# PROPOSAL FOR
# NO FURTHER ACTION
# Environmental Restoration Project

# Site 150, Building 9939/9939A Septic System
# Operable Unit 1295
# January 1997

**Prepared by**
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**Prepared for the**
**Department of Energy**

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# 1.0 INTRODUCTION

## 1.1 ER Site 150, Building 9939/9939A 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 150, Building 9939/9939A Septic System, Operable Unit (OU) 1295. ER Site 150 is listed in the Hazardous and Solid Waste Amendments (HSWA) Module IV (EPA August 1993) of the SNL/NM Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management Facility Permit (NM5890110518-1) (EPA August 1992).

## 1.2 SNL/NM Administrative NFA Process

This proposal for a determination of an NFA decision based on confirmatory sampling was prepared using the process presented in Section 4.5.3 of the SNL/NM Program Implementation Plan (SNL/NM February 1995). It follows guidance documented in Title 40, Code of Federal Regulations (CFR), Part 264.514[a] [2]) that states NFAs "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" (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 150 is based primarily on analytical results of confirmatory soil samples collected at the site. Concentrations of site-specific constituents of concern (COCs) detected in the soil samples were compared to background 95th percentile or upper tolerance limit (UTL) concentrations of COCs found in SNL/NM soils (IT March 1996) or other relevant background limits. If no SNL/NM background limit was available for a particular COC, or if the COC concentration exceeded the SNL/NM or other relevant background limit, then the constituent concentration was compared to the proposed 40 CFR Part 264 Subpart S (Subpart S) or other relevant soil action level for the compound (EPA July 1990).

A site is eligible for an NFA proposal if it meets one or more of the following criteria presented in the Environmental Restoration Document of Understanding (NMED November 1995):

- NFA Criterion 1: The site cannot be located or has been found not to exist, is a duplicate potential release site (PRS) or is located within and is therefore investigated as part of another PRS.

- NFA Criterion 2: The site has never been used for the management (that is, generation, treatment, storage, or disposal) of RCRA solid or hazardous wastes and/or constituents or other Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substances.

- NFA Criterion 3: No release to the environment has occurred, nor is likely to occur in the future.

- NFA Criterion 4: There was a release, but the site was characterized and/or remediated under another authority that adequately addresses corrective action, and documentation, such as a closure letter, is available.

- NFA Criterion 5: The PRS has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use.

Review and analysis of the ER Site 150 soil sample analytical data indicate that concentrations of COCs detected in soils at this site are less than SNL/NM or other applicable background concentrations or proposed Subpart S or other action levels. Thus, ER Site 150 is being proposed for an NFA decision based on confirmatory sampling data demonstrating that hazardous waste or COCs that may have been released from this SWMU into the environment pose an acceptable level of risk under current and projected future land use (Criterion 5).

## 1.3 Local Setting

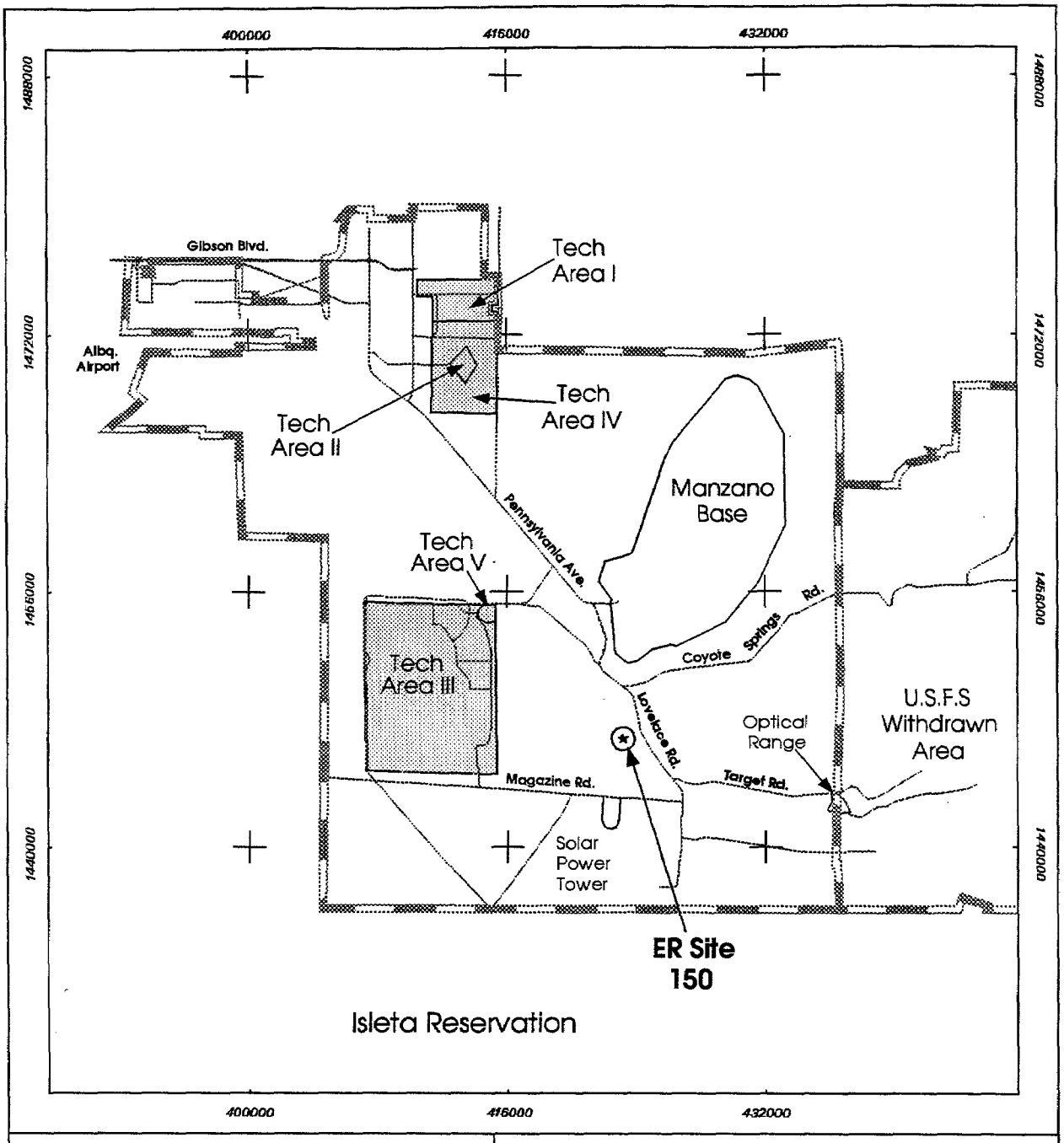
SNL/NM occupies 2,829 acres of land owned by the Department of Energy (DOE), with an additional 14,920 acres of land provided by land-use permits with Kirtland Air Force Base (KAFB), the United States Forest Service, the State of New Mexico, and the Isleta Indian Reservation. SNL/NM has been involved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

ER Site 150 is located on KAFB, and is approximately 0.7 miles east of Technical Area III (TA III). Access to the site is provided by paved and graded dirt roads that extend approximately 2.3 miles from the turn-off to TA III from Lovelace Road (Figure 1-1). ER Site 150 consists of the immediate area around a 750-gallon septic tank and two seepage pits southeast of Building 9939, and the drainfield north of Building 9939A that consists of four 6-foot long PVC distribution lines (SNL/NM January 1995a) (Figure 1-2). The site encompasses approximately 0.1 acres of land surrounding the septic tank and seepage pits, and 0.08 acres of land surrounding the drainfield. The site is flat-lying and has an average mean elevation of 5,614 feet above mean sea level (amsl).

There is a thin veneer of alluvial fan deposits at ER Site 150. Soil sampling experience at this site indicates that there is caliche or cemented conglomerate at about 7 to 9 feet below the ground surface (bgs). This experience is supported by lithologic information obtained from LMF-1, a monitoring well approximately 0.2 miles north of ER Site 150. LMF-1 collared in a caliche/ cemented conglomerate that persists for about 10 feet and then is underlain by another 10 feet of mainly siltstone with some limestone. Permian Abo Formation silty claystones and claystones persist from this point at 20 feet bgs to beyond the water table which is at approximately 309 feet bgs or 5,314 feet amsl. Pennsylvanian Madera Formation shales, siltstones, and sandstones were encountered in LMF-1 at 351 feet bgs and persisted to the bottom of the well at 410 feet bgs (SNL/NM August 1996).

Vegetation at ER Site 150 consists predominantly of grasses 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 5320 feet amsl at Site 150, so depth to groundwater is approximately 294 feet. Local groundwater flow is believed to be in a generally west to northwest direction in the vicinity of this site (SNL/NM March 1996a). The nearest production wells are northwest of the site and include KAFB-1, 2, 4, 7, and 14, which are approximately 5 to 6 miles away (SNL/NM August 1996a). The nearest groundwater monitoring well is LMF-1 (SNL/NM August 1996b).




## Legend

- ER Site 150
- Major Roads
- KAFB Boundary
- Technical Areas

Sandia National Laboratories, New Mexico
Environmental Restoration Geographic Information System

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

DRAFT
Unclassified
1:120000

0 5000 10000
Scale in Feet

0 1200 2400
Scale in Meters

N

**FIGURE 1-1**
**Location Map for ER Site 150**
**Sandia National Laboratories, New Mexico**

scmorri SNL GIS ORG. 7512 07/03/96 MAPID=960998

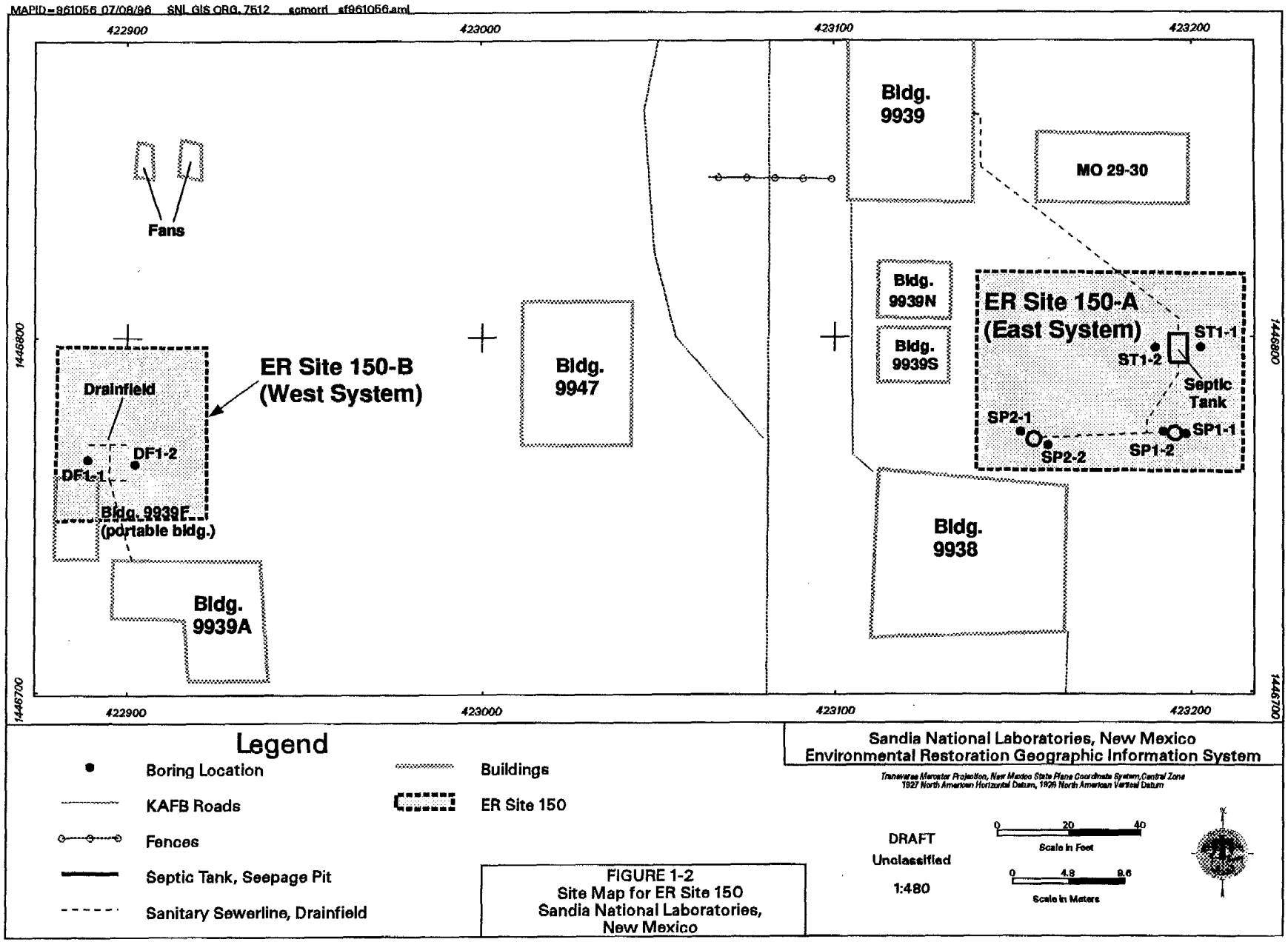



FIGURE 1-2
Site Map for ER Site 150
Sandia National Laboratories,
New Mexico

# 2.0 HISTORY OF THE SWMU

## 2.1 Sources of Supporting Information

In preparing the confirmatory sampling NFA proposal for ER Site 150, 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 the site operational history. The following sources of information, hierarchically listed with respect to degree of importance, were used to evaluate ER Site 150:

- Confirmatory subsurface soil excavation and sampling conducted in October 1994 and January 1995 (SNL/NM October 1994 and January 1995a, b and c);
- Two survey reports, including a geophysical survey (Lamb 1994), and a passive soil gas survey (NERI June 1995 and August 1996);
- Results of samples collected from the septic tank in 1992 (SNL/NM June 1993) and 1994 (SNL/NM May 1994a);
- Approved RFI Work Plan for OU 1295, Septic Tanks and Drainfields (SNL/NM March 1993, November 1994, December 1994, January 1995d, March 1995a, March 1995b, and May 1995; and EPA September 1994, January 1995, and March 1995);
- Photographs and field notes collected at the site by SNL/NM ER staff;
- SNL/NM Facilities Engineering building drawings (SNL/NM June 1971);
- SNL/NM Geographic Information System data; and
- The RCRA Facility Assessment (RFA) report (EPA April 1987).

## 2.2 Previous Audits, Inspections, and Findings

ER Site 150 was first listed as a potential release site in the RFA report to the EPA in 1987 (EPA April 1987). This report contained a generic statement about this and many other SNL/NM septic systems where sanitary and industrial wastes may have been discharged during past operations. This SWMU was included in the RFA report as Site 79, along with 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

The following historical information has been excerpted from several sources, including SNL/NM March 1993, IT March 1994, and SNL/NM November 1994.

Buildings 9939 and 9939A are known as the Evaluation Explosive Facility or the Molten Core Facility. Building 9939 was built in 1967 but remained unoccupied until 1977, when it was used to simulate nuclear meltdown tests. Metals involved in the testing included aluminum, steel, zirconium, and depleted uranium (DU). The possibility of DU surface contamination in the vicinity of Buildings 9939 and 9939A has been investigated as part of the OU 1335 site characterization process (SNL/NM March 1996b). A metallurgic testing laboratory was originally operated in Building 9939, from which laboratory waste such as acids, bases, xylene, hexane, methanol, ethanol, and vacuum pump grease may have been discharged to the septic system. Building 9939 contains floor drains and sinks and a restroom that discharged to a septic tank and two associated seepage pits.

Building 9939A was constructed sometime between 1977 and 1979. Experiments involving the use of molten sodium and DU were performed outside the building. Potential releases from these experiments will be investigated as part of the OU 1335 site characterization process (SNL/NM March 1996b). A water-cooled laser was formerly located in the building, and noncontact cooling water was discharged directly to the floor drains that discharge to the drainfield north of the building. Several years ago, transformers containing polychlorinated biphenyls (PCB) exploded inside the building, but should not have entered the drainage system because the drains were closed (SNL/NM March 1993).

The septic systems is no longer active. Building 9939, as of 1993, is connected to an extension of the City of Albuquerque sanitary sewer system (SNL/NM July 1993). The drainfield serving Building 9939A is no longer used and is not connected to any equipment inside the building.

# 3.0 EVALUATION OF RELEVANT EVIDENCE

## 3.1 Unit Characteristics

There are no safeguards inherent in the drain systems from Buildings 9939 or 9939A or in facility operations that could have prevented past releases to the environment.

## 3.2 Operating Practices

As discussed in Section 2.3, effluent was released to the Building 9939 septic tank and seepage pits, and to the Building 9939A drainfield, when the septic systems were active. Hazardous wastes were not managed or contained at ER Site 150.

## 3.3 Presence or Absence of Visual Evidence

No visible evidence of soil discoloration, staining, or odors indicating residual contamination was observed when soil samples were collected in the drainfield with the Geoprobe™ or around the septic tank and seepage pits with the backhoe in January 1995 (SNL/NM January 1995a, b, and c)

## 3.4 Results of Previous Sampling/Surveys

Sludge and aqueous samples were collected from the ER Site 150 septic tank in June and September 1992. The sampling report indicates that there is a primary and a secondary chamber to the septic tank. Removal of the septage waste in 1996 revealed that the tank consisted of only one chamber instead of two (SNL/NM January 1996a). Therefore, the discussion of this survey presents the results from the two chambers in the original survey as though there were two sets of samples rather than a set of samples each from two different locations. Two sets of aqueous and sludge samples were taken from the septic tank. The aqueous samples were analyzed for volatile organic compounds (VOC), semivolatile organic compounds (SVOC), pesticides, PCBs, total metals, selected radionuclide constituents, and several miscellaneous analytes. Two VOCs were identified in both aqueous samples (trichloroethene [TCE] and 1,2-dichloroethene), and a third VOC (acetone) was identified in one of the samples. One SVOC was identified both samples (4-methylphenol), and a second SVOC (benzoic acid) was identified in one of the samples. No pesticides, cyanide, or PCBs were detected. Phenolic compounds and fluoride were detected in both samples. Oil and grease were detected in one of the samples. Several metals and radionuclides were detected. The sludge samples were analyzed for gross alpha and beta and selected radionuclide constituents. Several radionuclides were detected. The analytical results of these samples are presented in Appendix A.1.

Septic tank sludge samples were collected in May 1994 (SNL/NM May 1994a) for waste characterization purposes and were analyzed for VOCs, SVOCs, Toxicity Characteristic Leaching Procedure (TCLP) RCRA metals, isotopic uranium, and gamma spectroscopy radionuclides. Two VOCs were identified (TCE and 1,2-dichloroethene), and two SVOCs were identified (phenol and 4-methylphenol). Barium was detected in the TCLP RCRA metal analysis; it was also detected in

the laboratory blank. Uranium isotopes were detected in the isotopic uranium analysis. Several radionuclides were identified in the gamma spectroscopy analysis.

Septic tank liquid samples were also collected in May 1994 (SNL/NM May 1994a) for waste characterization purposes. They were analyzed for VOCs, isotopic uranium, and tritium. Two VOCs were identified (TCE and 1,2-dichloroethene). Uranium isotopes were detected in the isotopic uranium analysis, and tritium was also identified. The results from the sampling of the septic tank in May 1994 are presented in Appendix A.2.

A geophysical survey using Geonics™ Model EM-31 and EM-38 ground conductivity meter was performed north of Building 9939A and in the vicinity of the seepage pits and septic tank near Building 9939 in February 1994. An area of high electromagnetic conductivity was found at each of the survey locations. The high area near Building 9939A originally was interpreted to be the location of the drainfield and indicative of shallow and deep septic infiltration at the site. However, this information was not considered to be sufficiently reliable and was not used to determine sample locations; instead, backhoe excavation was used to locate the drainfield lines and determine sample locations. At the other survey location, the area of high electromagnetic conductivity was found trending to the southeast from the eastern seepage pit. It was thought that this could be indicative of a septic leachate plume (Lamb 1994, SNL/NM January 1995a).

A passive soil-gas survey was conducted in the area of the septic tank and seepage pits in May 1994 using PETREX™ sampling tubes to identify any releases of VOCs and SVOCs that may have occurred from the drainfield (SNL/NM May 1994b). A PETREX™ soil-gas survey is a semiquantitative screening procedure that can be used to identify many VOCs and SVOCs, and 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 over a two- to three-week period rather than at one point in time. Each PETREX™ soil-gas sampler consists of two activated charcoal-coated wires housed in a reusable glass test tube container. At each sampling location, sample tubes are buried in an inverted position so that the mouth of the sampler is about 1 foot below grade. Samplers are left in place for a two- to three-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. In NERI's experience, levels below 100,000 ion counts for a single compound (such as perchloroethene [PCE] or TCE) and 200,000 ion counts for mixtures (such as benzene, toluene, ethylbenzene/xylene [BTEX] or aliphatic compounds [C4-C11 cycloalkanes]) under normal site conditions would not represent detectable levels by standard quantitative methods for soils and/or groundwater (NERI June 1995).

Sixteen PETREX™ tube samplers were placed in a grid pattern that covered the area surrounding the septic tank and two seepage pits at this site (SNL/NM May 1994b and NERI August 1996). A map showing the tube sampling locations and the analytical results of the ER Site 150 passive soil-gas survey is presented in Appendix A.3. The soil gas survey detected BTEX and aliphatics at four locations in the grid pattern surrounding the septic tank and seepage pits. Two of the locations (P-1 and P-8) were near one of the concrete pads adjacent

to Building 9939N and 9939S. The other two locations (P-7 and P-15) were within 15 feet of the seepage pits. Subsequent confirmatory soil samples collected immediately adjacent to the septic tank and seepage pits were analyzed for VOCs and SVOCs; no BTEX or aliphatics were detected in the soil samples. No PCE or TCE were found in detectable amounts in the passive soil-gas survey or subsequent soil samples.

## 3.5 Assessment of Gaps in Information

The most recent material in the septic tank was not necessarily representative of all discharges to the unit that occurred since it was put into service in the late 1970s. 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 pits and beneath the drainfield, 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 January 1995 (discussed below) are sufficient to determine whether releases of COCs occurred at the site.

## 3.6 Confirmatory Sampling

Although the likelihood of significant releases of hazardous constituents at ER Site 150 was considered low, confirmatory soil sampling was conducted to determine whether COCs above background or action levels were released via the septic system at this site. In October 1994, a Geoprobe™ was used to try to obtain soil samples near the septic tank and seepage pits (SNL/NM October 1994). See Figure 1-2 for the location of these features. The goal was to start sampling at 8 feet bgs near the septic tank and 9 feet bgs near the seepage pits. The Geoprobe™ met refusal at six different locations ranging from 6.5 to 9 feet bgs, which is the approximate depths at the bottom of these units. One of the boreholes attempted was well removed from the septic tank and seepage pits. Therefore, the refusal problem was not localized to the septic tank and seepage pits. In January 1995, a backhoe was used to determine the cause of the borehole refusal problems at the septic tank and seepage pits (SNL/NM January 1995a). From this backhoe work, it was determined that there was a surface of caliche or cemented conglomerate with rock fragments up to 6 inches in diameter at 7 to 8.5 feet bgs. Because this shallow caliche/cemented conglomerate surface prevented any Geoprobe™ sampling, soil samples near the septic tank and seepage pits were collected with the backhoe (SNL/NM January 1995b). The upper photograph in Figure 3-1 shows the soil sampling operation near the septic tank. The caliche layer prevented sampling any deep intervals near the seepage pits. Shallow interval confirmatory soil samples were collected on either side of the septic tank and on either side of each of the seepage pits on top of the caliche/cemented conglomerate surface. As part of the backhoe work at this site, the configuration of the small drainfield north of Building 9939A was verified (SNL/NM January 1995a). The Geoprobe™ was used to obtain soil samples from two locations in the drainfield, one on the eastern side and the other on the western side. See Figure 1-2 for the sample locations. Soil samples were collected easily from the shallow depth interval of 4 to 8 feet at the eastern location, but four tries were necessary to obtain the sample for the shallow depth interval at the western location. Again, the caliche/cemented conglomerate surface

Collecting soil samples next to the Building 9939 septic tank with the backhoe, January 12, 1995. The two seepage pits are also shown. View looking northeast.

Building 9939 septic tank septage removal and cleaning operation, January 3, 1996. View looking southeast.

Figure 3-1. ER Site 150 Photographs

prevented deep interval soil sampling in the drainfield. With the exception of the lack of deep soil interval samples 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) RFI Work Plan (SNL/NM March 1993) and addenda to the RFI Work Plan developed during the OU 1295 project approval process (SNL/NM March 1993, November 1994, December 1994, January 1995d, March 1995a, March 1995b, and May 1995; and EPA September 1994, January 1995, and March 1995). 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 3-1.

As discussed as the beginning of this section, because of the shallow caliche/cemented conglomerate surface and sampling problems related to it, soil samples near the seepage pit and septic tank were collected from immediately above the caliche/cemented conglomerate surface in the bucket of a backhoe. The subsurface soil samples in the drainfield were collected using the Geoprobe™ sampling system. The Geoprobe™ sampling tool was fitted with a butyl acetate (BA) sampling sleeve and was then 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, additional 2-foot sampling runs were completed 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.

Soil samples from the seepage pits, drainfield, and septic tank were analyzed for VOCs, SVOCs, soil pH, RCRA metals, and isotopic uranium. The drainfield samples were also analyzed for PCBs. Also, to determine if radionuclides were released from past activities at this site, composite soil samples were collected from the drainfield and each of the seepage pits. The samples were analyzed by a commercial laboratory for tritium and were screened for other radionuclides using SNL/NM in-house gamma spectroscopy. Samples were shipped to the off-site commercial laboratories by an overnight delivery service. Routine SNL/NM chain-of-custody and sample documentation procedures were employed for all samples collected at this site.

Quality assurance/quality control samples collected during this effort consisted of one set of duplicate soil samples from the shallow sampling interval in DF-1 (Figure 1-2) that were analyzed for VOCs, SVOCs, PCBs, RCRA metals, and isotopic uranium. A trip blank for each

## Table 3-1
## ER Site 150: Confirmatory Sampling Summary Table

| Sampling Location | Analytical Parameters | Number of Borehole or Sample Locations | Top of Sampling Interval at Each Boring or Sample Location | Total Number of Investigative Samples | Total Number of Duplicate Samples | Date(s) Samples Collected |
|---|---|---|---|---|---|---|
| Drainfield | VOCs | 2 | 4' | 2 | 1 | 1/25/95 |
| | SVOCs | 2 | 4' | 2 | 1 | |
| | PCBs | 2 | 4' | 2 | 1 | |
| | Soil pH | 2 | 4' | 2 | | |
| | PCBs | 2 | 4' | 2 | 1 | |
| | RCRA metals | 2 | 4' | 2 | 1 | |
| | Gamma spec. composite | 2 | 4' | 1 | | |
| | Isotopic uranium | 2 | 4' | 2 | 1 | |
| | Tritium composite | 2 | 4' | 1 | | |
| | | | | | | |
| Septic tank | VOCs | 2 | 8' | 2 | | 1/12/95 |
| | SVOCs | 2 | 8' | 2 | | |
| | Soil pH | 2 | 8' | 2 | | |
| | RCRA metals | 2 | 8' | 2 | | |
| | Isotopic uranium composite | 2 | 8' | 1 | | |
| | | | | | | |
| Eastern seepage pit | VOCs | 2 | 8' | 2 | | 1/12/95 |
| | SVOCs | 2 | 8' | 2 | | |
| | Soil pH | 2 | 8' | 2 | | |
| | RCRA metals | 2 | 8' | 2 | | |
| | Gamma spec. composite | 2 | 8' | 1 | | |
| | Isotopic uranium | 2 | 8' | 2 | | |
| | Tritium composite | 2 | 8' | 1 | | |
| | | | | | | |
| Western seepage pit | VOCs | 2 | 8' | 2 | | 1/12/95 |
| | SVOCs | 2 | 8' | 2 | | |
| | Soil pH | 2 | 8' | 2 | | |
| | RCRA metals | 2 | 8' | 2 | | |
| | Gamma spec. composite | 2 | 8' | 1 | | |
| | Isotopic uranium | 2 | 8' | 2 | | |
| | Tritium composite | 2 | 8' | 1 | | |

Notes
PCB = polychlorinated biphenyls
RCRA = Resource Conservation and Recovery Act
Spec. = Spectroscopy
SVOCs = Semivolatile organic compounds
VOCs = Volatile organic compounds

set of soil samples shipped to the laboratory was analyzed for VOCs only. Several common VOC laboratory contaminants were detected in the trip blanks—acetone, 2-hexanone, methyl ethyl ketone (MEK), methyl isobutyl ketone, methylene chloride, toluene, and xylenes. These common laboratory contaminants were either not detected or were found in lower concentrations in the soil characterization samples. Soil used for the trip blanks was prepared by heating the material and then transferring it immediately to the sample container. This heating process drives off any residual organic compounds (if present) and soil moisture that may be contained in the material. It is thought that 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 slightly contaminated.

Summaries of all constituents detected by commercial laboratory analyses for the confirmatory soil samples are presented in Tables 3-2, 3-3, and 3-4. Results of the SNL/NM in-house gamma spectroscopy composite soil sample screening for other radionuclides are presented in Appendices A.4 through A.6. Complete soil sample analytical data packages are archived in the SNL/NM Environmental Operations Records Center and are readily available for review and verification (SNL/NM January 1995e).

## 3.7 Rationale for Pursuing a Confirmatory Sampling NFA Decision

As discussed in Section 3.4, the passive soil-gas survey identified some areas with VOC anomalies in the vicinity of the seepage pits and septic tank, but subsequent soil sampling did not confirm the existence of detectable concentrations of these compounds in soils beneath and around these units.

Confirmatory soil sampling around the septic tank and seepage pits and in the drainfield did not identify any residual COCs indicating past discharges that could pose a threat to human health or the environment. As shown in Table 3-2, only below-reporting-limit concentrations of four VOCs (acetone, MEK, methylene chloride and toluene) that are common laboratory contaminants were detected in soil samples collected from this site. SVOCs and PCBs were not detected. The soil pH values ranged from 5.98 to 8.17.

As shown in Table 3-3, the analytical results of the soil samples from the septic tank, seepage pits, and drainfield indicate that all of the eight metals that were targeted in the Site 150 investigation were either (1) not detected, or (2) were detected in concentrations below the background UTL or 95th percentile concentrations presented in the SNL/NM study of naturally-occurring constituents (IT March 1996).

As shown in Table 3-4, the results of the isotopic uranium analysis were all below the 95th percentile background activity levels. Tritium was not detected in soil moisture from the composite samples collected near the seepage pits (Table 3-4). However, tritium was detected in soil moisture from the drainfield composite sample at an activity level of 260 picocuries per liter (pCi/L). Background tritium activity levels for SNL/NM soils were not reported in the IT background report (IT March 1996). The soil moisture contained in soil samples such as these represents either infiltrated precipitation or water discharged from Building 9939A to the drainfield. It is therefore appropriate to compare the tritium activity level detected in the sample

Table 3-2

ER Site 150
Summary of Organic Constituents and pH Measurements in Confirmatory Soil Samples
Collected Around the Septic Tank and Seepage Pits, and in the Drainfield

| Sample Number | Sample Matrix | Sample Type | Sample Date | Sample Location (Figure 2) | Top of Sample Interval (fbgs) | VOCs Method 8240 | | | | | | | SVOCs Method 8270 | PCBs Method 8080 | Units | Soil pH ASTM Method 4972 (pH units) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Acetone | 2-Hexa-none | MEK | MIBK | Meth. Chloride | Toluene | Total Xylenes | | | | |
| Septic Tank Soil Samples: | | | | | | | | | | | | | | | | |
| 018915-1,2 | Soil | Field | 1/12/95 | ST-1 | 8 | ND | ND | ND | ND | 2.4 B,J | 1.5 J | ND | ND | NS | ug/kg | 5.98 |
| 018916-1,2 | Soil | Field | 1/12/95 | ST-2 | 8 | ND | ND | ND | ND | 2.7 B,J | ND | ND | ND | NS | ug/kg | 7.19 |
| | | | | | | | | | | | | | | | | |
| East Seepage Pit Soil Samples: | | | | | | | | | | | | | | | | |
| 018917-1,2 | Soil | Field | 1/12/95 | SP1-1 | 8 | ND | ND | ND | ND | 2.1 B,J | ND | ND | ND | NS | ug/kg | 7.61 |
| 018918-1,2 | Soil | Field | 1/12/95 | SP1-2 | 8 | ND | ND | ND | ND | 2.3 B,J | ND | ND | ND | NS | ug/kg | 7.73 |
| | | | | | | | | | | | | | | | | |
| West Seepage Pit Soil and QA Samples: | | | | | | | | | | | | | | | | |
| 018919-1,2 | Soil | Field | 1/12/95 | SP2-1 | 8 | ND | ND | ND | ND | 2.8 B,J | ND | ND | ND | NS | ug/kg | 7.63 |
| 018920-1,2 | Soil | Field | 1/12/95 | SP2-2 | 8 | 1.1 J | ND | ND | ND | 2.6 B,J | ND | ND | ND | NS | ug/kg | 8.17 |
| 021455-1 | Soil | TB | 1/13/95 | Site 150 | NA | 24 | ND | 12 | ND | 4.9 B,J | 2.4 J | ND | NS | NS | ug/kg | NS |
| | | | | | | | | | | | | | | | | |
| Drainfield Soil and QA Samples: | | | | | | | | | | | | | | | | |
| 018942-1,2 | Soil | Field | 1/25/95 | DF-1 | 4 | 5.6 J | ND | 3.9 J | ND | 1.5 B,J | ND | ND | ND | ND | ug/kg | 7.6 |
| 018943-1,2 | Soil | Dupl. | 1/25/95 | DFD-1 | 4 | ND | ND | ND | ND | 1.6 B,J | ND | ND | ND | ND | ug/kg | NS |
| 018944-1,2 | Soil | Field | 1/25/95 | DF-2 | 4 | 8.4 J | ND | ND | ND | 1.6 B,J | ND | ND | ND | ND | ug/kg | 7.7 |
| 021636-1 | Soil | TB | 1/25/95 | Site 150 | NA | 96 | 3.6 J | 44 | 3.1 J | 3.6 B,J | ND | 1.3 J | NS | NS | ug/kg | NS |
| Laboratory Reporting Limit for Soil | | | | | | 10 | 10 | 10 | 10 | 5 | 5 | 5 | 330 or 1,600 | 33 | ug/kg | |
| | | | | | | | | | | | | | | | | |
| Proposed Subpart S Action Level For Soil | | | | | | 8E+06 | None | 5E+07 | 4E+06 | 9E+04 | 2E+07 | 2E+08 | NA | 9E+01 | ug/kg | |

Notes:

Note: no deep interval samples collected around the seepage pits or drainfield due to Geoprobe refusal at approximately 9 feet below the ground surface.

B = Compound detected in associated blank sample
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
MIBK = Methyl isobutyl ketone, or 4-Methyl-2-pentanone
NA = Not applicable
ND = Not detected
NS = No sample collected
PCBs = Polychlorinated biphenyls
QA = Quality assurance
SVOCs = Semivolatile organic compounds
TB = Trip blank
ug/kg = Micrograms per kilogram
VOCs = Volatile organic compounds

Table 3-3

ER Site 150
Summary of RCRA Metals in Confirmatory Soil Samples
Collected Around the Septic Tank and Seepage Pits, and in the Drainfield

| Sample Number | Sample Matrix | Sample Type | Sample Date | Sample Location (Figure 2) | Top of Sample Interval (fbgs) | RCRA Metals, Methods 6010 and 7471 | | | | | | | | Units |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | As | Ba | Cd | Cr, total | Pb | Hg | Se | Ag | |
| Septic Tank Soil Samples: | | | | | | | | | | | | | | |
| 018915-2 | Soil | Field | 1/12/95 | ST-1 | 8 | 4.9 | 59.2 | ND | 5 | 3.6 J | ND | ND | ND | mg/kg |
| 018916-2 | Soil | Field | 1/12/95 | ST-2 | 8 | 4.7 | 17.4 | ND | 4.4 | ND | ND | ND | ND | mg/kg |
| | | | | | | | | | | | | | | |
| East Seepage Pit Soil Samples: | | | | | | | | | | | | | | |
| 018917-2 | Soil | Field | 1/12/95 | SP1-1 | 8 | 3 | 37.9 | ND | ND | ND | ND | ND | ND | mg/kg |
| 018918-2 | Soil | Field | 1/12/95 | SP1-2 | 8 | 4.9 | 49.2 | ND | 3.4 | ND | ND | ND | ND | mg/kg |
| | | | | | | | | | | | | | | |
| West Seepage Pit Soil Samples: | | | | | | | | | | | | | | |
| 018919-2 | Soil | Field | 1/12/95 | SP2-1 | 8 | 3.8 | 103 | ND | 4.7 | ND | ND | ND | ND | mg/kg |
| 018920-2 | Soil | Field | 1/12/95 | SP2-2 | 8 | 2.8 | 62.1 | ND | 3 | ND | ND | ND | ND | mg/kg |
| | | | | | | | | | | | | | | |
| Drainfield Soil Samples: | | | | | | | | | | | | | | |
| 018942-2 | Soil | Field | 1/25/95 | DF-1 | 4 | 3 | 60.4 | ND | 5.4 | 6.9 | ND | ND | ND | mg/kg |
| 018943-2 | Soil | Dupl. | 1/25/95 | DFD-1 | 4 | 4.2 | 76.7 | ND | 4 | 5.6 | ND | ND | ND | mg/kg |
| 018944-2 | Soil | Field | 1/25/95 | DF-2 | 4 | 2.6 | 38.6 | ND | 3.4 | 5 | ND | ND | ND | mg/kg |
| Laboratory Reporting Limit for Soil | | | | | | 1 | 1 | 0.5 | 1 | 5 | 0.1 | 0.5 | 1 | mg/kg |
| | | | | | | | | | | | | | | |
| Number of SNL/NM Background Soil Sample Analyses * | | | | | | 15 | 727 | 1,740 | 647 | 536 | 1,724 | 2,134 | 2,302 | NA |
| SNL/NM Soil Background Range * | | | | | | 2.1-7.9 | 0.5-495 | 0.0027-6.2 | 0.5-31.4 | 0.75-103 | 0.0001-0.68 | 0.037-17.2 | 0.0016-8.7 | mg/kg |
| SNL/NM Soil Background UTL or 95th Percentile * | | | | | | 7 | 214 | 0.9 | 15.9 | 11.8 | <0.1 | <1.0 | <1.0 | mg/kg |
| Proposed Subpart S Action Level For Soil | | | | | | 0.50 | 6,000 | 80 | 80,000 ** | 400 *** | 20 | 400 | 400 | mg/kg |

Note: no deep interval samples collected around the seepage pits or drainfield due to Geoprobe refusal at approximately 9 feet below the ground surface.

Table 3-3, concluded:

ER Site 150
Summary of RCRA Metals in Confirmatory Soil Samples
Collected Around the Septic Tank and Seepage Pits, and in the Drainfield

Notes:

As = Arsenic. Arsenic background concentrations presented above are based on analyses of subsurface soil samples collected in the Coyote Test Field (CTF) area.
Ba = Barium. Barium background concentrations presented above are based on analyses of subsurface soil samples collected in the southwest and CTF areas.
Cd = Cadmium. Cadmium background concentrations presented above are based on analyses of subsurface soil samples collected in the North, Tijeras, Southwest, CTF, and Offsite areas.
Cr = Chromium. Chromium background concentrations presented above are based on analyses of subsurface soil samples collected in the Southwest area.
Pb = Lead. Lead background concentrations presented above are based on analyses of subsurface samples collected in the Southwest and Offsite areas.
Hg = Mercury. Mercury background concentrations presented above are based on analyses of subsurface soil samples collected in the North, Tijeras, Southwest, CTF and Offsite areas.
Se = Selenium. Selenium background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the North, Tijeras, Southwest, CTF and Offsite areas.
Ag = Silver. Silver background concentrations presented above are based on analyses of subsurface soil samples collected in the North, Tijeras, Southwest, CTF, and Offsite areas.

Dupl. = Duplicate soil sample
fbgs = Feet below ground surface
J = Result is detected below the reporting limit or is an estimated concentration.
mg/kg = Milligrams per kilogram
NA = Not applicable
ND = Not detected
UTL = Upper Tolerance Limit
* IT March 1996
** 80,000 mg/kg is for $Cr^{3+}$ only. For $Cr^{6+}$, proposed Subpart S action level is 400 mg/kg.
*** No proposed Subpart S action level for lead in soil, 400 ppm is EPA proposed residential scenario action level (EPA July 1994)

Table 3-4

ER Site 150
Summary of Isotopic Uranium and Tritium in Confirmatory Soil Samples
Collected Around the Septic Tank and Seepage Pits, and in the Drainfield

| Sample Number | Sample Matrix | Sample Type | Sample Date | Sample Location (Figure 2) | Top of Sample Interval (fbgs) | Isotopic Uranium Method HASL-300 (pCi/g) U-233/ U-234 Result | U-233/ U-234 Error * | U-233/ U-234 M.D.A. | U-235 Result | U-235 Error * | U-235 M.D.A. | U-238 Result | U-238 Error * | U-238 M.D.A. | Tritium Method EPA-600 906.0 (pCi/L) Result | Error * | M.D.A. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Septic Tank Soil Sample: | | | | | | | | | | | | | | | | | |
| 018915-5 | Soil | Composite | 1/12/95 | ST-1/2 | 8 | 1.6 | 0.25 | 0.041 | 0.032 | 0.027 | 0.032 | 1.1 | 0.19 | 0.047 | | | |
| East Seepage Pit Soil Samples: | | | | | | | | | | | | | | | | | |
| 018917-5 | Soil | Field | 1/12/95 | SP1-1 | 8 | 1.1 | 0.18 | 0.041 | 0.047 | 0.031 | 0.03 | 0.8 | 0.14 | 0.011 | | | |
| 018918-5 | Soil | Field | 1/12/95 | SP1-2 | 8 | 1.3 | 0.21 | 0.069 | ND | 0.034 | 0.055 | 0.97 | 0.17 | 0.052 | | | |
| 018917-3 | Soil | Composite | 1/12/95 | SP1-1/2 | 8 | | | | | | | | | | ND | 150 | 260 |
| West Seepage Pit Soil Samples: | | | | | | | | | | | | | | | | | |
| 018919-5 | Soil | Field | 1/12/95 | SP2-1 | 8 | 1.3 | 0.22 | 0.031 | ND | 0.024 | 0.031 | 1 | 0.18 | 0.031 | | | |
| 018920-5 | Soil | Field | 1/12/95 | SP2-2 | 8 | 1.6 | 0.24 | 0.041 | 0.077 | 0.04 | 0.039 | 1.1 | 0.18 | 0.052 | | | |
| 018919-3 | Soil | Composite | 1/12/95 | SP2-1/2 | 8 | | | | | | | | | | ND | 150 | 250 |
| Drainfield Soil Samples: | | | | | | | | | | | | | | | | | |
| 018942-5 | Soil | Field | 1/25/95 | DF-1 | 4 | 1.2 | 0.2 | 0.012 | 0.049 | 0.032 | 0.031 | 0.95 | 0.16 | 0.026 | | | |
| 018943-5 | Soil | Duplicate | 1/25/95 | DFD-1 | 4 | 1.2 | 0.19 | 0.044 | ND | 0.022 | 0.036 | 0.91 | 0.15 | 0.011 | | | |
| 018944-5 | Soil | Field | 1/25/95 | DF-2 | 4 | 0.86 | 0.15 | 0.035 | ND | 0.02 | 0.026 | 0.76 | 0.14 | 0.035 | | | |
| 018942-3 | Soil | Composite | 1/25/95 | DF-1/2 | 4 | | | | | | | | | | 260 | 150 | 230 |
| Number of SNL/NM Background Soil Sample Analyses ** | | | | | | 14 | | | 283 | | | 90 | | | U | | |
| SNL/NM Soil Background Range ** | | | | | | 0.44-<5.02 | | | 0.004-3 | | | 0.153-2.3 | | | U | | |
| SNL/NM Soil Background 95th Percentile ** | | | | | | <5.02 | | | 0.16 | | | 1.4 | | | U | | |
| Nationwide Tritium Range in Precipation and Drinking Water *** | | | | | | NA | | | NA | | | NA | | | 100-400 | | |

Note: no deep interval samples collected around the seepage pits or drainfield due to Geoprobe refusal at approximately 9 feet below the ground surface.

Table 3-4, concluded
ER Site 150
Summary of Isotopic Uranium and Tritium in Confirmatory Soil Samples
Collected Around the Septic Tank and Seepage Pits, and in the Drainfield

Notes:

U-233 = Uranium 233

U-234 = Uranium 234. Uranium 233/234 background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the Southwest area.

U-235 = Uranium 235. Uranium 235 background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the Southwest area.

U-238 = Uranium 238. Uranium 235 background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the Southwest area.

fbgs = Feet below ground surface

M.D.A. = Minimum detectable activity

ND = Not detected

pCi/g = Picocuries per gram

pCi/L = Picocuries per liter

U = Undefined for SNL/NM soils

UTL = Upper Tolerance Limit

* Error = +- 2 sigma uncertainty

** IT March 1996

*** EPA October 1993

soil moisture to naturally-occurring tritium levels found in precipitation or drinking water samples. The tritium activity level of 260 pCi/L detected in the drainfield sample was therefore compared to and found to be within the naturally occurring tritium activity range of 100 to 300 pCi/L found in precipitation samples collected from locations throughout the U.S., and 100 to 400 pCi/L in drinking water samples collected from locations around the country (EPA October 1993). This comparison indicates that tritium is not present above natural background levels in soil moisture beneath the drainfield at this site.

The gamma spectroscopy semiqualitative screening of composite samples from the drainfield shallow and deep sampling intervals did not indicate significant concentrations of other radionuclides in soils at this site (Appendices A.4 through A.6).

Although it was not possible to obtain any deep soil samples at ER Site 150 to confirm that no COCs existed at depth, it is highly unlikely that any COCs will travel far through the many low-permeability rock layers (including the near-surface caliche or cemented conglomerate and the underlying Abo Formation silty claystones and claystone) underlying this site.

Finally, the ER Site 150 septic tank contents were removed, and the tank was cleaned in January 1996 (SNL/NM January 1996a). This activity is displayed in the lower photograph of Figure 3-1. The tank was then inspected by a representative of the New Mexico Environment Department to verify that the tank contents had been removed, and the tank was closed in accordance with applicable State of New Mexico regulations (SNL/NM January 1996b).

# 4.0 CONCLUSION

Sample analytical results generated from this confirmatory sampling investigation have shown that detectable or significant concentrations of COCs are not present in soils at ER Site 150, and that additional investigations are unwarranted and unnecessary. Based on archival information and chemical and radiological analytical results of soil samples collected next to the septic tank and in the drainfield, SNL/NM has demonstrated that any contaminants present at this site pose an acceptable level of risk under current and projected future land use (Criterion 5 of Section 1.2). Therefore, ER Site 150 is recommended for an NFA determination.

Ecological risk has not been specifically addressed in this NFA. However, the RCRA metals, isotopic uranium, and tritium were either not detected or were detected in concentrations less than SNL/NM or other background concentrations. Also only trace levels of a few VOCs were identified, and these levels are probably the result of laboratory contamination. This information indicates that there is an acceptable level of ecological risk present at this site, and no further assessment of ecological risk is planned for ER Site 150.

# 5.0 REFERENCES

## 5.1 ER Site 150 References

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# Appendix A

## OU 1295, Site 150
## Results of Previous Sampling and Surveys

# Appendix A.1

ER Site 150
Summary of Constituents in the 1992 Septic Tank Samples

# Appendix A.1

## ER Site 150
## Summary of Constituents in the 1992 Septic Tank Samples

**Results of Septic Tank Analyses**
(LIQUID SAMPLES)

| | |
|---|---|
| **Building No./Area:** | 9939 CTF |
| **Tank ID No.:** | AD89042R (Primary Chamber) |
| **Date Sampled:** | 6/10/92 |
| **Sample ID No.:** | SNLA-009412 |

| Analytical Parameter | Measured Concentration | State Discharge Limit | COA Discharge Limit | Comments |
|---|---|---|---|---|
| *Volatile Organics (EPA 624)* | (mg/l) | (mg/l) | (mg/l) | |
| 1,2 -Dichloroethene (total) | 15 | NR | NR | |
| Trichloroethene | 83 | 0.1 | (TTO=5.0) | Exceeds State and COA Limits ; Exceeds RCRA TC limit of 0.5 mg/L |
| | | | | |
| *Semivolatile Organics (EPA 625)* | (mg/l) | (mg/l) | (mg/l) | |
| 4-Methylphenol | 0.26 | 0.005 | (TTO=5.0) | Exceeds State Limit |
| | | | | |
| *Pesticides (EPA 608)* | (mg/l) | (mg/l) | (mg/l) | |
| None detected above laboratory | | NR | (TTO=5.0) | |
| reporting limits. | | | | |
| *PCBs (EPA 608)* | (mg/l) | (mg/l) | (mg/l) | |
| None detected above laboratory | | 0.001 | (TTO=5.0) | |
| reporting limits. | | | | |
| *Metals* | (mg/l) | (mg/l) | (mg/l) | |
| Arsenic | 0.0057 | 0.1 | 2.0 | |
| Barium | 4.0 | 1.0 | 20.0 | Exceeds State Limit |
| Cadmium | 0.012 | 0.01 | 2.8 | Exceeds State Limit |
| Chromium | 0.016 | 0.05 | 20.0 | |
| Copper | 0.27 | 1.0 | 16.5 | |
| Lead | 0.038 | 0.05 | 3.2 | |
| Manganese | 0.33 | 0.20 | 20.0 | Exceeds State Limit |
| Mercury | ND (0.00020) | 0.002 | 0.1 | |
| Nickel | 0.061 | NR | 12.0 | |
| Selenium | 0.0051 | 0.05 | 2.0 | |
| Silver | ND (0.010) | 0.05 | 5.0 | |
| Thallium | --- | NR | NR | Not analyzed |
| Zinc | 2.2 | 10.0 | 28.0 | |
| Uranium | --- | 5.0 | NR | Not analyzed |
| *Miscellaneous Analytes* | (mg/l) | (mg/l) | (mg/l) | |
| Phenolic Compounds | 0.44 | 0.005 | 4.0 | Exceeds State Limit |
| Nitrates/Nitrites | ND (0.20) | 10.0 | NR | |
| Formaldehyde | ND (0.20) | NR | 260.0 | |
| Fluoride | 0.41 | 1.6 | 180.0 | |
| Cyanide | ND (0.010) | 0.2 | 8.0 | |
| Oil and Grease | ND (5.0) | NR | 150.0 | |
| *Radiological Analyses* | (pCi/l) | (pCi/l) | (pCi/l) | |
| Radium 226 | < 45 | 30.0 | NR | |
| Radium 228 | <8.6 | 30.0 | NR | |
| Gross Alpha | -4 +/- 19 | NR | NR | |
| Gross Beta | 71 +/- 62 | NR | NR | |
| Tritium | -340 +/- 580 | NR | NR | |

NR = Not Regulated; ND(#.#) = Not Detected (Reporting Limit); TC = Toxicity Characteristic of Hazardous Waste

Note: City and State Discharge Limits are for comparison purposes only. City limits apply to discharge of sanitary effluent and not septic tank waste, state limits apply to effluent discharged onto or below the surface of the ground.

References - City of Albuquerque NM Sewer Use and Wastewater Control Ordinance (1990), Section 8-9-3, and New Mexico Water Quality Control Commission Regulations (1988), Section 3-100.

## Appendix A.1, continued

ER Site 150
Summary of Constituents in the 1992 Septic Tank Samples

| Results of Septic Tank Analyses (Sludge Sample) | | | |
|---|---|---|---|
| **Building No./Area:** | **9939 PRIMARY TANK CTF** | | |
| **Tank ID No.:** | **AD89042R** | | |
| **Date Sampled:** | **9/30/92** | | |
| **Sample ID No.:** | **SNLA009412** | | |
| **Analytical Parameter** | **Measured Concentration** | **± 2 Sigma Uncertainty** | **Units** |
| Gross Alpha | 2E+01 | 2E+01 | pCi/g |
| Gross Beta | 1E+02 | 3E+01 | pCi/g |
| Gross Alpha | 1E+01 | 2E+01 | pCi/g |
| Gross Beta | 1.3E+02 | 3E+01 | pCi/g |
| Gross Alpha | 1E+01 | 2E+01 | pCi/g |
| Gross Beta | 1.1E+02 | 3E+01 | pCi/g |
| Gross Alpha | 2E+01 | 2E+01 | pCi/g |
| Gross Beta | 9E+01 | 3E+01 | pCi/g |
| Tritium | -3E+02 | 3E+02 | pCi/L |
| Bismuth-214 | 0.172 (0.2) | 0.0139 (0.1) | pCi/mL |
| Cesium-137 | <0.0160 (<0.0175) | NA | pCi/mL |
| Potassium-40 | 0.343 (<0.298) | 0.0958 | pCi/mL |
| Lead-212 | 0.0390 (<0.0200) | 0.0710 | pCi/mL |
| Lead-214 | 0.159 (0.2) | 0.0139 (0.2) | pCi/mL |
| Radium-226 | 3.84 (<0.310) | 0.191 | pCi/mL |
| Thorium-234 | 0.154 (15) | 0.453 (4) | pCi/mL |
| Thallium-208 | <0.0136 (<0.0159) | NA | pCi/mL |

ND = Not Detected
NA = Not Applicable
Note: Values in parenthesis are measurements reported by Enseco/RMAL in pCi/g (wet weight).

# ER Site 150
## Summary of Constituents in the 1992 Septic Tank Samples

**Results of Septic Tank Analyses**
(LIQUID SAMPLES)

| | |
|---|---|
| **Building No./Area:** | 9939 CTF |
| **Tank ID No.:** | AD 89042R (Secondary) |
| **Date Sampled:** | 6/10/92 |
| **Sample ID No.:** | SNLA-009413 |

| Analytical Parameter | Measured Concentration | State Discharge Limit | COA Discharge Limit | Comments |
|---|---|---|---|---|
| *Volatile Organics (EPA 624)* | (mg/l) | (mg/l) | (mg/l) | |
| Acetone | 0.98 | NR | NR | |
| 1,2-Dichloroethene | 0.88 | NR | NR | |
| Trichloroethene | 0.75 | 0.1 | (TTO=5.0) | Exceeds State Limit; Exceeds RCRA TC limit of 0.5 mg/L |
| *Semivolatile Organics (EPA 625)* | (mg/l) | (mg/l) | (mg/l) | |
| Benzoic acid | 0.23 | NR | (TTO=5.0) | |
| 4-Methyl phenol | 0.12 | 0.005 | (TTO=5.0) | Exceeds State Limit |
| *Pesticides (EPA 608)* | (mg/l) | (mg/l) | (mg/l) | |
| None detected above laboratory | | NR | (TTO=5.0) | |
| reporting limits | | | | |
| *PCBs (EPA 608)* | (mg/l) | (mg/l) | (mg/l) | |
| None detected above laboratory | | 0.001 | (TTO=5.0) | |
| reporting limits | | | | |
| | | | | |
| *Metals* | (mg/l) | (mg/l) | (mg/l) | |
| Arsenic | ND (0.0050) | 0.1 | 2.0 | |
| Barium | 0.11 | 1.0 | 20.0 | |
| Cadmium | ND (0.0050) | 0.01 | 2.8 | |
| Chromium | ND (0.010) | 0.05 | 20.0 | |
| Copper | 0.061 | 1.0 | 16.5 | |
| Lead | 0.014 | 0.05 | 3.2 | |
| Manganese | 0.12 | 0.20 | 20.0 | |
| Mercury | ND (0.00020) | 0.002 | 0.1 | |
| Nickel | ND (0.040) | NR | 12.0 | |
| Selenium | ND (0.0050) | 0.05 | 2.0 | |
| Silver | ND (0.010) | 0.05 | 5.0 | |
| Thallium | --- | NR | NR | Not analyzed |
| Zinc | 0.48 | 10.0 | 26.0 | |
| Uranium | --- | 5.0 | NR | Not analyzed |
| *Miscellaneous Analytes* | (mg/l) | (mg/l) | (mg/l) | |
| Phenolic Compounds | 0.049 | 0.005 | 4.0 | Exceeds State Limit |
| Nitrates/Nitrites | ND (0.10) | 10.0 | NR | |
| Formaldehyde | ND (0.50) | NR | 260.0 | |
| Fluoride | 0.51 | 1.6 | 180.0 | |
| Cyanide | ND (0.010) | 0.2 | 8.0 | |
| Oil and Grease | 11.6 | NR | 150.0 | |
| *Radiological Analyses* | (pCi/l) | (pCi/l) | (pCi/l) | |
| Radium 226 | <48 | 30.0 | NR | |
| Radium 228 | <9.5 | 30.0 | NR | |
| Gross Alpha | -5 +/- 20 | NR | NR | |
| Gross Beta | 94 +/- 60 | NR | NR | |
| Tritium | 270 +/- 600 | NR | NR | |

NR = Not Regulated; ND(#.#) = Not Detected (Reporting Limit); TC = Toxicity Characteristic of Hazardous Waste
Note: City and State Discharge Limits are for comparison purposes only. City limits apply to discharge of sanitary effluent and not septic tank waste, state limits apply to effluent discharged onto or below the surface of the ground.
References - City of Albuquerque NM Sewer Use and Wastewater Control Ordinance (1990), Section 8-9-3 and New Mexico Water Quality Control Commission Regulations (1988), Section 3-100.

## Appendix A.2

ER Site 150
Summary of Constituents in the 1994 Septic Tank Samples

Appendix A.2

ER Site 150
Summary of Constituents in the 1994 Septic Tank Samples

| Sample Number | Sample Matrix | Sample Type | Sample Date | Method | Compound Name | Result | Detection Limit or M.D.A | +- 2 Sigma Uncertainty | Units |
|---|---|---|---|---|---|---|---|---|---|
| 015460-1 | Liquid | Field | 5/5/94 | 8240 (VOCs) | 1,2-Dichloroethene | 370 | 12 | NA | ug/L |
| | | | | 8240 (VOCs) | Trichloroethene | 3.3 J | 12 | NA | ug/L |
| | | | | | | | | | |
| 015460-2 | Sludge | Field | 5/5/94 | 8240 (VOCs) | 1,2-Dichloroethene | 350 | 100 | NA | mg/kg |
| | | | | 8240 (VOCs) | Trichloroethene | 2,200 | 100 | NA | mg/kg |
| | | | | | | | | | |
| 015460-4 | Sludge | Field | 5/5/94 | 8270 (SVOCs) | Phenol | 3.1 J | 6.6 | NA | mg/kg |
| | | | | 8270 (SVOCs) | 4-Methylphenol | 62 | 6.6 | NA | mg/kg |
| | | | | | | | | | |
| 015460-3 | Sludge | Field | 5/5/94 | TCLP/6010 | Arsenic | ND | 0.2 | NA | mg/L |
| | | | | TCLP/6010 | Barium | 0.99 B | 0.02 | NA | mg/L |
| | | | | TCLP/6010 | Cadmium | ND | 0.01 | NA | mg/L |
| | | | | TCLP/6010 | Chromium | ND | 0.02 | NA | mg/L |
| | | | | TCLP/6010 | Lead | ND | 0.1 | NA | mg/L |
| | | | | TCLP/7470 | Mercury | ND | 0.0002 | NA | mg/L |
| | | | | TCLP/6010 | Selenium | ND | 0.4 | NA | mg/L |
| | | | | TCLP/6010 | Silver | ND | 0.02 | NA | mg/L |
| | | | | | | | | | |
| 015460-9 | Sludge | Field | 5/5/94 | | *Uranium series:* | | | | |
| | | | | Gamma Spec. | Uranium 238 | 6.56 | NR | 0.548 | pCi/g |
| | | | | Gamma Spec. | Thorium 234 | 6.57 | NR | 0.549 | pCi/g |
| | | | | Gamma Spec. | Radium 226 | 1.59 | NR | 0.434 | pCi/g |
| | | | | | *Other radionuclides:* | | | | |
| | | | | Gamma Spec. | Potassium 40 | 0.77 | NR | 0.231 | pCi/g |
| | | | | | | | | | |
| 015460-7 | Sludge | Field | 5/5/94 | U-07W | Uranium 238 | 28 | 0.024 | 3.2 | pCi/g |
| | | | | U-07W | Uranium 235 | 0.34 | 0.009 | 0.076 | pCi/g |
| | | | | U-07W | Uranium 233/234 | 5 B | 0.027 | 0.61 | pCi/g |
| | | | | | | | | | |
| 015460-6 | Liquid | Field | 5/5/94 | U-07W | Uranium 238 | 0.64 B | 0.028 | 0.17 | pCi/L |
| | | | | U-07W | Uranium 235 | ND | 0.063 | 0.042 | pCi/L |
| | | | | U-07W | Uranium 233/234 | 1.1 | 0.086 | 0.24 | pCi/L |
| | | | | | | | | | |
| 015460-5 | Liquid | Field | 5/5/94 | H-05-W | Tritium | 350 | 270 | 170 | pCi/L |

Notes

B = Compound detected in the laboratory blank.
J = Result is detected below the reporting limit or is an estimated concentration
M.D.A = Minimum Detectable Activity
mg/kg = Milligrams per kilogram
mg/L = Milligrams per liter
NA = Not applicable
ND = Not detected
NR = Not reported by laboratory
pCi/g = Picocuries per gram
pCi/L = Picocuries per liter
Spec = Spectroscopy
SVOCs = Semivolatile organic compounds
TCLP = Toxicity Characteristic Leaching Procedure
VOCs = Volatile organic compound
ug/L = Micrograms per liter

## Appendix A.3

ER Site 150
Summary of 1994 PETREX™ Passive Soil-Gas Survey Results

**Appendix A.3**

ER Site 150
Summary of 1994 PETREX™ Passive Soil-Gas Survey Results

**Table 1**
**PETREX Relative Soil Gas Response Values**
**(in ion counts)**
**STD Site 150**

| Sample | PCE | TCE | BTEX | Aliphatics |
|---|---|---|---|---|
| 1 | 5,882 | ND | 746,468 | 518,668 |
| 2 | 7,429 | 5,111 | 68,444 | 44,810 |
| 3 | ND | 25,741 | 88,202 | 58,597 |
| 4 | ND | 31,281 | 41,612 | 53,926 |
| 5 | ND | 955 | 17,837 | 6,833 |
| 6 | 4,691 | ND | 50,454 | 41,467 |
| 7 | ND | ND | 298,987 | 221,626 |
| 8 | ND | ND | 788,320 | 328,176 |
| 9 | ND | ND | 39,816 | 26,738 |
| 11 | ND | ND | 32,392 | 29,498 |
| 12 | ND | ND | 977 | 6,488 |
| 13 | ND | ND | 15,037 | 24,738 |
| 14 | ND | ND | 185,310 | 63,565 |
| 15 | ND | ND | 273,142 | 191,157 |
| 16 | ND | ND | 106,006 | 89,054 |
| * 47 | 3,924 | ND | 114,218 | 144,719 |
| * 48 | ND | ND | 23,640 | 123,350 |

PCE - Tetrachloroethene
Indicator Mass Peak(s) 164

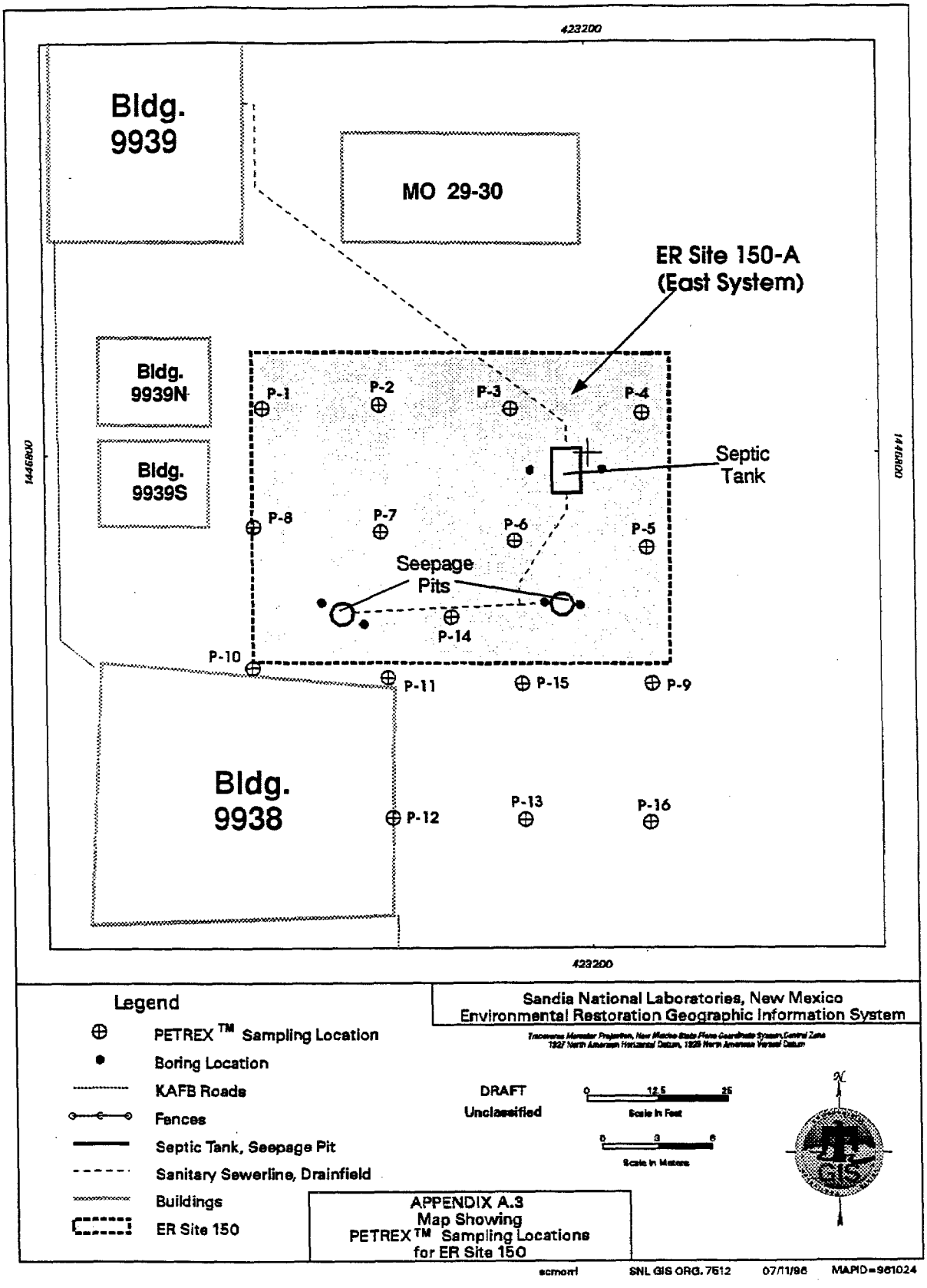
TCE - Trichloroethene
Indicator Mass Peak(s) 130

BTEX - Benzene, Toluene, Ethylbenzene/Xylene(s)
Indicator Mass Peak(s) 78, 92, 106

Aliphatics - C4-C9 Aliphatic Hydrocarbons
Indicator Mass Peak(s) 56, 70, 84, 98, 112,126

* QA/QC Blank Sample

ER Site 150
Summary of 1994 PETREX™ Passive Soil-Gas Survey Results



October 13, 2003

# ADDITIONAL /SUPPORTING DATA

CAN BE VIEWED AT THE
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