Sandia National Laboratories / New Mexico

PROPOSAL FOR NO FURTHER ACTION ENVIRONMENTAL RESTORATION PROJECT SITE 148, BUILDING 9927 SEPTIC SYSTEM OPERABLE UNIT 1295

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PROPOSAL FOR NO FURTHER ACTION
Environmental Restoration Project

Site 148, Building 9927 Septic System
OU 1295

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1. Introduction

1.1 ER Site 148, Building 9927 Septic System

Sandia National Laboratories/New Mexico (SNL/NM) is proposing a no further action (NFA) decision based on confirmatory sampling for Environmental Restoration (ER) Site 148, Building 9927 Septic System, Operable Unit (OU) 1295. ER Site 148 is listed in the Hazardous and Solid Waste Amendment (HSWA) Module IV (EPA August 1993) of the SNL/NM Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management Facility Permit (NM5890110518) (EPA August 1992).

1.2 SNL/NM Confirmatory Sampling NFA Process

This proposal for a determination of an NFA decision based on confirmatory sampling was prepared using the criteria presented in Section 4.5.3 of the SNL/NM Program Implementation Plan (PIP) (SNL/NM February 1995). Specifically, this proposal "must contain information demonstrating that there are no releases of hazardous waste (including hazardous constituents) from solid waste management units (SWMU) at the facility that may pose a threat to human health or the environment" (as proposed in the code of Federal Regulations [CFR], Section 40 Part 264.514[a] [2]) (EPA July 1990). The HSWA Module IV contains the same requirements for an NFA demonstration:

> Based on the results of the RFI [RCRA Facility Investigation] and other relevant information, the Permittee may submit an application to the Administrative Authority for a Class III permit modification under 40 CFR 270.42(c) to terminate the RFI/CMS [corrective measures study] process for a specific unit. This permit modification application must contain information demonstrating that there are no releases of hazardous waste including hazardous constituents from a particular SWMU at the facility that pose threats to human health and/or the environment, as well as additional information required in 40 CFR 270.42(c) (EPA August 1993).

If the available archival evidence is not considered convincing, SNL/NM performs confirmatory sampling to increase the weight of the evidence and allow an informed decision on whether to proceed with the administrative-type NFA or to return to the site characterization program for additional data collection (SNL/NM February 1995).

The Environmental Protection Agency (EPA) acknowledged that the extent of sampling required may vary greatly, stating that:

> The agency does not intend this rule [the second codification of HSWA] to require extensive sampling and monitoring at every SWMU....Sampling is generally required only in situations where there is insufficient evidence on which to make an initial release determination....The actual extent of sampling will vary...depending on the amount and quality of existing information available (EPA December 1987).

This request for an NFA decision for ER Site 148, Building 9927 Septic System, is based primarily on results of a passive soil-gas survey (NERI 1994) and analytical results of confirmatory soil samples collected from immediately around the ER Site 148 septic system components. Concentrations of site-specific constituents of concern (COCs) were first compared to background upper tolerance limit (UTL) concentrations of COCs found in SNL/NM soils. If, however, no background data were available for a particular COC, concentrations of that constituent were then compared to proposed 40 CFR Part 264 Subpart S (Subpart S) soil action levels for the COC of interest (EPA July 1990). Concentrations of constituents at this site were found to be less than either or both background UTLs or proposed Subpart S action levels. This unit is therefore eligible for an NFA proposal based on one or more of the following criteria taken from the RCRA Facility Assessment (RFA) Guidance (EPA October 1986):

- Criterion A: The unit has never contained constituents of concern.
- Criterion B: The unit has design and/or operating characteristics that effectively prevent releases to the environment.
- Criterion C: The unit clearly has not released hazardous waste or constituents into the environment.

Specifically, ER Site 148 is being proposed for an NFA decision based on confirmatory sampling data demonstrating that hazardous waste or constituents have not been released from this SWMU into the environment (Criterion C).

1.3 Local Setting

SNL/NM occupies 2,829 acres of land owned by the Department of Energy (DOE), with an additional 14,920 acres of land provided by land-use permits with Kirtland Air Force Base (KAFB), the United States Forest Service, the State of New Mexico, and the Isleta Indian Reservation. SNL/NM has been involved in nuclear weapons research, component development, assembly, testing, and other research and development activities since 1945 (DOE September 1987).

ER Site 148 is located in the Coyote Test Field on KAFB approximately 0.5 mile east of the southeast corner of Technical Area III (TA-III) (Figure 1). Access to the site is provided by Magazine Road, which extends west from Lovelace Road. ER Site 148 is situated south of Building 9927, a small explosives testing facility (Figure 2). The site encompasses approximately 0.046 acre of flat-lying land at an average elevation of 5,473 feet above mean sea level (AMSL).

The surficial geology at ER Site 148 is characterized by a veneer of aeolian sediments that are underlain by alluvial fan or alluvial deposits. Based on drilling records of similar deposits at KAFB, the alluvial materials are highly heterogeneous, composed primarily of medium to fine silty sands with frequent coarse sand, gravel, and cobble lenses. The alluvial deposits probably extend to the water table. Vegetation consists predominantly of grasses,

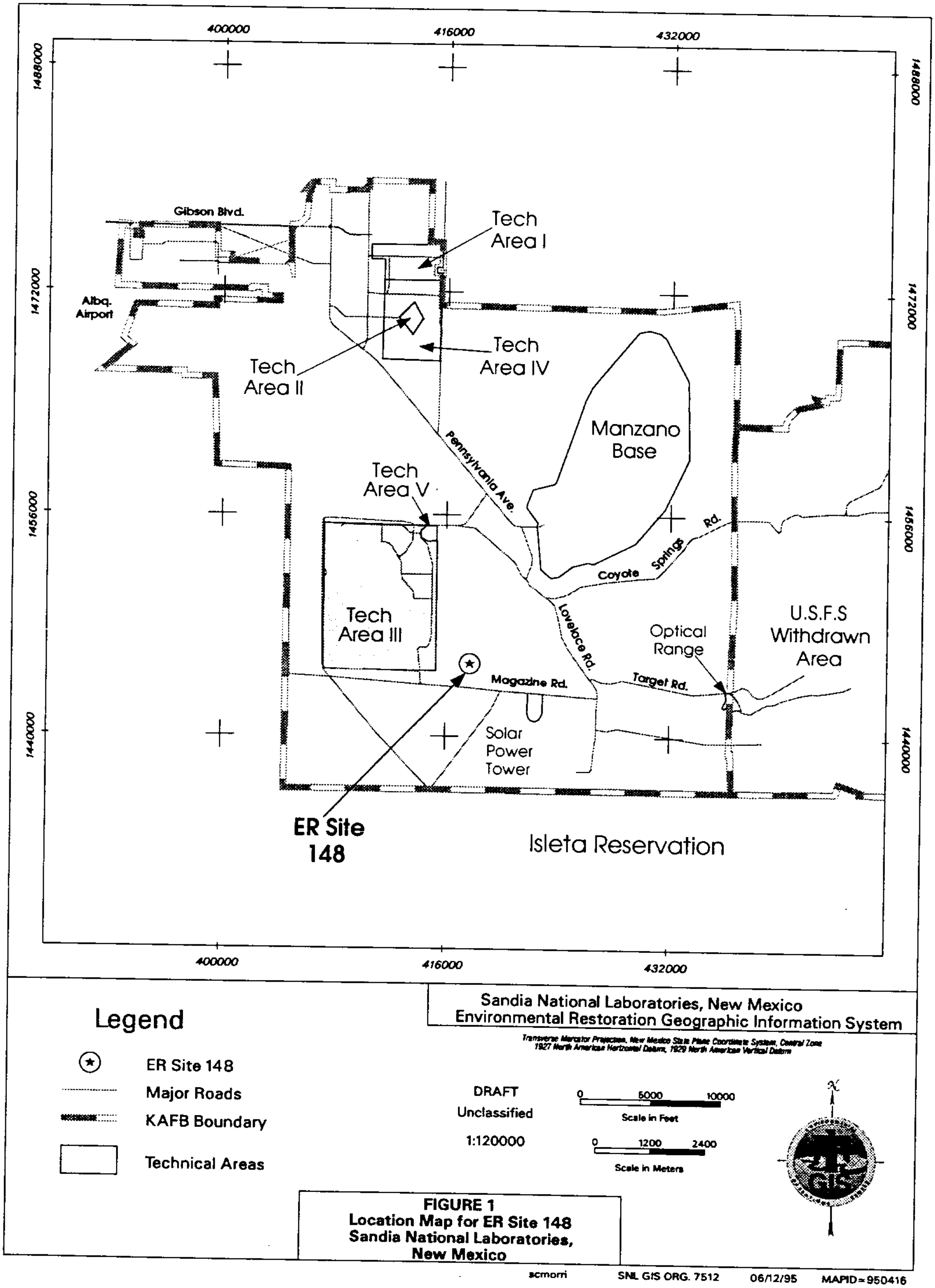


Figure 1. ER Site 148 Location Map

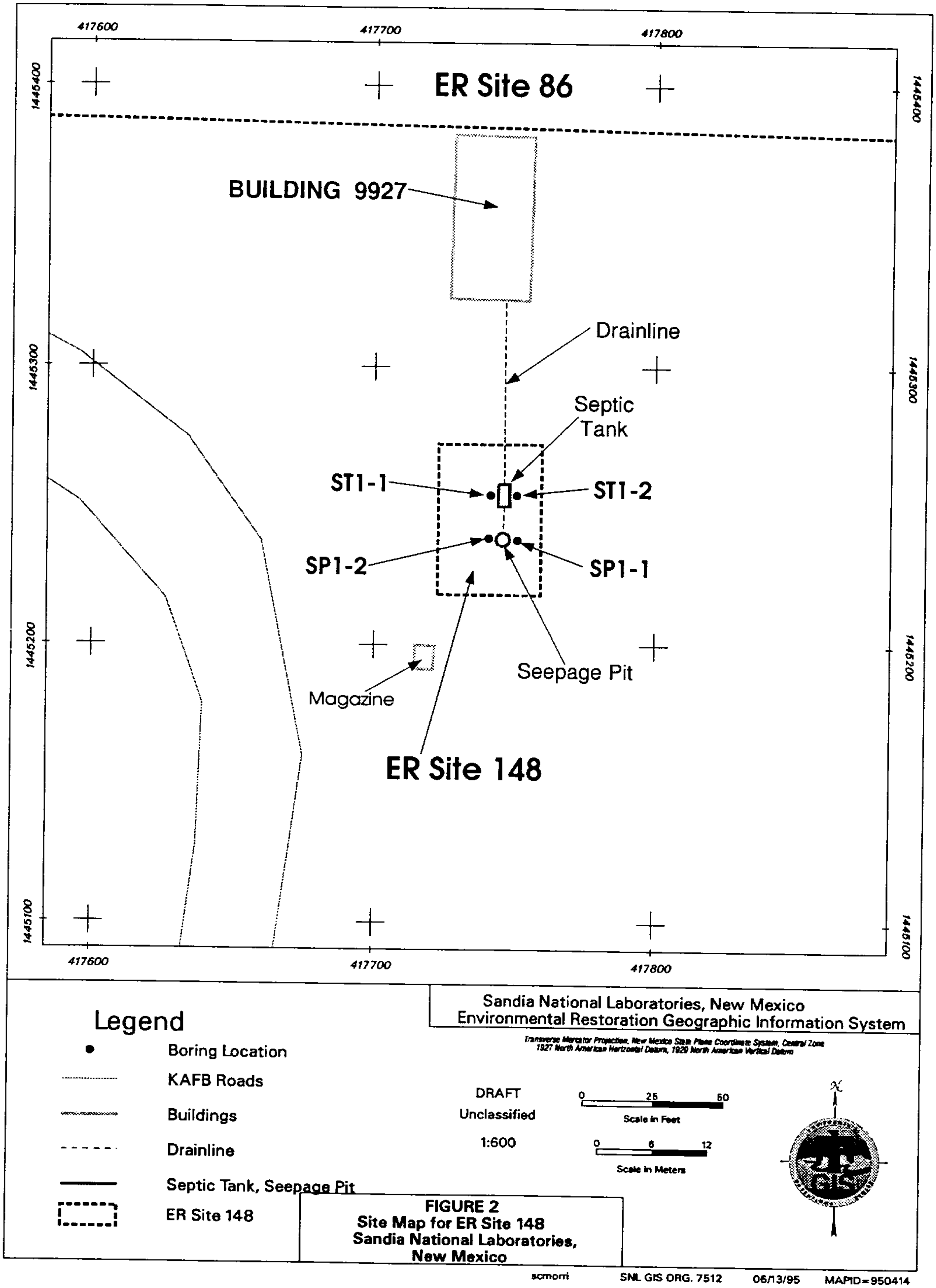


Figure 2. ER Site 148 Site Map

including grama, muhly, dropseed, and galleta. Shrubs commonly associated with the grasslands include sand sage, winter fat, saltbrush, and rabbitbush. Cacti are common and include cholla, pincushion, strawberry, and prickly pear (SNL/NM March 1993).

The water table elevation is approximately 5,150 feet AMSL at this location, so depth of water at this site is approximately 323 feet. No wells are located in the immediate vicinity of ER Site 148. The CWL-10 well is the nearest ground-water monitoring well and is located approximately 0.7 mile west of ER Site 148 in TA-III. Local ground water flow is believed to be in a generally northwest direction in the vicinity of this site (SNL/NM March 1995). The nearest production wells are northwest of the site and include KAFB-2, KAFB-4, KAFB-7, and KAFB-8 which are approximately 4.1 to 5.6 miles away (SNL/NM March 1995).

2. History of the SWMU

2.1 Sources of Supporting Information

In preparing the confirmatory sampling NFA proposal for ER Site 148, available background information was reviewed to quantify potential releases and to select analytes for the soil sampling. Background information was collected from SNL/NM facilities engineering drawings and interviews with employees familiar with site operational history.

The following sources of information, hierarchically listed with respect to assigned validity, were used to evaluate ER Site 148:

- Confirmatory shallow subsurface soil sampling conducted in October 1994
- Three survey reports, including data from a surface radiation survey (RUST December 1994), a geophysical survey (Lamb 1994), and a passive soil-gas survey (NERI 1994)
- Three sets of septic tank sludge and/or liquid samples collected in June 1992, May 1994, and January 1995
- RCRA Facilities Investigation Work Plan for OU 1295, Septic Tanks and Drainfields. This document contains information from interviews with employees who worked at the site in the past (SNL/NM March 1993)
- Photographs and field notes collected by SNL/NM ER staff at ER Site 148
- SNL/NM facilities engineering drawings
- SNL/NM Geographic Information System (GIS) data
- The RFA report (EPA April 1987)

2.2 Previous Audits, Inspections, and Findings

ER Site 148 was first listed as a potential release site in the RFA report (EPA April 1987), which noted that explosive residues and other COCs may have been discharged to the floor drains and sinks in Building 9927 during past operations. This SWMU was included in the RFA report as Site 79, along with several other septic and drain systems at SNL/NM. All the sites included in Site 79 are now designated by individual SWMU numbers.

2.3 Historical Operations

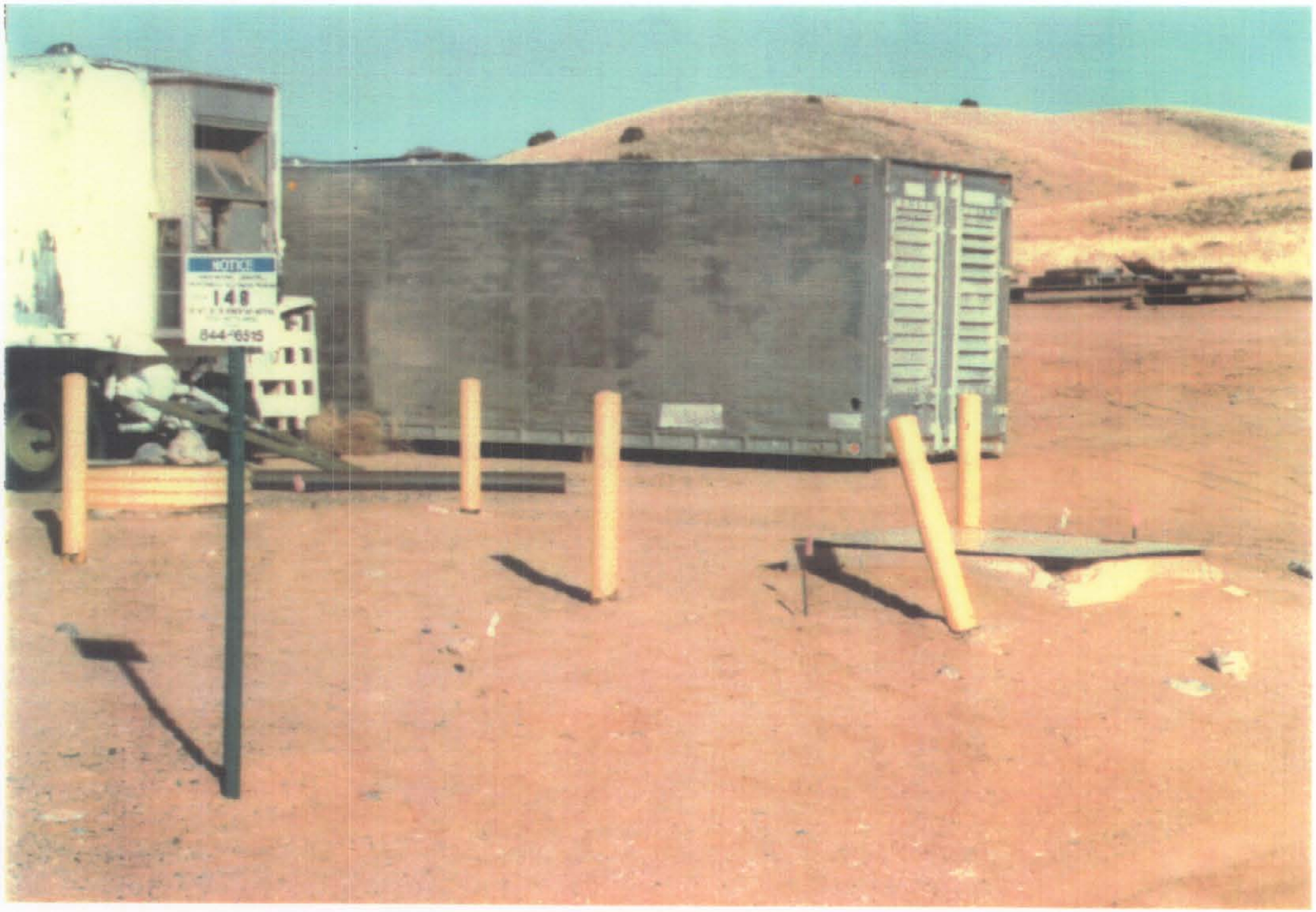
ER Site 148 consists of the septic system that served Building 9927. The center of the site is located 70 feet south of the building (Figure 2). A 750-gallon septic tank connected to a 5-foot diameter by 8-foot deep seepage pit handled effluent from a restroom, floor drains, and a darkroom sink. Both the septic tank and seepage pit are accessed by covered manholes, which are shown in the following photograph (Figure 3).

Building 9927, also referred to as the Drop Tower Facility, was constructed in 1962 and was used to support a variety of outdoor tests, including rocket motor armor penetration and simulated terrorist attacks. Beryllium, lead, lithium hydride, and depleted uranium (DU) were reportedly used in the above ground explosive tests. A darkroom inside the building was used to process black-and-white and x-ray film and it is estimated that approximately 20 gallons of developer and fixer solutions and an unknown volume of rinse water were discharged to the septic system every 10 months. Floor drains in a trough within the building were reportedly never used for washdown purposes. Explosives residue and organic solvents, including methanol, alcohol, toluene, and acetone, may have been discharged to the floor drains and sink. Effluent discharge rates (primarily from the restroom facilities) are estimated to have been between 20 and 1000 gallons per day, depending on building occupancy (SNL/NM March 1993).

Surface contamination is not included as part of OU 1295 assessment activities for ER Site 148. All potential surface contamination from the explosive testing is being investigated as part of the OU 1335 characterization program for ER Site 86.

Based on the activities performed at the facility, the primary COCs in the investigation were beryllium, lead, explosives, and DU residues from destructive testing, photoprocessing chemicals (e.g. cadmium, hexavalent chromium, cyanide, and silver), and volatile organic compounds such as methanol, toluene, and acetone.

The septic tank was reportedly pumped in 1989 (SNL/NM March 1993). Between 1990 and 1991 the sewage discharge line from the facility was connected to a new extension of the City of Albuquerque sanitary sewer system and the septic tank and seepage pit were abandoned. The residual tank contents were analyzed in 1994 for waste characterization purposes and were found not to contain any RCRA COCs. The remaining dry sludge in the septic tank will be removed for proper disposal and the system decommissioned per State of New Mexico, Bernalillo County, and City of Albuquerque wastewater control ordinances.



Septic Tank (left) and Seepage Pit (right) Covers (view looking east)

Figure 3. ER Site 148: Photograph

3. Evaluation of Relevant Evidence

3.1 Unit Characteristics

There are no safeguards inherent in the drain system from Building 9927 or in facility operations that could have prevented past releases to the environment.

3.2 Operating Practices

As discussed in Section 2.3, release of photoprocessing wastes to the septic system was standard procedure while the building was occupied. Hazardous wastes were not managed or contained at ER Site 148.

3.3 Presence or Absence of Visual Evidence

No visible evidence of soil discoloration, staining, or odors indicating residual contamination were observed when soil samples were collected adjacent to the septic tank and seepage pit in the fall of 1994 (SNL/NM October 1994).

3.4 Results of Previous Sampling/Surveys

The contents of the Building 9927 septic tank have been sampled on three separate occasions. Liquid and sludge samples were collected from the septic tank on June 21, 1992. These samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), metals, various radionuclide isotopes, and other miscellaneous compounds. The samples contained low concentrations of 3 VOC constituents, metals, and other miscellaneous constituents (IT June 1993). The radiological analyses conducted in 1992 had significant problems related to quality assurance/quality control (QA/QC) related problems and could not be used for waste characterization purposes. A summary of the constituents detected in the June 1992 samples is presented in Table A.1 of Appendix A.

A second set of sludge (dry at the time of sampling) samples were collected from the Building 9927 septic tank on May 9, 1994, and were analyzed for VOCs, SVOCs, metals using the Toxicity Characteristic Leaching Procedure (TCLP), and isotopic uranium. A screen was also completed for other radionuclides using SNL/NM in-house gamma spectroscopy to characterize the tank residue for waste disposal. No VOCs or SVOCs were detected in the dry sludge. Barium, cadmium, chromium, selenium, and silver were detected in the TCLP-derived leachate, but at concentrations well below the RCRA Toxicity Characteristic action levels. Very low concentrations of radionuclides were also detected in the material. A summary of the constituents detected in the May 1994 septic tank samples is presented in Table A.2 of Appendix A.

Additional dried sludge samples were collected from the septic tank on January 26, 1995, in order to complete additional analyses required for waste characterization. These samples were analyzed for isotopic uranium and tritium, and radionuclides using gamma spectroscopy, and were found to contain low concentrations of isotopic uranium, tritium, and other radionuclides detectable through gamma spectroscopy. A summary of the constituents detected in these January 1995 samples is included in Table A.2 of Appendix A.

The multiple rounds of ER Site 148 septic tank sampling described above were completed to characterize the current septic tank contents for waste disposal purposes. The dried residue in the tank is now adequately characterized and will be disposed as a separate removal action.

A surface radiological survey conducted by RUST Geotech Inc. around Building 9927 in March 1994 did not detect any point or aerial anomalies above background levels within ER Site 148 (RUST December 1994).

A geophysical survey performed at the site in March 1994 was intended to identify any subsurface areas with high moisture content, indicating a possible contaminant plume from past releases. The results of the geophysical survey were inconclusive, with no definitive indications of high moisture concentrations (Lamb 1994). Therefore, the geophysical survey results were not used as a guide in the soil sampling effort.

The passive soil-gas survey conducted at the site in June 1994 utilized PETREX sampling tubes to identify any releases of VOCs and SVOCs to the soil around the septic tank and seepage pit (SNL/NM June 1994). A PETREX tube soil-gas survey is a semiquantitative screening procedure that can be used to identify many VOCs and SVOCs, and can be used to guide VOC and SVOC site investigations. The advantages of this sampling methodology are that large areas can be surveyed at relatively low cost, the technique is highly sensitive to organic vapors, and the result produces a measure of soil-vapor chemistry integrated over a 2- to 3-week period rather than at one point in time. Each PETREX soil-gas sampler consists of 2 activated charcoal-coated wires housed in a reusable glass test tube container. At each sampling location, sample tubes are buried in an upside down position so that the mouth of the sampler is about 1 foot below grade. Samplers are left in place for a 2- to 3-week period, and are then removed from the ground and sent to the manufacturer, Northeast Research Institute (NERI), for analysis using Thermal Desorption-Gas Chromatography/Mass Spectrometry. The analytical laboratory reports all sample results in terms of "ion counts" instead of concentrations, and identifies those samples that contain compounds above the PETREX technique detection limits. NERI considers a "hit" for individual compounds (such as perchloroethene [PCE] or trichloroethene [TCE]) to be greater than 100,000 ion counts; and 200,000 ion counts for mixtures of compounds (benzene, toluene, ethylbenzene, xylene, [BTEX] or aliphatics, for example).

The soil-gas survey identified tetrachloroethene (also known as perchloroethene, or PCE) at a concentration just above the PETREX technique detection limit at one sampling location. Subsequent laboratory analysis of soil samples from this location did not detect PCE, nor was PCE detected in the septic tank contents sampled in 1994. No other VOCs or SVOCs were found in detectable quantities in PETREX tubes placed at this site (NERI 1994). The analytical results of the passive soil-gas survey at ER Site 148 are included in Table A.3 of Appendix A.

3.5 Assessment of Gaps in Information

The material currently in the septic tank is not necessarily representative of all discharges to the unit that have occurred since it was put into service in 1962. The analytical results of the various rounds of septic tank sampling were used, along with process knowledge and other available information, to help identify the most likely COCs that might be found in soils surrounding the septic tank and seepage pit, and to help select the types of analyses to be performed on soil samples collected from the site. While the history of past releases at the site is incomplete, analytical data from confirmatory soil samples collected in October 1994 (discussed below) are sufficient to determine whether releases of COCs occurred at the site.

3.6 Confirmatory Sampling

Although the likelihood of hazardous waste releases at ER Site 148 was considered low, confirmatory soil sampling was conducted in October 1994 immediately adjacent to both the septic tank and seepage pit to determine whether COCs above background or detectable levels had been released via the septic system to the environment at this site. The confirmatory soil sampling program was performed in accordance with the rationale and procedures described in the Septic Tank and Drainfields (ADS-1295) RCRA Facility Investigation Work Plan (SNL/NM March 1993), and addenda to the Work Plan developed during the OU 1295 project approval process (IT March 1994 and SNL/NM November 1994).

A summary of the types of samples, number of sample locations, sample depths and analytical requirements for confirmatory soil samples collected at this site is presented in Table 1.

Soil samples were collected from one boring on either side of the seepage pit, and from one boring on either side of the septic tank. The soil sampling locations are shown in Figure 2. Figure 3 shows the covers to the septic tank (left) and seepage pit (right). Two depth intervals were sampled at each location around the seepage pit, the first starting at the outside bottom of the pit (14 feet below grade), and the second, 10 feet below the top of the first sampling interval (24 feet below grade). The sampling locations on either side of the septic tank, from one interval in each borehole, started at the outside bottom of the tank, 12 feet below grade (SNL/NM October 1994). The samples adjacent to the tank were collected to determine whether discharges of COCs had occurred due to failure of the tank integrity. Depths below grade to the outside bottoms of the septic tank and seepage pit were determined based on field measurements and SNL/NM facilities engineering drawings (SNL/NM April 1962).

The Geoprobe sampling system was used to collect subsurface soil samples at this site. The Geoprobe sampling tool was fitted with a butyl acetate (BA) sampling sleeve and was then

Table 1
ER Site 148: Confirmatory Sampling Summary Table

ER Site Number and Unit	Analytical Parameters	Number of Sample Locns.	Top of Splg. Interval(s) at Each Boring Location	Total Number of Invest. Samples	Total Number of Duplicate Samples	Date(s) Samples Collected
148 seepage pit (outside bottom of seepage pit is 14 feet deep, measured in field)	VOCs	2	14', 24'	4	1	10/11-12/94: 2 of 2 shallow, 2 of 2 deep intervals, 1 set duplicate samples
	SVOCs	2	14', 24'	4	1	
	RCRA metals	2	14', 24'	4	1	
	HE (TNT screen)	2	14', 24'	4	1	
	Cyanide	2	14', 24'	4	1	
	Isotopic uranium	2	14', 24'	4	1	
	Gamma spec. compos.	2	14', 24'	2		
	Tritium composite	2	14', 24'	2		
148 septic tank (outside bottom of tank is 12 feet deep, measured in field)	VOCs	2	12'	2		10/12/94: 2 of 2 shallow intervals
	SVOCs	2	12'	2		
	RCRA metals	2	12'	2		
	HE (TNT screen)	2	12'	2		
	Cyanide	2	12'	2		
	Isotopic uranium	2	12'	2		

Notes

VOC = Volatile organic compounds
SVOC = Semivolatile organic compounds
RCRA = Resource Conservation and Recovery Act
HE = High explosives
TNT = Trinitrotoluene
Cr = Chromium

hydraulically driven to the top of the designated sampling depth. The sampling tool was opened, and driven an additional 2 feet in order to fill the 2-foot long by approximately 1.25-inch diameter BA sleeve. The sampling tool and soil-filled sleeve were then retrieved from the borehole. In order to minimize the potential for loss of volatile compounds (if present), the soil to be analyzed for VOCs was not emptied from the BA sleeve into another sample container. The filled BA sleeve was removed from the sampling tool, and the top 7 inches were cut off. Both ends of the 7-inch section of filled sleeve were immediately capped with a teflon membrane and rubber end cap, sealed with tape, and placed in an ice-filled cooler at the site. The soil in this section of sleeve was submitted for a VOC analysis.

Soil from the remainder of the sleeve was then emptied into a decontaminated mixing bowl. Following this, one or two more 2-foot sampling runs were completed at each interval in order to recover enough soil to satisfy sample volume requirements for the interval. Soil recovered from these additional runs was also emptied into the mixing bowl, and blended with soil from the first sampling run. The soil was then transferred from the bowl into sample containers using a decontaminated plastic spatula, and was analyzed for SVOCs, RCRA metals, hexavalent chromium, beryllium, and cyanide by laboratory analysis; and trinitrotoluene (TNT) compounds using a field screening immunoassay technique. Routine SNL/NM chain-of-custody and sample documentation procedures were employed, and samples were shipped to the laboratory by an overnight delivery service.

To determine if radionuclides were released from past activities at this site, soil samples were collected from each of the septic tank and seepage pit sampling intervals and were analyzed by a commercial laboratory for isotopic uranium. In addition, composite soil samples were collected from both the shallow and deep sampling intervals in the seepage pit borings and were analyzed by a commercial laboratory for tritium, and were also screened for other radionuclides using SNL/NM in-house gamma spectroscopy. Tritium and gamma spectroscopy composite screening samples were not collected from the septic tank borings because they were very close (approximately 15 feet) to the seepage pit borings.

QA/QC samples collected during this sampling effort consisted of one set of duplicate soil samples and one set of aqueous equipment rinsate samples that were analyzed for the same constituents as the field samples, except for tritium and the gamma spectroscopy radionuclides. Also, a soil trip blank sample was included with the shipment of ER Site 148 soil samples to the laboratory and was analyzed for VOCs only. Acetone, 1,1-dichloroethene, 2-butanone (MEK), methylene chloride, and toluene were detected in this soil trip blank by the laboratory. These common laboratory contaminants were either not detected or were found in generally lower concentrations in the site soil samples compared to the trip blank. Soil used for the trip blank was prepared by heating the material, and then transferring it immediately to the sample container. This heating process drives off any residual VOCs (if present) and soil moisture that may be contained in the material. Apparently when the soil trip blank container was opened at the laboratory, it immediately adsorbed both moisture and VOCs present in the laboratory atmosphere, and therefore became contaminated.

A summary of all constituents detected by commercial laboratory analyses in these confirmatory samples is presented in Tables 2, 3, and 4. Results of the SNL/NM in-house gamma spectroscopy composite soil sample screening for other radionuclides are presented in Tables A.4 and A.5 of Appendix A. Complete analytical data packages are archived in the Environmental Operations Records Center and are readily available for review and verification (SNL/NM October 1994).

3.7 Rationale for Pursuing a Confirmatory Sampling NFA Decision

Three rounds of samples were collected of the liquid and/or sludge in the septic tank for waste characterization purposes. Only low concentrations of a limited number of VOCs, SVOCs, metals, radionuclides, and other miscellaneous constituents were detected in the samples.

Table 2

ER Site 148
Summary of Organic and Other Constituents Detected in Confirmatory Soil Samples Collected Around the Septic Tank and Seepage Pit

Sample Number	Sample Matrix	Sample Type	Sample Date	Sample Location (Figure 2)	Top of Sample Interval (fbgs)	VOCs Method 8240 (ug/kg)					SVOCs Method 8270 (ug/kg)	Cyanide Method 9010/9012 (ug/kg)	TNT Screen Immunoassay Method Based on EPA 8515 (mg/kg)
						Acetone	1,1-DCE	MEK	Meth. Chloride	Toluene			
018118-1,2	Soil	Field	10/11/94	S148-SP1-1	14	ND	ND	ND	ND	ND	ND	ND	ND
018119-1,2	Soil	Field	10/11/94	S148-SP1-1	24	ND	ND	ND	1.6 J	ND	ND	ND	ND
018120-1,2	Soil	Field	10/12/94	S148-SP1-2	14	ND	ND	ND	2.1 J	2.5 J	ND	ND	ND
018121-1,2	Soil	Dupl.	10/12/94	S148-SP1-2	14	ND	ND	ND	1.6 J	ND	ND	ND	ND
018122-1,2	Soil	Field	10/12/94	S148-SP1-2	24	ND	ND	ND	1.6 J	ND	ND	ND	ND
018123-1,2	Soil	Field	10/12/94	S148-ST1-1	12	ND	ND	ND	1.3 J	ND	ND	ND	ND
018124-1,2	Soil	Field	10/12/94	S148-ST1-2	12	ND	ND	ND	1.8 J	ND	ND	ND	ND
018125-1	Soil	TB	10/12/94	Site 148	NA	93	2.1 J	18	7.5 B	1.2 J	NS	NS	NS
Laboratory Detection Limit For Soil						10	5	10	5	5	330, 1,600	0.5	1
Proposed Subpart S Action Level For Soil (ug/kg)						8E+06	1E+04	5E+07	9E+04	2E+07		2E+06	4E+04

Notes

B = Compound also detected in an associated laboratory blank
Dupl. = Duplicate soil sample
fbgs = feet below ground surface
J = Result is detected below the reporting limit or is an estimated concentration
MEK = Methyl ethyl ketone
Meth. Chloride = Methylene chloride
NA = Not applicable
ND = Not detected
NS = No sample
TB = Trip blank
1,1-DCE = 1,1-Dichloroethene
ug/kg = Micrograms per kilogram
mg/kg = Milligrams per kilogram
VOC = Volatile organic compounds
SVOC = Semivolatile organic compounds
TNT = Trinotrotoluene

Table 3

ER Site 148

Summary of RCRA Metals, Beryllium, and Hexavalent Chromium Analytical Results for Confirmatory Soil Samples Collected Around the Septic Tank and Seepage Pit

Sample Number	Sample Matrix	Sample Type	Sample Date	Sample Location (Figure 2)	Top of Sample Interval (fbgs)	RCRA Metals, Methods 6010 and 7471 (mg/kg)								Other Metals Be-Method 6010 Cr^{6+}-Method 7196 (mg/kg)	
						As	Ba	Cd	Cr, total	Pb	Hg	Se	Ag	Be	Cr^{6+}
018118-2	Soil	Field	10/11/94	S148-SP1-1	14	2.9	69.9	ND	5.2	ND	ND	ND	ND	0.31	ND
018119-2	Soil	Field	10/11/94	S148-SP1-1	24	3.1	67.3	ND	5.6	ND	ND	ND	ND	0.31	ND
018120-2	Soil	Field	10/12/94	S148-SP1-2	14	3.4	74.7	ND	5.3	9.7	ND	ND	0.78 J	0.35	ND
018121-2	Soil	Dupl.	10/12/94	S148-SP1-2	14	2.9	111	ND	5.5	4.1 J	ND	ND	ND	0.34	ND
018122-2	Soil	Field	10/12/94	S148-SP1-2	24	8.5	53.2	ND	5.4	8.4	ND	ND	ND	0.32	ND
018123-2	Soil	Field	10/12/94	S148-ST1-1	12	3.5	57.9	ND	4.9	3.4 J	ND	ND	ND	0.31	ND
018124-2	Soil	Field	10/12/94	S148-ST1-2	12	3.8	69.6	ND	4.4	ND	ND	ND	ND	0.25	ND
Laboratory Detection Limit For Soil (mg/kg)						1	1	0.5	1	5	0.1	0.5	1	0.2	0.05
SNL/NM Soil Background Range (mg/kg)*						U	0.13-730	0.1-8.5	0.01-58.1	1-110	U	U	0.05-10	0.1-1.1	ND
SNL/NM Soil Background UTL, 95th %tile (mg/kg)*						U	407.9	3.51	22.9	15	U	U	4	0.79	ND
Proposed Subpart S Action Level For Soil (mg/kg)						20	6,000	80	80,000**	400***	20	400	400	0.2	400**

Notes

As = Arsenic
Ba = Barium
Cd = Cadmium
Cr = Chromium
Pb = Lead
Hg = Mercury
Se = Selenium
Ag = Silver
Be = milligrams per kilogram
Dupl. = Duplicate soil sample
fbgs = Feet below ground surface
J = Result is detected below the reporting limit or is an estimated concentration
ND = Not detected
U = Undefined for SNL/NM soils
UTL = Upper tolerance limit
mg/kg = Milligrams per kilogram
* IT Corp., October 1994
** 80,000 mg/kg is for Cr3+ only. For Cr6+, proposed Subpart S action level is 400 mg/kg.
*** No proposed Subpart S action level for lead in soil; 400 ppm is EPA proposed action level (EPA, July 1994)

Table 4

ER Site 148
Summary of Isotopic Uranium and Tritium Analyses of Confirmatory Soil Samples Collected From Adjacent to the Seepage Pit and Septic Tank

Sample Number	Sample Matrix	Sample Type	Sample Date	Sample Location (Figure 2)	Top of Sample Interval (fbgs)	Analytical Method	Compound Name	Results	+- 2 Sigma Uncertainty	Detection Limit	Background UTL Activity**	Units
018118-5	Soil	Field	10/11/94	S148-SP1-1	14	NAS-NS-3050	Uranium-238	0.41	0.1	0.01	1.1	pCi/g
018118-5	Soil	Field	10/11/94	S148-SP1-1	14	NAS-NS-3050	Uranium-235/236	0.014	0.015	0.015	0.168	pCi/g
018118-5	Soil	Field	10/11/94	S148-SP1-1	14	NAS-NS-3050	Uranium-234	0.52	0.12	0.01	1	pCi/g
018119-5	Soil	Field	10/11/94	S148-SP1-1	24	NAS-NS-3050	Uranium-238	0.33	0.08	0.01	1.1	pCi/g
018119-5	Soil	Field	10/11/94	S148-SP1-1	24	NAS-NS-3050	Uranium-235/236	0.012	0.012	0.008	0.168	pCi/g
018119-5	Soil	Field	10/11/94	S148-SP1-1	24	NAS-NS-3050	Uranium-234	0.4	0.09	0.01	1	pCi/g
018120-5	Soil	Field	10/12/94	S148-SP1-2	14	NAS-NS-3050	Uranium-238	0.34	0.08	0.01	1.1	pCi/g
018120-5	Soil	Field	10/12/94	S148-SP1-2	14	NAS-NS-3050	Uranium-235/236	0.025	0.018	0.008	0.168	pCi/g
018120-5	Soil	Field	10/12/94	S148-SP1-2	14	NAS-NS-3050	Uranium-234	0.38	0.09	0.01	1	pCi/g
018121-5	Soil	Dupl.	10/12/94	S148-SP1-2	14	NAS-NS-3050	Uranium-238	0.29	0.08	0.01	1.1	pCi/g
018121-5	Soil	Dupl.	10/12/94	S148-SP1-2	14	NAS-NS-3050	Uranium-235/236	0.02	0.018	0.019	0.168	pCi/g
018121-5	Soil	Dupl.	10/12/94	S148-SP1-2	14	NAS-NS-3050	Uranium-234	0.4	0.1	0.02	1	pCi/g
018122-5	Soil	Field	10/12/94	S148-SP1-2	24	NAS-NS-3050	Uranium-238	0.31	0.08	0.01	1.1	pCi/g
018122-5	Soil	Field	10/12/94	S148-SP1-2	24	NAS-NS-3050	Uranium-235/236	0.014	0.013	0.008	0.168	pCi/g
018122-5	Soil	Field	10/12/94	S148-SP1-2	24	NAS-NS-3050	Uranium-234	0.35	0.08	0.01	1	pCi/g
018123-5	Soil	Field	10/12/94	S148-ST1-1	12	NAS-NS-3050	Uranium-238	0.41	0.1	0.01	1.1	pCi/g
018123-5	Soil	Field	10/12/94	S148-ST1-1	12	NAS-NS-3050	Uranium-235/236	0.031	0.021	0.009	0.168	pCi/g
018123-5	Soil	Field	10/12/94	S148-ST1-1	12	NAS-NS-3050	Uranium-234	0.48	0.11	0.01	1	pCi/g
018124-5	Soil	Field	10/12/94	S148-ST1-2	12	NAS-NS-3050	Uranium-238	0.31	0.08	0.01	1.1	pCi/g
018124-5	Soil	Field	10/12/94	S148-ST1-2	12	NAS-NS-3050	Uranium-235/236	0.032	0.022	0.01	0.168	pCi/g
018124-5	Soil	Field	10/12/94	S148-ST1-2	12	NAS-NS-3050	Uranium-234	0.4	0.1	0.01	1	pCi/g
018118-4	Soil	Compos.	10/12/94	S148-SP1-1/2	14	EERF H.01	Tritium *	ND	308	513.3	U	pCi/L
018119-4	Soil	Compos.	10/12/94	S148-SP1-1/2	24	EERF H.01	Tritium *	ND	283.43	515.33	U	pCi/L

Notes

Compos. = Composite soil sample
Dupl. = Duplicate sample
fbgs = Feet below ground surface
ND = Not detected
pCi/g = Picocuries per gram
pCi/L = Picocuries per liter
U = Undefined for SNL/NM soils
UTL = Upper Tolerance Limit
* Net tritium value = gross result minus blank sample result.
** IT Corp., October 1994

Aside from the possible presence of PCE that was identified in a single PETREX tube (discussed above) but which was not found in follow-up soil samples from that location, the passive soil-gas survey did not indicate any anomalies or areas of VOC or SVOC contamination in soils at ER Site 148.

Confirmatory soil sampling at the point of discharge around the seepage pit did not identify any residual COCs that indicate past discharges from this unit that could pose a threat to human health or the environment. No evidence of leakage or discharge from the septic tank into surrounding soils was identified from the soil sampling. The 2 VOC compounds (methylene chloride and toluene) that were detected in septic tank or seepage pit soil samples were identified at below-reporting-limit concentrations, and are common laboratory contaminants (Table 2). As shown in Table 2, no SVOC constituents, cyanide, or trinitrotoluene (TNT) compounds were identified in these soil samples. Soil sample analytical results indicate that except for arsenic, the 10 metals that were targeted in the Site 148 investigation were either not detected, or were detected in concentrations below the background UTL concentrations of metals presented in the draft SNL/NM study of naturally-occurring constituents (IT October 1994). Low concentrations of arsenic were detected in the ER Site 148 soil samples, but background concentrations for this metal have not been determined in SNL/NM soils. Arsenic concentrations were therefore compared to, and were found to be much lower than, the Subpart S soil action level for that metal (Table 3). In addition, isotopic uranium activity levels detected in all soil samples were less than corresponding background UTL activity levels for those nuclides (Table 4). As shown in Table 4, tritium was not detected in sample soil moisture from this site. Finally, the gamma spectroscopy semiqualitative screening detected only very low activity levels of a few radionuclides, and did not indicate the presence of contamination from other radionuclides in soils at this site (Table A.2 of Appendix A).

4. Conclusion

Sample analytical results generated from this confirmatory sampling investigation show that detectable or significant concentrations of COCs are not present in soils at ER Site 148, and that additional investigations are unwarranted and unnecessary. SNL/NM will remove the remaining dried sludge from the septic tank, properly dispose of the material, and will decommission the septic system in accordance with local ordinances.

Based on archival information and chemical and radiological analytical results of soil samples collected at the likely points of release of effluent from the Building 9927 Septic System, SNL/NM has demonstrated that hazardous waste or COCs have not been released from this SWMU into the environment (Criterion C of Section 1.2), and the site does not pose a threat to human health or the environment. Therefore, ER Site 148 is recommended for an NFA determination.

5. References

5.1 ER Site 148 References

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October 13, 2003

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