

Los Alamos

Environmental Restoration  
Records Processing Facility

LOS ALAMOS NATIONAL LABORATORY

ENVIRONMENTAL RESTORATION  
Records Processing Facility  
ER Records Index Form

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**Los Alamos**  
NATIONAL LABORATORY  
**memorandum**

Waste Site Studies Team  
ESH-19, K490

To/MS Ken Bostick / J495  
Thru/MS Bill Kopp / K490 BK  
From/MS Albert Dye / K490  
Phone/FAX 7-4715/7-5224  
Date September 25, 1996

**SUBJECT: Field Surveys at MDA-P 7/7-15**

Field surveys using a portable XRF spectrometer (metals), an ESP-1 meter (beta/gamma) and a Violinist III meter (low energy gamma) were conducted at MDA-P from July 3 to 15, 1996 by the ESH-19 Waste Site Studies Team. Elevated total barium in surface soils on the top of MDA-P and in the adjacent staging area east was detected at levels above 1000 ppm in roughly one third of the 88 grid locations. Other metals detected less frequently than barium included lead, silver cadmium mercury and antimony. Radiation measurements of the surface soils included some beia/gamma measurements slightly above LANL background values.

**Land Surveying**

The surveys covered the top, relatively level, surface of MDA-P. The coordinates for a 30 X 30 foot grid over MDA-P were calculated using a surveying computer software program. Control points were established using a GPS receiver system. The grid was then staked out using a total station theodolite. The grid points are shown in Figure 1.

**XRF Survey**

A portable Spectrace 9000 XRF spectrometer with the "Soils U, Th and Ag" application was used to take in-situ measurements at 64 grid points on the top surface of MDA-P. The ground surface at each grid point was smoothed and flattened using a stainless steel scoop, any gravel or vegetation was removed and a 60 second count ( for each of the 3 sources) was taken. The measurement data were stored in the unit and downloaded into a laptop computer at the ESH-19 offices. During the field survey, the staging area immediately to the east of MDA-P was found to be under construction. The ground surface had been cleared of vegetation and was ready to be backfilled. An approximate 25 X 25 foot grid was estimated, grid coordinates were land surveyed and XRF measurements were taken at 24 grid points prior to the area being backfilled.

Background for the XRF survey was established by calculating the standard deviation of 10 measurements of a teflon plug using the count time given above. The minimum detection limit (MDL) is set at 3 times the standard deviation of the mean of the background measurements. The minimum quantitation limit (MQL) is set at 10 times the standard deviation of the mean background measurement. Any results less than

OCT 09 1996

*LD*

the MDL are reported as "nd" (not detected). Any results equal to or greater than the MDL, but less than the MQL are qualified with a "J" and are estimated values. Results equal to or greater than the MQL are reported as is.

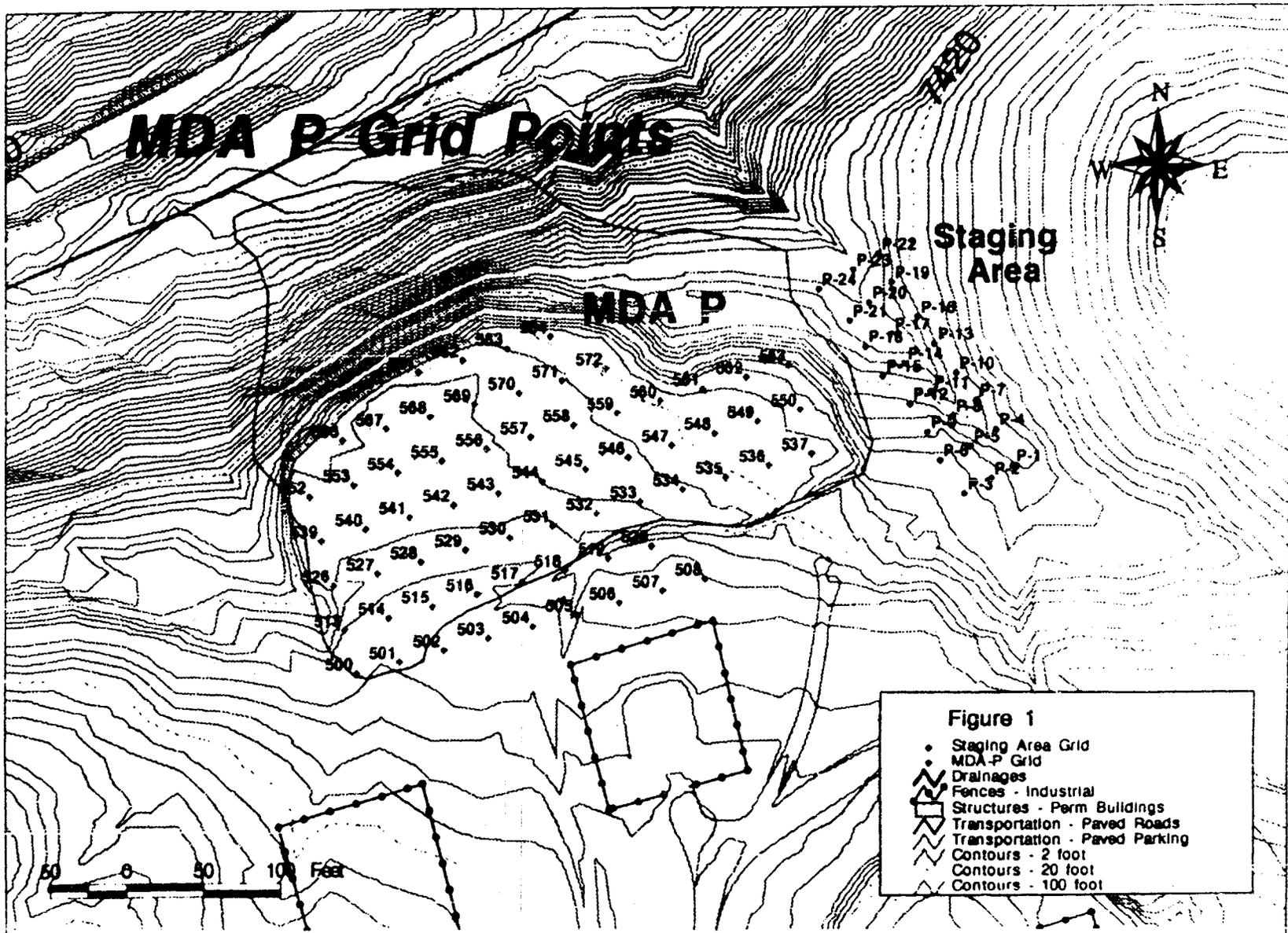
The results are shown in the attached table 1. Iso-concentration contours for barium are shown in figure 2 and on the attached FIMAD map. As can be noted, elevated barium levels were found in the surface soils with highest levels in the eastern "lobe" of MDA-P. Barium ranged from < 400 ppm to 27,000 ppm with a mean of 2200 ppm. Elevated levels of cadmium and silver were detected at the southwest corner of MDA-P (Grid point 500) and elevated antimony, lead and mercury levels were found at the north rim of MDA-P (Grid point 581). Point 500 was next to a steel fence post and there were strands of wire (possibly galvanized) on the ground, which may have influenced the measurement. Point 581 was in a pile of ashes, broken glass and metal debris. The difference in the matrix material found at this grid point may have also influenced the reported metals concentrations. The XRF data at this time should be considered as qualitative data. Nevertheless, the XRF spectrometer should prove to be a useful tool for quickly determining elevated metals, particularly barium, during the closure activities at MDA-P.

#### **Rad Survey**

Violinist and ESP-1 measurements were taken at each of the grid points over MDA-P. Violinist measurements were also taken at the center of each of the grid cells. These results are shown in Tables 2 and 3. A background Violinist survey at MDA-P has not been performed. However, the Violinist measurements taken at the MDA-P grid appear to be within background levels found at other technical areas at LANL. For the beta/gamma survey, the background levels at LANL using the ESP-1 meters average around 250 cpm. Beta/gamma levels slightly above the LANL average background were measured in the eastern and northern sections of MDA-P. A follow-up beta/gamma survey of the grid points will be conducted in the near future.

AD

cc Dave McInroy, EM/ER, MS M992  
Richard Romero, ESH-19, MS K490  
RPF, MS M707



**Figure 1**

- Staging Area Grid
- MDA-P Grid
- ~ Drainages
- ⌘ Fences - Industrial
- ⌘ Structures - Perm Buildings
- ⌘ Transportation - Paved Roads
- ⌘ Transportation - Paved Parking
- ~ Contours - 2 foot
- ~ Contours - 20 foot
- ~ Contours - 100 foot

# MDA P

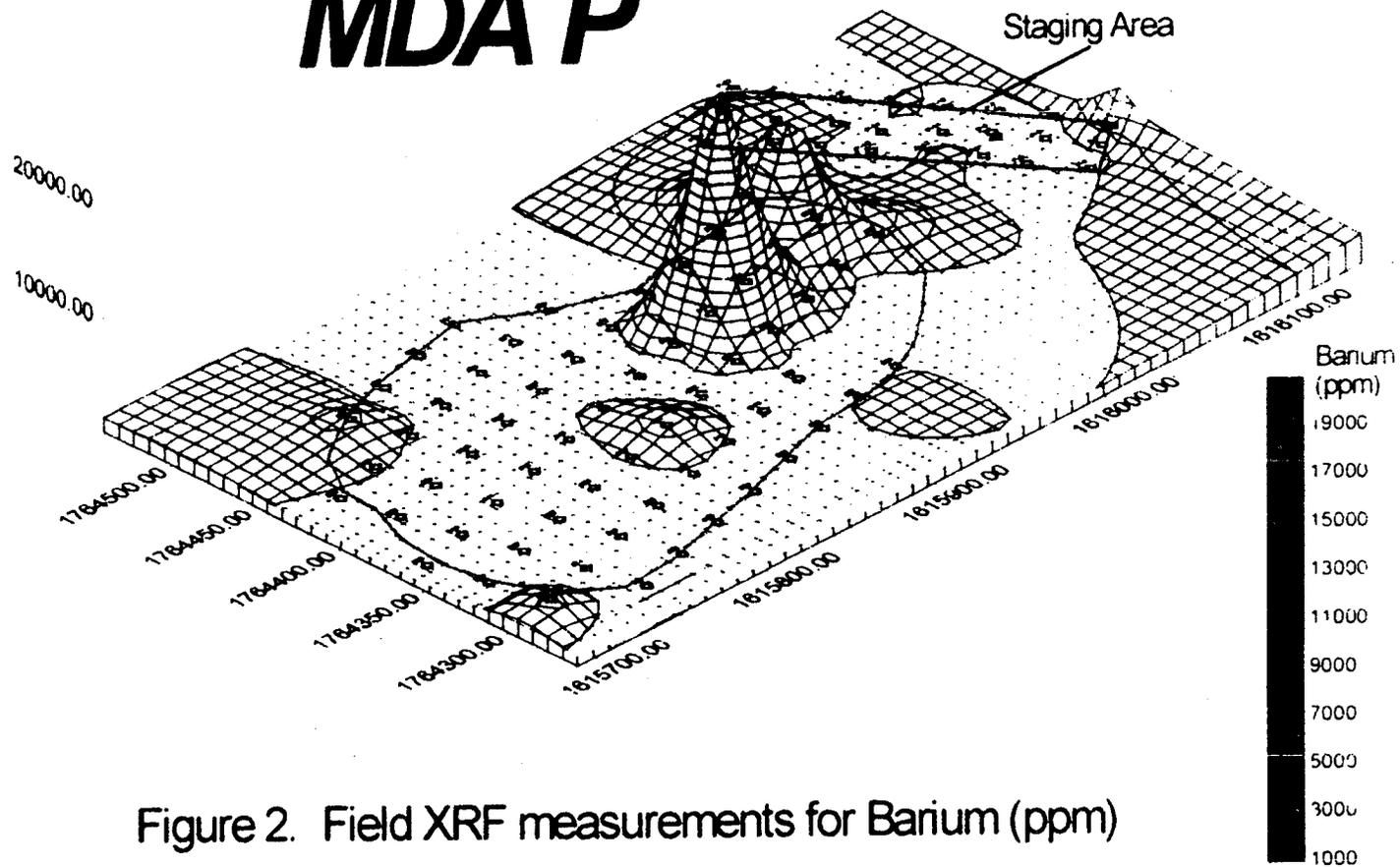


Figure 2. Field XRF measurements for Barium (ppm)

Table 1 XRF Results

	Ag	As	Ba	Cd	CrHI	CrLO	Hg	Ni	Pb	Sb	Se	U
MQL ppm->	328	369	67	553	3688	1547	435	875	223	140	188	101
MDL ppm->	98	111	20	166	1106	464	130	262	67	42	56	30

MDA-P Grid

"500"	2878	nd	nd	2362	nd	nd	nd	nd	nd	nd	nd	nd
"500"	3612	nd	21J	3411	nd	nd	nd	nd	nd	nd	nd	nd
"501"	nd	nd	343	nd	nd	nd	nd	nd	nd	nd	nd	nd
"502"	nd	nd	426	nd	nd	nd	nd	nd	nd	nd	nd	nd
"503"	nd	nd	666	nd	nd	nd	nd	nd	nd	nd	nd	nd
"504"	nd	nd	776	nd	nd	nd	nd	nd	nd	nd	nd	nd
"505"	nd	nd	472	nd	nd	nd	nd	nd	nd	nd	nd	nd
"506"	nd	nd	841	nd	nd	nd	nd	nd	nd	nd	nd	nd
"507"	nd	nd	1154	nd	nd	nd	nd	nd	nd	nd	nd	nd
"508"	nd	nd	1121	nd	nd	nd	nd	nd	nd	nd	nd	nd
"513"	nd	nd	2564	nd	nd	nd	nd	nd	nd	nd	nd	nd
"514"	nd	nd	423	nd	nd	nd	nd	nd	nd	nd	nd	nd
"515"	nd	nd	597	nd	nd	nd	nd	nd	nd	nd	nd	nd
"516"	nd	nd	475	nd	nd	nd	nd	nd	nd	nd	nd	nd
"517"	nd	nd	622	nd	nd	nd	nd	nd	nd	nd	nd	nd
"518"	nd	nd	356	nd	nd	nd	nd	nd	nd	44J	nd	nd
"519"	nd	nd	341	nd	nd	nd	nd	nd	nd	nd	nd	nd
"520"	nd	nd	748	nd	nd	nd	nd	nd	nd	nd	nd	nd
"526"	nd	nd	565	nd	nd	nd	nd	nd	nd	nd	nd	nd
"527"	nd	nd	592	nd	nd	nd	nd	nd	nd	nd	nd	nd
"528"	nd	nd	613	nd	nd	nd	nd	nd	nd	nd	nd	nd
"528"	nd	nd	614	nd	nd	nd	nd	nd	nd	nd	nd	nd
"529"	nd	nd	373	nd	nd	nd	nd	nd	nd	nd	nd	nd
"530"	nd	nd	917	nd	nd	nd	nd	nd	nd	nd	nd	nd
"531"	nd	nd	3043	nd	nd	nd	nd	nd	nd	nd	nd	nd
"532"	nd	nd	808	nd	nd	nd	nd	nd	nd	nd	nd	nd
"533"	nd	nd	925	nd	nd	nd	nd	nd	76J	nd	nd	nd

Table 1 XRF Results

	Ag	As	Ba	Cd	CrHI	CrLO	Hg	Ni	Pb	Sb	Se	U
MQL ppm->	328	369	67	553	3688	1547	435	875	223	140	188	101
MDL ppm->	98	111	20	166	1106	464	130	262	67	42	56	30

"534"	nd	nd	1620	nd	nd	nd	nd	nd	nd	nd	nd	nd
"535"	nd	nd	2278	nd	nd	nd	nd	nd	nd	nd	nd	nd
"536"	nd	nd	810	nd	nd	nd	nd	nd	nd	nd	nd	nd
"537"	nd	nd	3610	nd	nd	nd	nd	nd	nd	nd	nd	nd
"539"	nd	nd	553	nd	nd	nd	nd	nd	nd	nd	nd	nd
"540"	nd	nd	596	nd	nd	nd	nd	nd	nd	nd	nd	nd
"541"	nd	nd	505	nd	nd	nd	nd	nd	nd	47J	nd	nd
"542"	nd	nd	469	nd	nd	nd	nd	nd	nd	nd	nd	nd
"543"	nd	nd	422	nd	nd	nd	nd	nd	nd	nd	nd	nd
"544"	nd	nd	1514	nd	nd	nd	nd	nd	70J	nd	nd	nd
"545"	nd	nd	436	nd	nd	nd	nd	nd	nd	nd	nd	nd
"546"	nd	nd	1154	nd	nd	nd	nd	nd	nd	nd	nd	nd
"547"	nd	nd	23065	nd	nd	663J	nd	nd	nd	88J	nd	nd
"547"	nd	nd	26739	nd	nd	nd	nd	nd	nd	86J	nd	nd
"548"	nd	nd	3105	nd	nd	nd	nd	nd	nd	nd	nd	nd
"549"	nd	nd	14701	nd	nd	nd	nd	nd	nd	80J	nd	nd
"550"	nd	nd	2781	nd	nd	nd	nd	nd	nd	nd	nd	nd
"551"	nd	nd	13709	nd	nd	nd	nd	nd	nd	53J	nd	nd
"552"	nd	nd	455	nd	nd	nd	nd	nd	nd	nd	nd	nd
"553"	nd	nd	880	nd	nd	nd	nd	nd	nd	43J	nd	nd
"554"	nd	nd	530	nd	nd	nd	nd	nd	nd	nd	nd	nd
"555"	nd	nd	562	nd	nd	nd	nd	nd	nd	nd	nd	nd
"556"	nd	nd	514	nd	nd	nd	nd	nd	nd	nd	nd	nd
"557"	nd	nd	808	nd	nd	nd	nd	nd	nd	75J	nd	nd
"558"	nd	nd	462	nd	nd	nd	nd	nd	nd	nd	nd	nd
"559"	nd	nd	713	nd	nd	nd	nd	nd	nd	nd	nd	nd
"560"	nd	nd	1005	nd	nd	nd	nd	nd	nd	nd	nd	nd
"561"	nd	nd	1269	nd	nd	nd	nd	nd	nd	nd	nd	nd

Table 1 XRF Results

	Ag	As	Ba	Cd	CrHI	CrLO	Hg	Ni	Pb	Sb	Se	U
MQL ppm->	328	369	67	553	3688	1547	435	875	223	140	188	101
MDL ppm->	98	111	20	166	1106	464	130	262	67	42	56	30

"562"	nd	nd	8807	nd	nd	nd	nd	nd	nd	45J	nd	nd
"563"	nd	nd	3519	nd	nd	nd	nd	nd	nd	105J	nd	nd
"563"	nd	nd	1693	nd	nd	nd	nd	nd	nd	nd	nd	nd
"566"	nd	nd	677	nd	nd	nd	nd	nd	nd	nd	nd	nd
"567"	nd	nd	908	nd	nd	nd	nd	nd	nd	nd	nd	nd
"568"	nd	nd	781	nd	nd	nd	nd	nd	102J	nd	nd	nd
"569"	nd	nd	708	nd	nd	nd	nd	nd	nd	nd	nd	nd
"570"	nd	nd	598	nd	nd	nd	nd	nd	nd	nd	nd	nd
"571"	nd	nd	756	nd	nd	nd	nd	nd	70J	nd	nd	nd
"572"	nd	nd	963	nd	nd	nd	nd	nd	nd	nd	nd	nd
"581"	272J	nd	2435	nd	nd	nd	1124	486J	1563	454	144J	nd
"582"	nd	nd	463	nd	nd	nd	nd	nd	nd	nd	nd	nd
"583"	nd	nd	359	nd	nd	nd	nd	nd	nd	nd	nd	nd
"584"	nd	nd	552	nd	nd	nd	nd	nd	nd	nd	nd	nd
<b>Stage Grid</b>												
"P1"	nd	nd	5888	nd	nd	nd	nd	nd	nd	55J	nd	nd
"P2"	nd	nd	981	nd	nd	nd	nd	nd	nd	nd	nd	nd
"P3"	nd	nd	1092	nd	nd	nd	nd	nd	nd	nd	nd	nd
"P4"	nd	nd	1006	nd	nd	nd	nd	nd	nd	nd	nd	nd
"P5"	nd	nd	386	nd	nd	nd	nd	nd	nd	nd	nd	nd
"P6"	nd	nd	341	nd	nd	nd	nd	nd	nd	nd	nd	nd
"P7"	nd	nd	643	nd	nd	nd	nd	nd	nd	nd	nd	nd
"P8"	nd	nd	1212	nd	nd	nd	nd	nd	nd	nd	nd	nd
"P9"	nd	nd	389	nd	nd	nd	nd	nd	nd	nd	nd	nd
"P10"	nd	nd	423	nd	nd	nd	nd	nd	nd	nd	nd	nd
"P11"	nd	nd	637	nd	nd	nd	nd	nd	nd	nd	nd	nd
"P12"	nd	nd	1561	nd	nd	nd	nd	nd	nd	nd	nd	nd
"P13"	nd	nd	1278	nd	nd	nd	nd	nd	nd	nd	nd	nd
"P14"	nd	nd	590	nd	nd	nd	nd	nd	nd	nd	nd	nd

Table 1 XRF Results

	Ag	As	Ba	Cd	CrHI	CrLO	Hg	Ni	Pb	Sb	Se	U
MQL ppm->	328	369	67	553	3688	1547	435	875	223	140	188	101
MDL ppm->	98	111	20	166	1106	464	130	262	67	42	56	30

"P15"	nd	nd	484	nd	nd	nd						
"P16"	nd	nd	628	nd	nd	nd						
"P17"	nd	nd	1089	nd	nd	nd						
"P18"	nd	nd	844	nd	nd	nd						
"P19"	nd	nd	1090	nd	nd	nd						
"P20"	nd	nd	1235	nd	nd	nd						
"P21"	nd	nd	1676	nd	nd	nd	nd	nd	nd	44J	nd	nd
"P22"	nd	nd	712	nd	nd	nd						
"P23"	nd	nd	2252	nd	nd	nd						
"P24"	nd	nd	2046	nd	nd	nd						

Table 2. Violmist Survey Results

Date	Probe #	Grid ID	Pu ( $\mu\text{Ci}/\text{m}^2$ )	Am ( $\mu\text{Ci}/\text{m}^2$ )	ROI 3 (count/100 sec)
7/8/96	129	500	0	0.640	1300
7/8/96	129	501	0	0.640	1340
7/8/96	129	502	0	0.618	1280
7/8/96	129	503	0	0.618	1290
7/8/96	129	504	0	0.618	1320
7/8/96	129	505	0	0.640	1360
7/8/96	129	506	0	0.574	1180
7/8/96	129	507	0	0.552	1270
7/8/96	129	508	0	0.574	1200
7/10/96	130	513	0	0.695	1050
7/10/96	130	514	0	0.808	976
7/10/96	130	515	0	0.789	943
7/8/96	129	516	0	0.640	1260
7/8/96	129	517	0	0.618	1350
7/8/96	129	518	0	0.640	1330
7/8/96	129	519	0	0.618	1260
7/8/96	129	520	0	0.596	1270
7/10/96	129	526	0	0.685	1420
7/10/96	129	527	0	0.662	1330
7/10/96	129	528	0	0.662	1380
7/10/96	129	529	0	0.685	1380
7/10/96	129	530	0	0.707	1530
7/10/96	129	531	0	0.640	1510
7/10/96	129	532	0	0.707	1420
7/10/96	129	533	0	0.662	1420
7/10/96	129	534	0	0.618	1310
7/10/96	129	535	0	0.618	1350
7/10/96	129	536	0	0.685	1410
7/10/96	129	537	0	0.574	1460
7/10/96	130	539	0	0.770	1000
7/10/96	130	540	0	0.751	956
7/10/96	130	541	0	0.789	873
7/10/96	130	542	0	0.789	957
7/10/96	130	543	0	0.845	1040
7/10/96	130	544	0	0.808	994
7/10/96	130	545	0	0.789	926
7/10/96	130	546	0	0.733	1100
7/10/96	130	547	0	0.413	1140
7/10/96	130	548	0	0.695	956
7/10/96	130	549	0	0.432	983
7/10/96	130	550	0	0.695	1060
7/10/96	129	552	0	0.685	1440
7/10/96	129	553	0	0.618	1360
7/10/96	129	554	0	0.618	1310
7/10/96	129	555	0	0.640	1260
7/10/96	129	556	0	0.685	1420
7/10/96	129	557	0	0.707	1410
7/10/96	129	558	0	0.707	1500
7/10/96	129	559	0	0.596	1340

Table 2 Violinist Survey Results

Date	Probe #	Grid ID	Pu ( $\mu\text{Ci}/\text{m}^2$ )	Am ( $\mu\text{Ci}/\text{m}^2$ )	ROI 3 (counts/100 sec)
7/10/96	129	560	0	0.685	1410
7/10/96	129	561	0	0.662	1560
7/10/96	129	562	0	0.464	1440
7/10/96	129	563	0	0.618	1540
7/10/96	130	566	0	0.733	969
7/10/96	130	567	0	0.733	1020
7/10/96	130	568	0	0.733	901
7/10/96	130	569	0	0.751	961
7/10/96	130	570	0	0.714	925
7/10/96	130	571	0	0.751	940
7/10/96	130	572	0	0.770	977
7/10/96	130	581	0	0.394	585
7/10/96	130	582	0	0.770	920
7/10/96	130	583	0	0.751	965
7/10/96	130	584	0	0.733	945
<b>Center of Grid Cell Measurements</b>					
7/15/96	129	Cell-500	0	0.685	1490
7/15/96	130	Cell-501	0	0.808	1080
7/15/96	129	Cell-502	0	0.662	1400
7/15/96	130	Cell-503	0	0.827	999
7/15/96	129	Cell-504	0	0.685	1420
7/15/96	130	Cell-505	0	0.827	1010
7/15/96	129	Cell-506	0	0.640	1420
7/15/96	129	Cell-514	0	0.729	1420
7/15/96	130	Cell-515	0	0.808	1040
7/15/96	129	Cell-516	0	0.685	1450
7/15/96	130	Cell-517	0	0.883	1080
7/15/96	129	Cell-518	0	0.585	1480
7/15/96	130	Cell-519	0	0.827	1110
7/15/96	130	Cell-520	0	0.808	1040
7/15/96	129	Cell-527	0	0.640	1340
7/15/96	129	Cell-528	0	0.640	1390
7/15/96	130	Cell-529	0	0.845	1120
7/15/96	129	Cell-530	0	0.729	1420
7/15/96	130	Cell-531	0	0.827	1070
7/15/96	129	Cell-532	0	0.707	1480
7/15/96	130	Cell-533	0	0.808	1010
7/15/96	129	Cell-534	0	0.530	1460
7/15/96	130	Cell-535	0	0.413	1050
7/15/96	129	Cell-536	0	0.574	1320
7/15/96	130	Cell-537	0	0.507	1130
7/15/96	129	Cell-540	0	0.662	1320
7/15/96	130	Cell-541	0	0.789	983
7/15/96	129	Cell-542	0	0.618	1320
7/15/96	130	Cell-543	0	0.808	1080
7/15/96	129	Cell-544	0	0.662	1410
7/15/96	130	Cell-545	0	0.827	1100
7/15/96	129	Cell-546	0	0.662	1280
7/15/96	130	Cell-547	0	0.620	974

Table 2 Victimist Survey Results

Date	Probe #	Grid ID	Pu ( $\mu\text{Ci}/\text{m}^2$ )	Am ( $\mu\text{Ci}/\text{m}^2$ )	ROI 3 (count/100 sec)
7/15/96	129	Cell-548	0	0.574	1430
7/15/96	130	Cell-549	0	0.714	1050
7/15/96	129	Cell-550	0	0.375	1530
7/15/96	129	Cell-554	0	0.618	1240
7/15/96	130	Cell-555	0	0.789	969
7/15/96	130	Cell-556	0	0.808	1000
7/15/96	130	Cell-557	0	0.827	1140
7/15/96	130	Cell-558	0	0.845	1070
7/15/96	129	Cell-559	0	0.574	1220
7/15/96	129	Cell-560	0	0.618	1360
7/15/96	129	Cell-567	0	0.662	1520
7/15/96	130	Cell-568	0	0.827	1050
7/15/96	129	Cell-569	0	0.640	1310
7/15/96	130	Cell-570	0	0.845	1080
7/15/96	129	Cell-571	0	0.662	1340
7/15/96	130	Cell-572	0	0.827	1030

Table 3  
MDA-P  
Beta / Gamma

Date	Grid ID	$\beta$ - $\gamma$ (cpm)
7/3/96	500	221
7/3/96	501	188
7/3/96	502	212
7/3/96	503	204
7/3/96	504	212
7/3/96	505	237
7/3/96	506	217
7/3/96	508	242
7/3/96	509	352
7/3/96	510	221
7/3/96	513	206
7/3/96	514	225
7/3/96	515	271
7/3/96	516	204
7/3/96	517	237
7/3/96	518	250
7/3/96	519	233
7/3/96	520	192
7/3/96	528	202
7/3/96	527	173
7/3/96	528	269
7/3/96	529	237
7/3/96	530	321
7/3/96	531	231
7/3/96	532	239
7/3/96	533	306
7/3/96	534	210
7/3/96	535	365
7/3/96	536	433
7/3/96	537	206
7/3/96	539	181
7/3/96	540	212
7/3/96	541	225
7/3/96	542	208
7/3/96	543	210
7/3/96	544	217
7/3/96	545	217
7/3/96	546	210
7/3/96	547	229
7/3/96	548	212
7/3/96	549	240
7/3/96	550	319
7/3/96	551	277
7/8/96	552	227
7/8/96	553	183
7/8/96	554	267
7/8/96	555	215
7/8/96	558	246
7/8/96	557	404
7/8/96	558	427
7/8/96	559	402
7/8/96	560	354
7/8/96	561	689
7/8/96	562	239
7/8/96	563	271
7/8/96	566	290
7/8/96	567	177
7/8/96	568	188
7/8/96	569	212
7/8/96	570	210
7/8/96	571	442
7/8/96	572	252
7/8/96	582	221
7/8/96	583	462
7/8/96	584	158

# Media Place Holder Target

This target represents media that was not microfilmed. The original media can be obtained through the Records Processing Facility.

ER ID # 55227

Box # \_\_\_\_\_

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Record Type: Map

Date: 07/22/96

Symbol: Finad Plot Id: G-104941

Subject:

State Plane Coordinate System, New Mexico  
Central Zone. Grid Provides NM  
State Plane Coordinates in feet.  
Sample XRF Field Measure for  
Barium.