TA 42

Preliminary Draft

OU 1129 Accelerated Characterization at Former TA-42 in Support of Construction Validation Project at Los Alamos National Laboratory (LANL)

September 1993

2509

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1.0 INTRODUCTION

This report describes the results of the activities performed as part of an accelerated characterization to evaluate contamination at the former site of Technical Area (TA)-42. This accelerated characterization was conducted for construction validation of the Nuclear Safeguards Technology Laboratory (NSTL), which is to be constructed at the former site of TA-42. All activities described herein were conducted for and funded by the NSTL program sponsors, N Division and ENG Division. Department of Energy Albuquerque (DOE-AL) used the results of this investigation for construction validation. The results will be incorporated into the overall Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) characterization report for Operable Unit (OU) 1129.

Sampling activities were conducted under the guidelines described in the *RFI Work Plan for Operable Unit 1129* (LANL 1992, 0785) (hereafter referred to as the Work Plan). The environmental setting is described in Chapter 2; description of the Potential Release Sites (PRSs) at former TA-42 can be found in Chapter 3, Section 3.4; the conceptual model is detailed in Chapter 4; and the technical approach in Chapter 5. The sampling and analysis plan (SAP) (which describes the approach used in this characterization) was revised, and is included as Appendix E in the Work Plan. This investigation was conducted to support an institutionally-driven accelerated characterization.

TA-42 was the former site of a radioactive waste incinerator facility that operated from 1951 to 1952. From 1956 to 1969, it was used as an area for storage and decontamination of equipment. The facilities were decommissioned and the site decontaminated in 1978. The following PRSs, which resulted from the operations at the site, were included in this investigation:

- 42-001(a), former location of an incinerator;
- 42-001(b and c), former location of two ash storage tanks;
- 42-002(a), former location of a building used as an indoor storage and decontamination area;
- 42-002(b), a former outdoor decontamination area; and
- 42-003, former location of a septic tank and tile field.

2.0 PREVIOUS DATA

Data collected at the site before this investigation came from two sources: the Environmental Surveillance Group's study of the site after D&D activities in 1978, and a reconnaissance study performed by Environmental Protection Group (EM-8) in 1991. This data was used to develop the revised sampling and analysis plan (Appendix E of the Work Plan).

2.1 Environmental Surveillance Group's Study

Final gross-alpha contamination measurements from soil samples taken after the D&D activities in 1978 (Harper and Garde 1981, 0591) are shown in Table 1.

TABLE 1

RESULTS OF ENVIRONMENTAL SURVEILLANCE GROUP'S STUDY AFTER D&D

Location	Number of Samples with Gross-Alpha Below 25 pCi/g	Values (in pCi/g) for Samples with Gross-Alpha Activity Greater than 25 pCi/g
Former Building Area	60	29
Septic Tank Area	Unknown	none
Tile Field	17	31 35 44 99 45
Excavation Under the Tile Field Drain	8	65 78 87 310 418
Canyon Wall Below the Tile Field Outfall	14	29 36 40

The Harper and Garde (1981, 0591) report states: "Because of the low levels of contamination and the safety hazards associated with any further excavation, the Environmental Surveillance Group considered the area decontaminated to as low as reasonably achievable (ALARA). After concurrence from the Laboratory's Health Division Office and the Los Alamos, New Mexico, Area Office of the U.S. Department of Energy the area was contoured and revegetated to minimize erosion."

2.2 EM-8 Reconnaissance Study

At the request of the construction leader from the Project Management Group (ENG-1), EM-8 performed a reconnaissance survey in January 1991. The OU 1129 technical team used the analytical results from samples that EM-8 collected as Phase I results to design the sampling and analysis plan (Appendix E of the Work Plan) for this accelerated characterization at former TA-42. Table 2 contains results for ^{238}Pu, and $^{239,240}Pu$ for the near-surface samples (surface to 3-5 ft depth). The near surface became important because the construction activities would impact it, and because, if contamination was found to be present, it would be were the path to receptors would originate. Table 3 contains analytical results for the samples (near surface and subsurface) that EM-8 investigated. Figure 1 shows the location of the reconnaissance samples, which have the prefix "PF," and Figure 2 shows the corresponding cross-section.

TABLE 2

1991 RECONNAISSANCE RESULTS FOR NEAR-SURFACE SAMPLING AT FORMER TA-42

Borehole	Sample Depth (feet)	pCi/g		pCi/g		Pb TCLP (ppm)
		^{238}Pu	Uncertainty	$^{239,240}Pu$	Uncertainty	
PF-IB1	0-5	0.0004	0.0009	0.015	0.026	11.4
PF-IB2	0-5	0.003	0.001	0.0554	0.0047	0.05
PF-HT2	0-5	0.002	0.002	0.0179	0.0036	< 0.01
PF-HT3	0-5	0.0012	0.0007	0.0205	0.0031	0.04
PF-CDA	0-5	0.0036	0.0009	0.0014	0.0006	0.17
PF-PLN	0-5	0.0012	0.0008	0.006	0.001	0.01
PF-PLM	0-5	0.009	0.002	0.0148	0.0021	< 0.01
PF-PLS	0-5	0.006	0.001	0.0151	0.0018	0.34

3.0 OU 1129 SAMPLING ACTIVITIES

Three methods were used for sampling. A hand auger was used to collect fill material, soil, and nonwelded tuff in the near surface from 0 to 6 ft. A power-assisted hand auger was used to collect fill material, soil, and nonwelded tuff in the subsurface from 5 to 11 ft. Subsurface samples from 10 to 30 ft were collected with a hollow-stem auger drill. Table 4 shows the samples collected and sample depths. Figure 1 shows the locations of samples collected.

TABLE 3

ANALYTICAL RESULTS FROM RECONNAISSANCE SAMPLING AT FORMER TA-42

Sample No.[a, b]	PCBs[c] (g/g)	Pb[d] (mg/L)	VOCs[e]	SVOCs[e]	^{238}Pu (pCi/g)	^{239}Pu (pCi/g)	Total U (g/g)	^{137}Cs (pCi/g)
PF-IB1-0	< 0.05	11.4	NTCF	NTCF	0.0004	0.015	3.58	0.0883
PF-IB1-5	< 0.05	0.29	NTCF	NTCF	0.007	0.0002	3.44	0.176
PF-IB2-0	< 0.05	0.05	NTCF	NTCF	0.003	0.0554	3.5	0.0944
PF-IB2-5	< 0.05	0.03	NTCF	NTCF	0.0003	0.000	3.76	0.193
PF-HT2-0	1.02	< 0.01	NTCF	NTCF	0.002	0.0179	3.85	0.169
PF-HT-2-5	0.4	0.04	NTCF	NTCF	0.009	0.0628	3.76	0.0643
PF-HT2-10	< 0.05	< 0.01	NTCF	NTCF	0.0006	0.0013	3.7	0.236
PF-HT3-0	0.08	0.04	NTCF	NTCF	0.0012	0.0205	3.65	0.245
PF-HT3-5	0.11	< 0.01	NTCF	NTCF	0.0035	0.0086	3.13	0.241
PF-HT3-10	< 0.05	0.04	NTCF	NTCF	0.0016	0.0292	3.6	0.238
PF-CDA-0	< 0.05	0.17	NTCF	NTCF	0.0036	0.0014	1.86	0.0643
PF-ST-10	< 0.05	2.2	NTCF	NTCF	0.015	0.151	4.17	0.143
PF-ST-15	< 0.05	0.45	NTCF	(see note f)	2.48	4.77	5.2	0.0579
PF-ST-20	< 0.05	< 0.01	NTCF	NTCF	0.155	0.40	3.34	0.0239
PF-ST-25	< 0.05	< 0.01	NTCF	NTCF	0.016	0.0032	3.9	0.463
PF-PLN-0	0.52	0.01	NTCF	(see note g)	0.0012	0.006	3.7	0.0662
PF-PLM-0	0.12	< 0.01	NTCF	NTCF	0.009	0.0148	3.44	0.272
PF-PLS-0	< 0.05	0.34	NTCF	NTCF	0.006	0.0151	2.47	0.16

a. Last number on sampling site identifier indicates the depth of sampling in feet.

b. PF = Philip Fresquez (sample collector), ST = septic tank, HT = holding tank, PLS = parking lot south, PLM = parking lot middle, PLN = parking lot north, IB = incinerator building, CDA = canyon disposal area.

c. Action level for PCBs is 50 g/g (or ppm).

d. TCLP metals analyzed for included Hg, As, Se, Ag, Ba, Cd, Cr, and Pb. All other TCLP metals were below action levels except for a sample that contained Pb above action levels; therefore, only Pb results are shown.

e. No target compound found (NTCF).

f. Eight SVOCs were detected in this sample. Seven of the eight were polyaromatic hydrocarbons (PAHs). Although these hydrocarbon compounds are carcinogen hazards in volatile forms (Sax and Lewis 1987), they are all common constituents in paving (asphalt) and roofing tar (coal tar pitch) materials (Windholz 1983). The soil sample collected at the 15-ft level was fill material, thus the PAHs detected in this soil sample were probably from a piece of asphalt or paving tar, a nonhazardous material (nonsoluble and nonvolatile) in its present form. The other SVOC detected is bis-2-ethyl-hexylphthalate, but at trace amounts (400 ppb).

g. This sample contained a trace amount of bis-2-ethyl-hexylphthalate (400 ppb). This amount is below the EPA action-level guideline of 83 ppm.

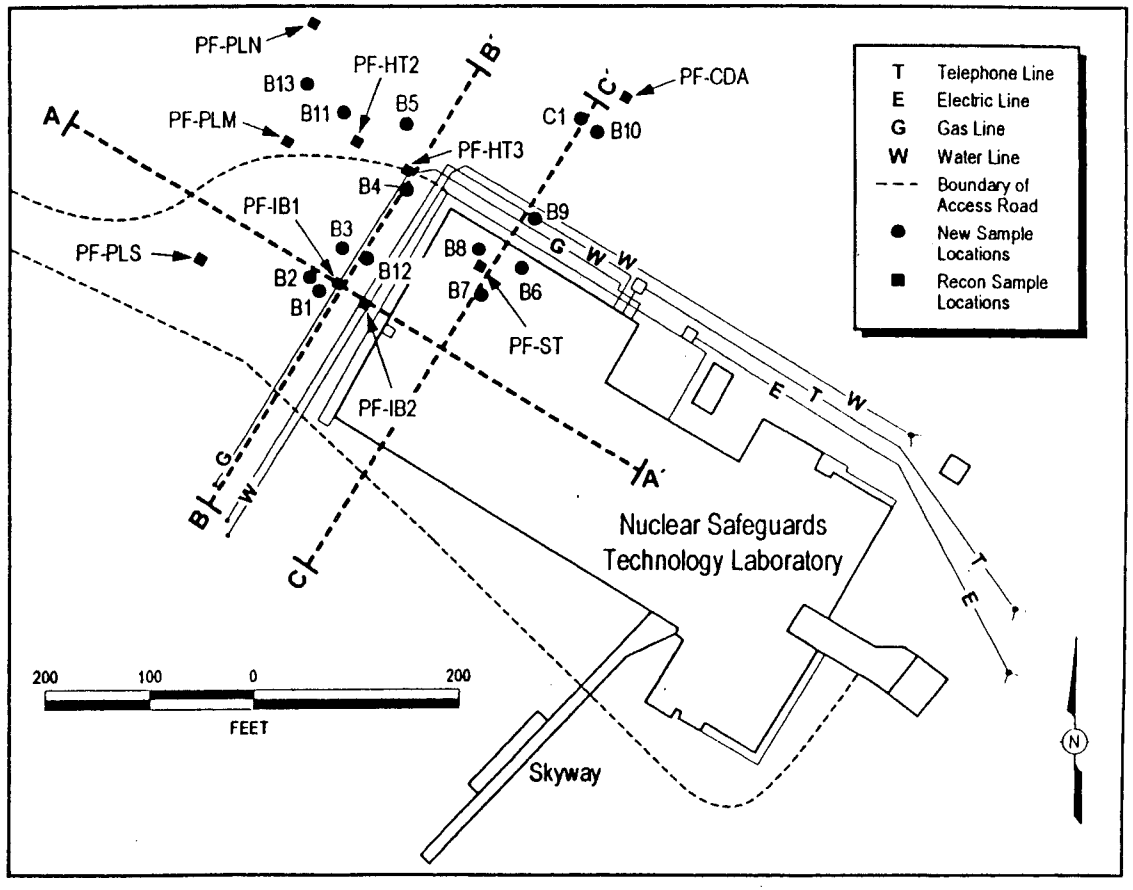


FIG 1 / TA 42_RPT / 092893

Figure 1. Nuclear Safeguards Technology Laboratory (proposed) with sample points, borehole locations, and cross sections.

PRELIMINARY DRAFT

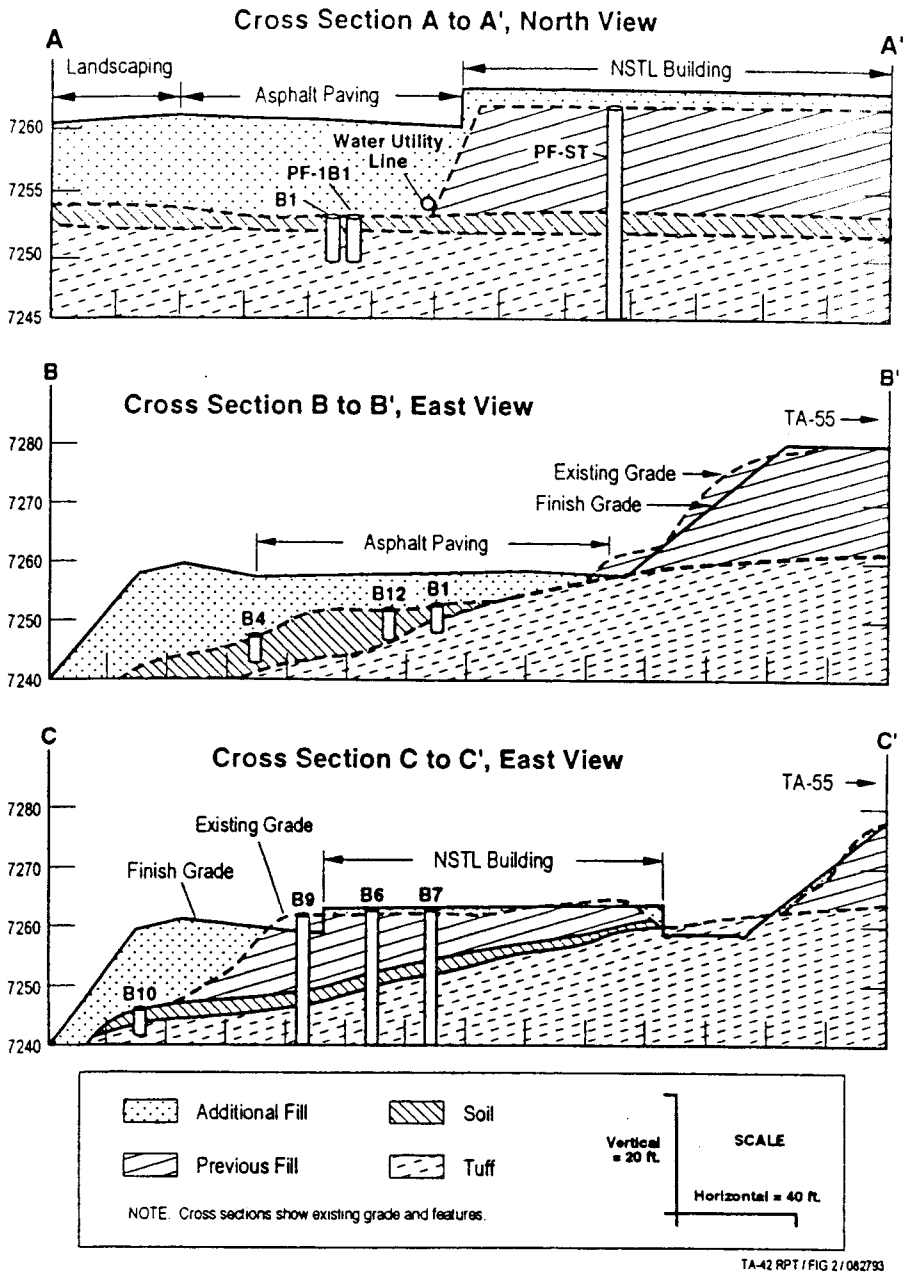


Figure 2. Cross section through former TA-42 site showing existing grade and finished grade after the proposed NSTL building is completed. A) north view; B) east view; and C) east view.

TABLE 4

SAMPLING SUMMARY FOR TA-42

Location (FIMAD No.)	Sample Designation	Depth of Samples Collected (feet)	Minimum Amount of Sample Collected		
			Screening	INC-12	EM-9
B_1 (42-1021)	B-1-1 B-1-2	0-1.8 1.8-2.4	500 g/ea	125 g/ea	125 g/ea
B_2 (42-1022)	B-2-1 B-2-2	0-2.6 2.6-3.5	500 g/ea	125 g/ea	125 g/ea
B_3 (42-1023)	B-3-1 B-3-2	0-3 3-4.75	500 g/ea	125 g/ea	125 g/ea
B_4 (42-1025)	B-4-1 B-4-2	0-2.2 2.2-5.25	500 g/ea	125 g/ea	125 g/ea
B_5 (42-1027)	B-5-1 B-5-2	0-3 3-6	500 g/ea	125 g/ea	125 g/ea
B_6 (42-1028)	B-6-1 B-6-1D B-6-2 B-6-3 B-6-C2	10-15 10-15 15-20 20-25 25-28	500 g/ea	125 g/ea	125 g/ea
B_7 (42-1029)	B-7-1 B-7-2 B-7-3	10-15 15-20 20-25	500 g/ea	125 g/ea	125 g/ea
B_8 (42-1030)	B-8-1 B-8-1D B-8-2 B-8-3 B-8-C3	10-15 10-15 15-20 20-25 25-28	500 g/ea	125 g/ea	125 g/ea
B_9 (42-1031)	B-9-1 B-9-2 B-9-3	10-17 17-22 22-27	500 g/ea	125 g/ea	125 g/ea
B_{10} (42-1032)	B-10-1 B-10-2 B-10-3	0-5 5-7 7-11	500 g/ea	125 g/ea	125 g/ea
B_{11} (42-1026)	B-11-1 B-11-2	0-3 3-6	500 g/ea	125 g/ea	125 g/ea
B_{12} (42-1024)	B-12-1 B-12-2	0-3 3-5	500 g/ea	125 g/ea	125 g/ea
B_{13} (42-1034)	B-13-1 B-13-2	0-3 3-6	500 g/ea	125 g/ea	125 g/ea

3.1 Sampling Techniques

Near surface samples were taken with a hand auger. The auger was used to bore and collect unconsolidated materials in 6 to 12 in. intervals. The auger was pulled when full, and the sample placed in a decontaminated pan. Augering continued until the top 3 ft of soil was collected, or when the soil-tuff contact was encountered (Table 4 shows the actual sample depths). When the soil-tuff contact was reached, the sample was homogenized and splits from the composite taken for Isotope and Nuclear Chemistry (INC)-12 analysis (125 g); alpha, beta, and gamma screening (500 g); and for the Health and Environmental Chemistry Group (EM-9) analysis (125 g). A custody record was completed on the Chain-of-Custody/Request for Analysis Form, and a sample label affixed to the sample containers. A complete description of the sample was documented in the Borehole Log Form.

Hand-auger subsurface samples were also collected in the interval below the soil-tuff contact. After the contact was encountered and the near-surface samples collected, the equipment was decontaminated. Augering on the same hole continued below the contact in the nonwelded tuff until the auger could no longer be turned, or when a 3-ft interval was collected. The sample was handled in the same manner as near-surface samples.

A power-assisted auger was used to collect samples near the tile drain field. The targeted depths were 0 to 5, 5 to 10, and 10 to 15 ft, however the actual depths collected were 0 to 5, 5 to 7, and 7 to 11 ft. The first 5 ft was collected with a hand auger. The second interval was also attempted with the hand auger, and when the 7-ft level was reached, the hand auger could no longer be turned. At that point, the 2-ft interval that was drilled with the hand auger was collected. The power-assisted auger was used to collect the 7- to 11-ft interval. The auger bit, by turning, brought the sample up to the surface for collection.

Subsurface samples gathered at intervals between 10 and 30 ft were collected by drilling with a hollow-stem auger and split spoon. The split spoon is a 5-ft core barrel that can be opened to remove the sample. The top 10 ft of fill was not sampled. Coring started at 10 ft, and samples were collected at every 5-ft interval.

3.2 Sampling Locations

Sampling locations were selected to bound the extent of contaminants detected during the reconnaissance study of 1991, and in locations in which construction activities may impact

residual contamination around the NSTL structures or utility lines (Figure 1). The locations were surveyed after sampling was conducted so that the exact coordinates would be documented.

Sample B-10 was moved from the planned location in the SAP (Appendix E of the Work Plan) because the tile drain field was not found on the first try. A second hole was augered to find the location of the former structure. The soil from the abandoned hole was collected as a contingency sample (Figure 1).

4.0 RESULTS

4.1 Stratigraphy of the Site

Schematic cross sections were constructed using the information collected during drilling and augering, and also showing the grade that the site will be finished to after the proposed NSTL is constructed, see Figure 2. Figure 1 shows the location of the cross sections. In addition, detailed core logs of samples drilled using a hollow-stem auger are shown in Figures 3 through 6. These logs have a detailed lithologic description of the core collected, show core losses and qualitative moisture content, and present the analysis requested for each specific interval.

4.2 Screening

The EM-9 mobile laboratory performed alpha, beta, and gamma screening. The minimum detection activity (MDA) in a soil matrix for alpha screening is 63 pCi/g, for beta screening is 24 pCi/g, and for gamma screening is 4 pCi/g. All samples collected were screened before analysis. Gross-alpha, -beta, and -gamma radiation was not detected in any of the samples collected.

4.3 Field Monitoring

Radiation and organic screening was conducted concurrently with the sampling effort. The auger holes and the breathing zone around sample locations were tested for organic vapors every time the auger advanced an interval. Organic screening was done with a Century OVA 128 GC and HNu Photo-ionizer detector. Monitoring for radiation was done on the soil brought up by the hand augers, the cuttings at the drill rig, the core after opening the splits

Figure 3. OU 1129 Geological Log of Hole B6 42-1028
(On following page)

OU1129 GEOLOGICAL LOG

LOS ALAMOS NATIONAL LABORATORY

RCRA SITE CHARACTERIZATION

TA	42	SITEWORK PLAN	OU1129 TA-42	DATE LOGGED	7-21-92
HOLE NO	B6 42-1028	COLLAR ELEV	7262'	PAGE	1 OF 1
CORE SIZE	2 1/2"	TOTAL DEPTH	28'	FTL	GABRIELLA GAINER
METHOD	6 1/2" HOLLOW STEM AUGER	COORDINATES N	1769770 86	GEOLOGIST	JEFF WALTERSCHEID
		E	485077 53		

DEPTH IN FEET	SAMPLE INTERVAL	ANALYSIS REQUESTED: GROSS (Alpha, Beta, Gamma)	GAMMA SPEC	ALPHA SPEC	Pb		DRY/WET: DRY	LOW MOISTURE	MOIST	VERY MOIST	PROFILE	LITHOLOGIC DESCRIPTION AND REMARKS
0												TS Tuff soil, sandy, pebbles mixture, grey in color, 0-2' depth, MOIST
5												TCS Soil/Clay/Tuff mixture, grey to reddish brown, 2-3' depth, MOIST
												NO RECOVERY No Recovery between 3-4 5'
10												TS Soil tuff mix, tan-grey in color, 4-6' depth, MOIST
		X				SAMPLE NO B-6-1 (D)						TCS Soil/Clay/Tuff, dark brown color, mud-clay horizon, 6-8' depth, VERY MOIST
												NO RECOVERY No Recovery between 8-8 5'
15		X	X	X	X	SAMPLE NO B-6-2						TS Soil/Tuff, tan-brown in color, trace to moderate clay, 8 5-10 00 depth, MOIST
20												TUFF Tuff contact in this zone, hard to pick actual contact, 10 00-12 00' depth, VERY MOIST
		X				SAMPLE NO B-6-3						CLAY Zone of clay and roots, orange color, 12 00-12 5' depth, moderately MOIST
25												TUFF Soft tan-brown, no competence, 12 5-13 00' depth, MOIST
						SAMPLE NO B-6-C-2						TUFF Soft tan-brown, 13 00-15 00'. depth, MOIST
30						28' TOTAL DEPTH NOTE No dust at collar or during drilling 23-28' is dry, almost dusty Small amount of dust when tripping out Fill material 0-11'						CLAY Reddish-brown with 30% tuff (soft grey brown) NOTE 1/4" root running down axis of core barrel in clay zone White clay at contact with tuff, 15 00-18 00' depth, VERY MOIST
35												CLAY As above but without the organics, 18 00-20 00' depth, VERY MOIST
40												CLAY 50% clay and 50% soft tuff Tuff is drying out but still very soft and fragile 20 00-22 00' depth The clay is VERY MOIST at contact with tuff
												TUFF Grey, fragile, pumice is visible, 22 00-23 00 depth', LOW MOISTURE.
45												TUFF Grey, edges are dusty, starting to become competent and welded Up to 1" pumice crystals, 23 00-28 00' depth, DRY

Figure 4. OU 1129 Geological Log of Hole B7 42-1029
(On following page)

OU1129 GEOLOGICAL LOG

LOS ALAMOS NATIONAL LABORATORY

RCRA SITE CHARACTERIZATION

TA	42	SITEWORK PLAN	OU1129 TA-42	DATE LOGGED	7-21-92
HOLE NO	B7 42-1029	COLLAR ELEV	7263'	PAGE	1 OF 1
CORE SIZE	2 1/2	TOTAL DEPTH	28 5'	FTL	GABRIELLA GAINER
METHOD	6 1/2 HOLLOW STEM AUGER	COORDINATES	N 1769759 13 E 485077 53	GEOLOGIST	JEFF WALTERSCHEID

DEPTH IN FEET	SAMPLE INTERVAL	GROSS (Alpha, Beta, Gamma)	GAMMA SPEC	ALPHA SPEC	Pb		DRY	LOW MOISTURE	MOIST	VERY MOIST	PROFILE	LITHOLOGIC DESCRIPTION AND REMARKS
0												TS Tuff/soil mixture 60% tuff gravels, 40% silty sand of tuff origin, grey-brown in color Trace clay, 0-3 5' depth, MOIST
5												NO RECOVERY No recovery between 3 5-4 5'depth
												TS Tuff/soil mixture as noted above Slight increase in brown clay, 4 5-6 5'depth, MOIST
												CLAY Clayey soil, brown in color, 6 5-8 5' depth, VERY MOIST
10		X				SAMPLE NO B-7-1						CLAY Brown clay with weathered tuff gravels and soils, 8 5-10 00' depth Note 10 00' tuff contact MOIST
15												TUFF Grey tuff, weakened, but fire core, pumice is evident, "rocky", 10-13 5'depth MOIST
		X	X	X		SAMPLE NO B-7-2						TUFF Competent, grey, not quite dusty, but getting very dry with depth Pumice and quartz crystals Possible PID hit at approximately 14 00-16 00'depth, LOW MOISTURE, 14 00-18 5'depth
20												
		X				SAMPLE NO B-7-3						TUFF Competent, grey, drying out with depth, 18 5-23 5' depth, LOW MOISTURE
25												TUFF Competent, grey, 23 5-25 00' depth, LOW MOISTURE
												TUFF Competent, grey, dusty 25 00-28 5' depth, DRY
30												
35												
40												
50												

28 5' TOTAL DEPTH

NOTES 1) 14'-28 5 Competent tuff 2) Wind is blowing 10-15 MPH and swirling around vehicles Dust was also blowing off auger as they tripped out 3) Fill material 0-approximately 10'

Figure 5. OU 1129 Geological Log of Hole B8 42-1030
(On following page)

OU1129 GEOLOGICAL LOG

LOS ALAMOS NATIONAL LABORATORY

RCRA SITE CHARACTERIZATION

TA	42	SITEWORK PLAN	OU1129 TA-42	DATE LOGGED	7-21-92
HOLE NO	B8 42-1030	COLLAR ELEV	7262'	PAGE	1 OF 1
CORE SIZE	2 1/2	TOTAL DEPTH	28'	FTL	GABRIELA GAINER
METHOD	6 1/2 HOLLOW STEM AUGER	COORDINATES	N 1769778 96 E 485076 86	GEOLOGIST	JEFF WALTERSCHEID

DEPTH IN FEET	SAMPLE INTERVAL	GROSS (Alpha, Beta, Gamma)	GAMMA SPEC	ALPHA SPEC	Pb		DRY	LOW MOISTURE	MOIST	VERY MOIST	PROFILE	LITHOLOGIC DESCRIPTION AND REMARKS
0												TS Soil/Tuff mixture, predominantly fine to medium silty sand with tuff gravels Trace clay, grey in color 0-2'depth, MOIST
5												CLAY Clayey soil with tuff gravels Brown soil, MOIST
												NO RECOVERY No recovery 3-4' depth
10		X				SAMPLE NO B-8-1(0)						CLAY Brown clay, 30% tuff gravels Pieces of asphalt (small pebbles) found at 5 5' Tuff gravels are purple in color with pumice, VERY MOIST, 4-8'depth
												TS Soil tuff mixture, 8-10' depth, MOIST
15		X	X			SAMPLE NO B-8-2						CLAY Brown clay zone at tuff contact, 10-11 50' depth, MOIST
												CLAY Brown clay zone at tuff contact, MOIST
20		X				SAMPLE NO B-8-3						TUFF Grey/tan in color, " rocky", not quite competent, 11 50-13' depth, LOW MOISTURE
25		X	X	X		SAMPLE NO B-8-C-3						TUFF Competent, grey/tan tuff Almost dusty, but still holding moisture Pumice is evident, 15-18' depth, LOW MOISTURE
												TUFF competent, grey/tan color, drying out with depth, 18-23' depth, LOW MOISTURE
30												TUFF Same as above, 23-24' depth, LOW MOISTURE
												TUFF Competent, grey dusty tuff, lightly welded, 24-28' depth, DRY
35												
40												
45												
50												

28' TOTAL DEPTH
NOTE No dust while drilling, swirling winds(10-15 mph), blowing dust as they tripped out
FILL MATERIAL 0-11'

Figure 6. OU 1129 Geological Log of Hole B9 42-1031
(On following page)

OU1129 GEOLOGICAL LOG

LOS ALAMOS NATIONAL LABORATORY

RCRA SITE CHARACTERIZATION

TA	42	SITEWORK PLAN	OU1129 TA-42	DATE LOGGED	7-21-92
HOLE NO	B9 42-1031	COLLAR ELEV	7260'	PAGE	1 OF 1
CORE SIZE	2 1/2"	TOTAL DEPTH	27'	FTL	GABRIELLA GAINER
METHOD	6 1/2" HOLLOW STEM AUGER	COORDINATES	N 1769796 48 E 485100 34	GEOLOGIST	JEFF WALTERSCHEID

DEPTH IN FEET	SAMPLE INTERVAL	ANALYSIS REQUESTED: GROSS (Alpha, Beta, Gamma)	GAMMA SPEC	ALPHA SPEC	Pb		DRY/WET: DRY	LOW MOISTURE	MOIST	VERY MOIST	PROFILE	LITHOLOGIC DESCRIPTION AND REMARKS
0												TS Tuff/soil mixture, grey No dust produced when collaring 0-1' depth, MOIST
												TUFF Tan block of tuff, 1-1' depth, MOIST
5												TS Soil (70%), tuff(30%) mixture, brown clay visible with depth Grey to reddish brown in color(with increase in clay) Also, holding more moisture with increase in clay, 2-6' depth, MOIST
10												NO RECOVERY No recovery between 6-7' depth
		X	X	X		SAMPLE NO. B-9-1(0)						CLAY Clayey soil, reddish brown in color Tuff pebbles are smaller and decreasing in frequency Clay content has high moisture, 7-12' depth, VERY MOIST NOTE 10.3 to 10.5'- 2 inch rubble zone of asphalt (it is included in the first sample)
15												NO RECOVERY No recovery between 12-15'
		X				SAMPLE NO B-9-2						TUFF Tuff contact (100% Recovery) at 16 ' Actual contact is unknown due to recovery problems 16'- strong clay horizon at contact Tuff is very moist and soft (due to weathering), light brown-grey in color Pumice is evident, 15-17' depth, VERY MOIST
20						SAMPLE NO B-9-3						
25												TUFF Tuff continues, 17-18' depth, MOIST
												CLAY Clay seam, red brown, 18-20' depth, MOIST
												TUFF Tuff, grey, soft, MOIST
30						27' TOTAL DEPTH NOTE No dust during drilling or tripping out Fill material 0-18'						CLAY Clay seam 21-21.50' depth, MOIST
												TUFF Tuff, grey, non welded NOTE losing moisture as color turns light grey to flesh 21.50-22' depth, MOIST
35												TUFF Same as above, 22.00-22.50' depth, MOIST
												CLAY Clay fracture fill (50% Tuff, 50% clay), red brown clay, grey tuff, 22.50-23' depth, MOIST
40												TUFF Tuff, very fragile, non cohesive, light grey to flesh in color non welded Increase in pumice NOTE will probably be dry in plus or minus 10' 23-27' depth, LOW MOISTURE
45												
50												

spoons, and the equipment every time the auger or drill rig advanced an interval. In addition, personnel's shoes and coveralls were checked before leaving the site. Beta and gamma radiation was monitored with an Eberline ESP. Alpha radiation was monitored using an Alpha instrument Model 139.

No radiation was detected above background by the monitoring instruments during sampling. Organic vapors were detected up to 2 ppm in the hole and in several sections in the split-spoon sampler for the auger drill, but they were not detected in the breathing zone. The industrial health technician indicated that the reading was probably the result of the high moisture in the sample or fumes from the drill rig. The samples were high in moisture content but were not saturated.

Field monitoring of fugitive dust in the site was conducted in conjunction with the drill operation. Two high-volume air samplers (HVAS) were set up at the site, one upwind and one downwind of the drill rig. The filter samples were submitted to EM-9 for analysis of gross-alpha, -beta, and -gamma activity, and $^{239,240}Pu$ and ^{241}Am. Results from the HVAS are presented in Table 5.

The ^{238}Pu and $^{239,240}Pu$ concentrations in air filter samples collected downwind of the drilling operation are higher than ^{238}Pu and $^{239,240}Pu$ values in air filter samples collected upwind of the drilling operation. However, the analytical results were less than two sigma from the

TABLE 5

RESULTS OF HIGH-VOLUME AIR SAMPLERS

Analyte	Upwind HVAS		Downwind HVAS	
	Analytical Result (pCi/filter)	Analytical Uncertainty	Analytical Result (pCi/filter)	Analytical Uncertainty
ALPHA	0.09	0.2	0.8	0.2
BETA	1.9	0.3	2.0	0.3
GAMMA	80	80	100	80
^{238}Pu	0.002	0.011	0.015	0.016
$^{239,240}Pu$	0.006	0.01	0.026	0.016
^{241}Am	0.0	0.23	0.01	0.04

nominal result; therefore, the results are not considered detectable (measurable) values. The ^{241}Am concentrations in air filter samples collected downwind were similar to values in air filters collected upwind of the drilling operation.

4.4 INC-12 Analysis

INC-12 provided quick-turnaround analysis of samples collected at the former TA-42 site. Quick-turnaround analyses were needed to proceed with construction validation for the NSTL. Turnaround time for receiving the complete set of analytical results from the contract laboratory was about 14 months. The INC analyses were used to make decisions about the type of remediation needed at the site. INC provided ^{238}Pu, $^{239,240}Pu$, and Pb analyses for a selected suite of samples (Table 6). The limited number of samples were selected on the basis of sample site importance and knowledge gained from the reconnaissance results. Because the INC-12 analyses are not Contract Laboratory Program (CLP) Level III or better, and EPA-approved procedures were not followed, a description of the sample preparation, analyses, and limits of detection follow.

INC-12 personnel prepared the samples for the plutonium analysis. The samples were air dried, pulverized, and placed in a plastic vial from which 0.3- to 5-g samples were weighed. A ^{236}Pu tracer was added to each sample. The samples were completely dissolved with mineral acids and taken to near dryness. The plutonium analysis consisted of a lanthanum fluoride precipitation and two ion-exchange cleanup steps. The purified plutonium fractions were electroplated onto platinum discs and then submitted for counting on solid-state detectors. The counting length was set for 20 hours. The samples were counted three times. The errors for the Pu numbers (Table 6) reflect the counting errors.

A reagent blank was run with each set of 3 to 5 soil samples to establish the detection limit. The average value for the blank is 0.150 pCi (61%) of $^{239,240}Pu$, which probably reflects the Pu contribution from room 415 at INC-12. No ^{238}Pu was seen on the process blanks. The criterion used for setting the limit of detection is the average value (counting or process blank activity) plus 3. Actual sample values have to be greater than this value (99% level) to be reported. For ^{238}Pu, this value is based on the counting statistics only. Only one of six counters showed any background activity in the ^{238}Pu alpha region. The detection limit for ^{238}Pu is estimated at about 0.04 pCi for this counter. For the remaining five counters the activity observed was assumed to be ^{238}Pu. For $^{239,240}Pu$, no activity was observed at this

alpha range in the process blanks. The limit of detection is based on the average of five process blanks and is ~0.42 pCi.

INC-12 personnel also prepared samples for Pb analysis. The samples (~0.5 g) analyzed for Pb were dissolved in mineral acids. They were taken to near dryness and then diluted to volume. The samples were analyzed using Ion Coupled Plasma-Mass Spectroscopy. A process blank was also run through the procedure in which a contribution from Pb was observed and subtracted from the sample values. Method detection limits for Pb are estimated at about 5 ppm.

Results of the INC-12 analyses are presented in Table 6. Results are given by sample and borehole for each depth sampled. Samples reported as less than (<) values are below the detection level of the instrument. The value provided in these cases is based only on counting statistics. Toxicity characteristic leaching procedure (TCLP) equivalents were calculated using a worst case scenario in which it is assumed that all of the Pb present is leachable.

On the basis of this data, OU 1129 personnel proposed that the site be recommended for no further action (NFA). This preliminary data showed contaminant of concern levels that were below screening action levels, and that most of the NSTL building foundation would not overlap the former foot print of the incinerator facility (see map in Appendix B). The parking lot of the proposed NSTL would be the only structure covering the former incinerator facility and associated structures. If other (final contract laboratory analysis) data showed elevated concentrations for the contaminants of concern, remediation could still be conducted, because only the parking lot of the future building would need to be removed. With this information, DOE-AL gave ENG Division and N Division a go-ahead with construction validation in October 1992.

4.5 EDXRF Screening

After obtaining the results of the INC-12 analyses, more information was needed to assess the extent of the Pb result in the location of sample PF-IB1, which was collected during the reconnaissance sampling (Table 3). Sampling and energy dispersive x-ray fluorescence (EDXRF) screening at the former site of the incinerator building was conducted. Figure 7 shows the predicted distribution of Pb concentrations using the interpolation technique kriging, and then plotting the predicted concentrations using the software SURFER. The

model calculated an area approximately 5 ft in diameter around the old PF-IB1 sample (Figure 1) in which TCLP concentrations of Pb could be as high as 7.5 mg/L.

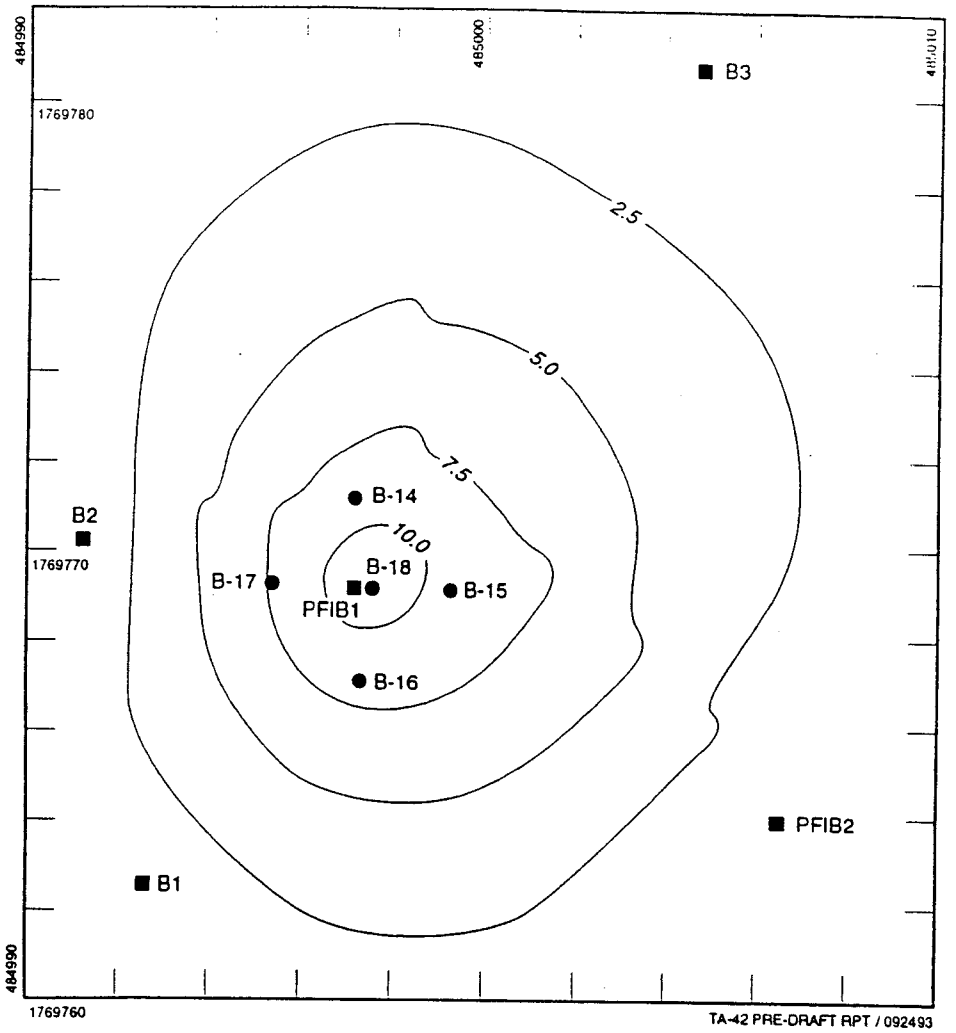
Pb screening and sampling was conducted inside the 7.5-mg/L contour predicted by the model. Figure 1 shows the sample locations that were selected inside this circumference to test the model. Four samples (B-14 to B-17) were taken 2 ft away from the PF-IB1 sample,

TABLE 6

INC-12 ANALYTICAL RESULTS FOR SAMPLING AT FORMER TA-42

Sample Number	Sample Depth (feet)	pCi/g				Total Pb (ppm)	TCLP Equivalent (mg/L)
		^{238}Pu	Error %	$^{239,240}Pu$	Error %		
B-1-1	0-1.8	0.036	8	1.28	6.5	17	0.85
B-2-1	0-2.6	< 0.02	12	0.094	15	< 5	< 0.25
B-2-2	2.6-3.5	< 0.004	1	0.044	11	< 5	< 0.25
B-3-2	3-4.75	0.016	25	1.05	4.8	< 5	< 0.25
B-4-1	0-2.2	0.0067	24	0.110	20	NM[a]	NA[b]
B-4-2	2.2-5.25	< 0.002	2	0.144	0.9	NM	NA
B-5-2	3-6	< 0.004	9	0.165	13	NM	NA
B-6-2	15-20	< 0.06	17	< 0.406	18	NM	NA
B-6 C-2	25-28	< 0.06	9	< 0.29	79	NM	NA
B-7-2	15-20	< 0.01	6	< 0.006	45	NM	NA
B-8-2	15-20	0.067	7	< 0.002	28	NM	NA
B-8 C-3	25-28	< 0.03	9	< 0.17	13	NM	NA
B-9-1	10-17	0.010	20	0.176	12	NM	NA
B-9-2	17-22	< 0.01	3	< 0.003	28	NM	NA
B-10-1	0-5	0.022	19	0.639	14	NM	NA
B-10-3	7-11	0.009	44	< 0.006	24	NM	NA
B-11-1	0-3	0.012	30	0.149	2.9	NM	NA
B-12-1	0-3	< 0.003	5	0.043	11	NM	NA
B-12-2	3-5	0.029	18	0.877	3.0	NM	NA
B-13-1	0-3	< 0.01	2	< 0.002	23	NM	NA

a NM = Not Measured.
b NA = Not Applicable.



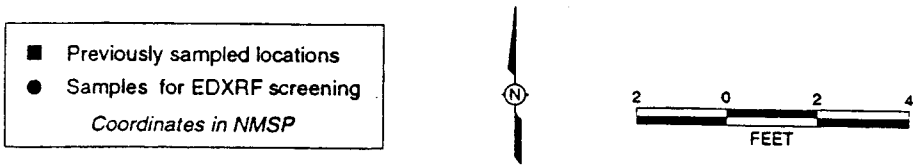


Figure 7. Predicted distribution of lead TCLP concentrations isopleths based on reconnaissance sampling data. Kriging interpolation technique was used.

in cardinal directions (N, S, E, and W). In addition, one sample (B-18) was taken immediately adjacent to the PF-IB1 sample to determine if the 11.4 mg/L (TCLP) Pb in the reconnaissance sample PF-IB1 was from a point source of contamination.

The samples were analyzed with a portable EDXRF instrument. The instrument is a Spectrace 9000 that provides field portable EDXRF analysis. Splits were collected from each 1-ft interval, placed in special 32-mm sample cups, and sealed with 4-micrometer polypropylene x-ray film windows. Total Pb results are shown on Table 7. TCLP maximum potential concentrations were calculated from the total Pb analyses and are included on Table 7. The calculation assumes Pb is 100% leachable from the soil. If TCLP analyses for Pb were performed on these samples, the values would be less than the calculated maximum. The calculation is based on the analytical methodology given in 40 CFR 261, Appendix II, Method 311, in which the solid phase is extracted with an amount of extraction fluid equal to 20 times the weight of the solid phase.

EDXRF analyses did not show Pb concentrations equivalent to or greater than 5 mg/L TCLP; therefore, only five of the samples were submitted to EM-9 for confirmatory contract laboratory analyses. The results of the confirmatory analyses are also shown in Table 7 for comparison. It was demonstrated once the contract laboratory analysis were received, that the EDXRF analysis was very close to the analysis conducted with ICPES by the contract laboratory, making the fast-turnaround technique of EDXRF a good alternative technique for Pb analysis.

This investigation indicated that the most plausible explanations for the 11.4-mg/L (TCLP) Pb analytical result is that the contamination detected during the reconnaissance sampling at the location PF-IB1 was a very localized point source or an analytical error.

4.6 Contract Laboratory Analytical Results

An aliquot of samples collected were submitted to EM-9 for contract laboratory analysis. Not all samples were analyzed for all contaminants of concern, because not all COCs existed at all potential release sites (PRSs). For example, in the case of the confirmatory samples collected for Pb analysis, only 5 of the 16 samples collected were submitted for confirmatory contract laboratory analyses. Table 8 presents results and uncertainty values of the contract laboratory analysis, and shows which samples were analyzed for each COC. Blank spaces under certain analytes represent samples that were not analyzed for that particular COC.

TABLE 7

EDXRF ANALYSIS RESULTS FOR FORMER TA-42 LEAD INVESTIGATION

Sample	Depth in inches	Total Pb by EDXRF (ppm)	TCLP Equivalent* (ppm)	Contract Laboratory Total Pb (ppm)
B-14-1	0-12	8	0.4	
B-14-2	12-24	19	0.95	
B-14-3	24-36	19	0.95	
B-15-1	0-12	12	0.6	
B-15-2	12-24	6	0.3	
B-15-3	24-36	10	0.5	
B-16-1	0-12	12	0.6	
B-16-2	12-24	25	1.25	10.4
B-16-3	24-36	19	0.95	
B-17-1	0-12	19	0.95	
B-17-2	12-24	7	0.35	
B-17-3	24-36	16	0.8	
B-18-1	0-12	19	0.95	12.5
B-18-2	12-24	15	0.75	15.3
B-18-2R	12-24	15	0.75	17.1
B-18-3	24-36	13	0.65	12.4

* Equivalent from EDXRF analyses.

TABLE 8

CONTRACT LABORATORY ANALYTICAL RESULTS

SAMPLE NUMBER	Pu238	unc*	Pu239	unc	Pb	unc	Th228	unc	Th230	unc	Th232	unc	U234	unc	U235	unc	U238	unc	Am241	unc
	pCi/g				mg/kg		pCi/g						pCi/g						pCi/g	
B-1-1	0.0739	0.0244	0.0523	0.0206	14.4	2.88													0.491	0.0352
B-1-1-D					14.5	2.9														
B-1-2	0.2	0.062	0.0839	0.0395	4.3	0.86													0.0657	0.0566
B-2-1					12	2.4														
B-2-2					6.6	1.32														
B-3-1					11.7	2.34														
B-3-2	1.75	0.24	2.24	0.31	28.1	5.62													0.332	0.107
B-4-1	0.438	0.149	0.125	0.08															0.121	0.055
B-4-2	0.289	0.107	0.231	0.098															0.0818	0.0477
B-5-1	0.36	0.146	0.218	0.112															0.0958	0.0558
B-5-2	0.139	0.075	0.511	0.155			1.9	0.49	1.55	0.41	1.53	0.41	0.819	0.28	0.0999	0.0901	0.779	0.226	0.138	0.061
B-6-1																			0.061	0.211
B-6-1-D																			0.0249	0.0490
B-6-2																			0.0862	0.0529
B-6-3																			0.134	0.062
B-6 C-2	0.134	0.09	0.0964	0.0743															0.135	0.057
B-7-1																			0.0707	0.0584
B-7-2																			0.0386	0.0778
B-7-3																			0.0413	0.034
B-8-1																			0.152	0.074
B-8-1-D																			0.292	0.107
B-8-2	0.0838	0.0727	0.0119	0.024															0.327	0.098
B-8-3	0.289	0.105	0.0178	0.0254															0.358	0.112
B-8 C-3	0.147	0.09	0.0793	0.061															0.332	0.087
B-9-1	0.0492	0.0738	0.312	0.159															0.483	0.118
B-9-1-D	0.132	0.07	0.29	0.111															0.748	0.171
B-9-2	0.0238	0.0424	0.0189	0.0378															0.529	0.127
B-9-3	0.332	0.144	0.0553	0.0559															0.342	0.102
B-10-1	0.377	0.171	0.298	0.151															0.103	0.046
B-10-1-D	0.0973	0.0783	0.401	0.152															0.209	0.060
B-10-2																			0.157	0.075
B-10-3																			0.057	0.114
B-11-1	0.389	0.165	0.135	0.102			1.27	0.29	1.1	0.26	1.39	0.3	1	0.43	0	0.105	0.815	0.385	0.107	0.055
B-11-2	0.214	0.108	0.485	0.187															0.227	0.071
B-12-1	0.154	0.091	0.0441	0.0543															0.0804	0.0455
B-12-2																			0.38	0.12
B-13-1	0.0827	0.0719	0.0591	0.0535			2.59	0.81	1.52	0.55	0.91	0.395							0.833	0.184
B-13-2	0.0771	0.07	0	0.0024			1.83	0.69	1.1	0.44	1.46	0.53							0.309	0.09
B-16-2					10.4	NR**														
B-18-1					12.5	NR														
B-18-2					15.3	NR														
B-18-2-R					17.1	NR														
B-18-3					12.4	NR														
C-1-1	0.154	0.102	0.296	0.144															0.105	0.052

* unc = uncertainty

** NR = not reported

5.0 DATA ANALYSIS: INTERPRETATION, MODELS, AND PARAMETERS

Once analytical data was received from the contract laboratory, analyses values for each COC were compared with the screening action level. Table 9 shows the screening action levels compared with the highest concentration measured in samples collected at the site. The concentrations shown in Table 9 are the highest (maximum) concentrations returned from analyses independently of what analytical facility or what method was used to conduct the analysis. None of the samples collected contained concentrations above the screening action level, and in fact, all the COCs are at least an order of magnitude below the screening action level, except for ^{232}Th. The screening action level for ^{232}Th is 0.88 pCi/g; however, the generic limit set in DOE 5400.5 is 15 pCi/g for intervals below 15 cm in depth. The sample containing 1.53 pCi/g was collected at an interval of 3 to 6 ft. So even this value that is above the screening action level published in the LANL Installation Work Plan (to be published November 1993) is an order of magnitude below the limit set by DOE.

TABLE 9

COMPARISON OF SCREENING ACTION LEVELS AND CONCENTRATIONS OF CONTAMINANTS OF CONCERN AT TA-42

Chemical	Soil Screening Action Level [a]	Maximum Concentration at TA-42
Pb	500.0 mg/kg	25. mg/kg
^{241}Am	22.0 pCi/g	0.933 pCi/g
^{238}Pu	27.0 pCi/g	1.75 pCi/g
$^{239,240}Pu$	24.0 pCi/g	2.24 pCi/g
^{230}Th	10.0 pCi/g	1.52 pCi/g
^{232}Th	0.88 pCi/g [b]	1.53 pCi/g
^{234}U	86.0 pCi/g	1.0 pCi/g
^{235}U	18.0 pCi/g	0.0999 pCi/g
^{238}U	59.0 pCi/g	0.815 pCi/g

a. LANL Installation Work Plan (to be published November 1993).

b. Generic limits for ^{232}Th are set in DOE 5400.5 (DOE 1990, 0080) at 5 pCi/g averaged over the first 15 cm of soil and 15 pCi/g averaged over each additional 15 cm interval. The more conservative derived screening action levels are to be used for screening purposes only.

Although all the analytical data concludes that all COCs are below screening action levels, the data was modeled using gridding software to better show the distribution of the COCs at the site. The software package ROCKWORKS was used to perform two- and three-dimensional modeling of the data.

5.1 Two-Dimensional Modeling: Concentration Isopleths

The program GRIDZO was used to construct grids and fit the data using an inverse-distance-weighing algorithm without radial searching, then contouring the data to create isopleths of concentrations for each COC. The inverse-distance-weighing algorithm accommodates clustered data points, and will not exaggerate its extrapolations beyond the given data points. This algorithm was chosen because of the nature of the PRSs. The potential contamination associated with each PRS is independent from the others, so an algorithm that would restrict influences from other clusters of data was the ideal one to use. Appendix C contains tables with the parameters chosen to construct the isopleth maps. The data chosen to construct the two dimensional isopleth maps was the highest concentration measured for a particular COC at each unique XY coordinate (sampling location). That is, if four samples were taken at different depth-intervals at a unique XY coordinate, the highest concentration measured for each COC in any of those samples was selected to construct the contour map. Figures 8 to 11 show isopleth maps constructed for ^{241}Am, ^{238}Pu, ^{239,240}Pu, and Pb.

The areas in which ^{241}Am was found in greater concentrations (Figure 8) was in the northern most section of the outdoor decontamination area (0.9 pCi/g), and in the sample intersecting the line connecting the tile field with the septic tank (0.75 pCi/g). Figures 9 and 10 show how alike ^{238}Pu and ^{239,240}Pu behave; both show similar elevated and lower concentrations in the same areas on the isopleth maps. Elevated concentrations for ^{238}Pu and ^{239,240}Pu were found in the former location of the incinerator. Lead is somewhat uniformly distributed in the site (Figure 11), with values ranging from 4.3 to 28.1 mg/kg. Values for samples that by the Environmental Surveillance group in 1990 (Environmental Protection Group 1992, 0740) collected from canyons all across the laboratory ranged from 20 to 28 mg/kg. Therefore, it can be stated that values for Pb at TA-42 are at background levels.

Figure 8. Predicted concentration isopleths for ^{241}Am at former TA-42

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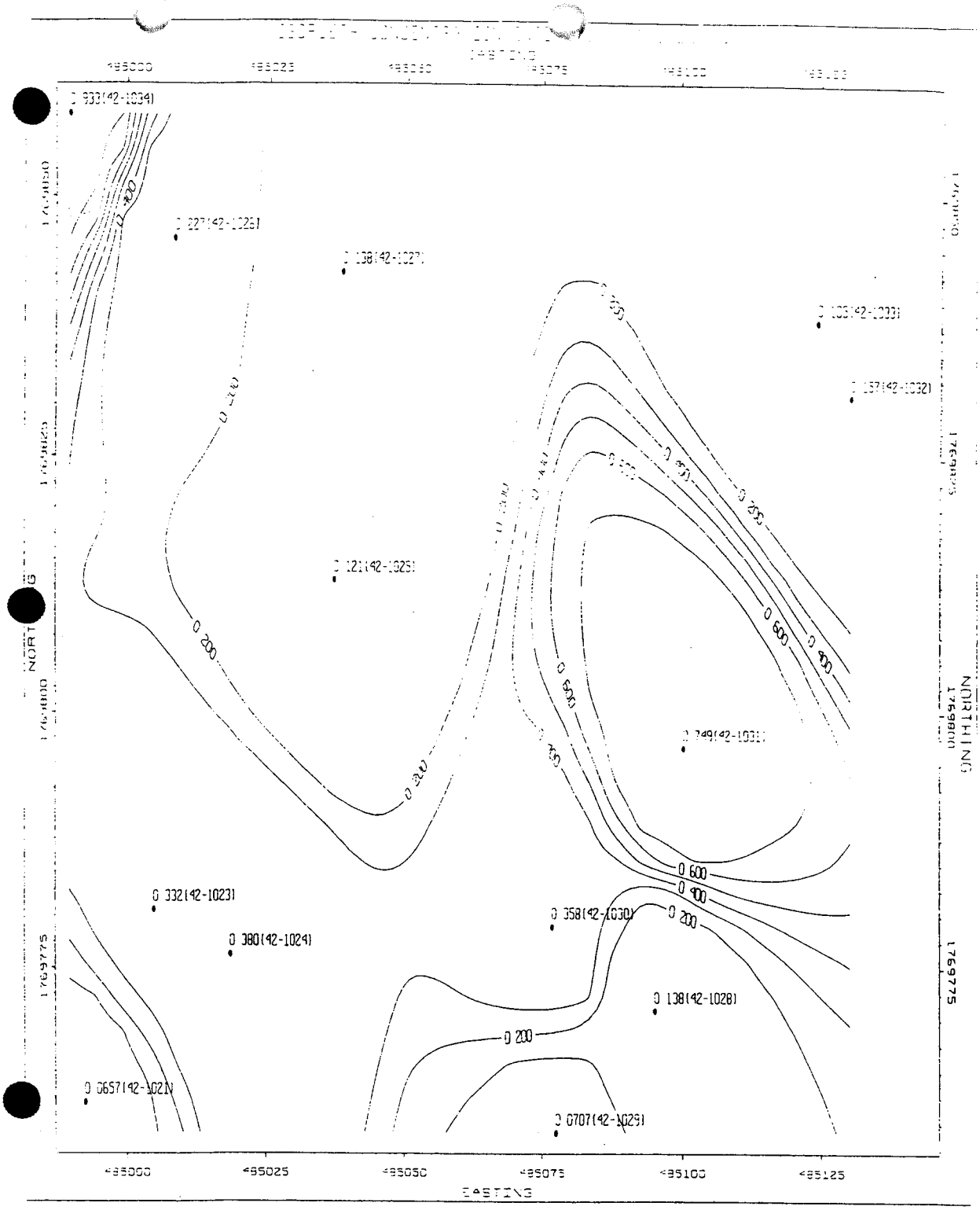
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Figure 9. Predicted concentration isopleths for ^{238}Pu at former TA-42

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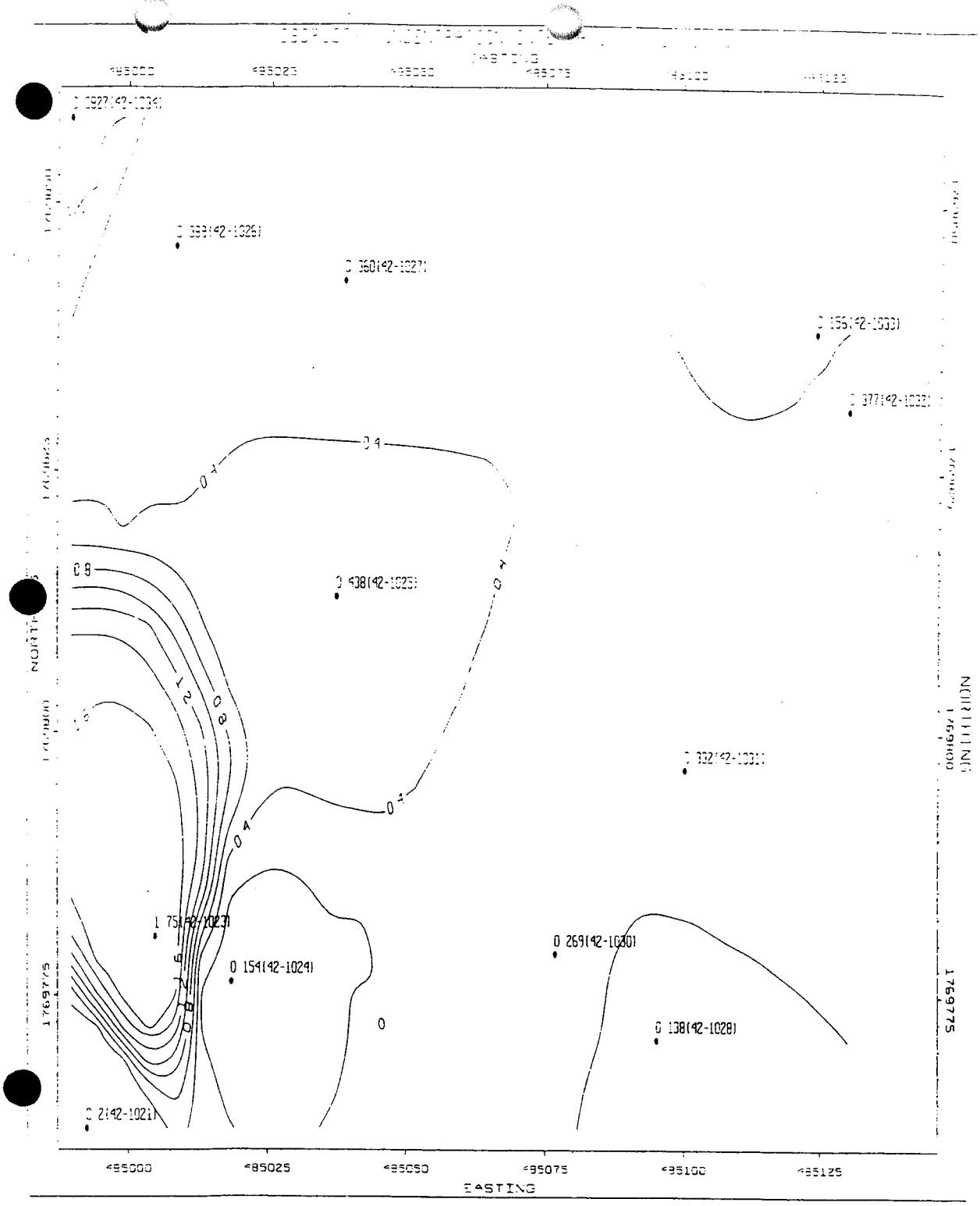
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0 154(42-1024)
0 438(42-1025)
0 332(42-1031)
0 377(42-1032)
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0 383(42-1026)
0 2(42-1021)

Figure 10. Predicted concentration isopleths for $^{239,240}Pu$ at former TA-42

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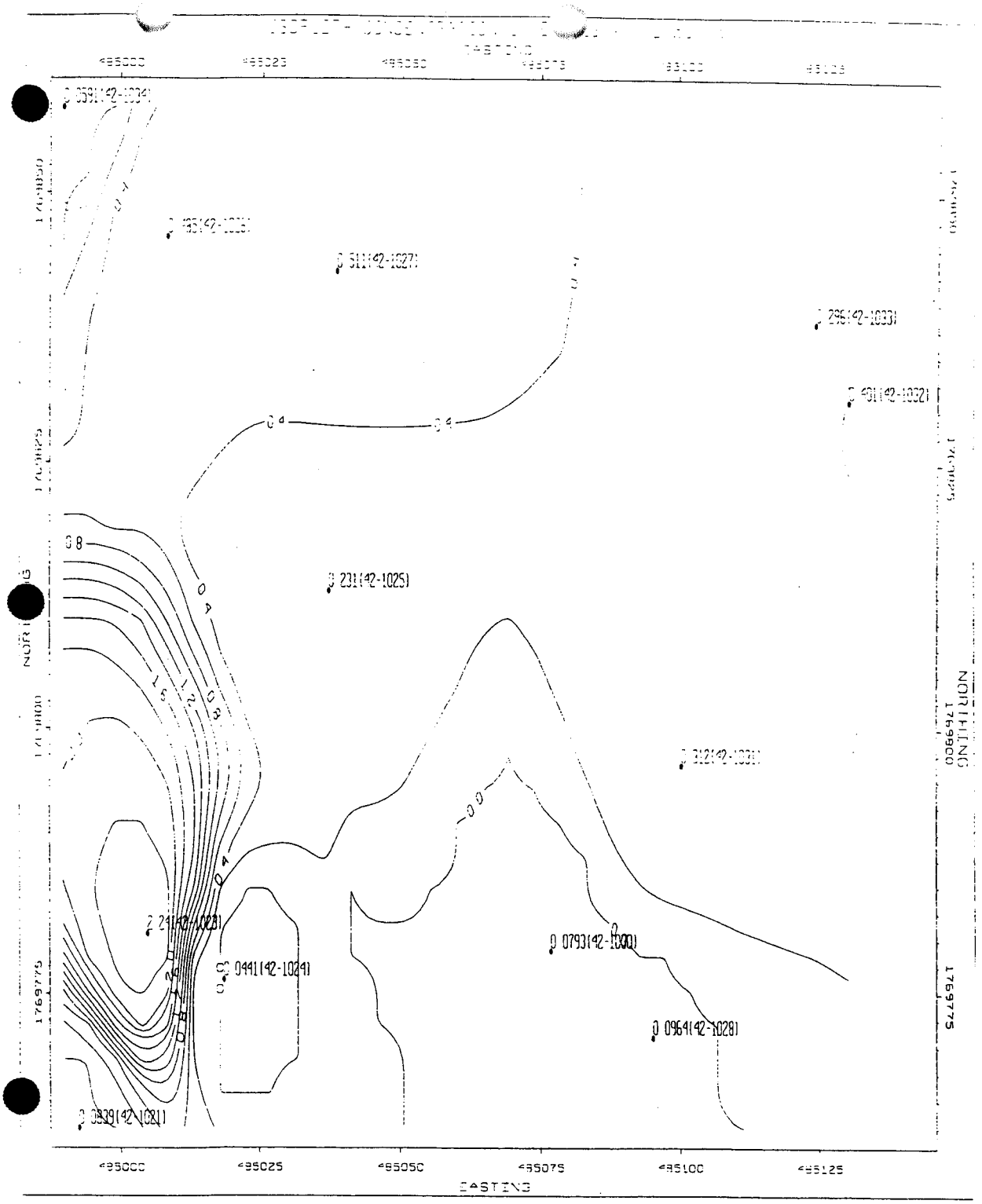
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0.6
0.7
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0.4
0.4
0.4

Figure 11. Predicted concentration isopleths for Pb at former TA-42

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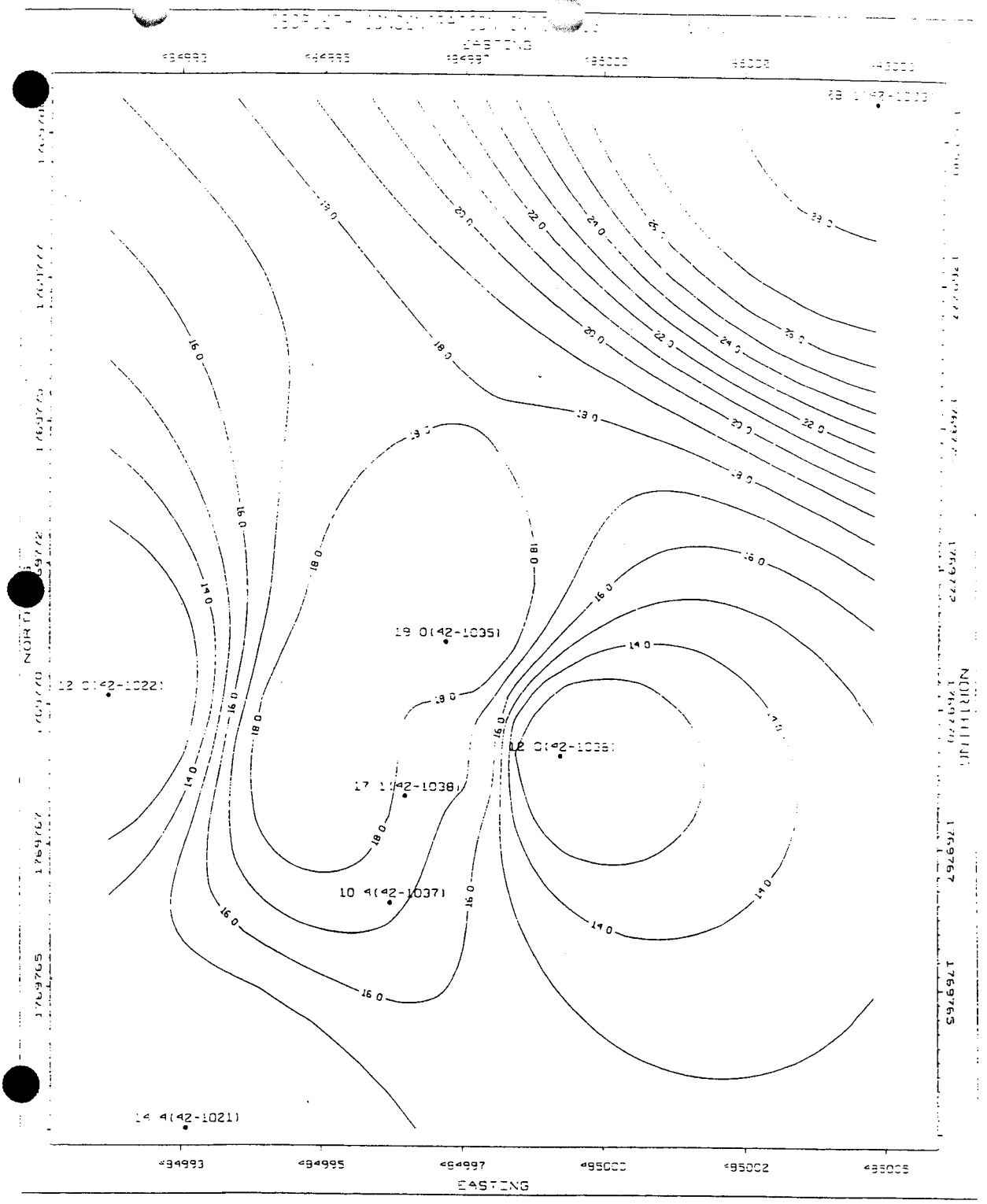
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12 0(42-1036)
17 1(42-1038)
10 4(42-1037)
14 4(42-1021)
16 0
18 0
20 0
22 0
24 0
26 0
14 0

5.2 Three Dimensional Modeling: Block Diagrams

ROCKSOLID was used to construct three-dimensional grids and fit the data using an inverse-distance-squared-with-octant-searching algorithm, then constructing block diagrams that show areas of equal concentration in three dimensions. The inverse-distance modeling method assigns a voxel node value on the basis of the weighted average of the eight closest data points, one point in each of the eight octants surrounding the node. If no point is found in any octant, that octant is left out of the computation. This octant searching approach ensures that clustered data points will not overly influence the value assigned to a voxel node. This model was chosen so that clustered points in the surface (more samples collected near the surface) do not overly influence values assigned to nodes at depth. Appendix C contains tables with the parameter chosen to construct the block diagrams. Block diagrams show exceptionally well the distribution of COCs in three dimensions (Figures 12 to 15).

6.0 QUALITY ASSURANCE AND QUALITY CONTROL

Activities described in this report were conducted following ER Program administrative procedures (APs) and standard operating procedures (SOPs). Procedures used include:

- LANL-ER-AP-02.1, "Procedure for LANL Records Management"
- LANL-ER-SOP-01.01, "General Instructions for Field Investigations"
- LANL-ER-SOP-01.02, "Sample Containers and Preservation"
- LANL-ER-SOP-01.03, "Handling, Packaging, and Shipping of Samples"
- LANL-ER-SOP-01.04, "Sample Control and Field Documentation"
- LANL-ER-SOP-01.05, "Field Quality Control Samples"
- LANL-ER-SOP-01.06, "Management of Field Generated Waste"
- LANL-ER-SOP-06.10, "Hand-Auger and Thin-Wall Tube Sampler"

As part of quality control (QC) to check the operation of the analytical laboratory and to obtain a measure of the quality of the data generated, field duplicate samples were collected to evaluate the reproducibility of the sampling technique. Blind and spiked samples were included with samples to be analyzed, and replicate analysis were performed by the contract laboratory, which help to evaluate analytical procedures. Equipment rinsate blanks and bottle blanks or field blanks were collected and submitted for every 20 samples or per sampling event (a sampling event is defined as one day of sampling). These blanks were collected to evaluate decontamination and other sampling handling procedures. Results of QC samples are shown in Table 10.

Figure 12. Block diagram of former TA-42 showing distribution of ^{241}Am concentrations in pCi/g.

(On following page)

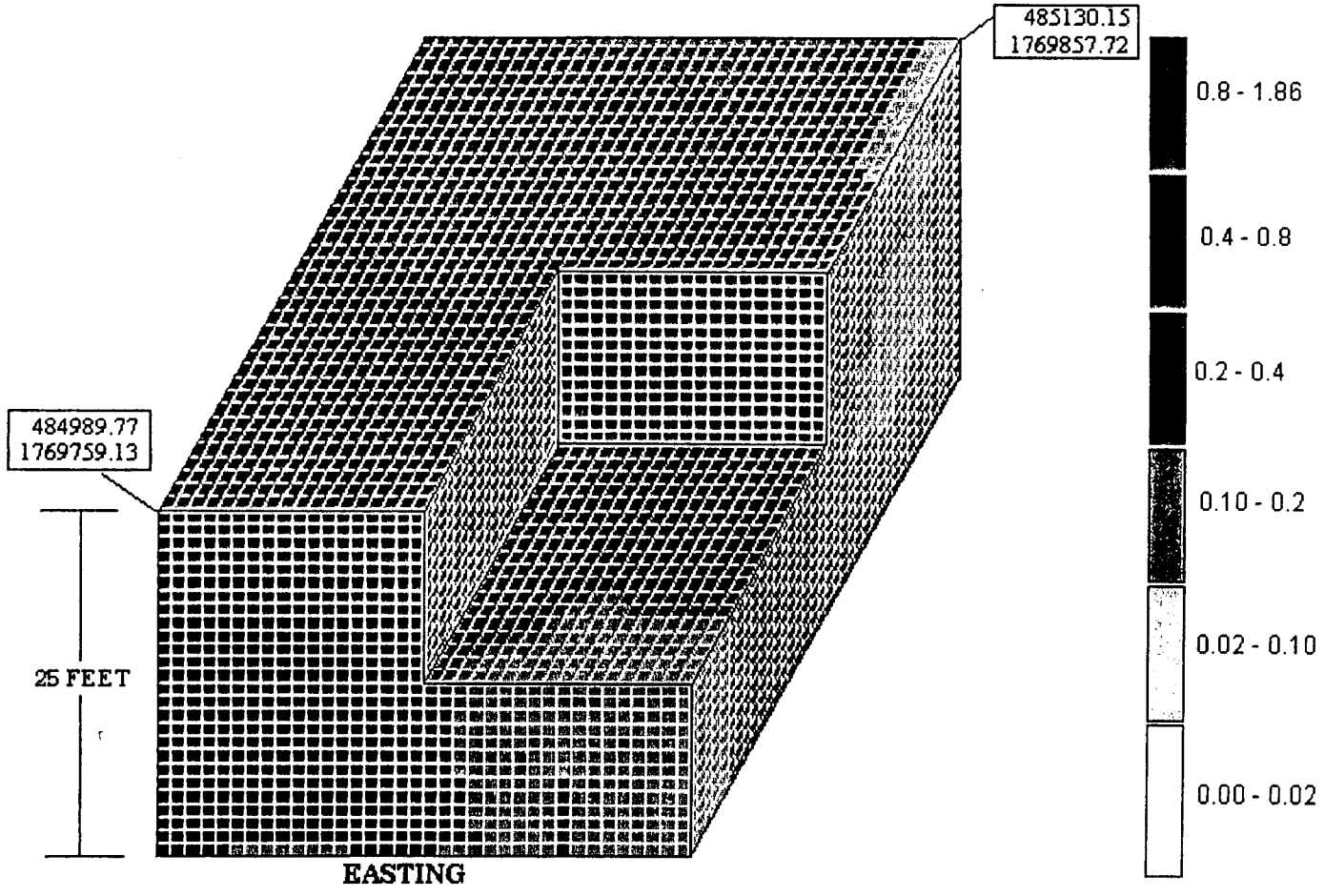
485130.15
1769857.72
484989.77
1769759.13
25 FEET
EASTING
0.8 - 1.86
0.4 - 0.8
0.2 - 0.4
0.10 - 0.2
0.02 - 0.10
0.00 - 0.02

Figure 13. Block diagram of former TA-42 showing distribution of ^{238}Pu concentrations in pCi/g.

(On following page)

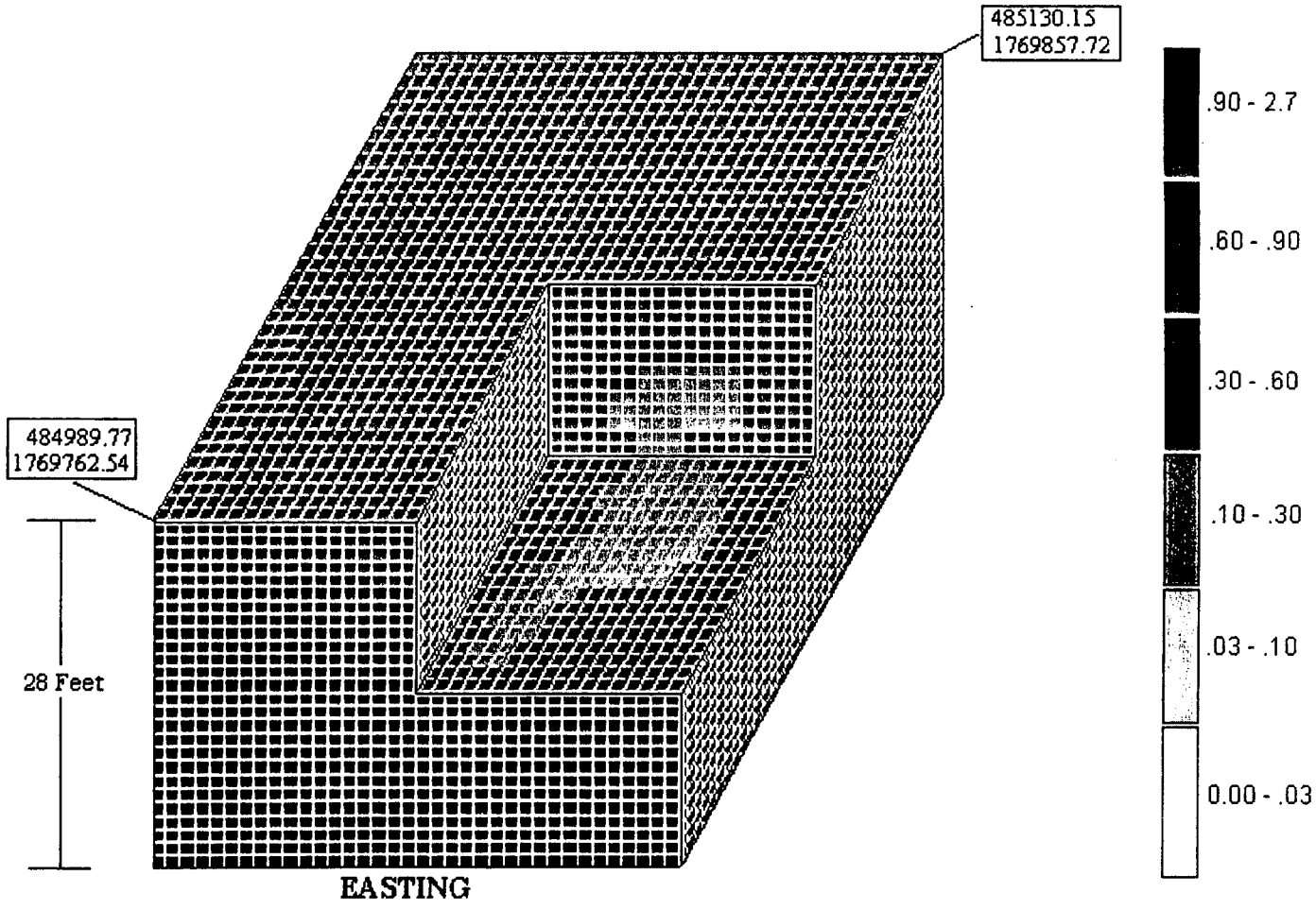
485130.15
1769857.72
484989.77
1769762.54
28 Feet
EASTING
.90 - 2.7
.60 - .90
.30 - .60
.10 - .30
.03 - .10
0.00 - .03

Figure 14. Block diagram of former TA-42 showing distribution of $^{239,240}Pu$ concentrations in pCi/g.

(On following page)

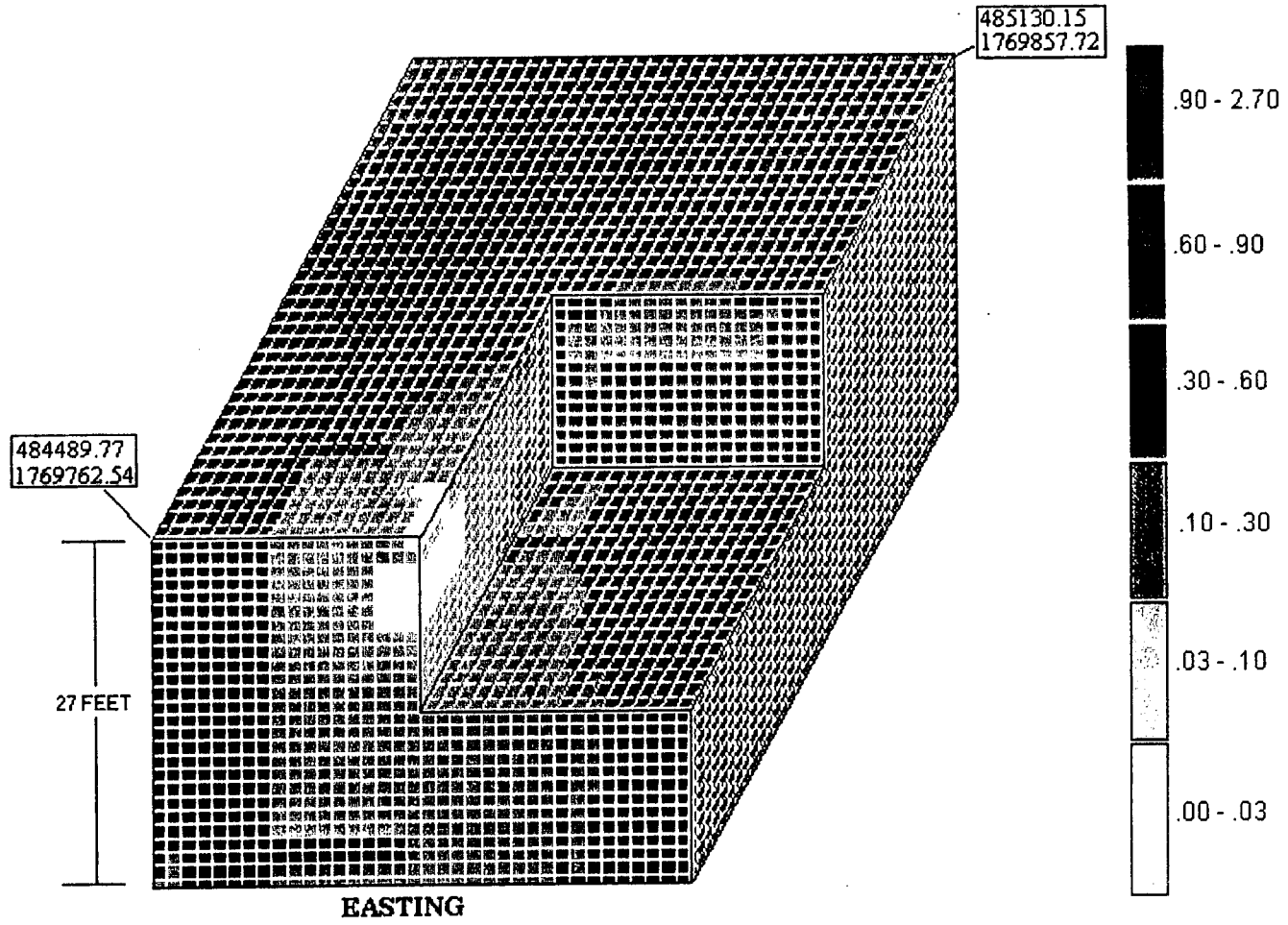
485130.15
1769857.72
484489.77
1769762.54
27 FEET
EASTING
.90 - 2.70
.60 - .90
.30 - .60
.10 - .30
.03 - .10
.00 - .03

Figure 15. Block diagram of former TA-42 showing distribution of Pb concentrations in ppm.

(On following page)

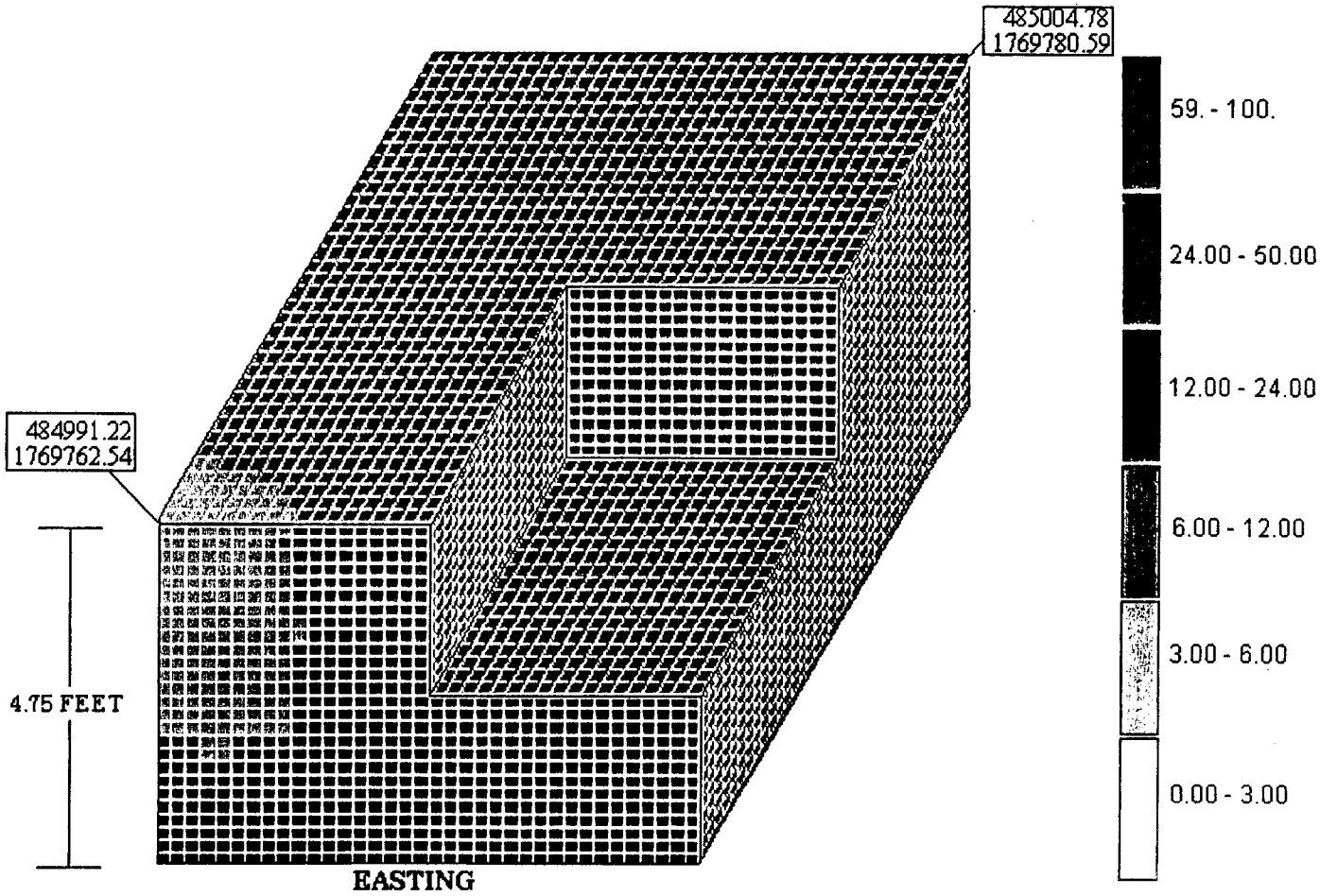
485004.78
1769780.59
484991.22
1769762.54
4.75 FEET
EASTING
59. - 100.
24.00 - 50.00
12.00 - 24.00
6.00 - 12.00
3.00 - 6.00
0.00 - 3.00

TABLE 10

RESULTS OF QUALITY CONTROL SAMPLES

SAMPLE NUMBER	Pu-238 uncertainty		Pu-239 uncertainty		Pb uncertainty		Am-241 uncertainty	
	pCi/L				ug/L		pCi/L	
B-12-2-bb*	1.8	1.18	0.969	0.846			0.264	0.325
B-12-2-erb**	5.63	1.66	2.68	1.1			1.09	0.56
B-9-3-bb	0.465	0.471	0	0.0181			0.199	0.298
B-9-3-erb	0.852	0.815	0.142	0.492			0.135	0.27
B-18-3-erb					5.3	NR***		
B-3-2-bb					4.2	0.42		
B-3-2-erb					3.7	0.37		
QC-1					<1			
QC-2					17.6	1		

* bb= bottle blank.

** erb= equipment rinsate blank.

*** NR= not reported.

TABLE 11

RESULTS OF SPIKE AND BLIND QC SAMPLES

Analysis	Amount Spiked	Amount Recovered	Units	Analytical Result	Analytical Uncertainty	QC Value	QC Uncertainty	Sample Type	Comment
Pb	2.31	38%						Spike	
Pb	2.31	39%						Spike	
Pb			mg/kg	< 0.3		0.00		Open QC	Under control
Pb			mg/L	11.40	1.14	12.50	0.50	Blind QC	Under control
Pb	2.31	122.20%						Spike	
Pb	2.31	115.70%						Spike	
Pb			ug/L	<1				Open QC	Under control
Pb			mg/L	17.60		16.00	1.00	Blind QC	Under control
Pu-238			pCi/g	0.30	0.12	0.00	0.00	Blind QC	Warning 2-3 sig
Pu-239			pCi/g	0.31	0.12	0.22	0.02	Blind QC	Under control
Pu-238			pCi/g	0.28	0.11	0.34	0.02	Blind QC	Under control
Pu-239			pCi/g	0.70	0.19	0.79	0.01	Blind QC	Under control
Pu-238			pCi/g	0.40	0.18	0.34	0.02	Blind QC	Under control
Pu-239			pCi/g	0.03	0.04	0.00		Blind QC	Under control
Pu-238			pCi/g	0.05	0.05	0.00		Blind QC	Under control
Pu-239			pCi/g	0.02	0.03	0.04	0.00	Blind QC	Under control
Am-241			pCi/g	0.00		0.32	0.01	Blind QC	Insuf. sample
Am-241			pCi/g	0.00		0.65	0.01	Blind QC	Insuf. sample

7.0 CONCLUSIONS

This report presents results from the investigation at former TA-42 site. This investigation included the following PRSs:

- 42-001(a), former location of an incinerator;
- 42-001(b and c), former location of two ash storage tanks;
- 42-002(a), former location of a building used as an indoor storage and decontamination area;
- 42-002(b), a former outdoor decontamination area; and
- 42-003, former location of a septic tank and tile field.

As it can be seen from the results; none of the samples collected at the PRSs contained concentrations of COCs above screening action levels, and in fact all the COCs are at least an order of magnitude below the screening action level. Therefore, no risk to human health or the environment exists. On the basis of these results, it was recommended to DOE-AL that no remedial actions are required before construction of the NSTL. Additionally, these PRSs will be recommended for no further action by OU 1129 RFI.

8.0 REFERENCES

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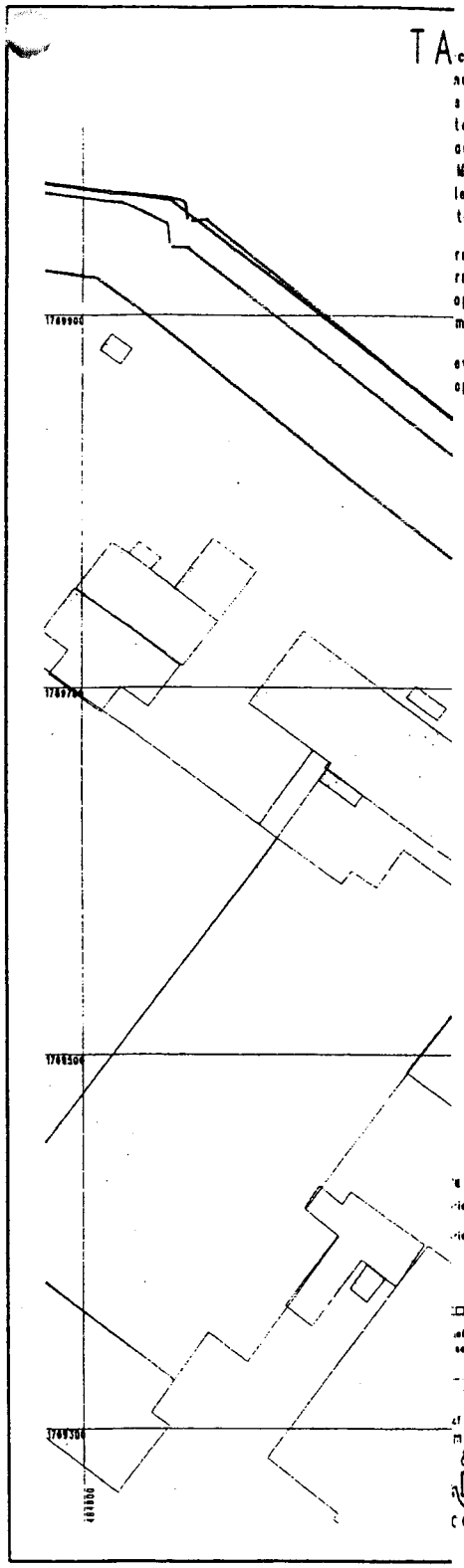
APPENDIX A

FIMAD Map of Former TA-42 Showing
Incinerator Facility and Proposed NSTL



T A ctrical, Pr d
nce, Security
s Line, Proposed
te
ad, Access
MU, Probable
lephone Line, Proposed
ter Line, Proposed

rmer Structure
rmanent Structure
oposed Structure
mporary Structure

evious Samples
oposed Samples

'E State Plane
-id provides NNSP coordinates, in feet
-id interval, in feet: 200

40 80 120 FEET ON GROUND

nformation on this map is provisional
not been checked for accuracy

of California
mos National Laboratory
& Environmental Sciences Division
D Facility for Information Management, Analysis and Display
ced by: Marcia Jones
92-07-10

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APPENDIX B

Model input parameters

(Not available for Preliminary Draft)