**CORRECTIVE ACTION INVESTIGATION PLAN
FOR CORRECTIVE ACTION UNIT NO. 427:
AREA 3 SEPTIC WASTE SYSTEM NUMBERS 2 and 6,
TONOPAH TEST RANGE, NEVADA**

DOE Nevada Operations Office
Las Vegas, Nevada

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TONOPAH TEST RANGE, NEVADA**

Approved by:

Janet Appenzeller-Wing, Project Manager
Industrial Sites Subproject

Date:

9/11/97

Approved by:

for Stephen A. Mellington, Project Manager
Nevada Environmental Restoration Project

Date:

9/11/97

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List of Acronyms and Abbreviations

AEC	U.S. Atomic Energy Commission
bgs	Below ground surface
CADD	Corrective Action Decision Document
CAIP	Corrective Action Investigation Plan
CAS	Corrective Action Site(s)
CAU	Corrective Action Unit(s)
CFR	<i>Code of Federal Regulations</i>
COC	Contaminant(s) of concern
DOE	U.S. Department of Energy
DOE/NV	U.S. Department of Energy, Nevada Operations Office
DOT	U.S. Department of Transportation
DQO	Data Quality Objective(s)
EM	Engineering Manual
EPA	U.S. Environmental Protection Agency
ERD	Environmental Restoration Division
ERP	Environmental Restoration Project
FFACO	<i>Federal Facility Agreement and Consent Order</i>
ft	Foot (feet)
HASP	Health and Safety Plan
IDW	Investigation-derived waste
IT	IT Corporation
m	Meter(s)
mg/kg	Milligram(s) per kilogram
mg/L	Milligram(s) per liter
NAC	<i>Nevada Administrative Code</i>
NDEP	Nevada Division of Environmental Protection
NTSWAC	Nevada Test Site Waste Acceptance Criteria
ORERP	Offsite Radiation Exposure Review Project
PAL	Preliminary action level(s)
PCB	Polychlorinated biphenyl(s)
ppm	Part(s) per million

List of Acronyms and Abbreviations (Continued)

QA/QC	Quality assurance and quality control
QAPP	Quality Assurance Project Plan
RCRA	<i>Resource Conservation and Recovery Act</i>
RESRAD	Residual Radiation
RPD	Relative percent difference
SNL	Sandia National Laboratories
SVOC	Semivolatile organic compound(s)
SWS	Septic Waste System(s)
TC	Toxicity characteristic
TPH	Total petroleum hydrocarbon(s)
TSCA	<i>Toxicity Substance Control Act</i>
TTR	Tonopah Test Range
USACE	United States Army Corps of Engineers
USAF	United States Air Force
VCP	Vitrified clay pipe
VOC	Volatile organic compound(s)
$\mu\text{g/L}$	Microgram(s) per kilogram
%R	Percent recovery

1.0 Introduction

This Corrective Action Investigation Plan (CAIP) has been developed 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 State of Nevada Division of Environmental Protection (NDEP), and the U.S. Department of Defense. The CAIP is a document that provides or references all of the specific information for planning investigation activities associated with Corrective Action Units (CAUs) or Corrective Action Sites (CASs) (FFACO, 1996).

This CAIP contains the environmental sample collection objectives and the criteria for conducting site investigation activities at the Area 3 Compound, specifically CAU No. 427, which is located at the Tonopah Test Range (TTR). The TTR, included in the Nellis Air Force Range, is approximately 255 kilometers (140 miles) northwest of Las Vegas, Nevada (Figures 1-1 and 1-2). The *Corrective Action Unit Work Plan, Tonopah Test Range, Nevada* (hereafter referred to as the TTR Work Plan) (DOE/NV, 1996a) divides investigative activities at TTR into Source Groups. The Septic Tanks and Lagoons Group consists of seven CAUs. Corrective Action Unit No. 427 is one of three septic waste system CAUs in TTR Area 3. Corrective Action Unit Numbers 405 and 428 will be investigated at a future date. Corrective Action Unit No. 427 is comprised of Septic Waste Systems (SWSs) Numbers 2 and 6 with respective CAS Numbers 03-05-002-SW02 and 03-05-002-SW06 (DOE/NV, 1996a).

Plate 1 presents the location of each CAS with respect to the Area 3 Compound. Each SWS has been designated as a separate CAS and assigned a CAS No.; the numbers and corresponding site names are presented in Table 3-1 of the TTR Work Plan (DOE/NV, 1996a).

1.1 Purpose

The Septic Waste Systems associated with CAU No. 427 were installed to receive liquid wastes generated from the daily operations conducted at the Area 3 Compound (DOE/NV, 1996a), and they were operated during different time intervals from 1960 through 1990. Due to disposal

Tonopah
Test Range

SCALE

Source: DOE/NV, 1996a

LEGEND

- Nevada Test Site boundary
- Tonopah Test Range boundary
- Nellis Air Force Range boundary
- State Line
- Road or Highway
- City

Figure 1-1
Tonopah Test Range Location Map

LEGEND

- Tonopah Test Range boundary
- Primary roadway
- Area/gate
- Spring
- BLM Bureau of Land Management
- NAFR Nellis Air Force Range
- TTR Tonopah Test Range
- Operation Roller Coaster sites
- Approximate Location of CAU No. 427

Source: Adapted from DOE/NV, 1996a

Figure 1-2
Location of the Area 3 Tonopah Test Range

activities commonly associated with early septic operations, an investigation will be conducted at CAU No. 427 to complete the following tasks:

- Identify the presence and nature of possible contaminant migration from the leachfields and associated wastewater collection systems.
- Determine the vertical and lateral extent of possible contaminant migration.
- Ascertain the potential impact to human health and the environment.
- Provide sufficient information and sample analytical data from which further assessment, remediation, and/or closure strategies may be developed for the site.
- Obtain sufficient sample analytical data for management of investigation-derived waste (IDW).

This CAIP was developed using the U.S. Environmental Protection Agency (EPA) Data Quality Objectives (DQOs) (EPA, 1994) process to clearly define the purpose(s) for which environmental data will be used and to design a data collection program that will satisfy these goals. A summary of the results of the DQO process is presented in a worksheet format as Appendix A of this plan.

1.2 Scope

The scope of this investigation includes the following:

- Preparing a preliminary evaluation of all components of the Septic Waste Systems Numbers 2 and 6
- Conducting continuous field screening
- Conducting exploratory excavations to confirm the locations of the leachfields
- Collecting environmental samples for laboratory and geotechnical analyses, and waste management purposes
- Conducting subsurface sampling from trenches
- Conducting a video survey of subsurface piping
- Sampling of the contents of septic tanks (if possible)

1.3 CAIP Contents

Section 1.0 of this CAIP provides an introduction to this project, including the purpose and scope for this corrective action investigation. The FFACO (1996) requires that CAIPs address the following elements:

- Management
- Technical aspects
- Quality assurance
- Health and safety
- Public involvement
- Field sampling
- Waste management

The managerial aspects of this project are discussed in the DOE/NV Environmental Restoration Project (ERP), *Project Management Plan*, Rev. 0 (DOE/NV, 1994a) and the site-specific Project Management Plan. The technical aspects of this CAIP are contained in the TTR Work Plan (DOE/NV, 1996a) and in Sections 2.0 and 3.0 of this document. General field and laboratory quality assurance and quality control (QA/QC) issues are presented in the *Industrial Sites Quality Assurance Project Plan* (QAPP) (DOE/NV, 1994c; DOE/NV, 1996d), and the specific aspects of field QA/QC are discussed in approved procedures. The health and safety aspects of this project are documented in the *Environmental Restoration Project Health and Safety Plan* (HASP) (DOE/NV, 1996b) and will also be supplemented with a site-specific HASP written prior to commencement of field work. No CAU-specific public involvement activities are planned at this time; however, an overview of public involvement is documented in the final "Public Involvement Plan" in Appendix V of the FFACO (1996). Field sampling activities are discussed in Section 4.0 of this CAIP. Waste management issues are discussed in the TTR Work Plan (DOE/NV, 1996a) and in Section 5.0 of this CAIP. The project schedule and records availability information are discussed in Section 6.0 of this CAIP, and a complete set of project references is provided in Section 7.0 of this CAIP.

2.0 Facility Description

The TTR facility is operated by the Sandia National Laboratories/New Mexico (SNL/NM) for the U.S. Department of Energy (DOE). Historically, TTR has been a research facility with the mission to perform defense-related projects. Associated with these projects, normal industrial operations, experiments, and site maintenance operations were conducted which may have resulted in impacts to the environment (DOE/NV, 1996a). Operations within various maintenance buildings at the TTR Area 3 generated sanitary and industrial wastewaters containing Stoddard solvent, cutting oils, cleaning solutions, and paint solvents that were disposed of through floor drains into septic tanks and dispersed throughout leachfields (DOE/NV, 1996a).

Corrective Action Unit No. 427 consists of two CASs (or SWSs) that were in operation during different periods beginning in 1960 through 1990. The process knowledge and information currently available to assess the Septic Waste Systems was examined during the DQO process (Appendix A). This information includes geophysical surveys, engineering drawings, TTR reports, and interviews with present and former TTR workers. Because of the similarities and routing of wastewaters, the sites can be addressed collectively in the interpretive assumptions presented in Sections 2.2 and 2.3. However, specific details concerning the Septic Waste Systems in regard to exact locations of subsurface components, and the composition, physical nature, and condition of the components are limited. Based on historic information, it is known that each SWS consists of at least one septic tank, an associated leachfield, and piping (DOE/NV, 1996a).

The general background information pertaining to the history of TTR and the Area 3 Compound, a geologic assessment, and an overview of the area hydrogeology including depths to groundwater are provided in the TTR Work Plan (DOE/NV, 1996a).

2.1 Site Assessment and Operational History

The site assessment and operational history for each CAS were determined from interpretations of engineering drawings (see Appendix C for a composite of key attributes from selected engineering drawings), TTR reports, interviews, and a surface geophysical interpretation map (Appendix B).

2.1.1 Septic Waste System No. 6 (CAS No. 03-05-002-SW06)

Septic Waste System No. 6 includes Septic Tank 33-12, associated collection system piping, and an associated leachfield (Figure 2-1). The leachfield located west of Building 0367 (Figure 2-1) serviced Septic Tank 33-12. The dimensions of the leachfield as specified at installation were approximately 12 by 15 meters (m) (40 by 50 feet [ft]). The leachfield is believed to be constructed of five parallel pipes that drain to the south. A U.S. Atomic Energy Commission (AEC) utility map (AEC, 1982) indicates that this leachfield was slated for removal (DOE/NV, 1996a). However, there is no evidence to indicate that this operation was performed.

Septic Tank 33-12 is located immediately west of Building 0367 (Figure 2-1). This tank and associated leachfield received waste oil generated in the Automotive Maintenance Building 0360 until a separate waste-oil system was installed in 1965 (Quas, 1993). Waste drains receiving only wastewaters from Building 0360 were then connected with a newly installed sewer line to Septic Tank 33-4 (SWS No. 2) and its associated leachfield (Figure 2-2). Septic Tank 33-12, associated sewer line and leachfield were abandoned in the process. The status of Septic Tank 33-12 is unknown; the exact location is unknown; and the contents of the tank have not been characterized.

As a result of the DQO scopings, the collection system (all of the underground septic line) has also been included for investigation (Appendix A).

2.1.2 Septic Waste System No. 2 (CAS No. 03-05-002-SW02)

Septic Waste System No. 2 includes Septic Tanks 33-4, 33-5, and 33-6 and one or more associated leachfield(s) (DOE/NV, 1996a). As a result of the DQO scopings, the collection system (underground sewer lines) has been included for investigation (Appendix A). The leachfield(s) that serviced Septic Tanks 33-4, 33-5, and 33-6 is (are) located north of Building 0380 (Figure 2-2). The precise location of leachfields and the actual number of leachfields installed is problematic due to conflicting site drawings (IT, 1997). Three potential leachfield locations are presented in Figure 2-2. A total of four possible locations were presented in the DQO scopings, and the fourth possibility is presented based on an interview (see Appendix C) (Quas, 1993). Details on the chronology of leachfield installation(s) and operations are limited to interviews with former workers and inspections of engineering drawings because no construction records exist, and the information that is available is contradictory.

IT01

(1990)
BLDG. 0370T
LUNCHROOMS

IT13

DOCK

IT14

IT12

LEGEND

CAS *03-05-002-SW06 (SW

Septic Tank

Associated Building 0360

Approximate Location of Lea

Concrete pads

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Figure 2-1
SWS No. 6
Site Location Map
CAU No. 427 Tonopah Test Range
Nye County, Nevada

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Figure 2-2
SWS No. 2
Site Location Map
CAU No. 427 Tonopah Test Range
Nye County, Nevada

Limited details exist for a certain leachfield that was apparently installed or in operation between 1965 and 1975 (see Figure 2-2 and Appendix C, Figure C-1) (Quas, 1993) and is shown to consist of two parallel extensions of Orangeburg perforated pipe, as specified in a revised "Drawing of Work as-Built" (AEC, 1982), which drain to the northwest. The leachfield dimensions are believed to be approximately 30 m long by 6 m wide by 2 m deep (100 ft by 20 ft by 6 ft). Fill material exists from the surface to approximately 2 m (6 ft) below ground surface (bgs). The fill material consists of 3- to 4-inch rock (no gravel or dirt) (AEC, 1982). Based upon another drawing, the most southern (Figure 2-2) leachfield was presented as the existing leachfield (i.e., no single drawing shows more than one leachfield) in this area and is labeled as an "abandoned" leachfield in a 1989 engineering drawing (SNL, 1989).

Septic Tanks Numbers 33-4, 33-5, and 33-6 have been field located in recent years but the exact locations are not presently marked (IT, 1991). Possible locations are presented in Figure 2-2. A septic tank abandonment program was conducted in 1993 by Sandia National Laboratories (SNL) and consisted of pumping out the residual liquid wastes, air drying the tanks, and filling the tanks with sand and cement (DOE/NV, 1994b). Interviews with site maintenance workers (Quas, 1994) verified that abandonment procedures were physically performed on Septic Tanks 33-4, 33-5, and 33-6. Septic Tank 33-12 was not part of this effort.

Septic Tank 33-4 is believed to be located southwest of Building 0367 and northwest of Building 0374 (Plate 1). This tank received waste from the Automotive Maintenance (post 1965) and the Electrical Shop, Buildings 0360 and 0367, respectively. Septic Tank 33-4 is currently inactive, and the liquid waste has been removed (DOE/NV, 1994c). Information obtained from an interview with a site employee indicated that the tank has been filled with cement (Quas, 1994).

Septic Tank 33-5 is located southeast of Building 0367 and received waste from the Equipment Maintenance and Machine Shop and the Security, First Aid, and Fire Department Building; Buildings 0354 and 0369, respectively (Figure 2-2). According to an interview with a site maintenance worker, liquid waste (residual septage) within Septic Tank 33-5 was removed, and the tank was filled with cement (Quas, 1994). As a result of the DQO scopings, Building 0355 (the Camera Repair Building) and the associated septic line (see Appendix C) has been added to the scope of this investigation (Appendix A).

Septic Tank 33-6 is believed to be located northeast of Building 0380 and northwest of Building 0374 (Figure 2-2). The tank received waste from the Heavy Duty Repair Shop, Building 0374 (DOE/NV, 1996a). The liquid waste (septage) was removed in 1993, and the tank was filled with cement (Quas, 1994).

2.2 Waste Inventory

Information from interviews with former TTR workers (Quas, 1993), interpretations of engineering drawings (Appendix C), and descriptions of processes and chemicals used in potential source buildings (IT, 1994) indicate that sanitary and industrial wastewaters were disposed in the septic waste systems. The DQO process evaluated available information, and a list of potential contaminants was developed (Appendix A).

Liquids typically associated with the various shops that support TTR daily operations included waste oil, greases, paints, solvents, fuels, and cleaning supplies (DOE/NV, 1996a). Records of liquid waste quantities discharged through the collection systems are not available.

In the past, the septic tanks were pumped out every few years, and the sludge was buried at the TTR Septic Sludge Disposal Pits 1 and 2 (CAU No. 409 in Other Waste Sites) (DOE/NV, 1996a). In 1990, a consolidated sewer system was installed and activated to replace the system of discrete septic tanks and leachfields in and around Area 3. Because the septic waste systems were replaced, SWSs Numbers 2 and 6 are no longer receiving any wastewaters. The effluent generated at the Area 3 facility is now discharged to a nearby flocculating lagoon owned and maintained by the United States Air Force (USAF) (DOE/NV, 1996a).

2.3 Release Information

The source of potential contamination at each leachfield and the associated collection systems is septic wastes that were channeled from building drains through underground septic lines, into septic tanks, and released into leachfields. The leachfields were designed for liquid to be dispersed over an area just below the surface and to percolate down into the subsurface soil. The driving force for downward migration of the contamination was the discharge from the septic tanks, which no longer exists. The possibility of leakage at points along the collection system exists, but there is no evidence of documented leaks or releases.

Industrial wastewaters containing small amounts of oils, greases, cleaning solutions, and solvents were likely disposed of with sanitary wastewaters into the SWSs.

In the late 1960s or early 1970s, oil seepage occurred at ground surface in the area of the leachfield associated with SWS No. 6. Contaminated soils were removed and replaced with clean fill (DOE/NV, 1996a). According to a former TTR worker, contaminated soil was also encountered during the construction of Building 0370T in 1970 (Quas, 1993).

Specific details concerning the waste inventory within the source buildings during the various years of operation are limited (DOE/NV, 1996a). The quantities of wastewater generated or discharged during the operational periods is unknown.

2.4 Investigative Background

Two geophysical surveys were conducted in the vicinity of the TTR Area 3 to identify and delineate the leachfields and to locate septic tanks. The first survey was conducted in July and November of 1993 (IT, 1997). The second survey was completed in September of 1996 (IT, 1997). The results for SWS Numbers 2 and 6 are inconclusive as both surveys encountered extensive interference due to the presence of underground utilities. An interpretative geophysical map is included (Appendix B), but the only anomaly identified as a possible finding is the location of a SWS No. 6 feature, namely Septic Tank 33-12 (DOE/NV, 1996a).

In 1990, during the SNL consolidated sewer system installation, the active septic system contributing to the leachfield in SWS No. 2 was replaced, and wastewaters were rerouted through the new system. During the installation, the former tanks and associated sewer lines and branches were sealed off, and the septic tanks were left in place (DOE/NV, 1996a).

Sandia National Laboratories sampled septic tanks at the TTR on March 26 and 28, 1991, and the residual septage within Septic Tanks 33-4, 33-5, and 33-6 was sampled and analyzed (IT, 1991). Analytical results indicate the majority of chemical constituents analyzed for were detected at trace concentrations or were non-detectable. Analytical results showed concentrations of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), oils, and greases.

Because the samples analyzed during this study were collected directly from the septic tanks, they may not be representative of the effluent actually discharged into the soil column. Rather, the data generated represent concentrations of constituents present in the septic system in previous years (IT, 1991).

3.0 Objectives

The sampling objectives were determined using the DQO process outlined by the EPA in their *Guidance for the Data Quality Objectives Process* (EPA, 1994). The DQOs are qualitative and quantitative statements that specify the quality of the data required to support potential corrective action at the CAU. The DQOs were developed to clearly define the purpose(s) for which environmental data will be used and to design a data collection program that will satisfy these goals. One product of the DQO process is the formulation of site conceptual models.

3.1 Conceptual Site Model

A conceptual model has been developed as a basis for the site characterization plan. The model is based on assumptions and premises that were discussed during the DQO process and outlined in the DQO worksheet (Appendix A). The following summarizes the primary assumptions that were included in the DQOs (Appendix A) and considered in formulating the site conceptual model:

- The potential presence of contaminants of concern (COCs) within the soils of the site is a result of releases from the following known or potential contaminant sources:
 - Discharges through designated sinks and floor drains within buildings, into collection systems, then into septic tanks and leachfields between 1960 and 1990
 - Possible leakage from the collection system lines leading to the leachfield distribution systems
 - Possible leakage from the leachfield distribution box(es)
 - Possible leakage from the septic tanks
- Future use of the area is likely to be similar to current use (light industrial).
- Groundwater is not thought to have been impacted because depth to groundwater is greater than 110 m (361 ft) (DOE/NV, 1996a), and the environmental conditions at the site (i.e., arid climate, low permeabilities) are not conducive to downward migration.

- If contaminant migration is present, it will be limited laterally to the soil 4.5 m (15 ft) adjacent to and beneath the leachfield to a total depth of 16 m (50 ft) below ground surface.
- Excavation of contaminated material by site workers is the likely potential exposure pathway.

To facilitate the evaluation of the conceptual model, each septic waste system was divided into areas based on function of the different portions of the leachfield system and the varying potential for contamination. The study areas for the site and the hypothesized potential for contamination of each area are assigned as follows:

- Soil directly below the downstream (below septic tanks) connecting pipe and surrounding the septic tanks which is likely to have been impacted by unplanned leakages
- Soil directly below and immediately surrounding the piping leading from contributing buildings' drain lines and collection systems through septic tanks and to the leachfield distribution box
- Soil directly below and immediately surrounding the leachfield piping that has the potential to have been impacted by designed releases from the leachfield piping
- The contents of Septic Tank 33-12 which has not been evaluated or characterized.

The sampling objectives have been translated into a field sampling plan which will confirm, evaluate, and potentially modify or refute the current conceptual model. They have been used to develop a sampling methodology to ensure that data-collection activities provide data that are meaningful, valid, defensible, and which lead to development of a closure strategy. This approach identifies areas of concern (i.e., areas which violate the conceptual model) early in the characterization and then targets those areas for additional investigation, as needed.

The most likely affected area is located immediately beneath the distribution lines within the leachfields (Figures 2-1 and 2-2). In order to adequately assess the possibility of lateral migration (of possible contamination), soil characteristic information including moisture content, will be collected during the investigation to determine if conditions exist that are conducive for lateral movement. If both contamination and anisotropic conditions are found to exist beyond the boundaries defined in the primary model, NDEP will be notified and the project rescoped to account for lateral migration.

3.2 Potential Contaminants of Concern

Potential types of contaminants that could be present were identified through a review of site history documentation, subjective process knowledge, and inferred activities associated with the Area 3 SWSs Numbers 2 and 6. Contaminants are expected to be similar to septage from sanitary and light industrial sewage systems.

The following list of potential COCs for the site was designated during the DQO process:

- Volatile organic compounds
- Semivolatile organic compounds
- *Resource Conservation and Recovery Act* (RCRA) metals
- Polychlorinated biphenyls (PCBs)
- Radionuclides
- Total petroleum hydrocarbons (TPH)

3.3 Preliminary Action Levels

Preliminary action levels for both on-site field screening methods and off-site analytical methods will be used to determine the presence of contamination. All action levels were agreed upon during the DQO process. The following on-site action levels will be used:

- Volatile organic compound headspace screening levels at 20 parts per million (ppm) in a closed system or 2.5 times background, whichever is higher
- 100 ppm TPH concentration using a field screening technique
- Radiation (alpha, beta/gamma) levels two times established daily background levels

The preliminary action levels for the off-site laboratory analytical methods will be the values upon which decisions for future action for the septic waste systems will be based. These preliminary action levels are as follows:

- NDEP Corrective Action Regulation (NAC, 1996a) levels for initial site characterization. Risk-based levels based on modeling may be used as an alternative.
- 100 ppm TPH
- Twice that of background radiological levels or levels listed in the *DOE Nevada Test Site/Yucca Mountain Project Radiological Control Manual*, Table 2-2 (Gile, 1996).

3.4 Measurement Objectives

Laboratory analysis of the soil samples will provide the means for a quantitative measurement of the potential contaminants of concern. The analytical methods and minimum reporting limits for each analyte are provided in Table 3-1.

Table 3-1
Site Characterization Laboratory Analytical Requirements
(Page 1 of 2)

Analyte	Medium	Analytical Method ^a	Minimum Reporting Limit	Precision ^b (RPD)	Accuracy ^b (%R)
Total VOCs	Water	8260 ^c	Analyte-specific estimated quantitation limits ^d	14	60 - 132
	Soil			24	59 - 172
Total SVOCs	Water	8270 ^c	Analyte-specific estimated quantitation limits ^d	50	5 - 230
	Soil			50	11 - 142
Total RCRA Metals Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	Water	6010/7470 ^c	10 µg/L 200 µg/L 5 µg/L 10 µg/L 3 µg/L 0.2 µg/L 5 µg/L 10 µg/L	20	75 - 125
	Soil		2 mg/kg 40 mg/kg 1 mg/kg 2 mg/kg 0.6 mg/kg 0.1 mg/kg 1 mg/kg 2 mg/kg		
Total Petroleum Hydrocarbons	Water (gasoline)	8015 modified ^c	1 mg/L	20	25 - 145
	Water (diesel)		1 mg/L	20	25 - 145
	Water (oil)		1 mg/L	20	25 - 145
	Soil (gasoline)		1 mg/kg	30	30 - 130
	Soil (diesel)		30 mg/kg	30	30 - 130
	Soil (oil)		30 mg/kg	30	30 - 130
PCBs	Water	8080 ^c	Analyte-specific estimated quantitation limits ^d	30	8 - 160
	Soil			50	8 - 139

Table 3-1
Site Characterization Laboratory Analytical Requirements
 (Page 2 of 2)

Analyte	Medium	Analytical Method ^a	Minimum Reporting Limit	Precision ^b (RPD)	Accuracy ^b (%R)
Gamma Spectroscopy	Water	EPA 901.1 ^e or LAL-91-SOP-0063 ^f	Background levels or ORERP ^g	20	80 - 120
	Soil	HASL 300, 4.5.2.3 ^h or LAL-91-SOP-0064 ⁱ		20	80 - 120

^aQC (water) samples are included in table.

^bPrecision and Accuracy requirements are parameter-specific and are referenced from the *Resource Conservation and Recovery Act Industrial Sites Quality Assurance Project Plan*, dated 1994 (DOE/NV, 1994c). The high-low range for all parameters for each method is displayed here, but the actual range will vary by analyte.

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

^dEstimated Quantitation Limit as given in Method SW-846, U.S. EPA (EPA, 1996)

^eStandard Methods for the Examination of Water and Wastewater, American Public Health Association (APHA, 1992)

^f"Sample Preparation and Analysis for Gamma Activity in Aqueous Samples," Standard Operating Procedure, LAS Laboratories, Inc., 1996a.

^gOffsite Radiation Exposure Review Project (ORERP), Phase II Soils Program report (DOE/NV/10384-23) (McArthur and Miller, 1989)

^hEnvironmental Measurements Laboratory Procedure Manual, HASL-300, U.S. Department of Energy (DOE, 1992)

ⁱ"Sample Preparation and Analysis for Gamma Activity in Solids," Standard Operating Procedure, LAS Laboratories, Inc., 1996b.

VOC = Volatile organic compound(s)

mg/kg = Milligram(s) per kilogram

RCRA = Resource Conservation and Recovery Act

μg/L = Microgram(s) per liter

mg/L = Milligram(s) per liter

SVOC = Semivolatile organic compound(s)

PCB = Polychlorinated biphenyl(s)

RPD = Relative percent difference

%R = Percent recovery

4.0 Field Investigation

Data will be collected during the field investigation to confirm or refute the conceptual model for the site, to assess the migration of COCs, and to determine if COCs are present in concentrations exceeding the preliminary action levels (PALs) established for the site. Samples will also be collected to obtain site-specific geotechnical information applicable to the evaluation of remediation and/or closure options. Sampling will also be conducted to allow for definition of migration pathways consistent with the DQOs and to provide adequate data to support or develop a closure strategy. The characterization activities (i.e., sampling, decontamination, etc.) will be conducted in accordance with approved sampling instructions and operating procedures and the *RCRA Industrial Sites QAPP* (DOE, 1996d).

4.1 Technical Approach

The technical approach consists of the following main CAI activities:

- A preliminary video survey will be conducted to map the network of piping associated with the collection system and lines leading to leachfield distribution boxes.
- Locate the actual leachfield distribution lines through exploratory trenching. At least one trench will be excavated at each of the five potential leachfield locations (one site associated with SWS No. 6 and four sites associated with SWS No. 2).
- Once located, each leachfield will be exposed along two transect excavations, perpendicular to the distribution lines: one near the distribution box and another near the distal end of the leachfield.
- Field screening of soils excavated during the excavations will be performed to guide sampling activities and assist with waste management decisions.
- Soil samples will be collected from the excavations in native soil below each distribution line and again 0.7 m (2.5 ft) below the base of the leachfield. Thus, if there are three distribution lines, a minimum of twelve samples would be collected from two trenches per leachfield.
- The results of excavation sampling at each leachfield will dictate the location of the soil borings. If contamination is widespread throughout the leachfield, then the corners of the leachfield will be drilled and appropriate step out borings would then ensue. If the contamination is localized to a few hot spots, then the borings would be drilled at those locations with appropriate step out borings. Each of the borings would be drilled to a

maximum of 16 m (50 ft) below ground surface, consistent with the conceptual model. If drilling to greater depths is necessary, the project will be rescoped as appropriate.

- Soil samples will also be collected at each distribution box and in the immediate vicinity (downstream ends) of the septic tanks.
- Excavation and boring samples will be analyzed for total VOCs, SVOCs, RCRA Metals, PCBs, TPH, and gamma spectroscopy.
- In addition, samples will be collected from *in situ* soils beneath the distribution system and analyzed for geotechnical parameters.

In general, the contents of the leachfields and the unsaturated interval will be investigated to a maximum depth not to exceed (as defined in the primary model) 16 m (50 ft) or when properly characterized, as defined by identifying two consecutive intervals to have containment concentrations below appropriate Preliminary Action Levels as stated in Section 3.3.

The field investigative program shall be conducted to allow for either the modification or termination of the characterization activities when it is determined that sufficient data exist to support or refute the conceptual model. If the conceptual model is proven to be incorrect (e.g., contamination is deeper or more widespread than projected) during the planned activities, the conceptual model will be changed and the investigation scope altered accordingly. The alternate model assumes that infiltration was greater and contaminants have migrated to a deeper extent and/or greater lateral extent than indicated in the primary conceptual model. Two contingencies were developed if the conceptual model needs to be changed, and they are as follows:

- If the contamination is deeper than anticipated, the contingency is having the ability to drill deeper (i.e., deeper than 16 m [50 ft] bgs) than the conceptual model indicates if regulated contamination is present.
- If the contamination covers a larger area or is more complexly distributed, the contingency is having the ability to include more extensive subsurface soil sampling outside of the area of the leachfields via additional sampling (or other intrusive methods) and/or drilling techniques.

Contingent investigations may be carried out, if approved, as part of the current or subsequent characterization phases and will be based on the results of the first phase of the investigation.

The sampling and analysis plan will be executed as described in the following sections. The following sections detail the technical approach and activities that will be conducted for the characterization.

4.2 Field Activities

4.2.1 Video Survey

A preliminary video survey of the sewer collection system will be conducted to inspect the current physical condition and layout of the septic line network. A visual assessment of the system's integrity will be performed by identifying obvious breaches, unsuspected branchings, and open joints. A commercially available cable and camera system will be utilized and introduced through any easily available access points (cleanouts, surface drains, opening of capped ends) involving little or no excavation. If needed, subsurface features will be exposed by excavation methods (which may coincide with trenching activities during other exploratory activities) to gain additional access for observation purposes or reintroduction of the video setup (in the event of jamming). The entire collection system including the tanks will be identified and physically mapped through tracking the network piping and locating or ruling out the existence of other possible branches (Appendix C). An electronic device which emits a signal that can be tracked at the ground surface will be coupled with the video setup and introduced into the piping.

4.2.2 Exploratory Trenching

Trenching will be conducted to transect and locate the SWS Numbers 2 and 6 leachfields at possible locations, or the locations will be ruled out as possibilities (Figure 4-1) by means of exposing the distribution pipe arrangement and viewing the relative placement of materials and pipes within the leachfield. This will also function to visually assess horizons within the leachfields and define the basement of the leachfield.

An application of this sequence will define parameters and guide the selection of preferential sampling points. Investigation sampling will consist of representative soil which was possibly impacted (biased selection) by releases.

Leachfield
Waste System
No. 2

Sept
Possible
distribution box

Leachfield
Waste System
No. 6

0370T

0370T

IT13

LEGEND

Planned Trench Location

Planned Trench Soil
Sample Location

Septage Sample (Septic Tank 33-12)

Septic Line

Septic tank

Boundary/Baseline
Photodocumentation Monument

Building

Concrete Pad

Approximate Location of Leachfield

"Biased" Soil Sample Location (one per outfall end of each Septic Tank and leachfield[s] after loca

Approximate Location
of Distribution Box

Possible
Locations of
Septic Tank 33-6

IT14

SCALE

0 20 40 Feet

0 6 12 Meters

Note: All locations are approximate.

Figure 4-1
Trench and Sample Location Map
Septic Waste Systems
No. 2 and No. 6
Area 3 Compound, Tonopah Test Range
Nye County, Nevada

In the event sampling results indicate concentrations exceed specified action levels (i.e., contamination has not been bounded), additional locations will be selected (lateral extensions) and/or subsurface drilling conducted to further track the vertical extent of contamination.

4.2.3 Miscellaneous Exploratory and Sampling Activities

The inspection of the collection system may be performed simultaneously with sampling activities because excavations will serve three functions: exposure of sampling horizons, access for introducing the video camera setup, and consequential discovery of septic tanks "in-line". This approach will be applied in the regions of possible distribution boxes and the connecting line ends of septic tanks (Figure 4-1). Characterization samples will be collected from the underlying soil at the downfall (downstream) ends of each Septic Tank (33-4, 33-5, 33-6, and 33-12) for a total of four samples. Soil samples will be collected downstream and underneath the junction of each found distribution box. Additionally, the contents within Septic Tank 33-12 will be characterized by analytical means (Table 3-1).

4.2.4 Sampling Approach

This section of the CAIP contains the sampling approach for investigating CAU No. 427. All sampling activities will be conducted in compliance with the *Industrial Sites QAPP* (DOE/NV, 1996d). Requirements for field and laboratory environmental sampling are contained in the *Industrial Sites QAPP* (DOE/NV, 1996d) and Table 3-1 and Table 4-1.

The sampling approach for CAU No. 427 was developed from the DQO process (Appendix A). Sampling activities will focus on evaluating COC concentrations, defining contaminant extent to confirm or refute the conceptual model for the site, and determining if COCs are present in concentrations exceeding the PALs for the site. The sampling activities will also be used to determine waste types for appropriate waste minimization options and management requirements. The sampling plan will consist of continuous field screening and environmental sampling to be conducted in the investigation, and the results will be included in the decision process.

Table 4-1
Soil Engineering Analytical Requirements for Geotechnical Studies
at the Septic Waste System Numbers 2 and 6 Leachfields

Soil Engineering Analysis	Method
Initial moisture content	ASTM ^a D 2216
Dry bulk density	EM ^b -1110-2-1906
Calculated porosity	EM-1110-2-1906
Saturated/unsaturated hydraulic conductivity	ASTM D 5084
Particle-size distribution (preferred method is hydrometer distribution)	ASTM D 422
Moisture retention characteristics	ASTM D 3152
Atterberg limits	ASTM D 4318-93

^a Annual Book of ASTM Standards, Section 4, "Construction," Volume 04.08, Soil and Rock (1), and Volume 04.09, Soil and Rock (11), 1996.

^b United States Army Corps of Engineers (USACE), Engineer Manual 1110-2-1906, *Laboratory Soils Testing*, Appendix II, 1970.

ASTM = American Society for Testing and Materials
 EM = Engineering Manual

4.2.5 Field Screening

Field screening tests will be performed for all soil samples. The field screening methods will consist of headspace screening for volatiles, TPH screening, and radiological screening for alpha and beta/gamma emitters. This field screening data will serve two primary purposes. First, the data will provide continuous environmental measurements of the subsurface and the soil beneath the leachfields and piping. Second, the data will provide a mechanism for guiding the investigation deeper, if necessary. If field screening results exceed the preliminary action levels listed in Section 3.3, then screening will continue as appropriate. Using field screening tests, the vertical and lateral boundaries will be established by two successive, negative field screening measurements, and environmental samples will be collected at these depths for laboratory confirmation.

4.3 Trenching and Associated Sampling Activities

Exploratory trenching will be conducted by transecting leachfields with a backhoe equipped with a narrow bucket to create two linear transects perpendicular to the lengths of the distribution lines. The first trench will be near the distribution box(es) and 1.5 to 3 m (5 to 10 ft)

downstream from the likely coordinates (Figure 4-1). There will be a limited (IDW minimization) second trench or a series of "potholes" 1.5 m (5 ft) from the distal end based on estimated pipe lengths (Figure 4-1). Trenching activities will be minimal to carefully expose just enough pipe or material to expose sampling horizons and will initially stay within estimated leachfield boundaries to minimize the generation of IDW. Only soil will be sampled; leachrock will be excluded from characterization sampling. Trench sampling locations along a given trench will be positioned just below each distribution line, three lines (times two trenches) will equate to a total of six samples per depth-interval in each leachfield. Soil will be collected with a stainless steel scoop out of the backhoe bucket immediately upon retrieval. The interval, one foot above to the basement (original base of excavation when installed) of the leachbed, will define the uppermost sampling interval (see Figure 4-2). If more volume for a given sampling event is required, then sample collection will be extended laterally at the same depth.

As discussed in the DQO scopings, leachfield systems were likely installed per Nevada regulations or Uniform Building Code requirements as either shallow or deep systems. An estimated depth below ground surface to the leachfield basement for a shallow system is approximately 1 m (3 ft) and a deep system is 1 m (3 ft) to a maximum of 2 m (6 ft) (Appendix A). Tile-lined leachbeds instead of leachlines placed in leachrock may exist, but individual samples will still be collected in similar positions and distribution. A second horizon of 0.7 m (2.5 ft) beneath the leachfield basement will be exposed by a second, deeper trench within the same walls and sampled out of the backhoe bucket immediately upon retrieval. A third interval (1.5 m [5 ft] below the second interval) may be accessible for sampling as limited by the backhoe reach. A single sample will also be collected from directly beneath the distribution box or junction at each positively identified leachfield (see Figure 4-1). All samples identified in Figure 4-2 will be submitted to the laboratory for quick-turnaround analyses.

The trenches will be extended laterally 4.5 m (15 ft) beyond the perimeter of the distribution lines in the event that results indicate areas of contamination exceeding action levels at the initial locations. If horizontal contamination extends 4.5 m (15 ft) outside the leachfields, then the conceptual model has failed, and the CAIP will need revision. Two consecutive "clean" samples, confirmed through offsite laboratory analysis, will adequately define the lower or lateral limits of the affected soils. If application of this approach results in "clean" results for peripheral

Note: Horizontal scale is exaggerated and pipe width is not to scale
 Estimated leachfield widths: SWS No. 2 = 20 feet
 SWS No. 6 = 40 feet

LEGEND

- Surface above leachfield
- Leachfield material
- Potential extent of contaminant migration (conceptual model)
- Grab sampling interval (backhoe)
- Distribution pipes (end view)

Figure 4-2
Cross-Sectional View of a Typical Leachfield Transect with Grab Sampling Locations at the TTR Area 3 Septic Waste Systems No. 2 and No. 6

(i.e., the 4.5-m [15-ft] extensions) and both of the trench intervals (below the pipes and the interval 0.7 m [2.5] ft below the basement), then it will be recommended that the leachfield be closed.

It is anticipated that approximately 15 to 20 initial samples will be obtained within the area of each identified leachfield based on the current conceptual model. A total of five samples (including the contents of Septic Tank 33-12) will be collected at the outfall ends of the septic tanks (see Figure 4-1). Samples to be analyzed by the off-site laboratory will be selected based on the results of field screening and planned sampling intervals. The actual number of samples analyzed will depend on decisions made in the field. Additional (or fewer) characterization samples may be sent for off-site analysis based on field screening results and the results of sample analyses when they become available.

4.4 Drilling Activities

Drilling activities will be conducted, if necessary, to depths 15 m (50 ft) (conceptual model). Any drilling to confirm or refute the alternate model (greater than 50-ft depths) may be pursued with concurrence from the appropriate parties. Strategies for selecting boring locations will be loosely based on strategies discussed during the DQO scoping for the project (the following paragraphs outline two possible scenarios). The quick-turnaround results of the upper and lower interval trench samples (Figure 4-2) or a deeper "maximum-reach" backhoe sample will dictate if drilling is needed and will determine from which locations to advance to greater depths.

In the event screening results indicate that contamination continues below the second sampling horizon (or a deeper interval as accessible with a backhoe), borehole samples will be collected at new locations. This scenario assumes that contamination was dispersed throughout the majority of the leachfield system(s). To minimize the number of boreholes and samples, regions near the corners (up to four) and the center of the leachfield will be targeted for initial borehole locations. The boreholes will be positioned only at corners that exceeded action levels and that are located within 1.5 m (5 ft) (horizontal) of the outermost (peripheral) sample location (Figure 4-3). Each corner borehole will be advanced to appropriate depths to track the vertical extent of contamination and samples will be collected in 1.5-m (5-ft) intervals beginning 1.5 m (5 ft) below the depth of the lowest horizon (adjacent) trench sample. Two additional boreholes

(stepouts) per "corner" borehole (see secondary boreholes in Figure 4-3) will be advanced to the same total depths or terminated if results indicate two consecutive, "clean" intervals.

A second scenario assumes that a leachfield region has received preferential flow (concentrating around a broken distribution box, blockage of other distribution lines, disconnects) of wastewater input as evidenced by an uneven distribution (i.e., contrasting regions with nondetectable or below action level concentrations) of trench sample results. An initial borehole will be placed near an estimated contaminant plume center with a minimum of three stepouts (in the standard triangular pattern) emanating from this center with the aforementioned instructions regarding total depths and 4.5 m (15 ft) horizontal resolution applied.

In general, samples will be collected using a split-spoon sampler or core barrel at 1.5 m (5 ft) intervals beginning 1.5 m (5 ft) below the lowest trench sample and continuing, if needed, to a maximum depth of 50 ft. If drilling is approved to be conducted below 15 m (50 ft), the sampling interval will be increased to 3 m (10 ft). Before terminating a boring, two unimpacted samples (as identified through on-site screening) will be collected from approximately 1.5 and 3 m (5 and 10 ft) below any encountered contaminant zones. The two samples, confirmed through off-site laboratory analyses, should adequately define the lower limit of the affected soils, based on the type of soils expected (sands and gravels) and the properties of the contaminants (liquid phase wetting the grains). Soil samples will be collected from the bottom 0.6-m (2-ft) of each sample interval within the core barrel sampler. Beginning at the leading end of the core barrel, the first two portions will be retained for total VOCs and TPH analyses, respectively. The next portion of the core will be retained for VOC and TPH field screening. The third portion will be retained for total SVOCs, PCBs, RCRA metals analysis, and gamma spectroscopy. The remaining core will be used (and properly noted) if additional sample volume is needed for samples that are not sensitive to volatilization. The entire core will be field screened for alpha and beta/gamma radiological contamination during sample aliquot collection.

Additional soil samples (one from below each distribution point sample per leachfield as in Figure 4-1) will be collected from the basement soil underneath the leachfield/natural soil interface to assess the geotechnical characteristics. These samples will be analyzed for soil

Figure 4-3
Leachfield Borehole Locations
(Widespread Scenario)

engineering parameters. They will be collected within brass sleeves (or other as appropriate) so as not to disturb the natural physical characteristics of the soil. Table 4-1 presents the soil engineering analyses to be used.

All equipment which contacts the soil will be decontaminated in accordance with written and approved procedures consistent with the DOE/NV Environmental Restoration Division (ERD) Procedure ERD-05-701, "Sampling Equipment Decontamination," Rev. 0 (DOE/NV, 1994d) or as appropriate for special equipment being decontaminated (i.e., steam-cleaning core barrels).

Clean core barrels will be used for each sampling event. This will minimize the potential for cross-contamination between sample locations. All samples collected for laboratory analysis will be from fresh media (rather than reusing the sample media used for screening). Records will be kept of the soil description, field screening measurements, and all other relevant data. All pertinent and required sampling information (i.e., date, time, sample interval) will be documented in accordance with the *Industrial Sites QAPP* (DOE/NV, 1996d). Approved Chain of Custody procedures (IT, 1996) will be followed to assure the defensibility of the data.

5.0 Waste Management

There is no process knowledge that indicates radioactive wastes were disposed of in the septic systems. However, there is some potential that industrial wastewaters containing small amounts of oils, greases, cleaning solutions, and solvents were disposed. During the preliminary site investigation, specific hazardous constituents used in solvent processes were not identified. Therefore, if contaminants are identified, it is likely that they would be characteristic rather than listed hazardous wastes.

Waste generated through sampling activities will be traceable to its source and to individual samples. Administrative controls (e.g., decontamination procedures, trenching method, drilling method, and characterization strategies) will minimize waste generated during site characterization activities. Decontamination activities will be performed in accordance with approved procedures as specified in the field sampling instructions (to be written prior to commencement of field work) and will be designated according to the contaminants of concern present at the site.

If laboratory results indicate the waste is hazardous, the waste will be managed in accordance with RCRA (DOE/NV, 1994d) in a hazardous waste accumulation area with the 90-day accumulation time limit starting when the waste is identified as hazardous. As soon as it is known that the waste is radioactive or mixed, the waste will be managed in accordance with the Nevada Test Site Waste Acceptance Criteria (NTSWAC) (DOE/NV, 1996c) and the "Mutual Consent Agreement Between the State of Nevada and the U.S. Department of Energy for the Storage of Low-Level Land Disposal Restricted Mixed Waste" (NDEP, 1995), respectively. In addition, all drilling and/or trenching will be terminated and NDEP will be notified. All waste types, if present, will be managed according to U.S. Department of Transportation (DOT) regulations.

5.1 Waste Minimization

Investigation activities have been designed to minimize the amount of waste generated. Soil waste that does not require management as radioactive or RCRA-regulated waste will be used as fill material, when appropriate. Other waste, such as disposable sampling and personal protective equipment, will be segregated to the greatest extent possible to avoid generation of

hazardous waste. Hazardous materials will be controlled, minimizing generation of hazardous waste, and waste segregation will be applied to all identified waste streams.

5.2 Potential Waste Streams

Potential waste that may be encountered includes hydrocarbon-contaminated, listed, and characteristic wastes.

The TPH field screening method uses reagents that may produce small quantities of hazardous wastes. This waste stream will be segregated and managed as follows:

- Waste will be accumulated at or near the point of generation.
- The waste will be compatible with the container.
- The container will be in good condition and free from corrosion and dents that impair the integrity of the container.
- At a minimum, the container will be labeled with the following information:
 - The words "Hazardous Waste"
 - A unique waste stream identification number
 - All applicable EPA waste numbers
 - Contact name

Wastes generated during the investigation activities may include, but are not limited to, the following:

- Decontamination rinsate
- Contaminated disposable sampling equipment (e.g., plastic, paper, aluminum foil, and sample containers)
- Personal protective equipment
- Contaminated soil
- Contaminated core material (drill cuttings)
- Sanitary waste
- TPH Kit waste

5.3 Waste Determination

Proper waste management consists of making a determination of waste status (i.e., RCRA-hazardous) and management based on the waste determination. The determination of whether or not the waste is characteristic or listed is based on the *Code of Federal Regulations* (CFR) Title 40 Part 261, "Identification and Listing of Hazardous Wastes" (CFR, 1996a). Waste is determined to be hydrocarbon-contaminated if it exceeds the State of Nevada 100 ppm TPH action level (NAC, 1996b).

Solid materials other than soil wastes are RCRA *Toxicity Substance Control Act* (TSCA) or hydrocarbon waste only by virtue of contact with contaminated media (DOE/NV, 1996e). The same is true of decontamination rinsate. A waste determination on the excavated soil will be made per boring and/or excavation according to the sample results for that boring and/or excavation. Therefore, sampling and analysis of the waste, separate from site characterization analyses, will not be required. The data generated as a result of site characterization will be used to assign the appropriate waste type (i.e., unregulated TPH, hazardous, low-level waste, or mixed) to the IDW. The action levels for IDW contaminants are presented in Table 5-1.

5.4 Sanitary Waste Management

Sanitary waste will be contained in plastic bags, dumpsters, or drums and transported to a Subtitle D Landfill. Soils that are not regulated or are below low-level waste limits for radioactivity will be returned to the site of excavation.

5.5 Hydrocarbon Waste Management

Hydrocarbon waste (containing more than 100-ppm TPH) will be properly containerized in bags, drums, or roll-off boxes and will be transported to an appropriate treatment storage and disposal facility after the waste is fully characterized.

5.6 Waste Management Activities

All waste will be managed on site within the defined boundaries at the CAU until analytical results are received to determine the disposition of the waste. By adhering to administrative controls, sampling personnel will ensure that no additional contaminants are added to the waste.

Table 5-1
Action Levels for Investigation-Derived Waste Contaminants

Parameter	Action Level	Source	Comments
TPH ^a	100 ppm ^b	NAC ^c 459.9973	Regulated by the NDEP ^d
Total VOCs ^e , SVOCs ^f , pesticides, and RCRA ^g metals	See note below	40 CFR ^h 261 ⁱ	-----
PCBs ^j	50 ppm	40 CFR 761.1 (b) ^k NAC ^l 444.940 to 444.9555	NDEP requires manifesting as hazardous waste for shipping and disposal purposes.
Radiological	Isotope-specific	NTS POC ^m	-----

^aTotal petroleum Hydrocarbons

^bParts per million

^cNevada Administrative Code (NAC), 1996b

^dNevada Division of Environmental Protection

^eVolatile organic compound(s)

^fSemivolatile organic compound(s)

^gResource Conservation and Recovery Act

^hCode of Federal Regulations

ⁱCFR, 1996a

^jPolychlorinated biphenyl(s)

^kCFR, 1996b

^lNevada Administrative Code (NAC), 1990

^mNevada Test Site Performance Objective for Certification of Radioactive Hazardous Waste (BN, 1995)

Note: Total VOCs, SVOCs, pesticides, and RCRA metal concentrations of the samples will be determined through laboratory analysis. The laboratory-derived concentrations for soil samples (milligram/kilogram) will be divided by a factor of 20 and compared to the toxicity characteristic (TC) limit (milligram/liter) for hazardous parameters. If the total value divided by 20 is greater than the TC limit, IDW associated with these samples will be considered hazardous waste.

For administrative purposes, the waste will be managed as three waste streams (at a minimum): soil, potentially contaminated solid waste, and liquid waste (i.e., decontamination rinsate). Each waste stream will be segregated, and additional segregation may occur within each waste stream:

- Waste such as contaminated personal protective equipment and decontamination rinsate will be segregated into DOT-compliant waste containers.
- Soil excavated below and adjacent to leachfield piping, that is suspected as being hazardous, will be managed in spoils piles on 10-mil thick plastic sheeting, covered, and accumulated near the site of excavation. When possible, soils sampled and analyzed that are determined to be nonhazardous will be used as fill material and returned to the site of excavation.

- Soil excavated above leachfield piping, which is assumed to be nonhazardous, will be screened for TPH, Radiological and Volatile Organic Compounds. If the screening indicates the soil is nonhazardous, it will ultimately be used as fill material and returned to the site of excavation. If the screening indicates the soil is potentially hazardous, it will be managed in accordance with the preceding paragraph.

The contents of each container and/or spoils pile will be recorded, appropriately marked, and labeled in accordance with RCRA and DOE requirements (40 CFR 262, 1997b; 49 CFR 172, 1997a). Access to waste temporarily accumulated at the project site will be controlled by placing the waste within an access-controlled area. All waste containers and spoils piles will be covered and appropriately labeled.

6.0 Time Frame and Records Availability

6.1 Time Frame

After the submittal of the Final CAIP to the DOE/NV, the following is a tentative schedule of activities (in working days):

- Day 0: Preparation for field work will begin.
- Day 40: The field work, including field screening and sampling, will begin.
- Day 110: The field work will be completed, and samples will be shipped to the laboratory for analysis.
- Day 160: The quality-assured laboratory analytical sample data will be available for NDEP review.
- Day 300: The Corrective Action Decision Document (CADD) will be submitted to NDEP.

The following information will be reported in the CADD:

- Introduction, including purpose, scope, an FFACO cross-walk, and a discussion about the need for further action
- The results of the corrective action investigation
- A corrective measures study, including initial screening of alternatives, evaluation of alternatives, and comparison of alternatives
- The recommended alternative

6.2 Records Availability

Historic information and documents referenced in this plan are retained in the DOE project files in Las Vegas, Nevada, and can be obtained through written request to the DOE/NV Project Manager.

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Appendix A

Data Quality Objectives Worksheets

DATA QUALITY OBJECTIVES WORKSHEETS FOR THE AREA 3 SWS's Nos. 2 and 6 - CAU NO. 427

Results of the DQO Scoping Meeting Conducted on June 2 and 3, 1997.

These notes are based on the DQO meeting held by the Core Decision Team and the Scoping Team members. The notes follow the outline of the DQO guidance (EPA, 1994). The steps systematically build on the data acquired during background research for the Corrective Action Investigation Plan (CAIP). Copies of the background data are in IT project files. To view the operational details of the sampling plan, see Step VIII of this worksheet.

Members of the Scoping Team:

1. Scoping Team

DOE/NV

Janet Appenzeller-Wing
Kevin Cabble
Lori Arent

NDEP

Dean Mierau
Harry vanDrielen

IT Corporation

Kenneth Beach
Randy Dubiskas
Grant Evenson
Syl Hersh
Jeanne Wightman

Bechtel

Dave Madsen
Steve Nacht

2. Core Decision Team

Janet Appenzeller-Wing
Kevin Cabble
Karen Beckley
Kenneth Beach
Dave Madsen

3. Primary Decision Makers

Janet Appenzeller-Wing
Kevin Cabble

DATA QUALITY OBJECTIVES WORKSHEETS

I. PROBLEM STATEMENT

A. State the problem

Regulated wastes have been released into the subsurface at the CAU.

B. Summarize the contamination problem - combine the relevant background information into a concise description of the problem to be resolved.

1. Problem to be resolved

Determine whether liquid waste seepage in the septic waste system(s) has contaminated or has the potential to contaminate underlying soil or groundwater to the extent that it may be a hazard to potential receptors.

2. List known or suspected sources of contamination.

The Area 3 CAU No. 427 is comprised of Septic Waste Systems (SWS) Numbers 2 and 6 with their respective CAS Numbers, 03-05-002-SW02 and 03-05-002-SW06. Septic Waste System No. 2 includes Septic Tanks 33-4, 33-5, and 33-6; associated 4-inch and 6-inch vitrified clay pipe (VCP) influent/effluent lines; a distribution box; and four potential leachfields. Septic Waste System No. 6 consists of Septic Tank 33-12, VCP lines, and an associated leachfield.

Evidence for potential contamination includes:

- a. A waste manifest (SNL) described septage pumped from Tank 33-6 as petroleum Naphtha. (RFI CAU Work Plan, TTR, July 1996) as part of a preliminary site investigation for the Environmental Restoration Program.
- b. Descriptions of processes in buildings served as potential waste sources (from a site inspection report and as-built drawings). The TTR Work Plan describes chemicals believed to be used and documented in past observations in buildings connected to the SWS in 1994. These buildings may have contributed hazardous materials to the Area 3 Septic Waste Systems.

DATA QUALITY OBJECTIVES WORKSHEETS

- c. Operations in the following buildings may have contributed hazardous materials to the Area 3 SWSs Numbers 2 and 6:

Automotive Maintenance (Light Duty Shop) - 0360

REECO Electrical (Crafts) Shop - 0367

Security, First Aid and Fire Dept. - 0369

Heavy Duty Repair Shop - 0374

Equipment Maintenance (Range) and Machine Shop - 0354

Camera Repair Building - 0355

- d. Analytical Results from sampling efforts: Since operations began in the 1960s, buildings within the complex have been connected to conventional septic systems. During 1990, a consolidated sewer system was installed, which is connected to the nearby Air Force facultative lagoon wastewater treatment system. The existing septic system leachfield was abandoned with all the sanitary wastes rerouted through the new system. During the process of installing the new system, the former tanks and associated branches were sealed off. Later, the septic tanks in SWS No. 2 were pumped dry, and the septage (sludge and liquid) that remained within Septic Tanks Numbers 33-4, 33-5, and 33-6 was sampled. Analytical results showed concentrations of VOCs, SVOCs, oils, and greases.
- e. A Federal Facility Preliminary Assessment Review presents a description of the Area 3 Septic Tanks and Leachfields as identified by the DOE. According to this review, sanitary wastewater, industrial wastewater containing small amounts of Stoddard solvent, cutting oils, cleaning solutions, and paint solvents appear to have been disposed of in septic tanks and released into leachfields.

II. DEVELOP/REFINE THE CONCEPTUAL MODEL.

A. Primary Model

1. Infiltration and concentration of contaminants in the form of liquid waste into the soil directly below (surrounding) the leachlines and within the leachfield.
2. Minor lateral migration (due to soil anisotropy) of contaminants in the form of liquid waste into the soil.
3. Infiltration limited to less than 50 feet vertically and 15 feet horizontally. Any underground lines extending into the area could extend the lateral migration pathways further.

DATA QUALITY OBJECTIVES WORKSHEETS

B. Alternate Model

1. Infiltration is greater than 50 feet of vertical migration and greater than 15 feet of lateral migration.
2. If vertical migration is greater than approximately 360 feet, potentially contaminated groundwater.
3. Potential contamination plumes may exist along collection lines due to loss of integrity in lines or tanks.

Contaminant levels (if present) are expected to be similar to septage from sanitary and light industrial sewage systems. The extent to which these materials have impacted surrounding and underlying soil and/or groundwater, is currently not known, but must be determined in order to close the site under NDEP, RCRA, and DOE requirements.

III. IDENTIFY THE DECISION

Select the appropriate decision for the current phase of the site assessment process.

- A. Decide if the COCs in the leachfield exceed action levels.
- B. Contaminant migration: If regulated contaminants exceed screening levels, determine with a "Yes" or "No" answer whether or not regulated contaminant concentrations exceed the spatial boundaries proposed in the conceptual model for the site.

IV. IDENTIFY THE INPUTS TO THE DECISION

A. Identify the information inputs needed and resolve the decision.

Contaminant Identification: - Analyses of soils for specified parameters

1. In leachfield(s)
2. In septic tanks
3. In soil below leachfields
4. In soil around septic lines

Action Level Exceedence: - Analytical Results will be compared with established action levels.

DATA QUALITY OBJECTIVES WORKSHEETS

- Contaminant Migration:
- Boundaries of contaminant migration from indicator parameters and/or analyses of soils for the parameters listed in I.B.3
 - Soil moisture content within and directly below the leachfields
 - Soil physical characteristics (hydrological and geotechnical)
 - Soil analysis outside of leachfield and pipes but within boundaries
 - Full set of geotechnical and permeability data

Also to be considered

- Waste Management:
- NTSWAC analyses

B. List types of contaminants and affected media.

1. VOCs - subsurface soil
2. RCRA metals - subsurface soil and possibly residual septage
3. SVOCs - subsurface soil
4. Radionuclides - no known source because of process knowledge
5. TPH as oils and greases in subsurface soil
6. PCBs - subsurface soil
7. Borates associated with vintage antifreeze. This is contingent upon the CAI results indicating contamination is approaching groundwater.

C. Identify potential sampling approaches and appropriate analytical methods.

1. Conduct biased sampling during the field investigation to confirm or refute the conceptual model for the site, to assess the migration of the COCs, and to determine if COCs are present in concentrations exceeding the PALs for the site. Regions exceeding the PALs would necessitate horizontal step-out or deeper borings to investigate any potential migration of subsurface contaminants.
2. In general, investigate the contents of the leachfields and the unsaturated interval to a maximum depth (as defined in the primary model) of 50 feet and 2 consecutive intervals below appropriate screening levels as determined by field screening and other analytical methods. Representative sampling will consist of

DATA QUALITY OBJECTIVES WORKSHEETS

"minimal suite" analyses, with a possible reduction to a limited suite analysis if non-detects (F-listed) or results are below PALs, as appropriate.

3. In addition, collect samples in order to obtain site-specific geotechnical information applicable to the evaluation of remediation and/or closure options.
4. Analytical
Parameters selected based on process knowledge and requirements specified by the NDEP for "full suite" analysis.
 - a. Total VOCs - EPA 8260
 - b. Total SVOCs - EPA 8270
 - c. Total RCRA Metals - 6010/7470
 - d. Total petroleum hydrocarbons - gasoline, diesel, and oil fractions - 8015 modified
 - e. PCBs - 8080
 - f. Gamma spectroscopy
 - g. NTSWAC
 - h. Off-site, fixed-base laboratory may be used for soil properties analysis:
 - Initial moisture content
 - Dry bulk density
 - Calculated porosity
 - Saturated/unsaturated hydraulic conductivity
 - Particle size distribution
 - Moisture retention characteristics
 - Atterberg limits

V. DEFINE THE BOUNDARIES OF THE STUDY

A. Define the geographic areas of the field investigation

1. Define the domain or geographic area within which all decisions must apply (in some cases this may be defined by the Corrective Action Unit)

Figure A-1 shows a dashed loop marking the CAU boundary. If the preliminary evaluation (limited intrusion and equipment) shows that the eastern extension (within the secured area near Building 0367) does not need further investigation, it may be practical to reduce the boundary. All contaminated equipment traffic will be within the defined CAU boundaries, with appropriate decontamination taking place prior to exiting boundaries. All IDW will be accumulated within the boundaries of the CAU. The boundary will be of adequate size to contain equipment, spoils, etc. This boundary is subject to change as TTR personnel may

DATA QUALITY OBJECTIVES WORKSHEETS

be involved in making decisions. TTR must pre-approve boundaries, both time and space.

2. Specify the characteristics that define the population of interest

The population of interest is the type, quantity, and distribution of contaminants.

B. Define the temporal boundaries of the decision

1. Determine the time frame to which the study data apply

- a. Hold times for the analytical samples.
- b. The deadline for the CADD is 7/31/98.
- c. Migration (if occurring) is assumed to be imperceptibly slow with no wastewater input since 1990 and very minimal surface water runoff or infiltration.
- d. The time frame begins after the CAIP is approved and allows for finalizing the data in preparation for the CADD to ensure this deadline can be met.
- e. IDW samples holding time.

2. Determine when to collect data

Field activities (data collection) are scheduled to take place in November and December 1997. Data will not be collected during electrical storms, heavy winds or during holidays.

3. Define relevant time constraints

CADD delivery date to the NDEP on 07/12/98

C. Identify any practical constraints on data collection

1. Testing operations (TTR security constraints)
2. Meteorological
3. Confined spaces
4. Health and safety
5. Heavy equipment availability
6. Remoteness of the site
7. Approval of the CAIP

DATA QUALITY OBJECTIVES WORKSHEETS

VI. DEVELOP A DECISION RULE - DEFINE A LOGICAL BASIS FOR CHOOSING AMONG ALTERNATIVE ACTIONS

A. Specify the action level or preliminary action level for the decision

The action levels trigger the "yes" decisions described in the Decision Identification process, and they include:

1. On-site methods
 - a. Radiation levels greater than 2 times that of background
 - b. VOC screening (25 ppm) in a closed system.
 - c. TPH above 100 ppm
2. Off-site Analysis
RCRA-listed contaminant concentrations above the NDEP Corrective Action Regulations for initial site screening and characterization and above risk-based levels (modeling - which may be different).

TPH concentrations above the TPH limits per NDEP Corrective Action Regulations

Presence of man-made radionuclides above two times a field-established daily background for initial field screening, followed by application of DOE NTS/YMP Radiological Control Manual Table 2.2 screening levels for evaluation of laboratory analysis data and finally risk-based analysis using RESRAD for remediation/closure evaluation.

VII. OPTIMIZE THE DESIGN - OUTLINE A SAMPLING DESIGN, SPECIFYING THE OPERATIONAL DETAILS OF THE SAMPLING PLAN WHICH FALLS WITHIN THE PROJECTS CONSTRAINTS

A. Develop general sampling and analysis design alternatives

1. Develop a preliminary estimate of variability

Insufficient data is available to adequately estimate the variability for the likely constituents of concern.

2. Develop a sampling strategy for the site that specifies all of the previously defined data quality objectives

- a. Trenching (i.e., less than approximately 12 to 14 feet below ground surface as defined by the maximum reach of the backhoe) and sampling will be conducted below the distribution lines within the leachfields, below the

DATA QUALITY OBJECTIVES WORKSHEETS

distribution box, at the outfall ends of the septic tanks, and the contents of any tanks that have not been filled at locations positively identified in the preliminary evaluation.

- b. Subsurface drilling (i.e., less than 50 feet below ground surface as defined by the conceptual model) and sampling will be conducted to confirm or refute contamination at greater depths immediately below the above locations.

B. Select the most resource-effective design that satisfies all of the DQOs.

1. Conduct biased sampling during the field investigation to confirm or refute the conceptual model for the site, to assess the migration of the COCs, and to determine if COCs are present in concentrations exceeding the PALs for the site. Select preferential sampling points within the leachfields and surrounding the collection system, as sampling locations. Locate and target collection system areas of obvious breaches, leakage, loss of system integrity that are in the immediate vicinity of identified septic tanks. Within the leachfield(s), overlay a sampling pattern on the leachlines and collect subsurface soil samples at various depths below the distribution lines. Collect soil samples from depths attained by backhoe excavation, and continue to greater depths with a drill rig as needed to track the vertical extent of contamination. Regions exceeding the PALs would necessitate horizontal step-out or deeper borings to investigate any potential migration of subsurface contaminants.
2. In general, investigate the contents of the leachfields and the unsaturated interval to a maximum depth (as defined in the primary model) of 50 feet and two consecutive intervals below appropriate screening levels as determined by field screening and other analytical methods. Representative sampling will consist of "full suite" analyses with a possible reduction to a limited suite analysis if non-detects (F-listed) or results are below PALs, as appropriate.
3. In addition, collect samples to obtain site-specific, geotechnical information applicable to the evaluation of remediation and/or closure options.

05/14/97 FIELD OBSERVATIONS

Suspected "sampling point" for Tank 33-6 found 15 feet west of IT12 (ER Sites Inventory Database 1993 photograph)

Electric box (aboveground) ("Recent Feature") - 32 feet west of IT12

Fire station box ("Recent Feature") - 30 feet north of IT12

G. Evenson best estimate for S. Tank 33-6, based on 1993 photograph, interviews and that recent excavations ("Recent Features") did not encounter interference

0	08/08/97		L. B. Smith			
REV. #	DATE	DESCRIPTION OF REVISION	REV. BY	ENG	CHKD BY	APPRD BY
PROJECT MANAGER: K. Smith			DRAWN BY: R. Smith			
FIGURE A-1						
CAU NO. 427 TONOPAH TEST RANGE						
SEPTIC WASTE SYSTEMS 2 AND 6						
ATTRIBUTE COMPOSITE MAP (DQO)						
LAYER(S)		DATE INITIATED		DRAWING NUMBER		
		05/16/97		0100004		

Appendix B

Geophysical Interpretation Map

FIGURE 25 (IT, 1997)

**SEPTIC TANKS 33-4, 33-5, 33-6 AND 33-12
GEOPHYSICAL INTERPRETATION MAP
TONOPAH TEST RANGE**

PREPARED FOR

**U.S. DEPARTMENT OF ENERGY
LAS VEGAS, NEVADA**

Figure B-1

- LOCATION OF SEPTIC TANK BASED ON PLOT PLAN—MECHANICAL UTILITIES WEST, SANDIA MASTER UTILITIES PLAN DATED 9/30/89
- LOCATION OF SEPTIC TANK BASED ON SEWER & GAS SYSTEM MAP DATED 11/18/82
- W — PIPE/CABLE (S=SEWER, G=GAS, E=ELECTRICAL, W=WATER, P=UNKNOWN)

NOTE:
REFER TO FIGURE 20 LEGEND FOR
EXPLANATION OF CULTURAL FEATURES

Appendix C

Septic Waste Systems 2 and 6 Attribute Composite Map (DQO)

LEGEND

- CAS *03-05-003-SW-02 (SWS-2)
- CAS *03-05-007-SW-06 (SWS-6)
- A. IT TTR Site Survey Interview (Quas, 1993)
- B. Additional possible piping

SCALE

0 15 30 90 Feet

05/14/97 FIELD OBSERVATIONS

Suspected "sampling point" for Tank 33-6 found 15 feet west of IT12
(ER Sites Inventory Database 1993 photograph)

Electric box (aboveground) ("Recent Feature") - 32 feet west of IT12

Fire station box ("Recent Feature") - 30 feet north of IT12

G. Evenson best estimate for S. Tank 33-6, based on 1993 photograph, interviews and that recent excavations ("Recent Features") did not encounter interference

REV. #	DATE	DESCRIPTION OF REVISION	REV. BY	ENG	CHKD BY	APPVD BY
0	09/20/97		Shyler			
PROJECT MANAGER: K. Bush						
DRAWN BY: B. Bates						
FIGURE C-1 CAU NO. 427 TONOPAH TEST RANGE SEPTIC WASTE SYSTEMS 2 AND 6 ATTRIBUTE COMPOSITE MAP (DQO)						
LAYER(0)		DATE INITIATED		DRAWING NUMBER		
		09/16/97		6105422		

Appendix D

Nevada Department of Environmental Protection Document Review Sheets for Draft CAIP

NEVADA ENVIRONMENTAL RESTORATION PROJECT DOCUMENT REVIEW SHEET

1. Document Title/Number <u>Corrective Action Investigation Plan for CAU No. 427: Area 3 Septic Waste System Numbers 2 and 6, Tonopah Test Range, Nevada</u>		2. Document Date <u>July 1997</u>	
3. Revision Number <u>Draft</u>		4. Originator/Organization <u>IT Corporation</u>	
5. Responsible DOE/NV ERP Subproject Mgr. <u>Janet Appenzeller-Wing</u>		6. Date Comments Due <u>8/09/97</u>	
7. Review Criteria _____			
8. Reviewer/Organization/Phone No. <u>Dean Mierau, Bureau of Federal Facilities, NDEP</u>		9. Reviewer _____	

10. Comment Number/ Location	11. Type ^a	12. Comment	13. Comment Response	14. Accept
1. Page 1 of 40	M	In the first paragraph, the first sentence states "Correction Action --". The more commonly accepted usage is "Corrective Action--".	Text changed to "Corrective Action" in place of "Correction Action."	Yes
2. Page 1 of 40	M	In the second paragraph, the last sentence gives the CAS numbers as 03-05-003-SW-02 and 03-05-003-SW-06. In the May issue of the "Index of Corrective Action Units" the CAU 427 CASs are listed as 03-05-002-SW02 and 03-05-002-SW06 on page 13 of 35 in Appendix III. One of these is surely right.	The CAS numbers are incorrectly listed in the CAIP. The proper CAS No. for SWS No. 6 is 03-05-002-SW06; this is corrected on page 1, para. 2, and page 7, para. 1, line 1 of the section 2.1.1 title, and page A-3 of Appendix A, second line of I.B.2. The legend on page 8 (Figure 2-1) is also modified to read CAS 03-05-002-SW06 (SW-6). The proper CAS No. for SWS No. 2 is 03-05-002-SW02; this is corrected on page 1, para. 2, and page 7, para. 4, in the 2.1.2 section title, and page A-3 of Appendix A, second line of I.B.2. The legend on page 9 (Figure 2-2) is also modified to read CAS 03-05-002-SW02 (SWS-2).	Yes

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

NEVADA ENVIRONMENTAL RESTORATION PROJECT DOCUMENT REVIEW SHEET

Document Title/Number Corrective Action Investigation Plan for CAU No. 427:
Area 3 Septic Waste System Numbers 2 and 6, Tonopah Test Range, Nevada
Reviewer/Organization Dean Mierau, Bureau of Federal Facilities, NDEP

Revision Number Draft

10. Comment Number/ Location	11. Type ^a	12. Comment	13. Comment Response	14. Accept
3. Page 7 of 40	M	In the first paragraph, the second sentence indicates a leachfield to the northeast of septic tanks 33-4 and 33-6 in Figure 2-2. The leachfields are shown in Figure 2-2 to be to the northwest of the tanks mentioned. If there is a leachfield in the area indicated in the sentence it is not portrayed in Figure 2-2 layout.	Figure 2-2 (SWS No. 2) was incorrectly referenced. The second sentence of para. 1, page 7 has been changed to read: "The leachfield located west of Building 0367 (Figure 2-1) serviced Septic Tank 33-12."	Yes
4. Page 7 of 40	M	In the first paragraph, the fourth sentence indicates the leachfield drains to the south. The leachfields shown cannot drain in the indicated direction unless they are designed incorrectly.	Comment Response No. 3 removes the incorrect reference to Figure 2-2. Figure 2-1 (SWS No. 6) shows the proper leachfield draining to the south.	Yes
5. Page 7 or 40	M	In the second paragraph, the first sentence states the location of septic tank 33-12 is to the west of building 0367. The second sentence then states "This tank and associated leachfield----"; which, would imply a connection to a leachfield. In the accompanying Figure 2-1 there is not a leachfield indicated in the legend, and the tank appears to empty instead into a building for parts storage.	The appropriate symbol for the leachfield has been added to the legend of Figure 2-1 (page 8) as well as a description which reads: "Appropriate Location of Leachfield."	Yes
6. Page 7 of 40	M	In the second paragraph, the third sentence includes the following: "----were then connected with a newly installed sewer line to septic tanks 33-4----". How many tanks are there with the identification symbol 33-4? If there are several 33-4 septic tanks it is not indicated elsewhere in the report.	There is only one tank. Replace the word "tanks" (page 7, second para., third sentence) with "tank". Multiple locations of Septic Tank 33-4 are shown because of the uncertainty in various "as-built" drawings.	Yes

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

NEVADA ENVIRONMENTAL RESTORATION PROJECT DOCUMENT REVIEW SHEET

Document Title/Number Corrective Action Investigation Plan for CAU No. 427:
Area 3 Septic Waste System Numbers 2 and 6, Tonopah Test Range, Nevada
Reviewer/Organization Dean Mierau, Bureau of Federal Facilities, NDEP

Revision Number Draft

10. Comment Number/ Location	11. Type ^a	12. Comment	13. Comment Response	14. Accept
7. Page 7 of 40	M	In the last paragraph, the third sentence has a directional problem. The first part reads fine, but the last part of the sentence following the Building 0380 reference states, "and southwest of building 0370T (Figure 2-2)", which errs in that the building referenced sits on one of the possible positions of the leachfield. It would seem prudent to stop the sentence after the Building 0380 reference and add (Figure 2-2) at that point and a period; thereby not referencing building 0370T at all.	Change the sentence as suggested. Page 7, para. 4, sentence 3 now reads, "The leachfield(s) that serviced Septic Tanks 33-4, 33-5, and 33-6 is(are) located north of Building 0380 (Figure 2-2)."	Yes
8. Page 8 of 40	M	Correct the legend for this Figure to show leachfield design. The leachfield is referenced in the text and, therefore, should be properly identified in the Figure referenced.	See comment response No. 5. The addition to legend in Figure 2-1 corrects this.	Yes
9. Page 10 of 40	M	In the third paragraph, the first sentence references Plate 1 in the report. After viewing the Plate and associated reference, it was discovered that the Plate does not have a north arrow for orientation to directions, leaving the reference directionless.	A north arrow has been added to Plate 1.	Yes
10. Page 23 of 40	M	In the first paragraph, the second sentence has too many samplings in it. Try this: "Investigation sampling will consist of representative soil which was possibly impacted (biased selection) by releases".	Change the sentence as suggested. Page 21, paragraph 1, second sentence now reads, "Investigation sampling will consist of representative soil which was possibly impacted (biased selection) by releases."	Yes
11. Page A-5 of A-12, Item III.	M	IDENTIFY THE DECISION, does not require the decision maker to be part of the decision. Therefore, C can be eliminated from the choices.	The sentence as "C" has been omitted in Appendix A, page A-5, item III.	Yes

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

NEVADA ENVIRONMENTAL RESTORATION PROJECT DOCUMENT REVIEW SHEET

Document Title/Number Corrective Action Investigation Plan for CAU No. 427:
Area 3 Septic Waste System Numbers 2 and 6, Tonopah Test Range, Nevada
Reviewer/Organization Dean Mierau, Bureau of Federal Facilities, NDEP

Revision Number Draft

10. Comment Number/ Location	11. Type ^a	12. Comment	13. Comment Response	14. Accept
12. Page A-5 of A-12, Item IV.A	M	Might read better if, "needed to resolve the decision and prepare a list of all of" was omitted and replaced with an "and".	Change as suggested. Appendix A, page A-5, item IV.A title now reads: "Identify the information inputs and resolve the decision."	Yes
13. Page A-11 of A-12, Item VII.B.3	M	The words "in order" are superfluous.	Change as suggested. The sentence in Appendix A, page A-10, item VII.B.3 has had the words "in order" deleted.	Yes

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

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

Plate 1

**Septic Waste Systems, Area 3,
Tonopah Test Range, Nye County, Nevada**

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