



Stu

Department of Energy

Field Office, Albuquerque
Kirtland Area Office
P.O. Box 5400
Albuquerque New Mexico 87185-5400

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Benito Garcia, Bureau Chief
New Mexico Environment Department
Hazardous and Radioactive Materials Bureau
2044 Galisteo Street
P.O. Box 26110
Santa Fe, NM 87505-2100



Dear Mr. Garcia:

Enclosed are two copies of the Department of Energy (DOE)/ Sandia National Laboratories/New Mexico (SNL/NM) response to the NMED Notice of Deficiency (NOD) for the third submission of No Further Action (NFA) proposals. NOD responses are provided for the following environmental restoration sites:

- OU 1295 - Septic Tanks and Drain Fields
 - Site 142 - Building 9970 Septic System
 - Site 143 - Building 9972 Septic System
 - Site 146 - Building 9920 Drain System
 - Site 148 - Building 9927 Septic System
- OU 1332 - Foothills Test Area
 - Site 15 - Trash Pits
 - Site 27 - Building 9820 Animal Disposal Pit
 - Site 28-2 - Mine Shaft
 - Site 28-10 - Mine Shaft
 - Site 67 - Frustration Site
- OU 1333 - Canyons Test Area
 - Site 59 - Pendulum Site
 - Site 63A - Balloon Test Area
 - Site 63B - Balloon Test Area
 - Site 64 - Gun Site
 - Site 92 - Pressure Vessel Test Site

If you have any questions, please contact John Gould at (505) 845-6089, or Mark Jackson at (505) 845-6288.

Sincerely,

George K. Jackson
Michael J. Zamorski
Acting Area Manager

Enclosures

HSWA SNL 1295
1332
1333



Benito Garcia

cc w/enclosure:

T. Trujillo, AL, ERD

W. Cox, SNL, MS 1147

J. Parker, NMED-OB

R. Kennett, NMED-OB

D. Neleigh, EPA, Region 6 (2 copies via certified mail)

cc w/o enclosure:

B. Oms, KAO-OB

B. Galloway, SNL, MS 1147

C. Byrd, SNL, MS 1148

S. Young, SNL, MS 1147

S. Dinwiddie, NMED

T. Davis, NMED

S. Kruse, NMED

Sandia National Laboratories Albuquerque, New Mexico June 1997

Environmental Restoration Project Responses to NMED Technical Comments on No Further Action Proposals Dated August 1995

INTRODUCTION

This document responds to comments received in a letter from the State of New Mexico Environment Department to the U.S. Department of Energy (Zamorski, April 28, 1997) documenting the review of 14 No Further Action (NFA) Proposals submitted in August 1995.

This response document is organized in sections by operable unit (OU) and subdivided in numerical order by site number. Each OU section provides NMED comments repeated in **bold** by comment number and by site number in the same order as provided in the call for response to comments. The DOE/SNL response is written in normal font style on a separate line under "Response". Responses to general technical comments begin on page 3 and responses to site-specific technical comments begin on page 5. Additional supporting information for the general and site-specific comments is included as figures and tables within each comment and as attachments within each section, as appropriate. When referenced in the site-specific NOD responses, risk assessment analyses will be submitted to NMED at a later date.



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**RESPONSES TO NMED COMMENTS
ON NO FURTHER ACTION PROPOSALS
DATED AUGUST 1995**

GENERAL COMMENTS

- 1. Final, rather than draft, site maps should be provided for each unit proposed for No Further Action (NFA). (Needed for adequate review)**

Response: Final site maps for OUs 1295, 1332, and 1333 are provided in Attachment A of this section. In addition, all future NFA submittals will be submitted with final rather than draft site maps.

- 2. Interviews alone are not sufficient documentation to make an NFA determination. Site history and interviews can be used to guide an investigation or confirm other evidence, but are not sufficient by themselves. In the absence of any other supporting information, screening sampling should be conducted to further corroborate the interview and site history information. (Best Professional Judgment)**

In most cases, an NFA proposal is not likely to be approved unless it is based on some sampling and analysis of the medium/media of concern. (Best Professional Judgment)

Response: DOE/SNL believe that, where the actual persons involved with the operation, at the time of the suspected release, provide first-hand, eyewitness accounts, they are reliable sources of information. In most cases, a combination of information is used to determine whether a release has occurred, including sampling. In some cases the suspect media has been removed, and therefore can no longer be sampled. In summary, each case must be judged individually. Where additional sampling is appropriate for those sites reviewed in the third round of NFAs, it is so stated under the site-by-site responses given below.

- 3. Analytical results obtained at Environmental Restoration (ER) sites should be compared with sitewide background concentrations, when approved by the New Mexico Environment Department, to determine whether contamination has occurred. (Best Professional Judgment)**

General Comments

Response: DOE/SNL are currently in the process of negotiating site-wide background concentrations with the New Mexico Environment Department (NMED), and expect that all values except those for OUs 1332, 1333, and 1334 to be approved. Upon final approval of the site-wide background study report, all OUs except for OUs 1332, 1333, and 1334 will compare analytical results to the background concentrations contained in the report. Additional background samples will be collected at OUs 1332, 1333, and 1334 upon mutual agreement with NMED of locations for such sampling.

- 4. A sampling and analysis plan or RFI Work Plan should be submitted prior to the start of any sampling activities conducted as a result of this Notice of Deficiency. (Permit Condition J.1)**

Response: Where sampling is anticipated, a sampling and analysis plan is developed which is provided to the NMED. Meetings with the NMED Oversight Bureau are scheduled in order to review these sampling plans and make any changes in the technical approach that would benefit the investigation. These practices will continue. However, DOE/SNL may not have always provided the NMED Hazardous and Radioactive Material Bureau with such sampling plans, or an invitation to participate in pre-sampling discussions. If that has happened, it was an oversight for which DOE/SNL apologizes. DOE/SNL will make every effort in the future to be inclusive in the pre-sampling discussions with all appropriate elements of NMED.

- 5. Any sources cited in NFA proposals should be documented and referenced. The source documents should be readily available to the public and to any reviewers. (Additional information needed for adequate review)**

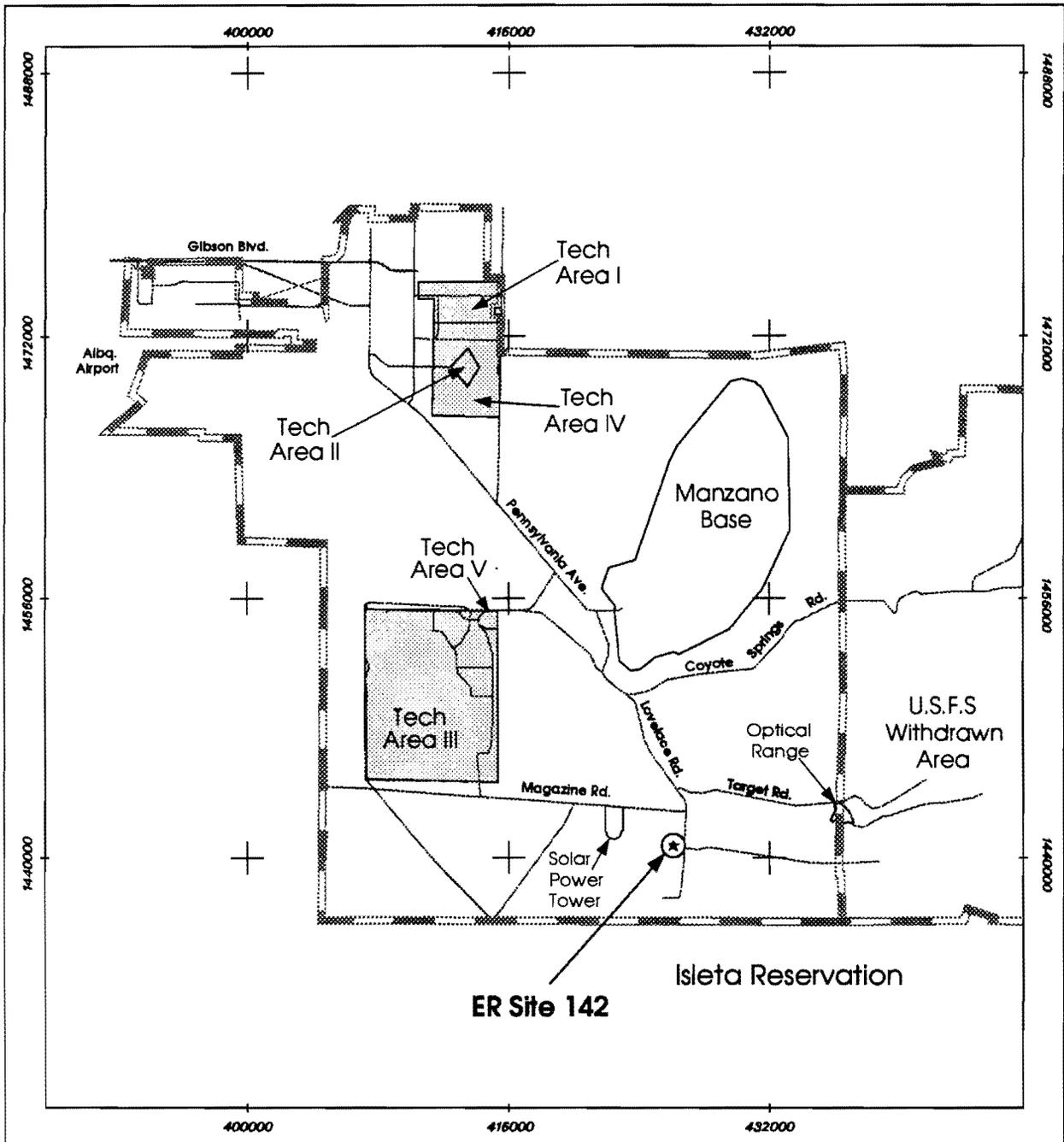
Response: Sources cited in all current submissions of NFA proposals are documented and referenced. General ER Project documents (e.g., RFI Work Plans, RFI Reports, NFAs, the Program Implementation Plan, etc.) are available to the public and other reviewers at the DOE Public Reading Room located at the Library Building at Albuquerque Technical-Vocational Institute, Joseph M. Montoya Campus, at 4700 Morris Avenue, NE. DOE/KAO will continue its practice of simultaneously transmitting to NMED copies of all documents sent to the Public Reading Room. OU-specific archival references are located at the ER Project Records Center. The public and regulators can access information from the ER Project Records Center by verbal or written request to John Gould, DOE/KAO, at (505) 845-6089.

General Comments

ATTACHMENT A
FINAL SITE MAPS FOR
OUs 1295, 1332, AND 1333

General Comments

FINAL SITE MAPS FOR OU 1295



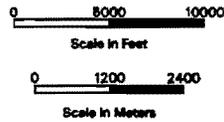
Legend

- ★ ER Site 142
- Major Roads
- ⋯ KAFB Boundary
- ▨ Technical Areas

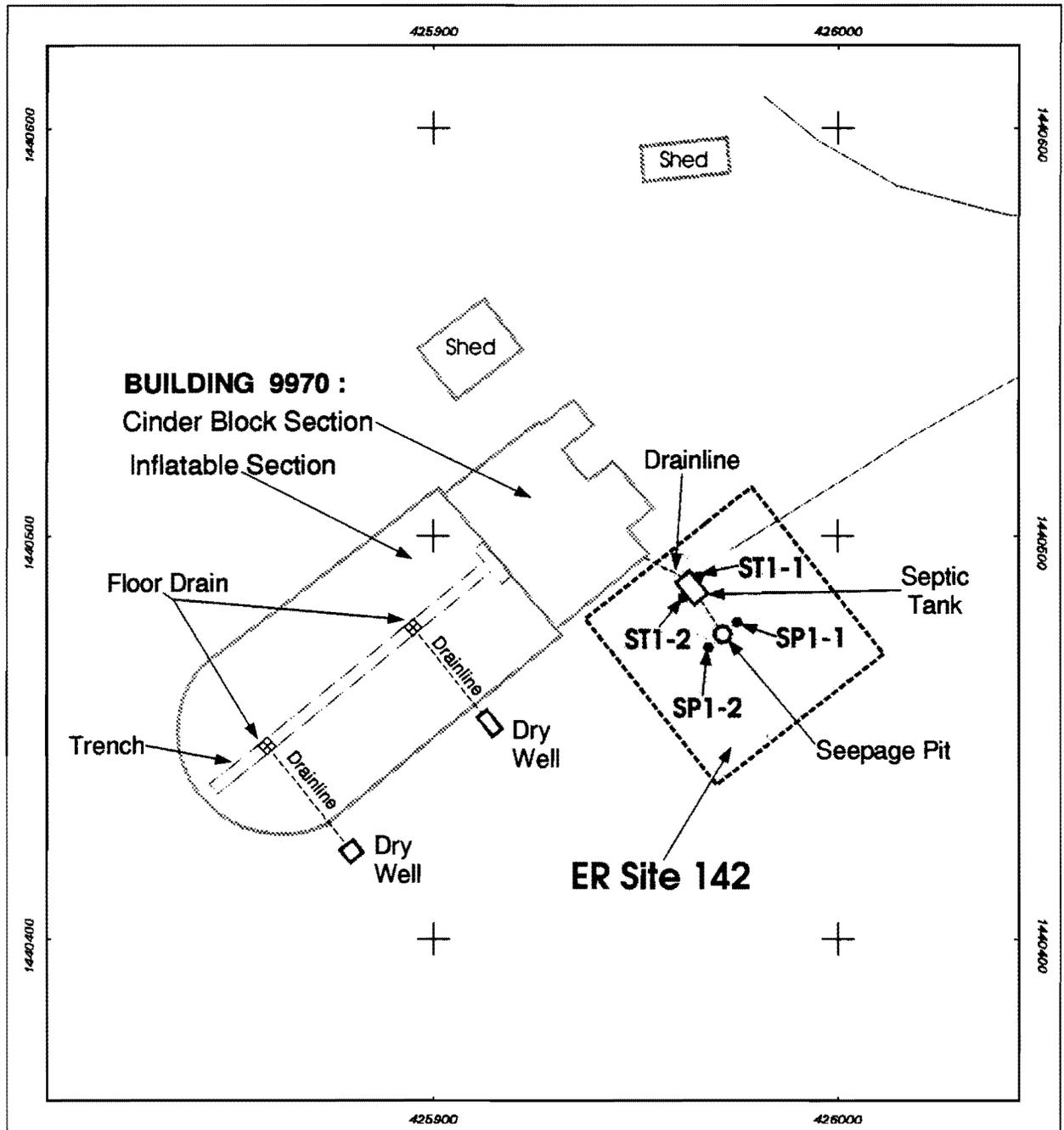
**Sandia National Laboratories, New Mexico
Environmental Restoration Geographic Information System**

Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone
1927 North American Horizontal Datum, 1983 North American Vertical Datum

Unclassified



**FIGURE 1
Location Map for ER Site 142
Sandia National Laboratories,
New Mexico**



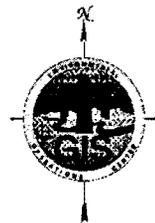
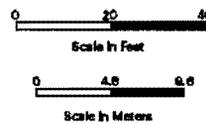
Legend

- Boring Location
- ◆ Floor Drain
- KAFB Roads
- ⋯ Buildings
- - - Drainline
- ⋯ ER Site 142

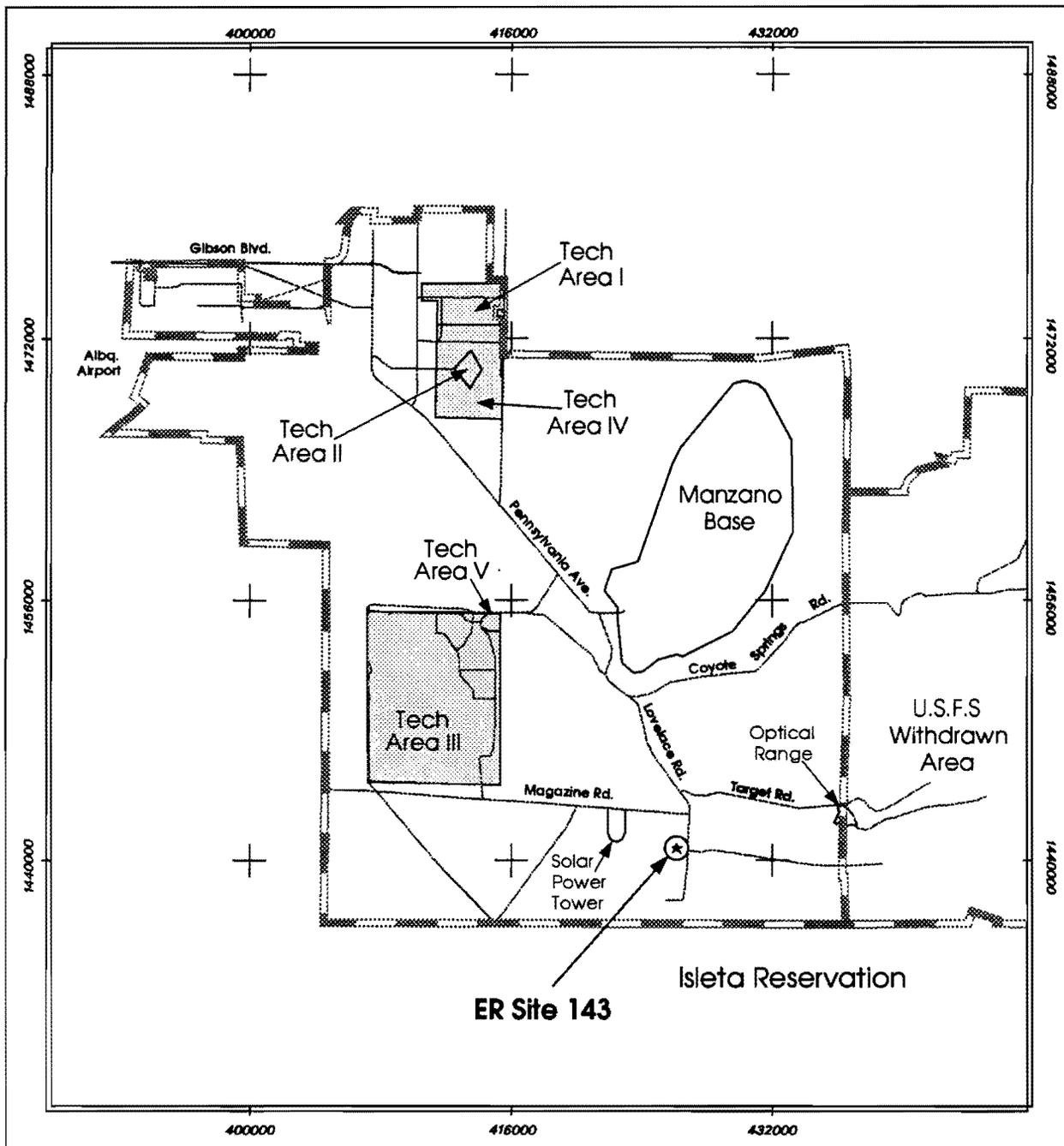
**Sandia National Laboratories, New Mexico
Environmental Geographic Information System**

*Transverse Mercator Projection, New Mexico State Plane Geospatial System, Central Zone
1987 North American Horizontal Datum, 1928 North American Vertical Datum*

Unclassified



**FIGURE 2
Site Map for ER Site 142
Sandia National Laboratories,
New Mexico**



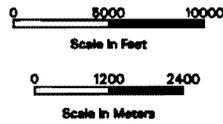
Legend

-  ER Site 143
-  Major Roads
-  KAFB Boundary
-  Technical Areas

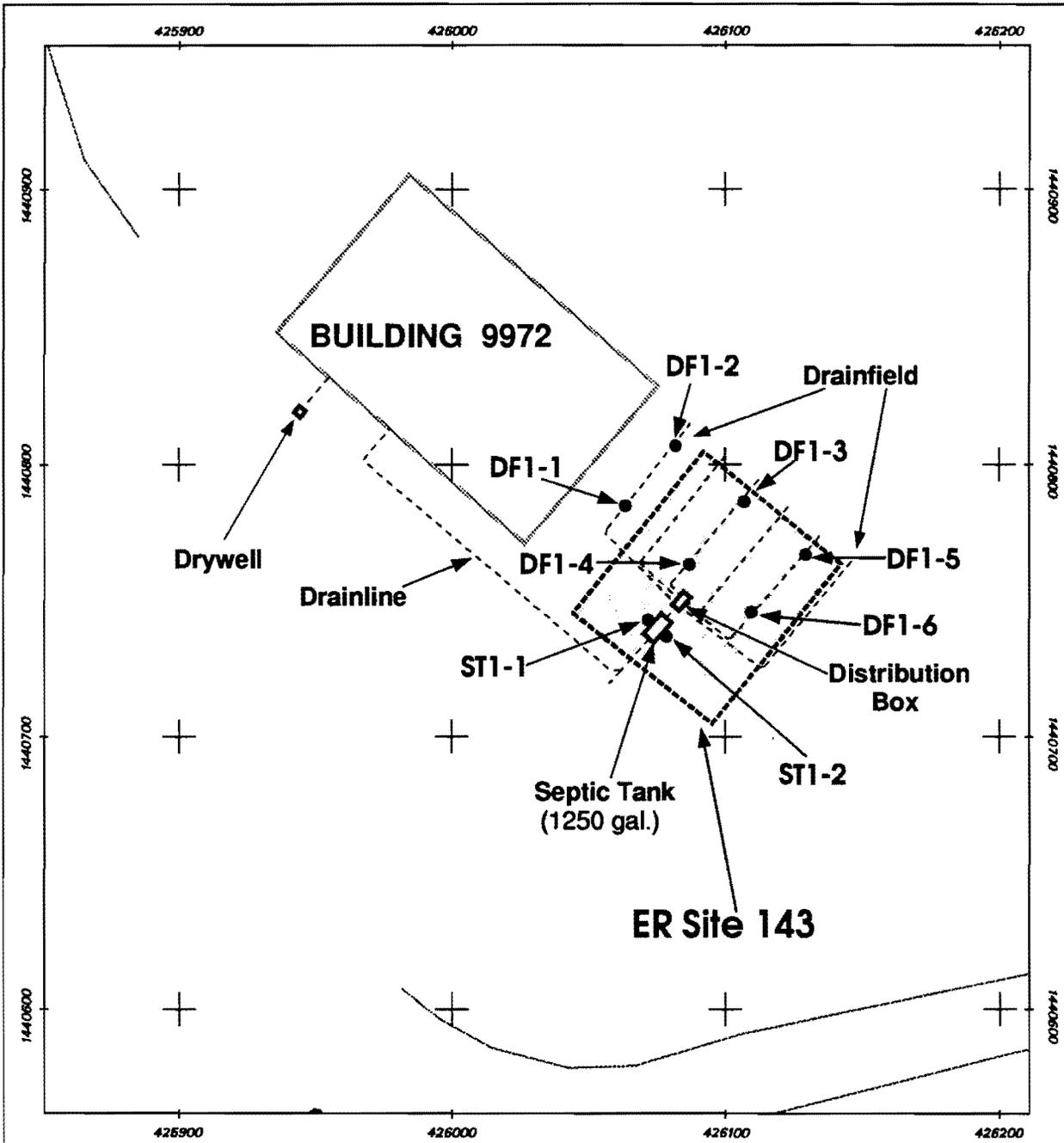
**Sandia National Laboratories, New Mexico
Environmental Restoration Geographic Information System**

Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone
1987 North American Horizontal Datum, 1989 North American Vertical Datum

Unclassified



**FIGURE 1
Location Map for ER Site 143
Sandia National Laboratories,
New Mexico**



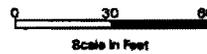
Legend

- Boring Location
- KAFB Roads
- ▤ Buildings
- - - Drainline
- ▭ Septic Tank, Distribution Box, Drywell
- ▭ ER Site 143

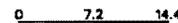
Sandia National Laboratories, New Mexico
 Environmental Restoration Geographic Information System

*Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone
 1987 North American Horizontal Datum, 1983 North American Vertical Datum*

Unclassified



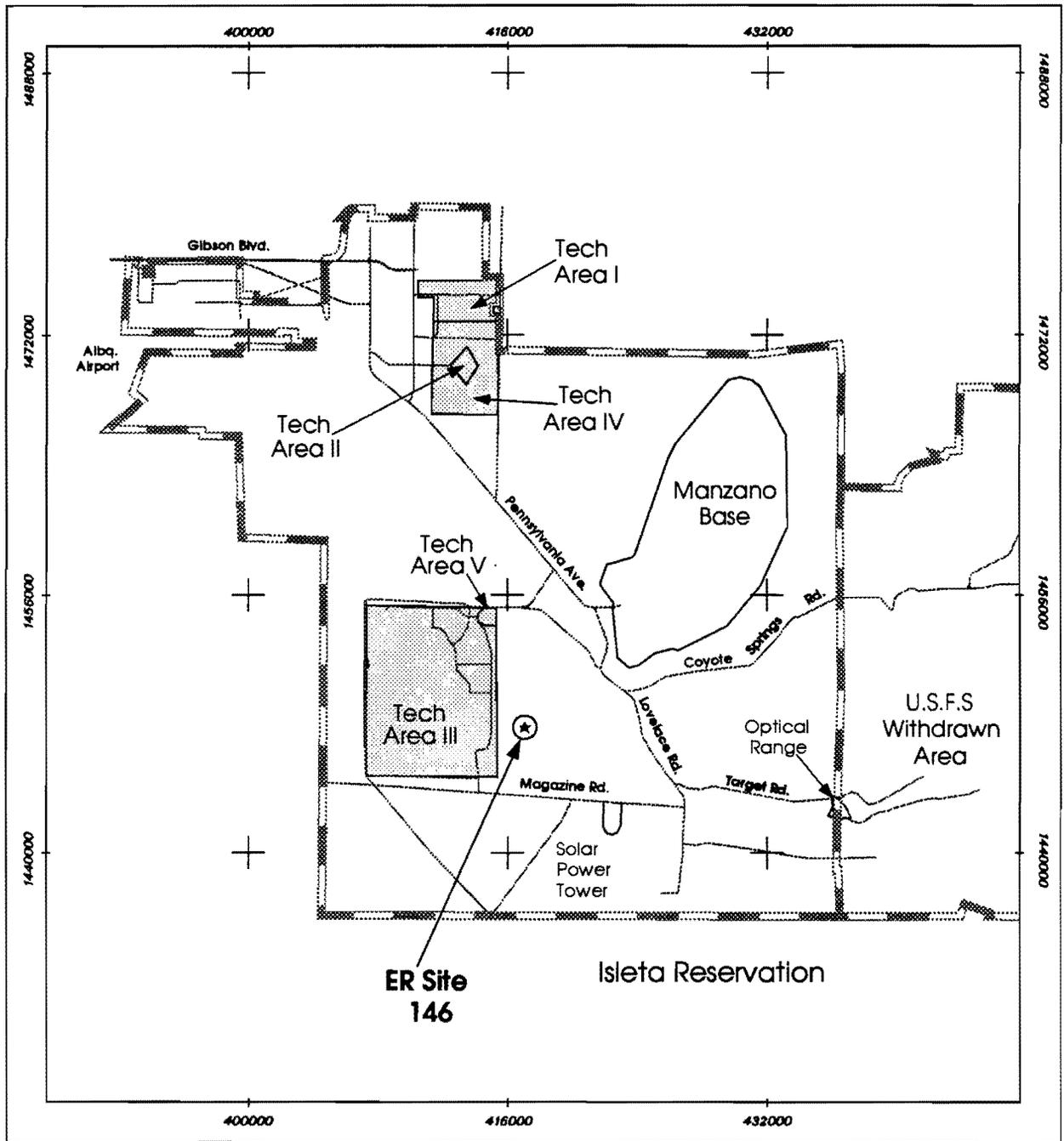
Scale in Feet



Scale in Meters



FIGURE 2
Site Map for ER Site 143
Sandia National Laboratories,
New Mexico



Legend

-  ER Site 146
-  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, 1923 North American Vertical Datum

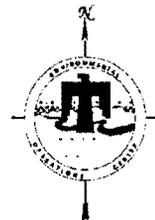
Unclassified



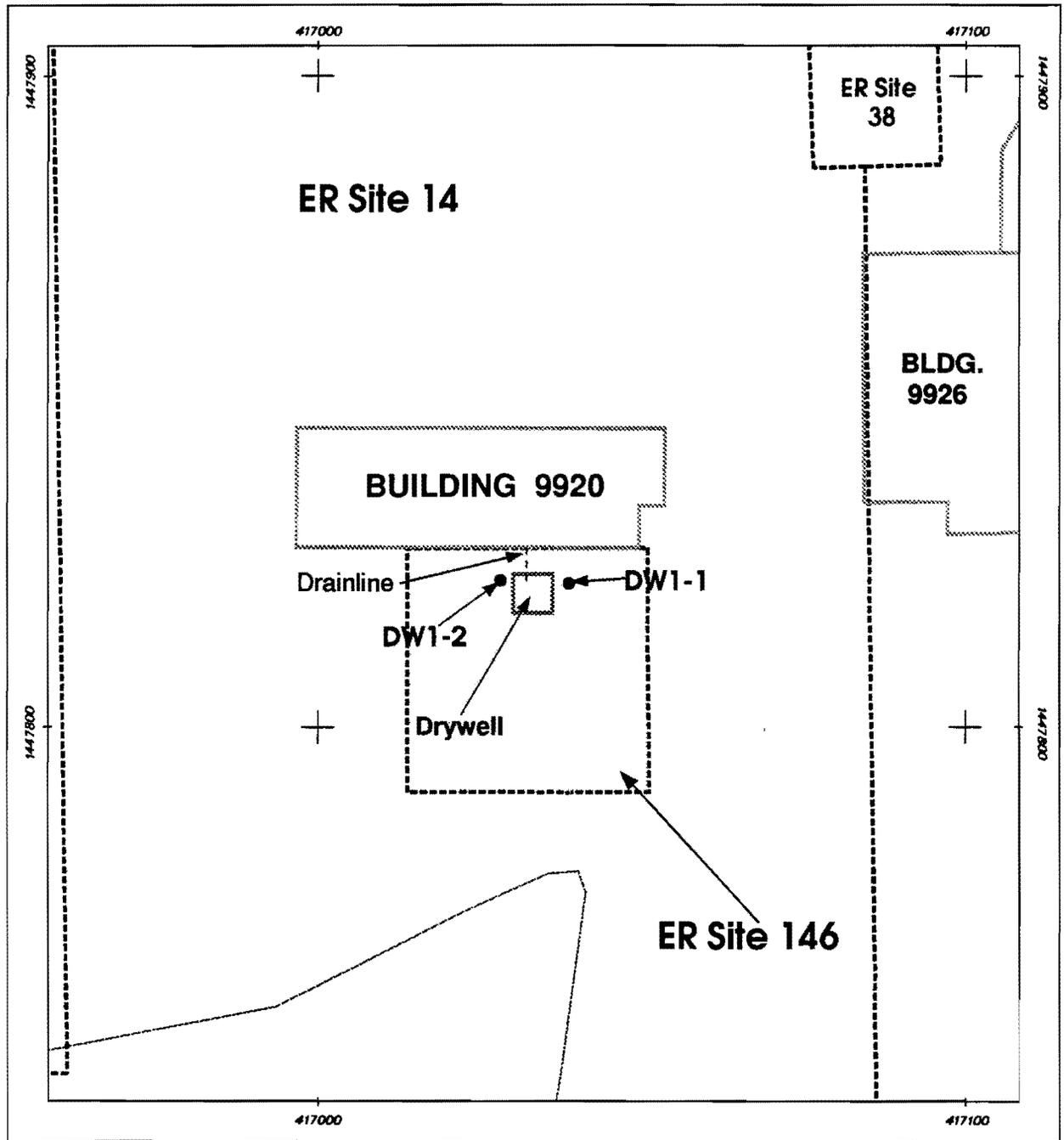
Scale in Feet



Scale in Meters



**FIGURE 1
Location Map for ER Site 146
Sandia National Laboratories,
New Mexico**



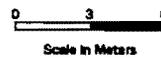
Legend

- Boring Location
- KAFB Roads
- ⋯ Buildings
- - - Drainline
- ⋯ Dry Well
- ⋯ ER Site 146

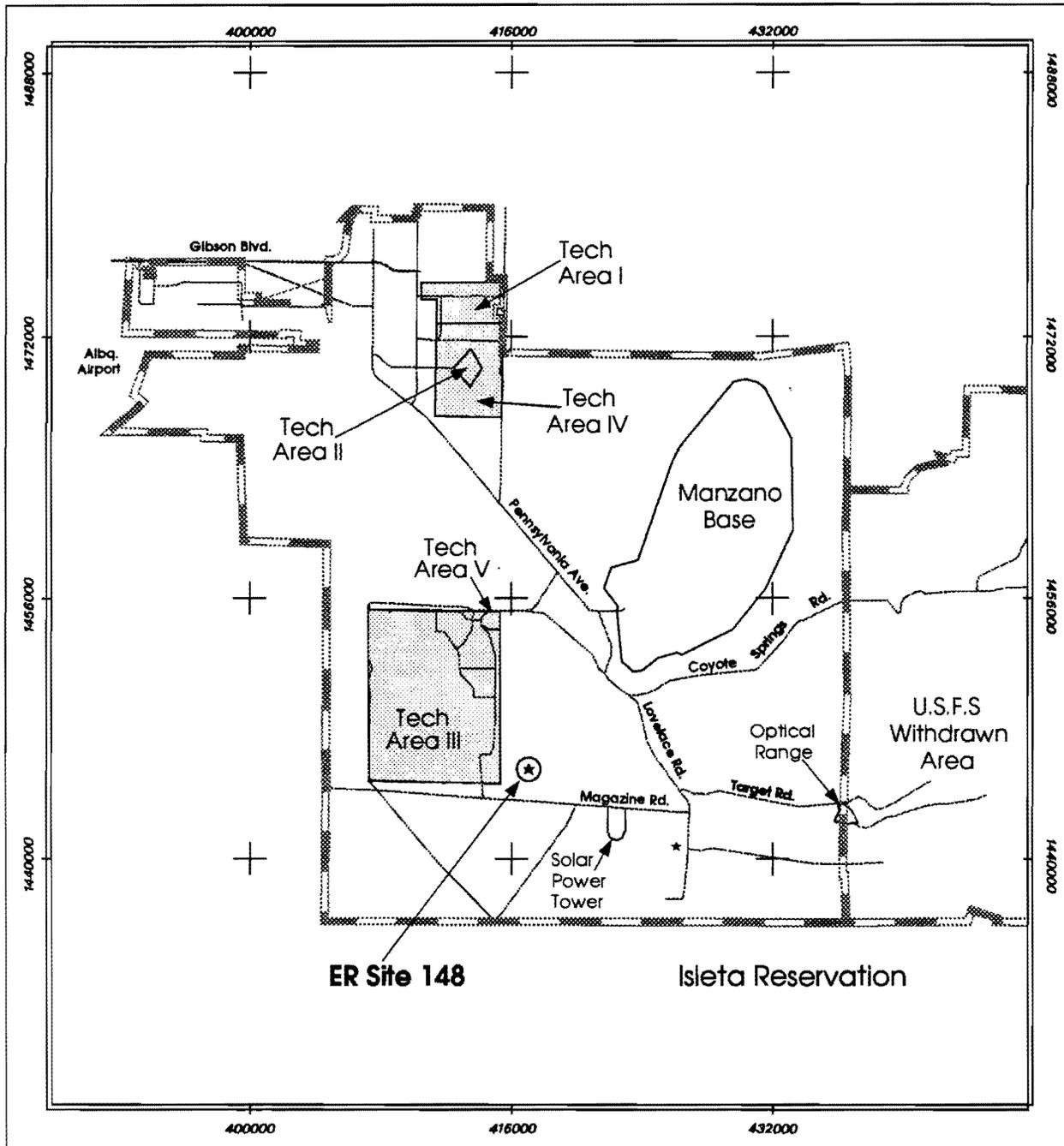
**Sandia National Laboratories, New Mexico
Environmental Restoration Geographic Information System**

Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone
1983 North American Horizontal Datum, 1983 North American Vertical Datum

Unclassified



**FIGURE 2
Site Map for ER Site 146
Sandia National Laboratories,
New Mexico**



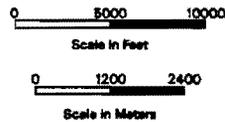
Legend

- ⊛ ER Site 148
- Major Roads
- ⋯ KAFB Boundary
- ▨ Technical Areas

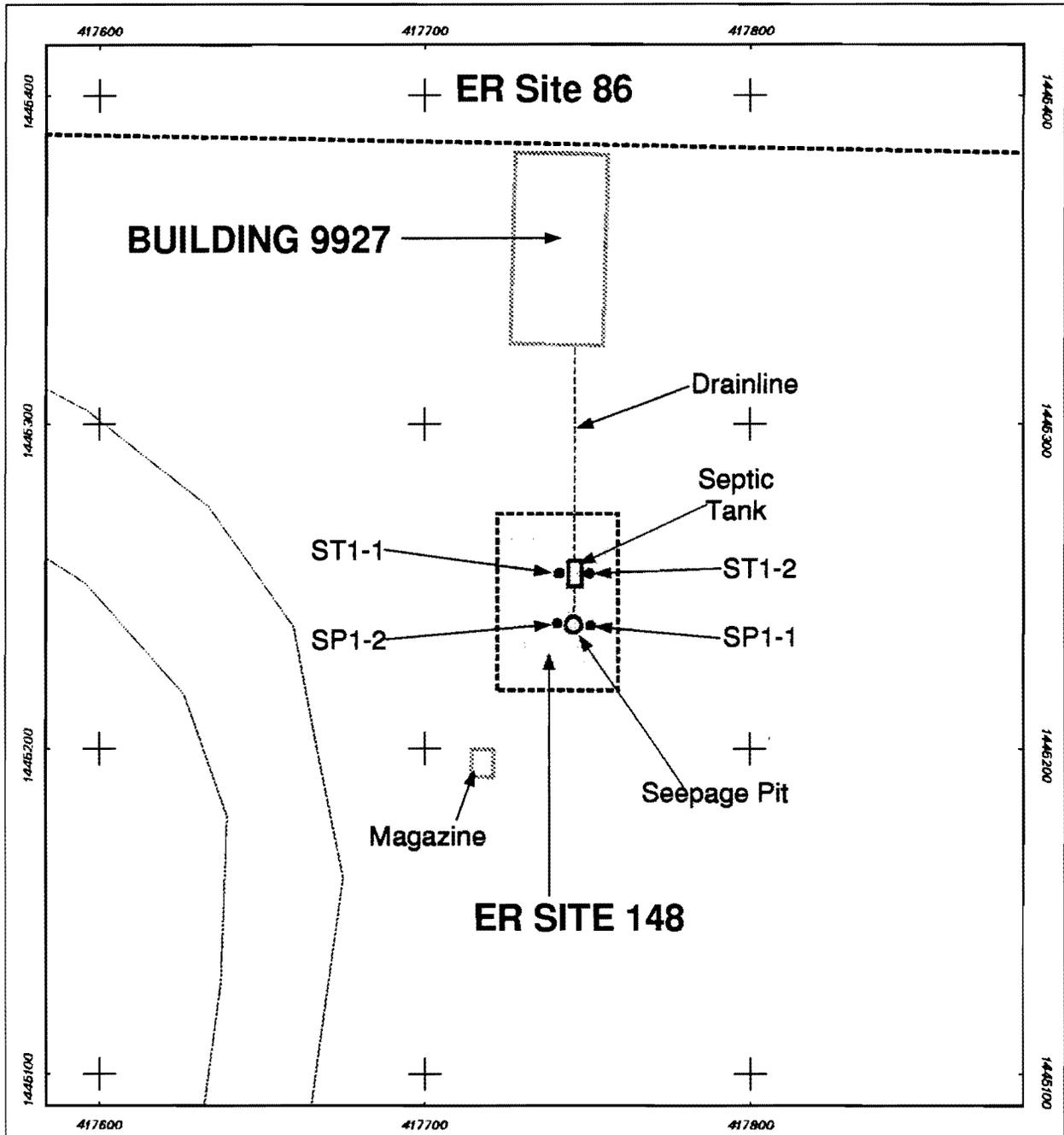
**Sandia National Laboratories, New Mexico
Environmental Restoration Geographic Information System**

Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone
1987 North American Horizontal Datum, 1988 North American Vertical Datum

Unclassified



**FIGURE 1
Location Map for ER Site 148
Sandia National Laboratories,
New Mexico**



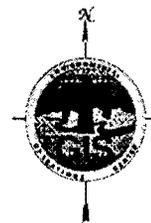
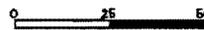
Legend

- Boring Location
- KAFB Roads
- ⋯ Buildings
- - - Drainline
- ▭ Septic Tank, Seepage Pit
- ▭ ER Site 148

**Sandia National Laboratories, New Mexico
Environmental Geographic Information System**

*Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone
1987 North American Horizontal Datum, 1928 North American Vertical Datum*

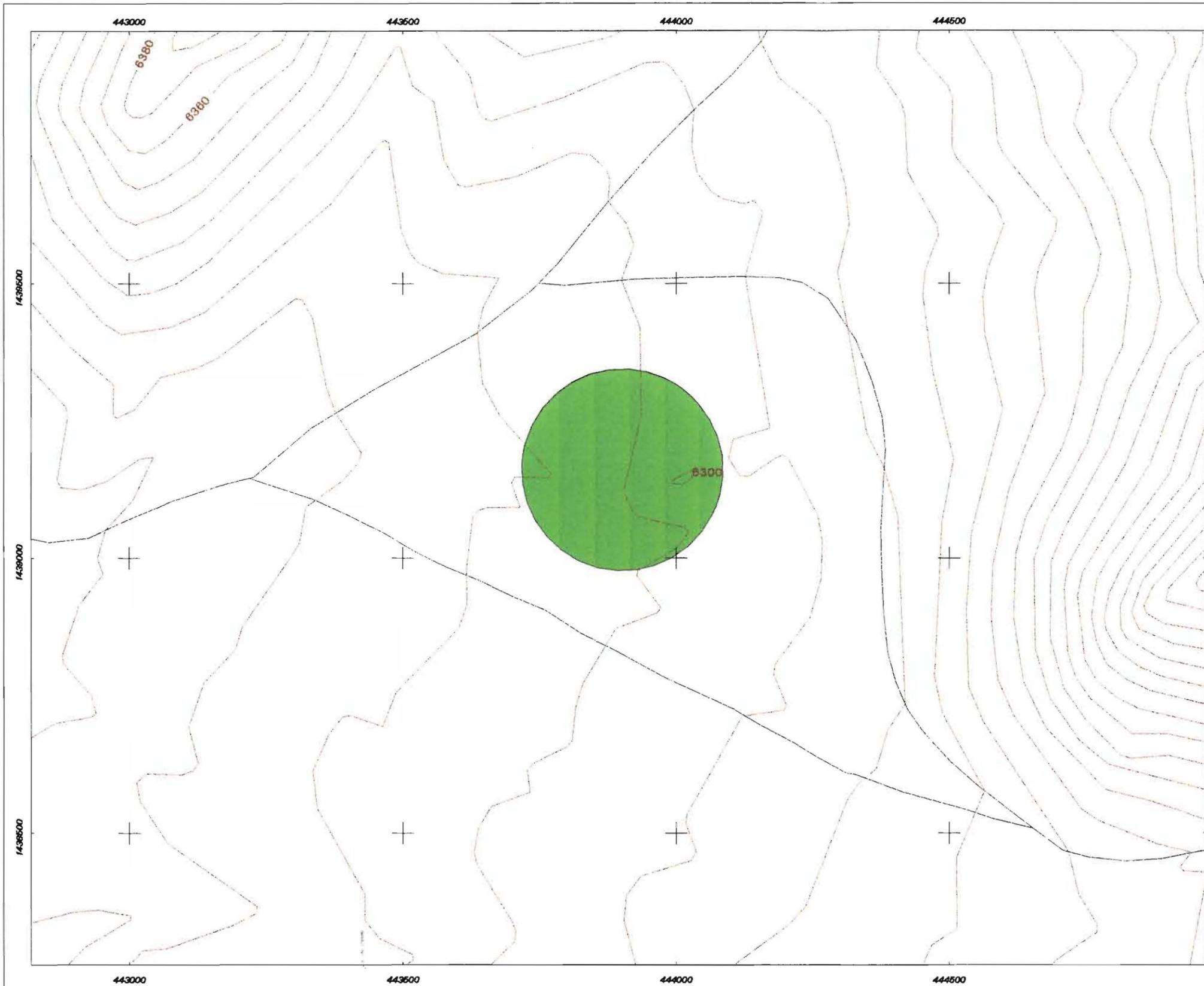
Unclassified



**FIGURE 2
Site Map for ER Site 148
Sandia National Laboratories,
New Mexico**

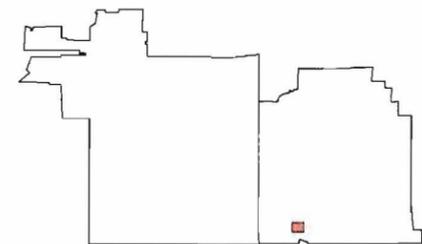
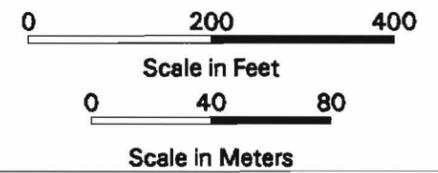
General Comments

FINAL SITE MAPS FOR OU 1332



Legend

-  Road
-  20 Foot Contour
-  ER Site 15



Sandia National Laboratories, New Mexico
Environmental Geographic Information System

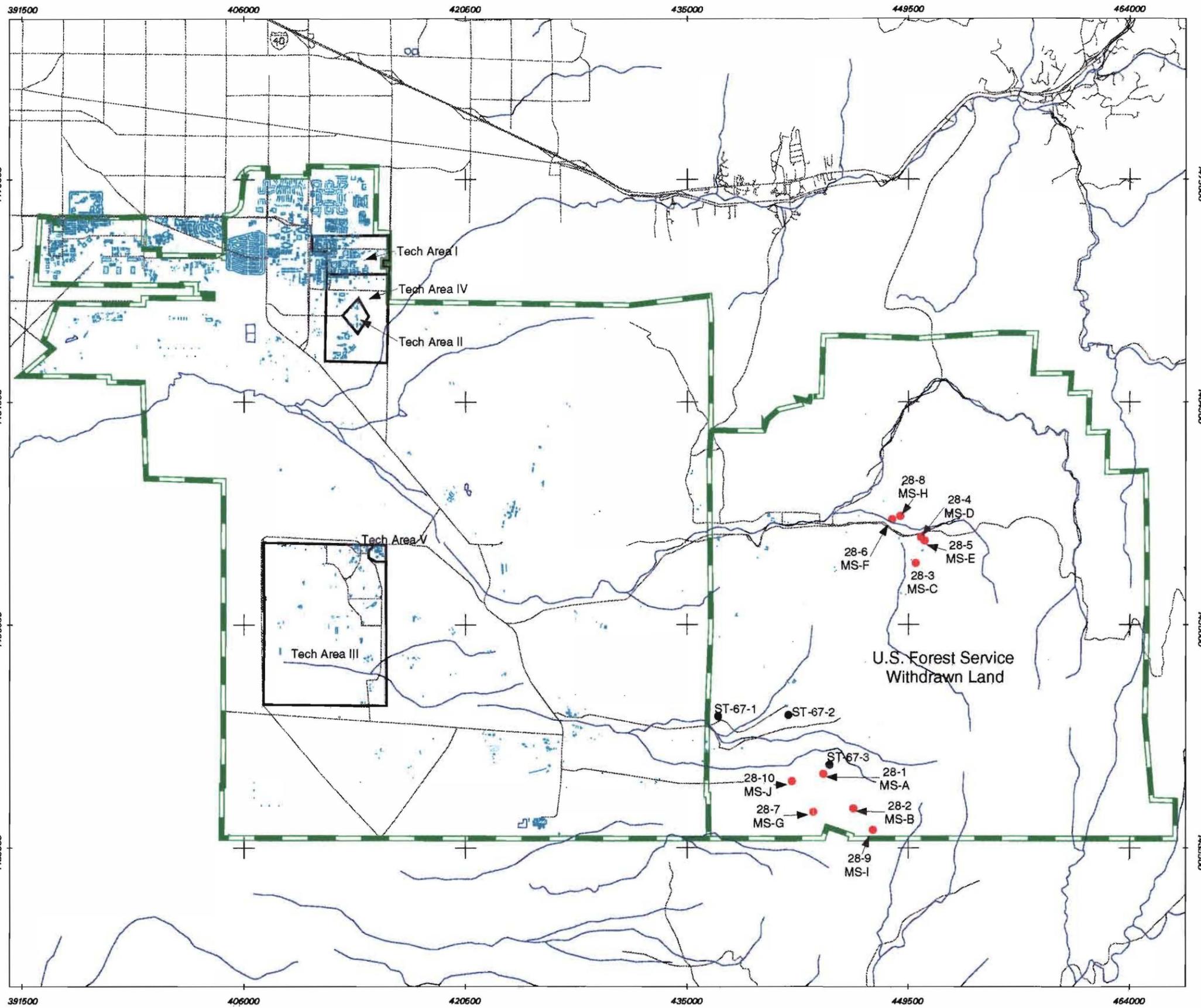
Environmental Restoration Site 15 Trash Pits (Frustration Site)



Transverse Mercator Projection, New Mexico State Plane Coordinate System,
Central Zone, 1987 North American Horizontal Datum,
1986 North American Vertical Datum

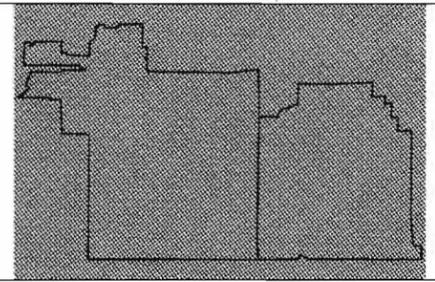
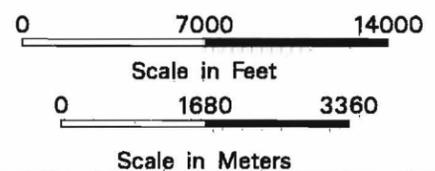


1:2400	MAPID=970560
Unclassified	SNL GIS ORG. 6682
DHeitrich	dh970560.aml 06/16/97



Legend

- KAFB Roads
- Technical Areas
- KAFB Boundary
- Surface Water
- Buildings
- Mine Location (SNL)
- Mine Location (KAFB)



Sandia National Laboratories, New Mexico
Environmental Operations Geographic Information System

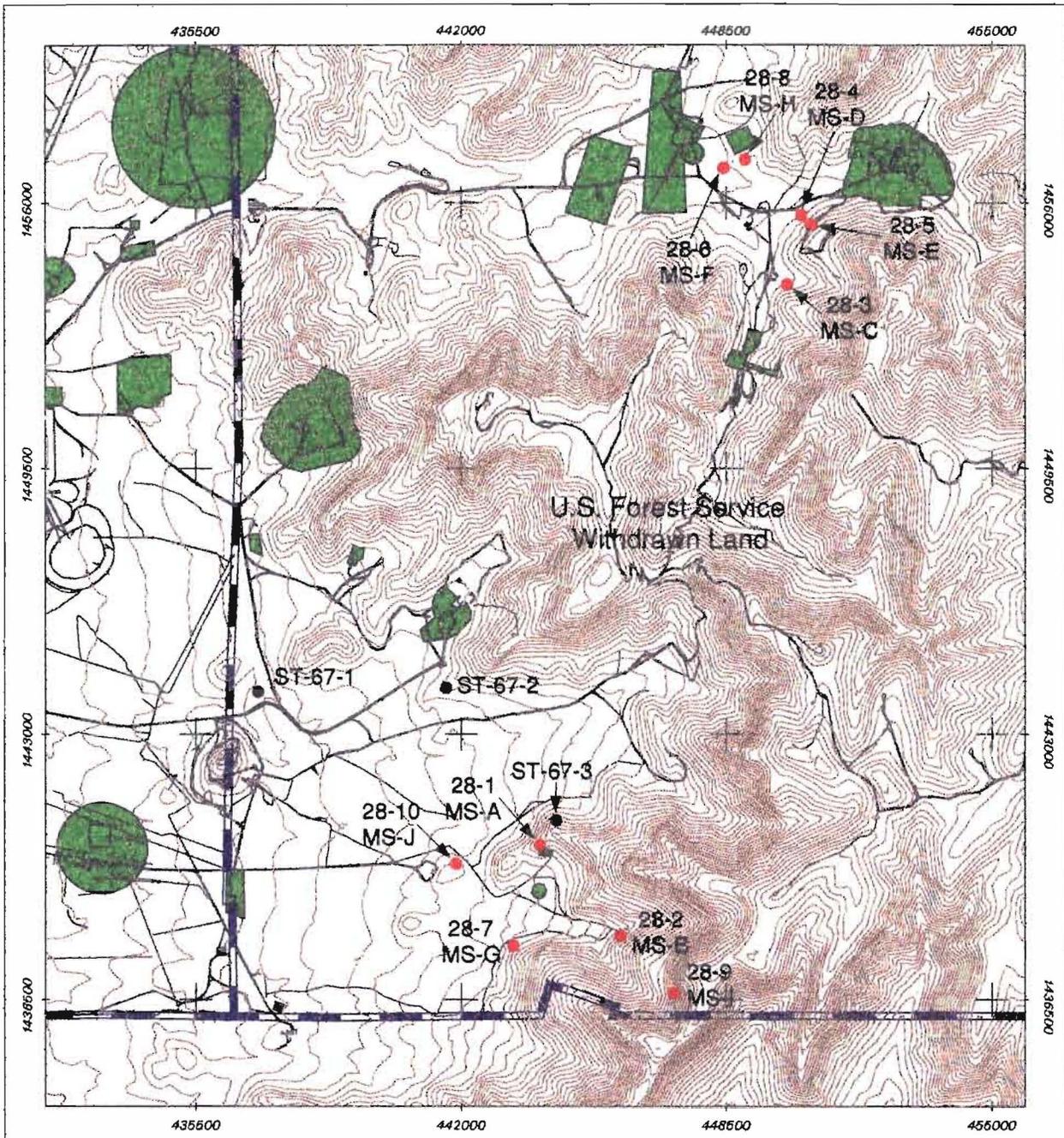
Figure 1
General Location Map of
ER Site 28



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



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Unclassified		SNL GIS ORG. 7512
DaHellfrich	d950738a.aml	04/12/95

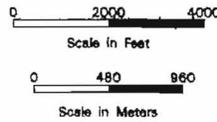


Legend

-  ER Sites
-  KAFB Roads
-  40 Foot Contours
-  KAFB Boundary
-  Mine Location (SNL)
-  Mine Location (KAFB)

Sandia National Laboratories, New Mexico
Environmental Restoration Geographic Information System

Figure 1a
Location of ER Site 28
Mine Shafts



Unclassified

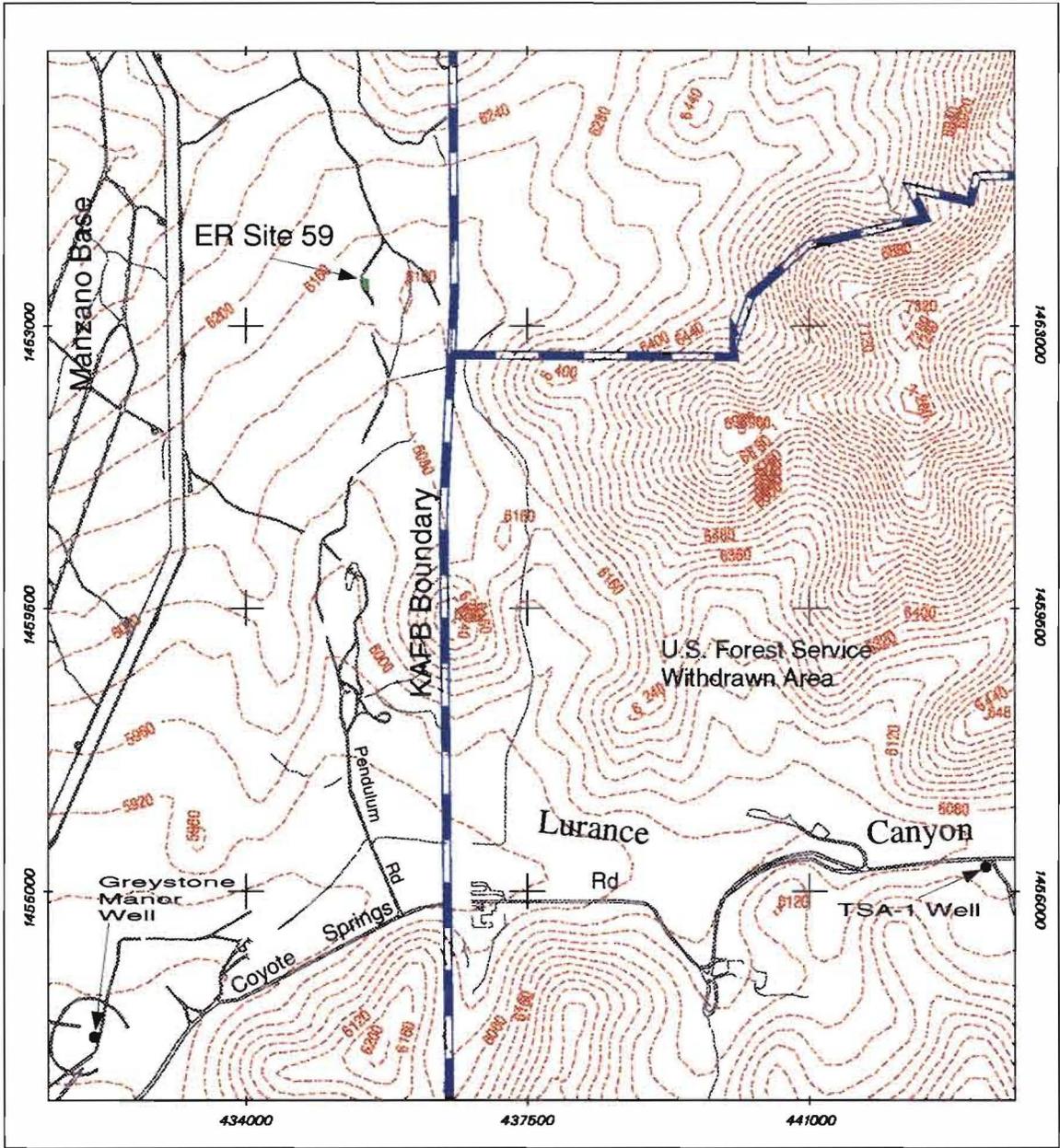
1:48000
1 in = 4000'



Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone
1827 North American Horizontal Datum, 1929 North American Vertical Datum

General Comments

FINAL SITE MAPS FOR OU 1333



Legend

-  OU 1333
ER Site 59
-  40 Ft. Contour Interval
-  Roads
-  KAFB Boundary

**Sandia National Laboratories, New Mexico
Environmental Restoration Geographic Information System**

**ER SITE 59
OU 1333
CENTRAL COYOTE TEST AREA**

0 1000 2000
Scale in Feet

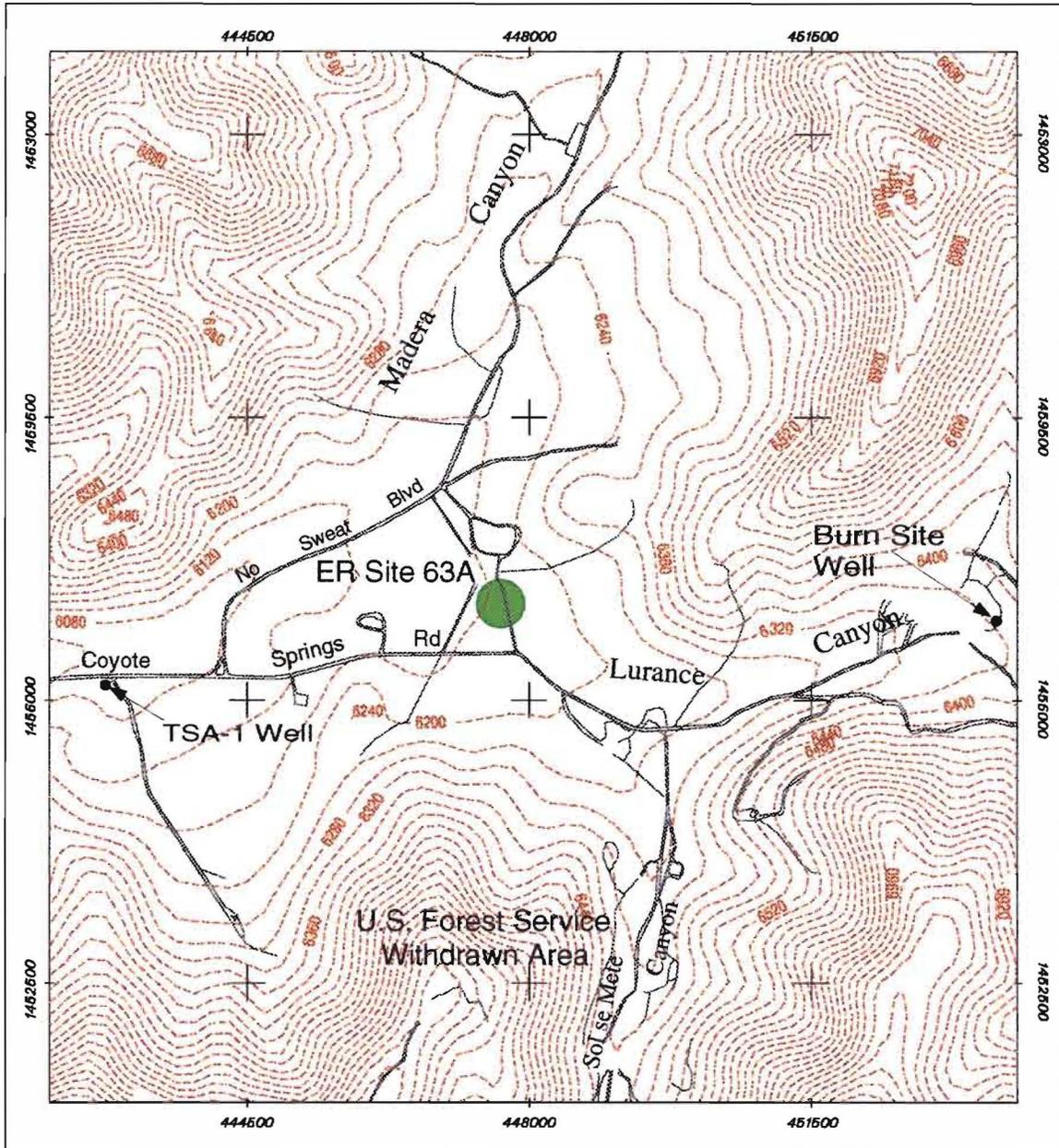
0 240 480
Scale in Meters

Unclassified

1:24000



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

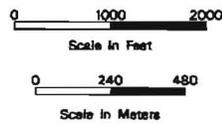


Legend

-  OU 1333
-  ER Site 63A
-  40 Ft. Contour Interval
-  Roads
-  KAFB Boundary

Sandia National Laboratories, New Mexico
Environmental Restoration Information System

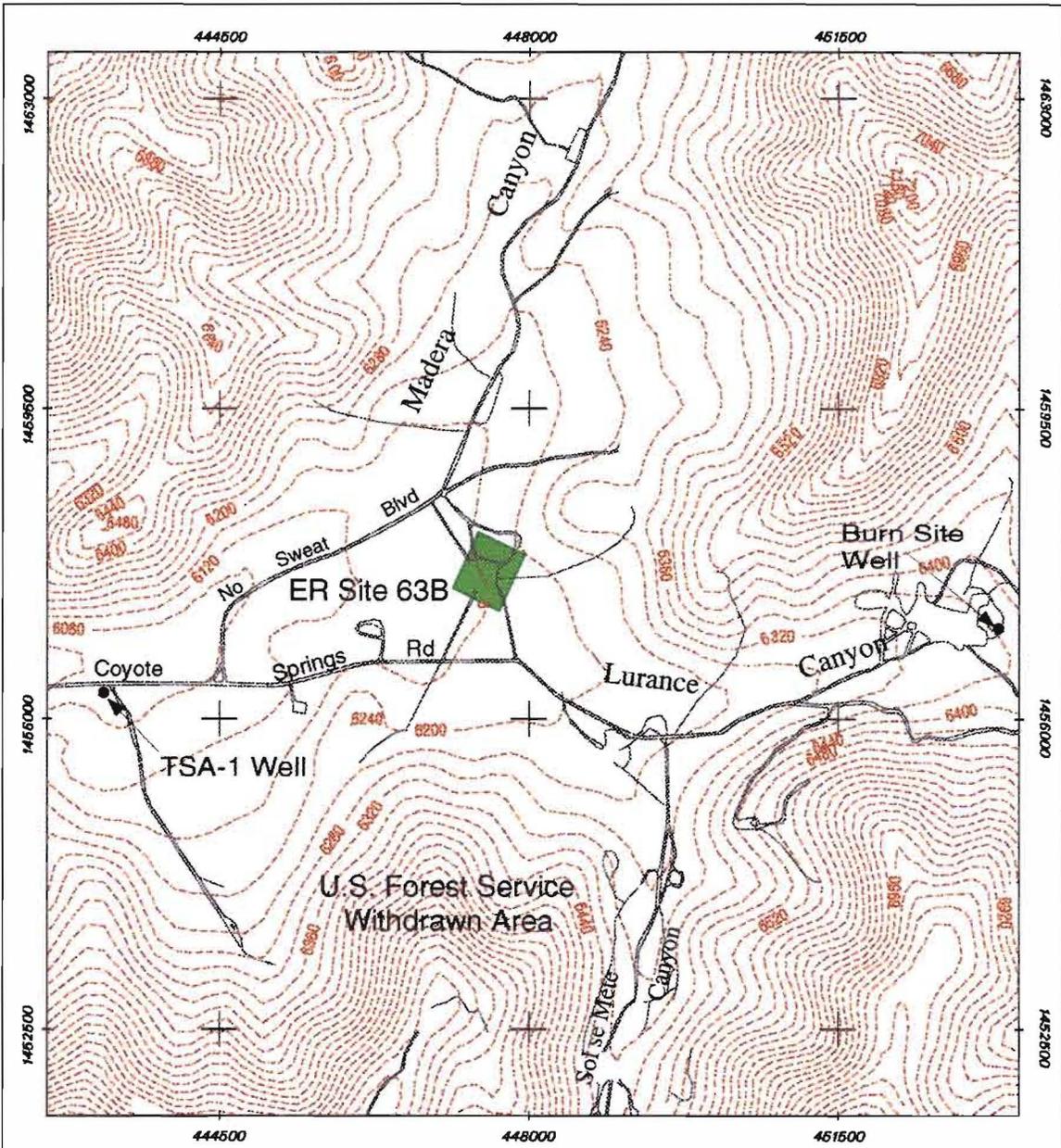
ER SITE 63A
OU 1333
CENTRAL COYOTE TEST AREA



Unclassified
1:24000



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

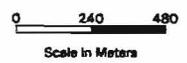


Legend

-  OU 1333
ER Site 63B
-  40 Ft. Contour Interval
-  Roads
-  KAFB Boundary

Sandia National Laboratories, New Mexico
Environmental Restoration Information System

ER SITE 63B
OU 1333
CANYONS TEST AREA

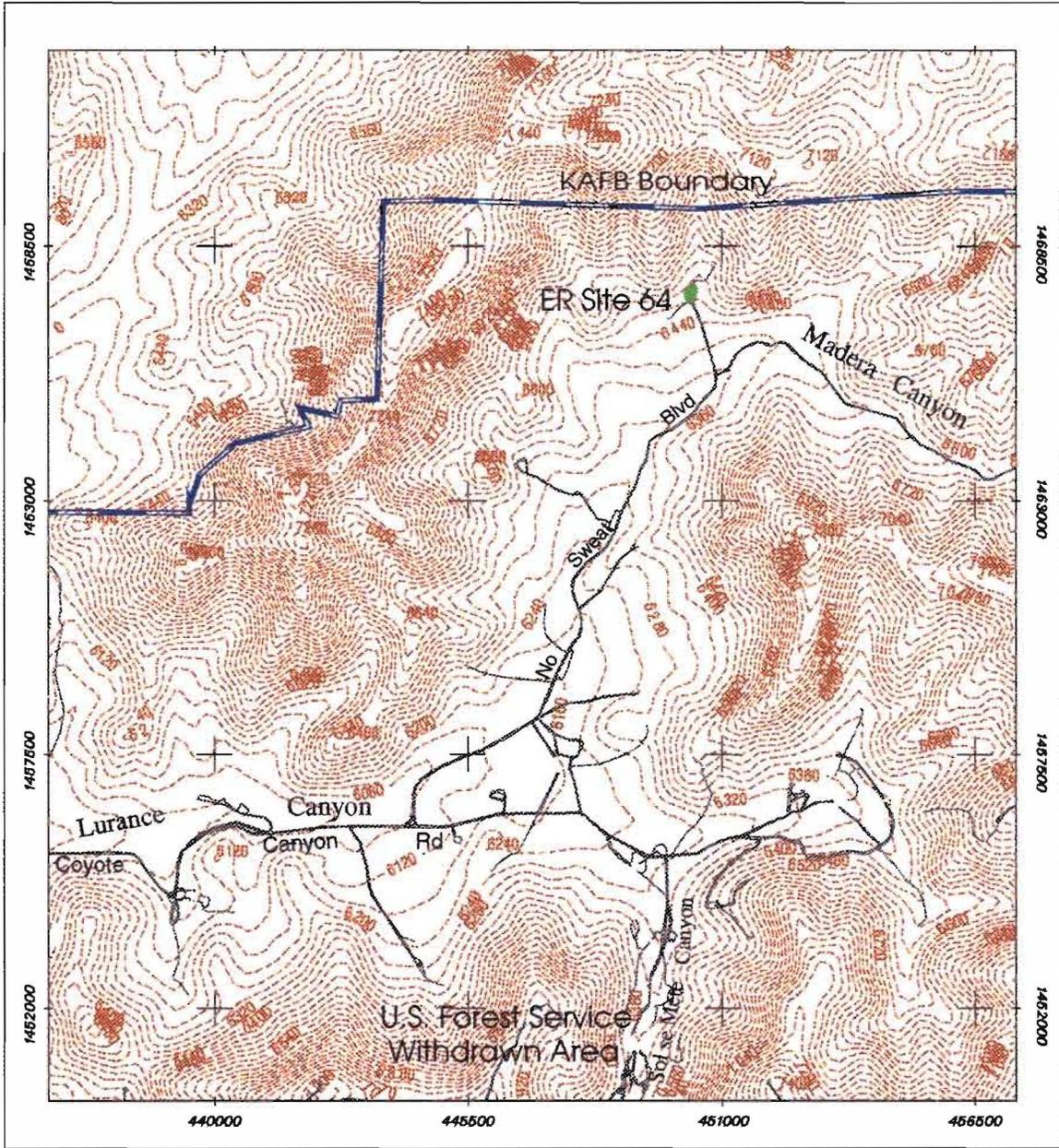


Unclassified

1:24000



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

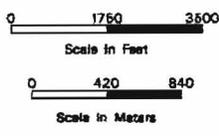


Legend

-  OU 1333
ER Site 64
-  40 Ft. Contour Interval
-  Roads
-  KAFB Boundary

Sandia National Laboratories, New Mexico
Environmental Restoration Geographic Information System

ER SITE 64
OU 1333
CENTRAL COYOTE TEST AREA



Unclassified
1:42000



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

SITE -SPECIFIC COMMENTS**OU 1295, Septic Tanks and Drain Fields**

6. **Boreholes used to characterize ER sites consisting of septic tanks, drain fields, etc. must be located so as to intercept the mass of known or suspected contaminated matter in the Solid Waste Management Unit (SWMU). Boreholes must be drilled to allow sampling of waste matter and of environmental media beneath the SWMU to determine if a release has occurred. (Even then, contaminant concentrations may not reflect what lies at greater depth, due to percolation of waste.) (Best Professional Judgment)**

Response: The characterization approach for SNL/NM septic tanks, drainfields, seepage pits, drywells, and other effluent release points is described in the RCRA Facility Investigation Work Plan, with addenda, for Operable Unit (OU) 1295, Septic Tanks and Drainfields, approved by EPA and NMED on March 31, 1995 (SNL/NM March 1993, SNL/NM 1994, SNL/NM May 1995, and EPA March 1995). This NOD comment will not be addressed here. DOE/SNL believe that the response should be subject to a separate negotiating process.

Site 142, OU 1295, Building 9970 Septic System

7. **A schedule for the removal of the tank and sludges at this site must be provided. (Additional information needed for adequate review)**

Response: The top of the septic tank was excavated and opened, then the waste material was removed on December 14, 1995 (SNL/NM December 1995a). The tank was thoroughly steam-cleaned. Then on December 15, 1995, an inspector from NMED verified that the tank had been emptied in compliance with state guidelines (SNL/NM December 1995b). The tank was then backfilled with clean fill dirt and the site graded.

8. **Based on the detection of VOCs, SVOCs, metals and radionuclides in liquid and sludge from the septic tank, analysis of additional samples from below this structure is necessary. (Best Professional Judgment)**

Response: Refer to the response to Comment #6 concerning the sampling approach for the OU 1295 septic and drain system sites. This NFA proposal is based on the confirmatory soil samples connected at the site, not the concentrations of constituents in the septic tank.

9. **Based on the shallow depth of the saturated zone at this site, groundwater monitoring must be conducted, unless the results of sampling and analysis required in Comment No. 6 above indicate otherwise. (Best Professional Judgment)**

Response: Refer to the response to Comment #6 concerning the sampling approach for the OU 1295 septic and drain system sites. The intermittent occupancy of Building 9970 and the nature of the testing performed at this facility (SNL/NM March 1993) indicate that only low effluent rates were disposed to the system and do not suggest the use or release of significant volumes of constituents of concern (COCs). For these reasons, along with the lack of significant COC concentrations detected in the confirmatory soil samples collected around the release point, DOE/SNL do not believe that groundwater monitoring is necessary or justified at this site.

Site 143, OU 1295, Building 9972 Septic System

10. **Based on the detection of VOCs, SVOCs, barium, and tritium in liquid and sludge from the septic tank and organics in soil samples from the leachfield, analysis of additional samples from beneath these features is necessary. (Best Professional Judgment)**

Response: Refer to the response to Comment #6 concerning the sampling approach for the OU 1295 septic and drain system sites. In addition, referring to Figure 2 of the NFA proposal for Site 143, the sampling locations are almost directly on top of the drainlines in the leachfield. With the first sampling interval starting level with the bottom of the trenches excavated for the leachfield and the second interval starting 10 feet below the first, DOE/SNL believe that the sampling would have intercepted and identified any significant release of COCs from the septic system. The septic tank still contained liquid wastes when it was emptied, indicating that there were no leaks from the structure. If the tank had been leaking, the two sampling locations on either side of the tank would have intercepted any COCs released.

This NFA proposal is based on the confirmatory soil samples, not the concentrations of constituents in the septic tank. The organic constituents reported in the soil samples are clearly attributable to analytical laboratory contamination. Concerning the organic constituents found in the soil samples, EPA guidance (EPA 1988) specifically states that "No positive sample results should be reported unless the concentration of the compound in the sample exceeds 10 times the amount in any blank for the common contaminants listed below, or 5 times the amount for other compounds." The guidance also states that if positive

concentrations are reported and are below the Contract Required Quantitation Limit, the data should be qualified as non-detects. The list of five common laboratory contaminants listed by the EPA include MEK, acetone, and methylene chloride, which are the three compounds detected in Site 143 soil analyses. The soil trip blank shipped to the CLP laboratory with the site samples contains the highest concentrations of all the compounds reported, and all are common laboratory contaminants. All the concentrations of organics in site samples are below the laboratory quantitation limits for soil except for two samples with acetone, one at the reporting limit of 10 mg/kg, and the other at 11 mg/kg. In comparison, the trip blank contained acetone at 18 times the laboratory reporting limit (Table 2 of the NFA proposal for Site 143). DOE/SNL believe that the site was sufficiently characterized and that additional sampling is not justified. DOE/SNL will perform a risk assessment analysis to show that the COCs detected at the site do not pose any significant risk to human health or the environment.

- 11. Based on the shallow depth of the saturated zone at this site, groundwater monitoring must be conducted unless the results of sampling and analysis recommended in Comment No. 8 above indicate otherwise. (Best Professional Judgment)**

Response: Refer to the response to Comment #6 concerning the sampling approach for the OU 1295 septic and drain system sites. The nature of the testing performed at this facility (SNL/NM March 1993) does not suggest the use or release of significant volumes of the COCs found in the septic tank. For this reason, along with the analytical results of confirmatory soil samples collected in the leachfield and next to the septic tank, DOE/SNL do not believe that groundwater monitoring is necessary or justified at this site.

Site 146, OU 1295, Building 9920 Drain System

- 12. The only analyses available come from soil/sediment samples collected outside the 6-foot square area used for liquid waste disposal. Because VOCs, RCRA metals, and tritium were detected in these samples, analysis of additional samples from below the disposal area is necessary. (Best Professional Judgment)**

Response: Refer to the response to Comment #6 concerning the sampling approach for the OU 1295 septic and drain system sites. DOE/SNL believe that soil samples were collected from below the disposal area.

As stated in Section 3.7 of the NFA proposal for Site 146, DOE/SNL believe that the organic constituents detected in the soil samples collected are due to

laboratory contamination rather than residual concentrations from a significant release at the site. Refer to the response to Comment #10 for EPA guidance on evaluating data to identify laboratory-introduced contamination. The volatile organic compounds (VOCs) detected in the soil trip blank (Table 2 of the NFA proposal) are an indicator of contamination introduced during transit or most likely in the analytical laboratory. The trip blank exhibits the highest concentrations and the largest number of VOCs found in the site soil samples.

The RCRA metals detected in the soil samples (Table 3 of the NFA proposal) were all less than the 95th percentile for background metals concentrations in soil at SNL/NM (IT March 1996). The highest concentration of each metal constituent detected at the site is compared to the latest available maximum background values in Table III-1 below. In addition, the lowest sampling interval started at 14 feet below ground surface (bgs); samples from this deep interval contained metals concentrations that did not vary significantly from those collected in the interval starting at 4 feet bgs, indicating that even if metal COCs were released from the facility, their downward migration in the soil column was insignificant during the approximately 22 years of facility operation.

Table III-1. Comparison of Soil Concentrations and Background Values for Site 146.

Constituent	Highest Concentration	SNL/NM Background
As	2.8 ppm	7 ppm
Ba	185 ppm	214 ppm
Cr	6.8 ppm	15.9 ppm
Pb	4.8 ppm	11.8 ppm

The highest tritium activity detected was 250 picocuries per liter (pCi/L) in soil moisture, which is at the method detection limit for the analytical laboratory. While no background activity has been estimated for tritium in soil at SNL/NM, the activity of tritium in soil moisture can be approximated by samples taken by the EPA of rainwater throughout the United States (EPA 1993). Assuming that the atmospheric tritium concentration in rainwater is in equilibrium with tritium in soil moisture, the background range for soil is 100 to 400 pCi/L, which brackets the highest tritium concentration detected at Site 146. DOE/SNL believe that the site was sufficiently characterized and that additional sampling is not justified. SNL/NM will perform a risk assessment analysis to show that the COCs detected at the site do not pose any significant risk to human health or the environment.

Site 148, OU 1295, Building 9927 Septic System

13. **The only analyses available come from soil/sediment samples outside the area used for liquid waste disposal here. Because VOCs and potentially elevated levels of RCRA metals were detected in these samples, analysis of additional samples from directly below the disposal area is necessary. (Best Professional Judgment)**

Response: Refer to the response to Comment #6 concerning the sampling approach for the OU 1295 septic and drain system sites.

From Table 2 in the NFA proposal for Site 148, organic compounds detected in the soil samples are again clearly the result of laboratory contamination. Refer to the response to Comment #10 for EPA guidance on evaluating data to identify laboratory-introduced contamination. The two VOC compounds detected above the laboratory reporting limit in the soil trip blank were not detected in the site samples. This strongly suggests that they were introduced in transit, or more likely in the laboratory once the trip blank container was opened. The concentrations reported in the site samples for toluene and methylene chloride were all below the laboratory reporting limit, and these compounds were also present in the trip blank.

From Table 3 in the NFA proposal for Site 148, the concentrations of RCRA metals reported in the site samples were all below the SNL/NM 95th percentile for soils except for arsenic from one sampling interval (IT March 1996). The highest concentration of each metal constituent is compared to the latest available maximum background values in Table IV-1 below. One arsenic value is slightly above the maximum background value for SNL/NM. However, the concentration is still within the range of background values for arsenic in subsurface SNL/NM soils of 0.033 to 17.0 milligrams per kilogram (mg/kg) (IT March 1996). The concentration is also well below the proposed Subpart S Action Level for soil of 20 mg/kg. DOE/SNL believe that the site was sufficiently characterized and that additional sampling is not justified. DOE/SNL will perform a risk assessment analysis to show that the COCs detected at the site do not pose any significant risk to human health or the environment.

Table IV-1. Comparison of Soil Concentrations and Background Values for Site 148.

Constituent	Highest Concentration	SNL/NM Background
As	8.5 ppm	7 ppm
Ba	111 ppm	214 ppm
Cr	5.6 ppm	12.8 ppm
Pb	9.7 ppm	11.8 ppm
Ag	0.78 ppm	<1 ppm

References (for OU 1295)

IT Corporation (IT), March 1996, "Background Concentrations of Constituents of Concern to the Sandia National Laboratories/New Mexico Environmental Restoration Project and the Kirtland Air Force Base Installation Restoration Program," IT Corporation, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), March 1993, "Septic Tanks and Drainfields (ADS-1295) RCRA Facility Investigation Work Plan", Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), 1994, "Comment Responses to USEPA Notice of Deficiency November 1994", Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), May 1995, Letter with attachments dated May 11, 1995 from SNL/NM (Bob Galloway) to EPA (Nancy Morlock) describing number of and spacing between boreholes used to characterize each of the OU 1295 drainfields in late 1994 and early 1995. Maps showing borehole locations in each OU 1295 drainfield were also included with the transmittal.

Sandia National Laboratories/New Mexico (SNL/NM), December 1995a, Field Log #0147, Pages 87 through 91, 12/14/95, Field notes for the ER Site 142 septage waste removal and tank cleaning operation.

Sandia National Laboratories/New Mexico (SNL/NM), December 1995b, Field Log #0147, Book #2, Pages 93 through 97, 12/15/95, Field notes for the ER Site 142 empty septic tank inspection by NMED.

U.S. Environmental Protection Agency (EPA), February 1988, "Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses", prepared for the Hazardous Site Evaluation Division U.S. Environmental Protection Agency, February 1, 1988.

U.S. Environmental Protection Agency (EPA), October 1993, "Environmental Radiation Data Report 73, January-March 1993", Report Number EPA 402-R-93-092, National Air and Radiation Environmental Laboratory, Montgomery, Alabama.

U.S. Environmental Protection Agency (EPA), March 1995, Letter dated March 31, 1995 from EPA (Allyn M. Davis) to DOE/AL (Kathleen A. Carlson) approving the March 1993 OU 1295 RFI Work Plan and follow-up addenda, and specifying a few additional conditions and requirements.

Site 15, OU 1332, Trash Pits

14. **Sample locations on Appendix A, p. A-2, Figure 1 are not clearly labeled. There are two locations marked 003, and the location of 004 is not apparent. Sample location symbols on this map must agree with sample identification numbers in the data tables. (Editorial comment)**

Response: A corrected map is included as Attachment A to this section.

Site 27, OU 1332, Building 9820 Animal Disposal Pit

15. **The donkey pit area must be trenched to a depth of at least 10 feet to ensure that all burial pits are located. Where a pit is encountered, trenching must continue until undisturbed geologic material beneath the pit is encountered. (Best Professional Judgment)**

Response: Pit will be trenched to 10 feet or bedrock, whichever is encountered first.

16. **Any buried solid wastes found in the donkey pit area must be characterized. Also, at a minimum, the undisturbed material underlying each burial pit must be sampled and analyzed for VOCs, SVOCs, metals, pesticides, herbicides, gross α , gross β , and gamma spectra. (Best Professional Judgment)**

Response: Sampling as requested will be conducted. Samples will be analyzed for all the analytes requested except pesticides and herbicides. These analytes are not COCs at any SNL/NM ER site, and the site history does not suggest they could have been used at the site.

17. **During a site visit, NMED identified a trash mound containing laboratory debris located approximately 100 feet north of the animal pit. Solid wastes in the trash mound must be characterized. The undisturbed geologic material beneath the trash mound must also be sampled for VOCs, SVOCs, metals, pesticides, herbicides, gross α , gross β , and gamma spectra. (Best Professional Judgment)**

Response: Sampling as requested will be conducted. Samples will be analyzed for all the analytes requested except pesticides and herbicides. These analytes are not COCs at any SNL/NM ER site, and the site history does not suggest they could have been used at the site.

18. **Additionally, background soil samples for analysis of gross α and gross β activity must be collected. (Best Professional Judgment)**

Response: Site-specific background samples will be collected for gross alpha and gross beta.

19. **Any mine adits, shafts and pits posing a health or safety hazard should be sealed or fenced, and appropriate warning signs installed. (The Abandoned Mine Lands Bureau, Mining and Minerals Division, New Mexico Energy, Minerals and Natural Resources Department can be contacted for assistance (505-827-5970).) (Best Professional Judgment)**

Response: Mines posing a health and safety hazard will be sealed or fenced. Warning signs will be installed on fenced mines.

Site 28-2, OU 1332

20. **Information on and results of the Radiation Survey of Kirtland Air Force Base/Department of Energy Controlled Areas conducted on August 18, 1989 must be submitted for review. (Best Professional Judgment)**

Response: Results of all radiation surveys are included as Attachment B to this section.

21. **The lower adit appears to have been used for experimental or disposal purposes. Due to the uncertainty regarding the presence and/or release of hazardous and radioactive constituents at this site, a worst case risk assessment must be submitted. The risk assessment must address all appropriate hazardous and radioactive constituents. A recreational future land use must be assumed. At a minimum, the ground water pathway and ground water to surface water pathway must be addressed. (Best Professional Judgment)**

Response: A risk assessment will be conducted and submitted as requested. DOE/SNL would like to meet with NMED to better define input parameters.

22. **Cross-sections of the suspected disposal area behind the concrete block, showing all excavations and backfilling, must be submitted. (Additional information required for adequate review)**

Response: The request to provide cross-sections of the mine would require mine entrance, coring the floor with heavy equipment, and measuring backfill. The

cross-sections are not required to conduct the risk assessment approach developed at the April 16, 1997, meeting. Since the cross-section is not necessary for the developed approach, the required mine entrance does not seem warranted.

The proposed approach for this site was developed from discussions with NMED and EPA personnel during a tour on April 16, 1997, and is discussed in greater detail in the response to OU 1332 Workplan comments sent to NMED May 8, 1997. The approach involves conducting a risk assessment using conservative assumptions about source terms, migration pathways, and receptors. If acceptable risk is found from this assessment, no further work is warranted. DOE/SNL believes that the risk at a site should include real-time risks to site workers conducting assessment/cleanup activities. The 28-2 mine is clearly unstable, based on the obvious collapse of the mine opening. The historical records indicate that SNL personnel walked into the mine without obstruction when the mine was used decades earlier. Currently there is only a small opening through which personnel could crawl into the mine. Any further collapse could trap personnel in the mine. The cost to stabilize the mine adequately for personnel entrance under applicable safety regulations would be very substantial.

- 23. The original field reports must be provided as appendices in the NFA proposal. (Additional information needed for adequate review)**

Response: Copies of original field reports are included as Attachment C to this section.

Site 28-10, OU 1332

- 24. The "slag" around the shaft near the top of the hill must be sampled and analyzed for RCRA hazardous constituents. (Best Professional Judgment)**

Response: The slag will be analyzed for RCRA metals and gamma spec.

- 25. A modern road leads to what may be a backfilled portal or open cut near the base of the eastern side of the hill. This "working" must be dug out with a back hoe and inspected for evidence of previous testing, waste disposal or waste storage. If such evidence is found, then the site must be sampled and further characterized. (Best Professional Judgment)**

Response: The disturbed area will be investigated as requested.

Site 67, OU 1332, Frustration Site

- 26. Soil at the transformer location must be analyzed for PCBs. (Best Professional Judgment)**

Response: Sampling will be conducted as requested.

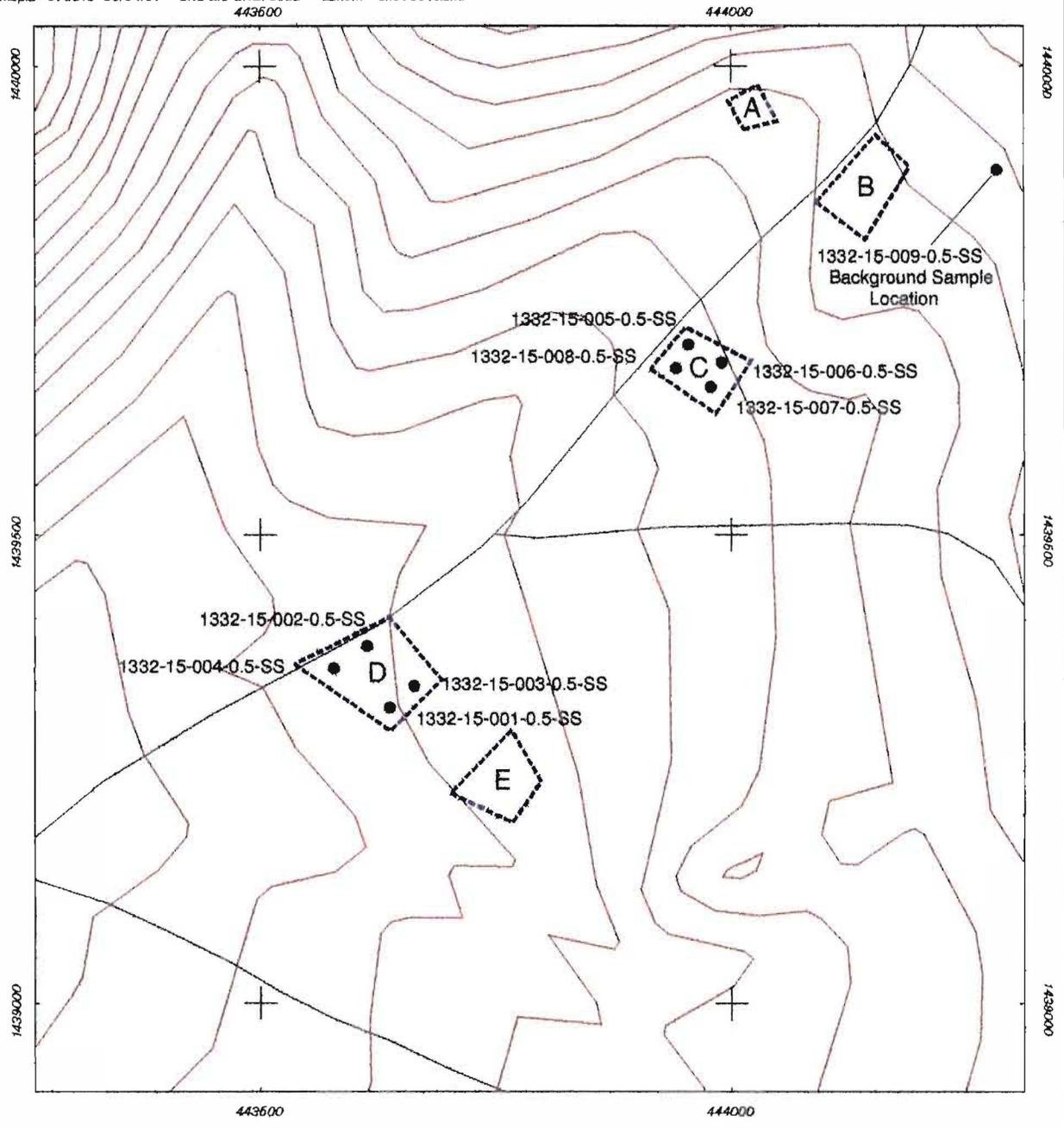
- 27. All electrical equipment, instrumentation, office furniture and debris in the mine, as well as the fence around the transformer location, must be removed. (Best Professional Judgment)**

Response: The fencing around the transformer pad will be removed. DOE/SNL propose that nonhazardous material in the mine will be removed if sampling discussed in comment # 28 finds COCs above action levels. A significant portion of the material on the floor consists of shoring members that have collapsed. Movement of bulk materials presents the danger of bumping the remaining shoring and causing a collapse of the mine. DOE/SNL would have to reshore the mine before such work could be attempted. This would involve substantial cost for little benefit. Such costs could only be justified if elevated COCs are found to be present.

- 28. Investigation of the mine floor must follow the removal action described in Comment No. 27 above to verify that no releases have occurred. (Best Professional Judgment)**

Response: DOE/SNL propose that sampling of the exposed floor be conducted around the debris. This would determine if COCs are present without having to shore the mine again. A significant portion of the material on the floor consists of shoring members that have collapsed. Judgmental/random sampling could be carefully conducted so as not to impact remaining shoring members. A minimum of 10 samples will be collected. If COCs are found, the nonhazardous materials in the mine will be removed to allow additional sampling.

ATTACHMENT A
CORRECTED SITE MAP

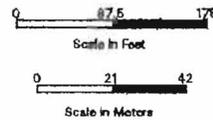


Legend

- Sample Location
- Road
- 10 Foot Contour
- - - - Disturbed Area

Note: Areas A, B, C, D, & E are identified in aerial photographs, indicating potential areas of excavation

Figure 1 ER Site 15 Trash Pits



ATTACHMENT B
RESULTS OF RADIATION SURVEYS

Radiation Survey of KAFB/DOE Controlled Areas,
Kirtland Air Force Base, Albuquerque, NM

Douglas M. Minnema
Reactor Applications Division, 6451
and
George E. Tucker
Health Physics Division, 3212
Issued August 18, 1989

INTRODUCTION

Sandia National Labs (SNL) has performed a number of outdoor tests on weapons components and systems over the past forty years. Some of these tests involved the inclusion of radioactive material, primarily natural or depleted uranium. Increased concern over environmental issues, coupled with decreased acceptable limits, has resulted in reevaluating the test areas for potential low level contamination. As a result of this concern, SNL has performed a radiation survey of selected sites on Department of Energy (DOE), Forest Service, and Air Force areas on Kirtland Air Force Base (KAFB), Albuquerque, New Mexico. The sites studied were selected based upon input from three sources: KAFB site maps, the results of an EG&G helicopter survey of April, 1980, and interviews of selected SNL staff. The KAFB maps indicated several sites that were identified by an inspection performed by the Defense Nuclear Agency and a private firm contracted by the U.S. Air Force (ref. 1 & 2). These sites consisted of dirt mounds, test sites, and old mine diggings. The helicopter survey identified areas of above background radiation levels in the area. The interviews helped identify other sites that were known locations of past tests.

INSTRUMENTATION

The surveys were performed using SNL's mobile radiation measurement lab, consisting of a computerized multichannel analyzer, a portable intrinsic germanium gamma spectrometer, and various other portable instruments, housed in a trailer. The gamma spectrometer could be operated at distances up to 300 meters from the trailer, allowing the radiation spectra at each site to be measured directly. Also, soil and debris samples could be analyzed with the spectrometer mounted within a lead shield in the trailer. For the more inaccessible sites, a portable multichannel analyzer and battery pack were used with the spectrometer to acquire the spectra.

Each site was studied according to its particular situation. Horizontal mine shafts were entered and inspected visually and with a portable high sensitivity radiation meter, and spectra were acquired at any locations within the shaft above local background. The spectrometer was lowered into vertical shafts, or a sodium-iodide (NaI) detector was used, depending upon the condition of the shaft. Dirt mounds were surveyed at several locations around and on the top. Surface areas were evaluated by mounting the spectrometer on a tripod and analyzing spectra at several locations within the identified area. If the area surveys showed above background readings or isotopes not normally associated with background, grab samples of soil and debris were also collected and analyzed as appropriate.

The germanium spectrometer is very sensitive for most of the uses described here. Surface contamination can be detected down to levels of approximately 0.2 picoCuries per gram (pCi/g) of soil, and individual contributors of a radiation field can be identified at levels of roughly 5% of the total field. The spectrometer's resolution is sufficient to identify individual peaks that are less than 0.2% apart in gamma energies. This sensitivity is extremely good for looking at surface contamination and sources that may have been disposed of in mines. The technique is more limited in looking for buried sources due to attenuation of the radiation in the soil cover. A stronger radiation source would be required to penetrate greater than roughly 1 meter of cover soil with sufficient intensity to be detected by the spectrometer, raising the minimum detectable level to the equivalent of a few microCuries per gram for buried sources. This presented a problem for only one site consisting of 3 covered trenches of unknown depth, since all other sites had minimal or no cover. As an example of the spectrometer's sensitivity and accuracy, Cesium-137 from atmospheric weapons testing fallout was observed in almost all of the surface spectra at levels averaging roughly 0.3 to 0.5 pCi/g, agreeing well with the average found from SNL's environmental monitoring program of 0.388 pCi/g (ref. 5).

IDENTIFICATION OF SITES

The KAFB map "Radioactive Contaminated Sites, Kirtland Air Force Base", tab #Cl.1a (ref. 3), identified a total of 6 dirt mounds (DM-1 through 6) and 6 mine shafts (MS-A through F) that the USAF contractor's inspection had found to be either unposted, or posted with various warning signs with no documented explanation for the purpose or contents of the location. During our investigations of these sites, 4 additional shafts (MS-G through J) were found and included in the study, and two shafts were identified at sites MS-B through D, rather than the single shafts indicated on map Cl.1a, and all were included in the study. Also, the site identified as dirt mound DM-3 on map Cl.1a was actually a group of 3 old burn pits.

The EG&G helicopter survey of April, 1981 (ref. 4), was consulted as another possible source for locating sites. One site in particular, listed as 'Area 5' in their survey (not to be confused with SNL Tech Area V) was identified as having higher than normal levels of uranium daughter products. This area is directly south of the southern boundary of Manzano Base. Investigations indicated that there were no known tests conducted in this area, so this site was also included in the survey.

Interviews with SNL personnel helped to identify another site of possible contamination, the "Pendulum Site" located directly east of Manzano Base. At this site weapon penetration tests had been conducted in a protected bunker until a test device exploded, destroying the bunker and potentially spreading depleted uranium into the surrounding area. Although this site was cleaned at the time, it was included in this survey. Some other sites were suggested as having potential for contamination, however these sites are currently in use and are monitored by the Health Physics division, and so were not included in this survey.

RESULTS OF THE SURVEY

The results of the survey can be divided into groups based upon the type of site studied. None of the 11 mines surveyed showed any signs of having been used for radioactive waste disposal. The radiation spectra showed nothing more than variations in background levels due to the types of rocks found at each location. Visual inspection of the horizontal shafts suggest that these mines were mainly exploratory shafts from prospectors working the area, however a few show signs of commercial production before they were abandoned. The vertical shafts show similar indications that they were also developed by prospectors, although these were not entered for visual inspection due to hazardous conditions. Only one shaft requires special mention, the one labeled as MS-B on map Cl.1a. There has been some recent activity at this mine of unknown intent. For unknown reasons the entrance was posted with a radiation warning sign. This study, however, indicated that the sign is unwarranted and should be removed. It should be noted that all of these mines are in poor repair, and represent conventional safety hazards that should be appropriately fenced and posted to prevent an accident. The shafts are easily accessible and some are hidden from view by underbrush, enhancing the possibility of somebody stumbling into them unknowingly.

The KAFB maps also identified 6 dirt mounds that were listed as 'possible burial sites'. As mentioned, one of these sites turned out to be an old burn test site with 3 pits, labeled DM-3 on map Cl.1a. One of these pits was locally contaminated with ceramic thoria thermocouple insulation debris from a burn test. This debris was confined to within one pit, and SNL Health Physics has cleaned up this site and disposed of the debris. Survey and grab samples of the surrounding area and the

other pits show no other contamination present. Two other mounds in the same general area, labeled as DM-1 and DM-2, were also surveyed. Radiation spectra at these mounds show nothing unusual, and the dirt mounds are not high enough to significantly shield any sources. These sites are fenced with two sets of signs posted. The older, faded signs label the area as an explosive test area, and the newer signs label the area as a radiation area. These sites are most likely disposal sites for old explosive ordinance removed from the area, and are believed to be clean of radioactive contamination. The remaining 3 sites, DM-4, 5, and 6, are located in the Lawrence Canyon area. These sites are actually located roughly 600 meters east of their recorded positions on the base maps. These mounds line up directly with the old 155mm gun site north of their location, and were used as targets when that facility was in operation. Radiation spectra show nothing unusual at these mounds, and they are believed to be clean also.

The 'area 5' location reported in the EG&G helicopter survey was also investigated. The site was found to be a natural lava mound formed by an uprising of a brown lava rock. Apparently as the brown rock cooled it fractured, and a darker metallic lava was pushed up through the fissures and cooled in place. Radiation levels in the area were found to be roughly twice the normal background. Since no man-made source could be found, the rocks were analyzed, and the metallic rock was found to contain natural uranium at levels roughly four times the concentrations in the brown lava. This is a completely natural occurrence and not caused by any practices of KAFB or SNL personnel, therefore cleanup of the site would be both impractical and unnecessary. There may well be other similar occurrences in the area, although none were positively identified. The presence of natural uranium deposits probably explains why the helicopter survey indicated slightly higher background levels in and around the mountainous areas than those observed on the mesa.

The next site surveyed was the Pendulum Site. Several years ago penetration tests were performed inside an earth covered bunker built into the side of a small hill using devices with depleted uranium loadings. The last test resulted in an explosion that blew the roof off the bunker and destroyed the facility. This area was studied for possible uranium contamination with a series of soil samples. Out of 8 samples, only one showed any signs of contamination, and only at a level of 60 pCi/g, compared to the natural uranium average background concentration of 0.9 pCi/g reported in the SNL environmental monitoring program (ref. 5). The contaminated area was a small pile of vermiculite, and was cleaned up easily. This site is now believed to be clean of contamination.

One other site was also found through the interviews, a series of 3 filled trenches east of Pennsylvania Road across from the NATO Evaluation Site, near a small arroyo. This site is on Air Force land, and is vaguely posted as a radiation area, although the signs are roughly 60 meters away from the trenches. (It is not clear whether the

signs are intended for the trenches or for a USAF training area further to the east of the site, known to be contaminated with thorium ore.) The trenches are marked with two wooden stakes, apparently indicating the trench ends, and with a yellow metal post in roughly the center of the trenches (this posting corresponds with a 'dated' method for identifying radioactive waste burial areas). There are no other markings or signs, and inquiries to the Air Force have yielded no information. Radiation spectra acquired above the trenches indicate nothing above background; however, the depth of the trenches could severely limit the detection capabilities of the spectrometer due to the amount of cover soil. The trenches are on KAFB property, and the military has been notified of their condition. As a minimum precaution the trenches should be better identified.

CONCLUSIONS

With the exception of the trenches across from the NATO Site, and the two sites that have since been cleaned up, nothing unusual was found at any of the sites. These sites should be considered clean of any radioactive contamination and removed from the maps, including the old burn site and the Pendulum site, since they have been cleaned up as required. All radiation signs should be removed to avoid confusion, and the two mounds believed to be explosives disposals should be either cleaned up or reposted as such. It is further recommended that the mine shafts be sealed off and labeled to reduce the hazardous conditions that exist at these sites.

REFERENCES

1. "Radioactive Waste Survey", August 16, 1971, performed by the Defense Nuclear Agency, Headquarters Field Command, KAFB.
2. "Installation Restoration Program, Phase I Records Search, Hazardous Materials Disposal Sites, KAFB", performed by Engineering-Science, 57 Executive Park South, NE, Suite 590, Atlanta, GA, 30329 (Draft report only).
3. "Radioactive Contaminated Sites, Kirtland Air Force Base", a base map, tab # C1.1a, revised to 9/30/82.
4. "An Aerial Radiological Survey of the United States Department of Energy's Sandia National Laboratories and Inhalation Toxicology Research Institute, Albuquerque, New Mexico", P. K. Boyns, project scientist; date of survey, April, 1981; The Remote Sensing Laboratory operated for the U.S. DOE by EG&G Energy Measurements Group.
5. "1982 Environmental Monitoring Report, Sandia National Laboratories, Albuquerque, New Mexico", Gloria Chavez Millard, Charles E. Gray, Theodore N. Simmons, Bill L. O'Neal. SAND83-0789, printed April 1983.

**INSTALLATION
RESTORATION PROGRAM**

**PHASE I - RECORDS SEARCH,
HAZARDOUS MATERIALS DISPOSAL SITES**

**KIRTLAND AFB,
NEW MEXICO**

PREPARED FOR

**UNITED STATES AIR FORCE
AFESC/DEV**

Tyndall AFB, Florida

NOVEMBER, 1981

RB-10 is an open site used for disposal of low level radioactive contaminated test animals and tissues. The site is located by the Lovelace Facility and is within 500 feet of the base boundary. The nearest active drinking water well is over three miles away and the ground-water depth in this area is believed to be about 50 feet (subject to confirmation). The RB-10 site received a rating score of 32.

- b) Radioactive liquid holding tanks (RB-4, 5, 6, 8 and 9), the dirt mounds and the mine shafts appear to pose little potential for water contamination problems. RB-4, 5, 6, 8 and 9 are emergency underground holding tanks which would only receive contaminated material (low-level radioactive liquid waste) in the event of an emergency. The waste material would then be removed from the tanks and disposed of at another location. The rating score for these sites was 23.

Recent investigations of the dirt mounds and mine shafts have not detected any radiation levels above background level and no evidence has been found to indicate hazardous materials are present at these locations.

3) Fire Training Area

- a) The main base fire training area (located by the FAA tower) ranks high as a potential contamination site because of the large quantity of JP-4, foam and waste chemicals that were used at the old fire training pit and the very permeable soil conditions. Fire training procedures have changed; the use of waste chemicals has been eliminated, fire training is conducted less frequently and a concrete liner has been constructed in the pit. However, the past practice have probably left chemical materials in the soil. Therefore, this site received a rating score of 50.
- b) The old fire training area by Manzano has a rating score of 35 and is not considered to have as great a potential for contaminant migration as the main base fire training area. The Manzano fire training area was used less frequently than the main base site and no waste chemicals were known to be burned at the site.

DM-3 were also fenced. These three mounds were resurveyed during the fall of 1980 with no indication of radiation levels above background.

Mine Shafts

Two horizontal and four vertical mine shafts have been identified as possible radioactive burial sites. The mine shafts are shown as MS-1 through MS-5 on Figure 4.16. In a 1971 survey of potential radioactive burial sites on the former Sandia Base, several of these mine shafts exhibited radiation levels of 2 to 3 times typical background levels. There is no indication of what, if anything, is contained in the mine shafts. A more recent survey in 1980 with the fidler probe indicated no increase above background radiation levels at mine shafts MS-2, MS-4, MS-5, and MS-6. The other two areas (MS-1 and MS-3) were not rechecked.

EVALUATION OF PAST DISPOSAL ACTIVITIES AND FACILITIES

The review of past operation and maintenance functions and past waste management practices at Kirtland AFB has resulted in the identification of 31 sites containing hazardous waste materials and having the potential for migration of contamination off the base boundaries. Other sites were reviewed and eliminated from further evaluation based on the logic presented in the decision tree shown in Figure 4.1. Three sites (RB-1, RB-3 and the chemical waste landfill) are located on DOE owned property, not Kirtland AFB property and have been tabulated separately from the other 31 sites (Appendix I).

The 34 sites have been assessed using a rating system which takes into account characteristics of potential receptors, pathways of migration of contaminants, waste characteristics, and specific characteristics of the site related to waste management practices. The details of the rating procedure are presented in Appendix G and the results of the assessment are summarized in Table 4.14 for sites on Kirtland AFB and Table 4.15 for the three sites on DOE property. The sites are listed in order of ranking, based on the rating scores developed for the individual location. The rating system is designed to indicate the relative need for more detailed site assessment and/or remedial action.

Ref 41

memorandum

Albuquerque Operations Office

Site 28
(Miles Near Frustr. Site)

DATE: JUL 26 1989

REPLY TO:
ATTN OF: MSD:ESHB:BHY

SUBJECT: Radiological Survey Reports on the Frustration and No-Name Abandoned Mine Sites.

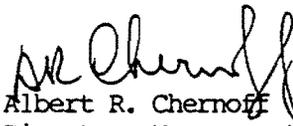
TO: P. M. Stanford, Controller, 0100, SNLA

It is the Department of Energy's (DOE) understanding that Sandia National Laboratories (SNL) completed radiological surveys of the above areas around two-years ago. The old mine sites were used as SNL experimental stations. It is also our understanding that reports were written on the results of the surveys and the areas are clean of radioactive materials and contamination. Due to proposed land use changes in that area, it is paramount that the mine areas be officially cleared, since both sites are still posted with radioactive area signs.

We need copies of the previous radiological reports. DOE conducted a new survey on the sites due to changing survey requirements, but having previous reports will substantiate any new information.

Please contact Bennett H. Young of my staff at 846-8211, regarding the status of these much needed radiological reports by August 1, 1989.

Sincerely,

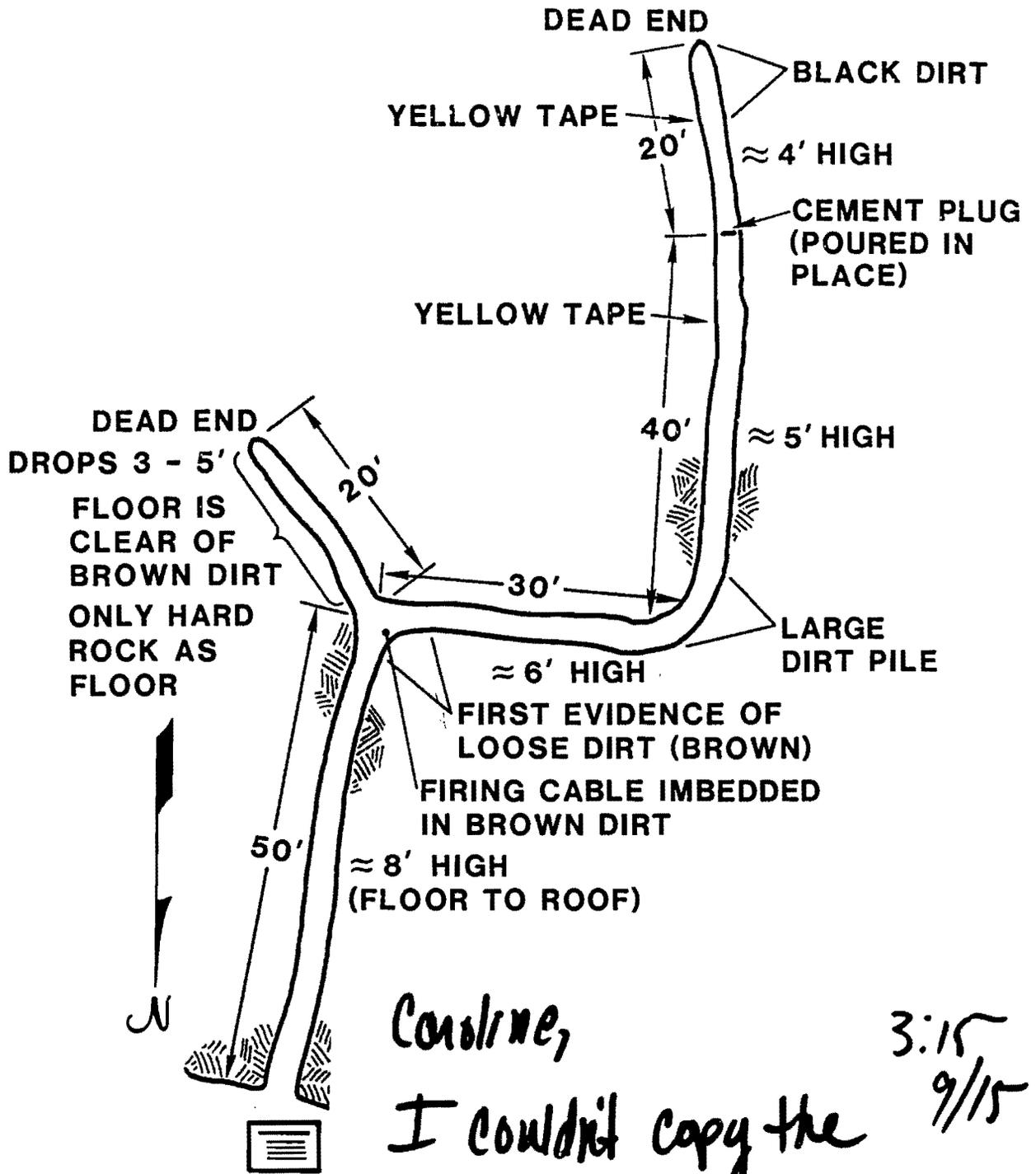

Albert R. Chernoff
Director, Management
Support Division

CC:
G. Tucker, 3312, SNLA
J. Phelan, 3314, SNLL,
H. Davidson, 1606 ABW/DEEU
B. Dow, 1606 ABW/DEEU
B. Young, MSD
P. Boehme, MSD

check on
who still owns/claims mines
from BLM next to Pine Club

Ref 41

CR-1041-43



Conline, 3:15
 I couldn't copy the 9/15
 map. But I'm sure that
 someone else could shrink
 it in the record center.
 Vozzina

INDUSTRIAL HYGIENE SERVICES
Laboratory Services and Chain of Custody Form

ER 1297-28

SF 2040-NAIS-881

Page ___ of ___

Submitted by W.A. DURAND	Org B202	For Zone I.H.	Date Submitted 11/13/89 Mo. Day Yr.
Lab Log No. 891947 to T	Report Date 0,20,5 90 Mo. Day Yr.	Analyst GRAY / Thompson	
Contaminant Uranium	Contaminant Code (CAS)	Analytical Method No. Fluorometric / Y Scan	
Sample Type <input type="checkbox"/> Air <input type="checkbox"/> Water <input checked="" type="checkbox"/> Soil <input type="checkbox"/> Veg. <input type="checkbox"/> Oil <input type="checkbox"/> Urine <input type="checkbox"/> Blood <input type="checkbox"/> Prod. I.D. <input type="checkbox"/> Qual./Quan. <input type="checkbox"/> Swipe <input type="checkbox"/> Misc.			
Reference: Employee	Building/Room AREA III		
Analysis Requested: TOTAL URANIUM	Priority: <input type="checkbox"/> Rush <input checked="" type="checkbox"/> Usual		
Log No. 891947	Sample Description MINE SHAFT SOIL 00025	Results See attached for X's detected. No 234Th or 230Pa detected which would indicate it.	Units
Charlie		No Uranium detected by Fluorometric analysis above bkg. 2.4 ug/g to 2 ug/g	
I was looking for a Total Number		Uranium	

(Continue entries on additional sheets; attach together.)

Relinquished By: **Durand** Date/Time: **11-13-89 5:35** Received By: **K. Gueulich** Date/Time: **11/13/89 3:55**

Relinquished By: _____ Date/Time: _____ Received By: _____ Date/Time: _____

Relinquished By: _____ Date/Time: _____ Received By: _____ Date/Time: _____

Disposal Instructions: **Tox** Disposal By: **PMG** Date/Time: **7/5/90 11:00am**

Approved by: **Charlie Gray** Date: **2/5/90** 3311 Supervisor _____ Date _____

Ref 41

* GAMMA SPECTRUM ANALYSIS *

CANBERRA SPECTRAN-F V4.0

Division 3313 Radiation Diagnostic Lab

01-FEB-90 13:41:29

ANALYSIS PARAMETERS

MCA Unit Number: 1 / ADC Unit Number: 1.1
Detector Number: 1 / Geometry Number: 30
Spectrum Size: 4096 channels from MCA Region FULL
Order of Smoothing Function: 5
Number of Background Channels: 4 on each side of peak
Peak Confidence Factor: 95.0%
Multiplet Sensitivity: 4
Identification Energy Window: +- 2.00 keV
Error Quotation: 1.00 sigma uncertainty

Environmental Background Subtracted
ULD Calculation Performed
Multiplet Analysis NOT Performed

Regular Output
Spectral data read directly from Multichannel Analyzer ANO
Analyzed by: djt

Sample Description: 90-007
Geometry Description: Marinelli Beaker
Sample Size: 4.7700E+02 gm / Conversion Factor: 1.0000E+00
Standard Size: 8.9000E+02 gm
Analysis Library file: ANL003

COLLECT started on 29-JAN-90 at 13:50:00

COLLECT Live Time: 6000. seconds
Real Time: 6009. seconds
Dead Time: 0.15 %

Decayed to 0. days, 0.0000 hours BEFORE the start of COLLECT

Energy Calibration performed 5-OCT-89
Efficiency Calibration performed 10-OCT-89

Ref 41

P E A K A N A L Y S I S

PK	Centroid channel	Energy keV	FWHM keV	Backgnd counts	Net Area counts	Error %	Nuclides
1	127.23	63.62	1.2	1076.	221.	22.7	TH-234
1B		63.44			43.	32.3	
2M	154.51	77.27	1.4	2596.	2471.	4.3	
3M	174.46	87.25	1.1	2211.	682.	12.3	CD-109
4	186.20	93.13	1.3	943.	450.	10.5	TH-234
4B		92.75			54.	27.1	
5	258.51	129.31	1.3	783.	213.	19.8	CS134M,PU-239
6	372.11	186.15	1.7	631.	557.	7.7	RA-226
7	418.60	209.41	1.4	551.	378.	10.2	U-237,NP-239
8M	477.43	238.85	1.3	990.	4063.	2.1	PB-212
8B		238.84			48.	23.9	
9	540.30	270.30	1.2	402.	325.	10.6	
10	590.61	295.47	1.4	392.	912.	4.6	PB-214,GA-73
11	600.31	300.33	1.2	414.	186.	17.6	PB-212
12	655.89	328.13	1.6	390.	164.	19.7	LA-140
13	676.88	338.63	1.5	321.	671.	5.5	AC-228,CS-136
14	704.05	352.22	1.5	273.	1609.	2.9	PB-214
14B		351.99			24.	32.8	
15	926.31	463.41	1.5	253.	195.	14.5	CS-138
16	1021.78	511.16	1.8	221.	495.	6.4	TL-208,NA-22,
16B		511.07			116.	10.8	ANN-RD
17	1166.64	583.62	1.4	175.	1132.	3.5	TL-208
18	1218.90	609.75	1.5	188.	1095.	3.6	XE-135,BI-214
18B		608.59			14.	39.6	
19	1454.71	727.69	1.8	164.	257.	9.9	BI-212
20	1536.72	768.70	1.4	103.	90.	18.8	
21	1589.97	795.32	1.6	144.	95.	22.5	CS-134
22	1721.38	861.03	1.9	88.	148.	12.3	BI-212
23	1822.93	911.81	1.8	131.	762.	4.3	AC-228
24	1929.96	965.32	0.9	149.	75.	26.5	
25	2241.53	1121.08	1.8	167.	280.	9.6	BI-214,SC-46, TA-182
26	2476.84	1238.70	2.3	224.	65.	40.1	BI-214,CO-56
27	2817.20	1408.81	1.2	21.	54.	18.7	
28	2922.88	1461.62	2.0	54.	3702.	1.7	K-40
29	3177.40	1588.80	1.3	25.	54.	18.9	
30	3242.93	1621.54	1.3	14.	12.	51.3	BI-212
31	3261.75	1630.95	2.2	21.	32.	27.9	
32	3278.13	1639.13	0.8	15.	17.	43.1	
33	3460.99	1730.49	2.2	12.	44.	19.6	
34	3531.23	1765.58	2.5	10.	222.	7.2	BI-214

ror Quotation at 1.00 sigma
Peak Confidence Level at 95.0%

M - Possible Multiplet
B - Environmental Background peak

Background Subtraction performed using file BK0001
Background Description: 100 min BKG
Background COLLECT started on 12-OCT-89 at 14:26:00

Ref 41

Division 3313 Radiation Diagnostic Lab

01-FEB-90 13:41:29

Sample: 90-007

Data collected on 29-JAN-90 at 13:50:00

Decayed to 0. days, 0.0000 hours BEFORE the start of COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

Nuclide	Activity Concentration in pCi /gm			
	Measured	Error	Decay corrected	Error
AM-241	LLD<4.73E-01		LLD<4.73E-01	
CO-57	LLD<3.42E-02		LLD<3.42E-02	
CE-144	LLD<2.86E-01		LLD<2.86E-01	
CR-51	LLD<2.61E-01		LLD<2.61E-01	
PB-214	1.16E+00	+ - 3.67E-02	1.16E+00	+ - 3.67E-02
SB-125	LLD<9.10E-02		LLD<9.10E-02	
SE-7	LLD<2.84E-01		LLD<2.84E-01	
TL-208	5.39E-01	+ - 1.87E-02	5.39E-01	+ - 1.87E-02
CS-134	LLD<6.48E-02		LLD<6.48E-02	
BI-214	9.73E-01	+ - 3.58E-02	9.73E-01	+ - 3.58E-02
RU-106	LLD<3.10E-01		LLD<3.10E-01	
CS-137	LLD<4.15E-02		LLD<4.15E-02	
I-212	1.07E+00	+ - 1.05E-01	1.07E+00	+ - 1.05E-01
_R-95	LLD<6.76E-02		LLD<6.76E-02	
CO-58	LLD<3.72E-02		LLD<3.72E-02	
MN-54	LLD<3.80E-02		LLD<3.80E-02	
AC-228	LLD<1.60E-01		LLD<1.60E-01	
ZN-65	LLD<1.21E-01		LLD<1.21E-01	
NA-22	LLD<5.54E-02		LLD<5.54E-02	
CO-60	LLD<4.66E-02		LLD<4.66E-02	
NA-24	LLD<4.27E-02		LLD<4.27E-02	
K-40	3.14E+01	+ - 5.32E-01	3.14E+01	+ - 5.32E-01
Total	3.51E+01	+ - 5.45E-01	3.51E+01	+ - 5.45E-01

Error Quotation at 1.00 Sigma
LLD Confidence Level at 95.0%

Ref 41

PEAKS NOT IDENTIFIED

Centroid channel	Energy keV	Net Area counts	Error %	Gammas/sec
127.23	63.62	177.	29.3	2.55E+00
154.51	77.27	2471.	4.3	1.80E+01
174.46	87.25	682.	12.3	3.63E+00
186.20	93.13	396.	12.4	1.84E+00
258.51	129.31	213.	19.8	7.40E-01
372.11	186.15	557.	7.7	2.03E+00
418.60	209.41	378.	10.2	1.43E+00
477.43	238.85	4015.	2.1	1.59E+01
540.30	270.30	325.	10.6	1.35E+00
590.61	295.47	912.	4.6	3.97E+00
600.31	300.33	186.	17.6	8.16E-01
655.89	328.13	164.	19.7	7.57E-01
676.88	338.63	671.	5.5	3.16E+00
926.31	463.41	195.	14.5	1.14E+00
1021.78	511.16	379.	9.0	2.40E+00
1536.72	768.70	90.	18.8	8.16E-01
1589.97	795.32	95.	22.5	8.92E-01
1822.93	911.81	762.	4.3	8.13E+00
929.96	965.32	75.	26.5	8.37E-01
2476.84	1238.70	65.	40.1	9.11E-01
2817.20	1408.81	54.	18.7	8.35E-01
3177.40	1588.80	54.	18.9	9.15E-01
3242.93	1621.54	12.	51.3	2.15E-01
3261.75	1630.95	32.	27.9	5.58E-01
3278.13	1639.13	17.	43.1	2.92E-01
3460.99	1730.49	44.	19.6	7.79E-01
3531.23	1765.58	222.	7.2	4.01E+00

Ref 71

ER 1297-28

DATE: July 27, 1989

TO: Distribution

Charlotte Gilmer

FROM: Charlotte Gilmer, 132

SUBJECT: Two Mines in Sol se Mete Canyon

Reference Memó, H. C. Bohannon to P. M. Stanford, dtd 7/17/89, same subject

Attachment Attached for your information is a copy of the referenced memo requesting that a meeting at the subject mines be set up to determine the environmental/safety issues concerned with the closure of the mines.

Action requested Please coordinate the requested meeting with the proper Sandia personnel and Deborah Garcia of DOE:MSD. Please notify Michael Norte, Organization 7821, at 6-6367, of the meeting time.

Also, please advise me of the meeting and attendees for our file information.

CG:132

Distribution:
3200 N. R. Ortiz
3202 G. J. Smith
7821 M. E. Norte
132 File (864)

Ref 41

1291-28

INDUSTRIAL HYGIENE SERVICES

Laboratory Services and Chain of Custody Form

SF 2040-NA(15-88)

Page ___ of ___

Submitted by: W. DURAND	Org: 3202	For Zone I.H.	Date Submitted 06/27/89 Mo. Day Yr.
Lab Log No. 890811 (890815)	Report Date 07/10/89 Mo. Day Yr.	Analyst Greenlich / Thompson	
Contaminant Gamma Scan	Contaminant Code (CAS)	Analytical Method No. γ Scan	
Sample Type <input type="checkbox"/> Air <input checked="" type="checkbox"/> Water <input checked="" type="checkbox"/> Soil <input type="checkbox"/> Veg. <input type="checkbox"/> Oil <input type="checkbox"/> Urine <input type="checkbox"/> Blood <input type="checkbox"/> Prod. I.D. <input type="checkbox"/> Qual./Quan. <input type="checkbox"/> Swipe <input type="checkbox"/> Misc.			
Reference: Employee		Building/Room	
Analysis Requested: GAMMA SCAN		Priority: <input type="checkbox"/> Rush <input checked="" type="checkbox"/> Usual	
Log No.	Sample Description	Results	Units
SNL 000288	MW-2		
SNL 000283	MW-2A	See Attached Sheets for data ↓ 9/23/89	
SNL 000287	MW-3A		
SNL 000291	BW-3		
SNL 000280	MW-1A		
SNL 000295	MINE SOIL		
Sample obtained from unnamed mine adit with buried radiation warning sign on 6/20/89 at the very end behind the concrete plug. J. Phillips (3202)			

(Continue entries on additional sheets; attach together.) *for MUGLETT*

Relinquished By: Nicholas Durand Date/Time 6-27-89 1:20 Received By: K. Greenlich Date/Time 6/27/89 1:20 pm

Relinquished By: _____ Date/Time _____ Received By: _____ Date/Time _____

Relinquished By: _____ Date/Time _____ Received By: _____ Date/Time _____

Disposal Instructions Keep temp. Disposal By: _____ Date/Time _____

Approved by: Charles Gray Date 7/10/89 Chem. Lab Supervisor Date

3311 Supervisor

Ref-41

*
* G A M M A S P E C T R U M A N A L Y S I S *
*

CANBERRA SPECTRAN-F V4.0

Division 3313 Radiation Diagnostic Lab

06-JUL-89 10:40:58

A N A L Y S I S P A R A M E T E R S

MCA Unit Number: 1 / ADC Unit Number: 1.1
Detector Number: 1 / Geometry Number: 30
Spectrum Size: 4096 channels from MCA Region FULL
Order of Smoothing Function: 5
Number of Background Channels: 4 on each side of peak
Peak Confidence Factor: 95.0%
Multiplet Sensitivity: 4
Identification Energy Window: +- 1.00 keV
Error Quotation: 1.00 sigma uncertainty

Environmental Background Subtracted
Multiplet Analysis NOT Performed

Regular Output
Spectral data read directly from Multichannel Analyzer ANO
Analyzed by: djt

Sample Description: SOIL 890815
Geometry Description: 783 GM MARINELLI STD
Sample Size: 5.9600E+02 gm / Conversion Factor: 1.0000E+00
Standard Size: 7.8300E+02 GM
Analysis Library file: ANL000

COLLECT started on 6-JUL-89 at 08:32:00

COLLECT Live Time: 6000. seconds
 Real Time: 6013. seconds
 Dead Time: 0.22 %

Decayed to 0. days, 0.0000 hours BEFORE the start of COLLECT

Energy Calibration performed 30-JAN-89
Efficiency Calibration performed 12-FEB-87

Ref 41

P E A K A N A L Y S I S

PK	Centroid channel	Energy keV	FWHM keV	Backgnd counts	Net Area counts	Error %	Nuclides
1	126.68	63.37	1.8	1380.	160.	35.7	TH-234
2	149.38	74.72	1.1	2711.	410.	19.2	TL-208
2B		74.95			212.	10.9	
3	167.81	83.95	0.9	695.	148.	23.3	TL-208
3E		84.73			54.	31.6	
4	186.00	93.04	1.4	1130.	419.	12.0	TH-234
4B		92.69			58.	24.7	
5	258.27	129.20	1.3	656.	266.	16.2	PU-239
6	371.68	185.94	1.7	655.	649.	6.7	RA-226
6B		185.56			44.	21.2	
7	418.17	209.20	1.5	699.	383.	11.0	NP-239
8M	476.93	238.59	1.3	1254.	4867.	1.9	PB-212
8B		238.73			65.	21.6	
9	540.30	270.30	1.5	448.	291.	11.8	
10M	590.11	295.21	1.3	881.	1253.	5.2	PB-214
11	655.52	327.94	1.3	350.	219.	13.8	LA-140
12	676.17	338.27	1.4	457.	841.	5.2	AC-228
13	703.32	351.85	1.3	383.	1736.	2.9	PB-214
14	818.41	409.43	1.7	293.	138.	20.0	CS-138
15	925.35	462.92	1.6	204.	216.	11.6	CS-138
16	1020.73	510.64	1.6	294.	484.	7.1	TL-208, NA-22, ANN-RD
17	1165.37	582.99	1.7	188.	1259.	3.2	TL-208
18	1217.54	609.09	1.7	219.	1267.	3.3	BI-214
19	1453.44	727.09	1.6	105.	290.	7.6	BI-212
20	1534.68	767.72	1.5	108.	102.	16.7	
21	1588.68	794.73	1.8	143.	182.	12.5	
22	1719.37	860.10	1.3	190.	154.	16.6	BI-212
23	1820.96	910.92	1.7	173.	868.	4.2	AC-228
24	1927.81	964.36	1.4	151.	106.	19.1	
25	2239.35	1120.19	2.0	164.	285.	9.4	BI-214, SC-46
26	2753.76	1377.77	2.0	53.	73.	19.0	BI-214
27	2919.84	1460.52	1.9	56.	4256.	1.6	K-40
28	3174.26	1587.76	2.3	41.	52.	23.6	
29	3258.81	1630.05	2.3	20.	43.	22.8	
30	3456.78	1729.05	1.4	18.	59.	17.4	
31	3527.16	1764.24	2.1	15.	226.	7.2	BI 214
32M	3693.64	1847.49	1.5	25.	36.	29.8	

Error Quotation at 1.00 sigma
Peak Confidence Level at 95.0%

M - Possible Multiplet
B - Environmental Background peak

Background Subtraction performed using file BK0001
Background Description: 100 min BKG
Background COLLECT started on 14-OCT-88 at 09:06:00
Background Live Time = 6000. seconds

ER 1297

Ref 41

Division 3313 Radiation Diagnostic Lab

06-JUL-89 10:40:58

Sample: SOIL 890815

Data collected on 6-JUL-89 at 08:32:00

Decayed to 0. days, 0.0000 hours BEFORE the start of COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

Nuclide	Activity Concentration in PCI /gm			
	Measured	Error	Decay corrected	Error
K-40	2.90E+01	+- 4.68E-01	2.90E+01	+- 4.68E-01
RA-226	2.91E+00	+- 2.18E-01	2.91E+00	+- 2.18E-01
TH-234	1.44E+00	+- 2.10E-01	1.44E+00	+- 2.10E-01
TL-208	3.01E+01	+- 1.25E+01	3.01E+01	+- 1.25E+01
TL-208	3.66E+01	+- 1.49E+01	3.66E+01	+- 1.49E+01
Total	1.00E+02	+- 1.95E+01	1.00E+02	+- 1.95E+01

Error Quotation at 1.00 Sigma

*Ac 228, naturally
occurring, most
likely @ 129*

Ref 41

PEAKS NOT IDENTIFIED

Centroid channel	Energy keV	Net Area counts	Error %	Gammas/sec
126.68	63.37	160.	35.7	2.36E+00
258.27	129.20	266.	16.2	9.27E-01
418.17	209.20	383.	11.0	1.38E+00
476.93	238.59	4803.	2.0	1.83E+01
540.30	270.30	291.	11.8	1.19E+00
590.11	295.21	1253.	5.2	5.38E+00
655.52	327.94	219.	13.8	1.01E+00
676.17	338.27	841.	5.2	3.96E+00
703.32	351.85	1736.	2.9	8.42E+00
818.41	409.43	138.	20.0	7.50E-01
925.35	462.92	216.	11.6	1.30E+00
1020.73	510.64	484.	7.1	3.18E+00
1165.37	582.99	1259.	3.2	9.29E+00
1217.54	609.09	1267.	3.3	9.72E+00
1453.44	727.09	290.	7.6	2.61E+00
1534.68	767.72	102.	16.7	9.63E-01
1588.68	794.73	182.	12.5	1.77E+00
1719.37	860.10	154.	16.6	1.61E+00
1820.96	910.92	868.	4.2	9.53E+00
1927.81	964.36	106.	19.1	1.22E+00
2239.35	1120.19	285.	9.4	3.74E+00
2753.76	1377.47	73.	19.0	1.12E+00
3174.26	1587.76	52.	23.6	8.92E-01
3258.81	1630.05	43.	22.8	7.47E-01
3456.78	1729.05	59.	17.4	1.08E+00
3527.16	1764.24	226.	7.2	4.20E+00
3693.64	1847.49	36.	29.8	6.94E-01

ATTACHMENT C
ORIGINAL FIELD REPORTS

RECORD

KAFB/DOE PROPERTY

RADIATION SURVEY

11/8/82 -

1/5/83 Completed initial analysis of first spectrum taken at far end of remote mine (MS-1), see 12/21/82. Spectrum shows only uranium-radium daughters Pb-214 & Bi-214, along with K-40. All are of magnitudes expected in natural material so there are no surprises. Mine appears to be clean of man-made materials.

Completed initial analysis of second spectrum taken at exposed black rock layer (see 12/21/82) in MS-I. Spectrum shows only U-Ra daughters & Th-232 daughters & K-40 at slightly higher levels than in above mentioned spectrum. Nothing unusual observed, probably due to different rock contents.

1/6/83 Return to suspicious mine site to redo spectra run on 12/20/82 at lower and upper shafts. Ran lower spectra at lower shaft ~~at~~ behind cement block for 1000 seconds, equipment worked well. Moved to upper shaft for another spectra, but on the way up hill detector got snow on connectors (2 slipped) and equipment would not function properly. Suspect moisture in connections wd could not dry out good enough, so ~~g~~ quit for evening.

1/7/83 Entered spectrum ND-6 #9 from lower shaft behind cement block taken 1/6/82 into TN-4000 for analysis. All peaks (22 total) have been identified as being from U-Ra daughters, Th-232 daughters, and K-40; however there are some differences from the levels observed in the other mines. The K-40 and Th-232 levels appear to be much higher and the Uranium daughters appear to be somewhat lower than the other mines surveyed so far. Note that this does not imply man-induced contamination, since this kind of variation is very common, whereas man-induced contamination (even Th-232 & U-238) would have a significantly different spectral signature than that observed here.

Returned to upper shaft at suspicious mine & reran spectrum again of 1/6/83. All equipment worked normally.

Toured mortar hill, found vertical shaft ~ 40' deep as the rock falls, very unsafe, may not test or will require special equipment. Labeled this new shaft as MS-J on map.

1/11/83 Traveled to mine MS-G, remote mine found on date 11/8/82 for gathering spectrum. Took road around from Frustration Station and scanned area on way to site, found nothing else. Upon arrival at mine found that right rear tire was flat, and no spare tire or jack (of course!). Proceeded to take spectrum



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 377TH AIR BASE WING (AFMC)

19 AUG 1993.

377 ABW/EM
2000 Wyoming Blvd SE
Kirtland AFB NM 87117-5659

Mr Warren B. Cox
Manager, ER Projects
ER Project Department, 7051
Sandia National Laboratories
Albuquerque, NM 87185

Dear Mr Cox

Reference: Your letter to Ms Nancy R. Morlock, EPA Region VI, dated 30 July 1993, with attachments.

Your letter summarizes the difficulties involved in identifying Kirtland Air Force Base (KAFB) Installation Restoration Program (IRP) sites RW-48, RW-49 and RW-50, in order to correlate them with Sandia National Laboratory (SNL) Environmental Restoration (ER) Program sites. RW-48 and RW-49 are mine adits (horizontal shafts), and RW-50 is a vertical mine shaft.

KAFB Environmental Management Division (EM) personnel have recently completed a detailed investigation of 37 excavations located primarily in the southern portion of the U.S. Forest Service Withdrawal Area. Three excavations are located to the north in Lurance Canyon. The results of this investigation indicate that KAFB site RW-48 is the same as SNL's ER-67, Frustration Instrumentation Site. KAFB sites RW-49 and RW-50 are both part of SNL's ER-28 and are two of the 11 sites surveyed in 1987.

A copy of a memorandum for record, dated 17 August 1993 is attached. This memorandum summarizes the observations made during field investigations to date. In addition, a set of maps, which was provided by Ms Denise Bleakly of SNL, has been updated with the excavation locations. Other man-made features observed during the field investigations were also placed onto the maps. The updated maps will be delivered to Ms Bleakly.

If you have any questions, contact Mr Chris DeWitt at 846-0053.

Sincerely

A handwritten signature in cursive script that reads "Thomas A. Norris".

THOMAS A. NORRIS, Colonel, USAF
Director
Environmental Management Division

Atch
Memorandum

cc: Ms Denise Bleakly, SNL Dept
7053 (w/maps)
Mr John Gould, DOE/AC/KAO

Subject: Kirtland Air Force Base Abandoned Mine Sites

To: Col Norris

1. On 2 August 1993, the subject sites were visited by Messrs Harry Davidson, Bob Dow, Stephen Lee, and the undersigned, 377 ABW/EM. The subject sites and adjacent mines were revisited on August 4, 6, 10, and 13, 1993 by Messrs Bob Dow and Chris DeWitt. The purpose of these visits was to gather detailed site information to aid in determining the final disposition of these sites with respect to agency responsibility. These sites are listed as Kirtland AFB SWMUs RW-48, RW-49 and RW-50, and are described in the Management Action Plan (MAP) as Mine Shaft 1, Mine Shaft 2 and Mine Shaft 3. In addition, detailed inspections were made of all observed adits, pits, trenches and shafts to assist Sandia National Laboratories (SNL) in determining which mines are the 11 surveyed in 1987 (part of the Comprehensive Environmental Assessment and Response Program (CEARP)) and identified as SNL's ER-28. SNL presently has 33 sites listed under ER-28, based on an earlier report issued in 1984, and is waiting to identify which of these 33 sites were the 11 surveyed by CEARP.

2. RW-48 is described as Mine Shaft 1 in the MAP and as Site MS-4 in the IRP Phase 1 Report. It consists of one adit that is part of the mine workings previously known as the Frustration Mine. The old mine workings at this site were developed along a set of north-northwesterly striking fracture-filling hydrothermal vein deposits in faulted and brecciated Precambrian granite and granite gneiss. The veins dip steeply to the northeast. The mineralization observed consists primarily of coarsely crystalline fluorite (CaF_2), with minor galena (PbS) and quartz (SiO_2).

a. There are two adits (horizontal shafts) at this site. The lower adit is KAFB SWMU No. 48 and SNL's ER No. 67. This adit extends to the north-northwest for approximately 70 feet. At 50 feet from the portal, there is a drift that extends 45 feet to the northeast. A steel door and door frame were installed at the portal, and there is a door just before the drift. Remnant furniture, equipment and other structural features indicate that this adit was used as an instrumentation site. Records indicate that a seismic recording station was set up at this site to record ground movements during explosives tests elsewhere on the base. Outside the portal of the lower adit is an approximately 10 ft. X 8 ft. fenced area that once housed a transformer. There is reported to be a debris burial area designated as ER-15 associated with activities at the Frustration Site. As of this date, however, this site has not been located in the field.

b. In addition to the lower adit, a number of other workings constitute the Frustration Mine. These other workings are not part of RW-48, ER-67 or ER-28. An upper adit extends to the northwest for a distance of approximately 60 feet. The portal of this adit is located approximately 75 vertical feet above the lower adit. There is a winze that trends back to the southeast at an angle of 45° located 35 feet from the portal of the upper adit. The winze is approximately 25 feet long and does not connect to the lower adit. There is a section of radio tower in the winze that appears to have been used as a ladder to gain access to the bottom of the winze. The adit between the winze and 12 feet from the face is stoped (excavated) to the surface. On the surface, this stope appears as a narrow, deep trench up to 75 feet deep. The adit then extends 12 feet beyond the stope. On the ground surface between the

Atch

two adits, the vein has been trenched to a depth of one foot to two feet. There are two small prospect pits located 150 feet and 250 feet east of the main workings and a shallow shaft near the crest of the hill, 200 feet east of the open stope described above. All of the excavations described above are on the south-facing slope of a narrow ridge which protrudes from the main escarpment of the Manzano Mountains. This slope contains scattered five-inch (155 mm) projectiles. In addition to the mine workings, there is a buried cable line that traverses the ridge from northeast to southwest and a small borrow pit that was used to provide fill for repairing washouts in the access road. A black, polyurethane-clad cable was observed on the surface. It follows the base of the mountains to the KAFB southern boundary, where it turns westward. At least 6,000 feet of cable was observed. There are a few other very small pits that actually may be impact craters from the five-inch projectiles.

c. There are also some mine workings located northeast of the Frustration Site on the north-facing slope of the ridge. These workings are developed along a similar deposit as at the Frustration Mine. The mineralization is also similar, except that some minor barite (BaSO_4) and malachite [$\text{Cu}_2(\text{CO}_3)(\text{OH})_2$] was also observed. There is a short trench, approximately 6 feet deep near the top of the ridge. This trench is not one of the present ER-28 sites or any KAFB site. A decline adit extends to the southeast for approximately 50 feet. The portal to this decline is 45 vertical feet below the trench. There is a shaft located 40 vertical feet below the decline. The actual depth of the shaft can not be determined because it is filled with water below 50 feet. Drifts at the 30-foot and 45-foot levels can be observed heading to the southeast. The decline and shaft are two of the present ER-28 sites and are likely to be two of the 11 sites surveyed by CEARP. A short adit extending to the southeast is located along the same vein system near the base of the ridge. The portal has been trenched for approximately 10 feet. There is a prospect pit located 250 feet east of the main workings and a prospect pit near the base of the ridge 1,100 feet west of the lower adit. There is some unidentified lightweight burn slag located on the tailings dump of the shaft. Otherwise, there is no indication of post-mining activities or that any material was disposed of at this site. The short adit and prospect pits are not part of ER-28 and are not part of any KAFB sites.

3. RW-49 is described as Mine Shaft 2 in the MAP and as MS-5 in the IRP Phase I Report. It consists of one adit that is part of the mine workings associated with a mine of unknown name. The ore deposition at this site is the same as that at the Frustration Mine, except that galena was not observed in the veins or in any of the tailings material on the associated mine dumps. It is located approximately 2,600 feet southeast of the Frustration Mine.

a. There are two adits at this site. The lower adit is KAFB SWMU No. 49 and part of the present ER-28. It is described in detail in other reports and was previously posted as contaminated by radiation. In addition, it is easily accessed and, therefore, is likely to be one of the 11 surveyed sites. This adit extends to the south-southwest to a point 50 feet from the portal before turning to the southeast for 20 feet. At the turn in the adit, a drift extends to the west for 30 feet and then turns to the south for a distance of 60 feet. There is a large concrete plug located 20 feet from the face of the drift. This plug nearly blocks the drift and appears to have moved after it was placed. There are piles of brown soil located at the entrance to the drift, at the turn in the drift, and in front of the concrete plug. The soil behind the plug is black. It appears the soil was brought into the mine in burlap or canvas sandbags that have since rotted away. The yellow tape used to seal the bags is all that remains. It is possible, however, that the bags

were cut and the soil was dumped onto the piles. The concrete plug acted as a Klotz device to attenuate the gas pressure and shock waves from detonations, as did the piles of soil. Two-conductor black detonation cable is visible protruding from the first soil pile. The radiation hazard sign previously posted at the portal has been removed. This evidence suggests that some type of explosive ordnance test(s) was conducted in this adit. On some old maps, this site is shown as a second Frustration Site. It is likely that, during tests, ordnance was detonated in this adit, and ground motion was measured at the RW-48 Site.

b. In addition to the lower adit, there is an upper adit, the portal of which is located approximately 60 vertical feet above the lower adit and is not part of RW-49. This upper adit extends to the south for 15 feet and then turns to the southeast for 15 feet. A short (< two ft.) drift extends to the south four feet from the adit face. Another short drift extends to the southwest from just beyond the portal. Although a section of two-conductor black detonation wire was observed on the slope below this adit, there is no indication of any post-mining use or disposal. There is a 1.5-inch-diameter pipe protruding from the portal that was apparently used for draining water. Mud and algae in the adit indicate that it is often saturated. What remains of an abandoned road continues up the south side of the canyon to the east for a distance of approximately 1,800 feet, where it crosses to the north side, continuing up-slope for 400 feet. The road dead ends at a leveled pad of unknown origin or use. There are remnants of an "outhouse" latrine located 100 feet west of this pad. In the area where the road crosses the canyon, there are numerous five-inch and scattered three-inch projectiles on the surface. There is another small prospect pit or caved adit adjacent to this old road approximately 1,000 feet east of the two main adits. Scattered projectiles were observed between the adits and the area of abundant projectiles. The upper adit and the prospect pit are not part of ER-28 and are not part of any KAFB sites.

c. There is a third adit located approximately 1,800 feet southeast of the other adits at an elevation of approximately 7,340 feet. This adit extends 550 feet to the east. Near the face, the adit intersects a steeply dipping fault. Drifts, each 10 feet long, extend from the adit in opposite directions along the fault. Most of the adit contains a plated wooden skid-type track. No mineralization of economic interest was observed in any of the workings, and there was no evidence of post-mining activity or disposal. There are two small prospect pits located on either side of the canyon leading to this adit and the ruins of a cabin located 500 feet west-northwest of the adit. This canyon and adjacent slopes contain scattered five-inch and three-inch projectiles. The adit is part of the present ER-28 but the prospect pits are not. None of these workings are part of any KAFB sites.

4. RW-50 is described as Mine Shaft 3 in the MAP and as MS-6 in the IRP Phase I Report. It is located on the south side of Lurance Canyon, approximately three miles north-northeast of the RW-48 Frustration Mine Site, and consists of a shaft that is part of the workings known as the Blackbird Mine. The ore deposition at this site is the same as that at the Frustration Mine, having formed along a steeply dipping fault zone in Precambrian granitic rocks, except that very little galena was observed in the tailings material on the dump.

a. In addition to the shaft, there are two trenches at this site. The shaft is KAFB SWMU No. 50 and part of ER-28. It is at least 50 feet deep, based on a New Mexico Bureau of Mines and Mineral Resources report dated 1946.

It is not possible to determine the exact depth due to caving near the collar. This report also describes a drift at a depth of 42 feet extending from the shaft toward the southeast for 87 feet with stopes to the surface. There is abundant timbering at the collar, indicating that there was once a headframe over the shaft. An old truck frame mounted near the collar is all that remains of a makeshift hoisting winch. There are also concrete pads and scrap lumber piles near the shaft. There is no visible evidence, however, of any post-mining activity or disposal. Based on earlier reports and easy access, the shaft is likely to be one of the 11 surveyed sites.

b. The two trenches, which are not part of RW-50, are located immediately southeast of the shaft. The closest trench is up to six feet deep and was formed by the collapse of the stopes described in the 1946 report. The other trench is approximately three feet deep and 25 feet long. It was excavated to explore the mineralized zone at the surface. The trenches are not part of ER-28 and are not part of any KAFB site.

5. There are three other areas with mine excavations located south and west of the Frustration Mine. Two of these excavations are part of the present ER-28. None of these excavations are part of any KAFB site.

a. There is a small hill located 2,000 feet west of the Frustration Mine. The west side of this knoll houses a building and support structures used during laser tests at the Sandia Optical Range. Three adits were driven to explore a mineralized zone similar to that at the Frustration Mine near the base of the northwest quadrant of this hill. All three adits are caved, but appear to have been less than 15 feet in length. None of the adits are part of ER-28. A shaft on the north slope near the summit of the hill is approximately 50 feet deep. There are numerous 4.2-inch mortar round shipping canisters on the ground in an area just south of this shaft. A small amount of unidentified slag material was observed at the collar of the shaft. The shaft is part of the present ER-28 and is likely to be one of the 11 surveyed sites. There is a caved shaft and caved adit located on the east side of the hill. These workings are in an epidote-rich granite gneiss similar to rocks elsewhere in the region which contain low levels of thorium and uranium. They are not part of the present ER-28. With the exception of the slag observed at the deep shaft, there is no evidence of post-mining activities or disposal at any of these excavations.

b. Two prospect pits are located on a hill approximately 3,700 feet to the southwest of the Frustration Mine. The pit on the north slope may be a caved adit and is one of the present ER-28 sites. The other prospect pit is located near the base of the south slope. Two prospect pits are also located on a small rock knoll 2,000 feet southwest of the Frustration Mine. None of these four prospect pits show evidence of post-mining activities or disposal.

c. The third area lies just north of KAFB's southern boundary and is centered 3,400 feet southwest of the Frustration Mine. It consists of a south-trending decline located approximately 1,000 feet north of a south-southwest-trending adit, a trench, and two prospect pits. The decline is 25 feet long. The adit was not entered because of caving at the portal. A two-conductor detonation wire was observed leading up to the adit. This indicates that this adit may have been used to conduct tests associated with the Frustration Site. Otherwise, no evidence of post-mining activities or disposal was observed. The adit is one of the present ER-28 sites and is likely to be one of the 11 surveyed sites.

6. In summary, 37 separate excavations were examined. All but three were in the South Coyote Test Range area. The 37 excavations include shafts, pits, trenches, and adits. They can be grouped, for convenience, into six areas as described above. Eight of these excavations are part of SNL's ER-28. Six of these eight excavations are likely to be part of the 11 surveyed sites. One excavation is SNL's ER-67. I believe that this site is also one of the 11 surveyed sites, and, therefore, only 10 surveyed sites will be on SNL's final list for ER-28. KAFB RW-48 site is definitely SNL's ER-67, and RW-49 and RW-50 are part of SNL's ER-28. All evidence and available records indicate that RW-49 and RW-50 are two of the 11 surveyed sites and should be part of SNL's final ER-28.


Christopher B. DeWitt, R.P.G.
IRP Program Geologist

2000' between ticks

5' contours

8/4/93

SNL ERG/S





2000' between ticks

5' contours

8/4/93

SNE ERGIS

Ref 165

Notes to File

Interview with Walter Hyde on October 27, 1993

Frustration sites and mine near frustration site.

Site numbers 67, 15, and 28

Walter indicated that there was no explosives tests associated with frustration site. It was a seismic station and explosions would have damaged the equipment. The white metal door was recognized as the door to the frustration site.

Site
15/67/28

He was not sure about the dump. Maybe it was waste from field activities in the area. Did not recall any rad work in the area.

Site # 28

He recalls detonating waste RDX, Comp 4 and detcord in a mine that you could drive up to. They load the explosives into the mine directly from the truck. The explosives were detonated in a side shaft so rock debris would be thrown against the mine wall and not out the front of the mine. The mine is identified as MS-B on the attached map. This mine is also identified as the mine with a large concrete block inside. Behind the block, he found debris and detonating wire. Yellow tape was also found in this mine. See attached letter. The mine opening is nearly closed in with soil at the time of the visit. No attempt to enter the mine was made on this trip.

*)

Except from the interview with Walt Hyde conducted by Mike Young
The tour was at mine 28-2 when this conversation took place.

WH: They would bring old explosive, unburned explosives out there and stack it in there and then they would, every few weeks or few months, travel over here and use them. Burn em, shoot em, or something like that.) *

MY: Um hum and that was a Sandia operation?

WH: Yeah.
This was driven up here.

The interview tape stopped here due to low battery. We were at the road into 28-2 at the time and he remembered that they would drive up and off-load the explosives from the back of the truck into the mine.

Reference - 16

SA-0237-111

S V28

telephone conversation March 8 1985

Doug Minnema - 844-5079

Area V.

ask H. Carroll about Doughman

When Doug did his survey he found no radioactive material in the mines. He does understand that there are supposed to be 100-150 old mines on the base. They only surveyed 25 of these mines

at Frustration site if you continue on road there is an adit. Part way in the tunnel is a concrete block. He called Margaret Carroll of safety + with her in attendance he crawled behind the concrete block

Site 28
east of
adit
-8

and it was 15-20" thick + that a small 10' room was all that was behind. However yellow tape (Pandora type) was in the room! Therefore some Pandora experiments must have taken place. He has done a survey of "old tunnels" + has not found how this tunnel was used

Beyond this mine in next canyon over half way up canyon wall is 900' long adit with old rail track etc. This is the largest working Doug has found

Around the Frustration site are lots of shells, shrapnel, etc.

Doug did find one mine 7100' deep at which at the 30-40' level there was a yellow metal can. Because of safety problems did not recover the can.

b7V

They did find slight contamination at an old test site which they cleaned up

In the Madera Canyon 155 gun site they did find shells containing short half life radionuclides. They may

(Reference 16)

have lost two shells - however radionuclides should have decayed by now.

They went onto the Pendulum site from the north. Did find one small spot of U contamination. Had heard that there was lots of U at this site but just didn't find any.

Near golf course there are three trenches marked with posts. He has people who tell him that in the late 50's or early 60 earth moving equipment worked in the area & people were fully suited out. So far no permission from Kirkland to continue trying to determine what it is.

He will take us to this site - difficult to find. Agreed to try to set up a meeting.

He says there have been reports of shells in old mine shafts, but he didn't find any.

It would also appear possible that there may be live shells lying about - also warns of snakes.

287

SANDIA NATIONAL LABORATORIES
Record of Verbal Communication

Date 2/27/95
Time 1515

FROM: Mike Mitchell of (Halliburton NWS) 7585
TO: Bob Schwing of 7714
SUBJECT: Survey of a mine shaft location on KAFB property
LOCATION: _____

By Telephone
 By Radio
 In Person

Received the following Issued the following Had the following

INSTRUCTIONS: AUTHORIZATION: INFORMATION: DISCUSSION:

I called Bob Schwing (7714) to follow up on a note from Denise Bleately (7512), which stated that Bob was aware of elevated radiation readings in a mine shaft with a concrete wall inside of it. The "elevated reading" were observed when an instrument probe was inserted between the concrete wall and the rock wall. (This mine is ER site 28-2)

After several phone messages, we got together on the phone and discussed. Bob did not actually go into the mine, one of the his co-workers did, but he recalled their task of checking out the mines. Bob mentioned that the readings behind the concrete wall were higher than in the mine itself, but not necessarily above background. I mentioned that Doug Minema did collect gamma spectrometer readings in the same location and reported nothing out of "natural background range." Bob said he was aware of Doug's survey; in fact the same co-worker who noted the elevated readings showed Doug the mine location. We discussed Doug's survey results, and Bob ~~was~~ concluded that if Doug's readings indicated background, then there is no man-induced radioactive contamination in that mine. Bob is not aware of other "suspect mining locations" where radioactive material may have been disposed of or dumped.

Signed: Mike Mitchell

COMMUNICANTS' COPIES

OTHER COPY DISTRIBUTION

Bob Schwing, 7714*

Caroline Byrd, 7585

ORIGINAL TO RECORDS CENTER

ER Site 28 Files (Background)

* Reviewed and approved - no changes - 2/28/95

SANDIA NATIONAL LABORATORIES

ALBUQUERQUE, NEW MEXICO 87185

TO: Bob Schwing, 7714

FAX#: 844-6806

MESSAGE: Bob - attached is a copy of a telecon
form I filled out to document our phone conversation
yesterday. I would greatly appreciate it if you
would take a few minutes and review it. If
you want me to make any changes just give me
a call or fax me the changes. Thanks for
your info and help!

FROM: Mike Mitchell

ORGANIZATION: 7585

PHONE #: 848-0327

FAX #: 848-0398

NUMBER OF PAGES SENT: 2 (INCLUDING COVER SHEET)

Logbook #0651

INDEX

Property of SANDIA NATIONAL LABS

ORG 7724

Address PO BOX 5800

ALB, NM 87122

Telephone ATT: RECORDS CENTER
844-8519

Mike M. Mitchell
ER Project Dept. 7585
Phone: 505 848-0327

Field Log Book #0051

This Book is manufactured of a High Grade 50% Rag Ledger Paper having a Water Resistant Surface, and is sewed with Nylon Waterproof Thread.

Chris DeWitte 846-2773

1454 @ MS-C 28-3

+2 vertical shafts

1 vertical shaft ~ 30' deep
and 1 horizontal shaft, ~ 30'
long. Paula taking GPS reading
right between the 2 shafts.
Shafts ~ 15' apart.

1508 @ The Blackbird Mine MS-D 28-4

One main, large vertical shaft
~ 15 to 20' in diameter
with lots of timber and
shoring. A much smaller
vertical shaft is located
~ 40' south. Both are
caved in and in very
poor shape. Steve said
main shaft looks more
caved in than 4 years
ago when he saw it.

1530

@ MS-E 28-5 general area.
Can not find the mine - did
find a pile (small) of what

24

looks like mine workings - which
is what Denise marked on
the map for this location
with Doug Minner. We
scouted the area pretty
well and didn't find anything
else.

1536 After checking maps, we decide
to leave. No GPS reading
taken. Head back to BDM office.

1605

Final Top ~~containing~~
elevation: 57.4 miles

Arrive back @ BDM office.

can see into larger room.

Another adit is located E-NE approximately ~180' and ~70' above the lower adit. Drain

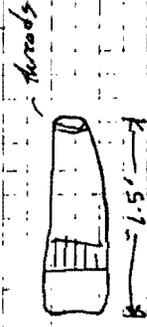
pipe and moss in shaft indicate water is present frequently - but not saturated now.

Upper adit has a very smooth NE wall - shaft is well formed and looks in good shape. No evidence of post-mining activity, but det. cord does run up towards the upper adit.

* Only 1 GPS reading taken at lower main adit.

1200 Core @ MS-G 28-7. Horizontal adit extends back (south) into hill ~30 feet. 5" mortar shells around the vicinity, one shell @ entrance to adit. GPS reading taken at entrance.

Just south of adit up hill ~20 feet are several mortar shells, rusted.



Up the ridge to the SE-E are many shells, more than 6 shells observed walking the area.

1429 Arrive @ MS-F - H (28-8) with crew minus Tim Fischer (ET) and Chris Dewitte (KAFB), who left before lunch. They had other commitments this afternoon.

@ 20-6. Paule getting GPS reading. Vertical shaft ~15' deep, ~5' wide.

1431 @ 28-8 MS-H very shallow, small p.t. < 4' deep.

5A

Friday 11-4-94

0920 In BDM office preparing for field trip to the Mac shaft sites of Steve Hoagland, Coakle Byrd, Denise Bleakley, Paulo Glavinia, and ^{Tim King} W. Will meet Chris DeWitte (KAFFB) later in the day out in the field.

Objective: Locate, photograph, survey with GPS unit, and verify the 11 GNL ER site ²DBs. Steve needs to check each location for Cultural Resource surveys as part of the EA work.

1056 Crew @ #28 MS-10 J; 28-10 location. Paulo will survey w/ GPS. Survey point on south edge of shaft. Shaft is ~50' deep as per Chris DeWitte, can't see bottom.

There is a small curved in shaft just to the east (~80').

55

Viewing 28-9 MS-1 up on ridge to east. Can see spoils pile. Chris has been through the mine: a horizontal shaft extends ~700 feet east into the hill. I saw some horizontal drifts at the end. No evidence of any post mining activity.

On the 28-10 hill there are numerous adits and small workings. The optical range target structure is actually cut into an adit.

Many 'Mortar containers' (containers that mortars 4.2" came in) are scattered about the hill. That activity was in the 60s do per Chris.

1133 Crew arrives @ 28-2 MS-B 2 adits here, lower adit is main one here, has concrete block, yellow tape, and det cord. Mine entrance is covered but

Site 59, OU 1333, Pendulum Site

- 29. General information regarding the materials used in the Honest John and Betty warhead shells must be provided so that potential contaminants at this site can be evaluated. (Additional information needed for adequate review)**

Response: As stated in the original (August 1995) NFA proposal (p. 3-2), "all tests conducted at ER Site 59, including those involving warhead test units, were nondestructive (59-25). There was never any impact, breakage, or failure of test equipment at the site (59-4)." There is no additional information available regarding the materials used in the Honest John and Betty warhead shells.

- 30. Soil samples for metals (especially lead), gross α , gross β , and gamma spectra must be collected and analyzed. Additionally, samples for analysis of gross α and gross β must also be collected at background locations, as they were not included in the sitewide background determinations. (Best Professional Judgment)**

Response: DOE/SNL will submit a sampling and analysis plan prior to collecting several soil samples at the site and screening them for RCRA metals, gross alpha/beta, and gamma spectroscopy. Additionally, DOE/SNL will include in the sampling and analysis plan several soil samples at background locations near the site to be screened for gross alpha/beta.

Site 63A, OU 1333, Balloon Test Area: Plutonium Dispersal Project

- 31. Although most high explosive material (HE) was probably expended during the tests, confirmation samples must be collected from "ground zero" and analyzed for nitro-aromatics. (Best Professional Judgment)**

Response: DOE/SNL will submit a sampling and analysis plan prior to collecting a few samples from "ground zero" and screening them for high explosive compounds.

- 32. The possible release of depleted uranium to the environment must be further investigated. Surface soil samples must be collected across the test area. The samples must be analyzed in the laboratory for total uranium. (Best Professional Judgment)**

Response: As stated in the NFA proposal, a surface radiation survey performed in 1993 by RUST Geotech Inc. found no areas of gamma activity greater than 30% above natural background levels (9 to 13 microrentgen per hour). Based on this

result, DOE/SNL believe that the possible release of depleted uranium to the environment has been adequately investigated and that analysis of soil samples for total uranium is not necessary.

Site 63B, OU 1333, Balloon Test Area

- 33. Both the drop and the tethered-rocket tests must be described in more detail. (Additional information needed for adequate review)**

Response: All available information concerning these tests is contained in the NFA proposal text and references. Additional information regarding these tests is not available.

- 34. At least 12 surface soil samples must be collected for lead analysis: 4 at the tethered-rocket launch pad site, 4 along the flight path, and 4 others at the rocket impact area. (Best Professional Judgment)**

Response: DOE/SNL will submit a sampling and analysis plan prior to collecting 12 surface soil samples at the locations described above for lead screening.

- 35. All gamma spectra results must be included in the NFA proposal. (Additional information needed for adequate review)**

Response: Analytical results for the 4 soil samples collected and analyzed by gamma spectroscopy from the locations indicated on Figure 2-1 on page 2-4 of the August 1995 Proposal for No Further Action at ER Project Site 63B are included as Attachment A to this section.

- 36. A partially buried, green, 55-gallon drum which may or may not contain liquid is located along the southwest Tethered-Line Road next to the arroyo channel. The current or original contents of this drum are not known. Soil beneath the drum must be sampled, unless it can be demonstrated that the drum could not have released a hazardous constituent. (Best Professional Judgment)**

Response: DOE/SNL will submit a sampling and analysis plan prior to collecting a sample of drum contents, if any, and a sample of soil beneath the drum. The drum contents sample, if any, and soil sample will be screened for VOCs. The drum, drum contents, if any, and any impacted soil surrounding the drum will be removed from the site and disposed of in accordance with DOE/SNL waste management practices.

37. **The lack of vegetation in the "graded area" suggests that the site is still maintained. SNL must clarify whether ER Site 63B is still active. (Additional information needed for adequate review)**

Response: The site is inactive. Spraying of an herbicide used routinely at SNL/NM has continued in the "graded area" despite the inactive status. DOE/SNL will remove this site from the list of areas to be sprayed with herbicide, so that routine herbicide applications will not continue.

38. **SNL must explain why its Radiation Protection Office (RPO) conducted the beta/gamma survey at the area shown in Figure 2-1, p. 2-4. (Additional information needed for adequate review)**

Response: The SNL/NM RPO conducted the beta/gamma survey at the area shown in Figure 2-1, p. 2-4 because Sitewide Hydrologic Characterization Project personnel were planning to conduct arroyo characterization studies at that location. At the time of the arroyo studies (1993), the information available concerning previous testing at ER Site 63B and up gradient from the area surveyed was not as thorough as it currently is. SNL/NM considered it prudent to conduct a precautionary radiation survey at that time. The survey detected no elevated readings other than natural outcrops.

Site 64, OU 1333, Gun Site, Madera Canyon

39. **At least 8 surface soil samples for lead analysis must be collected: 4 at the portable rocket launch pad site and 4 immediately down range from the gun site. (Best Professional Judgment)**

Response: DOE/SNL will submit a sampling and analysis plan prior to collecting 8 surface soil samples at the locations described above for lead screening.

40. **Information specifying the type of radionuclide tracers used must be provided. (Additional information required for adequate review)**

Response: Information regarding the type of radionuclide tracer(s) used during operations at the Madera Canyon Gun Site is not available.

41. **Specific information as to how the rocket launch pad was located at ER Site 64 must be provided. (Additional information needed for adequate review)**

Response: The portable rocket launch pad at ER Site 64 was located from historical interviews and from visual inspections of the site.

Site 92, OU 1333, Pressure Vessel Test Site

DOE/SNL will initiate a Class III HSWA permit modification for Site 92 to remove it from the list of current ER sites.

ATTACHMENT A
ANALYTICAL RESULTS FOR SOIL SAMPLES

Date: 7/27/93



Sandia National Laboratories
Radiation Sample Diagnostic Program

SAMPLE ANALYSIS REQUEST

To be completed by Customer

Shaded areas are for Lab use

Customer: <u>OLDE WAGE</u>	Hazards/Special Instructions:	Batch Log Number: <u>930722</u>
Organization: <u>7714</u>		Logged By: <u>FWD</u>
Project Location: <u>BALLOON SITE AREA</u>		Analysis Type: <input checked="" type="checkbox"/> Gamma <input type="checkbox"/> H-3 <input type="checkbox"/> Alpha/Beta <input type="checkbox"/> Other
Phone: <u>845-3271/263618</u>		
Date Results Needed: _____		
Suspect Isotopes: <u>DU 238</u>	Rad Scan Background: <u>20.1</u> mR/hr	

Customer Sample ID	Sample Type	Date/Time Collected	Sample Volume	Requested Analysis	RSDP Sample ID	Rad Scan mR/hr	Analyst	Remarks/Flags
B.S. #1	SOLID	7-26-93 1520	664g	GAMMA SPEC.	01	20.1	FWD	
B.S. #2	SOLID	7-26-93 1525	728g	}	02	20.1	FWD	
B.S. #3	SOLID	7-26-93 1527	731g		03	20.1	FWD	
B.S. #4	SOLID	7-26-93 1530	791g		GAMMA SPEC.	04	20.1	FWD
L.C.S.		11/26/90		Y	05		FWD	

Relinquished by [Signature] Date 7-27-93 0835 Received by [Signature] Date 7/27/93
 Relinquished by [Signature] Date 7/27/93 Received by [Signature] Date 7/27/93
 Relinquished by [Signature] Date _____ Received by _____ Date _____

BI-207	Not Detected	-----	3.31E-02
CD-109	Not Detected	-----	9.61E-01
CE-139	Not Detected	-----	2.29E-02
CE-144	Not Detected	-----	1.69E-01
CM-243	Not Detected	-----	9.20E-02
CO-57	Not Detected	-----	2.27E-02
CO-58	Not Detected	-----	2.40E-02
CO-60	Not Detected	-----	3.10E-02
CR-51	Not Detected	-----	2.34E-01
CS-134	Not Detected	-----	2.61E-02
CS-137	1.03E-01	4.37E-02	-----
EU-152	Not Detected	-----	6.82E-02
EU-154	Not Detected	-----	1.18E-01
EU-155	Not Detected	-----	1.08E-01
FE-59	Not Detected	-----	5.21E-02
HG-203	Not Significant	-----	-----
I-125	Not Detected	-----	0.00E+00
I-129	Not Detected	-----	0.00E+00
I-131	Not Detected	-----	2.98E-02
IR-192	Not Detected	-----	2.81E-02
K-40	1.85E+01	1.03E+00	-----
LA-140	Not Detected	-----	5.13E-02
MN-54	Not Detected	-----	2.39E-02
MN-56	Short Half-Life	-----	-----
NA-22	Not Detected	-----	2.60E-02
NA-24	Not Detected	-----	1.59E-01
NB-95	Not Detected	-----	1.47E-01
RU-103	Not Detected	-----	2.14E-02
RU-106	Not Detected	-----	2.38E-01
SB-124	Not Detected	-----	2.46E-02
SB-125	Not Detected	-----	7.27E-02
SB-126	Not Detected	-----	3.06E-02
SN-113	Not Detected	-----	3.41E-02
SR-85	Not Detected	-----	2.60E-02
TA-182	Not Detected	-----	1.99E-01
TL-201	Not Detected	-----	2.79E-01
XE-133	Not Detected	-----	1.08E-01
Y-88	Not Detected	-----	2.65E-02
ZN-65	Not Detected	-----	4.97E-02
ZR-95	Not Detected	-----	4.78E-02

 * SNL Radiation Sample Diagnostic Program (7715)/881 28-JUL-93 10:44:09 *

 H.OLDEWAGE/B.SCHWEITZER (7714) BALLOON SITE #2

Operator: JA 7/28/93 Reviewed by RAM 7/28/93

 *
 Data File : 93032202.DAT * Sample Quantity: 728.000 GRAM
 Acquire Date: 28-JUL-93 09:43:00 * Efficiency File: SMAR1.EFF
 Sample Date: 26-JUL-93 15:25:00 * Library File: RSDP.LIB
 Sample Type: SOLID *

 *
 Preset Live Time: 3600.0 sec * FWHM at 1332 KeV : 1.9 KeV
 Elapsed Live Time: 3600.0 sec * Peak Search Sensitivity: 4.0
 Elapsed Real Time: 3601.0 sec * Gaussian Assymetry : 10.0 %

 *
 Detector : DET1 * Fit Iterations : 20.
 Calib Date : 17-MAY-93 09:33:24 * Energy Tolerance: 2.0 KeV
 KeV/Channel : .50016 * Half Life Ratio : 8.0
 Offset : -.28985 * Abundance Limit : 50.00 %

[Summary Report -- SNL (7715) -- version 1.1]

Nuclide	Activity (pCi /GRAM)	2-sigma Error	MDA (pCi /GRAM)
U-238	9.14E-01	5.46E-01	-----
TH-234	9.15E-01	5.47E-01	-----
U-234	Not Detected	-----	7.47E+00
TH-230	Not Detected	-----	1.09E+01
RA-226	7.09E-01	8.83E-02	-----
PB-214	8.88E-01	1.04E-01	-----
BI-214	7.41E-01	9.23E-02	-----
PB-210	Not Detected	-----	0.00E+00
TH-232	1.18E+00	1.86E-01	-----
RA-228	1.18E+00	1.86E-01	-----
AC-228	1.06E+00	1.68E-01	-----
TH-228	9.36E-01	6.80E-02	-----
RA-224	7.13E-01	8.24E-01	-----
PB-212	9.40E-01	6.83E-02	-----
BI-212	6.64E-01	3.07E-01	-----
TL-208	9.13E-01	1.35E-01	-----
U-235	Not Detected	-----	1.84E-01
TH-231	Not Detected	-----	3.79E-01
PA-231	Not Detected	-----	1.16E+00
AC-227	Not Detected	-----	1.26E+00
TH-227	Not Detected	-----	2.20E-01
AM-241	Not Detected	-----	1.65E-01
AM-243	Not Detected	-----	3.28E+00
NP-237	Not Significant	-----	-----
PA-233	Not Detected	-----	6.18E-02
TH-229	Not Detected	-----	9.00E-02
AG-110	Not Detected	-----	2.43E-02
BE-7	Not Detected	-----	2.33E-01
BA-133	Not Detected	-----	2.69E-02
BA-140	Not Detected	-----	1.01E-01

BI-207	Not Detected	-----	2.90E-02
CD-109	Not Detected	-----	8.86E-01
CE-139	Not Detected	-----	2.06E-02
CE-144	Not Detected	-----	1.62E-01
CM-243	Not Detected	-----	8.05E-02
CO-57	Not Detected	-----	2.07E-02
CO-58	Not Detected	-----	2.43E-02
CO-60	Not Detected	-----	2.65E-02
CR-51	Not Detected	-----	2.10E-01
CS-134	Not Detected	-----	2.48E-02
CS-137	2.88E-01	4.44E-02	-----
EU-152	Not Detected	-----	6.22E-02
EU-154	Not Detected	-----	1.02E-01
EU-155	Not Detected	-----	9.82E-02
FE-59	Not Detected	-----	5.45E-02
HG-203	Not Detected	-----	2.99E-02
I-125	Not Detected	-----	0.00E+00
I-129	Not Detected	-----	0.00E+00
I-131	Not Detected	-----	2.66E-02
IR-192	Not Detected	-----	2.61E-02
K-40	1.57E+01	9.14E-01	-----
LA-140	Not Detected	-----	4.17E-02
MN-54	Not Detected	-----	2.56E-02
MN-56	Short Half-Life	-----	-----
NA-22	Not Detected	-----	3.10E-02
NA-24	Not Detected	-----	1.57E-01
NB-95	Not Detected	-----	1.41E-01
RU-103	Not Detected	-----	2.29E-02
RU-106	Not Detected	-----	2.17E-01
SB-124	Not Detected	-----	2.30E-02
SB-125	Not Detected	-----	7.03E-02
SB-126	Not Detected	-----	2.59E-02
SN-113	Not Detected	-----	3.44E-02
SR-85	Not Detected	-----	2.40E-02
TA-182	Not Detected	-----	1.58E-01
TL-201	Not Detected	-----	2.46E-01
XE-133	Not Detected	-----	1.10E-01
Y-88	Not Detected	-----	2.74E-02
ZN-65	Not Detected	-----	5.07E-02
ZR-95	Not Detected	-----	4.18E-02

 * SNL Radiation Sample Diagnostic Program (7715)/881 28-JUL-93 12:07:21 *

 H.OLDEWAGE/B.SCHWEITZER (7714) BALLOON SITE #3

Operator: *J* 7/28/93 Reviewed by *AM* 7/28/93

 *
 Data File : 93032203.DAT * Sample Quantity: 731.000 GRAM
 Acquire Date: 28-JUL-93 11:06:19 * Efficiency File: SMAR1.EFF
 Sample Date: 26-JUL-93 15:27:00 * Library File: RSDP.LIB
 Sample Type: SOLID *

 *
 Preset Live Time: 3600.0 sec * FWHM at 1332 KeV : 1.9 KeV
 Elapsed Live Time: 3600.0 sec * Peak Search Sensitivity: 4.0
 Elapsed Real Time: 3601.0 sec * Gaussian Assymetry : 10.0 %

 *
 Detector : DET1 * Fit Iterations : 20.
 Calib Date : 17-MAY-93 09:33:24 * Energy Tolerance: 2.0 KeV
 KeV/Channel: .50016 * Half Life Ratio : 8.0
 Offset : -.28985 * Abundance Limit : 50.00 %

[Summary Report -- SNL (7715) -- version 1.1]

Nuclide	Activity (pCi /GRAM)	2-sigma Error	MDA (pCi /GRAM)
U-238	Not Detected	-----	5.95E-01
TH-234	Not Detected	-----	5.96E-01
U-234	Not Detected	-----	7.16E+00
TH-230	Not Detected	-----	1.08E+01
RA-226	6.61E-01	9.85E-02	-----
PB-214	7.89E-01	7.09E-02	-----
BI-214	6.91E-01	1.03E-01	-----
PB-210	Not Detected	-----	0.00E+00
TH-232	9.40E-01	1.64E-01	-----
RA-228	9.40E-01	1.64E-01	-----
AC-228	8.49E-01	1.48E-01	-----
TH-228	8.55E-01	6.39E-02	-----
RA-224	1.45E+00	8.90E-01	-----
PB-212	8.58E-01	6.42E-02	-----
BI-212	6.32E-01	2.58E-01	-----
TL-208	8.98E-01	1.25E-01	-----
U-235	Not Detected	-----	1.82E-01
TH-231	4.84E-01	3.85E-01	-----
PA-231	Not Detected	-----	1.08E+00
AC-227	Not Detected	-----	1.22E+00
TH-227	Not Detected	-----	1.99E-01
AM-241	Not Detected	-----	1.58E-01
AM-243	Not Detected	-----	3.06E+00
NP-237	Not Significant	-----	-----
PA-233	Not Detected	-----	5.25E-02
TH-229	Not Detected	-----	9.12E-02
AG-110	Not Detected	-----	2.14E-02
BE-7	Not Significant	-----	-----
BA-133	Not Detected	-----	2.83E-02
BA-140	Not Detected	-----	8.68E-02

BI-207	Not Detected	-----	2.93E-02
CD-109	Not Detected	-----	8.79E-01
CE-139	Not Detected	-----	2.11E-02
CE-144	Not Detected	-----	1.52E-01
CM-243	Not Detected	-----	8.05E-02
CO-57	Not Detected	-----	1.93E-02
CO-58	Not Detected	-----	2.30E-02
CO-60	Not Detected	-----	2.41E-02
CR-51	Not Detected	-----	2.31E-01
CS-134	Not Detected	-----	2.27E-02
CS-137	3.64E-01	5.24E-02	-----
EU-152	Not Detected	-----	5.80E-02
EU-154	Not Detected	-----	9.95E-02
EU-155	Not Detected	-----	1.01E-01
FE-59	Not Detected	-----	4.02E-02
HG-203	Not Detected	-----	2.85E-02
I-125	Not Detected	-----	0.00E+00
I-129	Not Detected	-----	0.00E+00
I-131	Not Detected	-----	2.98E-02
IR-192	Not Detected	-----	2.72E-02
K-40	1.73E+01	9.35E-01	-----
LA-140	Not Detected	-----	4.04E-02
MN-54	Not Detected	-----	2.69E-02
MN-56	Short Half-Life	-----	-----
NA-22	Not Detected	-----	2.52E-02
NA-24	Not Detected	-----	1.55E-01
NB-95	Not Detected	-----	1.31E-01
RU-103	Not Detected	-----	2.32E-02
RU-106	Not Detected	-----	2.00E-01
SB-124	Not Detected	-----	2.18E-02
SB-125	Not Detected	-----	6.84E-02
SB-126	Not Detected	-----	2.59E-02
SN-113	Not Detected	-----	3.12E-02
SR-85	Not Detected	-----	2.55E-02
TA-182	Not Detected	-----	1.60E-01
TL-201	Not Detected	-----	2.41E-01
XE-133	Not Detected	-----	1.01E-01
Y-88	Not Detected	-----	2.33E-02
ZN-65	Not Detected	-----	5.53E-02
ZR-95	Not Detected	-----	4.17E-02

Operator: J 7/28/93 Reviewed by JAM 7/28/93

 *
 Data File : 93032204.DAT * Sample Quantity: 791.000 GRAM
 Acquire Date: 28-JUL-93 12:09:38 * Efficiency File: SMAR1.EFF
 Sample Date: 26-JUL-93 15:30:00 * Library File: RSDP.LIB
 Sample Type: SOLID *

 *
 Preset Live Time: 3600.0 sec * FWHM at 1332 KeV : 1.9 KeV
 Elapsed Live Time: 3600.0 sec * Peak Search Sensitivity: 4.0
 Elapsed Real Time: 3601.0 sec * Gaussian Assymetry : 10.0 %

 *
 Detector : DET1 * Fit Iterations : 20.
 Calib Date : 17-MAY-93 09:33:24 * Energy Tolerance: 2.0 KeV
 KeV/Channel: .50016 * Half Life Ratio : 8.0
 Offset : -.28985 * Abundance Limit : 50.00 %

[Summary Report -- SNL (7715) -- version 1.1]

Nuclide	Activity (pCi /GRAM)	2-sigma Error	MDA (pCi /GRAM)
U-238	6.48E-01	6.38E-01	-----
TH-234	6.49E-01	6.39E-01	-----
U-234	Not Detected	-----	7.03E+00
TH-230	Not Detected	-----	1.04E+01
RA-226	7.21E-01	8.11E-02	-----
PB-214	7.84E-01	9.22E-02	-----
BI-214	7.54E-01	8.48E-02	-----
PB-210	Not Detected	-----	0.00E+00
TH-232	7.80E-01	1.56E-01	-----
RA-228	7.80E-01	1.56E-01	-----
AC-228	7.04E-01	1.41E-01	-----
TH-228	6.61E-01	5.70E-02	-----
RA-224	7.44E-01	8.80E-01	-----
PB-212	6.64E-01	5.72E-02	-----
BI-212	4.50E-01	2.11E-01	-----
TL-208	6.33E-01	1.05E-01	-----
U-235	Not Detected	-----	1.72E-01
TH-231	Not Detected	-----	3.54E-01
PA-231	Not Detected	-----	1.03E+00
AC-227	Not Detected	-----	1.04E+00
TH-227	Not Detected	-----	1.84E-01
AM-241	Not Detected	-----	1.47E-01
AM-243	Not Detected	-----	2.81E+00
NP-237	Not Detected	-----	2.07E-01
PA-233	Not Detected	-----	4.82E-02
TH-229	Not Detected	-----	8.21E-02
AG-110	Not Detected	-----	1.98E-02
BE-7	Not Detected	-----	2.06E-01
BA-133	Not Detected	-----	3.03E-02
EA-140	Not Detected	-----	7.81E-02

BI-207	Not Detected	-----	2.74E-02
CD-109	Not Detected	-----	7.86E-01
CE-139	Not Detected	-----	1.79E-02
CE-144	Not Detected	-----	1.42E-01
CM-243	Not Detected	-----	7.43E-02
CO-57	Not Detected	-----	1.84E-02
CO-58	Not Detected	-----	1.96E-02
CO-60	Not Detected	-----	2.48E-02
CR-51	Not Detected	-----	2.06E-01
CS-134	Not Detected	-----	2.14E-02
CS-137	5.48E-01	5.00E-02	-----
EU-152	Not Detected	-----	5.53E-02
EU-154	Not Detected	-----	1.01E-01
EU-155	Not Detected	-----	8.77E-02
FE-59	Not Detected	-----	3.88E-02
HG-203	Not Detected	-----	2.57E-02
I-125	Not Detected	-----	0.00E+00
I-129	Not Detected	-----	0.00E+00
I-131	Not Detected	-----	2.45E-02
IR-192	Not Detected	-----	2.21E-02
K-40	1.09E+01	7.50E-01	-----
LA-140	Not Detected	-----	4.20E-02
MN-54	Not Detected	-----	1.98E-02
MN-56	Short Half-Life	-----	-----
NA-22	Not Detected	-----	2.38E-02
NA-24	Not Detected	-----	1.50E-01
NB-95	Not Detected	-----	1.22E-01
RU-103	Not Detected	-----	2.09E-02
RU-106	Not Detected	-----	1.78E-01
SB-124	Not Detected	-----	2.22E-02
SB-125	Not Detected	-----	6.40E-02
SB-126	Not Detected	-----	2.30E-02
SN-113	Not Detected	-----	2.80E-02
SR-85	Not Detected	-----	2.07E-02
TA-182	Not Detected	-----	1.53E-01
TL-201	Not Detected	-----	2.44E-01
XE-133	Not Detected	-----	9.80E-02
Y-88	Not Detected	-----	1.83E-02
ZN-65	Not Detected	-----	4.17E-02
ZR-95	Not Detected	-----	4.18E-02