

1-1-2000

# Statement of Basis Approval of No Further Action Volume 16 of 30 January 2000 ER Site 59 Operable Unit 1333 Round 9

Sandia National Laboratories/NM

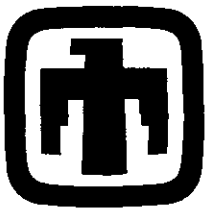
Follow this and additional works at: [https://digitalrepository.unm.edu/snl\\_complete](https://digitalrepository.unm.edu/snl_complete)

---

## Recommended Citation

Sandia National Laboratories/NM. "Statement of Basis Approval of No Further Action Volume 16 of 30 January 2000 ER Site 59 Operable Unit 1333 Round 9." (2000). [https://digitalrepository.unm.edu/snl\\_complete/203](https://digitalrepository.unm.edu/snl_complete/203)

This Technical Report is brought to you for free and open access by the Sandia National Labs/NM Technical Reports at UNM Digital Repository. It has been accepted for inclusion in Regulatorily Completed by an authorized administrator of UNM Digital Repository. For more information, please contact [disc@unm.edu](mailto:disc@unm.edu).



**Sandia National Laboratories**

---

**Statement of Basis  
Approval of No Further Action  
Volume 16 of 30**

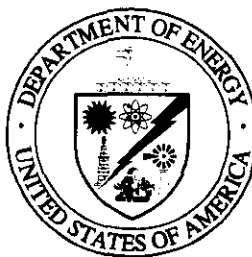
**January 2000**

**ER Site 59  
Operable Unit 1333  
Round 9**

(RCRA Permit No. NM5890110518)

NFA Originally Submitted September 24, 1997

**Environmental  
Restoration  
Project**



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

---

---

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

**January 2000**

**ER Site 59  
Operable Unit 1333  
Round 9**

(RCRA Permit No. NM5890110518)

NFA Originally Submitted September 24, 1997

---

NFA

---

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

**January 2000**

**ER Site 59  
Operable Unit 1333  
Round 9**

**NFA Originally Submitted September 24, 1997**

---

## TABLE OF CONTENTS

1.0	INTRODUCTION .....	1-1
1.1	Description of ER Site 59 .....	1-1
1.2	No Further Action Basis .....	1-3
2.0	HISTORY OF ER SITE 59.....	2-1
2.1	Historical Operations.....	2-1
2.2	Previous Audits, Inspections, and Findings.....	2-6
3.0	EVALUATION OF RELEVANT EVIDENCE .....	3-1
3.1	Unit Characteristics and Operating Practices .....	3-1
3.2	Results of SNL/NM ER Project Sampling/Surveys .....	3-1
3.2.1	Summary of Prior Investigations.....	3-1
3.2.2	UXO/HE Survey of ER Site 59.....	3-2
3.2.3	Summary of Radiological Surveys of ER Site 59 .....	3-2
3.2.4	Summary of Cultural Resources Survey of ER Site 59 .....	3-2
3.2.5	Summary of Sensitive Species Survey of ER Site 59 .....	3-2
3.2.6	Summary of Scoping Sampling of ER Site 59.....	3-3
3.2.7	Summary of Confirmatory Sampling of ER Site 59 .....	3-3
3.3	Gaps in Information.....	3-7
4.0	RATIONALE FOR NO FURTHER ACTION DECISION .....	4-1
5.0	REFERENCES .....	5-1
6.0	ANNEXES .....	6-1
6.1	Gamma Spectroscopy Results and Review .....	6-2
6.2	Gross Alpha and Gross Beta Activity Results .....	6-27

## LIST OF FIGURES

Figure		Page
1-1	Location of ER Site 59, Pendulum Site .....	1-2
2-1	Site Map of ER Site 59, Pendulum Site .....	2-2
2-2a	ER Site 59 Photograph .....	2-3
2-2b	ER Site 59 (Pendulum Site) Photographs .....	2-4
2-2c	Rocket Powered Pendulum .....	2-5
3-1	Soil Sampling Locations at ER Site 59 .....	3-4

## LIST OF TABLES

Table		Page
3-1	Summary of Site 59 Confirmatory Soil Sample Metal and Radiological Analytical Results, July 1997 .....	3-5



## ACRONYMS AND ABBREVIATIONS

CEARP	Comprehensive Environmental Assessment and Response Program
DOE	U.S. Department of Energy
DOU	Document of Understanding
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ft	foot (feet)
HE	high explosive(s)
HSWA	Hazardous and Solid Waste Amendment
KAFB	Kirtland Air Force Base
mi	mile(s)
NFA	no further action
NMED	New Mexico Environment Department
OU	operable unit
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
SNL/NM	Sandia National Laboratories/New Mexico
UXO	unexploded ordnance
µR/hr	microroentgen(s) per hour

## 1.0 INTRODUCTION

Sandia National Laboratories/New Mexico (SNL/NM) is proposing a no further action (NFA) decision for Environmental Restoration (ER) Site 59, Pendulum Site, Operable Unit (OU) 1333, based upon confirmatory sampling (NFA Criterion 3 [NMED April 1996]). ER Site 59 is listed in the Hazardous and Solid Waste Amendment (HSWA) Module IV (EPA August 1993) (hereinafter referred to as the HSWA Module IV) of the SNL/NM Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management Facility Permit (NM5890110518) (EPA August 1992). The site was originally petitioned for an administrative NFA in 1995 (SNL/NM August 1995). The New Mexico Environment Department (NMED) issued a notice of deficiency requesting that screening soil sampling be conducted to further corroborate the interview and site history information (NMED April 28, 1997). This proposal summarizes the analytical results of the requested soil samples.

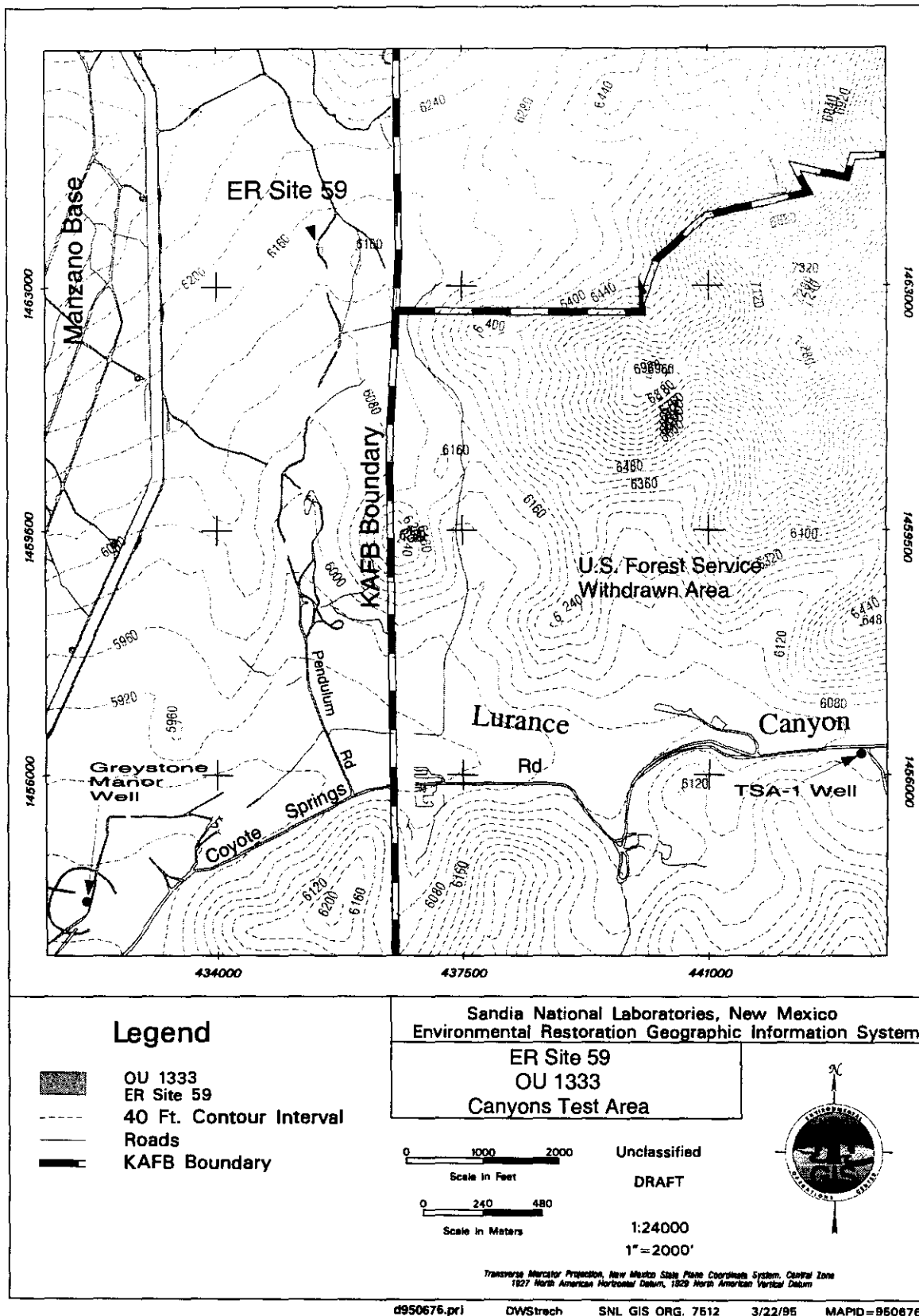
### 1.1 Description of ER Site 59

ER Site 59 formerly housed a rocket-powered pendulum that was used primarily to study the effects of acceleration on weapons components in the early 1950s and consists of a concrete trench, two concrete pads and wooden poles.

ER Site 59 (Figure 1-1) is located near the northeastern corner of Kirtland Air Force Base (KAFB) on U.S. Air Force land permitted to the U.S. Department of Energy (DOE) (SNL/NM July 1994a). ER Site 59 is accessible by traveling approximately 1.5 miles (mi) north on a poorly graded secondary road that diverges from Coyote Springs Road just east of Coyote Springs. The site lies on approximately 0.2 acre at a mean elevation of 6,129 feet (ft) above sea level (SNL/NM April 1995).

This inactive site is adjacent to an arroyo channel and lies on Tesajo-Millett stony sandy loams and soils of the Salas complex (USDA June 1977) that are underlain by igneous and metamorphic Precambrian rocks (IT May 1994). The soils are derived from course-grained decomposed igneous and metamorphic Precambrian rock. They are well-drained soils with moderately deep to deep profiles developed on alluvial fan surfaces (USDA June 1977). The arroyo channel is located to the immediate east of ER Site 59 and is a tributary channel to the Arroyo del Coyote. There are no channel gauging stations in this arroyo channel or documented channel discharges in the vicinity of ER Site 59. Immediate topographic relief around the site is approximately 100 ft (Figure 1-1). The depth of the alluvial fan and channel deposits at ER Site 59 is unknown.

The Greystone Manor and TSA-1 wells are the nearest monitoring wells, lying approximately 1.8 mi southwest and southeast of ER Site 59, respectively (Figure 1-1). Ground-water conditions at the TSA-1 well are probably more representative of conditions at ER Site 59, because ER Site 59 and the TSA-1 well lie east of the Coyote Fault on thin alluvial deposits underlain by igneous and metamorphic Precambrian rocks (IT May 1994). At the TSA-1 well, ground water is encountered in fractured Precambrian bedrock at a depth of 180 ft below the surface under semiconfined to confined hydraulic conditions (IT May 1994). Local ground-



water flow in the vicinity of ER Site 59 may be complicated because of the abundant fractures and faults in the area.

For a detailed discussion regarding the local setting at ER Site 59, refer to Chapter 3.0 of the RCRA Facility Investigation (RFI) work plan for OU 1333 (SNL/NM September 1995).

## **1.2 No Further Action Basis**

This proposal for a determination of a confirmatory sampling NFA decision was prepared using the criteria presented in Annex B of the ER Document of Understanding (DOU) (NMED April 1996) and is consistent with the HSWA Module IV. Specifically, this proposal presents "information demonstrating that there are no releases of hazardous waste (including hazardous constituents) from solid waste management units . . . at the facility that pose a threat to human health or the environment" (as proposed in the Code of Federal Regulations, Title 40, Part 264.51[a][2] [EPA July 1990]).

This request for an NFA decision for ER Site 59 is based primarily upon archival and survey information and upon confirmatory soil analytical results collected in July 1997 to satisfy the HSWA Module IV requirements.

Review and analysis of all relevant data for ER Site 59 indicate that concentrations of contaminants of concern (COC) at this site are less than SNL/NM background concentration limits. Therefore, ER Site 59 is proposed for an NFA decision based upon NFA Criterion 3 of the ER DOU (NMED April 1996) supported by confirmatory sampling data demonstrating that no release to the environment has occurred.

## **2.0 HISTORY OF ER SITE 59**

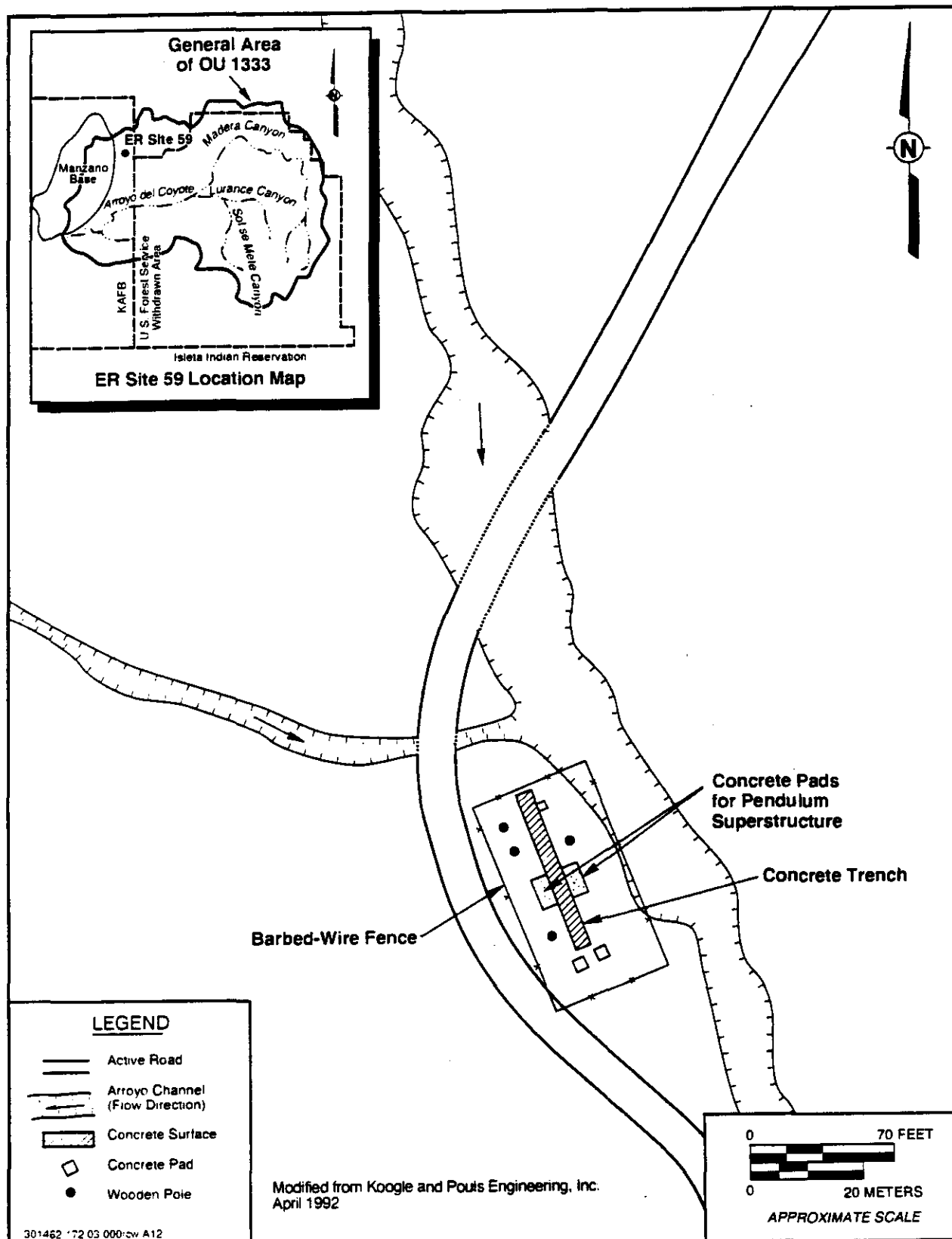
### **2.1 Historical Operations**

ER Site 59 consists of a concrete trench, two concrete pads, and four wooden poles surrounded by a 3-strand barbed-wire fence (120 by 60 ft) (Figures 2-1, 2-2a, and 2-2b). The site formerly housed a rocket-powered pendulum (Figure 2-2c) that was primarily used to study the effects of acceleration on weapons components in the early 1950s. Acceleration was induced with bazooka rocket motors (SNL/NM EORC 1995).

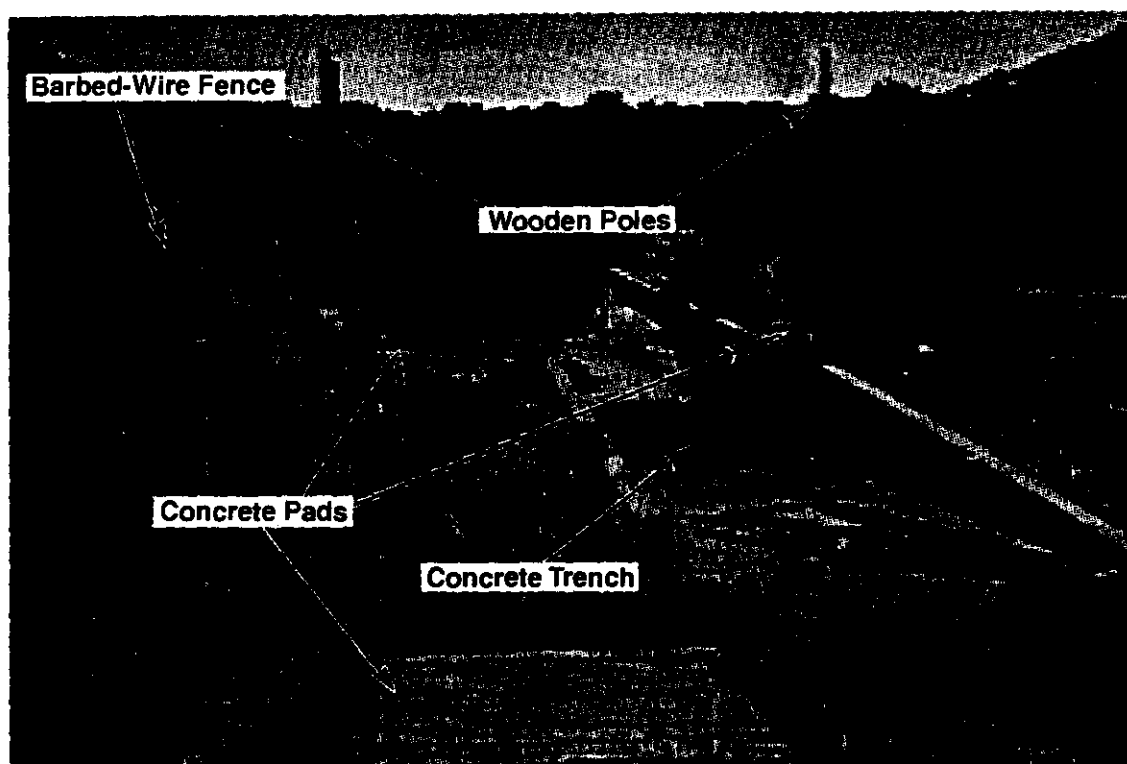
Historical aerial photographs indicate that ER Site 59 was constructed between September 1951 and November 1951 (USGS September 1951, USGS November 1951, SNL/NM August 1994). Based upon interpretation of the aerial photographs, the initial construction appears to have disrupted the drainage pattern in the adjacent arroyo; but by 1959 surface-water flow appears to be reestablished in the arroyo channel (USGS November 1959, SNL/NM August 1994). The pendulum superstructure was removed between October 1967 and September 1971 (USGS October 1967, USGS September 1971).

Instantaneous acceleration tests on weapons components were conducted from 1951 through 1953 using bazooka rockets and Honest John and Betty warhead shells. Honest John warhead shells were used in tests conducted from 1951 to 1953, and Betty warhead shells were used for testing activities in 1953. The rocket and/or warhead shell was attached to the pendulum bob, and the rocket was fired to impart instantaneous acceleration to the shell (SNL/NM [n.d.] [Ref. 59-11]). No explosives were used in the testing of warhead shells or components. The structural response of the shell to the imparted acceleration was measured via an instrument trailer housed in a concrete bunker at ER Site 60 (Bunker Area), approximately 800 ft to the north. Acceleration tests were also performed with instruments placed inside the weapon, rather than with the remote instrumentation set-up in trailers housed at ER Site 60. These internally instrumented acceleration tests were also referred to as shock tests. Visual observation of the tests took place at a distance of approximately 200 ft from the structure (SNL/NM EORC 1995).

The precise number of tests conducted at ER Site 59 from 1951 through 1953, when the last test occurred, is unknown. The majority of weapons test units contained components rather than warheads (SNL/NM [n.d.] [Ref. 59-12]). In addition, although some weapons reportedly contained warheads, detonations did not occur. ER interviews recorded that no depleted uranium or hazardous materials were used in the tests and that there was no release of materials from this site. The bazooka rockets probably contained a composite propellant and, unlike double-based propellant which contains lead, no hazardous materials are associated with the exhaust from composite propellant. No information is available regarding the materials used in the Honest John and Betty warhead shells. However, the nondestructive nature of the tests precludes hazardous materials from being present at ER Site 59.

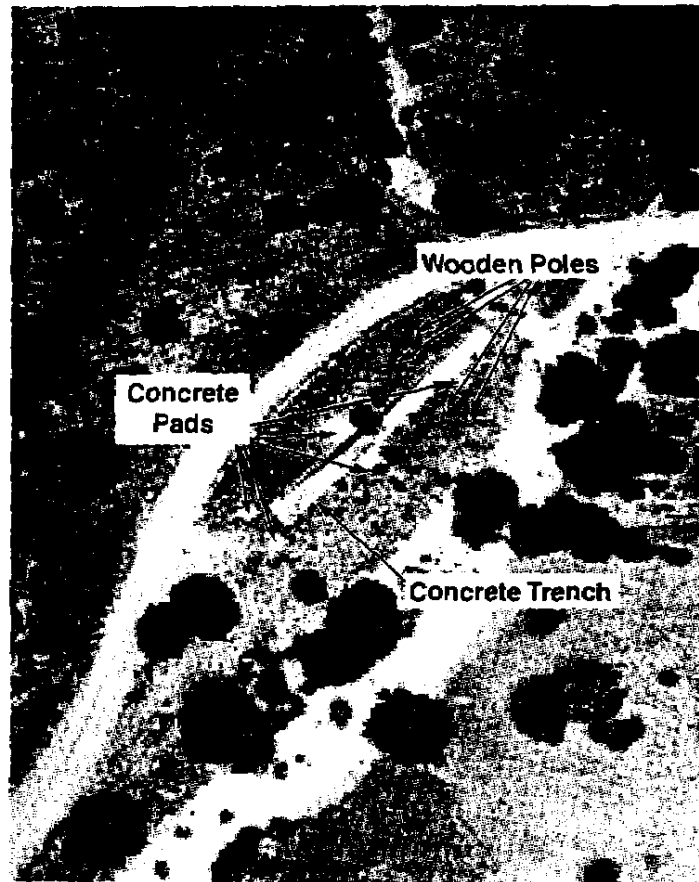


**Figure 2-1**  
**Site Map of ER Site 59, Pendulum Site**



**Figure 2-2a.** Photograph of ER Site 59 in November 1992. The concrete trench, concrete pads, and wooden poles associated with the former pendulum superstructure are identified. A barbed-wire fence surrounds the site. View is to the north.

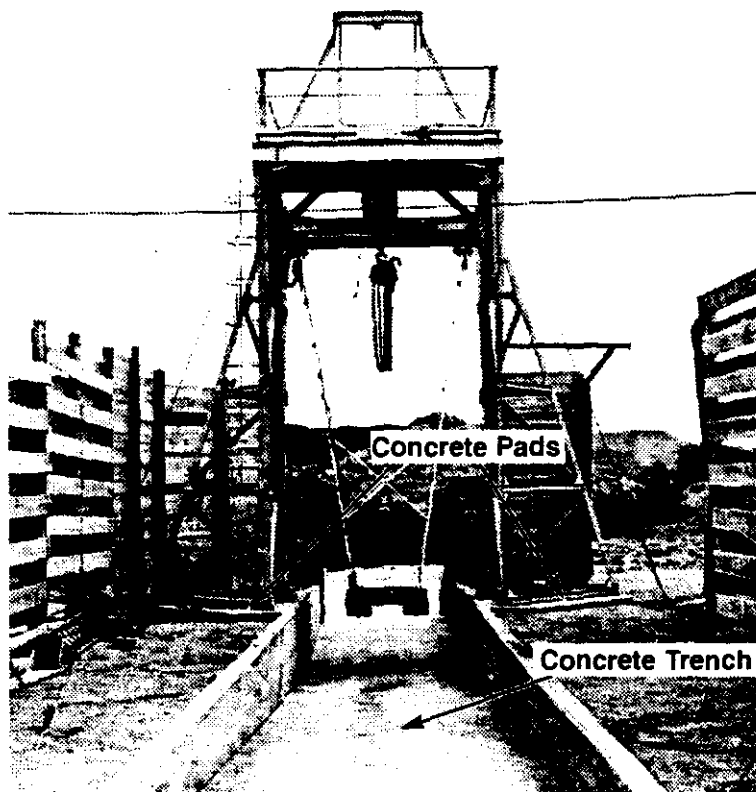
**Figure 2-2**  
**ER Site 59 Photographs**



**Figure 2-2b.** Low-altitude photograph of ER Site 59 in 1987. The concrete trench, concrete pads, and wooden poles associated with the former pendulum superstructure are identified.

**Figure 2-2 (continued)  
ER Site 59 Photographs**





**Figure 2-2c.**

Historical photograph (date unknown) of the rocket-powered pendulum at ER Site 59. Identified features are currently present at the site.

**Figure 2-2 (concluded)  
ER Site 59 Photographs**

## **2.2 Previous Audits, Inspections, and Findings**

ER Site 59 was identified during investigations conducted under the Comprehensive Environmental Assessment and Response Program (CEARP) (DOE September 1987). The CEARP report noted that no destruction of weapons occurred during ER Site 59 tests and that no hazardous materials were released to the environment other than gases from bazooka rockets. Although there was considerable debris around the site, no hazardous materials were identified (SNL/NM [n.d.] [Ref. 59-13]). The Comprehensive Environmental Response, Compensation, and Liability Act finding was negative for Federal Facility Site Discovery and Identification Findings, Preliminary Assessment, and Preliminary Site Inspection; therefore, no Hazard Ranking System score was calculated. No further action was planned under the CEARP and the site was not investigated during the RCRA Facility Assessment (EPA April 1987).

### **3.0 EVALUATION OF RELEVANT EVIDENCE**

#### **3.1 Unit Characteristics and Operating Practices**

The concrete trench, two concrete pads, several wooden poles, and the concrete support slabs for the pendulum framework are currently present at ER Site 59 (SNL/NM August 1994). These are the only physical structures associated with past activities, as evidenced by historical aerial photographs that verify that no other activities or structures were present at ER Site 59 (SNL/NM August 1994). The pendulum superstructure was removed between October 1967 and September 1971 (USGS October 1967, USGS September 1971).

#### **3.2 Results of SNL/NM ER Project Sampling/Surveys**

##### **3.2.1 Summary of Prior Investigations**

In preparing to request a confirmatory sampling NFA decision for ER Site 59, a background study was conducted to collect available and relevant site information. Background information sources included existing records and reports of site activity. Interviews were conducted with SNL/NM staff as well as with contractors familiar with site operational history. The study was completely documented and has provided traceable references that sustain the integrity of this proposal.

The following sources of information, presented in chronological order, were used to evaluate ER Site 59:

- One preliminary radiological survey conducted in 1993 (SNL/NM EORC 1995)
- Four interviews with five current and retired facility personnel (SNL/NM EORC 1995)
- Six historical aerial photographs spanning 41 years (1951–1992) (SNL/NM August 1994)
- An unexploded ordnance (UXO)/high explosives (HE) surface survey (SNL/NM September 1994)
- Surface radiological surveys (RUST Geotech Inc. December 1994)
- Scoping soil sampling conducted in October 1995

- Photographs and field notes from numerous site inspections conducted by SNL/NM staff (SNL/NM EORC 1995)
- An archaeological/cultural resources survey and a sensitive species survey (SNL/NM March 1996, IT February 1995)
- Confirmatory soil sampling conducted in July 1997

### 3.2.2 UXO/HE Survey of ER Site 59

In September 1993, KAFB Explosive Ordnance Disposal conducted a visual survey for the presence of UXO/HE and ordnance debris on the ground surface of ER Site 59. The survey identified no live ordnance, but 15 empty 3.5-inch rocket motor containers were found (SNL/NM September 1994). The origin of the empty rocket motor containers is unknown.

### 3.2.3 Summary of Radiological Surveys of ER Site 59

In April and May 1993, SNL/NM Health Physics conducted a radiation survey of roads in the area. Periodic swipe surveys of the vehicle were performed after driving sections of road, and air samples were collected from behind the moving vehicle. Radioactivity was not detected on the vehicle and no airborne radioactivity was detected in the dust kicked up by the vehicle (SNL/NM EORC 1995).

In October 1993, RUST Geotech Inc. conducted a gamma radiation survey of ER Site 59. No gamma activity areas greater than 30 percent above natural background concentration levels (10 to 16 microrentgen per hour [ $\mu$ R/hr]) were identified (RUST Geotech Inc. December 1994).

### 3.2.4 Summary of Cultural Resources Survey of ER Site 59

A survey of cultural resources was conducted in 1994 in support of the sitewide Environmental Assessment. No cultural resources were identified at ER Site 59 (SNL/NM March 1996).

### 3.2.5 Summary of Sensitive Species Survey of ER Site 59

A sensitive species survey was conducted at ER Site 59 on April 26, 1994, as part of the ER Site 10 survey. The site is highly disturbed as a result of the construction and past operation of the pendulum test structure. No sensitive species were found at the site (IT February 1995). The gray vireo, a state Endangered Group 2 species, has been recorded at similar piñon-juniper woodland habitat south of the site (NMNHP April 1995) but was not recorded during the 1994 survey.

### 3.2.6 Summary of Scoping Sampling of ER Site 59

On August 17, 1995, ER Site 59 was investigated as part of a sitewide scoping sampling program. The purpose of the scoping sampling effort was to obtain preliminary analytical data to support the ER Project site ranking and prioritization. No quality assurance (QA)/quality control (QC) samples were collected. Four surface soil samples were collected around the pendulum structure from the surface to 0.5 ft. The samples were analyzed for total metals using x-ray fluorescence screening methods. All metals concentrations were detected within the range of background concentration levels.

### 3.2.7 Summary of Confirmatory Sampling of ER Site 59

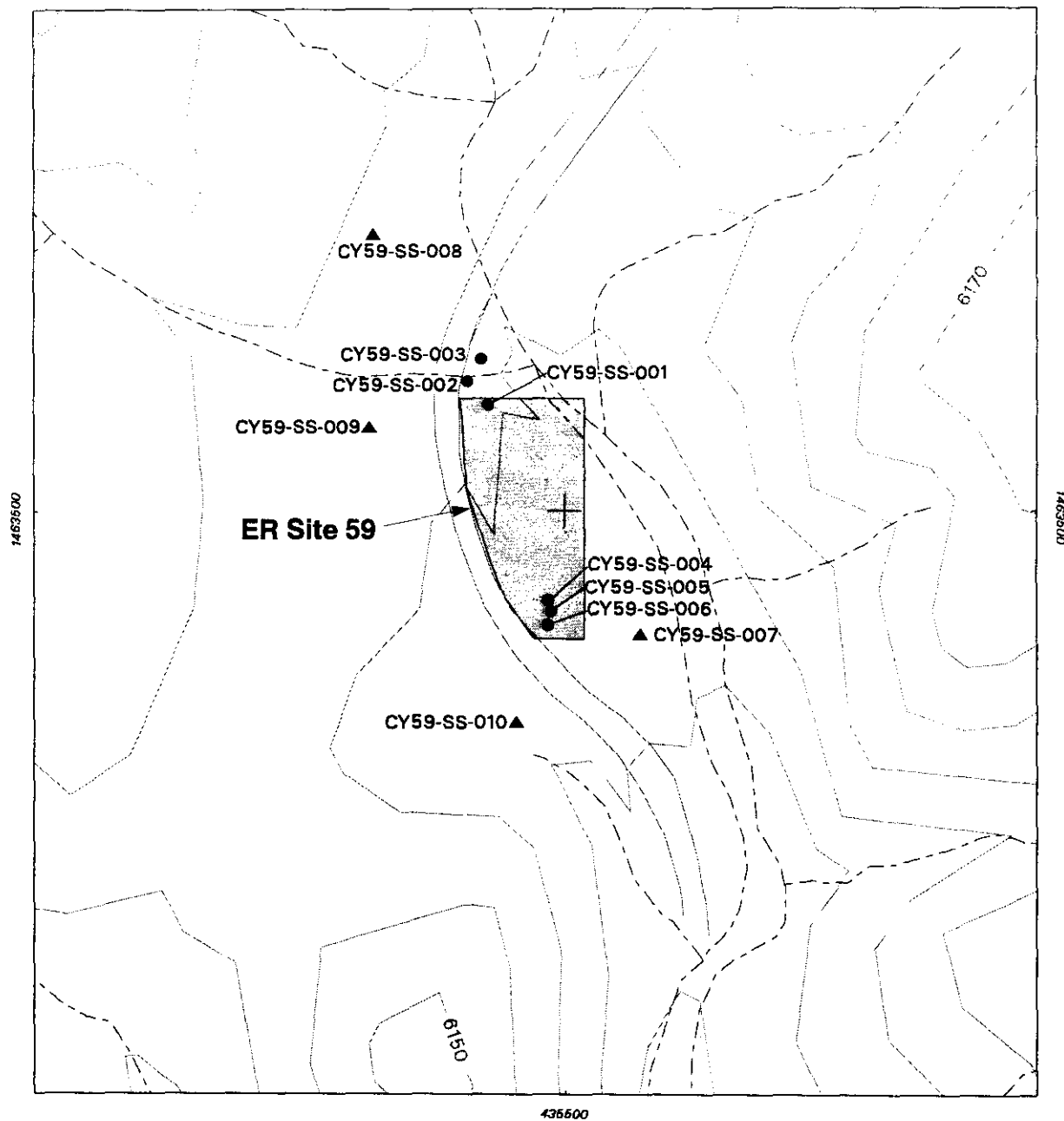
Confirmatory soil sampling was conducted at ten locations at ER Site 59 in July 1997 in accordance with the sampling plan reviewed by the NMED DOE Oversight Bureau (SNL/NM July 1997, NMED DOE OB July 1997). Six environmental surface soil samples (CY-59-SS-001 through CY-59-SS-006) were collected from the north and south pendulum locations where residual lead or other contaminants from rocket exhaust would have most likely occurred (Figure 3-1). Four site-specific background samples (CY-59-SS-007 through CY-59-SS-010) were also collected from the site. Samples CY59-SS-002 and CY59-SS-003 were collected from locations slightly north from the reviewed plan due to the end of the concrete being much closer to the fence (i.e., site boundary) than depicted on the map (Figure 2-1). Sample CY59-SS-007 was moved approximately 110 feet south of the reviewed location from an isolated outcrop of greenstone to an area more typical of the granitic soil composition. The soil samples were collected from a depth interval of 0 to 0.5 ft using the spade and scoop method (SNL/NM January 1995) and were analyzed at an off-site laboratory for RCRA metals using U.S. Environmental Protection Agency (EPA) Methods 6010/7471/3050 (EPA November 1986). Both the environmental soil samples and the background samples were analyzed using gamma spectroscopy and for gross alpha and gross beta activity at the on-site radiological laboratory. The only analytical variance is that Sample CY-59-SS-005 was not analyzed for gross alpha and gross beta activity as originally planned due to sample loss in the laboratory.

Concentrations of all RCRA metals in the surface soil at ER Site 59 are below the Canyons' Background upper tolerance limits/95th-percentile concentrations (IT July 1997). The gamma spectroscopy data indicate that the environmental samples are representative of the background radionuclide concentration levels. All uranium series radionuclides were at activities less than the local background values presented for the Canyons' Background study area. Thorium series values for the environmental samples exceeded these Canyons Background study area values but were consistent, within the errors of analysis, with the site-specific background samples. All gross alpha and gross beta activity for the environmental and background samples were below the minimum detectable activity. Table 3-1 summarizes all sample analytical results. Section 6.1 contains complete gamma spectroscopy data.

### QA/QC Results

As part of the ER Site 63A confirmatory sampling effort, several QA/QC samples were analyzed at the off-site contracted laboratory. All data were reviewed and verified/validated according to

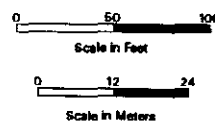
435500



### Legend

- Environmental Sample
- ▲ Site-Specific Background Sample
- Road
- - - 10 Foot Contour
- - - Surface Drainage
- OU 1333  
ER Site 59

**Figure 3-1**  
**Soil Sampling Locations**  
**at ER Site 59**



Sandia National Laboratories, New Mexico  
Environmental Geographic Information System

Table 3-1  
Summary of Site 59 Confirmatory Soil Sample Metals and Radiological Analytical Results, July 1997

Sample Attributes			Metals (EPA 6010A/7471/3050) <sup>a</sup>									
			(mg/kg)									
			Silver		Arsenic		Barium		Cadmium		Chromium	
Sample Number	ER Sample ID	Depth (ft)	Result	Reporting Limit	Result	Reporting Limit	Result	Reporting Limit	Result	Reporting Limit	Result	Reporting Limit
033858 <sup>b</sup>	CY-59-SS-001	0-0.5	0.105J	0.990	1.59	0.990	67.6	0.990	ND U	0.495	3.58	0.990
033861 <sup>b</sup>	CY-59-SS-002	0-0.5	0.0876J	0.990	1.41	0.990	40.4	0.990	ND U	0.495	3.74	0.990
033862 <sup>b</sup>	CY-59-SS-003	0-0.5	0.0415J	0.943	1.87	0.943	54.2	0.943	ND U	0.472	3.94	0.943
033863 <sup>b</sup>	CY-59-SS-004	0-0.5	ND U	1.00	2.07	1.00	74.8	1.00	ND U	0.500	6.55	1.00
033864 <sup>b</sup>	CY-59-SS-005	0-0.5	0.0545J	1.00	1.84	1.00	67.5	1.00	ND U	0.500	5.44	1.00
033865 <sup>b</sup>	CY-59-SS-006	0-0.5	0.129J	0.980	2.16	0.980	75.0	0.980	ND U	0.490	6.20	0.980
033866 <sup>b</sup>	CY-59-SS-007	0-0.5										
033867 <sup>b</sup>	CY-59-SS-008	0-0.5										
033868 <sup>b</sup>	CY-59-SS-009	0-0.5										
033869 <sup>b</sup>	CY-59-SS-010	0-0.5										
Canyons Background UTLs/95th-Percentile Concentrations (mg/kg)			<0.5		9.8		246		0.64		18.8	
Quality Assurance/Quality Control Samples--Soil (mg/kg)												
033860	CY-59-SS-001 (duplicate)	0-0.5	0.118J	0.971	1.77	0.971	63.0	0.971	ND U	0.485	4.64	0.971
033859	CY-59-SS-001 (MS/MSD)	0-0.5	0.0806J	0.943	1.86	0.943	68.2	0.943	ND U	0.472	5.10	0.943
Quality Assurance/Quality Control Sample--Water (mg/L)												
033870	CY-59-SS-001-EB (equipment blank)	NA	0.000448J	0.0100	ND U	0.0100	0.00115J	0.0100	ND U	0.00500	0.00201J	0.0100

Refer to footnotes at end of table.

Table 3-1 (Concluded)  
Summary of Site 59 Confirmatory Soil Sample Metals and Radiological Analytical Results, July 1997

			Metals (EPA 6010A/7471/3050) <sup>a</sup> (mg/kg)									
Sample Attributes			Mercury		Lead		Selenium		Gross Alpha		Gross Beta	
Sample Number	ER Sample ID	Depth (ft)	Result	Reporting Limit	Result	Reporting Limit	Result	Reporting Limit	Activity pCi/g	2 sigma Error pCi/g	Activity pCi/g	2 sigma Error pCi/g
033858 <sup>b</sup>	CY-59-SS-001	0-0.5	ND U	0.0325	8.38	0.495	0.306J	0.495	0.725	4.57	-5.38	18.0
033861 <sup>b</sup>	CY-59-SS-002	0-0.5	0.0164J	0.0309	5.58	0.495	0.402J	0.495	1.45	4.68	20.2	19.5
033862 <sup>b</sup>	CY-59-SS-003	0-0.5	0.0198J	0.0327	6.79	0.472	0.712	0.472	1.88	4.74	-13.7	18.4
033863 <sup>b</sup>	CY-59-SS-004	0-0.5	0.0174J	0.0332	8.43	0.500	0.767	0.500	2.46	4.83	-2.53	17.9
033864 <sup>b</sup>	CY-59-SS-005	0-0.5	0.0145J	0.0288	9.53	0.500	0.729	0.500	SNA	NA	SNA	NA
033865 <sup>b</sup>	CY-59-SS-006	0-0.5	0.0189J	0.0311	10.7	0.490	0.448J	0.490	4.64	5.16	3.67	18.1
033866 <sup>b</sup>	CY-59-SS-007	0-0.5							4.92	5.20	-10.3	18.2
033867 <sup>b</sup>	CY-59-SS-008	0-0.5							3.47	4.98	-7.15	18.1
033868 <sup>b</sup>	CY-59-SS-009	0-0.5							4.14	5.09	-3.14	18.0
033869 <sup>b</sup>	CY-59-SS-010	0-0.5							3.33	4.96	-7.15	18.1
MDA									5.41		21.1	
Canyons Background UTLs/95th-Percentile Concentrations <sup>c</sup> (mg/kg)			0.055		18.9		3.0					
Quality Assurance/Quality Control Samples-Soil (mg/kg)												
033860	CY-59-SS-001 (duplicate)	0-0.5	ND U	0.0315	9.11	0.485	0.486	0.485				
033859	CY-59-SS-001 (MS/MSD)	0-0.5	ND U	0.0331	8.19	0.472	0.456 J	0.472				
Quality Assurance/Quality Control Sample-Water (mg/L)												
033870	CY-59-SS-001-EB (equipment blank)	NA	0.000142 J	0.000200	ND U	0.00500	ND U	0.00500				

<sup>a</sup>EPA November 1986.

<sup>b</sup>Samples analyzed using gamma spectroscopy.

<sup>c</sup>17 July 1997.

B - Analyte was detected in the laboratory method blank.

J - Concentration below the reporting limit but equal to or above the effective detection limit.

MDA - Minimum detectable activity.

mg/kg - Milligrams per kilogram.

MS/MSD - Matrix spike/matrix spike duplicate.

NA - Not applicable.

ND - Not detected at the detection limit.

pCi/g - Picocuries per gram.

SNA - Sample not analyzed.

U - Concentration below the effective DL.

UTL - Upper tolerance limit.



"Data Verification/Validation Level 2—DV-2" in Attachment B of the Technical Operating Procedure 94-03, Rev. 0 (SNL/NM July 1994b). The equipment rinsate blank (CY-59-SS-001-EB) that checks the sampling equipment decontamination procedure was also analyzed for silver, arsenic, barium, cadmium, chromium, mercury, lead, selenium, and gross alpha and gross beta emitters. Silver, barium, chromium, and mercury were detected in the equipment rinsate as J values. The J qualifier was below the reporting limit but equal to or greater than the effective detection limit for the analysis. Based on these data, the equipment decontamination was conducted appropriately.

Laboratory quality control results concurrently analyzed with the samples included laboratory control samples, method blanks, and matrix spikes. Matrix spike and matrix spike duplicates for QC batch 10522 were out of range most likely due to matrix interference. The spike conducted on the distilled water was in control. Method blanks detected barium, silver, cadmium, lead and selenium at very low concentrations and should be subtracted for the analytical results. Otherwise measurements for accuracy and precision were generally within laboratory control limits for all parameters. With considerations noted above, the QC results are viewed as conditionally acceptable.

### **3.3 Gaps in Information**

There is an absence of records documenting waste release or disposal at ER Site 59. However, all tests conducted at ER Site 59, including those involving warhead test units, were nondestructive. There was never an impact, breakage, or failure of test equipment documented at the site. All available information indicates that only bazooka rockets containing composite propellant were used at the site. However, the use of double-base propellants containing lead could not be ruled out. Therefore, the confirmatory sampling investigation was developed to address the issue of whether exhaust from any double-based propellants may have left lead residues in the surrounding soil. The NMED Hazardous and Radioactive Materials Bureau requested that all environmental samples be analyzed for gross alpha and gross beta activity in addition to using gamma spectroscopy and that background samples be analyzed for gross alpha and gross beta activity (NMED April 28, 1997). No additional data gaps remain that might affect an NFA decision.

#### **4.0 RATIONALE FOR NO FURTHER ACTION DECISION**

Based upon process knowledge and field investigation data, an NFA decision is being recommended for ER Site 59 for the following reasons:

- Operational history of the site is well documented and involved nondestructive testing.
- No radionuclides were detected during the field-screening program.
- Gamma spectroscopy and gross alpha/gross beta activity results were within background concentration levels.
- Concentrations of RCRA metals were not detected above SNL/NM background concentration levels.

Based upon the evidence provided above, ER Site 59 is proposed for an NFA decision in conformance with Criterion 3 of the DOU (NMED April 1996), which states that no release to the environment has occurred.

## 5.0 REFERENCES

DOE, see U.S. Department of Energy.

EPA, see U.S. Environmental Protection Agency.

IT, see IT Corporation.

IT Corporation (IT) May 1994. "Hydrogeology of the Central Coyote Test Area OU 1334," IT Corporation, Albuquerque, New Mexico.

IT Corporation (IT), February 1995. "Sensitive Species Survey Results, Environmental Restoration Project, Sandia National Laboratories/New Mexico," IT Corporation, Albuquerque, New Mexico.

IT Corporation (IT), July 1997. "Background Distributions of Metals in Soil at Sandia National Laboratories and Kirtland Air Force Base Canyon Areas," IT Corporation, Albuquerque, New Mexico.

Koogle and Pouls Engineering, Inc., April 10, 1992. Historical Aerial Photograph, KAFB 1-2-5, Albuquerque, New Mexico.

New Mexico Environment Department (NMED), April 1996. "Environmental Restoration Document of Understanding," agreement between New Mexico Environment Department, U.S. Environmental Protection Agency, U.S. Department of Energy, Los Alamos National Laboratory, and Sandia National Laboratories/New Mexico, Santa Fe, New Mexico.

New Mexico Environment Department (NMED). "Notice of Deficiency; Proposal to Approve: Proposals for No Further Action, Environmental Restoration Project (Third Round)," Correspondence to Kirtland Area Office, U.S. Department of Energy, April 28, 1997.

New Mexico Environment Department, U.S. Department of Energy, Oversight Bureau (NMED DOE OB), July 1997. "Site-Specific Sampling Plans, ER Sites 59, 63A, 63B, and 64," New Mexico Environment Department, Albuquerque, New Mexico.

New Mexico Natural Heritage Program (NMNHP), April 1995. "Threatened and Endangered Species Survey of Kirtland Air Force Base, New Mexico," University of New Mexico, Albuquerque, New Mexico.

NMED, see New Mexico Environment Department.

NMED DOE OB, see New Mexico Environment Department, U.S. Department of Energy, Oversight Bureau.

NMNHP, see New Mexico Natural Heritage Program.

RUST Geotech Inc., December 1994. "Sandia Surface Radiological Survey," prepared for Environmental Restoration Project, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), [n.d.] (Ref. 59-11). Site 59 Photograph, "Environmental Test Facilities," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), [n.d.] (Ref. 59-12). Notes Relating to Site 59, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM) [n.d.] (Ref. 59-13). Notes Relating to Site 59, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), July 1994a. "Ownership (Land Use), Canyons Test Area—ADS 1333," Sandia National Laboratories, GIS Group, Environmental Restoration Department, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), July 1994b. "Verification and Validation of Chemical and Radiological Data," Technical Operating Procedure (TOP) 94-03, Rev. 0, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), August 1994. "Historical Aerial Photo Interpretation of the Canyons Test Area, OU 1333," Sandia National Laboratories, Environmental Restoration Project, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), September 1994. "Unexploded Ordnance/High Explosives (UXO/HE) Visual Survey of ER Sites, Final Report," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), January 1995. "Spade and Scoop Method for Collection of Soil Samples," Field Operating Procedure (FOP) 94-52, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), April 1995. "Mean Elevation and Acreage Computation Report," GIS Group, Sandia National Laboratories, Environmental Restoration Department, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), August 1995. "Proposal for No Further Action, Environmental Restoration Project Site 59, Pendulum Site, Operable Unit 1333," U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), September 1995. "RCRA Facility Investigation Work Plan for Operable Unit 1333, Canyons Test Area," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), March 1996. "Environmental Assessment of the Environmental Restoration Project at Sandia National Laboratories, New Mexico," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), July 1997. "Site-Specific Sampling Plan Form, ER Site 59," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico, Environmental Operations Record Center (SNL/NM EORC), 1995. Personal Communication including interview notes and records of telephone conversations with current and retired SNL/NM employees (Refs. 1, 2, 3, 4, 5, 6, 7, 10, 11, 12, 13).\*

SNL/NM, see Sandia National Laboratories/New Mexico.

SNL/NM EORC, see Sandia National Laboratories/New Mexico, Environmental Operations Record Center.

USDA, see U.S. Department of Agriculture.

U.S. Department of Agriculture (USDA), June 1977. "Soil Survey of Bernalillo County and Parts of Sandoval and Valencia Counties, New Mexico," Soil Conservation Service, U.S. Department of Agriculture, Washington D.C.

U.S. 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 I: Installation Assessment, Sandia National Laboratories, Albuquerque," Department of Energy, Albuquerque Operations Office, Albuquerque, New Mexico.

U.S. Environmental Protection Agency (EPA), November 1986. "Test Methods for Evaluating Solid Waste," 3d ed., Update 1, SW-846, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), April 1987. "Final RCRA Facility Assessment Report of Solid Waste Management Units at Sandia National Laboratories, Albuquerque, New Mexico," Contract No. 68-01-7038, EPA Region 6.

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.

---

\*Environmental Operations Record Center, Sandia National Laboratories/New Mexico, Albuquerque, New Mexico, maintains these personal communication notes as a controlled document.

U.S. Environmental Protection Agency (EPA), August 1992. Hazardous Waste Management Facility Permit No. NM 5890110518, EPA Region 6, issued to Sandia National Laboratories, Albuquerque, New Mexico.

U.S. Environmental Protection Agency (EPA), August 1993. Module IV of RCRA Permit No. NM5890110518, EPA Region 6, Issued to Sandia National Laboratories, Albuquerque, New Mexico.

U.S. Geological Survey (USGS), September 1951. Historical Aerial Photograph, USGS RU 1-89, Albuquerque, New Mexico.

U.S. Geological Survey (USGS), November 1951. Historical Aerial Photograph, GS-RT 1-73, Albuquerque, New Mexico.

U.S. Geological Survey (USGS), November 1959. Historical Aerial Photograph, GS-VZR 2-38, Albuquerque, New Mexico.

U.S. Geological Survey (USGS), October 1967. Historical Aerial Photograph, GS-VBUG 2-86, Albuquerque, New Mexico.

U.S. Geological Survey (USGS), September 1971. Historical Aerial Photograph, EXG 2-274, Albuquerque, New Mexico.

USGS, see U.S. Geological Survey.

## **6.0 ANNEXES**

**6.1 Gamma Spectroscopy Results and Review**

**6.2 Gross Alpha and Gross Beta Activity Results**

**Section 6.1**  
**Gamma Spectroscopy Results and Review**





**Sandia National Laboratories**

Operated for the U.S. Department of Energy by  
Sandia Corporation

Albuquerque, New Mexico 87185-1132

date: August 6, 1997

to: Devon Jercinovic, MS-1147 (6682)

from:  Craig D. Brown (Environmental Dimensions Inc.), MS-1132 (7527)

subject: Review of Radiological Data for ER Site 59

I have reviewed the gamma spectroscopy data associated with AR/COC 06830. The data consisted of six samples (sample numbers 033858-002, 033861-002, 033862-002, 033863-002, 033864-002, and 033865-002) that were taken for site characterization. Four samples (033866-002, 033867-002, 033868-002, and 033869-002) were taken approximately 100 feet away from the site for determining background.

Based on the above review, and assuming that the samples adequately characterize the site, it appears that site characterization samples are representative of background radionuclide concentrations and that no radioactive contamination exists on site. All uranium series radionuclides were less than the local background values presented for the Canyons background study area. Thorium series values exceeded these Canyons background study area values but were consistent, within the errors of the analysis, with those taken near the site. Maximum results for the long-lived radionuclides in the thorium series are as follows:

Background

Th-232:  $1.30 \pm 0.61$

Ra-228:  $1.38 \pm 0.34$

Max Site 59 Values

Th-232:  $1.45 \pm 0.69$

Ra-228:  $1.39 \pm 0.41$

Please let me know if you have any questions.

Copy to:

MS1147 Sharissa Young (6682)  
Correspondence File: 97036.doc

\*\*\*\*\*  
 \* Sandia National Laboratories \*  
 \* Radiation Protection Sample Diagnostics Program [881 Laboratory] \*  
 \* 7-18-97 3:03:50 PM \*  
 \*\*\*\*\*  
 \* Analyzed by: *[Signature]* 7/18/97 Reviewed by: *[Signature]* 7/21/97 \*  
 \*\*\*\*\*

Customer : S.YOUNG/MAC (6682/SMO)  
 Customer Sample ID : 033858-002  
 Lab Sample ID : 70124401

Sample Description : MARINELLI SOLID SAMPLE  
 Sample Quantity : 765.000 gram  
 Sample Date/Time : 7-17-97 2:05:00 PM  
 Acquire Start Date/Time : 7-18-97 1:19:28 PM  
 Detector Name : LAB01  
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

\*\*\*\*\*

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	1.84E+00
TH-234	1.29E+00	4.81E-01	5.37E-01
RA-226	Not Detected	-----	6.12E-01
PB-214	9.36E-01	1.59E-01	5.69E-02
BI-214	8.91E-01	1.66E-01	5.83E-02
TH-232	1.20E+00	5.84E-01	1.99E-01
RA-228	1.25E+00	3.32E-01	1.92E-01
AC-228	1.10E+00	1.05E+00	1.31E-01
TH-228	9.96E-01	6.67E-01	5.43E-01
RA-224	1.24E+00	4.56E-01	9.61E-02
PB-212	1.09E+00	1.87E-01	4.94E-02
BI-212	1.18E+00	4.43E-01	3.86E-01
TL-208	1.02E+00	1.18E+00	8.30E-02
U-235	Not Detected	-----	2.57E-01
TH-231	Not Detected	-----	1.05E+01
PA-231	Not Detected	-----	1.66E+00
TH-227	Not Detected	-----	4.41E-01
RA-223	Not Detected	-----	1.76E-01
RN-219	Not Detected	-----	4.92E-01
PB-211	Not Detected	-----	1.12E+00
TL-207	<del>5.66E+00</del>	<del>6.45E+00</del>	1.02E+01
AM-241	Not Detected	-----	2.25E-01
PU-239	Not Detected	-----	3.49E+02
NP-237	Not Detected	-----	3.46E-01
PA-233	Not Detected	-----	6.96E-02
TH-229	Not Detected	-----	2.33E-01

*not detected* *[Signature]* 7/19/97

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	5.36E-02
AG-110m	Not Detected	-----	6.52E-02
BA-133	Not Detected	-----	6.75E-02
BE-7	Not Detected	-----	3.18E-01
CD-109	<del>2.19E-00</del>	<del>6.36E-01</del>	8.90E-01
CD-115	Not Detected	-----	1.11E-01
CE-139	Not Detected	-----	3.15E-02
CE-141	Not Detected	-----	5.66E-02
CE-144	Not Detected	-----	2.26E-01
CO-56	Not Detected	-----	4.52E-02
CO-57	Not Detected	-----	2.90E-02
CO-58	Not Detected	-----	4.14E-02
CO-60	Not Detected	-----	5.14E-02
CR-51	Not Detected	-----	2.74E-01
CS-134	Not Detected	-----	5.43E-02
CS-137	3.25E-01	6.66E-02	3.00E-02
EU-152	Not Detected	-----	8.68E-02
EU-154	Not Detected	-----	2.48E-01
EU-155	Not Detected	-----	1.36E-01
FE-59	Not Detected	-----	1.02E-01
GD-153	Not Detected	-----	9.40E-02
HG-203	Not Detected	-----	3.76E-02
I-131	Not Detected	-----	3.84E-02
IR-192	Not Detected	-----	3.24E-02
K-40	2.70E+01	4.04E+00	3.45E-01
MN-52	Not Detected	-----	4.70E-02
MN-54	Not Detected	-----	4.42E-02
MO-99	Not Detected	-----	4.02E-01
NA-22	Not Detected	-----	5.62E-02
NA-24	Not Detected	-----	1.35E-01
NB-95	Not Detected	-----	2.23E-01
ND-147	Not Detected	-----	2.84E-01
NI-57	Not Detected	-----	1.02E-01
PB-210	Not Detected	-----	9.22E+00
RU-103	Not Detected	-----	3.73E-02
RU-106	Not Detected	-----	3.72E-01
SB-122	Not Detected	-----	6.53E-02
SB-124	Not Detected	-----	3.87E-02
SB-125	Not Detected	-----	1.10E-01
SN-113	Not Detected	-----	4.68E-02
SR-85	Not Detected	-----	4.56E-02
TA-182	Not Detected	-----	2.15E-01
TA-183	Not Detected	-----	2.18E-01
TC-99m	Not Detected	-----	4.35E-01
TL-201	Not Detected	-----	1.60E-01
XE-133	Not Detected	-----	1.55E-01
Y-88	Not Detected	-----	3.50E-02
ZN-65	Not Detected	-----	1.44E-01
ZR-95	Not Detected	-----	7.39E-02

not detected. 7/19/97

\*\*\*\*\*  
 \* Sandia National Laboratories \*  
 \* Radiation Protection Sample Diagnostics Program [881 Laboratory] \*  
 \* 7-18-97 4:55:12 PM \*  
 \*\*\*\*\*  
 \*  
 \* Analyzed by: *J 7/15/97* Reviewed by: *SL 7/21/97* \*  
 \*\*\*\*\*

Customer : S.YOUNG/MAC (6682/SMO)  
 Customer Sample ID : 033861-002  
 Lab Sample ID : 70124402

Sample Description : MARINELLI SOLID SAMPLE  
 Sample Quantity : 785.000 gram  
 Sample Date/Time : 7-17-97 1:57:00 PM  
 Acquire Start Date/Time : 7-18-97 3:06:25 PM  
 Detector Name : LAB01  
 Elapsed Live/Real Time : 6000 / 6004 seconds

Comments:

\*\*\*\*\*

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	1.92E+00
TH-234	1.67E+00	4.60E-01	5.57E-01
RA-226	2.54E+00	7.30E-01	6.59E-01
PB-214	1.26E+00	2.12E-01	5.72E-02
BI-214	1.04E+00	2.00E-01	6.33E-02
TH-232	1.45E+00	6.87E-01	1.83E-01
RA-228	1.39E+00	4.07E-01	1.96E-01
AC-228	1.43E+00	6.59E-01	1.23E-01
TH-228	1.42E+00	6.83E-01	6.33E-01
RA-224	1.48E+00	5.34E-01	9.99E-02
PB-212	1.49E+00	2.95E-01	5.16E-02
BI-212	1.64E+00	5.36E-01	4.32E-01
TL-208	1.43E+00	2.58E-01	8.34E-02
U-235	Not Detected	-----	2.61E-01
TH-231	Not Detected	-----	1.11E+01
PA-231	Not Detected	-----	1.77E+00
TH-227	Not Detected	-----	4.85E-01
RA-223	Not Detected	-----	1.87E-01
PN-219	<del>3.64E-01</del>	<del>4.24E-01</del>	5.09E-01
PB-211	Not Detected	-----	1.13E+00
TL-207	Not Detected	-----	1.88E+01
AM-241	Not Detected	-----	2.35E-01
PU-239	Not Detected	-----	4.58E+02
NP-237	Not Detected	-----	3.67E-01
PA-233	Not Detected	-----	7.44E-02
TH-229	Not Detected	-----	2.50E-01

*Not detected J 7/15/97*

[Summary Report] - Sample ID: : 70124402

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	5.79E-02
AG-110m	Not Detected	-----	5.16E-02
BA-133	Not Detected	-----	7.24E-02
BE-7	1.78E-01	2.11E-01	2.12E-01
CD-109	<del>2.49E-00</del>	<del>6.76E-01</del>	9.58E-01
CD-115	Not Detected	-----	1.20E-01
CE-139	Not Detected	-----	3.32E-02
CE-141	Not Detected	-----	5.83E-02
CE-144	Not Detected	-----	2.41E-01
CO-56	Not Detected	-----	4.65E-02
CO-57	Not Detected	-----	3.06E-02
CO-58	Not Detected	-----	3.97E-02
CO-60	Not Detected	-----	5.01E-02
CR-51	Not Detected	-----	2.99E-01
CS-134	Not Detected	-----	5.78E-02
CS-137	1.27E-01	3.79E-02	3.12E-02
EU-152	Not Detected	-----	9.19E-02
EU-154	Not Detected	-----	2.70E-01
EU-155	Not Detected	-----	7.81E-02
FE-59	Not Detected	-----	1.04E-01
GD-153	Not Detected	-----	1.04E-01
HG-203	Not Detected	-----	3.98E-02
I-131	Not Detected	-----	4.08E-02
IR-192	Not Detected	-----	3.50E-02
K-40	2.58E+01	3.84E+00	3.49E-01
MN-52	Not Detected	-----	4.80E-02
MN-54	Not Detected	-----	4.81E-02
MO-99	Not Detected	-----	4.29E-01
NA-22	Not Detected	-----	6.05E-02
NA-24	Not Detected	-----	1.38E-01
NB-95	Not Detected	-----	2.48E-01
ND-147	Not Detected	-----	2.93E-01
NI-57	Not Detected	-----	1.05E-01
PB-210	Not Detected	-----	9.89E+00
RU-103	Not Detected	-----	3.86E-02
RU-106	Not Detected	-----	3.84E-01
SB-122	Not Detected	-----	6.82E-02
SB-124	Not Detected	-----	3.94E-02
SB-125	Not Detected	-----	1.13E-01
SN-113	Not Detected	-----	4.89E-02
SR-85	Not Detected	-----	4.81E-02
TA-182	Not Detected	-----	2.29E-01
TA-183	Not Detected	-----	2.30E-01
TC-99m	Not Detected	-----	5.62E-01
TL-201	Not Detected	-----	1.75E-01
XE-133	Not Detected	-----	1.68E-01
Y-88	Not Detected	-----	3.57E-02
ZN-65	Not Detected	-----	1.56E-01
ZR-95	Not Detected	-----	8.16E-02

*not detected* *7/19/57*

\*\*\*\*\*  
 \* Sandia National Laboratories \*  
 \* Radiation Protection Sample Diagnostics Program [881 Laboratory] \*  
 \* 7-18-97 6:47:51 PM \*  
 \*\*\*\*\*

\* Analyzed by: *[Signature]* 7/15/97 Reviewed by: *[Signature]* 7/18/97 \*  
 \*\*\*\*\*

Customer : S.YOUNG/MAC (6682/SMO)  
 Customer Sample ID : 033862-002  
 Lab Sample ID : 70124403

Sample Description : MARINELLI SOLID SAMPLE  
 Sample Quantity : 817.000 gram  
 Sample Date/Time : 7-17-97 2:00:00 PM  
 Acquire Start Date/Time : 7-18-97 4:58:34 PM  
 Detector Name : LAB01  
 Elapsed Live/Real Time : 6000 / 6004 seconds

Comments:  
 \*\*\*\*\*

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	1.57E+00	1.41E+00	2.02E+00
TH-234	1.41E+00	3.95E-01	5.31E-01
RA-226	2.70E+00	1.22E+00	7.53E-01
PB-214	1.07E+00	2.30E-01	5.78E-02
BI-214	1.00E+00	2.52E-01	5.51E-02
TH-232	1.17E+00	8.35E-01	1.64E-01
RA-228	1.22E+00	3.86E-01	2.05E-01
AC-228	1.25E+00	3.41E-01	1.14E-01
TH-228	7.23E-01	4.21E-01	5.35E-01
RA-224	1.28E+00	4.10E-01	7.03E-02
PB-212	1.21E+00	1.93E-01	4.69E-02
BI-212	1.44E+00	6.97E-01	4.12E-01
TL-208	1.11E+00	1.11E+00	9.34E-02
U-235	Not Detected	-----	2.46E-01
TH-231	Not Detected	-----	1.01E+01
PA-231	Not Detected	-----	1.70E+00
TH-227	Not Detected	-----	4.40E-01
RA-223	Not Detected	-----	1.74E-01
RN-219	Not Detected	-----	4.96E-01
PB-211	Not Detected	-----	1.13E+00
TL-207	Not Detected	-----	1.77E+01
AM-241	Not Detected	-----	2.20E-01
PU-239	Not Detected	-----	4.19E+02
NP-237	Not Detected	-----	2.36E-01
PA-233	Not Detected	-----	6.83E-02
TH-229	Not Detected	-----	2.34E-01

[Summary Report] - Sample ID: : 70124403

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	5.48E-02
AG-110m	Not Detected	-----	7.18E-02
BA-133	Not Detected	-----	6.64E-02
BE-7	9.04E-02	8.10E-02	1.68E-01
CD-109	<del>2.66E+00</del>	<del>7.66E-01</del>	8.02E-01
CD-115	Not Detected	-----	1.14E-01
CE-139	Not Detected	-----	3.15E-02
CE-141	Not Detected	-----	5.63E-02
CE-144	Not Detected	-----	2.28E-01
CO-56	Not Detected	-----	4.37E-02
CO-57	Not Detected	-----	2.85E-02
CO-58	Not Detected	-----	4.04E-02
CO-60	Not Detected	-----	4.77E-02
CR-51	Not Detected	-----	2.84E-01
CS-134	Not Detected	-----	5.32E-02
CS-137	4.92E-01	9.03E-02	3.04E-02
EU-152	Not Detected	-----	8.55E-02
EU-154	Not Detected	-----	2.54E-01
EU-155	Not Detected	-----	6.68E-02
FE-59	Not Detected	-----	9.83E-02
GD-153	Not Detected	-----	9.43E-02
HG-203	Not Detected	-----	3.71E-02
I-131	Not Detected	-----	4.00E-02
IR-192	Not Detected	-----	3.17E-02
K-40	2.43E+01	3.65E+00	3.54E-01
MN-52	Not Detected	-----	4.65E-02
MN-54	Not Detected	-----	2.48E-02
MO-99	Not Detected	-----	4.02E-01
NA-22	Not Detected	-----	5.75E-02
NA-24	Not Detected	-----	1.53E-01
NB-95	Not Detected	-----	2.30E-01
ND-147	Not Detected	-----	2.72E-01
NI-57	Not Detected	-----	1.11E-01
PB-210	Not Detected	-----	9.21E+00
RU-103	Not Detected	-----	3.82E-02
RU-106	Not Detected	-----	3.51E-01
SB-122	<del>2.37E-02</del>	<del>2.24E-02</del>	3.47E-02
SB-124	Not Detected	-----	3.64E-02
SB-125	Not Detected	-----	1.07E-01
SN-113	Not Detected	-----	4.61E-02
SR-85	Not Detected	-----	4.61E-02
TA-182	Not Detected	-----	2.07E-01
TA-183	Not Detected	-----	2.18E-01
TC-99m	Not Detected	-----	6.41E-01
TL-201	Not Detected	-----	1.62E-01
XE-133	Not Detected	-----	1.57E-01
Y-88	Not Detected	-----	3.40E-02
ZN-65	Not Detected	-----	1.40E-01
ZR-95	Not Detected	-----	7.34E-02

not detected 7/15/97

not detected 7/15/97

\*\*\*\*\*  
 \* Sandia National Laboratories \*  
 \* Radiation Protection Sample Diagnostics Program [881 Laboratory] \*  
 \* 7-18-97 8:39:03 PM \*  
 \*\*\*\*\*  
 \*  
 \* Analyzed by: *[Signature]* 7/19/97 Reviewed by: *[Signature]* 7/19/97 \*  
 \*\*\*\*\*

Customer : S.YOUNG/MAC (6682/SMO)  
 Customer Sample ID : 033863-002  
 Lab Sample ID : 70124404

Sample Description : MARINELLI SOLID SAMPLE  
 Sample Quantity : 686.000 gram  
 Sample Date/Time : 7-17-97 1:35:00 PM  
 Acquire Start Date/Time : 7-18-97 6:50:55 PM  
 Detector Name : LAB01  
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

\*\*\*\*\*

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	1.87E+00
TH-234	6.58E-01	4.35E-01	6.44E-01
RA-226	1.84E+00	5.92E-01	6.74E-01
PB-214	9.18E-01	4.52E-01	6.02E-02
BI-214	Not Detected	-----	6.65E-02
TH-232	1.09E+00	5.29E-01	1.86E-01
RA-228	1.07E+00	2.73E-01	1.87E-01
AC-228	1.13E+00	2.65E-01	1.21E-01
TH-228	8.79E-01	5.86E-01	5.88E-01
RA-224	1.01E+00	3.49E-01	8.31E-02
PB-212	1.07E+00	1.75E-01	4.85E-02
BI-212	9.62E-01	4.50E-01	4.26E-01
TL-208	1.00E+00	1.08E+00	9.56E-02
U-235	<del>2.20E-02</del>	<del>1.02E-01</del>	2.54E-01
TH-231	Not Detected	-----	1.07E+01
PA-231	Not Detected	-----	1.75E+00
TH-227	Not Detected	-----	4.54E-01
RA-223	Not Detected	-----	7.82E-02
RN-219	<del>2.34E-01</del>	<del>4.19E-01</del>	5.19E-01
PB-211	Not Detected	-----	1.15E+00
TL-207	Not Detected	-----	1.94E+01
AM-241	Not Detected	-----	2.27E-01
PU-239	Not Detected	-----	4.23E+02
NP-237	Not Detected	-----	3.44E-01
PA-233	Not Detected	-----	7.04E-02
TH-229	Not Detected	-----	2.42E-01

*not detected* *[Signature]* 7/19/97  
*not detected* *[Signature]* 7/19/97



[Summary Report] - Sample ID: : 70124404

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	5.39E-02
AG-110m	Not Detected	-----	7.08E-02
BA-133	Not Detected	-----	6.91E-02
BE-7	Not Detected	-----	3.43E-01
CD-109	<del>1.06E+00</del>	<del>7.90E-02</del>	<del>7.03E-01</del>
CD-115	Not Detected	-----	1.23E-01
CE-139	Not Detected	-----	3.20E-02
CE-141	Not Detected	-----	5.62E-02
CE-144	Not Detected	-----	2.31E-01
CO-56	Not Detected	-----	4.68E-02
CO-57	Not Detected	-----	2.90E-02
CO-58	Not Detected	-----	4.46E-02
CO-60	Not Detected	-----	5.20E-02
CR-51	Not Detected	-----	3.01E-01
CS-134	Not Detected	-----	5.72E-02
CS-137	3.65E-01	7.32E-02	3.48E-02
EU-152	Not Detected	-----	8.75E-02
EU-154	Not Detected	-----	2.50E-01
EU-155	Not Detected	-----	1.39E-01
FE-59	Not Detected	-----	1.03E-01
GD-153	Not Detected	-----	9.99E-02
HG-203	Not Detected	-----	3.88E-02
I-131	Not Detected	-----	3.96E-02
IR-192	Not Detected	-----	3.47E-02
K-40	2.34E+01	3.58E+00	3.61E-01
MN-52	Not Detected	-----	5.41E-02
MN-54	Not Detected	-----	2.55E-02
MO-99	Not Detected	-----	4.29E-01
NA-22	Not Detected	-----	6.24E-02
NA-24	Not Detected	-----	1.74E-01
NB-95	Not Detected	-----	2.41E-01
ND-147	Not Detected	-----	2.79E-01
NI-57	Not Detected	-----	1.20E-01
PB-210	Not Detected	-----	9.58E+00
RU-103	Not Detected	-----	4.06E-02
RU-106	Not Detected	-----	3.95E-01
SB-122	Not Detected	-----	7.29E-02
SB-124	Not Detected	-----	4.05E-02
SB-125	Not Detected	-----	1.14E-01
SN-113	Not Detected	-----	4.77E-02
SR-85	Not Detected	-----	4.87E-02
TA-182	Not Detected	-----	2.24E-01
TA-183	Not Detected	-----	2.28E-01
TC-99m	Not Detected	-----	8.58E-01
TL-201	Not Detected	-----	1.73E-01
XE-133	<del>5.12E-02</del>	<del>9.50E-02</del>	<del>8.74E-02</del>
Y-88	Not Detected	-----	3.58E-02
ZN-65	Not Detected	-----	1.52E-01
ZR-95	Not Detected	-----	8.15E-02

Not detected 7/15/57

Not detected 7/15/57

\*\*\*\*\*  
 \* Sandia National Laboratories \*  
 \* Radiation Protection Sample Diagnostics Program [881 Laboratory] \*  
 \* 7-18-97 10:30:26 PM \*  
 \*\*\*\*\*

\* Analyzed by: *J 7/15/97* Reviewed by: *[Signature] 7/15/97* \*

Customer : S.YOUNG/MAC (6682/SMO)  
 Customer Sample ID : 033864-002  
 Lab Sample ID : 70124405

Sample Description : MARINELLI SOLID SAMPLE  
 Sample Quantity : 758.000 gram  
 Sample Date/Time : 7-17-97 1:38:00 PM  
 Acquire Start Date/Time : 7-18-97 8:41:57 PM  
 Detector Name : LAB01  
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:  
 \*\*\*\*\*

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	1.81E+00
TH-234	1.59E+00	4.49E-01	5.47E-01
RA-226	2.00E+00	6.93E-01	7.24E-01
PB-214	1.02E+00	1.82E-01	5.94E-02
BI-214	9.72E-01	1.95E-01	5.99E-02
TH-232	1.25E+00	6.27E-01	1.84E-01
RA-228	1.01E+00	3.54E-01	2.12E-01
AC-228	1.11E+00	3.00E-01	1.28E-01
TH-228	1.22E+00	7.73E-01	5.89E-01
RA-224	1.14E+00	3.63E-01	1.00E-01
PB-212	1.16E+00	2.18E-01	4.76E-02
BI-212	Not Detected	-----	4.30E-01
TL-208	1.11E+00	2.24E-01	8.71E-02
U-235	Not Detected	-----	2.56E-01
TH-231	Not Detected	-----	1.07E+01
PA-231	Not Detected	-----	1.74E+00
TH-227	Not Detected	-----	4.49E-01
RA-223	Not Detected	-----	1.83E-01
RN-219	<del>2.35E-01</del>	<del>4.08E-01</del>	5.02E-01 <i>not detected J 7/15/97</i>
PB-211	Not Detected	-----	1.14E+00
TL-207	Not Detected	-----	1.92E+01
AM-241	Not Detected	-----	2.25E-01
PU-239	Not Detected	-----	4.30E+02
NP-237	<del>7.17E-01</del>	<del>2.11E-01</del>	2.69E-01 <i>not detected J 7/15/97</i>
PA-233	Not Detected	-----	7.10E-02
TH-229	Not Detected	-----	2.44E-01

[Summary Report] - Sample ID: : 70124405

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	5.68E-02
AG-110m	Not Detected	-----	6.79E-02
BA-133	Not Detected	-----	6.76E-02
BE-7	Not Detected	-----	3.29E-01
CD-109	Not Detected	-----	1.18E+00
CD-115	Not Detected	-----	1.23E-01
CE-139	Not Detected	-----	3.21E-02
CE-141	Not Detected	-----	5.79E-02
CE-144	Not Detected	-----	2.30E-01
CO-56	Not Detected	-----	4.97E-02
CO-57	Not Detected	-----	2.91E-02
CO-58	Not Detected	-----	4.27E-02
CO-60	Not Detected	-----	5.40E-02
CR-51	Not Detected	-----	2.89E-01
CS-134	Not Detected	-----	5.58E-02
CS-137	3.54E-01	1.01E-01	3.33E-02
EU-152	Not Detected	-----	8.72E-02
EU-154	Not Detected	-----	2.62E-01
EU-155	Not Detected	-----	1.39E-01
FE-59	Not Detected	-----	1.05E-01
GD-153	Not Detected	-----	9.72E-02
HG-203	Not Detected	-----	3.85E-02
I-131	Not Detected	-----	4.00E-02
IR-192	Not Detected	-----	3.30E-02
K-40	2.52E+01	3.80E+00	2.62E-01
MN-52	Not Detected	-----	4.96E-02
MN-54	Not Detected	-----	4.49E-02
MO-99	Not Detected	-----	4.38E-01
NA-22	Not Detected	-----	5.68E-02
NA-24	Not Detected	-----	1.83E-01
NB-95	Not Detected	-----	2.42E-01
ND-147	Not Detected	-----	2.74E-01
NI-57	Not Detected	-----	1.23E-01
PB-210	Not Detected	-----	9.37E+00
RU-103	Not Detected	-----	3.88E-02
RU-106	Not Detected	-----	3.67E-01
SB-122	Not Detected	-----	6.97E-02
SB-124	Not Detected	-----	3.73E-02
SB-125	Not Detected	-----	1.08E-01
SN-113	Not Detected	-----	4.85E-02
SR-85	Not Detected	-----	4.63E-02
TA-182	Not Detected	-----	2.15E-01
TA-183	Not Detected	-----	2.28E-01
TC-99m	Not Detected	-----	1.08E+00
TL-201	Not Detected	-----	1.74E-01
XE-133	Not Detected	-----	1.76E-01
Y-88	Not Detected	-----	3.09E-02
ZN-65	Not Detected	-----	1.47E-01
ZR-95	Not Detected	-----	7.83E-02

\*\*\*\*\*  
 \* Sandia National Laboratories \*  
 \* Radiation Protection Sample Diagnostics Program [881 Laboratory] \*  
 \* 7-19-97 12:21:59 AM \*  
 \*\*\*\*\*  
 \*  
 \* Analyzed by: *[Signature]* 7/14/97 Reviewed by: *[Signature]* 7/21/97 \*  
 \*\*\*\*\*  
 Customer : S.YOUNG/MAC (6682/SMO)  
 Customer Sample ID : 033865-002  
 Lab Sample ID : 70124406

Sample Description : MARINELLI SOLID SAMPLE  
 Sample Quantity : 773.000 gram  
 Sample Date/Time : 7-17-97 1:45:00 PM  
 Acquire Start Date/Time : 7-18-97 10:33:26 PM  
 Detector Name : LAB01  
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

\*\*\*\*\*

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	1.85E+00
TH-234	1.38E+00	4.04E-01	5.65E-01
RA-226	2.15E+00	6.17E-01	6.31E-01
PB-214	1.01E+00	1.70E-01	5.74E-02
BI-214	9.15E-01	1.70E-01	5.58E-02
TH-232	1.11E+00	5.31E-01	1.66E-01
RA-228	1.21E+00	3.32E-01	2.05E-01
AC-228	1.10E+00	2.95E-01	1.29E-01
TH-228	8.11E-01	8.58E-01	5.31E-01
RA-224	1.28E+00	4.29E-01	6.24E-02
PB-212	1.20E+00	1.92E-01	4.68E-02
BI-212	1.28E+00	6.21E-01	4.12E-01
TL-208	1.05E+00	2.06E-01	9.20E-02
U-235	Not Detected	-----	2.48E-01
TH-231	Not Detected	-----	1.03E+01
PA-231	Not Detected	-----	1.72E+00
TH-227	Not Detected	-----	4.46E-01
RA-223	Not Detected	-----	1.77E-01
RN-219	Not Detected	-----	5.08E-01
PB-211	Not Detected	-----	1.12E+00
TL-207	Not Detected	-----	1.80E+01
AM-241	Not Detected	-----	2.23E-01
PU-239	Not Detected	-----	4.15E+02
NP-237	Not Detected	-----	3.40E-01
PA-233	Not Detected	-----	6.82E-02
TH-229	Not Detected	-----	2.36E-01

[Summary Report] - Sample ID: : 70124406

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	5.20E-02
AG-110m	Not Detected	-----	5.44E-02
BA-133	Not Detected	-----	6.76E-02
BE-7	Not Detected	-----	3.31E-01
CD-109	<del>2.58E+00</del>	<del>7.22E-01</del>	7.93E-01
CD-115	Not Detected	-----	1.22E-01
CE-139	Not Detected	-----	3.11E-02
CE-141	Not Detected	-----	5.64E-02
CE-144	Not Detected	-----	2.27E-01
CO-56	Not Detected	-----	4.58E-02
CO-57	Not Detected	-----	2.92E-02
CO-58	Not Detected	-----	4.34E-02
CO-60	Not Detected	-----	4.93E-02
CR-51	Not Detected	-----	2.83E-01
CS-134	Not Detected	-----	5.52E-02
CS-137	1.84E-01	3.13E-01	3.07E-02
EU-152	Not Detected	-----	8.71E-02
EU-154	Not Detected	-----	2.41E-01
EU-155	Not Detected	-----	1.34E-01
FE-59	Not Detected	-----	9.81E-02
GD-153	Not Detected	-----	9.80E-02
HG-203	Not Detected	-----	3.77E-02
I-131	Not Detected	-----	3.87E-02
IR-192	Not Detected	-----	3.27E-02
K-40	2.63E+01	3.94E+00	2.88E-01
MN-52	Not Detected	-----	4.60E-02
MN-54	Not Detected	-----	4.64E-02
MO-99	Not Detected	-----	4.57E-01
NA-22	Not Detected	-----	6.19E-02
NA-24	Not Detected	-----	2.01E-01
NB-95	Not Detected	-----	2.41E-01
ND-147	Not Detected	-----	2.77E-01
NI-57	Not Detected	-----	1.26E-01
PB-210	Not Detected	-----	9.42E+00
RU-103	Not Detected	-----	3.70E-02
RU-106	Not Detected	-----	3.66E-01
SB-122	Not Detected	-----	7.10E-02
SB-124	Not Detected	-----	3.68E-02
SB-125	Not Detected	-----	1.10E-01
SN-113	Not Detected	-----	4.64E-02
SR-85	Not Detected	-----	4.66E-02
TA-182	Not Detected	-----	2.05E-01
TA-183	Not Detected	-----	2.28E-01
TC-99m	Not Detected	-----	1.26E+00
TL-201	Not Detected	-----	1.74E-01
XE-133	Not Detected	-----	1.77E-01
Y-88	Not Detected	-----	3.60E-02
ZN-65	Not Detected	-----	1.42E-01
ZR-95	Not Detected	-----	7.41E-02

not detected 7/15/97

\*\*\*\*\*  
 \* Sandia National Laboratories \*  
 \* Radiation Protection Sample Diagnostics Program [881 Laboratory] \*  
 \* 7-19-97 2:13:00 AM \*  
 \*\*\*\*\*  
 \* Analyzed by: *[Signature]* 7/19/97 Reviewed by: *[Signature]* 7/21/97 \*  
 \*\*\*\*\*

Customer : S.YOUNG/MAC (6682/SMO)  
 Customer Sample ID : 033866-002  
 Lab Sample ID : 70124407

Sample Description : MARINELLI SOLID SAMPLE  
 Sample Quantity : 787.000 gram  
 Sample Date/Time : 7-17-97 1:51:00 PM  
 Acquire Start Date/Time : 7-19-97 12:24:59 AM  
 Detector Name : LAB01  
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

\*\*\*\*\*

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	1.62E+00
TH-234	Not Detected	-----	6.23E-01
RA-226	1.34E+00	7.33E-01	5.80E-01
PB-214	6.17E-01	1.32E-01	5.28E-02
BI-214	6.09E-01	1.33E-01	5.87E-02
TH-232	7.28E-01	3.70E-01	1.70E-01
RA-228	6.77E-01	3.03E-01	2.17E-01
AC-228	7.75E-01	2.29E-01	1.15E-01
TH-228	4.42E-01	4.19E-01	4.67E-01
RA-224	7.70E-01	3.13E-01	6.13E-02
PB-212	7.04E-01	1.21E-01	4.34E-02
BI-212	1.14E+00	6.82E-01	4.79E-01
TL-208	6.84E-01	1.59E-01	7.95E-02
U-235	Not Detected	-----	2.22E-01
TH-231	Not Detected	-----	9.18E+00
PA-231	Not Detected	-----	1.55E+00
TH-227	Not Detected	-----	3.60E-01
RA-223	Not Detected	-----	1.58E-01
RN-219	Not Detected	-----	4.40E-01
PB-211	Not Detected	-----	9.87E-01
TL-207	Not Detected	-----	1.80E+01
AM-241	Not Detected	-----	1.97E-01
PU-239	Not Detected	-----	3.76E+02
NP-237	Not Detected	-----	2.94E-01
PA-233	Not Detected	-----	6.60E-02
TH-229	Not Detected	-----	2.13E-01

[Summary Report] - Sample ID: : 70124407

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	4.85E-02
AG-110m	Not Detected	-----	4.56E-02
BA-133	Not Detected	-----	5.67E-02
BE-7	1.53E-01	1.64E-01	1.44E-01
CD-109	<del>6.59E-01</del>	<del>4.63E-01</del>	6.67E-01
CD-115	Not Detected	-----	1.08E-01
CE-139	Not Detected	-----	2.82E-02
CE-141	Not Detected	-----	4.87E-02
CE-144	Not Detected	-----	2.09E-01
CO-56	Not Detected	-----	4.19E-02
CO-57	Not Detected	-----	2.70E-02
CO-58	Not Detected	-----	3.85E-02
CO-60	Not Detected	-----	5.37E-02
CR-51	Not Detected	-----	2.60E-01
CS-134	Not Detected	-----	4.80E-02
CS-137	Not Detected	-----	2.62E-02
EU-152	Not Detected	-----	8.12E-02
EU-154	Not Detected	-----	2.25E-01
EU-155	Not Detected	-----	1.21E-01
FE-59	Not Detected	-----	1.06E-01
GD-153	Not Detected	-----	8.78E-02
EG-203	Not Detected	-----	3.36E-02
I-131	Not Detected	-----	3.62E-02
IR-192	Not Detected	-----	3.09E-02
K-40	3.31E+01	4.86E+00	2.65E-01
MN-52	Not Detected	-----	4.41E-02
MN-54	Not Detected	-----	4.30E-02
MO-99	Not Detected	-----	4.34E-01
NA-22	Not Detected	-----	6.27E-02
NA-24	Not Detected	-----	2.21E-01
NB-95	Not Detected	-----	2.00E-01
ND-147	Not Detected	-----	2.55E-01
NI-57	Not Detected	-----	1.28E-01
PB-210	Not Detected	-----	8.08E+00
RU-103	Not Detected	-----	3.49E-02
RU-106	Not Detected	-----	3.47E-01
SB-122	Not Detected	-----	6.46E-02
SB-124	Not Detected	-----	3.46E-02
SB-125	Not Detected	-----	9.87E-02
SN-113	Not Detected	-----	4.30E-02
SR-85	Not Detected	-----	4.20E-02
TA-182	Not Detected	-----	1.99E-01
TA-183	Not Detected	-----	2.04E-01
TC-99m	Not Detected	-----	1.42E+00
TL-201	Not Detected	-----	1.55E-01
XE-133	Not Detected	-----	1.62E-01
Y-88	Not Detected	-----	3.16E-02
ZN-65	Not Detected	-----	1.35E-01
ZR-95	Not Detected	-----	7.49E-02

not detected 7/19/5

\*\*\*\*\*  
 \* Sandia National Laboratories \*  
 \* Radiation Protection Sample Diagnostics Program [881 Laboratory] \*  
 \* 7-19-97 4:04:22 AM \*  
 \*\*\*\*\*

\* Analyzed by: *[Signature]* 7/15/97 Reviewed by: *[Signature]* 7/15/97 \*  
 \*\*\*\*\*

Customer : S. YOUNG/MAC (6682/SMO)  
 Customer Sample ID : 033867-002  
 Lab Sample ID : 70124408

Sample Description : MARINELLI SOLID SAMPLE  
 Sample Quantity : 852.000 gram  
 Sample Date/Time : 7-17-97 2:07:00 PM  
 Acquire Start Date/Time : 7-19-97 2:15:50 AM  
 Detector Name : LAB01  
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:  
 \*\*\*\*\*

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	1.68E+00
TH-234	1.47E+00	4.56E-01	5.12E-01
RA-226	2.39E+00	6.35E-01	6.07E-01
PB-214	9.72E-01	1.66E-01	5.18E-02
BI-214	8.87E-01	1.77E-01	5.30E-02
TH-232	1.07E+00	5.15E-01	1.74E-01
RA-228	1.02E+00	2.56E-01	1.77E-01
AC-228	9.94E-01	2.70E-01	1.17E-01
TH-228	1.19E+00	7.10E-01	5.21E-01
RA-224	1.15E+00	2.93E-01	8.48E-02
PB-212	1.01E+00	1.67E-01	4.32E-02
BI-212	1.18E+00	4.53E-01	3.86E-01
TL-208	9.19E-01	5.11E-01	7.42E-02
U-235	Not Detected	-----	2.32E-01
TH-231	Not Detected	-----	9.76E+00
PA-231	Not Detected	-----	1.53E+00
TH-227	Not Detected	-----	3.99E-01
RA-223	Not Detected	-----	1.68E-01
RN-219	<del>5.51E-01</del>	<del>3.66E-01</del>	4.56E-01
PB-211	Not Detected	-----	1.01E+00
TL-207	Not Detected	-----	1.72E+01
AM-241	Not Detected	-----	2.03E-01
PU-239	Not Detected	-----	3.92E+02
NP-237	Not Detected	-----	3.15E-01
PA-233	Not Detected	-----	6.46E-02
TH-229	Not Detected	-----	2.18E-01

*not detected 7/15/97*



Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	4.98E-02
AG-110m	Not Detected	-----	5.29E-02
BA-133	Not Detected	-----	6.37E-02
BE-7	1.03E-01	1.22E-01	1.88E-01
CD-109	<del>2.32E-01</del>	<del>5.62E-01</del>	7.84E-01
CD-115	Not Detected	-----	1.18E-01
CE-139	Not Detected	-----	2.90E-02
CE-141	Not Detected	-----	5.14E-02
CE-144	Not Detected	-----	2.13E-01
CO-56	Not Detected	-----	4.08E-02
CO-57	Not Detected	-----	2.77E-02
CO-58	Not Detected	-----	3.80E-02
CO-60	Not Detected	-----	4.88E-02
CR-51	Not Detected	-----	2.62E-01
CS-134	Not Detected	-----	5.03E-02
CS-137	2.08E-01	4.25E-02	2.95E-02
EU-152	Not Detected	-----	8.33E-02
EU-154	Not Detected	-----	2.30E-01
EU-155	Not Detected	-----	1.26E-01
FE-59	Not Detected	-----	9.19E-02
GD-153	Not Detected	-----	8.99E-02
HG-203	Not Detected	-----	3.53E-02
I-131	Not Detected	-----	3.80E-02
IR-192	Not Detected	-----	3.07E-02
K-40	2.38E+01	3.53E+00	2.56E-01
MN-52	Not Detected	-----	4.61E-02
MN-54	Not Detected	-----	2.16E-02
MO-99	Not Detected	-----	4.23E-01
NA-22	Not Detected	-----	5.14E-02
NA-24	Not Detected	-----	2.15E-01
NB-95	Not Detected	-----	2.18E-01
ND-147	Not Detected	-----	2.55E-01
NI-57	Not Detected	-----	1.24E-01
PB-210	Not Detected	-----	8.47E+00
RU-103	Not Detected	-----	3.45E-02
RU-106	Not Detected	-----	3.39E-01
SB-122	Not Detected	-----	6.81E-02
SB-124	Not Detected	-----	3.53E-02
SB-125	Not Detected	-----	9.57E-02
SN-113	Not Detected	-----	4.27E-02
SR-85	Not Detected	-----	4.26E-02
TA-182	Not Detected	-----	1.95E-01
TA-183	Not Detected	-----	2.11E-01
TC-99m	Not Detected	-----	1.74E+00
TL-201	Not Detected	-----	1.67E-01
XE-133	Not Detected	-----	1.73E-01
Y-88	Not Detected	-----	3.47E-02
ZN-65	Not Detected	-----	1.30E-01
ZR-95	Not Detected	-----	6.96E-02

*not detected 7/15/97*

\*\*\*\*\*  
 \* Sandia National Laboratories \*  
 \* Radiation Protection Sample Diagnostics Program [881 Laboratory] \*  
 \* 7-19-97 5:55:48 AM \*  
 \*\*\*\*\*

\* Analyzed by: *J 7/19/97* Reviewed by: *[Signature]* \*\*\*\*\*

Customer : S. YOUNG/MAC (6682/SMO)  
 Customer Sample ID : 033868-002  
 Lab Sample ID : 70124409

Sample Description : MARINELLI SOLID SAMPLE  
 Sample Quantity : 771.000 gram  
 Sample Date/Time : 7-17-97 2:08:00 PM  
 Acquire Start Date/Time : 7-19-97 4:07:19 AM  
 Detector Name : LAB01  
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

\*\*\*\*\*

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	1.89E+00
TH-234	1.54E+00	5.10E-01	5.46E-01
RA-226	2.49E+00	8.14E-01	7.86E-01
PB-214	1.06E+00	2.34E-01	5.82E-02
BI-214	1.01E+00	3.34E-01	5.99E-02
TH-232	1.30E+00	6.08E-01	1.92E-01
RA-228	1.38E+00	3.41E-01	2.28E-01
AC-228	1.29E+00	1.06E+00	1.16E-01
TH-228	1.11E+00	4.73E-01	5.51E-01
RA-224	1.32E+00	4.16E-01	7.43E-02
PB-212	1.31E+00	2.25E-01	5.38E-02
BI-212	1.26E+00	5.05E-01	4.21E-01
TL-208	1.15E+00	2.63E-01	8.90E-02
U-235	<del>2.66E-02</del>	<del>1.36E-01</del>	2.59E-01
TH-231	Not Detected	-----	1.08E+01
PA-231	Not Detected	-----	1.70E+00
TH-227	Not Detected	-----	4.66E-01
RA-223	Not Detected	-----	1.89E-01
RN-219	<del>2.52E-01</del>	<del>4.22E-01</del>	5.07E-01
PB-211	Not Detected	-----	1.12E+00
TL-207	Not Detected	-----	1.88E+01
AM-241	Not Detected	-----	2.32E-01
PU-239	Not Detected	-----	4.37E+02
NP-237	Not Detected	-----	3.58E-01
PA-233	Not Detected	-----	7.10E-02
TH-229	Not Detected	-----	2.42E-01

*Not Detected J 7/19/97*

*Not Detected J 7/19/97*

[Summary Report] - Sample ID: : 70124409

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	5.78E-02
AG-110m	Not Detected	-----	6.20E-02
BA-133	Not Detected	-----	7.11E-02
BE-7	Not Detected	-----	3.40E-01
CD-109	<del>2.61E+00</del>	<del>6.96E-01</del>	8.35E-01
CD-115	Not Detected	-----	1.41E-01
CE-139	Not Detected	-----	1.46E-02
CE-141	Not Detected	-----	5.77E-02
CE-144	Not Detected	-----	2.35E-01
CO-56	Not Detected	-----	4.67E-02
CO-57	Not Detected	-----	3.02E-02
CO-58	Not Detected	-----	4.35E-02
CO-60	Not Detected	-----	5.13E-02
CR-51	Not Detected	-----	2.89E-01
CS-134	Not Detected	-----	5.61E-02
CS-137	2.78E-01	6.01E-02	3.37E-02
EU-152	Not Detected	-----	9.04E-02
EU-154	Not Detected	-----	2.66E-01
EU-155	Not Detected	-----	1.43E-01
FE-59	Not Detected	-----	1.02E-01
GD-153	Not Detected	-----	9.92E-02
HG-203	Not Detected	-----	3.84E-02
I-131	Not Detected	-----	4.15E-02
IR-192	Not Detected	-----	3.27E-02
K-40	2.79E+01	4.16E+00	3.22E-01
MN-52	Not Detected	-----	5.18E-02
MN-54	Not Detected	-----	2.47E-02
MO-99	Not Detected	-----	4.86E-01
NA-22	Not Detected	-----	6.17E-02
NA-24	Not Detected	-----	2.72E-01
NB-95	Not Detected	-----	2.58E-01
ND-147	Not Detected	-----	2.94E-01
NI-57	Not Detected	-----	1.31E-01
PB-210	Not Detected	-----	9.66E+00
RU-103	Not Detected	-----	3.95E-02
RU-106	Not Detected	-----	3.70E-01
SB-122	Not Detected	-----	7.76E-02
SB-124	Not Detected	-----	3.89E-02
SB-125	Not Detected	-----	1.14E-01
SN-113	Not Detected	-----	4.77E-02
SR-85	Not Detected	-----	4.75E-02
TA-182	Not Detected	-----	2.23E-01
TA-183	Not Detected	-----	2.44E-01
TC-99m	Not Detected	-----	2.38E+00
TL-201	Not Detected	-----	1.91E-01
XE-133	Not Detected	-----	1.97E-01
Y-88	Not Detected	-----	3.48E-02
ZN-65	Not Detected	-----	1.54E-01
ZR-95	Not Detected	-----	7.89E-02

*n.t. detected 7/13/97*

\*\*\*\*\*  
 \* Sandia National Laboratories \*  
 \* Radiation Protection Sample Diagnostics Program [881 Laboratory] \*  
 \* 7-19-97 7:41:46 AM \*  
 \*\*\*\*\*  
 \* Analyzed by: *[Signature]* 7/19/97 Reviewed by: *[Signature]* 7/19/97 \*  
 \*\*\*\*\*  
 Customer : S.YOUNG/MAC (6682/SMO)  
 Customer Sample ID : 033869-002  
 Lab Sample ID : 70124410  
  
 Sample Description : MARINELLI SOLID SAMPLE  
 Sample Quantity : 675.000 gram  
 Sample Date/Time : 7-17-97 1:48:00 PM  
 Acquire Start Date/Time : 7-19-97 5:59:05 AM  
 Detector Name : LAB01  
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

\*\*\*\*\*

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	1.92E+00
TH-234	1.41E+00	4.54E-01	5.72E-01
RA-226	2.02E+00	7.29E-01	6.23E-01
PB-214	9.86E-01	2.41E-01	6.31E-02
BI-214	8.72E-01	1.86E-01	6.29E-02
TH-232	1.07E+00	5.14E-01	1.97E-01
RA-228	1.04E+00	2.85E-01	2.14E-01
AC-228	1.16E+00	3.04E-01	1.22E-01
TH-228	Not Detected	-----	4.94E-01
RA-224	1.15E+00	4.35E-01	7.15E-02
PB-212	1.13E+00	1.83E-01	5.28E-02
BI-212	1.25E+00	7.24E-01	4.51E-01
TL-208	1.06E+00	2.31E-01	9.31E-02
U-235	Not Detected	-----	2.56E-01
TH-231	Not Detected	-----	1.09E+01
PA-231	Not Detected	-----	1.85E+00
TH-227	Not Detected	-----	4.63E-01
RA-223	Not Detected	-----	1.94E-01
RN-219	Not Detected	-----	5.34E-01
PB-211	Not Detected	-----	1.20E+00
TL-207	Not Detected	-----	1.89E+01
AM-241	Not Detected	-----	2.40E-01
PU-239	Not Detected	-----	4.46E+02
NP-237	Not Detected	-----	3.66E-01
PA-233	Not Detected	-----	7.42E-02
TH-229	Not Detected	-----	2.50E-01

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	5.96E-02
AG-110m	Not Detected	-----	7.95E-02
BA-133	Not Detected	-----	7.48E-02
BE-7	Not Detected	-----	2.36E-01
CD-109	<del>2.31E+00</del>	<del>6.46E-01</del>	9.12E-01
CD-115	Not Detected	-----	1.43E-01
CE-139	Not Detected	-----	3.34E-02
CE-141	Not Detected	-----	5.81E-02
CE-144	Not Detected	-----	2.35E-01
CO-56	Not Detected	-----	4.78E-02
CO-57	Not Detected	-----	3.01E-02
CO-58	Not Detected	-----	4.51E-02
CO-60	Not Detected	-----	5.39E-02
CR-51	Not Detected	-----	3.15E-01
CS-134	Not Detected	-----	5.58E-02
CS-137	5.12E-01	1.04E-01	3.28E-02
EU-152	Not Detected	-----	9.07E-02
EU-154	Not Detected	-----	2.75E-01
EU-155	Not Detected	-----	1.40E-01
FE-59	Not Detected	-----	1.09E-01
GD-153	Not Detected	-----	1.03E-01
HG-203	Not Detected	-----	4.13E-02
I-131	Not Detected	-----	4.39E-02
IR-192	Not Detected	-----	3.59E-02
K-40	2.51E+01	3.83E+00	3.83E-01
MN-52	Not Detected	-----	5.75E-02
MN-54	<del>2.07E-02</del>	<del>2.09E-02</del>	2.66E-02
MO-99	Not Detected	-----	5.13E-01
NA-22	Not Detected	-----	5.84E-02
NA-24	Not Detected	-----	2.80E-01
NB-95	Not Detected	-----	2.61E-01
ND-147	Not Detected	-----	3.10E-01
NI-57	Not Detected	-----	1.51E-01
PB-210	Not Detected	-----	1.00E+01
RU-103	Not Detected	-----	4.08E-02
RU-106	Not Detected	-----	3.78E-01
SB-122	Not Detected	-----	8.10E-02
SB-124	Not Detected	-----	4.11E-02
SB-125	Not Detected	-----	1.17E-01
SN-113	Not Detected	-----	5.25E-02
SR-85	Not Detected	-----	4.94E-02
TA-182	Not Detected	-----	2.19E-01
TA-183	Not Detected	-----	2.56E-01
TC-99m	Not Detected	-----	3.17E+00
TL-201	Not Detected	-----	2.00E-01
XE-133	Not Detected	-----	2.03E-01
Y-88	Not Detected	-----	3.29E-02
ZN-65	Not Detected	-----	1.49E-01
ZR-95	Not Detected	-----	8.02E-02

*not detected*  
*7/15/57*

*not detected*  
*7/15/57*

\*\*\*\*\*  
 \* Sandia National Laboratories \*  
 \* Radiation Protection Sample Diagnostics Program [681 Laboratory] \*  
 \* 7-19-97 8:52:14 AM \*  
 \*\*\*\*\*  
 \* Analyzed by: *[Signature]* 7/19/97 Reviewed by: *[Signature]* 7/19/97 \*  
 \*\*\*\*\*  
 Customer : S.YOUNG/MAC (6682/SMO)  
 Customer Sample ID : LAB CONTROL SAMPLE USING CG134  
 Lab Sample ID : 70124411

Sample Description : MIXED GAMMA STANDARD CG134  
 Sample Quantity : 1.000 Each  
 Sample Date/Time : 11-01-90 12:00:00 PM  
 Acquire Start Date/Time : 7-19-97 8:39:08 AM  
 Detector Name : LAB01  
 Elapsed Live/Real Time : 600 / 605 seconds

Comments:

\*\*\*\*\*

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
U-238	Not Detected	-----	8.83E+03
TH-234	Not Detected	-----	3.45E+03
RA-226	Not Detected	-----	5.86E+03
PB-214	Not Detected	-----	7.88E+02
BI-214	Not Detected	-----	7.14E+02
TH-232	Not Detected	-----	2.32E+03
RA-228	Not Detected	-----	3.39E+03
AC-228	Not Detected	-----	2.01E+03
TH-228	Not Detected	-----	8.38E+04
RA-224	Not Detected	-----	2.57E+03
PB-212	Not Detected	-----	6.13E+03
BI-212	Not Detected	-----	6.32E+04
TL-208	Not Detected	-----	1.24E+04
U-235	Not Detected	-----	1.60E+03
TH-231	Not Detected	-----	5.69E+04
PA-231	Not Detected	-----	1.54E+04
TH-227	Not Detected	-----	2.64E+03
RA-223	Not Detected	-----	1.00E+26
RN-219	Not Detected	-----	6.69E+03
PB-211	Not Detected	-----	1.51E+04
TL-207	Not Detected	-----	2.73E+05
AM-241	8.38E+04	1.41E+04	1.45E+03
PU-239	Not Detected	-----	2.56E+06
NP-237	Not Detected	-----	1.78E+03
PA-233	Not Detected	-----	6.51E+02
TH-229	Not Detected	-----	1.39E+03

[Summary Report] - Sample ID: : 70124411

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
AG-108m	Not Detected	-----	4.10E+02
AG-110m	Not Detected	-----	1.67E+06
BA-133	Not Detected	-----	7.52E+02
BE-7	Not Detected	-----	2.81E+17
CD-109	3.49E+05	2.27E+05	1.63E+05
CD-115	Not Detected	-----	1.00E+26
CE-139	Not Detected	-----	4.88E+07
CE-141	Not Detected	-----	1.00E+26
CE-144	Not Detected	-----	5.71E+05
CO-56	Not Detected	-----	1.74E+12
CO-57	Not Detected	-----	9.48E+04
CO-58	Not Detected	-----	1.11E+13
CO-60	7.82E+04	1.09E+04	4.07E+02
CR-51	Not Detected	-----	1.00E+26
CS-134	Not Detected	-----	3.16E+03
CS-137	6.94E+04	9.30E+03	3.19E+02
EU-152	Not Detected	-----	7.74E+02
EU-154	Not Detected	-----	3.14E+03
EU-155	Not Detected	-----	2.16E+03
FE-59	Not Detected	-----	4.06E+19
GD-153	Not Detected	-----	6.36E+05
HG-203	Not Detected	-----	2.15E+18
I-131	Not Detected	-----	1.00E+26
IR-192	Not Detected	-----	3.02E+12
K-40	Not Detected	-----	2.03E+03
MN-52	Not Detected	-----	1.00E+26
MN-54	Not Detected	-----	1.04E+05
MO-99	Not Detected	-----	1.00E+26
NA-22	Not Detected	-----	1.63E+03
NA-24	Not Detected	-----	1.00E+26
NB-95	Not Detected	-----	1.00E+26
ND-147	Not Detected	-----	1.00E+26
NI-57	Not Detected	-----	1.00E+26
PB-210	Not Detected	-----	6.69E+04
RU-103	Not Detected	-----	2.60E+21
RU-106	Not Detected	-----	3.48E+05
SB-122	Not Detected	-----	1.00E+26
SB-124	Not Detected	-----	6.17E+14
SB-125	Not Detected	-----	7.17E+03
SN-113	Not Detected	-----	1.31E+09
SR-85	Not Detected	-----	1.04E+14
TA-182	Not Detected	-----	4.01E+09
TA-183	Not Detected	-----	1.00E+26
TC-99m	Not Detected	-----	1.00E+26
TL-201	Not Detected	-----	1.00E+26
XE-133	Not Detected	-----	1.00E+26
Y-88	Not Detected	-----	1.52E+09
ZN-65	Not Detected	-----	1.21E+06
ZR-95	Not Detected	-----	2.36E+14

\*\*\*\*\*  
 \* Sandia National Laboratories \*  
 \* Radiation Protection Sample Diagnostics Program \*  
 \* Quality Assurance Report \*  
 \*\*\*\*\*

Report Date : 7-19-97 8:52:58 AM  
 QA File : C:\GENIEPC\CAMFILES\LCS1.QAF  
 Analyst : FCD  
 Sample ID : 70124411  
 Sample Quantity : 1.00 Each  
 Sample Date : 11-01-90 12:00:00 PM  
 Measurement Date : 7-19-97 8:39:08 AM  
 Elapsed Live Time : 600 seconds  
 Elapsed Real Time : 605 seconds

Parameter	Mean	1S Error	New Value	< LU : SD : UD : BS >
AM-241 Activity	8.746E-02	2.712E-03	8.380E-02	< :In : : > OF
CS-137 Activity	6.887E-02	1.661E-03	6.936E-02	< : 7/12/97 : >
CO-60 Activity	7.589E-02	2.987E-03	7.755E-02	< : : : >

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

Reviewed by: 7/12/97



**Section 6.2**  
**Gross Alpha and Gross Beta Activity Results**

\*\*\*\*\*  
 Sandia Radiation Protection Sample Diagnostics Program  
 Monday, August 11, 1997 (7:18:01 AM)  
 \*\*\*\*\*  
 LSC Analysis Program - Version: 1.5.010

Batch Number : 70124401  
 Count Protocol : 11  
 Client : E.R SITE 59 (S.YOUNG 6682) 70124401  
 Laboratory ID : 881-2  
 Count Date : 10-Aug-97  
 Protocol Name : H3AB -- SOLID  
 Region of Interest : 20 - 600  
 Count Time : 60 minutes  
 Background cpm : 3.95 +/- .51  
 Background tSIE : 206  
 Background Eff : 1.0338  
 Sample Aliquot : 0.1 gram(s)

DATA REVIEWED

By: JW Date: 8/11/97  
 Checked: [Signature] 8/11/97  
 Approved: [Signature] 8/11/97

Alpha MDA = 5.41E+00 pCi/gram  
 Alpha CL = 2.60E+00 pCi/gram

Alpha Sys. Error : 8.9%  
 Alpha Efficiency : 1.039 - exp(-0.009895\*tSIE^1.178)

Flag Description:

>CL : Result > 2-sigma Error and Result > Critical Level.  
 <CL : Result < 2-sigma Error and Result < Critical Level.  
 @CL : Result < 2-sigma Error and Result > Critical Level.  
 @CL : Result > 2-sigma Error and Result < Critical Level.  
 ERR : Efficiency <= 0.

RPSD ID	Client ID	Alpha Activity							
		volume	cpm	Error	tSIE	Eff	pCi/gram	2s Error	Flag
001	33858-1	1.00E-01	4.12E+00	5.24E-01	237	1.037	7.25E-01	4.57E+00	<CL
002	33861-2	1.00E-01	4.28E+00	5.34E-01	227	1.036	1.45E+00	4.68E+00	<CL
003	33862-2	1.00E-01	4.38E+00	5.41E-01	237	1.037	1.88E+00	4.74E+00	<CL
004	33863-2	1.00E-01	4.52E+00	5.49E-01	231	1.037	2.46E+00	4.83E+00	<CL
005	33865-2	1.00E-01	5.02E+00	5.78E-01	220	1.036	4.64E+00	5.16E+00	@CL
006	33866-2	1.00E-01	5.08E+00	5.82E-01	239	1.037	4.92E+00	5.20E+00	@CL
007	33867-2	1.00E-01	4.75E+00	5.63E-01	241	1.037	3.47E+00	4.98E+00	@CL
008	33868-2	1.00E-01	4.90E+00	5.72E-01	211	1.035	4.14E+00	5.09E+00	@CL
009	33869-2	1.00E-01	4.72E+00	5.61E-01	246	1.037	3.33E+00	4.96E+00	@CL

\*\*\*\*\*  
 Sandia Radiation Protection Sample Diagnostics Program  
 Monday, August 11, 1997 (7:18:02 AM)  
 \*\*\*\*\*  
 LSC Analysis Program - Version: 1.5.010

Batch Number : 70124401  
 Count Protocol : 11  
 Client : E.R SITE 59 (S.YOUNG 6682) 70124401  
 Laboratory ID : 881-2  
 Count Date : 10-Aug-97  
 Protocol Name : H3AB -- SOLID  
 Region of Interest : 12 - 2000  
 Count Time : 60 minutes  
 Background cpm : 40.9 +/- 1.65  
 Background tSIE : 206  
 Background Eff : .8322  
 Sample Aliquot : 0.1 gram(s)

Beta MDA = 2.11E+01 pCi/gram  
 Beta CL = 1.04E+01 pCi/gram

Beta Sys. Error : 6.3%  
 Beta Efficiency : 0.841 - exp(-0.01319\*tSIE<sup>1.104</sup>)

Flag Description:

>CL : Result > 2-sigma Error and Result > Critical Level.  
 <CL : Result < 2-sigma Error and Result < Critical Level.  
 @CL : Result < 2-sigma Error and Result > Critical Level.  
 @CL : Result > 2-sigma Error and Result < Critical Level.  
 ERR : Efficiency <= 0.

RPSD ID	Client ID	volume	cpm	Error	tSIE	Eff	Beta Activity pCi/gram	2s Error	Flag
001	33858-1	1.00E-01	3.99E+01	1.63E+00	237	0.837	-5.38E+00	1.80E+01	<CL
002	33861-2	1.00E-01	4.47E+01	1.72E+00	227	0.836	2.02E+01	1.95E+01	>CL
003	33862-2	1.00E-01	3.83E+01	1.60E+00	237	0.837	-1.37E+01	1.84E+01	<CL
004	33863-2	1.00E-01	4.04E+01	1.64E+00	231	0.836	-2.53E+00	1.79E+01	<CL
005	33865-2	1.00E-01	4.16E+01	1.66E+00	220	0.835	3.67E+00	1.81E+01	<CL
006	33866-2	1.00E-01	3.90E+01	1.61E+00	239	0.837	-1.03E+01	1.82E+01	<CL
007	33867-2	1.00E-01	3.96E+01	1.62E+00	241	0.837	-7.15E+00	1.81E+01	<CL
008	33868-2	1.00E-01	4.03E+01	1.64E+00	211	0.833	-3.14E+00	1.80E+01	<CL
009	33869-2	1.00E-01	3.96E+01	1.62E+00	246	0.838	-7.15E+00	1.81E+01	<CL