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Los Alamos National Laboratory

Environmental Restoration

A Department of Energy environmental cleanup program

QUARTERLY TECHNICAL REPORT

OCTOBER–DECEMBER

FISCAL YEAR 1994

March 10, 1994

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LIST OF ACRONYMS AND ABBREVIATIONS

ADS	Activity data sheet
CST	Chemical Science and Technology (Division)
CST-9	Environmental Chemistry Group
DOE	US Department of Energy
EES	Earth and Environmental Science (Division)
EES-1	Geology and Geochemistry Group
ESA	Engineering Sciences and Applications (Division)
ESA-2	Weapons Prototype Group
ESH	Environment, Safety, and Health (Division)
ESH-8	Environmental Protection Group
EPA	US Environmental Protection Agency
ER	Environmental restoration
FIMAD	Facility for Information Management, Analysis, and Display
FY	Fiscal year
HSWA	Hazardous and Solid Waste Amendments
JCI	Johnson Controls World Services Inc.
LANL	Los Alamos National Laboratory
LOD	Limit of detection
MDA	Material disposal area
NMED	New Mexico Environment Department
NPDES	National pollutant discharge elimination system
OU	Operable unit
PCB	Polychlorinated biphenyl
PRS	Potential release site
RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigation
SAL	Screening action level
SOP	Standard operating procedure
SVOC	Semivolatile organic compound
SWMU	Solid waste management unit
TA	Technical area
TCLP	Toxicity characteristic leaching procedure
VOC	Volatile organic compound

QUARTERLY REPORT
OCTOBER–DECEMBER
FISCAL YEAR 1994
LOS ALAMOS NATIONAL LABORATORY
ENVIRONMENTAL RESTORATION PROGRAM

ALBUQUERQUE OPERATIONS OFFICE

CONTRACTOR: University of California

ACTING PROGRAM MANAGER: David McInroy

NUMBER OF POTENTIAL RELEASE SITES (sampling sites): Approximately 1,700, of which approximately 1,100 are solid waste management units

SUSPECT WASTE: Radionuclides, High Explosives, Metals, Solvents, Organics

1.0 INTRODUCTION

This quarterly report describes the technical status of activities in the Los Alamos National Laboratory (the Laboratory) Environmental Restoration (ER) Program. Each activity is identified by an activity data sheet (ADS) number, a brief title describing the activity or the technical area (TA) where the activity is located, and the name of the project leader. The Hazardous and Solid Waste Amendments (HSWA) portion of the facility operating permit (Section P, Task III, c) requires the submission of a technical progress report on a quarterly basis. This report, submitted to fulfill the permit's requirement, summarizes the work performed and the results of sampling and analysis in the ER Program.

2.0 ACTIVITY DATA SHEETS

2.1 ADS 1049—Canyons (Project Leader: Everett Springer)

The potential release sites (PRSs) within Operable Unit (OU) 1049 were ranked using software developed by the ER Program; the site rankings were reviewed with the Technical Review Team, which included personnel from the US Department of Energy (DOE), Sandia National Laboratories, and Los Alamos. A presentation on hydraulic properties of the Bandelier Tuff, using archival data from Mortandad Canyon, was made at the Rocky Mountain Groundwater Conference in Albuquerque on October 27, 1993. Data archival activities for OU 1049 continued with the revision of data files for transfer to the Facility for Information Management, Analysis, and Display (FIMAD). A revised FY94 budget was provided by the ER Program Office in November, and efforts are underway to prepare a new Baseline for the ADS by January 21, 1994.

2.2 ADS 1071—TAs-0, -19, -26, -73, -74 (Project Leader: Jim Aldrich)

The primary focus for OU 1071 during this past quarter has been to prepare for fieldwork at the following solid waste management units (SWMUs).

SWMU Group 0-3: Preparations began for a readiness review in January for fieldwork at septic tanks 0-030 (c), (e), (f), and (q). Work continued on the section of the phase report for septic tank 0-030 (g).

Bandelier PRSs: Plans were underway for the evaluation of the borrow pits and landfill formerly used by the Laboratory but now deeded to Bandelier National Monument.

SWMU Group 0-4: Preparations began for a readiness review in January 1994 for fieldwork at the former motorpool.

SWMU 0-016: In late October, preparations were completed for soil-washing activities at the inactive firing range, including the assembly of processing equipment, the earthwork construction of handling areas and settling basins, and the construction of fencing. Freezing temperatures delayed the soil processing until the spring of 1994. Background samples were acquired from five locations in early October, but analytical results for these samples have not yet been received.

SWMU Group 73-1: Preparations began for a readiness review in January for fieldwork at the airport landfill.

SWMU Aggregate 0-D: Work continued on the phase report for the ordnance impact areas. Analyses for high explosives have been completed for areas 0-011 (a) and (e). Target-analyte-list metals analyses are in progress.

2.3 ADS 1078—TA-1 (Project Leader: Carl Newton)

Addenda to the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) work plan for OU 1078 (LANL 1992, 0782) that were submitted to the US Environmental Protection Agency (EPA) included sampling plans for the Western Sanitary Waste Line and for 24 proposals for no further action for mesa-top PRSs. A notice of deficiency response was sent to the EPA for the sampling plans for D-Building Stratum 1 and for Hillsides 138 and 140. Access agreements were obtained for sampling the Western Sanitary Waste Line.

RFI activities conducted this quarter included completing the Phase I investigation of the hillsides and continuing the Phase I investigation of the mesa top. Analytical chemistry results were received for most of the outstanding FY92 soil samples and for many of the March 1993 borehole samples taken under the west parking lot of the Los Alamos Inn.

Radiochemical data from the hillsides soil samples are presented in Table 2-1, updating Table B-6 in the last quarterly report, "ER Quarterly Technical Report, July–September, Fiscal Year 1993." The radiochemical data table in the last quarterly report had many blanks in the plutonium and uranium columns because the analytical laboratory had not yet reported the results. The table in this report fills in those blanks and corrects six values that were entered incorrectly (the six values had been correctly entered into the FIMAD data files). The additions and corrections are provided in the shaded areas. Data in the table that exceed one-half of the Laboratory screening action levels (SALs) are shown in bold numerals. The Phase I Hillsides Report, currently being prepared, will provide a complete interpretation of these results and will present the data from the August 1993 sampling of Hillsides 138 and 140. The only hillsides areas of concern where soil concentrations of contamination have exceeded SALs are the septic tank outfall areas and portions of the respective drainages, below Septic Tanks 137, 138, and 140. All of these areas are on the DOE property separated from the adjacent private properties by an exclusion fence posted for No Trespassing.

2.4 ADS 1079—TAs-10, -31, -32, -45 (Project Leader: Garry Allen)

The primary focus for ADS 1079 during this past quarter has been to initiate data evaluation and prepare for fieldwork scheduled for next calendar year. A brief summary of activities for each of the technical areas of the operable unit is presented below.

TA-10: The geomorphic map of TA-10, completed last quarter, has been entered into the FIMAD database and integrated with the topographic base and other overlays. Mapping indicates that sediment transport is more dynamic in this canyon than anticipated, with at least 2 periods of deposition and 3 periods of incision within approximately the last 50 years. Historic alluvial units, which contain abundant metallic and nonmetallic debris, are up to 3.5 ft thick. The geomorphic mapping will show possible

TABLE 2-1. CONTRACTOR-VALIDATED RADIOCHEMICAL DATA FOR OU 1078

Sample Location	Aggregate/Area	E R Sample No.	Sample Date	CST-9 Sample No.	Rad Req. No.	Gamma Ray	Pu-238 pCi/g	Pu-239 pCi/g	U-234 pCi/g	U-235 pCi/g	U-238 pCi/g	Total U µg/g	Alpha pCi/g	Beta pCi/g	Gamma pCi/g	RAD Screen Date*
01-6005	CAN DUMP SITE/WHOLE AREA	AAA0709	07/20/92	92.23693	13202	NAO	0.0334	0.167	-	-	-	3.8	4.96	17.40	2.58	07/20/92
01-6005R	CAN DUMP SITE/WHOLE AREA	AAA0710	07/20/92	92.23694	13202	NAO	0.2650	0.095	-	-	-	<7.3	NC	NC	NC	NC
01-6014	CAN DUMP SITE/WHOLE AREA	AAA0711	07/20/92	92.23695	13202	NAO	0.1440	0.252	-	-	-	5.6	3.93	12.40	1.72	07/20/92
01-6023	CAN DUMP SITE/WHOLE AREA	AAA0712	07/20/92	92.23696	13202	NAO	0.1270	0.675	-	-	-	7.2	3.24	15.80	2.13	07/20/92
01-6023R	CAN DUMP SITE/WHOLE AREA	AAA0713	07/20/92	92.23697	13202	NAO	0.0982	0.729	-	-	-	8.0	NC	NC	NC	NC
01-6012-6017	CAN DUMP SITE/WHOLE AREA	AAA0714	07/20/92	92.23698	13202	NAO	0.1780	0.318	-	-	-	<6.3	2.21	13.4	2.13	07/20/92
01-6018-6023	CAN DUMP SITE/WHOLE AREA	AAA0715	07/20/92	92.23699	13202	NAO	0.0805	0.368	-	-	-	<5.2	5.3	15.7	2.15	07/20/92
01-1162	J2/TU, HS140/OUTFALL ST135	AAA0716	07/20/92	92.23700	13202	NAO	0.1530	0.0941	-	-	-	<7.2	3.76	13.2	2.01	11/04/92
01-1168	J2/TU, HS140/OUTFALL ST135	AAA0717	07/20/92	92.23701	13202	NAO	0.1180	0.168	-	-	-	<6.5	3.07	14	2.12	11/04/92
01-1168R	J2/TU, HS140/OUTFALL ST135	AAA0718	07/20/92	92.23702	13202	NAO	0.2610	0.157	-	-	-	3.2	NC	NC	NC	NC
01-1174	J2/TU, HS140/OUTFALL ST135	AAA0719	07/20/92	92.23703	13202	NAO	0.2950	0.03	-	-	-	<7.8	3.07	15.6	2.24	11/04/92
01-1160-1164	J2/TU, HS140/OUTFALL ST135	AAA0720	07/20/92	92.23704	13202	NAO	0.2540	0.0636	-	-	-	<7.1	2.04	11.8	2.06	07/20/92
01-1165-1171	J2/TU, HS140/OUTFALL ST135	AAA0721	07/20/92	92.23705	13202	NAO	0.1270	0.0908	-	-	-	<4	3.24	13.9	1.91	07/20/92
01-1172-1176	J2/TU, HS140/OUTFALL ST135	AAA0722	07/20/92	92.23706	13202	NAO	0.1350	0.251	-	-	-	8.7	4.1	13.2	2.05	07/20/92
01-1083	HS140/HS140 SURF RUNOFF AREAS	AAA0723	07/23/92	92.24110	13235	NAO	0.2260	0.0226	-	-	-	<9.7	2.21	15.3	1.05	07/23/92
01-1090	HS140/HS140 SURF RUNOFF AREAS	AAA0724	07/23/92	92.24111	13235	NAO	0.0994	0.0099	-	-	-	<5.3	3.4	17.2	1.02	07/23/92
01-1094	HS140/HS140 SURF RUNOFF AREAS	AAA0725	07/23/92	92.24112	13235	NAO	0.0421	0.101	-	-	-	**2073.0**	154.6	670.2	12.71	07/23/92
01-1095	HS140/HS140 SURF RUNOFF AREAS	AAA0726	07/23/92	92.24113	13235	NAO	<0.6	<0.6	-	-	-	**581.0**	50.8	147.8	5.26	07/23/92
01-1096	HS140/HS140 SURF RUNOFF AREAS	AAA0727	07/23/92	92.24114	13235	NAO	<0.6	<0.6	-	-	-	10.7	3.76	14.5	0.79	07/23/92
01-1096R	HS140/HS140 SURF RUNOFF AREAS	AAA0728	07/23/92	92.24115	13235	NAO	<0.6	<0.6	-	-	-	10.3	NC	NC	NC	07/23/92
01-1097	HS140/HS140 SURF RUNOFF AREAS	AAA0729	07/23/92	92.24116	13235	NAO	<0.6	<0.6	-	-	-	**2457.0**	121.1	445.2	11.17	07/23/92
01-1080-1086	HS140/HS140 SURF RUNOFF AREAS	AAA0730	07/23/92	92.24117	13235	NAO	<0.6	<0.6	-	-	-	12.0	3.41	14	1.10	07/23/92
01-1087-1093	HS140/HS140 SURF RUNOFF AREAS	AAA0731	07/23/92	92.24118	13235	NAO	<0.6	<0.6	-	-	-	**53.6**	6.33	27.5	1.29	07/23/92
01-1109	HS140/HS140 SURF RUNOFF AREAS	AAA0732	07/23/92	92.24119	13235	NAO	<0.6	<0.6	-	-	-	17.7	117	560.2	4.40	07/23/92
01-1110	HS140/HS140 SURF RUNOFF AREAS	AAA0733	07/23/92	92.24120	13235	NAO	<0.6	1.23	-	-	-	**849.0**	130	645.5	22.97	07/23/92
01-1111	HS140/HS140 SURF RUNOFF AREAS	AAA0734	07/23/92	92.24121	13235	NAO	<0.6	<0.6	-	-	-	**135.0**	24.5	80.4	3.05	07/23/92
01-1111R	HS140/HS140 SURF RUNOFF AREAS	AAA0735	07/23/92	92.24122	13235	NAO	<0.6	<0.6	-	-	-	**138.0**	24.98	88.5	2.90	07/23/92
01-1112	HS140/HS140 SURF RUNOFF AREAS	AAA0736	07/23/92	92.24123	13235	NAO	<0.6	<0.6	-	-	-	**165.0**	17.7	59.3	2.34	07/23/92
01-1202	HS140/HS140 SURF RUNOFF AREAS	AAA0737	07/23/92	92.24124	13235	NAO	<0.6	<0.6	-	-	-	<7.1	2.73	17.30	1.36	07/23/92
01-1202R	HS140/HS140 SURF RUNOFF AREAS	AAA0738	07/23/92	92.24125	13235	NAO	<0.6	<0.6	-	-	-	6.0	2.73	17.3	1.32	07/23/92
01-1017	HS140/HS140 SURF RUNOFF AREAS	AAA0739	07/23/92	92.24126	13235	NAO	<0.6	<0.6	-	-	-	8.8	0.149	0	1.05	07/23/92
01-1045	HS140/HS140 SURF RUNOFF AREAS	AAA0740	07/23/92	92.24127	13235	NAO	<0.6	1.24	-	-	-	17.2	2.9	15.6	0.77	07/23/92
01-1144	HS140/HS140 SURF RUNOFF AREAS	AAA0741	07/23/92	92.24128	13235	NAO	<0.6	<0.6	-	-	-	18.7	4.1	19.4	1.12	07/23/92
01-1144R	HS140/HS140 SURF RUNOFF AREAS	AAA0742	07/23/92	92.24129	13235	NAO	<0.6	<0.6	-	-	-	8.8	4.1	19.4	1.12	07/23/92

TABLE 2-1. CONTRACTOR-VALIDATED RADIOCHEMICAL DATA FOR OU 1078

Sample Location	Aggregate/Area	E R Sample No.	Sample Date	CST-9 Sample No.	Rad Req. No	Gamma Ray	Pu-238 pCi/g	Pu-239 pCi/g	U-234 pCi/g	U-235 pCi/g	U-238 pCi/g	Total U µg/g	Alpha pCi/g	Beta pCi/g	Gamma pCi/g	RAD Screen Date*
01-1147	HS140/HS140 SURF RUNOFF AREAS	AAA0743	07/23/92	92.24130	13235	NAO	<0.6	0.629	-	-	-	<5.9	1.35	15.2	0.40	07/23/92
01-1098	HS140/HS140 SURF RUNOFF AREAS	AAA0744	07/23/92	92.24131	13235	NAO	<0.07	0.247	-	-	-	56.9	8.05	26	1.03	07/23/92
01-1089	HS140/HS140 SURF RUNOFF AREAS	AAA1469	07/23/92	92.24132	13235	NAO	0.108	0.199	-	-	-	35.5	6.16	22.7	1.08	07/23/92
01-5091	HS138/SELA INN/CANYON BOTTOM	AAA0746	07/27/92	92.24335	13259	NAO	<0.06	5.1	-	-	-	<12.2	1.87	15.20	0.29	07/27/92
01-5091R	HS138/SELA INN/CANYON BOTTOM	AAA0747	07/27/92	92.24336	13259	NAO	<0.08	5.94	-	-	-	5.6	1.87	9.88	0.19	07/27/92
01-5098	HS138/SELA INN/CANYON BOTTOM	AAA0748	07/27/92	92.24337	13259	NAO	0.369	1.95	-	-	-	<3.9	3.24	12.90	0.15	07/27/92
01-5075-5079,5092	HS138/SELA INN/CANYON BOTTOM	AAA0749	07/27/92	92.24338	13259	NAO	0.0992	0.707	-	-	-	<6.2	3.24	10.2	0.26	07/27/92
01-5093-5098	HS138/SELA INN/CANYON BOTTOM	AAA0750	07/27/92	92.24339	13259	NAO	0.0787	1.97	-	-	-	8.3	1.69	12.6	0.26	07/27/92
01-5088-5091, 5099	HS138/SELA INN/CANYON BOTTOM	AAA0751	07/27/92	92.24340	13259	NAO	<0.06	3.18	-	-	-	4.5	1.52	12.8	0.16	07/27/92
01-3132	HS137/CT 80/BOTTOM OF CANYON	AAA1471	07/29/92	92.24592	13285	NAO	0.123	17.5	-	-	-	11.2	9.43	19.37	0.47	07/29/92
01-3139	HS137/CT 80/BOTTOM OF CANYON	AAA1472	07/29/92	92.24593	13285	NAO	<0.16	18.1	-	-	-	<11.6	7.71	17.53	0.48	07/29/92
01-3139R	HS137/CT 80/BOTTOM OF CANYON	AAA1473	07/29/92	92.24594	13285	NAO	<0.14	20.7	-	-	-	7.3	6.33	18.34	0.44	07/29/92
01-3144	HS137/CT 80/BOTTOM OF CANYON	AAA1474	07/29/92	92.24595	13285	NAO	<0.11	19.3	-	-	-	7.6	8.57	14.19	0.53	07/29/92
01-1248	J2/TU, HS140 BOTTOM OF CANYON	AAA1475	07/29/92	92.24596	13285	NAO	<0.09	0.0828	-	-	-	<10.6	5.65	20.15	0.57	07/29/92
01-1249	J2/TU, HS140 BOTTOM OF CANYON	AAA1476	07/29/92	92.24597	13285	NAO	0.13	0.104	-	-	-	15.6	3.24	15.01	0.29	07/29/92
01-1253	J2/TU, HS140 BOTTOM OF CANYON	AAA1477	07/29/92	92.24598	13285	NAO	0.0445	0.0779	-	-	-	<6.5	3.24	13.80	0.28	07/29/92
01-1253R	J2/TU, HS140 BOTTOM OF CANYON	AAA1478	07/29/92	92.24599	13285	NAO	<0.06	<0.06	-	-	-	3.7	2.38	14.20	0.03	07/29/92
01-1260	J2/TU, HS140 BOTTOM OF CANYON	AAA1479	07/29/92	92.24600	13285	NAO	<0.06	0.0527	-	-	-	5.8	3.93	16.02	0.34	07/29/92
01-1250-1254	J2/TU, HS140 BOTTOM OF CANYON	AAA1480	07/29/92	92.24601	13285	NAO	<0.06	0.073	-	-	-	<9.4	5.13	16.6	0.34	07/29/92
01-1255-1260	J2/TU, HS140 BOTTOM OF CANYON	AAA1481	07/29/92	92.24602	13285	NAO	<0.06	0.154	-	-	-	19.0	4.27	17.3	0.35	07/29/92
01-2013	B BRIDGE/SURF RUNOFF TOP AREA	AAA1482	08/03/92	92.24829	13320	NAO	0.14	0.0747	-	-	-	6.3	3.76	11.60	0.35	08/03/92
01-2022	B BRIDGE/SURF RUNOFF TOP AREA	AAA1483	08/03/92	92.24830	13320	NAO	0.0921	0.067	-	-	-	6.0	3.07	12.90	0.39	08/03/92
01-2022R	B BRIDGE/SURF RUNOFF TOP AREA	AAA1496	08/03/92	92.24842	13320	NAO	0.0792	0.0495	-	-	-	4.3	2.38	14.10	0.35	08/03/92
01-2023	B BRIDGE/SURF RUNOFF TOP AREA	AAA1484	08/03/92	92.24831	13320	NAO	0.0612	0.0272	-	-	-	4.0	3.24	14.60	0.36	08/03/92
01-2024	B BRIDGE/SURF RUNOFF TOP AREA	AAA1485	08/03/92	92.24832	13320	NAO	0.105	0.0646	-	-	-	<9	4.61	13.60	0.38	08/03/92
01-2034	B BRIDGE/SURF RUNOFF TOP AREA	AAA1486	08/03/92	92.24833	13320	NAO	0.136	0.0678	-	-	-	<6.9	2.90	14.60	0.40	08/03/92
01-2035	B BRIDGE/SURF RUNOFF TOP AREA	AAA1487	08/03/92	92.24834	13320	NAO	0.262	0.157	-	-	-	6.2	3.07	15.80	0.39	08/03/92
01-2036	B BRIDGE/SURF RUNOFF TOP AREA	AAA1489	08/03/92	92.24835	13320	NAO	0.0798	<0.047	-	-	-	6.7	3.41	12.20	0.33	08/03/92

TABLE 2-1. CONTRACTOR-VALIDATED RADIOCHEMICAL DATA FOR OU 1078

Sample Location	Aggregate/Area	E R Sample No.	Sample Date	CST-9 Sample No.	Rad Req. No.	Gamma Ray	Pu-238 pCi/g	Pu-239 pCi/g	U-234 pCi/g	U-235 pCi/g	U-238 pCi/g	Total U µg/g	Alpha pCi/g	Beta pCi/g	Gamma pCi/g	RAD Screen Date*
01-2038	B BRIDGE/SURF RUNOFF TOP AREA	AAA1490	08/03/92	92.24836	13320	NAO	0.0554	0.0246	-	-	-	<3.2	2.04	7.33	0.05	08/03/92
01-2043	B BRIDGE/SURF RUNOFF TOP AREA	AAA1491	08/03/92	92.24837	13320	NAO	<0.067	0.0797	-	-	-	6.1	2.90	15.60	0.37	08/03/92
01-2045	B BRIDGE/SURF RUNOFF TOP AREA	AAA1492	08/03/92	92.24838	13320	NAO	0.0669	0.0401	-	-	-	4.1	1.69	13.58	0.25	08/03/92
01-2050	B BRIDGE/SURF RUNOFF TOP AREA	AAA1493	08/03/92	92.24839	13320	NAO	0.144	0.0678	-	-	-	5.3	3.59	13.67	0.27	08/03/92
01-2058	B BRIDGE/SURF RUNOFF TOP AREA	AAA1494	08/03/92	92.24840	13320	NAO	0.163	0.124	-	-	-	<9.2	3.41	15.50	0.34	08/03/92
01-2064	B BRIDGE/SURF RUNOFF TOP AREA	AAA1495	08/03/92	92.24841	13320	NAO	0.096	0.524	-	-	-	6.0	3.24	17.60	0.38	08/03/92
01-5041	HS 138, SE LA INN/DEBRIS AREA	AAA0752	08/10/92	92.25418	13360	NAO	0.002	0.018	0.92	0.05	1.06	-	0.84	12.00	0.26	08/10/92
01-5046	HS 138, SE LA INN/DEBRIS AREA	AAA1509	08/10/92	92.25419	13360	NAO	0	0.016	0.92	0.04	0.14	-	1.69	13.20	0.32	08/10/92
01-5042-5046	HS 138, SE LA INN/DEBRIS AREA	AAA1510	08/10/92	92.25420	13360	NAO	0.005	1.33	1.32	0.07	1.34	-	2.55	12.5	0.26	08/10/92
01-5004	HS138, SELA INN/OUTFALL ST138	AAA1511	08/17/92	92.26360	13383	NAO J	0.4	2.6	NR	NR	NR	-	3.24	10.60	0.13	08/18/92
01-5011	HS138, SELA INN/OUTFALL ST138	AAA1512	08/17/92	92.26361	13383	NAO J	0.021	4.14	NR	NR	NR	-	1.18	10.20	0.12	08/18/92
01-5018	HS138, SELA INN/OUTFALL ST138	AAA1513	08/17/92	92.26377	13412	NAO	44	2500	-	-	-	20.3	265.60	19.20	0.27	08/18/92
01-5028	HS138, SELA INN/OUTFALL ST138	AAA1514	08/17/92	92.26378	13412	NAO	lost by laboratory		-	-	-	30.7	312.70	27.00	0.07	08/18/92
01-5028R	HS138, SELA INN/OUTFALL ST138	AAA1515	08/17/92	92.26379	13412	NAO	26	2400	-	-	-	35.6	NC	NC	NC	NC
01-5049	HS138, SELA INN/OUTFALL ST138	AAA1516	08/17/92	92.26380	13412	NAO	36	910	-	-	-	8.4	157.50	30.60	0.35	08/18/92
01-5049R	HS138, SELA INN/OUTFALL ST138	AAA1517	08/17/92	92.26381	13412	NAO	14	1200	-	-	-	11.5	116.30	24.00	0.33	08/18/92
01-5061	HS138, SELA INN/OUTFALL ST138	AAA1518	08/17/92	92.26362	13383	NAO J	0.017	2.42	NR	NR	NR	-	4.79	14.40	0.06	08/18/92
01-5065	HS138, SELA INN/OUTFALL ST138	AAA1519	08/17/92	92.26363	13383	NAO J	0.009	2.37	NR	NR	NR	-	4.61	15.50	0.25	08/18/92
01-5000-5004	HS138, SELA INN/OUTFALL ST138	AAA1520	08/17/92	92.26364	13383	NAO J	0.002	0.601	NR	NR	NR	-	2.38	11.8	0.14	08/18/92
01-2142	BAILEY BRIDGE/BOTTOM OF CANYON	AAA1523	07/29/92	92.24673	13292	NAO	0.0831	1.64	-	-	-	<6	1.35	14.16	0.54	07/29/92
01-2147	BAILEY BRIDGE/BOTTOM OF CANYON	AAA1524	07/29/92	92.24674	13292	NAO	0.102	0.244	-	-	-	<10.1	2.38	14.28	0.59	07/29/92
01-2147R	BAILEY BRIDGE/BOTTOM OF CANYON	AAA1525	07/29/92	92.24675	13292	NAO	0.142	0.249	-	-	-	<13.8	4.44	16.00	0.61	07/29/92
01-2150	BAILEY BRIDGE/BOTTOM OF CANYON	AAA1526	07/29/92	92.24676	13292	NAO	0.106	0.242	-	-	-	9.1	3.24	15.73	0.55	07/29/92
01-2150-2156	BAILEY BRIDGE/BOTTOM OF CANYON	AAA1527	07/29/92	92.24677	13292	NAO	<0.07	0.431	-	-	-	5.7	1.35	13.7	0.44	07/29/92
01-2073	BAILEY BRIDGE/TWO LOWER LINES EOD	AAA1528	08/03/92	92.24843	13320	NAO	0.195	0.072	-	-	-	5.1	3.24	13.57	0.20	08/03/92
01-2073R	BAILEY BRIDGE/TWO LOWER LINES EOD	AAA1529	08/03/92	92.24844	13320	NAO	0.0736	0.204	-	-	-	<10.4	1.52	16.13	0.14	08/03/92
01-2075	BAILEY BRIDGE/TWO LOWER LINES EOD	AAA1530	08/03/92	92.24845	13320	NAO	0.167	0.683	-	-	-	4.1	6.85	18.24	0.26	08/03/92
01-2080	BAILEY BRIDGE/TWO LOWER LINES EOD	AAA1531	08/03/92	92.24846	13320	NAO	0.311	18	-	-	-	<12.4	4.61	14.01	0.24	08/03/92

TABLE 2-1. CONTRACTOR-VALIDATED RADIOCHEMICAL DATA FOR OU 1078

Sample Location	Aggregate/Area	E R Sample No.	Sample Date	CST-9 Sample No.	Rad Req. No.	Gamma Ray	Pu-238 pCi/g	Pu-239 pCi/g	U-234 pCi/g	U-235 pCi/g	U-238 pCi/g	Total U µg/g	Alpha pCi/g	Beta pCi/g	Gamma pCi/g	RAD Screen Date*
01-2095	BAILEY BRIDGE/TWO LOWER LINES EOD	AAA1532	08/03/92	92.24847	13320	NAO	<0.06	0.981	-	-	-	15.6	3.41	14.21	0.33	08/03/92
01-2096	BAILEY BRIDGE/TWO LOWER LINES EOD	AAA1533	08/03/92	92.24848	13320	NAO	0.194	0.659	-	-	-	10.1	3.24	19.73	0.37	08/03/92
01-2006	BAILEY BRIDGE/OPPOSITE PARK	AAA1534	08/10/92	92.25421	13360	NAO	0.013	0.443	7.59	0.37	8.62	-	3.07	14.00	0.15	08/10/92
01-2007	BAILEY BRIDGE/OPPOSITE PARK	AAA1535	08/10/92	92.25422	13360	NAO	0.004	0.145	3.61	0.12	3.86	-	2.38	13.40	0.29	08/10/92
01-2007R	BAILEY BRIDGE/OPPOSITE PARK	AAA1536	08/10/92	92.25423	13360	NAO	0.007	0.204	3.9	0.16	3.88	-	NC	NC	NC	NC
01-2009	BAILEY BRIDGE/OPPOSITE PARK	AAA1537	08/10/92	92.25424	13360	NAO	0.001	0.032	2.65	0.1	2.75	-	1.87	16.70	0.23	08/10/92
01-2001-2006	BAILEY BRIDGE/OPPOSITE PARK	AAA1538	08/10/92	92.25425	13360	NAO	0.002	0.035	1.7	0.07	1.66	-	2.21	14.1	0.30	08/10/9
01-2007-2011	BAILEY BRIDGE/OPPOSITE PARK	AAA1539	08/10/92	92.25426	13360	NAO	0.004	0.15	6.29	0.34	6.55	-	2.9	16.7	0.24	08/10/9
01-2114	B BRIDGE/BENCH AREA IN DRAINAGE	AAA1540	08/10/92	92.25427	13360	NAO	0.092	6.17	4.18	0.21	4.16	-	3.76	16.00	0.23	08/10/92
01-2122	B BRIDGE/BENCH AREA IN DRAINAGE	AAA1541	08/10/92	92.25428	13360	NAO	0.008	0.271	1.09	0.06	0.88	-	3.76	11.10	0.25	08/10/92
01-2122R	B BRIDGE/BENCH AREA IN DRAINAGE	AAA1544	08/10/92	92.25429	13360	NAO	0.007	0.527	1.57	0.08	1.48	-	NC	NC	NC	NC
01-2133	B BRIDGE/BENCH AREA IN DRAINAGE	AAA1545	08/10/92	92.25430	13360	NAO	0.015	2.04	2.23	0.12	1.99	-	2.73	15.60	0.25	08/10/92
01-2110-2116	B BRIDGE/BENCH AREA IN DRAINAGE	AAA1546	08/10/92	92.25431	13360	NAO	0.015	0.946	2.3	0.13	2.1	-	2.21	12	0.19	08/10/92
01-2120-2123	B BRIDGE/BENCH AREA IN DRAINAGE	AAA1547	08/10/92	92.25432	13360	NAO	0.009	0.526	1.51	0.07	1.59	-	1.87	13.8	0.19	08/10/92
01-2130-2134	B BRIDGE/BENCH AREA IN DRAINAGE	AAA1548	08/10/92	92.25433	13360	NAO	0.009	1.59	2.74	0.1	2.43	-	2.55	13.2	0.31	08/10/92
01-3003	HS137.CT80/D-BLD & HS137 OUTFALLS	AAA1521	08/19/92	92.26386	13415	NAO J	0.005	4.22	-	-	-	3.1 J	2.04	13.30	0.31	08/20/92
01-3007	HS137.CT80/D-BLD & HS137 OUTFALLS	AAA1522	08/19/92	92.26387	13415	NAO J	0.077	**15.3**	-	-	-	10.1 J	3.07	15.30	0.24	08/20/92
01-3015	HS137.CT80/D-BLD & HS137 OUTFALLS	AAA1550	08/19/92	92.26388	13415	NAO J	0.035	**13.4**	-	-	-	4.5 J	5.30	15.70	0.32	08/20/92
01-3023	HS137.CT80/D-BLD & HS137 OUTFALLS	AAA1551	08/19/92	92.26399	13415	NAO J	0.072	**38.9**	-	-	-	3 J	9.94	15.20	0.42	08/20/92
01-3033	HS137.CT80/D-BLD & HS137 OUTFALLS	AAA1552	08/19/92	92.26405	13415	NAO J	0.066	**27**	-	-	-	2.1 J	9.43	17.00	0.52	08/20/92
01-3045	HS137.CT80/D-BLD & HS137 OUTFALLS	AAA1553	08/19/92	92.26407	13415	NAO J	0.013	1.26	-	-	-	3.7 J	5.65	18.80	0.49	08/20/92
01-3051	HS137.CT80/D-BLD & HS137 OUTFALLS	AAA1554	08/19/92	92.26393	13415	NAO J	0.003	1.28	-	-	-	4.5 J	4.10	18.50	0.49	08/20/9
01-3053	HS137.CT80/D-BLD & HS137 OUTFALLS	AAA1555	08/19/92	92.26390	13415	NAO J	0.041	9.63	-	-	-	2.6 J	5.65	14.10	0.21	08/20/9
01-3059	HS137.CT80/D-BLD & HS137 OUTFALLS	AAA1556	08/19/92	92.26396	13415	NAO J	0.095	**28.2**	-	-	-	10.4 J	7.19	16.80	0.26	08/20/92
01-3088	HS137.CT80/D-BLD & HS137 OUTFALLS	AAA1557	08/19/92	92.26395	13415	NAO J	0.041	**15.4**	-	-	-	9.5 J	7.19	16.06	0.32	08/20/92
01-3093	HS137.CT80/D-BLD & HS137 OUTFALLS	AAA1558	08/19/92	92.26406	13415	NAO J	0.105	**20.7**	-	-	-	5.4 J	4.10	13.84	0.17	08/20/92
01-3000-3006	HS137.CT80/D-BLD & HS137 OUTFALLS	AAA1559	08/19/92	92.26397	13415	NAO J	0.003	3.46	-	-	-	2.1 J	2.73	12.1	0.34	08/20/92
01-3031-3037	HS137.CT80/D-BLD & HS137 OUTFALLS	AAA1560	08/19/92	92.26389	13415	NAO J	0.012	8.7	-	-	-	2.4 J	6.68	17	0.48	08/20/92
01-3052-3056	HS137.CT80/D-BLD & HS137 OUTFALLS	AAA1561	08/19/92	92.26391	13415	NAO J	0.041	**13.7**	-	-	-	3.5 J	1.69	11.4	0.26	08/20/92
01-3057-3062,3086	HS137.CT80/D-BLD & HS137 OUTFALLS	AAA1562	08/19/92	92.26403	13415	NAO J	0.46	**130 J**	-	-	-	3 J	11.8	14	0.23	08/20/92
01-3087-3090	HS137.CT80/D-BLD & HS137 OUTFALLS	AAA1563	08/19/92	92.26401	13415	NAO J	0.029	10.4	-	-	-	2.9 J	7.36	15.9	0.43	08/20/92
01-3091-3094	HS137.CT80/D-BLD & HS137 OUTFALLS	AAA1564	08/19/92	92.26392	13415	NAO J	0.06	19.9	-	-	-	4.1 J	4.61	13.4	0.34	08/20/92

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Sample Location	Aggregate/Area	E R Sample No.	Sample Date	CST-9 Sample No.	Rad Req. No.	Gamma Ray	Pu-238 pCi/g	Pu-239 pCi/g	U-234 pCi/g	U-235 pCi/g	U-238 pCi/g	Total U µg/g	Alpha pCi/g	Beta pCi/g	Gamma pCi/g	RAD Screen Date*
01-3065	HS 137.CT 80/BENCH AREA OF HS 137	AAA1565	08/19/92	92.26404	13415	NAO J	0.078 r	3.5 r	-	-	-	1.5 J	3.07	17.80	0.55	08/20/92
01-3069	HS 137.CT 80/BENCH AREA OF HS 138	AAA1566	08/19/92	92.26400	13415	NAO J	0.012	5.25	-	-	-	2.3 J	4.44	15.81	0.35	08/20/92
01-3074	HS 137.CT 80/BENCH AREA OF HS 139	AAA1567	08/19/92	92.26394	13415	NAO J	0.008	1.88	-	-	-	2.7 J	1.87	17.68	0.41	08/20/92
01-3081	HS 137.CT 80/BENCH AREA OF HS 140	AAA1568	08/19/92	92.26409	13415	NAO J	0.076	12.3	-	-	-	1.6 J	7.71	16.24	0.28	08/20/92
01-3083	HS 137.CT 80/BENCH AREA OF HS 141	AAA1569	08/19/92	92.26408	13415	NAO J	0.017	1.93	-	-	-	1.5 J	2.73	16.71	0.26	08/20/92
01-3072-3077	HS 137.CT 80/BENCH AREA OF HS 142	AAA1570	08/19/92	92.26410	13415	NAO J	0.026	6.06	-	-	-	1.4 J	2.73	17	0.28	08/20/92
01-3078-3081	HS 137.CT 80/BENCH AREA OF HS 143	AAA1571	08/19/92	92.26402	13415	NAO J	0.157	45.5	-	-	-	1.8 J	8.91	16	0.43	08/20/92
01-3082-3085	HS 137.CT 80/BENCH AREA OF HS 144	AAA1572	08/19/92	92.26398	13415	NAO J	0.008	3.7	-	-	-	1.6 J	4.96	23.3	0.35	08/20/92
01-1300	J-2/TU.HS140/HILLSIDE 140 DRAINAGE	AAA1573	08/26/92	92.26763	13425	NAO J	0.001	0.508	20.358	1.333	20.012	-	4.10	20.27	0.82	08/26/92
01-1301	J-2/TU.HS140/HILLSIDE 140 DRAINAGE	AAA1574	08/26/92	92.26780	13450	NAO J	0.007	0.43	-	-	-	130.2 J	12.86	61.83	1.64	08/26/92
01-1302	J-2/TU.HS140/HILLSIDE 140 DRAINAGE	AAA1575	08/26/92	92.26764	13425	NAO J	0.003	0.461	2.206	0.093	2.292	-	2.38	13.21	0.35	08/26/92
01-1303	J-2/TU.HS140/HILLSIDE 140 DRAINAGE	AAA1576	08/26/92	92.26765	13425	NAO J	0.007	0.755	11.18	0.667	13.963	-	5.82	23.68	1.01	08/26/92
01-1304	J-2/TU.HS140/HILLSIDE 140 DRAINAGE	AAA1577	08/26/92	92.26779	13450	NAO J	0.005	0.7	-	-	-	143.7 J	12.00	40.40	1.54	08/26/92
01-1305	J-2/TU.HS140/HILLSIDE 140 DRAINAGE	AAA1578	08/26/92	92.26781	13450	NAO J	0.003	0.36	-	-	-	130.7 J	9.26	34.37	1.00	08/26/92
01-1306	J-2/TU.HS140/HILLSIDE 140 DRAINAGE	AAA1579	08/26/92	92.26766	13425	NAO J	0.004	1.3	43.633	lost by lab	38.676	-	12.69	44.11	1.26	08/26/92
01-1307	J-2/TU.HS140/HILLSIDE 140 DRAINAGE	AAA1580	08/26/92	92.26767	13425	NAO J	0.003	0.497	10.151	lost by lab	11.203	-	5.13	22.79	0.64	08/26/92
01-1308	J-2/TU.HS140/HILLSIDE 140 DRAINAGE	AAA1581	08/26/92	92.26777	13450	NAO J	0.23	0.57	-	-	-	160.3 J	10.63	47.72	1.24	08/26/92
01-1309	J-2/TU.HS140/HILLSIDE 140 DRAINAGE	AAA1582	08/26/92	92.26768	13425	NAO J	0.005	1.12	19.96	1.276	19.299	-	7.19	22.15	0.82	08/26/92
01-1310	J-2/TU.HS140/HILLSIDE 140 DRAINAGE	AAA1583	08/26/92	92.26775	13450	NAO J	0.007	0.94	-	-	-	368.5 J	17.85	78.00	2.50	08/26/92
01-1311	J-2/TU.HS140/HILLSIDE 140 DRAINAGE	AAA1584	08/26/92	92.26778	13450	NAO J	0.3	0.57	-	-	-	123.2 J	9.94	40.05	1.73	08/26/92
01-1312	J-2/TU.HS140/HILLSIDE 140 DRAINAGE	AAA1585	08/26/92	92.26774	13450	NAO J	0.008	0.31	-	-	-	727 J	63.37	248.99	5.57	08/26/92
01-1313	J-2/TU.HS140/HILLSIDE 140 DRAINAGE	AAA1586	08/26/92	92.26773	13450	NAO J	0.052	0.17	-	-	-	479 J	62.00	148.58	3.64	08/26/92
01-1314	J-2/TU.HS140/HILLSIDE 140 DRAINAGE	AAA1587	08/26/92	92.26776	13450	NAO J	0.005	0.29	-	-	-	302 J	25.06	101.42	2.11	08/26/92
01-5080	HS138.SELA INN/BELOW ST138 OUTFALL	AAA1588	08/27/92	92.26827	13445	NAO J	0.1	980	4.514	1.078	4.351	17.5 J	626.80	79.70	154.00	08/27/92
01-5081	HS138.SELA INN/BELOW ST138 OUTFALL	AAA1589	08/27/92	92.26828	13445	NAO J	2	670	3.378	0.156	3.102	17.5 J	644.30	43.30	59.00	08/27/92
01-5082	HS138.SELA INN/BELOW ST138 OUTFALL	AAA1590	08/27/92	92.26829	13445	NAO J	7	1100	3.867	0.184	3.678	20 J	872.80	88.50	161.00	08/27/92
01-5083	HS138.SELA INN/BELOW ST138 OUTFALL	AAA1591	08/27/92	92.26830	13445	NAO J	1.4	900	3.568	0.392	3.278	12.6 J	258.40	29.50	29.00	08/27/92
01-5084	HS138.SELA INN/BELOW ST138 OUTFALL	AAA1592	08/27/92	92.26831	13445	NAO J	0.1	140	3.913	0.194	3.839	13.5 J	180.00	31.40	29.00	08/27/92
01-5085	HS138.SELA INN/BELOW ST138 OUTFALL	AAA1593	08/27/92	92.26832	13445	NAO J	0.1	570	3.128	0.0156	3.002	20.9 J	724.00	75.50	131.00	08/27/92
01-5086	HS138.SELA INN/BELOW ST138 OUTFALL	AAA1594	08/27/92	92.26833	13445	NAO J	1.4	240	2.741	0.127	2.889	14.1 J	352.30	39.90	75.00	08/27/92
01-5087	HS138.SELA INN/BELOW ST138 OUTFALL	AAA1595	08/27/92	92.26834	13445	NAO J	0.4	170	2.417	0.233	2.281	10.5 J	242.20	36.50	54.00	08/27/92

TABLE 2-1. CONTRACTOR-VALIDATED RADIOCHEMICAL DATA FOR OU 1078

Sample Location	Aggregate/Area	E R Sample No.	Sample Date	CST-9 Sample No.	Rad Req. No.	Gamma Ray	Pu-238 pCi/g	Pu-239 pCi/g	U-234 pCi/g	U-235 pCi/g	U-238 pCi/g	Total U µg/g	Alpha pCi/g	Beta pCi/g	Gamma pCi/g	RAD Screen Date*
01-3103	HS137, CT80/D-BLD OUTFALL-TOP	AAA1599	09/02/92	92.27583	13500	NAO J	0.034	14.3	1.521	0.067	0.993	-	4.44	14.71	0.76	09/02/92
01-3103R	HS137, CT80/D-BLD OUTFALL-TOP	AAA1600	09/02/92	92.27584	13500	NAO J	0.061	13.3	1.518	0.073	1.002	-	5.13	11.41	0.58	09/02/92
01-3106	HS137, CT80/D-BLD OUTFALL-TOP	AAA1601	09/02/92	92.27585	13500	NAO J	0.116	29.8	2.746	0.123	2.282	-	4.44	13.53	1.08	09/02/92
01-3110	HS137, CT80/D-BLD OUTFALL-TOP	AAA1602	09/02/92	92.27586	13500	NAO J	0.005	2.05	0.746	0.032	0.757	-	2.04	14.79	0.83	09/02/92
01-3113	HS137, CT80/D-BLD OUTFALL-TOP	AAA1603	09/02/92	92.27587	13500	NAO J	0.037	14.3	2.69	0.137	2.75	-	3.41	15.01	2.01	09/02/92
01-3114	HS137, CT80/D-BLD OUTFALL-TOP	AAA1604	09/02/92	92.27588	13500	NAO J	0.034	16.2	1.912	0.092	1.831	-	6.16	18.19	1.73	09/02/92
01-3117	HS137, CT80/D-BLD OUTFALL-TOP	AAA1605	09/02/92	92.27589	13500	NAO J	0.078	23	2.353	0.103	1.779	-	5.82	13.21	1.15	09/02/92
01-3117R	HS137, CT80/D-BLD OUTFALL-TOP	AAA1606	09/02/92	92.27590	13500	NAO J	0.191	24.2	2.308	0.098	1.684	-	4.61	14.32	1.08	09/02/9
01-3124	HS137, CT80/D-BLD OUTFALL-TOP	AAA1607	09/02/92	92.27591	13500	NAO J	0.16	11	0.994	0.077	0.957	-	3.59	14.39	0.77	09/02/9
01-3125	HS137, CT80/D-BLD OUTFALL-TOP	AAA1608	09/02/92	92.27592	13500	NAO J	0.033	0.8	1.462	0.064	1.465	-	3.24	17.68	0.91	09/02/92
01-3126	HS137, CT80/D-BLD OUTFALL-TOP	AAA1609	09/02/92	92.27593	13500	NAO J	0.021	11.9	0.898	0.038	0.872	-	3.07	14.60	0.94	09/02/92
01-3127	HS137, CT80/D-BLD OUTFALL-TOP	AAA1610	09/02/92	92.27594	13500	NAO J	0.049	11.4	4.926	0.179	5.09	-	5.30	20.30	2.47	09/02/92
01-3128	HS137, CT80/D-BLD OUTFALL-TOP	AAA1611	09/02/92	92.27595	13500	NAO J	0.17	33.4	1.795	0.072	1.819	-	4.10	16.20	1.49	09/02/92
01-6100W	ASHLEY POND	AAA1612	09/08/92	92.27790	13533	NAO J	0.013	0.054	-	-	-	0.78 J				
01-6101W	ASHLEY POND	AAA1613	09/08/92	92.27791	13533	NAO J	0.015	0.087	-	-	-	0.3 J				
01-6101WR	ASHLEY POND	AAA1614	09/08/92	92.27792	13533	NAO J	0	0.099	-	-	-	0.36 J				
01-6102W	ASHLEY POND	AAA1615	09/08/92	92.27793	13533	NAO J	0.014	0.138	-	-	-	0.32 J				
01-6103W	ASHLEY POND	AAA1616	09/08/92	92.27794	13533	NAO J	0.02	0.113	-	-	-	0.31 J				
01-6104W	ASHLEY POND	AAA1617	09/08/92	92.27795	13533	NAO J	0.018	0.065	-	-	-	0.23 J				
01-6100SL	ASHLEY POND	AAA1619	09/08/92	92.27798	13536	NAO J	0.0005	0.226	-	-	-	3.35 J				
01-6101SL	ASHLEY POND	AAA1620	09/08/92	92.27799	13536	NAO J	0.007	0.723	-	-	-	3.57 J				
01-6101SLR	ASHLEY POND	AAA1621	09/08/92	92.27800	13536	NAO J	0.003	0.531	-	-	-	3.5 J				
01-6102SL	ASHLEY POND	AAA1622	09/08/92	92.27801	13536	NAO J	0.006	0.351	-	-	-	2.29 J				
01-6103SL	ASHLEY POND	AAA1623	09/08/92	92.27802	13536	NAO J	0.015	0.504	-	-	-	2.08 J				
01-6104SL	ASHLEY POND	AAA1624	09/08/92	92.27803	13536	NAO J	0.0247	0.45	-	-	-	2.72 J				
01-6054	CANYON RIM STUDY	AAA1628	09/09/92	92.27968	13547	NAO J	0.011	0.621	1.265	0.053	1.283	-	3.41	16.03	0.75	09/09/92
01-6057	CANYON RIM STUDY	AAA1629	09/09/92	92.27969	13547	NAO J	0.077	0.481	1.356	0.064	1.409	-	3.59	12.19	0.87	09/09/92
01-6064	CANYON RIM STUDY	AAA1630	09/09/92	92.27970	13547	NAO J	0.006	0.396	1.825	0.087	1.807	-	4.44	14.74	0.82	09/09/92
01-6069	CANYON RIM STUDY	AAA1631	09/09/92	92.27971	13547	NAO J	0.039	7.53	1.023	0.04	0.838	-	3.59	15.50	0.77	09/09/92
01-6073	CANYON RIM STUDY	AAA1632	09/09/92	92.27972	13547	NAO J	0.008	1.32	0.782	0.032	0.734	-	3.07	11.79	0.63	09/09/92
01-6074	CANYON RIM STUDY	AAA1633	09/09/92	92.27973	13547	NAO J	0.032	5.83	1.008	0.04	0.946	-	3.24	13.49	1.20	09/09/92
01-6074R	CANYON RIM STUDY	AAA1634	09/09/92	92.27974	13547	NAO J	0.015	6.16	0.957	0.033	0.963	-	4.27	11.37	1.02	09/09/92

TABLE 2-1. CONTRACTOR-VALIDATED RADIOCHEMICAL DATA FOR OU 1078

Sample Location	Aggregate/Area	E R Sample No.	Sample Date	CST-9 Sample No.	Rad Req. No.	Gamma Ray	Pu-238 pCi/g	Pu-239 pCi/g	U-234 pCi/g	U-235 pCi/g	U-238 pCi/g	Total U µg/g	Alpha pCi/g	Beta pCi/g	Gamma pCi/g	RAD Screen Date*
01-1113	HS140, B BRIDGE	AAA1635	09/16/92	92.28580	13587	NAO J	0.003	1.28	-	-	-	37.3 J	4.44	22.20	1.00	09/16/92
01-1142	HS140, B BRIDGE	AAA1636	09/16/92	92.28581	13587	NAO J	0.008	1.07	-	-	-	65.2 J	6.68	32.17	1.31	09/16/92
01-1143	HS140, B BRIDGE	AAA1637	09/16/92	92.28582	13587	NAO J	0.05	3.94	-	-	-	61.6 J	5.82	26.80	1.72	09/16/92
01-1156	HS140, B BRIDGE	AAA1638	09/16/92	92.28583	13587	NAO J	0.001	0.341	-	-	-	11.5 J	1.01	12.80	0.58	09/16/92
01-1157	HS140, B BRIDGE	AAA1639	09/16/92	92.28584	13587	NAO J	0.026	5.23	-	-	-	62.3 J	8.22	24.97	1.38	09/16/92
01-1251	HS140, B BRIDGE	AAA1640	09/16/92	92.28585	13587	NAO J	0.027	6.36	-	-	-	93.2 J	7.54	32.83	1.40	09/16/92
01-1256	HS140, B BRIDGE	AAA1641	09/16/92	92.28586	13587	NAO J	0.003	1.56	-	-	-	57.4 J	4.10	25.86	1.15	09/16/92
01-2076	HS140, B BRIDGE	AAA1642	09/16/92	92.28587	13587	NAO J	0.44	2.3	-	-	-	13.9 J	6.33	13.42	0.12	09/16/92
01-3019	HILLSIDE 137	AAA1643	09/17/92	92.28755	13596	NAO	0.495	21.1	-	-	-	1.3 J	57.9	12.3	0.96	09/17/92
01-3057	HILLSIDE 137	AAA1644	09/17/92	92.28756	13596	NAO	0.78	22	-	-	-	2.2 J	37.4	10.9	0.84	09/17/92
01-3058	HILLSIDE 137	AAA1645	09/17/92	92.28757	13596	NAO	0.85	50	-	-	-	2.6 J	120.6	12.8	0.95	09/17/92
01-3082	HILLSIDE 137	AAA1646	09/17/92	92.28748	13587	NAO	0.007	1.08	-	-	-	2.1 J	4.61	14.05	0.71	09/17/92
01-5016	HILLSIDE 138	AAA1647	09/17/92	92.28749	13587	NAO	0.25	94	1.083	0.064	1.1	2.3	21.45	10.87	1.66	09/17/92
01-5025	HILLSIDE 138	AAA1648	09/17/92	92.28750	13587	NAO	0.027	8.06	1.226	0.082	1.375	1.8	3.76	13.97	0.98	09/17/92
01-5048	HILLSIDE 138	AAA1649	09/17/92	92.28758	13596	*Cs-137*	0.326	150	-	-	-	8.7 J	464.04	38.39	91.00	09/17/92
01-5056	HILLSIDE 138	AAA1650	09/17/92	92.28759	13596	NAO	0.544	110	-	-	-	4.2 J	111.64	14.23	5.40	09/17/92
01-5057	HILLSIDE 138	AAA1651	09/17/92	92.28760	13596	*Cs-137*	0.789	120	-	-	-	12.8 J	724.59	112.21	168.00	09/17/92
01-5058	HILLSIDE 138	AAA1652	09/17/92	92.28761	13596	*Cs-137*	0.92	83	-	-	-	19.5 J	450.86	41.23	87.00	09/17/92
01-3153	HILLSIDE 137 DRAINAGE	AAA1654	09/23/92	92.29359	13613	NAO J	0.37	96	-	-	-	1.19 J	24.7	17.3	0.84	09/23/92
01-3155	HILLSIDE 137 DRAINAGE	AAA1655	09/23/92	92.29360	13613	NAO J	0.17	45	-	-	-	0.72 J	9.43	16.9	0.64	09/23/92
01-3162	HILLSIDE 137 DRAINAGE	AAA1656	09/23/92	92.29361	13613	NAO J	0.007	0.662	-	-	-	1.6 J	4.96	15.5	0.99	09/23/92
01-5100	HILLSIDE 138 DRAINAGE	AAA1657	09/23/92	92.29362	13613	NAO J	0.005	1.42	-	-	-	2.56 J	3.59	11.58	1.28	09/23/92
01-5104	HILLSIDE 138 DRAINAGE	AAA1658	09/23/92	92.29363	13613	NAO J	0	2.87	-	-	-	1.78 J	1.52	12.33	0.98	09/23/9[illegible]
01-5110	HILLSIDE 138 DRAINAGE	AAA1659	09/23/92	92.29364	13613	NAO J	0.005	16.3	-	-	-	1.72 J	10.11	12.35	1.24	09/23/9[illegible]
01-5112	HILLSIDE 138 DRAINAGE	AAA1660	09/23/92	92.29365	13613	NAO J	0.003	1.68	-	-	-	1.43 J	2.90	16.13	0.71	09/23/92
01-5120-6	HILLSIDE 138 BENCH TRENCH	AAA1662	09/24/92	92.29366	13613	NAO J	0.011	1.56	-	-	-	1.6 J	3.59	17.66	1.08	09/24/92
01-5123-6	HILLSIDE 138 BENCH TRENCH	AAA1663	09/24/92	92.29367	13613	NAO J	0.27	31	-	-	-	1.36 J	9.77	15.71	2.24	09/24/92
01-5128-6	HILLSIDE 138 BENCH TRENCH	AAA1664	09/24/92	92.29368	13613	NAO J	0.003	10.7	-	-	-	1.22 J	5.47	16.99	0.97	09/24/92
01-5122-T	HILLSIDE 138 BENCH TRENCH	AAA1665	09/24/92	92.29369	13613	NAO J	0.002	1.49	-	-	-	1.59 J	2.55	17.36	1.05	09/24/92
01-5127-T	HILLSIDE 138 BENCH TRENCH	AAA1666	09/24/92	92.29370	13613	NAO J	0.004	5.01	-	-	-	1.62 J	5.47	16.46	1.17	09/24/92

TABLE 2-1. CONTRACTOR-VALIDATED RADIOCHEMICAL DATA FOR OU 1078

Sample Location	Aggregate/Area	E R Sample No.	Sample Date	CST-9 Sample No.	Rad Req. No.	Gamma Ray	Pu-238 pCi/g	Pu-239 pCi/g	U-234 pCi/g	U-235 pCi/g	U-238 pCi/g	Total U µg/g	Alpha pCi/g	Beta pCi/g	Gamma pCi/g	RAD Screen Date*
01-5127-TR	HILLSIDE 138 BENCH TRENCH	AAA1667	09/24/92	92.29371	13613	NAO J	0.012	4.63	-	-	-	1.53 J	4.79	15.84	1.36	09/24/92
01-5128-T	HILLSIDE 138 BENCH TRENCH	AAA1668	09/24/92	92.29372	13613	NAO J	0.017	2.62	-	-	-	1.07 J	2.38	17.48	2.49	09/24/92
01-3178-3	HILLSIDE 137, CT 80/BENCH TRENCH	AAA1670	10/08/92	92.30511	13699	NAO J	0.07	[illegible]	0.505	0.02	0.487	-	7.71	17	1.81	10/08/92
01-3183-3	HILLSIDE 137, CT 80/BENCH TRENCH	AAA1671	10/08/92	92.30512	13699	NAO J	0.014	5.94	1.001	0.04	0.91	-	5.82	15.5	1.51	10/08/92
01-3184-3	HILLSIDE 137, CT 80/BENCH TRENCH	AAA1672	10/08/92	92.30513	13699	NAO J	0.011	2.85	0.908	0.039	0.966	-	4.1	17.7	1.53	10/08/92
01-3170-T	HILLSIDE 137, CT 80/BENCH TRENCH	AAA1673	10/08/92	92.30514	13699	NAO J	0.004	2.01	0.945	0.044	0.919	-	5.82	17.8	1.82	10/08/92
01-3173-T	HILLSIDE 137, CT 80/BENCH TRENCH	AAA1674	10/08/92	92.30515	13699	NAO J	0.027	1.04	0.866	0.035	0.755	-	5.65	15.8	1.57	10/08/92
01-3179-T	HILLSIDE 137, CT 80/BENCH TRENCH	AAA1675	10/08/92	92.30516	13699	NAO J	0.009	[illegible]	0.891	0.037	0.963	-	4.96	14.1	1.56	10/08/9[illegible]
01-2164	BAILEY BRIDGE DRAINAGE	AAA1676	10/19/92	92.30916	13751	NAO J	0.025	1.39	1.129	0.095	0.945	-	2.73	15.5	0.93	10/19/92
01-2171	BAILEY BRIDGE DRAINAGE	AAA1677	10/19/92	92.30917	13751	NAO J	0.026	2.5	2.149	0.099	1.911	-	3.41	7.63	0.96	10/19/92
01-2172	BAILEY BRIDGE DRAINAGE	AAA1678	10/19/92	92.30919	13751	NAO J	0.029	[illegible]	3.46	0.167	2.867	-	3.41	15	1.28	10/19/92
01-2171R	BAILEY BRIDGE DRAINAGE	AAA1679	10/19/92	92.30919	13751	NAO J	0.016	2.97	2.152	0.185	2.169	-	2.9	15.4	1.05	10/19/92

Notes:

New or revised from July -September Quarterly Report.
- = analysis not requested.
* = most recent screening date.
Cs-137 = cesium-137 detected but not quantified.
NA = not available.
NAO = natural activity only.
NC = not counted.
NR = analysis not received.
r = rejected because of low recovery of radioactive tracer.
J flags indicate possible data use limitations.

Bold numbers represent the following values:
Pu-238 > 13.5 pCi/g
Pu-239 > 12.0 pCi/g
U-234 > 43.0 pCi/g
U-235 > 9.0 pCi/g
U-238 > 29.5 pCi/g
Total U > 33.0 µg/g

Sample Location Codes:
Sample#-3 = depth of 3 in.
Sample#-6 = depth of 6 in.
R = replicate.
SL = sludge.
T = tuff interface.
W = water.

"reservoirs" for contaminants and will be used to help guide the RFI sampling and subsequent cleanup activities required during corrective measures studies or corrective measures implementations.

Personnel completed the fieldwork for the seismic reflection/refraction profiling of TA-10. Data were taken along three profiles: two reflection profiles with 3-ft spacing were run near the upper and lower boundaries of the technical area, perpendicular to the canyon, and a refraction profile was run parallel to the drainage. This seismic work was planned to characterize the bedrock and other sedimentary interfaces that may control the hydrology of the canyon and to obtain geometrical constraints that will be critical to subsurface groundwater flow models. Modeling of the subsurface flow may be required to characterize the distribution and movement of potential subsurface contaminants at this site.

TA-31: Activities were confined to tracking the analysis of sample materials collected during the fourth quarter of FY93. The process of data review began for some of the sample results received to date.

TA-32: Activities have been focused on the tracking of sample materials collected during the fourth quarter of FY93, and the data review process began for those sample results received thus far.

TA-45: Sample analysis data collected from the surface sampling activities at TA-45 have been reviewed, and interpretation has been initiated (see Figure 2-1). A brief discussion of the analytical results and the initial interpretation of those data are presented in the text below.

Analytical Results

Analytical results from the soil samples taken during the 1992 surface sampling activities at TA-45 have undergone preliminary data analysis and are presented here in summary form. Each soil sample was analyzed for particular suites of analytes as called out in the RFI work plan for OU 1079 (LANL 1992, 0783). The collection of analyte suites of interest for this sampling plan, a total of 166 analytes, includes volatile compounds, semivolatile compounds, metals, various radionuclides, and high-explosive compounds. Each sample was analyzed for only the particular subset of analytes called out in the RFI work plan.

Summary statistics for each analyte are provided in Table 2-2. There are a total of 3,963 individual measurement values summarized in the table covering the 166 distinct analytes. To allow presentation of summary data, each individual measurement value was classified as being either above or below the limit of detection (LOD) for that analyte. The LOD varies for each analyte and for each individual measurement for a given analyte. For those measurement values above the LOD, the range of concentrations is given for that analyte. For those measurement values less than the LOD, the LOD range is given for that analyte.

The data were further categorized based on measurement value comparisons with the SAL and the LOD for each analyte. This comparison process placed each value in one of four categories: (1) values above SAL, (2) values not above SAL, (3) values where the SAL and the value were below the LOD, so a comparison cannot be made, and (4) values for which a SAL is not available. In addition, a judgmental categorization of the summary data based on the above comparisons is given in the last column of the table. Those categories are as follows:

Exceeds SAL: indicates that one analyte value or more exceeded the SAL for that analyte;

Further Evaluation: indicates that one analyte value or more were greater than the LOD, and there is no current SAL for comparison;

Special Case: indicates that the analyte values are less than the LOD for that analyte, and the SAL is known to be less than the LOD as well;

Null Case: indicates that the analyte values are less than the LOD for that analyte, and the SAL is unknown; and

No Concern: indicates that the analyte values are all less than the SAL for that analyte.

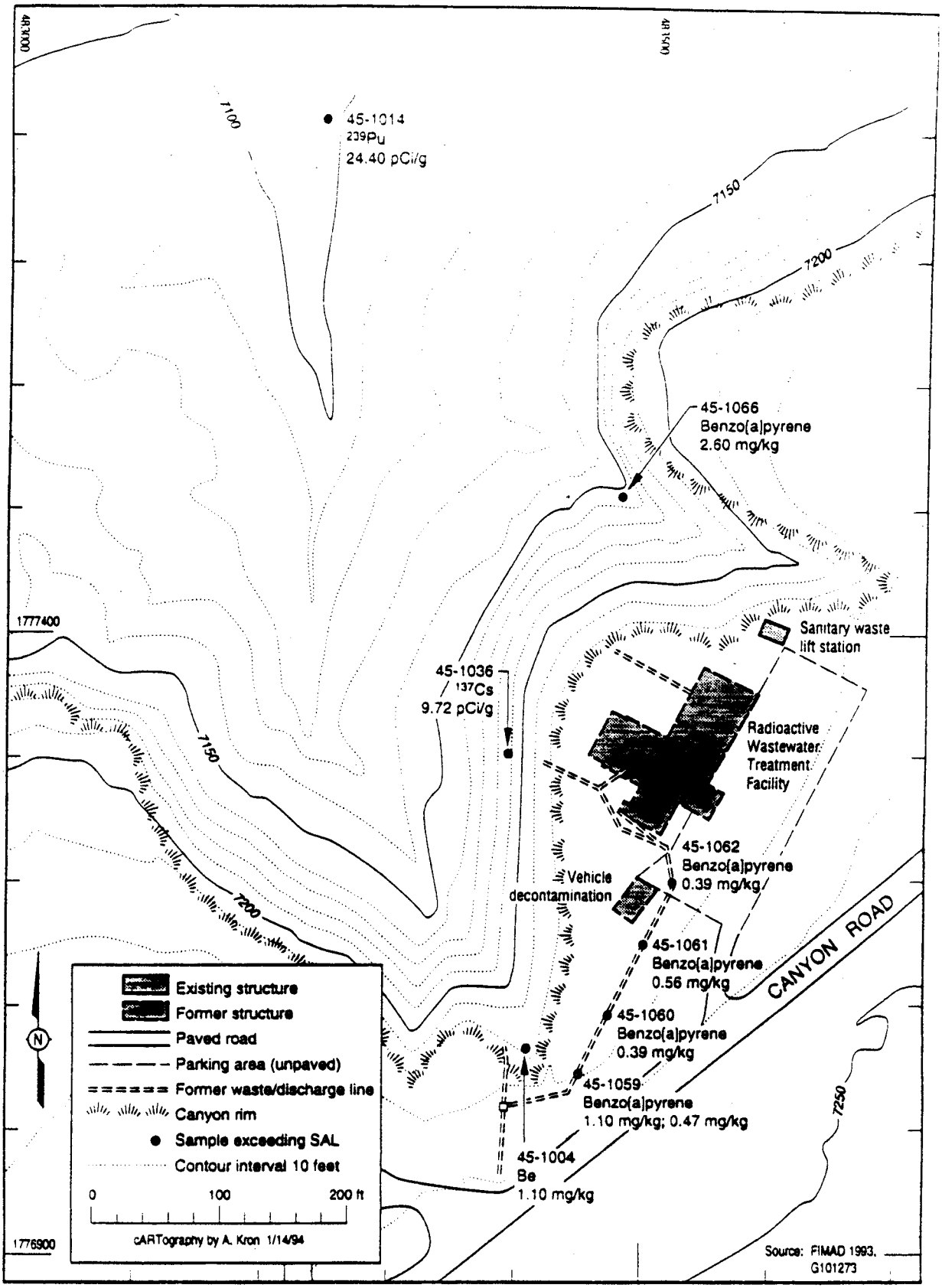


Figure 2-1. **Locations and values above SALs for Be, ^{137}Cs, ^{239}Pu, and benzo[a]pyrene at the former TA-45.**

TABLE 2-2. SUMMARY FOR TA-45 SURFACE SOIL SAMPLE ANALYSIS

	Analyte Name	Number of Values Per Analyte	Number of Values >= LOD	Concentration Range Minimum	Concentration Range Maximum	SAL	Units	Number of Values < LOD	LOD Range Minimum	LOD Range Maximum	Number of Values >SAL	Number of Values <=SAL	Values<LOD & LOD>SAL	Number of Values with No SAL	Analyte Disposition
1	Acenaphthene	31	1	1.8	1.8	4800	mg/kg	30	0.33	0.41		31			No Concern
2	Acenaphthylene	31					mg/kg	31	0.33	0.41				31	Null Case
3	Acetone	3	2	0.034	0.05	8000	mg/kg	1	0.01	0.01		3			No Concern
4	Acrolein	3					mg/kg	3	0.1	0.12				3	Null Case
5	Acrylonitrile	3					mg/kg	3	0.1	0.12				3	Null Case
6	Aluminium	48	48	859	11300		mg/kg							48	Further Eval.
7	Aniline	16					mg/kg	16	0.34	0.41				16	Null Case
8	Anthracene	31	2	0.58	2.2	24000	mg/kg	29	0.33	0.41		31			No Concern
9	Antimony	48				32	mg/kg	48	0.6	2.5		48			No Concern
10	Arsenic	48	43	0.4	3.1	0.4	mg/kg	5	0.4	0.5	40	6	2		Exceeds SAL
11	Azobenzene	31					mg/kg	31	0.33	0.41				31	Null Case
12	Barium	48	48	6.4	147	5600	mg/kg					48			No Concern
13	Benzene	3				0.67	mg/kg	3	0.005	0.006		3			No Concern
14	Benzidine [m-]	31					mg/kg	31	1.6	2				31	Null Case
15	Benzo[a]anthracene	31	5	0.48	2.5	0.64	mg/kg	26	0.33	0.41	2	29			Exceeds SAL
16	Benzo[a]pyrene	31	6	0.39	2.6	0.1	mg/kg	25	0.33	0.41	6		25		Exceeds SAL
17	Benzo[b]fluoranthene	31	6	0.4	2.7	0.7	mg/kg	25	0.33	0.41	3	28			Exceeds SAL
18	Benzo[g,h,i]perylene	31	1	1.3	1.3	44	mg/kg	30	0.33	0.41		31			No Concern
19	Benzo[k]fluoranthene	31	2	0.61	1	1.5	mg/kg	29	0.33	0.41		31			No Concern
20	Benzoic acid	31				320000	mg/kg	31	1.6	2		31			No Concern
21	Benzyl alcohol	31					mg/kg	31	0.67	0.82				31	Null Case
22	Beryllium	48	1	1.1	1.1	0.16	mg/kg	47	1	1.3	1		47		Exceeds SAL
23	Bis(2-chloroethoxy)methane	31					mg/kg	31	0.33	0.41				31	Null Case
24	Bis(2-chloroethyl)ether	31				0.13	mg/kg	31	0.33	0.41			31		Special Case
25	Bis(2-chloroisopropyl)ether	31					mg/kg	31	0.33	0.41				31	Null Case
26	Bis(2-ethylhexyl)phthalate	31				50	mg/kg	31	0.33	0.41		31			No Concern
27	Bromobenzene	3					mg/kg	3	0.005	0.006				3	Null Case
28	Bromochloromethane	3					mg/kg	3	0.005	0.006				3	Null Case
29	Bromodichloromethane	3				11	mg/kg	3	0.005	0.006		3			No Concern
30	Bromoform	3				89	mg/kg	3	0.005	0.006		3			No Concern
31	Bromomethane	3				0.43	mg/kg	3	0.01	0.012		3			No Concern
32	Bromophenylphenyl ether [4-]	31					mg/kg	31	0.33	0.41				31	Null Case
33	Butanone [2-]	3				4000	mg/kg	3	0.01	0.012		3			No Concern
34	Butyl benzyl phthalate	31				16000	mg/kg	31	0.33	0.41		31			No Concern
35	Butylbenzene [n-]	3					mg/kg	3	0.005	0.006				3	Null Case
36	Butylbenzene [sec-]	3					mg/kg	3	0.005	0.006				3	Null Case
37	Butylbenzene [tert-]	3					mg/kg	3	0.005	0.006				3	Null Case
38	Cadmium	48	2	1.2	5.7	80	mg/kg	46	1	1.3		48			No Concern
39	Calcium	48	48	247	7370		mg/kg							48	Further Eval
40	Carbon disulfide	3				7.4	mg/kg	3	0.005	0.006		3			No Concern
41	Carbon tetrachloride	3				0.21	mg/kg	3	0.005	0.006		3			No Concern
42	Cesium-137	48	16	0.18	9.72	4	pCi/g	32	0.05	0.26	1	47			Exceeds SAL
43	Chloro-3-methylphenol [4-]	31				16000	mg/kg	31	0.67	0.82		31			No Concern
44	Chloroaniline [4-]	31				320	mg/kg	31	0.67	0.82		31			No Concern
45	Chlorobenzene	3				67	mg/kg	3	0.005	0.006		3			No Concern
46	Chlorodibromomethane	3				83	mg/kg	3	0.005	0.006		3			No Concern
47	Chloroethane	3				3300	mg/kg	3	0.01	0.012		3			No Concern
48	Chloroform	3				0.21	mg/kg	3	0.005	0.006		3			No Concern

TABLE 2-2. SUMMARY FOR TA-45 SURFACE SOIL SAMPLE ANALYSIS

	Analyte Name	Number of Values Per Analyte	Number of Values >= LOD	Concentration Range Mini-mum	Concentration Range Maxi-mum	SAL	Units	Number of Values < LOD	LOD Range Mini-mum	LOD Range Maxi-mum	Number of Values >SAL	Number of Values <=SAL	Values<LOD & LOD>SAL	Number of Values with No SAL	Analyte Disposition
49	Chloromethane	3				6.4	mg/kg	3	0.01	0.012		3			No Concern
50	Chloronaphthalene [2-]	31				6400	mg/kg	31	0.33	0.41		31			No Concern
51	Chlorophenol [o-]	31					mg/kg	31	0.33	0.41				31	Null Case
52	Chlorophenylphenyl ether [4-]	31					mg/kg	31	0.33	0.41				31	Null Case
53	Chlorotoluene [o-]	3					mg/kg	3	0.005	0.006				3	Null Case
54	Chlorotoluene [p-]	3					mg/kg	3	0.005	0.006				3	Null Case
55	Chromium	48	32	3	10.4	400	mg/kg	16	2.6	3		48			No Concern
56	Chrysene	31	5	0.49	2.3	22	mg/kg	26	0.33	0.41		31			No Concern
57	Cobalt	48	15	2.1	5		mg/kg	33	2	2.5				48	Further Eval.
58	Di-n-butyl phthalate	31				8000	mg/kg	31	0.33	0.41		31			No Concern
59	Di-n-octyl phthalate	31				1600	mg/kg	31	0.33	0.41		31			No Concern
60	Dibenzo[a,h]anthracene	31					mg/kg	31	0.33	0.42				31	Null Case
61	Dibenzofuran	31	1	1.6	1.6		mg/kg	30	0.33	0.41				31	Further Eval.
62	Dibromo-3-chloropropane [1,2-]	3					mg/kg	3	0.005	0.006				3	Null Case
63	Dibromoethane [1,2-]	3					mg/kg	3	0.005	0.006				3	Null Case
64	Dibromomethane	3					mg/kg	3	0.005	0.006				3	Null Case
65	Dichlorobenzene (1,2) [o-]	34				1600	mg/kg	34	0.005	0.41		34			No Concern
66	Dichlorobenzene (1,3) [m-]	34					mg/kg	34	0.005	0.41				34	Null Case
67	Dichlorobenzene (1,4) [p-]	34				290	mg/kg	34	0.005	0.41		34			No Concern
68	Dichlorobenzidine [3,3'-]	31				1.6	mg/kg	31	0.67	0.82		31			No Concern
69	Dichlorodifluoromethane	3					mg/kg	3	0.01	0.012				3	Null Case
70	Dichloroethane [1,1-]	3				410	mg/kg	3	0.005	0.006		3			No Concern
71	Dichloroethane [1,2-]	3				0.2	mg/kg	3	0.005	0.006		3			No Concern
72	Dichloroethene [1,1-]	3				0.59	mg/kg	3	0.005	0.006		3			No Concern
73	Dichloroethene [trans-1,2-]	3					mg/kg	3	0.005	0.006				3	Null Case
74	Dichloroethylene [cis-1,2-]	3					mg/kg	3	0.005	0.006				3	Null Case
75	Dichlorophenol [2,4-]	31				240	mg/kg	31	0.33	0.41		31			No Concern
76	Dichloropropane [1,2-]	3				6.5	mg/kg	3	0.005	0.006		3			No Concern
77	Dichloropropane [1,3-]	3					mg/kg	3	0.005	0.006				3	Null Case
78	Dichloropropane [2,2-]	3					mg/kg	3	0.005	0.006				3	Null Case
79	Dichloropropene [1,1-]	3					mg/kg	3	0.005	0.006				3	Null Case
80	Dichloropropene [cis-1,3-]	3				0.17	mg/kg	3	0.005	0.006		3			No Concern
81	Dichloropropene [trans-1,3-]	3				0.17	mg/kg	3	0.005	0.006		3			No Concern
82	Diethyl phthalate	31				64000	mg/kg	31	0.33	0.41		31			No Concern
83	Dimethyl phthalate	31				80000	mg/kg	31	0.33	0.41		31			No Concern
84	Dimethylphenol [2,4-]	31				1600	mg/kg	31	0.33	0.41		31			No Concern
85	Dinitrophenol [2,4-]	31				160	mg/kg	31	1.6	2		31			No Concern
86	Dinitrotoluene [2,4-]	32				1	mg/kg	32	0.26	0.41		32			No Concern
87	Dinitrotoluene [2,6-]	32				1	mg/kg	32	0.27	0.41		32			No Concern
88	Ethylbenzene	3				3100	mg/kg	3	0.005	0.006		3			No Concern
89	Ethylene dibromide	3					mg/kg	3	0.005	0.006				3	Null Case
90	Fluoranthene	31	6	0.73	5.2	3200	mg/kg	25	0.33	0.41		31			No Concern
91	Fluorene	31	1	2.7	2.7	3200	mg/kg	30	0.33	0.41		31			No Concern
92	Hexachlorobenzene	31				0.44	mg/kg	31	0.33	0.41		31			No Concern
93	Hexachlorobutadiene	34				90	mg/kg	34	0.005	0.41		34			No Concern
94	Hexachlorocyclopentadiene	31				560	mg/kg	31	0.33	0.41		31			No Concern
95	Hexachloroethane	31				80	mg/kg	31	0.33	0.41		31			No Concern

TABLE 2-2. SUMMARY FOR TA-45 SURFACE SOIL SAMPLE ANALYSIS

	Analyte Name	Number of Values Per Analyte	Number of Values >= LOD	Concentration Range Minimum	Concentration Range Maximum	SAL	Units	Number of Values < LOD	LOD Range Minimum	LOD Range Maximum	Number of Values >SAL	Number of Values <=SAL	Values<LOD & LOD>SAL	Number of Values with No SAL	Analyte Disposition
96	Hexanone [2-]	3					mg/kg	3	0.01	0.012				3	Null Case
97	Indeno[1,2,3-cd]pyrene	31	2	0.38	1.2	0.41	mg/kg	29	0.33	0.41	1	30			Exceeds SAL
98	Iron	48	48	3150	14400		mg/kg							48	Further Eval.
99	Isophorone	31				7400	mg/kg	31	0.33	0.41		31			No Concern
100	Isopropylbenzene	3					mg/kg	3	0.005	0.006				3	Null Case
101	Isopropyltoluene [4-]	3					mg/kg	3	0.005	0.006				3	Null Case
102	Lead	48	46	3.2	56.6	500	mg/kg	2	11	12		48			No Concern
103	Lithium	48	2	25	25		mg/kg	46	20.2	25				48	Further Eval.
104	Magnesium	48	48	132	2140		mg/kg							48	Further Eval.
105	Mercury	48	19	0.1	1	24	mg/kg	29	0.05	1		48			No Concern
106	Methyl iodide	3					mg/kg	3	0.005	0.006				3	Null Case
107	Methyl-2-pentanone [4-]	3				510	mg/kg	3	0.01	0.012		3			No Concern
108	Methyl-4,6-dinitrophenol [2-]	31					mg/kg	31	1.6	2				31	Null Case
109	Methylene chloride	3	1	0.01	0.01	5.6	mg/kg	2	0.006	0.006		3			No Concern
110	Methylnaphthalene [2-]	31	1	2.3	2.3	0.1	mg/kg	30	0.33	0.41	1		30		Exceeds SAL
111	Methylphenol [2-]	31				4000	mg/kg	31	0.33	0.41		31			No Concern
112	Methylphenol [4-]	31				4000	mg/kg	31	0.33	0.41		31			No Concern
113	Molybdenum	48	13	2.2	3.6	400	mg/kg	35	2	6.2		48			No Concern
114	Naphthalene	34	1	8.5	8.5	3200	mg/kg	33	0.005	0.41		34			No Concern
115	Nickel	48	1	5.7	5.7	1600	mg/kg	47	5.1	9.2		48			No Concern
116	Nitroaniline [2-]	31				4.8	mg/kg	31	1.6	2		31			No Concern
117	Nitroaniline [3-]	31					mg/kg	31	1.6	2				31	Null Case
118	Nitroaniline [4-]	31					mg/kg	31	1.6	2				31	Null Case
119	Nitrobenzene	32				5.3	mg/kg	32	0.27	0.41		32			No Concern
120	Nitrophenol [2-]	31					mg/kg	31	0.33	0.41				31	Null Case
121	Nitrophenol [4-]	31					mg/kg	31	1.6	2				31	Null Case
122	Nitrosodi-n-propylamine [N-]	31				0.1	mg/kg	31	0.33	0.41			31		Special Case
123	Nitrosodimethylamine [N-]	31					mg/kg	31	0.33	0.41				31	Null Case
124	Nitrosodiphenylamine [N-]	31				140	mg/kg	31	0.33	0.41		31			No Concern
125	Pentachlorophenol	31				5.8	mg/kg	31	1.6	2		31			No Concern
126	Phenanthrene	31	6	0.43	7.6	0.1	mg/kg	25	0.33	0.41	6		25		Exceeds SAL
127	Phenol	31				48000	mg/kg	31	0.33	0.41		31			No Concern
128	Phosphorus	48	48	26.7	461		mg/kg							48	Further Eval.
129	Plutonium-238	48	41	-0.01	0.43	27	pCi/g	7	0.058	0.994		48			No Concern
130	Plutonium-239	48	48	-0.02	24.4	24	pCi/g				1	47			Exceeds SAL
131	Potassium	48	29	145	1330		mg/kg	19	504	601				48	Further Eval.
132	Propylbenzene	3					mg/kg	3	0.005	0.006				3	Null Case
133	Pyrene	31	6	0.57	4.7	2400	mg/kg	25	0.33	0.41		31			No Concern
134	Selenium	48	1	0.55	0.55	400	mg/kg	47	0.3	1.9		48			No Concern
135	Silver	48	4	3.3	9	400	mg/kg	44	2	2.5		48			No Concern
136	Sodium	48	42	104	455		mg/kg	6	102	109				48	Further Eval.
137	Strontium	48	35	1	22.2	70000	mg/kg	13	5	6		48			No Concern
138	Strontium-90	48	40	0.17	5.8	8.9	pCi/g	8	0.29	0.359		48			No Concern
139	Styrene	3				16000	mg/kg	3	0.005	0.006		3			No Concern
140	Tetrachloroethane [1,1,1,2-]	3					mg/kg	3	0.005	0.006				3	Null Case
141	Tetrachloroethane [1,1,2,2-]	3				3.9	mg/kg	3	0.005	0.006		3			No Concern
142	Tetrachloroethylene	3					mg/kg	3	0.005	0.006				3	Null Case
143	Thallium	48				6.4	mg/kg	48	0.3	0.5		48			No Concern

TABLE 2-2. SUMMARY FOR TA-45 SURFACE SOIL SAMPLE ANALYSIS

	Analyte Name	Number of Values Per Analyte	Number of Values >= LOD	Concentration Range Mini-mum	Concentration Range Maxi-mum	SAL	Units	Number of Values < LOD	LOD Range Mini-mum	LOD Range Maxi-mum	Number of Values >SAL	Number of Values <=SAL	Values<LOD & LOD>SAL	Number of Values with No SAL	Analyte Disposition
144	Toluene	3				890	mg/kg	3	0.005	0.006		3			No Concern
145	Trichloro-1,2,2-trifluoroethane	3					mg/kg	3	0.005	0.01				3	Null Case
146	Trichlorobenzene [1,2,3-]	3					mg/kg	3	0.005	0.01				3	Null Case
147	Trichlorobenzene [1,2,4-]	34				160	mg/kg	34	0.005	0.41		34			No Concern
148	Trichloroethane [1,1,1-]	3				1000	mg/kg	3	0.005	0.01		3			No Concern
149	Trichloroethane [1,1,2-]	3				6.3	mg/kg	3	0.005	0.01		3			No Concern
150	Trichloroethene	3				3.2	mg/kg	3	0.005	0.01		3			No Concern
151	Trichlorofluoromethane	3					mg/kg	3	0.01	0.01				3	Null Case
152	Trichlorophenol [2,4,5-]	31				8000	mg/kg	31	0.33	0.41		31			No Concern
153	Trichlorophenol [2,4,6-]	31				64	mg/kg	31	0.33	0.41		31			No Concern
154	Trichloropropane [1,2,3-]	3					mg/kg	3	0.005	0.01				3	Null Case
155	Trimethylbenzene [1,2,4-]	3					mg/kg	3	0.005	0.01				3	Null Case
156	Trimethylbenzene [1,3,5-]	3					mg/kg	3	0.005	0.01				3	Null Case
157	Tritium	45	41	0.022	0.026	1.5E+07	pCi/g	4	0.01	0.03		45			No Concern
158	Tritium	48	44	200	3000		pCi/l	4	100	1310				48	Further Eval.
159	Uranium-234	48	48	0.476	7.76	86	pCi/g					48			No Concern
160	Uranium-235	48	43	0.022	0.26	18	pCi/g	5	0.075	0.12		48			No Concern
161	Uranium-238	48	48	0.444	2.19	59	pCi/g					48			No Concern
162	Vanadium	48	42	2.4	22.8	560	mg/kg	6	2	2.2		48			No Concern
163	Vinyl acetate	3					mg/kg	3	0.01	0.01				3	Null Case
164	Vinyl chloride	3					mg/kg	3	0.01	0.01		3			Null Case
165	Xylenes (o + m + p) [Mixed-]	3				160000	mg/kg	3	0.005	0.01		3			No Concern
166	Zinc	48	48	25.4	99.5	24000	mg/kg					48			No Concern
	Total Number of Values	3963	1087					2876			62	2554	191	1156	

Notes:

1. The table summarizes the analytical information available in the FIMAD database on December 8, 1993, for TA-45 surface soil samples. Each analyte of interest is listed along with its units and accompanying summary information.

2. Blanks in the concentration columns indicate that all values were less than the LOD.

3. The column labeled SAL gives the screening action level for each analyte, where available. Blanks in the SAL column indicate that a SAL was not available for that analyte.

4. For summary display, the analyte values have been divided into two groups, those that are above the LOD and those that are below the LOD. For the values that are above the LOD, the table gives the number of values in this group along with the range of concentrations measured for that analyte. For the values that are below the LOD, the table gives the number of analyses in this group along with the LOD range for that analyte.

5. The last five columns further categorize the analytes based on value comparisons to SAL and LOD. Four of the columns contain the number of values in each of four categories:
   (a) Values that exceeded the SAL,
   (b) Values that do not exceed the SAL,
   (c) Values where the analyte LOD is greater than the SAL and the analyte value is less than LOD, and
   (d) Values for which a SAL is not available

6. The last column indicates analyte disposition as described to the right

Analyte Disposition Column Categories:

1. " Exceeds SAL" indicates that one or more analyte values exceeded the SAL for that analyte.

2. "Further Evaluation" ("Further Eval.")indicates that one or more analyte values were greater than the LOD and that there is no current SAL for comparison.

3. "Special Case" indicates that the analyte values are less than the LOD for that analyte, and the SAL is known to be less than the LOD.

4. "Null Case" indicates that the analyte values are less than the LOD for that analyte, and the SAL is unknown.

5. "No Concern" indicates that the analyte values are all less than the SAL for that analyte.

Interpretation of Analysis

The ten analytes that were labeled "Exceeds SAL" had at least one value that exceeded the corresponding SAL. These analytes were arsenic, beryllium, cesium-137, plutonium-239, benzo[a]pyrene, benzo[a]anthracene, benzo[b]fluoranthene, ideno[1,2,3-cd]pyrene, 2-methylnaphthalene, and phenanthrene. Each of these constituents is undergoing additional evaluation to determine the distribution of concentrations and the magnitude of the exceedances.

Although arsenic values exceeded the SAL, arsenic occurs naturally in relatively high concentrations in the volcanic rock found in the Los Alamos area. Preliminary analyses indicated that the sample arsenic values are not above background (1–11 ppm) and do not represent an increased risk to human health.

Beryllium is one of the few analytes with the SAL less than the LOD; therefore, any values above the LOD automatically exceed SAL. Examining the beryllium entry in Table 2-2 reveals that only one of 48 measurements exceeded the LOD. Also note that the LOD range spans the single value measured above the LOD, placing some question on the meaningfulness of this data point.

A single value of cesium-137 that exceeded the SAL was obtained. The single value was from a near-surface sample obtained from a cliff face and is undergoing further evaluation.

One of the plutonium-239 values was 24.4 pCi/g, just above the SAL of 24.0 pCi/g. Some of the values along the drainage from the former TA-1 acid waste line and the connecting drainage from the wastewater treatment facility were elevated above background level but below the SAL. Based on these results, Plutonium-239 was identified as a potential contaminant of concern and was proposed for inclusion in a preliminary baseline risk assessment.

The remaining constituents with values above SAL are all polycyclic aromatic hydrocarbons. These constituents are undergoing further evaluation.

The eleven analytes that were labeled "Further Evaluation" had readings above the LOD yet had no SAL for comparison: aluminum, calcium, cobalt, dibenzofuran, iron, lithium, magnesium, phosphorus, potassium, sodium, and tritium. Clearly, these analytes warrant further evaluation either to develop an appropriate SAL for comparison or to examine the implication of the concentration value using an alternative criteria.

The "Special Case" category represents an analyte disposition ambiguity for those analytes with values less than the LOD and with SALs known to be less than the LOD. Only two analytes fall into this category that do not already fall into one of the earlier categories: bis(2-chloroethyl)ether and nitrosodi-n-propylamine[N-]. Note that beryllium fits the definition of this category because the SAL is less than the LOD; however, it also has at least one value that exceeds the SAL, and therefore has been included in the "Exceeds SAL" category. The number of analytes in this category may grow as the unknown SALs for other analytes become known.

The 52 analytes forming the "Null Case" category are characterized as having values less than the LOD and an unknown SAL for that analyte. The fact that the value is less than the LOD is a strong indicator that these analytes will be of no concern but is not totally conclusive. If the unknown SAL were less than the LOD, the analyte would join the "Special Case" category above. If the unknown SAL were greater than the LOD, the analyte would join the "No Concern" category below.

The 91 analytes marked "No Concern" form the most clear-cut grouping of analytes relative to disposition. All of these analytes have known SALs and either (a) measured values below the SAL or (b) values below the LOD with the LOD ranges below SAL. There is no question that these 91 analytes are of no concern.

2.5 ADS 1082—TAs-11, -13, -16, -24, -25, -28, -37 (Project Leader: Brad Martin)

Draft Volume II of the RFI work plan for OU 1082 was delivered on schedule for internal review. Activities began for the development of the first draft of Volume III of the RFI work plan, which addresses the next approximately 100 PRSs in OU 1082; it is scheduled for delivery to the EPA in July 1995. The storm water run-on project for the Area P Landfill was completed on schedule in accordance with the closure plan submitted to the NMED in August 1993.

2.6 ADS 1085—TAs-12, -14, -67 (Project Leader: Paul Aamodt)

The first draft of the RFI work plan for OU 1085 was essentially completed in early December and has undergone an informal internal review. Calvin Martell retired in October, and Paul Aamodt became acting operable unit project leader. The development of a new Baseline for ADS 1085 is progressing on schedule.

2.7 ADS 1086—TA-15 (Project Leader: Caroline Mason)

Comments have not been received from the EPA on the draft RFI work plan for OU 1086, submitted July 1, 1993. Preliminary fieldwork was accomplished. The work included sampling at the major drainage areas over the entire mesa to characterize the main hydrologic pathways and noninvasive radiological screening of E-F and R-44 sites using long-range alpha detector instrumentation. The main sampling effort at TA-15 will not start until the snow melts in the spring of 1994.

2.8 ADS 1093—TA-18 (Project Leader: Gene Gould)

OU 1093 includes a target practice area commonly referred to as the Bazooka Impact Area (PRS 27-003), which was used by the US Army in 1947. The site is located in Pajarito Canyon, north of Pajarito Road, 0.25 mi east of the TA-18 sewage lagoons (TA-36-135). The site has been fenced since 1962. In October and November 1993, an explosive ordnance disposal team from Environmental Hazards Specialists International, Inc., used two types of magnetic detectors to locate surface and subsurface metallic objects to a depth of 18 in. First, the team determined the east-west boundaries of the zone. Next, it conducted sequential magnetic sweeps in 10-ft-wide adjoining lanes parallel to the cliff. Rocks and talus on the cliff were moved to check for any buried ordnance, and the cliff's vertical surfaces were checked by personnel with magnetic detectors rappelling from the mesa top. Sweeps continued until no further ordnance was found. Downrange from the impact area and within the TA-54 fenced area (see Figure 2-2), adjacent portions of OU 1148 also were swept. Small amounts of debris were found, indicating that either the area had not been significantly impacted or that it had been previously cleaned up by US Army explosive ordnance disposal teams during the 1960s and 1970s.

Between October 4 and November 2, 1993, eight live bazooka rounds and six unexploded booster subassemblies were found. In addition, 3,200 pieces of ordnance debris were removed. The unexploded ordnance was detonated in place on five separate occasions, requiring brief closure of Pajarito Road. The debris was screened for radioactivity and sent to the Weapons Prototype Group (ESA-2) for destruction. Several pieces of slightly radioactive fragments from unrelated Laboratory testing were disposed of separately.

2.9 ADS 1098—TAs-2, -41 (Project Leader: Patrick Longmire)

EPA approved the final draft of the RFI work plan for OU 1098 (LANL 1993). Alluvial groundwater within Laboratory boundaries has been found to exceed Laboratory drinking water standards, in some cases, for strontium-90, cesium-137, and tritium. The groundwater standards for strontium-90, cesium-137, and tritium are 8.9, 120, and 20,000 pCi/l, respectively. The sources of strontium-90 and cesium-137 are inactive leach fields. The source of tritium was from a break in a weld seam within the primary-cooling water system for the inactive Omega West Reactor at TA-2. The most recent data for tritium are provided in Table 2-3. Groundwater from characterization well LADP-3 was sampled 326 ft below ground

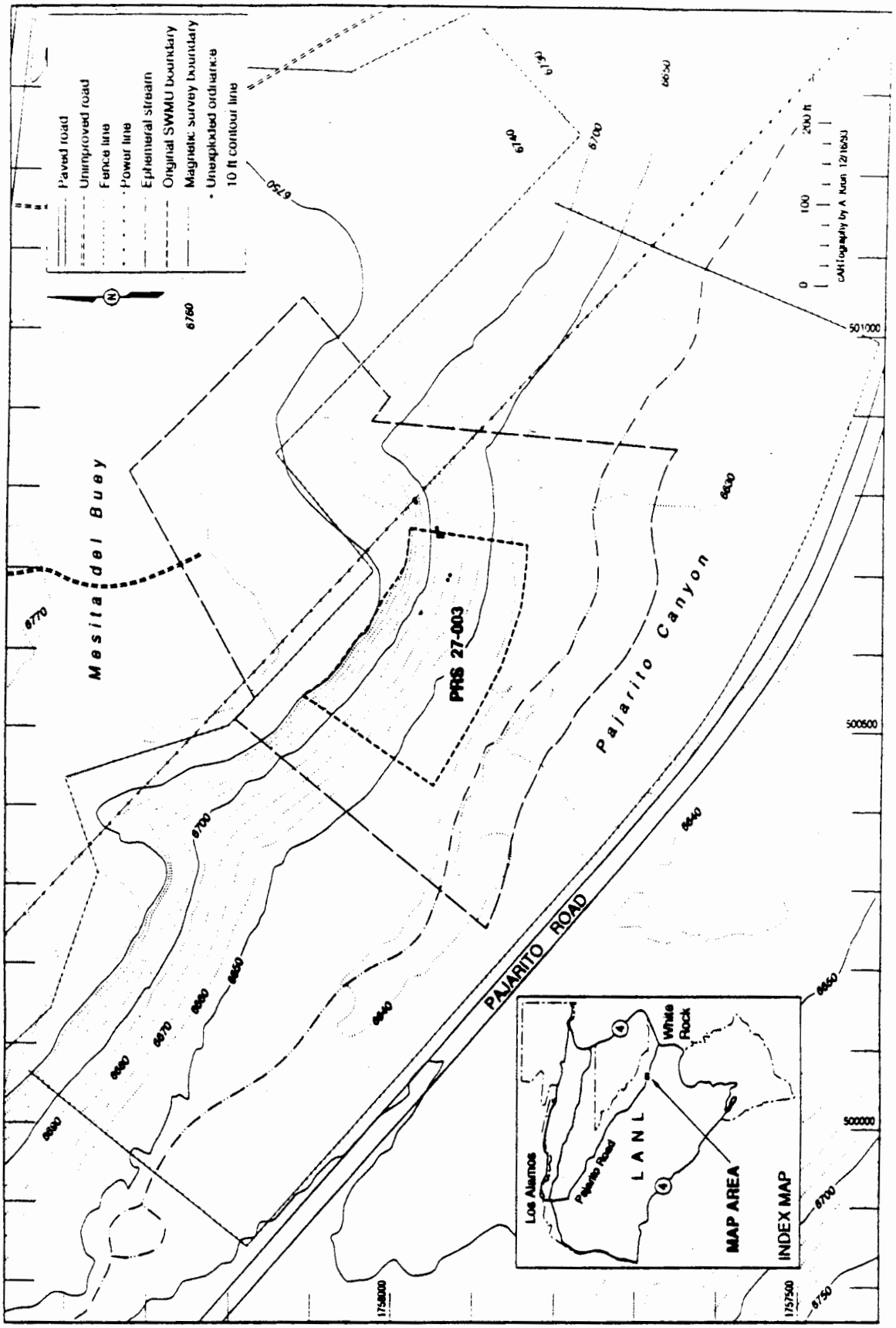


Figure 2-2. Bazooka Impact Area (PRS 27-003), OU 1093.

TABLE 2-3

TRITIUM ACTIVITIES IN ALLUVIAL AND GUAJE PUMICE GROUNDWATER AND SURFACE WATER, LOS ALAMOS CANYON

Date	Characterization Well	Tritium (pCi/l)
	Alluvial Groundwater	
7/29/93	LAO-C	200±300*
7/29/93	LAO-0.7	600±300
7/29/93	LAO-1	1300±300
7/29/93	LAO-3	1100±300
7/29/93	LAO-4	900±300
7/29/93	LAO-4.5	800±300
	Guaje Pumice Groundwater	
12/15/94	LADP-3	6003±160
	Surface Water	
7/29/93	DPS1-SW	200±300

surface within Los Alamos Canyon. The tritium analysis for this sample was done at the University of Miami. The other tritium analyses were done by the Laboratory's Environmental Chemistry Group (CST-9). Additional characterization wells are proposed in the work plan to identify source terms and contaminant distributions in subsurface waters.

2.10 ADS 1100—TA-53 (Project Leader: Gene Gould)

The first draft of the RFI work plan for OU 1100 was submitted to the ER Program Office on November 15, 1993. The first review comments were returned, and the second draft of the work plan is being prepared. OU 1100 team members met with the New Mexico Environment Department (NMED) staff on November 18, 1993, to discuss NMED's comments on the previously submitted closure plan. The formal response to the NMED comments is being prepared.

2.11 ADS 1106—TA-21 (Project Leader: P. G. Eller)

EPA Region 6 granted the Laboratory a variance for submitting Phase Report 1B. The report deadline was extended, and the report was split into two parts, 1B and 1C, because of the volume of data. Phase Report 1B, due January 31, 1994, addresses local contaminant levels of mesa-wide surface soils, mesa-wide investigation of airborne deposition, and filter buildings investigations. Phase Report 1C, due February 28, 1994, addresses outfalls investigations. The first drafts of the two reports have been prepared, and the internal review process has started.

Field activities this quarter included the completion of deep drilling at boreholes LADP-3 and LADP-4 and the installation of a monitoring well at LADP-3, as described in Section 12.5.1.2 of the RFI work plan for

TA-21 (LANL 1991, 0689). A summary of the number of samples collected at deep boreholes LADP-3 and LADP-4 through the end of this quarter is presented in Table 2-4. Fewer samples than planned were collected at LADP-3 because of geologic zones with little or no core recovery. More samples than planned were collected at LADP-4 because drilling progressed beyond the planned depth in an attempt to penetrate to basalt. The number of quality control samples collected differed from the number planned because drilling progress was different from that which was expected, resulting in a change in the required number of trip blanks. Data assessment activities continued for the grid, filter buildings, and outfalls investigations.

TABLE 2-4

FY94 FIRST QUARTER SAMPLING SUMMARY

	Borehole Core Samples		Borehole Water Samples*	Quality Control Samples	
Borehole No.	Planned	Collected	Collected	Planned	Collected
LADP-3	80	63	2	8	10
LADP-4	135	150	0	8	7

*No borehole water samples were planned.

A summary of all samples collected during the FY93-FY94 fieldwork for specified laboratory analyes is provided in Table 2-5. Summaries are presented for the grid extension, Material Disposal Area (MDA) T, outfalls, national pollutant discharge elimination system (NPDES) outfalls, shallow boreholes, deep boreholes LADP-3 and LADP-4, special, and DP Spring samples. Special samples were collected during a buried-tank removal and trenching operation within the process area at TA-21. Currently, few analytical data have been received.

Several schedule deviations occurred this quarter. Deep drilling associated with vadose zone investigations at LADP-3 and LADP-4 was completed well ahead of the planned start date later in FY94. Vadose zone investigations at liquid waste disposal area MDA V (PRS 21-018) remained delayed because of funding limitations. The progress of near-surface and subsurface investigation schedules is presented in Figures 2-3 and 2-4, respectively.

2.11.1 Borehole LADP-4

Borehole LADP-4, the first of the two holes drilled, is located in DP Canyon north of MDAs T and A (see Figure 2-5). LADP-4 was drilled to determine whether perched groundwater occurs beneath DP Canyon and to investigate whether subsurface contaminants from the industrialized areas of TA-21 have migrated northward toward DP Canyon. Geologic and hydrologic data from LADP-4 are being compared with data from nearby boreholes to identify the presence and properties of major hydrogeologic units at TA-21. These data will be used to improve conceptual models for the site, to identify potential transport

TABLE 2-5

PERCENTAGE OF ANALYTICAL LABORATORY RESULTS RECEIVED FOR FY93-94 SAMPLING

Analysis Requested	Number of Samples Submitted	Number of Sample Results Received	Percentage of Data Received	Percentage of Data in FIMAD
Grid Extension				
Gamma Ray Spectrometry	27	0	0%	0%
Tritium	27	0	0%	0%
Isotopic Uranium	27	0	0%	0%
Isotopic Plutonium	27	0	0%	0%
Sr-90	27	0	0%	0%
Am-241	27	0	0%	0%
SVOCs[a]	11	11	100%	0%
VOCs[b]	0	0	0%	0%
Metals	29	0	0%	0%
MDA T				
Gamma Ray Spectrometry	56	0	0%	0%
Tritium	56	0	0%	0%
Isotopic Uranium	56	0	0%	0%
Isotopic Plutonium	56	0	0%	0%
Sr-90	56	0	0%	0%
Am-241	56	0	0%	0%
SVOCs	59	59	100%	0%
VOCs	0	0	0%	0%
Metals	59	0	0%	0%
Outfall PRSs				
Gamma Ray Spectrometry	48	0	0%	0%
Tritium	48	0	0%	0%
Isotopic Uranium	48	0	0%	0%
U-234	0	0	0%	0%
U-235	0	0	0%	0%
U-238	0	0	0%	0%
Isotopic Plutonium	48	0	0%	0%
Sr-90	48	0	0%	0%
Am-241	48	0	0%	0%
Isotopic Thorium	16	0	0%	0%
SVOCs	17	0	0%	0%
VOCs	0	0	0%	0%
Metals	0	0	0%	0%

TABLE 2-5 (continued)

Analysis Requested	Number of Samples Submitted	Number of Sample Results Received	Percentage of Data Received	Percentage of Data in FIMAD
NPDES Outfalls				
Gamma Ray Spectrometry	31	0	0%	0%
Tritium	31	0	0%	0%
Isotopic Uranium	31	0	0%	0%
U-234	0	0	0%	0%
U-235	0	0	0%	0%
U-238	0	0	0%	0%
Isotopic Plutonium	31	0	0%	0%
Sr-90	31	2	6%	0%
Am-241	0	0	0%	0%
Isotopic Thorium	0	0	0%	0%
SVOCs	31	21	68%	0%
VOCs	35	21	60%	0%
Metals	35	35	100%	0%
Shallow Boreholes				
Gross Alpha Particles	0	0	0%	0%
Gross Beta Particles	0	0	0%	0%
Gross Gamma Rays	0	0	0%	0%
Gamma Scan	0	0	0%	0%
Gamma Ray Spectrometry	79	0	0%	0%
Tritium	79	0	0%	0%
Isotopic Uranium	79	0	0%	0%
Isotopic Plutonium	79	0	0%	0%
Sr-90	79	0	0%	0%
Am-241	79	0	0%	0%
Isotopic Thorium	75	0	0%	0%
SVOCs	83	59	71%	0%
VOCs	92	75	82%	0%
Metals	83	0	0%	0%
LADP-3				
Gross Alpha Particles	2	2	100%	0%
Gross Beta Particles	1	1	100%	0%
Gross Gamma Rays	0	0	0%	0%
Gamma Scan	0	0	0%	0%
Gamma Ray Spectrometry	7	1	14%	0%
Tritium	8	2	25%	0%
Isotopic Uranium	7	0	0%	0%
Isotopic Plutonium	7	1	14%	0%

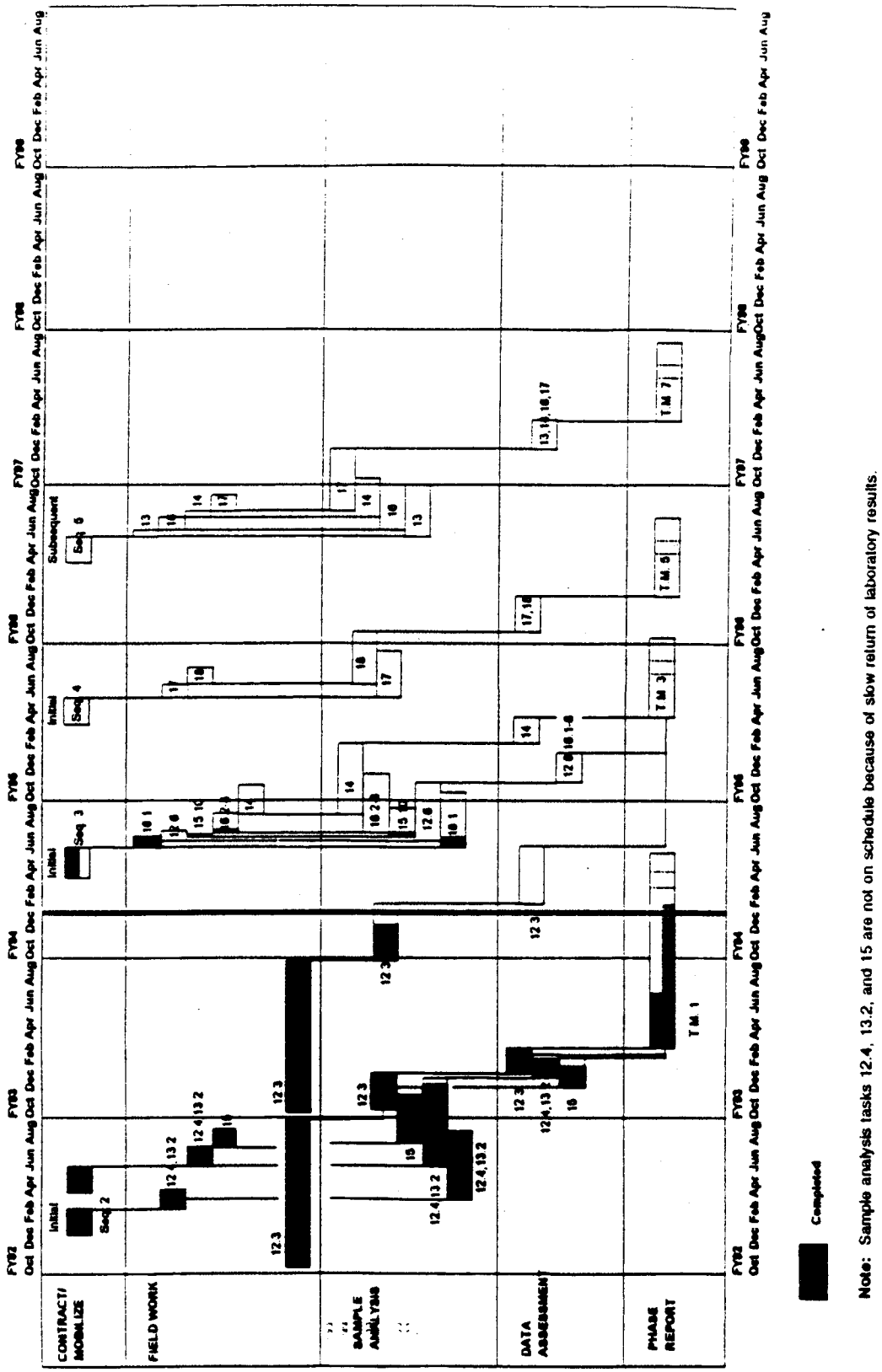
TABLE 2-5 (continued)

Analysis Requested	Number of Samples Submitted	Number of Sample Results Received	Percentage of Data Received	Percentage of Data in FIMAD
Sr-90	7	1	14%	0%
Am-241	5	0	0%	0%
Isotopic Thorium	7	0	0%	0%
SVOCs	7	4	57%	0%
VOCs	10	2	20%	0%
Metals	7	0	0%	0%
LADP-4				
Gross Alpha Particles	0	0	0%	0%
Gross Beta Particles	0	0	0%	0%
Gross Gamma Rays	0	0	0%	0%
Gamma Scan	0	0	0%	0%
Gamma Ray Spectrometry	7	1	14%	0%
Tritium	7	0	0%	0%
Isotopic Uranium	7	0	0%	0%
Isotopic Plutonium	7	1	14%	0%
Sr-90	7	1	14%	0%
SVOCs	9	4	44%	0%
VOCs	10	3	30%	0%
Metals	9	0	0%	0%
TCLP[c] Metals	0	0	0%	0%
Special Samples				
Gross Alpha Particles	3	1	33%	0%
Gross Beta Particles	3	1	33%	0%
Gross Gamma Rays	3	0	0%	0%
Gamma Scan	3	1	33%	0%
Gamma Ray Spectrometry	0	0	0%	0%
Tritium	0	0	0%	0%
Isotopic Uranium	0	0	0%	0%
Isotopic Plutonium	0	0	0%	0%
Sr-90	0	0	0%	0%
SVOCs	3	2	67%	0%
VOCs	3	0	0%	0%
Metals	3	0	0%	0%
TCLP Metals	3	0	0%	0%

TABLE 2-5 (continued)

Analysis Requested	Number of Samples Submitted	Number of Sample Results Received	Percentage of Data Received	Percentage of Data in FIMAD
		DP Spring		
Gross Alpha Particles	5	0	0%	0%
Gross Beta Particles	5	0	0%	0%
Gross Gamma Rays	0	0	0%	0%
Gamma Scan	0	0	0%	0%
Gamma Ray Spectrometry	0	0	0%	0%
Isotopic Uranium	5	3	60%	0%
Isotopic Plutonium	5	1	20%	0%
Sr-90	5	4	80%	0%
Am-241	0	0	0%	0%
Cs-137	5	0	0%	0%
Ra-226	5	0	0%	0%
Th-230	5	0	0%	0%
SVOCs	5	3	60%	0%
VOCs	7	5	71%	0%
Metals	5	2	40%	0%
TCLP Metals	0	0	0%	0%
Hg	5	2	40%	0%
Bromide	5	4	80%	0%
Silica	5	2	40%	0%
Cyanide	5	5	100%	0%
Stable Isotopes D, ^{18}O	5	3	60%	0%
Tritium	5	3	60%	0%
Sr-86, 87	5	3	60%	0%
General Chemistry, Filtered	5	3	60%	0%
General Chemistry, Unfiltered	5	3	60%	0%
Boron	5	0	0%	0%
Chlorate	5	0	0%	0%
Ammonium	5	0	0%	0%
Chloride	5	0	0%	0%
Sulfate	5	0	0%	0%
Fluoride	5	0	0%	0%
Nitrate	5	0	0%	0%
Nitrite	5	0	0%	0%
Phosphate	5	0	0%	0%
Dissolved Organic Carbon	5	0	0%	0%

a. SVOCs = semivolatile organic compounds.
b. VOCs = volatile organic compounds.
c. TCLP = toxicity characteristic leaching procedure.



Note: Sample analysis tasks 12.4, 13.2, and 15 are not on schedule because of slow return of laboratory results.

Figure 2-3. TA-21 OU progress: near-surface investigations schedule.

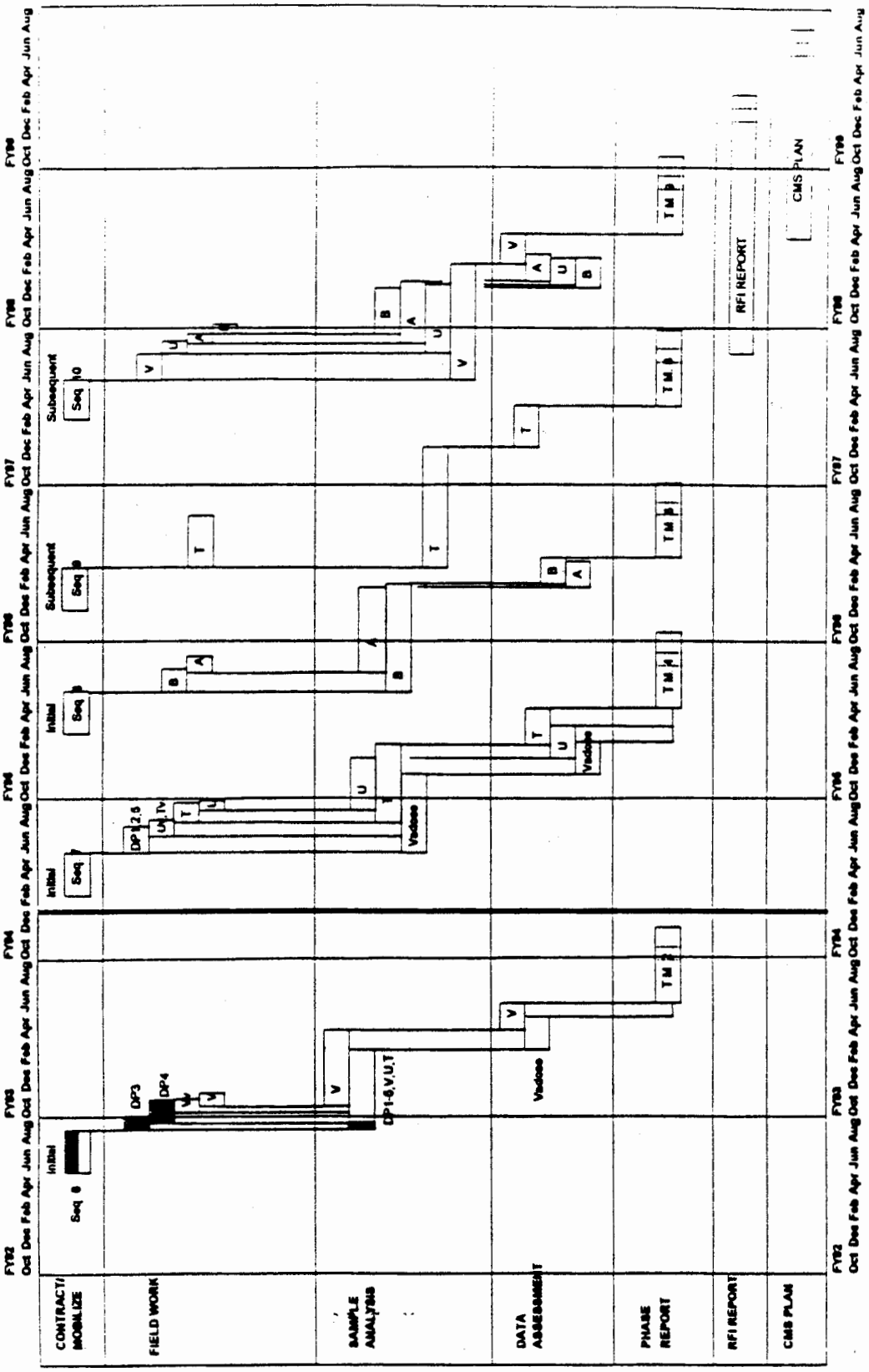


Figure 2-4. TA-21 OU progress: subsurface investigations schedule.

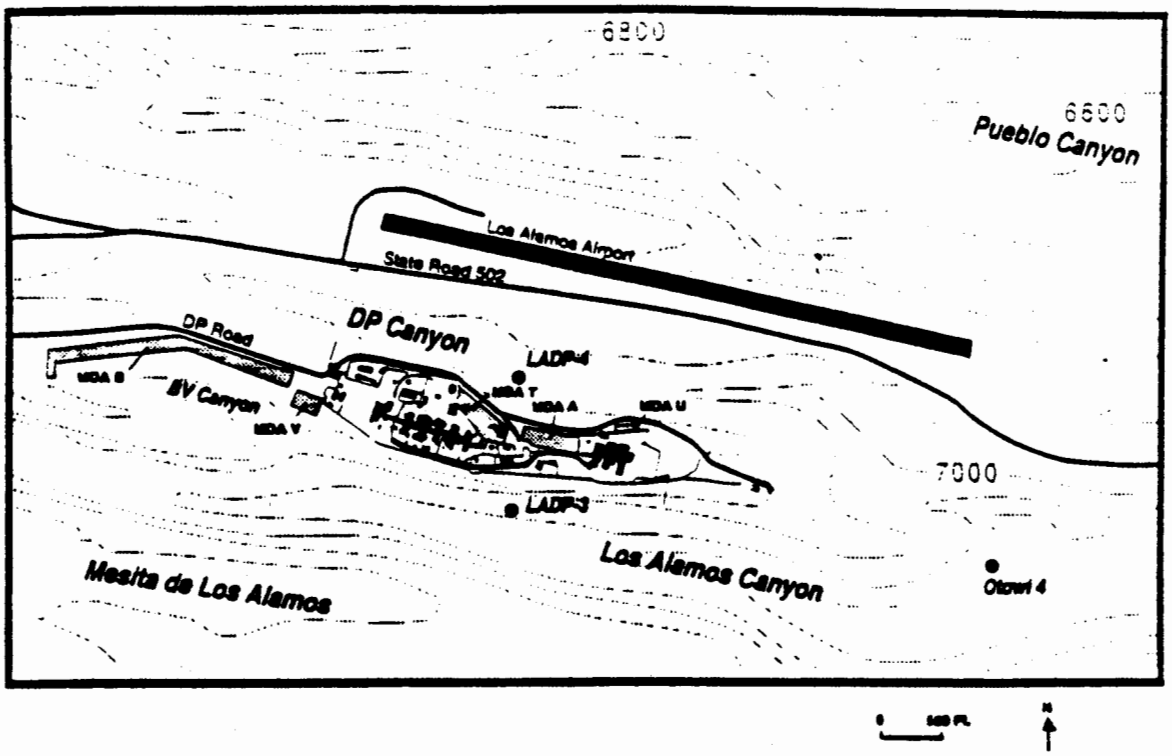


Figure 2-5. Location map of deep boreholes LADP-3 and LADP-4 at TA-21.

pathways, and to provide useful planning information for subsequent drilling operations at TA-21. All work was done according to the RFI work plan.

Drilling of LADP-4 began on August 30, 1993, and was completed on November 7, 1993. LADP-4 was drilled to a depth of 800 ft using air-rotary methods. ODEX casing (8.625-in. outer diameter) lines the hole to a depth of 579 ft. From 579 to 800 ft, the ODEX casing telescopes to 6.626-in. outer diameter. Continuous core of 4.5-in. diameter was collected from the surface to 573-ft depth. Cuttings were collected from 573- to 800-ft depth because the unconsolidated nature of the Puye Formation prevented intact core recovery. ODEX casing remains in place until a decision is reached on final disposition of this borehole.

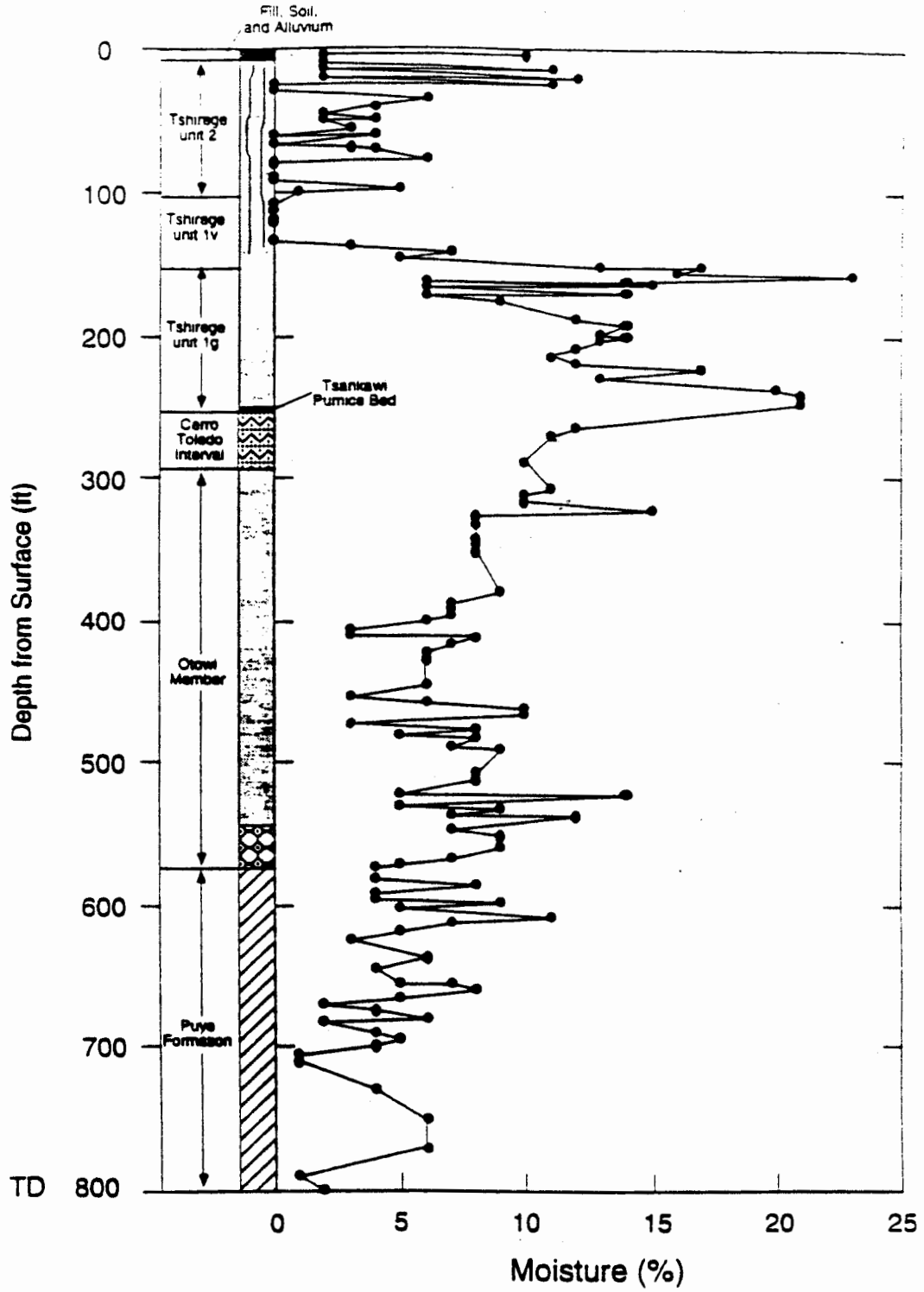
2.11.1.1 Summary of Sampling Activities

Moisture/tritium samples were collected every 5 ft for the total depth of LADP-4, and six background geochemical and radiochemical samples also were collected. The analytical suite is presented in Table 12.5-III of the RFI work plan. Laboratory analytical results are not yet available. In addition, 25 high-quality intact core samples were collected for detailed characterization of hydrogeologic parameters later this winter. The core samples were sealed in airtight containers to prevent changes in moisture content before analysis.

2.11.1.2 Preliminary Analytical Results

Moisture contents were determined for 139 samples from LADP-4. The average moisture content of core and cutting samples was 7%, and the maximum was 23%. Saturated zones were not encountered at any depth. Moisture distribution as a function of depth is shown in Figure 2-6.

Analyses indicate that moisture contents are somewhat elevated (~10%) in surface soils and in the upper part of bedrock tuffs in LADP-4. Moisture in the tuff decreases with depth until approximately 136 ft, where a noticeable increase in moisture content occurs. The increase occurs at the abrupt transition between devitrified tuffs of Tshirege Unit 1v and the vitric tuffs of Tshirege Unit 1g, with peak moisture contents reaching 23%. Moisture contents also are elevated (~20%) in the lowermost part of Tshirege Unit 1g and



TD = terminal depth.

Figure 2-6. Variation in moisture contents as a function of depth in borehole LADP-4.

in the underlying Tsankawi Pumice Bed. Although somewhat variable, moisture in LADP-4 generally decreases with depth below the Tsankawi Pumice Bed.

Laboratory tritium results are not yet available for most samples taken from LADP-4. However, initial screening of samples in the field laboratory indicates that low-level tritium is present in some samples. A high-priority laboratory analysis yielded 13.2 ± 1.1 nCi/l tritium from a single sample at a depth of 158.6 to 160.1 ft, the contact between Tshirege Unit 1v and Tshirege Unit 1g. This value compares with a tritium SAL of 1.5×10^7 nCi/l.

2.11.1.3 Preliminary LADP-4 Borehole Geology

Borehole LADP-4 penetrated alluvium on the canyon floor and extended into the following bedrock units: the Tshirege Member of the Bandelier Tuff (including the Tsankawi Pumice Bed); fluvial sediments of the Cerro Toledo Interval; the Otowi Member of the Bandelier Tuff (including the Guaje Pumice Bed); and fluvial sandstones, gravels, and conglomerates of the Puye Formation. A preliminary geologic log for LADP-4 is presented in Figure 2-6 and in Table 2-6.

The original target depth of 675 ft for LADP-4 was based on occurrences of perched water in nearby boreholes in Los Alamos and Pueblo Canyons. The borehole was also designed to intersect a basalt flow penetrated by boreholes Otowi 4 and T-2 in Los Alamos Canyon. Where present, this basalt could act as a barrier to the downward migration of groundwater through the vadose zone, causing water to perch. The borehole was deepened to 800 ft to ensure that a basalt flow does not exist any deeper than originally projected. The extended borehole did not encounter basalt, and drilling was terminated in gravels of the Puye Formation.

2.11.2 Borehole LADP-3

Borehole LADP-3, which is located in Los Alamos Canyon south of MDAs T and A (see Figure 2-5), was drilled to determine whether perched groundwater occurs at depths greater than the alluvial aquifer system in Los Alamos Canyon. In addition, geologic and hydrologic data from LADP-3 are being collected to characterize the major hydrogeologic units at TA-21, including a lateral variability. All work was done according to the RFI work plan.

Drilling and construction of LADP-3 began on November 2, 1993, and was completed on December 17, 1993. Originally, the target depth for LADP-3 was determined by the elevation of the basalt penetrated by boreholes Otowi 4 and T-2 about one mile east in Los Alamos Canyon, or a total depth of 490 ft, whichever was encountered first. However, a perched water zone was encountered at a depth of 326 ft, at the base of the Guaje Pumice Bed. Grout-pumping experiments confirmed the presence of a clay layer at the base of the Guaje Pumice Bed. The clay layer causes water to perch.

LADP-3 was drilled from the surface to 233 ft using an 8-in. hollow-stem auger. The borehole was completed to the final depth of 349 ft using air-rotary drilling methods. Rock coring, using a 4.5-in.-diameter rock barrel, alternated with advancement of 6.73-in.-inner-diameter ODEX casing from 233 to 349 ft. A small amount of shallow alluvial water was encountered at a depth of 27 ft and at ~35 ft. Alluvial and surface groundwater were cased out of the borehole by installing and grouting permanent 10.75-in.-outer-diameter surface casing to a depth of 83 ft. As specified in the RFI work plan, a well was completed at the deep perched water zone. The monitoring well was completed with 2-in. polyvinyl chloride casing inside the temporary ODEX casing that was subsequently removed. The well was screened from 316 to 326 ft. The estimated thickness of the perched zone is 6 to 10 ft. Details of the completed monitoring well are shown in Figure 2-7. After the monitoring well is developed, a continuous water-level-monitoring transducer will be installed, and quarterly water sampling will be conducted.

2.11.2.1 Summary of Sampling Activities

Moisture/tritium samples and water samples were collected every 5 ft for the total depth of LADP-3. Four background geochemical and radiochemical samples also were collected. The analytical suite for chemical and radionuclide characterization is described in Table 12.5-III of the RFI work plan. Water samples were collected from the deep perched zones. Except as noted below, Laboratory analyses are

TABLE 2-6

PRELIMINARY GEOLOGIC LOG OF LADP-4

Depth (ft)	Stratigraphic Unit	Description
0-8	Fill/Top Soil	Drill pad fill material consisting of silty sand with a trace of gravel. Moist, brown.
8-102	Tshirege Unit 2 (Qbt-2)	Massive, nonwelded to moderately welded vapor phase altered ignimbrite, ~20-25% vapor phase altered pumices. Pumices are light to medium gray, some quartz crystals in a pinkish gray to gray matrix. Unit exhibits good fracturing.
102-151	Tshirege Unit 1v (Qbt-1v)	Massive, nonwelded to poorly welded vapor phase altered ignimbrite, ~20% vapor phase altered pumices to 5cm. Pumices are gray to chocolate brown in color and have a sugary texture, 5-10% quartz and sanidine crystals in a grayish white matrix. "Vapor phase notch" forms base of Unit 1v from 148-151 ft.
151-250	Tshirege Unit 1g (Qbt-1g)	Massive, nonwelded to very poorly welded vitric ignimbrite, ~20% vitric pumices to 7 cm with fibrous texture. Pumices are medium to dark gray, ~15% sanidine and quarts crystals, rusty red matrix, trace of lithics. Ash-rich surge beds occur near base of unit. Tsankawi Pumice Bed of the Tshirege Member forms base of Unit 1g from 250-253.5 ft. Pumice beds consist of clast-supported pumice fallout deposits. Pumice diameters average 3cm, are fibrous, and have a vitreous luster. Pumices are bluish white in color.
253.5-293	Cerro Toledo Formation (Qct)	Reworked sediments consisting of ~15% light grey to rust brown pumices in a matrix of orangish-pink tuffaceous sands. Pumices have subhedral crystals, traces of lithic material.
293-545	Otowi Member Bandelier Tuff (Qbo)	Massive, poor to moderately welded ignimbrite, ~15-20% rust brown vitric crystal rich pumices in an orange-pink matrix. Pumices are fibrous in appearance and have a slight vitreous luster. Pumices are 2-5cm, ~2-5% angular black to brown lava lithics, lithics from 0.1-2cm, ~5% crystals. Guaje Pumice Bed forms base of Otowi from 545-573 ft. Pumice bed consists of clast-supported fallout deposit. Pumices average 1-2cm in diameter, are fibrous, and have a vitreous luster. Pumices are light gray in color.
573-800	Puye Formation (QTp)	Fine to coarse gravels in a matrix of sand silt and little clay. Gravels consist of intermediate composition lavas, color is gray to dark brown where moist. Interval between 700 ft and 800 ft has alternating zones of moist gravels and slightly moist to dry silts and sands.

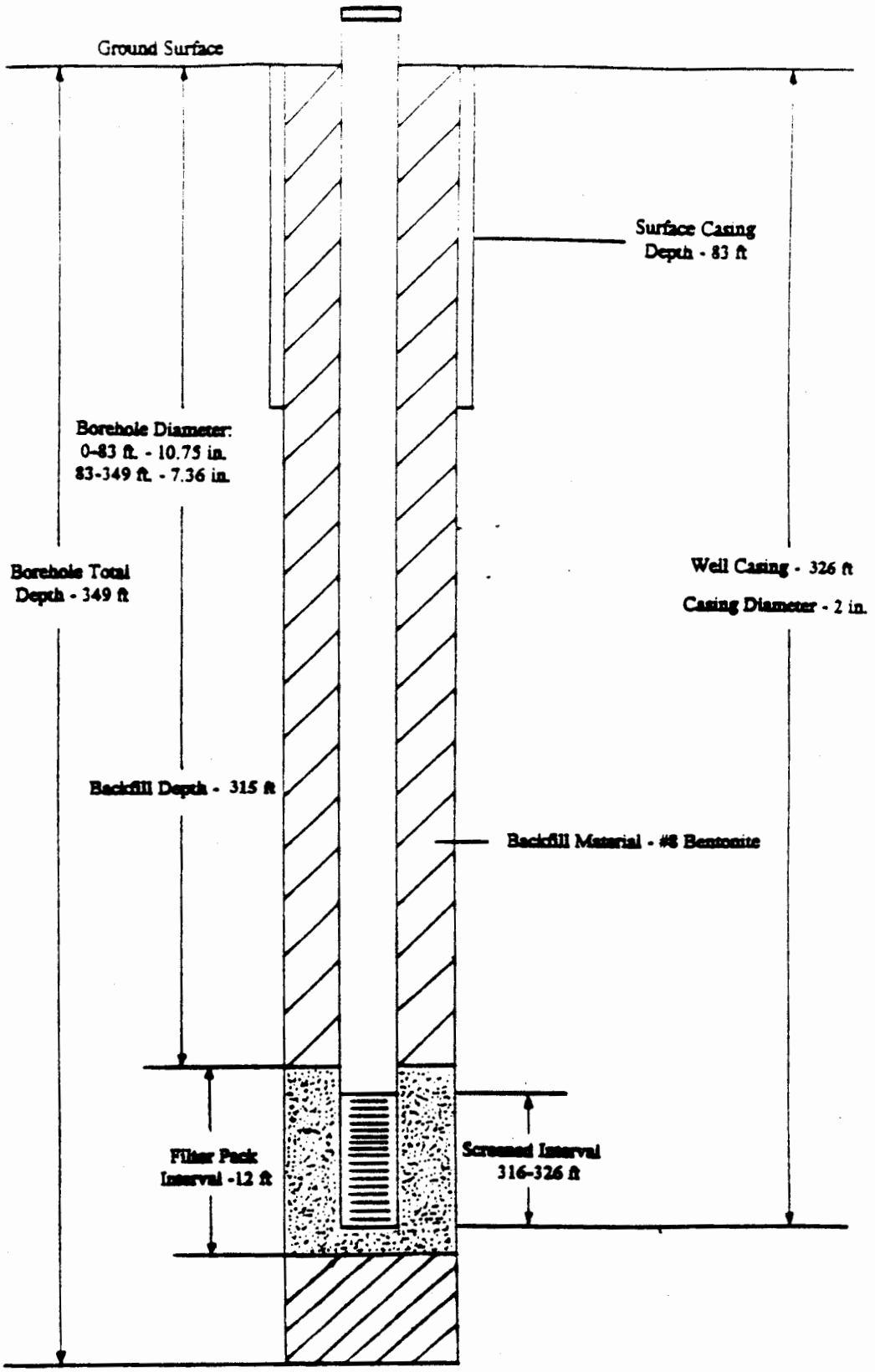


Figure 2-7 Monitoring well construction diagram of LADP-3.

not yet available. In addition, 36 high-quality intact core samples were collected for analysis of hydrogeologic properties later this winter. The core was sealed in air-tight containers to prevent changes in moisture content.

2.11.2.2 Preliminary Analytical Results

A water sample from the deep perched water zone at 326 ft was analyzed for major constituents and tritium. Table 2-7 summarizes the preliminary results from these analyses.

Analyses indicate that the water chemistry from the perched zone is similar in major constituents to that of the shallow alluvial aquifer. This similarity, in addition to the presence of low-level tritium contamination, strongly suggests a hydrologic connection between the two aquifer systems. Additional analyses are being conducted to determine whether other contaminants are present in the perched aquifer system and to further investigate the possibility of a hydrologic connection between the alluvial and perched aquifer systems. Preliminary low-level measurements of Cs-137 and plutonium isotopes failed to detect these constituents. Field laboratory screening results for samples collected at LADP-3 and LADP-4 are presented in Table 2-8.

Moisture content was determined for 59 core and cuttings samples from LADP-3. Moisture content in unsaturated samples ranged from 7 to 41%, with an average of about 16%. Moisture distribution as a function of depth is shown in Figure 2-8. Moisture content is most elevated (~40%) in stream alluvium above the bedrock tuffs in LADP-3, coinciding with the shallow alluvial aquifer of Los Alamos Canyon. Moisture contents in the bedrock tuff are relatively low (12 to 15%) beneath the canyon floor, but moisture increases to about 37% in the upper part of the Guaje Pumice Bed, just above the deeper perched water zone.

2.11.2.3 Preliminary LADP-3 Borehole Geology

LADP-3 penetrated a thick sequence of slope-derived colluvium and stream-derived alluvium on the canyon floor before entering bedrock. The shallow alluvial aquifer was encountered at depths of 27 ft and 35 ft despite attempts to avoid shallow groundwater by locating the hole as far as possible from the stream channel. It was a concern that potentially contaminated water at shallow depths would cross-contaminate other borehole depths. The shallow alluvial aquifer produced water from a 2-ft-thick, cobble-rich bed within the stream alluvium. Bedrock units penetrated by the borehole include the Otowi Member of the Bandelier Tuff, including the Guaje Pumice Bed, and gravels of the Puye Formation. Perched water was encountered in the lower part of the Guaje Pumice Bed, and drilling was terminated 11 ft into the Puye Formation after determining the extent of the perched zone. The perched zone is 6 to 10 ft thick and straddles the Guaje-Puye contact above a suspected clay layer. A preliminary geologic log for LADP-3 is presented in Table 2-9 and in Figure 2-8.

2.12 ADS 1111—TAs-6, -7, -22, -40, -58, -62 (Project Leader: Cheryl K. Rofer)

A readiness review was held on October 15, 1993, for radiological and magnetrometric surveys of Aggregate 1, which includes MDA F and adjacent areas [PRSs 6-005 and 6-007 (a–e)]. The land survey to locate data collection points was completed. More than 200 points at MDA F and adjacent areas were surveyed using the field instrument for detection of low-energy radiation; no elevated readings were found. The locations and numbers of pits at MDA F, which was active in the late 1940s and early 1950s, are largely unknown, and little documentation exists for this area. Therefore, work has begun on photographic enhancement and analysis of Aggregate 1 to help locate probable pits. A contract has been placed with EG&G Idaho for a detailed magnetometry survey of Aggregate 1, which is planned for January 1994. EG&G's magnetometry unit can record data rapidly so that buried metal objects can be located much more accurately than with ordinary magnetometry units.

TABLE 2-7

CHEMISTRY OF WATER FROM PERCHED ZONE AT 326-FT DEPTH IN BOREHOLE LADP-3, LOS ALAMOS CANYON

Sample PP 93-36

Constituent	Analysis Result[a]	Constituent	Analysis Result
Al	0.21 ± 0.03	Si	20.0 ± 0.1
As	<0.001	Sr	0.13 ± 0.01
B	0.04 ± 0.01	Zn	0.16 ± 0.01
Ba	0.02 ± 0.01	ClO_3	<0.02
Br	0.07	CO_3 Cond.[b]	302 (µmho/cm)
Ca	11.7 ± 0.1	CO_3	0
Cl	46.8	HCO_3	65
F	0.38	NH_4	0.32
Fe	0.13 ± 0.01	NO_2	0.37
Hg	<0.002	NO_3	1.21
K	8.7 ± 0.3	OH	0
Li	0.02 ± 0.01	PO_4	<0.02
Mg	4.08 ± 0.01	SO_4	12.8
Mn	0.44 ± 0.01	Acidity	6.62 pH
Na	33.8 ± 0.9	TDS[c]	206.9
Sb	<0.001	^3H	5500 ± 700 (pCi/l)
Se	<0.001		

a. All values reported in ppm unless otherwise noted.
b. Cond. = conductivity.
c. TDS = total dissolved solids.

TABLE 2-8

FIELD LABORATORY SCREENING RESULTS FOR SAMPLES COLLECTED AT LADP-3 AND LADP-4

ER Program Sample ID	Alpha (pCi/g)	Beta (pCi/g)	Gamma (pCi/g)	H-3 (pCi/g)	Moisture (%)
AAA4185	11.8	-15.1	0.4	in process	in process
AAA4187	-35.3	-30.9	1.6	in process	in process
AAA4189	-58.8	16.9	0	in process	in process
AAA4190	-47.1	24.6	2.8	in process	in process
AAA4192	0	-11.2	2.9	in process	in process
AAA4198	26.5	28.5	-3.2	NR*	NR
AAA4200	15.8	3.1	-3	in process	in process
AAA4202	10.9	-6.7	3.2	NR	NR
AAA4203	3.6	6.2	6.3	NR	NR
AAA4205	-10.5	-18	3.3	NR	NR
AAA4207	-11.8	-32.3	4	in process	in process
AAA5685	-5.3	-2.3	1.1	NR	NR
AAA6145	0	8.7	-4.2	in process	in process
AAA6146	-5.3	-8.7	-6.7	in process	in process
AAA6147	-5.3	-12.8	-4.9	in process	in process
AAA6148	-5.3	-0.6	-4.7	in process	in process
AAA6149	10.5	-4.1	-3.6	in process	in process
AAA6150	5.3	-3.2	-2.1	in process	in process
AAA6151	15.8	24	-2.2	in process	in process
AAA6152	10.5	19.1	-4.4	in process	in process
AAA6153	NR	NR	NR	in process	in process
AAA6154	NR	NR	NR	in process	in process
AAA6155	NR	NR	NR	in process	in process
AAA6156	NR	NR	NR	in process	in process
AAA6157	NR	NR	NR	in process	in process
AAA6158	NR	NR	NR	in process	in process
AAA6159	NR	NR	NR	in process	in process
AAA6160	NR	NR	NR	in process	in process
AAA6161	NR	NR	NR	in process	in process
AAA6162	NR	NR	NR	in process	in process
AAA6163	NR	NR	NR	in process	in process
AAA6164	NR	NR	NR	in process	in process
AAA6165	NR	NR	NR	in process	in process
AAA6166	NR	NR	NR	in process	in process
AAA6170	NR	NR	NR	in process	in process
AAA6171	NR	NR	NR	in process	in process
AAA6172	NR	NR	NR	in process	in process
AAA6173	NR	NR	NR	in process	in process
AAA6174	NR	NR	NR	in process	in process
AAA6175	NR	NR	NR	in process	in process
AAA6176	NR	NR	NR	in process	in process
AAA6177	NR	NR	NR	in process	in process
AAA6178	NR	NR	NR	in process	in process
AAA6179	NR	NR	NR	in process	in process
AAA6180	NR	NR	NR	in process	in process

TABLE 2-8 (continued)

ER Program Sample ID	Alpha (pCi/g)	Beta (pCi/g)	Gamma (pCi/g)	H-3 (pCi/g)	Moisture (%)
AAA6181	NR	NR	NR	in process	in process
AAA6183	NR	NR	NR	in process	in process
AAA6184	NR	NR	NR	in process	in process
AAA6186	NR	NR	NR	in process	in process
AAA6187	NR	NR	NR	in process	in process
AAA6189	NR	NR	NR	in process	in process
AAA6190	NR	NR	NR	in process	in process
AAA6191	NR	NR	NR	in process	in process
AAA6192	NR	NR	NR	in process	in process
AAA6193	NR	NR	NR	in process	in process
AAA6194	NR	NR	NR	in process	in process
AAA6195	NR	NR	NR	in process	in process
AAA6196	NR	NR	NR	in process	in process
AAA6197	NR	NR	NR	in process	in process
AAA6198	NR	NR	NR	in process	in process
AAA6200	NR	NR	NR	in process	in process
AAA6201	NR	NR	NR	in process	in process
AAA6202	NR	NR	NR	in process	in process
AAA6203	NR	NR	NR	in process	in process
AAA6204	NR	NR	NR	in process	in process
AAA6205	NR	NR	NR	in process	in process
AAA6206	NR	NR	NR	in process	in process
AAA6207	NR	NR	NR	in process	in process
AAA6208	NR	NR	NR	in process	in process
AAA6209	NR	NR	NR	in process	in process
AAA6210	NR	NR	NR	in process	in process
AAA6211	-7.3	-14.8	5	in process	in process
AAA6212	NR	NR	NR	in process	in process
AAA6213	NR	NR	NR	in process	in process
AAA6214	NR	NR	NR	in process	in process
AAA6215	NR	NR	NR	in process	in process
AAA6216	NR	NR	NR	in process	in process
AAA6217	NR	NR	NR	in process	in process
AAA6218	NR	NR	NR	in process	in process
AAA6219	NR	NR	NR	in process	in process
AAA6220	NR	NR	NR	in process	in process
AAA6221	NR	NR	NR	in process	in process
AAA6222	NR	NR	NR	in process	in process
AAA6223	NR	NR	NR	in process	in process
AAA6225	NR	NR	NR	in process	in process
AAA6226	NR	NR	NR	in process	in process
AAA6227	NR	NR	NR	in process	in process
AAA6228	NR	NR	NR	in process	in process
AAA6229	NR	NR	NR	in process	in process
AAA6230	NR	NR	NR	in process	in process
AAA6231	NR	NR	NR	in process	in process
AAA6232	NR	NR	NR	in process	in process
AAA6233	NR	NR	NR	in process	in process

TABLE 2-8 (continued)

ER Program Sample ID	Alpha (pCi/g)	Beta (pCi/g)	Gamma (pCi/g)	H-3 (pCi/g)	Moisture (%)
AAA6234	NR	NR	NR	in process	in process
AAA6235	NR	NR	NR	in process	in process
AAA6236	NR	NR	NR	in process	in process
AAA6237	NR	NR	NR	in process	in process
AAA6238	NR	NR	NR	in process	in process
AAA6239	NR	NR	NR	in process	in process
AAA6240	NR	NR	NR	in process	in process
AAA6241	NR	NR	NR	in process	in process
AAA6242	NR	NR	NR	in process	in process
AAA6243	NR	NR	NR	in process	in process
AAA6244	NR	NR	NR	in process	in process
AAA6245	NR	NR	NR	in process	in process
AAA6246	NR	NR	NR	in process	in process
AAA6247	NR	NR	NR	in process	in process
AAA6248	NR	NR	NR	in process	in process
AAA6701	NR	NR	NR	in process	in process
AAA6702	NR	NR	NR	in process	in process
AAA6703	NR	NR	NR	in process	in process
AAA6704	NR	NR	NR	in process	in process
AAA6705	NR	NR	NR	in process	in process
AAA6706	NR	NR	NR	in process	in process
AAA6707	NR	NR	NR	in process	in process
AAA6708	NR	NR	NR	in process	in process
AAA6709	NR	NR	NR	in process	in process
AAA6710	NR	NR	NR	in process	in process
AAA6711	NR	NR	NR	in process	in process
AAA6712	NR	NR	NR	in process	in process
AAA6713	NR	NR	NR	in process	in process
AAA6714	NR	NR	NR	in process	in process
AAA6715	NR	NR	NR	in process	in process
AAA6716	NR	NR	NR	in process	in process
AAA6717	NR	NR	NR	in process	in process
AAA6718	NR	NR	NR	in process	in process
AAA6719	NR	NR	NR	in process	in process
AAA6720	NR	NR	NR	in process	in process
AAA6721	NR	NR	NR	in process	in process
AAA6722	NR	NR	NR	in process	in process
AAA6723	NR	NR	NR	in process	in process
AAA6724	NR	NR	NR	in process	in process
AAA6725	NR	NR	NR	in process	in process
AAA6726	NR	NR	NR	in process	in process
AAA6727	NR	NR	NR	in process	in process
AAA6728	NR	NR	NR	in process	in process
AAA6729	NR	NR	NR	in process	in process
AAA6730	NR	NR	NR	in process	in process
AAA6731	NR	NR	NR	in process	in process
AAA6732	NR	NR	NR	in process	in process
AAA6734	NR	NR	NR	in process	in process

TABLE 2-8 (continued)

ER Program Sample ID	Alpha (pCi/g)	Beta (pCi/g)	Gamma (pCi/g)	H-3 (pCi/g)	Moisture (%)
AAA6735	NR	NR	NR	in process	in process
AAA6736	NR	NR	NR	in process	in process
AAA6737	NR	NR	NR	in process	in process
AAA6740	NR	NR	NR	in process	in process
AAA6741	NR	NR	NR	in process	in process
AAA6742	NR	NR	NR	in process	in process
AAA6743	NR	NR	NR	in process	in process
AAA6744	NR	NR	NR	in process	in process
AAA6745	NR	NR	NR	in process	in process
AAA6746	NR	NR	NR	in process	in process
AAA6747	NR	NR	NR	in process	in process
AAA6748	NR	NR	NR	in process	in process
AAA6749	NR	NR	NR	in process	in process
AAA6750	NR	NR	NR	in process	in process
AAA6751	NR	NR	NR	in process	in process
AAA6752	NR	NR	NR	in process	in process
AAA6753	NR	NR	NR	in process	in process
AAA6754	NR	NR	NR	in process	in process
AAA6755	NR	NR	NR	in process	in process
AAA6756	NR	NR	NR	in process	in process
AAA6757	NR	NR	NR	in process	in process
AAA6760	NR	NR	NR	in process	in process
AAA6761	NR	NR	NR	in process	in process
AAA6762	NR	NR	NR	in process	in process
AAA6768	NR	NR	NR	in process	in process
AAA6785	NR	NR	NR	in process	in process
AAA6786	NR	NR	NR	in process	in process
AAA6787	NR	NR	NR	in process	in process
AAA6788	NR	NR	NR	in process	in process
AAA6801	NR	NR	NR	in process	in process
AAA6802	NR	NR	NR	in process	in process
AAA6803	NR	NR	NR	in process	in process
AAA6804	NR	NR	NR	in process	in process
AAA6805	NR	NR	NR	in process	in process
AAA6806	NR	NR	NR	in process	in process
AAA6807	NR	NR	NR	in process	in process
AAA6808	NR	NR	NR	in process	in process
AAA6809	NR	NR	NR	in process	in process
AAA6810	NR	NR	NR	in process	in process
AAA6811	NR	NR	NR	in process	in process
AAA6812	NR	NR	NR	in process	in process
AAA6813	NR	NR	NR	in process	in process
AAA6814	NR	NR	NR	in process	in process
AAA6815	NR	NR	NR	in process	in process
AAA6816	NR	NR	NR	in process	in process
AAA6817	NR	NR	NR	in process	in process
AAA6818	NR	NR	NR	in process	in process
AAA6819	NR	NR	NR	in process	in process

TABLE 2-8 (continued)

ER Program Sample ID	Alpha (pCi/g)	Beta (pCi/g)	Gamma (pCi/g)	H-3 (pCi/g)	Moisture (%)
AAA6820	NR	NR	NR	in process	in process
AAA6821	NR	NR	NR	in process	in process
AAA6822	NR	NR	NR	in process	in process
AAA6823	NR	NR	NR	in process	in process
AAA6824	NR	NR	NR	in process	in process
AAA6825	NR	NR	NR	in process	in process
AAA6826	NR	NR	NR	in process	in process
AAA6827	NR	NR	NR	in process	in process
AAA6828	NR	NR	NR	in process	in process
AAA6836	NR	NR	NR	in process	in process
AAA6837	NR	NR	NR	in process	in process
AAA6838	NR	NR	NR	in process	in process
AAA6839	NR	NR	NR	in process	in process
AAA6840	NR	NR	NR	in process	in process
AAA6841	NR	NR	NR	in process	in process
AAA6842	NR	NR	NR	in process	in process
AAA6843	NR	NR	NR	in process	in process
AAA6850	NR	NR	NR	in process	in process
AAA7498	0	-7	0.5	in process	in process

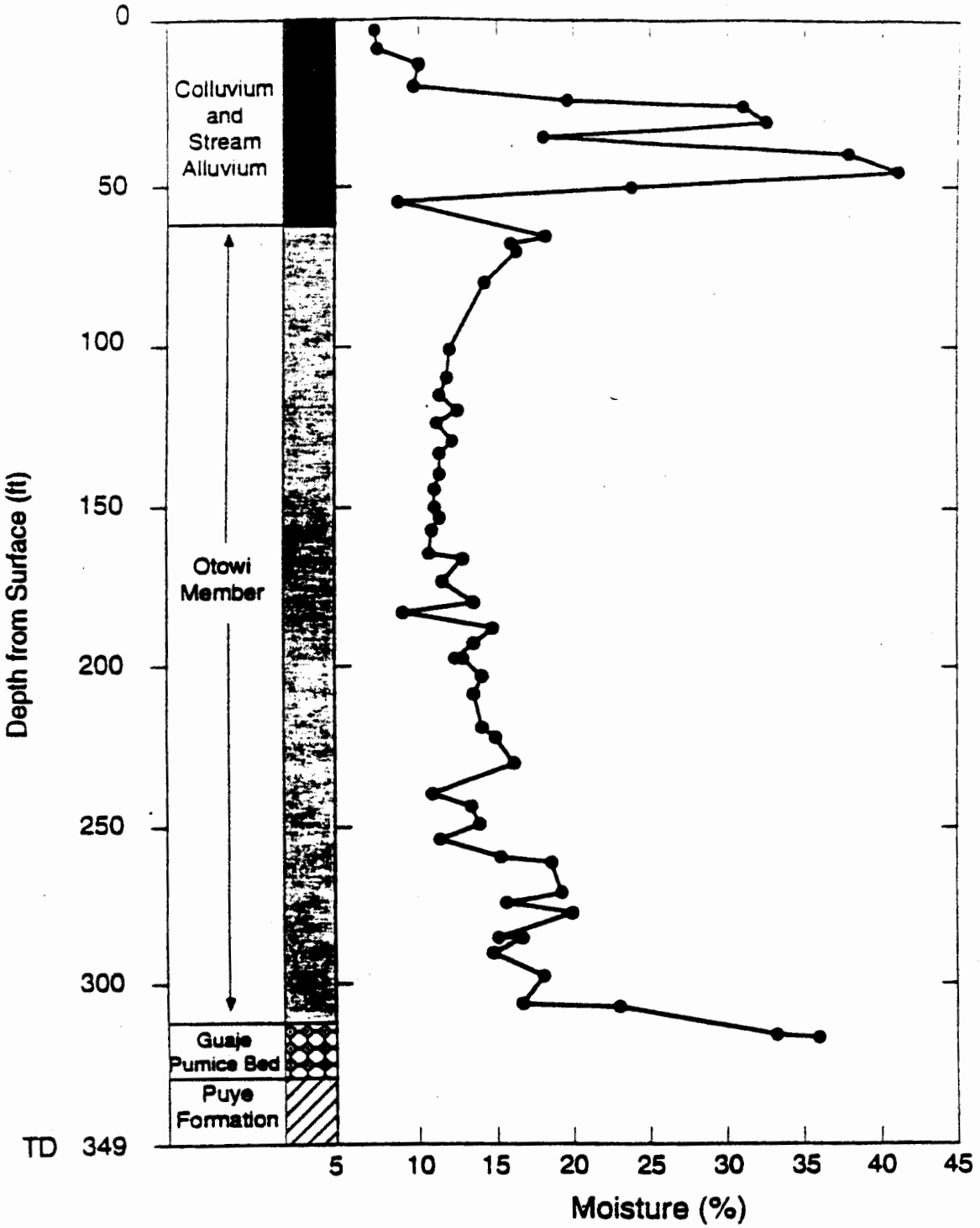
*NR = not required.

Pilot studies on landfill covers continue. A tracer study is being planned to evaluate travel times for water in the soil. Improvements based on a full year's experience are being made to the system to prepare for winter. These improvements include upgrading time-domain reflectometry probes that measure soil moisture, software refinements, installation of larger sediment filters, and installation of a wind shield for the snow collector. A report on the comparison of water balances in soil under a gravel mulch and in a comparable unmulched plot has been completed and is being reviewed. Gravel mulches appear to have the potential to stabilize soil inexpensively.

Samples of altered and unaltered tuff from PRS 22-015(c), the plating bath outflow, are being examined for their mineralogical composition to help determine the nature and degree of contamination and possible remediation schemes. During this quarter, examination of the unaltered tuff began to determine the background levels and distributions of metals in the weathered tuff. The materials are being examined with the sample procedures and techniques used for the tuff altered by the plating bath fluids.

2.13 ADS 1114—TAs-3, -30, -59, -60, -61, -64 (Project Leader: Garry Allen)

The primary focus of OU 1114 has been to continue literature search and data analysis for 183 PRSs to develop draft Volume II of the RFI work plan for OU 1114, which is scheduled for submission to the EPA and the NMED in mid-July 1995. OU 1114 personnel completed a notice of deficiency response to the EPA comments regarding the draft Volume I of the RFI work plan for OU 1114; this response included clarification comments and a commitment to develop sampling plans for two PRSs that had been recommended for no further action. Other activities included conducting additional analyses on the samples taken at PRS 3-010(a), the mercury spill at TA-3-30. TCLP analyses for mercury indicated that the elemental mercury present at the spill area is not leachable. Samples were resubmitted for TCLP tests for all metals, with particular emphasis on lead; final remediation decisions will be made when the analyses are complete.



TD = terminal depth.

Figure 2-8. Variation in moisture contents as a function of depth in borehole LADP-3

TABLE 2-9

PRELIMINARY GEOLOGIC LOG OF LADP-3

Depth (ft)	Stratigraphic Unit	Description
0-5	Fill/Top Soil	Drill pad fill material consisting of gray silty sand. Top soil begins at about 3 ft and consists of brown sand with some silt, dry to slightly moist, trace of roots.
5-65	Colluvium/Alluvium (Qal)	Tuffaceous colluvium derived from canyon walls and underlying alluvial sediments. Colluvium consists of vapor-phase and vitric ignimbrite from Tshirege Member of Bandelier Tuff. Alluvium consists of well-rounded stream gravels in a sandy matrix. Gravels 3-8 cm in diameter.
65-328	Otowi Member Bandelier Tuff (Qbo)	Massive, orangish, nonwelded to partially welded vitric ignimbrite. Pumice lapilli deeply colored to rusty orange color at the top of the unit. Pumices become more tan colored toward the base of the ignimbrite. Pumices are up to 5 cm in diameter. Tuff contains 1-3% black lava lithics. Guaje Pumice Bed forms base of unit from 308-328 ft. Pumice bed is a clast-supported fallout deposit with pumices to 5 cm. Pumices have a fibrous texture.
328-349	Puye Formation (QTp)	Gravels in a matrix of silt, sand, and some clay. Brown to gray in color. Upper 10 ft of unit is water-saturated. Thin clay lenses occur in upper part of unit.

2.14 ADS 1122—TAs-33, -70 (Project Leader: Roy Michelotti)

All Phase I sampling has been completed at Main Site and Area 6, except for trenching the Area 6 berms. Geodetic and radiation surveys and sample-location staking have been completed at South, East, and National Radioastronomy Observatory sites in preparation for sampling in the spring of FY94.

Drilling operations were completed at MDA K. The drilling campaign, consisting of three boreholes, met all stated objectives. Geology through Bandelier Tuff and into underlying basalt is well characterized by collected core; no perched water deposits were encountered in any hole. The following tritium information is based on results of the CST-9 radiation-analysis van and is of a preliminary nature. Tritium above the DOE Derived Concentration Guide of 2000 pCi/ml was encountered in only the middle hole, effectively defining the north-south lateral extent of the tritium plume. Tritium values in the flanking holes were low, though above background. Total-depth samples also indicated tritium values above background. Final analytical results will be forthcoming. A decision on the disposition of boreholes at MDA K is awaiting guidance from the ER Program Office. A geomorphologic study of TA-33 completed by the Geology and Geochemistry Group (EES-1) indicates that the mesa underlying TA-33 is geologically stable. The study was initiated to address questions concerning MDA E but also will be used in assessing MDA K and MDA D.

Other activities included the following tasks. All PRSs at OU 1122 were ranked, by aggregates, for the ER Program's Site Ranking System. A contamination-media survey for the DOE was completed. All available information for evaluating data from the spring sampling campaign has been sent to the FIMAD. About 95% of the analytical results have been received.

2.15 ADS 1127—TA-35, TSL-125 (Project Leader: David McInroy)

On November 1, 1993, the NMED approved clean closure of surface impoundment TSL-125. The Laboratory will now revise the RCRA Part B permit to show that this unit no longer has permitted or interim status.

2.16 ADS 1129—TAs-4, -5, -35, -42, -48, -52, -55, -63, -66 (Project Leader: Allyn Pratt)

The following activities were completed at OU 1129 during the first quarter of FY94.

- OU 1129 personnel submitted a work breakdown structure index outline for the ADS 1129 FY94 Baseline to the ER Program Office on December 14, 1993; adjustments continue to be made to that outline.

- OU 1129 personnel completed preparation of the site ranking system, which summarizes the best available data and our knowledge of the sites to allow ranking the large number of PRSs for OU 1129.

- OU 1129 personnel prepared a response for the EPA notice of deficiency for Appendix E of the RFI work plan for OU 1129 (LANL 1992, 0785).

- On December 17, 1993, OU 1129 personnel responded to the 14 technical comments from the State Agreement-in-Principle staff concerning the RFI work plan.

- The following TA-48 sampling activities took place.

  1. OU 1129 completed installation of sample location monuments. EPA outfall designations were noted and are being verified with the active outfall listing from the Environmental Protection Group (ESH-8).

  2. OU 1129 completed the supplementary Phase I sampling at two TA-48 aggregates on October 28, 1993.

     Aggregate L: The supplementary investigation at Aggregate L was designed to confirm or deny the presence of mercury contamination in the soils around PRS 48-002(a and b) (see Figure 2-9). Six surface samples were collected in sediment catchment basins along runoff drainages leading away from this PRS. Samples were submitted for analyses of mercury concentrations and total activities of alpha and beta particles and gamma rays (see Table 2-10).

     Aggregate N: OU 1129 conducted supplementary sampling at Aggregate N after evaluating the initial drilling results for former acid waste line 34. The trench for the former acid waste line was not successfully located or sampled at first. Additional research of aerial photos, of revised engineering drawings, and of field surveys was conducted to successfully locate the former acid waste line trench (approximately 18 ft south of the previous sample locations). OU 1129 personnel drilled three boreholes into the trace of the trench, collected five subsurface samples in PRS 48-005 (see Figure 2-10), and submitted the samples for analyses of metals and SVOCs concentrations, alpha-particle and gamma-ray spectrometry, and total activities of alpha and beta particles and gamma rays (see Table 2-10).

     The final TA-48 analytical returns received to date are summarized in Table 2-11.

- The following TA-35 sampling activities took place:

  1. OU 1129 began TA-35 Phase I sampling on November 16, 1993, at PRS 35-014(a and b) in Aggregate H (see Figures 2-11 and 2-12). Ten holes were hand-augered to a depth of 3 ft, and 34 samples were collected. Samples were submitted for analyses of tritium and metals concentrations, alpha-particle and gamma-ray spectrometry, and total activities of alpha and beta particles and gamma rays.

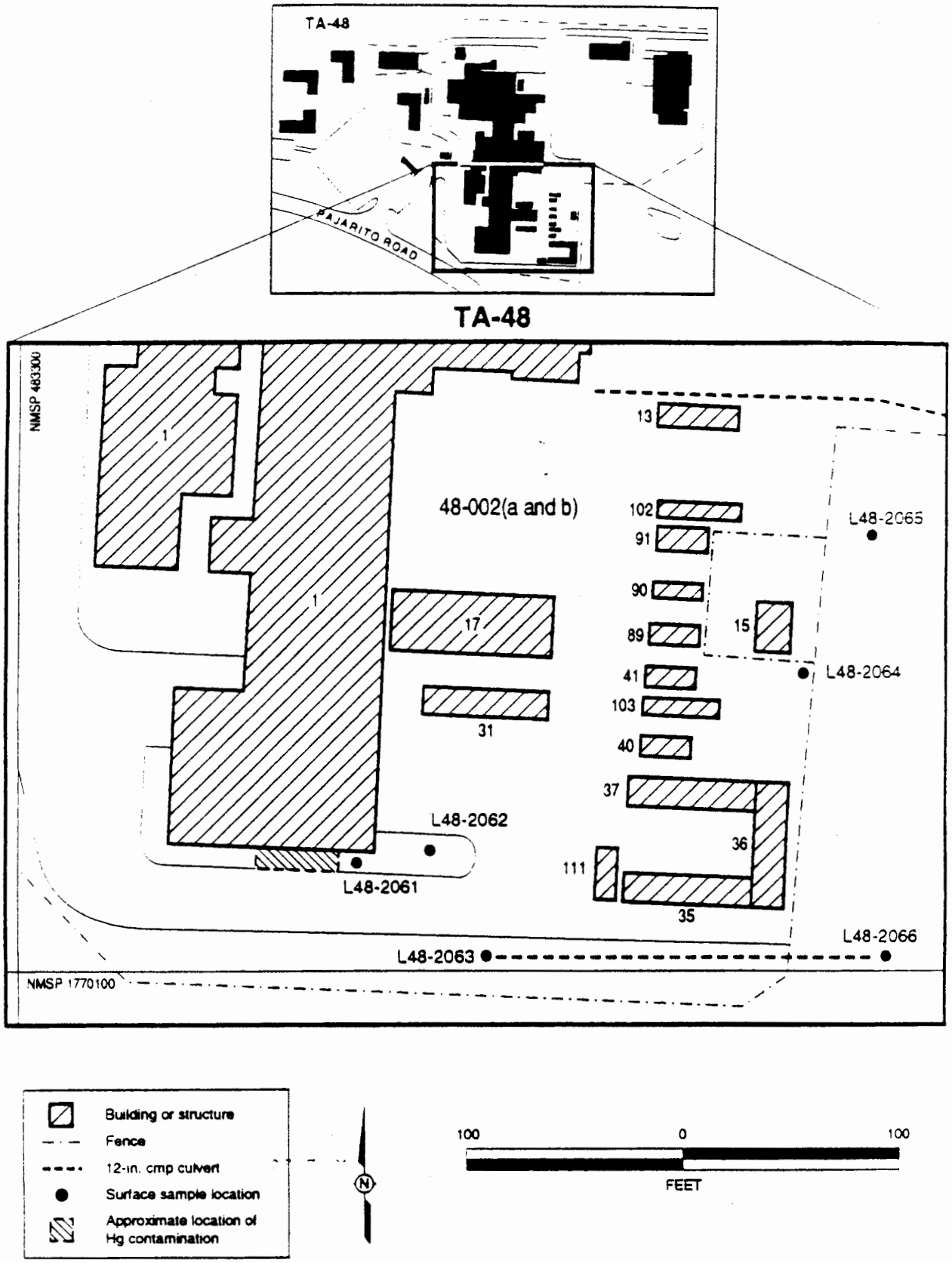


Figure 2-9. Schematic sample location map for PRS 48-002(a and b), Aggregate L.

TABLE 2-10

TA-48 SAMPLING ACTIVITIES FOR THE FIRST QUARTER OF FY94

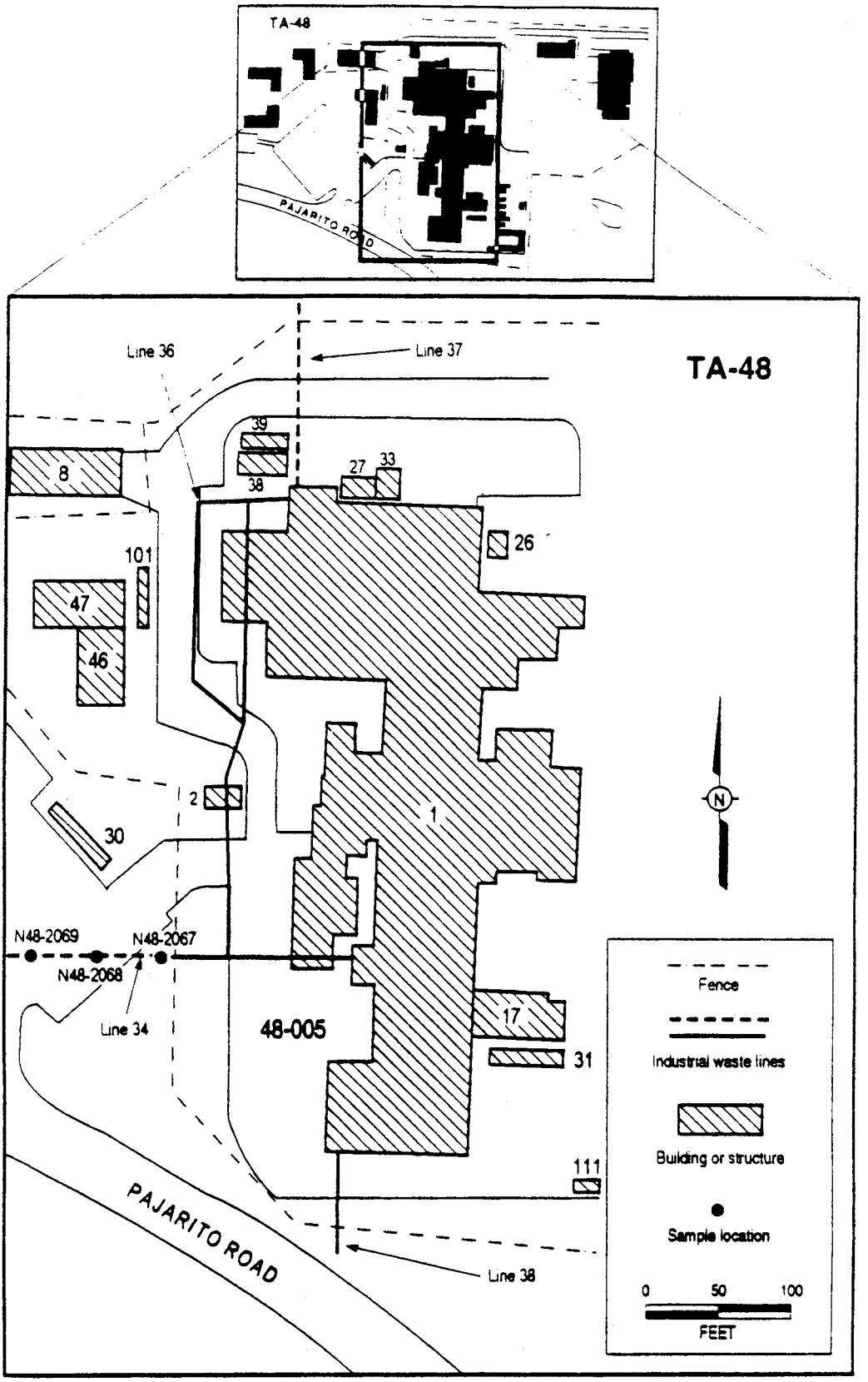
			Analyses Requested					
Date Collected	PRS	Sample No.	Gross-alpha, -beta, -gamma	Gamma Ray Spectro-metry	Alpha Particle Spectro-metry	Metals	SVOCs	HG
10/27/93	48-002 (a, b)	L48-2061-S1	1	1	0	0	0	1
10/27/93	48-002 (a, b)	L48-2062-S1	1	1	0	0	0	1
10/27/93	48-002 (a, b)	L48-2063-S1	1	1	0	0	0	1
10/27/93	48-002 (a, b)	L48-2064-S1	1	1	0	0	0	1
10/27/93	48-002 (a, b)	L48-2065-S1	1	1	0	0	0	1
10/27/93	48-002 (a, b)	L48-2066-S1	1	1	0	0	0	1
10/28/93	48-005	N48-2067-B1	1	1	1	1	1	0
10/28/93	48-005	N48-2067-B2	1	1	1	1	1	0
10/28/93	48-005	N48-2068-B1	1	1	1	1	1	0
10/28/93	48-005	N48-2069-B1	1	1	1	1	1	0
10/28/93	48-005	N48-2069-B2	1	1	1	1	1	0

TABLE 2-11

SUMMARY OF TA-48 ANALYTICAL RETURNS

Analytical Suite	Percentage Received
Metals by EDXRF[a]	95%
Metals by ICP/AES[b]	46%
Alpha Particle Spectrometry	23%
Gamma Ray Spectrometry	24%
VOCs	87%
SVOCs	52%
PCBs	10%
Gross-alpha, -beta, and -gamma	70%

a. EDXRF = energy dispersive x-ray fluorescence.
b. ICP/AES = inductively coupled plasma/atomic emission spectrometry.



(LANL 1991 (TA-48 Utilities Map, AUTOGIS)

Figure 2-10. Schematic sample location map for PRS 48-005, Aggregate N.

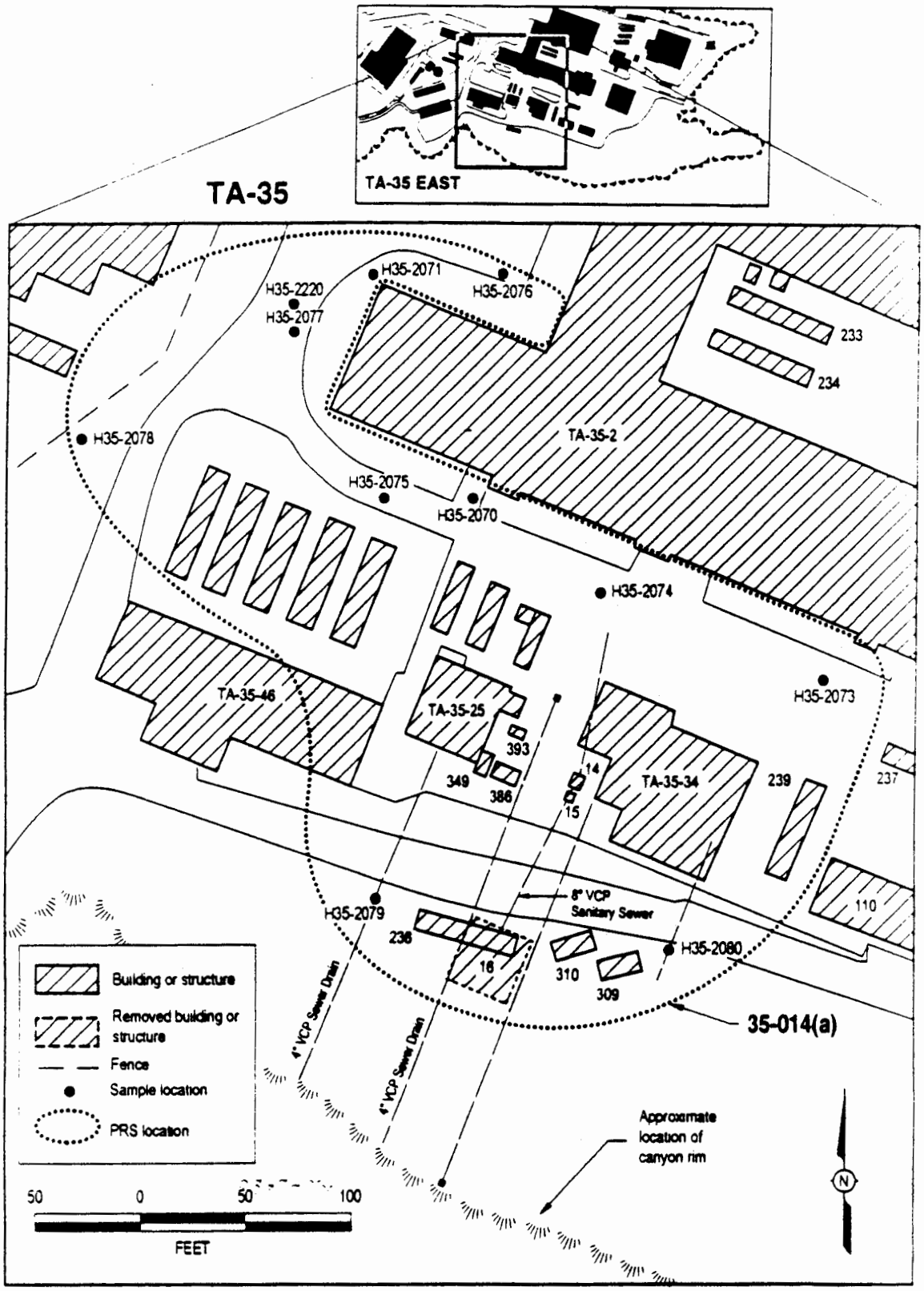


Figure 2-11. Schematic sample location map for PRS 35-014(a), Aggregate H.

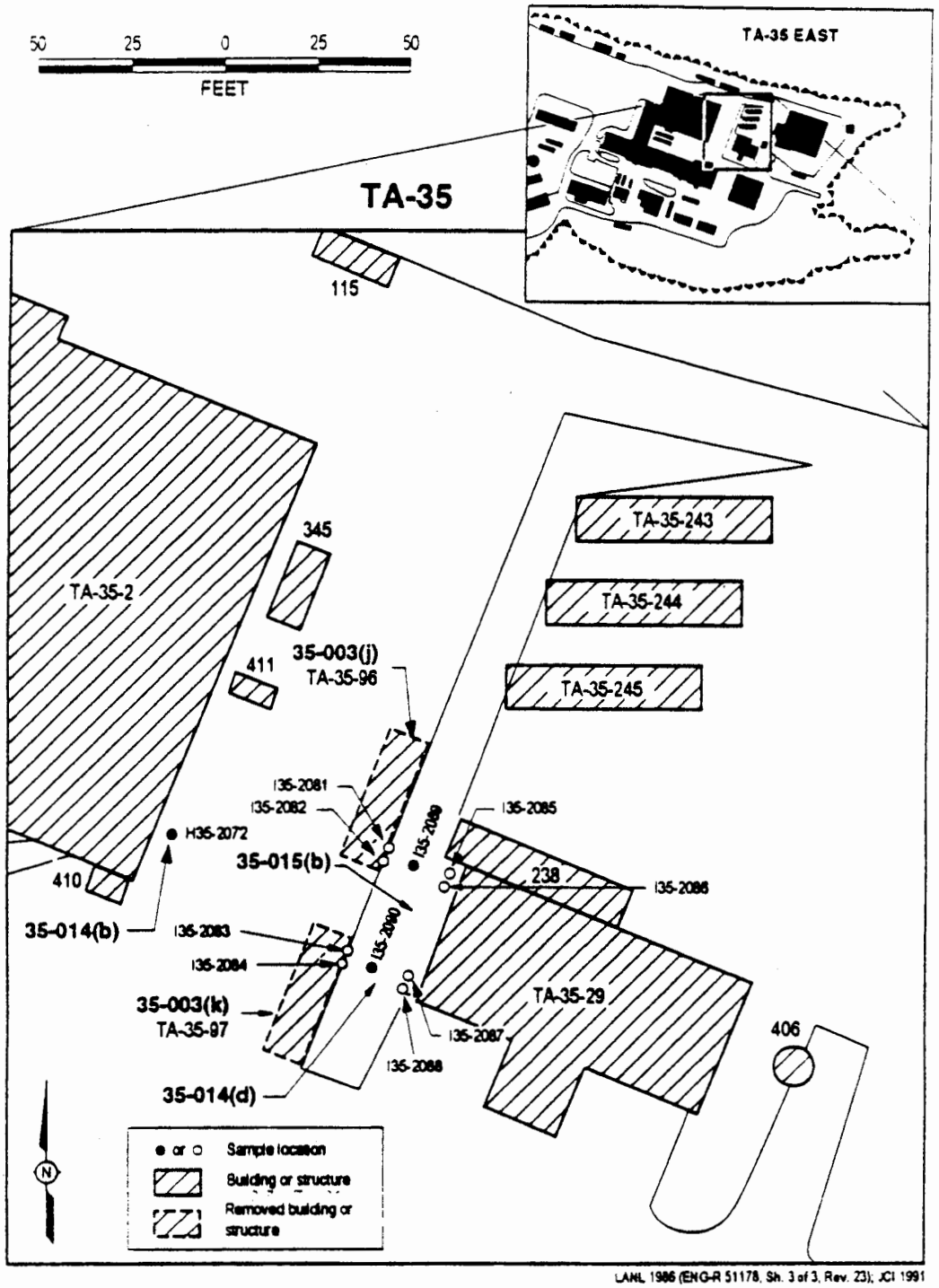


Figure 2-12. Schematic sample location map for PRS 35-014(b), Aggregate H; and PRSs 35-003(j and k), 35-014(d), and 35-015(b), Aggregate I.

2. On November 30, 1993, sampling activities continued in Aggregate I at PRSs 35-003 (j and k) and 35-015(b) (see Figure 2-12). Eight near-surface samples and 12 hand-augered samples were collected. Samples were submitted for analyses of metals, VOCs, SVOCs and polychlorinated biphenyls (PCBs) concentrations, alpha-particle and gamma-ray spectrometry, and total activities of alpha and beta particles and gamma rays.

3. Sampling continued in Aggregate F at PRS 35-009(a) on December 9, 1993. Six bore holes were drilled, and 24 samples were taken (see Figure 2-13). Samples were submitted for analyses of metals and SVOCs concentrations, alpha-particle and gamma-ray spectrometry, and total activities of alpha and beta particles and gamma rays.

The analyses requested for the TA-35 sampling efforts are listed in Table 2-12.

- OU 1129's sample management and sample tracking programs used interactive Microsoft ACCESS as well as ACCESS Basic to produce documentation equivalent to that in the current version of LANL-ER-SOP-1.04, "Sample Control and Field Documentation."

2.17 ADS 1130—TAs-36, -68, -71 (Project Leader: Gene Gould)

The field team completed land, radiation, and geophysical surveys during the quarter. The surveys established control points and located sampling locations. Two locations in the lower Slobbovia area were found to have slightly elevated radiation readings. No elevated radioactivity was detected during the survey of the Boneyard, but the survey has not been completed.

2.18 ADS 1132—TA-39 (Project Leader: Gene Gould)

Fieldwork continued, and the radiation survey for the soil dump area was completed. No elevated levels of radiation were found. Data analysis from the second series of rainfall simulator tests was completed, and the final report is being prepared.

2.19 ADS 1135—TA-40 (Project Leader: David McInroy)

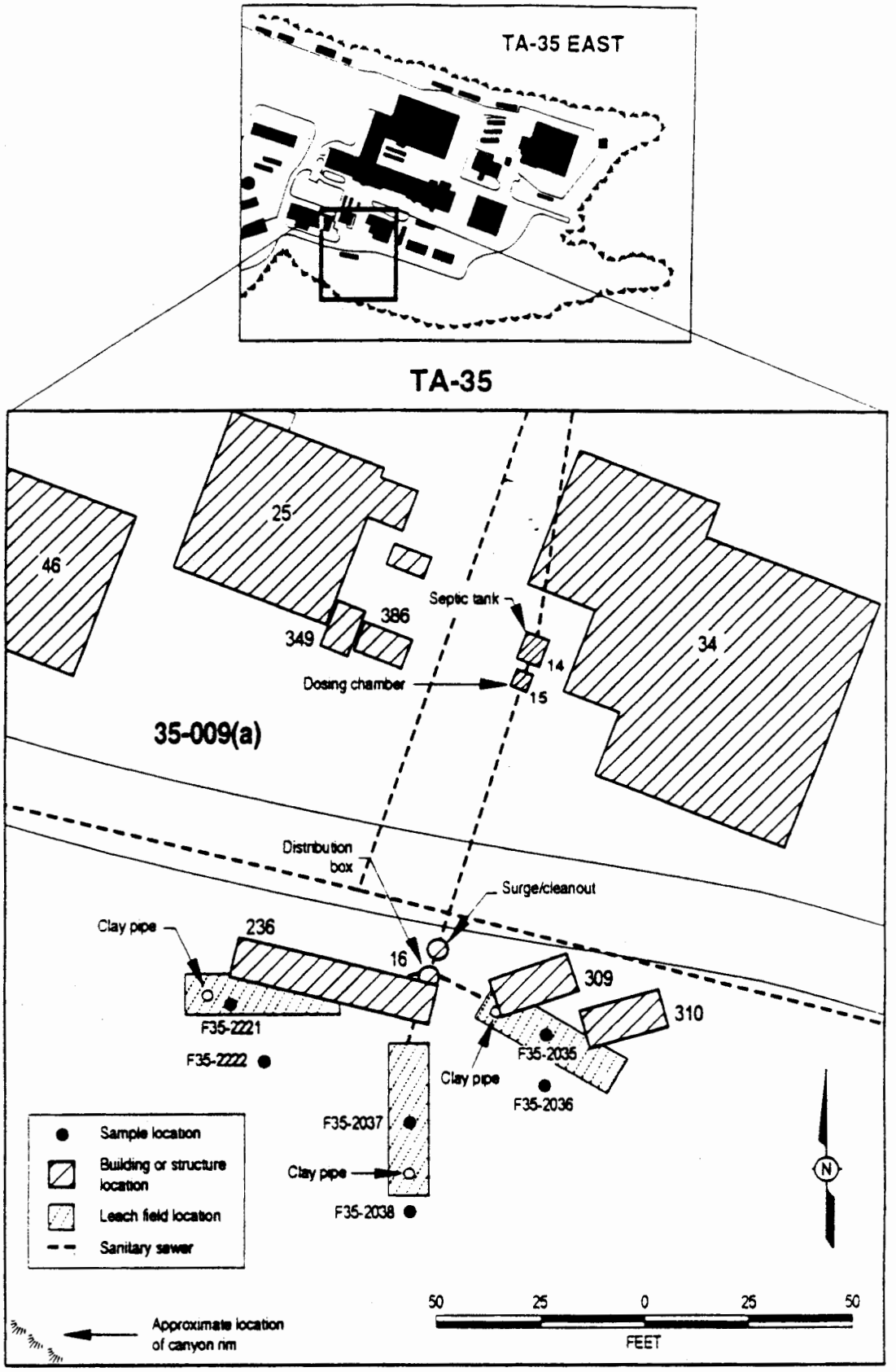
Sample analyses revealed isolated areas of contamination (barium, lead, and zinc) above background and screening action levels. A final sampling and cleanup strategy has been submitted to the NMED in the form of a closure plan amendment. The Laboratory is awaiting comments or approval of the amendment before implementation. Fieldwork is expected to resume in the spring of 1994.

2.20 ADS 1136—TA-43 (Project Leader: Paul Aamodt)

Work continued on the first draft of the RFI work plan for OU 1136, which is scheduled for delivery to the EPA in May of 1994. A major change in the work plan was initiated this quarter: Previously it had been assumed that the entire OU could be recommended for no further action or be deferred until decontamination and decommissioning. This is not the case; therefore, a full work plan will be written. The expected completion date of the first draft is January 21, 1994.

2.21 ADS 1140—TA-46 (Project Leader: Roy Michelotti)

Fieldwork continued in OU 1140. Land and radiation surveys in preparation for the FY94 sampling campaign have been completed, and all planned sampling locations for FY94 have been staked and surveyed. The Facilities, Security, and Safeguards (FSS) Division and Johnson Controls World Services Inc. (JCI) continue to reroute unpermitted outfalls into the sanitary sewer system. All PRSs at OU 1140 were ranked, by aggregates, for the ER Program's Site Ranking System. A contamination-media survey for the DOE was completed. A Fieldwork Planning Report was completed, and a fieldwork implementation plan is being prepared. The approach proposed in the Fieldwork Planning Report is being modified to reflect the recent budget-cut guidance. A poster session introducing OU 1140 was presented at the ER Program's public meetings.



LASL 1955 (ENG-R 1352, Sh. 2 of 2, Rev. 2); LANL 1986 (ENG-R 5117, Sh. 3 of 3, Rev. 23)

Figure 2-13. Schematic sample location map for PRS 35-009(a), Aggregate F.

TABLE 2-12

TA-35 SAMPLING ACTIVITIES FOR THE FIRST QUARTER OF FY94

			Analysis Requested							
Date Collected	PRS	Sample No.	Gross-alpha, -beta, -gamma	Gamma Ray Spectro-metry	Alpha Particle Spectro-metry	Metals	VOCs	SVOCs	PCBs	Tritium
11/16/93	35-014 (a)	H35-2070-A1	1	1	1	0	0	0	0	1
11/16/93	35-014 (a)	H35-2070-A2	1	1	1	0	0	0	0	1
11/16/93	35-014 (a)	H35-2070-A3	1	1	1	0	0	0	0	1
11/16/93	35-014 (a)	H35-2071-A1	1	1	1	0	0	0	0	1
11/16/93	35-014 (a)	H35-2071-A2	1	1	1	0	0	0	0	1
11/16/93	35-014 (a)	H35-2071-A3	1	1	1	0	0	0	0	1
11/16/93	35-014 (b)	H35-2072-A1	1	1	1	0	0	1	1	1
11/16/93	35-014 (b)	H35-2072-A2	1	1	1	0	0	1	1	1
11/16/93	35-014 (b)	H35-2072-A3	1	1	1	0	0	1	1	1
11/17/93	35-014 (a)	H35-2073-A1	1	1	1	0	0	0	0	1
11/17/93	35-014 (a)	H35-2073-A2	1	1	1	0	0	0	0	1
11/17/93	35-014 (a)	H35-2073-A3	1	1	1	0	0	0	0	1
11/17/93	35-014 (a)	H35-2074-A1	1	1	1	0	0	0	0	1
11/17/93	35-014 (a)	H35-2074-A2	1	1	1	0	0	0	0	1
11/17/93	35-014 (a)	H35-2074-A3	1	1	1	0	0	0	0	1
11/17/93	35-014 (a)	H35-2075-A1	1	1	1	0	0	0	0	1
11/17/93	35-014 (a)	H35-2075-A2	1	1	1	0	0	0	0	1
11/17/93	35-014 (a)	H35-2075-A3	1	1	1	0	0	0	0	1
11/18/93	35-014 (a)	H35-2076-A1	1	1	1	0	0	0	0	1
11/18/93	35-014 (a)	H35-2076-A2	1	1	1	0	0	0	0	1
11/18/93	35-014 (a)	H35-2076-A3	1	1	1	0	0	0	0	1
11/18/93	35-014 (a)	H35-2077-A1	1	1	1	0	0	0	0	1
11/19/93	35-014 (a)	H35-2078-A1	1	1	1	0	0	0	0	1
11/19/93	35-014 (a)	H35-2078-A2	1	1	1	0	0	0	0	1
11/19/93	35-014 (a)	H35-2078-A3	1	1	1	0	0	0	0	1
11/19/93	35-014 (a)	H35-2079-A1	1	1	1	0	0	0	0	1
11/19/93	35-014 (a)	H35-2079-A2	1	1	1	0	0	0	0	1
11/19/93	35-014 (a)	H35-2079-A3	1	1	1	0	0	0	0	1
11/19/93	35-014 (a)	H35-2080-A1	1	1	1	0	0	0	0	1
11/19/93	35-014 (a)	H35-2080-A2	1	1	1	0	0	0	0	1
11/19/93	35-014 (a)	H35-2080-A3	1	1	1	0	0	0	0	1
11/30/93	35-014 (a)	H35-2220-A1	1	1	1	0	0	0	0	1
11/30/93	35-014 (a)	H35-2220-A2	1	1	1	0	0	0	0	1
11/30/93	35-014 (a)	H35-2220-A3	1	1	1	0	0	0	0	1
11/30/93	35-003 (k)	I35-2083-S1	1	1	1	0	0	1	1	0
11/30/93	35-003 (k)	I35-2084-S1	1	1	1	0	0	1	1	0
11/30/93	35-015 (b)	I35-2086-S1	1	1	1	0	0	1	1	0
11/30/93	35-015 (b)	I35-2087-S1	1	1	1	0	0	1	1	0

TABLE 2-12 (continued)

			Analysis Requested							
Date Collected	PRS	Sample No.	Gross-alpha, -beta, -gamma	Gamma Ray Spectro-metry	Alpha Particle Spectro-metry	Metals	VOCs	SVOCs	PCBs	Tritium
11/30/93	35-015 (b)	I35-2088-S1	1	1	1	0	0	1	1	0
12/01/93	35-003 (j)	I35-2081-S1	1	1	1	0	1	1	1	0
12/01/93	35-003 (j)	I35-2082-S1	1	1	1	0	1	1	1	0
12/01/93	35-015 (b)	I35-2085-S1	1	1	1	0	0	1	1	0
12/01/93	35-015 (b)	I35-2089-A1	1	1	1	0	1	1	1	0
12/01/93	35-015 (b)	I35-2089-A2	1	1	1	0	1	1	1	0
12/01/93	35-015 (b)	I35-2089-A3	1	1	1	0	1	1	1	0
12/01/93	35-015 (b)	I35-2089-A4	1	1	1	0	1	1	1	0
12/01/93	35-015 (b)	I35-2089-A5	1	1	1	0	1	1	1	0
12/01/93	35-015 (b)	I35-2089-A6	1	1	1	0	1	1	1	0
12/01/93	35-015 (b)	I35-2090-A1	1	1	1	0	1	1	1	0
12/01/93	35-015 (b)	I35-2090-A2	1	1	1	0	1	1	1	0
12/01/93	35-015 (b)	I35-2090-A3	1	1	1	0	1	1	1	0
12/01/93	35-015 (b)	I35-2090-A4	1	1	1	0	1	1	1	0
12/01/93	35-015 (b)	I35-2090-A5	1	1	1	0	1	1	1	0
12/01/93	35-015 (b)	I35-2090-A6	1	1	1	0	1	1	1	0
12/09/93	35-009 (a)	F35-2035-B1	1	1	1	1	0	1	0	0
12/09/93	35-009 (a)	F35-2035-B2	1	1	1	1	0	1	0	0
12/09/93	35-009 (a)	F35-2035-B3	1	1	1	1	0	1	0	0
12/09/93	35-009 (a)	F35-2035-B4	1	1	1	1	0	1	0	0
12/09/93	35-009 (a)	F35-2036-B1	1	1	1	1	0	1	0	0
12/09/93	35-009 (a)	F35-2036-B2	1	1	1	1	0	1	0	0
12/09/93	35-009 (a)	F35-2036-B3	1	1	1	1	0	1	0	0
12/09/93	35-009 (a)	F35-2036-B4	1	1	1	1	0	1	0	0
12/09/93	35-009 (a)	F35-2037-B1	1	1	1	1	0	1	0	0
12/09/93	35-009 (a)	F35-2037-B2	1	1	1	1	0	1	0	0
12/09/93	35-009 (a)	F35-2037-B3	1	1	1	1	0	1	0	0
12/09/93	35-009 (a)	F35-2037-B4	1	1	1	1	0	1	0	0
12/10/93	35-009 (a)	F35-2038-B1	1	1	1	1	0	1	0	0
12/10/93	35-009 (a)	F35-2038-B2	1	1	1	1	0	1	0	0
12/10/93	35-009 (a)	F35-2038-B3	1	1	1	1	0	1	0	0
12/10/93	35-009 (a)	F35-2038-B4	1	1	1	1	0	1	0	0
12/10/93	35-009 (a)	F35-2221-B1	1	1	1	1	0	1	0	0
12/10/93	35-009 (a)	F35-2221-B2	1	1	1	1	0	1	0	0
12/10/93	35-009 (a)	F35-2221-B3	1	1	1	1	0	1	0	0
12/10/93	35-009 (a)	F35-2221-B4	1	1	1	1	0	1	0	0
12/10/93	35-009 (a)	F35-2222-B1	1	1	1	1	0	1	0	0
12/10/93	35-009 (a)	F35-2222-B2	1	1	1	1	0	1	0	0
12/10/93	35-009 (a)	F35-2222-B3	1	1	1	1	0	1	0	0
12/10/93	35-009 (a)	F35-2222-B4	1	1	1	1	0	1	0	0

2.22 ADS 1144—TA-49 (Project Leader: Ines Triay)

The drilling plan for MDA-AB (Areas 1, 2, 2A, 2B, 3, and 4 of TA-49) was approved by the EPA. Personnel began drilling and sampling a 700-ft borehole (49-2-700-01) in Area 12, immediately east of Area 2 (see Figure 2-14); drilling and sampling were completed for more than 400 ft of the 700-ft hole. Soil moisture data were obtained using an on-site mobile radiological laboratory. The gravimetric moisture content is accurate to 0.01% (see Figure 2-15).

Area 2 was surveyed using a high-performance ground-penetrating radar. This radar uses the same principles for transmission as commercially available ground-penetrating radar systems, but it operates over broader frequencies and transmits a pulse with 6,000 times higher power to decrease opacity. It also uses significantly improved image processing algorithms. The subsurface radar survey of Area 2 searched for underground inhomogeneities that would interfere with the drilling of the six boreholes inside Area 2 (see Figure 2-14). The results of the survey indicate that the planned locations for the deep 150-ft boreholes (49-2-150-1 and 49-2-150-2) appear to be clean, homogeneous areas. However, the northeast corner in Area 2 has a region showing returns from shallow depths, probably caused by buried debris or high moisture content in the near-surface soil. Therefore, the location of shallow borehole 49-2-10-4 was moved to an undisturbed area (see Figure 2-14). A report describing the details of the survey is being written.

2.23 ADS 1147—TA-50 (Project Leader: Cheryl K. Rofer)

Work continues on a final version of RFI work plan for OU 1147 (LANL 1992, 0787). No formal comments on the work plan have been received from the NMED. Locations of soil samples from Aggregate 5 [PRSs 50-006(c), 50-007, and 50-008] and locations of soil samples from MDA C are shown in Figure 2-16. These samples were taken to a depth of 6 in. Radiation measurements were also made at all soil sample locations and at the additional locations indicated on the figure. Locations of soil samples from Aggregate 6, Ten-Site Canyon [PRS 50-006 (a)] and Mortandad Canyon [PRS 50-006 (d)] are shown in Figures 2-17 and 2-18, respectively. These samples were taken at the surface and at depths to 3 ft. All samples were sent to CST-9 for analysis. Chemical analysis results for the soil samples are being reviewed. An internal audit was conducted in December on sample collection documentation.

2.24 ADS 1148—TAs-51, -54 (Project Leader: Don Krier)

The Laboratory's response to the EPA's notice of deficiency for the RFI work plan for OU 1148 (LANL 1992, 0788) was accepted, and on December 14, 1993, the EPA transmitted its approval of the RFI work plan. OU 1148 underwent the transition to a new operable unit project leader; Don Neeper retired, and Don Krier of EES-1 assumed the position. The preparation of a new Baseline began, and it is scheduled to be completed on January 21, 1994.

Field activities included executing an auger drilling program at MDA L at TA-54. Three holes (54-1003, 54-1004, and 54-1005) totalling 925 ft were augered in the low-contaminated area southeast of the MDA L fence. Seventy-two samples for VOC analyses and 200 samples for gravimetric moisture analyses were taken and submitted for analyses. Three additional holes (54-1007, 54-1008, and 54-1009) totalling 450 ft were augered next to the MDA L pit A and nearby disposal shafts. These holes were EPA-approved substitutions for the three previously planned 500-ft holes in the same source areas. The previous drilling indicated that below about 150 ft, a thick section of weak tuff dominated the lithology, which would have made deep air-rotary drilling risky when attempting to complete the hole with grout after drilling. A better deep-hole design will be planned and presented in April 1994 for DOE and EPA approval. Data assessment of the 299 sample cartridges from the passive soil gas survey across the OU began.

Quarterly sampling of monitoring wells required by the HSWA permit was completed on schedule. This sampling was done to monitor the organic plume in the subsurface beneath MDA L. Sampling is being performed with a truck-mounted infrared gas analyzer that yields good results for about 10 analytes. Samples with the higher concentrations were taken for confirmatory analysis at a fixed-base laboratory.

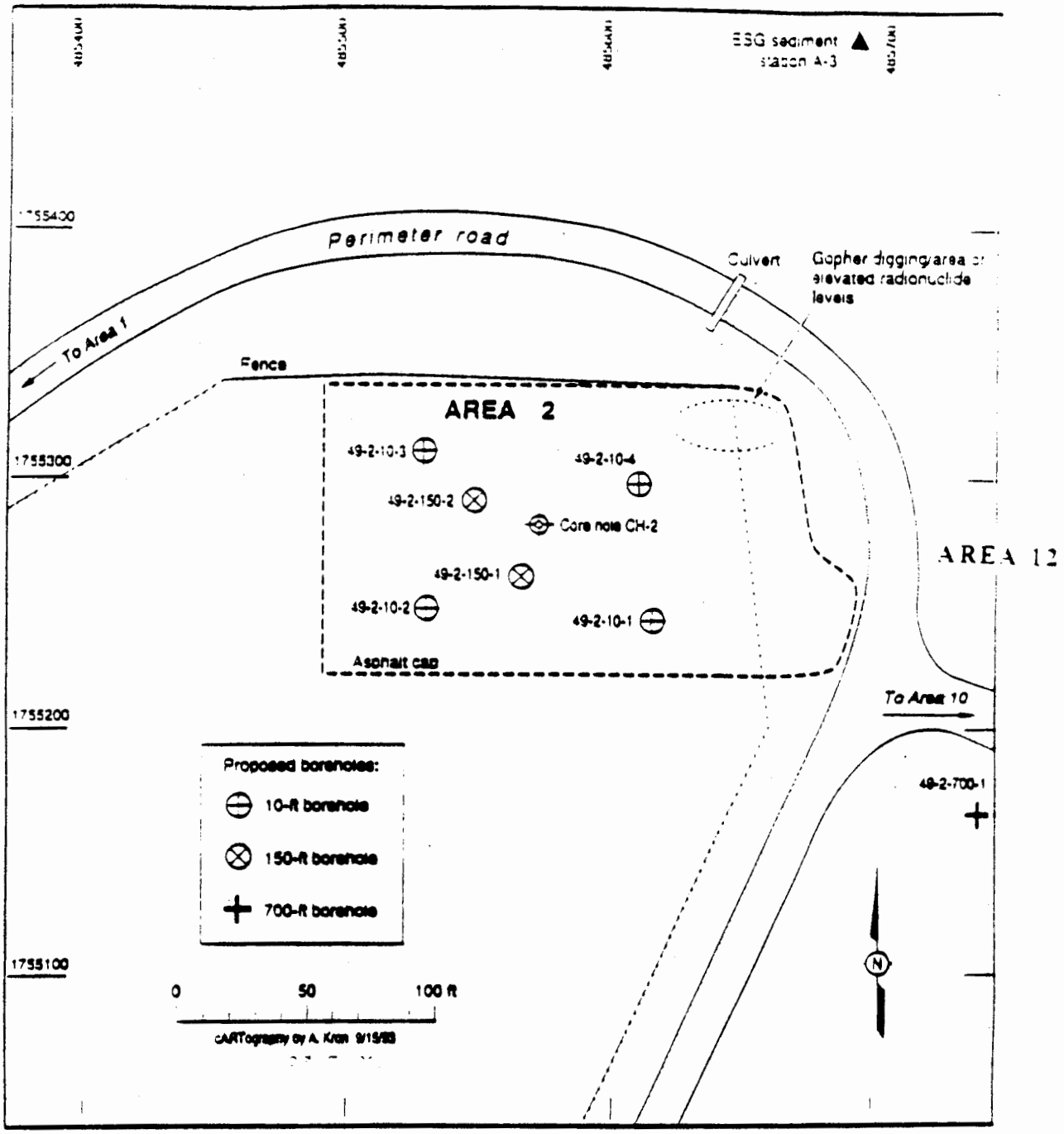


Figure 2-14. Locations of proposed boreholes for Areas 2 and 12.

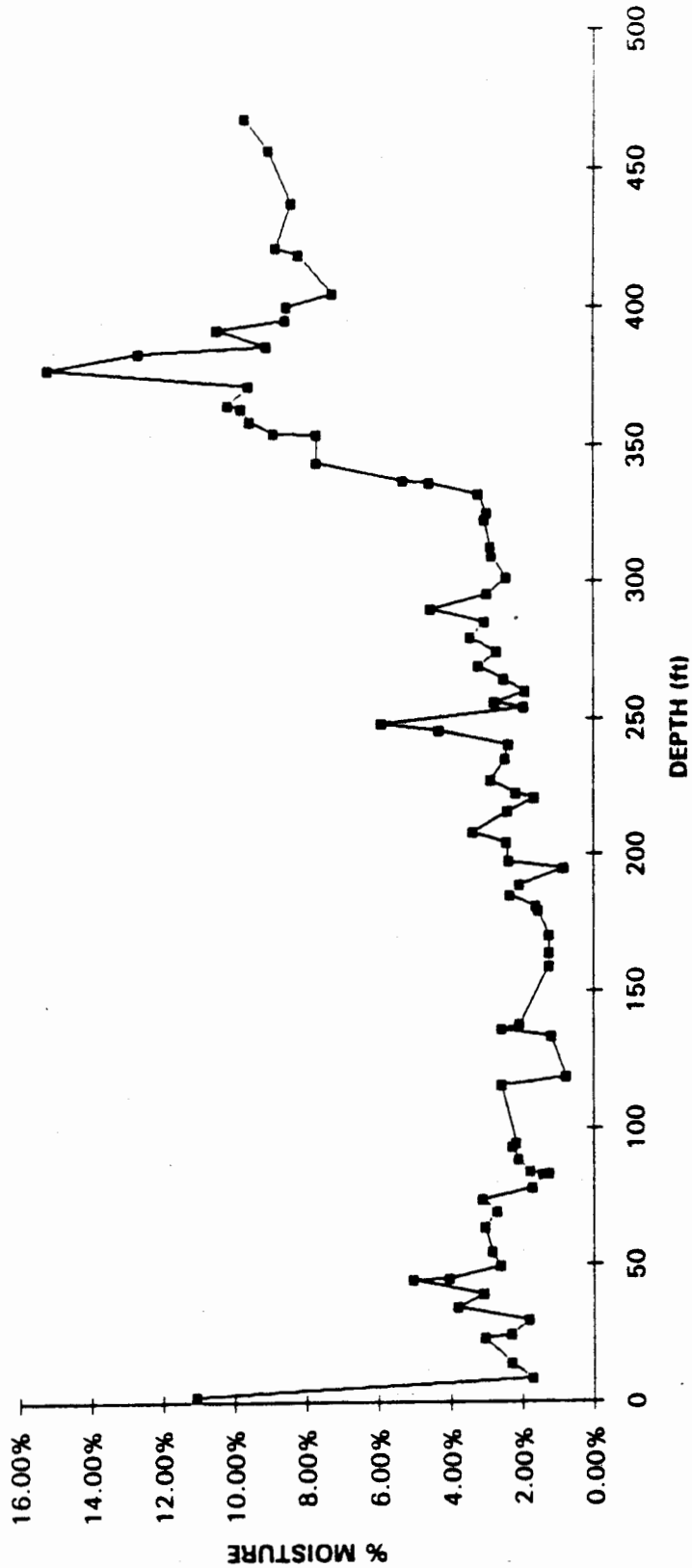


Figure 2-15. Soil moisture data for OU 1144, TA-49, Borehole 49-2-700-1.

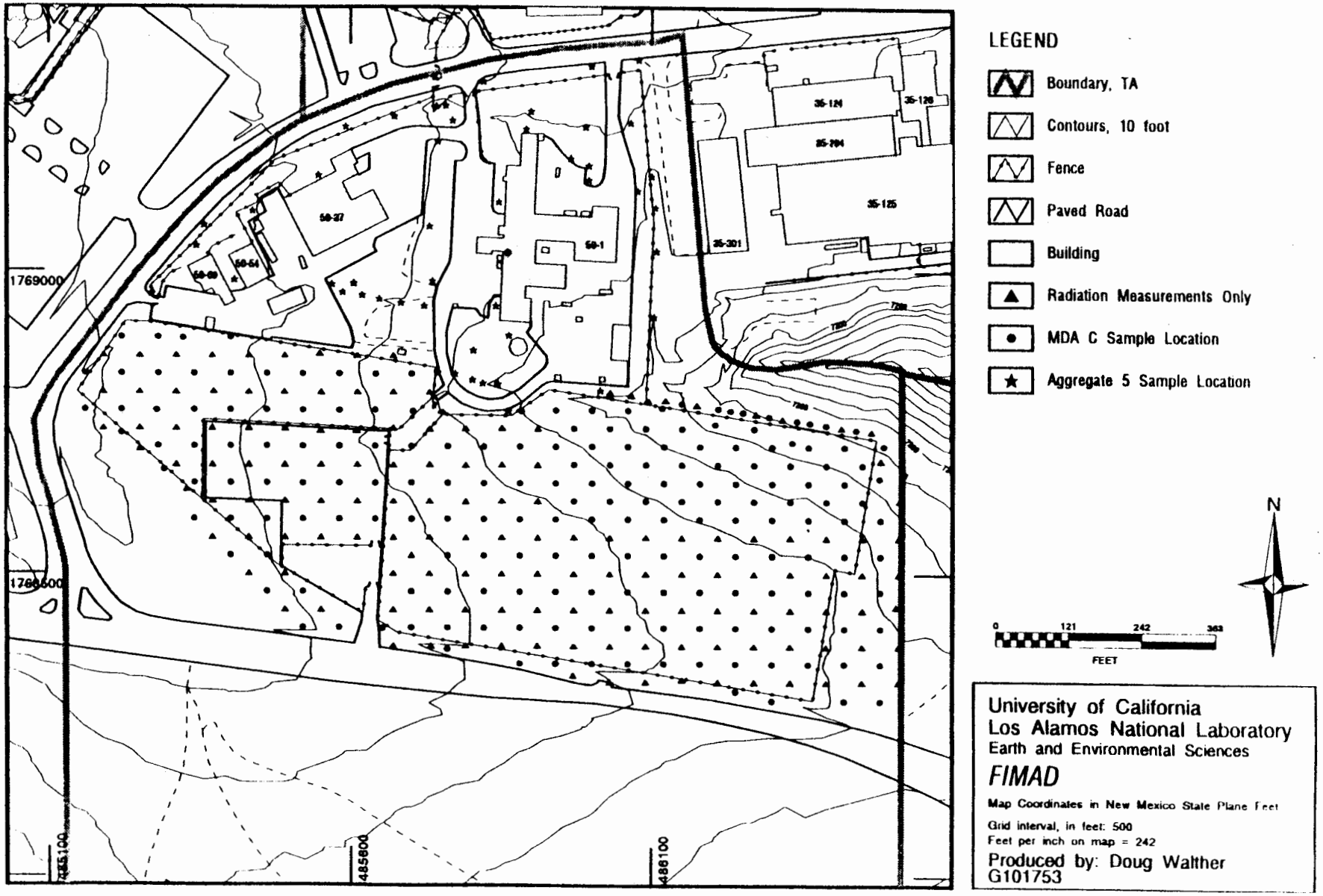
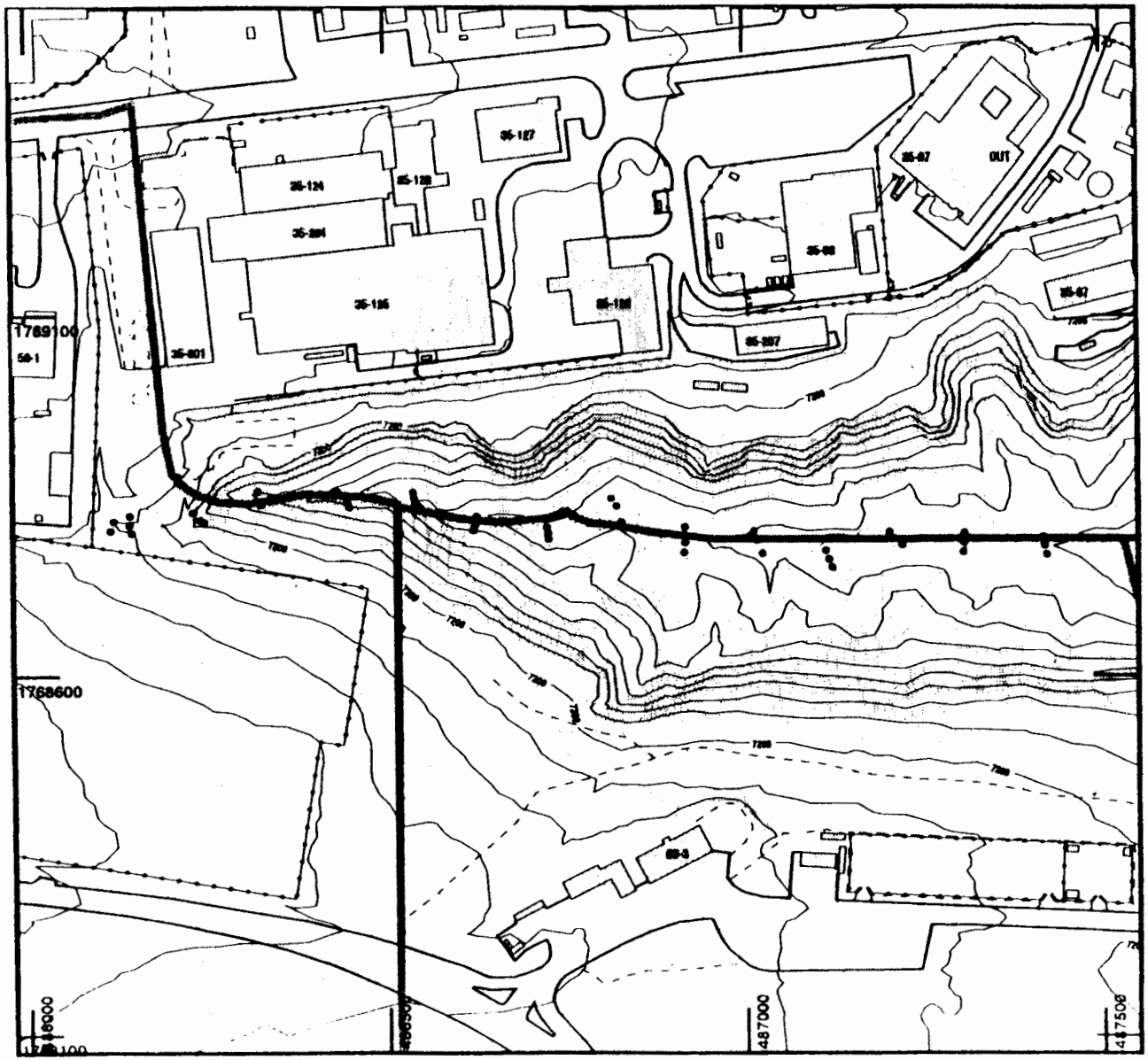


Figure 2-16. Sample locations for Aggregate 5 and MDA C.



LEGEND

- Boundary, TA
- Contours, 2 foot
- Contours, 10 foot
- Fence
- Paved Road
- Building
- Sample Location

N

0 121 242 363
FEET

University of California
Los Alamos National Laboratory
Earth and Environmental Sciences

FIMAD

Map Coordinates in New Mexico State Plane Feet

Grid interval, in feet: 500
Feet per inch on map = 242

Produced by: Doug Walther
G101755

Figure 2-17. Sample locations for Aggregate 6, Ten-Site Canyon.

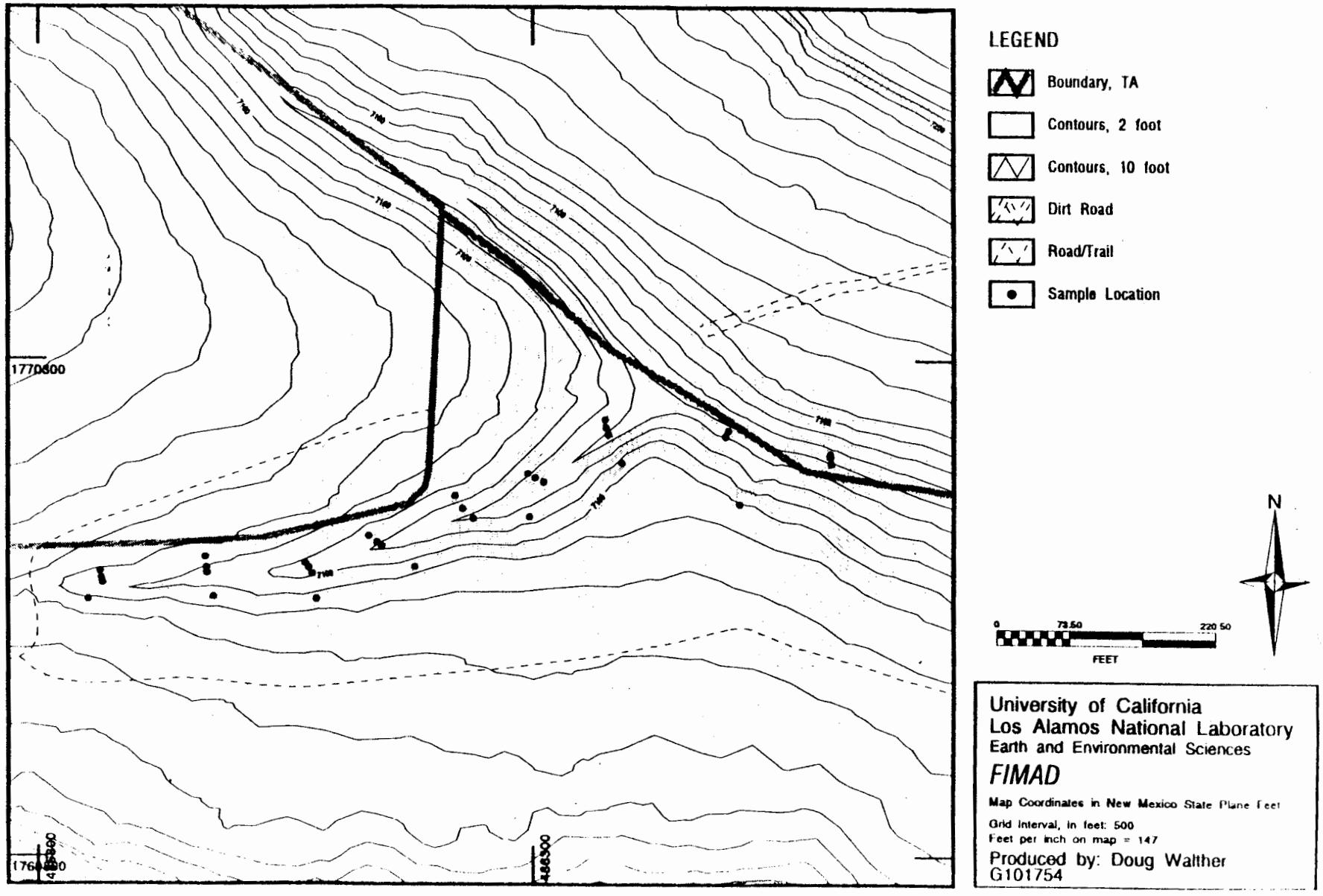


Figure 2-18. Sample locations for Aggregate 6, Mortandad Canyon.

2.25 ADS 1154—TA-57 (Project Leader: Tracy Glatzmaier)

The informal review for the draft RFI work plan for OU 1154 was conducted, and comments were incorporated. The second draft of the work plan is on schedule for review starting January 3, 1994. A presentation was given and a site visit was conducted for personnel from Argonne National Laboratory in preparation for their review of the work plan. Other activities included participating in the Site Ranking System exercise and scheduling the ADS for the FY94 Baseline.

2.26 ADS 1157—TAs-8, -9, -23, -69 (Project Leader: Tracy Glatzmaier)

A readiness review was held in November to prepare for the general surveying of sample point locations throughout the operable unit and for the radiological, geodetic, and geophysics surveys at TA-8 and TA-9. Field screening for radiological contamination was performed in TA-9 at the decommissioned circles area and at the TA-8 Gun-Firing Site and MDA Q. Geodetic and geophysics surveys also were conducted in these areas. The equipment used in the surveys included EM-31 and EM-61 surface-based electrical resistivity instruments and a ground-penetrating radar.

Other activities at OU 1157 included participating in the Site Ranking System exercise; scheduling the ADS for the FY94 Baseline; giving a presentation and conducting a site visit for Barbara Driscoll of the EPA, Region 6; and participating in the ER public meetings held in Española, Los Alamos, and Santa Fe in December. For those meetings, a display of OU 1157 and a presentation on the site ranking system, using MDA M as an example, were conducted.

3.0 REFERENCES

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LANL (Los Alamos National Laboratory), May 1992. "RFI Work Plan for Operable Unit 1129," Los Alamos National Laboratory Report LA-UR-92-800, Los Alamos, New Mexico. (LANL 1992, 0785)

LANL (Los Alamos National Laboratory), May 1992. "RFI Work Plan for Operable Unit 1147," Los Alamos National Laboratory Report LA-UR-92-969, Los Alamos, New Mexico. (LANL 1992, 0787)

LANL (Los Alamos National Laboratory), May 1992. "RFI Work Plan for Operable Unit 1148," Los Alamos National Laboratory Report LA-UR-92-855, Los Alamos, New Mexico. (LANL 1992, 0788)

LANL (Los Alamos National Laboratory), June 1993. "RFI Work Plan for Operable Unit 1098," Los Alamos National Laboratory Report LA-UR-92-3825, Los Alamos, New Mexico. (LANL 1993)

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Document Titles:

LANL Quarterly Technical Report, October–December, Fiscal Year 1994

Name: _____ Date 3/8/94

Dennis Erickson
ESH Division Director
Los Alamos National Laboratory

Name: _____ Date: 3/11/94

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