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Periodic Monitoring Report for Pajarito Watershed, September 4–September 24, 2007

Prepared by the Environmental Programs Directorate

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EXECUTIVE SUMMARY

The purpose of this report is to provide the results of the periodic monitoring event (PME) conducted by Los Alamos National Laboratory in the Pajarito Watershed. This PME for the Pajarito Watershed was conducted pursuant to the "Interim Facility-Wide Groundwater Monitoring Plan," prepared under the Compliance Order on Consent.

The PME documented in this report occurred from September 4 to September 24, 2007. This event included the sampling of groundwater wells or well ports, springs, and base-flow stations. Previously unreported results from a 2006 PME are also included. These results were not available for inclusion in the previous PME because of data validation issues and time needed for review by San Ildefonso Pueblo.

Water samples obtained from various locations during this PME were analyzed for target analyte list metals, volatile organic compounds, cyanide, semivolatile organic compounds, pesticides, polychlorinated biphenyls, high explosives, radionuclides, low-level tritium, general inorganic chemicals, perchlorate, stable isotopes, and field parameters (alkalinity, dissolved oxygen, pH, specific conductance, temperature, and turbidity).

No results from the previous PME exceeded screening levels.

Four aluminum results from surface water samples collected during this PME from Pajarito Canyon exceeded screening levels.

Sixteen results from groundwater samples collected during this PME from Pajarito Canyon exceeded screening levels.

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Acronyms and Abbreviations

AK	acceptable knowledge
AOC	area of concern
BCG	Biota Concentration Guide (DOE)
bgs	below ground surface
C	cancer
Consent Order	Compliance Order on Consent
DCG	Derived Concentration Guideline (DOE)
DOE	Department of Energy (U.S.)
DOT	Department of Transportation (U.S.)
ENV-RCRA	Environmental Protection Water Quality and Resource Conservation Recovery
EPA	Environmental Protection Agency (U.S.)
F	filtered
HE	high explosives
IDW	investigation-derived waste
IFGMP	Interim Facility-Wide Groundwater Monitoring Plan
LANL	Los Alamos National Laboratory
MCL	maximum contaminant level (EPA)
MDA	material disposal area
MDL	method detection limit
msl	mean sea level
MTBE	methyl tertiary butyl ether
N	noncancer
NMED	New Mexico Environment Department
NMEIB	New Mexico Environmental Improvement Board
NMWQCC	New Mexico Water Quality Control Commission
NOI	notice of intent
PAH	polycyclic aromatic hydrocarbon

PCB	polychlorinated biphenyl
PME	periodic monitoring event
PMR	periodic monitoring report
PPE	personal protective equipment
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RPF	Records Processing Facility
RLWTF	Radioactive Liquid Waste Treatment Facility
SERF	Sanitary Effluent Reclamation Facility
SAA	satellite accumulation area
SOP	standard operating procedure
SVOC	semivolatile organic compound
SWSC	Sanitary Wastewater Systems Consolidation plant
SWMU	solid waste management unit
TA	technical area
TDS	total dissolved solids
TSD	treatment, storage, or disposal
UF	unfiltered
VOC	volatile organic compound
WCSF	waste characterization strategy form
WPF	waste profile form

1.0 INTRODUCTION

This report provides documentation of quarterly groundwater and surface water monitoring conducted by Los Alamos National Laboratory (LANL or the Laboratory) in the Pajarito Watershed pursuant to the "Interim Facility-Wide Groundwater Monitoring Plan" (IFGMP) (LANL 2007, 096665), prepared under the Compliance Order on Consent (Consent Order). This report includes the periodic monitoring event (PME) that occurred from September 4–September 24, 2007. This sample event included sampling at groundwater wells or ports, springs, and base flow stations.

The Consent Order identifies New Mexico Water Quality Control Commission (NMWQCC) groundwater standards, including alternative abatement standards and U.S. Environmental Protection Agency (EPA) drinking water maximum contaminant levels (MCLs) as cleanup levels for groundwater when corrective action is implemented. NMWQCC groundwater standards, MCLs, and EPA tap water screening levels are used as screening levels for monitoring data and are provided in this report.

This report presents the following information:

- general background information on the watershed
- the watershed conceptual model
- field-measurement monitoring results
- water-quality monitoring results
- results of the screening analysis (comparing these PME results with screening levels and results from previous reports)
- summary based on the data and the screening analysis.

Data that were not reported in the previous PMR because of data validation and San Ildefonso Pueblo review are included in Appendix D. Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to the New Mexico Environment Department (NMED) in accordance with U.S. Department of Energy (DOE) policy.

1.1 Background

This section describes the physical characteristics of the Pajarito Watershed, some of the investigatory activities conducted, and the Laboratory activities that have potentially impacted groundwater and surface water.

Pajarito Canyon is located on the Pajarito Plateau in the central part of the Laboratory. The Pajarito Canyon Watershed is approximately 13 mi^2 in area and heads in the Santa Fe National Forest, approximately 2.9 mi (4.6 km) west of the Laboratory boundary at an elevation of approximately 10,434 ft (3180 m). Pajarito Canyon trends east-southeast across both the Laboratory and Los Alamos County. It discharges into the Rio Grande in White Rock Canyon at an elevation of 5422 ft (1653 m). Twomile Canyon and Threemile Canyon are major tributaries that join Pajarito Canyon approximately 7.3 mi (11.7 km) and 4.9 mi (9.3 km), respectively, upstream of the Rio Grande.

The primary Laboratory use of the Pajarito Canyon Watershed has been as the canyon-bottom location for the Los Alamos Critical Experiments Laboratory at Technical Area (TA) 18 and for mesa-top surface and subsurface Material Disposal Areas (MDAs) F and Q at TA-06; M at TA-09; and G, H, J, and L at TA-54.

The technical areas located within this watershed include TA-03, -06, -07, -08, -09, -14, -15, -18, -22, -23, -27, -36, -40, -46, -50, -54, -55, -58, -59, -64, -65, -66, -67, and -69. The contaminant release history from approximately 379 solid waste management units (SWMUs) and areas of concern (AOCs) includes releases or possible releases from outfalls, septic systems, spills, open detonations from firing sites, and MDAs. Laboratory-related contamination has been detected in Pajarito Canyon water samples obtained from perennial and ephemeral streams, alluvial groundwater, and springs supplied by intermediate groundwater from the Bandelier Tuff.

Other uses within the watershed area include surface and subsurface MDAs and a buffer zone for mesa-top firing activities. To a lesser extent, the canyon has been used for liquid waste disposal. The early discharges were associated with outfalls, surface runoff, and dispersion from firing sites located at TA-06, -07, -08, -09, -12 (former), -15, -18, -22, -27 (former), and -69. Additional discharges began with the continued expansion of Laboratory operations to new sites from the 1950s to the 1970s, specifically TA-03, -36, -40, -48, and -59. Discharges to Pajarito Canyon and its tributaries have decreased as fewer firing sites within the watershed remain active during the past decades, and many outfalls have either been rendered inactive or rerouted to the Laboratory's sanitary waste treatment facility at TA-46 during the 1980s and 1990s.

1.2 Conceptual Model

The conceptual model for the Pajarito Watershed is presented in Appendix A of this document.

2.0 SCOPE OF ACTIVITIES

The PME for the Pajarito Watershed was conducted pursuant to the 2007 IFGMP.

Table 2.0-1 provides the location name, sample collection date, port name, port depth, screened interval, top and bottom screen depths, base flow or water level, and the water-level method for each of the monitored locations. These locations are shown in Figure 2.0-1.

3.0 MONITORING RESULTS

3.1 Methods and Procedures

All methods and procedures used to perform the field activities associated with the PME are documented in the 2007 IFGMP.

3.2 Field Parameter Results

Appendix B contains the field parameter results for the PME and the three PMEs immediately before the September 2007 sampling event.

3.3 Water-Level Observations

The periodic monitoring water-level data for this event and the previous three monitoring events are presented in Table C-1 of Appendix C. For wells equipped with transducers, the reported water level is the water-level measurement taken earliest on the day of sampling. All manual measurements are reported at the time immediately before sampling. The water-level measurements taken during these periodic monitoring events are shown graphically in Figures 3.3-1 and 3.3-2.

3.4 Deviations from Planned Scope

Table 3.4-1 describes the deviations from the planned scope of the PME.

4.0 ANALYTICAL DATA RESULTS

4.1 Methods and Procedures

All methods and procedures used to perform the analytical activities of the PME are documented in the 2007 IFGMP.

4.2 Analytical Data

Appendix D presents the analytical data from the PME and from the three sampling events before September 2007. The screening levels with which the results are compared are shown in Table 4.2-1. The analytical laboratory reports (including chains of custody, etc.) are included in Appendix G.

Appendix D contains all data obtained during the PME (that is, all data that have been independently reviewed for conformance with Laboratory requirements), with the following constraints.

- All data
    - ❖ Data that are R qualified (rejected because of noncompliance regarding quality control [QC] acceptance criteria) during independent validation are considered "not detected" but are still reported. Analytical laboratory QC results, including matrix spike and matrix spike duplicates, are not included in the data set.
- Radionuclides
    - ❖ All low-detection-limit tritium data are reported. Results greater than 3 times the 1 standard deviation total propagated analytical uncertainty (or 3σ) are considered to be detections.
    - ❖ Americium-241 and uranium-235 are reported only by chemical separation alpha spectroscopy. No gamma spectroscopy results are presented for these analytes.
    - ❖ Only cesium-137, colbalt-60, neptunium-237, potassium-40, and sodium-22 are reported (or analyzed) for the gamma spectroscopy suite.
    - ❖ Otherwise, all detections are reported at all locations (that is, results without a laboratory qualifier of U or X (abbreviations that indicate the analyte was not detected).
- Nonradionuclides
    - ❖ All results, excluding nondetections, are reported. Field duplicates, reanalyses, field blanks, trip blanks, equipment blanks, and different analytical methods are also reported.

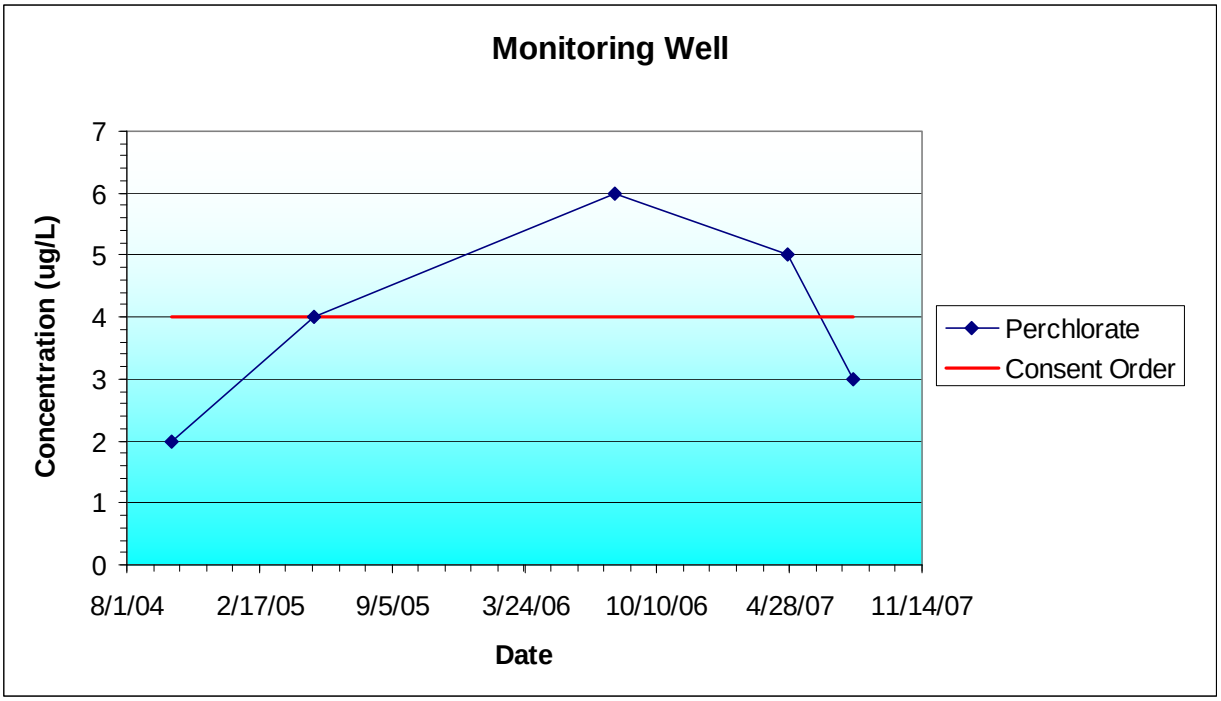
The screening levels applied to all media are listed in Table 4.2-1, which indicates the type of screening level and its source.

Data for PMRs are evaluated using the following screening process.

- Surface water and groundwater perchlorate data were compared with the screening level of 4 µg/L established in Section VIII.A.1.a of the Consent Order. Surface water sampling results were compared with all surface-water standards without consideration of the designated use for the particular reach. The New Mexico Water Quality Control Commission (NMWQCC) groundwater standards apply to the dissolved (filtered) portion of specified contaminants; however, the standards for mercury, organic compounds, and nonaqueous phase liquids apply to the total unfiltered concentrations of the contaminants.
- As required by the Consent Order, EPA Region 6 tap water screening levels are used for constituents having no other regulatory standard and for which toxicological information is published. For these screening levels, the tables indicate a risk type of C (excess cancer risk level of 10^{-5}) or N (noncancer). The Consent Order specifies screening for excess cancer risk at a risk level of 10^{-5} (rather than 10^{-6} as given in the Region 6 tables). Therefore, the EPA Region 6 values were multiplied by 10 to obtain the 10^{-5} excess cancer risk level.
- The analytical results for radioactivity are compared with the DOE Biota Concentration Guide (BCG) for surface water and Derived Concentration Guidelines (DCGs) for groundwater.

Tables in Appendix E show all values for perchlorate, radioactivity, organic compounds, and all values greater than half the lowest applicable screening level values for metals and general inorganic compounds.

Analytical results are presented graphically in Figure 4.2-1. Figure 4.2-1 contains diagrams displaying a series of selected analytes. An example of a diagram displaying perchlorate concentration is shown below.



Perchlorate concentration

The analytes shown in Figure 4.2-1 were selected from data acquired during the PME. The analytes shown on the figure were selected for display because of their concentrations compared to screening levels and historical presence in surface water and groundwater in this watershed.

Radionuclides are not shown in the diagrams. The solid red lines, when shown, depict applicable screening levels. Note that some standards or screening levels may exceed the highest concentration displayed and may not appear on the diagram. Screening-level values may be found in Tables E-1 through E-9 in Appendix E.

Tables E-1 through E-4 (Appendix E) compare the surface water analytical data with screening levels. Graphical representations of select surface-water analytical results are shown in Figure 4.2-1.

Tables E-5 through E-9 (Appendix E) compare the surface water analytical data to screening levels. Graphical representations of select groundwater analytical results are shown in Figure 4.2-1.

Table 4.2-2 shows results for surface water and groundwater (by hydrogeologic zone for a specific analytical suite) that are above a screening level. Multiple detections of a particular constituent at a location are counted as one result. For example, if aluminum is detected above a screening level in both a primary sample and a field duplicate, only one result is shown.

4.2.1 Surface Water (Base Flow)

4.2.1.1 Previously Unreported Results

None of the results reported from the previous sampling event were measured above screening levels in surface water samples.

4.2.1.2 Results from the September 2007 PME

The filtered aluminum concentration of 219 µg/L at location “Pajarito below confluences of South and North Anchor East Basin” was above the New Mexico Aquatic Life Chronic Standard of 87 µg/L, which applies in this perennial reach. This concentration is the lowest measured at the location for five sampling events in the last year; the March 2007 result was 3840 µg/L.

The filtered aluminum concentrations of 1130 µg/L, 7700 µg/L, and 4710 µg/L at locations Pajarito above Twomile, Twomile above Pajarito, and Twomile Canyon below TA-59 were above the New Mexico Aquatic Life Acute Standard of 750 µg/L, which applies in these ephemeral reaches. Results for the first two locations are similar to those from the last 2 yr of sampling. At Twomile Canyon below TA-59, the recent result is about 7 times the highest measurement made over the last year.

4.2.2 Groundwater

4.2.2.1 Previously Unreported Results

None of the results reported from the prior sampling event were measured above screening levels in groundwater samples.

4.2.2.2 Results from the September 2007 PME

The filtered iron results at one alluvial well and a spring were above the screening level (NMWQCC groundwater standard applicable domestic water supply) of 1000 µg/L. The iron results at TA-18 Spring

and 18-BG-1 were 1490 µg/L and 1660 µg/L respectively. At the spring the result is consistent with highly variable measurements made over the past three years. At 18-BG-1 the result is the highest of five samples over the past year.

Filtered and unfiltered mercury measurements at alluvial well 18-MW-8 of 4.1 µg/L and 6.7 µg/L were above the screening level (NMWQCC groundwater standard of 2 µg/L, applicable to total mercury). The only previous detection from four sampling events over a year of measurements is one estimated filtered result of 0.12 µg/L (near the detection limit).

The filtered manganese result at alluvial well PCO-3 of 220 µg/L was above the screening level (NMWQCC groundwater standard, applicable domestic water supply) of 200 µg/L. This is the lowest of four results since 2005; earlier results are quite variable, and some are much higher.

One filtered aluminum and several filtered iron results at intermediate groundwater zones monitoring locations were above their screening levels (NMWQCC groundwater standards respectively applicable to irrigation use and domestic water supply) of 5000 µg/L and 1000 µg/L. The aluminum and iron results at Homestead Spring were 5610 µg/L and 3090 µg/L, respectively; field duplicate results were lower for both compounds at 2240 µg/L and 1090 µg/L, respectively. Results for the first two locations are similar to those from the last 2 yr of sampling.

At Kieling Spring, Charlie's Spring, 03-B-10, and 03-B-13, the filtered iron results were 2270 µg/L, 1260 µg/L, 2200 µg/L, and 2300 µg/L, respectively. At each location the results are in the range of the highly variable results measured over the past year.

Several organic compounds were detected above screening levels at intermediate wells at SM-30 in TA-03. At 03-B-9, bis(2-ethylhexyl)phthalate was detected for the first time at 19.5 µg/L, above the EPA MCL screening level of 6 µg/L.

Dioxane[1,4-] was detected in two nearby wells at concentrations above the EPA tap water screening level of 61.1 µg/L. At 03-B-10, the concentration measured with the volatile organic method was 147 µg/L; this method has a method detection limit (MDL) of 20 µg/L. A separate analysis of the sample by the more precise semivolatile organic method, which has an MDL of 1 µg/L, was 75.2 µg/L. At 03-B-13, the result measured with the volatile organic method was 72.7 µg/L; the semivolatile result was 24.1 µg/L. The semivolatile results taken from both wells during the past year range over an order of magnitude; recent values are near the middle of the range.

Dichloroethene[1,1-] was detected at 03-B-10 at 5.73 µg/L, above the EPA MCL screening level of 5 µg/L. Results from six sampling events during the past 15 mo range from 2 µg/L to 9 µg/L. Trichloroethane[1,1,1-] was detected at 03-B-10 and 03-B-13 at concentrations of 173 µg/L and 79.4 µg/L, above the screening level (NMWQCC groundwater standard of 60 µg/L). Trichloroethane[1,1,1-] concentrations from six sample events over the past 15 mo ranged from 80 µg/L to 440 µg/L.

4.3 Sampling Program Modifications

No modifications to the periodic monitoring sampling for the Pajarito Watershed are proposed at this time.

5.0 INVESTIGATION-DERIVED WASTE

Appendix F discusses the management of wastes produced during the PME and contains the waste management records for waste streams generated during this sampling event.

6.0 SUMMARY

6.1 Monitoring Results

An evaluation of the field parameter monitoring results presented in Table B-1 (Appendix B) and subsequent monitoring events will be provided in the annual update to the IFGMP.

6.2 Analytical Results

6.2.1 Surface Water (Base Flow)

The types of contaminants detected and their concentrations are consistent with data reported from previous monitoring events in this watershed.

6.2.1.1 Previously Unreported Results

No results from surface water samples reported from the previous PME from Pajarito Canyon exceeded screening levels.

6.2.1.2 Results from the September 2007 PME

Overall, four aluminum results from surface water samples collected during this PME from Pajarito Canyon exceeded screening levels (Table 4.2-2).

6.2.2 Groundwater

The types of contaminants detected and their concentrations are consistent with data reported from previous monitoring events in this watershed.

6.2.2.1 Previously Unreported Results

No results from groundwater samples reported from the previous PME from Pajarito Canyon exceeded screening levels.

6.2.2.2 Results from the September 2007 PME

Overall, 16 results from groundwater samples collected during this PME from Pajarito Canyon exceeded screening levels (Table 4.2-2).

6.3 Data Gaps

A summary of the field parameter gaps encountered during the PME are presented in Table 3.4-1. The table also provides a detailed account of sampling-event deviations.

7.0 REFERENCES

The following list includes all documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ER ID number. This information is also included in text citations. ER ID numbers are assigned by the Environmental Programs Directorate's Records

Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable in the Program master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau; the U.S. Department of Energy–Los Alamos Site Office; the U.S. Environmental Protection Agency, Region 6; and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

LANL (Los Alamos National Laboratory), May 2007. "Interim Facility-Wide Groundwater Monitoring Plan," Los Alamos National Laboratory document LA-UR-07-3271, Los Alamos, New Mexico. (LANL 2007, 096665)

11x17

Figure 2.0-1 Watershed monitoring locations

11x17

Figure 3.3-1 Alluvial groundwater elevations

11x17

Figure 3.3-2 Intermediate and regional groundwater elevations

11x17

Figure 4.2-1 Analytical results

Table 2.0-1
Monitoring Locations and General Information

Location	Sample Collection Date	Port Name	Port Depth (ft)	Screened Interval (ft)	Top Screen Depth (ft)	Bottom Screen Depth (ft)	Instantaneous Stream Flow (ft^3/s)	Water Level (ft above msl[a])	Water Level Method
Base Flow									
Pajarito 0.5 mi above SR-501	13-Sep-07	n/a[b]	n/a	n/a	n/a	n/a	11	n/a	n/a
Pajarito above Twomile	12-Sep-07	n/a	n/a	n/a	n/a	n/a	1.0	n/a	n/a
Pajarito below confluences of South and North Anchor East Basin	04-Sep-07	n/a	n/a	n/a	n/a	n/a	0.033	n/a	n/a
Pajarito below TA-18	10-Sep-97	n/a	n/a	n/a	n/a	n/a	Dry[c]	n/a	n/a
Two Mile Canyon below TA-59	11-Sep-07	n/a	n/a	n/a	n/a	n/a	2.2	n/a	n/a
Twomile above Pajarito	12-Sep-07	n/a	n/a	n/a	n/a	n/a	0.2	n/a	n/a
Springs									
Anderson Spring	11-Sep-07	n/a	n/a	n/a	n/a	n/a	0.01	n/a	n/a
Bulldog Spring	04-Sep-07	n/a	n/a	n/a	n/a	n/a	0.006	n/a	n/a
Charlie's Spring	05-Sep-07	n/a	n/a	n/a	n/a	n/a	0.016	n/a	n/a
Homestead Spring	05-Sep-07	n/a	n/a	n/a	n/a	n/a	0.011	n/a	n/a
Keiling Spring	04-Sep-07	n/a	n/a	n/a	n/a	n/a	0.001	n/a	n/a
PC Spring	19-Sep-07	n/a	n/a	n/a	n/a	n/a	0.003	n/a	n/a
Starmer Spring	20-Sep-07	n/a	n/a	n/a	n/a	n/a	0.027	n/a	n/a
TA-18 Spring	17-Sep-07	n/a	n/a	n/a	n/a	n/a	0.0078	n/a	n/a
Threemile Spring	17-Sep-07	n/a	n/a	n/a	n/a	n/a	Dry	n/a	n/a
TW-1.72 Spring	13-Sep-07	n/a	n/a	n/a	n/a	n/a	Dry	n/a	n/a
Alluvial									
18-BG-1	10-Sep-07	Single	10	25	10	35	n/a	6764.21	Transducer
18-BG-4	10-Sep-07	Single	2.5	4	2.5	6.5	n/a	Dry	NA[d]
18-MW-11	13-Sep-07	Single	27	20	27	47	n/a	6723.36	Transducer
18-MW-18	12-Sep-07	Single	12.5	10.5	12.5	23	n/a	6642.63	Transducer
18-MW-8	13-Sep-07	Single	8	30	8	38	n/a	6739.22	Transducer
18-MW-9	12-Sep-07	Single	6	25	6	31	n/a	6724.67	Transducer
PCO-2	11-Sep-07	Single	1.5	8	1.5	9.5	n/a	6611.76	Transducer

Location	Sample Collection Date	Port Name	Port Depth (ft)	Screened Interval (ft)	Top Screen Depth (ft)	Bottom Screen Depth (ft)	Instantaneous Stream Flow (ft^3/s)	Water Level (ft above msl[a])	Water Level Method
PCO-3	11-Sep-07	Single	5.7	12	5.7	17.7	n/a	6543.92	Manual
Intermediate									
03-B-10	18-Sep-07	Single	20.6	10	20.6	30.6	n/a	7437.21	Transducer
03-B-13	14-Sep-07	Single	21.5	10	21.5	31.5	n/a	7458.26	Manual
R-19	06-Sep-07	MP1A	844.2	16.4	827.2	843.6	n/a	Dry	NA
R-19	04-Sep-07	MP2A	909.3	16.3	893.3	909.6	n/a	6169.16	Transducer
R-23i	06-Sep-07	P1A	400.3	19.7	400.3	420	n/a	6078.48	Manual
R-23i	07-Sep-07	P3A	524	23	524	547	n/a	6078.65	Manual
Regional									
R-17	18-Sep-07	P1A	1057	23	1057	1080	n/a	5888.48	Manual
R-17	18-Sep-07	P2A	1124	10	1124	1134	n/a	5882.55	Manual
R-18	04-Sep-07	Single	1358	23	1358	1381	n/a	6117.04	Manual
R-19	04-Sep-07	MP3A	1191	44	1171.4	1215.4	n/a	5887.23	Transducer
R-19	11-Sep-07	MP4A	1413	7.2	1410.2	1417.4	n/a	5879.93	Transducer
R-19	05-Sep-07	MP5A	1586	7.2	1582.6	1589.8	n/a	5876.5	Transducer
R-19	06-Sep-07	MP6A	1730	7.1	1726.8	1733.9	n/a	5868.49	Transducer
R-19	04-Sep-07	MP7A	1835	7.1	1832.4	1839.5	n/a	5865.34	Transducer
R-22	19-Sep-07	MP1A	907.1	41.9	872.3	914.2	n/a	5762.02	Transducer
R-22	18-Sep-07	MP2A	962.8	41.9	947	988.9	n/a	5755.19	Transducer
R-22	17-Sep-07	MP3A	1274	6.7	1272.2	1278.9	n/a	5699.46	Transducer
R-22	14-Sep-07	MP4A	1378	6.7	1378.2	1384.9	n/a	5694.04	Transducer
R-22	17-Sep-07	MP5A	1448	5	1447.3	1452.3	n/a	5693.91	Transducer
R-23	06-Sep-07	Single	816	57.2	816	873.2	n/a	5698.23	NA

[a] msl = Mean sea level.

[b] n/a = Not applicable.

[c] See Table 3.4-1 for explanation.

[d] NA = Not available.

Table 3.4-1
Observations and Deviations

Sampling Problems			
Location	Deviation	Cause	Comment
18-BG-4, Pajarito below TA-18	No data are included in this report for these locations.	The locations were not sampled on 9/10/07 because they were dry.	The locations will be sampled during next PME if sufficient water is present.
R-19, Screen 1	No data are included in this report for this well screen.	The screen was not sampled on 9/6/07 because it was dry.	The screen will be sampled during next PME if sufficient water is present.
TW-1.72 Spring	No data are included in this report for this location.	The location was not sampled on 9/13/07 because it was dry.	The location will be sampled during next PME if sufficient water is present.
Threemile Spring	No data are included in this report for this location.	The location was not sampled on 9/17/07 because it was dry.	The location will be sampled during next PME if sufficient water is present.

Table 4.2-1
Cleanup Standards, Risk-Based Screening Levels, and Risk-Based Cleanup Levels for Groundwater and Surface Water at Los Alamos National Laboratory

Standard Type	Groundwater	Surface Water
BCG	n/a[a]	x[b]
DOE 100 mrem Public Dose DCG	x	n/a
DOE 4 mrem Drinking Water DCG	x	n/a
EPA MCL	x	n/a
EPA Region 6 Tap Water Screening Level	x	n/a
New Mexico Environmental Improvement Board Radiation Protection Standards	x	x
NMWQCC Fisheries Standards Chronic	n/a	x
NMWQCC Fisheries Standards Chronic, Hardness = 100 mg/L	n/a	x
NMWQCC Groundwater Standard	x	n/a
NMWQCC Livestock Watering Standard	n/a	x
NMWQCC Wildlife Habitat Standard	n/a	x
NMWQCC Human Health Standard Ephemeral	n/a	x
NMWQCC Human Health Standard Perennial	n/a	x

[a] n/a = Not applicable.

[b] x = Standard applied to data screen for this report.

Table 4.2-2
Results above Screening Levels for Groundwater and Surface Water

Location	Date	Analyte	Result	Units	Screening Level	Screening Level Type
Surface Water						
Pajarito above Twomile	09/12/07	Aluminum	1130	µg/L	750	NM Aquatic Acute
Two mile above Pajarito	09/12/07	Aluminum	7700	µg/L	750	NM Aquatic Acute
Two Mile Canyon below TA-59	09/11/07	Aluminum	4710	µg/L	750	NM Aquatic Acute
Pajarito below confluences of South and North Anchor East Basin	09/04/07	Aluminum	219	µg/L	87	NM Aquatic Chronic
Alluvial Groundwater						
TA-18 Spring	09/17/07	Iron	1490	µg/L	1000	NMWQCC
18-BG-1	09/10/07	Iron	1660	µg/L	1000	NMWQCC
18-MW-8	09/13/07	Mercury	4.1	µg/L	2	EPA MCL
18-MW-8	09/13/07	Mercury	6.7	µg/L	2	NMWQCC
PCO-3	09/11/07	Manganese	220	µg/L	200	NMWQCC
Intermediate Groundwater						
Homestead Spring	09/05/07	Aluminum	5610	µg/L	5000	NMWQCC
Homestead Spring	09/05/07	Iron	3090	µg/L	1000	NMWQCC
Kieling Spring	09/04/07	Iron	2270	µg/L	1000	NMWQCC
Charlie's Spring	09/05/07	Iron	1260	µg/L	1000	NMWQCC
03-B-10	09/18/07	Iron	2200	µg/L	1000	NMWQCC
03-B-13	09/14/07	Iron	2380	µg/L	1000	NMWQCC
03-B-9	09/17/07	Bis(2-ethylhexyl)phthalate	19.5	µg/L	6	EPA MCL
03-B-10	09/18/07	Dioxane[1,4-]	75.2	µg/L	61.1	EPA Tap
03-B-10	09/18/07	Dioxane[1,4-]	147	µg/L	61.1	EPA Tap
03-B-10	09/18/07	Dichloroethene[1,1-]	5.73	µg/L	5	NMWQCC
03-B-10	09/18/07	Trichloroethane[1,1,1-]	173	µg/L	60	NMWQCC
03-B-13	09/14/07	Dioxane[1,4-]	72.7	µg/L	61.1	EPA Tap
03-B-13	09/14/07	Trichloroethane[1,1,1-]	79.4	µg/L	60	NMWQCC

Note: Multiple detections of a particular constituent at a location are counted as one result.