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Statement of Basis Approval of No Further Action Volume 6 of 30 January 2000 ER Site 56 Operable Unit 1335 Round 5

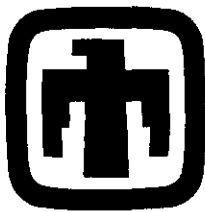
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**Statement of Basis
Approval of No Further Action
Volume 6 of 30**

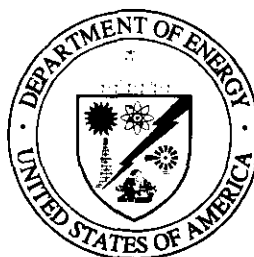
January 2000

**ER Site 56
Operable Unit 1335
Round 5**

(RCRA Permit No. NM5890110518)

NFA Originally Submitted October 30, 1996
RSI Originally Submitted May 1998

**Environmental
Restoration
Project**



**United States Department of Energy
Albuquerque Operations Office**

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1.0 Introduction

1.1 ER Site 56, Old Thunderwells

Sandia National Laboratories/New Mexico (SNL/NM) is proposing a no further action (NFA) decision based on confirmatory sampling for Environmental Restoration (ER) Site 56, Old Thunderwells, Operable Unit (OU) 1335. ER Site 56 is listed in the Hazardous and Solid Waste Amendments (HSWA) Module IV (EPA August 1993) of the SNL/NM Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management Facility Permit (NM5890110518-1) (EPA August 1992).

1.2 SNL/NM Administrative NFA Process

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

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

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

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

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

This request for an NFA decision for ER Site 56 is based primarily on analytical results of confirmatory soil samples collected at the site. Concentrations of site-specific constituents of concern (COCs) detected in the soil samples were first compared to background 95th percentile or upper tolerance limit (UTL) concentrations of COCs found in SNL/NM soils (IT March 1996). If no SNL/NM or other relevant background limit was available for a particular COC, or if the COC concentration exceeded the SNL/NM or other relevant background limit, then the constituent concentration was compared to the proposed 40 CFR Part 264 Subpart S or other relevant soil action level for the compound (EPA July 1990). If the COC concentration exceeded both the background limit and relevant action level for that compound, or if no background limit or action level has been determined or proposed for the constituent, then a risk assessment was performed. The highest concentration of the particular COC identified at the site was then compared to the derived risk assessment action level to determine if the COC concentration at the site poses a significant health risk.

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

- NFA Criterion 1: The site cannot be located or has been found not to exist, is a duplicate potential release site (PRS) or is located within and therefore, investigated as part of another PRS.
- NFA Criterion 2: The site has never been used for the management (that is, generation, treatment, storage, or disposal) of RCRA solid or hazardous wastes and/or constituents or other CERCLA hazardous substances.
- NFA Criterion 3: No release to the environment has occurred, nor is likely to occur in the future.
- NFA Criterion 4: There was a release, but the site was characterized and/or remediated under another authority which adequately addresses corrective action, and documentation, such as a closure letter, is available.
- NFA Criterion 5: The PRS has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use.

Review and analysis of the ER Site 56 soil sample analytical data indicate that concentrations of COCs at this site are less than (1) proposed Subpart S or other action levels, or (2) derived risk assessment action levels.

ER Site 56 is being proposed for an NFA decision based on confirmatory sampling data which demonstrates that hazardous waste or COCs that were released from this SWMU into the environment have been remediated and pose an acceptable level of risk under current and projected future land use (Criterion 5).

1.3 Local Setting

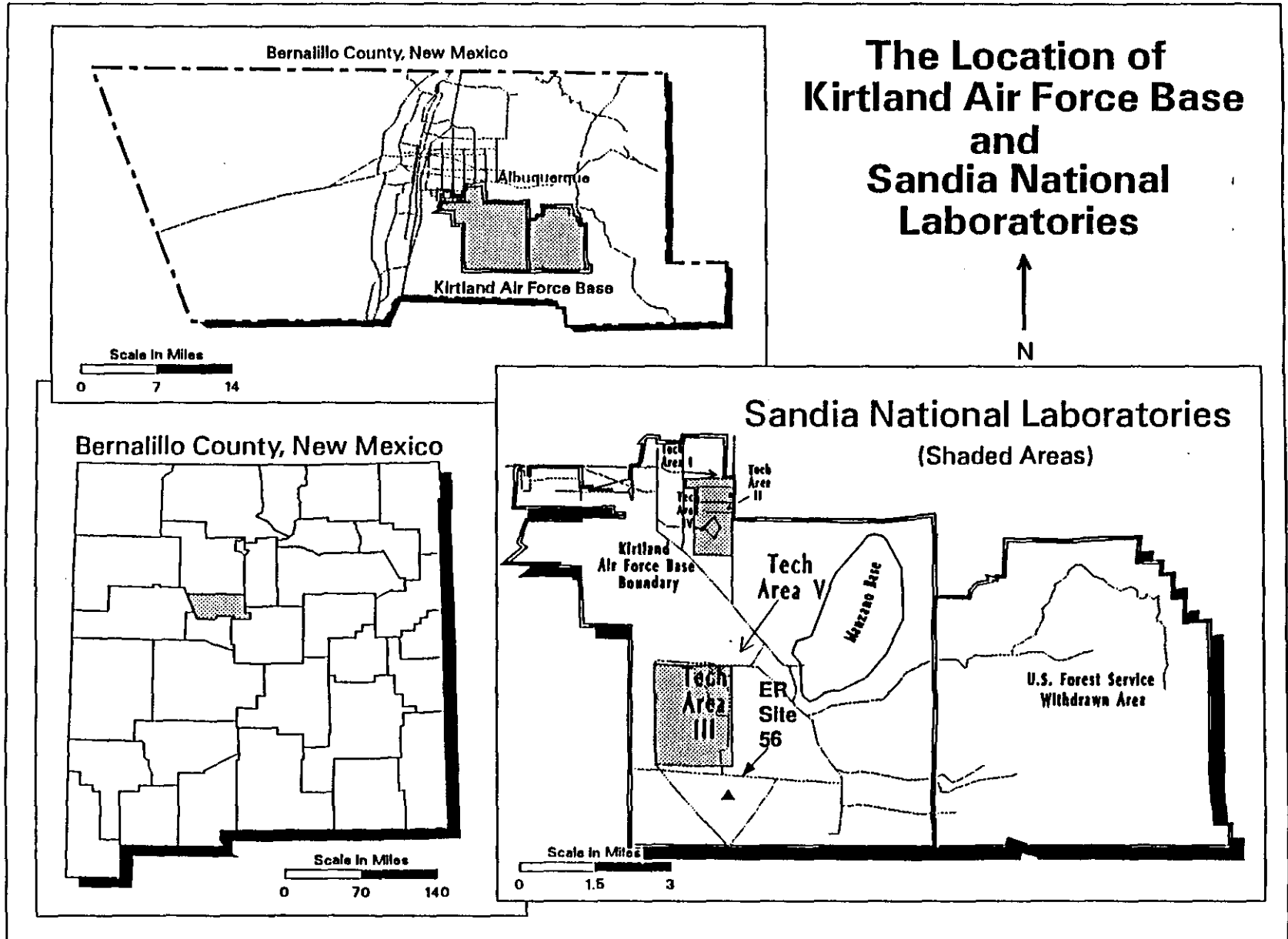
SNL/NM occupies 2,829 acres of land owned by the Department of Energy (DOE), with an additional 14,920 acres of land provided by land-use permits with Kirtland Air Force Base (KAFB), the United States Forest Service (USFS), the State of New Mexico, and the Isleta Indian Reservation (Figure 1). SNL/NM has been involved in nuclear weapons research, component development, assembly, testing, and other research and development activities since 1945 (DOE September 1987).

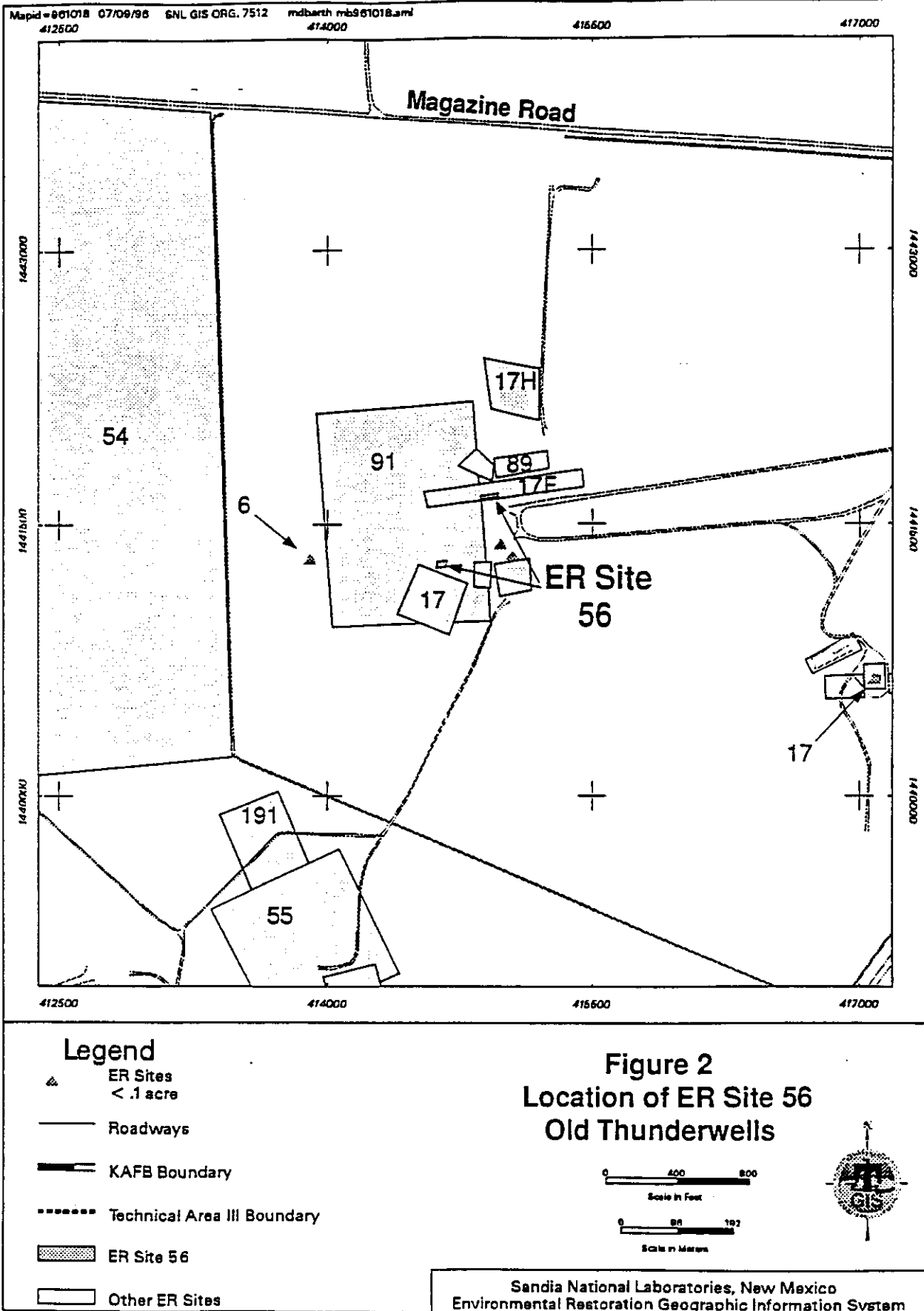
ER Site 56 is located near the southwest corner of Kirtland Air Force Base, east of Building 9966, south of Magazine Road near the large shock tube (ER Site 89) and west of the SNL Solar Power Tower (Figure 2). The site is actually two areas which were used for the same purposes at the same relative time. For all intents and purposes, though, ER Site 56 is considered one site. It is on land which is permitted to the Department of Energy from the Air Force. The site occupies approximately .86 acres and is essentially flat, with a slight slope to the west, at an average elevation of 5,415 feet above mean sea level (AMSL). The area is graded and clear of vegetation, however the surrounding area is covered by desert grasses and cacti. Access to the site is limited through a locked gate at the entrance to South Thunder Range.

The surficial geology at ER Site 56 is characterized by a veneer of aeolian sediments that are underlain by alluvial fan or alluvial deposits. Based on drilling records of similar deposits at KAFB, the alluvial materials are highly heterogeneous, composed primarily of medium to fine silty sands with frequent coarse sand, gravel, and cobble lenses. The alluvial deposits probably extend to the water-table. Vegetation consists predominantly of grasses including grama, muhly, dropseed, and galleta. Shrubs commonly associated with the grasslands include sand sage, winter fat, saltbrush, and rabbitbush. Cacti are common, and include cholla, pincushion, strawberry, and prickly pear.

The water-table elevation is approximately 4935 feet AMSL at this location, with a depth to groundwater of approximately 480 feet. Local groundwater flow is believed to be in a generally west to northwest direction. The nearest production well, KAFB-9, is northeast of the site and is approximately 3 miles away. The nearest groundwater monitor wells to the site are the group of wells installed around the Chemical Waste Landfill in the southeast corner of TA III. These wells are located approximately 0.6 miles northeast of ER Site 56 (SNL/NM March 1995).

Figure 1





2.0 History of the SWMU

2.1 Sources of Supporting Information

In preparing the NFA proposal for ER Site 56, available background information was reviewed to quantify potential releases and to select analytes for the soil sampling. Background information was collected from SNL/NM Facilities Engineering drawings and interviews with employees familiar with site operational history. The following sources of information, hierarchically listed with respect to assigned validity, were used to evaluate ER Site 56:

- * Confirmatory subsurface soil sampling conducted in August 1995;
- * An unexploded ordnance/high explosive survey conducted in November 1993;
- * Interviews with current and retired personnel familiar with the activities at ER Site 56;
- * Miscellaneous information sources including SNL/NM personnel correspondence (memorandums, letters, and notes regarding ER Site 56);
- * Photographs and field notes collected at the site by SNL/NM ER staff;
- * Historical aerial photographs;
- * The Comprehensive Environmental Assessment and Response Program (CEARP) Phase I Report (DOE, Sept. 1987) and CEARP background records;
- * The RCRA Facility Assessment (RFA) report (EPA April 1987).

2.2 Previous Audits, Inspections, and Findings

Investigations conducted under the CEARP and RFA identified ER Site 56 as a potential release site. They listed the site because the site may have been contaminated with high explosives and well casing fragments and particulates.

2.3 Historical Operations

The site consisted of several (possibly six) wells measuring 20 ft deep, 8 ft in diameter and lined with 1/2 inch thick corrugated steel casing. Five wells were constructed at a location that is now on the south side of the 18-foot diameter Large Shock Tube (ER Site 89) about half way down the length of the tube, centered near the foot of the more easterly set of access steps to the top of the tube. Another well was constructed about 50 ft from the southeast corner of the fence around ER Site 91 (Lead Firing Site).

The tests associated with the Old Thunderwells were known as the "Bagpipe" tests. This testing program, jointly operated between SNL/NM and Lawrence Livermore National Laboratory (LLNL), was conducted between 1963 and 1971. Between 500 and 2,000 pounds of explosives for each test were placed in the bottom of the well and the test unit was placed near the top of the tube, where the blast pressures exerted several thousand pounds per square inch (psi). A bell shaped cavern was created in the bottom of each Thunderwell due to the force of the blasts. According to available information, there were 8 tests performed at the site, but there were only 5 documented Thunderwells on the site. It is believed that some of the tests may have been conducted in the above ground horizontal blast tubes at ER Site 89.

After each test was performed, the casing was removed from the well and the remaining hole was collapsed and filled with soil from the surrounding area.

3.0 Evaluation of Relevant Evidence

3.1 Unit Characteristics

The Old Thunderwells were constructed and used before the above-ground shock tubes (ER Site 89) existed and were used for studying the impact of shock waves on test units. Former locations of the wells and the description of the tests are based on information provided by the former Range Manager. The wells near the Large Shock Tube were open to the surface. A charge was detonated near the bottom of the hole, and the shock wave traveled up the well toward a test unit hanging overhead at the surface. The well casing within approximately 3 ft of the charge was deformed and/or fragmented by the detonation. The steel well casing was removed from the hole after each detonation and the well holes were backfilled with soil from the surrounding area, with the exception of the casing used in the last test which may still remain in the ground at that location. No depleted uranium was used in any of the tests. Only metal debris from the steel well casings and minor HE residues are suspected as being generated as the result of the blasts. The surface overlying and adjacent to the wells has been graded and used heavily for other shock tube tests since the Old Thunderwells testing operations were concluded.

The well located southeast of the adjacent ER Site 91 was used for 1 or 2 tests. These tests involved the use of water in creating the shockwave. A photograph taken in 1985 (CEARP) shows a metal cap on the top of the well. It is not known if the well was open to the surface during testing. This well was not damaged as the result of detonation, and no explosives contacted subsurface soils adjacent to the well. The casing was pulled from the well and the well was filled in following testing.

3.2 Operating Practices

Large pieces of shrapnel and explosives were generally picked up after a test. Any finely divided material was dispersed over the test area.

3.3 Presence or Absence of Visual Evidence

Since the tests were subsurface, and all test articles and the larger test article fragments were removed from the site, there is no visual evidence that releases of hazardous materials occurred. There are small metal fragments on the site. The sampling, discussed in Section 3.6, did not reveal any concentrations of RCRA regulated metals above background levels.

3.4 Results of Previous Sampling/Surveys

An Unexploded Ordnance (UXO)/High Explosives (HE) visual surface survey was conducted by KAFB Explosive Ordnance Disposal personnel in November of 1993. No UXO/HE or ordnance debris was found during the survey (SNL/NM, Sept. 1994). No geophysical surveys of the Thunderwells were performed since all metal casing was ostensibly removed from the wells. In

addition, the proximity of the Thunderwells to other large metallic objects such as the Large Shock Tube made electromagnetic geophysical methods impractical.

3.5 Assessment of Gaps in Information

Process knowledge and other available information help identify the most likely COCs which may be found in soils at ER Site 56, and help select the types of analyses to be performed on soil samples. While the history of past releases at the site is incomplete, analytical data from confirmatory soil samples collected in August 1995 (discussed below) are sufficient to determine whether releases of COCs occurred at the site.

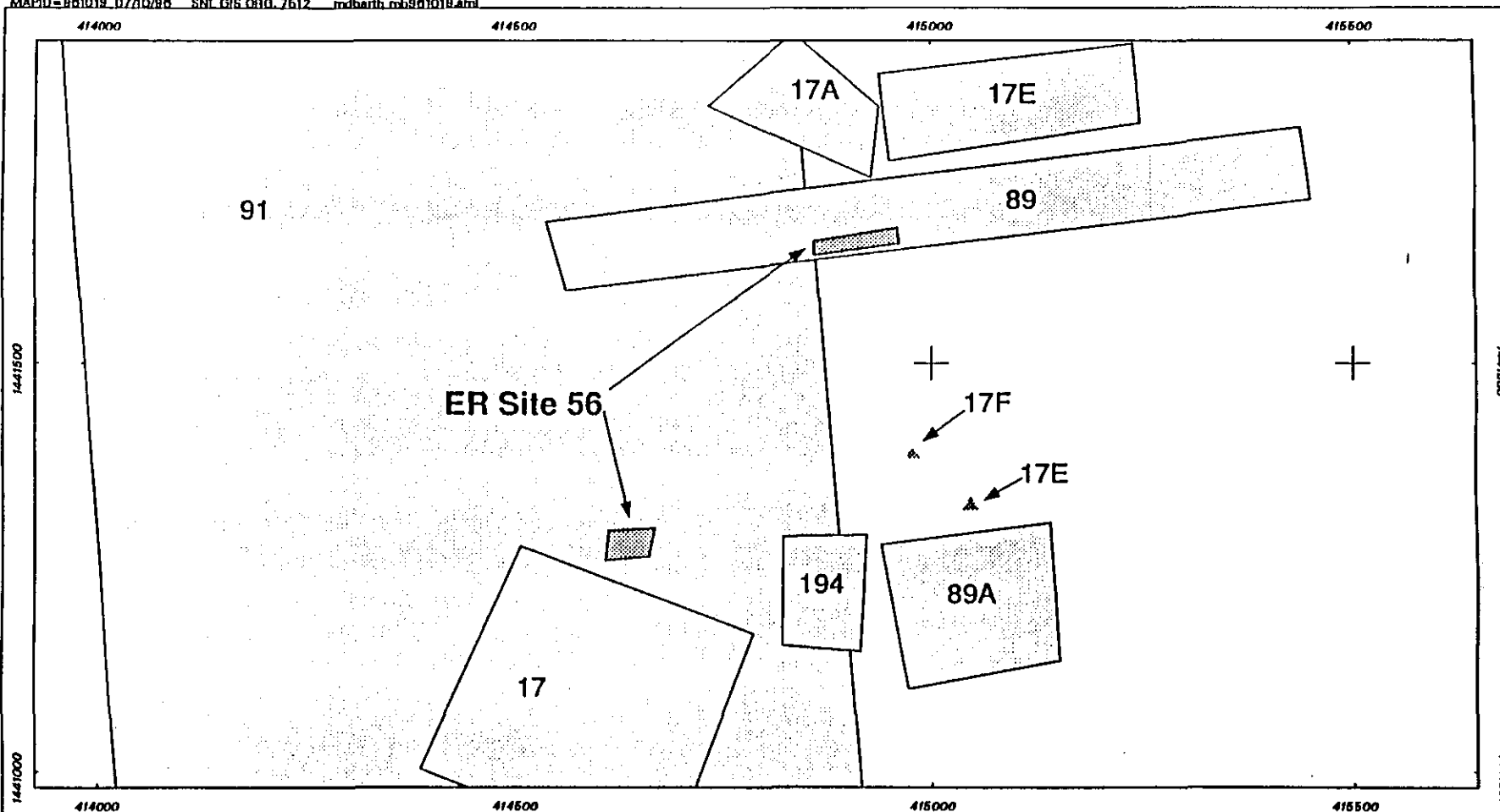
3.6 Confirmatory Sampling

Although the likelihood of hazardous waste releases at ER Site 56 was considered low, confirmatory soil sampling was conducted to determine whether COCs above background or detectable levels were released at this site. The confirmatory soil sampling program was performed in accordance with the rationale and procedures described in the Site 56 - Old Thunderwells Sampling and Analysis Plan developed in June 1995. A series of soil samples were collected to determine possible contamination at the site at judgementally selected locations (Figure 3). Since the tests were detonated in the subsurface, the majority of the explosive material would be contained at the center of the blast area. Therefore, the boreholes were advanced near the center of the thunderwells to target the "worst case" scenario for contamination at each of the well locations.

The GeoprobeTM sampling system was used to collect subsurface soil samples at this site. The GeoprobeTM sampling tool was fitted with a butyl acetate (BA) sampling sleeve and was then hydraulically driven to the top of the designated sampling depth. The sampling tool was opened, and driven an additional two feet in order to fill the two-foot long by approximately 1.25-inch diameter BA sleeve. The sampling tool and soil-filled sleeve were then retrieved from the borehole. Both ends of the seven-inch section of filled sleeve were immediately capped with a TeflonTM membrane and rubber end cap, sealed with tape, and placed in an ice-filled cooler at the site. The soil to be sent to the onsite laboratory was delivered to the lab in the sealed BA sleeve. The soil to be sent to the offsite laboratory was removed from the BA sleeve, emptied into and mixed in a decontaminated mixing bowl, then placed in 4 ounce glass sample containers using a decontaminated plastic spatula, sealed with tape and placed in an ice-filled cooler at the site.

A GeoprobeTM borehole was advanced near each known well location (Figure 4). Samples were taken at depths of 0-2, 5-7, 10-12, 15-17, 20-22, and 25-27 feet below ground surface (bgs). This sample interval is a standard interval used due to the 5-foot sleeve lengths of the GeoprobeTM sampling tool. Most samples were analyzed for HE residues and Target Analyte List (TAL) metals.

88 sample splits from five individual locations were collected and delivered to the appropriate laboratory. Of the 88 splits, 20 were analyzed by a commercial offsite laboratory, exceeding the 20 percent offsite analysis for verification purposes. A summary of the types of samples, number of sample locations, sample depths and analytical requirements for confirmatory soil samples collected at this site is presented in Table 1.



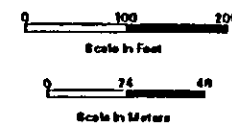
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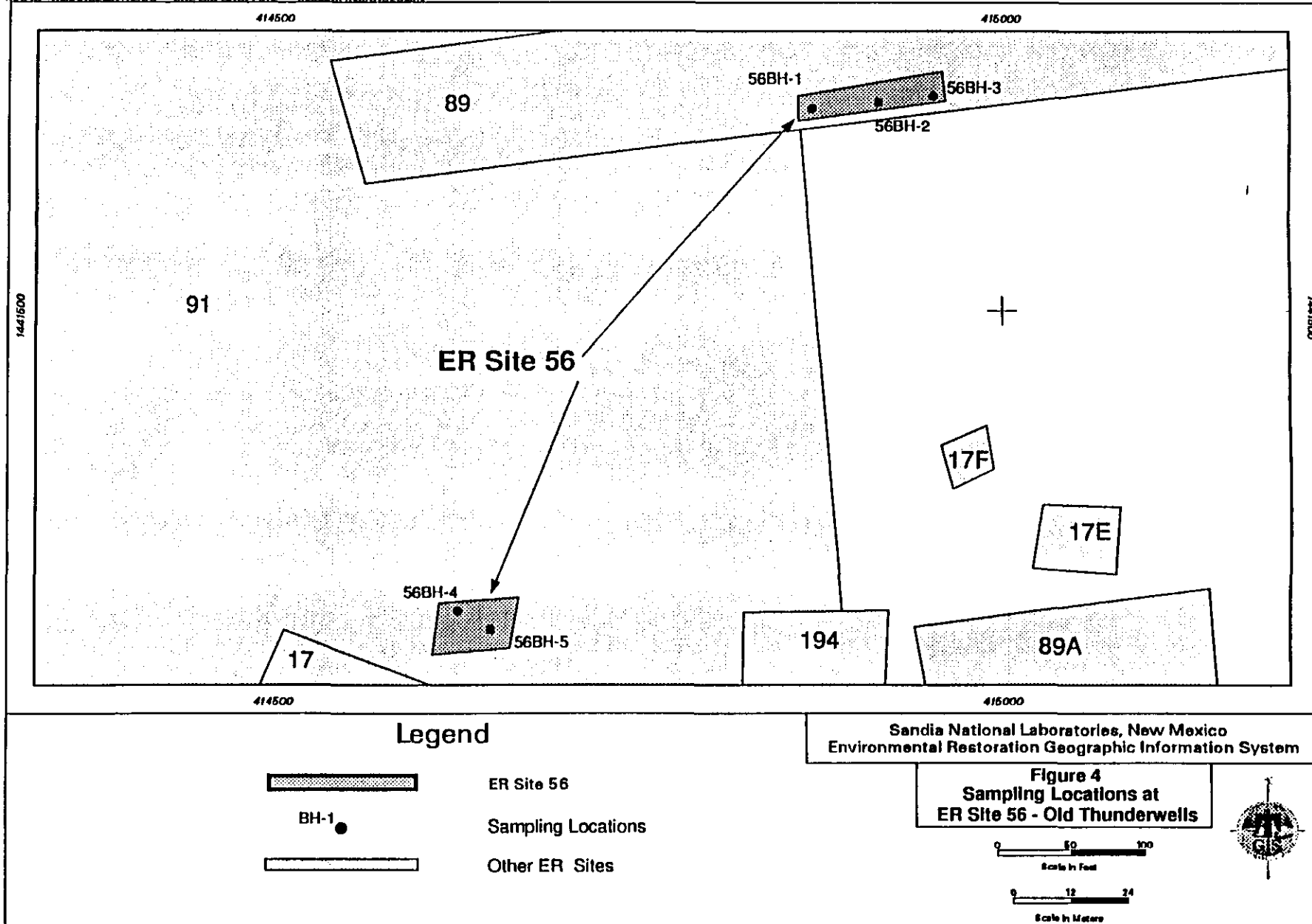
Legend

- | | |
|---|-----------------------|
|  | ER Sites
< .1 acre |
|  | ER Site 56 |
|  | Other ER Sites |

Sandia National Laboratories, New Mexico
Environmental Restoration Geographic Information System

Figure 3
Site Map for ER Site 56
Old Thunderwells





ER Site 56 samples were analyzed by Inductively Coupled Plasma (ICP) for TAL Metals (EPA Method 6010, modified for the target metals) by the onsite Department 7584 Laboratory and for TAL Metals (EPA Method 6010/7000) by the offsite Lockheed Analytical Services of Las Vegas, Nevada. The HE samples were analyzed onsite by SNL Department 2552 High Explosives laboratory and by the offsite Lockheed laboratory. All samples were routed to the laboratories by the SNL/NM Sample Management Office. Routine SNL/NM chain-of-custody and sample documentation procedures were employed for all samples collected at this site.

Table 1
ER Site 54: Confirmatory Sampling Summary Table

Sampling Location	Analytical Parameters	Number of Borehole Locations	Top of Sampling Intervals at Each Borehole Location (ft)	Total Number of Investigative Samples	Total Number of QA/QC Samples	Samples Collection Date
Boreholes 1, 2	High Explosives	2	0,5,10,15,20,25	28	8	8/21/95
	TAL Metals					
Boreholes 3,4,5	High Explosives	3	0,5,10,15,20,25	44	8	8/22/95
	TAL Metals					

Quality assurance/quality control (QA/QC) samples collected during this effort consisted of two sets of aqueous equipment rinsate samples, one for the onsite lab and one for the offsite lab, that were analyzed for the same constituents as the other confirmatory soil samples. Two sets of aqueous samples, one for each laboratory, were collected as field blanks as well. No significant concentrations of COCs were detected in the QA/QC samples.

All samples were far below action level for all analytes in the analysis suite. A summary of all analytes for the TAL metals analysis is presented in Appendix A.2 and the corresponding summary for the High Explosives analysis is presented in Appendix A.3. Complete soil sample analytical data packages are archived in the SNL/NM Environmental Operations Records Center and are readily available for review.

3.7 Rationale for Pursuing a Confirmatory Sampling NFA Decision

The confirmatory sampling did not identify any residual COCs indicating past releases that could pose a threat to human health or the environment. Although there were some analytes that were above the laboratory detection limit, there were no analytes detected at the site that are classified as RCRA metals that were above the proposed RCRA Subpart S action levels.

4.0 Conclusion

Sample analytical results generated from this confirmatory sampling investigation have shown that there are no significant concentrations of COCs in soils at ER Site 56, and that additional investigations are unwarranted and unnecessary. Based on archival information and chemical and radiological analytical results of soil samples collected at the site, SNL/NM has demonstrated that this potential release site has been characterized in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use (Criterion 5 of Section 1.2). The site does not pose a threat to human health or the environment; therefore, ER Site 56 is recommended for an NFA determination.

5.0 References

5.1 ER Site 54 References

Sandia National Laboratories/New Mexico (SNL/NM), August 1995, Field Log #2RN, Pages 48 - 52, 08/21/95 - 8/22/95, Field notes of confirmatory sampling activities at ER Site 56 - Old Thunderwells.

5.2 Other References

Department of Energy (DOE), Albuquerque Operations Office, Environmental Safety and Health Division, Environmental Program Branch, September 1987, draft "Comprehensive Environmental Assessment and Response Program (CEARP) Phase 1: Installation Assessment, Sandia National Laboratories, Albuquerque", Department of Energy, Albuquerque Operations Office, Albuquerque, New Mexico.

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.

New Mexico Environment Department (NMED), November 1995, "Environmental Restoration Document of Understanding", Santa Fe, New Mexico, November 16, 1995.

Sandia National Laboratories/New Mexico (SNL/NM), February 1995, "Program Implementation Plan for Albuquerque Potential Release Sites", Sandia National Laboratories Environmental Restoration Program, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), March 1995, "Site-Wide Hydrogeologic Characterization Project, Calendar Year 1994 Annual Report", Sandia National Laboratories Environmental Restoration Project, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), March 1996, "RCRA Facility Investigation Work Plan for Operable Unit 1335 Southwest Test Area", Sandia National Laboratories Environmental Restoration Project, Albuquerque, New Mexico.

U.S. Environmental Protection Agency (EPA), April 1987, "Final RCRA Facilities Assessment Report of Solid Waste Management Units at Sandia National Laboratories, Albuquerque, New Mexico." Prepared by A.T. Kearney, Inc., and Harding Lawson Associates under Contract No. 68-01-7038, April 1987.

U.S. Environmental Protection Agency (EPA), December 1987, "Hazardous Waste; Codification Rule for 1984 RCRA Amendments; Final Rule", *Federal Register*, Vol. 52, Title 40, Parts 144, 264, 265, 270, and 27, Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), July 1990, "Corrective Action for Solid Waste Management Units (SWMU) at Hazardous Waste Management Facilities, Proposed Rule," *Federal Register*, Vol. 55, Title 40, Parts 264, 265, 270, and 271.

U.S. Environmental Protection Agency (EPA), August 1992, "Hazardous Waste Management Facility Permit No. NM5890110518," EPA Region VI, issued to Sandia National Laboratories, Albuquerque, New Mexico.

U.S. Environmental Protection Agency (EPA), August 1993, "Module IV of RCRA Permit No. NM 5890110518," EPA Region VI, issued to Sandia National Laboratories, Albuquerque, New Mexico.

Appendix A.1

ER Site 56: Results of Confirmatory Soil Sampling for TAL Metals at the Old Thunderwells

ER Site 56: Results of Confirmatory Soil Sampling for TAL Metals at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
6010 Mo	56-BH1-0-S-2	ALUMINUM	3000	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	140	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	35000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	3300	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	1800	ppm	10	
		MANGANESE	140	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	18	ppm	10	J
	56-BH1-5-S-2	ALUMINUM	7600	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	110	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	38000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	7800	ppm	5	J
		LEAD	22	ppm	10	J
		MAGNESIUM	2900	ppm	10	
		MANGANESE	180	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	24	ppm	10	J
	56-BH1-10-S-2	ALUMINUM	3600	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	120	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U

ER Site 56: Results of Confirmatory Soil Sampling for TAL Metals at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
	56-BH1-10-S-2	CALCIUM	55000	ppm	20	J
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	4200	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	2600	ppm	10	
		MANGANESE	72	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	6.6	ppm	4	J
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	11	ppm	10	J
	56-BH1-15-S-2	ALUMINUM	1500	ppm	20	
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	68	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	55000	ppm	20	J
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	3100	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	1300	ppm	10	
		MANGANESE	140	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	10	ppm	10	U
	56-BH1-20-S-2	ALUMINUM	1700	ppm	20	
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	110	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	130000	ppm	20	J
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	3500	ppm	5	J
		LEAD	10	ppm	10	U

ER Site 56: Results of Confirmatory Soil Sampling for TAL Metals at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
6010 Mo	56-BH1-20-S-2	MAGNESIUM	1900	ppm	10	
		MANGANESE	170	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	110	ppm	4	
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	29	ppm	10	J
		ALUMINUM	2900	ppm	20	J
	56-BH1-25-S-2	ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	43	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	17000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	4500	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	1400	ppm	10	
		MANGANESE	71	ppm	10	
		MERCURY	0.07	ppm	0.2	J
		NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	10	ppm	10	U
	56-BH2-0-S-2	ALUMINUM	3700	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	85	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	28000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	4200	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	1900	ppm	10	
		MANGANESE	190	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U

ER Site 56: Results of Confirmatory Soil Sampling for TAL Metals at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
6010 Mo	56-BH2-0-S-2	THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	10	ppm	10	U
	56-BH2-5-S-2	ALUMINUM	5000	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	110	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	35000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	6000	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	2000	ppm	10	
		MANGANESE	95	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	11	ppm	10	J
	56-BH2-10-S-2	ALUMINUM	2200	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	260	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	80000	ppm	20	J
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	2500	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	2300	ppm	10	
		MANGANESE	50	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	19	ppm	10	J
	56-BH2-15-S-2	ALUMINUM	2300	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U

ER Site 56: Results of Confirmatory Soil Sampling for TAL Metals at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
6010 Mo	56-BH2-15-S-2	BARIUM	91	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	40000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	3700	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	2600	ppm	10	
		MANGANESE	110	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	19	ppm	4	J
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	16	ppm	10	J
		ZINC	10	ppm	10	U
	56-BH2-20-S-2	ALUMINUM	1700	ppm	20	
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	43	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	57000	ppm	20	J
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	3800	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	1600	ppm	10	
		MANGANESE	130	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	48	ppm	4	
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	10	ppm	10	U
	56-BH2-25-S-2	ALUMINUM	1200	ppm	20	
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	49	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	34000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U

ER Site 56: Results of Confirmatory Soil Sampling for TAL Metals at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
6010 Mo	56-BH2-25-S-2	COPPER	20	ppm	20	U
		IRON	2200	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	1100	ppm	10	
		MANGANESE	63	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	64	ppm	4	
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	10	ppm	10	U
	56-BH3-0-S-2	ALUMINUM	11000	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	140	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	44000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	9800	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	3600	ppm	10	
		MANGANESE	270	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	15	ppm	10	J
		ZINC	30	ppm	10	J
	56-BH3-5-S-2	ALUMINUM	2200	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	92	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	26000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	2900	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	1400	ppm	10	
		MANGANESE	81	ppm	10	
		MERCURY	0.2	ppm	0.2	U

ER Site 56: Results of Confirmatory Soil Sampling for TAL Metals at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
6010 Mo	56-BH3-5-S-2	NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	10	ppm	10	U
	56-BH3-10-S-2	ALUMINUM	2400	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	26	ppm	10	J
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	45000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	3900	ppm	5	J
		LEAD	10	ppm	10	U
	56-BH3-15-S-2	MAGNESIUM	1500	ppm	10	
		MANGANESE	130	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	23	ppm	10	J
		ALUMINUM	1400	ppm	20	
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	38	ppm	10	
			43	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	43000	ppm	20	
			45000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	2100	ppm	5	J
			2200	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	1200	ppm	10	
			1300	ppm	10	
		MANGANESE	86	ppm	10	
			93	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	9.4	ppm	4	J

ER Site 56: Results of Confirmatory Soil Sampling for TAL Metals at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
6010 Mo	56-BH3-15-S-2		18	ppm	4	J
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	10	ppm	10	U
	56-BH3-20-S-2	ALUMINUM	1500	ppm	20	
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIIUM	50	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	56000	ppm	20	J
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	2700	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	1400	ppm	10	
		MANGANESE	120	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	59	ppm	4	
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	10	ppm	10	U
	56-BH3-25-S-2	ALUMINUM	1600	ppm	20	
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIIUM	55	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	44000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	2900	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	1100	ppm	10	
		MANGANESE	58	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	10	ppm	10	U

ER Site 56: Results of Confirmatory Soil Sampling for TAL Metals at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
6010 Mo	56-BH4-0-S-2	ALUMINUM	4900	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	120	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	22000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	6400	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	2300	ppm	10	
		MANGANESE	180	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	14	ppm	10	J
	56-BH4-5-S-2	ALUMINUM	3600	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	100	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	30000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	5400	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	2200	ppm	10	
		MANGANESE	130	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	10	ppm	10	U
	56-BH4-10-S-2	ALUMINUM	5500	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	200	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U

ER Site 56: Results of Confirmatory Soil Sampling for TAL Metals at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
6010 Mo	56-BH4-10-S-2	CALCIUM	69000	ppm	20	J
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	5500	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	2800	ppm	10	
		MANGANESE	73	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	13	ppm	10	J
	56-BH4-15-S-2	ALUMINUM	2600	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	76	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	42000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	4000	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	2400	ppm	10	
		MANGANESE	100	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	J
		ZINC	10	ppm	10	U
	56-BH4-20-S-2	ALUMINUM	1500	ppm	20	
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	60	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	53000	ppm	20	J
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	2100	ppm	5	J
		LEAD	10	ppm	10	U

ER Site 56: Results of Confirmatory Soil Sampling for TAL Metals at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
6010 Mo	56-BH4-20-S-2	MAGNESIUM	1300	ppm	10	
		MANGANESE	100	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	40	ppm	4	
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	J
		ZINC	10	ppm	10	U
	56-BH4-25-S-2	ALUMINUM	3500	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	77	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	38000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	4600	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	1600	ppm	10	
		MANGANESE	78	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	10	ppm	10	U
	56-BH5-0-S-2	ALUMINUM	13000	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	200	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	37000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	11000	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	4100	ppm	10	
		MANGANESE	240	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U

ER Site 56: Results of Confirmatory Soil Sampling for TAL Metals at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
6010 Mo	56-BH5-0-S-2	THALLIUM	200	ppm	200	U
		VANADIUM	19	ppm	10	J
		ZINC	31	ppm	10	J
	56-BH5-0-SD-2	ALUMINUM	8400	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	140	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	41000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	8700	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	3500	ppm	10	
		MANGANESE	200	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	13	ppm	10	J
	56-BH5-5-S-2	ZINC	24	ppm	10	J
		ALUMINUM	2500	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	120	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	37000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	3000	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	1600	ppm	10	
		MANGANESE	59	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
	56-BH5-10-S-2	VANADIUM	10	ppm	10	U
		ZINC	10	ppm	10	U
		ALUMINUM	2000	ppm	20	
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U

ER Site 56: Results of Confirmatory Soil Sampling for TAL Metals at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
6010 Mo	56-BH5-10-S-2	BARIUM	140	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	34000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	2000	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	2000	ppm	10	
		MANGANESE	61	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	10	ppm	10	U
	56-BH5-15-S-2	ALUMINUM	3200	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	170	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	40000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	5000	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	2400	ppm	10	
		MANGANESE	120	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	4	ppm	4	U
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	13	ppm	10	J
	56-BH5-20-S-2	ALUMINUM	3000	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	91	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	46000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U

ER Site 56: Results of Confirmatory Soil Sampling for TAL Metals at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
6010 Mo	56-BH5-20-S-2	COPPER	20	ppm	20	U
		IRON	4400	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	2200	ppm	10	
		MANGANESE	140	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	17	ppm	4	J
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	11	ppm	10	J
		ZINC	20	ppm	10	J
	56-BH5-25-S-2	ALUMINUM	2900	ppm	20	J
		ANTIMONY	10	ppm	10	U
		ARSENIC	50	ppm	50	U
		BARIUM	98	ppm	10	
		BERYLLIUM	3.4	ppm	3.4	U
		CADMIUM	10	ppm	10	U
		CALCIUM	48000	ppm	20	
		CHROMIUM	10	ppm	10	U
		COBALT	10	ppm	10	U
		COPPER	20	ppm	20	U
		IRON	4800	ppm	5	J
		LEAD	10	ppm	10	U
		MAGNESIUM	2000	ppm	10	
		MANGANESE	120	ppm	10	
		MERCURY	0.2	ppm	0.2	U
		NICKEL	160	ppm	4	
		SELENIUM	50	ppm	50	U
		SILVER	10	ppm	10	U
		THALLIUM	200	ppm	200	U
		VANADIUM	10	ppm	10	U
		ZINC	10	ppm	10	U
EPA-SW846-6010	56-BH1-20-SO-3	ALUMINUM	2900	mg/kg	41	
		ANTIMONY	12	mg/kg	12	U
		ARSENIC	3.7	mg/kg	2	
		BARIUM	230	mg/kg	41	
		BERYLLIUM	1	mg/kg	1	U
		CADMIUM	1	mg/kg	1	U
		CALCIUM	80000	mg/kg	1000	
		CHROMIUM	8.6	mg/kg	2	
		COBALT	10	mg/kg	10	U
		COPPER	5.1	mg/kg	5.1	U
		IRON	6000	mg/kg	20	*
		LEAD	5.9	mg/kg	0.61	
		MAGNESIUM	2100	mg/kg	1000	
		MANGANESE	200	mg/kg	3.1	N

ER Site 56: Results of Confirmatory Soil Sampling for TAL Metals at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
EPA-SW846-6010	56-BH1-20-SO-3	NICKEL	170	mg/kg	8.2	
		POTASSIUM	1000	mg/kg	1000	U
		SELENIUM	1	mg/kg	1	U
		SILVER	2	mg/kg	2	U
		SODIUM	1000	mg/kg	1000	U
		THALLIUM	2	mg/kg	2	U
		VANADIUM	10	mg/kg	10	U
		ZINC	29	mg/kg	4.1	
		ALUMINUM	5500	mg/kg	43	
		ANTIMONY	13	mg/kg	13	U
	56-BH2-15-SO-3	ARSENIC	4.2	mg/kg	2.2	
		BARIUM	170	mg/kg	43	
		BERYLLIUM	1.1	mg/kg	1.1	U
		CADMIUM	1.1	mg/kg	1.1	U
		CALCIUM	97000	mg/kg	1100	
		CHROMIUM	7.1	mg/kg	2.2	
		COBALT	11	mg/kg	11	U
		COPPER	5.4	mg/kg	5.4	U
		IRON	8600	mg/kg	22	*
		LEAD	7.5	mg/kg	0.65	
		MAGNESIUM	4400	mg/kg	1100	
		MANGANESE	270	mg/kg	3.3	N
		NICKEL	8.7	mg/kg	8.7	
		POTASSIUM	1100	mg/kg	1100	U
		SELENIUM	1.1	mg/kg	1.1	
		SILVER	2.2	mg/kg	2.2	U
		SODIUM	1100	mg/kg	1100	U
		THALLIUM	2.2	mg/kg	2.2	U
		VANADIUM	22	mg/kg	11	
		ZINC	27	mg/kg	4.3	
	56-BH2-25-EB-2	ALUMINUM	0.2	mg/L	0.2	U
		ANTIMONY	0.06	mg/L	0.06	U
		ARSENIC	0.01	mg/L	0.01	U
		BARIUM	0.2	mg/L	0.2	U
		BERYLLIUM	0.005	mg/L	0.005	U
		CADMIUM	0.005	mg/L	0.005	U
		CALCIUM	5	mg/L	5	U
		CHROMIUM	0.01	mg/L	0.01	U
		COBALT	0.05	mg/L	0.05	U
		COPPER	0.025	mg/L	0.025	U
		IRON	0.11	mg/L	0.1	
		LEAD	0.003	mg/L	0.003	U
		MAGNESIUM	5	mg/L	5	U
		MANGANESE	0.015	mg/L	0.015	U
		NICKEL	0.04	mg/L	0.04	U
		POTASSIUM	5	mg/L	5	U
		SELENIUM	0.005	mg/L	0.005	U
		SILVER	0.01	mg/L	0.01	U

ER Site 56: Results of Confirmatory Soil Sampling for TAL Metals at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
EPA-SW846-6010	56-BH2-25-EB-2	SODIUM	5	mg/L	5	U
		THALLIUM	0.01	mg/L	0.01	U
		VANADIUM	0.05	mg/L	0.05	U
		ZINC	0.02	mg/L	0.02	U
	56-BH2-25-FB-2	ALUMINUM	0.2	mg/L	0.2	U
		ANTIMONY	0.06	mg/L	0.06	U
		ARSENIC	0.01	mg/L	0.01	U
		BARIUM	0.2	mg/L	0.2	U
		BERYLLIUM	0.005	mg/L	0.005	U
		CADMIUM	0.005	mg/L	0.005	U
		CALCIUM	5	mg/L	5	U
		CHROMIUM	0.01	mg/L	0.01	U
		COBALT	0.05	mg/L	0.05	U
		COPPER	0.025	mg/L	0.025	U
		IRON	0.1	mg/L	0.1	U
		LEAD	0.003	mg/L	0.003	U
		MAGNESIUM	5	mg/L	5	U
		MANGANESE	0.015	mg/L	0.015	U
		NICKEL	0.04	mg/L	0.04	U
		POTASSIUM	5	mg/L	5	U
		SELENIUM	0.005	mg/L	0.005	U
		SILVER	0.01	mg/L	0.01	U
		SODIUM	5	mg/L	5	U
		THALLIUM	0.01	mg/L	0.01	U
		VANADIUM	0.05	mg/L	0.05	U
		ZINC	0.02	mg/L	0.02	U
	56-BH3-10-SO-3	ALUMINUM	3200	mg/kg	41	
		ANTIMONY	12	mg/kg	12	U
		ARSENIC	2.1	mg/kg	2	
		BARIUM	41	mg/kg	41	U
		BERYLLIUM	1	mg/kg	1	U
		CADMIUM	1	mg/kg	1	U
		CALCIUM	44000	mg/kg	1000	
		CHROMIUM	3.9	mg/kg	2	
		COBALT	10	mg/kg	10	U
		COPPER	5.1	mg/kg	5.1	U
		IRON	6300	mg/kg	20	*
		LEAD	4.3	mg/kg	0.61	
		MAGNESIUM	1800	mg/kg	1000	
		MANGANESE	120	mg/kg	3.1	N
		NICKEL	8.1	mg/kg	8.1	U
		POTASSIUM	1000	mg/kg	1000	U
		SELENIUM	1	mg/kg	1	U
		SILVER	2	mg/kg	2	U
		SODIUM	1000	mg/kg	1000	U
		THALLIUM	2	mg/kg	2	U
		VANADIUM	10	mg/kg	10	U
		ZINC	19	mg/kg	4.1	

ER Site 56: Results of Confirmatory Soil Sampling for TAL Metals at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
EPA-SW846-6010	56-BH4-5-SO-3	ALUMINUM	6100	mg/kg	41	
		ANTIMONY	12	mg/kg	12	U
		ARSENIC	2.1	mg/kg	2.1	
		BARIUM	88	mg/kg	41	
		BERYLLIUM	1	mg/kg	1	U
		CADMIUM	1	mg/kg	1	U
		CALCIUM	34000	mg/kg	1000	
		CHROMIUM	7.3	mg/kg	2.1	
		COBALT	10	mg/kg	10	U
		COPPER	5.9	mg/kg	5.2	
		IRON	8200	mg/kg	21	*
		LEAD	6.2	mg/kg	0.62	
		MAGNESIUM	2700	mg/kg	1000	
		MANGANESE	140	mg/kg	3.1	N
		NICKEL	13	mg/kg	8.3	
		POTASSIUM	1300	mg/kg	1000	
		SELENIUM	1	mg/kg	1	U
		SILVER	2.1	mg/kg	2.1	U
		SODIUM	1000	mg/kg	1000	U
		THALLIUM	2.1	mg/kg	2.1	U
		VANADIUM	14	mg/kg	10	
		ZINC	21	mg/kg	4.1	
	56-BH5-0-SO-3	ALUMINUM	13000	mg/kg	42	
		ANTIMONY	13	mg/kg	13	U
		ARSENIC	4.2	mg/kg	2.1	
		BARIUM	290	mg/kg	42	
		BERYLLIUM	1.1	mg/kg	1.1	U
		CADMIUM	1.1	mg/kg	1.1	U
		CALCIUM	39000	mg/kg	1100	
		CHROMIUM	12	mg/kg	2.1	
		COBALT	11	mg/kg	11	U
		COPPER	11	mg/kg	5.3	
		IRON	14000	mg/kg	21	*
		LEAD	9.3	mg/kg	0.63	
		MAGNESIUM	4700	mg/kg	1100	
		MANGANESE	250	mg/kg	3.2	N
		NICKEL	11	mg/kg	8.5	
		POTASSIUM	2800	mg/kg	1100	
		SELENIUM	1.1	mg/kg	1.1	U
		SILVER	2.1	mg/kg	2.1	U
		SODIUM	1100	mg/kg	1100	U
		THALLIUM	2.1	mg/kg	2.1	U
		VANADIUM	26	mg/kg	11	
		ZINC	38	mg/kg	4.2	
	56-BH5-20-SO-3	ALUMINUM	4800	mg/kg	41	
		ANTIMONY	12	mg/kg	12	U
		ARSENIC	3	mg/kg	2.1	
		BARIUM	89	mg/kg	41	

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
EPA-SW846-6010	56-BH5-20-SO-3	BERYLLIUM	1	mg/kg	1	U
		CADMIUM	1	mg/kg	1	U
		CALCIUM	44000	mg/kg	1000	
		CHROMIUM	8.4	mg/kg	2.1	
		COBALT	10	mg/kg	10	U
		COPPER	5.2	mg/kg	5.2	U
		IRON	8300	mg/kg	21	*
		LEAD	17	mg/kg	0.62	
		MAGNESIUM	2800	mg/kg	1000	
		MANGANESE	170	mg/kg	3.1	N
		NICKEL	83	mg/kg	8.3	
		POTASSIUM	1000	mg/kg	1000	U
		SELENIUM	1	mg/kg	1	U
		SILVER	2.1	mg/kg	2.1	U
		SODIUM	1000	mg/kg	1000	U
		THALLIUM	2.1	mg/kg	2.1	U
		VANADIUM	16	mg/kg	10	
		ZINC	31	mg/kg	4.1	
	56-BH5-25-EB-2	ALUMINUM	0.2	mg/L	0.2	U
		ANTIMONY	0.06	mg/L	0.06	U
		ARSENIC	0.01	mg/L	0.01	U
		BARIUM	0.2	mg/L	0.2	U
		BERYLLIUM	0.005	mg/L	0.005	U
		CADMIUM	0.005	mg/L	0.005	U
		CALCIUM	5	mg/L	5	U
		CHROMIUM	0.01	mg/L	0.01	U
		COBALT	0.05	mg/L	0.05	U
		COPPER	0.025	mg/L	0.025	U
		IRON	0.12	mg/L	0.1	
		LEAD	0.003	mg/L	0.003	U
		MAGNESIUM	5	mg/L	5	U
		MANGANESE	0.015	mg/L	0.015	U
		NICKEL	0.04	mg/L	0.04	U
		POTASSIUM	5	mg/L	5	U
		SELENIUM	0.005	mg/L	0.005	U
		SILVER	0.01	mg/L	0.01	U
		SODIUM	5	mg/L	5	U
		THALLIUM	0.01	mg/L	0.01	U
		VANADIUM	0.05	mg/L	0.05	U
		ZINC	0.02	mg/L	0.02	U
	56-BH5-25-FB-2	ALUMINUM	0.2	mg/L	0.2	U
		ANTIMONY	0.06	mg/L	0.06	U
		ARSENIC	0.01	mg/L	0.01	U
		BARIUM	0.2	mg/L	0.2	U
		BERYLLIUM	0.005	mg/L	0.005	U
		CADMIUM	0.005	mg/L	0.005	U
		CALCIUM	5	mg/L	5	U
		CHROMIUM	0.01	mg/L	0.01	U

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
EPA-SW846-6010	56-BH5-25-FB-2	COBALT	0.05	mg/L	0.05	U
		COPPER	0.03	mg/L	0.025	
		IRON	0.48	mg/L	0.1	
		LEAD	0.003	mg/L	0.003	U
		MAGNESIUM	5	mg/L	5	U
		MANGANESE	0.015	mg/L	0.015	U
		NICKEL	0.04	mg/L	0.04	U
		POTASSIUM	5	mg/L	5	U
		SELENIUM	0.005	mg/L	0.005	U
		SILVER	0.01	mg/L	0.01	U
		SODIUM	5	mg/L	5	U
		THALLIUM	0.01	mg/L	0.01	U
		VANADIUM	0.05	mg/L	0.05	U
		ZINC	0.065	mg/L	0.02	
EPA-SW846-7470	56-BH2-25-EB-2	MERCURY	0.0002	mg/L	0.0002	U
	56-BH2-25-FB-2	MERCURY	0.0002	mg/L	0.0002	U
	56-BH5-25-EB-2	MERCURY	0.0002	mg/L	0.0002	U
	56-BH5-25-FB-2	MERCURY	0.0002	mg/L	0.0002	U
EPA-SW846-7471	56-BH1-20-SO-3	MERCURY	0.1	mg/kg	0.1	U
	56-BH2-15-SO-3	MERCURY	0.11	mg/kg	0.11	U
	56-BH3-10-SO-3	MERCURY	0.1	mg/kg	0.1	U
	56-BH4-5-SO-3	MERCURY	0.1	mg/kg	0.1	U
	56-BH5-0-SO-3	MERCURY	0.11	mg/kg	0.11	U
	56-BH5-20-SO-3	MERCURY	0.1	mg/kg	0.1	U

Appendix A.2

ER Site 56: Results of Confirmatory Soil Sampling for TAL Metals at the Old Thunderwells

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Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
EPA-SW846-8330	56-BH1-20-SO-3	1,3,5-TRINITROBENZENE	0.07	ug/g	0.07	U
		1,3-DINITROBENZENE	0.1	ug/g	0.1	U
		2,4,6-TRINITROTOLUENE	0.11	ug/g	0.11	U
		2,4-DINITROTOLUENE	0.16	ug/g	0.16	U
		2,6-DINITROTOLUENE	0.19	ug/g	0.19	U
		2-AMINO-4,6-DINITROTOLUENE	0.13	ug/g	0.13	U
		2-NITROTOLUENE	0.07	ug/g	0.07	U
		3-NITROTOLUENE	0.16	ug/g	0.16	U
		4-AMINO-2,6-DINITROTOLUENE	0.055	ug/g	0.055	U
		4-NITROTOLUENE	0.17	ug/g	0.17	U
		HMX	0.42	ug/g	0.42	U
		NITROBENZENE	0.15	ug/g	0.15	U
		RDX	0.19	ug/g	0.19	U
		TETRYL	0.34	ug/g	0.34	U
	56-BH2-15-SO-3	1,3,5-TRINITROBENZENE	0.07	ug/g	0.07	U
		1,3-DINITROBENZENE	0.1	ug/g	0.1	U
		2,4,6-TRINITROTOLUENE	0.11	ug/g	0.11	U
		2,4-DINITROTOLUENE	0.16	ug/g	0.16	U
		2,6-DINITROTOLUENE	0.19	ug/g	0.19	U
		2-AMINO-4,6-DINITROTOLUENE	0.13	ug/g	0.13	U
		2-NITROTOLUENE	0.07	ug/g	0.07	U
		3-NITROTOLUENE	0.16	ug/g	0.16	U
		4-AMINO-2,6-DINITROTOLUENE	0.055	ug/g	0.055	U
		4-NITROTOLUENE	0.17	ug/g	0.17	U
		HMX	0.42	ug/g	0.42	U
		NITROBENZENE	0.15	ug/g	0.15	U
		RDX	0.19	ug/g	0.19	U
		TETRYL	0.34	ug/g	0.34	U
	56-BH2-25-EB-1	1,3,5-TRINITROBENZENE	0.04	ug/L	0.04	U
		1,3-DINITROBENZENE	0.03	ug/L	0.03	U
		2,4,6-TRINITROTOLUENE	0.03	ug/L	0.03	U
		2,4-DINITROTOLUENE	0.11	ug/L	0.11	U
		2,6-DINITROTOLUENE	0.07	ug/L	0.07	U
		2-AMINO-4,6-DINITROTOLUENE	0.04	ug/L	0.04	U
		2-NITROTOLUENE	0.03	ug/L	0.03	U
		3-NITROTOLUENE	0.02	ug/L	0.02	U
		4-AMINO-2,6-DINITROTOLUENE	0.05	ug/L	0.05	U
		4-NITROTOLUENE	0.03	ug/L	0.03	U
		HMX	0.08	ug/L	0.08	U
		NITROBENZENE	0.04	ug/L	0.04	U
		RDX	0.2	ug/L	0.2	U
		TETRYL	0.04	ug/L	0.04	U
	56-BH2-25-FB-1	1,3,5-TRINITROBENZENE	0.04	ug/L	0.04	U
		1,3-DINITROBENZENE	0.03	ug/L	0.03	U
		2,4,6-TRINITROTOLUENE	0.03	ug/L	0.03	U
		2,4-DINITROTOLUENE	0.11	ug/L	0.11	U
		2,6-DINITROTOLUENE	0.07	ug/L	0.07	U
		2-AMINO-4,6-DINITROTOLUENE	0.04	ug/L	0.04	U

ER Site 56: Results of Confirmatory Soil Sampling for High Explosives at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
EPA-SW846-8330	56-BH2-25-FB-1	2-NITROTOLUENE	0.03	ug/L	0.03	U
		3-NITROTOLUENE	0.02	ug/L	0.02	U
		4-AMINO-2,6-DINITROTOLUENE	0.05	ug/L	0.05	U
		4-NITROTOLUENE	0.03	ug/L	0.03	U
		HMX	0.08	ug/L	0.08	U
		NITROBENZENE	0.04	ug/L	0.04	U
		RDX	0.2	ug/L	0.2	U
		TETRYL	0.04	ug/L	0.04	U
		1,3,5-TRINITROBENZENE	0.07	ug/g	0.07	U
		1,3-DINITROBENZENE	0.1	ug/g	0.1	U
	56-BH3-10-SO-3	2,4,6-TRINITROTOLUENE	0.11	ug/g	0.11	U
		2,4-DINITROTOLUENE	0.16	ug/g	0.16	U
		2,6-DINITROTOLUENE	0.19	ug/g	0.19	U
		2-AMINO-4,6-DINITROTOLUENE	0.13	ug/g	0.13	U
		2-NITROTOLUENE	0.07	ug/g	0.07	U
		3-NITROTOLUENE	0.16	ug/g	0.16	U
		4-AMINO-2,6-DINITROTOLUENE	0.055	ug/g	0.055	U
		4-NITROTOLUENE	0.17	ug/g	0.17	U
		HMX	0.42	ug/g	0.42	U
		NITROBENZENE	0.15	ug/g	0.15	U
	56-BH4-5-SO-3	RDX	0.19	ug/g	0.19	U
		TETRYL	0.34	ug/g	0.34	U
		1,3,5-TRINITROBENZENE	0.07	ug/g	0.07	U
		1,3-DINITROBENZENE	0.1	ug/g	0.1	U
		2,4,6-TRINITROTOLUENE	0.11	ug/g	0.11	U
		2,4-DINITROTOLUENE	0.16	ug/g	0.16	U
		2,6-DINITROTOLUENE	0.19	ug/g	0.19	U
		2-AMINO-4,6-DINITROTOLUENE	0.13	ug/g	0.13	U
		2-NITROTOLUENE	0.07	ug/g	0.07	U
		3-NITROTOLUENE	0.16	ug/g	0.16	U
	56-BH5-0-SO-3	4-AMINO-2,6-DINITROTOLUENE	0.055	ug/g	0.055	U
		4-NITROTOLUENE	0.17	ug/g	0.17	U
		HMX	0.42	ug/g	0.42	U
		NITROBENZENE	0.15	ug/g	0.15	U
		RDX	0.19	ug/g	0.19	U
		TETRYL	0.34	ug/g	0.34	U
		1,3,5-TRINITROBENZENE	0.07	ug/g	0.07	U
		1,3-DINITROBENZENE	0.1	ug/g	0.1	U
		2,4,6-TRINITROTOLUENE	0.11	ug/g	0.11	U
		2,4-DINITROTOLUENE	0.16	ug/g	0.16	U
		2,6-DINITROTOLUENE	0.19	ug/g	0.19	U
		2-AMINO-4,6-DINITROTOLUENE	0.13	ug/g	0.13	U
		2-NITROTOLUENE	0.07	ug/g	0.07	U
		3-NITROTOLUENE	0.16	ug/g	0.16	U
		4-AMINO-2,6-DINITROTOLUENE	0.055	ug/g	0.055	U
		4-NITROTOLUENE	0.17	ug/g	0.17	U
		HMX	0.42	ug/g	0.42	U
		NITROBENZENE	0.15	ug/g	0.15	U

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
EPA-SW846-8330	56-BH5-0-SO-3	RDX	0.19	ug/g	0.19	U
		TETRYL	0.34	ug/g	0.34	U
	56-BH5-20-SO-3	1,3,5-TRINITROBENZENE	0.07	ug/g	0.07	U
		1,3-DINITROBENZENE	0.1	ug/g	0.1	U
		2,4,6-TRINITROTOLUENE	0.11	ug/g	0.11	U
		2,4-DINITROTOLUENE	0.16	ug/g	0.16	U
		2,6-DINITROTOLUENE	0.19	ug/g	0.19	U
		2-AMINO-4,6-DINITROTOLUENE	0.13	ug/g	0.13	U
		2-NITROTOLUENE	0.07	ug/g	0.07	U
		3-NITROTOLUENE	0.16	ug/g	0.16	U
		4-AMINO-2,6-DINITROTOLUENE	0.055	ug/g	0.055	U
		4-NITROTOLUENE	0.17	ug/g	0.17	U
		HMX	0.42	ug/g	0.42	U
		NITROBENZENE	0.15	ug/g	0.15	U
		RDX	0.19	ug/g	0.19	U
		TETRYL	0.34	ug/g	0.34	U
	56-BH5-25-EB-1	1,3,5-TRINITROBENZENE	0.04	ug/L	0.04	U
		1,3-DINITROBENZENE	0.03	ug/L	0.03	U
		2,4,6-TRINITROTOLUENE	0.03	ug/L	0.03	U
		2,4-DINITROTOLUENE	0.11	ug/L	0.11	U
		2,6-DINITROTOLUENE	0.07	ug/L	0.07	U
		2-AMINO-4,6-DINITROTOLUENE	0.04	ug/L	0.04	U
		2-NITROTOLUENE	0.03	ug/L	0.03	U
		3-NITROTOLUENE	0.02	ug/L	0.02	U
		4-AMINO-2,6-DINITROTOLUENE	0.05	ug/L	0.05	U
		4-NITROTOLUENE	0.03	ug/L	0.03	U
		HMX	0.08	ug/L	0.08	U
		NITROBENZENE	0.04	ug/L	0.04	U
		RDX	0.2	ug/L	0.2	U
		TETRYL	0.04	ug/L	0.04	U
	56-BH5-25-FB-1	1,3,5-TRINITROBENZENE	0.04	ug/L	0.04	U
		1,3-DINITROBENZENE	0.03	ug/L	0.03	U
		2,4,6-TRINITROTOLUENE	0.03	ug/L	0.03	U
		2,4-DINITROTOLUENE	0.11	ug/L	0.11	U
		2,6-DINITROTOLUENE	0.07	ug/L	0.07	U
		2-AMINO-4,6-DINITROTOLUENE	0.04	ug/L	0.04	U
		2-NITROTOLUENE	0.03	ug/L	0.03	U
		3-NITROTOLUENE	0.02	ug/L	0.02	U
		4-AMINO-2,6-DINITROTOLUENE	0.05	ug/L	0.05	U
		4-NITROTOLUENE	0.03	ug/L	0.03	U
		HMX	0.08	ug/L	0.08	U
		NITROBENZENE	0.04	ug/L	0.04	U
		RDX	0.2	ug/L	0.2	U
		TETRYL	0.04	ug/L	0.04	U
HPLC	56-BH1-0-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U

ER Site 56: Results of Confirmatory Soil Sampling for High Explosives at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
HPLC	56-BH1-0-S-1	RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH1-5-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH1-10-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH1-15-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH1-20-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH1-25-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH2-0-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH2-5-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH2-10-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH2-15-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH2-20-S-1	HMX	500	ppb	500	U

ER Site 56: Results of Confirmatory Soil Sampling for High Explosives at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
HPLC	56-BH2-20-S-1	NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH2-25-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
	56-BH3-0-S-1	TRINITROTOLUENE	400	ppb	400	U
		HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
	56-BH3-5-S-1	RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
		HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
	56-BH3-10-S-1	PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
		HMX	500	ppb	500	U
	56-BH3-15-S-1	NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH3-20-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
	56-BH3-25-S-1	TRINITROTOLUENE	400	ppb	400	U
		HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
	56-BH4-0-S-1	RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
		HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
	56-BH4-5-S-1	PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
		HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U

ER Site 56: Results of Confirmatory Soil Sampling for High Explosives at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
HPLC	56-BH4-5-S-1	TRINITROTOLUENE	400	ppb	400	U
	56-BH4-10-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH4-15-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH4-20-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH4-25-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH5-0-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH5-5-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH5-10-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH5-15-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH5-20-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U
		PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U
	56-BH5-25-S-1	HMX	500	ppb	500	U
		NITROGLYCERINE	150	ppb	150	U

ER Site 56: Results of Confirmatory Soil Sampling for High Explosives at the Old Thunderwells

Test Method	Sample ID	Analyte	Result	Units	Detection Limits	Qualifier
HPLC	56-BH5-25-S-1	PETN	750	ppb	750	U
		RDX	750	ppb	750	U
		TRINITROTOLUENE	400	ppb	400	U

RSI

**Statement of Basis
Approval of No Further Action**

January 2000

**ER Site 56
Operable Unit 1335
Round 5**

RSI Originally Submitted May 1998

ER Site 56, Old Thunder Wells (Thunder Range)

ER Site 56 may be appropriate for NFA petition, pending submittal and review of the additional information requested below:

General Comment on ER Site 56 Comments: Most of the comments regarding ER Site 56 are in reference to the analytical tables presented in the NFA proposal. These tables have been revised to comply with approved NFA proposal format. Please substitute the attached sheets (Attachment K) in the ER Site 56 NFA proposal.

1. **Section 3.6, last paragraph, second sentence – TAL metals analyses are found in Appendix A.1, not A.2. HE analyses are found in Appendix A.2, not A.3. The title on the title page for Appendix A.2 incorrectly refers to TAL metals, instead of HE. Please submit replacement pages.**

Response: Revision noted. Note: For the metals tables, RCRA metals have been substituted for target analyte list (TAL) metals since most of the TAL metals such as aluminum and calcium are not primarily hazardous metals nor are many of the non-RCRA TAL metals contaminants of concern at ER Site 56 (see Attachment K).

2. **Results for barium exceed the approved background level (214 mg/kg) for samples: 56-BH2-10-S-2 (260 ppm), 56-BH1-20-SO-3 (230 mg/kg), 56-BH5-0-SO-3 (290 mg/kg). Is barium a suspected COC at ER Site 56 due to explosives or the various test devices used there?**

Response: The use of baratol, a barium-based explosive, has not been documented at ER Site 56. The tests performed at ER Site 56 were similar to those performed at ER Site 89, the shock tubes. Shock waves from explosive charges were amplified in the tube to simulate nuclear forces. The explosives used at the shock tubes were Composition B, PETN, C-4, TNT, RDX, HMX, and primacord. Based on this information, it appears that baratol was not used at ER Site 89 because it would not generate the type of shock waves necessary for nuclear simulation. For this reason, it is assumed that baratol was not used at ER Site 56. The barium anomalies at ER Site 56 have been evaluated for risk, and this discussion has been incorporated into Section 3.6 of the NFA proposal (see Attachment L).

3. **Appendix A.1 -- the data in these tables should be compared to approved background levels. Any data that exceed background levels should be reported.**

Response: Agreed. The data in the summary tables have been compared to approved background levels and are discussed in the NFA proposal, Section 3.6 (see Attachment L).

4. **Appendices A.1 and A.2 – The data are not differentiated with respect to whether they were derived from the onsite or offsite laboratory. A discussion as to how the onsite and offsite laboratory data compare should be included in the text.**

Response: On- and off-site data have been identified on the revised tables (see Attachment K). Six soil samples were collected at ER Site 56 and split with Lockheed Analytical Services (LAS), SNL's contract off-site laboratory. The split samples were collected from sample locations 56-BH1-20, 56-BH2-15, 56-BH3-010, 56-BH4-005, 56-BH5-00, and 56-BH5-020. The data were evaluated by IT Corporation (IT Corporation, June 1996).

The Level III metals and HE analyses were performed by LAS, while Level II inductively coupled plasma (ICP) metals and HE analyses were performed by SNL's on-site laboratories.

Both the on-site and corresponding off-site analyses for explosives were nondetect, indicating good correlation between the two laboratories for explosives analyses. For most analytes, there is generally good agreement between the Level II and the Level III ICP data. MDLs for Level II arsenic, beryllium, cadmium, selenium, and silver are above the maximum background value. The MDLs for the analytes, however, appear to be sufficiently low to detect anthropogenic contributions to the sample population.

RPD was calculated in the field samples (on-site laboratory and off-site laboratory splits) for those analytes that were above detection limits according to the EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (February 1994). This includes five barium samples and one nickel sample. RPD for the barium ranges from 2.2 to 70 percent. Two sets were within the EPA-recommended range of 20 percent, and three sets were out of the 20 percent RPD range. RPD for two of the nickel samples for the on- and off-site laboratories are 74 and 132 percent. These values are attributable to inhomogeneity in the soil. Please see the revised tables for the ER Site 56 NFA proposal (see Attachment K).

Reference: IT Corporation, June 1996. "Data Validation and Comparison of Level II and level III Analytical Data to Published Background Ranges at Sandia National Laboratories/ New Mexico, Operable Unit 1335," IT Corporation, Albuquerque, New Mexico.

5. **Appendices A.1 and A.2 – See general comments 2, 3 and 5.**

Response: See revised tables and response to General Comments 2, 3, and 5 (Attachment K).

6. **Appendix A.1 -- The detection limits for Sb, As, Be, Cd, Co, Cu, Hg, Se, Ag, and Tl exceed the NMED-approved background levels for these constituents for the**

Southwest Area Group (subsurface soil). Except for that for Cu, all of the detection limits exceed approved background levels by 2 or more times; many exceed background levels by approximately 10 times or more. For inorganic constituents of concern, appropriate data quality objectives include the use of detection limits which do not exceed approved background levels.

For this site, with respect to this issue, HRMB will not insist that new soil samples be collected and analyzed utilizing lower detection limits for the above constituents of concern. However, be advised that HRMB will not routinely accept data which fail to meet appropriate data quality objectives.

Response: Agreed.

7. **Appendix A.1 -- With respect to several different metals, some results have a "J-code" qualifier, even when such results are above the method detection limit. For example, on page 1, sample 56-BH1-0-S-2, the "J-coded" result for aluminum is 3000 ppm; whereas, the detection limit is 20 ppm; this result exceeds the detection limit by 150 times. Please provide an explanation as to why certain results are "J-coded" when they exceed the method detection limit.**

Response: J-values do not refer to MDLs but to PQLs, which are not identified in this table. The PQL is the minimum level at which a concentration can be quantified. Anything between the PQL and the MDL (the limit at which a compound or element can be detected) is an estimated value rather than a quantified or measured value and is given a 'J' qualifier. Anything below the mdl is non-detect or given a 'U' qualifier. 'J' values are considered 'hits' since the concentrations are above the MDLs. Note: This table has been revised to conform to the NFA proposal format, showing RCRA metals plus beryllium and nickel (see Attachment K).

8. **Appendices A.1 and A.2 -- the various data qualifiers should be explained.**

Response: Tables have been revised. Footnotes have been provided to explain the data qualifiers presented (see Attachment K).

9. **Appendices A.1 and A.2 -- Abbreviations in the various columns "test method" and "sample ID" need to be explained.**

Response: Tables have been revised. Footnotes have been provided to explain the data qualifiers presented (see Attachment K).

10. **Appendices A.1 and A.2 -- If HRMB's assumptions are correct, various types of QA/QC data are mixed in with the environmental samples. This makes it difficult to review the NFA proposal. See general comment 3.**

Response: Tables have been revised. QA/QC data have been identified in the table (see Attachment K).

Reference:

Anonymous, 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: Sandia National Laboratories, variously paged.

ATTACHMENT K
REVISED APPENDICES A.1 AND A.2 OF
THE ER SITE 56 NFA PROPOSAL

Appendix A.1

ER Site 56: Results of Confirmatory Soil Sampling for ~~TAL~~ RCRA Metals at the Old Thunderwells

Appendix A.1
Summary of ER Site 56 Confirmatory Soil Sampling Metals Analysis Results, August 1995

Sample Attributes			Metals (EPA 6010/7000)* (mg/kg)									
COC Number	ER Sample ID (Figure 4)	Sample Depth (ft)	Arsenic	Barium	Beryllium	Cadmium	Chromium	Lead	Mercury	Nickel	Selenium	Silver
01526	56-BH1-0-S-2	0	ND(50)	140	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
01526	56-BH1-5-S-2	5	ND(50)	110	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
01526	56-BH1-10-S-2	10	ND(50)	120	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	6.6 J (15)	ND(50)	ND(10)
01526	56-BH1-15-S-2	15	ND(50)	68	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
04186	56-BH1-20-S0-3 (off-site laboratory)	20	3.7	230	ND(1.0)	ND(1.0)	8.6	5.9	ND(0.10)	170	ND(1.0)	ND(2.0)
01526	56-BH1-20-S-2	20	ND(50)	110	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	110	ND(50)	ND(10)
01526	56-BH1-25-S-2	25	ND(50)	43	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
01526	56-BH2-0-S-2	0	ND(50)	85	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
01526	56-BH2-5-S-2	5	ND(50)	110	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
01526	56-BH2-10-S-2	10	ND(50)	260	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
04186	56-BH2-15-S0-3 (off-site laboratory)	15	4.2	170	ND(1.1)	ND(1.1)	7.1	7.5	ND(0.11)	8.7	1.1	ND(2.2)
01526	56-BH2-15-S-2	15	ND(50)	91	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	19 J	ND(50)	ND(10)
01526	56-BH2-20-S-2	20	ND(50)	43	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	48	ND(50)	ND(10)
01526	56-BH2-25-S-2	25	ND(50)	49	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	64	ND(50)	ND(10)
01526	56-BH3-0-S-2	0	ND(50)	140	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
01526	56-BH3-5-S-2	5	ND(50)	92	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
04186	56-BH3-10-S0-3 (off-site laboratory)	10	2.1	ND(41.)	ND(1.0)	ND(1.0)	3.9	4.3	ND(0.10)	ND(8.1)	ND(1.0)	ND(2.0)
01526	56-BH3-10-S-2	10	ND(50)	26 J (38)	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
01526	56-BH3-15-S-2	15	ND(50)	43	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	18 J (15)	ND(50)	ND(10)
01526	56-BH3-20-S-2	20	ND(50)	50	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	59	ND(50)	ND(10)
01526	56-BH3-25-S-2	25	ND(50)	55	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
01526	56-BH4-0-S-2	0	ND(50)	120	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
04186	56-BH4-5-S0-3 (off-site laboratory)	5	2.1	88.	ND(1.0)	ND(1.0)	7.3	6.2	ND(0.10)	13.	ND(1.0)	ND(2.1)
01526	56-BH4-5-S-2	5	ND(50)	100	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
01526	56-BH4-10-S-2	10	ND(50)	200	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
01526	56-BH4-15-S-2	15	ND(50)	76	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
01526	56-BH4-20-S-2	20	ND(50)	60	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	40	ND(50)	ND(10)
01526	56-BH4-25-S-2	25	ND(50)	77	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
04186	56-BH5-0-S0-3 (off-site laboratory)	0	4.2	290	ND(1.1)	ND(1.1)	12.	9.3	ND(0.11)	11.	ND(1.1)	ND(2.1)
01526	56-BH5-0-S-2	0	ND(50)	200	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
01526	56-BH5-0-SD-2	0	ND(50)	140	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
01526	56-BH5-5-S-2	5	ND(50)	120	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
01526	56-BH5-10-S-2	10	ND(50)	140	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
01526	56-BH-15-S-2	15	ND(50)	170	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	ND(4.0)	ND(50)	ND(10)
04186	56-BH5-20-S0-3 (off-site laboratory)	20	3.0	89.	ND(1.0)	ND(1.0)	8.4	17.	ND(0.10)	83.	ND(1.0)	ND(2.1)
01526	56-BH5-20-S-2	20	ND(50)	91	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	17 J (15)	ND(50)	ND(10)
01526	56-BH5-25-S-2	25	ND(50)	98	ND(0.11)	ND(10)	ND(10)	ND(10)	ND(0.06)	160	ND(50)	ND(10)

Refer to footnotes at end of table.

Appendix A.1 (Concluded)
Summary of ER Site 56 Confirmatory Soil Sampling Metals Analysis Results, August 1995

Sample Attributes			Metals (EPA 6010/7000)* (mg/kg)									
COC Number	ER Sample ID (Figure 4)	Sample Depth (ft)	Arsenic	Barium	Beryllium	Cadmium	Chromium	Lead	Mercury	Nickel	Selenium	Silver
Quality Assurance/Quality Control Samples (all in mg/L)												
04186	56-BH2-25-EB-2 (off-site laboratory)	NA	ND(0.010)	ND(0.20)	ND(0.0050)	ND(0.0050)	ND(0.010)	ND(0.0030)	ND(0.00020)	ND(0.040)	ND(0.0050)	ND(0.010)
04186	56-BH2-25-FB-2 (off-site laboratory)	NA	ND(0.010)	ND(0.20)	ND(0.0050)	ND(0.0050)	ND(0.010)	ND(0.0030)	ND(0.00020)	ND(0.040)	ND(0.0050)	ND(0.010)
04186	56-BH5-25-EB-2 (off-site laboratory)	NA	ND(0.010)	ND(0.20)	ND(0.0050)	ND(0.0050)	ND(0.010)	ND(0.0030)	ND(0.00020)	ND(0.040)	ND(0.0050)	ND(0.010)
04186	56-BH5-25-FB-2 (off-site laboratory)	NA	ND(0.010)	ND(0.20)	ND(0.0050)	ND(0.0050)	ND(0.010)	ND(0.0030)	ND(0.00020)	ND(0.040)	ND(0.0050)	ND(0.010)
SNL/NM SWTA Surface Soil Background UTL or 95 ^a Percentile Concentrations			5.6	130	0.65	<1	17.3	21.4	<0.25	11.5	<1	<1
SNL/NM SWTA Subsurface Soil Background UTL or 95 ^a Percentile Concentrations			4.4	214	0.65	0.9	15.9	11.8	<0.1	11.5	<1	<1

^aEPA November 1986.

^bDinwiddle September 1997.

BH = Borehole.

COC = Chain of custody record.

EB = Equipment blank.

EPA = U.S. Environmental Protection Agency.

ER = Environmental Restoration.

FB = Field blank.

ft = Feet.

ID = Identification.

J () = The estimated value reported is either above the highest calibration standard or less than the practical quantification limit (shown in parenthesis).

mg/L = Milligrams per liter.

mg/kg = Milligrams per kilogram.

NA = Not applicable.

ND () = Not detected at or above the method detection limit (shown in parenthesis).

S, SD = Soil sample, soil sample duplicate.

SWTA = Southwest Test Area.

UTL = Upper tolerance limit.

Appendix A.2

ER Site 56: Results of Confirmatory Soil Sampling for High Explosives at the Old Thunderwells

Appendix A.2
Summary of ER Site 56 Confirmatory Soil Sampling HE Analysis Results, August 1997

Sample Attributes			HE (EPA 8330)* (µg/g)							
COC Number	ER Sample ID (Figure 4)	Sample Depth (ft)	2,4,6-Trinitrotoluene	2,4-Dinitrotoluene	2,6-Dinitrotoluene	2 Amino-4, 6-dinitrotoluene	4-Amino-2,6-dinitrotoluene	HMX	Nitrobenzene	RDX
01526	56-BH1-0-S-1	0	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH1-5-S-1	5	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH1-10-S-1	10	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH1-15-S-1	15	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
04186	56-BH1-20-S0-3 (off-site laboratory)	20	ND(0.25)	ND(0.26)	ND(0.25)	ND(0.25)	ND(0.25)	ND(2.2)	ND(0.26)	ND(0.99)
01526	56-BH1-20-S-1	20	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH1-25-S-1	25	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH2-0-S-1	0	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH2-5-S-1	5	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH2-10-S-1	10	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
04186	56-BH2-15-S0-3 (off-site laboratory)	15	ND(0.28)	ND(0.29)	ND(0.28)	ND(0.28)	ND(0.28)	ND(2.4)	ND(0.29)	ND(1.1)
01526	56-BH2-15-S-1	15	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH2-20-S-1	20	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH2-25-S-1	25	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH3-0-S-1	0	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH3-5-S-1	5	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
04186	56-BH3-10-S0-3 (off-site laboratory)	10	ND(0.25)	ND(0.26)	ND(0.25)	ND(0.25)	ND(0.25)	ND(2.2)	ND(0.26)	ND(1.0)
01526	56-BH3-10-S-1	10	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH3-15-S-1	15	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH3-20-S-1	20	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH3-25-S-1	25	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH4-0-S-1	0	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH4-5-S-1	5	ND(0.28)	ND(0.29)	ND(0.28)	ND(0.28)	ND(0.28)	ND(2.4)	ND(0.29)	ND(1.1)
04186	54-BH4-5-S0-3 (off-site laboratory)	5	ND(0.25)	ND(0.26)	ND(0.25)	ND(0.25)	ND(0.25)	ND(2.2)	ND(0.26)	ND(1.0)
01526	56-BH4-10-S-1	10	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH4-15-S-1	15	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH4-20-S-1	20	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH4-25-S-1	25	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
04186	56-BH5-0-S0-3 (off-site laboratory)	0	ND(0.25)	ND(0.26)	ND(0.25)	ND(0.25)	ND(0.25)	ND(2.2)	ND(0.26)	ND(1.0)
01526	56-BH5-0-S-1	0	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH5-5-S-1	5	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH5-10-S-1	10	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH5-15-S-1	15	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
04186	56-BH5-20-S0-3 (off-site laboratory)	20	ND(0.25)	ND(0.26)	ND(0.25)	ND(0.25)	ND(0.25)	ND(2.2)	ND(0.26)	ND(1.0)
01526	56-BH5-20-S-1	20	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)
01526	56-BH5-25-S-1	25	ND(.076)	NT	NT	NT	NT	ND(0.100)	NT	ND(0.150)

Refer to footnotes at end of table.

Appendix A.2 (Continued)
Summary of ER Site 56 Confirmatory Soil Sampling HE Analysis Results, August 1997

Sample Attributes			HE (EPA 8330)* (µg/g)							
COC Number	ER Sample ID (Figure 4)	Sample Depth (ft)	2,4,6-Trinitrotoluene	2,4-Dinitrotoluene	2,6-Dinitrotoluene	2 Amino-4, 6-dinitrotoluene	4-Amino-2,6-dinitrotoluene	HMX	Nitrobenzene	RDX
Quality Assurance/Quality Control Samples (all in µg/L)										
04186	56-BH2-25-EB-1 (off-site laboratory)	NA	ND(0.26)	ND(0.26)	ND(0.25)	ND(0.26)	ND(0.26)	ND(1.0)	ND(0.50)	ND(0.85)
04186	56-BH2-25-FB-1 (off-site laboratory)	NA	ND(0.26)	ND(0.26)	ND(0.25)	ND(0.26)	ND(0.26)	ND(1.0)	ND(0.50)	ND(0.85)
04186	56-BH5-25-EB-1 (off-site laboratory)	NA	ND(0.26)	ND(0.26)	ND(0.25)	ND(0.26)	ND(0.26)	ND(1.0)	ND(0.50)	ND(0.85)
04186	56-BH5-25-FB-1 (off-site laboratory)	NA	ND(0.26)	ND(0.26)	ND(0.25)	ND(0.26)	ND(0.26)	ND(1.0)	ND(0.50)	ND(0.85)

Refer to footnotes at end of table.

Appendix A.2 (Continued)
Summary of ER Site 56 Confirmatory Soil Sampling HE Analysis Results, August 1997

Sample Attributes			HE (EPA 8330)* (µg/g)							
COC Number	ER Sample ID (Figure 4)	Sample Depth (ft)	PETN	NG	TETRL	1,3-Dinitrobenzene	2-Nitrotoluene	3-Nitrotoluene	4-Nitrotoluene	1,3,5-Trinitrobenzene
01526	56-BH1-0-S-1	0	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH1-5-S-1	5	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH1-10-S-1	10	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH1-15-S-1	15	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
04186	56-BH1-20-S0-3 (off-site laboratory)	20	NT	NT	ND(0.64)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)
01526	56-BH1-20-S-1	20	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH1-25-S-1	25	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH2-0-S-1	0	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH2-5-S-1	5	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH2-10-S-1	10	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
04186	56-BH2-15-S0-3 (off-site laboratory)	15	NT	NT	ND(0.72)	ND(0.28)	ND(0.28)	ND(0.28)	ND(0.28)	ND(0.28)
01526	56-BH2-15-S-1	15	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH2-20-S-1	20	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH2-25-S-1	25	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH3-0-S-1	0	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH3-5-S-1	5	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
04186	56-BH3-10-S0-3 (off-site laboratory)	10	NT	NT	ND(0.65)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)
01526	56-BH3-10-S-1	10	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH3-15-S-1	15	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH3-20-S-1	20	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH3-25-S-1	25	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH4-0-S-1	0	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH4-5-S-1	5	NT	NT	ND(0.72)	ND(0.28)	ND(0.28)	ND(0.28)	ND(0.28)	ND(0.28)
04186	56-BH4-5-S0-3 (off-site laboratory)	5	NT	NT	ND(0.65)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)
01526	56-BH4-10-S-1	10	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH4-15-S-1	15	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH4-20-S-1	20	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH4-25-S-1	25	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
04186	56-BH5-0-S0-3 (off-site laboratory)	0	NT	NT	ND(0.65)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)
01526	56-BH5-0-S-1	0	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH5-5-S-1	5	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH5-10-S-1	10	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH5-15-S-1	15	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
04186	56-BH5-20-S0-3 (off-site laboratory)	20	NT	NT	ND(0.65)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)
01526	56-BH5-20-S-1	20	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT
01526	56-BH5-25-S-1	25	ND(0.150)	ND(0.030)	NT	NT	NT	NT	NT	NT

Refer to footnotes at end of table.

Appendix A.2 (Concluded)
Summary of ER Site 56 Confirmatory Soil Sampling HE Analysis Results, August 1997

Sample Attributes			HE (EPA 8330)* (µg/g)							
COC Number	ER Sample ID (Figure 4)	Sample Depth (ft)	PETN	NG	TETRL	1,3-Dinitrobenzene	2-Nitrotoluene	3-Nitrotoluene	4-Nitrotoluene	1,3,5-Trinitrobenzene
Quality Assurance/Quality Control Samples (all in µg/L)										
04186	56-BH2-25-EB-1 (off-site laboratory)	NA	NT	NT	ND(1.0)	ND(0.30)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.45)
04186	56-BH2-25-FB-1 (off-site laboratory)	NA	NT	NT	ND(1.0)	ND(0.30)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.45)
04186	56-BH5-25-EB-1 (off-site laboratory)	NA	NT	NT	ND(1.0)	ND(0.30)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.45)
04186	56-BH5-25-FB-1 (off-site laboratory)	NA	NT	NT	ND(1.0)	ND(0.30)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.45)

*EPA November 1986.

BH = Borehole.
 COC = Chain of custody record.
 EB = Equipment Blank.
 EPA = U.S. Environmental Protection Agency.
 ER = Environmental Restoration.
 FB = Field blank.
 ft = feet.
 HE = High Explosives.
 HMX = 1,3,5,7-tetranitro-1,3,5,7-tetrazacyclooctane.
 ID = Identification.
 NA = Not applicable.
 ND () = Not detected at or above the method detection limit (shown in parenthesis) for on-site laboratory analyses, or the practical quantitation limit (shown in parenthesis) for off-site laboratory analyses.
 NG = Nitroglycerin.
 NT = Not tested.
 PETN = Pentaerythritol tetranitrate.
 RDX = 1,3,5-trinitro-1,3,5-triazacyclohexane.
 TETRYL = 2,4,6-trinitrophenylmethyl nitramine.
 µg/L = Microgram(s) per liter.
 µg/g = Microgram(s) per gram.

Attachment L

ATTCHMENT L

**REPLACEMENT PAGES FOR SECTION 3.65 AND APPENDIX B
OF THE ER SITE 56 NFA PROPOSAL**

ER Site 56 samples were analyzed by Inductively Coupled Plasma (ICP) for TAL Metals (EPA Method 6010, modified for the target metals) by the onsite Department 7584 Laboratory and for TAL Metals (EPA Method 6010/7000) by the offsite Lockheed Analytical Services of Las Vegas, Nevada. Because not all TAL metals such as aluminum or calcium are COCs at ER Site 56, only the RCRA metals from this list plus beryllium and nickel are reported in this NFA proposal. The HE samples were analyzed onsite by SNL Department 2552 High Explosives laboratory and by the offsite Lockheed laboratory. All samples were routed to the laboratories by the SNL/NM Sample Management Office. Routine SNL/NM chain-of-custody and sample documentation procedures were employed for all samples collected at this site.

Table 1
ER Site 546: Confirmatory Sampling Summary Table

Sampling Location	Analytical Parameters	Number of Borehole Locations	Top of Sampling Intervals at Each Borehole Location (ft)	Total Number of Investigative Samples	Total Number of QA/QC Samples	Samples Collection Date
Boreholes 1, 2	High Explosives	2	0.5,10,15,20,25	28	8	8/21/95
	TAL Metals					
Boreholes 3,4,5	High Explosives	3	0.5,10,15,20,25	44	8	8/22/95
	TAL Metals					

Quality assurance/quality control (QA/QC) samples collected during this effort consisted of two sets of aqueous equipment rinsate samples, one for the onsite lab and one for the offsite lab, that were analyzed for the same constituents as the other confirmatory soil samples. Two sets of aqueous samples, one for each laboratory, were collected as field blanks as well. No significant concentrations of COCs were detected in the QA/QC samples.

All samples were far below action level for all analytes in the analysis suite. A summary of all analytes for the TAL RCRA metals analysis soil concentrations is presented in Appendix A-2 A.1 and the corresponding summary for the High Explosives analysis is presented in Appendix A-3 A.2. Complete soil sample analytical data packages are archived in the SNL/NM Environmental Operations Records Center and are readily available for review.

When compared to the NMED-recommended background levels for surface and subsurface soils in the Southwest Test Area (Appendix A-1), the barium, nickel and selenium were above background levels. All other metals were below background levels.

Barium was present in three surface soil samples above the background level of 130 mg/kg at sample locations BH-1, BH-3, and BH-5. These elevated concentration levels ranged from 140 to 290 mg/kg. Two subsurface samples (from BH-1 at 20 feet and from BH-2 at 10 feet) were above the NMED recommended subsurface background level of 214 mg/kg. These concentration

levels were 230 and 260 mg/kg respectively. An ecological risk assessment was performed on plant species, deer mouse, and burrowing owl, and a human health risk assessment was performed for barium and nickel for an industrial land use scenario (see Appendix B).

The incremental risk for the barium hot spots causes no significant ecological risk. The incremental risk for the maximum value barium hot spot produces a Hazardous Quotient (HQ) of greater than 1. The average value of barium at ER Site 56, which is similar to that of background at 0 to 5 feet bgs, produces insignificant incremental risk. Therefore, there is no significant risk to the deer mice population.

The HQ for human health exposure for barium at the levels encountered at ER Site 56 is zero. Therefore, there is no human health risk for barium.

Nickel was present above the approved background levels of 11.5 mg/kg in four subsurface soils—from BH-2 at 15 feet bgs (19 mg/kg), from BH-4 at 5 feet bgs (13 mg/kg), from BH-3 at 25 feet bgs (59 mg/kg), and from BH-5 at 20 feet bgs (160 mg/kg, the highest reading of three samples from this location).

The nickel value of 170 mg/kg would produce an HQ of 6.0 for the plant uptake. However, the two anomalies are greater than 20 feet bgs, and at this depth, there is no pathway to the plant. The average nickel data, excluding these two anomalies, are within background levels. The ecological risk as a result of nickel as a contaminant is, therefore, insignificant.

Selenium occurs above the recommended background level of less than 1.0 in one sample (BH-2 at a depth of 15 feet [1.1 mg/kg]). This concentration of 0.1 mg/kg above background at one location is considered to have an insignificant impact on the environment.

No HE were detected in any of the samples collected at ER Site 56. Therefore, explosives are considered not to have any impact on the environment at ER Site 56.

3.7 Rationale for Pursuing a Confirmatory Sampling NFA Decision

The confirmatory sampling did not identify any residual COCs indicating past releases that could pose a threat to human health or the environment. ~~Although there were some analytes that were above the laboratory detection limit, there were no analytes detected at the site that are classified as RCRA metals that were above the proposed RCRA Subpart S action levels.~~ Although some metal constituents were above NMED-recommended background levels, risk evaluation indicates that ecological receptors or human receptors would not be adversely affected by constituents at the low concentration levels at which they occur at ER Site 56. HE do not appear to be present in the soils at ER Site 56.

4.0 Conclusion

Sample analytical results generated from this confirmatory sampling investigation have shown that there are no significant concentrations of COCs in soils at ER Site 56 that would have an adverse impact on the environment, and that additional investigations are unwarranted and unnecessary. Based on archival information and chemical and radiological analytical results of soil samples collected at the site, SNL/NM has demonstrated that this potential release site has been characterized in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use (Criterion 5 of Section 1.2).

The site does not pose a threat to human health or the environment; therefore, ER Site 56 is recommended for an NFA determination.

5.0 References

5.1 ER Site 546 References

Sandia National Laboratories/New Mexico (SNL/NM), August 1995, Field Log #2RN, Pages 48 - 52, 08/21/95 - 8/22/95, Field notes of confirmatory sampling activities at ER Site 56 - Old Thunderwells.

5.2 Other References

Department of Energy (DOE), Albuquerque Operations Office, Environmental Safety and Health Division, Environmental Program Branch, September 1987, draft "Comprehensive Environmental Assessment and Response Program (CEARP) Phase 1: Installation Assessment, Sandia National Laboratories, Albuquerque", Department of Energy, Albuquerque Operations Office, Albuquerque, New Mexico.

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.

New Mexico Environment Department (NMED), November 1995, "Environmental Restoration Document of Understanding", Santa Fe, New Mexico, November 16, 1995.

Sandia National Laboratories/New Mexico (SNL/NM), February 1995, "Program Implementation Plan for Albuquerque Potential Release Sites", Sandia National Laboratories Environmental Restoration Program, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), March 1995, "Site-Wide Hydrogeologic Characterization Project, Calendar Year 1994 Annual Report", Sandia National Laboratories Environmental Restoration Project, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), March 1996, "RCRA Facility Investigation Work Plan for Operable Unit 1335 Southwest Test Area", Sandia National Laboratories Environmental Restoration Project, Albuquerque, New Mexico.

U.S. Environmental Protection Agency (EPA), April 1987, "Final RCRA Facilities Assessment Report of Solid Waste Management Units at Sandia National Laboratories, Albuquerque, New Mexico." Prepared by A. T. Kearney, Inc., and Harding Lawson Associates under Contract No. 68-01-7038, April 1987.

U.S. Environmental Protection Agency (EPA), December 1987, "Hazardous Waste; Codification Rule for 1984 RCRA Amendments; Final Rule", *Federal Register*, Vol. 52, Title 40, Parts 144, 264, 265, 270, and 27, Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), July 1990, "Corrective Action for Solid Waste Management Units (SWMU) at Hazardous Waste Management Facilities, Proposed Rule," *Federal Register*, Vol. 55, Title 40, Parts 264, 265, 270, and 271.

U.S. Environmental Protection Agency (EPA), August 1992, "Hazardous Waste Management Facility Permit No. NM5890110518," EPA Region VI, issued to Sandia National Laboratories, Albuquerque, New Mexico.

U.S. Environmental Protection Agency (EPA), August 1993, "Module IV of RCRA Permit No. NM 5890110518," EPA Region VI, issued to Sandia National Laboratories, Albuquerque, New Mexico.

Appendix B
ER Site 56: Risk Assessment

Appendix B

Risk Assessment, ER Site 56

A human health risk assessment was performed for an industrial land use scenario for the maximum concentration level of barium detected at ER Site 56 (290mg/kg) (see Table B-1). Similarly, an ecological risk assessment was performed for plant species, deer mouse, and the burrowing owl.

For human health, the cancer risk for barium at 290 mg/kg is calculated to be zero. For eco-risk, the maximum HQ for plant uptake is 0.58. For the deer mouse, using the insectivorous deer mouse model, which would be the worst case, the HQ is 4.35 and for the burrowing owl, 0.03. The average value of barium, however, is very similar to that of its background. At 0 to 5 feet the average HQ for plant uptake is 0.2, at the 133-mg/kg concentration level. The insectivorous deer mouse HQ is 2.00, again the worst case for herbivorous, omnivorous, and insectivorous deer mice. For the burrowing owl, the HQ is 0.01. There appears to be no significant risk to these species for barium contamination.

A similar risk assessment was performed for nickel. For the eco-risk, the nickel value of 170 mg/kg would produce an HQ of 6 for plants. This anomaly, however, is at 20 feet bgs, so there is no pathway to the plant. For the deer mouse and burrowing owl, the HQ is less than 1. Also, the average of the nickel data, excluding the two hot spots, is within the background level. The ecological risk for contamination from nickel is insignificant. For human health, the cancer risk from nickel contamination at the maximum concentration level of 170 mg/kg is 0.01. Therefore, the human health risk is also insignificant.

Table B-1

Hazard Quotient of Barium and Nickel, Site 56

	Plant Hazard Quotient	Deer MouseHazard Quotient (Herbivorous)	Deer MouseHazard Quotient (Omnivorous)	Deer MouseHazard Quotient (Insectivorous)	Burrowing OwlHazard Quotient	Industrial Human Health		excess cancer risk
	Barium, mg/kg	HQ	HQ	HQ	HQ	HQ	HQ	
background	1.30E+02	2.60E-01	3.25E-01	1.12E+00	1.95E+00	1.42E-02	0.00	NA
Max.value	2.90E+02	5.80E-01	7.25E-01	2.50E+00	4.35E+00	3.16E-02	0.00	NA
Average(12pts 0-5')	1.33E+02	2.66E-01	3.33E-01	1.15E+00	2.00E+00	1.45E-02	NA	NA
Max -bkgd	1.60E+02	3.20E-01	4.00E-01	1.38E+00	2.40E+00	1.75E-02	NA	NA
Ave -bkgd	3.00E+00	6.00E-03	7.50E-03	2.59E-02	4.50E-02	3.27E-04	NA	NA

NA: information not available

	Nickel, mg/kg							
background	11.5	NA	NA	NA	NA	NA	0.00	NA
Max.value	170	5.7	0.074	0.11	0.14	0.0063	0.01	NA
Average , 0-5'	17	5.70E-01	7.40E-03	1.10E-02	1.40E-02	6.30E-04	0.00	NA
Max -bkgd	NA	NA	NA	NA	NA	NA	NA	NA
Ave -bkgd	NA	NA	NA	NA	NA	NA	NA	NA

NA: information not available