

Nevada
Environmental
Restoration
Project

DOE/NV--661



Corrective Action Decision
Document/Closure Report for
Corrective Action Unit 252:
Area 25 Engine Test Stand-1
Decontamination Pad,
Nevada Test Site, Nevada

Controlled Copy No : ____

Revision No : 0

October 2000

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**CORRECTIVE ACTION DECISION DOCUMENT/
CLOSURE REPORT
FOR CORRECTIVE ACTION UNIT 252:
AREA 25 ENGINE TEST STAND-1
DECONTAMINATION PAD,
NEVADA TEST SITE, NEVADA**

DOE Nevada Operations Office
Las Vegas, Nevada

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**CORRECTIVE ACTION DECISION DOCUMENT/CLOSURE REPORT
FOR CORRECTIVE ACTION UNIT 252:
AREA 25 ENGINE TEST STAND-1 DECONTAMINATION PAD,
NEVADA TEST SITE, NEVADA**

Approved by: _____ Date: _____

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List of Acronyms and Abbreviations

bgs	Below ground surface
CADD/CR	Corrective Action Decision Document/Closure Report
CAIP	Corrective Action Investigation Plan
CAS	Corrective Action Site
CAU	Corrective Action Unit
CLP	Contract Laboratory Program
COC	Contaminant(s) of concern
COPC	Contaminant(s) of potential concern
CRDL	Contract-required detection limit
DOE/NV	U.S. Department of Energy, Nevada Operations Office
DQO	Data Quality Objective(s)
EPA	U.S. Environmental Protection Agency
FFACO	<i>Federal Facility Agreement and Consent Order</i>
FSL	Field-screening level(s)
ft	Foot (feet)
IDL	Instrument detection limit
in.	Inch(es)
LCS	Laboratory control sample(s)
mi	Mile(s)
mg/kg	Milligram(s) per kilogram
MS/MSD	Matrix spike/matrix spike duplicate
NDEP	Nevada Division of Environmental Protection
NIST	National Institute for Standards and Technology
NTS	Nevada Test Site
PAL	Preliminary action level(s)
PB	Preparation blanks
PCB	Polychlorinated biphenyls

List of Acronyms and Abbreviations (Continued)

pCi/g	Picocurie(s) per gram
ppm	Part(s) per million
PRG	Preliminary Remediation Goals
QA	Quality assurance
QAPP	Quality Assurance Project Plan
QC	Quality control
RCRA	<i>Resource Conservation and Recovery Act</i>
RPD	Relative percent difference
SDG	Sample delivery group
SVOC	Semivolatile organic compound(s)
TPH	Total petroleum hydrocarbons
VOC	Volatile organic compound(s)
%R	Percent recovery

Executive Summary

This Corrective Action Decision Document/Closure Report has been prepared for Corrective Action Unit (CAU) 252: Area 25 Engine Test Stand-1 Decontamination Pad, in accordance with the *Federal Facility Agreement and Consent Order* (FFACO, 1996). Corrective Action Site 25-07-04, Decontamination Pad is the only Corrective Action Site within CAU 252. The Corrective Action Decision Document and Closure Report have been combined into one report because the contaminants of potential concern were either not present in the soil, or are present at naturally occurring concentrations.

The purpose of this Corrective Action Decision Document/Closure Report is to justify and recommend that no corrective action is required at CAU 252. To achieve this, the following actions are required:

- Review the current site conditions based on corrective action investigation results.
- Document closure of the CAU.

Corrective action investigation activities were performed as set forth in the *Corrective Action Investigation Plan for Corrective Action Unit 252, Area 25 Engine Test Stand-1 Decontamination Pad, Nevada Test Site, Nevada* (DOE/NV, 1999). The purpose of the corrective action investigation is described as follows:

- Identify the presence, distribution, and concentrations of contaminants of potential concern (COPCs) at the CAU.
- Determine the vertical and lateral extent of COPCs.
- Provide sufficient information and data to develop appropriate corrective actions for the CAU.

Analytes detected during the corrective action investigation were evaluated against preliminary action levels to determine contaminants of concern for CAU 252. Analysis of the data generated from corrective action investigation activities indicates the preliminary action levels were not exceeded for total volatile organic compounds, total semivolatile organic compounds, total petroleum hydrocarbons as diesel-range organics, total pesticides, polychlorinated biphenyls, total *Resource Conservation and Recovery Act* metals (except arsenic), gamma-emitting radionuclides, isotopic uranium, and isotopic plutonium for any of the soil samples collected from CAU 252. A

concentration of arsenic was detected above the preliminary action level in one sample; however, the concentration is considered representative of ambient conditions at the site.

The U.S. Department of Energy, Nevada Operations Office provides the following recommendations:

- No corrective action is required at CAU 252.
- No corrective action plan is required.
- A Notice of Completion to the U.S. Department of Energy, Nevada Operations Office is requested from the Nevada Division of Environmental Protection for the closure of CAU 252, Area 25 Engine Test Stand-1 Decontamination Pad (Corrective Action Site 25-07-04).
- CAU 252 should be moved from Appendix III to Appendix IV of the *Federal Facility Agreement and Consent Order*.
- No use restrictions are required to be placed on the CAU.

1.0 Introduction

This Corrective Action Decision Document/Closure Report (CADD/CR) has been prepared for Corrective Action Unit (CAU) 252, Area 25 Engine Test Stand-1 Decontamination Pad, in accordance with the *Federal Facility Agreement and Consent Order* (FFACO) that was agreed to by the U.S. Department of Energy, Nevada Operations Office (DOE/NV); the Nevada Division of Environmental Protection (NDEP); and the U.S. Department of Defense (FFACO, 1996). Corrective Action Site (CAS) 25-07-04, Decontamination Pad, is the only CAS within CAU 252. The CADD and CR have been combined into one report because sample data collected during the corrective action investigation indicated that contaminants of concern (COCs) were either not present in the soil, or present at concentrations not requiring corrective action.

Corrective Action Unit 252 is located in Area 25 of the Nevada Test Site (NTS) in Nevada. The NTS is approximately 65 miles (mi) northwest of Las Vegas, Nevada ([Figure 1-1](#) and [Figure 1-2](#)).

1.1 Purpose

This CADD/CR provides justification for no further action at CAU 252. The justification is based on the results of investigative activities conducted in accordance with the *Corrective Action Investigation Plan (CAIP) for Corrective Action Unit 252, Area 25 Engine Test Stand-1 Decontamination Pad, Nevada Test Site, Nevada* (DOE/NV, 1999).

1.2 Scope

The scope of this CADD/CR is to justify and recommend that no corrective action is required at CAU 252. To achieve this scope, the following actions are required:

- Review the current site conditions based on corrective action investigation results.
- Document closure of the CAU.

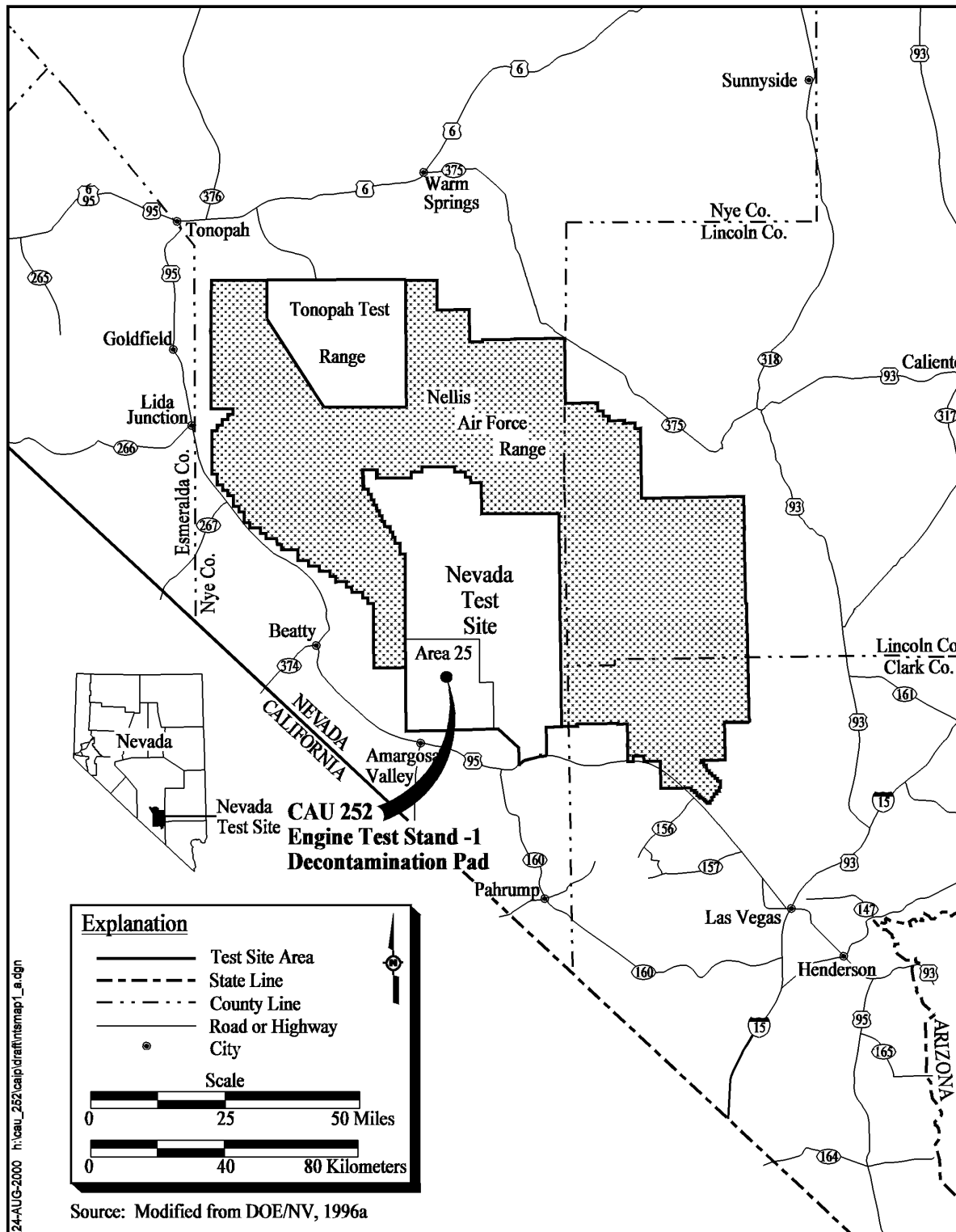


Figure 1-1
Nevada Test Site and CAU 252, Area 25 Engine Test Stand-1
Decontamination Pad Location Map, Nevada

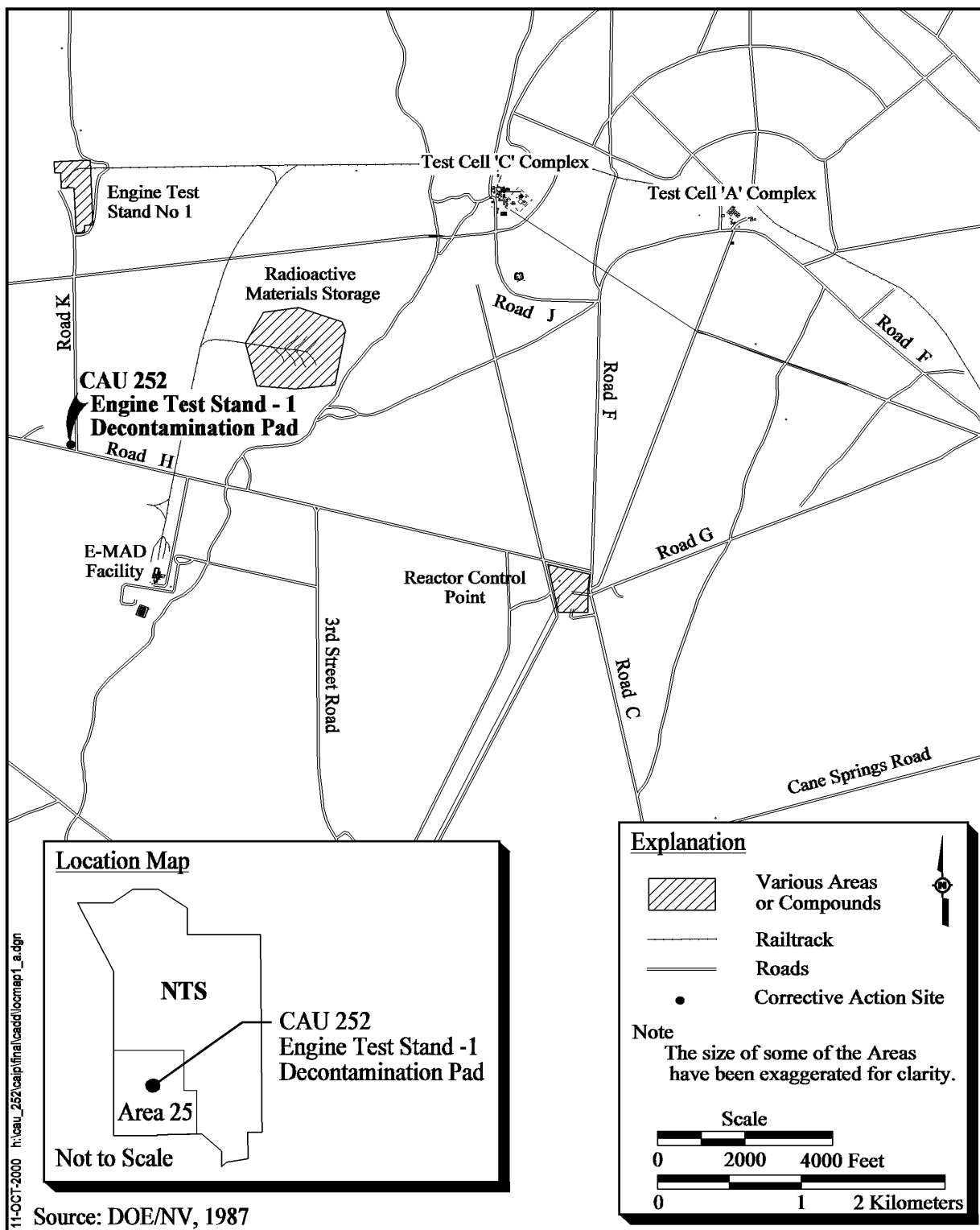


Figure 1-2
CAU 252, Area 25 Engine Test Stand-1
Decontamination Pad Location, Nevada Test Site

1.3 CADD/CR Contents

This CADD/CR is divided into the following sections:

[Section 1.0](#) - Introduction: summarizes the purpose, scope, and contents of this CADD/CR.

[Section 2.0](#) - Corrective Action Investigation Summary: summarizes the investigation activities, the results of the investigation, and the justification for no further action.

[Section 3.0](#) - Recommendation: recommends no further action is required at the CAU and requests a Notice of Completion.

[Section 4.0](#) - References: provides a list of all referenced documents.

[Appendix A](#) - *Corrective Action Investigation Report for CAU 252: Area 25 Engine Test Stand-1 Decontamination Pad, Nevada Test Site, Nevada*

[Appendix B](#) - Nevada Department of Environmental Protection Document Review Sheets

All work was performed in accordance with the following documents:

- *Corrective Action Investigation Plan for Corrective Action Unit 252, Area 25 Engine Test Stand-1 Decontamination Pad, Nevada Test Site, Nevada*, Rev. 1, DOE/NV--556 (DOE/NV, 1999)
- *Industrial Sites Quality Assurance Project Plan (QAPP)*, Rev. 1, DOE/NV--372 (DOE/NV, 1996b)
- FFACO (FFACO, 1996)
- *Project Management Plan*, Rev. 0 (DOE/NV, 1994)

2.0 Corrective Action Investigation Summary

The following sections describe and summarize the results of the investigation activities conducted at CAU 252. For detailed investigation results, please refer to [Appendix A](#).

2.1 Investigation Activities

Corrective action investigation activities were performed as set forth in the CAIP (DOE/NV, 1999). The purpose of the investigation was the following:

- Identify the presence, distribution, and concentrations of contaminants of potential concern (COPCs) at the CAU.
- Determine the vertical and lateral extent of COPCs.
- Provide sufficient information and data to develop appropriate corrective actions for the CAU.

The investigation activities are summarized below:

- Collected a total of six surface and near-surface environmental soil samples from the excavation of five sample locations. The samples were collected from 0 to 0.5 feet [ft] and 4 to 4.5 ft below ground surface (bgs) and submitted to an off-site laboratory for the following analyses:
 - Total volatile organic compounds (VOCs); total semivolatile organic compounds (SVOCs); total *Resource Conservation and Recovery Act* (RCRA) metals; total pesticides, total petroleum hydrocarbons (TPH) (diesel-range organics), and polychlorinated biphenyls (PCBs), isotopic uranium, isotopic plutonium, and gamma-emitting radionuclides
- Soil samples were field screened for VOCs and radiological activity to guide soil sampling activities.

2.2 Results

Analysis of the data generated from corrective action investigation activities conducted at CAU 252 indicates that analytes were not detected at concentrations above the minimum reporting limits for VOCs, SVOCs, TPH, pesticides, PCBs, RCRA metals, or isotopic plutonium. The preliminary action levels (PALs) for gamma-emitting radionuclides and isotopic uranium were not exceeded in soil

samples collected from the site. The PAL for arsenic was exceeded in one sample, but the concentration is considered representative of ambient conditions at this site.

Details of the methods used and results found during the investigation are presented in [Appendix A](#). Based on these results, the CAU 252 site has been adequately characterized.

2.3 *Need for Corrective Action*

Analytes detected during the corrective action investigation were evaluated against PALs to determine COCs for CAU 252. Analytical results did not exceed PALs, except for the arsenic concentration in one sample. However, the concentration of arsenic in this sample is considered ambient at this site (Moore, 1999). Therefore, no corrective action is necessary for this site.

3.0 Recommendation

Based on the results of the corrective action investigation in [Appendix A](#), no COCs have been identified in the soil at CAU 252. The DOE/NV provides the following recommendations:

- No corrective action is required at CAU 252.
- No corrective action plan is required.
- A Notice of Completion to DOE/NV is requested from NDEP for the closure of CAU 252, Area 25 Engine Test Stand-1 Decontamination Pad (CAS 25-07-04).
- CAU 252 should be moved from Appendix III to Appendix IV of the FFACO.
- No use restrictions are required to be placed on the CAU.

4.0 References

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

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

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

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

U.S. Department of Energy, Nevada Operations Office. 1987. *Nevada Test Site - Environmental Compliance Atlas*, 15 June. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1994. *Project Management Plan*, Rev. 0. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1996a. *Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada*, DOE/EIS 0243. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1996b. *Industrial Sites Quality Assurance Project Plan, Nevada Test Site, Nevada*, Rev. 1, DOE/NV--372. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1999. *Corrective Action Investigation Plan for Corrective Action Unit 252: Area 25 Engine Test Stand-1 Decontamination Pad, Nevada Test Site, Nevada*, Rev. 0, DOE/NV--556. Las Vegas, NV.

Appendix A

Corrective Action Investigation Report for CAU 252: Area 25 Engine Test Stand-1 Decontamination Pad, Nevada Test Site, Nevada

A.1.0 Introduction

This appendix presents corrective action investigation activities and analytical results for CAU 252, Engine Test Stand-1 Decontamination Pad, at the NTS. Corrective Action Unit 252 consists of CAS 25-07-04, Decontamination Pad. The corrective action investigation was conducted in accordance with the CAIP (DOE/NV, 1999) as developed under the FFACO (1996).

For the purposes of this discussion, this site will be referred to as either CAU 252 or the ETS-1 Decontamination Pad.

The ETS-1 Decontamination Pad was designed for use as a mobile radiation checkpoint and vehicle decontamination. The site is located at the intersection of Roads H and K, south of the ETS-1 Facility at the NTS, 65 mi northwest of Las Vegas, Nevada. Process knowledge indicates that potentially hazardous wastes could have been discharged to a sump ([Figure A.2-1](#)). Two pipes discharged to the sump, one from the decontamination pad drain and the other as a sewer pipe for a trailer. Soil near the northeast corner of the decontamination pad may also be contaminated. The decontamination pad slopes toward the northeast and effluent from the vehicle decontamination process could have drained across the pad and ponded on the adjacent soil. Preliminary analytical results (Forsgren, 1998) showed no presence of COPCs above U.S. Environmental Protection Agency (EPA) Region IX Industrial Soil Preliminary Remediation Goals (PRGs) (EPA, 1998) in the surface soil northeast of the decontamination pad. Additional information regarding the history of the site, planning, and the scope of the investigation is presented in the CAIP (DOE/NV, 1999) and will not be repeated in this report.

A.1.1 Project Objectives

The ETS-1 Decontamination Pad was investigated to determine the presence and extent of COPCs and to provide sufficient information and data to develop appropriate corrective action alternatives for ETS-1 Decontamination Pad.

The primary objectives of the investigation were as described below:

- Identify the presence, distribution, and concentrations of COPCs at the CAU.

- Determine the vertical and lateral extent of COPCs.
- Provide sufficient information and data to develop appropriate corrective actions for the CAU.

The selection of soil sample locations for the three sites was based on site conditions and the strategy developed during the DQO process as outlined in the CAIP (DOE/NV, 1999).

A.1.2 Report Content

This report contains information and data in sufficient detail to support the selection of a no further action alternative in the CADD/CR. The contents of this report are as follows:

- [Section A.1.0](#) describes the investigation background, objectives, and the report content.
- [Section A.2.0](#) provides information regarding the field activities and sampling methods.
- [Section A.3.0](#) summarizes the results of the laboratory analyses from the investigation sampling.
- [Section A.4.0](#) discusses the Quality Assurance (QA) and Quality Control (QC) procedures that were followed and the results of the QA/QC activities.
- [Section A.5.0](#) is a summary of the investigation results.
- [Section A.6.0](#) provides the cited references.

The complete field documentation and laboratory data, including Field Activity Daily Logs, Sample Collection Logs, Analysis Request/Chain-of-Custody Forms, soil sample descriptions, laboratory certificates of analyses, analytical results, and surveillance results are retained in project files.

A.2.0 Field Investigation and Sampling Activities

The field investigation and sampling activities were conducted on June 19 and 21, 2000. Soil samples from the surface and near-surface were collected from the excavation of both test pits and a sump. Soil and water samples were collected for QC. Soil samples were field screened for VOCs and radiological activity to guide soil sampling activities. Field-screening levels (FSLs) were not exceeded. All environmental and QC samples were submitted for off-site laboratory analyses. At the conclusion of the field investigation, material excavated from sample locations was replaced.

The field investigation and sampling program was managed in accordance with the requirement set in the CAIP (DOE/NV, 1999). The field activities were performed in accordance with an approved Site-Specific Health and Safety Plan (IT, 1999). The samples were collected and documented by following approved protocols and procedures for sample collection, field activity documentation, decontamination, chain of custody preparation, shipping, and conducting radiation surveys as indicated in the CAIP (DOE/NV, 1999). Quality control samples (e.g., field blanks, equipment rinsate blanks, trip blanks, and sample duplicates) were collected as required by the Industrial Sites QAPP (DOE/NV, 1996) and approved procedures. During field activities, waste minimization practices were followed according to approved procedures, including segregation of waste by stream.

A.2.1 Site Descriptions and Conditions

Dimensions of the entire CAU 252 site are 115 by 60 ft and include the following structures:

- A concrete decontamination pad that measures approximately 35 by 15 ft with a grated drain (18 by 6 inches [in.]). There are two light poles on either side of the pad. The decontamination pad slopes to the northeast.
- A gravel-filled sump that measures 31 by 35 ft. The surface of the sump is below the general elevation of the nearby area.
- Concrete trailer pads, including two parallel concrete pads that measure 3 by 55 ft and two parallel concrete pads that measure 3 by 18 ft. Two smaller concrete pads were for the trailer tongues.
- Several utility boxes.

There are no visible stains or odors at the site. A preliminary sample (ERS00044) was collected on August 15, 1997 (Forsgren, 1998). The sample was collected from the soil near the northwest corner of the decontamination pad. The sample was analyzed for parameters listed in [Table A.3-2](#). The results did not indicate any other COPCs above levels requiring corrective action.

A.2.1.1 Sample Locations

Sampling locations were biased and selected based on process knowledge, engineering drawings, and interviews. Samples were collected at approximately 2-foot intervals to a maximum depth of 4.5 ft bgs or below the gravel fill and native soil interface from the following locations:

- The sump where the decontamination pad drain pipe discharged.
- The sump where the sewer pipe discharged.
- The soil near the northeast corner of the decontamination pad where runoff from decontamination effluent would have most likely ponded.

Soil samples were collected for laboratory analysis as follows:

- Soil samples were collected at the gravel/soil interface in each of the sump test pits. Soil samples were collected from each test pit at approximately 2-ft depth intervals until two consecutive samples had been collected below FSLs. A minimum of two samples were collected for off-site laboratory analysis.
- At the test pit near the northeast corner of the decontamination pad, soil sampling began at ground surface and continued at approximately 2-ft depth intervals until two consecutive samples had been collected below FSLs. A minimum of two samples were collected for off-site laboratory analysis.

The test pit locations are shown in [Figure A.2-1](#).

A.2.1.2 Excavation Activities

A utility survey was conducted prior to excavation activities. For excavation, a backhoe was used to remove the gravel from the sump and to excavate three test pits (limited excavation) at the site (see [Figure A.2-1](#)). Two test pits were excavated in the sump at the discharge locations for the trailer sewage pipe and the decontamination pad drainage pipe. The third test pit was excavated near the northeast corner of the decontamination pad.

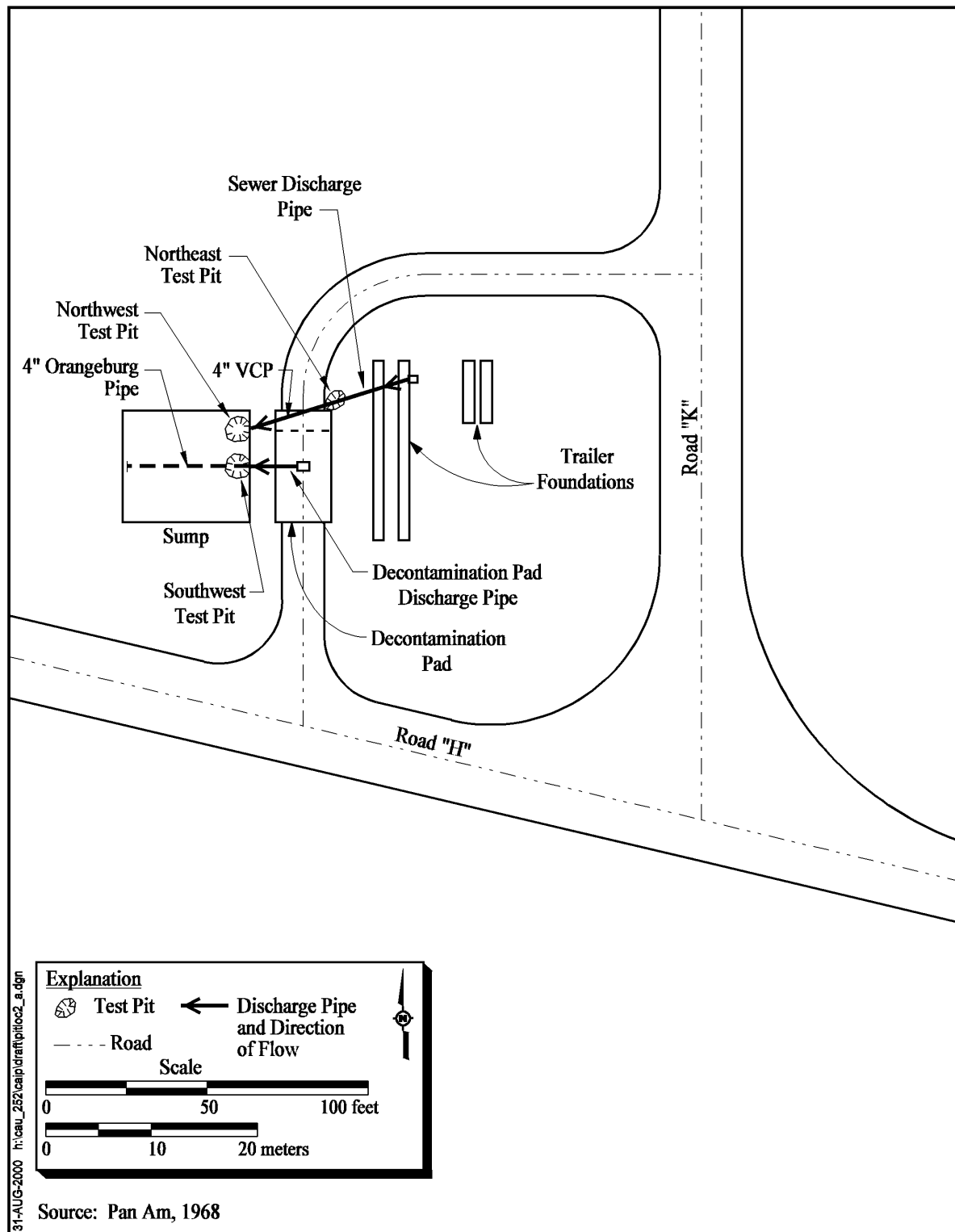


Figure A.2-1
CAU 252, Area 25 Engine Test Stand-1 Decontamination Pad and Test Pit Locations

A.2.1.3 Field Screening

Field-screening activities were performed as specified in the CAIP (DOE/NV, 1999). Field-screening for VOCs were determined using the headspace method with a photoionization detector and a water bath at constant temperature, and for radiation by surveying for both alpha and beta activity using an NE Technology model Electra and gamma activity using a Bicron[®] microrem detector. The FSL for VOC headspace was established at 20 parts per million (ppm) or 2.5 times background, whichever is greater. The FSL for radiation was defined as the mean background activity level plus two times the standard deviation of 20 surficial background sample readings. The radiological FSLs were determined prior to the start of field activities using an Electra alpha/beta scintillator and a Bicron[®] microrem detector by taking 20 surficial background sample readings and calculating the mean plus two standard deviations. Established FSLs were used to guide sample collection both laterally and vertically.

A.2.2 Sample Collection

Sample collection was performed as specified in the CAIP (DOE/NV, 1999). Samples were collected directly from the backhoe bucket, except for a single surface sample. Only media suitable for laboratory analysis were submitted. Samples were monitored for health and safety purposes upon retrieval, and then screened for comparison to radiological and VOC FSLs (as described in [Section A.2.1.3](#)). The uppermost sample retained for submittal to the laboratory was from the first interval sampled at each location. The lower sample was collected and submitted from the bottommost interval (maximum depth) displaying monitored results less than FSLs. The samples were submitted for off-site laboratory analysis for the parameters listed in [Table A.3-2](#).

Soil sampling and screening of sump contents within both of the test pits began at the gravel/soil interface and continued vertically in approximately 2-ft increments (i.e., 0-0.5, 2-2.5, and 4-4.5 ft below gravel/soil interface). The FSLs were not exceeded; therefore, samples from 0-0.5 and 4-4.5 ft bgs were submitted for analysis. Soil sampling of the northeast test pit began at the ground surface and continued in approximately 2-ft increments (i.e., 0-0.5, 2-2.5, and 4-4.5 ft below gravel/soil interface). The FSLs were not exceeded; therefore, samples from 0-0.5 and 4-4.5 ft bgs were submitted for analysis.

Soil descriptions performed by the sampling team were recorded on Sample Collection Logs which are located in the project files.

The samples were collected from the aforementioned intervals and placed into the appropriate containers. The VOC soil samples were immediately placed into a jar and sealed. The headspace sample, used for field-screening purposes, was then collected and sealed. The soil samples for the SVOCs, RCRA metals, PCBs, pesticides, and radionuclides analyses were homogenized in a steel bowl, screened for radionuclides, containerized, and sealed.

A.2.3 *Geology*

Corrective Action Unit 252 is located in Jackass Flats. The Jackass Flats basin was formed by faulting of Paleozoic carbonate rocks. The Paleozoic rock and clastic sediment are approximately 22,000 ft thick and overlain by welded and semiwelded ashflow and ash fall tuffs of Tertiary age, approximately 5,000 ft thick. The most prominent structural feature in Jackass Flats is a fault which trends northeast and is located west of Well J-11. Surface geology and soils in Area 25 consists of silty sand, ranging from fine sand to coarse sand and gravel. These types of soils are generally unstable and cohesionless. Other rock types in the surrounding area include shales, quartzites, and carbonates of Lower to Middle Cambrian age; carbonate and thin shale layers of Middle Cambrian to Devonian age; and argillites, cherty limestones, and conglomerates of Devonian to Permian age. Soils in the area range from poorly sorted silt to coarse sand and gravel (SNPO, 1970).

A.2.4 *Hydrology*

The alluvium and colluvium lie above the saturated zone throughout nearly all of Jackass Flats. The Paleozoic sedimentary rocks contain limestone and dolomite units that are excellent water producers elsewhere; however, these units are too deep in Jackass Flats to be economic water sources. The only important water-producing unit known in the vicinity of the area is a welded-tuff aquifer, the Topopah Spring Member of the Paintbrush tuff (DRI, 1988; SNPO, 1970).

The three water supply wells within Area 25 are Wells J-11, J-12, and J-13. Yucca Flat, Frenchman Flat, and Jackass Flats are believed to be hydraulically connected, with groundwater moving along

fracture zones in the carbonates. It is thought that the present groundwater is a result of rainfall in the past, and that no significant recharge of groundwater is occurring now (SNPO, 1970).

Surface water is ephemeral and is a function of variations in annual climate patterns. Climate in this area is affected by the rain shadow of the Sierra Nevada Mountain Range. The average annual rainfall for Jackass Flats is approximately 4 in. (DOE, 1988).

A.3.0 Investigation Results

The analytical results of samples collected from the CAU 252 investigation have been compiled and evaluated to determine the presence and/or extent of contamination. The analytical results that are above the minimum reporting limits are summarized in the following subsections. The complete laboratory results data packages are available in the project files.

During investigation activities, seven soil and eight water samples were submitted for analyses. All analyses were performed by Paragon Analytics, Inc., Fort Collins, Colorado. A list of the samples collected and analyzed for the investigation are presented in [Table A.3-1](#). The analytical parameters and laboratory's analytical methods performed for this investigation are presented in [Table A.3-2](#).

The analytical parameters were selected through the application of site process knowledge according to the EPA's *Guidance for the Data Quality Objectives (DQOs) Process* (EPA, 1994a). Preliminary action levels for off-site laboratory analytical methods were determined during the DQO process and are documented in the CAIP (DOE/NV, 1999; EPA, 1998). Sampling activities were conducted to confirm or disprove assumptions (i.e., models outlined in CAIP) made in the DQO process (DOE/NV, 1999).

A.3.1 Total Volatile Organic Compound Analytical Results

Total VOCs were not detected at concentrations above the minimum reporting limits (DOE/NV, 1999).

A.3.2 Total Semivolatile Organic Compound Analytical Results

Total SVOCs were not detected at concentrations above the minimum reporting limits (DOE/NV, 1999).

A.3.3 Total Petroleum Hydrocarbon Analytical Results

Total petroleum hydrocarbons, as diesel-range organics, were not detected at concentrations above the minimum reporting limits (DOE/NV, 1999).

Table A.3-1
Samples Collected During the CAU 252, Area 25 Engine Test Stand-1
Decontamination Pad, Corrective Action Investigation
(Page 1 of 2)

Sample Number	Sample Location	Depth (ft bgs)	Sample Matrix	Sample Type	Parameters Analyzed
Northeast Test Pit					
ETSDP001	Northeast Test Pit	0-0.5	Soil	Environmental	Total VOCs, Total SVOCs, TPH, Total RCRA Metals, Gamma Spectrometry, PCBs, Total Pesticides, Isotopic Pu, Isotopic U
ETSDP003	Northeast Test Pit	4-4.5	Soil	Environmental/MS/MSD	Total VOCs, Total SVOCs, TPH, Total RCRA Metals, Gamma Spectrometry, PCBs, Total Pesticides, Isotopic Pu, Isotopic U
ETSDP004	Northeast Test Pit	4-4.5	Soil	Field Duplicate of ETSDP003	Total VOCs, Total SVOCs, TPH, Total RCRA Metals, Gamma Spectrometry, PCBs, Total Pesticides, Isotopic Pu, Isotopic U
Northwest Test Pit					
ETSNS001	In Sump and East of Northwest Test Pit	gravel/soil	Soil	Environmental	Total VOCs, Total SVOCs, TPH, Total RCRA Metals, Gamma Spectrometry, PCBs, Total Pesticides, Isotopic Pu, Isotopic
ETSNS003	In Sump and West of Northwest Test Pit	4-4.5	Soil	Environmental	Total VOCs, Total SVOCs, TPH, Total RCRA Metals, Gamma Spectrometry, PCBs, Total Pesticides, Isotopic Pu, Isotopic U
Southwest Test Pit					
ETSSS001	In Sump Above Decontamination Pad Drainage Pipe and East of South Test Pit	0-0.5	Soil	Environmental	Total VOCs, Total SVOCs, TPH, Total RCRA Metals, Gamma Spectrometry, PCBs, Total Pesticides, Isotopic Pu, Isotopic U
ETSSS003	In Sump and Southwest of Southwest Test Pit	4-4.5	Soil	Environmental	Total VOCs, Total SVOCs, TPH, Total RCRA Metals, Gamma Spectrometry, PCBs, Total Pesticides, Isotopic Pu, Isotopic U
Quality Control Water Samples					
ETSDP200	*	NA	Water	Trip Blank	Total VOCs
ETSDP201	Bechtel NV Water Truck Located At Intersection of Roads H & K	NA	Water	Source Blank	Total VOCs, Total SVOCs, TPH, Total RCRA Metals, Gamma Spectrometry, PCBs, Total Pesticides, Isotopic Pu, Isotopic U
ETSDP202	*	NA	Water	Trip Blank	Total VOCs
ETSDP203	From Backhoe Bucket Located Directly North of Sump	NA	Water	Equipment Rinsate Blank	Total VOCs, Total SVOCs, TPH, Total RCRA Metals, Gamma Spectrometry, PCBs, Total Pesticides, Isotopic Pu, Isotopic U
ETSDP204	*	NA	Water	Trip Blank	Total VOCs

Table A.3-1
Samples Collected During the CAU 252, Area 25 Engine Test Stand-1
Decontamination Pad, Corrective Action Investigation
(Page 2 of 2)

Sample Number	Sample Location	Depth (ft bgs)	Sample Matrix	Sample Type	Parameters Analyzed
ETSDP205	In Sump and West of Southwest Test Pit	NA	Water	Field Blank	Total VOCs, Total SVOCs, TPH, Total RCRA Metals, Gamma Spectrometry, PCBs, Total Pesticides, Isotopic Pu, Isotopic U
ETS295	*	NA	Water	Trip Blank	Total VOCs
ETS296	*	NA	Water	Trip Blank	Total VOCs

BGS = Below ground surface

MS/MSD = Matrix spike and matrix spike duplicate

NA = Not Applicable

VOCs = Volatile organic compounds

TPH = Total petroleum hydrocarbons

SVOCs = Semivolatile organic compounds

RCRA = *Resource Conservation and Recovery Act*

PCB = Polychlorinated biphenyls

Pu = Plutonium

U = Uranium

* Depth represents feet below soil/gravel interface.

Table A.3-2
Laboratory Analytical Methods Used for Samples Collected at the
CAU 252, Area 25 Engine Test Stand-1 Decontamination Pad

Analytical Parameter	Analytical Method
Total Volatile Organic Compounds	EPA 8260B ^a
Total Semivolatile Organic Compounds	EPA 8270C ^a
Total RCRA Metals (arsenic, barium, cadmium, chromium, lead, selenium, silver, and mercury)	EPA 6010B/7470A ^a EPA 6010B/7471A ^a
Total Petroleum Hydrocarbons - diesel-range organics	EPA 8015B (modified) ^a
Total Pesticides	EPA 8081A ^a
Polychlorinated Biphenyl(s)	EPA 8082 ^a
Isotopic Uranium	ASTM 3972-97 ^b ASTM C1000-90 ^b
Isotopic Plutonium	ASTM 3865-97 ^c ASTM C1001-90 ^c
Gamma Spectrometry	EPA 901.1 ^d HASL 300 ^e

^aEPA Test Methods for Evaluating Solid Waste, 3rd Edition, Parts 1-4, SW-846 (EPA, 1996)

^bStandard Test Method for Isotopic Uranium Water by Radiochemistry (ASTM, 1997a)

^cStandard Test Method for Radiochemical Determination of Uranium Isotopes in Soil by Alpha Spectrometry (ASTM, 1995b)

^dStandard Test Method for Plutonium in Water (ASTM, 1997b)

^eStandard Test Method for Radiochemical Determination of Plutonium in Soil by Alpha Spectrometry (ASTM, 1995a)

^fPrescribed Procedures for Measurements of Radioactivity in Drinking Water (EPA, 1980)

^gEnvironmental Measurements Laboratory Procedures Manual (DOE, 1997)

A.3.4 Total Pesticides Results

Pesticides were not detected at concentrations above the minimum reporting limits (DOE/NV, 1999).

A.3.5 PCB Results

Polychlorinated biphenyls were not detected at concentrations above the minimum reporting limits (DOE/NV, 1999).

A.3.6 Total RCRA Metals Results

The total RCRA metals (arsenic, barium, chromium, lead, and selenium) were detected at concentrations above their minimum reporting limits and are presented in [Table A.3-3](#).

Table A.3-3
Total RCRA Metals Detected Above Minimum Reporting Limits
CAU 252 Area 25 Engine Test Stand-1 Decontamination Pad

Sample Location	Sample Number	Start Depth (ft)	End Depth (ft)	Contaminants of Potential Concern (mg/kg)					
				Arsenic	Barium	Chromium	Lead	Mercury	Selenium
Preliminary Action Levels (mg/kg) Industrial ^a				3.0	100,000	64	1,000	560	9,400
Northeast Test Pit	ETSDP001	0	0.5	2.2	63	2.4	5	--	--
Northeast Test Pit	ETSDP003	4	4.5	1.7	47	2.1	3.7	--	--
Northeast Test Pit	ETSDP004	4	4.5	1.6	40	1.5	3	--	--
In Sump and East of Northwest Test Pit	ETSNS001	0	0.5	1.8	47	2.3	3.8	--	--
In Sump and West of Northwest Test Pit	ETSNS003	4	4.5	1.6	36	1.4	2.9	--	--
In Sump above Decontamination Pad Drainage Pipe and East of South Test Pit	ETSSS001	0	0.5	2.1	51	2	4.4	--	0.67
In Sump and Southwest of Southwest Test Pit	ETSSS003	4	4.5	4	68	5.1	6	1.3	--

^aEnvironmental Protection Agency Region IX, Preliminary Remediation Goals (PRGs) (EPA, 1998)

-- = Not detected above minimum reporting limits
mg/kg = Milligram(s) per kilogram
ft = Feet

Arsenic was detected above the PAL of 3.0 milligrams per kilogram (mg/kg) in one of the samples analyzed. However, this PAL is lower than the 7 to 8 ppm (mg/kg) mean concentrations of arsenic in silt from the Nellis Air Force Range (NBMG, 1998) and is, therefore, considered representative of ambient conditions at this site (Moore, 1999).

A.3.7 Gamma Spectrometry Results

None of the samples had concentrations in excess of the Performance Objective Criteria “rad added” screening levels. The radionuclides detected in soil using gamma spectrometry were actinium-228,

bismuth-212, bismuth-214, lead-212, lead-214, potassium-40, and thallium-208. Results are provided in [Table A.3-4](#). The radionuclides detected occur naturally and are found in soil throughout Nevada. The radionuclide concentrations are not distinguishable from their naturally occurring concentrations found at background locations (McArthur and Miller, 1989; Atlan-Tech, 1991); therefore, they are below the PALs.

A.3.8 Isotopic Uranium and Plutonium Results

Uranium-234 was detected at concentrations not distinguishable from its naturally occurring concentrations at background locations (McArthur and Miller, 1989; Atlan-Tech, 1991); therefore, it is below the PAL. Uranium-235 and uranium-238 were detected in three samples in other than natural ratios. However, these results are similar to the sample results from other sites in Area 25 (i.e., approximately 1.5 percent enrichment by mass). These samples were depleted in uranium-238 and enriched in uranium-235. Results are provided in [Table A.3-5](#). Isotopic plutonium was not detected above minimum reporting limits.

Table A.3-4
Gamma Spectrometry Results for CAU 252, Area 25 Engine Test Stand-1 Decontamination Pad

Sample Location	Sample Number	Start Depth (ft)	End Depth (ft)	Contaminants of Potential Concern (pCi/g)						
				Actinium-228	Bismuth-212	Bismuth-214	Lead-212	Lead-214	Potassium-40	Thalium-208
Maximum Background Concentrations (pCi/g)				3.64 ^a	2.4 ^b	3.47 ^b	2.9 ^a	2.9 ^a	96 ^a	3.4 ^a
Northeast Test Pit	ETSDP001	0	0.5	2.06 ± 0.47	--	0.96 ± 0.26	1.47 ± 0.22	0.74 ± 0.16	26.6 ± 3.6	0.58 ± 0.11
Northeast Test Pit	ETSDP003	4	4.5	1.81 ± 0.38	--	0.88 ± 0.26	1.46 ± 0.24	0.91 ± 0.26	23.6 ± 3.6	0.56 ± 0.14
Northeast Test Pit	ETSDP004	4	4.5	1.56 ± 0.41	--	0.91 ± 0.31	1.7 ± 0.59	0.85 ± 0.34	24.2 ± 3.9	0.81 ± 0.18
In Sump and East of Northwest Test Pit	ETSNS001	0	0.5	1.82 ± 0.43	1.67 ± 0.74	0.98 ± 0.33	1.89 ± 0.40	0.94 ± 0.32	24.8 ± 3.9	0.73 ± 0.18
In Sump and West of Northwest Test Pit	ETSNS003	4	4.5	1.77 ± 0.37	--	0.91 ± 0.32	1.7 ± 0.38	0.79 ± 0.21	22.8 ± 3.6	0.58 ± 0.19
In Sump above Decontamination Pad Drainage Pipe and East of South Test Pit	ETSSS001	0	0.5	1.94 ± 0.44	--	1.09 ± 0.22	1.56 ± 0.25	0.94 ± 0.28	23.9 ± 3.6	0.78 ± 0.22
In Sump and Southwest of Southwest Test Pit	ETSSS003	4	4.5	1.74 ± 0.61	--	1.04 ± 0.27	1.86 ± 0.36	0.86 ± 0.23	23.5 ± 3.6	0.51 ± 0.19

^aBackground concentrations listed in *Environmental Monitoring Report for the Proposed Ward Valley, California Low-Level Radioactive Waste (LLRW) Facility* (Atlan-Tech, 1991).

^bBackground concentrations listed in or derived from *Off-Site Radiation Exposure Review Project Phase II Soils Program*, McArthur and Miller (1989).

Note: Soil concentrations are calculated values derived from the U-238, Th-232, and Pu-239/240 concentrations reported in McArthur and Miller (1989).

ft = Feet

-- = Not detected above the minimum reporting limits

pCi/g = Picocurie(s) per gram

Table A.3-5
Isotopic Uranium Results Detected Above Minimum Reporting Limits
CAU 252 Area 25 Engine Test Stand-1 Decontamination Pad

Sample Location	Sample No.	Start Depth (ft)	End Depth (ft)	Contaminants of Potential Concern (pCi/g)				
				Uranium-234 ^a	Uranium-235 ^a	Uranium-238 ^b	U-235 Natural Mass Abundance	U-238 Natural Mass Abundance
Background Concentrations (pCi/g)				2.6	0.1	3.2	0.7204	99.27
Northeast Test Pit	ETSDP001	0	0.5	0.66 ± 0.14	--	0.63 ± 0.14	--	--
Northeast Test Pit	ETSDP003	4	4.5	0.72 ± 0.14	0.062 ± 0.031	0.71 ± 0.14	1.34	98.66
Northeast Test Pit	ETSDP004	4	4.5	0.66 ± 0.13	--	0.66 ± 0.13	--	--
In Sump and East of Northwest Test Pit	ETSNS001	0	0.5	0.8 ± 0.15	0.065 ± 0.032	0.79 ± 0.15	1.26	98.73
In Sump and West of Northwest Test Pit	ETSNS003	4	4.5	0.78 ± 0.15	--	0.6 ± 0.12	--	--
In Sump above Decontamination Pad Drainage Pipe and East of South Test Pit	ETSSS001	0	0.5	0.78 ± 0.15	--	0.89 ± 0.17	--	--
In Sump and Southwest of Southwest Test Pit	ETSSS003	4	4.5	0.72 ± 0.14	0.06 ± 0.031	0.82 ± 0.16	1.12	98.87

^aBackground concentrations listed in *Environmental Monitoring Report for the Proposed Ward Valley, California Low-Level Radioactive Waste (LLRW) Facility* (Atlan-Tech, 1991).

^bBackground concentrations listed in or derived from *Off-Site Radiation Exposure Review Project Phase II Soils Program*, McArthur and Miller (1989).

Note: Soil concentrations are calculated values derived from the U-238, Th-232, and Pu-239/240 concentrations reported in McArthur and Miller (1989).

-- = Not Detected above Minimum Reporting Limit

pCi/g = Picocurie(s) per gram

ft = Feet

A.4.0 Quality Assurance

The results of the QA/QC activities for the ETS-1 Decontamination Pad corrective action investigation sampling events are summarized in the following text. Detailed information regarding the QA program is contained in the Industrial Sites QAPP (DOE/NV, 1996).

Quality control results are typically judged in terms of precision, accuracy, representativeness, completeness, and comparability and are described in the following sections.

A.4.1 Precision

Precision is a quantitative measure of the variability of a group of measurements from their average value. Precision is assessed for inorganic analysis by collecting and analyzing duplicate field samples and comparing the results with the original sample. Precision is also assessed by creating, preparing, analyzing, and comparing laboratory duplicates from one or more field samples in inorganic analyses and matrix spike and matrix spike duplicate (MS/MSD) samples for organic analyses. Precision is reported as relative percent difference (RPD) which is calculated as the difference between the measured concentrations of duplicate samples, divided by the average of the two concentrations, and multiplied by 100. Any deviation from these requirements has been documented and explained, and the related data qualified accordingly. The qualification process is described in [Section A.4.7.1](#).

A.4.2 Accuracy

Analytical accuracy is defined as the nearness of a measurement to the true or accepted reference value. It is the composite of the random and systematic components of the measurement system and measures bias in the measurement system. The random component of accuracy is measured and documented through the analyses of spiked samples. Sampling accuracy is assessed by evaluating the results of spiked samples and laboratory control samples. Accuracy measurements are calculated as percent recovery by dividing the measured sample concentration by the true concentration, and multiplying the quotient by 100.

Field accuracy is assessed by confirming that the documents of record track the sample from origin, through transfer of custody, to disposal. The goal of field accuracy is for all samples to be collected

from the correct locations at the correct time, placed in a correctly labeled container with the correct preservative, and sealed with custody tape to prevent tampering. All samples in this sampling event were properly collected and custody was maintained during shipment to the laboratories.

A.4.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition (EPA, 1987). Sample representativeness was achieved through the implementation of a sampling program designed to ensure proper sampling locations, number of samples, and the use of validated analytical methods. Representativeness was assessed through analysis of duplicate samples. Representativeness of the samples taken in this sampling event was assured by collecting the specified number of samples (DOE/NV, 1996) and by analyzing them with the approved analytical methods shown in [Table A.3-2](#).

A.4.4 Completeness

Completeness is defined as a percentage of measurements made that are judged to be valid. A sampling and analytical requirement of 80 percent completeness was established for this project (DOE/NV, 1996).

The specified sampling locations were utilized as planned. All samples were collected as specified in the CAIP (DOE/NV, 1999), and all sample containers reached the laboratory intact and properly preserved (when applicable). Sample temperatures were maintained during shipment to the laboratory, and sample chain of custody was maintained during sample storage and/or shipment.

A.4.5 Comparability

Comparability is a qualitative parameter expressing the confidence with which one dataset can be compared to another (EPA, 1987). To ensure comparability, sampling activities were performed and documented in accordance with approved procedures, and all samples were collected in accordance with the CAIP (DOE/NV, 1999). Approved standardized methods and procedures were also used to analyze and report the data (e.g., Contract Laboratory Program [CLP] and/or CLP-like data packages). This approach ensures that the data from this project can be compared to other datasets.

Based on the minimum comparability requirements specified in the Industrial Sites QAPP (DOE/NV, 1996), all requirements were met.

Field (i.e., sample-handling) documentation, laboratory nonconformance reports, and the precision and accuracy of quality-control sample results were evaluated for their effect on the results of the associated environmental soil samples. The environmental sample results were then qualified according to processes outlined in the following sections. Documentation of the data qualifications resulting from these reviews is retained in project files as both hard copy and electronic media.

A.4.6 Tier I and Tier II Data Evaluations

All laboratory data from samples collected at CAU 252 have been evaluated for data quality according to the EPA Functional Guidelines (EPA, 1994b and 1999). These guidelines are implemented in a tiered process and are presented in the following text. No data rejected during the data evaluation process were used to draw the conclusions presented in the CADD. Only valid data, whether estimated (i.e., J-qualified) or not, were used.

The adjustments to data and data qualifiers resulting from the data evaluation process were documented in project files and were summarized in memoranda for each sample delivery group (SDG). These memoranda are maintained in the project files.

A.4.6.1 Tier I Evaluation

Tier I evaluation for both chemical and radiological analyses examines (but is not limited to):

- Sample count/type consistent with chain of custody
- Analysis count/type consistent with chain of custody
- Correct sample matrix
- Significant problems stated in cover letter or case narrative
- Completeness of certificates of analysis
- Completeness of CLP or CLP-like packages
- Completeness of signatures, dates, and times on chain of custody
- Condition-upon-receipt variance form included
- Requested analyses performed on all samples
- Date received/analyzed given for each sample
- Correct concentration units indicated
- Electronic data transfer supplied

- Results reported for field and laboratory QC samples
- Whether or not the deliverable met the overall objectives of the project

A.4.6.2 Tier II Evaluation

Tier II evaluation for both chemical and radiological analyses examines (but is not limited to):

Chemical:

- Correct detection limits achieved
- Sample date, preparation date, and analysis date for each sample
- Holding time criteria met
- QC batch association for each sample
- Cooler temperature upon receipt
- Sample pH for aqueous samples, as required
- Detection limits properly adjusted for dilution, as required
- Blank contamination evaluated and applied to sample results/qualifiers
- MS/MSD percent recoveries (%R) and RPDs evaluated and applied to laboratory results/qualifiers
- Field duplicate RPDs evaluated using professional judgement and applied to laboratory results/qualifiers
- Laboratory duplicate RPDs evaluated and applied to laboratory results/qualifiers
- Surrogate %Rs evaluated and applied to laboratory results/qualifiers
- Laboratory control sample %R evaluated and applied to laboratory results/qualifiers
- Initial and continuing calibration evaluated and applied to laboratory results/qualifiers
- Internal standard evaluated and applied to laboratory results/qualifiers
- Recalculation of 10 percent of laboratory results from raw data

Radioanalytical:

- Correct detection limits achieved
- Blank contamination evaluated and validation data qualifier applied to sample results/qualifiers
- Certificate of Analysis consistent with data package documentation
- Quality control sample results (duplicates, laboratory control samples, laboratory blanks) evaluated and validation data qualifiers applied to laboratory result qualifiers

- Sample results, error, and minimum detectable activity evaluated and applied to laboratory result qualifiers
- Detector system calibrated to National Institute for Standards and Technology (NIST) traceable sources
- Calibration sources preparation was documented, demonstrating proper preparation and appropriateness for sample matrix, emission energies, and concentrations
- Detector system response to daily, weekly, and monthly background and calibration checks for peak energy, peak centroid, peak full-width half-maximum, and peak efficiency
- Tracers NIST-traceable, appropriate for the analysis performed, and recoveries that met QC requirements
- Documentation of all QC sample preparation complete and properly performed
- Spectra lines, emissions, particle energies, peak areas, and background peak areas support the identified radionuclide and its concentration

A.4.6.3 Tier III

Data quality considerations that are included in EPA data review functional guidelines (EPA, 1994b and 1999) as a Tier III review include the additional evaluations:

Chemical:

- Recalculation of all laboratory results from raw data

Radioanalytical:

- QC sample results (e.g., calibration source concentration, percent recovery, and RPD) verified
- Radionuclides and their concentration appropriate considering their decay schemes, half-lives, and process knowledge and history of the facility and site
- Each identified line in spectra verified against emission libraries and calibration results
- Independent identification of spectra lines, area under the peaks, and quantification of radionuclide concentration in a random number of sample results

A Tier III review of at least 5 percent of the sample analytical data is currently being performed by Tech Law, Inc. in Lakewood, Colorado. Any changes to the chemical and radiological data will be incorporated as a results of the Tier III review. Documentation of the Tier III review will be retained in the project files.

A.4.7 Quality Control Samples

Five trip blanks, one field blank, one source blank, one equipment rinsate blank, one MS/MSD, and one field duplicate were collected and submitted for laboratory analyses as shown in [Table A.3-1](#).

The blanks and duplicates were assigned individual sample numbers and sent to the laboratory “blind.” Additional samples were selected by the laboratory to be analyzed as laboratory duplicates. Documentation related to the collection and analyses of these samples is retained in project files.

The field blanks were taken by placing distilled water into appropriate sample bottles and preserving them according to the requirement specified in the Industrial Sites QAPP (DOE/NV, 1996). The equipment rinsate blank was obtained by collecting distilled water, which was poured over the decontamination sampling equipment, into the appropriate sample bottles and preserve as applicable. The field duplicates and the MS/MSD were taken at the same location as the environmental sample. The trip blanks were placed in each cooler containing samples for VOC analysis. The results of the QC samples are discussed in the following sections.

A.4.7.1 Field Quality Control Samples

Review of the field-collected blank analytical data for the CAU 252 investigation indicates that cross-contamination from field methods may have occurred during sample collection, although concentration was above the contract-required detection limit (CRDL), the PALs were not exceeded, and the results did not have an impact on the investigation. Field and equipment rinsate blanks were analyzed for the parameters listed in [Table A.3-2](#) and trip blanks were analyzed for VOCs only. The SVOCs, TPH as diesel-range organics, pesticides, and PCBs were not detected in the analysis of this samples. In the field-collected blank arsenic, barium, and selenium were detected at a concentration above the instrument detection limit (IDL) but below the CRDL. In the equipment rinsate sample, barium and silver were detected above the IDL but below the CRDL. Mercury was not detected in any of these samples (DOE/NV, 1999).

During the sampling event, one field duplicate soil sample was sent as a blind sample to the laboratory to be analyzed for the investigation parameters listed in [Table A.3-2](#). For this sample, the duplicate result precision (i.e., RPDs between the environmental sample results and their corresponding field duplicate sample results) was evaluated to the guidelines set forth in EPA

Functional Guidelines (EPA, 1994b and 1999). The EPA Functional Guidelines state that there are no required review criteria for field duplicate analyses comparability, but allow the data reviewer to exercise professional judgement. The RPD between the environmental sample result and its corresponding field duplicate sample results exceeded the 20 percent criteria stated in the Industrial Sites QAPP (DOE/NV, 1996) for target analytes chromium and lead. However, all RPD results were less than 35 percent as stated in the EPA Functional Guidelines criteria (EPA, 1994b).

The laboratory duplicate sample was compared to the criteria set forth in the EPA Functional Guidelines (EPA, 1994b), and the associated sample results were qualified accordingly. Both detections and nondetections have been qualified as estimated (J and UJ, respectively) if the relative percent difference between an environmental sample and its laboratory duplicate fell outside established criteria.

One field sample was selected for use as MS/MSD sample. The percent recoveries of these samples (a measure of accuracy) and the relative percent differences in these sample results (a measure of precision) were compared to EPA Functional Guideline criteria (EPA, 1994b and 1999). The results were used to qualify associated environmental sample results accordingly.

The EPA Functional Guidelines for review of organic data state that no data qualification action is taken on the basis of MS/MSD results alone. The data reviewer exercises professional judgement in considering these results in conjunction with the results of laboratory control samples (LCSs) and other QC criteria in applying qualifications to the data.

The inorganic data review in EPA Functional Guidelines allows professional judgement to be applied in evaluating the results of matrix spikes (EPA, 1994b). The EPA Functional Guidelines for inorganic data review allows professional judgement to be applied in evaluating the results of matrix spikes (EPA, 1994b). Generally, if spike recovery is greater than the upper acceptance limits (>125%), nondetections are acceptable for use. If spike recovery is greater than the upper acceptance limits (>125%) or less than the lower acceptance limit (<75%), positive results are qualified as estimated (J). If spike recovery falls within the range of 30-74%, nondetections are qualified as estimated (UJ). If spike recovery is less than 30 percent (grossly low), positive results are not qualified and nondetections are qualified as unusable (R).

Acetone (F003) was detected in sample number ETSDP203 (Equipment Rinsate) at a concentration that exceeded the CRDL. There is no process knowledge that acetone would be present due to documented historic operations. The NDEP's position has been that if there is no demonstrated evidence that a waste is "listed" based on documented historic operations, the waste should not be considered as listed. Furthermore, the acetone is present in a media that is not flammable. It is believed that the acetone in the rinsate is due to laboratory contamination.

A.4.7.2 Laboratory Quality Control Samples

Analysis of method QC blanks and surrogate spikes for organic analyses, method blanks, preparation blanks, initial and continuing calibration blanks for total metals, and laboratory control samples were performed for each SDG by Paragon Analytics, Inc. The results of these analyses were used to qualify associated environmental sample results according to EPA Functional Guidelines (EPA, 1994b and 1999).

The EPA Functional Guidelines (EPA, 1994b and 1999) state that no qualification action is taken if a compound is found in a sample, but not in an associated blank. The action taken when a compound is detected in both the sample and the associated blank varies depending upon the analyte involved and is described in the "5X/10X Rule."

For most VOCs, SVOCs, TPH (diesel-range organics), PCBs, pesticides, and radionuclides if an analyte is detected in the sample and was also detected in an associated blank the result is qualified as undetected (U) if the sample concentration is less than five times (5X) the blank concentration.

However, for the common laboratory contaminants (e.g., methylene chloride, acetone, 2-butanone [methylethyl ketone or MEK], and phthalate esters [especially bis(2-ethylhexyl)phthalate]), the factor is raised to ten times (10X) the blank concentration. The sample result is elevated to the quantitation limit if it is less than the quantitation limit or remains unaltered if the sample result is greater than or equal to the quantitation limit.

For inorganics (i.e., total RCRA metals), sample results greater than the IDL, but less than five times (5X) the amount found in an associated blank, are qualified as undetected (U). There are no metallic common laboratory contaminants, so there is no "10X Rule" for metals, and the sample result is never

altered. When applying the 5X criteria to soil sample data or calibration blank data, the raw data results are used to evaluate and qualify the reported results on the Certificate of Analysis.

Preparation blanks (PB) were evaluated for each matrix, with every SDG, or with each batch of samples digested, whichever is more frequent. The analyte concentration in the PB should be below CRDL of any analyte concentration in the PB if it is above the CRDL; the lowest concentration of that analyte in the associated samples must be ten times (10X) the PB concentration. Otherwise, all samples associated with the PB with the analyte's concentration, and above the CRDL, should be redigested and reanalyzed. If the concentration of the PB is less than or equal to the CRDL, no corrective action to the associated sample is required.

Surrogate spikes, or system monitoring compounds, are added to the environmental samples analyzed by chromatographic techniques for VOCs, SVOCs, TPH (diesel-range organics), pesticides, PCBs, gasoline, and diesel. Surrogate compounds are analytes that are not expected to be present in associated environmental samples, but behave the same as similar target compounds chromatographically. Known amounts of each surrogate are added prior to sample preparation and are carried throughout the preparation/analysis procedure. The percent recoveries of these surrogate compounds give some measure of the anticipated recoveries of the target compounds whose chromatographic behavior they mimic.

If any surrogate percent recoveries are out of the acceptable range (which differs for each surrogate in each method), laboratory protocol requires the sample to be reprepared and/or reanalyzed. When the surrogate recoveries are acceptable on the second run, only the second analysis results are reported. When both analyses yield the same unacceptable range, the results of both analyses are reported.

The evaluation of surrogate spike percent recovery results is not straightforward. The functional guidelines suggest several optional approaches, but require the data reviewer to exercise professional judgement in reviewing surrogate data and qualifying associated data as estimated (J or UJ, for detections or nondetections, respectively) or unusable (R).

One laboratory duplicate analysis for metals was performed for each SDG and sample matrix that reported total RCRA metals. The duplicate results are compared to the results of the original sample to give a measure of analytical laboratory precision. If the results from a duplicate analysis for a

particular analyte fall outside the control limits, the EPA Functional Guidelines for Inorganic Data Review (EPA, 1994b) call for all results for that analyte in all associated samples of the same matrix to be qualified as estimated (J).

Laboratory control samples, also known as blank spikes, consist of known quantities of target compounds added to purified sand or deionized, distilled water and analyzed along with the environmental samples in the SDG. The percent recoveries of the compounds in the LCS give a measure of laboratory accuracy. The functional guidelines call for the data reviewer to use professional judgement to qualify associated data according to established criteria.

A.4.8 Field Nonconformances

A field nonconformance pertaining to documentation was noted for this project. However, it has no effect on the validity of the data contained in this report.

A.4.9 Laboratory Nonconformances

No laboratory nonconformances were documented for this project.

A.5.0 Summary

Analysis of the data generated from corrective action investigation activities conducted at CAU 252 ETS-1 Decontamination Pad indicates that analytes were not detected at concentrations above the minimum reporting limits for VOCs, SVOCs, TPH, pesticides, PCBs, RCRA metals, or isotopic plutonium. The PALs for gamma-emitting radionuclides and isotopic uranium were not exceeded in soil samples collected from the site. The PAL for arsenic was exceeded in one sample, but the concentration is considered representative of ambient conditions at this site.

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Appendix B

Nevada Department of Environmental Protection Document Review Sheets

NEVADA ENVIRONMENTAL RESTORATION PROJECT DOCUMENT REVIEW SHEET

1. Document Title/Number: Draft Corrective Action Decision Document/Closure Report for Corrective Action Unit 252: Area 25 Engine Test Stand-1 Decontamination Pad, Nevada Test Site, Nevada			2. Document Date: September 2000	
3. Revision Number: 0			4. Originator/Organization: IT Corporation	
5. Responsible DOE/NV ERP Project Mgr.: Janet Appenzeller-Wing			6. Date Comments Due: October 9, 2000	
7. Review Criteria: Full				
8. Reviewer/Organization/Phone No.: NDEP			9. Reviewer's Signature:	

10. Comment Number/ Location	11. Type*	12. Comment	13. Comment Response	14. Accept
1.		NDEP reviewed the Draft Corrective Action Decision Document/Closure Report for Corrective Action Unit 252 and had no comments to this document.		

^a Comment Types: M = Mandatory, S = Suggested.

Return Document Review Sheets to DOE/NV Environmental Restoration Division, Attn: QAC, M/S 505.

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