2-1-2004

Justification for Class III Permit Modification February 2004 SWMU 107 Explosives Test Area Operable Unit 1306

Sandia National Laboratories/NM

This work supported by the United States Department of Energy under contract DE-AC04-94I85000.

Sandia National Laboratories

SWMU 107
Explosives Test Area

Environmental Restoration Project

Site History

- SWMU 107 is a 23-acre site located in the southeastern portion of TA-III.
- The site was reportedly used as an HE test area from the 1950s until 1972. Personnel interviews revealed information regarding periods of testing at the site and types of explosives that may have been used.

Depth to Groundwater

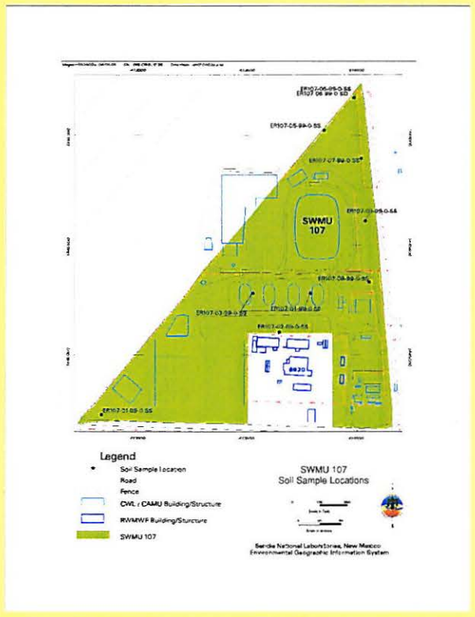
- Approximately 460 ft bgs.

Constituents of Concern

- HE, silver and lead (from metal cladding for charges), DU, nitrate plus nitrite (as explosive by-products).

Previous Investigations

- In 1992, ten composite samples plus one duplicate were collected from the site. The samples were analyzed for HE, nitrate plus nitrite, metals and radionuclides. No HE compounds were detected and low levels of nitrate plus nitrite were detected. Some metals were detected, but none exceeded the approved background levels. Uranium equilibrium analysis indicated that no enriched or depleted uranium exists at the site.



Summary of Data Used for NFA Justification

- In 1999, nine discrete confirmatory surface soil samples plus one duplicate were collected. Samples were analyzed for RCRA metals and beryllium, HE, nitrate plus nitrite (as nitrogen) at an off-site laboratory. Nine surface soil samples and a duplicate were also collected to analyze for radionuclides by gamma spectroscopy at the on-site laboratory.
- There were no detectable amounts of any HE constituents in any of the surface soil samples. One sample revealed beryllium that was above the background level. No other metals exceeded the background levels. Nitrate plus nitrite (as nitrogen) was detected in six of the samples and ranged from 0.5 to 6 mg/kg. There is no background value that can be used for comparison. There were no detections of U-235, U-238, Th-232, or Cs-137 above background activities. However, the MDA for U-235 was greater than the background activity in all but two of the samples.

Recommended Future Land Use

- Industrial land use was established for this site.

Results of Risk Analysis

- Risk assessment results for the residential scenario are calculated per NMED risk assessment guidance in 2003 as presented in the "Supplemental Risk Document Supporting Class 3 Permit Modification Process" (SNL October 2003).
- Because COCs were present in concentrations or activities greater than background-screening levels or because constituents were present that did not have background-screening levels, it was necessary to perform a risk assessment for the site. The risk assessment analysis evaluated the potential for adverse health effects for the residential land-use scenario.
- The total human HI (0.01) was below the NMED guidance of 1 for the residential land-use scenario.
- The total estimated excess cancer risk was 9E-10 for the residential land-use scenario. NMED guidance states that cumulative excess lifetime cancer risk must be less than 1E-5, thus the excess cancer risk for this site is also below the suggested acceptable risk value.
- The human health residential land-use scenario incremental TEDE was 1.8E-2 mrem/yr for the radiological COCs. The EPA's numerical guideline is 75 mrem/yr. Thus, the TEDE is below EPA's guideline.
- Using the SNL predictive ecological risk assessment methodology, the ecological risk for this SWMU is acceptable.
- In conclusion, human health and ecological risks are acceptable for the residential land use scenario per NMED guidance.

Human Health Risk Assessment Values for SWMU 107 Nonradiological COCs

COC	Maximum Concentration (mg/kg)	Residential Land Use Scenario	
		Hazard Index	Cancer Risk
Beryllium	0.676 J	0.00	6E-10
Cadmium	0.445 J	0.01	3E-10
Mercury	0.0233	0.00	--
Nitrogen as Nitrate	6	0.00	--
Selenium	0.711 J	0.00	--
Total		**0.01**	**9E-10**
NMED Guidance		**≤1**	**<1E-5**

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Sandia National Laboratories

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SWMU 107
Explosives Test Area
Operable Unit 1306

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NOD Submitted Oct. 1997

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RSI Submitted Aug. 2001

Supplemental Risk Document Submitted Oct. 2003

Environmental
Restoration
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United States Department of Energy
Albuquerque Operations Office

NFA

Sandia National Laboratories

Results of the Technical Areas III and V RCRA Facility Investigation

June 1996

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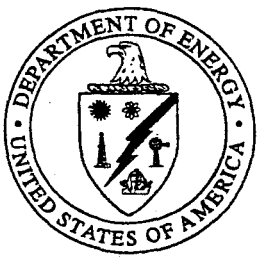

United States Department of Energy
Albuquerque Operations Office

RESULTS OF THE TECHNICAL AREAS III AND V RCRA FACILITY INVESTIGATION

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Department 7582: Environmental Restoration for Technical Areas and Miscellaneous Sites

EXECUTIVE SUMMARY

A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) was conducted in 1994 and 1995 at 21 Environmental Restoration (ER) sites within Technical Areas III and V (TA-III/V) at Sandia National Laboratories in Albuquerque, New Mexico (SNL/NM). This report details the investigations at each of the sites.

In the RFI Work Plan (SNL/NM 1993a, 1993b), the ER sites were grouped into five categories:

1. Sites proposed for No Further Action (NFA);
2. Potential petroleum-impacted sites;
3. Sites potentially impacted only by hazardous constituents of concern (COCs);
4. Sites potentially impacted only by radioactive constituents; and
5. Sites potentially impacted by both hazardous and radioactive compounds.

The sites were investigated separately and are discussed in the report in individual sections (Sections 3.0 through 23.0).

Three of the sites proposed for NFA (ER Sites 105, 188, and 195) were submitted to the U.S. Environmental Protection Agency (EPA) in 1995 for administrative NFA decisions. All three were granted NFA status in July 1995.

Based on confirmatory sampling, the following sites are proposed for NFA in this RFI report: Sites 26, 31, 34, 35, 36, 37, 51, 78, 100, 102, 107, 111, 196, and 241. A Class III permit modification request will be submitted following final determinations on sites addressed within this RFI report. This RFI report constitutes the NFA proposals for these sites. Most sites in this group exhibited no contamination above background levels; the remainder of these sites were contaminated at levels far below regulatory limits. Although Site 107 falls into this group, it has been identified as the preferred site for a future temporary unit and corrective action management unit (TU/CAMU) for the ER Project. Thus additional activities related to its TU/CAMU status will be conducted.

Several of the ER sites are still active (i.e., testing is currently being conducted at or immediately adjacent to the sites). Because of this, only limited investigations were conducted at Sites 26, 83, and 84 where ongoing testing significantly impacts thorough site characterization. Investigations at these sites included geophysical surveys to identify buried material at Sites 26 and 84 and surface radiation surveys (discussed below) at Sites 83 and 84. Investigations will be completed when these sites are decommissioned or placed in final inactive status. Site 240 was reactivated for testing after site characterization was completed. Thus, proposed geophysical investigations of Site 240 will be postponed until the site is placed in final inactive status.

A Voluntary Corrective Measure (VCM) was performed to survey and remove surface radiation hazards associated with testing conducted at several ER sites. Sites 18, 83, 84, 102, 240, and 241 were surveyed for radioactive anomalies. Removal activities were conducted at sites where anomalies were demonstrated to exist (Sites 18, 83, 84, and 240).

A VCM also was conducted at the Gas Cylinder Disposal Pit (Site 78) to mitigate the immediate hazard posed to human health and the environment. The site exhibited many unruptured gas cylinders containing hazardous and toxic gases, high-explosive (HE) residues, and radioactively contaminated soil and slag. The VCM was accelerated from the original schedule of site assessment, remedy selection, and full-scale remediation. The entire contents of the pit were removed and examined, the contaminants were identified, and hazardous, radioactive, and solid wastes were disposed in a manner appropriate to regulatory requirements. As indicated above, Site 78 is proposed for NFA based on the results of the VCM.

The investigation of Site 18 revealed limited chemical contamination for which a VCM is planned. Site 18 exhibited elevated levels of polychlorinated biphenyls (PCBs) in an area approximately 10 feet by 80 feet. The contamination is believed to be restricted to the upper few inches of soil; shallow excavation (scraping the soil) is proposed to remediate the hazard posed by the PCBs. The results of the VCM at Site 18 will be documented in an NFA proposal, and the adequacy of the cleanup will be evaluated in a Class 3 permit modification process.

1.0 INTRODUCTION

1.1 Site Background

The Sandia National Laboratories/New Mexico (SNL/NM) Environmental Restoration (ER) Project is chartered with the assessment and cleanup of inactive waste sites at its facilities. This document presents the results of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) of the SNL/NM sites within Technical Areas III and V (TA-III/V). The sites were identified during a preliminary assessment/site investigation (PA/SI) (DOE 1987) as potential areas of concern or as solid waste management units (SWMUs) as a result of past practices in TA-III/V. Detailed descriptions of these sites are found in the TA-III/V RFI Work Plan (SNL/NM 1993a, 1993b). The purpose of the RFI was to determine the presence or absence of contamination at each of the TA-III/V ER sites.

Sandia Corporation, a subsidiary of Lockheed Martin Corporation, operates SNL/NM as a prime contractor to the U.S. Department of Energy (DOE), which owns SNL/NM. SNL/NM conducts research, development, design, and testing of nuclear and conventional weapons, energy systems, and other programs. Figure 1-1 identifies SNL/NM and its technical areas in relation to Kirtland Air Force Base (KAFB) and the city of Albuquerque, and several surrounding physical features. TA-III/V were established in 1953 for testing weapons components in a variety of natural and simulated environments. TA-III/V are located approximately 6 kilometers (km) south of the main laboratories and offices known as Technical Area I (TA-I) (Figure 1-1).

1.2 RFI Work Plan Overview and Objectives

This RFI has been conducted in accordance with the U.S. Environmental Protection Agency (EPA)-approved TA-III/V RFI Work Plan (SNL/NM 1993a) and its amendment (SNL/NM 1993b). A total of 19 sites in TA-III/V were originally identified as requiring investigation. Varying levels of investigation were conducted at all sites originally identified in the RFI Work Plan. Table 1-1 provides a summary of the sites, their status, and the field investigations conducted at each site and Figure 1-2 shows the location of each site.

Sites were classified as active and inactive, based on use at the time of this RFI. Both active and inactive sites were investigated but full investigation and remediation of active sites was postponed until facility decommissioning. Two sites that were originally grouped together in the Work Plan were subdivided based on physical separation and difference in historical activities: Site 18 was divided into Site 18 (Concrete Pad) and Site 241 (Storage Yard); Site 83 was divided into Site 83 (Long Sled Track) and Site 240 (Short Sled Track).

The objectives of the RFI were to identify the nature and extent of contamination at sites within TA-III/V, evaluate potential risks posed by the contamination, and provide guidance for selecting remedial alternatives. The objective of this RFI report is to document and transmit this information to all stakeholders, including SNL/NM, the DOE, the EPA, the New Mexico Environment Department (NMED), and the general public.

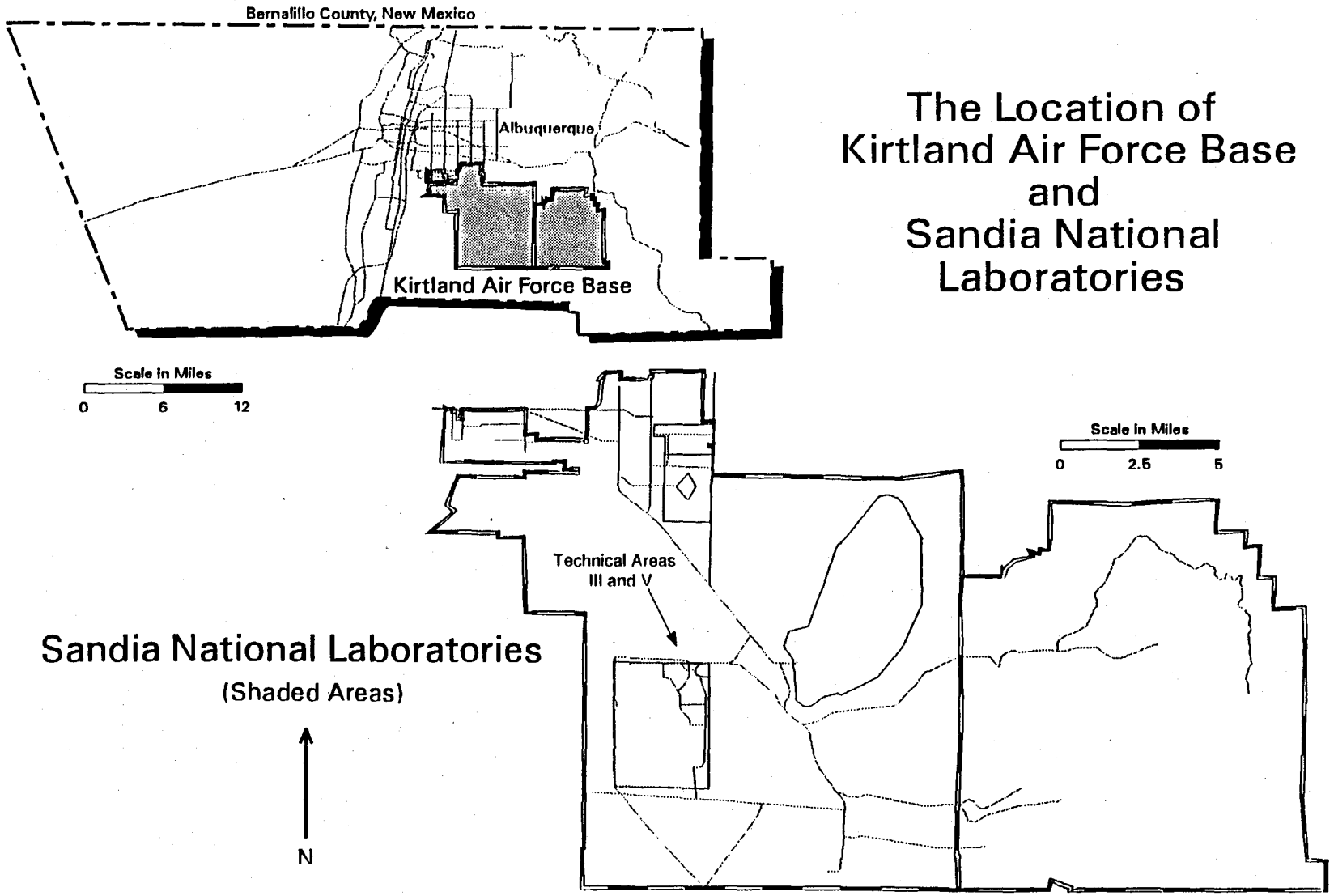


Figure 1-1 Location of Technical Areas III and V at Sandia National Laboratories, Albuquerque

Table 1-1
Summary of Environmental Restoration Sites Within Technical Areas III and V

Site Number	Site Name	Location	Areal Extent	Potential Contaminants[a]/ Detected During RFI?	Period of Operation (Status)	Sampling Method and Date	Total Samples	Field Screen Samples	Off-Site Analyses	Notes[b]
18	Concrete Pad	Central TA-III; South of Short Sled Track.	125 ft by 400 ft	Metals/Yes Radionuclides/Yes HEs/No Oil/Yes PCBs/Yes	1979 - present (Active).	Phase I: Surface, 04/27/94.	43	43	12	Rad. VCM completed. Extent of contamination defined for metals, PCBs, and TPH.
						Phase II: Auger, 01/24/95.	13	13	9	VCM planned.
26	Burial Site	West TA-III; West of Long Sled Track.	145 acres	Metals/NA[c] Radionuclides/Yes	Prior to 1989 (Inactive). Co-located with active Long Sled Track.	NA	NA	NA	NA	Geophysics done; found potential burials. These to be investigated with Site 83. Proposed for NFA.
31	Transformer Oil Spill	Central TA-III; Centrifuge Facility.	20 ft by 20 ft	Oil/No PCBs/No	1971 - present (Active).	Surface, 03/29/94.	11	3	11	No COCs above background. Proposed for NFA.
34	Centrifuge Oil Spill	Central TA-III; Centrifuge Facility.	90-ft diameter	Oil/No	1955 - present (Active).	Shallow subsurface, 05/20/95.	18	18	10	No COCs above background. Proposed for NFA.
35	Vibration Facility Oil Spill	Central TA-III.	20 ft by 50 ft	Oil/Yes PCBs/No	1955 - present (Active).	Phase I: Surface, 04/15/94.	4	0	4	Extent of oil defined. Proposed for NFA.
						Phase II: Shallow subsurface, 06/29/94.	13	13	4	

[a]Contaminants as follows: HEs = high explosives; PCBs = polychlorinated biphenyls; VOCs = volatile organic compounds.
[b]VCM = Voluntary Corrective Measure; TPH = Total petroleum hydrocarbons; NFA = No Further Action; COC = constituent of concern.
[c]NA = Not applicable. These sites were not sampled during the RCRA Facility Investigation (RFI); see Notes column.

Table 1-1
Summary of Environmental Restoration Sites Within Technical Areas III and V (Continued)

Site Number	Site Name	Location	Areal Extent	Potential Contaminants[a]/ Detected During RFI?	Period of Operation (Status)	Sampling Method and Date	Total Samples	Field Screen Samples	Off-Site Analyses	Notes[b]
36	HERMES Oil Spill	Central TA-V; North of Bldg 6596.	1 acre	Oil/Yes VOCs/Yes	1968 - 1989 (Inactive).	Phase I: Shallow subsurface, 07/6/94.	28	28	11	No oil detected in shallow subsurface. Defined extent of oil and VOCs.
						Phase II: Drilling, 03/10/95.	40	40	36	Proposed for NFA.
37	PROTO Oil Spill	Central TA-V; East of Bldg 6597.	1 acre	Oil/No	1978 - 1989 (Inactive).	Auger, 06/9/94.	23	23	8	No COCs above background. Proposed for NFA.
51	Bldg 6924 Pad, Tank, Pit	Southeast TA-III; Northwest of Site 241.	1/2 acre	Metals/Yes HEs/No VOCs/No	1963 - 1990 (Inactive).	Excavation, 09/6/94.	5	4	5	No COCs above background. Proposed for NFA.
78	Gas Cylinder Disposal Pit	Southeast TA-III; East of Chemical Waste Landfill.	80 ft by 180 ft	Toxic, corrosive, reactive, and flammable gases/Yes Radionuclides/Yes Metals/Yes HEs/Yes	1963 - 1984 (Inactive).	Phase I: Excavation - Radioactive.	94	386	91	Health and safety and geophysics surveys. Began VCM 07/94; finished 02/95.
						Phase I: Excavation - Chemical.	94	37	186	Detected chromium, thorium, gases, and reactive chemicals.
						Phase II: Gas analyses.	97	0	97	
						Phase II: Reactive chemicals.	32	32	0	No off-site analysis of reactive chemicals was feasible.
						Phase III: Confirmatory shallow subsurface.	20	0	20	No COCs above background during Phase III. Proposed for NFA.

[a]Contaminants as follows: HEs = high explosives; PCBs = polychlorinated biphenyls; VOCs = volatile organic compounds.
[b]VCM = Voluntary Corrective Measure; TPH = Total petroleum hydrocarbons; NFA = No Further Action; COC = constituent of concern.
[c]NA = Not applicable. These sites were not sampled during the RCRA Facility Investigation (RFI); see Notes column.

Table 1-1
Summary of Environmental Restoration Sites Within Technical Areas III and V (Continued)

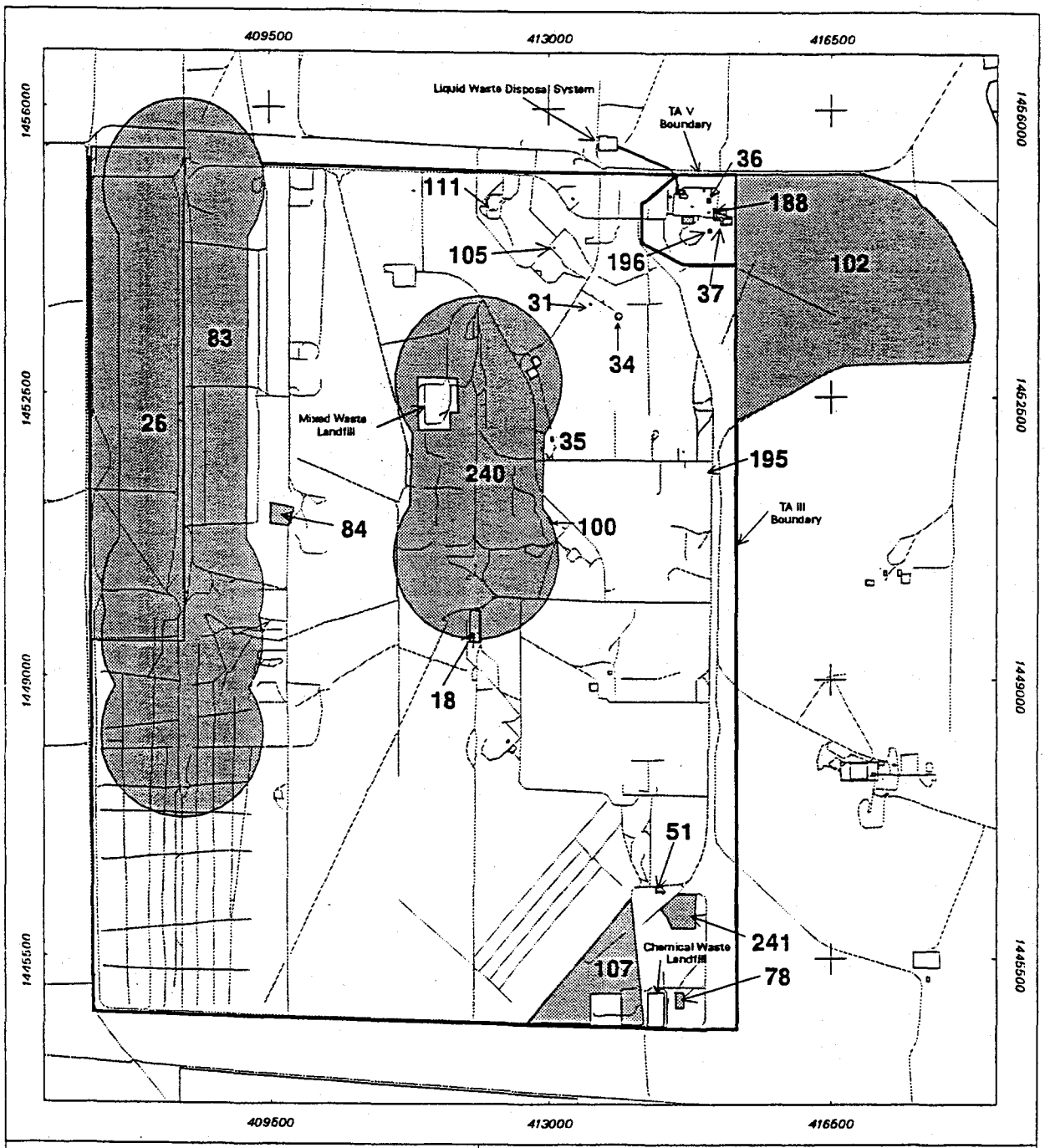
Site Number	Site Name	Location	Areal Extent	Potential Contaminants[a]/ Detected During RFI?	Period of Operation (Status)	Sampling Method and Date	Total Samples	Field Screen Samples	Off-Site Analyses	Notes[b]
83	Long Sled Track	West TA-III boundary.	350 acres	Metals/NA[c] HEs/NA Radionuclides/Yes	1966 - present (Active).	Surface, 04/15/94.	6	0	6	Minor surface sampling done. Rad. VCM completed. Full RFI when site deemed inactive.
84	Gun Facilities	West-central TA-III; East of Long Sled Track.	2 acres	Metals/NA HEs/NA Radionuclides/Yes	1965 - present (Active).	NA	NA	NA	NA	Rad. VCM completed. Full RFI when site deemed inactive.
100	Bldg 6620 Drain/Sump	Central TA-III, immediately southeast of Short Sled Track.	25 ft by 60 ft	Metals/NA HEs/NA	1958 - unknown (Inactive).	Exploratory trenching, 07/25/94.	0	0	0	Site not located during RFI. Proposed for NFA.
102	Radioactive Disposal Area	East of TA-V.	155 acres	Radionuclides/No	Unknown - 1967 (Inactive).	Excavation, 07/25/94.	3	0	3	Rad. survey done. No COCs above background. Proposed for NFA.
105	Mercury Spill at Bldg 6536	North-central TA-III.	20 ft by 20 ft	Mercury/NA	1972 - 1985 (Inactive).	Document search.	NA	NA	NA	Administrative NFA approved July 1995.
107	Explosives Test Area	Southeast TA-III; West of Chemical Waste Landfill.	25 acres	Metals/No HEs/No Nitrate and nitrite/No Radionuclides/No	1953 - 1972 (Inactive).	Surface, 05/17/94.	11	11	11	No COCs above background. Proposed for NFA. Future site of TU-CAMU.

[a]Contaminants as follows: HEs = high explosives; PCBs = polychlorinated biphenyls; VOCs = volatile organic compounds.
[b]VCM = Voluntary Corrective Measure; TPH = Total petroleum hydrocarbons; NFA = No Further Action; COC = constituent of concern.
[c]NA = Not applicable. These sites were not sampled during the RCRA Facility Investigation (RFI); see Notes column.

Table 1-1
Summary of Environmental Restoration Sites Within Technical Areas III and V (Concluded)

Site Number	Site Name	Location	Areal Extent	Potential Contaminants[a]/ Detected During RFI?	Period of Operation (Status)	Sampling Method and Date	Total Samples	Field Screen Samples	Off-Site Analyses	Notes[b]
111	Bldg 6715 Sump/Drain	North-central TA-III.	20 ft by 20 ft	Silver/No HEs/No VOCs/No	1971 - 1988 (Inactive).	Shallow subsurface, 06/17/94.	10	9	4	No COCs above background. Proposed for NFA.
188	Bldg 6597 Aboveground Spill Contain.	TA-V; co-located with Site 37.	15 ft by 25 ft	Used oil/NA[c]	1983 - 1986 (?) (Inactive).	Aerial photographs; confirmatory sampling.	37	22	22	Administrative NFA approved July 1995 - water tanks.
195	Experimental Test Pit	East-central TA-III.	6 ft by 6 ft	Cobalt-60/NA	1955 - 1956 (Inactive).	Document search.	NA	NA	NA	Administrative NFA approved July 1995.
196	TA-V Cistern	South TA-V; West of Bldg 6597.	25-ft diameter	Metals/Yes Oil/Yes VOCs/No	Unknown - 1989 (Inactive).	Phase I: Sludge sampling, 06/27/94 and 10/10/94.	4	3	1	Defined extent of metals in soil. No VOCs or PCBs. Proposed for NFA.
						Phase II: Excavation, 05/95.	2	0	2	
						Phase III: Auger, 06/5/95.	26	26	3	
240	Short Sled Track	Central TA-III.	160 acres	Metals/Yes HEs/No Radionuclides/Yes	1951 - 1966 (Inactive).	Surface, 06/13/94 and 06/22/94.	201	40	40	Rad. VCM completed. Detected rad. and lead.
241	Storage Yard	Southeast TA-III, North of Site 78.	3 acres	Metals/Yes HEs/No Radionuclides/No	1953 - 1994 (Inactive).	Surface, 05/24/94.	29	29	16	Defined extent of lead. Proposed for NFA.

[a]Contaminants as follows: HEs = high explosives; PCBs = polychlorinated biphenyls; VOCs = volatile organic compounds.
[b]VCM = Voluntary Corrective Measure; TPH = Total petroleum hydrocarbons; NFA = No Further Action; COC = constituent of concern.
[c]NA = Not applicable. Thzese sites were not sampled during the RCRA Facility Investigation (RFI); see Notes column.



Legend

- TA-III/V ER Sites
- Technical Area Boundary
- Roads

Buildings, Elevation Contours and Drainages not shown.

Sandia National Laboratories, New Mexico
Environmental Restoration Geographic Information System

Figure 1-2
ER Sites within Technical Areas III/V

0 1000 2000
Scale in Feet

0 240 480
Scale in Meters

Unclassified

FINAL

1:24000

Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone
1927 North American Horizontal Datum, 1929 North American Vertical Datum

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This RFI report consists of an executive summary, an introduction, a discussion of the Sampling and Analysis Program, descriptions of investigations conducted at individual sites, Voluntary Corrective Measures (VCMs) conducted at several sites, a summary and conclusion, a list of references, and supporting documentation in several appendices.

1.3 Facility Setting

SNL/NM consists of 2,820 acres of research laboratories and office facilities entirely contained within the 52,223-acre confines of KAFB (Figure 1-1). KAFB is bounded on the north and northwest by the city of Albuquerque, on the east by the Cibola National Forest, on the south by the Isleta Indian Reservation, and on the west by land owned by the State of New Mexico, the KAFB buffer zones, and the Albuquerque International Airport. Cibola National Forest access is controlled by the U.S. Forest Service (USFS) and is restricted within the buffer zones on the southwest corner of the base and within the Isleta Indian Reservation.

KAFB is located on a high, arid mesa (mean elevation of 5,350 feet [ft]) approximately 5 miles (mi) east of the Rio Grande. The mesa is cut by Tijeras Arroyo, which runs east-west and ultimately drains into the Rio Grande. The east side of KAFB is bounded by the southern end of the Sandia Mountains and the Manzanita Mountains. Most of the area is relatively flat, although the eastern portions of KAFB and SNL/NM extend into the Manzanita Mountains where some of the terrain is precipitous, rough, and cut by numerous arroyos (ERDA 1977).

1.4 Climate

The climate for SNL/NM is typical of high altitude, dry continental climates with a normal daily winter temperature range of 23 degrees Fahrenheit (°F) to 52°F and a normal daily summer temperature range of 57°F to 91°F (Bonzon et al. 1974). The average annual precipitation for the Albuquerque area is 8.54 inches (in.), and most rain occurs in the summer months (Williams 1986). Wind speeds seldom exceed 32 miles per hour (mph) but strong east winds, often accompanied by blowing dust, can occur (Bonzon et al. 1974).

1.5 Geology

The Albuquerque-Belen structural basin is one of the largest north- to south-trending basins in the Rio Grande Rift. The basin is a compound graben measuring 90 mi long and 30 mi wide, bordered by uplifted fault blocks to the east and west (Bjorklund and Maxwell 1961). The eastern boundary is marked by the Sandia, Manzanita, and Manzano mountains. The western side of the basin is bounded by the Lucero uplift, with the Ladron Mountains to the south and minor physiographic relief on the northwest side of the basin.

During the Miocene and Pliocene epochs, erosion from the surrounding highlands filled the Albuquerque Basin with up to 10,000 ft of sediments. This sequence of sediments is called the Santa Fe Group and consists of debris flows and channel, floodplain, and aeolian deposits; the Santa Fe Group thins toward the edges of the basin and is truncated by the bounding uplifts. The Santa Fe Group sediments are

interbedded with Tertiary and Quaternary basalts and pyroclastics, and are overlain in places by the Pliocene-age Ortiz gravel deposits and Rio Grande fluvial deposits (Bjorklund and Maxwell 1961).

1.6 Soil Characteristics

According to the Bernalillo County Soil Survey (USDA 1977), soils in TA-III/V consist of the Tijeras Series. The Tijeras Series is a deep, well-drained soil formed in decomposed granitic alluvium on old alluvial fans. The surface layer is a 4-in.-thick, brown, gravelly, sandy loam. The subsoil consists of 15 in. of brown, sandy loam, with some accumulation of calcium carbonate in the lower part. Below 19 in. is a pale brown, very gravelly, loamy sand extending to a depth of 5 ft. The gravel is angular and derived from granite (USDA 1977).

The Tijeras Series is a level to gently sloping soil (0 to 5 percent) subject to moderate runoff and water erosion. Permeability is moderate, with an available water capacity of 0.10 to 0.16 in. This soil is moderately alkaline and the effective rooting depth is 5 ft deep or more (USDA 1977).

1.7 Hydrogeology

The Rio Grande flows in a southerly direction and is the primary surface drainage feature in the Albuquerque-Belen Basin. In the basin, the ground-water system is controlled by the Rio Grande and its floodplain, tributary inflow, mountain front runoff, and recharge.

The principal aquifer in the area occurs in the unconsolidated and semiconsolidated sands, gravels, silts, and clays of the Santa Fe Group. The aquifer is generally unconfined, although semiconfined conditions may exist locally because of discontinuous, lenticular silt and clay-rich deposits.

Beneath KAFB, the regional aquifer generally flows toward the Rio Grande at an average gradient of approximately 10 ft/mi; however, local perturbations in the water table exist near municipal wells and as a result of lithologic and structural controls. Prior to extensive development of the regional aquifer by the city of Albuquerque and KAFB, the predominant ground-water flow direction in the SNL/NM KAFB area was west-southwest (Bjorklund and Maxwell 1961); however, pumping by the city of Albuquerque and KAFB has substantially affected the natural ground-water flow regime (Reeder et al. 1967; Kues 1987). The production wells have a substantial effect on the hydraulic gradient in the area, creating a depression in the potentiometric surface in the northern portion of KAFB. U.S. Geological Survey (USGS) projections indicate that, by the end of the century, the water table in the Albuquerque area will drop an estimated 30 to 50 ft from 1989 levels (Reeder et al. 1967).

Major structural controls on the local flow regime are in the form of a complex assemblage of faults along the margin of the basin. These fault systems include the Manzano, Hubbell Springs, Sandia, and Tijeras faults, all of which are expressed within a zone 1.5 mi east of TA-V. The specific impact of local faulting on ground-water flow is largely unknown; however, the Tijeras and Hubbell Springs faults may control ground-water movement. It has been postulated that travertine deposition (precipitation of calcium carbonate from solution in ground water) within fault fractures has reduced permeabilities such that the faults act as barriers to ground-water movement. Springs have been observed along the fault alignments, and there is a shallow water table east of the faults. The primary regional aquifer, the valley

fill, underlies KAFB west of the Hubbell Springs fault at a depth of 400 to 600 ft and east of the fault at a depth of 50 to 150 ft (DOE 1987).

The primary source of ground water in the TA-III/V area is the unconsolidated and semiconsolidated sedimentary deposits of the basin-fill aquifer. A relatively thick unsaturated zone of approximately 460 ft overlies the Santa Fe Group deposits. The basin-fill aquifer underlying TA-III/V is recharged primarily by inflow from the mountain areas to the east. Recharge resulting from direct infiltration of precipitation is inferred to be minor because of high surface coverage, high evaporation, low precipitation, and an extensive vadose zone.

Based on water levels measured in monitoring wells near the Liquid Waste Disposal System (LWDS) in TA-V and near the Chemical Waste Landfill (CWL) and MWL in TA-III, the depth to ground water is approximately 480 to 490 ft below ground surface (bgs) in TA-III/V. Water levels measured in all wells in TA-III indicate the general ground-water flow direction is west-northwest.

2.0 SAMPLING AND ANALYSIS PROGRAM

The sampling and analysis program for the sites in TA-III/V followed standard EPA procedures for sample collection (EPA 1987a), quality assurance/quality control (QA/QC) protocols (EPA 1987b, 1980), and statistical analysis (EPA 1992a). Each of these is discussed in the following sections.

2.1 Field Methods

Field investigations at the ER sites within TA-III/V followed phased approaches according to those proposed in the RFI Work Plan (SNL/NM 1993a, 1993b), except at six sites. Field conditions dictated that methods other than those specified in the Work Plan be used at Sites 34, 36, 78, 102, 111, and 196. Deviations from the Work Plan are noted in the individual descriptions of site activities (Sections 6.0, 8.0, 11.0, 15.0, 18.0, and 21.0).

The methods of investigation used during the TA-III/V RFI included the following:

- Aerial photograph analysis and ground-truthing;
- Nonintrusive geophysical investigations;
- Radiological surveying and scrap/debris removal;
- Surface soil sampling;
- Shallow subsurface soil sampling and deep subsurface soil sampling; and
- Trenching and excavation.

Protocols for sampling and analysis at SNL/NM followed the methodologies in the ER Project Quality Assurance Project Plan (QAPjP) and Operating Procedures (OPs) developed specifically for the ER Project. A complete list of OPs used during this project is provided in Table 2-1. Although much of the field work was done before the formal issuance of the SNL/NM ER OPs, activities were conducted in accordance with generally accepted practices and professional experience and judgment (i.e., American Society for Testing and Materials [ASTM] procedures, best engineering practices, and draft OPs), which ultimately formed the basis of the final OPs. All work was conducted following the requirements of site-specific Health and Safety Plans (HASPs), which are available for review in the Environmental Operations Records Center (EORC).

The following activities were conducted at the sites noted:

- Aerial photographic interpretation—all sites;
- Geophysical surveys—Sites 26, 78, and 84;
- Radiation surveys and associated removal of radioactive anomalies—Sites 18, 83, 84, 102, 240, and 241;

Table 2-1
Sandia National Laboratories/New Mexico Environmental Restoration Project Operating Procedures Applicable to Technical Areas III and V RFI Work

Operating Procedure (OP) Number	Title
AOP 94-40	ER Project Site Posting and Security
FOP 94-01	Safety Meetings, Inspections, and Pre-Entry Briefings
FOP 94-05	Borehole Lithologic Logging
FOP 94-22	Deep Soil Gas Sampling
FOP 94-23	Hand Auger and Thin-Wall Tube Sampler
FOP 94-25	Documentation of Field Activities
FOP 94-26	General Equipment Decontamination
FOP 94-27	Thin-Walled Tube Sampling of Soils
FOP 94-28	Health and Safety Monitoring of Organic Vapors (Flame Ionization Detector [FID] and Photoionization Detector [PID])
FOP 94-30	Health and Safety Monitoring of Combustible Gas Levels
FOP 94-34	Field Sample Management and Custody
FOP 94-38	Drilling Methods and Drill Site Management
FOP 94-39	Excavating Methods
FOP 94-40	Test Pit Logging, Mapping, and Sampling
FOP 94-52	Spade and Scoop Method for Collection of Soil Samples
FOP 94-57	Decontaminating Drilling and Other Field Equipment
FOP 94-68	Field Change Control
FOP 94-69	Personnel Decontamination (Level D, C & B Protection)
FOP 94-71	Land Surveying
FOP 94-78	Environmental Restoration Project Waste Management and Characterization Procedure
FOP 94-81	Establishment and Management of Less-Than-90-Day Accumulation Areas for Environmental Restoration Project Sites
FOP 95-23	Shallow Subsurface Drilling and Soil Sampling Using Mechanized Hydraulic Augers or the Geoprobe® Soil Core Sampler

Source: SNL/NM (1995a).

- Sampling of surface soils—Sites 18, 31, 35, 78, 107, 240, and 241;
- Subsurface sampling using augers, a hydraulic probe, or a full-size drill rig—Sites 18, 34, 35, 36, 37, 78, and 111;
- Trenching, excavation, and other cleaning—Sites 51, 78, 100, 102, 196, and 241; and
- Voluntary removal actions or cleanups (excluding the radiological removals)—Site 78.

Further investigation of Sites 26, 83, 84, and 240 (active sites) will be postponed until site decommissioning in the future. Site 26 is proposed in this RFI report (Section 4.0) to be combined with Site 83 for future investigation. No schedule for decommissioning or corrective action at these sites has been identified at this time.

Two VCMs were conducted during the course of the RFI. One was performed to survey and remove radiological constituents at the six sites listed above; details of this VCM are provided in Section 24.0. The second was performed at Site 78 to remove gas cylinders and mitigate health and safety hazards; the details of this VCM are provided in Section 11.0.

Subsurface and ground-water investigations conducted at the neighboring LWDS in TA-V are detailed in the RFI report submitted for that site in September 1995 (SNL/NM 1995b). Because no ground-water investigations were conducted during the TA-III/V RFI, the LWDS RFI report should be consulted for information on this subject. Reports on the ongoing investigation at the CWL in TA-III also should be consulted for ground-water information.

2.1.1 Aerial Photograph Analysis and Ground-Truthing

An examination of aerial photographs was conducted to locate possible additional ER sites within TA-III/V and to gather supplemental data on existing sites. Aerial photographs from 1973 to 1990 were assembled and digitized using an Arc/Info Geographic Information System (GIS) and were used to produce a set of year-specific overlays. A base photographic image was combined with the year-specific overlays to illustrate the changes in surface features over time (Plate I). All of the sites were evaluated within 1,000 ft of the site boundaries (unless noted otherwise) for signs of soil disturbance, vegetation changes, or new construction. Surface features were grouped into eight categories including cleared or disturbed surface, concrete pad, landfill, pile, possible excavation, tank/concrete target, trench, and unknown. An attempt was made to further subcategorize features, but no additional or valuable information was revealed.

After the aerial photograph interpretation was completed, ground-truthing (field verification) was performed to determine whether the interpretations were valid. Field personnel inspected the suspect areas for evidence of potential site impacts; e.g., cleared or disturbed surfaces were located to within 10 ft of the area seen on the photographs and were examined for signs of burning, scraping, or blading for road or facility construction, and were validated as such. In a few instances, revegetation and cultural activities did not permit the unequivocal verification of features identified in early photographs. Site-specific discussions of the aerial photograph interpretation are included in each site section.

2.1.2 Nonintrusive Geophysical Investigations

Nonintrusive electromagnetic (EM) conductivity (metal detection) and vertical-gradient magnetometer surveys were conducted at ER Sites 26, 78, and 84 to locate any potential subsurface objects. The sites were gridded to detect objects of a certain size and are listed below.

- Site 26, Northern Portion—Locate and map any objects equivalent to or larger than two 55-gallon (gal.) drums buried at a depth of 5 ft.
- Site 26, Southern Portion—Locate and map any objects equivalent to or larger than one 55-gal. drum buried at a depth of 5 ft.
- Site 78—Locate and map subsurface concentrations of metal, particularly cylinders with dimensions of 12 in. by 2 in.
- Site 84—Locate major fragments of depleted uranium (DU), lead, and metallic materials larger than 3 in. by 3 in. buried to a depth of 1.5 ft; and significant burials equivalent to a 5-gal. bucket buried to a depth of 3 ft.

Wooden stakes and plastic pin flags were used to delineate the traverse spacings. Electromagnetic data were gathered using a Geonics Ltd.™ EM-61 high-precision metal detector; magnetic data were gathered using a Geometrics™ G-856-AX proton precession magnetometer deployed in the vertical mode. A brief description of each follows.

The EM-61 generates EM pulses by passing a current through a 1-square-meter (m^2) coil. These pulses penetrate the subsurface and briefly induce secondary EM fields; soil has relatively low conductivity, and the secondary fields dissipate rapidly. Buried metallic objects have essentially infinite conductivity when compared to soil, and their secondary fields persist much longer. The EM-61 measures the strength of the secondary fields during the "off time" between the primary pulses. The measurement is delayed until the response from the soil has dissipated and only the response of buried metal is present. The secondary EM fields are measured by a 1-m^2 main sensor which is coincident with the transmitter coil, and by a second focusing coil positioned 40 centimeters (cm) above the main coil. Each sensor coil measures the secondary field strength during a time period between the primary pulses. Two sensor coils are used to allow differentiation between shallow objects and deeper objects. The EM-61 was deployed in the trailer mode, towed on wheels behind the operator, with data acquisition triggered by the wheel approximately every 20 cm.

The G-856-AX consists of two magnetic sensors mounted on the same vertical staff separated by a known distance. The instrument generates a pulse and registers the difference in time for the return magnetic pulse to be recorded by the top and bottom sensors. This difference is then converted to a standard reading. The G-856-AX was held vertically, and moved along the traverse manually, from grid node to grid node. Data acquisition was performed manually or programmed to be collected at regular intervals (every few seconds [sec]).

2.1.3 Surface Radiological Survey and Scrap/Debris Removal

Nonintrusive surface radiological surveys were performed at 64 sites at SNL/NM including six sites within TA-III/V, as part of a coordinated facility-wide assessment and removal VCM. Surveys were conducted in a manual sweep pattern using a line of five to six 2-in. by 2-in. sodium iodide (NaI) detectors optimized to detect DU. Gridded areas were surveyed by technicians in straight traverses, each covering a 6-ft-wide swath.

A list of radioactive anomalies (both point and area sources) at each site was compiled. After the surveys were complete, all the point sources and the majority of the area sources were removed by hand and placed in a container. Subsequent to the removal action, soil samples were collected to confirm effective cleanup. Brief discussions of results are included in the individual site sections, and a more detailed description of the radiological surveys conducted at the sites within TA-III/V that were suspected of exhibiting radioactive soil contamination is provided in Section 24.0.

2.1.4 Surface Soil Sampling

Surface soil samples were collected from a depth of 0 to 1 ft bgs using a stainless-steel trowel and bowl. All sampling equipment was cleaned between samples using dry decontamination methods (i.e., paper towels, brushing, etc.) where possible or rinsed with distilled water. Sample location coordinates are provided in Appendix A.

2.1.5 Shallow Subsurface Soil Sampling

Shallow subsurface soil sampling was accomplished using either hand or power augers or a small-diameter hydraulic probe. Discussions of these techniques follow.

Auger Sampling

Augering using a hand bucket or power auger and thin-walled stainless-steel samplers was generally performed at sites where sampling depth was a maximum of 10 ft bgs. Soil augering was performed to a predetermined depth approximately 6 in. above the level to be sampled, and the bucket auger was extracted. Loose soil was removed, and a separate sampling auger was used to collect the sample. All augering and sampling equipment was cleaned between sample locations using dry decontamination methods where possible or rinsed with distilled water.

Small-Diameter Boring

At sites where augering techniques would not attain the desired depths (generally greater than 10 ft bgs), a vehicle-mounted, hydraulically powered soil probing machine that uses static force and a percussion hammer was utilized to advance small-diameter sampling tools into the subsurface to collect soil samples to 30 ft bgs. The unit used was manufactured by Geoprobe™. The probe produced no drill cuttings and obtained samples through probe holes of 1 to 1.5 in. diameter with typical penetration rates of 1 to 2 ft per minute.

Small quantities of soil were obtained by driving the probe to a predetermined depth, disengaging an expendable drive point at the target depth and pulling back 3 to 6 in. on the probe rods, and then redriving the hollow rods. The end of the rod was filled with soil cut from the wall of the hole.

2.1.6 Deep Subsurface Sampling

Drilling was conducted at Site 36 using an air rotary casing hammer rig to drill to depths of greater than 300 ft bgs. A more detailed discussion of the drilling and sampling procedures used at the site is included with the Site 36 activity description in Section 8.0.

2.1.7 Excavation and Trenching

Excavation, trenching, and cleanouts were accomplished using a backhoe, trackhoe, clamshell, or front-end loader at several sites. Details of the excavations and cleanouts are provided in the individual site sections for Sites 51, 78, 100, 102, 196, and 241.

2.2 Field Screening and On-Site Laboratory Analysis Methods

Where feasible, field screening was conducted on approximately 100 percent of the collected soil samples from all sites investigated in TA-III/V. At least 20 percent of these were submitted for confirmatory analysis at an EPA-approved Contract Laboratory Program (CLP) laboratory (Section 2.3). The field screening data for each site are included in Appendix B. Discussions of the following field-screening methods used during the RFI are included in subsequent sections:

- Photoionization detection (PID) and flame ionization detection (FID) of volatile organic compounds (VOCs);
- Soil vapor detection of VOCs;
- Thermal desorption detection of mineral oil;
- Immunoassay detection of polychlorinated biphenyls (PCBs) and high explosives (HEs);
- X-ray fluorescence (XRF) analysis of metals;
- Direct current plasma (DCP) and inductively coupled plasma (ICP) analysis of metals; and
- Gamma spectroscopic analysis of radionuclides.

2.2.1 Photoionization Detection and Flame Ionization Detection of Volatile Organic Compounds

Screening for VOCs in the field was generally accomplished using hand-held PIDs and FIDs. The units used were manufactured by HNU and Foxboro. Soil samples were placed in a glass jar, sealed, agitated, and warmed to allow volatile constituents to develop in the headspace of the jar. The PID or FID sample probe was placed in the headspace, where a sample of vapor was drawn into a chamber, ionized, and interpreted by the instrument. The low sample rate allowed for only very localized readings. Monitoring for health and safety levels was also performed during drilling activities at 5-ft intervals downhole, as well as in the breathing zone. Where elevated organic vapor levels were encountered, monitoring was

performed continuously in the breathing zone. The instrument calibrations and readings were recorded in the field logbook.

2.2.2 Soil Vapor Analysis

Soil samples were collected for on-site analysis of soil vapor for the presence of VOCs during drilling activities at Site 36 and were immediately transported to the TA-III ER Field Laboratory for analysis. Soil vapors were collected by polyethylene tubing connected to a glass bulb using a pump under vacuum.

Soil vapor analyses were conducted by purging a 500-milliliter (mL) gas bulb for 20 minutes (min) with helium onto a trap and desorbing the trap onto a gas chromatograph equipped with a mass selective detector (MSD). Purging the entire contents of the sample bulb allowed attainment of lower detection levels for the sensitive soil vapor analysis. All analyses were performed on an HP 5972 MSD with an HP 5890 Series II plus gas chromatograph. EPA Methods 8240/8260 (EPA 1986) procedures were used for calibration and quantitation. The target analyte list (TAL) for EPA Method 8240 was used. For heavily contaminated soils, a smaller aliquot of gas was subsampled from the 500-mL bulb.

2.2.3 Thermal Desorption/Gas Chromatography

SNL/NM ER personnel conducted an investigation of available technologies to locate an alternative heavy-end total petroleum hydrocarbon (TPH) field-screening technique that was more reliable than the Hanby Method. Neither the Hanby Method nor field screening using immunoassay kits was effective because neither is sensitive to the nonaromatic High Energy Radiation Megavolt Electron Source (HERMES) transformer oil (discussed below). As a response to these ineffective screening methods, SNL/NM developed a technique that employs thermal desorption/gas chromatography (TD/GC) to rapidly quantify non-PCB-containing transformer oil in soil.

The transformer oil used at the HERMES-II facility is primarily a mixture of aliphatic and alicyclic hydrocarbons, and contains no significant quantities of EPA-regulated hazardous constituents as manufactured (e.g., PCBs or VOCs). Indeed, any appreciable amount of VOCs in the dielectric oil would have significantly altered the insulating properties of the oil. The boiling point for the mineral oil ranges from approximately 120 degrees Celsius (°C) to 365°C; its relatively low volatility makes it undetectable by real-time field monitoring instruments such as PIDs and FIDs, which rely on volatilization of contaminants at ambient conditions.

TD/GC has been used to characterize fuel-contaminated soils (i.e., those containing volatile and/or semivolatile constituents) and soils containing PCBs (Goldsmith 1994). The technique utilizes the direct injection of organic contaminants from soil onto a GC column, avoiding the use of environmentally harmful solvents. The method detection limit (MDL) is 10 milligrams per kilogram (mg/kg). The low MDL is a result of direct sample analysis without the potential dilution problems associated with sample preparation. Method sensitivity is also enhanced by analysis of the soil sample within hours of field collection, which minimizes potential storage loss and cross-contamination.

TD/GC analyses for mineral oil were performed using an SRI Model 8610 GC equipped with a TD oven and a manual sampling valve. The system was equipped with an FID that was used for the detection and quantitation of the oil after it had passed through the TD/GC sequence. An aliquot of soil

(approximately 1.0 gram [g]) was placed in the desorption chamber for 1 min at 325°C to vaporize organic constituents. The vapors were then swept onto the GC column for separation. A relatively nonpolar megabore capillary column (J&W Scientific, DB-5, 8 ft by 0.53 millimeter [mm]) was used for constituent separation and quantitation. A five-point calibration curve was generated by spiking clean sand with a mixture of HERMES oil in toluene (10 to 500 mg/kg). The curve was linear with a correlation coefficient of $r^2 = 0.998$. TPH in soil was quantified by "pattern recognition" using the total area under the distinctive mineral oil chromatogram. An external standard (dodecane) was added to determine sample matrix interference and injection efficacy. QA samples included replicate analyses for every 10 samples and a mid-range calibration check standard prior to daily sample analyses, after every 20 samples, or at the end of a 12-hour (hr) period.

2.2.4 Immunoassay Tests for Polychlorinated Biphenyls and High Explosives

Immunoassay tests for chemical constituents are based on the antibody response of mammalian immune systems to the introduction of chemical contaminants. To produce the desired antibodies in the kit, predetermined concentrations of specific chemicals are introduced into a test animal, causing the animal's immune system to produce antibodies to that chemical. Antibodies are extracted, separated, purified, and encapsulated for test kits. The antibodies in the test kits respond to varying concentrations of chemical compounds by giving varying responses. The test kits for PCBs and HEs, both manufactured by EnSys Inc., are discussed below.

PCBs

The protocol for PCB test kits conforms to SW-4020, immunoassay-based field screening for PCBs in soil. Detection limits range from 400 microgram per kilogram (µg/kg) for Aroclors 1254 and 1260 (prevalent Aroclors in dielectric fluids at SNL/NM) to 1, 2, 4, and 4 mg/kg for Aroclors 1248, 1242, 1016, and 1232, respectively. The test is specific to PCBs and has no anticipated interferences. The field test is positively biased for PCBs. Rigorous testing against lab-GC SW-8080 (prior to commercial availability of the test kit) resulted in false negatives in less than 1 percent of field tests performed. When testing samples, the method requires standard replicate analysis with each environmental sample analyzed; the relative standard deviation must be within ±20 percent, or the sample analysis will be repeated.

HEs

The field test kit for HE conforms to proposed SW-8515 for field screening for trinitrotoluene (TNT) in soil and can detect TNT, dinitrotoluene (DNT) isomers, and trinitrobenzene at concentrations of approximately 1 mg/kg in soil as measured by colorimetric reaction. The test is positively biased for HEs. Prior to commercialization of the test kit, false negatives were identified by SW-8515 in less than one percent of the field samples.

2.2.5 X-Ray Fluorescence

XRF was conducted using a Spectrace® 6000 Spectrometer. XRF is a whole-rock quantitation method for analyzing concentrations of elemental metals in environmental samples. Characteristic X-ray spectra are emitted when a specimen is irradiated with a beam of sufficiently short wavelength X-radiation. Standard reference materials of the National Institute of Standards and Testing (NIST) are used to verify the accuracy of the calibration. XRF can analyze metals with detection limits of 10 to 60 mg/kg. XRF is

a nondestructive method for analyzing environmental samples and generates no waste; samples are dried and ground prior to analysis. XRF was used during sampling activities as a field-screening tool for metals to direct the sampling for off-site laboratory analyses.

2.2.6 Direct Current Plasma/Inductively-Coupled Plasma

DCP and ICP elemental analyses for metals concentrations were conducted in accordance with SW-6010A using a Leeman PS 1000 sequential ICP. Soil samples were prepared by microwave-assisted acid digestion (EPA Methods 3051 and 6010 QA requirements). An aerosolized sample is introduced into a plasma of argon gas, producing characteristic spectra.

2.2.7 Mercury Analysis

Soil samples were analyzed for mercury content following EPA SW-7471A, "Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique)" (EPA 1994). The instruments used were a Leeman AP200 Automated Mercury Preparation System and a Leeman PS200 Automated Mercury Analyzer. A 0.1-g aliquot of soil was used for sample preparation and analysis. The practical limit of quantitation (PLQ) was 0.3 µg/kg.

2.2.8 Gamma Spectroscopy

All soil samples collected from areas suspected to be impacted by radioactive compounds were screened for radiological constituents using gamma spectroscopy. In some instances, these screens were mandatory to allow samples to be shipped to an off-site laboratory for chemical analysis. In other cases, the only analysis of the samples was the gamma spectroscopy.

Soil samples were collected in 500-mL Marinelli beakers, sealed, swiped, and counted in the field for loose, surface, radioactive contamination. Upon completion of the field check, the samples were transported to the SNL/NM 7715 laboratory for fixed gamma spectroscopic analysis.

The equipment used by the SNL/NM 7715 laboratory consists of a Canberra high purity germanium (HPGE) detector shielded by 4 in. of lead lined with cadmium and copper sheets. Twelve samples in Marinelli beakers can be run unattended using an autosampler. A typical sample is counted for 600 sec. Peaks generated during the gamma spectroscopy are matched against a user-defined library to identify individual radionuclides. Laboratory control sample (LCS) analyses are performed for americium-241, cesium-137, and cobalt-60 with identical analytical methods to monitor routine sample analysis data usability.

2.3 Off-Site Laboratory Chemical Analyses

Off-site laboratory analyses for constituents of concern (COCs) from each site were conducted in accordance with the EPA-approved protocols listed in SW-846 (EPA 1986). The COCs, field-screening techniques, laboratory analysis methods, and the corresponding method numbers are listed in Table 2-2. The data are provided in electronic format in Appendix C.

Table 2-2
Field Screening and Laboratory Analyses for Constituents of Concern[a]

Constituent of Concern	Field-Screening Techniques	On-Site Laboratory Analysis Methods	Off-Site Laboratory Analysis Methods	EPA Method Number
Metals	NA[a]	X-ray Fluorescence/ Directly Coupled Plasma	Inductively Coupled Plasma/Atomic Absorption	6010/7000
Volatile Organic Compounds (VOCs)	Photoionization Detector/ Flame Ionization Detector	Gas Chromatography/ Mass Spectrometry	Gas Chromatography/ Mass Spectrometry/ Toxicity Characteristic Leaching Procedure	8240 1311
Total Petroleum Hydrocarbons (TPH)	NA	Thermal Desorption/Gas Chromatography	Infrared	418.1
High Explosives (HEs)	Colorimetry	High-Performance Liquid Chromatography	High-Performance Liquid Chromatography	8330
Polychlorinated Biphenyls (PCBs)	Immunoassay	NA	Gas Chromatography	8080
Nitrates/Nitrites	NA	Colorimetry	Colorimetry	353.2
Radionuclides	G-M Pancake Probe/Sodium Iodide (NaI) Scintillometer	Gamma Spectroscopy	Gamma Spectroscopy/ Isotopic Analyses	6010

Source: EPA 1986.

[a]NA = Not applicable.

2.4 Summary of Quality Assurance/Quality Control Activities

As part of the sampling activities conducted in support of the RFI, a plan for QA/QC was developed to ensure that sampling procedures and laboratory analyses were performed to a rigid standard. The following QA/QC soil and water samples were collected to assure sampling procedure integrity and laboratory quality:

- Field Blank—Water poured directly from a freshly opened bottle of distilled water into laboratory-prepared sample bottles to determine whether any field conditions affected sample collection.

- Trip Blank—Laboratory-prepared water sample for analysis of VOCs to determine whether any VOCs were inadvertently introduced during sampling or shipment.

- Equipment Blank—Water sample prepared in the field after decontaminating equipment to determine whether any contaminants were introduced from improperly cleaned equipment.

- Duplicate—Soil sample split from an original field sample to determine reproducibility of laboratory analytical results.

- Matrix Spike/Matrix Spike Duplicate—Soil sample split from an original field sample to determine effects of matrix (e.g., soil) on laboratory results (i.e., whether any interference occurred); sample is spiked with a known concentration of a reference chemical, then analyzed to ascertain recovery of that chemical.

Results of the QA/QC program indicated very few problems with the collection of the data. Some general trends in laboratory QC were noted. The off-site laboratory used for the chemical analyses has consistently shown levels of VOCs (primarily acetone and methylene chloride) in their method blanks; however, this mainly impacted the data collected for Site 36, where elevated levels of several VOCs were noted (see Section 8.0). Independent analyses conducted by the on-site SNL/NM laboratory confirmed the presence of contamination in the samples, however, so the impact of laboratory contamination is somewhat lessened.

Some elevated levels of VOCs were noted in some soil trip blanks submitted for Site 78. Preparation of the soil trip blanks involved collection of soil from an area known to be uncontaminated, followed by heating of the sample to drive off any potential VOCs, which effectively removed any moisture that might have been in the sample. It is believed that, because the sample was dehydrated, when it reached the laboratory, the ambient humidity and vapor-phase VOCs typical of many laboratories (i.e., those VOCs commonly used for sample preparation [acetone, methylene chloride, toluene, etc.]) caused rapid adsorption of the laboratory chemicals onto the soil matrix, producing erroneous results. The process for preparing soil blanks on-site is currently under review, because it does not appear to be a useful tool in its present form, given the problems cited above. Regardless of the results of the trip blanks for Site 78, no elevated VOCs were noted in the soil samples collected for confirmatory analyses.

The same laboratory exhibited low concentrations of lead in their blanks, affecting the data for the rinsate and field blanks from Sites 18 and 107, but at concentrations too low to account for the concentrations detected above the statistical background levels for Site 18.

Matrix spike/matrix spike duplicate (ms/msd) data indicated occasional elevated recoveries for some metals (antimony, barium, beryllium, and zinc) that are ubiquitous in the surrounding granite-derived soils. No general problems with the laboratory's recovery were noted, however. The single exception is for the ms/msd data for antimony at Site 241. Because of apparent erroneous recovery data, the sample that had been split for a ms/msd had an anomalously high antimony concentration (29.6 mg/kg). The location (plus two others) was resampled and found to have nondetectable antimony. The results of the QA/QC program are provided in electronic format in Appendix D.

2.5 Statistical Analysis of Background Data

To determine whether the soil sampling results for potentially contaminated sites within TA-III/V indicated the presence of COCs, the results were compared to the samples collected from TA-III and TA-V during the site-wide investigation of background concentrations at SNL/NM (IT 1994a). Thus, a subset of the full site-wide background data set was selected for the TA-III/V evaluation. The COCs for

evaluation (barium, beryllium, cadmium, chromium, copper, lead, nickel, silver, uranium, and zinc) were chosen based on site knowledge and their likelihood of being a site contaminant within TA-III/V. At the time the statistical tests were completed, no site-wide background data sets existed for other COCs of interest (e.g., antimony, mercury, PCBs, etc.); thus a direct comparison to the applicable site-wide upper tolerance limits (UTLs, discussed below) updated in January 1996 was made for those COCs.

2.5.1 Background Concentration Determinations

To determine the range of background concentrations, the 95th UTL and 95th percentile were calculated for parametric and nonparametric data sets, respectively. The following steps were completed: (1) a priori screening of the data; (2) determination of the percentage of nondetects in the data sets, with a cutoff level of 15 percent; (3) distribution analysis of the portion of the data set that exhibited less than 15 percent nondetects, including coefficients of skewness, histograms, and probability plots; (4) a second screening of the data performed by the calculation of the T_n statistic for parametric data; and finally (5) calculation of the UTL for parametric data sets or the 95th percentile for nonparametric data sets. Each is discussed in the following sections, and example calculations, together with histograms and probability plots, are provided in Appendix E.

A Priori Screening

The a priori test involved a visual inspection of the data to eliminate any outliers. The data values were sorted from highest to lowest to facilitate the inspection. Maximum values that were a factor of three higher than their nearest neighbor were removed from the data set before the next test in the sequence was applied.

Determination of Parametric Versus Nonparametric Data

The data sets were divided into parametric or nonparametric by this process (discussed in the following paragraphs):

- Initial division based on the percentage of nondetect data; and
- Subdivision of the data sets with fewer than 15 percent nondetect values into normal, lognormal, or nonparametric.

First, the percentage of nondetect data in each of the data sets was determined. Raw nondetect data were not equated with "zero" values; rather, they were replaced with a coded value of one-half of the PLQ (EPA 1992a). Those sets with fewer than 15 percent nondetect values were identified as eligible for parametric distribution analysis; those sets with greater than 15 percent nondetect values were identified as eligible for nonparametric analysis. Coded data sets tend to skew the data toward zero and decrease the effectiveness of reporting the mean. Therefore, the median is reported as the measure of central tendency when greater than 15 percent of the data are nondetects (i.e., the data set appears nonparametric).

Distribution analyses then were conducted on the data to determine whether the data were parametric (normal or lognormal) or nonparametric. The distribution analyses included computing the coefficients of skewness and producing the histograms and probability plots for each COC for normal and lognormal (i.e., log transformed) data; the histograms and probability plots for each tested COC are included in Appendix E.

Calculation of T_n Statistic

The T_n statistic test was performed on data determined to be parametric (normal or lognormal) after the distribution analysis was completed to verify that no other statistical outliers existed. The datum was considered an outlier if the T_n statistic exceeded the critical number (C_n) identified in the EPA guidance for a given sample size (EPA 1992a). The test was run iteratively until the largest value in the data set passed. A new mean and standard deviation were calculated for each data set that had outliers removed in the T_n statistic analysis before the test was run again.

Calculation of UTL and 95th Percentile

Basic statistical parameters, including the mean, standard deviation, and UTL, were calculated for each normal or lognormal parametric population data set. The UTL establishes a concentration range that is constructed to contain a specified proportion of the population with a specified confidence. The proportion of the population included is referred to as the coverage, and the probability with which the tolerance interval includes the proportion is referred to as the tolerance coefficient. The EPA-recommended coverage value of 95 percent and tolerance coefficient value of 95 percent were used to calculate the UTLs (EPA 1992a). Most elementary statistical textbooks provide detailed descriptions of basic parametric statistics.

Nonparametric statistics were used when data sets did not exhibit normal or lognormal distributions, or when the percentage of nondetects exceeded 15 percent. The data sets examined exhibited fewer than 90 percent nondetects, so the median (50th percentile) was used to describe central tendency, and the 95th percentile was used for background comparison. Most elementary statistical textbooks provide detailed descriptions of basic nonparametric statistics.

Results

Table 2-3 presents the results of the a priori tests conducted on the data sets. None of the COCs examined were determined a priori to be outliers.

Table 2-4 provides the results of the probability plot, coefficient of skewness, and histogram for determination of the distribution type for each TA-III/V background data set. Background distributions for barium, beryllium, cadmium, copper, lead, nickel, and zinc were lognormal. The data set for silver was nonparametric, and the data set for total uranium (U_{tot}) was normally distributed.

Tests were performed for outliers using the T_n statistic (Table 2-5). Only the nickel data set was censored for the calculation of TA-III/V background values by removing the three highest values for nickel (30.9, 30.0, and 29.5 mg/kg. Three possible reasons for the anomalously high nickel data are noted. Nickel might exhibit a wide natural variation, and this sampling effort happened to access areas that were relatively mineral rich. Alternatively, laboratory error might have produced elevated analytical results. It is also possible that the higher nickel concentrations are anthropogenic, although these higher concentrations are well below the proposed RCRA Subpart S soil action level for nickel (2,000 mg/kg). To be conservative, these values were removed from the data set, and the censored data set was used for all subsequent comparisons for TA-III/V sites.

The natural logs of the means and standard deviations of the TAL metals and their corresponding UTLs or 95th percentiles are provided in Table 2-6. Proposed RCRA Subpart S soil action levels for the COCs detected during the RFI sampling effort are provided in Table 2-7. As stated earlier, only those COCs

Table 2-3
Technical Areas III and V Background Samples - A Priori Sampling

Parameter	Maximum Value	Next Maximum	X Factor[a]	Result
Barium	730	320	2.28	Pass
Beryllium	1.1	1.1	1.00	Pass
Cadmium	8.5	7.7	1.10	Pass
Chromium	58.1	57.3	1.01	Pass
Copper	29	27.5	1.05	Pass
Lead	73	73	1.00	Pass
Nickel	30.9	30	1.03	Pass
Silver	10	9.7	1.03	Pass
Uranium (total)	4.66	4.61	1.01	Pass
Zinc	59.9	56	1.07	Pass

[a]X factor is the ratio of the maximum value to the next maximum. If the ratio is greater than or equal to 3, it indicates the maximum value is anomalously high.

Table 2-4
Results of the Distribution Analysis for Technical Areas III and V

Parameter	Probability Plot	Coefficient of Skewness[a]	Histogram	Distribution Type
Barium	Lognormal	-2.3	Lognormal	Lognormal
Beryllium	Lognormal	-0.30	Lognormal	Lognormal
Cadmium	Lognormal	0.49	Lognormal	Lognormal
Chromium	Lognormal	-1.72	Lognormal	Lognormal
Copper	Lognormal	-0.15	Lognormal	Lognormal
Lead	Lognormal	0.50	Lognormal	Lognormal
Nickel	Lognormal	-0.48	Lognormal	Lognormal
Silver	Nonparametric	-0.59	Nonparametric	Nonparametric
Uranium (total)	Normal	-0.23	Lognormal	Normal
Zinc	Lognormal	0.69	Lognormal	Lognormal

[a]Critical Coefficient of Skewness is -1 to 1.

Table 2-5
Technical Areas III and V T_n Statistic Analysis for Target Analyte List Metals

Parameter	Distribution	Natural Log (Ln) of Maximum Value	Natural Log Mean	Natural Log Standard Deviation	T_n Statistic	Number of Samples	Critical Value[a]	Pass or Fail T_n Statistic
Barium	Lognormal	6.59	3.84	1.13	2.44	503	3.74	Pass
Beryllium	Lognormal	0.10	-1.14	0.43	2.87	331	3.60	Pass
Cadmium	Lognormal	2.14	-0.89	0.99	3.06	176	3.39	Pass
Chromium	Lognormal	4.06	1.86	0.8	2.75	538	3.76	Pass
Copper	Lognormal	3.37	1.82	0.48	3.22	392	3.66	Pass
Lead	Lognormal	4.29	1.89	0.73	3.29	259	3.52	Pass
Nickel (first iteration)	Lognormal	3.43	1.84	0.43	3.70	403	3.67	Fail
Nickel (second iteration)	Lognormal	3.40	1.83	0.42	3.74	402	3.67	Fail
Nickel (third iteration)	Lognormal	3.38	1.83	0.42	3.70	401	3.67	Fail
Nickel (fourth iteration)	Lognormal	3.31	1.83	0.41	3.62	400	3.67	Pass
Silver	Nonparametric	ND[b]	ND	ND	ND	247	ND	ND
Uranium (total)	Normal	4.66[c]	2.05[c]	0.99[c]	2.64	81	3.13	Pass
Zinc	Lognormal	4.09	3.1	0.34	2.89	158	3.36	Pass

[a]One-sided critical values for the upper 5 percent significance level; critical values derived from Table 8 (EPA 1992a) for given number of samples.
[b]ND = Not determined.
[c]Normal maximum values (i.e., actual values) provided for normally distributed uranium.

Table 2-6
Upper Tolerance Limits for Target Analyte List Metals in Technical Areas III and V Soil

Target Analyte List (TAL) Metal	Distribution	Censored?	Natural Log Mean	Natural Log Standard Deviation	Mean	Standard Deviation	One-Sided Tolerance Factor (K)	Natural Log UTL	UTL	Number of Samples
Barium	Lognormal	No	3.84	1.13	NA[a]	NA	1.76	5.83	341.0	503
Beryllium	Lognormal	No	-1.14	0.43	NA	NA	1.79	-0.37	0.7	331
Cadmium	Lognormal	No	-0.89	0.99	NA	NA	1.85	0.94	2.6	176
Chromium	Lognormal	No	1.86	0.8	NA	NA	1.76	3.27	26.2	538
Copper	Lognormal	No	1.82	0.48	NA	NA	1.78	2.67	14.5	392
Lead	Lognormal	No	1.89	0.73	NA	NA	1.81	3.21	24.8	259
Nickel	Lognormal	Yes	1.83	0.4	NA	NA	1.78	4.40	81.3	400
Silver[a]	Nonparametric	NA	NA	NA	NA	NA	NA	NA	NA	247
Uranium (total)	Normal	No	NA	NA	2.05	0.99	1.96	NA	4.0	81
Zinc	Lognormal	No	3.1	0.34	NA	NA	1.86	3.73	41.8	158

[a]NA = Not applicable.
[b]For silver, the 50th percentile value was 1 mg/kg and the 95th percentile value was 4 mg/kg; these describe the central tendency for nonparametrically distributed parameters.

Table 2-7
Generic Proposed Soil Action Levels Under Proposed RCRA Subpart S

Analyte	Proposed RCRA Subpart S Soil Action Level (mg/kg)
1,2-Dichloroethane	8
Acetone	8,000
Aluminum	NA[a]
Antimony	30
Arsenic	20
Barium	6,000
Beryllium	0.2
Bis (2-Ethylhexyl) Phthalate	50
2-Butanone	50,000
Cadmium	80
Calcium	NA
Chromium (VI)	400
Cobalt	NA
Copper	NA
2-Hexanone	NA
Iron	NA
Lead	2,000[b]
Lithium	NA
Magnesium	NA
Manganese	NA
Mercury	20
Nickel	2,000
Nitrate	100,000
Nitrite	8,000
Polychlorinated Biphenyls	0.1
Potassium	NA
Selenium	400
Silver	400
Sodium	NA
Toluene	20,000
Total Petroleum Hydrocarbon	100[c]
Uranium	NA
Vanadium	600
Xylenes (total)	200,000
Zinc	20,000

[a]NA = No proposed RCRA Subpart S soil action level is currently listed for the analyte.
[b]Lead action level not formally promulgated; proposed 2,000 mg/kg (EPA 1996). → sites w/ Pb
[c]Not EPA-regulated. Standard from New Mexico Environmental Improvement Board Underground Storage Tank Regulations (NMEIB/USTR 1990).

for which site-wide background data sets existed (at the time of this RFI) were analyzed for statistical significance. The proposed RCRA Subpart S soil action levels for the remaining COCs are provided for comparison to site sampling data.

2.5.2 Comparison Tests: Background Data Versus Environmental Restoration Site Data

Two nonparametric, two parametric tests, and one test that utilized both parametric and nonparametric analyses were used to compare TA-III/V background data to data from potentially contaminated TA-III/V ER sites (Appendix E). The nonparametric tests included the Wilcoxon Rank Sum (WRS) Test and the Quantile test. The parametric tests included Student's t-tests using assumptions of equal and of unequal variance. The hot-measurement comparison uses either the 95th UTL calculation (for parametric data) or the 95th percentile calculation (in the case of nonparametric data) as recommended by the EPA (EPA 1992a). Nonparametric tests were applied to all soil data; however, parametric tests were not applied to nonparametric data.

The WRS test is performed by ordering all observations from background and the potentially contaminated site according to their magnitude and then assigning a rank from lowest to highest. The ranks in the potentially contaminated area are summed and compared to a table of critical values to determine whether the site is contaminated.

The WRS test is a nonparametric test more powerful than the Quantile test (described below) in determining whether the potentially contaminated area has concentrations uniformly higher than background (EPA 1992a). However, the WRS test allows for fewer less-than measurements than the Quantile test. As a general rule, the WRS test should be avoided if more than 40 percent of the measurements taken at the potentially contaminated area or at background areas are nondetects. All soil analytical data were subjected to the WRS test in this analysis, although the test power was known to be greatly reduced when the nondetect percent was greater than 40.

The Quantile test is performed by separating background data and individual site data. The data are then ordered from highest to lowest. The number of background and individual site data points are calculated. The number of data points for background and the selected potentially contaminated site is then compared to a table that identifies how many of the highest measurements must come from the potentially contaminated site versus background to indicate contamination.

The Quantile test is a nonparametric test that has more power than the WRS test to detect when only a small portion of the remediated site has not been completely cleaned up. Also, the Quantile test can be used even when a fairly large proportion of the measurements is below the limit of detection (EPA 1992a).

The hot-measurement comparison consists of comparing each measurement from the potentially contaminated area with an upper-limit concentration value. This upper-limit concentration value is such that any measurement from the potentially contaminated area that is equal to or greater than this value indicates an area of relatively high concentrations that must be further investigated (EPA 1992a). Concentrations exceeding the upper-limit value may indicate inappropriate sample collection, handling, or analysis procedures, or actual contamination. The upper-limit concentration value was calculated as previously described based on the 95th percentile for nonparametric data and the 95th UTL for parametric data.

The t-test is a parametric test that compares the means of two samples. To use the t-test statistic, both sampled populations must be approximately normally (or lognormally) distributed with approximately equal population variances, and the random samples must be selected independently of each other. The equations and methodology for applying the t-test are explained in most statistics books, including McClave and Dietrich (1982) and Mendenhall (1975).

Results

Comparison tests between background data and the maximum concentrations for TA-III/V site data were performed for metals at Sites 18, 51, 107, 111, 240, and 241 in accordance with the RFI Work Plan (SNL/NM 1993a). In the case of Site 78, a simple comparison of maximum metal concentrations to the TA-III/V background UTLs were made for the samples collected during the confirmatory sampling event. These were the only sites where metals were regarded as suspect contamination. The respective text sections herein contain discussions of the significance of the statistical tests on data for each site and comparisons to the relevant proposed RCRA Subpart S soil action levels (Table 2-7) for each constituent.

2.6 Contaminant Fate and Transport/Risk Assessment

The majority of contaminants detected at sites in TA-III/V were restricted to the upper 2 ft of surface soils. No conclusive evidence has been found that any sites investigated during this RFI have had an impact on the local ground water (at depths of 480 to 500 ft bgs).

For those sites at which contaminants were elevated with respect to background, a comparison was made of each elevated constituent relative to its proposed RCRA Subpart S soil action level. All COCs were at least one to two orders of magnitude below their corresponding action levels, except at Site 18 (which displayed PCBs above the proposed RCRA Subpart S soil action level). As indicated in the individual section for this site, the efficacy of conducting a VCM was evaluated. Three other sites (35, 36, and 196) also exhibited TPH above the New Mexico Underground Storage Tank Regulations (NMUSTR) standard, but each of these is proposed for NFA because TPH is in the form of a nonhazardous mineral oil.

17.0 ER SITE 107: EXPLOSIVES TEST AREA

Site 107 is a triangular-shaped area located to the west of the CWL near Building 6920 along the southern boundary of TA-III (Figure 17-1). The site was used for shock wave HE testing from the 1950s until 1972. Metal-clad explosives containing silver or lead might have been used during the tests.

Potential COCs include DU, HEs, and heavy metals. The investigation protocols and results are discussed below.

17.1 Field Investigation Protocols

Field investigation protocols at Site 107 included aerial photograph analysis and surface soil sampling. Each is discussed below.

17.1.1 Aerial Photograph Analysis

Aerial photographs from 1973 to 1990 were assembled, digitized, and compared for changes in surface features during successive years at the Explosives Test Area. The area within 1,000 ft of the site boundaries was studied for signs of soil disturbance, vegetation changes, or new construction.

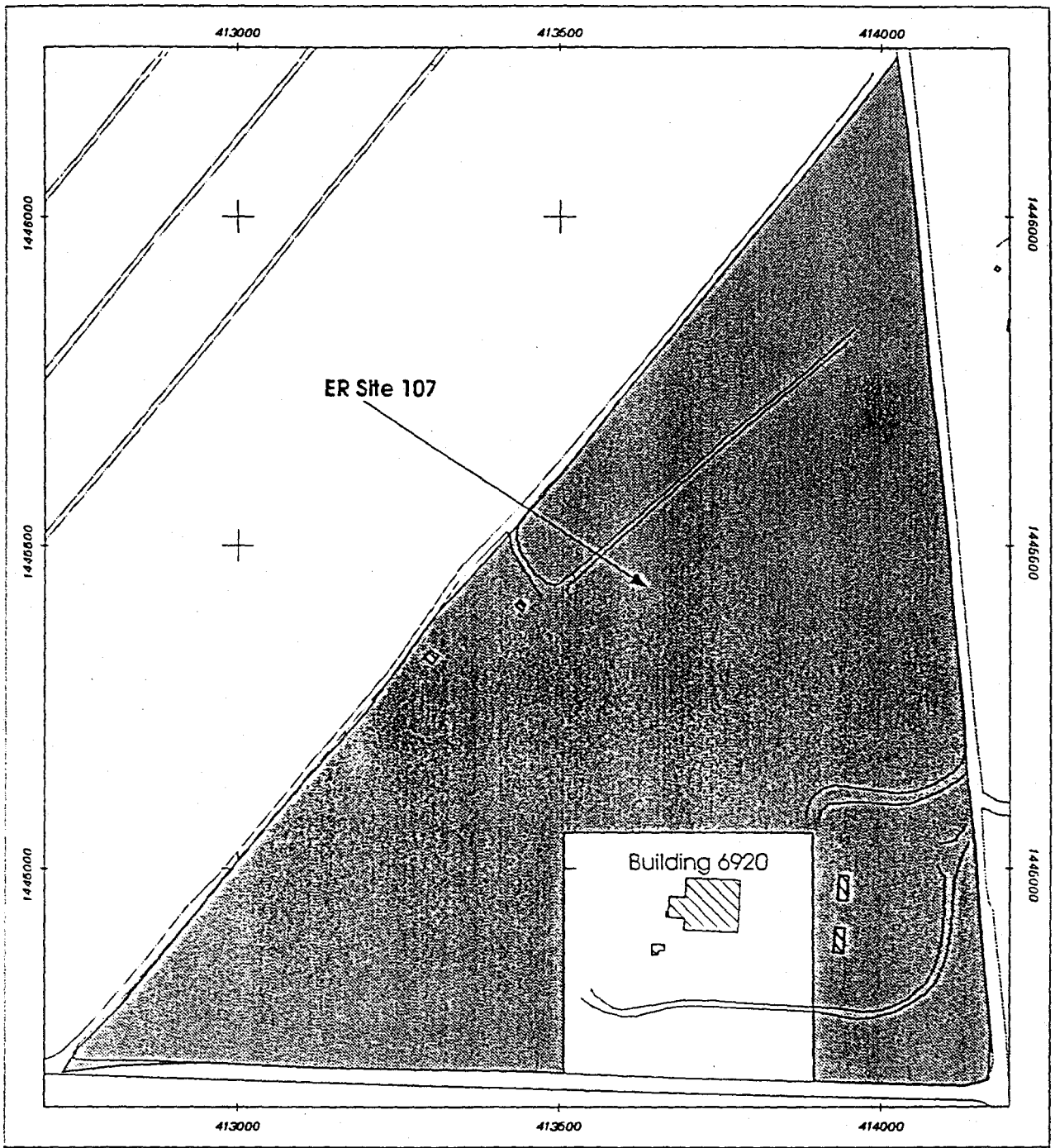
17.1.2 Sampling Strategies

The sampling and analysis plan was modified slightly from that proposed in the RFI Work Plan (SNL/NM 1993a, 1993b). To cover a wider potentially contaminated area, and because the sampling was conducted to verify earlier grid sampling, the grid length was increased from the proposed spacing of 200 ft to a spacing of 350 to 400 ft. The site was gridded on 400-ft centers in the north-south direction and 350-ft centers in the east-west direction, then subdivided into 10 sampling sections (Figure 17-2). Composite surface soil samples (10 plus one duplicate) were collected from the site in May 1994. Within each section, four to eight soil samples were collected from a depth of approximately 0.25 ft and mixed into a single composite sample using a trowel and stainless-steel bowl in accordance with the appropriate FOPs. Each sample was split for field screening of HEs by immunoassay, metals by XRF analysis, and radionuclides by gamma spectroscopy. Rather than only the two samples identified in the RFI Work Plan for off-site analysis (SNL 1993b), all 10 composite samples (and one for duplicate analysis) were submitted for laboratory analysis of HEs, nitrates and nitrites, metals, and gamma spectroscopy in accordance with the EPA methods identified in Table 2-2.

17.2 Field Investigation Results

17.2.1 Aerial Photograph Interpretation

A variety of cleared or disturbed surfaces was noted during the time period covered by the photographs for Site 107 (Plate I). There were no surface features found within 1,000 ft of the boundaries of Site 107 until 1986.



Legend

ER Site 107

Buildings

Roads

Sandia National Laboratories, New Mexico
Environmental Restoration Geographic Information System

Figure 17-1 ER Site 107
Explosives Test Area, TA-III

0 125 250
Scale in Feet

0 30 60
Scale in Meters

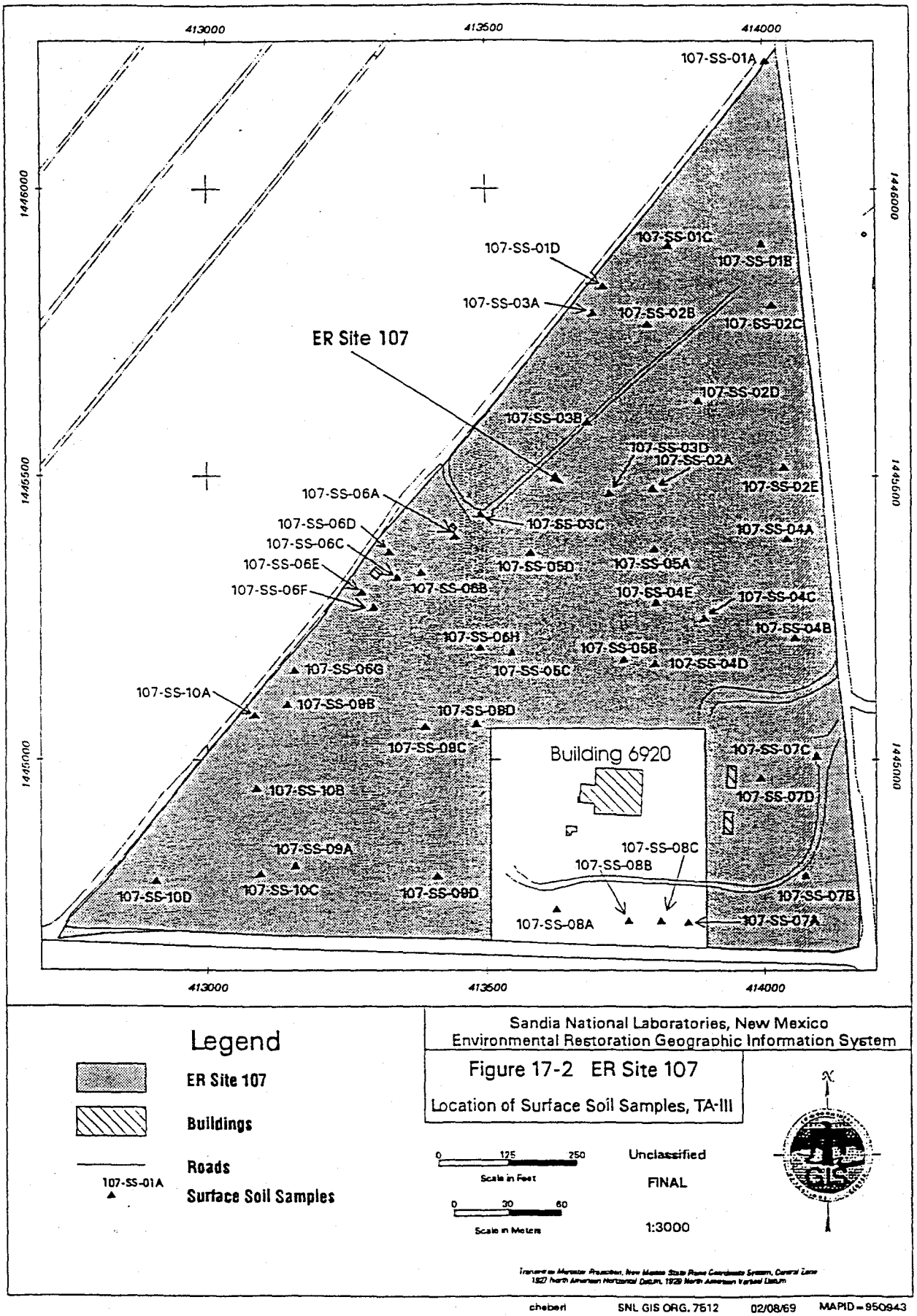
Unclassified

FINAL

1:3000

Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone
1927 North American Horizontal Datum, 1929 North American Vertical Datum

cheberl SNL GIS ORG. 7512 02/08/69 MAPID=950942



Legend

- ER Site 107
- Buildings
- Roads
- 107-SS-01A — Surface Soil Samples

Sandia National Laboratories, New Mexico
Environmental Restoration Geographic Information System

Figure 17-2 ER Site 107
Location of Surface Soil Samples, TA-III

0 125 250
Scale in Feet

0 30 60
Scale in Meters

Unclassified
FINAL
1:3000

Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone
1927 North American Horizontal Datum, 1929 North American Vertical Datum

cheberl SNL GIS ORG. 7612 02/08/69 MAPID = 950943

- 1986: A cleared or disturbed surface appeared in the 1986 photograph immediately to the west of the site, running along the diagonal northeast-trending site boundary. The feature was approximately 1,700 ft long and 400 ft wide at its widest point.

- 1990: In 1990, the southwestern half of the feature identified in 1986 was visible.

On-ground investigations of the areas identified in the aerial photographs as being of possible concern revealed no evidence of potential contamination or impact to Site 107.

17.2.2 Nature and Extent of Contamination

Table 17-1 summarizes all chemical constituents that were detected in concentrations greater than the MDL for the soil samples collected during the surface investigation. Detailed field screening data are provided in Appendix B; soil sampling and QA/QC results are provided in electronic format in Appendices C and D, respectively.

Table 17-1
Summary of Detected Constituents of Concern in Surface Soil Sample Analytical Results, Site 107

Analyte	Range (mg/kg)	Detection Limit (mg/kg)	Total Samples	Mean (mg/kg)	Number of Non-Detects	Samples ≤ Mean	Samples > Mean
Aluminum	4,000-6,290	10	11	4,905	0	6	5
Arsenic	1.9-4	1	11	2.8	0	5	6
Barium	60.3-93.6	1	11	70.2	0	6	5
Beryllium	0.3-0.6	0.2	11	0.4	0	9	2
Cadmium	<0.5-1.3	0.5	11	0.6	8	10	1
Calcium	2,450-26,100	20	11	6,405	0	5	6
Chromium	5.2-7.9	1	11	6.1	0	6	5
Cobalt	2.9-3.7	1	11	3.2	0	8	3
Copper	5.9-10.6	2	11	7.1	0	8	3
Iron	6,380-9,180	10	11	7,343	0	6	5
Lead	8.2-11.2	0.3	11	9.4	0	6	5
Magnesium	1,660-3,420	20	11	2,158	0	6	5
Manganese	133-228	1	11	176	0	4	7
Nickel	5.1-7.8	4	11	6.2	0	6	5
Potassium	1,430-2,450	500	11	1,738	0	7	4
Vanadium	11.1-15.7	1	11	13.3	0	7	4
Zinc	18.2-34.5	2	11	22.6	0	7	4
Nitrate/nitrite	0.8-2.4	0.5	11	1.3	0	6	5

No HEs were detected above the MDL. Nitrate/nitrites ranged from 0.76 to 2.4 mg/kg, well below the proposed RCRA Subpart S soil action level of 100,000/8,000 mg/kg, respectively, noted in Section 2.5. Several metals were detected above their respective MDLs. Because several metals are essential nutrients or are geologically prevalent (i.e., the soil-forming Sandia granite naturally contains high concentrations of aluminum, calcium, iron, magnesium, manganese, and potassium), these metals were removed from further consideration. Furthermore, no proposed RCRA Subpart S soil action levels are currently promulgated for any of these constituents. Table 17-2 summarizes the comparison of background levels to concentrations of RCRA metals detected at Site 107. No metals were determined to be site contaminants based on the statistical analysis conducted for Site 107. A few metals (arsenic, cobalt, and vanadium) were compared to the revised site-wide report (IT 1996) because there were no TA-III/V site-wide background data available at the time the statistical analyses were completed; these comparisons are provided in Table 17-3. None of the metals exceeded site-wide UTLs.

The gamma spectroscopy results were examined to determine whether any enriched uranium or DU existed at the site. A uranium equilibrium analysis of the ratios of activities for uranium-234 and uranium-238 and the ratio of the activities of both radioisotopes to uranium-235 activity was completed. The results of the analysis indicated that no enriched uranium or DU exists at the site. Also, no additional radionuclides were identified as potential COCs by the broad spectrum covered by gamma spectroscopy.

17.3 Summary and Conclusions

No chemical or radionuclide was detected in any of the surface soil samples at a level considered to be statistically in excess of background. No additional sampling or remediation appears to be warranted; however, Site 107 has been identified as the preferred site for a future temporary unit and corrective action management unit (TU/CAMU) for the ER Project. Therefore, further activities related to its TU/CAMU status, but unrelated to the RFI, will be conducted at the site. Summaries of these activities will be provided under the reporting requirements for the TU/CAMU waste management program. At such time as the TU/CAMU activities no longer affect Site 107, it will be proposed for NFA in accordance with Criterion 3 listed in Section 4.4 of this RFI report.

Table 17-2
Comparison of Site 107 Data to Technical Areas III and V Background

Parameter	Population Distribution	Statistical Test Applied					Maximum Concentration at Site 107 (mg/kg)	Site Contaminant[a]
		Student's t-test		Wilcoxon	Quantile	UTL or 95th Percentile (mg/kg)		
		Equal Variance	Unequal Variance					
Barium	Lognormal	Pass[b]	Fail[c]	Pass	Pass	341.0	93.6	No
Beryllium	Lognormal	Pass	Fail	Fail	Pass	0.7	0.64	No
Cadmium	Lognormal	Pass	Pass	Pass	Pass	2.6	1.3	No
Chromium	Lognormal	Pass	Pass	Pass	Pass	26.2	7.9	No
Copper	Lognormal	Pass	Fail	Pass	Pass	14.5	10.6	No
Lead	Lognormal	Pass	Fail	Fail	Pass	24.8	11.2	No
Nickel	Lognormal	Pass	Pass	Pass	Pass	12.9	7.8	No
Zinc	Lognormal	Pass	Pass	Pass	Pass	41.8	34.5	No

[a]Assessment of site contaminant based upon a qualitative evaluation of each statistical test applied to the data. For example: If all tests "fail," the highest concentration is statistically "greater" than background. If one or more tests "pass," other criteria may indicate that the highest concentration is not obviously, or statistically, greater than background. Other criteria include (1) the power of the individual statistical test, and (2) whether the maximum concentration exceeds the UTL or 95th percentile.
[b]Pass = Accept the null hypothesis that test statistics are equal.
[c]Fail = Reject the null hypothesis that test statistics are equal.

Table 17-3
Comparison of Site 107 Data to Site-Wide Background

Parameter	Maximum Concentration (mg/kg)	Site-Wide UTL (SNL 1996) (mg/kg)
Arsenic	4	5.6
Cobalt	3.7	5.2
Vanadium	15.7	20.4

RESULTS OF THE TECH AREAS III AND V RCRA FACILITY INVESTIGATION

APPENDIX B – FIELD SCREENING DATA

APPENDIX B. FIELD SCREENING RESULTS

SITE 107 SOIL SCREENING RESULTS

		TOTAL METALS			HIGH EXPLOSIVES	
Sample Label	Location	Analyte	Field Results (XRF) (ppm)	Lab Results (6010/7000) (ppm)	Field Results (Immunoassay) (ppm)	Lab Results (HPLC) (ppm)
16101-1	107-SS-01	NA	NA	NA	ND	ND
		Al	NA	5200	NA	NA
		Sb	NA	3	NA	NA
		As	NA	4	NA	NA
		Ba	613.67	93.6	NA	NA
		Be	NA	0.42	NA	NA
		Cd	NA	ND	NA	NA
		Ca	5.15%	26100	NA	NA
		Cr	33.83	6	NA	NA
		Co	NA	2.9	NA	NA
		Cu	NA	6.9	NA	NA
		Fe	1.51%	7050	NA	NA
		Pb	18.83	9.6	NA	NA
		Mg	NA	3420	NA	NA
		Mn	238.98	142	NA	NA
		Hg	NA	ND	NA	NA
		Ni	NA	7.8	NA	NA
		K	1.39%	1490	NA	NA
		Se	NA	ND	NA	NA
		Ag	NA	0.6	NA	NA
		Na	NA	ND	NA	NA
		Th	NA	ND	NA	NA
		Ti	2357.57	NA	NA	NA
		V	67.3	14.3	NA	NA
		Zn	27.89	22.5	NA	NA
16102-1	107-SS-02	NA	NA	NA	ND	ND
		Al	NA	5670	NA	NA
		Sb	NA	ND	NA	NA
		As	NA	3.2	NA	NA
		Ba	509.04	82.5	NA	NA
		Be	NA	0.42	NA	NA
		Cd	NA	ND	NA	NA
		Ca	2.40%	11100	NA	NA
		Cr	NA	6.7	NA	NA
		Co	NA	3.7	NA	NA
		Cu	NA	7.1	NA	NA
		Fe	1.63%	7970	NA	NA
		Pb	18.74	9.6	NA	NA

Site 107 - Comparison of Field Screening to Laboratory Analytical Results

		TOTAL METALS			HIGH EXPLOSIVES	
Sample Label	Location	Analyte	Field Results (XRF) (ppm)	Lab Results (6010/7000) (ppm)	Field Results (Immunoassay) (ppm)	Lab Results (HPLC) (ppm)
		Mg	NA	2460	NA	NA
		Mn	361.99	182	NA	NA
		Hg	NA	ND	NA	NA
		Ni	NA	6.6	NA	NA
		K	1.52%	1920	NA	NA
		Se	NA	ND	NA	NA
		Ag	NA	0.42	NA	NA
		Na	NA	ND	NA	NA
		Th	NA	ND	NA	NA
		Ti	2344.63	NA	NA	NA
		V	NA	13.9	NA	NA
		Zn	38.42	23.2	NA	NA
16103-1	107-SS-03		NA	NA	ND	ND
		Al	NA	6290	NA	NA
		Sb	NA	ND	NA	NA
		As	NA	2.9	NA	NA
		Ba	573.64	79.2	NA	NA
		Be	NA	0.64	NA	NA
		Cd	NA	1.3	NA	NA
		Ca	1.10%	4850	NA	NA
		Cr	52.54	7.9	NA	NA
		Co	NA	3.5	NA	NA
		Cu	NA	8.1	NA	NA
		Fe	1.69%	9180	NA	NA
		Pb	14.56	10	NA	NA
		Mg	NA	2590	NA	NA
		Mn	383.03	228	NA	NA
		Hg	NA	ND	NA	NA
		Ni	NA	7.3	NA	NA
		K	1.60%	2450	NA	NA
		Se	NA	ND	NA	NA
		Ag	NA	0.6	NA	NA
		Na	NA	ND	NA	NA
		Th	NA	ND	NA	NA
		Ti	2330.03	NA	NA	NA
		V	NA	15.7	NA	NA
		Zn	44.05	29.5	NA	NA
16104-1	107-SS-04	NA	NA	NA	ND	ND
		Al	NA	5170	NA	NA
		Sb	NA	ND	NA	NA
		As	NA	3.1	NA	NA
		Ba	579.26	69.7	NA	NA

Site 107 - Comparison of Field Screening to Laboratory Analytical Results

		TOTAL METALS			HIGH EXPLOSIVES	
Sample Label	Location	Analyte	Field Results (XRF) (ppm)	Lab Results (6010/7000) (ppm)	Field Results (Immunoassay) (ppm)	Lab Results (HPLC) (ppm)
		Be	NA	0.42	NA	NA
		Cd	NA	ND	NA	NA
		Ca	1.67%	8180	NA	NA
		Cr	NA	6.3	NA	NA
		Co	NA	3.2	NA	NA
		Cu	NA	10.6	NA	NA
		Fe	1.53%	7920	NA	NA
		Pb	18.23	11.2	NA	NA
		Mg	NA	2220	NA	NA
		Mn	322.44	181	NA	NA
		Hg	NA	ND	NA	NA
		Ni	NA	6.4	NA	NA
		K	1.68%	1860	NA	NA
		Se	NA	ND	NA	NA
		Ag	NA	0.3	NA	NA
		Na	NA	ND	NA	NA
		Th	NA	ND	NA	NA
		Ti	2308.68	NA	NA	NA
		V	NA	13.8	NA	NA
		Zn	27.93	34.5	NA	NA
16105-1	107-SS-05	NA	NA	NA	ND	ND
		Al	NA	4070	NA	NA
		Sb	NA	ND	NA	NA
		As	NA	2.1	NA	NA
		Ba	577.73	62	NA	NA
		Be	NA	0.37	NA	NA
		Cd	NA	ND	NA	NA
		Ca	1.03%	3020	NA	NA
		Cr	NA	5.2	NA	NA
		Co	NA	3.1	NA	NA
		Cu	NA	6.5	NA	NA
		Fe	1.47%	6520	NA	NA
		Pb	19.86	8.6	NA	NA
		Mg	NA	1910	NA	NA
		Mn	363.23	195	NA	NA
		Hg	NA	ND	NA	NA
		Ni	NA	6.1	NA	NA
		K	1.50%	1700	NA	NA
		Se	NA	ND	NA	NA
		Ag	NA	ND	NA	NA
		Na	NA	ND	NA	NA
		Th	NA	ND	NA	NA

Site 107 - Comparison of Field Screening to Laboratory Analytical Results

		TOTAL METALS			HIGH EXPLOSIVES	
Sample Label	Location	Analyte	Field Results (XRF) (ppm)	Lab Results (6010/7000) (ppm)	Field Results (Immunoassay) (ppm)	Lab Results (HPLC) (ppm)
		Ti	2401.88	NA	NA	NA
		V	82.55	11.1	NA	NA
		Zn	32.69	20.5	NA	NA
16106-1	107-SS-06	NA	NA	NA	ND	ND
		Al	NA	4850	NA	NA
		Sb	NA	ND	NA	NA
		As	NA	3.3	NA	NA
		Ba	575.06	70.6	NA	NA
		Be	NA	0.42	NA	NA
		Cd	NA	ND	NA	NA
		Ca	1.79%	8630	NA	NA
		Cr	NA	5.6	NA	NA
		Co	NA	3.2	NA	NA
		Cu	19.79	6.7	NA	NA
		Fe	1.68%	7280	NA	NA
		Pb	19.07	10.4	NA	NA
		Mg	NA	2100	NA	NA
		Mn	344.2	185	NA	NA
		Hg	NA	ND	NA	NA
		Ni	NA	6.2	NA	NA
		K	1.56%	1640	NA	NA
		Se	NA	ND	NA	NA
		Ag	NA	ND	NA	NA
		Na	NA	ND	NA	NA
		Th	NA	ND	NA	NA
		Ti	2810.58	NA	NA	NA
		V	NA	13.2	NA	NA
		Zn	24.57	20.2	NA	NA
16111-1	107-SS-6D	NA	NA	NA	ND	ND
		Al	NA	5250	NA	NA
		Sb	NA	ND	NA	NA
		As	NA	2.7	NA	NA
		Ba	529.26	74.8	NA	NA
		Be	NA	0.53	NA	NA
		Cd	NA	ND	NA	NA
		Ca	1.81%	8720	NA	NA
		Cr	NA	6.3	NA	NA
		Co	NA	3.3	NA	NA
		Cu	NA	7.5	NA	NA
		Fe	1.59%	7600	NA	NA
		Pb	18.23	9.4	NA	NA
		Mg	NA	2300	NA	NA

Site 107 - Comparison of Field Screening to Laboratory Analytical Results

		TOTAL METALS			HIGH EXPLOSIVES	
Sample Label	Location	Analyte	Field Results (XRF) (ppm)	Lab Results (6010/7000) (ppm)	Field Results (Immunoassay) (ppm)	Lab Results (HPLC) (ppm)
		Mn	322.5	185	NA	NA
		Hg	NA	ND	NA	NA
		Ni	NA	6.6	NA	NA
		K	1.49%	2060	NA	NA
		Se	NA	ND	NA	NA
		Ag	NA	ND	NA	NA
		Na	NA	66.4	NA	NA
		Th	NA	ND	NA	NA
		Ti	2398.42	NA	NA	NA
		V	NA	14.2	NA	NA
		Zn	26.02	20.7	NA	NA
16107-1	107-SS-07	NA	NA	NA	ND	ND
		Al	NA	4000	NA	NA
		Sb	NA	ND	NA	NA
		As	NA	3	NA	NA
		Ba	571.4	60.3	NA	NA
		Be	NA	0.31	NA	NA
		Cd	NA	ND	NA	NA
		Ca	2.16%	10400	NA	NA
		Cr	NA	5.7	NA	NA
		Co	NA	2.9	NA	NA
		Cu	NA	6.6	NA	NA
		Fe	1.37%	6380	NA	NA
		Pb	14.77	9	NA	NA
		Mg	NA	1800	NA	NA
		Mn	290.07	133	NA	NA
		Hg	NA	ND	NA	NA
		Ni	NA	5.1	NA	NA
		K	1.61%	1450	NA	NA
		Se	NA	ND	NA	NA
		Ag	NA	ND	NA	NA
		Na	NA	ND	NA	NA
		Th	NA	ND	NA	NA
		Ti	2286.02	NA	NA	NA
		V	NA	12.4	NA	NA
		Zn	23.56	23.3	NA	NA
16108-1	107-SS-08	NA	NA	NA	ND	ND
		Al	NA	4810	NA	NA
		Sb	NA	ND	NA	NA
		As	NA	2.4	NA	NA
		Ba	541	63.3	NA	NA
		Be	NA	0.42	NA	NA

Site 107 - Comparison of Field Screening to Laboratory Analytical Results

		TOTAL METALS			HIGH EXPLOSIVES	
Sample Label	Location	Analyte	Field Results (XRF) (ppm)	Lab Results (6010/7000) (ppm)	Field Results (Immunoassay) (ppm)	Lab Results (HPLC) (ppm)
		Cd	NA	0.53	NA	NA
		Ca	1.19%	4120	NA	NA
		Cr	29.63	5.8	NA	NA
		Co	NA	3.1	NA	NA
		Cu	NA	6.7	NA	NA
		Fe	1.50%	7100	NA	NA
		Pb	22.03	8.5	NA	NA
		Mg	NA	1970	NA	NA
		Mn	319.97	158	NA	NA
		Hg	NA	ND	NA	NA
		Ni	NA	5.8	NA	NA
		K	1.58%	1640	NA	NA
		Se	NA	ND	NA	NA
		Ag	NA	0.36	NA	NA
		Na	NA	ND	NA	NA
		Th	NA	ND	NA	NA
		Ti	2206.08	NA	NA	NA
		V	NA	13.7	NA	NA
		Zn	36.75	20.7	NA	NA
16109-1	107-SS-09	NA	NA	NA	ND	ND
		Al	NA	4900	NA	NA
		Sb	NA	3.2	NA	NA
		As	NA	1.9	NA	NA
		Ba	NA	62	NA	NA
		Be	NA	0.42	NA	NA
		Cd	NA	ND	NA	NA
		Ca	NA	2540	NA	NA
		Cr	NA	6.3	NA	NA
		Co	NA	3.2	NA	NA
		Cu	NA	6.2	NA	NA
		Fe	NA	7250	NA	NA
		Pb	NA	8.2	NA	NA
		Mg	NA	1800	NA	NA
		Mn	NA	185	NA	NA
		Hg	NA	ND	NA	NA
		Ni	NA	6	NA	NA
		K	NA	1720	NA	NA
		Se	NA	ND	NA	NA
		Ag	NA	ND	NA	NA
		Na	NA	98.7	NA	NA
		Th	NA	ND	NA	NA
		Ti	NA	NA	NA	NA

Site 107 - Comparison of Field Screening to Laboratory Analytical Results

		TOTAL METALS			HIGH EXPLOSIVES	
Sample Label	Location	Analyte	Field Results (XRF) (ppm)	Lab Results (6010/7000) (ppm)	Field Results (Immunoassay) (ppm)	Lab Results (HPLC) (ppm)
		V	NA	12.4	NA	NA
		Zn	NA	19.5	NA	NA
16110-1	107-SS-10	NA	NA	NA	ND	ND
		Al	NA	4220	NA	NA
		Sb	NA	ND	NA	NA
		As	NA	2.5	NA	NA
		Ba	561.02	61.7	NA	NA
		Be	NA	0.31	NA	NA
		Cd	NA	0.53	NA	NA
		Ca	0.76%	2620	NA	NA
		Cr	NA	5.4	NA	NA
		Co	NA	3	NA	NA
		Cu	NA	5.9	NA	NA
		Fe	1.30%	6910	NA	NA
		Pb	13.8	9.2	NA	NA
		Mg	NA	1660	NA	NA
		Mn	321.71	176	NA	NA
		Hg	NA	ND	NA	NA
		Ni	NA	5.3	NA	NA
		K	1.54%	1430	NA	NA
		Se	NA	ND	NA	NA
		Ag	NA	ND	NA	NA
		Na	NA	ND	NA	NA
		Th	NA	ND	NA	NA
		Ti	2180.33	NA	NA	NA
		V	NA	12.3	NA	NA
		Zn	33.67	18.2	NA	NA

Site 107 - Comparison of Field Screening to Laboratory Analytical Results

		TOTAL METALS			HIGH EXPLOSIVES	
Sample Label	Location	Analyte	Field Results (XRF) (ppm)	Lab Results (6010/7000) (ppm)	Field Results (Immunoassay) (ppm)	Lab Results (HPLC) (ppm)

Definitions:

HPLC- High Performance Liquid Chromatography
PPM- Parts Per Million
NA- Not Applicable
ND- Not Detected
XRF- X-Ray Fluorescence

RESULTS OF THE TECH AREAS III AND V RCRA FACILITY INVESTIGATION

APPENDIX C – LABORATORY ANALYTICAL DATA

APPENDIX C. LABORATORY ANALYTICAL DATA									
ERSITE	Test Method	Analyte	Sample ID	Sample Depth (ft)	Sample Date	Result	Units	Detection Lim	Qualifier
107									
Chemical Data	353.2 Mo	NITRATE NITRITE	TA3/5-107-SS-01	0	17-MAY-94	0.77	mg/kg	0.5	
			TA3/5-107-SS-02	0	17-MAY-94	1.8	mg/kg	0.5	
			TA3/5-107-SS-03	0	17-MAY-94	1.1	mg/kg	0.5	
			TA3/5-107-SS-04	0	17-MAY-94	2.4	mg/kg	0.5	
			TA3/5-107-SS-05	0	17-MAY-94	1.5	mg/kg	0.5	
			TA3/5-107-SS-06	0	17-MAY-94	0.76	mg/kg	0.5	
			TA3/5-107-SS-06D	0	17-MAY-94	0.78	mg/kg	0.5	
			TA3/5-107-SS-07	0	17-MAY-94	2.1	mg/kg	0.5	
			TA3/5-107-SS-08	0	17-MAY-94	1.9	mg/kg	0.5	
			TA3/5-107-SS-09	0	17-MAY-94	1.1	mg/kg	0.5	
			TA3/5-107-SS-10	0	17-MAY-94	1.2	mg/kg	0.5	
	6010	ALUMINUM	TA3/5-107-SS-01	0	17-MAY-94	5200	mg/kg	10	
			TA3/5-107-SS-02	0	17-MAY-94	5670	mg/kg	10	
			TA3/5-107-SS-03	0	17-MAY-94	6290	mg/kg	10	
			TA3/5-107-SS-04	0	17-MAY-94	5170	mg/kg	10	
			TA3/5-107-SS-05	0	17-MAY-94	4070	mg/kg	10	
			TA3/5-107-SS-06	0	17-MAY-94	4850	mg/kg	10	
			TA3/5-107-SS-06D	0	17-MAY-94	5250	mg/kg	10	
			TA3/5-107-SS-07	0	17-MAY-94	4000	mg/kg	10	
			TA3/5-107-SS-08	0	17-MAY-94	4810	mg/kg	10	
			TA3/5-107-SS-09	0	17-MAY-94	4900	mg/kg	10	
			TA3/5-107-SS-10	0	17-MAY-94	4220	mg/kg	10	
		ANTIMONY	TA3/5-107-SS-01	0	17-MAY-94	3	mg/kg	6	J
			TA3/5-107-SS-09	0	17-MAY-94	3.2	mg/kg	6	J
		ARSENIC	TA3/5-107-SS-01	0	17-MAY-94	4	mg/kg	1	
			TA3/5-107-SS-02	0	17-MAY-94	3.2	mg/kg	1	
			TA3/5-107-SS-03	0	17-MAY-94	2.9	mg/kg	1	
			TA3/5-107-SS-04	0	17-MAY-94	3.1	mg/kg	1	
			TA3/5-107-SS-05	0	17-MAY-94	2.1	mg/kg	1	
			TA3/5-107-SS-06	0	17-MAY-94	3.3	mg/kg	1	
			TA3/5-107-SS-06D	0	17-MAY-94	2.7	mg/kg	1	
			TA3/5-107-SS-07	0	17-MAY-94	3	mg/kg	1	
			TA3/5-107-SS-08	0	17-MAY-94	2.4	mg/kg	1	
			TA3/5-107-SS-09	0	17-MAY-94	1.9	mg/kg	1	
			TA3/5-107-SS-10	0	17-MAY-94	2.5	mg/kg	1	
		BARIUM	TA3/5-107-SS-01	0	17-MAY-94	93.6	mg/kg	1	
			TA3/5-107-SS-02	0	17-MAY-94	82.5	mg/kg	1	
			TA3/5-107-SS-03	0	17-MAY-94	79.2	mg/kg	1	
			TA3/5-107-SS-04	0	17-MAY-94	69.7	mg/kg	1	
			TA3/5-107-SS-05	0	17-MAY-94	62	mg/kg	1	
			TA3/5-107-SS-06	0	17-MAY-94	70.6	mg/kg	1	
			TA3/5-107-SS-06D	0	17-MAY-94	74.8	mg/kg	1	
			TA3/5-107-SS-07	0	17-MAY-94	60.3	mg/kg	1	
			TA3/5-107-SS-08	0	17-MAY-94	63.3	mg/kg	1	
			TA3/5-107-SS-09	0	17-MAY-94	62	mg/kg	1	
			TA3/5-107-SS-10	0	17-MAY-94	61.7	mg/kg	1	
		BERYLLIUM	TA3/5-107-SS-01	0	17-MAY-94	0.42	mg/kg	0.2	
			TA3/5-107-SS-02	0	17-MAY-94	0.42	mg/kg	0.2	
			TA3/5-107-SS-03	0	17-MAY-94	0.64	mg/kg	0.2	
			TA3/5-107-SS-04	0	17-MAY-94	0.42	mg/kg	0.2	
			TA3/5-107-SS-05	0	17-MAY-94	0.37	mg/kg	0.2	
			TA3/5-107-SS-06	0	17-MAY-94	0.42	mg/kg	0.2	
			TA3/5-107-SS-06D	0	17-MAY-94	0.53	mg/kg	0.2	
			TA3/5-107-SS-07	0	17-MAY-94	0.31	mg/kg	0.2	
			TA3/5-107-SS-08	0	17-MAY-94	0.42	mg/kg	0.2	
			TA3/5-107-SS-09	0	17-MAY-94	0.42	mg/kg	0.2	
			TA3/5-107-SS-10	0	17-MAY-94	0.31	mg/kg	0.2	
		CADMIUM	TA3/5-107-SS-03	0	17-MAY-94	1.3	mg/kg	0.5	
			TA3/5-107-SS-08	0	17-MAY-94	0.53	mg/kg	0.5	
			TA3/5-107-SS-10	0	17-MAY-94	0.53	mg/kg	0.5	
		CALCIUM	TA3/5-107-SS-01	0	17-MAY-94	26100	mg/kg	20	
			TA3/5-107-SS-02	0	17-MAY-94	11100	mg/kg	20	
			TA3/5-107-SS-03	0	17-MAY-94	4850	mg/kg	20	
			TA3/5-107-SS-04	0	17-MAY-94	8180	mg/kg	20	
			TA3/5-107-SS-05	0	17-MAY-94	3020	mg/kg	20	
			TA3/5-107-SS-06	0	17-MAY-94	8630	mg/kg	20	

APPENDIX C. LABORATORY ANALYTICAL DATA									
ERSITE	Test Method	Analyte	Sample ID	Sample Depth (ft)	Sample Date	Result	Units	Detection Lim	Quali
107									
			TA3/5-107-SS-06D	0	17-MAY-94	8720	mg/kg	20	
			TA3/5-107-SS-07	0	17-MAY-94	10400	mg/kg	20	
			TA3/5-107-SS-08	0	17-MAY-94	4120	mg/kg	20	
			TA3/5-107-SS-09	0	17-MAY-94	2540	mg/kg	20	
			TA3/5-107-SS-10	0	17-MAY-94	2620	mg/kg	20	
		CHROMIUM	TA3/5-107-SS-01	0	17-MAY-94	6	mg/kg	1	
			TA3/5-107-SS-02	0	17-MAY-94	6.7	mg/kg	1	
			TA3/5-107-SS-03	0	17-MAY-94	7.9	mg/kg	1	
			TA3/5-107-SS-04	0	17-MAY-94	6.3	mg/kg	1	
			TA3/5-107-SS-05	0	17-MAY-94	5.2	mg/kg	1	
			TA3/5-107-SS-06	0	17-MAY-94	5.6	mg/kg	1	
			TA3/5-107-SS-06D	0	17-MAY-94	6.3	mg/kg	1	
			TA3/5-107-SS-07	0	17-MAY-94	5.7	mg/kg	1	
			TA3/5-107-SS-08	0	17-MAY-94	5.8	mg/kg	1	
			TA3/5-107-SS-09	0	17-MAY-94	6.3	mg/kg	1	
			TA3/5-107-SS-10	0	17-MAY-94	5.4	mg/kg	1	
		COBALT	TA3/5-107-SS-01	0	17-MAY-94	2.9	mg/kg	1	
			TA3/5-107-SS-02	0	17-MAY-94	3.7	mg/kg	1	
			TA3/5-107-SS-03	0	17-MAY-94	3.5	mg/kg	1	
			TA3/5-107-SS-04	0	17-MAY-94	3.2	mg/kg	1	
			TA3/5-107-SS-05	0	17-MAY-94	3.1	mg/kg	1	
			TA3/5-107-SS-06	0	17-MAY-94	3.2	mg/kg	1	
			TA3/5-107-SS-06D	0	17-MAY-94	3.3	mg/kg	1	
			TA3/5-107-SS-07	0	17-MAY-94	2.9	mg/kg	1	
			TA3/5-107-SS-08	0	17-MAY-94	3.1	mg/kg	1	
			TA3/5-107-SS-09	0	17-MAY-94	3.2	mg/kg	1	
			TA3/5-107-SS-10	0	17-MAY-94	3	mg/kg	1	
		COPPER	TA3/5-107-SS-01	0	17-MAY-94	6.9	mg/kg	2	
			TA3/5-107-SS-02	0	17-MAY-94	7.1	mg/kg	2	
			TA3/5-107-SS-03	0	17-MAY-94	8.1	mg/kg	2	
			TA3/5-107-SS-04	0	17-MAY-94	10.6	mg/kg	2	
			TA3/5-107-SS-05	0	17-MAY-94	6.5	mg/kg	2	
			TA3/5-107-SS-06	0	17-MAY-94	6.7	mg/kg	2	
			TA3/5-107-SS-06D	0	17-MAY-94	7.5	mg/kg	2	
			TA3/5-107-SS-07	0	17-MAY-94	6.6	mg/kg	2	
			TA3/5-107-SS-08	0	17-MAY-94	6.7	mg/kg	2	
			TA3/5-107-SS-09	0	17-MAY-94	6.2	mg/kg	2	
			TA3/5-107-SS-10	0	17-MAY-94	5.9	mg/kg	2	
		IRON	TA3/5-107-SS-01	0	17-MAY-94	7050	mg/kg	10	
			TA3/5-107-SS-02	0	17-MAY-94	7970	mg/kg	10	
			TA3/5-107-SS-03	0	17-MAY-94	9180	mg/kg	10	
			TA3/5-107-SS-04	0	17-MAY-94	7920	mg/kg	10	
			TA3/5-107-SS-05	0	17-MAY-94	6520	mg/kg	10	
			TA3/5-107-SS-06	0	17-MAY-94	7280	mg/kg	10	
			TA3/5-107-SS-06D	0	17-MAY-94	7600	mg/kg	10	
			TA3/5-107-SS-07	0	17-MAY-94	6380	mg/kg	10	
			TA3/5-107-SS-08	0	17-MAY-94	7100	mg/kg	10	
			TA3/5-107-SS-09	0	17-MAY-94	7250	mg/kg	10	
			TA3/5-107-SS-10	0	17-MAY-94	6910	mg/kg	10	
		LEAD	TA3/5-107-SS-01	0	17-MAY-94	9.6	mg/kg	0.3	
			TA3/5-107-SS-02	0	17-MAY-94	9.6	mg/kg	0.3	
			TA3/5-107-SS-03	0	17-MAY-94	10	mg/kg	0.3	
			TA3/5-107-SS-04	0	17-MAY-94	11.2	mg/kg	0.3	
			TA3/5-107-SS-05	0	17-MAY-94	8.6	mg/kg	0.3	
			TA3/5-107-SS-06	0	17-MAY-94	10.4	mg/kg	0.3	
			TA3/5-107-SS-06D	0	17-MAY-94	9.4	mg/kg	0.3	
			TA3/5-107-SS-07	0	17-MAY-94	9	mg/kg	0.3	
			TA3/5-107-SS-08	0	17-MAY-94	8.5	mg/kg	0.3	
			TA3/5-107-SS-09	0	17-MAY-94	8.2	mg/kg	0.3	
			TA3/5-107-SS-10	0	17-MAY-94	9.2	mg/kg	0.3	
		MAGNESIUM	TA3/5-107-SS-01	0	17-MAY-94	3420	mg/kg	20	
			TA3/5-107-SS-02	0	17-MAY-94	2460	mg/kg	20	
			TA3/5-107-SS-03	0	17-MAY-94	2590	mg/kg	20	
			TA3/5-107-SS-04	0	17-MAY-94	2220	mg/kg	20	
			TA3/5-107-SS-05	0	17-MAY-94	1910	mg/kg	20	
			TA3/5-107-SS-06	0	17-MAY-94	2100	mg/kg	20	

APPENDIX C. LABORATORY ANALYTICAL DATA									
ERSITE	Test Method	Analyte	Sample ID	Sample Depth (ft)	Sample Date	Result	Units	Detection Lim	Qualifier
107									
			TA3/5-107-SS-06D	0	17-MAY-94	2300	mg/kg	20	
			TA3/5-107-SS-07	0	17-MAY-94	1800	mg/kg	20	
			TA3/5-107-SS-08	0	17-MAY-94	1970	mg/kg	20	
			TA3/5-107-SS-09	0	17-MAY-94	1800	mg/kg	20	
			TA3/5-107-SS-10	0	17-MAY-94	1660	mg/kg	20	
		MANGANESE	TA3/5-107-SS-01	0	17-MAY-94	142	mg/kg	1	
			TA3/5-107-SS-02	0	17-MAY-94	182	mg/kg	1	
			TA3/5-107-SS-03	0	17-MAY-94	228	mg/kg	1	
			TA3/5-107-SS-04	0	17-MAY-94	181	mg/kg	1	
			TA3/5-107-SS-05	0	17-MAY-94	195	mg/kg	1	
			TA3/5-107-SS-06	0	17-MAY-94	185	mg/kg	1	
			TA3/5-107-SS-06D	0	17-MAY-94	185	mg/kg	1	
			TA3/5-107-SS-07	0	17-MAY-94	133	mg/kg	1	
			TA3/5-107-SS-08	0	17-MAY-94	158	mg/kg	1	
			TA3/5-107-SS-09	0	17-MAY-94	185	mg/kg	1	
			TA3/5-107-SS-10	0	17-MAY-94	176	mg/kg	1	
		NICKEL	TA3/5-107-SS-01	0	17-MAY-94	7.8	mg/kg	4	
			TA3/5-107-SS-02	0	17-MAY-94	6.6	mg/kg	4	
			TA3/5-107-SS-03	0	17-MAY-94	7.3	mg/kg	4	
			TA3/5-107-SS-04	0	17-MAY-94	6.4	mg/kg	4	
			TA3/5-107-SS-05	0	17-MAY-94	6.1	mg/kg	4	
			TA3/5-107-SS-06	0	17-MAY-94	6.2	mg/kg	4	
			TA3/5-107-SS-06D	0	17-MAY-94	6.6	mg/kg	4	
			TA3/5-107-SS-07	0	17-MAY-94	5.1	mg/kg	4	
			TA3/5-107-SS-08	0	17-MAY-94	5.8	mg/kg	4	
			TA3/5-107-SS-09	0	17-MAY-94	6	mg/kg	4	
			TA3/5-107-SS-10	0	17-MAY-94	5.3	mg/kg	4	
		POTASSIUM	TA3/5-107-SS-01	0	17-MAY-94	1490	mg/kg	500	
			TA3/5-107-SS-02	0	17-MAY-94	1920	mg/kg	500	
			TA3/5-107-SS-03	0	17-MAY-94	2450	mg/kg	500	
			TA3/5-107-SS-04	0	17-MAY-94	1860	mg/kg	500	
			TA3/5-107-SS-05	0	17-MAY-94	1700	mg/kg	500	
			TA3/5-107-SS-06	0	17-MAY-94	1640	mg/kg	500	
			TA3/5-107-SS-06D	0	17-MAY-94	2060	mg/kg	500	
			TA3/5-107-SS-07	0	17-MAY-94	1450	mg/kg	500	
			TA3/5-107-SS-08	0	17-MAY-94	1640	mg/kg	500	
			TA3/5-107-SS-09	0	17-MAY-94	1720	mg/kg	500	
			TA3/5-107-SS-10	0	17-MAY-94	1430	mg/kg	500	
		SILVER	TA3/5-107-SS-01	0	17-MAY-94	0.6	mg/kg	1	J
			TA3/5-107-SS-02	0	17-MAY-94	0.42	mg/kg	1	J
			TA3/5-107-SS-03	0	17-MAY-94	0.6	mg/kg	1	J
			TA3/5-107-SS-04	0	17-MAY-94	0.3	mg/kg	1	J
			TA3/5-107-SS-08	0	17-MAY-94	0.36	mg/kg	1	J
		SODIUM	TA3/5-107-SS-06D	0	17-MAY-94	66.4	mg/kg	500	J
			TA3/5-107-SS-09	0	17-MAY-94	98.7	mg/kg	500	J
		VANADIUM	TA3/5-107-SS-01	0	17-MAY-94	14.3	mg/kg	1	
			TA3/5-107-SS-02	0	17-MAY-94	13.9	mg/kg	1	
			TA3/5-107-SS-03	0	17-MAY-94	15.7	mg/kg	1	
			TA3/5-107-SS-04	0	17-MAY-94	13.8	mg/kg	1	
			TA3/5-107-SS-05	0	17-MAY-94	11.1	mg/kg	1	
			TA3/5-107-SS-06	0	17-MAY-94	13.2	mg/kg	1	
			TA3/5-107-SS-06D	0	17-MAY-94	14.2	mg/kg	1	
			TA3/5-107-SS-07	0	17-MAY-94	12.4	mg/kg	1	
			TA3/5-107-SS-08	0	17-MAY-94	13.7	mg/kg	1	
			TA3/5-107-SS-09	0	17-MAY-94	12.4	mg/kg	1	
			TA3/5-107-SS-10	0	17-MAY-94	12.3	mg/kg	1	
		ZINC	TA3/5-107-SS-01	0	17-MAY-94	22.5	mg/kg	2	
			TA3/5-107-SS-02	0	17-MAY-94	23.2	mg/kg	2	
			TA3/5-107-SS-03	0	17-MAY-94	29.5	mg/kg	2	
			TA3/5-107-SS-04	0	17-MAY-94	34.5	mg/kg	2	
			TA3/5-107-SS-05	0	17-MAY-94	20.5	mg/kg	2	
			TA3/5-107-SS-06	0	17-MAY-94	20.2	mg/kg	2	
			TA3/5-107-SS-06D	0	17-MAY-94	20.7	mg/kg	2	
			TA3/5-107-SS-07	0	17-MAY-94	23.3	mg/kg	2	
			TA3/5-107-SS-08	0	17-MAY-94	20.7	mg/kg	2	
			TA3/5-107-SS-09	0	17-MAY-94	19.5	mg/kg	2	

APPENDIX C. LABORATORY ANALYTICAL DATA									
ERSITE	Test Method	Analyte	Sample ID	Sample Depth (ft)	Sample Date	Result	Units	Detection Lim	Qualif
107									
			TA3/5-107-SS-10	0	17-MAY-94	18.2	mg/kg	2	
Radiological Data									
107	Gamma Spec	ACTINIUM-228	TA3/5-107-SS-01	0	17-MAY-94	0.71	pCi/g	0.28	
			TA3/5-107-SS-01	0	17-MAY-94	0.692	pCi/g	No Data	
			TA3/5-107-SS-02	0	17-MAY-94	0.96	pCi/g	0.34	
			TA3/5-107-SS-02	0	17-MAY-94	0.96	pCi/g	0.34	
			TA3/5-107-SS-02	0	17-MAY-94	0.691	pCi/g	No Data	
			TA3/5-107-SS-03	0	17-MAY-94	0.98	pCi/g	0.31	
			TA3/5-107-SS-03	0	17-MAY-94	0.95	pCi/g	No Data	
			TA3/5-107-SS-04	0	17-MAY-94	0.94	pCi/g	0.29	
			TA3/5-107-SS-04	0	17-MAY-94	0.836	pCi/g	No Data	
			TA3/5-107-SS-05	0	17-MAY-94	0.79	pCi/g	0.29	
			TA3/5-107-SS-05	0	17-MAY-94	0.746	pCi/g	No Data	
			TA3/5-107-SS-06	0	17-MAY-94	1.1	pCi/g	0.26	
			TA3/5-107-SS-06	0	17-MAY-94	0.86	pCi/g	No Data	
			TA3/5-107-SS-06D	0	17-MAY-94	0.91	pCi/g	0.35	
			TA3/5-107-SS-06D	0	17-MAY-94	0.898	pCi/g	No Data	
			TA3/5-107-SS-07	0	17-MAY-94	0.98	pCi/g	0.3	
			TA3/5-107-SS-07	0	17-MAY-94	0.631	pCi/g	No Data	
			TA3/5-107-SS-08	0	17-MAY-94	0.92	pCi/g	0.39	
			TA3/5-107-SS-08	0	17-MAY-94	0.862	pCi/g	No Data	
			TA3/5-107-SS-09	0	17-MAY-94	0.882	pCi/g	No Data	
			TA3/5-107-SS-09	0	17-MAY-94	0.6	pCi/g	0.38	
			TA3/5-107-SS-10	0	17-MAY-94	0.78	pCi/g	0.25	
			TA3/5-107-SS-10	0	17-MAY-94	0.71	pCi/g	No Data	
		BISMUTH-212	TA3/5-107-SS-01	0	17-MAY-94	1.2	pCi/g	0.99	
			TA3/5-107-SS-01	0	17-MAY-94	0.331	pCi/g	No Data	
			TA3/5-107-SS-02	0	17-MAY-94	1.2	pCi/g	0.99	
			TA3/5-107-SS-02	0	17-MAY-94	1.2	pCi/g	0.99	
			TA3/5-107-SS-02	0	17-MAY-94	0.37	pCi/g	No Data	
			TA3/5-107-SS-03	0	17-MAY-94	0.608	pCi/g	No Data	
			TA3/5-107-SS-04	0	17-MAY-94	0.609	pCi/g	No Data	
			TA3/5-107-SS-05	0	17-MAY-94	0.458	pCi/g	No Data	
			TA3/5-107-SS-06	0	17-MAY-94	0.515	pCi/g	No Data	
			TA3/5-107-SS-06D	0	17-MAY-94	1.6	pCi/g	1.1	
			TA3/5-107-SS-06D	0	17-MAY-94	0.449	pCi/g	No Data	
			TA3/5-107-SS-07	0	17-MAY-94	0.282	pCi/g	No Data	
			TA3/5-107-SS-08	0	17-MAY-94	0.572	pCi/g	No Data	
			TA3/5-107-SS-09	0	17-MAY-94	1.4	pCi/g	1.3	
			TA3/5-107-SS-09	0	17-MAY-94	0.411	pCi/g	No Data	
			TA3/5-107-SS-10	0	17-MAY-94	0.563	pCi/g	No Data	
		BISMUTH-214	TA3/5-107-SS-01	0	17-MAY-94	0.62	pCi/g	0.098	
			TA3/5-107-SS-01	0	17-MAY-94	0.471	pCi/g	No Data	
			TA3/5-107-SS-02	0	17-MAY-94	0.75	pCi/g	0.13	
			TA3/5-107-SS-02	0	17-MAY-94	0.75	pCi/g	0.13	
			TA3/5-107-SS-02	0	17-MAY-94	0.442	pCi/g	No Data	
			TA3/5-107-SS-03	0	17-MAY-94	0.567	pCi/g	No Data	
			TA3/5-107-SS-04	0	17-MAY-94	0.75	pCi/g	0.16	
			TA3/5-107-SS-04	0	17-MAY-94	0.504	pCi/g	No Data	
			TA3/5-107-SS-05	0	17-MAY-94	0.75	pCi/g	0.19	
			TA3/5-107-SS-05	0	17-MAY-94	0.523	pCi/g	No Data	
			TA3/5-107-SS-06	0	17-MAY-94	0.71	pCi/g	0.14	
			TA3/5-107-SS-06	0	17-MAY-94	0.548	pCi/g	No Data	
			TA3/5-107-SS-06D	0	17-MAY-94	0.54	pCi/g	0.19	
			TA3/5-107-SS-06D	0	17-MAY-94	0.535	pCi/g	No Data	
			TA3/5-107-SS-07	0	17-MAY-94	0.5	pCi/g	0.12	
			TA3/5-107-SS-07	0	17-MAY-94	0.467	pCi/g	No Data	
			TA3/5-107-SS-08	0	17-MAY-94	0.57	pCi/g	0.17	
			TA3/5-107-SS-08	0	17-MAY-94	0.456	pCi/g	No Data	
			TA3/5-107-SS-09	0	17-MAY-94	0.65	pCi/g	0.14	
			TA3/5-107-SS-09	0	17-MAY-94	0.534	pCi/g	No Data	
			TA3/5-107-SS-10	0	17-MAY-94	0.59	pCi/g	0.14	
			TA3/5-107-SS-10	0	17-MAY-94	0.488	pCi/g	No Data	
		CESIUM-137	TA3/5-107-SS-01	0	17-MAY-94	0.191	pCi/g	No Data	
			TA3/5-107-SS-01	0	17-MAY-94	0.15	pCi/g	0.084	

APPENDIX C. LABORATORY ANALYTICAL DATA

ERSITE	Test Method	Analyte	Sample ID	Sample Depth (ft)	Sample Date	Result	Units	Detection Lim	Qualifier
107									
			TA3/5-107-SS-02	0	17-MAY-94	0.2	pCi/g	0.11	
			TA3/5-107-SS-02	0	17-MAY-94	0.2	pCi/g	0.11	
			TA3/5-107-SS-02	0	17-MAY-94	0.169	pCi/g	No Data	
			TA3/5-107-SS-03	0	17-MAY-94	0.189	pCi/g	No Data	
			TA3/5-107-SS-03	0	17-MAY-94	0.18	pCi/g	0.1	
			TA3/5-107-SS-04	0	17-MAY-94	0.22	pCi/g	0.091	
			TA3/5-107-SS-04	0	17-MAY-94	0.196	pCi/g	No Data	
			TA3/5-107-SS-05	0	17-MAY-94	0.16	pCi/g	0.11	
			TA3/5-107-SS-05	0	17-MAY-94	0.148	pCi/g	No Data	
			TA3/5-107-SS-06	0	17-MAY-94	0.195	pCi/g	No Data	
			TA3/5-107-SS-06	0	17-MAY-94	0.15	pCi/g	0.09	
			TA3/5-107-SS-06D	0	17-MAY-94	0.18	pCi/g	0.085	
			TA3/5-107-SS-06D	0	17-MAY-94	0.177	pCi/g	No Data	
			TA3/5-107-SS-07	0	17-MAY-94	0.13	pCi/g	0.08	
			TA3/5-107-SS-07	0	17-MAY-94	0.12	pCi/g	No Data	
			TA3/5-107-SS-08	0	17-MAY-94	0.246	pCi/g	No Data	
			TA3/5-107-SS-08	0	17-MAY-94	0.21	pCi/g	0.076	
			TA3/5-107-SS-09	0	17-MAY-94	0.35	pCi/g	0.086	
			TA3/5-107-SS-09	0	17-MAY-94	0.303	pCi/g	No Data	
			TA3/5-107-SS-10	0	17-MAY-94	0.224	pCi/g	No Data	
			TA3/5-107-SS-10	0	17-MAY-94	0.15	pCi/g	0.087	
		LEAD-212	TA3/5-107-SS-01	0	17-MAY-94	0.71	pCi/g	0.088	
			TA3/5-107-SS-01	0	17-MAY-94	0.646	pCi/g	No Data	
			TA3/5-107-SS-02	0	17-MAY-94	0.77	pCi/g	0.095	
			TA3/5-107-SS-02	0	17-MAY-94	0.77	pCi/g	0.095	
			TA3/5-107-SS-02	0	17-MAY-94	0.697	pCi/g	No Data	
			TA3/5-107-SS-03	0	17-MAY-94	0.93	pCi/g	0.096	
			TA3/5-107-SS-03	0	17-MAY-94	0.83	pCi/g	No Data	
			TA3/5-107-SS-04	0	17-MAY-94	0.81	pCi/g	0.099	
			TA3/5-107-SS-04	0	17-MAY-94	0.787	pCi/g	No Data	
			TA3/5-107-SS-05	0	17-MAY-94	0.88	pCi/g	0.092	
			TA3/5-107-SS-05	0	17-MAY-94	0.681	pCi/g	No Data	
			TA3/5-107-SS-06	0	17-MAY-94	0.88	pCi/g	0.093	
			TA3/5-107-SS-06	0	17-MAY-94	0.67	pCi/g	No Data	
			TA3/5-107-SS-06D	0	17-MAY-94	0.84	pCi/g	0.095	
			TA3/5-107-SS-06D	0	17-MAY-94	0.744	pCi/g	No Data	
			TA3/5-107-SS-07	0	17-MAY-94	0.69	pCi/g	0.088	
			TA3/5-107-SS-07	0	17-MAY-94	0.575	pCi/g	No Data	
			TA3/5-107-SS-08	0	17-MAY-94	0.74	pCi/g	0.12	
			TA3/5-107-SS-08	0	17-MAY-94	0.65	pCi/g	No Data	
			TA3/5-107-SS-09	0	17-MAY-94	0.78	pCi/g	0.088	
			TA3/5-107-SS-09	0	17-MAY-94	0.637	pCi/g	No Data	
			TA3/5-107-SS-10	0	17-MAY-94	0.83	pCi/g	0.091	
			TA3/5-107-SS-10	0	17-MAY-94	0.679	pCi/g	No Data	
		LEAD-214	TA3/5-107-SS-01	0	17-MAY-94	0.56	pCi/g	0.15	
			TA3/5-107-SS-01	0	17-MAY-94	0.48	pCi/g	No Data	
			TA3/5-107-SS-02	0	17-MAY-94	0.76	pCi/g	0.16	
			TA3/5-107-SS-02	0	17-MAY-94	0.76	pCi/g	0.16	
			TA3/5-107-SS-02	0	17-MAY-94	0.572	pCi/g	No Data	
			TA3/5-107-SS-03	0	17-MAY-94	0.81	pCi/g	0.16	
			TA3/5-107-SS-03	0	17-MAY-94	0.696	pCi/g	No Data	
			TA3/5-107-SS-04	0	17-MAY-94	0.77	pCi/g	0.22	
			TA3/5-107-SS-04	0	17-MAY-94	0.59	pCi/g	No Data	
			TA3/5-107-SS-05	0	17-MAY-94	0.78	pCi/g	0.15	
			TA3/5-107-SS-05	0	17-MAY-94	0.625	pCi/g	No Data	
			TA3/5-107-SS-06	0	17-MAY-94	0.76	pCi/g	0.16	
			TA3/5-107-SS-06	0	17-MAY-94	0.621	pCi/g	No Data	
			TA3/5-107-SS-06D	0	17-MAY-94	0.78	pCi/g	0.16	
			TA3/5-107-SS-06D	0	17-MAY-94	0.616	pCi/g	No Data	
			TA3/5-107-SS-07	0	17-MAY-94	0.67	pCi/g	0.17	
			TA3/5-107-SS-07	0	17-MAY-94	0.466	pCi/g	No Data	
			TA3/5-107-SS-08	0	17-MAY-94	0.76	pCi/g	0.16	
			TA3/5-107-SS-08	0	17-MAY-94	0.566	pCi/g	No Data	
			TA3/5-107-SS-09	0	17-MAY-94	0.68	pCi/g	0.14	
			TA3/5-107-SS-09	0	17-MAY-94	0.597	pCi/g	No Data	
			TA3/5-107-SS-10	0	17-MAY-94	0.81	pCi/g	0.16	

APPENDIX C. LABORATORY ANALYTICAL DATA									
ERSITE	Test Method	Analyte	Sample ID	Sample Depth (ft)	Sample Date	Result	Units	Detection Lim	Qualifier
107									
			TA3/5-107-SS-10	0	17-MAY-94	0.56	pCi/g	No Data	
		POTASSIUM-40	TA3/5-107-SS-01	0	17-MAY-94	15.6	pCi/g	No Data	
			TA3/5-107-SS-01	0	17-MAY-94	15	pCi/g	0.78	
			TA3/5-107-SS-02	0	17-MAY-94	15.6	pCi/g	No Data	
			TA3/5-107-SS-02	0	17-MAY-94	15	pCi/g	0.66	
			TA3/5-107-SS-02	0	17-MAY-94	15	pCi/g	0.66	
			TA3/5-107-SS-03	0	17-MAY-94	16	pCi/g	0.72	
			TA3/5-107-SS-03	0	17-MAY-94	15.9	pCi/g	No Data	
			TA3/5-107-SS-04	0	17-MAY-94	17	pCi/g	0.57	
			TA3/5-107-SS-04	0	17-MAY-94	15.8	pCi/g	No Data	
			TA3/5-107-SS-05	0	17-MAY-94	16.6	pCi/g	No Data	
			TA3/5-107-SS-05	0	17-MAY-94	16	pCi/g	0.86	
			TA3/5-107-SS-06	0	17-MAY-94	17	pCi/g	No Data	
			TA3/5-107-SS-06	0	17-MAY-94	16	pCi/g	0.66	
			TA3/5-107-SS-06D	0	17-MAY-94	17	pCi/g	0.75	
			TA3/5-107-SS-06D	0	17-MAY-94	16.8	pCi/g	No Data	
			TA3/5-107-SS-07	0	17-MAY-94	16	pCi/g	0.56	
			TA3/5-107-SS-07	0	17-MAY-94	15.6	pCi/g	No Data	
			TA3/5-107-SS-08	0	17-MAY-94	16	pCi/g	No Data	
			TA3/5-107-SS-08	0	17-MAY-94	15	pCi/g	0.76	
			TA3/5-107-SS-09	0	17-MAY-94	17.3	pCi/g	No Data	
			TA3/5-107-SS-09	0	17-MAY-94	14	pCi/g	0.54	
			TA3/5-107-SS-10	0	17-MAY-94	16.6	pCi/g	No Data	
			TA3/5-107-SS-10	0	17-MAY-94	16	pCi/g	0.72	
		RADIUM-223	TA3/5-107-SS-04	0	17-MAY-94	0.39	pCi/g	0.29	
		RADIUM-224	TA3/5-107-SS-01	0	17-MAY-94	2.27	pCi/g	No Data	
			TA3/5-107-SS-02	0	17-MAY-94	0.653	pCi/g	No Data	
			TA3/5-107-SS-03	0	17-MAY-94	2	pCi/g	1.2	
			TA3/5-107-SS-03	0	17-MAY-94	0.634	pCi/g	No Data	
			TA3/5-107-SS-04	0	17-MAY-94	1.23	pCi/g	No Data	
			TA3/5-107-SS-05	0	17-MAY-94	1.31	pCi/g	No Data	
			TA3/5-107-SS-06D	0	17-MAY-94	2.94	pCi/g	No Data	
			TA3/5-107-SS-07	0	17-MAY-94	0.972	pCi/g	No Data	
			TA3/5-107-SS-09	0	17-MAY-94	1.7	pCi/g	1.6	
			TA3/5-107-SS-10	0	17-MAY-94	1.05	pCi/g	No Data	
		RADIUM-226	TA3/5-107-SS-01	0	17-MAY-94	1.33	pCi/g	No Data	
			TA3/5-107-SS-01	0	17-MAY-94	0.6	pCi/g	0.096	
			TA3/5-107-SS-02	0	17-MAY-94	0.971	pCi/g	No Data	
			TA3/5-107-SS-02	0	17-MAY-94	0.73	pCi/g	0.13	
			TA3/5-107-SS-02	0	17-MAY-94	0.73	pCi/g	0.13	
			TA3/5-107-SS-03	0	17-MAY-94	1.61	pCi/g	No Data	
			TA3/5-107-SS-03	0	17-MAY-94	0.69	pCi/g	0.14	
			TA3/5-107-SS-04	0	17-MAY-94	1.91	pCi/g	No Data	
			TA3/5-107-SS-04	0	17-MAY-94	0.73	pCi/g	0.15	
			TA3/5-107-SS-05	0	17-MAY-94	1.33	pCi/g	No Data	
			TA3/5-107-SS-05	0	17-MAY-94	0.73	pCi/g	0.18	
			TA3/5-107-SS-06	0	17-MAY-94	1.54	pCi/g	No Data	
			TA3/5-107-SS-06	0	17-MAY-94	0.69	pCi/g	0.14	
			TA3/5-107-SS-06D	0	17-MAY-94	2.02	pCi/g	No Data	
			TA3/5-107-SS-06D	0	17-MAY-94	0.53	pCi/g	0.19	
			TA3/5-107-SS-07	0	17-MAY-94	1.2	pCi/g	No Data	
			TA3/5-107-SS-07	0	17-MAY-94	0.48	pCi/g	0.12	
			TA3/5-107-SS-08	0	17-MAY-94	1.46	pCi/g	No Data	
			TA3/5-107-SS-08	0	17-MAY-94	0.55	pCi/g	0.17	
			TA3/5-107-SS-09	0	17-MAY-94	2.18	pCi/g	No Data	
			TA3/5-107-SS-09	0	17-MAY-94	0.63	pCi/g	0.14	
			TA3/5-107-SS-10	0	17-MAY-94	1.34	pCi/g	No Data	
			TA3/5-107-SS-10	0	17-MAY-94	0.57	pCi/g	0.14	
		RADIUM-228	TA3/5-107-SS-01	0	17-MAY-94	0.767	pCi/g	No Data	
			TA3/5-107-SS-01	0	17-MAY-94	0.71	pCi/g	0.28	
			TA3/5-107-SS-02	0	17-MAY-94	0.96	pCi/g	0.34	
			TA3/5-107-SS-02	0	17-MAY-94	0.96	pCi/g	0.34	
			TA3/5-107-SS-02	0	17-MAY-94	0.765	pCi/g	No Data	
			TA3/5-107-SS-03	0	17-MAY-94	0.98	pCi/g	0.31	
			TA3/5-107-SS-04	0	17-MAY-94	0.94	pCi/g	0.29	
			TA3/5-107-SS-04	0	17-MAY-94	0.926	pCi/g	No Data	

APPENDIX C. LABORATORY ANALYTICAL DATA

ERSITE	Test Method	Analyte	Sample ID	Sample Depth (ft)	Sample Date	Result	Units	Detection Lim	Qualifier
107									
			TA3/5-107-SS-05	0	17-MAY-94	0.826	pCi/g	No Data	
			TA3/5-107-SS-05	0	17-MAY-94	0.79	pCi/g	0.29	
			TA3/5-107-SS-06	0	17-MAY-94	1.1	pCi/g	0.26	
			TA3/5-107-SS-06	0	17-MAY-94	0.953	pCi/g	No Data	
			TA3/5-107-SS-06D	0	17-MAY-94	0.995	pCi/g	No Data	
			TA3/5-107-SS-06D	0	17-MAY-94	0.91	pCi/g	0.35	
			TA3/5-107-SS-07	0	17-MAY-94	0.98	pCi/g	0.3	
			TA3/5-107-SS-07	0	17-MAY-94	0.699	pCi/g	No Data	
			TA3/5-107-SS-08	0	17-MAY-94	0.955	pCi/g	No Data	
			TA3/5-107-SS-08	0	17-MAY-94	0.92	pCi/g	0.39	
			TA3/5-107-SS-09	0	17-MAY-94	0.977	pCi/g	No Data	
			TA3/5-107-SS-09	0	17-MAY-94	0.6	pCi/g	0.38	
			TA3/5-107-SS-10	0	17-MAY-94	0.786	pCi/g	No Data	
			TA3/5-107-SS-10	0	17-MAY-94	0.78	pCi/g	0.25	
		RADON-219	TA3/5-107-SS-04	0	17-MAY-94	0.5	pCi/g	0.37	
		STRONTIUM-85	TA3/5-107-SS-09	0	17-MAY-94	0.0312	pCi/g	No Data	
		THALLIUM-208	TA3/5-107-SS-01	0	17-MAY-94	0.7	pCi/g	0.22	
			TA3/5-107-SS-01	0	17-MAY-94	0.216	pCi/g	No Data	
			TA3/5-107-SS-02	0	17-MAY-94	0.74	pCi/g	0.26	
			TA3/5-107-SS-02	0	17-MAY-94	0.74	pCi/g	0.26	
			TA3/5-107-SS-02	0	17-MAY-94	0.283	pCi/g	No Data	
			TA3/5-107-SS-03	0	17-MAY-94	0.84	pCi/g	0.23	
			TA3/5-107-SS-03	0	17-MAY-94	0.269	pCi/g	No Data	
			TA3/5-107-SS-04	0	17-MAY-94	0.86	pCi/g	0.23	
			TA3/5-107-SS-04	0	17-MAY-94	0.233	pCi/g	No Data	
			TA3/5-107-SS-05	0	17-MAY-94	0.8	pCi/g	0.27	
			TA3/5-107-SS-05	0	17-MAY-94	0.243	pCi/g	No Data	
			TA3/5-107-SS-06	0	17-MAY-94	0.77	pCi/g	0.19	
			TA3/5-107-SS-06	0	17-MAY-94	0.246	pCi/g	No Data	
			TA3/5-107-SS-06D	0	17-MAY-94	0.8	pCi/g	0.19	
			TA3/5-107-SS-06D	0	17-MAY-94	0.291	pCi/g	No Data	
			TA3/5-107-SS-07	0	17-MAY-94	0.58	pCi/g	0.17	
			TA3/5-107-SS-07	0	17-MAY-94	0.215	pCi/g	No Data	
			TA3/5-107-SS-08	0	17-MAY-94	0.82	pCi/g	0.26	
			TA3/5-107-SS-08	0	17-MAY-94	0.239	pCi/g	No Data	
			TA3/5-107-SS-09	0	17-MAY-94	0.68	pCi/g	0.23	
			TA3/5-107-SS-09	0	17-MAY-94	0.264	pCi/g	No Data	
			TA3/5-107-SS-10	0	17-MAY-94	0.78	pCi/g	0.27	
			TA3/5-107-SS-10	0	17-MAY-94	0.207	pCi/g	No Data	
		THORIUM-228	TA3/5-107-SS-01	0	17-MAY-94	0.76	pCi/g	0.23	
			TA3/5-107-SS-01	0	17-MAY-94	0.643	pCi/g	No Data	
			TA3/5-107-SS-02	0	17-MAY-94	0.8	pCi/g	0.28	
			TA3/5-107-SS-02	0	17-MAY-94	0.8	pCi/g	0.28	
			TA3/5-107-SS-02	0	17-MAY-94	0.694	pCi/g	No Data	
			TA3/5-107-SS-03	0	17-MAY-94	0.91	pCi/g	0.25	
			TA3/5-107-SS-03	0	17-MAY-94	0.826	pCi/g	No Data	
			TA3/5-107-SS-04	0	17-MAY-94	0.92	pCi/g	0.25	
			TA3/5-107-SS-04	0	17-MAY-94	0.783	pCi/g	No Data	
			TA3/5-107-SS-05	0	17-MAY-94	0.86	pCi/g	0.29	
			TA3/5-107-SS-05	0	17-MAY-94	0.678	pCi/g	No Data	
			TA3/5-107-SS-06	0	17-MAY-94	0.84	pCi/g	0.21	
			TA3/5-107-SS-06	0	17-MAY-94	0.667	pCi/g	No Data	
			TA3/5-107-SS-06D	0	17-MAY-94	0.86	pCi/g	0.21	
			TA3/5-107-SS-06D	0	17-MAY-94	0.74	pCi/g	No Data	
			TA3/5-107-SS-07	0	17-MAY-94	0.62	pCi/g	0.18	
			TA3/5-107-SS-07	0	17-MAY-94	0.572	pCi/g	No Data	
			TA3/5-107-SS-08	0	17-MAY-94	0.88	pCi/g	0.28	
			TA3/5-107-SS-08	0	17-MAY-94	0.647	pCi/g	No Data	
			TA3/5-107-SS-09	0	17-MAY-94	0.74	pCi/g	0.25	
			TA3/5-107-SS-09	0	17-MAY-94	0.634	pCi/g	No Data	
			TA3/5-107-SS-10	0	17-MAY-94	0.84	pCi/g	0.29	
			TA3/5-107-SS-10	0	17-MAY-94	0.676	pCi/g	No Data	
		THORIUM-231	TA3/5-107-SS-03	0	17-MAY-94	0.456	pCi/g	No Data	
		THORIUM-232	TA3/5-107-SS-01	0	17-MAY-94	0.767	pCi/g	No Data	
			TA3/5-107-SS-01	0	17-MAY-94	0.71	pCi/g	0.28	
			TA3/5-107-SS-02	0	17-MAY-94	0.96	pCi/g	0.34	

APPENDIX C. LABORATORY ANALYTICAL DATA									
ERSITE	Test Method	Analyte	Sample ID	Sample Depth (ft)	Sample Date	Result	Units	Detection Lim	Qualif
107									
			TA3/5-107-SS-02	0	17-MAY-94	0.96	pCi/g	0.34	
			TA3/5-107-SS-02	0	17-MAY-94	0.765	pCi/g	No Data	
			TA3/5-107-SS-03	0	17-MAY-94	0.98	pCi/g	0.31	
			TA3/5-107-SS-04	0	17-MAY-94	0.94	pCi/g	0.29	
			TA3/5-107-SS-04	0	17-MAY-94	0.926	pCi/g	No Data	
			TA3/5-107-SS-05	0	17-MAY-94	0.826	pCi/g	No Data	
			TA3/5-107-SS-05	0	17-MAY-94	0.79	pCi/g	0.29	
			TA3/5-107-SS-06	0	17-MAY-94	1.1	pCi/g	0.26	
			TA3/5-107-SS-06	0	17-MAY-94	0.953	pCi/g	No Data	
			TA3/5-107-SS-06D	0	17-MAY-94	0.995	pCi/g	No Data	
			TA3/5-107-SS-06D	0	17-MAY-94	0.91	pCi/g	0.35	
			TA3/5-107-SS-07	0	17-MAY-94	0.98	pCi/g	0.3	
			TA3/5-107-SS-07	0	17-MAY-94	0.699	pCi/g	No Data	
			TA3/5-107-SS-08	0	17-MAY-94	0.955	pCi/g	No Data	
			TA3/5-107-SS-08	0	17-MAY-94	0.92	pCi/g	0.39	
			TA3/5-107-SS-09	0	17-MAY-94	0.977	pCi/g	No Data	
			TA3/5-107-SS-09	0	17-MAY-94	0.6	pCi/g	0.38	
			TA3/5-107-SS-10	0	17-MAY-94	0.786	pCi/g	No Data	
			TA3/5-107-SS-10	0	17-MAY-94	0.78	pCi/g	0.25	
		THORIUM-234	TA3/5-107-SS-01	0	17-MAY-94	1.06	pCi/g	No Data	
			TA3/5-107-SS-04	0	17-MAY-94	0.982	pCi/g	No Data	
			TA3/5-107-SS-06D	0	17-MAY-94	1.09	pCi/g	No Data	
			TA3/5-107-SS-09	0	17-MAY-94	1.2	pCi/g	0.87	
		URANIUM-238	TA3/5-107-SS-01	0	17-MAY-94	1.06	pCi/g	No Data	
			TA3/5-107-SS-04	0	17-MAY-94	0.98	pCi/g	No Data	
			TA3/5-107-SS-06D	0	17-MAY-94	1.09	pCi/g	No Data	

RESULTS OF THE TECH AREAS III AND V RCRA FACILITY INVESTIGATION

APPENDIX D – QUALITY ASSURANCE/QUALITY CONTROL DATA

Appendix D. Quality Assurance/Quality Control Data									
SITE 107 - QA/QC DATA									
Sample ID	Analyte	Result	Spike Amt	Units	Detection Limit	Qualifier	Sample Type	Sample Date	Matrix
TA3/5-107-RB	LEAD	0.0044		mg/L	0.003	B	EB	17-MAY-94	WATER
TA3/5-107-RB	SELENIUM	0.0058		mg/L	0.005		EB	17-MAY-94	WATER
TA3/5-107-RB	ZINC	0.053		mg/L	0.02		EB	17-MAY-94	WATER
TA3/5-107-SS-03	1,3,5-TRINITROBENZENE	4.6	5	ug/g	0.25		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	1,3,5-TRINITROBENZENE	5.4	5	ug/g	0.25		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	1,3-DINITROBENZENE	4.7	5	ug/g	0.25		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	1,3-DINITROBENZENE	5.4	5	ug/g	0.25		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	2,4-DINITROTOLUENE	4.6	5	ug/g	0.25		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	2,4-DINITROTOLUENE	5.2	5	ug/g	0.25		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	2,6-DINITROTOLUENE	4.6	5	ug/g	0.26		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	2,6-DINITROTOLUENE	5.2	5	ug/g	0.26		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	2-AMINO-4,6-DINITROTOLUENE	4.6	5	ug/g	0.25		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	2-AMINO-4,6-DINITROTOLUENE	5.3	5	ug/g	0.25		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	2-NITROTOLUENE	4.9	5	ug/g	0.25		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	2-NITROTOLUENE	5.7	5	ug/g	0.25		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	3-NITROTOLUENE	3.5	5	ug/g	0.25		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	3-NITROTOLUENE	4.1	5	ug/g	0.25		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	4-AMINO-2,6-DINITROTOLUENE	4.4	5	ug/g	0.25		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	4-AMINO-2,6-DINITROTOLUENE	5.1	5	ug/g	0.25		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	4-NITROTOLUENE	4.9	5	ug/g	0.25		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	4-NITROTOLUENE	5.9	5	ug/g	0.25		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	ALUMINUM	8260	200	mg/kg	10		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	ALUMINUM	8540	200	mg/kg	10		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	ANTIMONY	22.7	50	mg/kg	6		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	ANTIMONY	25.4	50	mg/kg	6		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	ARSENIC	47.5	50	mg/kg	1		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	ARSENIC	48.8	50	mg/kg	1		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	BARIUM	256	200	mg/kg	1		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	BARIUM	256	200	mg/kg	1		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	BERYLLIUM	5	5	mg/kg	0.2		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	BERYLLIUM	5.2	5	mg/kg	0.2		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	CADMIUM	5.1	5	mg/kg	0.5		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	CADMIUM	5.3	5	mg/kg	0.5		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	CALCIUM	13900	10000	mg/kg	20		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	CALCIUM	14100	10000	mg/kg	20		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	CHROMIUM	25.4	20	mg/kg	1		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	CHROMIUM	25.9	20	mg/kg	1		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	COBALT	48.3	50	mg/kg	1		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	COBALT	49.5	50	mg/kg	1		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	COPPER	31	25	mg/kg	2		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	COPPER	31.3	25	mg/kg	2		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	HMX	4.7	5	ug/g	2.2		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	HMX	5.4	5	ug/g	2.2		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	IRON	8910	100	mg/kg	10		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	IRON	8990	100	mg/kg	10		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	LEAD	57.6	50	mg/kg	0.3		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	LEAD	59.6	50	mg/kg	0.3		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	MAGNESIUM	7640	5000	mg/kg	20		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	MAGNESIUM	7670	5000	mg/kg	20		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	MANGANESE	256	50	mg/kg	1		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	MANGANESE	259	50	mg/kg	1		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	MERCURY	0.56	0.5	mg/kg	0.1		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	MERCURY	0.56	0.5	mg/kg	0.1		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	NICKEL	52.3	50	mg/kg	4		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	NICKEL	52.8	50	mg/kg	4		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	NITRATE/NITRITE	6.3	5	mg/kg	0.5		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	NITRATE/NITRITE	6.7	5	mg/kg	0.5		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	NITROBENZENE	4.3	5	ug/g	0.26		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	NITROBENZENE	5	5	ug/g	0.26		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	POTASSIUM	7060	5000	mg/kg	500		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	POTASSIUM	7160	5000	mg/kg	500		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	RDX	4.1	5	ug/g	1		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	RDX	4.8	5	ug/g	1		SD	17-MAY-94	SOIL

Appendix D. Quality Assurance/Quality Control Data									
SITE 107 - QA/QC DATA									
Sample ID	Analyte	Result	Spike Amt	Units	Detection Limit	Qualifier	Sample Type	Sample Date	Matrix
TA3/5-107-SS-03	SELENIUM	42.6	50	mg/kg	0.5		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	SELENIUM	44.9	50	mg/kg	0.5		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	SILVER	4.5	5	mg/kg	1		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	SILVER	4.7	5	mg/kg	1		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	SODIUM	9650	10000	mg/kg	500		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	SODIUM	9870	10000	mg/kg	500		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	TETRYL	2	5	ug/g	0.65		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	TETRYL	2.4	5	ug/g	0.65		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	THALLIUM	49.4	50	mg/kg	1		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	THALLIUM	50.5	50	mg/kg	1		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	TRINITROTOLUENE	3.9	5	ug/g	0.25		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	TRINITROTOLUENE	4.4	5	ug/g	0.25		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	VANADIUM	54.7	50	mg/kg	1		SD	17-MAY-94	SOIL
TA3/5-107-SS-03	VANADIUM	55.6	50	mg/kg	1		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	ZINC	72.6	50	mg/kg	2		MS	17-MAY-94	SOIL
TA3/5-107-SS-03	ZINC	72.7	50	mg/kg	2		SD	17-MAY-94	SOIL

Sandia National Laboratories
Environmental Restoration Project

Comment Responses

Notice of Deficiency July 31, 1997
Results of the Technical Area III and V RCRA Facility Investigation
Submitted to EPA and NMED June 1996

The following are Department of Energy (DOE) and Sandia National Laboratories/New Mexico (SNL/NM) Environmental Restoration (ER) Project responses to the Notice of Deficiency (NOD) comments (July 31, 1997) for the Technical Area III and V RCRA Facility Investigation. Prior to responding to the NOD, a meeting with representatives from the New Mexico Environment Department (NMED) Hazardous and Radioactive Materials Bureau (HRMB), Department of Energy (DOE) Oversight Bureau (OB), the DOE, and the SNL/NM ER Project was held on September 15, 1997 to provide an opportunity to discuss any questions concerning the comments and their responses. A list of attendees at the September 15 meeting is included in Attachment 1.

GENERAL DEFICIENCIES

Comment 1

Table 2-6. Upper Tolerance Limits for Target Analyte List Metals in Technical Areas III and V Soils, page 2-16, shows upper limits for barium, chromium, and silver which are higher than those proposed in SNL's Background Study report (March 1996). An explanation as to why the upper limits are higher must be provided.

Response to Comment 1

The Upper Tolerance Limits (UTLs) for the SNL/NM Background Study had not been calculated nor approved by the NMED or the USEPA by the time the TA-III/V data were being evaluated and the report written. To provide comparisons to background, a subset of the data from the SNL/NM Background Study was used to perform statistical analyses to obtain UTLs for TA-III/V. These calculations are described on pages 2-11 through 2-19 of the TA-III/V RFI report and in Appendix E. The SNL/NM Background Study reports background from five 'Super Groups', one of which is the Southwest Super Group that included background data from TA-III, TA-V, McCormick Ranch, and Thunder Range. The TA-III/V RFI report used a subset of the background data that included only TA-III and TA-V. Table 1 (Attachment 2) contains the TA-III/V RFI UTLs and the SNL/NM site-wide UTL. A comparison of the maximum values for each site indicates that very few samples (<10) that passed the TA-III/V UTLs exceeded the SNL/NM site-wide background values. This difference has not impacted the recommendations made in the TA-III/V RFI Report for

any site. See Response to Comment 9 for a discussion of the comparison of soil analytical results to background values.

Comment 2

Appendices B, C, and D (on disk) do not contain the full data set. An explanation as to why and how the full data set was queried to create the abbreviated data files must be provided. The complete data set must be referenced and made available upon request.

Response to Comment 2

The complete data set was queried and results below the method detection limits (MDL) were removed to provide a much more manageable data set for assessment and evaluation purposes. The data in Appendices B, C, and D include all data except for nondetects (NDs). The complete data set (on electronic disk) is available through the ER Project.

Comment 3

Throughout the approved RCRA Facility Investigation (RFI) Work Plan, a commitment was made to conduct additional interviews with current or former employees who may have historical knowledge of site operations. However, the RFI Report does not mention whether these interviews were conducted. The results of any interviews that were conducted during the investigation must be discussed. If no additional interviews were conducted, this fact should be included and discussed.

Response to Comment 3

No additional interviews were conducted with former employees who may have knowledge of past site operations. Efforts were made to contact former employees, however, these were unsuccessful. Interviews with current employees provided no additional useful historical information for any of the sites. Current employees did provide logistical coordination for the field investigations.

Comment 4

The aerial photographs reviewed during the RFI were dated from 1973 to 1990. Any older aerial photographs which are available must be identified and discussed.

Response to Comment 4

The ER Project has compiled an index of available aerial photographs (dating back to the 1930s) of KAFB and SNL/NM from many sources. This index is available for review at the ER Project Office, however, no aerial photographs in this index encompass areas in TA-III and TA-V prior to 1973.

Comment 5

SNL continues to use analysis for total petroleum hydrocarbons (TPH) instead of analyses for specific constituents, such as benzene, toluene, and ethylbenzene. EPA Methods 8240, 8020, and unmodified 8015 must be used.

Response to Comment 5

This issue was addressed initially in the TA-III/V Work Plan Comment 14. Our response to the RFI Work Plan Comment 14 was that analytes would be selected based on process knowledge and site history wherever possible to avoid resampling. If laboratory determination of TPH were called for, a small number of verification samples using Method 8240 would be performed at several sites. If Method 8240 were used, then analysis with Method 8020 would be redundant. Analytes from Method 8015 were not expected to be present at any of the sites, and therefore, this analysis would not be performed.

The response to Comment 14 on the RFI Work Plan was approved by EPA Region VI. Verification samples using Method 8240 were done for ER Sites 36, 37, and 196 for some samples that had detectable TPH. Other sites that had petroleum hydrocarbons (ER Site 31 and 34) as COCs did not have elevated TPH in soil samples. Soil samples from those sites that solely had mineral oil leaks/spills (ER Site 35 and 18) were analyzed by Method 418.1. A chromatograph spectrum for the mineral oil associated with the mineral oil-impacted sites is included in Attachment 3. The MSDS for Diala AX™ oil is also included (Attachment 3). Submission of the MSDSs for the transformer and hydraulic oils (Diala AX™, Univolt™, Shell 61™, Regal™) typically used at these sites were included in the responses to the RFI Work Plan comments (November 1993) in Attachments 8 and 10. The chromatogram of Shell Diala AX™ oil used at SNL/NM ER Sites 31, 34, 35, 36, and 37 displays a "backbone" fingerprint typical of hydrocarbons/mineral oil. Peaks on the chromatogram were tentatively identified based on mass spectra and labeled with corresponding carbon mass fragments.

Comment 6

Groundwater data exist from SNL/NM monitoring wells located in and near Technical Area (TA) III and TA V. Steady and sporadic detection of trichloroethylene (TCE), elevated nitrate, toluene, total chrome and other contaminants have been documented in some of these wells. These well locations can potentially serve as up-gradient or down-gradient wells. A summary table of these monitoring wells/results and a map of well location must be included in the RFI report.

Response to Comment 6

Results indicate quite conclusively that the ER sites investigated within the scope of the TA-III/V RFI report are not the source of TCE (or other contaminants found in monitoring wells at TA-V). None of these sites has been found to impact underlying groundwater.

The DOE and SNL/NM ER Project is continuing to investigate groundwater at TA-V as a separate issue. A summary table of analytical results of groundwater sampling and a map showing well locations will be included as part of the information provided concerning the investigation of groundwater at TA-V.

Comment 7

At all sites having oil-contaminated soils (e.g. Environmental Restoration (ER) Site 18), soils with TPH exceeding 100 ppm should be excavated and treated/disposed of in accordance with New Mexico Environment Department (NMED) Underground Storage Tank (UST) Regulations.

Response to Comment 7

Comment 7 appears to be contradictory to Comment 10 (please refer to Comment 10). During the September 15 meeting, the ER Project requested regulatory guidance on soils contaminated with mineral oil. Mineral oil is not a RCRA-regulated hazardous substance. The cleanup standards for petroleum hydrocarbons in the New Mexico Underground Storage Tank regulations (20NMAC5) were used for lack of any other regulatory guidelines, even though mineral oil in soil was due to spills at several sites and the UST regulations are not applicable. Additionally, as further clarification regarding the application of UST regulations 20 NMAC5.1C states that "20 NMAC 5 Parts 2 through 14 do not apply to any of the following types of UST systems: 1. Wastewater treatment tanks; 2. Sumps; 3. UST systems containing radioactive waste; 4. Electrical equipment; 5. Hydraulic lift tanks; and 6. any UST system with a capacity of 110 gallons of less." The HERMES and PROTO USTs were used to contain transformer oil for electrical equipment and, therefore, should be exempt from UST regulations. DOE and SNL/NM agree that this issue is not resolved at this time and that further discussions with NMED may be appropriate for sites containing mineral oil as a COC.

At the September 15 meeting, clarification was requested of NMED on cleanup standards for hydrocarbon contaminated soils. The ER Project has understood that the New Mexico UST regulations do not require excavation and treatment/disposal of soil with TPH exceeding 100 ppm under certain hydrogeologic conditions. The UST Soil/Water Sampling & Disposal Guidelines issued by the NMED (revised April 1995) state that "Soils which are not highly contaminated (saturated) and are located greater than fifty feet (50) above the seasonal high static water table do not need to be remediated." This was confirmed with a letter, dated October 8, 1997 to Robert Dinwiddie from Gerard Schoeppner of the UST Bureau (provided by Stephanie Kruse to Sharissa Young).

In conclusion, DOE and SNL/NM believe that according to the UST regulations soils contaminated with TPH greater than 100 ppm do not require excavation and disposal/treatment if groundwater is greater than 50 feet below the depth of contamination. Even so, mineral oil is not a RCRA regulated hazardous substance and may be exempt from UST regulations because the USTs containing mineral oil were used as part of a system for

electrical equipment. Again, DOE and SNL/NM encourage further discussion with NMED on this issue. DOE and SNL/NM believe that this issue is not resolved and that further guidance and clarification is required regarding mineral oil contaminated soil.

Comment 8

At this time, a background well southwest of TA-V, a potentially down-gradient well north of TA-V, and another well west of the abandoned KAFB-10 production well have been drilled. The wells southwest and north of the technical area should be useful for establishing background conditions and in characterizing the solvent and NO3 plumes underlying parts of TA-V, respectively. The well west of KAFB-10 is considered to be of limited value. The KAFB-10 production well should be replaced with a monitoring well to evaluated the potential contribution of ER Site 36 (and/or other ER sites) to the TA III & V groundwater contamination problem.

Response to Comment 8

As discussed during the September 15 meeting, the investigation of the groundwater in the vicinity of TA-V will be addressed separately from the ER sites within the TA-III/V RFI report. Results indicate that no ER sites discussed in this RFI report have any evidence of having impacted groundwater.

Comment 9

In the RFI Workplan Comment Responses (March 1993), General Comment No. 3 of the Notice of Deficiency (NOD) states that

> *Field sampling must extend horizontally and vertically until no subsequent increase in contaminant levels is likely to occur. A minimum of two (2) "clean" samples are required to verify delineation. These samples should be at or below the background levels previously approved by the EPA for each constituent.*

Following the requirement above, subsurface samples must be obtained where results from surface sampling exceed proposed upper tolerance limits (UTLs) or 95th percentiles. These results must be compared to approved UTLs or 95th percentiles to determine the vertical extent of contamination.

Response to Comment 9

As discussed in the September 15 meeting, DOE and the SNL/NM ER Project have followed a risk-based corrective action process. As discussed in the RFI Work Plan Response to Comment 1 "SNL/NM understands the need for, and use of, action levels, background data, and developing health and environmental criteria in determining the need for a CMS. Action levels will be used in the course of this RFI as a guide to help with decision making. Background data also will be collected and risk-based decision making will

be employed as well." At all the sites addressed within the TA-III/V RFI report, results have been compared with background and action levels. Concentrations in soils have been well below risk-based soil action levels. At ER Site 78, chromium was found in the surface verification samples (39.7 mg/kg) at above the TA-III/V UTL (26.2 mg/kg) but well below the proposed RCRA Subpart S action level (400 mg/kg). By employing the a risk-based decision making during the RFI process, additional sampling for chromium was determined to be unnecessary.

General Comment 9 is repeated for specific sites within the Notice of Deficiency (comments 12, 15, and 22). Specific reasons for varying from the field sampling protocol discussed in the Work Plan are provided in the responses to those site-specific comments.

XV. ER Site 107, TA-III: Explosives Test Area

Comment 28

Section 17.1, Field Investigation Protocols. In Subsection 17.1.2., Sampling Strategies, SNL states that "The sampling and analysis plan was modified slightly from that proposed in the RFI Work Plan..." This is not entirely accurate. The sampling grid spacing was doubled from that approved in the RFI Work Plan. Furthermore, there is no discussion of the statistical analysis of the data from the previous study, a task described in Section 18.6.3 of the approved RFI Work Plan. The rationale for these changes must be explained.

Response to Comment 28

A statistical analysis of the data collected during the previous sampling event (detailed in the RFI Work Plan) was completed in March 1993; the analysis indicated no additional sampling was required at Site 107. A second analysis was completed when the SNL/NM site-wide data became available. A comparison of the previous sampling results to both TA-III/V and SNL/NM site-wide background UTLs and 95th percentiles indicated no metals above either set of background values.

Although all previously collected samples were below background values, it was believed prudent to proceed with verification of these results, so a sampling program was patterned after that originally conducted. The original spacing of the grids was decreased from the 500-ft centers conducted previously to a 350- to 400-ft spacing. Additional samples were collected to cover more area within the site than originally done (see RFI Work Plan).

Whereas the original sampling was performed both within and outside of the site, the Phase II sampling was conducted entirely within the site boundaries, thereby increasing the number of locations sampled from within the site boundaries from 27 (originally) to 48 for the Phase II RFI sampling. In accordance with the NOD comment responses of November 1993 and the approval letter of April 1994, an additional sample was collected from each grid. Rather than only submitting three soil samples for off-site laboratory analysis, as requested in the Work Plan NOD comments, all 11 samples collected were submitted for laboratory analysis.

Because the results of the Phase II RFI sampling indicated no samples above either TA-III/V or SNL/NM site-wide UTLs, DOE and SNL/NM believe Site 107 is appropriate for a decision of No Further Action.

ATTACHMENT 1
September 15, 1997 Meeting Attendees

Meeting to Discuss NOD Comments for the TA-III/V RFI Report
Sandia National Laboratories, Bldg. 6584
September 15, 1997

Attendees
Terry Davis, NMED HRMB
John Gould, DOE
Grace Haggerty, GRAM (ER Project)
Kim Hill, EPA Region VI
Roger Kennett, NMED OB
Stephanie Kruse, NMED HRMB
Paula Slavin, GRAM (ER Project)
Sharissa Young, SNL/NM ER Project

ATTACHMENT 2
Comparison of Background Values

Table 1. Comparison of TA-III/V UTLs (95th Percentiles) to SNL/NM Site-Wide Background UTLs (95th Percentiles)

Metal	TA-III/V UTL, 95th Percentile (mg/kg)	SNL Site-Wide Background UTL, 95th Percentile (mg/kg)
Barium	341.0	130 (214)
Beryllium	0.7	0.65
Cadmium	2.6	1.6 (0.9)
Chromium	26.2	17.3 (15.9)
Copper	14.5	15.4(5.2)
Lead	24.8	21.4 (11.8)
Nickel	12.9	11.5
Silver	4.0	2.0 (<1.0)
Uranium	4.0	3.42 (2.3)
Zinc	41.8	62

Note: For SNL/NM site-wide background, some metals were separated into surface and subsurface UTLs. Values shown in parenthesis are for subsurface UTLs. No distinction was made between surface and subsurface UTLs for TA-III/V background results.

Sandia National Laboratories
Albuquerque, New Mexico
July 1998

Environmental Restoration Project
Responses to NMED 2nd Notice of Deficiency on the Technical Areas III and V RCRA Facility Investigation Dated June 1996

INTRODUCTION

This document responds to comments received in a letter from the State of New Mexico Environment Department (NMED) to the U.S. Department of Energy (DOE) (Dinwiddie, March 27, 1998) documenting the review of the 2nd Notice of Deficiency on the Technical Areas III and V RCRA Facility Investigation submitted in June 1996.

This response document provides NMED comments repeated in **bold** by comment number in the same order as provided in the call for response to comments. The DOE/Sandia National Laboratories response is written in normal font style on a separate line under "Response." Responses to general technical comments begin on page 3 and responses to specific technical comments begin on page 7. Additional supporting information for the specific comments is included as attachments to this section.

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RESPONSES TO THE 2ND NOTICE OF DEFICIENCY: RESULTS OF THE TECHNICAL AREA III AND V RCRA FACILITY INVESTIGATION

GENERAL COMMENTS

1. **The TA-III/V background study has not been approved by the New Mexico Environment Department (NMED).**

   Background concentrations have now been approved for that portion of Kirtland Air Force Base (KAFB) which includes OU 1306. These are the background concentrations that should be used by the U. S. Department of Energy (DOE)/Sandia National Laboratories (SNL) to determine whether there has been a release of contaminants to the environment.

   See also General Deficiency 7.

   Response: The DOE/SNL are aware that the background values used in the Resource Conservation Recovery Act (RCRA) Facility Investigation (RFI) report were not approved by the New Mexico Environment Department (NMED) and that there are some differences between the Technical Area (TA)-III/V RFI background values and the approved background concentrations. We apologize if this information was not conveyed more clearly in our response to the first notice of deficiency (NOD) comments. The RFI report was submitted in June 1996 while the background soil investigation was still underway. The background soil concentrations, approved by the NMED in September of 1997, included the same data set used in the June 1996 RFI report, as well as data from a broader area. Thus some minor differences in concentrations for the 95th upper tolerance limit (UTL) occurred.

   A comparison of analytical results for soils to the approved background soil concentrations is included with this submittal. The results of this comparison are contained within Attachments for the applicable environmental restoration (ER) sites. See also Response to General Deficiency 7.

   To avoid unnecessary sampling, risk-based assessments using conservative values (i.e., highest concentration values) can provide an indication of whether the site poses a human health risk or ecorisk.

2. **DOE/SNL Response to Comment 2.**

   In cases where individual environmental restoration (ER) sites have been proposed for No Further Action (NFA), the complete data set (hard copy form) must be submitted.

While summary tables listing only detected constituents are useful for review purposes, they provide only part of the information needed to fully evaluate a NFA proposal. To complete the data package, additional tables must be submitted listing all of the various constituents that were analyzed for and their method detection limits.

Please note that J-coded data must be treated as detected constituents.

Response: Data tables, including J-coded data, nondetections, and the method detection limits (MDL) are provided in this submittal within the attachments associated with specific sites (see the Sandia National Laboratories/New Mexico [SNL/NM] responses to Specific Comments for Enclosures A and B). The RFI Report did present the J-coded data for all the ER sites. Results of laboratory quality assurance (QA) and quality control (QC) samples are not contained within the Environmental Restoration Data Management System database and therefore, copies from the laboratory reports are attached following the specific comments for the ER sites.

3. **DOE/SNL Response to Comment 5.**

The Hazardous and Radioactive Materials Bureau (HRMB) does not generally accept TPH analyses for the purpose of site characterization. Although TPH analyses are useful for screening purposes, in most cases, DOE/SNL must also determine whether there has been a release of hazardous constituents at sites that are contaminated with TPH.

Methods 8240 and 8270 are the "standard" methods employed to characterize a site with respect to volatile and semi-volatile organic compounds (VOC's and SVOC's).

Response: Field screening (Hanby) and laboratory analyses for Total Petroleum Hydrocarbons (TPH) were the proposed methods described in the U.S. Environmental Protection Agency (EPA)- and NMED-approved TAIII/V Work Plan. These methods were performed at the majority of ER sites addressed in the TA-III/V RFI report. TPH was selected because of the type of hydrocarbons identified as constituents of concern (COC), specifically mineral oil and transformer oil. Because of the lack of volatile and semivolatile constituents in these types of oil, TPH was selected as the best method for characterizing sites impacted by oil spills and leaks. If additional sampling is required at specific sites, EPA Methods 8260 and 8270 will be used for detection of volatile organic compounds (VOC) and semivolatile organic compounds (SVOC). EPA Method 8260 (capillary column method) is fungible with Method 8240 (packed column method) although EPA Method 8260 is now the preferred method because it provides better resolution, selectivity, and sensitivity (SW 846).

4. **DOE/SNL Response to Comment 6.**

Additional site characterization is needed at some sites before a definitive determination can be made that there has been no impact to ground water. The requested ground-water data and map must be provided to the NMED.

The investigation of ground-water contamination at TA-V will be linked to the source (or sources) of contamination.

Response: The issue of a groundwater investigation at TA-V is more thoroughly addressed in the DOE transmittal letter to these 2nd NOD responses. In summary, existing data on the hydrogeologic conditions (including potential sources) at TA-V will be reviewed, analyzed, and summarized in a report to the NMED. Maps and cross-sections will be included in the data report. The expected date for submittal of this report is mid-December 1998.

5. **DOE/SNL Response to Comment 7.**

The reference to ER Site 18 is a mistake.

The NMED Underground Storage Tank (UST) Bureau will be consulted on a site-by-site basis to determine whether NMED UST regulations apply. In most cases, DOE/SNL will be required to provide proof (through sampling and analysis) that hazardous constituents have not been released to the environment.

Response: The DOE/SNL are interested in establishing who will consult with the NMED Underground Storage Tank (UST) Bureau on a site-by-site basis. With the exception of the High Energy Megavolt Electron Source (HERMES) site (ER Site 36), there are no other ER sites under investigation within the TA-III/V RFI that are former USTs. Transformer oil was spilled on the ground surface at several TA-III/V ER sites. These sites have been shown to contain no hazardous constituents (regulatory levels) with the exception of polychlorinated biphenyls (PCB) at ER Site 18. Please refer to the DOE/SNL responses to the site-specific comments for additional discussion on the potential for hazardous constituents to be released to the environment at oil-contaminated sites.

6. **DOE/SNL Response to Comment 8.**

The new well located west of the former position of KAFB-10 (now abandoned) was drilled at an unacceptable location (too far from LWDS-MW1). DOE/SNL was made aware of this situation prior to the drilling of this new well.

A monitor well must be drilled near the former location of KAFB-10 to evaluate the nature and concentration of contaminants in the ground water.

Response: DOE/SNL will review the existing data, perform some additional studies if prudent, and present the results to the NMED before installing new wells at TA-V. Proposed locations of new wells, if any, and the rationale for these wells will be presented in a TA-V data report. Also see response to General Deficiency 4.

7. **DOE/SNL Response to Comment 9.**

Additional site characterization may be required in cases where the concentration of a Constituent of Concern (COC) lies between the 95th UTL (or 95th percentile) and the proposed Subpart S Action Level for that constituent.

Response: In general, risk assessments can be performed with available data as the logical first step to evaluate whether concentrations of COCs at a site pose a threat to human health and environment. The SNL/NM risk assessment team will evaluate the TA-III/V ER sites under consideration in the near future. The risk assessment process has evolved over the past several years to include evaluating the risk to the ecosystem (or representatives of the ecosystem, i.e., deer mouse). The risk assessment will evaluate whether constituents with concentrations exceeding the maximum background levels (MBL) established by the NMED are of concern. Additional sampling and analysis potentially could be required to provide input to the risk assessments. DOE/SNL will provide the results of the risk assessments to the NMED.

ER Site 107, TA-III: Explosives Test Area

1. **DOE/SNL Response to Comment 28**
[located on page 17, paragraph six]

The 10 samples plus one duplicate sample collected for this investigation were composite samples. Composite samples are unacceptable for the purposes of site characterization. Therefore, statistical analyses of composite samples are not acceptable in this case.

Response: The results of the statistical analyses were specifically requested in the first NOD, and thus were provided. Composite sampling was an approved sampling method in the approved TA-III/V Work Plan.

2. **DOE/SNL Response to Comment 28**
[located on page 17, paragraph six, last sentence]

NMED has not approved TA-III/V specific background UTLs and 95th percentiles. DOE/SNL must compare TA-III/V investigation data to site-wide background UTLs/95th percentiles. DOE/SNL must compare analytical data from discrete samples to the site-wide background UTLs/95th percentiles.

Response: Discrete samples were not collected at ER Site 107. As described in the approved RFI Work Plan, composite samples were collected during the first phase of the investigation. The Phase I results indicate that soil contamination was not present at the site. However, the Phase II investigation proceeded to verify these results. Composite samples, described in the approved RFI Work Plan, were collected from 10 grid cells. Four to eight soil samples were collected at a depth of 0 to 6 inches and were composited. The composited samples were field screened for HEs by immunoassay, metals by x-ray fluorescence analysis, and radionuclides by gamma spectroscopy. Ten composited samples were analyzed at an off-site laboratory for HEs, nitrates and nitrites, metals, and gamma spectroscopy in accordance with EPA methods.

Attachment 107-1 contains the laboratory analytical results with approved site-wide background MBLs for applicable analytes.

3. **DOE/SNL Response to Comment 28**
[located on page 18, first paragraph, first sentence]

Are the Phase II samples composite samples? If so, they are unacceptable to the NMED. DOE/SNL shall submit analytical results of all discrete samples (hard copy form), submit all QA/QC data, a sampling map of all discrete sample locations, and shall compare all discrete sample concentrations to the site-wide background UTLs/95th percentiles. If DOE/SNL has not collected any discrete samples, DOE/SNL shall do so.

Response: As discussed in the response to Comment 2, the Phase II samples were composite samples. This sampling methodology was proposed in the RFI Work Plan and was approved by the EPA and NMED. Data that has been collected in accordance to an approved Work Plan and that is now determined to be unacceptable by NMED is a programmatic issue requiring further discussion with NMED.

As shown on the figure in Attachment 107-2, the Corrective Action Management Unit (CAMU) and the Radioactive Materials and Waste Management Facility are located within the boundaries of ER Site 107. The CAMU will be used for the staging, treatment, and containment of hazardous remediation waste generated during ER Project activities. The construction of the CAMU is in progress and significant physical alterations to the site have been made in consultation with the NMED and the EPA. The surface at the site has been graded and CAMU structures built. The "Class III Permit Modification Request for the Management of Hazardous Remediation Waste in the Corrective Action Management Unit, Technical Area III, Sandia National Laboratories/New Mexico, Environmental Restoration Project; Final Report, September 1997" addresses the regulatory requirements for designation of a CAMU at ER Site 107. The permit modification plan has been approved by the EPA. Appendix D of the CAMU document contains the Closure Plan for the CAMU. As part of the closure, sampling and analysis will be conducted to assure clean closure in all the staging and treatment areas.

4. **DOE/SNL Response to Comment 28**
[located on page 18, second paragraph]

A NFA decision is not appropriate.

Response: An NFA decision is proposed by DOE/SNL because we have demonstrated under an approved Work Plan that no contamination exists in the surface soils above regulatory limits or relevant MBLs. Please refer to ER Site 107 Specific Comment 2. We request that NMED reconsider its position on this NFA proposal or contact DOE/SNL to further discuss their concerns.

Attachment 107-1

Laboratory Analytical Results for ER Site 107

Laboratory QA/QC – copied from laboratory reports

ER Site 107 RFI Analytical Results for Soil Samples; Metals (EPA Method 6010) and Nitrate/nitrite (EPA Method 353.2)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Material Description	MBLs
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Aluminum	mg/kg	5200		SOIL	na
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Antimony	mg/kg	3	J	SOIL	3.9
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Arsenic	mg/kg	4		SOIL	4.4
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Barium	mg/kg	93.6		SOIL	214
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Beryllium	mg/kg	.42		SOIL	0.65
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Cadmium	mg/kg	<.5	U	SOIL	1
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Calcium	mg/kg	26100		SOIL	na
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Chromium	mg/kg	6		SOIL	21.8
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Cobalt	mg/kg	2.9		SOIL	5.2
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Copper	mg/kg	6.9		SOIL	15.4
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Iron	mg/kg	7050		SOIL	na
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Lead	mg/kg	9.6		SOIL	21.4
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Magnesium	mg/kg	3420		SOIL	na
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Manganese	mg/kg	142		SOIL	na
TA3/5-107-SS-01	SNL0130111	F	17-MAY-94	0	Mercury	mg/kg	<.1	U	SOIL	0.25
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Nickel	mg/kg	7.8		SOIL	11.5
TA3/5-107-SS-01	SNL0130109	F	17-MAY-94	0	Nitrate/nitrite	mg/kg	.77		SOIL	na
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Potassium	mg/kg	1490		SOIL	na
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Selenium	mg/kg	<.5	U	SOIL	1
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Silver	mg/kg	.6	J	SOIL	5.6
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Sodium	mg/kg	<500	U	SOIL	na
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Thallium	mg/kg	<1	U	SOIL	na
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Vanadium	mg/kg	14.3		SOIL	20.4
TA3/5-107-SS-01	SNL0130110	F	17-MAY-94	0	Zinc	mg/kg	22.5		SOIL	62
TA3/5-107-SS-02	SNL0130114	F	17-MAY-94	0	Aluminum	mg/kg	5670		SOIL	na
TA3/5-107-SS-02	SNL0130114	F	17-MAY-94	0	Antimony	mg/kg	<6	U	SOIL	3.9
TA3/5-107-SS-02	SNL0130114	F	17-MAY-94	0	Arsenic	mg/kg	3.2		SOIL	4.4
TA3/5-107-SS-02	SNL0130114	F	17-MAY-94	0	Barium	mg/kg	82.5		SOIL	214
TA3/5-107-SS-02	SNL0130114	F	17-MAY-94	0	Beryllium	mg/kg	.42		SOIL	0.65
TA3/5-107-SS-02	SNL0130114	F	17-MAY-94	0	Cadmium	mg/kg	<.5	U	SOIL	1
TA3/5-107-SS-02	SNL0130114	F	17-MAY-94	0	Calcium	mg/kg	11100		SOIL	na
TA3/5-107-SS-02	SNL0130114	F	17-MAY-94	0	Chromium	mg/kg	6.7		SOIL	21.8
TA3/5-107-SS-02	SNL0130114	F	17-MAY-94	0	Cobalt	mg/kg	3.7		SOIL	5.2
TA3/5-107-SS-02	SNL0130114	F	17-MAY-94	0	Copper	mg/kg	7.1		SOIL	15.4
TA3/5-107-SS-02	SNL0130114	F	17-MAY-94	0	Iron	mg/kg	7970		SOIL	na
TA3/5-107-SS-02	SNL0130114	F	17-MAY-94	0	Lead	mg/kg	9.6		SOIL	21.4

ER Site 107 RFI Analytical Results for Soil Samples; Metals (EPA Method 6010) and Nitrate/nitrite (EPA Method 353.2)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Material Description	MBLs
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Aluminum	mg/kg	5170		SOIL	na
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Antimony	mg/kg	<6	U	SOIL	3.9
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Arsenic	mg/kg	3.1		SOIL	4.4
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Barium	mg/kg	69.7		SOIL	214
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Beryllium	mg/kg	.42		SOIL	0.65
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Cadmium	mg/kg	<.5	U	SOIL	1
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Calcium	mg/kg	8180		SOIL	na
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Chromium	mg/kg	6.3		SOIL	21.8
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Cobalt	mg/kg	3.2		SOIL	5.2
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Copper	mg/kg	10.6		SOIL	15.4
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Iron	mg/kg	7920		SOIL	na
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Lead	mg/kg	11.2		SOIL	21.4
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Magnesium	mg/kg	2220		SOIL	na
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Manganese	mg/kg	181		SOIL	na
TA3/5-107-SS-04	SNL0130123	F	17-MAY-94	0	Mercury	mg/kg	<.1	U	SOIL	0.25
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Nickel	mg/kg	6.4		SOIL	11.5
TA3/5-107-SS-04	SNL0130121	F	17-MAY-94	0	Nitrate/nitrite	mg/kg	2.4		SOIL	na
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Potassium	mg/kg	1860		SOIL	na
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Selenium	mg/kg	<.5	U	SOIL	1
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Silver	mg/kg	.3	J	SOIL	5.6
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Sodium	mg/kg	<500	U	SOIL	na
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Thallium	mg/kg	<1	U	SOIL	na
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Vanadium	mg/kg	13.8		SOIL	20.4
TA3/5-107-SS-04	SNL0130122	F	17-MAY-94	0	Zinc	mg/kg	34.5		SOIL	62
TA3/5-107-SS-05	SNL0130126	F	17-MAY-94	0	Aluminum	mg/kg	4070		SOIL	na
TA3/5-107-SS-05	SNL0130126	F	17-MAY-94	0	Antimony	mg/kg	<6	U	SOIL	3.9
TA3/5-107-SS-05	SNL0130126	F	17-MAY-94	0	Arsenic	mg/kg	2.1		SOIL	4.4
TA3/5-107-SS-05	SNL0130126	F	17-MAY-94	0	Barium	mg/kg	62		SOIL	214
TA3/5-107-SS-05	SNL0130126	F	17-MAY-94	0	Beryllium	mg/kg	.37		SOIL	0.65
TA3/5-107-SS-05	SNL0130126	F	17-MAY-94	0	Cadmium	mg/kg	<.5	U	SOIL	1
TA3/5-107-SS-05	SNL0130126	F	17-MAY-94	0	Calcium	mg/kg	3020		SOIL	na
TA3/5-107-SS-05	SNL0130126	F	17-MAY-94	0	Chromium	mg/kg	5.2		SOIL	21.8
TA3/5-107-SS-05	SNL0130126	F	17-MAY-94	0	Cobalt	mg/kg	3.1		SOIL	5.2
TA3/5-107-SS-05	SNL0130126	F	17-MAY-94	0	Copper	mg/kg	6.5		SOIL	15.4
TA3/5-107-SS-05	SNL0130126	F	17-MAY-94	0	Iron	mg/kg	6520		SOIL	na
TA3/5-107-SS-05	SNL0130126	F	17-MAY-94	0	Lead	mg/kg	8.6		SOIL	21.4

ER Site 107 RFI Analytical Results for Soil Samples; Metals (EPA Method 6010) and Nitrate/nitrite (EPA Method 353.2)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Material Description	MBLs
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Aluminum	mg/kg	5250		SOIL	na
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Antimony	mg/kg	<6	U	SOIL	3.9
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Arsenic	mg/kg	2.7		SOIL	4.4
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Barium	mg/kg	74.8		SOIL	214
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Beryllium	mg/kg	.53		SOIL	0.65
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Cadmium	mg/kg	<.5	U	SOIL	1
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Calcium	mg/kg	8720		SOIL	na
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Chromium	mg/kg	6.3		SOIL	21.8
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Cobalt	mg/kg	3.3		SOIL	5.2
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Copper	mg/kg	7.5		SOIL	15.4
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Iron	mg/kg	7600		SOIL	na
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Lead	mg/kg	9.4		SOIL	21.4
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Magnesium	mg/kg	2300		SOIL	na
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Manganese	mg/kg	185		SOIL	na
TA3/5-107-SS-06D	SNL0130151	D	17-MAY-94	0	Mercury	mg/kg	<.1	U	SOIL	0.25
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Nickel	mg/kg	6.6		SOIL	11.5
TA3/5-107-SS-06D	SNL0130149	D	17-MAY-94	0	Nitrate/nitrite	mg/kg	.78		SOIL	na
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Potassium	mg/kg	2060		SOIL	na
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Selenium	mg/kg	<.5	U	SOIL	1
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Silver	mg/kg	<1	U	SOIL	5.6
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Sodium	mg/kg	66.4	J	SOIL	na
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Thallium	mg/kg	<1	U	SOIL	na
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Vanadium	mg/kg	14.2		SOIL	20.4
TA3/5-107-SS-06D	SNL0130150	D	17-MAY-94	0	Zinc	mg/kg	20.7		SOIL	62
TA3/5-107-SS-07	SNL0130134	F	17-MAY-94	0	Aluminum	mg/kg	4000		SOIL	na
TA3/5-107-SS-07	SNL0130134	F	17-MAY-94	0	Antimony	mg/kg	<6	U	SOIL	3.9
TA3/5-107-SS-07	SNL0130134	F	17-MAY-94	0	Arsenic	mg/kg	3		SOIL	4.4
TA3/5-107-SS-07	SNL0130134	F	17-MAY-94	0	Barium	mg/kg	60.3		SOIL	214
TA3/5-107-SS-07	SNL0130134	F	17-MAY-94	0	Beryllium	mg/kg	.31		SOIL	0.65
TA3/5-107-SS-07	SNL0130134	F	17-MAY-94	0	Cadmium	mg/kg	<.5	U	SOIL	1
TA3/5-107-SS-07	SNL0130134	F	17-MAY-94	0	Calcium	mg/kg	10400		SOIL	na
TA3/5-107-SS-07	SNL0130134	F	17-MAY-94	0	Chromium	mg/kg	5.7		SOIL	21.8
TA3/5-107-SS-07	SNL0130134	F	17-MAY-94	0	Cobalt	mg/kg	2.9		SOIL	5.2
TA3/5-107-SS-07	SNL0130134	F	17-MAY-94	0	Copper	mg/kg	6.6		SOIL	15.4
TA3/5-107-SS-07	SNL0130134	F	17-MAY-94	0	Iron	mg/kg	6380		SOIL	na
TA3/5-107-SS-07	SNL0130134	F	17-MAY-94	0	Lead	mg/kg	9		SOIL	21.4

ER Site 107 RFI Analytical Results for Soil Samples; Metals (EPA Method 6010) and Nitrate/nitrite (EPA Method 353.2)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Material Description	MBLs
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Aluminum	mg/kg	4900		SOIL	na
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Antimony	mg/kg	3.2	J	SOIL	3.9
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Arsenic	mg/kg	1.9		SOIL	4.4
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Barium	mg/kg	62		SOIL	214
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Beryllium	mg/kg	.42		SOIL	0.65
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Cadmium	mg/kg	<.5	U	SOIL	1
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Calcium	mg/kg	2540		SOIL	na
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Chromium	mg/kg	6.3		SOIL	21.8
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Cobalt	mg/kg	3.2		SOIL	5.2
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Copper	mg/kg	6.2		SOIL	15.4
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Iron	mg/kg	7250		SOIL	na
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Lead	mg/kg	8.2		SOIL	21.4
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Magnesium	mg/kg	1800		SOIL	na
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Manganese	mg/kg	185		SOIL	na
TA3/5-107-SS-09	SNL0130143	F	17-MAY-94	0	Mercury	mg/kg	<.1	U	SOIL	0.25
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Nickel	mg/kg	6		SOIL	11.5
TA3/5-107-SS-09	SNL0130141	F	17-MAY-94	0	Nitrate/nitrite	mg/kg	1.1		SOIL	na
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Potassium	mg/kg	1720		SOIL	na
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Selenium	mg/kg	<.5	U	SOIL	1
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Silver	mg/kg	<1	U	SOIL	5.6
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Sodium	mg/kg	98.7	J	SOIL	na
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Thallium	mg/kg	<1	U	SOIL	na
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Vanadium	mg/kg	12.4		SOIL	20.4
TA3/5-107-SS-09	SNL0130142	F	17-MAY-94	0	Zinc	mg/kg	19.5		SOIL	62
TA3/5-107-SS-10	SNL0130146	F	17-MAY-94	0	Aluminum	mg/kg	4220		SOIL	na
TA3/5-107-SS-10	SNL0130146	F	17-MAY-94	0	Antimony	mg/kg	<6	U	SOIL	3.9
TA3/5-107-SS-10	SNL0130146	F	17-MAY-94	0	Arsenic	mg/kg	2.5		SOIL	4.4
TA3/5-107-SS-10	SNL0130146	F	17-MAY-94	0	Barium	mg/kg	61.7		SOIL	214
TA3/5-107-SS-10	SNL0130146	F	17-MAY-94	0	Beryllium	mg/kg	.31		SOIL	0.65
TA3/5-107-SS-10	SNL0130146	F	17-MAY-94	0	Cadmium	mg/kg	.53		SOIL	1
TA3/5-107-SS-10	SNL0130146	F	17-MAY-94	0	Calcium	mg/kg	2620		SOIL	na
TA3/5-107-SS-10	SNL0130146	F	17-MAY-94	0	Chromium	mg/kg	5.4		SOIL	21.8
TA3/5-107-SS-10	SNL0130146	F	17-MAY-94	0	Cobalt	mg/kg	3		SOIL	5.2
TA3/5-107-SS-10	SNL0130146	F	17-MAY-94	0	Copper	mg/kg	5.9		SOIL	15.4
TA3/5-107-SS-10	SNL0130146	F	17-MAY-94	0	Iron	mg/kg	6910		SOIL	na
TA3/5-107-SS-10	SNL0130146	F	17-MAY-94	0	Lead	mg/kg	9.2		SOIL	21.4

ER Site 107 RFI Analytical Results for Soil Samples; Metals (EPA Method 6010) and Nitrate/nitrite (EPA Method 353.2)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Material Description	MBLs
TA3/5-107-FB	SNL0130158	FB	17-MAY-94	0	Vanadium	mg/L	<.01	U	WATER	
TA3/5-107-FB	SNL0130158	FB	17-MAY-94	0	Zinc	mg/L	.02		WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Aluminum	mg/L	<.1	U	WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Antimony	mg/L	.03	J	WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Arsenic	mg/L	<.01	U	WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Barium	mg/L	<.01	U	WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Beryllium	mg/L	<.002	U	WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Cadmium	mg/L	<.005	U	WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Calcium	mg/L	.2		WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Chromium	mg/L	.0034	J	WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Cobalt	mg/L	<.01	U	WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Copper	mg/L	<.02	U	WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Iron	mg/L	.024	J	WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Lead	mg/L	.0044	B	WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Magnesium	mg/L	<.2	U	WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Manganese	mg/L	.004	J	WATER	
TA3/5-107-RB	SNL0130155	EB	17-MAY-94	0	Mercury	mg/L	<.0002	U	WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Nickel	mg/L	<.04	U	WATER	
TA3/5-107-RB	SNL0130156	EB	17-MAY-94	0	Nitrate/nitrite	mg/L	<.1	U	WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Potassium	mg/L	<5	U	WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Selenium	mg/L	.0058		WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Silver	mg/L	<.01	U	WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Sodium	mg/L	.75	J	WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Thallium	mg/L	<.01	U	WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Vanadium	mg/L	<.01	U	WATER	
TA3/5-107-RB	SNL0130154	EB	17-MAY-94	0	Zinc	mg/L	.053		WATER	

F - field sample
SD - spiked duplicate
D - duplicate
FB - field blank
EB - equipment blank

ER Site 107 RFI Analytical Results for Soil Samples; HE (EPA Method 8080; HPLC)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Material Description
TA3/5-107-SS-01	SNL0130112	F	17-MAY-94	0	2,4-Dinitrotoluene	mg/kg	<.25	U	SOIL
TA3/5-107-SS-01	SNL0130112	F	17-MAY-94	0	Amino-2,6-dinitrotoluene, 4-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-01	SNL0130112	F	17-MAY-94	0	Amino-4,6-dinitrotoluene, 2-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-01	SNL0130112	F	17-MAY-94	0	Dinitrobenzene, 1,3-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-01	SNL0130112	F	17-MAY-94	0	Dinitrotoluene, 2,6-	mg/kg	<.26	U	SOIL
TA3/5-107-SS-01	SNL0130112	F	17-MAY-94	0	HMX	mg/kg	<2.2	U	SOIL
TA3/5-107-SS-01	SNL0130112	F	17-MAY-94	0	Nitro-benzene	mg/kg	<.26	U	SOIL
TA3/5-107-SS-01	SNL0130112	F	17-MAY-94	0	Nitrotoluene, m-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-01	SNL0130112	F	17-MAY-94	0	Nitrotoluene, o-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-01	SNL0130112	F	17-MAY-94	0	Nitrotoluene, p-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-01	SNL0130112	F	17-MAY-94	0	RDX	mg/kg	<1	U	SOIL
TA3/5-107-SS-01	SNL0130112	F	17-MAY-94	0	Tetryl	mg/kg	<.65	U	SOIL
TA3/5-107-SS-01	SNL0130112	F	17-MAY-94	0	Trinitrobenzene, 1,3,5-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-01	SNL0130112	F	17-MAY-94	0	Trinitrotoluene, 2,4,6-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-02	SNL0130116	F	17-MAY-94	0	2,4-Dinitrotoluene	mg/kg	<.25	U	SOIL
TA3/5-107-SS-02	SNL0130116	F	17-MAY-94	0	Amino-2,6-dinitrotoluene, 4-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-02	SNL0130116	F	17-MAY-94	0	Amino-4,6-dinitrotoluene, 2-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-02	SNL0130116	F	17-MAY-94	0	Dinitrobenzene, 1,3-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-02	SNL0130116	F	17-MAY-94	0	Dinitrotoluene, 2,6-	mg/kg	<.26	U	SOIL
TA3/5-107-SS-02	SNL0130116	F	17-MAY-94	0	HMX	mg/kg	<2.2	U	SOIL
TA3/5-107-SS-02	SNL0130116	F	17-MAY-94	0	Nitro-benzene	mg/kg	<.26	U	SOIL
TA3/5-107-SS-02	SNL0130116	F	17-MAY-94	0	Nitrotoluene, m-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-02	SNL0130116	F	17-MAY-94	0	Nitrotoluene, o-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-02	SNL0130116	F	17-MAY-94	0	Nitrotoluene, p-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-02	SNL0130116	F	17-MAY-94	0	RDX	mg/kg	<1	U	SOIL
TA3/5-107-SS-02	SNL0130116	F	17-MAY-94	0	Tetryl	mg/kg	<.65	U	SOIL
TA3/5-107-SS-02	SNL0130116	F	17-MAY-94	0	Trinitrobenzene, 1,3,5-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-02	SNL0130116	F	17-MAY-94	0	Trinitrotoluene, 2,4,6-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-03	SNL0130120	F	17-MAY-94	0	2,4-Dinitrotoluene	mg/kg	<.25	U	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; HE (EPA Method 8080; HPLC)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Material Description
TA3/5-107-SS-03	SNL/NM16103-1	SD	17-MAY-94	0	2,4-Dinitrotoluene	mg/kg	5.2		SOIL
TA3/5-107-SS-03	SNL0130120	F	17-MAY-94	0	Amino-2,6-dinitrotoluene, 4-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-03	SNL/NM16103-1	SD	17-MAY-94	0	Amino-2,6-dinitrotoluene, 4-	mg/kg	5.1		SOIL
TA3/5-107-SS-03	SNL0130120	F	17-MAY-94	0	Amino-4,6-dinitrotoluene, 2-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-03	SNL/NM16103-1	SD	17-MAY-94	0	Amino-4,6-dinitrotoluene, 2-	mg/kg	5.3		SOIL
TA3/5-107-SS-03	SNL0130120	F	17-MAY-94	0	Dinitrobenzene, 1,3-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-03	SNL/NM16103-1	SD	17-MAY-94	0	Dinitrobenzene, 1,3-	mg/kg	5.4		SOIL
TA3/5-107-SS-03	SNL0130120	F	17-MAY-94	0	Dinitrotoluene, 2,6-	mg/kg	<.26	U	SOIL
TA3/5-107-SS-03	SNL/NM16103-1	SD	17-MAY-94	0	Dinitrotoluene, 2,6-	mg/kg	5.2		SOIL
TA3/5-107-SS-03	SNL0130120	F	17-MAY-94	0	HMX	mg/kg	<2.2	U	SOIL
TA3/5-107-SS-03	SNL/NM16103-1	SD	17-MAY-94	0	HMX	mg/kg	5.4		SOIL
TA3/5-107-SS-03	SNL0130120	F	17-MAY-94	0	Nitro-benzene	mg/kg	<.26	U	SOIL
TA3/5-107-SS-03	SNL/NM16103-1	SD	17-MAY-94	0	Nitro-benzene	mg/kg	5		SOIL
TA3/5-107-SS-03	SNL/NM16103-1	SD	17-MAY-94	0	Nitrotoluene, 2-	mg/kg	5.7		SOIL
TA3/5-107-SS-03	SNL/NM16103-1	SD	17-MAY-94	0	Nitrotoluene, 3-	mg/kg	4.1		SOIL
TA3/5-107-SS-03	SNL/NM16103-1	SD	17-MAY-94	0	Nitrotoluene, 4-	mg/kg	5.9		SOIL
TA3/5-107-SS-03	SNL0130120	F	17-MAY-94	0	Nitrotoluene, m-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-03	SNL0130120	F	17-MAY-94	0	Nitrotoluene, o-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-03	SNL0130120	F	17-MAY-94	0	Nitrotoluene, p-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-03	SNL0130120	F	17-MAY-94	0	RDX	mg/kg	<1	U	SOIL
TA3/5-107-SS-03	SNL/NM16103-1	SD	17-MAY-94	0	RDX	mg/kg	4.8		SOIL
TA3/5-107-SS-03	SNL0130120	F	17-MAY-94	0	Tetryl	mg/kg	<.65	U	SOIL
TA3/5-107-SS-03	SNL/NM16103-1	SD	17-MAY-94	0	Tetryl	mg/kg	2.4		SOIL
TA3/5-107-SS-03	SNL0130120	F	17-MAY-94	0	Trinitrobenzene, 1,3,5-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-03	SNL/NM16103-1	SD	17-MAY-94	0	Trinitrobenzene, 1,3,5-	mg/kg	5.4		SOIL
TA3/5-107-SS-03	SNL/NM16103-1	SD	17-MAY-94	0	Trinitrotoluene	mg/kg	4.4		SOIL
TA3/5-107-SS-03	SNL0130120	F	17-MAY-94	0	Trinitrotoluene, 2,4,6-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-04	SNL0130124	F	17-MAY-94	0	2,4-Dinitrotoluene	mg/kg	<.25	U	SOIL
TA3/5-107-SS-04	SNL0130124	F	17-MAY-94	0	Amino-2,6-dinitrotoluene, 4-	mg/kg	<.25	U	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; HE (EPA Method 8080; HPLC)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Material Description
TA3/5-107-SS-04	SNL0130124	F	17-MAY-94	0	Amino-4,6-dinitrotoluene, 2-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-04	SNL0130124	F	17-MAY-94	0	Dinitrobenzene, 1,3-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-04	SNL0130124	F	17-MAY-94	0	Dinitrotoluene, 2,6-	mg/kg	<.26	U	SOIL
TA3/5-107-SS-04	SNL0130124	F	17-MAY-94	0	HMX	mg/kg	<2.2	U	SOIL
TA3/5-107-SS-04	SNL0130124	F	17-MAY-94	0	Nitro-benzene	mg/kg	<.26	U	SOIL
TA3/5-107-SS-04	SNL0130124	F	17-MAY-94	0	Nitrotoluene, m-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-04	SNL0130124	F	17-MAY-94	0	Nitrotoluene, o-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-04	SNL0130124	F	17-MAY-94	0	Nitrotoluene, p-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-04	SNL0130124	F	17-MAY-94	0	RDX	mg/kg	<1	U	SOIL
TA3/5-107-SS-04	SNL0130124	F	17-MAY-94	0	Tetryl	mg/kg	<.65	U	SOIL
TA3/5-107-SS-04	SNL0130124	F	17-MAY-94	0	Trinitrobenzene, 1,3,5-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-04	SNL0130124	F	17-MAY-94	0	Trinitrotoluene, 2,4,6-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-05	SNL0130128	F	17-MAY-94	0	2,4-Dinitrotoluene	mg/kg	<.25	U	SOIL
TA3/5-107-SS-05	SNL0130128	F	17-MAY-94	0	Amino-2,6-dinitrotoluene, 4-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-05	SNL0130128	F	17-MAY-94	0	Amino-4,6-dinitrotoluene, 2-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-05	SNL0130128	F	17-MAY-94	0	Dinitrobenzene, 1,3-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-05	SNL0130128	F	17-MAY-94	0	Dinitrotoluene, 2,6-	mg/kg	<.26	U	SOIL
TA3/5-107-SS-05	SNL0130128	F	17-MAY-94	0	HMX	mg/kg	<2.2	U	SOIL
TA3/5-107-SS-05	SNL0130128	F	17-MAY-94	0	Nitro-benzene	mg/kg	<.26	U	SOIL
TA3/5-107-SS-05	SNL0130128	F	17-MAY-94	0	Nitrotoluene, m-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-05	SNL0130128	F	17-MAY-94	0	Nitrotoluene, o-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-05	SNL0130128	F	17-MAY-94	0	Nitrotoluene, p-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-05	SNL0130128	F	17-MAY-94	0	RDX	mg/kg	<1	U	SOIL
TA3/5-107-SS-05	SNL0130128	F	17-MAY-94	0	Tetryl	mg/kg	<.65	U	SOIL
TA3/5-107-SS-05	SNL0130128	F	17-MAY-94	0	Trinitrobenzene, 1,3,5-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-05	SNL0130128	F	17-MAY-94	0	Trinitrotoluene, 2,4,6-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-06	SNL0130132	F	17-MAY-94	0	2,4-Dinitrotoluene	mg/kg	<.25	U	SOIL
TA3/5-107-SS-06	SNL0130132	F	17-MAY-94	0	Amino-2,6-dinitrotoluene, 4-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-06	SNL0130132	F	17-MAY-94	0	Amino-4,6-dinitrotoluene, 2-	mg/kg	<.25	U	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; HE (EPA Method 8080; HPLC)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Material Description
TA3/5-107-SS-06	SNL0130132	F	17-MAY-94	0	Dinitrobenzene, 1,3-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-06	SNL0130132	F	17-MAY-94	0	Dinitrotoluene, 2,6-	mg/kg	<.26	U	SOIL
TA3/5-107-SS-06	SNL0130132	F	17-MAY-94	0	HMX	mg/kg	<2.2	U	SOIL
TA3/5-107-SS-06	SNL0130132	F	17-MAY-94	0	Nitro-benzene	mg/kg	<.26	U	SOIL
TA3/5-107-SS-06	SNL0130132	F	17-MAY-94	0	Nitrotoluene, m-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-06	SNL0130132	F	17-MAY-94	0	Nitrotoluene, o-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-06	SNL0130132	F	17-MAY-94	0	Nitrotoluene, p-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-06	SNL0130132	F	17-MAY-94	0	RDX	mg/kg	<1	U	SOIL
TA3/5-107-SS-06	SNL0130132	F	17-MAY-94	0	Tetryl	mg/kg	<.65	U	SOIL
TA3/5-107-SS-06	SNL0130132	F	17-MAY-94	0	Trinitrobenzene, 1,3,5-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-06	SNL0130132	F	17-MAY-94	0	Trinitrotoluene, 2,4,6-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-06D	SNL0130152	D	17-MAY-94	0	2,4-Dinitrotoluene	mg/kg	<.25	U	SOIL
TA3/5-107-SS-06D	SNL0130152	D	17-MAY-94	0	Amino-2,6-dinitrotoluene, 4-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-06D	SNL0130152	D	17-MAY-94	0	Amino-4,6-dinitrotoluene, 2-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-06D	SNL0130152	D	17-MAY-94	0	Dinitrobenzene, 1,3-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-06D	SNL0130152	D	17-MAY-94	0	Dinitrotoluene, 2,6-	mg/kg	<.26	U	SOIL
TA3/5-107-SS-06D	SNL0130152	D	17-MAY-94	0	HMX	mg/kg	<2.2	U	SOIL
TA3/5-107-SS-06D	SNL0130152	D	17-MAY-94	0	Nitro-benzene	mg/kg	<.26	U	SOIL
TA3/5-107-SS-06D	SNL0130152	D	17-MAY-94	0	Nitrotoluene, m-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-06D	SNL0130152	D	17-MAY-94	0	Nitrotoluene, o-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-06D	SNL0130152	D	17-MAY-94	0	Nitrotoluene, p-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-06D	SNL0130152	D	17-MAY-94	0	RDX	mg/kg	<1	U	SOIL
TA3/5-107-SS-06D	SNL0130152	D	17-MAY-94	0	Tetryl	mg/kg	<.65	U	SOIL
TA3/5-107-SS-06D	SNL0130152	D	17-MAY-94	0	Trinitrobenzene, 1,3,5-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-06D	SNL0130152	D	17-MAY-94	0	Trinitrotoluene, 2,4,6-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-07	SNL0130136	F	17-MAY-94	0	2,4-Dinitrotoluene	mg/kg	<.25	U	SOIL
TA3/5-107-SS-07	SNL0130136	F	17-MAY-94	0	Amino-2,6-dinitrotoluene, 4-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-07	SNL0130136	F	17-MAY-94	0	Amino-4,6-dinitrotoluene, 2-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-07	SNL0130136	F	17-MAY-94	0	Dinitrobenzene, 1,3-	mg/kg	<.25	U	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; HE (EPA Method 8080; HPLC)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Material Description
TA3/5-107-SS-07	SNL0130136	F	17-MAY-94	0	Dinitrotoluene, 2,6-	mg/kg	<.26	U	SOIL
TA3/5-107-SS-07	SNL0130136	F	17-MAY-94	0	HMX	mg/kg	<2.2	U	SOIL
TA3/5-107-SS-07	SNL0130136	F	17-MAY-94	0	Nitro-benzene	mg/kg	<.26	U	SOIL
TA3/5-107-SS-07	SNL0130136	F	17-MAY-94	0	Nitrotoluene, m-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-07	SNL0130136	F	17-MAY-94	0	Nitrotoluene, o-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-07	SNL0130136	F	17-MAY-94	0	Nitrotoluene, p-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-07	SNL0130136	F	17-MAY-94	0	RDX	mg/kg	<1	U	SOIL
TA3/5-107-SS-07	SNL0130136	F	17-MAY-94	0	Tetryl	mg/kg	<.65	U	SOIL
TA3/5-107-SS-07	SNL0130136	F	17-MAY-94	0	Trinitrobenzene, 1,3,5-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-07	SNL0130136	F	17-MAY-94	0	Trinitrotoluene, 2,4,6-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-08	SNL0130140	F	17-MAY-94	0	2,4-Dinitrotoluene	mg/kg	<.25	U	SOIL
TA3/5-107-SS-08	SNL0130140	F	17-MAY-94	0	Amino-2,6-dinitrotoluene, 4-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-08	SNL0130140	F	17-MAY-94	0	Amino-4,6-dinitrotoluene, 2-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-08	SNL0130140	F	17-MAY-94	0	Dinitrobenzene, 1,3-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-08	SNL0130140	F	17-MAY-94	0	Dinitrotoluene, 2,6-	mg/kg	<.26	U	SOIL
TA3/5-107-SS-08	SNL0130140	F	17-MAY-94	0	HMX	mg/kg	<2.2	U	SOIL
TA3/5-107-SS-08	SNL0130140	F	17-MAY-94	0	Nitro-benzene	mg/kg	<.26	U	SOIL
TA3/5-107-SS-08	SNL0130140	F	17-MAY-94	0	Nitrotoluene, m-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-08	SNL0130140	F	17-MAY-94	0	Nitrotoluene, o-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-08	SNL0130140	F	17-MAY-94	0	Nitrotoluene, p-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-08	SNL0130140	F	17-MAY-94	0	RDX	mg/kg	<1	U	SOIL
TA3/5-107-SS-08	SNL0130140	F	17-MAY-94	0	Tetryl	mg/kg	<.65	U	SOIL
TA3/5-107-SS-08	SNL0130140	F	17-MAY-94	0	Trinitrobenzene, 1,3,5-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-08	SNL0130140	F	17-MAY-94	0	Trinitrotoluene, 2,4,6-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-09	SNL0130144	F	17-MAY-94	0	2,4-Dinitrotoluene	mg/kg	<.25	U	SOIL
TA3/5-107-SS-09	SNL0130144	F	17-MAY-94	0	Amino-2,6-dinitrotoluene, 4-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-09	SNL0130144	F	17-MAY-94	0	Amino-4,6-dinitrotoluene, 2-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-09	SNL0130144	F	17-MAY-94	0	Dinitrobenzene, 1,3-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-09	SNL0130144	F	17-MAY-94	0	Dinitrotoluene, 2,6-	mg/kg	<.26	U	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; HE (EPA Method 8080; HPLC)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Material Description
TA3/5-107-SS-09	SNL0130144	F	17-MAY-94	0	HMX	mg/kg	<2.2	U	SOIL
TA3/5-107-SS-09	SNL0130144	F	17-MAY-94	0	Nitro-benzene	mg/kg	<.26	U	SOIL
TA3/5-107-SS-09	SNL0130144	F	17-MAY-94	0	Nitrotoluene, m-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-09	SNL0130144	F	17-MAY-94	0	Nitrotoluene, o-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-09	SNL0130144	F	17-MAY-94	0	Nitrotoluene, p-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-09	SNL0130144	F	17-MAY-94	0	RDX	mg/kg	<1	U	SOIL
TA3/5-107-SS-09	SNL0130144	F	17-MAY-94	0	Tetryl	mg/kg	<.65	U	SOIL
TA3/5-107-SS-09	SNL0130144	F	17-MAY-94	0	Trinitrobenzene, 1,3,5-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-09	SNL0130144	F	17-MAY-94	0	Trinitrotoluene, 2,4,6-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-10	SNL0130148	F	17-MAY-94	0	2,4-Dinitrotoluene	mg/kg	<.25	U	SOIL
TA3/5-107-SS-10	SNL0130148	F	17-MAY-94	0	Amino-2,6-dinitrotoluene, 4-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-10	SNL0130148	F	17-MAY-94	0	Amino-4,6-dinitrotoluene, 2-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-10	SNL0130148	F	17-MAY-94	0	Dinitrobenzene, 1,3-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-10	SNL0130148	F	17-MAY-94	0	Dinitrotoluene, 2,6-	mg/kg	<.26	U	SOIL
TA3/5-107-SS-10	SNL0130148	F	17-MAY-94	0	HMX	mg/kg	<2.2	U	SOIL
TA3/5-107-SS-10	SNL0130148	F	17-MAY-94	0	Nitro-benzene	mg/kg	<.26	U	SOIL
TA3/5-107-SS-10	SNL0130148	F	17-MAY-94	0	Nitrotoluene, m-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-10	SNL0130148	F	17-MAY-94	0	Nitrotoluene, o-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-10	SNL0130148	F	17-MAY-94	0	Nitrotoluene, p-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-10	SNL0130148	F	17-MAY-94	0	RDX	mg/kg	<1	U	SOIL
TA3/5-107-SS-10	SNL0130148	F	17-MAY-94	0	Tetryl	mg/kg	<.65	U	SOIL
TA3/5-107-SS-10	SNL0130148	F	17-MAY-94	0	Trinitrobenzene, 1,3,5-	mg/kg	<.25	U	SOIL
TA3/5-107-SS-10	SNL0130148	F	17-MAY-94	0	Trinitrotoluene, 2,4,6-	mg/kg	<.25	U	SOIL
TA3/5-107-RB	SNL0130153	EB	17-MAY-94	0	2,4-Dinitrotoluene	ug/L	<.02	U	WATER
TA3/5-107-RB	SNL0130153	EB	17-MAY-94	0	Amino-2,6-dinitrotoluene, 4-	ug/L	<.06	U	WATER
TA3/5-107-RB	SNL0130153	EB	17-MAY-94	0	Amino-4,6-dinitrotoluene, 2-	ug/L	<.035	U	WATER
TA3/5-107-RB	SNL0130153	EB	17-MAY-94	0	Dinitrobenzene, 1,3-	ug/L	<.11	U	WATER
TA3/5-107-RB	SNL0130153	EB	17-MAY-94	0	Dinitrotoluene, 2,6-	ug/L	<.31	U	WATER

ER Site 107 RFI Analytical Results for Soil Samples; HE (EPA Method 8080; HPLC)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Material Description
TA3/5-107-RB	SNL0130153	EB	17-MAY-94	0	HMX	ug/L	<.8	U	WATER
TA3/5-107-RB	SNL0130153	EB	17-MAY-94	0	Nitro-benzene	ug/L	<.25	U	WATER
TA3/5-107-RB	SNL0130153	EB	17-MAY-94	0	Nitrotoluene, m-	ug/L	<.25	U	WATER
TA3/5-107-RB	SNL0130153	EB	17-MAY-94	0	Nitrotoluene, o-	ug/L	<.25	U	WATER
TA3/5-107-RB	SNL0130153	EB	17-MAY-94	0	Nitrotoluene, p-	ug/L	<.25	U	WATER
TA3/5-107-RB	SNL0130153	EB	17-MAY-94	0	RDX	ug/L	<.84	U	WATER
TA3/5-107-RB	SNL0130153	EB	17-MAY-94	0	Tetryl	ug/L	<.8	U	WATER
TA3/5-107-RB	SNL0130153	EB	17-MAY-94	0	Trinitrobenzene, 1,3,5-	ug/L	<.26	U	WATER
TA3/5-107-RB	SNL0130153	EB	17-MAY-94	0	Trinitrotoluene, 2,4,6-	ug/L	<.11	U	WATER
TA3/5-107-FB	SNL0130157	FB	17-MAY-94	0	2,4-Dinitrotoluene	ug/L	<.02	U	WATER
TA3/5-107-FB	SNL0130157	FB	17-MAY-94	0	Amino-2,6-dinitrotoluene, 4-	ug/L	<.06	U	WATER
TA3/5-107-FB	SNL0130157	FB	17-MAY-94	0	Amino-4,6-dinitrotoluene, 2-	ug/L	<.035	U	WATER
TA3/5-107-FB	SNL0130157	FB	17-MAY-94	0	Dinitrobenzene, 1,3-	ug/L	<.11	U	WATER
TA3/5-107-FB	SNL0130157	FB	17-MAY-94	0	Dinitrotoluene, 2,6-	ug/L	<.31	U	WATER
TA3/5-107-FB	SNL0130157	FB	17-MAY-94	0	HMX	ug/L	<.8	U	WATER
TA3/5-107-FB	SNL0130157	FB	17-MAY-94	0	Nitro-benzene	ug/L	<.25	U	WATER
TA3/5-107-FB	SNL0130157	FB	17-MAY-94	0	Nitrotoluene, m-	ug/L	<.25	U	WATER
TA3/5-107-FB	SNL0130157	FB	17-MAY-94	0	Nitrotoluene, o-	ug/L	<.25	U	WATER
TA3/5-107-FB	SNL0130157	FB	17-MAY-94	0	Nitrotoluene, p-	ug/L	<.25	U	WATER
TA3/5-107-FB	SNL0130157	FB	17-MAY-94	0	RDX	ug/L	<.84	U	WATER
TA3/5-107-FB	SNL0130157	FB	17-MAY-94	0	Tetryl	ug/L	<.8	U	WATER
TA3/5-107-FB	SNL0130157	FB	17-MAY-94	0	Trinitrobenzene, 1,3,5-	ug/L	<.26	U	WATER
TA3/5-107-FB	SNL0130157	FB	17-MAY-94	0	Trinitrotoluene, 2,4,6-	ug/L	<.11	U	WATER

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Actinium-227	pCi/g	<.804	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Actinium-228	pCi/g	.692		0.117	SOIL
TA3/5-107-SS-01	SNL0130549	F	17-MAY-94	0	Actinium-228	pCi/g	.71		0.23	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Americium-241	pCi/g	<.125	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Antimony-124	pCi/g	<.0144	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Antimony-125	pCi/g	<.0424	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Antimony-126	pCi/g	<.0176	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Barium-133	pCi/g	<.0229	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Barium-140	pCi/g	<.0494	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Bismuth-207	pCi/g	<.0192	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Bismuth-212	pCi/g	.331		0.193	SOIL
TA3/5-107-SS-01	SNL0130549	F	17-MAY-94	0	Bismuth-212	pCi/g	1.2		0.71	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Bismuth-214	pCi/g	.471		0.0605	SOIL
TA3/5-107-SS-01	SNL0130549	F	17-MAY-94	0	Bismuth-214	pCi/g	.62		0.098	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Cerium-139	pCi/g	<.0155	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Cerium-144	pCi/g	<.109	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Cesium-134	pCi/g	<.0151	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Cesium-137	pCi/g	.191		0.0306	SOIL
TA3/5-107-SS-01	SNL0130549	F	17-MAY-94	0	Cesium-137	pCi/g	.15		0.062	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Chromium-51	pCi/g	<.146	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Cobalt-56	pCi/g	<.0233	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Cobalt-57	pCi/g	<.0148	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Cobalt-58	pCi/g	<.014	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130549	F	17-MAY-94	0	Cobalt-60	pCi/g	<.058	U	999.999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Cobalt-60	pCi/g	<.0236	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130549	F	17-MAY-94	0	Cobalt-60	pCi/g	<.058	U	999.999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Copper-64	pCi/g	<24.4	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Europium-152	pCi/g	<.0448	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Europium-154	pCi/g	<.075	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Europium-155	pCi/g	<.0719	U	999.9999	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Gadolinium-153	pCi/g	<.048	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Indium-115M	pCi/g	<2.34	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Iodine-125	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Iodine-129	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Iodine-131	pCi/g	<.0182	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Iridium-192	pCi/g	<.0157	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Iron-59	pCi/g	<.034	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Lanthanum-140	pCi/g	<.0246	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Lead-210	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Lead-212	pCi/g	.646		0.0452	SOIL
TA3/5-107-SS-01	SNL0130549	F	17-MAY-94	0	Lead-212	pCi/g	.71		0.079	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Lead-214	pCi/g	.48		0.0662	SOIL
TA3/5-107-SS-01	SNL0130549	F	17-MAY-94	0	Lead-214	pCi/g	.56		0.12	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Mercury-203	pCi/g	<.0187	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Neptunium-237	pCi/g	<.147	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Niobium-95	pCi/g	<.0629	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Potassium-40	pCi/g	15.6		0.723	SOIL
TA3/5-107-SS-01	SNL0130549	F	17-MAY-94	0	Potassium-40	pCi/g	15		1.2	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Protactinium-231	pCi/g	<.735	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Protactinium-233	pCi/g	<.0385	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Radium-224	pCi/g	2.27		0.676	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Radium-226	pCi/g	1.33		0.573	SOIL
TA3/5-107-SS-01	SNL0130549	F	17-MAY-94	0	Radium-226	pCi/g	.6		0.095	SOIL
TA3/5-107-SS-01	SNL0130549	F	17-MAY-94	0	Radium-228	pCi/g	.71		0.23	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Radium-228	pCi/g	.767		0.13	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Ruthenium-103	pCi/g	<.0157	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Ruthenium-106	pCi/g	<.13	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Scandium-46	pCi/g	<.0161	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Silver-110	pCi/g	<.0156	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Sodium-22	pCi/g	<.0249	U	999.9999	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Sodium-24	pCi/g	<.0455	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Strontium-85	pCi/g	<.0148	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Tantalum-182	pCi/g	<.176	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Thallium-201	pCi/g	<.157	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Thallium-208	pCi/g	.216		0.0363	SOIL
TA3/5-107-SS-01	SNL0130549	F	17-MAY-94	0	Thallium-208	pCi/g	.7		0.18	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Thorium-227	pCi/g	<.114	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Thorium-228	pCi/g	.643		0.045	SOIL
TA3/5-107-SS-01	SNL0130549	F	17-MAY-94	0	Thorium-228	pCi/g	.76		0.2	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Thorium-229	pCi/g	<.062	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Thorium-231	pCi/g	<.33	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Thorium-232	pCi/g	.767		0.13	SOIL
TA3/5-107-SS-01	SNL0130549	F	17-MAY-94	0	Thorium-232	pCi/g	.71		0.23	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Thorium-234	pCi/g	1.06		0.394	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Tin-113	pCi/g	<.0222	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Uranium-234	pCi/g	<5.34	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Uranium-235	pCi/g	<.0298	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Uranium-238	pCi/g	1.06		0.393	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Xenon-133,-133M	pCi/g	<.0763	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Yttrium-88	pCi/g	<.0178	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Zinc-65	pCi/g	<.043	U	999.9999	SOIL
TA3/5-107-SS-01	SNL0130630	F	17-MAY-94	0	Zirconium-95	pCi/g	<.0255	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Actinium-227	pCi/g	<.867	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Actinium-228	pCi/g	.691		0.143	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Actinium-228	pCi/g	.96		0.29	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Actinium-228	pCi/g	.96		0.29	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Americium-241	pCi/g	<.128	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Antimony-124	pCi/g	<.0153	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Antimony-125	pCi/g	<.0477	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Antimony-126	pCi/g	<.0156	U	999.9999	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Barium-133	pCi/g	<.0227	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Barium-140	pCi/g	<.061	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Beryllium-7	pCi/g	<.152	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Bismuth-207	pCi/g	<.0191	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Bismuth-212	pCi/g	1.2		0.71	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Bismuth-212	pCi/g	1.2		0.71	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Bismuth-212	pCi/g	.37		0.203	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Bismuth-214	pCi/g	.75		0.12	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Bismuth-214	pCi/g	.75		0.12	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Bismuth-214	pCi/g	.442		0.0718	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Cadmium-109	pCi/g	<.634	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Cerium-139	pCi/g	<.016	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Cerium-144	pCi/g	<.116	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Cesium-134	pCi/g	<.0141	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Cesium-137	pCi/g	.2		0.079	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Cesium-137	pCi/g	.2		0.079	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Cesium-137	pCi/g	.169		0.0357	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Chromium-51	pCi/g	<.149	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Cobalt-56	pCi/g	<.0232	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Cobalt-57	pCi/g	<.0149	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Cobalt-58	pCi/g	<.0145	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Cobalt-60	pCi/g	<.049	U	999.999	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Cobalt-60	pCi/g	<.049	U	999.999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Cobalt-60	pCi/g	<.0219	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Cobalt-60	pCi/g	<.049	U	999.999	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Cobalt-60	pCi/g	<.049	U	999.999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Copper-64	pCi/g	<24.5	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Europium-152	pCi/g	<.0446	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Europium-154	pCi/g	<.0814	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Europium-155	pCi/g	<.0755	U	999.9999	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Gadolinium-153	pCi/g	<.0497	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Indium-115M	pCi/g	<2.16	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Iodine-125	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Iodine-129	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Iodine-131	pCi/g	<.0175	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Iridium-192	pCi/g	<.0164	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Iron-59	pCi/g	<.0425	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Lanthanum-140	pCi/g	<.0228	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Lead-210	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Lead-212	pCi/g	.697		0.0482	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Lead-212	pCi/g	.77		0.084	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Lead-212	pCi/g	.77		0.084	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Lead-214	pCi/g	.76		0.13	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Lead-214	pCi/g	.76		0.13	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Lead-214	pCi/g	.572		0.0701	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Manganese-54	pCi/g	<.0195	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Mercury-203	pCi/g	<.0211	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Neptunium-237	pCi/g	<.162	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Niobium-95	pCi/g	<.0665	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Potassium-40	pCi/g	15		1.2	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Potassium-40	pCi/g	15		1.2	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Potassium-40	pCi/g	15.6		0.723	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Protactinium-231	pCi/g	<.773	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Protactinium-233	pCi/g	<.0369	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Radium-224	pCi/g	.653		0.567	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Radium-226	pCi/g	.73		0.12	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Radium-226	pCi/g	.73		0.12	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Radium-226	pCi/g	.971		0.605	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Radium-228	pCi/g	.765		0.159	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Radium-228	pCi/g	.96		0.29	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Radium-228	pCi/g	.96		0.29	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Ruthenium-103	pCi/g	<.0155	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Ruthenium-106	pCi/g	<.161	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Scandium-46	pCi/g	<.016	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Silver-110	pCi/g	<.016	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Sodium-22	pCi/g	<.018	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Sodium-24	pCi/g	<.05	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Strontium-85	pCi/g	<.0166	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Tantalum-182	pCi/g	<.159	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Thallium-201	pCi/g	<.159	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Thallium-208	pCi/g	.74		0.21	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Thallium-208	pCi/g	.74		0.21	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Thallium-208	pCi/g	.283		0.0351	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Thorium-227	pCi/g	<.119	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Thorium-228	pCi/g	.8		0.22	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Thorium-228	pCi/g	.8		0.22	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Thorium-228	pCi/g	.694		0.048	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Thorium-229	pCi/g	<.0654	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Thorium-231	pCi/g	<.348	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Thorium-232	pCi/g	.765		0.159	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Thorium-232	pCi/g	.96		0.29	SOIL
TA3/5-107-SS-02	SNL0130550	F	17-MAY-94	0	Thorium-232	pCi/g	.96		0.29	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Thorium-234	pCi/g	<.387	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Tin-113	pCi/g	<.0221	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Uranium-234	pCi/g	<5.37	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Uranium-235	pCi/g	<.0309	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Uranium-238	pCi/g	<.404	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Xenon-133,-133M	pCi/g	<.0756	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Yttrium-88	pCi/g	<.018	U	999.9999	SOIL
TA3/5-107-SS-02	SNL0130631	F	17-MAY-94	0	Zinc-65	pCi/g	<.0438	U	999.9999	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Scandium-46	pCi/g	<.0175	U	999.9999	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Silver-110	pCi/g	<.0155	U	999.9999	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Sodium-22	pCi/g	<.024	U	999.9999	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Sodium-24	pCi/g	<.0737	U	999.9999	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Strontium-85	pCi/g	<.0176	U	999.9999	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Tantalum-182	pCi/g	<.181	U	999.9999	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Thallium-201	pCi/g	<.177	U	999.9999	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Thallium-208	pCi/g	.269		0.0323	SOIL
TA3/5-107-SS-03	SNL0130551	F	17-MAY-94	0	Thallium-208	pCi/g	.84		0.19	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Thorium-227	pCi/g	<.125	U	999.9999	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Thorium-228	pCi/g	.826		0.055	SOIL
TA3/5-107-SS-03	SNL0130551	F	17-MAY-94	0	Thorium-228	pCi/g	.91		0.21	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Thorium-229	pCi/g	<.0703	U	999.9999	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Thorium-231	pCi/g	.456		0.368	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Thorium-232	pCi/g	<.226	U	999.9999	SOIL
TA3/5-107-SS-03	SNL0130551	F	17-MAY-94	0	Thorium-232	pCi/g	.98		0.27	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Thorium-234	pCi/g	<.398	U	999.9999	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Tin-113	pCi/g	<.0231	U	999.9999	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Uranium-234	pCi/g	<5.67	U	999.9999	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Uranium-235	pCi/g	<.0336	U	999.9999	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Uranium-238	pCi/g	<.42	U	999.9999	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Xenon-133,-133M	pCi/g	<.0824	U	999.9999	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Yttrium-88	pCi/g	<.0171	U	999.9999	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Zinc-65	pCi/g	<.0455	U	999.9999	SOIL
TA3/5-107-SS-03	SNL0130632	F	17-MAY-94	0	Zirconium-95	pCi/g	<.0296	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Actinium-227	pCi/g	<.897	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130552	F	17-MAY-94	0	Actinium-228	pCi/g	.94		0.26	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Actinium-228	pCi/g	.836		0.132	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Americium-241	pCi/g	<.14	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Antimony-124	pCi/g	<.0182	U	999.9999	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Antimony-125	pCi/g	<.0448	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Antimony-126	pCi/g	<.0169	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Barium-133	pCi/g	<.0249	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Barium-140	pCi/g	<.066	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Beryllium-7	pCi/g	<.156	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Bismuth-207	pCi/g	<.0216	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Bismuth-212	pCi/g	.609		0.244	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Bismuth-214	pCi/g	.504		0.0722	SOIL
TA3/5-107-SS-04	SNL0130552	F	17-MAY-94	0	Bismuth-214	pCi/g	.75		0.14	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Cadmium-109	pCi/g	<.682	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Cerium-139	pCi/g	<.0167	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Cerium-144	pCi/g	<.126	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Cesium-134	pCi/g	<.0173	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130552	F	17-MAY-94	0	Cesium-137	pCi/g	.22		0.071	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Cesium-137	pCi/g	.196		0.041	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Chromium-51	pCi/g	<.151	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Cobalt-56	pCi/g	<.0274	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Cobalt-57	pCi/g	<.0166	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Cobalt-58	pCi/g	<.0169	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130552	F	17-MAY-94	0	Cobalt-60	pCi/g	<.055	U	999.999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Cobalt-60	pCi/g	<.0236	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130552	F	17-MAY-94	0	Cobalt-60	pCi/g	<.055	U	999.999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Copper-64	pCi/g	<40	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Europium-152	pCi/g	<.0498	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Europium-154	pCi/g	<.0809	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Europium-155	pCi/g	<.079	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Gadolinium-153	pCi/g	<.0531	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Indium-115M	pCi/g	<5.18	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Iodine-125	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Iodine-129	pCi/g	<0	U	999.9999	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Iodine-131	pCi/g	<.0194	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Iridium-192	pCi/g	<.0182	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Iron-59	pCi/g	<.0383	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Lanthanum-140	pCi/g	<.0274	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Lead-210	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Lead-212	pCi/g	.787		0.0568	SOIL
TA3/5-107-SS-04	SNL0130552	F	17-MAY-94	0	Lead-212	pCi/g	.81		0.089	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Lead-214	pCi/g	.59		0.0758	SOIL
TA3/5-107-SS-04	SNL0130552	F	17-MAY-94	0	Lead-214	pCi/g	.77		0.17	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Manganese-54	pCi/g	<.0189	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Mercury-203	pCi/g	<.0203	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Niobium-95	pCi/g	<.0729	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130552	F	17-MAY-94	0	Potassium-40	pCi/g	17		1.3	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Potassium-40	pCi/g	15.8		0.781	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Protactinium-231	pCi/g	<.761	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Protactinium-233	pCi/g	<.0379	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130552	F	17-MAY-94	0	Radium-223	pCi/g	.39		0.2	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Radium-224	pCi/g	1.23		0.568	SOIL
TA3/5-107-SS-04	SNL0130552	F	17-MAY-94	0	Radium-226	pCi/g	.73		0.14	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Radium-226	pCi/g	1.91		0.696	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Radium-228	pCi/g	.926		0.146	SOIL
TA3/5-107-SS-04	SNL0130552	F	17-MAY-94	0	Radium-228	pCi/g	.94		0.26	SOIL
TA3/5-107-SS-04	SNL0130552	F	17-MAY-94	0	Radon-219	pCi/g	.5		0.25	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Ruthenium-103	pCi/g	<.0192	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Ruthenium-106	pCi/g	<.143	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Scandium-46	pCi/g	<.0197	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Silver-110	pCi/g	<.0156	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Sodium-22	pCi/g	<.023	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Sodium-24	pCi/g	<.0819	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Strontium-85	pCi/g	<.017	U	999.9999	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Tantalum-182	pCi/g	<.187	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Thallium-201	pCi/g	<.177	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130552	F	17-MAY-94	0	Thallium-208	pCi/g	.86		0.2	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Thallium-208	pCi/g	.233		0.0374	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Thorium-227	pCi/g	<.126	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130552	F	17-MAY-94	0	Thorium-228	pCi/g	.92		0.22	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Thorium-228	pCi/g	.783		0.0566	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Thorium-229	pCi/g	<.0683	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Thorium-231	pCi/g	<.363	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Thorium-232	pCi/g	.926		0.146	SOIL
TA3/5-107-SS-04	SNL0130552	F	17-MAY-94	0	Thorium-232	pCi/g	.94		0.26	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Thorium-234	pCi/g	.982		0.437	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Tin-113	pCi/g	<.0229	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Uranium-234	pCi/g	<5.8	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Uranium-235	pCi/g	<.0332	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Uranium-238	pCi/g	.98		0.437	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Xenon-133,-133M	pCi/g	<.0851	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Yttrium-88	pCi/g	<.0193	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Zinc-65	pCi/g	<.0525	U	999.9999	SOIL
TA3/5-107-SS-04	SNL0130633	F	17-MAY-94	0	Zirconium-95	pCi/g	<.0329	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Actinium-227	pCi/g	<.892	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Actinium-228	pCi/g	.746		0.125	SOIL
TA3/5-107-SS-05	SNL0130553	F	17-MAY-94	0	Actinium-228	pCi/g	.79		0.25	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Americium-241	pCi/g	<.131	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Antimony-124	pCi/g	<.0149	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Antimony-125	pCi/g	<.0444	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Antimony-126	pCi/g	<.0163	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Barium-133	pCi/g	<.0209	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Barium-140	pCi/g	<.0592	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Beryllium-7	pCi/g	<.14	U	999.9999	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Bismuth-207	pCi/g	<.0173	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Bismuth-212	pCi/g	.458		0.176	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Bismuth-214	pCi/g	.523		0.0693	SOIL
TA3/5-107-SS-05	SNL0130553	F	17-MAY-94	0	Bismuth-214	pCi/g	.75		0.16	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Cadmium-109	pCi/g	<.633	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Cerium-139	pCi/g	<.014	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Cerium-144	pCi/g	<.113	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Cesium-134	pCi/g	<.0147	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Cesium-137	pCi/g	.148		0.0256	SOIL
TA3/5-107-SS-05	SNL0130553	F	17-MAY-94	0	Cesium-137	pCi/g	.16		0.077	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Chromium-51	pCi/g	<.134	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Cobalt-56	pCi/g	<.0232	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Cobalt-57	pCi/g	<.0149	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Cobalt-58	pCi/g	<.0144	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Cobalt-60	pCi/g	<.025	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130553	F	17-MAY-94	0	Cobalt-60	pCi/g	<.061	U	999.999	SOIL
TA3/5-107-SS-05	SNL0130553	F	17-MAY-94	0	Cobalt-60	pCi/g	<.061	U	999.999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Copper-64	pCi/g	<26.7	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Europium-152	pCi/g	<.0446	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Europium-154	pCi/g	<.0689	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Europium-155	pCi/g	<.076	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Gadolinium-153	pCi/g	<.0476	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Indium-115M	pCi/g	<5.34	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Iodine-125	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Iodine-129	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Iodine-131	pCi/g	<.0178	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Iridium-192	pCi/g	<.0154	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Iron-59	pCi/g	<.0383	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Lanthanum-140	pCi/g	<.027	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Lead-210	pCi/g	<0	U	999.9999	SOIL

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ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Lead-212	pCi/g	.681		0.0489	SOIL
TA3/5-107-SS-05	SNL0130553	F	17-MAY-94	0	Lead-212	pCi/g	.88		0.087	SOIL
TA3/5-107-SS-05	SNL0130553	F	17-MAY-94	0	Lead-214	pCi/g	.78		0.13	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Lead-214	pCi/g	.625		0.068	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Manganese-54	pCi/g	<.015	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Mercury-203	pCi/g	<.0194	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Niobium-95	pCi/g	<.0708	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Potassium-40	pCi/g	16.6		0.722	SOIL
TA3/5-107-SS-05	SNL0130553	F	17-MAY-94	0	Potassium-40	pCi/g	16		1.4	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Protactinium-231	pCi/g	<.773	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Protactinium-233	pCi/g	<.0362	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Radium-224	pCi/g	1.31		0.646	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Radium-226	pCi/g	1.33		0.502	SOIL
TA3/5-107-SS-05	SNL0130553	F	17-MAY-94	0	Radium-226	pCi/g	.73		0.16	SOIL
TA3/5-107-SS-05	SNL0130553	F	17-MAY-94	0	Radium-228	pCi/g	.79		0.25	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Radium-228	pCi/g	.826		0.138	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Ruthenium-103	pCi/g	<.0145	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Ruthenium-106	pCi/g	<.131	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Scandium-46	pCi/g	<.0163	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Silver-110	pCi/g	<.0161	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Sodium-22	pCi/g	<.0207	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Sodium-24	pCi/g	<.0831	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Strontium-85	pCi/g	<.0165	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Tantalum-182	pCi/g	<.165	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Thallium-201	pCi/g	<.157	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Thallium-208	pCi/g	.243		0.0328	SOIL
TA3/5-107-SS-05	SNL0130553	F	17-MAY-94	0	Thallium-208	pCi/g	.8		0.22	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Thorium-227	pCi/g	<.117	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Thorium-228	pCi/g	.678		0.0487	SOIL
TA3/5-107-SS-05	SNL0130553	F	17-MAY-94	0	Thorium-228	pCi/g	.86		0.23	SOIL

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ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Thorium-229	pCi/g	<.0676	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Thorium-231	pCi/g	<.338	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130553	F	17-MAY-94	0	Thorium-232	pCi/g	.79		0.25	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Thorium-232	pCi/g	.826		0.138	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Thorium-234	pCi/g	<.377	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Tin-113	pCi/g	<.0216	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Uranium-234	pCi/g	<5.42	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Uranium-235	pCi/g	<.0325	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Uranium-238	pCi/g	<.389	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Xenon-133,-133M	pCi/g	<.0782	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Yttrium-88	pCi/g	<.0172	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Zinc-65	pCi/g	<.0397	U	999.9999	SOIL
TA3/5-107-SS-05	SNL0130634	F	17-MAY-94	0	Zirconium-95	pCi/g	<.0285	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Actinium-227	pCi/g	<.933	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130554	F	17-MAY-94	0	Actinium-228	pCi/g	1.1		0.25	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Actinium-228	pCi/g	.86		0.143	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Americium-241	pCi/g	<.13	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Antimony-124	pCi/g	<.0175	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Antimony-125	pCi/g	<.05	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Antimony-126	pCi/g	<.0198	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Barium-133	pCi/g	<.026	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Barium-140	pCi/g	<.068	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Beryllium-7	pCi/g	<.138	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Bismuth-207	pCi/g	<.0197	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Bismuth-212	pCi/g	.515		0.198	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Bismuth-214	pCi/g	.548		0.0726	SOIL
TA3/5-107-SS-06	SNL0130554	F	17-MAY-94	0	Bismuth-214	pCi/g	.71		0.13	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Cadmium-109	pCi/g	<.704	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Cerium-139	pCi/g	<.0172	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Cerium-144	pCi/g	<.131	U	999.9999	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Cesium-134	pCi/g	<.0169	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130554	F	17-MAY-94	0	Cesium-137	pCi/g	.15		0.066	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Cesium-137	pCi/g	.195		0.0407	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Chromium-51	pCi/g	<.149	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Cobalt-56	pCi/g	<.0229	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Cobalt-57	pCi/g	<.0163	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Cobalt-58	pCi/g	<.0192	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130554	F	17-MAY-94	0	Cobalt-60	pCi/g	<.055	U	999.999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Cobalt-60	pCi/g	<.0252	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130554	F	17-MAY-94	0	Cobalt-60	pCi/g	<.055	U	999.999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Copper-64	pCi/g	<42.8	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Europium-152	pCi/g	<.0491	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Europium-154	pCi/g	<.0832	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Europium-155	pCi/g	<.0757	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Gadolinium-153	pCi/g	<.0537	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Indium-115M	pCi/g	<6.9	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Iodine-125	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Iodine-129	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Iodine-131	pCi/g	<.0207	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Iridium-192	pCi/g	<.0178	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Iron-59	pCi/g	<.0432	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Lanthanum-140	pCi/g	<.02	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Lead-210	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130554	F	17-MAY-94	0	Lead-212	pCi/g	.88		0.086	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Lead-212	pCi/g	.67		0.0671	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Lead-214	pCi/g	.621		0.0798	SOIL
TA3/5-107-SS-06	SNL0130554	F	17-MAY-94	0	Lead-214	pCi/g	.76		0.13	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Manganese-54	pCi/g	<.0177	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Mercury-203	pCi/g	<.0212	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Niobium-95	pCi/g	<.0781	U	999.9999	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-06	SNL0130554	F	17-MAY-94	0	Potassium-40	pCi/g	16		1.2	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Potassium-40	pCi/g	17		0.796	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Protactinium-231	pCi/g	<.81	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Protactinium-233	pCi/g	<.0369	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Radium-224	pCi/g	<.563	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130554	F	17-MAY-94	0	Radium-226	pCi/g	.69		0.13	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Radium-226	pCi/g	1.54		0.633	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Radium-228	pCi/g	.953		0.159	SOIL
TA3/5-107-SS-06	SNL0130554	F	17-MAY-94	0	Radium-228	pCi/g	1.1		0.25	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Ruthenium-103	pCi/g	<.0178	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Ruthenium-106	pCi/g	<.161	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Scandium-46	pCi/g	<.0202	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Silver-110	pCi/g	<.018	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Sodium-22	pCi/g	<.0269	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Sodium-24	pCi/g	<.0687	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Strontium-85	pCi/g	<.0178	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Tantalum-182	pCi/g	<.159	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Thallium-201	pCi/g	<.186	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Thallium-208	pCi/g	.246		0.0418	SOIL
TA3/5-107-SS-06	SNL0130554	F	17-MAY-94	0	Thallium-208	pCi/g	.77		0.17	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Thorium-227	pCi/g	<.132	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Thorium-228	pCi/g	.667		0.0668	SOIL
TA3/5-107-SS-06	SNL0130554	F	17-MAY-94	0	Thorium-228	pCi/g	.84		0.18	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Thorium-229	pCi/g	<.0671	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Thorium-231	pCi/g	<.367	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Thorium-232	pCi/g	.953		0.159	SOIL
TA3/5-107-SS-06	SNL0130554	F	17-MAY-94	0	Thorium-232	pCi/g	1.1		0.25	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Thorium-234	pCi/g	<.393	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Tin-113	pCi/g	<.0227	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Uranium-234	pCi/g	<6.03	U	999.9999	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Uranium-235	pCi/g	<.0319	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Uranium-238	pCi/g	<.416	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Xenon-133,-133M	pCi/g	<.086	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Yttrium-88	pCi/g	<.0213	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Zinc-65	pCi/g	<.0517	U	999.9999	SOIL
TA3/5-107-SS-06	SNL0130635	F	17-MAY-94	0	Zirconium-95	pCi/g	<.0314	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Actinium-227	pCi/g	<.949	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Actinium-228	pCi/g	.898		0.116	SOIL
TA3/5-107-SS-06D	SNL0130559	D	17-MAY-94	0	Actinium-228	pCi/g	.91		0.3	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Americium-241	pCi/g	<.134	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Antimony-124	pCi/g	<.0159	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Antimony-125	pCi/g	<.0493	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Antimony-126	pCi/g	<.0188	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Barium-133	pCi/g	<.0256	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Barium-140	pCi/g	<.0575	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Beryllium-7	pCi/g	<.147	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Bismuth-207	pCi/g	<.02	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Bismuth-212	pCi/g	.449		0.205	SOIL
TA3/5-107-SS-06D	SNL0130559	D	17-MAY-94	0	Bismuth-212	pCi/g	1.6		0.79	SOIL
TA3/5-107-SS-06D	SNL0130559	D	17-MAY-94	0	Bismuth-214	pCi/g	.54		0.15	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Bismuth-214	pCi/g	.535		0.0766	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Cerium-139	pCi/g	<.0158	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Cerium-144	pCi/g	<.121	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Cesium-134	pCi/g	<.0151	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Cesium-137	pCi/g	.177		0.0323	SOIL
TA3/5-107-SS-06D	SNL0130559	D	17-MAY-94	0	Cesium-137	pCi/g	.18		0.065	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Chromium-51	pCi/g	<.162	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Cobalt-56	pCi/g	<.0243	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Cobalt-57	pCi/g	<.0161	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Cobalt-58	pCi/g	<.0173	U	999.9999	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-06D	SNL0130559	D	17-MAY-94	0	Cobalt-60	pCi/g	<.048	U	999.999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Cobalt-60	pCi/g	<.0283	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130559	D	17-MAY-94	0	Cobalt-60	pCi/g	<.048	U	999.999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Copper-64	pCi/g	<17.9	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Europium-152	pCi/g	<.0468	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Europium-154	pCi/g	<.0814	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Gadolinium-153	pCi/g	<.0495	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Indium-115M	pCi/g	<.676	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Iodine-125	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Iodine-129	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Iodine-131	pCi/g	<.0198	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Iridium-192	pCi/g	<.0183	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Iron-59	pCi/g	<.0397	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Lanthanum-140	pCi/g	<.017	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Lead-210	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Lead-212	pCi/g	.744		0.0533	SOIL
TA3/5-107-SS-06D	SNL0130559	D	17-MAY-94	0	Lead-212	pCi/g	.84		0.086	SOIL
TA3/5-107-SS-06D	SNL0130559	D	17-MAY-94	0	Lead-214	pCi/g	.78		0.13	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Lead-214	pCi/g	.616		0.0687	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Manganese-54	pCi/g	<.0207	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Manganese-56	pCi/g	<4.2	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Mercury-203	pCi/g	<.0205	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Niobium-95	pCi/g	<.0669	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Potassium-40	pCi/g	16.8		0.772	SOIL
TA3/5-107-SS-06D	SNL0130559	D	17-MAY-94	0	Potassium-40	pCi/g	17		1.3	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Protactinium-231	pCi/g	<.802	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Protactinium-233	pCi/g	<.0368	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Radium-224	pCi/g	2.94		0.797	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Radium-226	pCi/g	2.02		0.581	SOIL
TA3/5-107-SS-06D	SNL0130559	D	17-MAY-94	0	Radium-226	pCi/g	.53		0.14	SOIL

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ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-06D	SNL0130559	D	17-MAY-94	0	Radium-228	pCi/g	.91		0.3	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Radium-228	pCi/g	.995		0.129	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Ruthenium-103	pCi/g	<.0146	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Ruthenium-106	pCi/g	<.159	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Scandium-46	pCi/g	<.0188	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Silver-110	pCi/g	<.0157	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Sodium-22	pCi/g	<.0232	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Sodium-24	pCi/g	<.0435	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Strontium-85	pCi/g	<.0174	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Tantalum-182	pCi/g	<.193	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Thallium-201	pCi/g	<.16	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130559	D	17-MAY-94	0	Thallium-208	pCi/g	.8		0.17	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Thallium-208	pCi/g	.291		0.0327	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Thorium-227	pCi/g	<.13	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130559	D	17-MAY-94	0	Thorium-228	pCi/g	.86		0.18	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Thorium-228	pCi/g	.74		0.053	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Thorium-229	pCi/g	<.0694	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Thorium-231	pCi/g	<.373	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130559	D	17-MAY-94	0	Thorium-232	pCi/g	.91		0.3	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Thorium-232	pCi/g	.995		0.129	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Thorium-234	pCi/g	1.09		0.514	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Tin-113	pCi/g	<.0217	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Uranium-234	pCi/g	<5.75	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Uranium-235	pCi/g	<.0346	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Uranium-238	pCi/g	1.09		0.513	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Xenon-133,-133M	pCi/g	<.0746	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Yttrium-88	pCi/g	<.0184	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Zinc-65	pCi/g	<.0452	U	999.9999	SOIL
TA3/5-107-SS-06D	SNL0130640	D	17-MAY-94	0	Zirconium-95	pCi/g	<.0328	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Actinium-227	pCi/g	<.809	U	999.9999	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Actinium-228	pCi/g	.631		0.111	SOIL
TA3/5-107-SS-07	SNL0130555	F	17-MAY-94	0	Actinium-228	pCi/g	.98		0.28	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Americium-241	pCi/g	<.113	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Antimony-124	pCi/g	<.0135	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Antimony-125	pCi/g	<.0401	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Antimony-126	pCi/g	<.0151	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Barium-133	pCi/g	<.0183	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Barium-140	pCi/g	<.055	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Beryllium-7	pCi/g	<.137	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Bismuth-207	pCi/g	<.0158	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Bismuth-212	pCi/g	.282		0.141	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Bismuth-214	pCi/g	.467		0.0578	SOIL
TA3/5-107-SS-07	SNL0130555	F	17-MAY-94	0	Bismuth-214	pCi/g	.5		0.1	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Cadmium-109	pCi/g	<.553	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Cerium-139	pCi/g	<.0136	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Cerium-144	pCi/g	<.106	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Cesium-134	pCi/g	<.0135	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130555	F	17-MAY-94	0	Cesium-137	pCi/g	.13		0.058	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Cesium-137	pCi/g	.12		0.0345	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Chromium-51	pCi/g	<.13	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Cobalt-56	pCi/g	<.0202	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Cobalt-57	pCi/g	<.0131	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Cobalt-58	pCi/g	<.0128	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130555	F	17-MAY-94	0	Cobalt-60	pCi/g	<.051	U	999.999	SOIL
TA3/5-107-SS-07	SNL0130555	F	17-MAY-94	0	Cobalt-60	pCi/g	<.051	U	999.999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Cobalt-60	pCi/g	<.0242	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Copper-64	pCi/g	<33.2	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Europium-152	pCi/g	<.0397	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Europium-154	pCi/g	<.0692	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Europium-155	pCi/g	<.0639	U	999.9999	SOIL

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ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Gadolinium-153	pCi/g	<.0417	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Indium-115M	pCi/g	<6.91	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Iodine-125	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Iodine-129	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Iodine-131	pCi/g	<.0158	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Iridium-192	pCi/g	<.0153	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Iron-59	pCi/g	<.0329	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Lanthanum-140	pCi/g	<.0193	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Lead-210	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130555	F	17-MAY-94	0	Lead-212	pCi/g	.69		0.078	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Lead-212	pCi/g	.575		0.0448	SOIL
TA3/5-107-SS-07	SNL0130555	F	17-MAY-94	0	Lead-214	pCi/g	.67		0.13	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Lead-214	pCi/g	.466		0.06	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Manganese-54	pCi/g	<.0163	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Mercury-203	pCi/g	<.0163	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Niobium-95	pCi/g	<.064	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Potassium-40	pCi/g	15.6		0.66	SOIL
TA3/5-107-SS-07	SNL0130555	F	17-MAY-94	0	Potassium-40	pCi/g	16		1.2	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Protactinium-231	pCi/g	<.667	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Protactinium-233	pCi/g	<.0316	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Radium-224	pCi/g	.972		0.624	SOIL
TA3/5-107-SS-07	SNL0130555	F	17-MAY-94	0	Radium-226	pCi/g	.48		0.1	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Radium-226	pCi/g	1.2		0.526	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Radium-228	pCi/g	.699		0.123	SOIL
TA3/5-107-SS-07	SNL0130555	F	17-MAY-94	0	Radium-228	pCi/g	.98		0.28	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Ruthenium-103	pCi/g	<.0139	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Ruthenium-106	pCi/g	<.126	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Scandium-46	pCi/g	<.0126	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Silver-110	pCi/g	<.0147	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Sodium-22	pCi/g	<.0209	U	999.9999	SOIL

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ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Sodium-24	pCi/g	<.0819	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Strontium-85	pCi/g	<.0138	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Tantalum-182	pCi/g	<.136	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Thallium-201	pCi/g	<.153	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Thallium-208	pCi/g	.215		0.0299	SOIL
TA3/5-107-SS-07	SNL0130555	F	17-MAY-94	0	Thallium-208	pCi/g	.58		0.15	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Thorium-227	pCi/g	<.104	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Thorium-228	pCi/g	.572		0.0446	SOIL
TA3/5-107-SS-07	SNL0130555	F	17-MAY-94	0	Thorium-228	pCi/g	.62		0.16	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Thorium-229	pCi/g	<.056	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Thorium-231	pCi/g	<.285	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Thorium-232	pCi/g	.699		0.123	SOIL
TA3/5-107-SS-07	SNL0130555	F	17-MAY-94	0	Thorium-232	pCi/g	.98		0.28	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Thorium-234	pCi/g	<.335	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Tin-113	pCi/g	<.0202	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Uranium-234	pCi/g	<5	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Uranium-235	pCi/g	<.026	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Uranium-238	pCi/g	<.349	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Xenon-133,-133M	pCi/g	<.0672	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Yttrium-88	pCi/g	<.0142	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Zinc-65	pCi/g	<.0409	U	999.9999	SOIL
TA3/5-107-SS-07	SNL0130636	F	17-MAY-94	0	Zirconium-95	pCi/g	<.0273	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Actinium-227	pCi/g	<.856	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Actinium-228	pCi/g	.862		0.121	SOIL
TA3/5-107-SS-08	SNL0130556	F	17-MAY-94	0	Actinium-228	pCi/g	.92		0.32	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Americium-241	pCi/g	<.125	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Antimony-124	pCi/g	<.0158	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Antimony-125	pCi/g	<.0482	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Antimony-126	pCi/g	<.0184	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Barium-133	pCi/g	<.0241	U	999.9999	SOIL

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ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Barium-140	pCi/g	<.058	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Beryllium-7	pCi/g	<.145	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Bismuth-207	pCi/g	<.0191	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Bismuth-212	pCi/g	.572		0.205	SOIL
TA3/5-107-SS-08	SNL0130556	F	17-MAY-94	0	Bismuth-214	pCi/g	.57		0.14	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Bismuth-214	pCi/g	.456		0.0662	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Cadmium-109	pCi/g	<.629	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Cerium-139	pCi/g	<.0161	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Cerium-144	pCi/g	<.111	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Cesium-134	pCi/g	<.0161	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Cesium-137	pCi/g	.246		0.0379	SOIL
TA3/5-107-SS-08	SNL0130556	F	17-MAY-94	0	Cesium-137	pCi/g	.21		0.064	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Chromium-51	pCi/g	<.141	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Cobalt-56	pCi/g	<.0219	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Cobalt-57	pCi/g	<.0149	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Cobalt-58	pCi/g	<.016	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Cobalt-60	pCi/g	<.0258	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130556	F	17-MAY-94	0	Cobalt-60	pCi/g	<.047	U	999.999	SOIL
TA3/5-107-SS-08	SNL0130556	F	17-MAY-94	0	Cobalt-60	pCi/g	<.047	U	999.999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Copper-64	pCi/g	<33.2	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Europium-152	pCi/g	<.0459	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Europium-154	pCi/g	<.086	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Europium-155	pCi/g	<.0715	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Gadolinium-153	pCi/g	<.0487	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Iodine-125	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Iodine-129	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Iodine-131	pCi/g	<.019	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Iridium-192	pCi/g	<.0177	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Iron-59	pCi/g	<.0405	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Lanthanum-140	pCi/g	<.0197	U	999.9999	SOIL

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ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Lead-210	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130556	F	17-MAY-94	0	Lead-212	pCi/g	.74		0.099	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Lead-212	pCi/g	.65		0.0618	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Lead-214	pCi/g	.566		0.0663	SOIL
TA3/5-107-SS-08	SNL0130556	F	17-MAY-94	0	Lead-214	pCi/g	.76		0.14	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Manganese-54	pCi/g	<.0207	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Mercury-203	pCi/g	<.0189	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Neptunium-237	pCi/g	<.164	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Niobium-95	pCi/g	<.0713	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Potassium-40	pCi/g	16		0.732	SOIL
TA3/5-107-SS-08	SNL0130556	F	17-MAY-94	0	Potassium-40	pCi/g	15		1.3	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Protactinium-231	pCi/g	<.762	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Protactinium-233	pCi/g	<.0371	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Radium-224	pCi/g	<.517	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Radium-226	pCi/g	1.46		0.581	SOIL
TA3/5-107-SS-08	SNL0130556	F	17-MAY-94	0	Radium-226	pCi/g	.55		0.14	SOIL
TA3/5-107-SS-08	SNL0130556	F	17-MAY-94	0	Radium-228	pCi/g	.92		0.32	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Radium-228	pCi/g	.955		0.134	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Ruthenium-103	pCi/g	<.0152	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Ruthenium-106	pCi/g	<.135	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Scandium-46	pCi/g	<.016	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Silver-110	pCi/g	<.0164	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Sodium-22	pCi/g	<.023	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Sodium-24	pCi/g	<.0939	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Strontium-85	pCi/g	<.0155	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Tantalum-182	pCi/g	<.165	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Thallium-201	pCi/g	<.176	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Thallium-208	pCi/g	.239		0.0352	SOIL
TA3/5-107-SS-08	SNL0130556	F	17-MAY-94	0	Thallium-208	pCi/g	.82		0.22	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Thorium-227	pCi/g	<.119	U	999.9999	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-08	SNL0130556	F	17-MAY-94	0	Thorium-228	pCi/g	.88		0.24	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Thorium-228	pCi/g	.647		0.0616	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Thorium-229	pCi/g	<.066	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Thorium-231	pCi/g	<.34	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130556	F	17-MAY-94	0	Thorium-232	pCi/g	.92		0.32	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Thorium-232	pCi/g	.955		0.134	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Thorium-234	pCi/g	<.381	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Tin-113	pCi/g	<.0203	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Uranium-234	pCi/g	<5.49	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Uranium-235	pCi/g	<.0308	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Uranium-238	pCi/g	<.399	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Xenon-133,-133M	pCi/g	<.0799	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Yttrium-88	pCi/g	<.0174	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Zinc-65	pCi/g	<.0408	U	999.9999	SOIL
TA3/5-107-SS-08	SNL0130637	F	17-MAY-94	0	Zirconium-95	pCi/g	<.0308	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Actinium-227	pCi/g	<.851	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130557	F	17-MAY-94	0	Actinium-228	pCi/g	.6		0.28	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Actinium-228	pCi/g	.882		0.129	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Americium-241	pCi/g	<.132	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Antimony-124	pCi/g	<.0158	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Antimony-125	pCi/g	<.0447	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Antimony-126	pCi/g	<.0171	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Barium-133	pCi/g	<.0237	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Barium-140	pCi/g	<.0564	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Beryllium-7	pCi/g	<.144	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Bismuth-207	pCi/g	<.0176	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Bismuth-212	pCi/g	.411		0.208	SOIL
TA3/5-107-SS-09	SNL0130557	F	17-MAY-94	0	Bismuth-212	pCi/g	1.4		0.89	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Bismuth-214	pCi/g	.534		0.0704	SOIL
TA3/5-107-SS-09	SNL0130557	F	17-MAY-94	0	Bismuth-214	pCi/g	.65		0.13	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Cadmium-109	pCi/g	<.639	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Cerium-139	pCi/g	<.0151	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Cerium-144	pCi/g	<.117	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Cesium-134	pCi/g	<.0158	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130557	F	17-MAY-94	0	Cesium-137	pCi/g	.35		0.078	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Cesium-137	pCi/g	.303		0.0432	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Chromium-51	pCi/g	<.143	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Cobalt-56	pCi/g	<.0242	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Cobalt-57	pCi/g	<.0156	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Cobalt-58	pCi/g	<.0147	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130557	F	17-MAY-94	0	Cobalt-60	pCi/g	<.051	U	999.999	SOIL
TA3/5-107-SS-09	SNL0130557	F	17-MAY-94	0	Cobalt-60	pCi/g	<.051	U	999.999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Cobalt-60	pCi/g	<.0231	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Copper-64	pCi/g	<40.4	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Europium-152	pCi/g	<.0465	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Europium-154	pCi/g	<.0789	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Europium-155	pCi/g	<.0755	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Gadolinium-153	pCi/g	<.0481	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Iodine-125	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Iodine-129	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Iodine-131	pCi/g	<.0192	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Iridium-192	pCi/g	<.0171	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Iron-59	pCi/g	<.0356	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Lanthanum-140	pCi/g	<.0299	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Lead-210	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Lead-212	pCi/g	.637		0.0614	SOIL
TA3/5-107-SS-09	SNL0130557	F	17-MAY-94	0	Lead-212	pCi/g	.78		0.08	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Lead-214	pCi/g	.597		0.0694	SOIL
TA3/5-107-SS-09	SNL0130557	F	17-MAY-94	0	Lead-214	pCi/g	.68		0.11	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Manganese-54	pCi/g	<.0178	U	999.9999	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Mercury-203	pCi/g	<.0203	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Niobium-95	pCi/g	<.0735	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130557	F	17-MAY-94	0	Potassium-40	pCi/g	14		1.1	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Potassium-40	pCi/g	17.3		0.744	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Protactinium-231	pCi/g	<.801	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Protactinium-233	pCi/g	<.0363	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Radium-224	pCi/g	<.529	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130557	F	17-MAY-94	0	Radium-224	pCi/g	1.7		1.1	SOIL
TA3/5-107-SS-09	SNL0130557	F	17-MAY-94	0	Radium-226	pCi/g	.63		0.12	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Radium-226	pCi/g	2.18		0.769	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Radium-228	pCi/g	.977		0.143	SOIL
TA3/5-107-SS-09	SNL0130557	F	17-MAY-94	0	Radium-228	pCi/g	.6		0.28	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Ruthenium-103	pCi/g	<.0137	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Ruthenium-106	pCi/g	<.15	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Scandium-46	pCi/g	<.0172	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Silver-110	pCi/g	<.0165	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Sodium-22	pCi/g	<.0205	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Sodium-24	pCi/g	<.0787	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Strontium-85	pCi/g	.0312		0.0252	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Tantalum-182	pCi/g	<.139	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Thallium-201	pCi/g	<.169	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130557	F	17-MAY-94	0	Thallium-208	pCi/g	.68		0.18	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Thallium-208	pCi/g	.264		0.032	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Thorium-227	pCi/g	<.12	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Thorium-228	pCi/g	.634		0.0611	SOIL
TA3/5-107-SS-09	SNL0130557	F	17-MAY-94	0	Thorium-228	pCi/g	.74		0.2	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Thorium-229	pCi/g	<.0682	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Thorium-231	pCi/g	<.336	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130557	F	17-MAY-94	0	Thorium-232	pCi/g	.6		0.28	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Thorium-232	pCi/g	.977		0.143	SOIL

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ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Thorium-234	pCi/g	<.377	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130557	F	17-MAY-94	0	Thorium-234	pCi/g	1.2		0.57	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Tin-113	pCi/g	<.0197	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Uranium-234	pCi/g	<5.57	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Uranium-235	pCi/g	<.0318	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Uranium-238	pCi/g	<.398	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Xenon-133,-133M	pCi/g	<.0823	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Yttrium-88	pCi/g	<.017	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Zinc-65	pCi/g	<.0475	U	999.9999	SOIL
TA3/5-107-SS-09	SNL0130638	F	17-MAY-94	0	Zirconium-95	pCi/g	<.0283	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Actinium-227	pCi/g	<.885	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130558	F	17-MAY-94	0	Actinium-228	pCi/g	.78		0.22	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Actinium-228	pCi/g	.71		0.128	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Americium-241	pCi/g	<.132	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Antimony-124	pCi/g	<.0171	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Antimony-125	pCi/g	<.0448	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Antimony-126	pCi/g	<.0174	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Barium-133	pCi/g	<.0205	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Barium-140	pCi/g	<.0594	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Bismuth-207	pCi/g	<.0196	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Bismuth-212	pCi/g	.563		0.27	SOIL
TA3/5-107-SS-10	SNL0130558	F	17-MAY-94	0	Bismuth-214	pCi/g	.59		0.12	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Bismuth-214	pCi/g	.488		0.0816	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Cadmium-109	pCi/g	<.629	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Cerium-139	pCi/g	<.0156	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Cerium-144	pCi/g	<.123	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Cesium-134	pCi/g	<.0158	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Cesium-137	pCi/g	.224		0.0372	SOIL
TA3/5-107-SS-10	SNL0130558	F	17-MAY-94	0	Cesium-137	pCi/g	.15		0.065	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Chromium-51	pCi/g	<.154	U	999.9999	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Cobalt-56	pCi/g	<.0235	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Cobalt-57	pCi/g	<.015	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Cobalt-58	pCi/g	<.0159	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130558	F	17-MAY-94	0	Cobalt-60	pCi/g	<.052	U	999.999	SOIL
TA3/5-107-SS-10	SNL0130558	F	17-MAY-94	0	Cobalt-60	pCi/g	<.052	U	999.999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Cobalt-60	pCi/g	<.0267	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Copper-64	pCi/g	<48.9	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Europium-152	pCi/g	<.0449	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Europium-154	pCi/g	<.0836	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Europium-155	pCi/g	<.0782	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Gadolinium-153	pCi/g	<.0489	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Iodine-125	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Iodine-129	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Iodine-131	pCi/g	<.018	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Iridium-192	pCi/g	<.0172	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Iron-59	pCi/g	<.0375	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Lanthanum-140	pCi/g	<.0284	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Lead-210	pCi/g	<0	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130558	F	17-MAY-94	0	Lead-212	pCi/g	.83		0.084	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Lead-212	pCi/g	.679		0.0547	SOIL
TA3/5-107-SS-10	SNL0130558	F	17-MAY-94	0	Lead-214	pCi/g	.81		0.13	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Lead-214	pCi/g	.56		0.0699	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Manganese-54	pCi/g	<.0202	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Mercury-203	pCi/g	<.0204	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Neptunium-237	pCi/g	<.157	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Niobium-95	pCi/g	<.0747	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Potassium-40	pCi/g	16.6		0.729	SOIL
TA3/5-107-SS-10	SNL0130558	F	17-MAY-94	0	Potassium-40	pCi/g	16		1.3	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Protactinium-231	pCi/g	<.817	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Protactinium-233	pCi/g	<.0392	U	999.9999	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Radium-224	pCi/g	1.05		0.751	SOIL
TA3/5-107-SS-10	SNL0130558	F	17-MAY-94	0	Radium-226	pCi/g	.57		0.12	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Radium-226	pCi/g	1.34		0.638	SOIL
TA3/5-107-SS-10	SNL0130558	F	17-MAY-94	0	Radium-228	pCi/g	.78		0.22	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Radium-228	pCi/g	.786		0.141	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Ruthenium-103	pCi/g	<.016	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Ruthenium-106	pCi/g	<.162	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Scandium-46	pCi/g	<.0171	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Silver-110	pCi/g	<.0147	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Sodium-22	pCi/g	<.0233	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Sodium-24	pCi/g	<.0946	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Strontium-85	pCi/g	<.0159	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Tantalum-182	pCi/g	<.167	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Thallium-201	pCi/g	<.181	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Thallium-208	pCi/g	.207		0.0321	SOIL
TA3/5-107-SS-10	SNL0130558	F	17-MAY-94	0	Thallium-208	pCi/g	.78		0.22	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Thorium-227	pCi/g	<.121	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Thorium-228	pCi/g	.676		0.0545	SOIL
TA3/5-107-SS-10	SNL0130558	F	17-MAY-94	0	Thorium-228	pCi/g	.84		0.23	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Thorium-229	pCi/g	<.0673	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Thorium-231	pCi/g	<.334	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130558	F	17-MAY-94	0	Thorium-232	pCi/g	.78		0.22	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Thorium-232	pCi/g	.786		0.141	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Thorium-234	pCi/g	<.396	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Tin-113	pCi/g	<.0202	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Uranium-234	pCi/g	<5.86	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Uranium-235	pCi/g	<.0307	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Uranium-238	pCi/g	<.419	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Xenon-133,-133M	pCi/g	<.0824	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Yttrium-88	pCi/g	<.0174	U	999.9999	SOIL

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Zinc-65	pCi/g	<.0443	U	999.9999	SOIL
TA3/5-107-SS-10	SNL0130639	F	17-MAY-94	0	Zirconium-95	pCi/g	<.0294	U	999.9999	SOIL
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Actinium-227	pCi/g	<.523	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Actinium-228	pCi/g	<.043	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Americium-241	pCi/g	<.0581	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Antimony-124	pCi/g	<.0101	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Antimony-125	pCi/g	<.032	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Antimony-126	pCi/g	<.0103	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Argon-41	pCi/g	<.193	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Barium-133	pCi/g	<.0131	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Barium-140	pCi/g	<.034	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Beryllium-7	pCi/g	<.087	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Bismuth-207	pCi/g	<.0153	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Bismuth-212	pCi/g	<.0747	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Bismuth-214	pCi/g	<.0302	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Cadmium-109	pCi/g	<.216	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Cerium-139	pCi/g	<.00886	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Cerium-144	pCi/g	<.0638	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Cesium-134	pCi/g	<.00907	U	999.9999	WATER
TA3/5-107-FB	SNL0130561	FB	17-MAY-94	0	Cesium-137	pCi/L	<25	U	999.999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Cesium-137	pCi/g	<.0109	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Chromium-51	pCi/g	<.0889	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Cobalt-56	pCi/g	<.0212	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Cobalt-57	pCi/g	<.00843	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Cobalt-58	pCi/g	<.01	U	999.9999	WATER
TA3/5-107-FB	SNL0130561	FB	17-MAY-94	0	Cobalt-60	pCi/L	<25	U	999.999	WATER
TA3/5-107-FB	SNL0130561	FB	17-MAY-94	0	Cobalt-60	pCi/L	<25	U	999.999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Cobalt-60	pCi/g	<.0106	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Copper-64	pCi/g	<5.75	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Europium-152	pCi/g	<.0251	U	999.9999	WATER

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Europium-154	pCi/g	<.0483	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Europium-155	pCi/g	<.0354	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Gadolinium-153	pCi/g	<.0237	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Indium-115M	pCi/g	<.0614	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Iodine-125	pCi/g	<0	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Iodine-129	pCi/g	<0	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Iodine-131	pCi/g	<.00956	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Iridium-192	pCi/g	<.0102	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Iron-59	pCi/g	<.019	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Lanthanum-140	pCi/g	<.0115	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Lead-210	pCi/g	<0	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Lead-212	pCi/g	<.0178	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Lead-214	pCi/g	<.0267	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Manganese-54	pCi/g	<.0103	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Manganese-56	pCi/g	<.162	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Mercury-203	pCi/g	<.0119	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Neptunium-237	pCi/g	<.0546	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Niobium-95	pCi/g	<.0291	U	999.9999	WATER
TA3/5-107-FB	SNL0130561	FB	17-MAY-94	0	Potassium-40	pCi/L	<650	U	999.999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Potassium-40	pCi/g	<.282	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Protactinium-231	pCi/g	<.404	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Protactinium-233	pCi/g	<.0233	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Radium-224	pCi/g	<.194	U	999.9999	WATER
TA3/5-107-FB	SNL0130561	FB	17-MAY-94	0	Radium-226	pCi/L	<41	U	999.999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Radium-226	pCi/g	<.238	U	999.9999	WATER
TA3/5-107-FB	SNL0130561	FB	17-MAY-94	0	Radium-228	pCi/L	<110	U	999.999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Radium-228	pCi/g	<.0477	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Ruthenium-103	pCi/g	<.01	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Ruthenium-106	pCi/g	<.1	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Scandium-46	pCi/g	<.0106	U	999.9999	WATER

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Silver-110	pCi/g	<.00785	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Sodium-22	pCi/g	<.00966	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Sodium-24	pCi/g	<.0123	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Strontium-85	pCi/g	<.0131	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Tantalum-182	pCi/g	<.0777	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Thallium-201	pCi/g	<.0712	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Thallium-208	pCi/g	<.0135	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Thorium-227	pCi/g	<.0618	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Thorium-228	pCi/g	<.0177	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Thorium-229	pCi/g	<.0377	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Thorium-231	pCi/g	<.208	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Thorium-232	pCi/g	<.0477	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Thorium-234	pCi/g	<.159	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Tin-113	pCi/g	<.0134	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Uranium-234	pCi/g	<3.13	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Uranium-235	pCi/g	<.0144	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Uranium-238	pCi/g	<.165	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Xenon-133,-133M	pCi/g	<.0426	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Yttrium-88	pCi/g	<.00954	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Zinc-65	pCi/g	<.0226	U	999.9999	WATER
TA3/5-107-FB	SNL0130642	FB	17-MAY-94	0	Zirconium-95	pCi/g	<.0157	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Actinium-227	pCi/g	<.463	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Actinium-228	pCi/g	<.039	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Americium-241	pCi/g	<.0577	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Antimony-124	pCi/g	<.0103	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Antimony-125	pCi/g	<.0257	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Antimony-126	pCi/g	<.0092	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Argon-41	pCi/g	<.0758	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Barium-133	pCi/g	<.014	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Barium-140	pCi/g	<.0339	U	999.9999	WATER

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Beryllium-7	pCi/g	<.0707	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Bismuth-207	pCi/g	<.0151	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Bismuth-212	pCi/g	<.0818	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Bismuth-214	pCi/g	<.0255	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Cadmium-109	pCi/g	<.224	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Cerium-139	pCi/g	<.0084	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Cerium-144	pCi/g	<.0657	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Cesium-134	pCi/g	<.0106	U	999.9999	WATER
TA3/5-107-RB	SNL0130560	EB	17-MAY-94	0	Cesium-137	pCi/L	<25	U	999.999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Cesium-137	pCi/g	<.0119	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Chromium-51	pCi/g	<.0903	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Cobalt-56	pCi/g	<.0203	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Cobalt-57	pCi/g	<.00807	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Cobalt-58	pCi/g	<.00917	U	999.9999	WATER
TA3/5-107-RB	SNL0130560	EB	17-MAY-94	0	Cobalt-60	pCi/L	<22	U	999.999	WATER
TA3/5-107-RB	SNL0130560	EB	17-MAY-94	0	Cobalt-60	pCi/L	<22	U	999.999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Cobalt-60	pCi/g	<.0106	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Copper-64	pCi/g	<3.31	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Europium-152	pCi/g	<.0233	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Europium-154	pCi/g	<.0407	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Europium-155	pCi/g	<.036	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Gadolinium-153	pCi/g	<.0243	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Indium-115M	pCi/g	<.0511	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Iodine-125	pCi/g	<0	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Iodine-129	pCi/g	<0	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Iodine-131	pCi/g	<.0108	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Iridium-192	pCi/g	<.0111	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Iron-59	pCi/g	<.0166	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Lanthanum-140	pCi/g	<.0118	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Lead-210	pCi/g	<0	U	999.9999	WATER

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Lead-212	pCi/g	<.0213	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Lead-214	pCi/g	<.0279	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Manganese-54	pCi/g	<.00795	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Manganese-56	pCi/g	<.0972	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Mercury-203	pCi/g	<.0116	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Neptunium-237	pCi/g	<.0663	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Niobium-95	pCi/g	<.035	U	999.9999	WATER
TA3/5-107-RB	SNL0130560	EB	17-MAY-94	0	Potassium-40	pCi/L	<650	U	999.999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Potassium-40	pCi/g	.162		0.216	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Protactinium-231	pCi/g	<.408	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Protactinium-233	pCi/g	<.0222	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Radium-224	pCi/g	<.192	U	999.9999	WATER
TA3/5-107-RB	SNL0130560	EB	17-MAY-94	0	Radium-226	pCi/L	<41	U	999.999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Radium-226	pCi/g	<.212	U	999.9999	WATER
TA3/5-107-RB	SNL0130560	EB	17-MAY-94	0	Radium-228	pCi/L	<96	U	999.999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Radium-228	pCi/g	<.0432	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Ruthenium-103	pCi/g	<.01	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Ruthenium-106	pCi/g	<.0845	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Scandium-46	pCi/g	<.00962	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Silver-110	pCi/g	<.00886	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Sodium-22	pCi/g	<.00966	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Sodium-24	pCi/g	<.012	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Strontium-85	pCi/g	<.0119	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Tantalum-182	pCi/g	<.0562	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Thallium-201	pCi/g	<.074	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Thallium-208	pCi/g	<.0114	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Thorium-227	pCi/g	<.0702	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Thorium-228	pCi/g	<.0212	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Thorium-229	pCi/g	<.0337	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Thorium-231	pCi/g	<.212	U	999.9999	WATER

ER Site 107 RFI Analytical Results for Soil Samples; Gamma Spectroscopic Analyses (SNL 7715/TMA Eberline)

ER Sample ID	Sample Number	Sample Type	Sample Date	Sample Depth (Feet)	Analyte	Units	Amount Detected	QC Flag	Uncertainty (+/-)	Material Description
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Thorium-232	pCi/g	<.0432	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Thorium-234	pCi/g	<.175	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Tin-113	pCi/g	<.0155	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Uranium-234	pCi/g	<2.91	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Uranium-235	pCi/g	<.0129	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Uranium-238	pCi/g	<.175	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Xenon-133,-133M	pCi/g	<.041	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Yttrium-88	pCi/g	<.0112	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Zinc-65	pCi/g	<.0237	U	999.9999	WATER
TA3/5-107-RB	SNL0130641	EB	17-MAY-94	0	Zirconium-95	pCi/g	<.0125	U	999.9999	WATER

Attachment 107-2

Figure 2-2: Sandia National Laboratories/New Mexico Correction Action Management Unit (CAMU) Areal Configuration

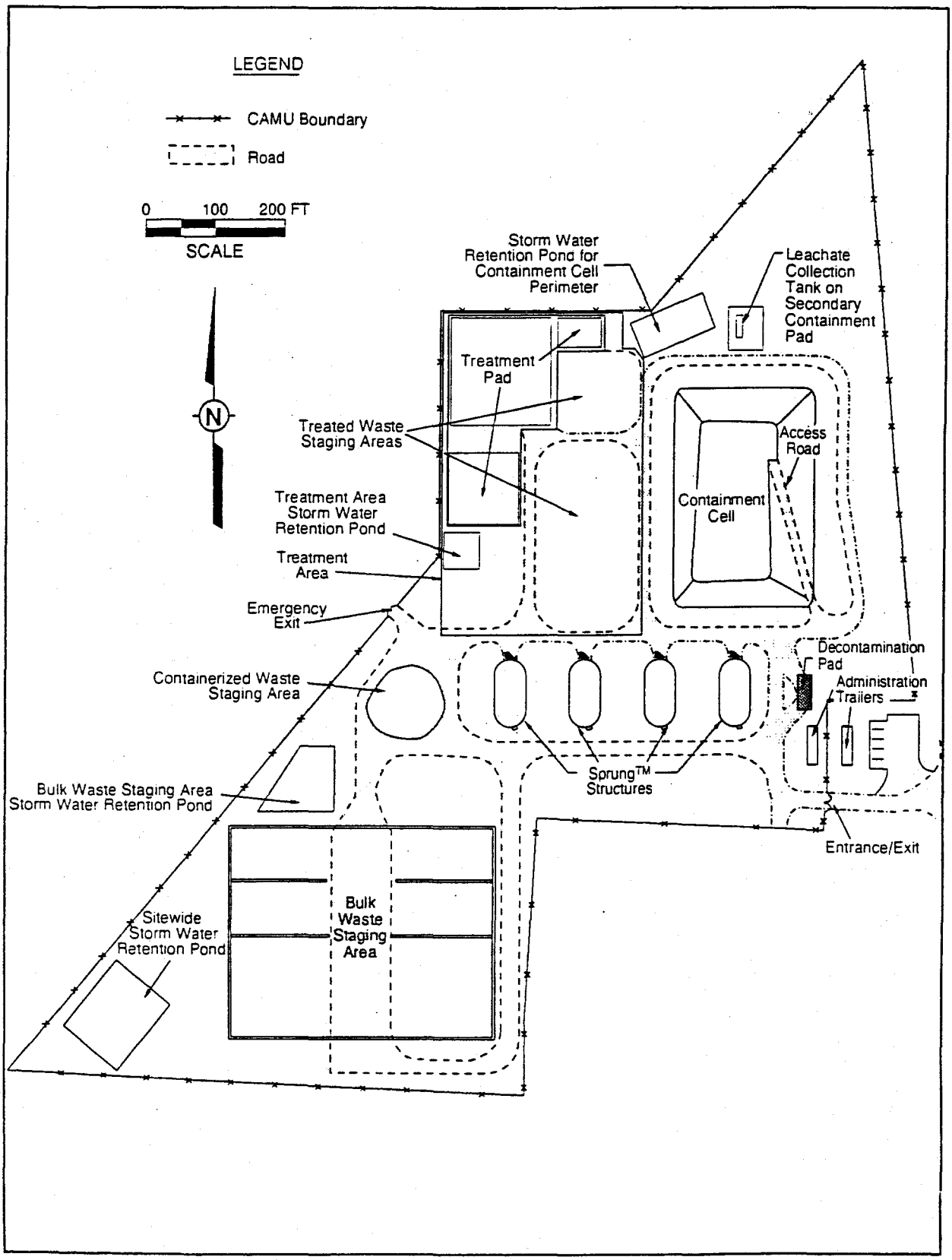

Figure 2-2
Sandia National Laboratories/New Mexico
Corrective Action Management Unit (CAMU) Areal Configuration

3.0 CAMU Design, Operating, and Closure Standards—40 CFR §§264.552(e)(2) and (4)

Only the CAMU land-based areas (e.g., waste staging areas, treatment area, and containment cell) are discussed in this section. The CAMU mobile treatment units (CMTU) to be located at the treatment area are not land-based units. As non-land-based units, they have separate regulatory identity and will therefore be addressed in future permit applications or modification requests to the New Mexico Environment Department (NMED) under the base RCRA permit. Support structures and functions at the proposed CAMU include the storm water retention ponds, the less-than-90-day leachate collection tank for the containment cell, the administration trailers, the decontamination pad with associated less-than-90-day collection tank, emergency eyewash stations, and electrical and water hookups. These are not RCRA units subject to permitting requirements and, therefore, are not described in detail in this section.

3.1 Requirements for Remediation Waste Management—40 CFR §§264.552(c)(2), (4), and (6); and 264.552(e)(2)

The proposed CAMU will be used for the staging, treatment, and containment of hazardous remediation waste. Placement of remediation waste into or within a CAMU does not constitute land disposal of hazardous waste (40 CFR §264.552[a][1]), nor does consolidation or placement of remediation waste into or within a CAMU constitute creation of a unit subject to minimum technology requirements (40 CFR §264.552[a][2]). However, the proposed CAMU is designed to be protective of human health and the environment.

The EPA has stated that the treatment standards prescribed in the "Superfund LDR Guide #6A (2nd Edition), Obtaining a Soil and Debris Treatability Variance for Remedial Actions," (EPA, 1990) are appropriate for remediation purposes (Volume 58, Federal Register Page 8659) (EPA, 1993). Establishing alternate treatment standards based on the EPA's Superfund LDR Guide #6A for placement of hazardous remediation wastes at the CAMU is appropriate for several reasons. First, 40 CFR Part 264, Subpart S (i.e., the CAMU regulations) states that "*placement of remediation wastes into or within a CAMU does not constitute land disposal of hazardous wastes*"; however, Subpart S also states that "*the CAMU shall enable the use, when appropriate, of treatment technologies...to enhance the long-term effectiveness of remedial actions by reducing the toxicity, mobility, or volume of wastes that will remain in place after closure of the CAMU.*" Thus, based on the first requirement, the application of land disposal restrictions (LDR) treatment standards to wastes emplaced within

programs. It also performs work for the U.S. Department of Defense and the U.S. Nuclear Regulatory Commission. SNL/NM falls under Standard Industrial Classification Numbers 9711 (National Defense Organizations) and 7391 (Research and Development).

The proposed CAMU will be located at ER Site 107, a 23-acre triangle-shaped area in the southeast corner of TA III at SNL/NM (Figure 2-1). In 1989, the Radioactive and Mixed Waste Management Facility (RMWMF) was constructed on a portion of ER Site 107; most of the remaining area within ER Site 107 is undeveloped. An area within the proposed CAMU boundary of approximately 0.75 acres, immediately to the north of the RMWMF, is the site of an approved Temporary Unit. The CAMU will encompass the Temporary Unit structures. Figure 2-2 shows the areal configuration of the CAMU.

2.1.1 Topographic Map—40 CFR §270.14(b)(19)

Figure 2-3 is a facility location map showing topography, locations of SNL/NM TAs, and the proposed CAMU in the southeastern corner of TA III. Figure 2-3 also includes the following, as required by 40 CFR §270.14(b)(19):

- Map scale and date (40 CFR §270.14[b][19][i])
- 100-year floodplain area (40 CFR §270.14[b][19][ii])
- Surface waters including intermittent streams (40 CFR §270.14[b][19][iii])
- A wind rose (40 CFR §270.14[b][19][v])
- Map orientation (i.e., north arrow) (40 CFR §270.14[b][19][vi])
- Wells both on and off site (40 CFR §270.14[b][19][ix])
- Location of the operational unit (i.e., proposed CAMU) (40 CFR §270.14[b][19][xii]).

Additional requirements of 40 CFR §270.14(b)(19) are provided in the following figures:

- Figure 2-4: Legal boundaries of the hazardous waste management facility site (i.e., the proposed CAMU) (40 CFR §270.14[b][19][vii])
- Figure 2-4: Access control (e.g., fences, gates) (40 CFR §270.14[b][19][viii])

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U.S. Department of Energy
Albuquerque Operations Office
Kirtland Area Office
P.O. Box 5400
Albuquerque, NM 87185-5400

AUG 0 9 2001

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. John Kieling, Manager
RCRA Permits Program
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Road
Building E
Santa Fe, NM 87505

Dear Mr. Kieling:

Enclosed is one of two NMED copies of the Department of Energy (DOE) and Sandia National Laboratories (SNL/NM) responses to the Request for Supplemental Information (RSI) for SWMU 107. This submittal includes site maps, a description of the confirmatory soil sampling, complete data tables, and a risk assessment. The NFA proposal for this site was included in the RCRA Facility Investigation (RFI) report for Technical Areas III and V, which was originally submitted in June 1996.

If you have any questions, please contact John Gould at (505) 845-6089.

Sincerely,

Michael J. Zamorski
Area Manager

Enclosure

AUG 0 9 2001

J. Kieling (2)

cc w/enclosure:
M. Gardipe, AL, ERD
J. Parker, NMED-OB
R. Kennett, NMED-OB
W. Moats, NMED-HRMB, MS 1089 (via Certified Mail)
D. Neleigh, EPA, Region 6 (2 copies-via Certified Mail)

cc w/o enclosure:
J. Estrada, KAO/AIP
F. Nimick, SNL, MS 1087
D. Stockham, SNL, MS 1087
A. Lai, SNL, MS 1087
J. Bearzi, NMED-HRMB

AUG 13 2001

Sandia National Laboratories
Albuquerque, New Mexico

June 2001

Environmental Restoration Project
Supplemental Responses to NMED 2nd Notice of Deficiency
Technical Areas III and V RCRA Facility Investigation
SWMU 107

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ACRONYMS AND ABBREVIATIONS

AOC	area of concern
AR/COC	analysis request/chain-of-custody
bgs	below ground surface
CAMU	Corrective Action Management Unit
COC	constituent of concern
CWL	Chemical Waste Landfill
DOE	U.S. Department of Energy
DU	Depleted uranium
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
g	gram(s)
HE	High Explosive
HMX	1,3,5,7-tetranitro-1,3,5,7-tetrazacyclooctane
kg	kilogram(s)
MDA	minimum detectable activity
MDL	minimum detection limit
mg	milligram(s)
NFA	no further action
NMED	New Mexico Environment Department
NOD	Notice of Deficiency
pCi	picocurie(s)
PETN	pentaerythritol tetranitrate
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RDX	1,3,5-trinitro-1,3,5-triazacyclohexane
RFI	RCRA Facility Investigation
RPD	relative percent difference
RPSD	Radiation Protection Sample Diagnostics
SNL/NM	Sandia National Laboratories/New Mexico
SWMU	Solid Waste Management Unit
TA	Technical Area
UTL	Upper Tolerance Limit

1.0 INTRODUCTION

This supplemental response document is submitted to address concerns by the New Mexico Environment Department (NMED) Hazardous Waste Bureau regarding Sandia National Laboratories/New Mexico's (SNL/NM's) no further action (NFA) proposal for Solid Waste Management Unit (SWMU) 107, the Explosives Test Area. A Technical Areas III/V (TA-III/V) Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report (SNL/NM June 1996) was submitted and included an NFA proposal for SWMU 107. NMED issued two Notices of Deficiencies (NODs) on the TA-III/V RFI report (Garcia July 1997, Garcia March 1998). Following the submittal of SNL/NM's responses to the NODs (SNL/NM October 1997, SNL/NM July 1998), several meetings were held between SNL/NM and NMED personnel to reach an agreement on what further characterization was required to complete the NFA proposals for sites included in the TA-III/V RFI Report.

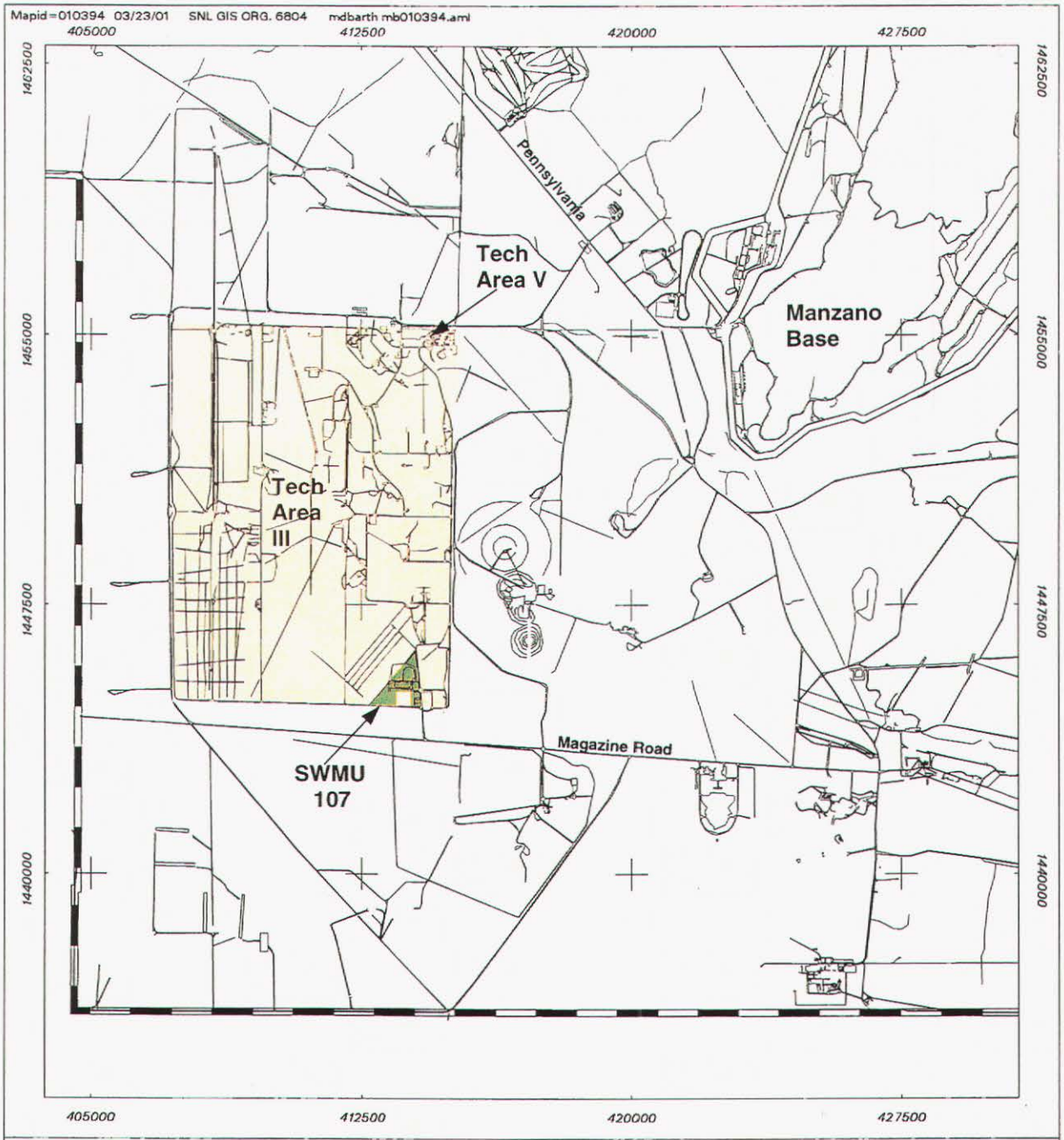
This document contains the additional information for SWMU 107 requested by NMED and is submitted in the form of supplemental information to the 2nd NOD responses. For SWMU 107, additional field characterization was required. This document follows the general NFA report guidelines but references the 1996 RFI report in order to reduce redundancy. This report includes operational history, description of the additional characterization activities, confirmatory soil sampling analytical summary tables in the NFA format, maps showing sample locations, and a summary of risk assessment results.

1.1 Site Description and Operational History

SWMU 107 is located in the southeastern portion of TA-III (Figure 1-1). The site comprises approximately 23 acres, has very little natural topographic relief, and was vegetated with grasses and shrubs. The area of concern (AOC) is a triangular area located in the vicinity of Building 6920 (Figure 1-2). Site conditions have been modified considerably and are discussed below.

The site was reportedly used as a high explosives (HEs) test area from the 1950s until 1972 (SNL/NM August 1990). Information from personnel interviews (SNL/NM August 1990) revealed some information regarding periods of testing at the site and types of explosives that may have been used. From the early 1950s to 1958 the types of explosives used at the site were not documented, but may have contained metals (silver and lead). From 1958 to 1968 testing occurred at the site infrequently.

From 1968 to 1972 testing at the site was conducted using an explosive manufactured by DuPont called Detasheet Type D. Detasheet explosive consists of 80% pentaerythritol tetranitrate (PETN) and 20% hydrocarbon binders. No metal-clad explosives were used during this period. The output from these blasts would have consisted of water, carbon dioxide, carbon monoxide, various nitrate compounds, and minor amounts of nitrous oxide. Most output would be in the form of gasses and fine particulate that would be rapidly and widely dispersed. It is highly unusual to have any unburned explosive debris remaining after a test and any other types of debris were routinely picked up (SNL/NM August 1990).



Legend

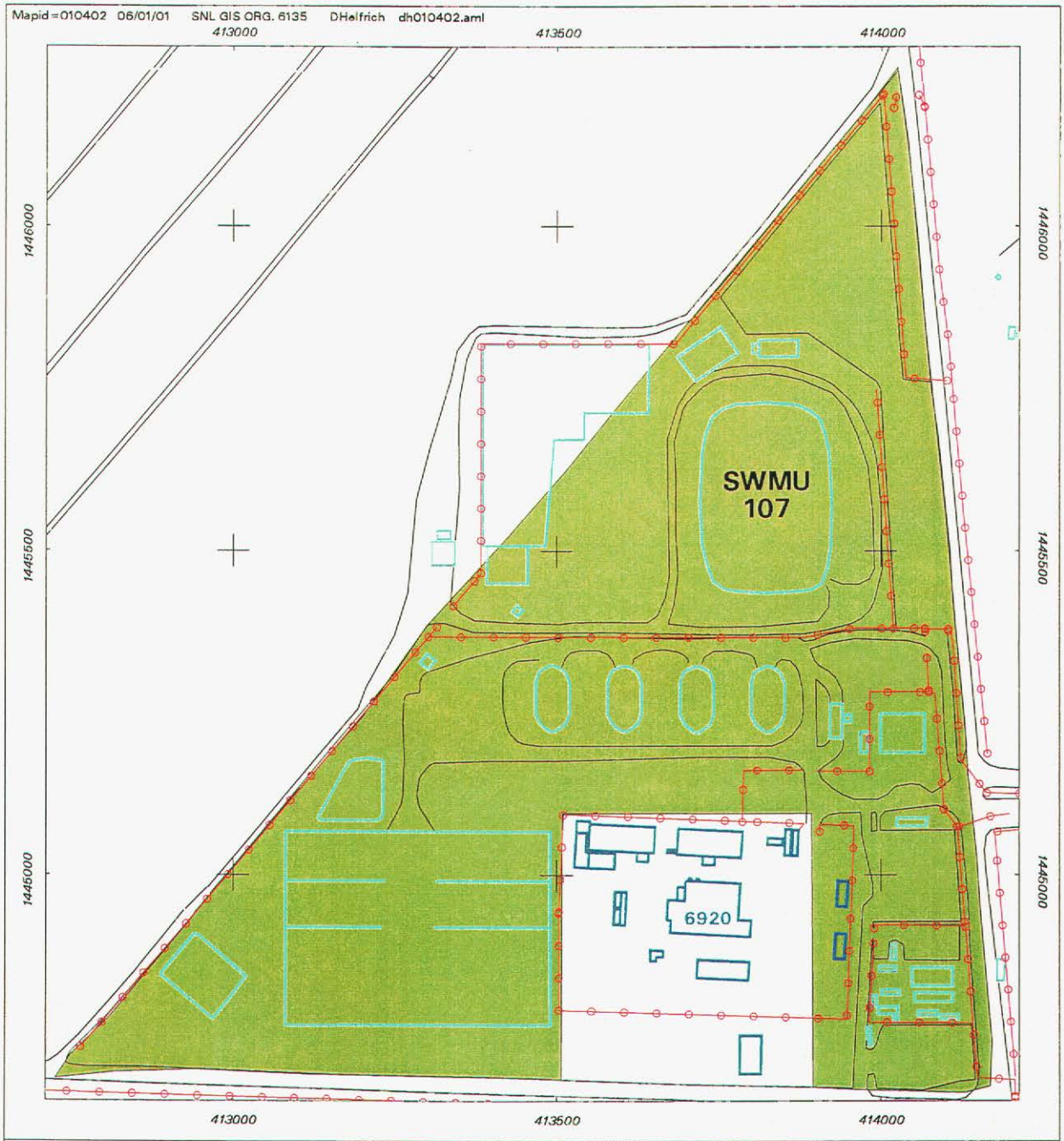
- SWMU 107
- Major Road
- KAFB Boundary
- Technical Area

Figure 1-1
Location of TA-III and SWMU 107

0 2250 4500
Scale in Feet

0 540 1080
Scale in Meters

Sandia National Laboratories, New Mexico
Environmental Geographic Information System



Legend

- Road
- Fence
- CWL / CAMU Building/Structure
- RWMWF Building/Sturcture
- SWMU 107

Figure 1-2
SWMU 107

0 125 250
Scale in Feet

0 30 60
Scale in Meters

Sandia National Laboratories, New Mexico
Environmental Geographic Information System

Because of the nature of these tests, only residual amounts of contaminants are expected to be present in the surface soils and these will tend to be fairly evenly dispersed over much of the site. Nitrogen-based explosive compounds will undergo chemical breakdown in soil over a period of time. The processes by which explosive compounds degrade in soil over time are hydrolysis, photolysis, and biotransformation. The rate of degradation and the resultant breakdown components will vary depending on the type of explosive and the conditions that exist at the site (Layton et al. December 1987).

The potential constituents of concern (COCs) at this site are lead and silver (metal cladding for charges), depleted uranium (DU), various residual HEs, and nitrate/nitrite (as explosive by-products). Possible HEs used at the site include PETN, 1,3,5-trinitro-1,3,5-triazacyclohexane (RDX) and 1,3,5,7-tetranitro-1,3,5,7-tetrazacyclooctane (HMX) (SNL/NM 1991).

The Corrective Action Management Unit (CAMU) is currently located within the boundaries of SWMU 107. There are also administrative buildings for the Chemical Waste Landfill (CWL) located within SWMU 107 boundaries. The CAMU will be used for the staging, treatment, and containment of hazardous soil generated during Environmental Restoration (ER) Project activities. The construction of the CAMU caused significant physical alterations to the site. The surface at the site has been graded and CAMU structures built. The "Class III Permit Modification Request for the Management of Hazardous Remediation Waste in the Corrective Action Management Unit, Technical Area III, Sandia National Laboratories/New Mexico, Environmental Restoration Project; Final Report, September 1997" addresses the regulatory requirements for designation of a CAMU at SWMU 107 (SNL/NM September 1997). The U.S. Environmental Protection Agency (EPA) has approved the permit modification and the CAMU is operational. The CAMU document contains the Closure Plan for the CAMU. As part of the closure, sampling and analysis will be conducted to assure clean closure in all the staging and treatment areas.

1.2 Previous Investigations and Results

In April 1992, ten composite surface soil samples (and one soil duplicate) were collected from the site to provide information prior to the CAMU construction activities (IT July 1992). The soil samples were analyzed for HEs, nitrate/nitrite, metals, and radionuclides. The RFI Work Plan (SNL/NM March 1993) and the RFI report (SNL/NM June 1996) detail the sampling plan, sampling event, and analytical results for this investigation.

In general, the results revealed no or low levels of COCs. No HE components were detected above the method detection limits (MDLs). Nitrate/nitrite ranged from 0.76 to 2.4 milligrams (mg) per kilogram (kg). Several metals were detected above their respective MDLs. Because several of these metals are essential nutrients or are geologically prevalent (i.e., iron, magnesium, manganese, and potassium), they were removed from further consideration. No metals were determined to be site contaminants based on the statistical analysis conducted for the site. A few metals (arsenic, cobalt, and vanadium) were compared to the revised site-wide background concentration report (IT March 1996) because there were no TA-III/V background data available at the time the statistical analysis was completed. None of the metals exceeded site-wide upper tolerance limits (UTLs).

The gamma spectroscopy results were examined to determine whether any enriched uranium or DU existed at the site. A uranium equilibrium analysis of the ratios of activities for uranium-234 and uranium-238, and the ratios of the activities of both radioisotopes to uranium-235 activity was completed. The results of the analysis indicated that no enriched uranium or DU exists at the site. Also, no additional radionuclides were identified as potential COCs by the broad spectrum covered by gamma spectroscopy.

1.3 Evaluation of Results

No chemical or radionuclide was detected in any of the composite surface soil samples at a level considered to be statistically greater than background. Based on the results presented in the RFI report, the U. S. Department of Energy (DOE)/SNL/NM proposed that SWMU 107 be considered for NFA based on Criterion 1 of the RCRA Facility Assessment Guidance (EPA 1987), which stated that "the site cannot be located or has been found not to exist, is a duplicate site, or is located within and therefore, investigated as part of another site."

The NMED's position on this proposal was that an NFA could not be granted based on the following:

- Composite samples are unacceptable for the purpose of site characterization. Therefore, the statistical analysis of the composite samples is not acceptable.
- DOE/SNL/NM must compare analytical data from discrete soil samples to the approved site-wide background UTLs/95th percentiles.
- DOE/SNL/NM must submit the analytical results of all discrete soil samples, all quality assurance (QA)/quality control (QC) data, a sampling map of all discrete sample locations, and a risk assessment, if necessary.

2.0 NOD RESPONSE ACTIVITIES

Negotiations between DOE/SNL/NM and NMED finalized an agreement on the additional investigative activities that needed to occur at SWMU 107. These negotiations included an agreement that an additional nine discrete surface soil samples would be collected at the site and submitted for off-site laboratory analyses for HEs, metals, and nitrate/nitrite. Samples would also be collected for gamma spectroscopy analyses at SNL/NM's on-site Radiation Protection Sample Diagnostics (RPSD) Laboratory. The sample locations were also discussed and agreed upon by the NMED.

2.1 Confirmatory Soil Sample Collection and Analyses

Nine discrete surface soil samples and one soil sample duplicate were collected on March 10 and March 15, 1999. Table 2-1 summarizes the sample identification and other related features for each sample. Figure 2-1 shows the locations of the soil samples. Sample locations were restricted to areas where construction activities were minimal. The majority of the site had been graded and the surface soil had been disturbed. Samples were collected from the edges of the site and a few interior areas. Samples were collected from 0 to 0.5 foot below ground surface (bgs).

All samples were sent to an off-site laboratory (General Engineering Laboratory) for analyses of RCRA metals plus beryllium (EPA Method 6010A/7471), HEs (EPA Method 8330), and nitrate plus nitrite, as nitrogen (EPA Method 353.1) under standard Analysis Request/Chain-of-Custody (AR/COC) procedures. All the AR/COCs are provided in Annex A. Nine discrete soil samples (plus one soil duplicate) were collected for gamma spectroscopy analyses (EPA Method 901.1) at the RPSD laboratory. Sample ER107-06-99-0-SD is the soil duplicate sample collected at the same location as ER107-06-99-0-SS.

Three equipment blanks were collected at the site before, during, and after sampling the soil. Sample ER107-99-DCW-01-SS was collected for metal analysis, Sample ER107-99-DCW-02-SS for nitrate plus nitrite analysis, and Sample ER107-99-DCW-03-SS for HEs analysis. Samples were collected by pouring deionized water over the sampling trowel and collecting the water in glass containers provided by the laboratory. The equipment blanks were submitted to the same off-site laboratory as the soil samples for analyses of the same parameters (HEs, nitrate plus nitrite, and metals).

2.2 Confirmatory Soil Sampling Analytical Results

Tables 2-2 through 2-6 show the analytical results and MDLs for the confirmatory soil sampling at SWMU 107. The analytical result tables in this report present only analytes with concentrations above the applicable MDLs. Therefore, an abbreviated suite of constituents is present in the analytical result tables. A complete list of the analytes tested for in each suite is provided in the corresponding MDL table. Related data-validation reports are provided in Annex B.

Metals

Table 2-2 gives the results of the metals analyses of the soil samples, the soil duplicate and the equipment blank. Table 2-3 provides the complete list of metals tested for and the respective MDLs for the soil and aqueous samples. Only one sample revealed a concentration of any metal that exceeded the approved background concentration. Sample ER107-99-07-0-SS had 0.676 mg/kg of beryllium (and has been qualified as a "J," an estimated value). The approved background value for beryllium is 0.65 mg/kg. There were detections of arsenic, barium, cadmium, total chromium, lead, mercury, and selenium that were below the approved background values for each. There were no detections of silver above the MDL in any sample; therefore, silver was not included in the tables.

Table 2-1
Confirmatory Soil Samples Collected and Analytical Suites for SWMU 107

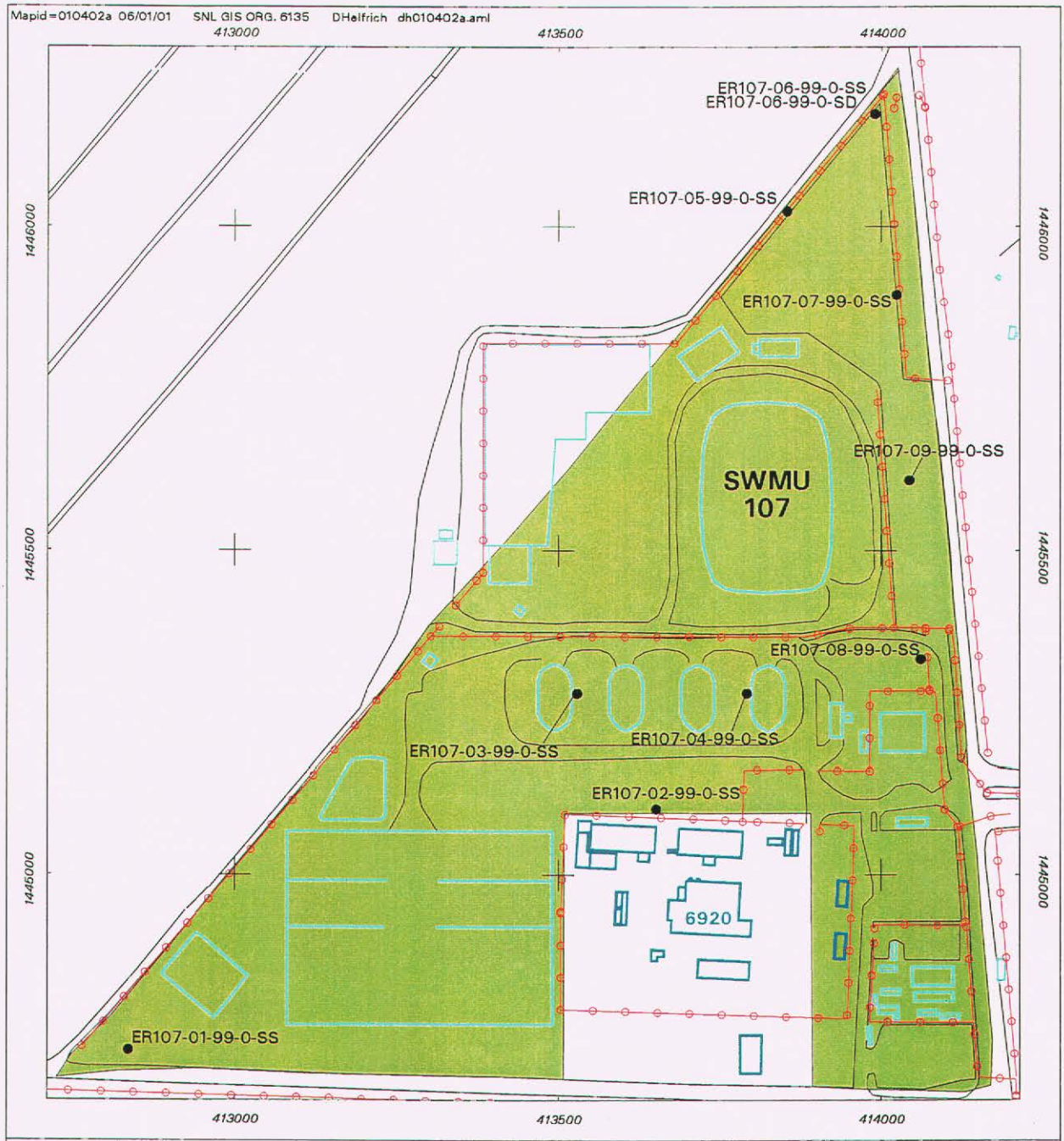
Sample Attributes				Analytical Suite			
AR/COC Number[a]	ER Sample ID	Date Sampled[b]	Sample Depth (ft)	RCRA Metals plus Beryllium (EPA Method 6010A/7471[c])	Nitrate plus Nitrite, as Nitrogen (EPA Method 353.1)	HEs (EPA Method 8330[c])	Gamma Spectroscopy (EPA Method 901.1)
601232/601650	ER107-01-99-0-SS	3-10-99 and 3-15-99	0–0.5	1	1	1	1
601232/601650	ER107-02-99-0-SS	3-10-99 and 3-15-99	0–0.5	1	1	1	1
601232/601650	ER107-03-99-0-SS	3-10-99 and 3-15-99	0–0.5	1	1	1	1
601232/601650	ER107-04-99-0-SS	3-10-99 and 3-15-99	0–0.5	1	1	1	1
601232/601650	ER107-05-99-0-SS	3-10-99 and 3-15-99	0–0.5	1	1	1	1
601232/601650	ER107-06-99-0-SS	3-10-99 and 3-15-99	0–0.5	1	1	1	1
601232/601650	ER107-06-99-0-SD	3-10-99 and 3-15-99	0–0.5	1	1	1	1
601232/601650	ER107-07-99-0-SS	3-10-99 and 3-15-99	0–0.5	1	1	1	1
601232/601650	ER107-08-99-0-SS	3-10-99 and 3-15-99	0–0.5	1	1	1	1
601232/601650	ER107-09-99-0-SS	3-10-99 and 3-15-99	0–0.5	1	1	1	1
Quality Assurance/Quality Control Samples							
601232	ER107-99-DCW-01-SS	3-15-99	NA	1	--	--	--
601232	ER107-99-DCW-02-SS	3-15-99	NA	--	1	--	--
601232	ER107-99-DCW-03-SS	3-15-99	NA	--	--	1	--

[a]Analysis request/chain of custody. AR/COC 601232 records samples for HEs, nitrate plus nitrite, and metals; AR/COC 601650 records samples for gamma spectroscopy.

[b]Gamma spectroscopy samples collected on March 10, 1999; all other parameters collected March 15, 1999.

[c]EPA November 1986.

AR/COC = Analysis request/chain-of-custody.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
DCW = Decontamination water (deionized water)
ft = Foot (feet).
HE = High explosive(s).
ID = Identification.
NA = Not applicable.
RCRA = Resource Conservation and Recovery Act.
SD = Soil sample duplicate.
SS = Soil sample.
SWMU = Solid Waste Management Unit.
-- = Indicates sample was not collected.



Legend

- Soil Sample Location
- Road
- Fence
- CWL / CAMU Building/Structure
- RWMWF Building/Sturcture
- SWMU 107

Figure 2-1
SWMU 107
Soil Sample Locations

0 125 250
Scale in Feet

0 30 60
Scale in Meters

Sandia National Laboratories, New Mexico
Environmental Geographic Information System

Table 2-2
Summary of Metals Analytical Results for SWMU 107 Confirmatory Soil Sampling
March 1999

Sample Attributes			Metals (EPA Method 6010A/7471) (mg/kg)							
AR/COC Number[a]	ER Sample ID	Sample Depth (ft)	Arsenic	Barium	Beryllium	Cadmium	Chromium, total	Lead	Mercury	Selenium
601232	ER107-01-99-0-SS	0-0.5	3.3 J	125 J	0.408 J	0.297 J	7.33 J	5.9 J	0.0118	0.563 J
601232	ER107-02-99-0-SS	0-.5	3.63 J	79.4 J	0.489 J	0.35 J	8.35 J	5.5 J	0.0058	0.711 J
601232	ER107-03-99-0-SS	0-0.5	3.09 J	64.9 J	0.42 J	0.34 J	8.17 J	6.42 J	0.0233	0.604 J
601232	ER107-04-99-0-SS	0-0.5	4.36 J	82.9 J	0.512 J	0.353 J	8.88 J	7.9 J	0.0186	0.564 J
601232	ER107-05-99-0-SS	0-0.5	4.14 J	114 J	0.453 J	0.312 J	8.26 J	6.93 J	0.0093	0.481 J
601232	ER107-06-99-0-SS	0-0.5	3.04 J	83.5 J	0.321 J	0.253 J	5.88 J	5.07 J	0.0044	0.384 J
601232	ER107-06-99-0-SD	0-0.5	2.83 J	94.2 J	0.303 J	0.237 J	5.55 J	5 J	0.00491	0.359 J
601232	ER107-07-99-0-SS	0-0.5	4.38 J	109 J	**0.676 J**	0.445 J	12 J	9.71 J	0.02	0.643 J
601232	ER107-08-99-0-SS	0-0.5	3.55 J	105 J	0.427 J	0.31 J	7.77 J	7.36 J	0.0181	0.388 J
601232	ER107-09-99-0-SS	0-0.5	2.87 J	75.5 J	0.43 J	0.36 J	8.39 J	8.89 J	0.00875	0.592 J
Background concentration, Southwest Supergroup[b]			5.6	130	0.65	<1	17.3	21.4	<0.25	<1
Quality Assurance/Quality Control Sample (mg/L)										
601232	ER107-99-DCW-01-SS	NA	ND (0.00451)	0.00126 J	ND (0.00026)	ND (0.00044)	ND (0.00056)	0.0019 J	ND (0.00004)	ND (0.00271)

Note: Numbers in **bold** represent values greater than the respective background concentration.

[a]Analysis request/chain-of-custody record.

[b]Dinwiddie September 1997.

AR/COC = Analysis request/chain-of-custody.
DCW = Decontamination water (deionized water used for preparation of equipment blank).
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
J = The associated value is an estimated quantity, see Data Validation Report (Annex B).
mg/kg = Milligram(s) per kilogram.
mg/L = Milligram(s) per liter.
NA = Not applicable.
ND ( ) = Not detected above the method detection limit, shown in parenthesis.
SD = Soil duplicate.
SS = Surface soil sample.
SWMU = Solid Waste Management Unit

Table 2-3
Metals Analytical Method Detection Limits
SWMU 107 Confirmatory Sampling
March 1999
(Off-Site Laboratory)

Analyte	EPA Method[a]	Method Detection Limits for Soil Samples(mg/kg)	Method Detection Limits Aqueous Sample (mg/L)
Arsenic	6010A	0.228	0.00451
Barium	6010A	0.027	0.00051
Beryllium	6010A	0.012	0.00026
Cadmium	6010A	0.019	0.00044
Chromium, total	6010A	0.038	0.00056
Lead	6010A	0.079	0.00159
Mercury	7471	0.00225	0.00004
Selenium	6010A	0.135	0.00271
Silver	6010A	0.031	0.00073

[a]EPA November 1986.
EPA = U.S. Environmental Protection Agency.
mg/kg = Milligrams(s) per kilogram.
mg/L = Milligrams(s) per liter.
SWMU = Solid Waste Management Unit.

Table 2-4
Summary of Nitrate plus Nitrite (as Nitrogen) Analytical Results
SWMU 107 Confirmatory Soil Sampling
March 1999
(Off-site Laboratory)

Sample Attributes			Nitrate plus Nitrite (as Nitrogen) (EPA Method 353.1) mg/kg	
AR/COC Number[a]	ER Sample ID	Sample Depth (ft)	Results	Method Detection Limit for soil samples (mg/kg)
601232	ER107-01-99-0-SS	0-0.5	2 J (2.5)	0.086
601232	ER107-02-99-0-SS	0-0.5	6	0.086
601232	ER107-05-99-0-SS	0-0.5	0.5 J (2.5)	0.086
601232	ER107-06-99-0-SS	0-0.5	2 J (2.5)	0.086
601232	ER107-06-99-0-SD	0-0.5	1 J (2.5)	0.086
601232	ER107-08-99-0-SS	0-0.5	2 J (2.5)	0.086
Quality Assurance/Quality Control (mg/L)				Method Detection Limit for aqueous sample (mg/L)
601232	ER107-99-DCW-02-SS	NA	0.12	0.013

[a]Analysis request/chain of custody.
AR/COC = Analysis request/chain-of-custody.
DCW = Decontamination water (deionized water used for preparation of equipment blank).
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
J ( ) = Analyte concentration is less than practical quantitation limit (shown in parenthesis) but greater than or equal to method detection limit, see Data Validation Report (Annex B).
mg/kg = Milligram(s) per kilogram.
mg/L = Milligram(s) per liter.
NA = Not applicable.
SD = Soil duplicate.
SS = Soil sample.
SWMU = Solid Waste Management Unit.

Table 2-5
HE Analytical Method Detection Limits for SWMU 107
Confirmatory Soil Sampling
March 1999
(Off-site Laboratory)

Analyte	Method Detection Limit for Soil Samples (µg/kg)	Method Detection Limit for Aqueous Sample (µg/L)
1,3,5-Trinitrobenzene	6.6	0.021
1,3-Dinitrobenzene	4.1	0.02
2,4,6-Trinitrotoluene	5.7	0.029
2,4-Dinitrotoluene	6.2	0.014
2,6-Dinitrotoluene	6.5	0.043
2-Amino-4,6-dinitrotoluene	6.6	0.019
2-Nitrotoluene	7.8	0.024
3-Nitrotoluene	11	0.031
4-Amino-2,6-dinitrotoluene	5.5	0.02
4-Nitrotoluene	11	0.034
HMX	5.3	0.046
Nitrobenzene	5.2	0.016
RDX	9.7	0.018
Tetryl	7.5	0.022

HE = High explosive(s).
HMX = 1,3,5,7-tetranitro-1,3,5,7-tetrazacyclooctane.
µg/kg = Microgram(s) per kilogram.
µg/L = Microgram(s) per liter
RDX = 1,3,5-trinitro-1,3,5-triazacyclohexane.
SWMU = Solid Waste Management Unit.
Tetryl = 2,4,6-trinitrophenylmethylnitramine.

Table 2-6
Summary of Gamma Spectroscopy Analytical Results for SWMU 107 Confirmatory Soil Sampling
March 1999
(On-site Laboratory)

Sample Attributes			Activity (pCi/g)							
			Uranium-235		Uranium-238		Thorium-232		Cesium-137	
AR/COC Number[a]	ER Sample ID	Sample Depth (ft)	Result	Error[b]	Result	Error[b]	Result	Error[b]	Result	Error[b]
601650	ER107-01-99-0-SS	0-0.5	1.30E-01	1.42E-01	ND (6.20E-01)	--	6.20E-01	1.19E+00	1.63E-02	3.20E-02
601650	ER107-02-99-0-SS	0-0.5	ND (1.80E-01)	--	ND (6.32E-01)	--	6.90E-01	3.72E-01	ND (2.59E-02)	--
601650	ER107-03-99-0-SS	0-0.5	ND (1.84E-01)	--	ND (6.34E-01)	--	6.71E-01	9.64E-01	2.08E-02	2.77E-02
601650	ER107-04-99-0-SS	0-0.5	ND (1.91E-01)	--	ND (6.42E-01)	--	6.63E-01	3.97E-01	3.48E-02	3.14E-02
601650	ER107-05-99-0-SS	0-0.5	ND (9.48E-02)	--	4.02E-01	3.76E-01	ND (1.27E-01)	--	5.43E-02	3.37E-02
601650	ER107-06-99-0-SS	0-0.5	ND (9.11E-02)	--	ND (4.79E-01)	--	7.16E-01	3.96E-01	4.98E-02	3.60E-02
601650	ER107-06-99-0-SD	0-0.5	ND (1.71E-01)	--	5.17E-01	7.16E-01	ND (1.33E-01)	--	3.35E-02	2.93E-02
601650	ER107-07-99-0-SS	0-0.5	ND (2.10E-01)	--	ND (7.29E-01)	--	8.97E-01	4.77E-01	1.53E-02	7.53E-03
601650	ER107-08-99-0-SS	0-0.5	ND (1.80E-01)	--	ND (5.06E-01)	--	7.50E-01	4.12E-01	6.95E-02	4.08E-02
601650	ER107-09-99-0-SS	0-0.5	ND (1.86E-01)	--	ND (6.28E-01)	--	6.72E-01	3.67E-01	4.54E-02	3.27E-02
Background Soil Concentrations, Southwest Supergroup (pCi/g)[c]			1.6E-01	NA	1.4E+00	NA	1.01E+00	NA	6.64E-01	NA

[a]Analysis request/chain of custody.

[b]Two standard deviations about the mean detected activity.

[c]Dinwiddie September 1997

AR/COC = Analysis request/chain-of-custody.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
NA = Not applicable.
ND ( ) = Not detected above the minimum detectable activity, shown in parenthesis.
pCi/g = Picocurie(s) per gram.
SS = Soil sample.
SD = Soil Duplicate.
SWMU = Solid Waste Management Unit.
-- = Error not calculated for nondetectable results.

Nitrate plus Nitrite, as Nitrogen

Table 2-4 gives the results for nitrate plus nitrite (as nitrogen) for the soil samples, the soil duplicate and the equipment blank. There were six samples (including the duplicate) with detectable amounts of nitrate plus nitrite (as nitrogen) ranging from 1.00 mg/kg to 6.00 mg/kg. Some of the values were given a "J" qualification. Five samples had no detectable concentrations of nitrate plus nitrite. There is no approved background value for nitrate/nitrite levels for comparison to the detected values. The MDLs for nitrate plus nitrite (as nitrogen) are also given in Table 2-4.

High Explosives

There were no detectable amounts of any HE constituents in any of the soil samples, the soil duplicate sample, or the equipment blank. Table 2-5 provides the list of HE analytes and the MDLs for each.

Radionuclides

Table 2-6 gives the results for the gamma spectroscopy analyses for the soil samples and the soil duplicate. The MDAs and the error (two standard deviations about the mean) are included in the table. There were no levels of activity above the approved background activity for uranium-235, uranium-238, thorium-232, or cesium-137. The minimum detectable activity (MDA) for uranium-235 (MDAs ranged from 0.0911 to 0.210 picocuries per gram [pCi/g]) is greater than the background (0.16 pCi/g) in most of the samples. The gamma spectroscopy analytical results are provided in Annex C.

2.3 Quality Assurance/Quality Control Results

This section describes the data quality assessment results for the soil sample analyses at SWMU 107. Equipment blanks (water) were collected to ensure contamination is not transferred from one sample to another via unclean sampling equipment. A duplicate soil sample was collected, and analytical results were compared to assess sampling method and soil matrix homogeneity. Soil samples collected on March 10 and 15, 1999 were collected in consecutive order and share equipment blanks ER107-99-DCW-01-SS, ER107-99-DCW-02-SS, and ER107-99-DCW-03-SS. Sample fraction 01 was analyzed for metals, fraction 02 was analyzed for nitrate plus nitrogen, and fraction 03 was analyzed for HEs. The soil samples, duplicate and equipment blanks are recorded on AR/COC 601232 (metals, nitrate plus nitrite, and HEs analyses) and 601650 (gamma spectroscopy). The AR/COCs are provided in Annex A.

The analytical-result tables include the results for the QA/QC samples for SWMU 107. There was a detectable value of nitrate plus nitrite (as nitrogen) in the equipment blank at 0.12 mg/L with an MDL of 0.013 mg/L. There were no other constituents detected above relevant MDLs in the equipment-blank samples.

Table 2-7 presents the relative percent differences (RPDs) that were calculated from the analytical results of the soil sample and duplicate (ER107-06-99-0-SS and ER107-06-99-0-SD). RPDs are not calculated for results that are either nondetect or estimated. Therefore, mercury is the only constituent for which an RPD has been calculated.

Table 2-7
Summary of SWMU 107 Soil Sample Relative Percent Differences

Sample Attributes			Relative Percent Difference[a] (%)
AR/COC Number[b]	ER Sample ID	Sample Depth (ft)	Mercury
601232	ER107-06-99-0-SS ER107-06-99-0-SD	0-0.5	11

[a]Relative Percent Difference not calculated for nondetected or estimated values.
[b]Analysis request/chain of custody.
AR/COC = Analysis request/chain-of-custody.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
SD = Duplicate soil sample.
SS = Surface soil sample.
SWMU = Solid Waste Management Unit.

2.4 Data Validation

All laboratory results were verified/validated according to "Data Validation Procedure for Chemical and Radiochemical Data" (SNL/NM 1999). Annex B contains the data validation reports for AR/COC 601232. The data validation process addresses internal laboratory QA/QC measures and the results.

3.0 SITE CONCEPTUAL MODEL

The site conceptual model for SWMU 107 is based on the site history, hydrogeologic setting, and COCs identified from operational history information and sampling analyses. This section summarizes the nature and extent of contamination and the environmental fate of COCs.

3.1 Nature and Extent of Contamination

The potential COCs at SWMU 107 are silver, lead, HEs, nitrate and DU. Actual site COCs were determined by comparing sample results to background concentrations and activities established for the Southwest Supergroup (Dinwiddie September 1997). Any metal or radionuclide found to exceed the background in any sample was considered a COC for the site. Although all the results for uranium-235 were below the background (0.16 pCi/g), the MDA in some of the samples is greater than the background. Therefore, uranium-235 has been

considered in the risk assessment for conservatism, but it is not considered an actual COC. The only detectable concentration of any COC that exceeded any approved background level was beryllium with a concentration of 0.676 mg/kg ("J" value) and a background level of 0.65 mg/kg. Four other COCs (cadmium, mercury, nitrate plus nitrite, and selenium) do not have quantifiable background concentrations or do not have a calculated background concentration; thus, it is unknown if these COCs exceed background.

3.2 Environmental Fate

The primary source of COCs at SWMU 107 was testing activities involving HEs. The primary release mechanism of COCs at SWMU 107 was to soil from testing activities. A secondary release mechanism is the transport of airborne particles. Confirmatory sampling results showed that concentrations of COCs at SWMU 107 are very low or nondetectable.

The future land use for SWMU 107 is industrial (DOE et al. September 1995). For all applicable pathways, the major exposure route for the human receptor is ingestion/inhalation of soil and dust. Potential biota receptors include flora and fauna at the site. Similar to the human receptor, direct ingestion of soil is considered the major exposure route for biota, in addition to ingestion of COCs through food chain transfers or direct uptake.

Figure 3-1 shows the conceptual model flow diagram including transport pathways for the migration of potential contaminants at SWMU 107. The contaminants are limited to airborne transport of fine materials in blowing dust or transport through direct contact with contaminated soils. The dispersed nature of possible contaminants and the low concentrations suggest these contaminants would not migrate significant distances through surface or subsurface soils. The migration mechanism that has the greatest effect on contaminant transport through the vadose zone is infiltration of surface water (precipitation). This mechanism will have limited influence at SWMU 107 because of low annual rainfall and high evaporation rates. As a result, little vertical migration of contaminants is expected into the subsurface. Because of the depth to groundwater, approximately 450 feet bgs (SNL/NM 2000), surface contaminants are not expected to reach groundwater. Furthermore, there are no surface-water sources at the site to aid in the transport of contaminants.

4.0 SITE ASSESSMENTS

The site assessment process for SWMU 107 includes a risk screening analysis for both human health risk and ecological risk, and a surface-water assessment. This section provides a summary of the site assessment results.

4.1 Human Health and Ecological Assessment Overview

Available data and modeling assumptions indicate that human health and ecological risks associated with SWMU 107 are acceptable for an industrial land-use scenario and a residential

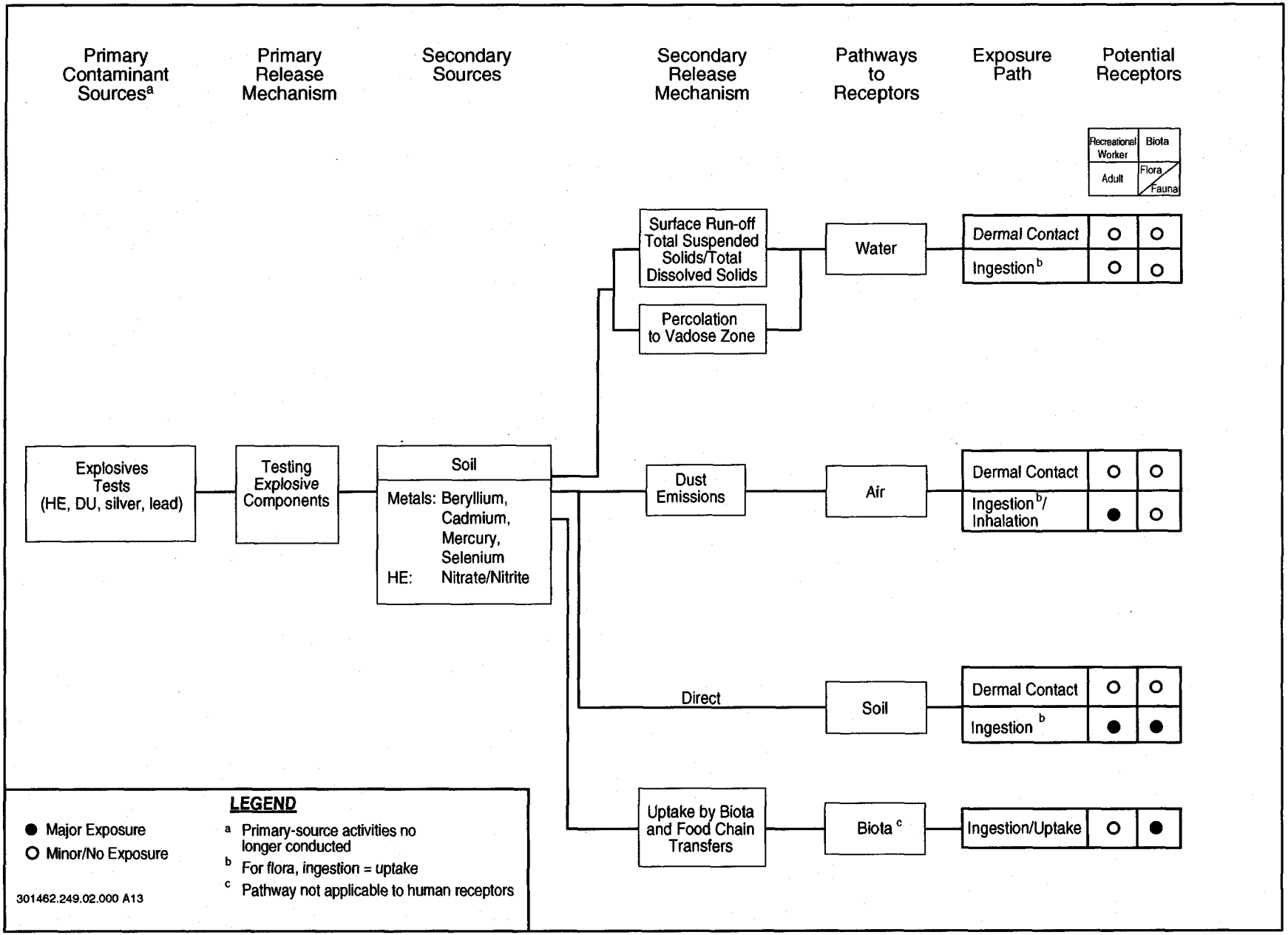


Figure 3-1

Conceptual Model Flow Diagram for SWMU 107, Explosives Test Area

land-use scenario. Complete details of the human health risk and ecological risk assessments are available in Annex D.

4.2 Surface-Water Assessment

A surface-water assessment was conducted at SWMU 107 in August 2000. The surface-water-assessment guidance was developed jointly by Los Alamos National Laboratory and the NMED Surface Water Quality Bureau. The assessment evaluated the potential for erosion from the site. SWMU 107 received a score of 11.8, indicating low erosion potential. The surface water assessment is provided in Annex E.

5.0 NO FURTHER ACTION PROPOSAL

Evaluation of the data collected at SWMU 107 supports the recommendation of NFA and closure for SWMU 107:

- The potential COCs at the site were either not present (radionuclides and HEs) or present at very low concentrations (metals and nitrate/nitrite) in the confirmatory soil samples.
- The risk screening assessment concluded that SWMU 107 poses insignificant risk to human health or the environment under either an industrial or a residential land-use scenario.

Based upon the evidence provided above, SWMU 107 is proposed for an NFA decision in conformance with Criterion 5 (NMED March 1998), which states "the SWMU/AOC has been characterized or remediated in accordance with current applicable state or federal regulations and that available data indicate that contaminants pose an acceptable level of risk under current and projected future land use."

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Sandia National Laboratories, New Mexico (SNL/NM), September 1997. "Class III Permit Modification Request for the Management of Hazardous Waste in the Corrective Action Management Unit, Technical Area III, Environmental Restoration Project, Final Report," Sandia National Laboratories/New Mexico, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), October 1997. "Responses to NMED Notice of Deficiency on the Technical Areas III and V RCRA Facility Investigation Dated June 1996," Environmental Restoration Project, Sandia National Laboratories/New Mexico, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), July 1998. "Responses to NMED 2nd Notice of Deficiency on the Technical Areas III and V RCRA Facility Investigation Dated June 1996," Environmental Restoration Project, Sandia National Laboratories/New Mexico, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), 1999. "Data Validation Procedure for Chemical and Radiochemical Data" SNL/NM Environmental Restoration Project Analytical Operating Procedure (AOP) 00-03, Rev. 0, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), March 2000. "Annual Groundwater Monitoring Report Fiscal Year 1999," Groundwater Protection Program, Sandia National Laboratories/New Mexico, Albuquerque, New Mexico.

U.S. Department of Energy (DOE), U.S. Air Force, and U.S. Forest Service, September 1995. "Workbook: Future Use Management Area 2," prepared by the Future Use Logistics and Support Working Group in cooperation with U.S. Department of Energy Affiliates, the U.S. Air Force, and the U.S. Forest Service.

U.S. Environmental Protection Agency (EPA), November 1986. "Test Methods for Evaluating Solid Waste," 3rd ed., Update III, SW-846, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 1987. "RCRA Facility Assessment Report of Solid Waste Management Units at Sandia National Laboratories," EPA, Region VI, Albuquerque, New Mexico.

ANNEX A
Analysis Request/Chain-of-Custody Forms

SF 2001-COC (10-
Supersedes (5-97) ins

Internal Lab Batch No. 900551 SAR/WR No.

ANALYSIS REQUEST AND CHAIN OF CUSTODY

AR/COC- 1232

Dept. No./Mail Stop: 6133 MS-1147
Project/Task Manager: Anh Lai/284-2527
Project Name: TAIII/V RFI Report Primary
Record Center Code: ER/1306/DAT
Logbook Ref. No.: __
Service Order No.: CF0678

Date Samples Shipped: _____ SMO USE
Carrier/Waybill No.: 643
Lab Contact: Edie Kent/(803)556-8171
Lab Destination: GEL Charleston, SC
SMO Contact/Phone: Doug Salmi/844-3110
Send Report to SMO: Suzi Jensen/844-3184

Contract No.: AJ-2480A
Case No.: 7219.11.01/61
SMO Authorization _____
Bill to: Sandia National Laboratories
Supplier Services, Dept. _____
P.O. Box 5800 MS 0154

Location Tech Area III
Building N/A Room N/A

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	EM Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	Parameter & Method Requested	LAB USE Lab Sample ID
045039-001	ER107-01-99-0-5S	N/A	107	3/15/99 1128	S	AG	500ml	4C	G	SA	HE8330RCRAMet+ Be6010,NPN	
045040-001	ER107-02-99-0-5S	N/A	107	3/15/99 1132	S	AG	500ml	4C	G	SA	HE8330RCRAMet+ Be6010,NPN	
045041-001	ER107-03-99-0-5S	N/A	107	3/15/99 1141	S	AG	500ml	4C	G	SA	HE8330RCRAMet+ Be6010,NPN	
045042-001	ER107-04-99-0-5S	N/A	107	3/15/99 1145	S	AG	500ml	4C	G	SA	HE8330RCRAMet+ Be6010,NPN	
045043-001	ER107-05-99-0-5S	N/A	107	3/15/99 1006	S	AG	500ml	4C	G	SA	HE8330RCRAMet+ Be6010,NPN	
045044-001	ER107-06-99-0-5S	N/A	107	3/15/99 1019	S	AG	500ml	4C	G	SA	HE8330RCRAMet+ Be6010,NPN	
045045-001	ER107-07-99-0-5S	N/A	107	3/15/99 1029	S	AG	500ml	4C	G	SA	HE8330RCRAMet+ Be6010,NPN	
045046-001	ER107-08-99-0-5S	N/A	107	3/15/99 1040	S	AG	500ml	4C	G	SA	HE8330RCRAMet+ Be6010,NPN	
045047-001	ER107-09-99-0-5S	N/A	107	3/15/99 1035	S	AG	500ml	4C	G	SA	HE8330RCRAMet+ Be6010,NPN	
045048-001	ER107-06-99-0-5D	N/A	107	3/15/99 1020	S	AG	500ml	4C	G	DU	HE8330RCRAMet+ Be6010,NPN	

RMMA XYes No Ref. No. ____
Sample Disposal Return to Client XDisposal by lab

Sample Tracking SMO USE
Date Entered (mm/dd/yy)
Entered by

Special Instructions/QC Requirements
EDD XYes No
Raw data package XYes No
Please deliver data package to
Grace Haggerty 284-2545
RELEASED BY 601650
Please list as separate report.

Abnormal Conditions on Receipt LAB USE

Turnaround Time XNormal Rush Required Report Date
QC Units

	Name	Signature	Init	Company/Organization/Phone
Sample Team Members	Stacy Griffith		SG	SNL6133/284-2588
	J. Christopher Sears	J. Christopher Sears	JCS	SNL6131/Weston/844-1136

1. Relinquished by	J. Christopher Sears	Org.	6131	Date	3/17/99	Time	0900	4. Relinquished by Org. Date Time
1. Received by	SMO	Org.	6131	Date	3/17/99	Time	0900	4. Received by Org. Date Time
2. Relinquished by		Org.		Date		Time		5. Relinquished by Org. Date Time
2. Received by		Org.		Date		Time		5. Received by Org. Date Time
3. Relinquished by		Org.		Date		Time		6. Relinquished by Org. Date Time
3. Received by		Org.		Date		Time		6. Received by Org. Date Time

Original To Accompany Samples, Laboratory Copy (White) 1st Copy To Accompany Samples, Return to SMO (Blue) 2nd Copy SMO Suspense Copy (Yellow) 3rd Copy Field Copy (Pink)

SF 2001-COC (10-97)

Supersedes (5-97) issue

ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Press F1 for instructions for each field.

AR/COC- 601232

Project Name: TAIII/V RFI Report Primary | Project/Task Manager: Anh Lai | Case No.: 7219.181

Location | Tech Area III | Building N/A | Room N/A

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in FL	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)						Parameter & Method Requested	LAB USE Lab Sample ID
					Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type		
045049-002	ER107-99-DCW-01-SS	N/A	107	3/15/99 1053	DCW	P	500ml	HNO3	G	SA	RCRA Metals + Be	
045049-003	ER107-99-DCW-02-SS	N/A	107	3/15/99 1054	DCW	P	250ml	H2SO4	G	SA	NPN (353, 28 day hold)	
045049-004	ER107-99-DCW-03-SS	N/A	107	3/15/99 1055	DCW	AG	4x1L	4C	G	SA	HE	

Abnormal Conditions on Receipt | LAB USE

Recipient Initials

Original To Accompany Samples, Laboratory Copy (White) | 1st Copy To Accompany Samples, Return to SMO (Blue) | 2nd Copy SMO Suspense Copy (Yellow) | 3rd Copy Field Copy (Pink)

Supersedes (5-9/

Batch No. _____ SAR/WR No. _____ AR/COC- 1650

Dept. No./Mail Stop: 6133 MS-1147	Date Samples Shipped: 3-11-99 SMO USE	Contract No.: AJ-2480A
Project/Task Manager: Anh Lal/284-2527	Carrier/Waybill No.: HC	Case No.: 7219.181
Project Name: TAIII/V RFI Report Primary	Lab Contact: ~~Edie Kent/(803)556-8171~~	SMO Authorization _____
Record Center Code: ER/1306/DAT	Lab Destination: ~~OEL Charleston, SC~~	Bill to: Sandia National Laboratories
Logbook Ref. No.: __	SMO Contact/Phone: Doug Salmi/844-3110	Supplier Services, Dept. _____
Service Order No.: CFO678	Send Report to SMO: Suzi Jensen/844-3184	P.O. Box 5800 MS 0154

Location Tech Area III

Building N/A Room N/A

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	Site No.	Date/Time Collected	Reference LOV (available at SMO) Sample Matrix	Container Type	Container Volume	Preservative NONE	Sample Collection Method	Sample Type	Parameter & Method Requested	LAB USE Lab Sample ID
045039-005	ER107-01-99-0-5S	N/A	107	3/10/99 1358	S	M	500ml	4C	G	SA	Gamma Spec	
045040-005	ER107-02-99-0-5S	N/A	107	3/10/99 1405	S	M	500ml	4C	G	SA	Gamma Spec	
045041-005	ER107-03-99-0-5S	N/A	107	3/10/99 1412	S	M	500ml	4C	G	SA	Gamma Spec	
045042-005	ER107-04-99-0-5S	N/A	107	3/10/99 1420	S	M	500ml	4C	G	SA	Gamma Spec	
045043-005	ER107-05-99-0-5S	N/A	107	3/10/99 1300	S	M	500ml	4C	G	SA	Gamma Spec	
045044-005	ER107-06-99-0-5S	N/A	107	3/10/99 1310	S	M	500ml	4C	G	SA	Gamma Spec	
045045-005	ER107-07-99-0-5S	N/A	107	3/10/99 1320	S	M	500ml	4C	G	SA	Gamma Spec	
045046-005	ER107-08-99-0-5S	N/A	107	3/10/99 1335	S	M	500ml	4C	G	SA	Gamma Spec	
045047-005	ER107-09-99-0-5S	N/A	107	3/10/99 1328	S	M	500ml	4C	G	SA	Gamma Spec	
045048-005	ER107-06-99-0-5D	N/A	107	3/10/99 1312	S	M	500ml	4C	G	DU	Gamma Spec	

RMMA XYes No Ref. No. _____

Sample Disposal Return to Client XDisposal by lab

Sample Tracking SMO USE
Date Entered (mm/dd/yy) _____
Entered by: _____

Special Instructions/QC Requirements
EDD XYes No
Raw data package XYes No
Please deliver data package to Grace Haggerty 284-2545

Abnormal Conditions on Receipt LAB USE

Turnaround Time XNormal XRush Required Report Date _____ QC inits _____

	Name	Signature	Init	Company/Organization/Phone
Sample Team Members	J. Christopher Sears	J. Christopher Sears	JCS	SNL6131/Weston/844-1136

Please list as separate report.

1. Relinquished by	J. Christopher Sears	Org. 6131	Date 3/11/99	Time 1345	4. Relinquished by	Org.	Date	Time
1. Received by	SMO 7577	Org.	Date 3/11/99	Time 1345	4. Received by	Org.	Date	Time
2. Relinquished by		Org.	Date	Time	5. Relinquished by	Org.	Date	Time
2. Received by		Org.	Date	Time	5. Received by	Org.	Date	Time
3. Relinquished by		Org.	Date	Time	6. Relinquished by	Org.	Date	Time
3. Received by		Org.	Date	Time	6. Received by	Org.	Date	Time

Original To Accompany Samples, Laboratory Copy (White) 1st Copy To Accompany Samples, Return to SMO (Blue) 2nd Copy SMO Suspense Copy (Yellow) 3rd Copy Field Copy (Pink)

ANNEX B
Data Validation Report

SAMPLE FINDINGS SUMMARY

Site: TA II / IV

AR/COC: 601232 Data Classification: Inorganic

Sample/ Fraction No.	Analysis	DV Qualifiers	Comments
	See Attached Table		

Sample No./Fraction No. - This value is located on the Chain of Custody in the ER Sample Id field.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470/1, EPA8015B, EPA8081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_ NO2, HACH_NO3, MEKC_HE, PCBRISC

Reviewed by: _____ Date: 6/21/99

INORGANIC METALS

SAMPLE FINDINGS SUMMARY

COC:601232 Sample Number	Ba (7440-39-3)	Be (7440-41-7)	Cd (7440-43-9)	Cr (7440-47-3)	Ag (7440-22-4)	Pb (7439-92-1)	Se (7782-49-2)	As (7440-38-2)
ER107-01-99-0-SS	JA2	JA2	JA2	JA2	UJA2	JA2	JA2	JA2
ER107-02-99-0-SS	JA2	JA2	JA2	JA2	UJA2	JA2	JA2	JA2
ER107-03-99-0-SS	JA2	JA2	JA2	JA2	UJA2	JA2	JA2	JA2
ER107-04-99-0-SS	JA2	JA2	JA2	JA2	UJA2	JA2	JA2	JA2
ER107-05-99-0-SS	JA2	JA2	JA2	JA2	UJA2	JA2	JA2	JA2
ER107-06-99-0-SS	JA2	JA2	JA2	JA2	UJA2	JA2	JA2	JA2
ER107-07-99-0-SS	JA2	JA2	JA2	JA2	UJA2	JA2	JA2	JA2
ER107-08-99-0-SS	JA2	JA2	JA2	JA2	UJA2	JA2	JA2	JA2
ER107-09-99-0-SS	JA2	JA2	JA2	JA2	UJA2	JA2	JA2	JA2
ER107-06-99-0-SD	JA2	JA2	JA2	JA2	UJA2	JA2	JA2	JA2

6/21/99

Data Validation Procedure for Chemical and Radiochemical Data
Appendix B. Data Validation Worksheets

Data Validation Qualifiers and Descriptive Flags

Note: Qualifiers may be used in conjunction with descriptive flags [for example, 10 J, A; 5 UJ, P; 10 U, B].

Qualifiers	Comment
J	The associated value is an estimated quantity.
R	The data are unusable for their intended purpose. The analyte may or may not be present. (Note: Resampling and re-analysis is necessary for verification.)
U	The analyte was analyzed for but was not detected.
UJ	The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
N	Presumptive evidence of the presence of the material.
NJ	Presumptive evidence of the presence of the material at an estimated quantity.
Descriptive Flags	
HT	The holding time was exceeded for the associated sample analysis.
TP	The method requirements for sample preservation/temperature were not met for the sample analysis.
A	Laboratory accuracy and/or bias measurements for the associated Laboratory Control Sample and/or duplicate (LCS/LCSD) do not meet acceptance criteria.
A1	Laboratory accuracy and/or bias measurements for the associated Surrogate Spike do not meet acceptance criteria.
A2	Laboratory accuracy and/or bias measurements for the associated Matrix Spike and/or duplicate (MS/MSD) do not meet acceptance criteria.
A3	Insufficient quality control data to determine laboratory accuracy.
B	Analyte present in laboratory method blank
B1	Analyte present in trip blank.
B2	Analyte present in equipment blank.
B3	Analyte present in calibration blank.
P	Laboratory precision measurements for the Laboratory Control Sample and duplicate (LCS/LCSD) do not meet acceptance criteria.
P1	Laboratory precision measurements for the Matrix Spike Sample and associated duplicate (MS/MSD) do not meet acceptance criteria.
P2	Insufficient quality control data to determine laboratory precision.

SAMPLE FINDINGS SUMMARY

Site: TA-II/IX

AR/COC: 601232 Data Classification: Organic

Sample/ Fraction No.	Analysis	DV Qualifiers	Comments
	No Data Qualified MH 6/21/99		
ER 107-99-DCV-03-SS	EPA 8330 HE	UJ2	

Sample No./Fraction No. - This value is located on the Chain of Custody in the ER Sample Id field.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470/1, EPA8015B, EPA8081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_NO2, HACH_NO3, MEKC_HE, PCBRISC

Reviewed by: [signature] Date: 6/21/99

SAMPLE FINDINGS SUMMARY

Site: TA III/IV

AR/COC: 601232 Data Classification: General Chemistry

Sample/ Fraction No.	Analysis	DV Qualifiers	Comments
ER107-05-99-0-55	NO_2/NO_3	JB2	

Sample No./Fraction No. - This value is located on the Chain of Custody in the ER Sample Id field.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470/1, EPA8015B, EPA8081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_ NO2, HACH_NO3, MEKC_HE, PCBRISC

Reviewed by: [signature] Date: 9/21/99

DATA VALIDATION SUMMARY:

SITE/PROJECT: TAIII/IV CASE #: 7219.161 # OF SAMPLES: 10 MATRIX: Soil
ARCOC #: 601232 LAB SAMPLE IDs: 9903648-01 thru -10
LABORATORY: CEL
LABORATORY REPORT #: 9903648

ANALYSIS/ QC ELEMENT	VOC	SVOC	PEST/ PCB	HPLC (HE)	ICP/AES	GFAA/ AA	CVAA (Hg)	CN	RAD	OTHER mb/mb3
1. HOLDING TIMES/ PRESERVATION				✓	✓		✓			✓
2. CALIBRATIONS				✓	✓		✓			✓
3. METHOD BLANKS				✓	✓		✓			JB
4. MS/MSD				✓	UJA2 / JA2		✓			✓
5. LABORATORY CONTROL SAMPLES				✓	✓		✓			✓
6. REPLICATES					—		—			✓
7. SURROGATES				✓						—
8. INTERNAL STDS										—
9. TCL COMPOUND IDENTIFICATION										—
10. ICP INTERFERENCE CHECK SAMPLE					✓					—
11. ICP SERIAL DILUTION					—					—
12. CARRIER/CHEM TRACER RECOVERIES										—
13. OTHER QC										

CHECK MARK (√) – ACCEPTABLE
J – ESTIMATED
U – NOT DETECTED

SHADED CELLS – NOT APPLICABLE
UJ – NOT DETECTED, ESTIMATED
R – UNUSABLE

REVIEWED BY: [signature] DATE: 6/21/99

DATA VALIDATION SUMMARY:

SITE/PROJECT: TAIL/IE CASE #: 7219.161
ARCOC #: 601232
LABORATORY: GEL
LABORATORY REPORT #: 9903648

OF SAMPLES: 3 MATRIX: aqueous
LAB SAMPLE IDs: 9903648-11 thru 13

ANALYSIS/ QC ELEMENT	VOC	SVOC	PEST/ PCB	HPLC (HE)	ICP/AES	GFAA/ AA	CVAA (Hg)	CN	RAD	OTHER 1102, 1103
1. HOLDING TIMES/ PRESERVATION				~~✓~~ UJ	✓		✓			✓
2. CALIBRATIONS				✓	✓		✓			✓
3. METHOD BLANKS				✓	✓		✓			✓
4. MS/MSD				—	—		~~✓~~			✓
5. LABORATORY CONTROL SAMPLES				✓	✓		✓			✓
6. REPLICATES					—		—			—
7. SURROGATES				✓						—
8. INTERNAL STDS										—
9. TCL COMPOUND IDENTIFICATION										—
10. ICP INTERFERENCE CHECK SAMPLE					✓					—
11. ICP SERIAL DILUTION					—					—
12. CARRIER/CHEM TRACER RECOVERIES										
13. OTHER QC										

CHECK MARK (√) – ACCEPTABLE
J – ESTIMATED
U – NOT DETECTED

SHADED CELLS – NOT APPLICABLE
UJ – NOT DETECTED, ESTIMATED
R – UNUSABLE

REVIEWED: [signature] DATE: 6/21/99

Memorandum

Date: 06/21/99

To: File

From: Marcia Hilchey

Subject: General Chemistry Data Review and Validation
Site: TA III/V
AR/COC: 601232
Case: 7219.161
Laboratory: GEL
SDG: 9903648

See attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and with specified methods (NO2/NO3 EPA353.1). All components were successfully analyzed.

Qualifications were applied to NO2/NO3 sample results due to equipment blank contamination.

Holding Times

The samples were analyzed within the prescribed holding times.

Calibration

Initial and continuing calibration met QC acceptance criteria.

Blanks

Initial and continuing calibration blanks and method blanks were free of target analytes above reporting limits.

Sample ER107-05-99-0-SS contained NO2/NO3 at <5X the value of the equipment blank. The sample result was JB2 qualified.

Matrix Spike Analysis

The matrix spike samples met all QC acceptance criteria.

Laboratory Control/Laboratory Control Duplicate Samples

The LCS/LCSD samples met QC acceptance criteria.

Laboratory Replicate Analysis

The laboratory replicate samples met all QC acceptance criteria.

Other QC

The soil field duplicate sample met RPD acceptance criteria.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

GENERAL CHEMISTRY:

SITE/PROJECT: TA III/IV ARCOC #: 601232 soil
LABORATORY: GEL LABORATORY REPORT #: 9903648
METHODS: NO_2/NO_3

QC/ Analyte	CAS #	ICV	CCV	ICB	CCB	Method Blanks	LCS	LCSD	LCSD RPD	MS	MSD	MSD RPD	REP RPD	Serial Dilution	Field Dup RPD	Equip. Blks	Field Blks			
		n/a		n/a		n/a	mg/l													
NO_2/NO_3		✓	✓	✓	✓	✓	✓	✓	✓	✓			✓		✓		.12			

Comments:

REVIEWED BY: _____ DATE: 6/21/99

GENERAL CHEMISTRY:

SITE/PROJECT: TA III/IV ARCOC #: 601232 cg.
LABORATORY: CEL LABORATORY REPORT #: 9903648
METHODS: NO2/NO3

n/a — n/a

QC/ Analyte	CAS #	ICV	CCV	ICB	CCB	Method Blanks	LCS	LCSD	LCSD RPD	MS	MSD	MSD RPD	REP RPD	Serial Dilution	Field Dup RPD	Equip. Blks	Field Blks			
NO2/NO3		✓	✓	✓	✓	✓	✓	✓	✓	✓			✓							

Comments:

REVIEWED BY: _____ DATE: 6/21/99

Memorandum

Date: 06/21/99

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation
Site: TA III/V
AR/COC: 601232
Case: 7219.161
Laboratory: GEL
SDG: 9903648

See attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and with specified methods (ICP EPA6010, CVAA EPA7470). All components were successfully analyzed.

No qualifications were applied to CVAA sample results.

Qualifications were applied to ICP sample results due to lack of matrix spike sample analysis.

Holding Times

The samples were analyzed within the prescribed holding times.

Calibration

Initial and continuing calibration met QC acceptance criteria for the CVAA method.

The ICP CCV associated with samples 9903648-08,09,and -10 had high RPD for cadmium. No further qualifications were applied (see Matrix Spike section below).

Blanks

Method blanks were free of target analytes above reporting limits in both ICP and CVAA analyses.

The CVAA initial and continuing calibration blanks were free of target analytes above reporting limits.

The ICP initial and continuing calibrations blanks and the field blank contained several analytes above the detection limit. No further qualifications were applied (see Matrix Spike section below).

Matrix Spike Analysis

The CVAA matrix spike samples met QC acceptance criteria.

No matrix spike samples were analyzed for this SDG for the ICP method. All positive soil sample results were JA2 qualified and non-detect soil sample results were UJA2 qualified. See attached inorganic Sample Findings Summary.

Laboratory Control/Laboratory Control Duplicate Samples

The LCS/LCSD samples met QC acceptance criteria for both methods.

ICP Interference check sample (ICS) Analysis

The ICS met all QC acceptance criteria.

Laboratory Replicate Analysis

No replicate samples were analyzed for the ICP method. No further qualifications were applied (see Matrix Spike section above).

The soil MSD results were used to assess laboratory precision for the CVAA method. All RPD acceptance criteria were met.

Other QC

Serial dilution was performed on one sample in this SDG, with satisfactory results. No sample results were qualified.

The field duplicate soil sample results met all RPD acceptance criteria.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

INORGANICS - METALS:

SITE/PROJECT: TA III / IV ARCOC #: 601232 soil
LABORATORY: GEL LABORATORY REPORT #: 9903648
METHODS: ICP, CVAA

ug/l =n/a n/a mg/l

QC Element/ Analyte	ICV	CCV	ICB	CCB	Method Blks	LCS	LCSD	LCSD RPD	MS	MSD	MSD RPD	REP RPD	ICS AB	Serial Dilution	Field Dup RPD	Eq. Blks	Field Blks
7429-90-5 Al																	
7440-39-3 Ba	✓	✓	0.3	0.2	✓	✓	✓	✓	—	—	—		✓		✓		.0026
7440-41-7 Be	✓	✓	✓	0.1	✓	✓	✓	✓	—	—	—		✓		✓		
7440-43-9 Cd	✓	111.4?	✓	✓	✓	✓	✓	✓	—	—	—		✓		✓		
7440-70-2 Ca																	
7440-47-3 Cr	✓	✓	✓	0.6	✓	✓	✓	✓	—	—	—		✓		✓		
7440-48-4 Co																	
7440-50-8 Cu																	
7439-89-6 Fe																	
7439-95-4 Mg																	
7439-96-5 Mn																	
7440-02-0 Ni																	
7440-09-7 K																	
7440-22-4 Ag	✓	✓	✓	✓	✓	✓	✓	✓	—	—	—		✓		✓		
7440-23-5 Na																	
7440-62-2 V																	
7440-66-6 Zn																	
7439-92-1 Pb	✓	✓	✓	✓	✓	✓	✓	✓	—	—	—		✓		✓		.0090
7782-49-2 Se	✓	✓	✓	✓	✓	✓	✓	✓	—	—	—		✓		✓		
7440-38-2 As	✓	✓	✓	✓	✓	✓	✓	✓	—	—	—		✓		✓		
7440-36-0 Sb																	
7440-28-0 Tl																	
7439-97-6 Hg	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓		
Cyanide CN																	

mg/kg = ug/g : [(ug/g) x (sample mass {g} / sample vol. {ml}) x (1000ml / 1liter)] / Dilution Factor = ug/l

Comments:

1 CCV 9

REVIEWED BY: _____ DATE: 6/21/99

INORGANIC METALS:

SITE/PROJECT: TA II/V ARCOC #: 601232 09.
LABORATORY: GEL LABORATORY REPORT #: 9903648
METHODS: 6010, CLAA

QC Element/ Analyte	ICV	CCV	ICB (ug/l)	CCB	Method Blks	LCS	LCSD	LCSD RPD	MS	MSD	MSD RPD	REP RPD	ICS AB	Serial Dilution	Field Dup RPD	Eq. Blks	Field Blks (n/a)			
7429-90-5 Al																				
7440-39-3 Ba	✓	✓	✓	0.1	✓	✓	✓	✓												
7440-41-7 Be	✓	✓	✓	✓	✓	✓	✓	✓												
7440-43-9 Cd	✓	✓	✓	✓	✓	✓	✓	✓												
7440-70-2 Ca																				
7440-47-3 Cr	✓	✓	0.4	✓	✓	✓	✓	✓												
7440-48-4 Co																				
7440-50-8 Cu																				
7439-89-6 Fe																				
7439-95-4 Mg																				
7439-96-5 Mn																				
7440-02-0 Ni																				
7440-09-7 K																				
7440-22-4 Ag	✓	✓	✓	✓	✓	✓	✓	✓												
7440-23-5 Na																				
7440-62-2 V																				
7440-66-6 Zn																				
7439-92-1 Pb	✓	✓	✓	✓	✓	✓	✓	✓												
7782-49-2 Se	✓	✓	✓	✓	✓	✓	✓	✓												
7440-38-2 As																				
7440-36-0 Sb																				
7440-28-0 Tl																				
7439-97-6 Hg	✓	✓	✓	✓	✓	✓	✓	✓												
Cyanide CN																				

mg/kg = ug/g : [(ug/g) x (sample mass {g} / sample vol. {ml}) x (1000ml / 1liter)] / Dilution Factor = ug/l

Comments:

REVIEWED BY: _____ DATE: 6/21/99

HOLDING TIME/PRESERVATION:

SITE/PROJECT: TA III/IV ARCOC #: 601232
LABORATORY: GEL LABORATORY REPORT #: 9903648

Sample ID	Analysis	Holding Time Criteria	Days Holding Time was Exceeded	Preservation Criteria	Preservation Deficiency	Comments
ER107-99-DCW-03-SS	EPA8330 HE	7 dys	3 dys			UJ2

Comments:

REVIEWED BY: _____ DATE: 6/21/99

Memorandum

Date: 06/21/99

To: File

From: Marcia Hilchey

Subject: Organic Data Review and Validation
Site: TA III/V
AR/COC: 601232
Case: 7219.161
Laboratory: GEL
SDG: 9903648

See attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and with specified methods (HE EPA8330). All compounds were successfully analyzed.

Qualifications were applied to HE sample data due to exceeded holding time.

Note: A run log was not included for the reanalysis of samples 9903648-01 through -05 on 3/30/99. No qualifications were applied.

Holding Times

The soil samples were extracted and analyzed within the prescribed holding times.

The aqueous sample (ER107-99-DCW-03-SS) was reextracted 3 days outside the prescribed holding time due to initial analyte contamination. The sample results were UJ2 qualified.

Calibration

Initial and continuing calibration met acceptance criteria.

Blanks

No target analytes were detected above the reporting limit in the method or equipment blanks.

Surrogates

All surrogate recoveries met acceptance criteria.

Matrix Spike/Matrix Spike Duplicates (MS/MSD)

Matrix spike sample analysis for soil HE met acceptance criteria.

No matrix spike sample was run for the aqueous analysis. No samples were qualified.

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

LCS/LCSD samples met all acceptance criteria.

Other QC

The soil field duplicate sample met RPD acceptance criteria.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

HIGH EXPL[illegible]ES:
SW846 Method 8330

SITE/PROJECT: TAH/DE ARCOC #: 601232 soils
LABORATORY: CEC LABORATORY REPORT #: 9903648

NAME	CAS #	Intercept	Curve R^2	CCV RPD	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks		
			.99	20%	U			20%			20%		U	U		
HMX	2691-41-0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		
RDX	121-82-4															
1,3,5-Trinitrobenzene	99-35-4															
1,3-dinitrobenzene	99-65-0															
Nitrobenzene	98-95-3															
Tetryl	479-45-8															
2,4,6-trinitrotoluene	118-96-7															
2-amino-4,6-dinitrotoluene	35572-78-2															
4-amino-2,6-dinitrotoluene	19406-51-0															
2,4-dinitrotoluene	121-14-2															
2,6-dinitrotoluene	606-20-2															
2-nitrotoluene	88-72-2															
4-nitrotoluene	99-99-0															
3-nitrotoluene	99-08-1		d													
PETN	78-11-5															

Sample	SMC %REC	SMC RT		Sample	SMC %REC	SMC RT
		dc				

Comments:

Confirmation

Sample	CAS #	RPD > 25%		Sample	CAS #	RPD > 25%
		n/a				

mg/kg = ug/g : [(ug/g) x (sample mass {g} / sample vol. {ml}) x (1000ml / 1liter)] / Dilution Factor = ug / l

REVIEWED BY: _____ DATE: 6/2/99

HIGH EXPLOSIVES:
SW846 Method 8330

SITE/PROJECT: TA III / IV ARCOC #: 601232 99
LABORATORY: CEL LABORATORY REPORT #: 9903648 1

n/a

NAME	CAS #	Intercept	Curve R^2	CCV RPD	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks		
			.99	20%	U			20%			20%		U	U		
HMX	2691-41-0	✓	✓	✓	✓	✓	✓	✓								
RDX	121-82-4															
1,3,5-Trinitrobenzene	99-35-4															
1,3-dinitrobenzene	99-65-0															
Nitrobenzene	98-95-3															
Tetryl	479-45-8															
2,4,6-trinitrotoluene	118-96-7															
2-amino-4,6-dinitrotoluene	35572-78-2															
4-amino-2,6-dinitrotoluene	19406-51-0															
2,4-dinitrotoluene	121-14-2															
2,6-dinitrotoluene	606-20-2															
2-nitrotoluene	88-72-2															
4-nitrotoluene	99-99-0															
3-nitrotoluene	99-08-1															
PETN	78-11-5															

Sample	SMC %REC	SMC RT		Sample	SMC %REC	SMC RT
		OK				

Comments:

Confirmation

Sample	CAS #	RPD > 25%		Sample	CAS #	RPD > 25%
		n/a				

mg/kg = ug/g : [(ug/g) x (sample mass (g) / sample vol. (ml)) x (1000ml / 1liter)] / Dilution Factor = ug/l

REVIEWED BY: [redacted] DATE: 6/21/99

Batch No. 900551 SAR/WR No. AR/COC- 01232

Dept. No./Mail Stop: 6133 MS-1147
Project/Task Manager: Anh Lai/284-2527
Project Name: TAIII/V RFI Report Primary
Record Center Code: ER/1306/DAT
Logbook Ref. No.: __
Service Order No.: CFO678

Date Samples Shipped: 3-17-99 SMO use
Carrier/Waybill No.: 718476
Lab Contact: Edie Kent/(803)556-8171
Lab Destination: GEL Charleston, SC
SMO Contact/Phone: Doug Salmi/844-3110
Send Report to SMO: Suzi Jensen/844-3184

Contract No.: AJ-2480A
Case No.: 7219.11, 161
SMO Authorization
Bill to: Sandia National Laboratories
Supplier Services, Dept. _____
P.O. Box 5800 MS 0154

Location Tech Area III
Building N/A Room N/A

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID (LAB USE)
045039-001	ER107-01-99-0-SS	N/A	107	3/15/99 1128	S	AG	500ml	4C	G	SA	HE8330RCRAMet+Be6010,NPN	
045040-001	ER107-02-99-0-SS	N/A	107	3/15/99 1132	S	AG	500ml	4C	G	SA	HE8330RCRAMet+Be6010,NPN	
045041-001	ER107-03-99-0-SS	N/A	107	3/15/99 1141	S	AG	500ml	4C	G	SA	HE8330RCRAMet+Be6010,NPN	
045042-001	ER107-04-99-0-SS	N/A	107	3/15/99 1145	S	AG	500ml	4C	G	SA	HE8330RCRAMet+Be6010,NPN	
045043-001	ER107-05-99-0-SS	N/A	107	3/15/99 1006	S	AG	500ml	4C	G	SA	HE8330RCRAMet+Be6010,NPN	
045044-001	ER107-06-99-0-SS	N/A	107	3/15/99 1019	S	AG	500ml	4C	G	SA	HE8330RCRAMet+Be6010,NPN	
045045-001	ER107-07-99-0-SS	N/A	107	3/15/99 1029	S	AG	500ml	4C	G	SA	HE8330RCRAMet+Be6010,NPN	
045046-001	ER107-08-99-0-SS	N/A	107	3/15/99 1040	S	AG	500ml	4C	G	SA	HE8330RCRAMet+Be6010,NPN	
045047-001	ER107-09-99-0-SS	N/A	107	3/15/99 1035	S	AG	500ml	4C	G	SA	HE8330RCRAMet+Be6010,NPN	
045048-001	ER107-06-99-0-SD	N/A	107	3/15/99 1020	S	AG	500ml	4C	G	DU	HE8330RCRAMet+Be6010,NPN	

RMMA ☐Yes ☒No Ref. No.
Sample Disposal ☐Return to Client ☒Disposal by lab

Sample Tracking (LAB USE)
Date Entered (mm/dd/yy) 3/22/99
Entered by:
QC inits

Special Instructions/QC Requirements
EDD XYes ☐No
Raw data package XYes ☐No
Please deliver data package to
Grace Haggerty 284-2545
RELINQUISHED BY 601650
Please list as separate report

Abnormal Conditions on Receipt (LAB USE)

Turnaround Time ☒Normal ☐Rush Required Report Date

Sample Team Members	Name	Signature	Init	Company/Organization/Phone
	Stacy Griffith		SG	SNL6133/284-2588
	J. Christopher Sears		JCS	SNL6131/Weston/844-1138

1. Relinquished by		Org.	6131	Date	3/17/99	Time	0900
1. Received by	SMO	Org.	7577	Date	3/17/99	Time	0900
2. Relinquished by	SMO	Org.	757F	Date	3/17/99	Time	1230
2. Received by		Org.		Date		Time	
3. Relinquished by		Org.		Date		Time	
3. Received by		Org.		Date		Time	
4. Relinquished by		Org.		Dat		Time	
4. Received by		Org.		Dat		Time	
5. Relinquished by		Org.		Dat		Time	
5. Received by		Org.		Dat		Time	
6. Relinquished by		Org.		Dat		Time	
6. Received by		Org.		Dat		Time	

Original To Accompany Samples, Laboratory Copy (White) 1st Copy To Accompany Samples, Return to SMO (Blue) 2nd Copy SMO Suspense Copy (Yellow) 3rd Copy Field Copy (Pink)

SF 2001-COL (.97)

Supersedes (5-97) issue

ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Press F1 for instructions for each field. 7210-161 3-4-99 AR/COC-

601232

Project Name: TAIII/V RFI Report Primary Project/Task Manager: Anh Lai Case No.: ~~7210-101~~

Location Tech Area III

Building N/A Room N/A

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth In Ft.	Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
					Reference LOV (available at SMO)							LAB USE
045049-002	ER107-99-DCW-01-SS	N/A	107	3/15/99 1053	DCW	P	500ml	HNO3	G	SA	RCRA Metals + Be	
045049-003	ER107-99-DCW-02-SS	N/A	107	3/15/99 1054	DCW	P	250ml	H2SO4	G	SA	NPN (353, 28 day hold)	
045049-004	ER107-99-DCW-03-SS	N/A	107	3/15/99 1055	DCW	AG	4x1L	4C	G	SA	HE	

Abnormal Conditions on Receipt LAB USE

Recipient Initials

Original To Accompany Samples, Laboratory Copy (White) 1st Copy To Accompany Samples, Return to SMO (Blue) 2nd Copy SMO Suspense Copy (Yellow) 3rd Copy Field Copy (Pink)

Contract Verification Review (CVR)

Project Leader LAI | Project Name TA III / V RFI REPORT PRIMARY | Case No. 7219.161

AR/COC No. 601232 | Analytical Lab GEL | SDG No. 9903648

In the tables below, mark any information that is missing or incorrect and give an explanation.

1.0 Analysis Request and Chain of Custody Record and Log-In Information

Line No.	Item	Complete? Yes	Complete? No	If no, explain	Resolved? Yes	Resolved? No
1.1	All items on COC complete - data entry clerk initialed and dated	X				
1.2	Container type(s) correct for analyses requested	X				
1.3	Sample volume adequate for # and types of analyses requested	X				
1.4	Preservative correct for analyses requested	X				
1.5	Custody records continuous and complete	X				
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct	X				
1.7	Date samples received	X				
1.8	Condition upon receipt information provided	X				

2.0 Analytical Laboratory Report

Line No.	Item	Complete? Yes	Complete? No	If no, explain	Resolved? Yes	Resolved? No
2.1	Data reviewed, signature	X				
2.2	Method reference number(s) complete and correct	X				
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	X				
2.4	Matrix spike/matrix spike duplicate data provided(if requested)	X				
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and L_c	X				
2.6	QC batch numbers provided	X				
2.7	Dilution factors provided and all dilution levels reported	X				
2.8	Data reported in appropriate units and using correct significant figures	X				
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	X				
2.10	Narrative provided	X				
2.11	TAT met	X				
2.12	Hold times met	X		HE SAMPLE #9903648-13 RE-EXTRACTED OUTSIDE HOLDING TIME DUE TO MATRIX INTERFERENCE	X	
2.13	Contractual qualifiers provided	X				
2.14	All requested result and TIC (if requested) data provided	X				

Contract Verification Review (Continued)

3.0 Data Quality Evaluation

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1 Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2 Quantitation limit met for all samples	X		
3.3 Accuracy a) Laboratory control samples accuracy reported and met for all samples	X		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
c) Matrix spike recovery data reported and met		X	Sb OUTSIDE RECOVERY LIMITS
3.4 Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	X		
b) Matrix spike duplicate RPD data reported and met for all organic samples	X		
3.5 Blank data a) Method or reagent blank data reported and met for all samples	X		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met	NA		
3.6 Contractual qualifiers provided: "J"- estimated quantity; "B"-analyte found in method blank above the MDL for organic or above the PQL for inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"-analysis done beyond the holding time	X		
3.7 Narrative addresses planchet flaming for gross alpha/beta	NA		
3.8 Narrative included, correct, and complete	X		
3.9 Second column confirmation data provided for methods 8330 (high explosives) and pesticides/PCBs	NA		

4.0 Calibration and Validation Documentation

Item	Yes	No	Comments
4.1 GC/MS (8260, 8270, etc.)			
a) 12-hour tune check provided	X		
b) Initial calibration provided	X		
c) Continuing calibration provided	X		
d) Internal standard performance data provided	X		
e) Instrument run logs provided	X		
4.2 GC/HPLC (8330 and 8010)			
a) Initial calibration provided	X		
b) Continuing calibration provided	X		
c) Instrument run logs provided	X		
4.3 Inorganics (metals)			
a) Initial calibration provided	X		
b) Continuing calibration provided	X		
c) ICP interference check sample data provided	X		
d) ICP serial dilution provided	X		
e) Instrument run logs provided	X		
4.4 Radiochemistry			
a) Instrument run logs provided	NA		

Contract Verification Review (Concluded)

5.0 Problem Resolution

Summarize the findings in the table below. List only samples/fractions for which deficiencies have been noted.

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions
9903648-05	NpN	REPORTED RESULT BELOW DL

Were deficiencies unresolved? ☑ Yes ☐ No

Based on the review, this data package is complete. ☐ Yes ☑ No

If no, provide: nonconformance report or correction request number 2120 and date correction request was submitted: 5-6-99

Reviewed by: W. Palencia Date: 5-6-99 Closed by: W Palencia Date: 5-13-99

ANNEX C
Gamma Spectroscopy Report

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
3/11/99 5:04:22 PM

Analyzed by: 3/15/99 Reviewed by: 3/15/99

ustomer : A. LAI/D.PERRY (6133/SMO)
ustomer Sample ID : 045039-005
ab Sample ID : 90055101

ample Description : MARINELLI SOLID SAMPLE
ample Quantity : 863.000 gram
ample Date/Time : 3/10/99 1:58:00 PM
cquire Start Date/Time : 3/11/99 3:24:09 PM
etector Name : LAB02
lapsed Live/Real Time : 6000 / 6003 seconds

omments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	6.20E-001
RA-226	1.25E+000	5.57E-001	4.01E-001
PB-214	5.35E-001	1.08E-001	3.56E-002
BI-214	5.14E-001	1.05E-001	3.55E-002
PB-210	Not Detected	---------	2.90E+001
TH-232	6.20E-001	1.19E+000	1.10E-001
RA-228	5.24E-001	2.38E-001	1.09E-001
AC 228	6.37E-001	1.68E-001	6.13E-002
TI 28	5.39E-001	5.40E-001	3.49E-001
RA-224	6.47E-001	1.63E-001	5.45E-002
PB-212	6.24E-001	1.16E-001	3.02E-002
BI-212	8.21E-001	1.06E+000	2.26E-001
TL-208	5.75E-001	8.46E-001	4.74E-002
U-235	1.30E-001	1.42E-001	1.81E-001
TH-231	Not Detected	---------	1.51E+000
PA-231	Not Detected	---------	1.09E+000
TH-227	Not Detected	---------	2.86E-001
RA-223	Not Detected	---------	1.66E-001
RN-219	Not Detected	---------	2.81E-001
PB-211	Not Detected	---------	6.28E-001
TL-207	Not Detected	---------	9.43E+000
AM-241	Not Detected	---------	4.06E-001
PU-239	Not Detected	---------	3.39E+002
NP-237	Not Detected	---------	3.09E-001
PA-233	Not Detected	---------	4.30E-002
TH-229	Not Detected	---------	2.15E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

INFORMATION COPY

SHEARS # 165081

[Summary Report] - Sample ID: : 90055101

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG)8m	Not Detected	---------	2.75E-002
AG-110m	Not Detected	---------	2.45E-002
BA-133	Not Detected	---------	4.56E-002
BE-7	Not Detected	---------	1.87E-001
CD-109	Not Detected	---------	8.35E-001
CD-115	Not Detected	---------	6.91E-002
CE-139	Not Detected	---------	2.27E-002
CE-141	Not Detected	---------	3.96E-002
CE-144	Not Detected	---------	1.85E-001
CO-56	Not Detected	---------	2.48E-002
CO-57	Not Detected	---------	2.43E-002
CO-58	Not Detected	---------	2.37E-002
CO-60	Not Detected	---------	2.70E-002
CR-51	Not Detected	---------	1.75E-001
CS-134	Not Detected	---------	2.71E-002
CS-137	1.63E-002	3.20E-002	1.50E-002
EU-152	Not Detected	---------	7.29E-002
EU-154	Not Detected	---------	1.35E-001
EU-155	Not Detected	---------	1.19E-001
FE-59	Not Detected	---------	5.26E-002
GD-153	Not Detected	---------	9.04E-002
HG-203	Not Detected	---------	2.38E-002
I-131	Not Detected	---------	2.33E-002
IR-192	Not Detected	---------	2.07E-002
K-40	1.54E+001	2.26E+000	1.71E-001
MN-52	Not Detected	---------	2.48E-002
MN-54	Not Detected	---------	1.46E-002
MO `9	Not Detected	---------	2.20E-001
NA .2	Not Detected	---------	3.00E-002
NA-24	Not Detected	---------	8.15E-002
NB-95	Not Detected	---------	1.53E-001
ND-147	Not Detected	---------	1.51E-001
NI-57	Not Detected	---------	5.82E-002
RU-103	Not Detected	---------	2.17E-002
RU-106	Not Detected	---------	2.12E-001
SB-122	Not Detected	---------	3.76E-002
SB-124	Not Detected	---------	2.17E-002
SB-125	Not Detected	---------	6.44E-002
SN-113	Not Detected	---------	2.68E-002
SR-85	Not Detected	---------	2.68E-002
TA-182	Not Detected	---------	1.16E-001
TA-183	Not Detected	---------	4.01E-001
TC-99m	Not Detected	---------	4.42E-001
TL-201	Not Detected	---------	1.78E-001
XE-133	Not Detected	---------	1.58E-001
Y-88	Not Detected	---------	1.80E-002
ZN-65	Not Detected	---------	7.63E-002
ZR-95	Not Detected	---------	3.89E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
3/11/99 7:01:09 PM

Analyzed by: 3/15/99 Reviewed by: 3/15/99

ustomer : A. LAI/D. PERRY (6133/SMO)
ustomer Sample ID : 045040-005
ab Sample ID : 90055102

ample Description : MARINELLI SOLID SAMPLE
ample Quantity : 862.000 gram
ample Date/Time : 3/10/99 2:05:00 PM
cquire Start Date/Time : 3/11/99 5:20:55 PM
etector Name : LAB02
lapsed Live/Real Time : 6000 / 6003 seconds

omments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)	
U-238	Not Detected	---	6.32E-001	
RA-226	1.26E+000	5.76E-001	4.81E-001	
PB-214	5.69E-001	1.18E-001	3.60E-002	
BI-214	5.40E-001	1.16E-001	3.35E-002	
PB-210	Not Detected	---	2.96E+001	
TH-232	6.90E-001	3.72E-001	9.74E-002	
RA-228	7.09E-001	1.88E-001	1.11E-001	
AC 228	6.03E-001	1.82E-001	7.12E-002	
TL 28	6.04E-001	5.49E-001	3.68E-001	
RA-224	7.29E-001	1.80E-001	4.83E-002	
PB-212	6.04E-001	3.72E-001	3.15E-002	
BI-212	7.48E-001	9.92E-001	2.52E-001	
TL-208	5.90E-001	3.07E-001	4.95E-002	
U-235	Not Detected	---	1.80E-001	
TH-231	Not Detected	---	1.57E+000	
PA-231	Not Detected	---	1.07E+000	
TH-227	Not Detected	---	2.84E-001	
RA-223	Not Detected	---	1.69E-001	
RN-219	Not Detected	---	2.85E-001	
PB-211	Not Detected	---	6.41E-001	
TL-207	Not Detected	---	1.02E+001	
AM-241	Not Detected	---	4.07E-001	
PU-239	Not Detected	---	3.34E+002	
NP-237	~~3.41E-001~~	~~1.86E-001~~	2.14E-001	NOT DETECTED for 3/15/99
PA-233	Not Detected	---	4.30E-002	
TH-229	Not Detected	---	2.09E-001	

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 90055102

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG)8m	Not Detected	---------	2.72E-002
AG-110m	Not Detected	---------	2.33E-002
BA-133	Not Detected	---------	4.66E-002
BE-7	Not Detected	---------	1.87E-001
CD-109	Not Detected	---------	7.25E-001
CD-115	Not Detected	---------	7.11E-002
CE-139	Not Detected	---------	2.39E-002
CE-141	Not Detected	---------	3.97E-002
CE-144	Not Detected	---------	1.84E-001
CO-56	Not Detected	---------	2.70E-002
CO-57	Not Detected	---------	2.43E-002
CO-58	Not Detected	---------	2.51E-002
CO-60	Not Detected	---------	2.84E-002
CR-51	Not Detected	---------	1.82E-001
CS-134	Not Detected	---------	2.65E-002
CS-137	Not Detected	---------	2.59E-002
EU-152	Not Detected	---------	7.29E-002
EU-154	Not Detected	---------	1.32E-001
EU-155	Not Detected	---------	1.19E-001
FE-59	Not Detected	---------	5.18E-002
GD-153	Not Detected	---------	8.75E-002
HG-203	Not Detected	---------	2.39E-002
I-131	Not Detected	---------	2.31E-002
IR-192	Not Detected	---------	2.02E-002
K-40	1.57E+001	2.27E+000	1.86E-001
MN-52	Not Detected	---------	2.65E-002
MN-54	Not Detected	---------	2.56E-002
MO 99	Not Detected	---------	2.32E-001
NA 22	Not Detected	---------	3.22E-002
NA-24	Not Detected	---------	8.12E-002
NB-95	Not Detected	---------	1.54E-001
ND-147	Not Detected	---------	1.54E-001
NI-57	Not Detected	---------	6.22E-002
RU-103	Not Detected	---------	1.98E-002
RU-106	Not Detected	---------	2.05E-001
SB-122	Not Detected	---------	3.95E-002
SB-124	Not Detected	---------	2.00E-002
SB-125	Not Detected	---------	6.46E-002
SN-113	Not Detected	---------	2.82E-002
SR-85	Not Detected	---------	2.69E-002
TA-182	Not Detected	---------	1.18E-001
TA-183	Not Detected	---------	4.06E-001
TC-99m	Not Detected	---------	5.49E-001
TL-201	Not Detected	---------	1.86E-001
XE-133	Not Detected	---------	1.61E-001
Y-88	Not Detected	---------	1.84E-002
ZN-65	Not Detected	---------	7.89E-002
ZR-95	Not Detected	---------	4.11E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
3/12/99 9:39:47 AM

Analyzed by: 3/15/99 Reviewed by: 3/15/99

ustomer : A. LAI/D. PERRY (6133/SMO)
ustomer Sample ID : 045041-005
ab Sample ID : 90055103

ample Description : MARINELLI SOLID SAMPLE
ample Quantity : 916.000 gram
ample Date/Time : 3/10/99 2:12:00 PM
cquire Start Date/Time : 3/12/99 7:59:32 AM
etector Name : LAB02
lapsed Live/Real Time : 6000 / 6003 seconds

omments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	6.34E-001
RA-226	Not Detected	---------	4.30E-001
PB-214	6.04E-001	1.11E-001	3.57E-002
BI-214	5.41E-001	1.19E-001	3.47E-002
PB-210	Not Detected	---------	2.91E+001
TH-232	6.71E-001	9.64E-001	1.13E-001
RA-228	7.34E-001	2.43E-001	1.09E-001
AC-228	7.24E-001	5.61E-001	6.72E-002
TL-208	6.86E-001	5.57E-001	3.23E-001
RA-224	7.48E-001	1.83E-001	5.13E-002
PB-212	6.82E-001	1.41E-001	3.26E-002
BI-212	Not Detected	---------	2.17E-001
TL-208	6.36E-001	1.24E-001	5.05E-002
U-235	Not Detected	---------	1.84E-001
TH-231	Not Detected	---------	1.55E+000
PA-231	Not Detected	---------	1.11E+000
TH-227	Not Detected	---------	2.92E-001
RA-223	Not Detected	---------	1.72E-001
RN-219	Not Detected	---------	2.80E-001
PB-211	Not Detected	---------	6.39E-001
TL-207	Not Detected	---------	1.02E+001
AM-241	Not Detected	---------	4.00E-001
PU-239	Not Detected	---------	3.38E+002
NP-237	Not Detected	---------	2.14E-001
PA-233	Not Detected	---------	4.48E-002
TH-229	Not Detected	---------	2.21E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 90055103

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG 108m	Not Detected	---------	2.66E-002
AG-110m	Not Detected	---------	2.46E-002
BA-133	Not Detected	---------	4.67E-002
BE-7	Not Detected	---------	1.09E-001
CD-109	~~1.47E+000~~	~~9.45E-001~~	7.26E-001 NOT DETECTED KK 3/19/99
CD-115	Not Detected	---------	8.71E-002
CE-139	Not Detected	---------	2.39E-002
CE-141	Not Detected	---------	4.12E-002
CE-144	Not Detected	---------	1.85E-001
CO-56	Not Detected	---------	2.61E-002
CO-57	Not Detected	---------	2.51E-002
CO-58	Not Detected	---------	2.51E-002
CO-60	Not Detected	---------	2.80E-002
CR-51	Not Detected	---------	1.79E-001
CS-134	Not Detected	---------	2.70E-002
CS-137	2.08E-002	2.77E-002	1.63E-002
EU-152	Not Detected	---------	7.50E-002
EU-154	Not Detected	---------	1.29E-001
EU-155	Not Detected	---------	1.18E-001
FE-59	Not Detected	---------	5.55E-002
GD-153	Not Detected	---------	9.24E-002
HG-203	Not Detected	---------	2.44E-002
I-131	Not Detected	---------	2.38E-002
IR-192	Not Detected	---------	2.05E-002
K-40	1.85E+001	2.66E+000	1.80E-001
MN-52	Not Detected	---------	2.74E-002
MN-54	Not Detected	---------	2.77E-002
MO 99	Not Detected	---------	2.61E-001
NA 22	Not Detected	---------	3.17E-002
NA-24	Not Detected	---------	1.70E-001
NB-95	Not Detected	---------	1.78E-001
ND-147	Not Detected	---------	1.64E-001
NI-57	Not Detected	---------	4.97E-002
RU-103	Not Detected	---------	2.16E-002
RU-106	Not Detected	---------	2.12E-001
SB-122	Not Detected	---------	4.84E-002
SB-124	Not Detected	---------	2.17E-002
SB-125	Not Detected	---------	6.44E-002
SN-113	Not Detected	---------	2.79E-002
SR-85	Not Detected	---------	2.81E-002
TA-182	Not Detected	---------	1.24E-001
TA-183	Not Detected	---------	4.39E-001
TC-99m	Not Detected	---------	3.02E+000
TL-201	Not Detected	---------	2.18E-001
XE-133	Not Detected	---------	1.98E-001
Y-88	Not Detected	---------	1.56E-002
ZN-65	Not Detected	---------	7.73E-002
ZR-95	Not Detected	---------	4.25E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
3/12/99 11:39:28 AM

A .yzed by: 3/15/99 Reviewed by: 3/15/99

ıstomer : A. LAI/D. PERRY (6133/SMO)
ıstomer Sample ID : 045042-005
ab Sample ID : 90055104

ample Description : MARINELLI SOLID SAMPLE
ample Quantity : 884.000 gram
ample Date/Time : 3/10/99 2:20:00 PM
cquire Start Date/Time : 3/12/99 9:59:13 AM
etector Name : LAB02
lapsed Live/Real Time : 6000 / 6003 seconds

omments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	6.42E-001
RA-226	Not Detected	---------	4.45E-001
PB-214	6.32E-001	1.22E-001	3.52E-002
BI-214	5.38E-001	1.08E-001	3.39E-002
PB-210	Not Detected	---------	3.06E+001
TH-232	6.63E-001	3.97E-001	1.19E-001
RA-228	7.63E-001	2.55E-001	1.14E-001
AC 228	8.03E-001	2.02E-001	6.31E-002
TH 228	8.01E-001	6.34E-001	3.64E-001
RA-224	8.03E-001	1.95E-001	5.10E-002
PB-212	7.75E-001	1.37E-001	3.18E-002
BI-212	8.28E-001	4.57E-001	2.43E-001
TL-208	6.66E-001	1.43E-001	5.12E-002
U-235	Not Detected	---------	1.91E-001
TH-231	Not Detected	---------	1.66E+000
PA-231	Not Detected	---------	1.13E+000
TH-227	Not Detected	---------	3.07E-001
RA-223	Not Detected	---------	1.81E-001
RN-219	Not Detected	---------	2.95E-001
PB-211	Not Detected	---------	6.60E-001
TL-207	Not Detected	---------	1.10E+001
AM-241	Not Detected	---------	4.19E-001
PU-239	Not Detected	---------	3.52E+002
NP-237	Not Detected	---------	3.23E-001
PA-233	Not Detected	---------	4.63E-002
TH-229	Not Detected	---------	2.20E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 90055104

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)	
AG)8m	Not Detected	---------	2.88E-002	
AG-110m	Not Detected	---------	2.54E-002	
BA-133	Not Detected	---------	4.86E-002	
BE-7	Not Detected	---------	2.13E-001	
CD-109	~~1.42E+000~~	~~7.22E-001~~	9.48E-001	NOT DETECTED KF 3/15/99
CD-115	Not Detected	---------	9.19E-002	
CE-139	Not Detected	---------	2.47E-002	
CE-141	Not Detected	---------	4.28E-002	
CE-144	Not Detected	---------	1.90E-001	
CO-56	~~9.61E-003~~	~~4.69E-003~~	1.86E-002	NOT DETECTED KF 3/15/99
CO-57	Not Detected	---------	2.51E-002	
CO-58	Not Detected	---------	2.49E-002	
CO-60	Not Detected	---------	2.96E-002	
CR-51	Not Detected	---------	1.87E-001	
CS-134	Not Detected	---------	2.76E-002	
CS-137	3.48E-002	3.14E-002	1.67E-002	
EU-152	Not Detected	---------	7.58E-002	
EU-154	Not Detected	---------	1.41E-001	
EU-155	Not Detected	---------	1.27E-001	
FE-59	Not Detected	---------	5.66E-002	
GD-153	Not Detected	---------	9.07E-002	
HG-203	Not Detected	---------	2.57E-002	
I-131	Not Detected	---------	2.69E-002	
IR-192	Not Detected	---------	2.16E-002	
K-40	1.81E+001	2.57E+000	2.13E-001	
MN-52	Not Detected	---------	2.98E-002	
MN-54	Not Detected	---------	1.43E-002	
MO 9	Not Detected	---------	2.68E-001	
NA 2	Not Detected	---------	3.25E-002	
NA-24	Not Detected	---------	2.03E-001	
NB-95	Not Detected	---------	1.89E-001	
ND-147	Not Detected	---------	1.71E-001	
NI-57	Not Detected	---------	6.06E-002	
RU-103	Not Detected	---------	2.17E-002	
RU-106	Not Detected	---------	2.16E-001	
SB-122	Not Detected	---------	4.90E-002	
SB-124	Not Detected	---------	2.28E-002	
SB-125	Not Detected	---------	6.51E-002	
SN-113	Not Detected	---------	3.02E-002	
SR-85	Not Detected	---------	2.87E-002	
TA-182	Not Detected	---------	1.18E-001	
TA-183	Not Detected	---------	4.55E-001	
TC-99m	Not Detected	---------	3.79E+000	
TL-201	Not Detected	---------	2.27E-001	
XE-133	Not Detected	---------	2.08E-001	
Y-88	Not Detected	---------	1.81E-002	
ZN-65	Not Detected	---------	7.94E-002	
ZR-95	Not Detected	---------	4.38E-002	

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
3/12/99 11:42:04 AM

A .yzed by: 3/15/99 Reviewed by: 3/15/99

ustomer : A. LAI/D. PERRY (6133/SMO)
ustomer Sample ID : 045043-005
ab Sample ID : 90055105

ample Description : MARINELLI SOLID SAMPLE
ample Quantity : 930.000 gram
ample Date/Time : 3/10/99 1:00:00 PM
.cquire Start Date/Time : 3/12/99 10:01:51 AM
)etector Name : LAB03
:lapsed Live/Real Time : 6000 / 6003 seconds

:omments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	4.02E-001	3.76E-001	3.47E-001
RA-226	Not Detected	---------	4.08E-001
PB-214	4.94E-001	1.86E-001	4.08E-002
BI-214	Not Detected	---------	4.28E-002
PB-210	Not Detected	---------	3.57E+000
TH-232	Not Detected	---------	1.27E-001
RA-228	6.96E-001	2.92E-001	1.46E-001
AC 228	6.18E-001	2.44E-001	8.34E-002
TH 28	5.26E-001	2.79E-001	3.36E-001
RA-224	5.84E-001	2.32E-001	6.46E-002
PB-212	6.17E-001	1.18E-001	3.23E-002
BI-212	6.99E-001	4.43E-001	2.83E-001
TL-208	5.35E-001	8.21E-001	5.65E-002
U-235	Not Detected	---------	9.48E-002
TH-231	Not Detected	---------	1.19E+000
PA-231	Not Detected	---------	1.18E+000
TH-227	Not Detected	---------	2.92E-001
RA-223	Not Detected	---------	1.11E-001
RN-219	Not Detected	---------	3.31E-001
PB-211	Not Detected	---------	7.50E-001
TL-207	Not Detected	---------	1.37E+001
AM-241	Not Detected	---------	1.23E-001
PU-239	Not Detected	---------	2.76E+002
NP-237	Not Detected	---------	1.67E-001
PA-233	Not Detected	---------	4.97E-002
TH-229	Not Detected	---------	1.47E-001

[Summary Report] - Sample ID: : 90055105

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG)8m	Not Detected	---------	3.65E-002
AG-110m	Not Detected	---------	3.44E-002
BA-133	Not Detected	---------	4.49E-002
BE-7	Not Detected	---------	2.29E-001
CD-109	Not Detected	---------	7.34E-001
CD-115	Not Detected	---------	9.96E-002
CE-139	Not Detected	---------	2.23E-002
CE-141	Not Detected	---------	3.63E-002
CE-144	Not Detected	---------	1.50E-001
CO-56	Not Detected	---------	2.88E-002
CO-57	Not Detected	---------	1.92E-002
CO-58	Not Detected	---------	2.86E-002
CO-60	Not Detected	---------	3.49E-002
CR-51	Not Detected	---------	2.11E-001
CS-134	Not Detected	---------	4.52E-002
CS-137	5.43E-002	3.37E-002	2.12E-002
EU-152	Not Detected	---------	5.76E-002
EU-154	Not Detected	---------	1.68E-001
EU-155	Not Detected	---------	8.80E-002
FE-59	Not Detected	---------	7.04E-002
GD-153	Not Detected	---------	6.18E-002
HG-203	Not Detected	---------	2.58E-002
I-131	Not Detected	---------	2.86E-002
IR-192	Not Detected	---------	2.40E-002
K-40	1.57E+001	2.72E+000	1.83E+000
MN-52	Not Detected	---------	3.40E-002
MN-54	Not Detected	---------	3.10E-002
MO 99	Not Detected	---------	3.38E-001
NA 22	Not Detected	---------	4.25E-002
NA-24	Not Detected	---------	2.69E-001
NB-95	Not Detected	---------	1.91E-001
ND-147	Not Detected	---------	1.94E-001
NI-57	Not Detected	---------	1.18E-001
RU-103	Not Detected	---------	2.45E-002
RU-106	Not Detected	---------	2.49E-001
SB-122	Not Detected	---------	5.76E-002
SB-124	Not Detected	---------	2.83E-002
SB-125	Not Detected	---------	7.38E-002
SN-113	Not Detected	---------	3.37E-002
SR-85	Not Detected	---------	2.96E-002
TA-182	Not Detected	---------	1.42E-001
TA-183	Not Detected	---------	1.35E-001
TC-99m	Not Detected	---------	3.79E+000
TL-201	Not Detected	---------	1.07E-001
XE-133	Not Detected	---------	1.19E-001
Y-88	Not Detected	---------	2.49E-002
ZN-65	Not Detected	---------	9.59E-002
ZR-95	Not Detected	---------	5.28E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
3/12/99 9:40:21 AM

Analyzed by: KT 3/16/99 Reviewed by: [illegible] 3/15/99

Customer : A. LAI/D. PERRY (6133/SMO)
Customer Sample ID : 045044-005
Lab Sample ID : 90055106

Sample Description : MARINELLI SOLID SAMPLE
Sample Quantity : 839.000 gram
Sample Date/Time : 3/10/99 1:10:00 PM
Acquire Start Date/Time : 3/12/99 8:00:07 AM
Detector Name : LAB03
Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)	
U-238	Not Detected	---	4.79E-001	
RA-226	1.13E+000	6.98E-001	4.36E-001	
PB-214	4.57E-001	7.75E-002	4.20E-002	
BI-214	4.43E-001	1.10E-001	4.45E-002	
PB-210	Not Detected	---	3.78E+000	
TH-232	7.16E-001	3.96E-001	1.35E-001	
RA-228	5.78E-001	3.14E-001	1.67E-001	
AC 228	5.37E-001	1.90E-001	7.75E-002	
TI 28	5.78E-001	6.32E-001	4.42E-001	
RA-224	5.90E-001	2.38E-001	8.12E-002	
PB-212	5.78E-001	2.80E-001	3.24E-002	
BI-212	5.43E-001	4.41E-001	3.01E-001	
TL-208	6.08E-001	1.18E-001	5.97E-002	
U-235	Not Detected	---	9.11E-002	
TH-231	Not Detected	---	1.23E+000	
PA-231	Not Detected	---	1.22E+000	
TH-227	Not Detected	---	3.06E-001	
RA-223	Not Detected	---	1.08E-001	
RN-219	Not Detected	---	3.37E-001	
PB-211	Not Detected	---	7.90E-001	
TL-207	Not Detected	---	1.40E+001	
AM-241	Not Detected	---	1.30E-001	
PU-239	Not Detected	---	2.86E+002	
NP-237	~~3.21E-001~~	~~1.63E-001~~	1.51E-001	NOT DETECTED KT 3/15/99
PA-233	Not Detected	---	5.21E-002	
TH-229	Not Detected	---	1.58E-001	

Summary Report] - Sample ID: : 90055106

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG)8m	Not Detected	---------	3.94E-002
AG-110m	Not Detected	---------	3.63E-002
BA-133	Not Detected	---------	4.64E-002
BE-7	Not Detected	---------	2.32E-001
CD-109	Not Detected	---------	7.49E-001
CD-115	Not Detected	---------	1.07E-001
CE-139	Not Detected	---------	2.29E-002
CE-141	Not Detected	---------	3.79E-002
CE-144	Not Detected	---------	1.56E-001
CO-56	Not Detected	---------	3.18E-002
CO-57	Not Detected	---------	1.99E-002
CO-58	Not Detected	---------	2.99E-002
CO-60	Not Detected	---------	3.61E-002
CR-51	Not Detected	---------	2.13E-001
CS-134	Not Detected	---------	4.70E-002
CS-137	4.98E-002	3.60E-002	2.17E-002
EU-152	Not Detected	---------	5.98E-002
EU-154	Not Detected	---------	1.82E-001
EU-155	Not Detected	---------	9.17E-002
FE-59	Not Detected	---------	7.04E-002
GD-153	Not Detected	---------	6.46E-002
HG-203	Not Detected	---------	2.74E-002
I-131	Not Detected	---------	2.71E-002
IR-192	Not Detected	---------	2.47E-002
K-40	1.47E+001	2.66E+000	2.04E+000
MN-52	Not Detected	---------	3.90E-002
MN-54	Not Detected	---------	1.21E-002
MO 99	Not Detected	---------	3.68E-001
N? 2	Not Detected	---------	4.23E-002
NA-24	Not Detected	---------	2.43E-001
NB-95	Not Detected	---------	1.97E-001
ND-147	Not Detected	---------	2.12E-001
NI-57	Not Detected	---------	1.08E-001
RU-103	Not Detected	---------	2.63E-002
RU-106	Not Detected	---------	2.75E-001
SB-122	Not Detected	---------	5.74E-002
SB-124	Not Detected	---------	2.77E-002
SB-125	Not Detected	---------	7.60E-002
SN-113	Not Detected	---------	3.36E-002
SR-85	Not Detected	---------	3.20E-002
TA-182	Not Detected	---------	1.51E-001
TA-183	Not Detected	---------	1.39E-001
TC-99m	Not Detected	---------	3.03E+000
TL-201	Not Detected	---------	1.08E-001
XE-133	Not Detected	---------	1.18E-001
Y-88	Not Detected	---------	2.59E-002
ZN-65	Not Detected	---------	1.01E-001
ZR-95	Not Detected	---------	5.47E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
3/12/99 1:48:14 PM

A lyzed by: KT 3/15/99 Reviewed by: JW 3/15/99

ustomer : A. LAI/D. PERRY (6133/SMO)
ustomer Sample ID : 045045-005
ab Sample ID : 90055107

ample Description : MARINELLI SOLID SAMPLE
ample Quantity : 790.000 gram
ample Date/Time : 3/10/99 1:20:00 PM
.cquire Start Date/Time : 3/12/99 12:07:59 PM
)etector Name : LAB02
:lapsed Live/Real Time : 6000 / 6003 seconds

:omments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)	
U-238	Not Detected	---------	7.29E-001	
RA-226	1.92E+000	7.44E-001	5.56E-001	
PB-214	6.91E-001	1.31E-001	3.79E-002	
BI-214	6.37E-001	1.25E-001	3.88E-002	
PB-210	Not Detected	---------	3.34E+001	
TH-232	8.97E-001	4.77E-001	1.36E-001	
RA-228	1.09E+000	3.09E-001	1.21E-001	
AC-228	9.27E-001	2.19E-001	7.26E-002	
TI 28	1.07E+000	6.85E-001	3.95E-001	
RA-224	1.06E+000	2.53E-001	5.49E-002	
PB-212	9.06E-001	4.69E-001	3.82E-002	
BI-212	9.81E-001	5.34E-001	2.56E-001	
TL-208	8.56E-001	1.73E-001	5.71E-002	
U-235	Not Detected	---------	2.10E-001	
TH-231	Not Detected	---------	1.78E+000	
PA-231	Not Detected	---------	1.22E+000	
TH-227	Not Detected	---------	3.55E-001	
RA-223	Not Detected	---------	2.02E-001	
RN-219	Not Detected	---------	3.23E-001	
PB-211	Not Detected	---------	7.39E-001	
TL-207	Not Detected	---------	1.16E+001	
AM-241	Not Detected	---------	4.73E-001	
PU-239	Not Detected	---------	3.88E+002	
NP-237	~~6.81E-001~~	~~6.06E-001~~	2.57E-001	NOT DETECTED KT 3/15/99
PA-233	Not Detected	---------	4.90E-002	
TH-229	Not Detected	---------	2.51E-001	

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 90055107

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG)8m	Not Detected	---------	3.08E-002
AG-110m	Not Detected	---------	2.73E-002
BA-133	Not Detected	---------	5.45E-002
BE-7	Not Detected	---------	2.22E-001
CD-109	Not Detected	---------	8.74E-001
CD-115	Not Detected	---------	1.10E-001
CE-139	Not Detected	---------	2.70E-002
CE-141	Not Detected	---------	4.75E-002
CE-144	Not Detected	---------	2.12E-001
CO-56	Not Detected	---------	2.88E-002
CO-57	Not Detected	---------	2.74E-002
CO-58	Not Detected	---------	2.58E-002
CO-60	Not Detected	---------	3.20E-002
CR-51	Not Detected	---------	2.10E-001
CS-134	Not Detected	---------	3.16E-002
CS-137	1.53E-002	7.53E-003	1.56E-002
EU-152	Not Detected	---------	8.30E-002
EU-154	Not Detected	---------	1.52E-001
EU-155	Not Detected	---------	1.37E-001
FE-59	Not Detected	---------	6.07E-002
GD-153	Not Detected	---------	1.02E-001
HG-203	Not Detected	---------	2.75E-002
I-131	Not Detected	---------	2.87E-002
IR-192	Not Detected	---------	2.27E-002
K-40	1.72E+001	2.50E+000	2.24E-001
MN-52	Not Detected	---------	3.35E-002
MN-54	Not Detected	---------	3.02E-002
MO 99	Not Detected	---------	3.13E-001
N 2	Not Detected	---------	3.41E-002
NA-24	Not Detected	---------	2.46E-001
NB-95	Not Detected	---------	2.25E-001
ND-147	Not Detected	---------	1.80E-001
NI-57	Not Detected	---------	6.06E-002
RU-103	Not Detected	---------	2.47E-002
RU-106	Not Detected	---------	2.52E-001
SB-122	Not Detected	---------	5.52E-002
SB-124	Not Detected	---------	2.54E-002
SB-125	Not Detected	---------	7.54E-002
SN-113	Not Detected	---------	3.29E-002
SR-85	Not Detected	---------	3.25E-002
TA-182	Not Detected	---------	1.33E-001
TA-183	Not Detected	---------	5.28E-001
TC-99m	Not Detected	---------	5.88E+000
TL-201	Not Detected	---------	2.51E-001
XE-133	Not Detected	---------	2.44E-001
Y-88	Not Detected	---------	2.18E-002
ZN-65	Not Detected	---------	8.66E-002
ZR-95	Not Detected	---------	4.91E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
3/12/99 1:50:04 PM

Analyzed by: KH 3/15/99 Reviewed by: [illegible] 3/15/99

Customer : A. LAI/D. PERRY (6133/SMO)
Customer Sample ID : 045046-005
Lab Sample ID : 90055108

Sample Description : MARINELLI SOLID SAMPLE
Sample Quantity : 829.000 gram
Sample Date/Time : 3/10/99 1:35:00 PM
Acquire Start Date/Time : 3/12/99 12:09:51 PM
Detector Name : LAB03
Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)	
U-238	Not Detected	---------	5.06E-001	
RA-226	Not Detected	---------	4.57E-001	
PB-214	Not Detected	---------	4.55E-002	
BI-214	5.46E-001	4.14E-001	4.43E-002	
PB-210	Not Detected	---------	3.91E+000	
TH-232	7.50E-001	4.12E-001	1.31E-001	
RA-228	7.75E-001	1.01E+000	1.52E-001	
AC-228	6.73E-001	5.00E-001	8.67E-002	
TH-228	Not Detected	---------	4.06E-001	
RA-224	6.56E-001	2.37E-001	7.10E-002	
PB-212	Not Detected	---------	3.76E-002	
BI-212	7.63E-001	4.72E-001	3.13E-001	
TL-208	6.73E-001	1.78E-001	6.27E-002	
U-235	Not Detected	---------	1.80E-001	
TH-231	Not Detected	---------	1.26E+000	
PA-231	Not Detected	---------	1.24E+000	
TH-227	Not Detected	---------	3.28E-001	
RA-223	Not Detected	---------	1.20E-001	
RN-219	Not Detected	---------	3.58E-001	
PB-211	Not Detected	---------	8.26E-001	
TL-207	Not Detected	---------	1.44E+001	
AM-241	Not Detected	---------	1.41E-001	
PU-239	Not Detected	---------	3.12E+002	
NP-237	~~5.64E-001~~	~~3.00E-001~~	1.55E-001	NOT DETECTED KH 3/15/99
PA-233	Not Detected	---------	5.23E-002	
TH-229	Not Detected	---------	1.69E-001	

[Summary Report] - Sample ID: : 90055108

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG 108m	Not Detected	---------	4.11E-002
AG-110m	Not Detected	---------	3.87E-002
BA-133	Not Detected	---------	5.09E-002
BE-7	Not Detected	---------	1.19E-001
CD-109	Not Detected	---------	8.16E-001
CD-115	Not Detected	---------	1.14E-001
CE-139	Not Detected	---------	2.46E-002
CE-141	Not Detected	---------	4.03E-002
CE-144	Not Detected	---------	1.68E-001
CO-56	Not Detected	---------	3.28E-002
CO-57	Not Detected	---------	2.14E-002
CO-58	Not Detected	---------	3.16E-002
CO-60	Not Detected	---------	3.67E-002
CR-51	Not Detected	---------	2.28E-001
CS-134	Not Detected	---------	5.21E-002
CS-137	6.95E-002	4.08E-002	2.36E-002
EU-152	Not Detected	---------	6.41E-002
EU-154	Not Detected	---------	1.87E-001
EU-155	Not Detected	---------	9.66E-002
FE-59	Not Detected	---------	7.94E-002
GD-153	Not Detected	---------	6.87E-002
HG-203	Not Detected	---------	2.84E-002
I-131	Not Detected	---------	2.92E-002
IR-192	Not Detected	---------	2.56E-002
K-40	1.64E+001	2.89E+000	2.06E+000
MN-52	Not Detected	---------	3.87E-002
MN-54	Not Detected	---------	3.54E-002
MO-99	Not Detected	---------	3.99E-001
NP 2	Not Detected	---------	4.30E-002
NA-24	Not Detected	---------	3.19E-001
NB-95	Not Detected	---------	2.18E-001
ND-147	Not Detected	---------	2.21E-001
NI-57	Not Detected	---------	1.22E-001
RU-103	Not Detected	---------	2.77E-002
RU-106	Not Detected	---------	2.68E-001
SB-122	Not Detected	---------	6.15E-002
SB-124	Not Detected	---------	2.99E-002
SB-125	Not Detected	---------	7.48E-002
SN-113	Not Detected	---------	3.69E-002
SR-85	Not Detected	---------	3.35E-002
TA-182	Not Detected	---------	1.56E-001
TA-183	Not Detected	---------	1.57E-001
TC-99m	Not Detected	---------	4.99E+000
TL-201	Not Detected	---------	1.19E-001
XE-133	Not Detected	---------	1.36E-001
Y-88	Not Detected	---------	2.82E-002
ZN-65	Not Detected	---------	1.06E-001
ZR-95	Not Detected	---------	6.04E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
3/12/99 3:57:16 PM

.lyzed by: 3/15/99 Reviewed by: 3/15/99

ustomer : A. LAI/D. PERRY (6133/SMO)
ustomer Sample ID : 045047-005
ab Sample ID : 90055109

ample Description : MARINELLI SOLID SAMPLE
ample Quantity : 930.000 gram
ample Date/Time : 3/10/99 1:28:00 PM
cquire Start Date/Time : 3/12/99 2:17:01 PM
etector Name : LAB02
lapsed Live/Real Time : 6000 / 6003 seconds

omments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	6.28E-001
RA-226	1.47E+000	7.44E-001	4.45E-001
PB-214	6.54E-001	1.22E-001	3.69E-002
BI-214	5.73E-001	3.98E-001	3.51E-002
PB-210	Not Detected	---------	2.92E+001
TH-232	6.72E-001	3.67E-001	1.19E-001
RA-228	7.82E-001	2.25E-001	1.17E-001
AC 228	7.48E-001	2.03E-001	6.46E-002
T .28	6.85E-001	6.28E-001	3.99E-001
RA-224	7.27E-001	1.78E-001	4.19E-002
PB-212	7.01E-001	1.33E-001	3.17E-002
BI-212	7.93E-001	4.76E-001	2.30E-001
TL-208	6.42E-001	1.02E-001	5.57E-002
U-235	Not Detected	---------	1.86E-001
TH-231	Not Detected	---------	1.57E+000
PA-231	Not Detected	---------	1.10E+000
TH-227	Not Detected	---------	2.93E-001
RA-223	Not Detected	---------	1.80E-001
RN-219	Not Detected	---------	2.79E-001
PB-211	Not Detected	---------	6.15E-001
TL-207	Not Detected	---------	1.01E+001
AM-241	Not Detected	---------	4.03E-001
PU-239	Not Detected	---------	3.43E+002
NP-237	Not Detected	---------	3.19E-001
PA-233	Not Detected	---------	4.61E-002
TH-229	Not Detected	---------	2.15E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 90055109

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
A 08m	Not Detected	---	2.69E-002
AG-110m	Not Detected	---	2.63E-002
BA-133	Not Detected	---	4.80E-002
BE-7	Not Detected	---	1.95E-001
CD-109	~~1.82E+000~~	~~7.14E-001~~	9.89E-001 NOT DETECTED KS 3/15/99
CD-115	Not Detected	---	9.59E-002
CE-139	Not Detected	---	2.35E-002
CE-141	Not Detected	---	4.21E-002
CE-144	Not Detected	---	1.85E-001
CO-56	Not Detected	---	2.61E-002
CO-57	Not Detected	---	2.48E-002
CO-58	Not Detected	---	2.37E-002
CO-60	Not Detected	---	2.88E-002
CR-51	Not Detected	---	1.83E-001
CS-134	Not Detected	---	2.75E-002
CS-137	4.54E-002	3.27E-002	1.75E-002
EU-152	Not Detected	---	7.43E-002
EU-154	Not Detected	---	1.32E-001
EU-155	Not Detected	---	1.22E-001
FE-59	Not Detected	---	5.67E-002
GD-153	Not Detected	---	8.96E-002
HG-203	Not Detected	---	2.52E-002
I-131	Not Detected	---	2.55E-002
IR-192	Not Detected	---	2.09E-002
K-40	1.75E+001	2.47E+000	1.88E-001
MN-52	Not Detected	---	2.88E-002
MN-54	Not Detected	---	2.60E-002
MO 99	Not Detected	---	2.96E-001
N. 2	Not Detected	---	3.17E-002
NA-24	Not Detected	---	2.40E-001
NB-95	Not Detected	---	1.89E-001
ND-147	Not Detected	---	1.69E-001
NI-57	Not Detected	---	5.21E-002
RU-103	Not Detected	---	2.14E-002
RU-106	Not Detected	---	2.09E-001
SB-122	Not Detected	---	5.00E-002
SB-124	Not Detected	---	2.18E-002
SB-125	Not Detected	---	6.53E-002
SN-113	Not Detected	---	2.79E-002
SR-85	Not Detected	---	2.81E-002
TA-182	Not Detected	---	1.20E-001
TA-183	Not Detected	---	4.58E-001
TC-99m	Not Detected	---	6.68E+000
TL-201	Not Detected	---	2.31E-001
XE-133	Not Detected	---	2.17E-001
Y-88	Not Detected	---	1.99E-002
ZN-65	Not Detected	---	7.69E-002
ZR-95	Not Detected	---	4.32E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
3/12/99 4:00:02 PM

Analyzed by: [signature] 3/15/99 Reviewed by: [signature] 3/15/99

Customer : A. LAI/D. PERRY (6133/SMO)
Customer Sample ID : 045048-005
Lab Sample ID : 90055110

Sample Description : MARINELLI SOLID SAMPLE
Sample Quantity : 839.000 gram
Sample Date/Time : 3/10/99 1:12:00 PM
Acquire Start Date/Time : 3/12/99 2:19:50 PM
Detector Name : LAB03
Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	5.17E-001	7.16E-001	3.43E-001
RA-226	1.21E+000	2.07E+000	4.64E-001
PB-214	4.85E-001	1.12E-001	4.12E-002
BI-214	4.49E-001	1.13E-001	4.31E-002
PB-210	Not Detected	---------	3.70E+000
TH-232	Not Detected	---------	1.33E-001
RA-228	5.54E-001	2.30E-001	1.53E-001
AC-228	5.62E-001	2.05E-001	9.25E-002
TH-228	4.45E-001	5.26E-001	4.06E-001
RA-224	5.92E-001	2.54E-001	7.67E-002
PB-212	5.95E-001	2.50E-001	3.27E-002
BI-212	8.12E-001	4.24E-001	2.51E-001
TL-208	5.45E-001	4.13E-001	5.86E-002
U-235	Not Detected	---------	1.71E-001
TH-231	Not Detected	---------	1.18E+000
PA-231	Not Detected	---------	1.15E+000
TH-227	Not Detected	---------	3.04E-001
RA-223	Not Detected	---------	1.15E-001
RN-219	Not Detected	---------	3.37E-001
PB-211	Not Detected	---------	7.75E-001
TL-207	Not Detected	---------	1.34E+001
AM-241	Not Detected	---------	1.31E-001
PU-239	Not Detected	---------	2.86E+002
NP-237	Not Detected	---------	1.35E-001
PA-233	Not Detected	---------	5.23E-002
TH-229	Not Detected	---------	1.56E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 90055110

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.98E-002
AG-110m	Not Detected	---------	3.36E-002
BA-133	Not Detected	---------	4.72E-002
BE-7	Not Detected	---------	2.26E-001
CD-109	Not Detected	---------	7.51E-001
CD-115	Not Detected	---------	1.15E-001
CE-139	Not Detected	---------	2.26E-002
CE-141	Not Detected	---------	3.84E-002
CE-144	Not Detected	---------	1.53E-001
CO-56	Not Detected	---------	3.14E-002
CO-57	Not Detected	---------	1.95E-002
CO-58	Not Detected	---------	3.04E-002
CO-60	Not Detected	---------	3.65E-002
CR-51	Not Detected	---------	2.11E-001
CS-134	Not Detected	---------	4.71E-002
CS-137	3.35E-002	2.93E-002	2.16E-002
EU-152	Not Detected	---------	5.86E-002
EU-154	Not Detected	---------	1.84E-001
EU-155	Not Detected	---------	9.27E-002
FE-59	Not Detected	---------	7.25E-002
GD-153	Not Detected	---------	6.46E-002
HG-203	Not Detected	---------	2.58E-002
I-131	Not Detected	---------	2.72E-002
IR-192	Not Detected	---------	2.36E-002
K-40	1.51E+001	2.71E+000	2.03E+000
MN-52	Not Detected	---------	3.96E-002
MN-54	Not Detected	---------	3.27E-002
MO-99	Not Detected	---------	3.74E-001
NB-92	Not Detected	---------	4.22E-002
NA-24	Not Detected	---------	3.23E-001
NB-95	Not Detected	---------	2.05E-001
ND-147	Not Detected	---------	2.06E-001
NI-57	Not Detected	---------	1.34E-001
RU-103	Not Detected	---------	2.71E-002
RU-106	Not Detected	---------	2.63E-001
SB-122	Not Detected	---------	6.31E-002
SB-124	Not Detected	---------	2.79E-002
SB-125	Not Detected	---------	7.55E-002
SN-113	Not Detected	---------	3.48E-002
SR-85	Not Detected	---------	3.25E-002
TA-182	Not Detected	---------	1.46E-001
TA-183	Not Detected	---------	1.47E-001
TC-99m	Not Detected	---------	6.36E+000
TL-201	Not Detected	---------	1.16E-001
XE-133	Not Detected	---------	1.35E-001
Y-88	Not Detected	---------	2.70E-002
ZN-65	Not Detected	---------	1.05E-001
ZR-95	Not Detected	---------	5.55E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
3/12/99 5:03:20 PM

alyzed by: 3/16/99 Reviewed by: 3/15/99

ustomer : A. LAI/D. PERRY (6133/SMO)
ustomer Sample ID : LAB CONTROL SAMPLE USING CG134
ab Sample ID : 90055111

ample Description : MIXED_GAMMA_STANDARD_CG134
ample Quantity : 1.000 Each
ample Date/Time : 11/01/90 12:00:00 PM
cquire Start Date/Time : 3/12/99 4:53:06 PM
etector Name : LAB02
lapsed Live/Real Time : 600 / 606 seconds

omments:

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
U-238	Not Detected	---------	4.19E+003
RA-226	Not Detected	---------	5.76E+003
PB-214	Not Detected	---------	6.49E+002
BI-214	Not Detected	---------	5.44E+002
PB-210	Not Detected	---------	2.70E+005
TH-232	Not Detected	---------	1.96E+003
RA-228	Not Detected	---------	2.19E+003
AC-228	Not Detected	---------	1.33E+003
228	Not Detected	---------	1.29E+005
RA-224	Not Detected	---------	2.92E+003
PB-212	Not Detected	---------	9.80E+003
BI-212	Not Detected	---------	7.42E+004
TL-208	Not Detected	---------	1.72E+004
U-235	Not Detected	---------	1.54E+003
TH-231	Not Detected	---------	1.27E+004
PA-231	Not Detected	---------	1.31E+004
TH-227	Not Detected	---------	2.42E+003
RA-223	Not Detected	---------	1.00E+026
RN-219	Not Detected	---------	5.23E+003
PB-211	Not Detected	---------	1.20E+004
TL-207	Not Detected	---------	1.89E+005
AM-241	8.31E+004	1.50E+004	2.88E+003
PU-239	Not Detected	---------	2.71E+006
NP-237	Not Detected	---------	2.13E+003
PA-233	Not Detected	---------	5.57E+002
TH-229	Not Detected	---------	1.78E+003

[Summary Report] - Sample ID: : 90055111

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
AG-108m	Not Detected	---	2.71E+002
AG-110m	Not Detected	---	6.83E+006
BA-133	Not Detected	---	6.94E+002
BE-7	Not Detected	---	5.37E+020
CD-109	Not Detected	---	4.02E+005
CD-115	Not Detected	---	1.00E+026
CE-139	Not Detected	---	1.02E+009
CE-141	Not Detected	---	1.00E+026
CE-144	Not Detected	---	2.67E+006
CO-56	Not Detected	---	2.61E+014
CO-57	Not Detected	---	5.15E+005
CO-58	Not Detected	---	2.76E+015
CO-60	8.02E+004	1.18E+004	4.07E+002
CR-51	Not Detected	---	1.00E+026
CS-134	Not Detected	---	4.27E+003
CS-137	7.08E+004	9.40E+003	2.36E+002
EU-152	Not Detected	---	9.92E+002
EU-154	Not Detected	---	2.33E+003
EU-155	Not Detected	---	3.31E+003
FE-59	Not Detected	---	1.00E+026
GD-153	Not Detected	---	4.62E+006
HG-203	Not Detected	---	1.39E+022
I-131	Not Detected	---	1.00E+026
IR-192	Not Detected	---	7.18E+014
K-40	Not Detected	---	1.42E+003
MN-52	Not Detected	---	1.00E+026
MN-54	Not Detected	---	2.71E+005
MO-99	Not Detected	---	1.00E+026
NA-22	Not Detected	---	1.49E+003
NA-24	Not Detected	---	1.00E+026
NB-95	Not Detected	---	1.00E+026
ND-147	Not Detected	---	1.00E+026
NI-57	Not Detected	---	1.00E+026
RU-103	Not Detected	---	1.00E+026
RU-106	Not Detected	---	8.33E+005
SB-122	Not Detected	---	1.00E+026
SB-124	Not Detected	---	4.72E+017
SB-125	Not Detected	---	8.48E+003
SN-113	Not Detected	---	3.85E+010
SR-85	Not Detected	---	4.93E+016
TA-182	Not Detected	---	9.75E+010
TA-183	Not Detected	---	1.00E+026
TC-99m	Not Detected	---	1.00E+026
TL-201	Not Detected	---	1.00E+026
XE-133	Not Detected	---	1.00E+026
Y-88	Not Detected	---	5.98E+010
ZN-65	Not Detected	---	4.44E+006
ZR-95	Not Detected	---	1.05E+017

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program
Quality Assurance Report

Report Date : 3/12/99 5:03:23 PM
QA File : C:\GENIE2K\CAMFILES\LCS2.QAF
Analyst : GLS
Sample ID : 90055111
Sample Quantity : 1.00 Each
Sample Date : 11/01/90 12:00:00 PM
Measurement Date : 3/12/99 4:53:06 PM
Elapsed Live Time : 600 seconds
Elapsed Real Time : 606 seconds

Parameter	Mean	1S Error	New Value	< LU	SD	UD	BS >
AM-241 Activity	8.181E-002	4.007E-003	8.307E-002	<	:	:	: >
CS-137 Activity	7.061E-002	1.956E-003	7.080E-002	<	:	:	: >
CO-60 Activity	7.860E-002	2.154E-003	7.963E-002	<	:	:	: >

Flags Key: LU = Boundary Test (Ab = Above , Be = Below)
SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
BS = Measurement Bias Test (In = Investigate, Ac = Action)

Reviewed by: _____ 2/17/99

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
3/12/99 5:22:30 PM

Analyzed by: 3/15/99 Reviewed by: 3/15/99

Customer : A. LAI/D. PERRY (6133/SMO)
Customer Sample ID : LAB CONTROL SAMPLE USING CG134
Lab Sample ID : 90055112

Sample Description : MIXED_GAMMA_STANDARD_CG134
Sample Quantity : 1.000 Each
Sample Date/Time : 11/01/90 12:00:00 PM
Acquire Start Date/Time : 3/12/99 5:12:15 PM
Detector Name : LAB03
Elapsed Live/Real Time : 600 / 606 seconds

Comments:

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
U-238	Not Detected	---	3.00E+003
RA-226	Not Detected	---	5.98E+003
PB-214	Not Detected	---	7.34E+002
BI-214	Not Detected	---	7.19E+002
PB-210	Not Detected	---	4.65E+004
TH-232	Not Detected	---	2.43E+003
RA-228	Not Detected	---	3.04E+003
AC-228	Not Detected	---	1.83E+003
TH-228	Not Detected	---	1.54E+005
RA-224	Not Detected	---	1.58E+003
PB-212	Not Detected	---	1.02E+004
BI-212	Not Detected	---	9.92E+004
TL-208	Not Detected	---	2.17E+004
U-235	Not Detected	---	1.49E+003
TH-231	Not Detected	---	9.90E+003
PA-231	Not Detected	---	1.48E+004
TH-227	Not Detected	---	2.50E+003
RA-223	Not Detected	---	1.00E+026
RN-219	Not Detected	---	6.75E+003
PB-211	Not Detected	---	1.53E+004
TL-207	Not Detected	---	2.70E+005
AM-241	8.91E+004	1.49E+004	1.18E+003
PU-239	Not Detected	---	2.35E+006
NP-237	Not Detected	---	1.33E+003
PA-233	Not Detected	---	6.75E+002
TH-229	Not Detected	---	1.23E+003

[Summary Report] - Sample ID: : 90055112

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
AG-108m	Not Detected	---------	3.65E+002
AG-110m	Not Detected	---------	9.01E+006
BA-133	Not Detected	---------	7.97E+002
BE-7	Not Detected	---------	6.64E+020
CD-109	Not Detected	---------	2.80E+005
CD-115	Not Detected	---------	1.00E+026
CE-139	Not Detected	---------	9.83E+008
CE-141	Not Detected	---------	1.00E+026
CE-144	Not Detected	---------	2.27E+006
CO-56	Not Detected	---------	3.48E+014
CO-57	Not Detected	---------	4.07E+005
CO-58	Not Detected	---------	3.50E+015
CO-60	7.90E+004	1.11E+004	4.52E+002
CR-51	Not Detected	---------	1.00E+026
CS-134	Not Detected	---------	5.64E+003
CS-137	6.99E+004	9.36E+003	3.20E+002
EU-152	Not Detected	---------	7.82E+002
EU-154	Not Detected	---------	3.15E+003
EU-155	Not Detected	---------	2.43E+003
FE-59	Not Detected	---------	1.00E+026
GD-153	Not Detected	---------	3.09E+006
HG-203	Not Detected	---------	1.55E+022
I-131	Not Detected	---------	1.00E+026
IR-192	Not Detected	---------	8.93E+014
K-40	Not Detected	---------	1.65E+003
MN-52	Not Detected	---------	1.00E+026
MN-54	Not Detected	---------	3.58E+005
MO-99	Not Detected	---------	1.00E+026
NA-22	Not Detected	---------	2.20E+003
NA-24	Not Detected	---------	1.00E+026
NB-95	Not Detected	---------	1.00E+026
ND-147	Not Detected	---------	1.00E+026
NI-57	Not Detected	---------	1.00E+026
RU-103	Not Detected	---------	1.00E+026
RU-106	Not Detected	---------	1.03E+006
SB-122	Not Detected	---------	1.00E+026
SB-124	Not Detected	---------	6.20E+017
SB-125	Not Detected	---------	1.05E+004
SN-113	Not Detected	---------	4.98E+010
SR-85	Not Detected	---------	5.93E+016
TA-182	Not Detected	---------	1.31E+011
TA-183	Not Detected	---------	1.00E+026
TC-99m	Not Detected	---------	1.00E+026
TL-201	Not Detected	---------	1.00E+026
XE-133	Not Detected	---------	1.00E+026
Y-88	Not Detected	---------	8.32E+010
ZN-65	Not Detected	---------	5.80E+006
ZR-95	Not Detected	---------	1.40E+017

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Sandia National Laboratories
Radiation Protection Sample Diagnostics Program
Quality Assurance Report

****

Report Date : 3/12/99 5:22:33 PM
QA File : C:\GENIE2K\CAMFILES\LCS3.QAF
Analyst : GLS
Sample ID : 90055112
Sample Quantity : 1.00 Each
Sample Date : 11/01/90 12:00:00 PM
Measurement Date : 3/12/99 5:12:15 PM
Elapsed Live Time : 600 seconds
Elapsed Real Time : 606 seconds

Parameter	Mean	1S Error	New Value	<	LU	:	SD	:	UD	:	BS	>
AM-241 Activity	8.698E-002	1.855E-003	8.908E-002	<		:		:		:		>
CS-137 Activity	6.942E-002	1.970E-003	6.990E-002	<		:		:		:		>
CO-60 Activity	7.947E-002	2.031E-003	8.018E-002	<		:		:		:		>

Flags Key: LU = Boundary Test (Ab = Above , Be = Below)
SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
BS = Measurement Bias Test (In = Investigate, Ac = Action)

Reviewed by: _____ 3/12/99

SF 2001-COC (10-97)
Supersedes (5-97) issue

Internal Lab Batch No. 900551

ANALYSIS REQUEST AND CHAIN OF CUSTODY

SAR/WR No.

AR/COC- 601650

Dept. No./Mail Stop: 6133 MS-1147
Project/Task Manager: Anh Lal/284-2527
Project Name: TAIII/V RFI Report Primary
Record Center Code: ER/1306/DAT
Logbook Ref. No.: __
Service Order No.: CF0678

Date Samples Shipped: 3-11-99 SMO USE
Carrier/Waybill No.: HC F. DOWLER-AW-783
Lab Contact: ~~Edie Kent/(803)556-8171~~ CF
Lab Destination: ~~GEL Charleston, SC~~ RPSD/6133
SMO Contact/Phone: Doug Salmi/844-3110
Send Report to SMO: Suzi Jensen/844-3184

Contract No.: AJ-2480A
Case No.: 7219.181.161
SMO Authorization
Bill to: Sandia National Laboratories
Supplier Services, Dept. ____
P.O. Box 5800 MS 0154

Location Tech Area III
Building N/A Room N/A

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative NONE	Sample Collection Method	Sample Type	Parameter & Method Requested	LAB USE Lab Sample ID
045039-005	ER107-01-99-0-5S	N/A	107	3/10/99 1358	S	M	500ml	4C	G	SA	Gamma Spec	
045040-005	ER107-02-99-0-5S	N/A	107	3/10/99 1405	S	M	500ml	4C	G	SA	Gamma Spec	
045041-005	ER107-03-99-0-5S	N/A	107	3/10/99 1412	S	M	500ml	4C	G	SA	Gamma Spec	
045042-005	ER107-04-99-0-5S	N/A	107	3/10/99 1420	S	M	500ml	4C	G	SA	Gamma Spec	
045043-005	ER107-05-99-0-5S	N/A	107	3/10/99 1300	S	M	500ml	4C	G	SA	Gamma Spec	
045044-005	ER107-06-99-0-5S	N/A	107	3/10/99 1310	S	M	500ml	4C	G	SA	Gamma Spec	
045045-005	ER107-07-99-0-5S	N/A	107	3/10/99 1320	S	M	500ml	4C	G	SA	Gamma Spec	
045046-005	ER107-08-99-0-5S	N/A	107	3/10/99 1335	S	M	500ml	4C	G	SA	Gamma Spec	
045047-005	ER107-09-99-0-5S	N/A	107	3/10/99 1328	S	M	500ml	4C	G	SA	Gamma Spec	
045048-005	ER107-06-99-0-5D	N/A	107	3/10/99 1312	S	M	500ml	4C	G	DU	Gamma Spec	

RMMA XYes No Ref. No. ____
Sample Disposal Return to Client XDisposal by lab

Sample Tracking SMO USE
Date Entered (mm/dd/yy) ____
Entered by: ____

Special Instructions/QC Requirements
EDD XYes No
Raw data package XYes No
Please deliver data package to
Grace Haggerty 284-2545

Abnormal Conditions on Receipt LAB USE

Turnaround Time XNormal Rush Required Report Date ____ QC Inits ____

	Name	Signature	Init	Company/Organization/Phone
Sample Team Members	J. Christopher Sears	J. Christopher Sears	JCS	SNL6131/Weston/844-1130

Please list as separate report.

1. Relinquished by	J. Christopher Sears	Org. 6131	Date 3/11/99	Time 1345	4. Relinquished by	Org.	Date	Time
1. Received by	SMO	Org. 7577	Date 3/11/99	Time 1345	4. Received by	Org.	Date	Time
2. Relinquished by	SMO	Org. 7577	Date 3/11/99	Time 1440	5. Relinquished by	Org.	Date	Time
2. Received by		Org. 7578	Date 3/11/99	Time 1440	5. Received by	Org.	Date	Time
3. Relinquished by		Org.	Date	Time	6. Relinquished by	Org.	Date	Time
3. Received by		Org.	Date	Time	6. Received by	Org.	Date	Time

Original To Accompany Samples, Laboratory Copy (White)
1st Copy To Accompany Samples, Return to SMO (Blue)
2nd Copy SMO Suspense Copy (Yellow)
3rd Copy Field Copy (Pink)

Sandia National Laboratories
Radiation Protection Sample Diagnostics

Sample Analysis Request Form
Page 1 of 1

To be completed by Customer

Shaded areas are for RPSD use only

Customer: ANH LAI
Organization: 6133
Project Location: CAMU (TA III)
Phone: 284-2527
Date Results Needed: 3/15/99
Suspect Isotopes: NONE
Case Number: 7219.181

Hazards/Special Instructions:
RMMA 160 MIN.
RUSH

Batch Log Number:
Logged By:
Analysis Type:
- ☐ Gamma Spec
- ☐ H-3
- ☐ Alpha/Beta
- ☐ Alpha Spec
- ☐ Total U
- ☐ Other

Customer Sample ID	Sample Type	Date/Time Collected	Sample Quantity	Requested Analysis	RPSD Sample ID	Screen cpm	Sample Mass	Remarks / Aliquot Amount
045039-005	SOIL	3/10/99 1358	500ml	GAMMA SPEC				
045040-005		1405						
045041-005		1412						
045042-005		1420						
045043-005		1300						
045044-005		1310						
045045-005		1320						
045046-005		1335						
045047-005		1328						
045048-005	↓	1312	↓	↓				

Relinquished by [signature] Date 3/11/99 Received by _____ Date _____
Relinquished by _____ Date _____ Received by _____ Date _____
Relinquished by _____ Date _____ Received by _____ Date _____
Relinquished by _____ Date _____ Received by _____ Date _____

Sandia National Laboratories
Radiation Protection Sample Diagnostics

Sample Analysis Request Form
Page 1 of 1

To be completed by Customer

Shaded areas are for RPSD use only

Customer: ANH LAI
Organization: 6133
Project Location: CAMU (TA-III)
Phone: 284-2527
Date Results Needed: 3/15/99
Suspect Isotopes: NONE
Case Number: 7219.181

Hazards/Special Instructions:
GAMMA 160 MIN.
RUSH

Batch Log Number: 900557
Logged By: ~~KS~~

Analysis Type:
- [x] Gamma Spec
- [ ] H-3
- [ ] Alpha/Beta
- [ ] Alpha Spec
- [ ] Total U
- [ ] Other

Customer Sample ID	Sample Type	Date/Time Collected	Sample Quantity	Requested Analysis	RPSD Sample ID	Screen cpm	Sample Mass	Remarks / Aliquot Amount
045039-005	SOIL	3/10/99 1358	500ml	GAMMA SPEC	01	<300	863g	
045040-005		1405			02	<300	862g	
045041-005		1412			03	<300	916g	
045042-005		1420			04		884g	
045043-005		1300			05		930g	
045044-005		1310			06		839g	
045045-005		1320			07		740g	
045046-005		1335			08		829g	
045047-005		1328			09		930g	
045048-005		1312			10		839g	
LCS					11, 12			

Relinquished by [signature] Date 3/11/99 Received by [signature] Date 3/11/99
Relinquished by [signature] Date 3/11/99 Received by [signature] Date 3/11/99
Relinquished by [signature] Date 3/15/99 Received by [signature] Date 3/15/99
Relinquished by _____ Date _____ Received by _____ Date _____

RPSD-0602-0

Survey Number: S17827

RADIOLOGICAL SURVEY FORM

Location	Requester/Dept.	Date	Time	Duration
ER107 CAMU	C SEARS/6134	031599	1500	NA

Purpose	Request #	RWP #	RPIR #
RELEASE OF SAMPLES	NA	309	NA

Instrument and Probe Type and Serial Number	Surveyor(s) Printed Name	Surveyor(s) Signature
ASP1-HP260-2824	KM BABILON	

#	Item Description/Location	BETA-GAMMA CONTAMINATION Counting Data Attached ☒ Yes ☐ No				ALPHA CONTAMINATION Counting Data Attached ☒ Yes ☐ No				RADIATION SURVEY Bkg. NA	
		%Eff. cpm	2σ Bkg cpm	/Radionuclide cpm / 100 cm² (1)	DU (2) T/R/F	%Eff cpm	NA Bkg cpm	/Radionuclide dpm / 100 cm² (1)	NA (2) T/R/F	mrem/hr (3)	Distance
1	Sample ID 045039	≤80	80	ND	T						
2	Sample ID 045040	≤80	80	ND	T						
3	Sample ID 045042	≤80	80	ND	T						
4	Sample ID 045041	≤80	80	ND	T						
5	Sample ID 045049	≤80	80	ND	T						
6	Sample ID 045049	≤80	80	ND	T						
7	Sample ID 045049	≤80	80	ND	T						
8	Sample ID 045049	≤80	80	ND	T						
9	Sample ID 045048	≤80	80	ND	T						
10	Sample ID 045043	≤80	80	ND	T						
11	Sample ID 045045	≤80	80	ND	T						
12	Sample ID 045047	≤80	80	ND	T						
13	Sample ID 045044	≤80	80	ND	T						
14	Sample ID 045046	≤80	80	ND	T						
15	Sample ID 045049	≤80	80	ND	T						
16	Sample ID 045049	≤80	80	ND	T						

Note (1): If area other than 100 cm², record as dpm/probe, or dpm/LAW. Note (2): Total/Removable/Fixed. Note (3): Indicate type, of other than gamma (i.e., η or β).

Remarks: The soil samples were taken in an RMMA. The samples were frisked (100%) and smeared for alpha, beta, and tritium. There was no detectable contamination.

Reviewed by: Date:

****
* Sandia Radioactive Sample Diagnostics Program 3-16-1999 *
****

LSC Analysis Program - version 5.3

Batch Number : 93023901
Count Protocol : 1
Client : ER107 SAMPLES 3/15/99 K. BABILON 7523/CWL 93023901
Laboratory ID : 6921-2 S/N 405921
Count Date : 16-Mar-99
Protocol Name : H3AB -- SWIPE
Region of Interest : 0-12
Count Time : 5.0 minutes
Background cpm : 20.60 +- 4.58
Background tSIE : 420.0
Background Eff : 0.378
Systematic Error : 12.90%
Sample Aliquot : 1.000 f

H-3 MDA = 2.64E+01 dpm/f
H-3 CL = 1.25E+01 dpm/f

H-3 Efficiency = 0.9740 - exp(-0.00047*tSIE^1.1600)

Flag Description:

>CL : Result > 2-sigma Error and Result > Critical Level.
<CL : Result < 2-sigma Error and Result < Critical Level.
@CL : Result < 2-sigma Error and Result > Critical Level.
CL : Result > 2-sigma Error and Result < Critical Level.

Analyzed by: RT Preston 3/16/99 Reviewed by: RT Preston 3/16/99

S#	RPSD ID	Client ID	cpm	Error	tSIE	Eff	H-3 Activity dpm/f	Error	Flag
2	001	001	2.64E+01	4.80E+00	432	0.389	1.49E+01	2.61E+01	@CL
3	002	002	2.84E+01	4.96E+00	433	0.389	2.00E+01	2.71E+01	@CL
4	003	003	2.26E+01	4.54E+00	429	0.386	5.18E+00	2.43E+01	<CL
5	004	004	2.50E+01	4.75E+00	432	0.388	1.13E+01	2.55E+01	<CL
6	005	005	2.76E+01	4.90E+00	428	0.385	1.82E+01	2.69E+01	@CL
7	006	006	2.84E+01	4.96E+00	423	0.381	2.05E+01	2.77E+01	@CL
8	007	007	2.28E+01	4.56E+00	438	0.393	5.59E+00	2.39E+01	<CL
9	008	008	2.88E+01	5.06E+00	429	0.386	2.12E+01	2.77E+01	@CL
10	009	009	2.80E+01	4.93E+00	429	0.386	1.92E+01	2.71E+01	@CL
11	010	010	2.48E+01	4.66E+00	437	0.393	1.07E+01	2.49E+01	<CL
12	011	011	2.66E+01	4.82E+00	424	0.382	1.57E+01	2.66E+01	@CL
13	012	012	2.68E+01	4.90E+00	427	0.384	1.61E+01	2.67E+01	@CL
14	013	013	2.72E+01	4.87E+00	430	0.387	1.71E+01	2.66E+01	@CL
15	014	014	2.48E+01	4.73E+00	429	0.386	1.09E+01	2.55E+01	<CL

****

• Sandia Radioactive Sample Diagnostics Program 3-16-1999 *

****

Batch Number: 93023901

S#	RPSD ID	Client ID	cpm	Error	tSIE	Eff	H-3 Activity dpm/f	Error	Flag
16	015	015	3.04E+01	5.18E+00	434	0.390	2.51E+01	2.83E+01	@CL
17	016	016	2.74E+01	4.98E+00	435	0.391	1.74E+01	2.67E+01	@CL

S17827

4 of 7

****
* Sandia Radioactive Sample Diagnostics Program 3-16-1999 *
****

LSC Analysis Program - version 5.3

Batch Number : 93023901
Count Protocol : 1
Client : ER107 SAMPLES 3/15/99 K. BABILON 7523/CWL 93023901
Laboratory ID : 6921-2 S/N 405921
Count Date : 16-Mar-99
Protocol Name : H3AB -- SWIPE
Region of Interest : 20-600
Count Time : 5.0 minutes
Background cpm : 5.00 +- 2.00
Background tSIE : 420.0
Background Eff : 1.039
Systematic Error : 8.90%
Sample Aliquot : 1.000 f

Alpha MDA = 5.01E+00 dpm/f
Alpha CL = 2.24E+00 dpm/f

Alpha Efficiency = 1.0390 - exp(-0.00990*tSIE^1.1780)

Flag Description:

>CL : Result > 2-sigma Error and Result > Critical Level.
<CL : Result < 2-sigma Error and Result > Critical Level.
?CL : Result < 2-sigma Error and Result < Critical Level.
*CL : Result > 2-sigma Error and Result < Critical Level.

S#	RPSD ID	Client ID	cpm	Error	tSIE	Eff	Alpha Activity dpm/f	Error	Flag
2	001	001	4.00E+00	1.79E+00	432	1.039	-9.62E-01	3.73E+00	<CL
3	002	002	5.20E+00	2.04E+00	433	1.039	1.92E-01	3.91E+00	<CL
4	003	003	4.20E+00	1.83E+00	429	1.039	-7.70E-01	3.76E+00	<CL
5	004	004	4.00E+00	1.79E+00	432	1.039	-9.62E-01	3.73E+00	<CL
6	005	005	7.20E+00	2.40E+00	428	1.039	2.12E+00	4.42E+00	<CL
7	006	006	5.00E+00	2.00E+00	423	1.039	0.00E+00	3.85E+00	<CL
8	007	007	6.00E+00	2.19E+00	438	1.039	9.62E-01	4.12E+00	<CL
9	008	008	4.60E+00	1.92E+00	429	1.039	-3.85E-01	3.81E+00	<CL
10	009	009	4.40E+00	1.88E+00	429	1.039	-5.77E-01	3.78E+00	<CL
11	010	010	3.00E+00	1.55E+00	437	1.039	-1.92E+00	3.59E+00	<CL
12	011	011	4.00E+00	1.79E+00	424	1.039	-9.62E-01	3.73E+00	<CL
13	012	012	4.80E+00	1.96E+00	427	1.039	-1.92E-01	3.83E+00	<CL
14	013	013	6.00E+00	2.19E+00	430	1.039	9.62E-01	4.12E+00	<CL
15	014	014	6.00E+00	2.19E+00	429	1.039	9.62E-01	4.12E+00	<CL

VITOLT

****

* Sandia Radioactive Sample Diagnostics Program 3-16-1999 *

****

Batch Number: 93023901

5 of 7

S#	RPSD ID	Client ID	cpm	Error	tSIE	Eff	Alpha Activity dpm/f	Error	Flag
16	015	015	4.60E+00	1.92E+00	434	1.039	-3.85E-01	3.81E+00	<CL
17	016	016	6.00E+00	2.19E+00	435	1.039	9.62E-01	4.12E+00	<CL

****
* Sandia Radioactive Sample Diagnostics Program 3-16-1999 *
****

LSC Analysis Program - version 5.3

Batch Number : 93023901
Count Protocol : 1
Client : ER107 SAMPLES 3/15/99 K. BABILON 7523/CWL 93023901
Laboratory ID : 6921-2 S/N 405921
Count Date : 16-Mar-99
Protocol Name : H3AB -- SWIPE
Region of Interest : 12-2000
Count Time : 5.0 minutes
Background cpm : 40.40 +- 5.68
Background tSIE : 420.0
Background Eff : 0.841
Systematic Error : 6.30%
Sample Aliquot : 1.000 f

Beta MDA = 1.64E+01 dpm/f
Beta CL = 7.88E+00 dpm/f

Beta Efficiency = 0.8410 - exp(-0.01319*tSIE^1.1040)

Flag Description:

>CL : Result > 2-sigma Error and Result > Critical Level.
<CL : Result < 2-sigma Error and Result < Critical Level.
?CL : Result < 2-sigma Error and Result > Critical Level.
@CL : Result > 2-sigma Error and Result < Critical Level.

S#	RPSD ID	Client ID	cpm	Error	tSIE	Eff	Beta Activity dpm/f	Error	Flag
2	001	001	4.32E+01	5.88E+00	432	0.841	3.33E+00	1.40E+01	<CL
3	002	002	4.00E+01	5.66E+00	433	0.841	-4.76E-01	1.35E+01	<CL
4	003	003	3.96E+01	5.63E+00	429	0.841	-9.51E-01	1.35E+01	<CL
5	004	004	4.10E+01	5.73E+00	432	0.841	7.13E-01	1.36E+01	<CL
6	005	005	3.98E+01	5.64E+00	428	0.841	-7.13E-01	1.35E+01	<CL
7	006	006	3.54E+01	5.32E+00	423	0.841	-5.95E+00	1.35E+01	<CL
8	007	007	4.06E+01	5.70E+00	438	0.841	2.38E-01	1.36E+01	<CL
9	008	008	4.08E+01	5.71E+00	429	0.841	4.76E-01	1.36E+01	<CL
10	009	009	3.88E+01	5.57E+00	429	0.841	-1.90E+00	1.35E+01	<CL
11	010	010	4.84E+01	6.22E+00	437	0.841	9.51E+00	1.48E+01	@CL
12	011	011	3.88E+01	5.57E+00	424	0.841	-1.90E+00	1.35E+01	<CL
13	012	012	3.98E+01	5.64E+00	427	0.841	-7.13E-01	1.35E+01	<CL
14	013	013	4.14E+01	5.75E+00	430	0.841	1.19E+00	1.37E+01	<CL
15	014	014	4.70E+01	6.13E+00	429	0.841	7.85E+00	1.45E+01	<CL

****

* Sandia Radioactive Sample Diagnostics Program 3-16-1999 *

****

Batch Number: 93023901

S#	RPSD ID	Client ID	cpm	Error	tSIE	Eff	Beta Activity dpm/f	Error	Flag
16	015	015	4.10E+01	5.73E+00	434	0.841	7.13E-01	1.36E+01	<CL
17	016	016	3.80E+01	5.51E+00	435	0.841	-2.85E+00	1.35E+01	<CL

ANNEX D
Risk Assessment Report

D.1.0 RISK SCREENING ASSESSMENT

The site assessment process for Solid Waste Management Unit (SWMU) 107 includes a risk screening analysis for both human health risk and ecological risk. The following provides the risk screening assessment results.

D.1.1 Health and Ecological Assessment Overview

The site assessment concludes that SWMU 107 does not have potential to adversely affect either human health or ecological receptors considering an industrial land-use scenario. Available data and modeling assumptions indicate that human health and ecological risks associated with SWMU 107 are insignificant to very low. The following sections provide the results of the human health and ecological risk screening analyses for SWMU 107.

D.1.1.1 Background Screening Procedure

Maximum constituent of concern (COC) concentrations are compared to the approved Sandia National Laboratories/New Mexico (SNL/NM) maximum screening levels for this area. The SNL/NM maximum background concentrations are selected to provide the background screening in Table D-1 and used to calculate risk attributable to background in Table D-2. Only the COCs that are above their respective SNL/NM maximum background screening levels, or do not have a quantifiable background screening level, are considered in further risk assessment analyses.

D.1.1.1 Results

A comparison of SWMU 107 maximum COC concentrations to the SNL/NM maximum background values (Dinwiddie September 1997) for the human health risk assessment is presented in Table D-1. One nonradiological COC exceeded its respective background screening value. Four nonradiological COCs either do not have quantifiable background concentrations or do not have a calculated background concentration; thus it is unknown if these COCs exceed background.

No radiological COCs had maximum measured activity concentrations greater than their respective background concentrations. However, the minimum detectable activity (MDA) of U-235 slightly exceeded the background activity, so the maximum MDA value was conservatively used in the risk assessment.

D.1.1.2 Human Health Risk Screening Assessment

The recommended future land-use for SWMU 107 is industrial (DOE et al September 1995). However, for comparison, both industrial and residential land uses are presented.

Table D-1
COCs for Human Health and Ecological Risk Screening Assessment for SWMU 107 with Comparison to the Associated SNL/NM Background Screening Value

COC Name	Maximum Concentration (mg/kg)	SNL/NM Background Screening Concentration (mg/kg)[a]	Is Maximum COC Concentration Less Than or Equal to the Applicable SNL/NM Background Screening Value?
Arsenic	4.38 J	5.6	Yes
Barium	125 J	130	Yes
Beryllium	0.676 J	0.65	**No**
Cadmium	0.445 J	<1	**Unknown**
Chromium, total	12 J	17.3	Yes
Lead	9.71 J	21.4	Yes
Mercury	0.0233	<0.25	**Unknown**
Nitrogen as Nitrate	6	NC	**Unknown**
Selenium	0.711 J	<1	**Unknown**
	(pCi/g)	(pCi/g)	
Cesium-137	0.0695	0.664	Yes
Thorium-232	0.897	1.01	Yes
Uranium-235/236	ND (0.21)	0.16	**No**
Uranium-238	0.517	1.4	Yes

Bold indicates COCs that exceed background screening values.
[a]From Dinwiddie (September 1997) Southwest (SW) Supergroup.
COC = Constituent of concern.
J = Concentration is an estimate.
mg/kg = Milligram(s) per kilogram.
pCi/g = Picocurie(s) per gram.
NA = Not applicable.
NC = Not calculated.
ND ( ) = Not detected above the minimum detectable activity, shown in parentheses.
SNL/NM = Sandia National Laboratories/New Mexico.
SWMU = Solid Waste Management Unit.

Table D-2
Human Health Risk Screening Assessment Values for SWMU 107 Nonradiological COCs using NMED Background Constituents

COC Name	Background Concentration[a] (mg/kg)	Industrial Land-Use Scenario[b]		Residential Land-Use Scenario[b]	
		Hazard Index	Cancer Risk	Hazard Index	Cancer Risk
Beryllium	0.65	0.00	3E-10	0.00	5E-10
Cadmium	<1	--	--	--	--
Mercury	<0.25	--	--	--	--
Nitrogen as Nitrate	NC	--	--	--	--
Selenium	<1	--	--	--	--
Total		**0.00**	**3E-10**	**0.00**	**5E-10**

[a]From Dinwiddie (September 1997) Southwest (SW) Supergroup.
[b]From EPA (1989).
COC = Constituent of concern.
EPA = U.S. Environmental Protection Agency.
mg/kg = Milligram(s) per kilogram.
NC = Not calculated.
NMED = New Mexico Environment Department.
SWMU = Solid Waste Management Unit.
-- = Information not available.

For the industrial land-use scenario nonradiological COCs, the hazard index (HI) calculated is 0.00 (less than the numerical guideline of 1 suggested in the Risk Assessment Guidance for Superfund [EPA 1989]) (Table D-3). Excess cancer risk is estimated at 5E-10 (Table D-3). New Mexico Environment Department (NMED) Guidance states that cumulative excess lifetime cancer risk must be less than 1E-5 (NMED March 2000), thus the excess cancer risk for this site is below the suggested acceptable risk value.

This assessment also determined risks considering background concentrations of the potential nonradiological COCs for both the industrial and residential land-use scenarios (Table D-2). For industrial land-use scenario, the HI is 0.00 and the estimated excess cancer risk is 3E-10. Incremental risk is determined by subtracting risk associated with background from potential COC risk. These numbers are not rounded before the difference is determined and, therefore, may appear to be inconsistent with numbers presented in tables and within the text. Incremental HI is 0.00, and the estimated incremental excess cancer risk is 2.00E-10 for the industrial land-use scenario. The incremental HI and estimated excess cancer risk are both below NMED guidance considering an industrial land-use scenario.

The calculated HI for the residential land-use scenario nonradiological COCs is 0.7, which is also below the numerical guidance (Table D-3). The estimated excess cancer risk is estimated at 8E-10. NMED Guidance states that cumulative excess lifetime cancer risk must be less than

Table D-3
Human Health Risk Assessment Values for SWMU 107 Nonradiological COCs

COC Name	Maximum Concentration (mg/kg)	Industrial Land-Use Scenario[a]		Residential Land-Use Scenario[a]	
		Hazard Index	Cancer Risk	Hazard Index	Cancer Risk
Beryllium	0.676 J	0.00	3E-10	0.00	5E-10
Cadmium	0.445 J	0.00	2E-10	0.36	3E-10
Mercury	0.0233 J	0.00	--	0.04	--
Nitrogen as Nitrate	6	0.00	--	0.00	--
Selenium	0.711 J	0.00	--	0.25	--
Total		**0.00**	**5E-10**	**0.7**	**8E-10**

[a]From EPA (1989).
COC = Constituent of concern.
EPA = U.S. Environmental Protection Agency.
J = Concentration is an estimate.
mg/kg = Milligram(s) per kilogram.
SWMU = Solid Waste Management Unit.
-- = Information not available.

1E-5 (NMED March 2000), thus the excess cancer risk for this site is below the suggested acceptable risk value. The HI for associated background for the residential land-use scenario is 0.00; the estimated excess cancer risk is 5E-10 (Table D-2). The incremental HI is 0.65, and the estimated incremental cancer risk is 3.00E-10 for the residential land-use scenario. Both the incremental HI and estimated excess cancer risk are below NMED guidance considering a residential land-use scenario.

Incremental total effective dose equivalent (TEDE) and corresponding estimated cancer risk from radiological COCs are much less than U.S. Environmental Protection Agency (EPA) guidance values; the estimated TEDE is 7.8E-3 millirems (mrem)/year (yr) for the industrial land-use scenario. This value is much less than the numerical guidance of 15 mrem/yr in EPA guidance (EPA 1997). The corresponding incremental estimated cancer risk value is 6.8E-8 for the industrial land-use scenario. Furthermore, the incremental TEDE for the residential land-use scenario that results from a complete loss of institutional control is only 1.8E-2 mrem/yr with an associated risk of 8.4 E-8. The guideline for this scenario is 75 mrem/yr (SNL/NM February 1998). Therefore, SWMU 107 is eligible for unrestricted radiological release.

Uncertainties associated with the calculations are considered small relative to the conservatism of risk assessment analysis. It is therefore concluded that SWMU 107 poses insignificant risk to human health under either an industrial or residential land-use scenario.

D.1.1.3 Ecological Risk Screening Assessment

None of the COC concentrations produced a hazard quotient greater than one per the SNL/NM predictive methodology, as shown in Table D-4 (IT July 1998). Overall, the ecological risk in SWMU 107 is very low.

Table D-4
Ecological Hazard Quotients Estimated for SWMU 107, Including Contribution by Background Concentrations

COC Name	Soil Concentration (mg/kg)	Plant HQ	Mouse HQ (Herbivorous)	Mouse HQ (Omnivorous)	Mouse HQ (Insectivorous)	Burrowing Owl HQ
Beryllium	0.676 J	7.0E-02	2.4E-03	4.0E-02	8.0E-02	--
Cadmium	0.445 J	1.5E-01	2.0E-02	2.0E-02	2.0E-02	7.2E-04
Mercury (Organic)	0.0233	8.0E-02	6.0E-02	6.0E-02	6.0E-02	3.3E-01
Mercury (Inorganic)	0.0233	0.0E+00	2.7E-04	2.7E-04	2.7E-04	4.7E-03
Selenium	0.711 J	7.1E-01	1.5E-01	2.2E-01	2.9E-01	5.0E-02
Nitrate	6.00	3.0E-01	7.7E-04	7.7E-04	7.7E-04	--
Background[a]						
Beryllium	0.65	7.0E-02	2.4E-03	4.0E-02	8.0E-02	--
Cadmium	1[b]	3.3E-01	5.0E-02	5.0E-02	5.0E-02	1.6E-03
Mercury (Organic)	0.25[b]	8.3E-01	6.3E-01	6.3E-01	6.3E-01	**3.6E+00**
Mercury (Inorganic)	0.25[b]	0.0E+00	2.8E-03	2.8E-03	2.8E-03	5.0E-02
Selenium	1[b]	1.0E+00	2.1E-01	3.1E-01	4.1E-01	7.0E-02

Note: **Bold** indicates HQs greater than unity.
[a]Background soil concentration for Southwest (SW) Supergroup (Dinwiddie September 1997).
[b]Background reported as below detection. Value shown is the detection limit. Thus, the HQs based on this value represent the upper limit of background risk.
COC = Constituent of concern.
HQ = Hazard quotient.
J = Concentration is an estimate.
mg/kg = Milligram(s) per kilogram.
SWMU = Solid Waste Management Unit.
-- = Information not available.

D.2.0 REFERENCES

Dinwiddie, R.S. (New Mexico Environment Department). Letter to M.J. Zamorski (U.S. Department of Energy), "Request for Supplemental Information: Background Concentrations Report, SNL/KAFB," September 24, 1997.

DOE, see U.S. Department of Energy.

EPA, see U.S. Environmental Protection Agency.

IT, see IT Corporation.

IT Corporation (IT), July 1998. "Predictive Ecological Risk Assessment Methodology, Environmental Restoration Program, Sandia National Laboratories, New Mexico," IT Corporation, Albuquerque, New Mexico.

New Mexico Environment Department (NMED), March 2000. Position Paper, " Assessing Human Health Risks Posed by Chemicals: Screening-level Risk Assessment," New Mexico Environment Department, Hazardous and Radioactive Materials Bureau, Santa Fe, New Mexico.

NMED, see New Mexico Environment Department.

Sandia National Laboratories/New Mexico (SNL/NM), February 1998. "RESRAD Input Parameter Assumptions and Justification," Environmental Restoration Project, Sandia National Laboratories/New Mexico, Albuquerque, New Mexico.

U.S. Department of Energy (DOE), U.S. Air Force, and U.S. Forest Service, September 1995. "Workbook: Future Use Management Area 2," prepared by the Future Use Logistics and Support Working Group in cooperation with U.S. Department of Energy Affiliates, the U.S. Air Force, and the U.S. Forest Service.

U.S. Environmental Protection Agency (EPA), 1989. "Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual," EPA/540-1089/002, U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 1997. "Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination," OSWER Directive No. 9200-4-18, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

ANNEX E
Surface Water Assessment Report

SURFACE WATER SITE ASSESSMENT Part B (3 pages)

Site Information:

1a) Site # 107 1b) Building # (if applicable) NA 1c) OU # 1306

2. Date/Time (M/D/Y H:M, 24Hr) 08-15-00/1028

Site Setting:

3a) (✓) On Alluvial Plain.

3b) ( ) Within a bench of an arroyo or drainage basin

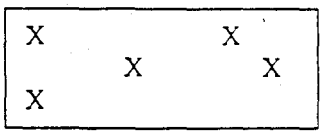
3c) ( ) In canyon floor/drainage basin, but not in an established channel.

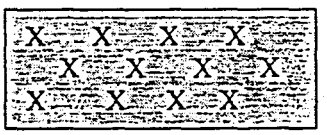
3d) ( ) Within established arroyo channel/drainage basin

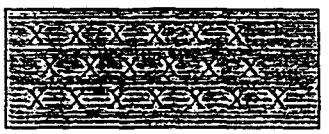
Explanation: Explosive Test Area (Southeast TA-III) camu structures built on site - located within the boundaries of SITE 107.

4. Estimated ground and / or canopy cover at the site: (deciduous leaves, pine needles, vegetation, trees, rocks)

Estimated percent of ground cover:

a) 

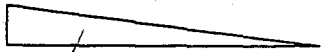
b) 

c) 

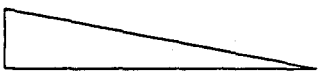
( ) 0-25% cover (✓) 25-75% cover ( ) 75-100% cover

Explanation: Natural vegetation, aprox 40' x 20' concrete secondary containment for tank, and lined pit (part of camu facility.

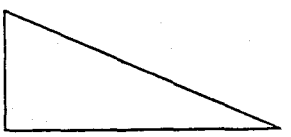
5. Steepest slope at the area impacted:

a) 

(✓) less than 10%

b) 

( ) 10 to 30%

c) 

( ) 30% or greater

Explanation:

Runoff Factors:

Y / N

( ) (✓) 6) Is there visible evidence of runoff discharging from the site? If yes, answer a) – c) below:

( ) (✓) 6a) Is runoff channelized? If yes, describe. ( ) Man-made channel. ( ) Natural Channel.

6b) Where does evidence of runoff terminate?

Drainage or wetland. (name) NA

Within bench of Canyon setting. (name) NA

Other (retention pond, meadow, mesa top etc) NA

Explanation: NA

( ) (✓) 6c) Has runoff caused visible erosion at the site? If yes, explain. ( ) Sheet ( ) Rill ( ) Gully

Explanation: NA

Run-on Factors:

Rate the potential for storm water to run on to this site: (Check EITHER #7 or #9)
Note: Include comments in appropriate boxes if both natural and man-made run-on exist.

( ) (✓) 7. Are structures creating run-on to the site? (buildings, roof drains, parking lots, storm drains)

Explanation: NA

( ) (✓) 8. Are current operations adversely impacting run-on to the site? (fire hydrants, NPDES outfalls)

Explanation: NA

( ) (✓) 9. Are natural drainage patterns directing stormwater onto the site?

Explanation: NA

Assessment Finding:

Y / N

( ) (✓) 10. Based on the above criteria and the assessment of this site, do soil erosion potentials exist? (REFER TO EROSION POTENTIAL MATRIX)

Explanation: NA

11. ANGEL B VEGA

ER SW Representative

Task Leader or Designee

MDM / (615) 844-9081

Company / Organization / Phone #

GRAM / (615) 284-5988

Company / Organization / Phone

Initials of Independent Reviewer. [ ] Check here when information is entered into database. [ ]

Notes Recommendations & Photos. (Please attach photos)

( ) (✓) 12a. Is there visible trash / debris on the site?

( ) (✓) 12b. Is there visible trash / debris in the watercourse?

Description of existing BMP's:
NA

(✓) ( ) 13a. Are BMP's being properly maintained? (If no, describe in "Other Internal Notes")

(✓) ( ) 13b. Are BMP's effectively keeping sediment in place and reducing erosion potential?

Recommended BMP's for this site:
majority of surface area of site disturbed due to construction activities (ie graded).

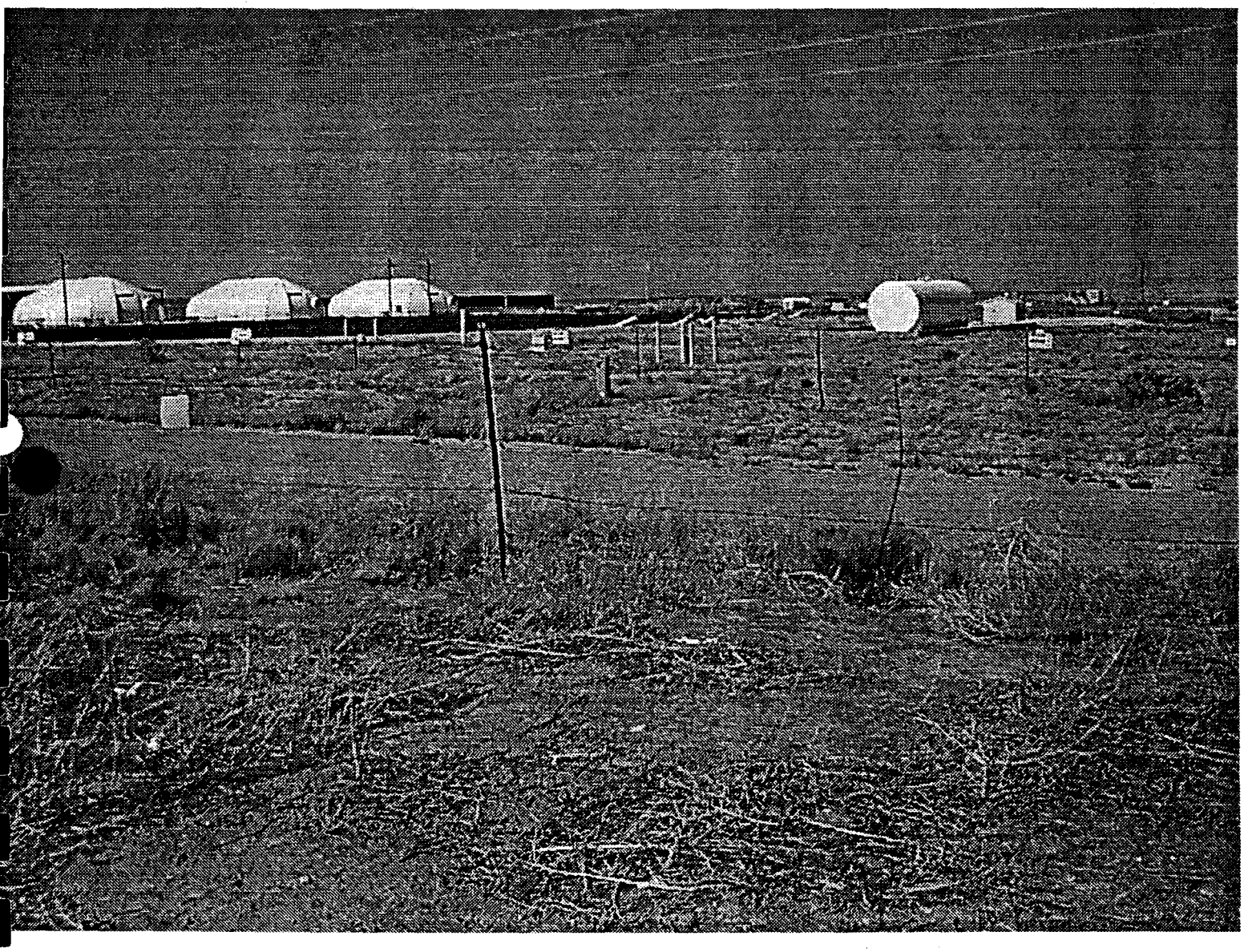
Other Internal Notes:

Surface Water Site Assessment Erosion Matrix Sheet

SWMU / IRP # 107

CRITERIA EVALUATED	Value	Erosion / Sediment transport Potential Factor Low 0.1	Medium 0.5	High 1.0	Calculated Score
Site Setting (43 point max.)					
On Mesa top or hill top	1	No Multiplying Factor	Defined Based on Topgraphic Setting		
Within bench of canyon/drainage basin	4				4
Within canyon floodplain or drainage basin, but not in watercourse	13				
Within canyon bottom or drainage basin and in watercourse	17				
Estimated % ground and canopy cover	13	> 75 %	✓ 25 - 75 %	< 25 %	6.5
Slope at area impacted	13	✓ 0 - 10 %	10 - 30 %	> 30 %	1.3
Surface Water Run-off Factors (46 point max.)				**Section Total**	
Visible evidence of runoff discharge? (Y/N)	5	If NO, Score 0 for Run-off Section. If YES, Score 5 and Complete Section.			0
Where does runoff terminate?	19	Other	Bench Setting	Drainage/Wetland	0
Has runoff caused visible erosion? (Y/N)	22	Sheet	Rill	Gully	0
		If NO, Score as 0. If YES, Caculate and Record Value.			
Surface Water Run-on Factors (11 point max.)				**Section Total**	
Do structures adversely affect run-on?* (Y/N)	7	If YES, Score as 7. If NO, Score as 0.			0
Does natural drainage adversely affect site run-on?* (Y/N)	7	If YES, Score as 7. If NO, Score as 0.			0
Do current operations adversely impact site run-on? (Y/N)	4	If YES, Score as 4. If NO, Score as 0.			0
* Select either structures OR natural drainage.					
MAX. POSSIBLE EROSION MATRIX SCORE:	100	Score: < 40 = low erosion potential 40 - 60 = moderate erosion potential > 60 = high erosion potential		**Total Score**	11.8

SITE 167



Sandia National Laboratories/New Mexico Environmental Restoration Project

Supplemental Risk Document Supporting Class 3 Permit Modification Process

October 2003

United States Department of Energy
Sandia Site Office

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Appendix

ACRONYMS AND ABBREVIATIONS

amsl	above mean sea level
AOC	Area of Concern
COC	constituent of concern
DOE	U.S. Department of Energy
EBP	Explosive Burn Pit
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
gal	gallon
HE	high explosives
HI	hazard index
JP-4	jet propulsion fuel grade 4
JP-8	jet propulsion fuel grade 8
KAFB	Kirtland Air Force Base
kg	kilogram(s)
LAARC	Light Airtransport Accident Resistant Container
LCBS	Lurance Canyon Burn Site
mg	milligram(s)
NFA	no further action
NMED	New Mexico Environment Department
OU	Operable Unit
PCB	polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
RDX	cyclotrimethylenetrinitramine
SNL/NM	Sandia National Laboratories/New Mexico
SOBP	Small Open Burn Pool
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TA	Technical Area
TNT	2,4,6-trinitrotoluene
UCL	upper confidence limit
USAF	U.S. Air Force
USFS	U.S. Forest Service
VCM	voluntary corrective measure
VOC	volatile organic compound

1.0 INTRODUCTION

This supplemental risk document was prepared to support no further action (NFA) determination and subsequent removal of 16 Solid Waste Management Units (SWMUs) and 2 Areas of Concern (AOCs) from the Hazardous and Solid Waste Amendments Module of the Resource Conservation and Recovery Act (RCRA) Permit for Sandia National Laboratories/New Mexico (SNL/NM) (U.S. Environmental Protection Agency [EPA] ID No. 5890110518). See Figure 1-1 for the locations of these SWMUs and AOCs.

Initially, risk assessments were performed for these sites considering the designated land use provided in the land use workbooks (DOE et al. September 1995, DOE et al. October 1995, DOE and USAF January 1996, and DOE and USAF March 1996). However, in January 2001, the New Mexico Environment Department (NMED) promulgated risk-based screening levels for RCRA Corrective Action Sites in New Mexico (Bearzi January 2001). The letter stated that "until statutory authority exists allowing restriction of future land use, corrective action sites applying for NFA determination (an NFA) under a risk-based approach cannot use industrial risk-based screening levels for soils." SNL/NM has determined from the letter that no more SWMUs or AOCs will be approved for NFA, under either industrial or recreational land use, unless the site also poses an insignificant risk to human health under the residential land use scenario.

In addition, in April 2003, the NMED requested that SNL/NM change its risk approach to include the dermal pathway for all land use scenarios and to eliminate the food ingestion pathway for the residential land use scenario.

This report presents a short site history and additional risk assessment analysis of 16 SWMUs and 2 AOCs. Each of these sites has been proposed for NFA based upon industrial or recreational land use scenarios. This supplemental analysis evaluates each site using a residential scenario and is based upon guidance provided in NMED's "Technical Background Document for Development of Soil Screening Levels" (NMED December 2000). Appendix 1 contains the SNL/NM default exposure pathways and input parameters. For SWMUs and AOCs that exceeded NMED guidance risk levels, summary statistics (95% upper confidence level [UCL] of the mean) were calculated following standard EPA guidance (EPA 1992) for the chemicals that contributed the most to the overall risk.

Additional information containing more detailed descriptions of site location, site history, site characterization, Voluntary Corrective Measures (VCMs)/Voluntary Corrective Actions (VCAs) (if applicable), verification sampling events, and other related data are contained in the respective SWMU's NFA proposal, Request for Supplemental Information (RSI), or Notice of Deficiency (NOD) documents. Supplemental information for each SWMU is identified in Table 1-1.

This report is organized by Operable Unit (OU) in ascending order with SWMUs in ascending order within each OU.

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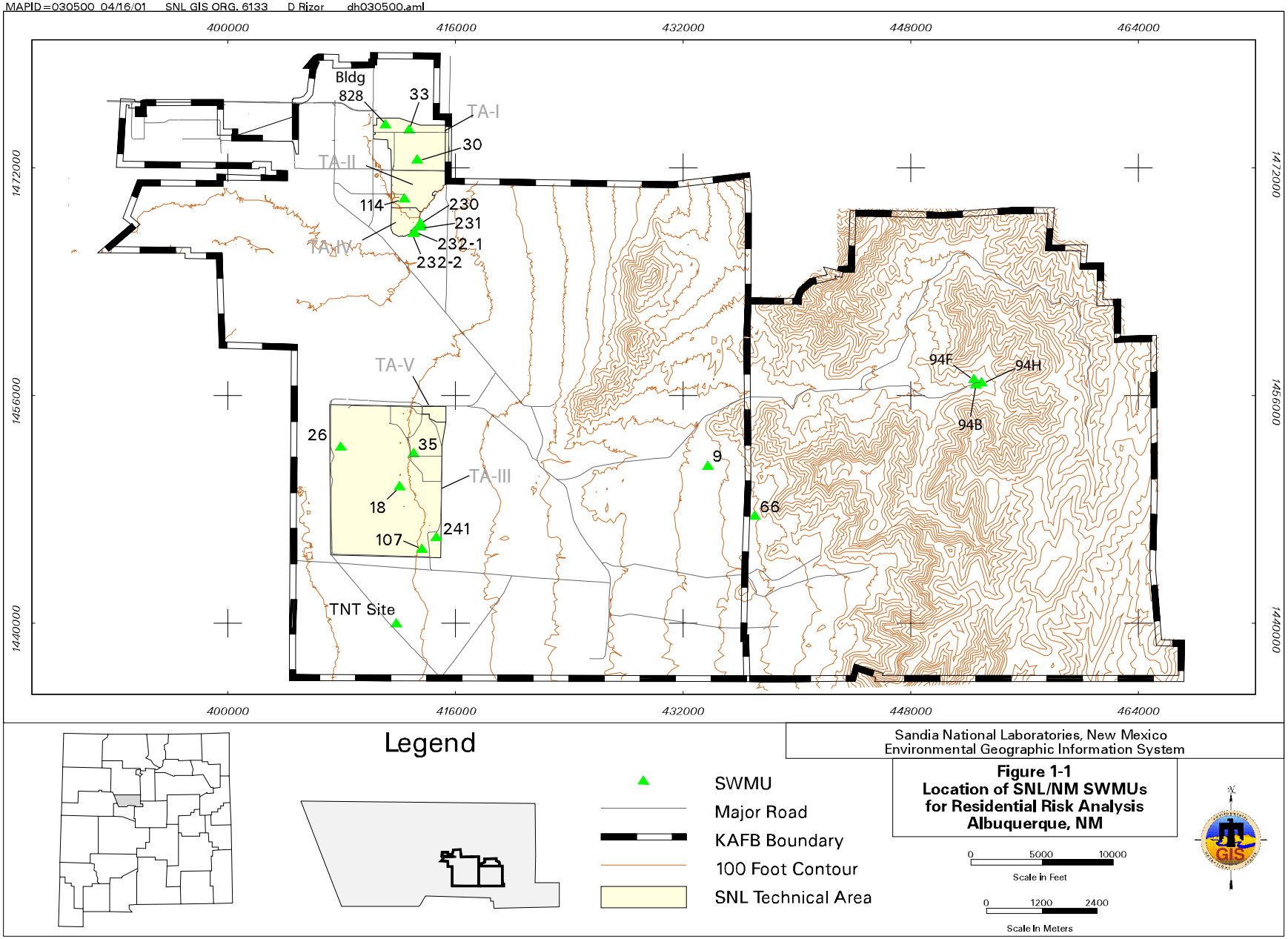


Table 1-1
Location of Supplemental Information for Each SNL/NM SWMU or AOC Proposed for NFA

OU Name	OU	SWMU/ AOC	NFA Date Submitted/ Batch No.	NOD or RSI Submittal Date	Comments
TA-I	1302	30	September 30, 2001/16	NA	
TA-I	1302	33	October 3, 1996/5	June 2001 September 10, 2001	The June 2001 response was not complete; the September 2001 response included results of additional sampling and risk assessment.
TA-I	1302	828	December 1996	June 2001 July 16, 2001 (SWMU Assessment Report)	PCB immunoassay data in letter of December 1996 indicated that SNL/NM did not consider this site a SWMU.
TA-II	1303	114	July 19, 1996/4	January 31, 2003	
TA-III/V	1306	18	Aug 11, 1997/8	October 1997 July 1998 June 2002	
TA-III/V	1306	26	June 1996	October 1997 July 1998 August 14, 2001	NFA originally proposed in the RFI report in June 1996.
TA-III/V	1306	35	June 1996	October 1997 July 1998 July 31, 2001	NFA originally proposed in the RFI report in June 1996.
TA-III/V	1306	107	June 1996	October 1997 July 1998 August 9, 2001	NFA originally proposed in the RFI report in June 1996.
TA-III/V	1306	241	June 1996	October 1997 July 1998 August 24, 2001	NFA originally proposed in the RFI report in June 1996.
Tijeras Arroyo	1309	230	August 28, 1995/2	December 2002	
Tijeras Arroyo	1309	231	August 28, 1995/2	December 2002	
Tijeras Arroyo	1309	232-1	August 11, 1997/8	December 2002	

Refer to footnotes at end of table.

Table 1-1 (Concluded)
Location of Supplemental Information for Each SNL/NM SWMU or AOC Proposed for NFA

OU Name	OU	SWMU/ AOC	NFA Date Submitted/ Batch No.	NOD or RSI Submittal Date	Comments
Tijeras Arroyo	1309	232-2	August 11, 1997/8	December 2002	
Foothills Test Area	1332	66	October 3, 1996/5	May 11, 1998	
Canyons Test Area	1333	94B	September 30, 2001/16	NA	
Canyons Test Area	1333	94F	September 30, 2001/16	NA	
Canyons Test Area	1333	94H	September 24, 2002/17	NA	
Central Coyote Test Area	1334	9	August 31, 1999/14	July 6, 1998	
Southwest Test Area	1335	TNT Site	September 24, 2002/17	NA	

AOC = Area of Concern.
NA = Not applicable.
NFA = No Further Action.
NOD = Notice of Deficiency.
OU = Operable Unit.
PCB = Polychlorinated biphenyl.
RCRA = Resource Conservation and Recovery Act.
RFI = RCRA Facility Investigation.
RSI = Request for Supplemental Information.
SNL/NM = Sandia National Laboratories/New Mexico.
SWMU = Solid Waste Management Unit.
TA = Technical Area.
TNT = 2,4,6-trinitrotoluene.

4.4 SWMU 107: Explosives Test Area (Southeast TA-III)

4.4.1 Site Location and Operational History

SWMU 107, Explosives Test Area, is located in the southeastern portion of TA-III (Figure 4.4.1-1). The site comprises approximately 23 acres, has very little natural topographic relief, and is vegetated with grasses and shrubs. The AOC is a triangular area located in the vicinity of Building 6920.

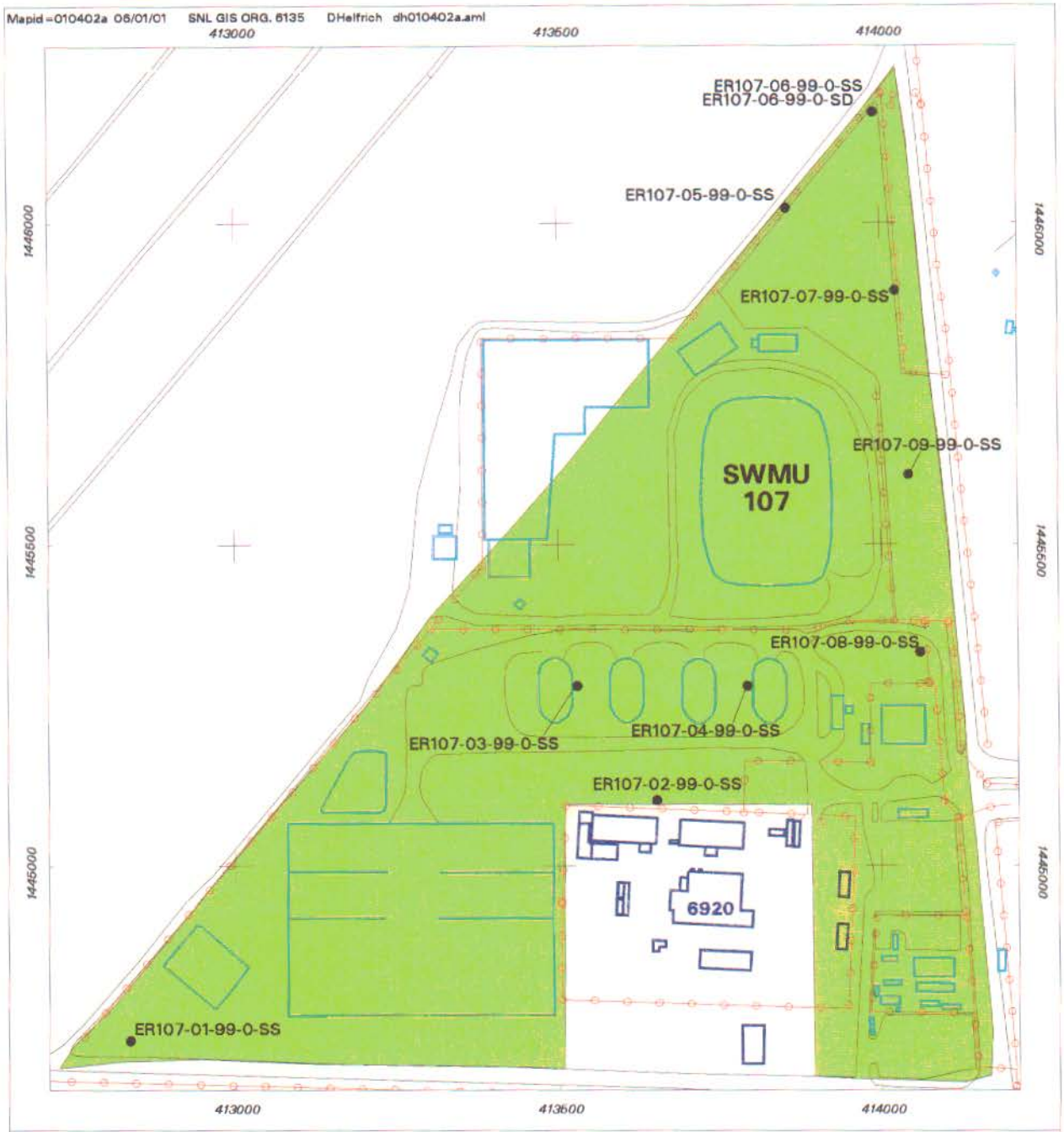
The site was reportedly used as an HE compound test area from the 1950s until 1972. Information from personnel interviews revealed some information regarding periods of testing at the site and types of explosives that may have been used. From the early 1950s to 1958, the types of explosives used at the site were not documented, but may have contained metals (silver and lead). From 1958 to 1968, testing occurred at the site infrequently.

The potential COCs at this site are lead and silver (metal cladding for charges), depleted uranium, various residual HE compounds, and nitrate/nitrite (explosive by-products). Possible HE compounds used at the site include pentaerythritoltetranitrate (PETN), RDX, and 1,3,5,7-tetranitro-1,3,5,7-tetrazacyclooctane (HMX).

4.4.2 Results of Risk Analysis

The risk assessment calculation was performed using maximum COC concentrations and the methods specified in NMED's "Technical Background Document for Development of Soil Screening Levels" (NMED December 2000). As shown in Table 4.4.2-1, the total human health HI (0.01) is lower than the NMED guidance value of 1 for the residential land use scenario. The total estimated excess cancer risk is 9E-10 for the residential land use scenario. NMED guidance states that cumulative excess lifetime cancer risk must be less than 1E-5 (Bearzi January 2001), thus the excess cancer risk for this site is also lower than the suggested acceptable risk value.

In conclusion, human health risk is within the acceptable range according to NMED guidance for the residential land use scenario.



Legend

- Soil Sample Location
- Road
- Fence
- CWL / CAMU Building/Structure
- RWMWF Building/Sturcture
- SWMU 107

Figure 4.4.1-1
SWMU 107
Soil Sample Locations

0 125 250
Scale in Feet

0 30 60
Scale in Meters

Sandia National Laboratories, New Mexico
Environmental Geographic Information System

Table 4.4.2-1
Human Health Risk Assessment Values for SWMU 107 Nonradiological COCs

COC	Maximum Concentration (mg/kg)	Residential Land Use Scenario[a]	
		Hazard Index	Cancer Risk
Inorganic			
Beryllium	0.676 J	0.00	6E-10
Cadmium	0.445 J	0.01	3E-10
Mercury	0.0233 J	0.00	--
Nitrogen as Nitrate	6	0.00	--
Selenium	0.711 J	0.00	--
Total		**0.01**	**9E-10**

[a]EPA 1989.
COC = Constituent of concern.
EPA = U.S. Environmental Protection Agency.
J = Estimated concentration.
mg/kg = Milligram(s) per kilogram.
SWMU = Solid Waste Management Unit.
-- = Information not available.

10.0 REFERENCES

Bearzi, J.P. (New Mexico Environment Department), January 2001. Memorandum to RCRA-Regulated Facilities, "Risk-Based Screening Levels for RCRA Corrective Action Sites in New Mexico," Hazardous Waste Bureau, New Mexico Environment Department, Santa Fe, New Mexico. January 23, 2001.

DOE and USAF, see U.S. Department of Energy and U.S. Air Force.

EPA, see U.S. Environmental Protection Agency.

New Mexico Environment Department (NMED), December 2000. "Technical Background Document for Development of Soil Screening Levels", Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program, December 18, 2000.

NMED, see New Mexico Environment Department.

U.S. Department of Energy, U.S. Air Force, and U.S. Forest Service, September 1995. "Workbook: Future Use Management Area 1," prepared by the Future Use Logistics and Support Working Group in cooperation with U.S. Department of Energy Affiliates, the U.S. Air Force, and the U.S. Forest Service.

U.S. Department of Energy, U.S. Air Force, and U.S. Forest Service, October 1995. "Workbook: Future Use Management Area 2," prepared by the Future Use Logistics and Support Working Group in cooperation with U.S. Department of Energy Affiliates, the U.S. Air Force, and the U.S. Forest Service.

U.S. Department of Energy and U.S. Air Force (DOE and USAF), January 1996. "Workbook: Future Use Management Areas 3,4,5,and 6," prepared by the Future Use Logistics and Support Working Group in cooperation with U.S. Department of Energy Affiliates, and the U.S. Air Force.

U.S. Department of Energy and U.S. Air Force (DOE and USAF), March 1996. "Workbook: Future Use Management Area 7," prepared by the Future Use Logistics and Support Working Group in cooperation with U.S. Department of Energy Affiliates and the U.S. Air Force.

U.S. Environmental Protection Agency (EPA), 1989. "Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual," EPA/540-1089/002, U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 1992. "Supplemental Guidance to RAGS: Calculating the Concentration Term," Publication 9285.7-081, Office of Solid Waste and Emergency Response, Washington, D.C.

APPENDIX 1
Exposure Pathway Discussion for Chemical and Radionuclide Contamination
Sandia National Laboratories/New Mexico

APPENDIX 1
EXPOSURE PATHWAY DISCUSSION FOR CHEMICAL AND RADIONUCLIDE CONTAMINATION

Introduction

Sandia National Laboratories/New Mexico (SNL/NM) uses a default set of exposure routes and associated default parameter values developed for each future land-use designation being considered for SNL/NM Environmental Restoration (ER) Project sites. This default set of exposure scenarios and parameter values are invoked for risk assessments unless site-specific information suggests other parameter values. Because many SNL/NM solid waste management units (SWMUs) have similar types of contamination and physical settings, SNL/NM believes that the risk assessment analyses at these sites can be similar. A default set of exposure scenarios and parameter values facilitates the risk assessments and subsequent review.

The default exposure routes and parameter values used are those that SNL/NM views as resulting in a Reasonable Maximum Exposure (RME) value. Subject to comments and recommendations by the U.S. Environmental Protection Agency (EPA) Region VI and New Mexico Environment Department (NMED), SNL/NM will use these default exposure routes and parameter values in future risk assessments.

At SNL/NM, all SWMUs exist within the boundaries of the Kirtland Air Force Base. Approximately 240 potential waste and release sites have been identified where hazardous, radiological, or mixed materials may have been released to the environment. Evaluation and characterization activities have occurred at all of these sites to varying degrees. Among other documents, the SNL/NM ER draft Environmental Assessment (DOE 1996) presents a summary of the hydrogeology of the sites and the biological resources present. When evaluating potential human health risk the current or reasonably foreseeable land use negotiated and approved for the specific SWMU/AOC, aggregate, or watershed will be used. The following references generally document these land uses: *Workbook: Future Use Management Area 2 (DOE et al. September 1995); Workbook: Future Use Management Area 1 (DOE et al. October 1995); Workbook: Future Use Management Areas 3, 4, 5, and 6 (DOE and USAF January 1996); Workbook: Future Use Management Area 7 (DOE and USAF March 1996).* At this time, all SNL/NM SWMUs have been tentatively designated for either industrial or recreational future land use. The NMED has also requested that risk calculations be performed based upon a residential land-use scenario. Therefore, all three land-use scenarios will be addressed in this document.

The SNL/NM ER Project has screened the potential exposure routes and identified default parameter values to be used for calculating potential intake and subsequent hazard index (HI), excess cancer risk and dose values. The EPA (EPA 1989) provides a summary of exposure routes that could potentially be of significance at a specific waste site. These potential exposure routes consist of:

- Ingestion of contaminated drinking water
- Ingestion of contaminated soil

- Ingestion of contaminated fish and shellfish
- Ingestion of contaminated fruits and vegetables
- Ingestion of contaminated meat, eggs, and dairy products
- Ingestion of contaminated surface water while swimming
- Dermal contact with chemicals in water
- Dermal contact with chemicals in soil
- Inhalation of airborne compounds (vapor phase or particulate)
- External exposure to penetrating radiation (immersion in contaminated air; immersion in contaminated water; and exposure from ground surfaces with photon-emitting radionuclides)

Based upon the location of the SNL/NM SWMUs and the characteristics of the surface and subsurface at the sites, we have evaluated these potential exposure routes for different land-use scenarios to determine which should be considered in risk assessment analyses (the last exposure route is pertinent to radionuclides only). At SNL/NM SWMUs, there is currently no consumption of fish, shellfish, fruits, vegetables, meat, eggs, or dairy products that originate on site. Additionally, no potential for swimming in surface water is present due to the high-desert environmental conditions. As documented in the RESRAD computer code manual (ANL 1993), risks resulting from immersion in contaminated air or water are not significant compared to risks from other radiation exposure routes.

For the industrial and recreational land-use scenarios, SNL/NM ER has, therefore, excluded the following four potential exposure routes from further risk assessment evaluations at any SNL/NM SWMU:

- Ingestion of contaminated fish and shellfish
- Ingestion of contaminated fruits and vegetables
- Ingestion of contaminated meat, eggs, and dairy products
- Ingestion of contaminated surface water while swimming
- Dermal contact with chemicals in water

That part of the exposure pathway for radionuclides related to immersion in contaminated air or water is also eliminated.

Based upon this evaluation, for future risk assessments the exposure routes that will be considered are shown in Table 1.

Table 1
Exposure Pathways Considered for Various Land-Use Scenarios

Industrial	Recreational	Residential
Ingestion of contaminated drinking water	Ingestion of contaminated drinking water	Ingestion of contaminated drinking water
Ingestion of contaminated soil	Ingestion of contaminated soil	Ingestion of contaminated soil
Inhalation of airborne compounds (vapor phase or particulate)	Inhalation of airborne compounds (vapor phase or particulate)	Inhalation of airborne compounds (vapor phase or particulate)
Dermal contact (nonradiological constituents only) soil only	Dermal contact (nonradiological constituents only) soil only	Dermal contact (nonradiological constituents only) soil only
External exposure to penetrating radiation from ground surfaces	External exposure to penetrating radiation from ground surfaces	External exposure to penetrating radiation from ground surfaces

Equations and Default Parameter Values for Identified Exposure Routes

In general, SNL/NM expects that ingestion of compounds in drinking water and soil will be the more significant exposure routes for chemicals; external exposure to radiation may also be significant for radionuclides. All of the above routes will, however, be considered for their appropriate land-use scenarios. The general equation for calculating potential intakes via these routes is shown below. The equations are taken from "Assessing Human Health Risks Posed by Chemicals: Screening-Level Risk Assessment" (NMED March 2000) and "Technical Background Document for Development of Soil Screening Levels" (NMED December 2000). Equations from both documents are based upon the "Risk Assessment Guidance for Superfund" (RAGS): Volume 1 (EPA 1989, 1991). These general equations also apply to calculating potential intakes for radionuclides. A more in-depth discussion of the equations used in performing radiological pathway analyses with the RESRAD code may be found in the RESRAD Manual (ANL 1993). RESRAD is the only code designated by the U.S. Department of Energy (DOE) in DOE Order 5400.5 for the evaluation of radioactively contaminated sites (DOE 1993). The Nuclear Regulatory Commission (NRC) has approved the use of RESRAD for dose evaluation by licensees involved in decommissioning, NRC staff evaluation of waste disposal requests, and dose evaluation of sites being reviewed by NRC staff. EPA Science Advisory Board reviewed the RESRAD model. EPA used RESRAD in their rulemaking on radiation site cleanup regulations. RESRAD code has been verified, undergone several benchmarking analyses, and been included in the International Atomic Energy Agency's VAMP and BIOMOVS II projects to compare environmental transport models.

Also shown are the default values SNL/NM ER will use in RME risk assessment calculations for industrial, recreational, and residential land-use scenarios, based upon EPA and other governmental agency guidance. The pathways and values for chemical contaminants are discussed first, followed by those for radionuclide contaminants. RESRAD input parameters that are left as the default values provided with the code are not discussed. Further information relating to these parameters may be found in the RESRAD Manual (ANL 1993) or by directly accessing the RESRAD websites at: http://web.ead.anl.gov/resrad/home2/ or http://web.ead.anl.gov/resrad/documents/.

Generic Equation for Calculation of Risk Parameter Values

The equation used to calculate the risk parameter values (i.e., hazard quotients/HI, excess cancer risk, or radiation total effective dose equivalent [TEDE] [dose]) is similar for all exposure pathways and is given by:

Risk (or Dose) = Intake x Toxicity Effect (either carcinogenic, noncarcinogenic, or radiological)

where;

C	= contaminant concentration (site specific)
CR	= contact rate for the exposure pathway
EFD	= exposure frequency and duration
BW	= body weight of average exposure individual
AT	= time over which exposure is averaged.

For nonradiological constituents of concern (COCs), the total risk/dose (either cancer risk or HI) is the sum of the risks/doses for all of the site-specific exposure pathways and contaminants. For radionuclides, the calculated radiation exposure, expressed as TEDE is compared directly to the exposure guidelines of 15 millirem per year (mrem/year) for industrial and recreational future use and 75 mrem/year for the unlikely event that institutional control of the site is lost and the site is used for residential purposes (EPA 1997).

The evaluation of the carcinogenic health hazard produces a quantitative estimate for excess cancer risk resulting from the COCs present at the site. This estimate is evaluated for determination of further action by comparison of the quantitative estimate with the potentially acceptable risk of 1E-5 for nonradiological carcinogens. The evaluation of the noncarcinogenic health hazard produces a quantitative estimate (i.e., the HI) for the toxicity resulting from the COCs present at the site. This estimate is evaluated for determination of further action by comparison of this quantitative estimate with the EPA standard HI of unity (1). The evaluation of the health hazard from radioactive compounds produces a quantitative estimate of doses resulting from the COCs present at the site. This estimated dose is used to calculate an assumed risk. However, this calculated risk is presented for illustration purposes only, not to determine compliance with regulations.

The specific equations used for the individual exposure pathways can be found in RAGS (EPA 1989) and are outlined below. The RESRAD Manual (ANL 1993) describes similar equations for the calculation of radiological exposures.

Soil Ingestion

A receptor can ingest soil or dust directly by working in the contaminated soil. Indirect ingestion can occur from sources such as unwashed hands introducing contaminated soil to food that is then eaten. An estimate of intake from ingesting soil will be calculated as follows:

$$I_s = \frac{C_s * IR * CF * EF * ED}{BW * AT}$$

where:

I_s = Intake of contaminant from soil ingestion (milligrams [mg]/kilogram [kg]-day)
C_s = Chemical concentration in soil (mg/kg)
IR = Ingestion rate (mg soil/day)
CF = Conversion factor (1E-6 kg/mg)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (period over which exposure is averaged) (days)

It should be noted that it is conservatively assumed that the receptor only ingests soil from the contaminated source.

Soil Inhalation

A receptor can inhale soil or dust directly by working in the contaminated soil. An estimate of intake from inhaling soil will be calculated as follows (EPA August 1997):

$$I_s = \frac{C_s * IR * EF * ED * \left(1/VF \text{ or } 1/PEF\right)}{BW * AT}$$

where:

I_s = Intake of contaminant from soil inhalation (mg/kg-day)
C_s = Chemical concentration in soil (mg/kg)
IR = Inhalation rate (cubic meters [m^3]/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
VF = soil-to-air volatilization factor (m^3/kg)
PEF = particulate emission factor (m^3/kg)
BW = Body weight (kg)
AT = Averaging time (period over which exposure is averaged) (days)

Soil Dermal Contact

$$D_a = \frac{C_s * CF * SA * AF * ABS * EF * ED}{BW * AT}$$

where:

D_a = Absorbed dose (mg/kg-day)
C_s = Chemical concentration in soil (mg/kg)
CF = Conversion factor (1E-6 kg/mg)
SA = Skin surface area available for contact (cm^2/event)
AF = Soil to skin adherence factor (mg/cm^2)
ABS = Absorption factor (unitless)
EF = Exposure frequency (events/year)

ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (period over which exposure is averaged) (days)

Groundwater Ingestion

A receptor can ingest water by drinking it or through using household water for cooking. An estimate of intake from ingesting water will be calculated as follows (EPA August 1997):

$$I_w = \frac{C_w * IR * EF * ED}{BW * AT}$$

where:

I_w = Intake of contaminant from water ingestion (mg/kg/day)
C_w = Chemical concentration in water (mg/liter [L])
IR = Ingestion rate (L/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (period over which exposure is averaged) (days)

Groundwater Inhalation

The amount of a constituent taken into the body via exposure to volatilization from showering or other household water uses will be evaluated using the concentration of the constituent in the water source (EPA 1991 and 1992). An estimate of intake from volatile inhalation from groundwater will be calculated as follows (EPA 1991):

$$I_w = \frac{C_w * K * IR_i * EF * ED}{BW * AT}$$

where:

I_w = Intake of volatile in water from inhalation (mg/kg/day)
C_w = Chemical concentration in water (mg/L)
K = volatilization factor (0.5 L/m^3)
IR_i = Inhalation rate (m^3/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (period over which exposure is averaged—days)

For volatile compounds, volatilization from groundwater can be an important exposure pathway from showering and other household uses of groundwater. This exposure pathway will only be evaluated for organic chemicals with a Henry's Law constant greater than $1x10^{-5}$ and with a molecular weight of 200 grams/mole or less (EPA 1991).

Tables 2 and 3 show the default parameter values suggested for use by SNL/NM at SWMUs, based upon the selected land-use scenarios for nonradiological and radiological COCs,

respectively. References are given at the end of the table indicating the source for the chosen parameter values. SNL/NM uses default values that are consistent with both regulatory guidance and the RME approach. Therefore, the values chosen will, in general, provide a conservative estimate of the actual risk parameter. These parameter values are suggested for use for the various exposure pathways, based upon the assumption that a particular site has no unusual characteristics that contradict the default assumptions. For sites for which the assumptions are not valid, the parameter values will be modified and documented.

Summary

SNL/NM will use the described default exposure routes and parameter values in risk assessments at sites that have an industrial, recreational, or residential future land-use scenario. There are no current residential land-use designations at SNL/NM ER sites, but NMED has requested this scenario to be considered to provide perspective of the risk under the more restrictive land-use scenario. For sites designated as industrial or recreational land use, SNL/NM will provide risk parameter values based upon a residential land-use scenario to indicate the effects of data uncertainty on risk value calculations or in order to potentially mitigate the need for institutional controls or restrictions on SNL/NM ER sites. The parameter values are based upon EPA guidance and supplemented by information from other government sources. If these exposure routes and parameters are acceptable, SNL/NM will use them in risk assessments for all sites where the assumptions are consistent with site-specific conditions. All deviations will be documented.

Table 2
Default Nonradiological Exposure Parameter Values for Various Land-Use Scenarios

Parameter	Industrial	Recreational	Residential
General Exposure Parameters			
Exposure Frequency (day/yr)	250[a,b]	8.7 (4 hr/wk for 52 wk/yr)[a,b]	350[a,b]
Exposure Duration (yr)	25[a,b,c]	30[a,b,c]	30[a,b,c]
Body Weight (kg)	70[a,b,c]	70 Adult[a,b,c] 15 Child[a,b,c]	70 Adult[a,b,c] 15 Child[a,b,c]
Averaging Time (days) for Carcinogenic Compounds (= 70 yr x 365 day/yr) for Noncarcinogenic Compounds (= ED x 365 day/yr)	25,550[a,b] 9,125[a,b]	25,550[a,b] 10,950[a,b]	25,550[a,b] 10,950[a,b]
Soil Ingestion Pathway			
Ingestion Rate (mg/day)	100[a,b]	200 Child[a,b] 100 Adult[a,b]	200 Child[a,b] 100 Adult[a,b]
Inhalation Pathway			
Inhalation Rate (m^3/day)	20[a,b]	15 Child[a] 30 Adult[a]	10 Child[a] 20 Adult[a]
Volatilization Factor (m^3/kg)	Chemical Specific	Chemical Specific	Chemical Specific
Particulate Emission Factor (m^3/kg)	1.36E9[a]	1.36E9[a]	1.36E9[a]
Water Ingestion Pathway			
Ingestion Rate (liter/day)	2.4[a]	2.4[a]	2.4[a]
Dermal Pathway			
Skin Adherence Factor (mg/cm^2)	0.2[a]	0.2 Child[a] 0.07 Adult[a]	0.2 Child[a] 0.07 Adult[a]
Exposed Surface Area for Soil/Dust (cm^2/day)	3,300[a]	2,800 Child[a] 5,700 Adult[a]	2,800 Child[a] 5,700 Adult[a]
Skin Adsorption Factor	Chemical Specific	Chemical Specific	Chemical Specific

[a]Technical Background Document for Development of Soil Screening Levels (NMED December 2000).
[b]Risk Assessment Guidance for Superfund, Vol. 1, Part B (EPA 1991).
[c]Exposure Factors Handbook (EPA August 1997).
ED = Exposure duration.
EPA = U.S. Environmental Protection Agency.
hr = Hour(s).
kg = Kilogram(s).
m = Meter(s).
mg = Milligram(s).
NA = Not available.
wk = Week(s).
yr = Year(s).

Table 3
Default Radiological Exposure Parameter Values for Various Land-Use Scenarios

Parameter	Industrial	Recreational	Residential
General Exposure Parameters			
Exposure Frequency	8 hr/day for 250 day/yr	4 hr/wk for 52 wk/yr	365 day/yr
Exposure Duration (yr)	25[a,b]	30[a,b]	30[a,b]
Body Weight (kg)	70 Adult[a,b]	70 Adult[a,b]	70 Adult[a,b]
Soil Ingestion Pathway			
Ingestion Rate	100 mg/day[c]	100 mg/day[c]	100 mg/day[c]
Averaging Time (days) (= 30 yr x 365 day/yr)	10,950[d]	10,950[d]	10,950[d]
Inhalation Pathway			
Inhalation Rate (m^3/yr)	7,300[d,e]	10,950[e]	7,300[d,e]
Mass Loading for Inhalation g/m^3	1.36 E-5[d]	1.36 E-5[d]	1.36 E-5[d]
Food Ingestion Pathway			
Ingestion Rate, Leafy Vegetables (kg/yr)	NA	NA	16.5[c]
Ingestion Rate, Fruits, Non-Leafy Vegetables & Grain (kg/yr)	NA	NA	101.8[b]
Fraction Ingested	NA	NA	0.25[b,d]

[a]Risk Assessment Guidance for Superfund, Vol. 1, Part B (EPA 1991).
[b]Exposure Factors Handbook (EPA August 1997).
[c]EPA Region VI guidance (EPA 1996).
[d]For radionuclides, RESRAD (ANL 1993).
[e]SNL/NM (February 1998).
EPA = U.S. Environmental Protection Agency.
g = Gram(s)
hr = Hour(s).
kg = Kilogram(s).
m = Meter(s).
mg = Milligram(s).
NA = Not applicable.
wk = Week(s).
yr = Year(s).

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APPENDIX 2
Calculation of the Upper 95% Confidence Limits of Mean Concentrations

APPENDIX 2
CALCULATION OF THE UPPER 95% CONFIDENCE LIMITS OF MEAN CONCENTRATIONS

For conservatism, Sandia National Laboratories/New Mexico uses the maximum concentration of the constituents of concern (COCs) for initial risk calculation. If the maximum concentrations produce risk above New Mexico Environment Department (NMED) guidelines, conservatism with this approach is evaluated and, if appropriate, a more realistic approach is applied. When the site has been adequately characterized, an estimate of the mean concentration of the COCs is more representative of actual site conditions. The NMED has proposed the use of the 95% upper confidence limit (UCL) of the mean to represent average concentrations at a site (NMED December 2000). The 95% UCL is calculated according to NMED guidance (Tharp June 2002) using the U.S. Environmental Protection Agency ProUCL program (EPA April 2002). Attached are the outputs from that program and the calculated UCLs used in the risk analysis.

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SWMU 30

SWMU 30	
Summary Statistics for	Antimony
Number of Samples	204
Minimum	0.592
Maximum	5.8
Mean	1.19702
Median	1.05
Standard Deviation	0.674566
Variance	0.455039
Coefficient of Variation	0.563538
Skewness	5.207189
Lilliefors Test Statisitic	0.522539
Lilliefors 5% Critical Value	0.062032
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95 % UCL (Assuming Normal Data)	
Student's-t	1.275061
95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	1.293103
Modified-t	1.27793
95 % Non-parametric UCL	
CLT	1.274704
Jackknife	1.275061
Standard Bootstrap	1.274023
Bootstrap-t	1.301275
Chebyshev (Mean, Std)	1.402886

SWMU 30	
Summary Statistics for	Arsenic
Number of Samples	217
Minimum	1.3
Maximum	8.4
Mean	4.002535
Median	3.9
Standard Deviation	1.22699
Variance	1.505505
Coefficient of Variation	0.306553
Skewness	0.907574
Lilliefors Test Statisitic	0.108883
Lilliefors 5% Critical Value	0.060146
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
97.5 % UCL (Assuming Normal Data)	
Student's-t	4.166707
97.5 % UCL (Adjusted for Skewness)	
Adjusted-CLT	4.173213
Modified-t	4.167562
97.5 % Non-parametric UCL	
CLT	4.165787
Jackknife	4.166707
Standard Bootstrap	4.160514
Bootstrap-t	4.16847
Chebyshev (Mean, Std)	4.522702

SWMU 30

Summary Statistics for	Barium
Number of Samples	217
Minimum	78
Maximum	1020
Mean	199.659
Median	179
Standard Deviation	105.0009
Variance	11025.2
Coefficient of Variation	0.525901
Skewness	3.144076

95 % UCL (Assuming Normal Data)	
Student's-t	211.4339

95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	213.009
Modified-t	211.6874

95 % Non-parametric UCL	
CLT	211.3834
Jackknife	211.4339
Standard Bootstrap	211.2211
Bootstrap-t	213.794
Chebyshev (Mean, Std)	230.7289

Summary Statistics for	ln(Barium)
Minimum	4.356709
Maximum	6.927558
Mean	5.199119
Standard Deviation	0.421616
Variance	0.17776
Lilliefors Test Statisitic	0.050666
Lilliefors 5% Critical Value	0.060146
Data are Lognormal at 5% Significance Leve	

Estimates Assuming Lognormal Distribution	
MLE Mean	197.947
MLE Standard Deviation	87.30759
MLE Coefficient of Variation	0.441065
MLE Skewness	1.409001
MLE Median	181.1127
MLE 80% Quantile	258.6265
MLE 90% Quantile	311.3433
MLE 95% Quantile	362.3743
MLE 99% Quantile	482.8946
MVU Estimate of Median	181.0385
MVU Estimate of Mean	197.8589
MVU Estimate of Std. Dev.	87.11469
MVU Estimate of SE of Mean	5.899481

UCL Assuming Lognormal Distribution	
95% H-UCL	208.2126
95% Chebyshev (MVUE) UCL	223.5741
99% Chebyshev (MVUE) UCL	256.558
Recommended UCL to use:	
Student's-t or H-UCL	

SWMU 30	
Summary Statistics for	Cadmium
Number of Samples	216
Minimum	0.038
Maximum	26
Mean	0.577157
Median	0.05
Standard Deviation	2.125555
Variance	4.517985
Coefficient of Variation	3.6828
Skewness	9.07822
Lilliefors Test Statisitic	0.399881
Lilliefors 5% Critical Value	0.060285
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
99% UCL (Assuming Normal Data)	
Student's-t	0.916134
99% UCL (Adjusted for Skewness)	
Adjusted-CLT	1.089653
Modified-t	0.931023
99% Non-parametric UCL	
CLT	0.913607
Jackknife	0.916134
Standard Bootstrap	0.920487
Bootstrap-t	1.443623
Chebyshev (Mean, Std)	2.016165

SWMU 30	
Summary Statistics for	Chromium
Number of Samples	217
Minimum	1.9
Maximum	35.3
Mean	6.657604
Median	6.3
Standard Deviation	3.184934
Variance	10.1438
Coefficient of Variation	0.47839
Skewness	4.020673
Lilliefors Test Statisitic	0.16202
Lilliefors 5% Critical Value	0.060146
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
99 % UCL (Assuming Normal Data)	
Student's-t	7.164337
99 % UCL (Adjusted for Skewness)	
Adjusted-CLT	7.276868
Modified-t	7.174172
99 % Non-parametric UCL	
CLT	7.160577
Jackknife	7.164337
Standard Bootstrap	7.147358
Bootstrap-t	7.305035
Chebyshev (Mean, Std)	8.80884

SWMU 30	
Summary Statistics for	Copper
Number of Samples	217
Minimum	2.7
Maximum	1080
Mean	27.84719
Median	8
Standard Deviation	106.352
Variance	11310.75
Coefficient of Variation	3.819129
Skewness	7.75972
Lilliefors Test Statisitic	0.407154
Lilliefors 5% Critical Value	0.060146
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
99 % UCL (Assuming Normal Data)	
Student's-t	44.76812
99 % UCL (Adjusted for Skewness)	
Adjusted-CLT	52.13701
Modified-t	45.40197
99 % Non-parametric UCL	
CLT	44.6426
Jackknife	44.76812
Standard Bootstrap	45.00691
Bootstrap-t	107.3865
Chebyshev (Mean, Std)	99.68175

SWMU 30	
Summary Statistics for	Thallium
Number of Samples	217
Minimum	0.1025
Maximum	1.8
Mean	0.63735
Median	0.5
Standard Deviation	0.299855
Variance	0.089913
Coefficient of Variation	0.470472
Skewness	0.990108
Lilliefors Test Statisitic	0.340138
Lilliefors 5% Critical Value	0.060146
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95 % UCL (Assuming Normal Data)	
Student's-t	0.670976
95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	0.672294
Modified-t	0.671204
95 % Non-parametric UCL	
CLT	0.670832
Jackknife	0.670976
Standard Bootstrap	0.670844
Bootstrap-t	0.672638
Chebyshev (Mean, Std)	0.726078

SWMU 30	
Summary Statistics for	Benzo(a)anthracene
Number of Samples	203
Minimum	0.0105
Maximum	1.8
Mean	0.03954433498
Median	0.0105
Standard Deviation	0.1691337364
Variance	0.0286062208
Coefficient of Variation	4.277066147
Skewness	9.600429941
Lilliefors Test Statisitic	0.4318272266
Lilliefors 5% Critical Value	0.0621850092
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95 % UCL (Assuming Normal Data)	
Student's-t	0.0591601219
95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	0.06761699862
Modified-t	0.06049325538
95 % Non-parametric UCL	
CLT	0.05907016396
Jackknife	0.0591601219
Standard Bootstrap	0.05903257542
Bootstrap-t	0.1467307946
Chebyshev (Mean, Std)	0.09128821899

SWMU 30	
Summary Statistics for	Benzo(a)pyrene
Number of Samples	203
Minimum	0.0105
Maximum	1.4
Mean	0.03557881773
Median	0.0105
Standard Deviation	0.1393922228
Variance	0.01943019178
Coefficient of Variation	3.917843022
Skewness	9.421068241
Lilliefors Test Statisitic	0.4286094696
Lilliefors 5% Critical Value	0.0621850092
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95 % UCL (Assuming Normal Data)	
Student's-t	0.05174524437
95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	0.058583413
Modified-t	0.0528234247
95 % Non-parametric UCL	
CLT	0.05167110519
Jackknife	0.05174524437
Standard Bootstrap	0.05196916335
Bootstrap-t	0.1148218532
Chebyshev (Mean, Std)	0.0782237398

SWMU 30		
Summary Statistics for	Benzo(b)fluoranthene	
Number of Samples	203	
Minimum	0.023	
Maximum	2.2	
Mean	0.06532019704	
Median	0.048	
Standard Deviation	0.1651837589	
Variance	0.02728567419	
Coefficient of Variation	2.528831301	
Skewness	11.16394414	
Lilliefors Test Statisitic	0.4235276709	
Lilliefors 5% Critical Value	0.0621850092	
Data not Normal at 5% Significance Level		
Data not Lognormal: Try Non-parametric UCL		
95 % UCL (Assuming Normal Data)		
Student's-t	0.0844778736	
95 % UCL (Adjusted for Skewness)		
Adjusted-CLT	0.09409666668	
Modified-t	0.08599191486	
95 % Non-parametric UCL		
CLT	0.08439001656	
Jackknife	0.0844778736	
Standard Bootstrap	0.08404098284	
Bootstrap-t	0.1178602954	
Chebyshev (Mean, Std)	0.1158556457	

SWMU 30	
Summary Statistics for	Benzo(ghi)perylene
Number of Samples	203
Minimum	0.038
Maximum	1.125
Mean	0.1176403941
Median	0.1125
Standard Deviation	0.1628316608
Variance	0.02651414975
Coefficient of Variation	1.384147529
Skewness	5.347718539
Lilliefors Test Statisitic	0.4633309945
Lilliefors 5% Critical Value	0.0621850092
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95 % UCL (Assuming Normal Data)	
Student's-t	0.1365252791
95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	0.1410221154
Modified-t	0.1372402035
95 % Non-parametric UCL	
CLT	0.1364386731
Jackknife	0.1365252791
Standard Bootstrap	0.136196107
Bootstrap-t	0.1466069039
Chebyshev (Mean, Std)	0.1674562543

SMMU 30		
Summary Statistics for	Dibenz[a,h]anthracene	
Number of Samples	203	
Minimum	0.012	
Maximum	0.31	
Mean	0.01787684729	
Median	0.012	
Standard Deviation	0.02480437533	
Variance	0.0006152570356	
Coefficient of Variation	1.387513969	
Skewness	9.236559483	
Lilliefors Test Statisitic	0.4407174179	
Lilliefors 5% Critical Value	0.0621850092	
Data not Normal at 5% Significance Level		
Data not Lognormal: Try Non-parametric UCL		
95 % UCL (Assuming Normal Data)		
Student's-t	0.02075360832	
95 % UCL (Adjusted for Skewness)		
Adjusted-CLT	0.02194634773	
Modified-t	0.02094170937	
95 % Non-parametric UCL		
CLT	0.0207404155	
Jackknife	0.02075360832	
Standard Bootstrap	0.02076194131	
Bootstrap-t	0.02450798073	
Chebyshev (Mean, Std)	0.02546536716	

SWMU 30	
Summary Statistics for	Indeno(1,2,3-c,d)pyrene
Number of Samples	203
Minimum	0.011
Maximum	0.77
Mean	0.02982512315
Median	0.011
Standard Deviation	0.07208069398
Variance	0.005195626445
Coefficient of Variation	2.416777749
Skewness	8.831107245
Lilliefors Test Statisitic	0.396981787
Lilliefors 5% Critical Value	0.0621850092
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95 % UCL (Assuming Normal Data)	
Student's-t	0.03818489551
95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	0.04149712607
Modified-t	0.03870751648
95 % Non-parametric UCL	
CLT	0.03814655762
Jackknife	0.03818489551
Standard Bootstrap	0.03804524108
Bootstrap-t	0.05624577682
Chebyshev (Mean, Std)	0.05187711082

SWMU 30	
Summary Statistics for	Phenanthrene
Number of Samples	203
Minimum	0.0115
Maximum	2.6
Mean	0.04084482759
Median	0.0115
Standard Deviation	0.2026506146
Variance	0.04106727159
Coefficient of Variation	4.961475579
Skewness	11.05978798
Lilliefors Test Statisitic	0.4424323824
Lilliefors 5% Critical Value	0.0621850092
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95 % UCL (Assuming Normal Data)	
Student's-t	0.0643478339
95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	0.07603725356
Modified-t	0.06618795938
95 % Non-parametric UCL	
CLT	0.06424004919
Jackknife	0.0643478339
Standard Bootstrap	0.06453160258
Bootstrap-t	0.1529764859
Chebyshev (Mean, Std)	0.1028426887

SWMU 33

SWMU 33	
Summary Statistics for	Arsenic
Number of Samples	44
Minimum	0.84
Maximum	4.8
Mean	2.489545
Median	2.4
Standard Deviation	0.955654
Variance	0.913274
Coefficient of Variation	0.383867
Skewness	0.56107
Shapiro-Wilk Test Statisitic	0.958688
Shapiro-Wilk 5% Critical Value	0.944
Data are Normal at 5% Significance Level	
Recommended UCL to use	Student's-t
95 % UCL (Assuming Normal Data)	
Student's-t	2.731738
95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	2.739541
Modified-t	2.733769
95 % Non-parametric UCL	
CLT	2.72652
Jackknife	2.731738
Standard Bootstrap	2.722356
Bootstrap-t	2.741929
Chebyshev (Mean, Std)	3.117533

SWMU 114

SWMU 114		
Summary Statistics for	arsenic	
Number of Samples	415	
Minimum	0.05	
Maximum	4.8	
Mean	2.044892	
Median	1.9	
Standard Deviation	0.879985	
Variance	0.774373	
Coefficient of Variation	0.430333	
Skewness	0.558008	
Lilliefors Test Statisitic	0.089123	
Lilliefors 5% Critical Value	0.043492	
Data not Normal at 5% Significance Level		
Data not Lognormal: Try Non-parametric UCL		
95 % UCL (Assuming Normal Data)		
Student's-t	2.116103	
95 % UCL (Adjusted for Skewness)		
Adjusted-CLT	2.117208	
Modified-t	2.1163	
95 % Non-parametric UCL		
CLT	2.115944	
Jackknife	2.116103	
Standard Bootstrap	2.115682	
Bootstrap-t	2.116594	
Chebyshev (Mean, Std)	2.233182	

SWMU 18

SWMU 18					
Summary Statistics for		cadmium		Summary Statistics for	ln(cadmiur
Number of Samples		34		Minimum	-4.961845
Minimum		0.007		Maximum	2.939162
Maximum		18.9		Mean	-1.088843
Mean		2.276644		Standard Deviation	2.047891
Median		0.25		Variance	4.193858
Standard Deviation		5.031886			
Variance		25.31988		Shapiro-Wilk Test Statisitic	0.965653
Coefficient of Variation		2.210221		Shapiro-Wilk 5% Critical Value	0.933
Skewness		2.637362		Data are Lognormal at 5% Significance Leve	
95	% UCL (Assuming Normal Data)			Estimates Assuming Lognormal Distribution	
Student's-t		3.737085		MLE Mean	2.740352
				MLE Standard Deviation	22.14062
95	% UCL (Adjusted for Skewness)			MLE Coefficient of Variation	8.079481
Adjusted-CLT		4.113153		MLE Skewness	551.6509
Modified-t		3.802139		MLE Median	0.336606
				MLE 80% Quantile	1.899566
95	% Non-parametric UCL			MLE 90% Quantile	4.677189
CLT		3.696089		MLE 95% Quantile	9.776075
Jackknife		3.737085		MLE 99% Quantile	39.43099
Standard Bootstrap		3.646522			
Bootstrap-t		4.531744		MVU Estimate of Median	0.316438
Chebyshev (Mean, Std)		6.038205		MVU Estimate of Mean	2.322436
				MVU Estimate of Std. Dev.	10.3463
				MVU Estimate of SE of Mean	1.126493
				UCL Assuming Lognormal Distribution	
				95% H-UCL	10.77957
				95% Chebyshev (MVUE) UCL	7.232705
				99% Chebyshev (MVUE) UCL	13.5309
				Recommended UCL to use:	
				95 % Chebyshev (MVUE) UCL	

General Statistics

SWMU 18		
Summary Statistics for	benzo(a)pyrene	
Number of Samples	22	
Minimum	0.001	
Maximum	0.289	
Mean	0.01409090909	
Median	0.001	
Standard Deviation	0.06140180631	
Variance	0.003770181818	
Coefficient of Variation	4.357547545	
Skewness	4.69041576	
Shapiro-Wilk Test Statisitic	0.2207134286	
Shapiro-Wilk 5% Critical Value	0.911	
Data not Normal at 5% Significance Level		
Data not Lognormal: Try Non-parametric UCL		
95 % UCL (Assuming Normal Data)		
Student's-t	0.03661699432	
95 % UCL (Adjusted for Skewness)		
Adjusted-CLT	0.0496113644	
Modified-t	0.0387988125	
95 % Non-parametric UCL		
CLT	0.0356235384	
Jackknife	0.03661699432	
Standard Bootstrap	0.03470468779	
Bootstrap-t	-1.#QNAN	
Chebyshev (Mean, Std)	0.0711528589	

SWMU 241

SWMU 241					
Summary Statistics for		Antimony		Summary Statistics for	ln(Antimon
Number of Samples		8		Minimum	0.841567
Minimum		2.32		Maximum	3.387774
Maximum		29.6		Mean	1.754299
Mean		8.2525		Standard Deviation	0.825739
Median		5		Variance	0.681845
Standard Deviation		9.083127			
Variance		82.50319		Shapiro-Wilk Test Statisitic	0.860459
Coefficient of Variation		1.100652		Shapiro-Wilk 5% Critical Value	0.818
Skewness		2.345822		Data are Lognormal at 5% Significance Leve	
95 % UCL (Assuming Normal Data)				Estimates Assuming Lognormal Distribution	
Student's-t		14.33669		MLE Mean	8.127239
				MLE Standard Deviation	8.035384
95 % UCL (Adjusted for Skewness)				MLE Coefficient of Variation	0.988698
Adjusted-CLT		16.38064		MLE Skewness	3.932569
Modified-t		14.7806		MLE Median	5.779393
				MLE 80% Quantile	11.61211
95 % Non-parametric UCL				MLE 90% Quantile	16.69941
CLT		13.53473		MLE 95% Quantile	22.48031
Jackknife		14.33669		MLE 99% Quantile	39.4474
Standard Bootstrap		13.21739			
Bootstrap-t		38.05266		MVU Estimate of Median	5.537147
Chebyshev (Mean, Std)		22.25054		MVU Estimate of Mean	7.716609
				MVU Estimate of Std. Dev.	6.557507
				MVU Estimate of SE of Mean	2.296024
				UCL Assuming Lognormal Distribution	
				95% H-UCL	21.16858
				95% Chebyshev (MVUE) UCL	17.72475
				99% Chebyshev (MVUE) UCL	30.56176
				Recommended UCL to use:	
				H-UCL	

SWMU 230

General Statistics

SWMU 230					
Summary Statistics for		arsenic		Summary Statistics for	ln(arsenic)
Number of Samples		14		Minimum	0.262364
Minimum		1.3		Maximum	1.88707
Maximum		6.6		Mean	0.832538
Mean		2.504286		Standard Deviation	0.394922
Median		2.15		Variance	0.155963
Standard Deviation		1.307197			
Variance		1.708765		Shapiro-Wilk Test Statisitic	0.89551
Coefficient of Variation		0.521984		Shapiro-Wilk 5% Critical Value	0.874
Skewness		2.651345		Data are Lognormal at 5% Significance Leve	
95 % UCL (Assuming Normal Data)				Estimates Assuming Lognormal Distribution	
Student's-t		3.122985		MLE Mean	2.485614
				MLE Standard Deviation	1.021171
95 % UCL (Adjusted for Skewness)				MLE Coefficient of Variation	0.410833
Adjusted-CLT		3.343458		MLE Skewness	1.301839
Modified-t		3.164244		MLE Median	2.299147
				MLE 80% Quantile	3.209923
95 % Non-parametric UCL				MLE 90% Quantile	3.819092
CLT		3.078937		MLE 95% Quantile	4.402553
Jackknife		3.122985		MLE 99% Quantile	5.761089
Standard Bootstrap		3.051074			
Bootstrap-t		3.865287		MVU Estimate of Median	2.286371
Chebyshev (Mean, Std)		4.027125		MVU Estimate of Mean	2.470953
				MVU Estimate of Std. Dev.	0.994565
				MVU Estimate of SE of Mean	0.265542
				UCL Assuming Lognormal Distribution	
				95% H-UCL	3.088412
				95% Chebyshev (MVUE) UCL	3.628424
				99% Chebyshev (MVUE) UCL	5.113063
				Recommended UCL to use:	
				Student's-t or H-UCL	

SWMU 231

General Statistics

SWMU 231			
Summary Statistics for	arsenic	Summary Statistics for	ln(arsenic)
Number of Samples	12	Minimum	0.182322
Minimum	1.2	Maximum	1.740466
Maximum	5.7	Mean	0.766958
Mean	2.374167	Standard Deviation	0.44689
Median	2.25	Variance	0.199711
Standard Deviation	1.217378		
Variance	1.482008	Shapiro-Wilk Test Statisitic	0.930821
Coefficient of Variation	0.51276	Shapiro-Wilk 5% Critical Value	0.859
Skewness	1.953615	Data are Lognormal at 5% Significance Leve	
95 % UCL (Assuming Normal Data)		Estimates Assuming Lognormal Distribution	
Student's-t	3.005288	MLE Mean	2.379317
		MLE Standard Deviation	1.118658
95 % UCL (Adjusted for Skewness)		MLE Coefficient of Variation	0.470159
Adjusted-CLT	3.163982	MLE Skewness	1.514406
Modified-t	3.03832	MLE Median	2.153206
		MLE 80% Quantile	3.141122
95 % Non-parametric UCL		MLE 90% Quantile	3.823675
CLT	2.952212	MLE 95% Quantile	4.491076
Jackknife	3.005288	MLE 99% Quantile	6.088639
Standard Bootstrap	2.921609		
Bootstrap-t	3.377078	MVU Estimate of Median	2.135352
Chebyshev (Mean, Std)	3.906	MVU Estimate of Mean	2.358104
		MVU Estimate of Std. Dev.	1.07576
		MVU Estimate of SE of Mean	0.310095
		UCL Assuming Lognormal Distribution	
		95% H-UCL	3.1481
		95% Chebyshev (MVUE) UCL	3.709775
		99% Chebyshev (MVUE) UCL	5.443506
		Recommended UCL to use:	
		Student's-t or H-UCL	

SWMU 232-1

SWMU 232-1			
Summary Statistics for	arsenic	Summary Statistics for	ln(arsenic)
Number of Samples	12	Minimum	-0.020203
Minimum	0.98	Maximum	1.629241
Maximum	5.1	Mean	0.609288
Mean	2.093333	Standard Deviation	0.516373
Median	1.7	Variance	0.266641
Standard Deviation	1.205354		
Variance	1.452879	Shapiro-Wilk Test Statisitic	0.948733
Coefficient of Variation	0.575806	Shapiro-Wilk 5% Critical Value	0.859
Skewness	1.531818	Data are Lognormal at 5% Significance Leve	
95 % UCL (Assuming Normal Data)		Estimates Assuming Lognormal Distribution	
Student's-t	2.718222	MLE Mean	2.10141
		MLE Standard Deviation	1.161629
95 % UCL (Adjusted for Skewness)		MLE Coefficient of Variation	0.552786
Adjusted-CLT	2.830077	MLE Skewness	1.827272
Modified-t	2.743866	MLE Median	1.839121
		MLE 80% Quantile	2.845171
95 % Non-parametric UCL		MLE 90% Quantile	3.570934
CLT	2.66567	MLE 95% Quantile	4.300458
Jackknife	2.718222	MLE 99% Quantile	6.112718
Standard Bootstrap	2.64416		
Bootstrap-t	3.04951	MVU Estimate of Median	1.818784
Chebyshev (Mean, Std)	3.610037	MVU Estimate of Mean	2.075856
		MVU Estimate of Std. Dev.	1.101586
		MVU Estimate of SE of Mean	0.317199
		UCL Assuming Lognormal Distribution	
		95% H-UCL	2.94203
		95% Chebyshev (MVUE) UCL	3.458497
		99% Chebyshev (MVUE) UCL	5.231951
		Recommended UCL to use:	
		H-UCL	

SWMU 66

SWMU 66					
Summary Statistics for		Arsenic		Summary Statistics for	ln(Arsenic)
Number of Samples		44		Minimum	0.741937
Minimum		2.1		Maximum	2.734368
Maximum		15.4		Mean	1.705288
Mean		6.1025		Standard Deviation	0.460243
Median		5.635		Variance	0.211824
Standard Deviation		2.891816			
Variance		8.362601		Shapiro-Wilk Test Statisitic	0.967748
Coefficient of Variation		0.473874		Shapiro-Wilk 5% Critical Value	0.944
Skewness		1.121094		Data are Lognormal at 5% Significance Leve	
95	% UCL (Assuming Normal Data)			Estimates Assuming Lognormal Distribution	
Student's-t		6.835376		MLE Mean	6.11778
				MLE Standard Deviation	2.971565
95	% UCL (Adjusted for Skewness)			MLE Coefficient of Variation	0.485726
Adjusted-CLT		6.898317		MLE Skewness	1.571775
Modified-t		6.847656		MLE Median	5.502968
				MLE 80% Quantile	8.118885
95	% Non-parametric UCL			MLE 90% Quantile	9.941319
CLT		6.819587		MLE 95% Quantile	11.73279
Jackknife		6.835376		MLE 99% Quantile	16.05166
Standard Bootstrap		6.810294			
Bootstrap-t		6.954678		MVU Estimate of Median	5.489737
Chebyshev (Mean, Std)		8.002795		MVU Estimate of Mean	6.101627
				MVU Estimate of Std. Dev.	2.934049
				MVU Estimate of SE of Mean	0.441066
				UCL Assuming Lognormal Distribution	
				95% H-UCL	6.974174
				95% Chebyshev (MVUE) UCL	8.024188
				99% Chebyshev (MVUE) UCL	10.49018
				Recommended UCL to use:	
				Student's-t or H-UCL	

SWMU 9

SWMU 9	
Summary Statistics for	2-Amino-4,6-dinitrotoluene
Number of Samples	76
Minimum	0.0033
Maximum	3.68
Mean	0.2118302632
Median	0.0067
Standard Deviation	0.5817663116
Variance	0.3384520413
Coefficient of Variation	2.746379592
Skewness	4.69054563
Lilliefors Test Statisitic	0.3600058379
Lilliefors 5% Critical Value	0.1016311701
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95% UCL (Assuming Normal Data)	
Student's-t	0.3229693582
95% UCL (Adjusted for Skewness)	
Adjusted-CLT	0.3599618782
Modified-t	0.3289535719
95% Non-parametric UCL	
CLT	0.3215965643
Jackknife	0.3229693582
Standard Bootstrap	0.3234650063
Bootstrap-t	0.4583355893
Chebyshev (Mean, Std)	0.502713419

SWMU 9			
Summary Statistics for		4-Amino-2,6-dinitrotoluene	
Number of Samples		76	
Minimum		0.00275	
Maximum		2.29	
Mean		0.1574065789	
Median		0.00505	
Standard Deviation		0.3890942839	
Variance		0.1513943618	
Coefficient of Variation		2.471906108	
Skewness		3.830155045	
Lilliefors Test Statisitic		0.362837273	
Lilliefors 5% Critical Value		0.1016311701	
Data not Normal at 5% Significance Level			
Data not Lognormal: Try Non-parametric UCL			
95	% UCL (Assuming Normal Data)		
Student's-t		0.2317381202	
95	% UCL (Adjusted for Skewness)		
Adjusted-CLT		0.2517725796	
Modified-t		0.2350063032	
95	% Non-parametric UCL		
CLT		0.2308199745	
Jackknife		0.2317381202	
Standard Bootstrap		0.2310650059	
Bootstrap-t		0.2743577913	
Chebyshev (Mean, Std)		0.3519537209	

SWMU 9	
Summary Statistics for	Benzo(a)pyrene
Number of Samples	73
Minimum	0.036
Maximum	0.12
Mean	0.03715068493
Median	0.036
Standard Deviation	0.009831456364
Variance	9.665753425E-005
Coefficient of Variation	0.2646372841
Skewness	8.544003745
Lilliefors Test Statisitic	0.5328876937
Lilliefors 5% Critical Value	0.1036984564
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95 % UCL (Assuming Normal Data)	
Student's-t	0.03906806366
95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	0.04027291673
Modified-t	0.03925984448
95 % Non-parametric UCL	
CLT	0.03904339322
Jackknife	0.03906806366
Standard Bootstrap	0.03906780011
Bootstrap-t	-1.#QNAN
Chebyshev (Mean, Std)	0.04216640426

SWMU 9	
Summary Statistics for	Benzo(g,h,l)perylene
Number of Samples	73
Minimum	0.0405
Maximum	0.13
Mean	0.04267808219
Median	0.0405
Standard Deviation	0.01317309175
Variance	0.0001735303463
Coefficient of Variation	0.308661755
Skewness	6.060960979
Lilliefors Test Statisitic	0.5382658485
Lilliefors 5% Critical Value	0.1036984564
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95 % UCL (Assuming Normal Data)	
Student's-t	0.045247163
95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	0.04638276345
Modified-t	0.04542944975
95 % Non-parametric UCL	
CLT	0.04521410727
Jackknife	0.045247163
Standard Bootstrap	0.04516633511
Bootstrap-t	-1.#QNAN
Chebyshev (Mean, Std)	0.04939860543

From File		
Summary Statistics for	RDX	
Number of Samples	76	
Minimum	0.00485	
Maximum	26	
Mean	2.863429	
Median	0.874	
Standard Deviation	5.348326	
Variance	28.60459	
Coefficient of Variation	1.867805	
Skewness	2.954668	
Lilliefors Test Statisitic	0.296504	
Lilliefors 5% Critical Value	0.101631	
Data not Normal at 5% Significance Level		
Data not Lognormal: Try Non-parametric UCL		
99% UCL (Assuming Normal Data)		
Student's-t	4.321769	
99% UCL (Adjusted for Skewness)		
Adjusted-CLT	4.700381	
Modified-t	4.356424	
99% Non-parametric UCL		
CLT	4.290632	
Jackknife	4.321769	
Standard Bootstrap	4.30461	
Bootstrap-t	5.294516	
Chebyshev (Mean, Std)	8.967627	

SWMU 9	
Summary Statistics for	2,4,6-Trinitrotoluene
Number of Samples	76
Minimum	0.00285
Maximum	18
Mean	0.8988052632
Median	0.00705
Standard Deviation	3.304352648
Variance	10.91874642
Coefficient of Variation	3.676383287
Skewness	4.555488479
Lilliefors Test Statisitic	0.4199366114
Lilliefors 5% Critical Value	0.1016311701
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
99% UCL (Assuming Normal Data)	
Student's-t	1.799810502
99% UCL (Adjusted for Skewness)	
Adjusted-CLT	2.170886233
Modified-t	1.832821336
99% Non-parametric UCL	
CLT	1.780573098
Jackknife	1.799810502
Standard Bootstrap	1.771129398
Bootstrap-t	6.030904486
Chebyshev (Mean, Std)	4.670158322