/09/2012

Photograph 36: CAS 09-99-06 (PLAYER), Soil Cover near YORK, Looking South, 02/13/2012

Photograph 37: CAS 09-99-06 (PLAYER), Benches on YORK Crater Slope, Looking South, 02/14/2012

Photograph 38: CAS 09-99-06 (PLAYER), Construction of Soil Cover on YORK Crater Slope, Looking Southeast, 02/22/2012

Photograph 39: CAS 09-99-06 (PLAYER), Construction of Soil Cover on YORK Crater Slope, Looking Southwest, 02/28/2012

Photograph 40: CAS 09-99-06 (PLAYER), Compaction of Soil Cover on YORK Crater Slope, Looking South, 03/07/2012

Photograph 41: CAS 09-99-06 (PLAYER), Construction of Soil Cover, Looking West, 03/08/2012

Photograph 42: CAS 09-99-06 (PLAYER), Construction of Soil Cover on YORK Crater Slope, Looking South, 03/14/2012

Photograph 43: CAS 09-99-06 (PLAYER), YORK Casing and Soil Cover on YORK Crater Slope, Looking Southwest, 04/25/2012

Photograph 44: CAS 09-99-06 (PLAYER), After Closure Activities, Looking Northeast, 04/25/2012

Photograph 45: CAS 09-99-06 (PLAYER), Completed Soil Cover on YORK Crater Slope, Looking South, 06/28/2012

Photograph 46: CAS 09-99-06 (PLAYER), Completed Soil Cover, Looking South, 06/28/2012

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APPENDIX F

POST-CLOSURE PLAN

*As presented and published in the approved *Corrective Action Decision Document/Corrective Action Plan for Corrective Action Unit 547: Miscellaneous Contaminated Waste Sites, Nevada National Security Site, Nevada*, 2011, DOE/NV--1463. Las Vegas, NV.

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Progressive Monitoring Approach for CAU 547

1.0 INTRODUCTION

Corrective Action Unit (CAU) 547, Miscellaneous Contaminated Waste Sites, consists of sites that were a result of direct gas sampling activities during underground safety tests. The gas sampling piping, equipment, and instrumentation were left in place following these tests. A progressive monitoring approach will be used to provide a protective and cost effective method to monitor the CAU 547 sites and address potential contaminant migration in the future.

CAU 547 consists of the following three Corrective Action Sites (CASs):

- CAS 02-37-02, Gas Sampling Assembly (resulting from the MULLET test)
- CAS 03-99-19, Gas Sampling Assembly (resulting from the TEJON and BERNALILLO tests)
- CAS 09-99-06, Gas Sampling Assembly (resulting from the PLAYER test)

2.0 ROUTINE POST-CLOSURE MONITORING AND INSPECTIONS

The CAU 547 CASs will be closed in place by covering the exposed piping and equipment with a 2-foot soil cover, installing concrete barriers and steel casings, and implementing a use restriction (UR) to prohibit unauthorized intrusive activities. Post-closure inspections and monitoring will be required to verify that integrity and effectiveness of the covers are being maintained, and to identify repairs to correct the effects of settling, subsidence, erosion, or other impacts to the cover effectiveness.

The approach for long term monitoring is described below. However, if any changes are required to this approach, these will be documented in the Closure Report. The CADD/CAP will not require modification.

2.1 INSPECTIONS

For the first two years following placement of the covers, quarterly visual site inspections will be completed at the CAU 547 sites. Annual inspections will be performed in the following years. Inspections will be conducted to verify that the UR warning signs are in place and readable and that the UR has been maintained. In addition, the soil covers will be inspected for cracks, animal burrows, or other evidence of subsidence or erosion, and the integrity of the soil covers will be verified. In particular, the sloped section of the PLAYER site will be monitored for indications of erosion. Concrete barriers and steel casings will be visually inspected to verify integrity, stability, and that berms are present along the base as constructed.

In addition, non-scheduled inspections will be conducted if precipitation occurs in excess of 1.0 inch in a 24-hour period at the nearest rain gauge to each site (to be specified). These inspections will be conducted to verify the continued integrity of the soil covers and document erosion or other conditions requiring repair.

Signs and barriers will be repaired or replaced as necessary. If burrows greater than 6 inches deep are observed and/or if erosion/subsidence greater than 6 inches deep and 3 feet long is observed, notification to the Nevada Division of Environmental Protection (NDEP) will be made, the damaged area(s) will be radiologically surveyed prior to repair, and repairs will be made within 90 calendar days of discovery. If contamination is not detected above action levels, no additional monitoring will be required.

The inspection results will be documented in the annual combined post-closure letter report for closed non-*Resource Conservation and Recovery Act* (RCRA) CAUs and submitted to NDEP. The post-closure letter report will include a discussion of observations made during the inspections, and provide a summary of repair and maintenance activities. In addition, copies of the completed inspection checklists will be included in the post-closure letter report.

2.2 MAINTENANCE AND REPAIR

Any identified maintenance or repair requirements will be reported to NDEP and completed within 90 calendar days of discovery. Repair work shall preserve the intent of the cover design. If the cover repair requires the modification of the cover design, the U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office (NNSA/NSO) shall present a formal design modification request to NDEP prior to making the design modification. All repair and maintenance activities will be documented in writing at the time of the repair and included in the annual combined post-closure letter report for non-RCRA CAUs.

2.3 RADIOLOGICAL SURVEYS

As part of the closure process, baseline radiological surveys will be conducted at each site after remedial action is complete to document conditions at closure. While not part of the FFACO process, the newly constructed soil cover over the pipe at CAS 03-99-19 (TEJON/BERNALILLO) will be evaluated in accordance with the Nevada National Security Site (NNSS) Radiation Safety Prime Contractor's (RSPC) radiological control program and down posted, if possible, from a Contaminated Area (CA) to an Underground Radioactive Material Area (URMA) to facilitate future inspections. CAS 02-37-02 (MULLET) is expected to remain a CA because of contaminated soil at this site. The soil cover will remain posted as a CA because of the likelihood of contamination spreading onto it from the surrounding soils. CAS 09-99-06 (PLAYER) is expected to remain an URMA.

Radiological controls, boundaries, and postings will remain in effect at these sites. The sites will be incorporated into the NNSS RSPC demarcation maintenance program for long-term maintenance and will be surveyed to monitor and control the potential for radiological contamination migration. Surveys will be conducted at a minimum frequency of every four years for an URMA and two years for a CA and will be performed in accordance with approved Radiological Control Department procedures and technical basis documents, including TBD-P260-015, *Radiological Posting of Outdoor Areas*, TBD-P260-033, *Removable Soil Contamination Survey: Stomp and Tromp,* and TBD-P260-038, *Demarcation Maintenance Program.* Contamination migration outside of the posted areas will trigger additional posting of the area(s), notification to NDEP, and further evaluation as described in the progressive monitoring approach (Section 3.0).

Table 1 summarizes the post-closure inspection and monitoring activities that will be conducted, the compliance criteria established for each activity, and the actions required if the compliance criteria are exceeded.

TABLE 1. PROGRESSIVE APPROACH FOR CAU 547

PROGRESSIVE MONITORING STEP	BASELINE/ACCEPTABLE CONDITION	TRIGGER CONDITION FOR PROGRESSING TO THE NEXT STEP
Step 1: Routine Monitoring	Contamination is not detected above action levels; no additional monitoring will be required.	General area removable alpha contamination is detected in damaged areas above the CA limits.
Step 2: Evaluate Source (i.e., CAU 547 or nearby sites)	The contamination source is determined not to be from CAU 547. Resume routine monitoring.	The source is either determined to be CAU 547 or a source cannot be determined.
Step 3: Evaluate Extent of Contamination	Contamination is less than 4 square feet • Radiological surveys of the repaired areas for next two quarterly inspections. • Discontinue radiological surveys if additional contamination not detected.	Contamination is greater than 4 square feet **and/or** Additional contamination is discovered during quarterly monitoring.
Step 4: Perform Air Sampling	No airborne hazard exists or air sampling indicates that the source is not CAU 547. Air sampling will be discontinued.	Airborne hazard exists or air sampling indicates that the source is CAU 547.
Step 5: Evaluate Design for Effectiveness	Design effective, increased monitoring will continue.	Design for a CAS or portion of a CAS shown not to be effective, propose design changes to NDEP for approval and implementation.

CA limits are consistent with DOE Orders and are currently specified within the Nevada Test Site Radiological Control Manual Table 2-2.

NDEP: Nevada Division of Environmental Protection
UR: Use restriction

3.0 PROGRESSIVE MONITORING APPROACH

As described in Section 2.0, visual inspections will be conducted periodically, and in the event that precipitation occurs in excess of 1.0 inch in a 24-hour period. Radiological surveys will be conducted as part of the repairs and maintenance activities to determine if there has been a potential release of radioactive material from these sites as a result. These steps are described below and in Table 1. These are also shown in Figure 1.

Routine Monitoring: Visual inspections will be conducted quarterly for the first two years, then annually and in the event that precipitation occurs in excess of 1.0 inch in a 24-hour period. If burrows are observed and/or if erosion/subsidence greater than 6 inches deep and 3 feet long is observed, NDEP will be notified, the damaged area(s) will be radiologically surveyed prior to repair, and repairs will be made within 90 calendar days of discovery. If contamination is not detected above action levels, no additional monitoring will be required.

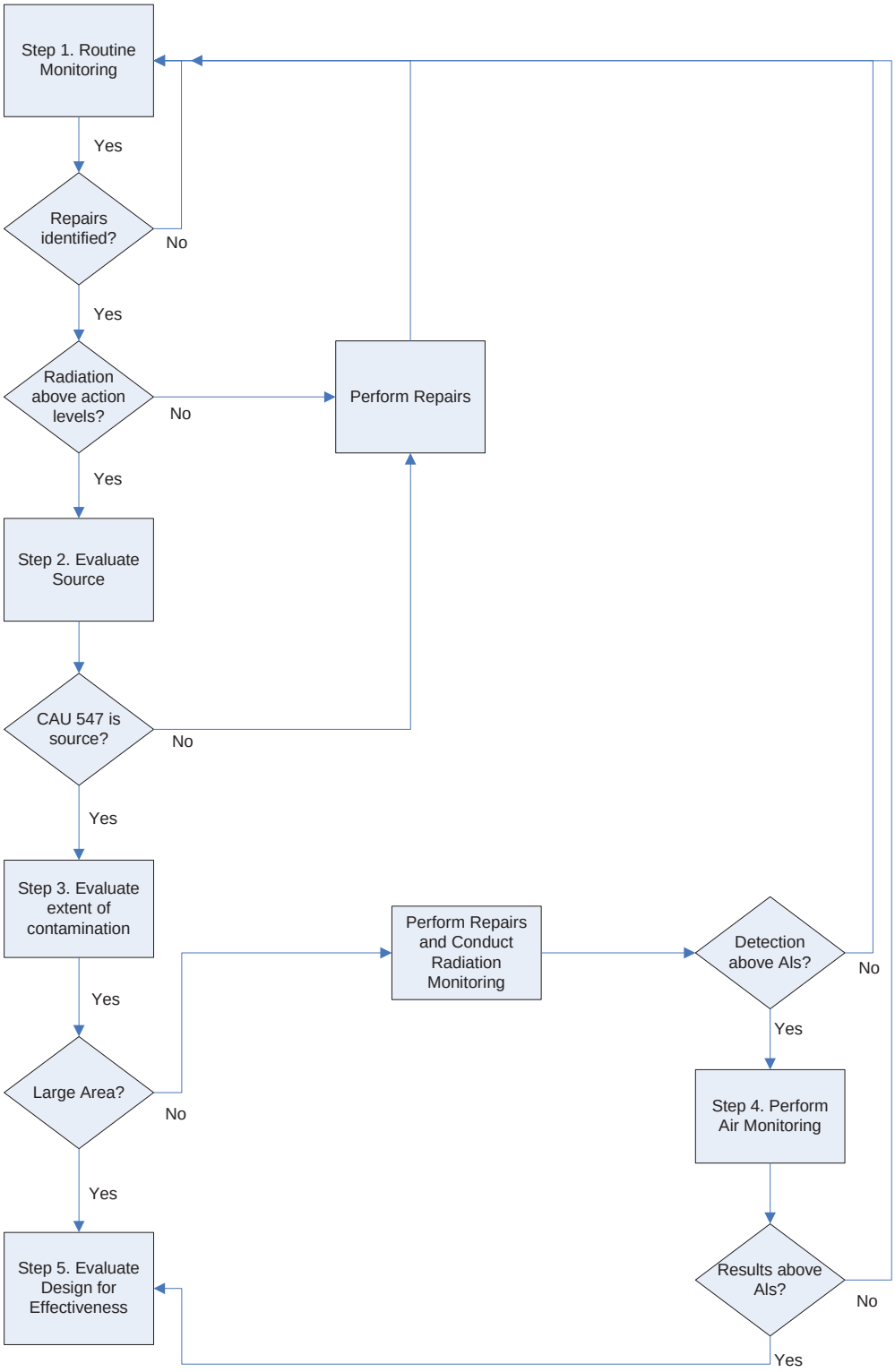
The post-closure program will be evaluated to determine whether the frequency and/or approach should be modified. If there is no additional radiation detected during the monitoring evaluations, NNSA/NSO may request that the frequency and/or complexity of monitoring be adjusted.

Minor Contamination is Detected: If general area removable alpha contamination is detected in damaged areas above CA limits, then an evaluation will be performed to determine the source of the contamination. If the source of the contamination is determined not to be from CAU 547, then no additional monitoring will be required and routine monitoring will resume. The following lines of inquiry will be used as appropriate to guide the evaluation and determine if the contamination is attributable to CAU 547:

- Is the pipe exposed, and/or is there evidence of a breach?
- Do radiological surveys indicate that the contamination is highest in the immediate vicinity of the damaged area, consistent with a compromised pipe, or is it widespread indicating a source other than CAU 547?
- Is contamination present in or on the clean fill material within the damaged area, indicating the source of contamination is from a compromised pipe, or is it primarily on the surface of the berms, indicating a source other than CAU 547?
- Are the contaminants similar to what is in the pipe indicating the source of contamination is from a compromised pipe, or dissimilar, indicating a source other than CAU 547?

If the evaluation described above determines that the source of contamination is CAU 547, then the extent of contamination will be evaluated using approved radiological survey methods and techniques. For areas where contamination is less than 4 square feet, repairs will be made, and the following two quarterly inspections will require radiological surveys of the repaired areas. These radiological surveys of the repaired areas will be discontinued if no additional contamination above CA limits is detected. If additional contamination is discovered during the quarterly surveys, then additional evaluation will be performed to determine the source of the contamination and determine if additional repairs are required.

FIGURE 1. DECISION TREE FOR THE CAU 547 SITES MONITORING



Contamination Detected in Larger Areas: If the extent of removable alpha contamination detected above CA limits is greater than 4 square feet, and if there is a potential risk for spread of contamination outside the posted area, then air sampling/monitoring will be implemented in accordance with approved Radiological Control Department procedures and technical basis documents to determine if an airborne hazard exists. Data from multiple air samplers should be compared to the CAU 547 information to determine if the contamination, if present, is most likely from CAU 547 or most likely from another source (non-CAU 547).

After 2 weeks of consecutive air sampling, if the source of the contamination has been repaired, and an airborne radioactivity hazard is proven not to exist, air sampling can be discontinued. If an airborne radioactivity hazard exists that is related to CAU 547, then the design for that CAS will be evaluated for effectiveness. In areas where the design is not effective, changes will be proposed to NDEP through the Record of Technical Change or revision process and implemented after approval. In addition, where contamination is greater than 20 square feet, the design for that CAS or portion of a CAS will be evaluated for effectiveness. Changes will be proposed as above if the design is shown not to be effective.

4.0 REFERENCES

National Security Technologies, LLC, 2009. *Air Sampling.* OP-0441.209. Las Vegas, NV.

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