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Periodic Monitoring Report for Los Alamos Watershed, July 16–August 5, 2007

Los Alamos
NATIONAL LABORATORY
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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 Los Alamos Watershed. The PME for Los Alamos 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 July 16 to August 5, 2007, and included 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 due to delays caused by data validation and San Ildefonso review.

Water samples obtained from various locations during this PME were analyzed for target analyte list metals, volatile organic compounds, semivolatile organic compounds, cyanide, 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 surface-water or groundwater sample values from the previously unreported PME data set exceeded screening levels.

Overall, two results from surface-water samples collected during this PME from Los Alamos Canyon exceeded screening levels.

Overall, 18 results from groundwater samples collected during this PME from Los Alamos 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 Guidelines (DOE)
DOE	Department of Energy (U.S.)
DOT	Department of Transportation (U.S.)
DP	Delta Prime
ENV	Environmental Protection
EPA	Environmental Protection Agency (U.S.)
F	filtered
HE	high explosives
IC	ion chromatography
IDW	investigation-derived waste
IFGMP	Interim Facility-Wide Groundwater Monitoring Plan
LANL	Los Alamos National Laboratory
LC	liquid chromatography
LLW	low-level radioactive waste
MCL	maximum contaminant level (EPA)
MDL	method detection limit
MS	mass spectrometry
MTBE	methyl tertiary butyl ether
N	noncancer
NMED	New Mexico Environment Department
NMWQCC	New Mexico Water Quality Control Commission
NOI	notice of intent
NTU	nephelometric turbidity unit
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
RLWTF	Radioactive Liquid Waste Treatment Facility
RPF	Records Processing Facility
SAA	satellite accumulation area
SERF	Sanitary Effluent Reclamation Facility
SOP	standard operating procedure
SU	standard unit
SVOA	semivolatile organic analysis
SVOC	semivolatile organic compound
SWMU	solid waste management unit
SWSC	Sanitary Wastewater Systems Consolidated [Plant}
TA	technical area
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 semiannual groundwater and surface-water monitoring conducted by Los Alamos National Laboratory (LANL or the Laboratory) in the Los Alamos Watershed pursuant to the "Interim Facility-Wide Groundwater Monitoring Plan" (IFGMP) (LANL 2006, 094043), prepared under the Compliance Order on Consent (Consent Order). The periodic monitoring event (PME) occurred from July 16 to August 5, 2007. This event included sampling at groundwater wells or well ports, springs, and base-flow stations.

The Consent Order identifies New Mexico Water Quality Control Commission (NMWQCC) groundwater standards, including alternative abatement standards and 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
- field-measurement monitoring results
- water-quality monitoring results
- results of the screening analysis (comparing the PME's results with regulatory standards and results from previous reports)
- summary and interpretation based on the data and the screening analysis

Data that were not reported in the previous PMR because of delays caused by data validation and San Ildefonso Pueblo review are now 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

The Los Alamos Watershed encompasses approximately 57 mi^2. It includes Los Alamos, Pueblo, Delta Prime (DP), and Acid Canyons. Bayo, Guaje, Rendija, and Barrancas Canyons (collectively known as the North Canyons) are smaller tributary canyons in the watershed. The watershed contains numerous springs, perennial and ephemeral stream segments, and alluvial groundwater. Portions of Los Alamos townsite, Los Alamos County, Santa Fe County, and San Ildefonso Pueblo tribal lands are located within the Los Alamos Watershed.

Laboratory operations have been associated with the release of treated and untreated effluent into the watershed since the establishment of the Laboratory in the 1940s and up to the present. Runoff from solid waste management units and areas of concern at former and current Technical Areas (TAs) TA-00, -01, -02, -03, -19, -21, -31, -41, -43, -53, -72, and -73 have contributed to contaminant releases within the watershed.

1.2 Conceptual Model

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

2.0 SCOPE OF ACTIVITIES

The PME for the Los Alamos 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 spatially 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.

3.3 Water-Level Observations

The periodic monitoring water-level data for this event and the previous three monitoring events are located in 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. One year of water-level measurements, including data taken during this periodic monitoring event, is shown graphically in Figures 3.3-1 through 3.3-3.

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 this PME and from the last three sampling events immediately before the July–August 2007 sampling event. 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 in Appendix G.

Appendix D contains all data obtained during the PME (i.e., 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 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, cobalt-60, neptunium-237, potassium-40, and sodium-22 are reported (or analyzed) for the gamma spectroscopy suite.
  - ❖ Otherwise, all results without a laboratory qualifier of U or X (abbreviations that indicate the analyte was not detected) are reported at all locations.
- Nonradionuclides
  - ❖ All results, excluding nondetections, are reported. Field duplicates, reanalyses, field blanks, trip blanks, equipment blanks, and different analytical methods are also reported.

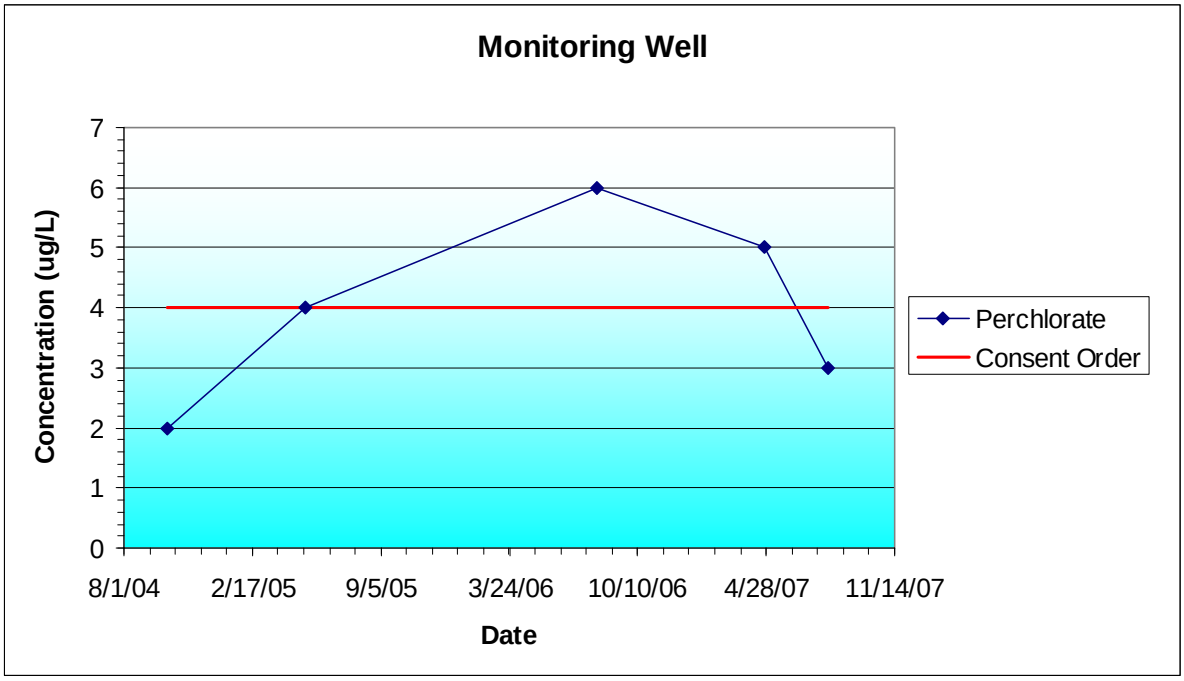
The screening levels applied to all media are listed in Table 4.2-1. Table 4.2-1 indicates the type of screening level and its source.

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 sample results were compared with all surface-water standards without consideration of the designated use for the particular reach. The 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, U.S. Environmental Protection Agency (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 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 E-1 through E-9 (Appendix E) show all values for perchlorate, radioactivity, and 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 select analytes. An example of a diagram displaying perchlorate concentration is shown below.



Perchlorate concentration

The analytes displayed in Figure 4.2-1 were selected from data acquired during the PMEs and were chosen for display on Figure 4.2-1 because of their historical presence in groundwater in this watershed. Radionuclides are not shown on the diagrams. The solid red lines, when shown, depict applicable screening levels. Note that some screening levels may exceed the highest concentration displayed and may not appear on the diagram. Screening-level values are in Tables E-1 through E-9 in Appendix E.

A summary of the results from comparing the surface-water analytical data with screening levels is shown in Tables E-1 through E-4 (Appendix E).

A summary of the results comparing the groundwater analytical data with screening levels is shown in Tables E-5 through E-9 (Appendix E). Graphical representations of select groundwater analytical results (section 4.2) are shown in Figure 4.2-1.

Tables 4.2-2 and 4.2-3 show surface-water and groundwater analytical results (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

In July 2006, tetrachlorodibenzodioxin[2,3,7,8-] was found at surface-water location Pueblo above SR-502 in both the duplicate samples; however, one duplicate result was rejected in secondary validation due to an analytical quality control failure. The other result of 1.64×10^{-6} µg/L was above the New Mexico human health standard of 5.1×10^{-8} µg/L. This is the only detection from two surface-water and four stormwater samples analyzed for this compound since 2004.

4.2.1.2 Results from the July–August PME

For the third consecutive sampling round at surface-water location Pueblo 3, the perchlorate concentration of 17 µg/L (measured by the ion chromatography [IC] method) was above the Consent Order screening level of 4 µg/L. As with earlier samples, however, the result in a duplicate sample using the more precise liquid chromatography/mass spectrometry/mass spectrometry (LC/MS/MS) method was much lower than the screening level; in this case, the result was a nondetection. The low LC/MS/MS result is consistent with prior data. No other general inorganic compound results for this PME exceeded screening levels.

No metals were detected in surface-water samples at concentrations above other New Mexico human health criteria or the New Mexico aquatic life chronic standards, applicable in these ephemeral reaches. The pesticide heptachlor was measured in the Pueblo 3 sample at 0.0295 µg/L, which is above the 0.00079 µg/L New Mexico human health criteria. This was the first detection of this compound in seven sample events. No other organic compounds were detected at concentrations above screening levels.

No radioactivity results were measured above concentration guidelines.

4.2.2 Groundwater

4.2.2.1 Previously Unreported Results

At alluvial well LLAO-1b (on San Ildefonso Pueblo) the nitrate (as nitrogen) concentration on August 9, 2006, was 9.7 mg/L, compared with the NMWQCC groundwater standard of 10 mg/L; the value was the highest to date but not above the screening level. Subsequent measurements have been as high as 26 mg/L.

Although there is no applicable standard for strontium-90 in alluvial groundwater, for screening purposes, strontium-90 activities in samples from alluvial wells LAUZ-1 and LAO-3a from August 2006 were above the EPA MCL for drinking water of 8 pCi/L. Gross beta activities in these were above the EPA drinking water system screening level of 50 pCi/L. These strontium-90 and gross beta activities at locations are similar to those measured over the last decade of sampling at these locations.

The nitrate (as nitrogen) concentration on August 8, 2006, at intermediate groundwater location Basalt Spring was 9.1 mg/L, compared with the NMWQCC groundwater standard of 10 mg/L. Results since 2000 have varied from 0.3 to 16 mg/L.

4.2.2.2 Results from the July–August PME

At alluvial well PAO-4, the perchlorate concentration of 15.7 µg/L measured by the IC method was above the Consent Order screening level of 4 µg/L. The result in a duplicate sample using the LC/MS/MS method was not detected, which is consistent with prior data.

At alluvial well LLAO-1b (on San Ildefonso Pueblo) the nitrate (as nitrogen) concentration was 26 mg/L, compared with the NMWQCC groundwater standard of 10 mg/L; the value is the highest to date but not the first above the standard.

Several filtered iron and manganese results at alluvial wells were above the respective screening levels of 1000 µg/L and 200 µg/L. The filtered iron and manganese results at APCO-1 were 1180 µg/L and 3440 µg/L. At PAO-4, the filtered iron and manganese results were 4500 µg/L and 2240 µg/L. The filtered manganese result at LAUZ-1 was 727 µg/L—the highest to date but not the first above the standard. Otherwise, although the filtered iron and manganese results in prior samples at these locations have fluctuated, the recent measurements are within the observed ranges.

There is no applicable standard for strontium-90 in alluvial groundwater, but for comparison purposes, strontium-90 activities in samples from four alluvial wells and one alluvial spring were above the EPA MCL for drinking water of 8 pCi/L. Gross beta activities in two wells and one spring were above the EPA drinking water system screening level of 50 pCi/L. These recent strontium-90 and gross beta activities at these locations are similar to those measured over the last decade of sampling.

Perchlorate concentrations in Los Alamos Canyon intermediate groundwater at R-6i and LAOI-3.2 were 7.1 µg/L and 9 µg/L, respectively, above the Consent Order screening level of 4 µg/L. These values are consistent with measurements made since each well was first sampled in 2005.

The regional aquifer perchlorate concentrations in Pueblo Canyon at R-4 was 4.3 µg/L, above the Consent Order screening level of 4 µg/L and typical of measurements made since sampling began in April 2005.

Methylene chloride was found in one trip blank at 5.1 µg/L, compared with the EPA MCL of 5 µg/L. Otherwise, no organic compounds were at concentrations above screening levels.

4.3 Sampling Program Modifications

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

5.0 INVESTIGATION-DERIVED WASTE

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

6.0 SUMMARY AND INTERPRETATIONS

6.1 Monitoring Results

An evaluation of the field parameter monitoring results presented in 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

Overall, one result from surface-water samples collected during this PME from Los Alamos Canyon exceeded screening levels (Table 4.2-2).

6.2.1.2 Results from the July–August 2007 PME

Overall, two results from surface-water samples collected during this PME from Los Alamos Canyon exceeded screening levels (Table 4.2-3).

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

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

6.2.2.2 Results from the July–August 2007 PME

Overall, 18 results from groundwater samples collected during this PME from Los Alamos Canyon exceeded screening levels (Table 4.2-3).

6.3 Data Gaps

A summary of the field parameter gaps encountered during the PME are in Table 3.4-1. The table provides detailed accounts 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 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), July 2006. "Interim Facility-Wide Groundwater Monitoring Plan, Revision 1.1," Los Alamos National Laboratory document LA-UR-06-4975, Los Alamos, New Mexico. (LANL 2006, 094043)

11x17

Figure 2.0-1 Watershed monitoring locations

11x17

Figure 3.3-1 Alluvial groundwater-level measurements

11x17

Figure 3.3-2 Intermediate groundwater-level measurements

11x17

Figure 3.3-3 Regional groundwater-level measurements

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									
Acid above Pueblo	25-Jul-07	n/a[b]	n/a	n/a	n/a	n/a	0, Samples taken from pool, no flow	n/a	n/a
DP above TA-21	24-Jul-07	n/a	n/a	n/a	n/a	n/a	Dry[c]	n/a	n/a
DP below Meadow at TA-21	25-Jul-07	n/a	n/a	n/a	n/a	n/a	0.007	n/a	n/a
Guaje above Rendija	24-Jul-07	n/a	n/a	n/a	n/a	n/a	Dry	n/a	n/a
Pueblo 3	26-Jul-07	n/a	n/a	n/a	n/a	n/a	0.017	n/a	n/a
Pueblo above Acid	24-Jul-07	n/a	n/a	n/a	n/a	n/a	0.0024	n/a	n/a
Pueblo above SR-502	24-Jul-07	n/a	n/a	n/a	n/a	n/a	Dry	n/a	n/a
Los Alamos above DP Canyon	24-Jul-07	n/a	n/a	n/a	n/a	n/a	Dry	n/a	n/a
Los Alamos above SR-4	24-Jul-07	n/a	n/a	n/a	n/a	n/a	Dry	n/a	n/a
Los Alamos below Ice Rink	24-Jul-07	n/a	n/a	n/a	n/a	n/a	Dry	n/a	n/a
Los Alamos below LA Weir	24-Jul-07	n/a	n/a	n/a	n/a	n/a	Dry	n/a	n/a
Los Alamos Canyon near Otowi Bridge	24-Jul-07	n/a	n/a	n/a	n/a	n/a	0.269	n/a	n/a
Springs									
Basalt Spring	31-Jul-07	n/a	n/a	n/a	n/a	n/a	Dry	n/a	n/a
DP Spring	23-Jul-07	n/a	n/a	n/a	n/a	n/a	0.001	n/a	n/a
GU-0.01 Spring	31-Jul-07	n/a	n/a	n/a	n/a	n/a	0.004	n/a	n/a
Los Alamos Spring	31-Jul-07	n/a	n/a	n/a	n/a	n/a	0.0045	n/a	n/a
Alluvial									
APCO-1	1-Aug-07	Single	4.7	10	4.7	14.7	n/a	6362.08	Transducer
LADP-3	30-Jul-07	Single	316	9	316	325	n/a	6436.87	Manual
LAO-0.3	17-Jul-07	Single	5.9	5	5.9	10.9	n/a	6961.34	Transducer
LAO-0.6	16-Jul-07	Single	8	5	8	13	n/a	6905.81	Transducer

Table 2.0-1 (continued)

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
LAO-1	1-Aug-07	Single	8	20	8	28	n/a	6825.5	Transducer
LAO-1.6g	18-Jul-07	Single	10.47	15	10.47	25.47	n/a	6644.7	Transducer
LAO-1.8	23-Jul-07	Single	8	10	8	18	n/a	Dry	na[d]
LAO-2	23-Jul-07	Single	7	25	7	32	n/a	6577.57	Transducer
LAO-3a	19-Jul-07	Single	4.7	10	4.7	14.7	n/a	6570.82	Transducer
LAO-4.5c	19-Jul-07	Single	13.3	10	13.3	23.3	n/a	6447	Transducer
LAO-5	3-Aug-07	Single	5	20	5	25	n/a	6386.33	Manual
LAO-6	3-Aug-07	Single	6	10	6	16	n/a	Dry	na
LAO-6a	3-Aug-07	Single	4.2	10	4.2	14.2	n/a	Dry	na
LAO-B	15-Jul-07	Single	11.84	15	11.84	26.84	n/a	7315.79	Transducer
LAUZ-1	1-Aug-07	Single	5.35	5	5.35	10.35	n/a	7028.63	Transducer
LLAO-1b	24-Jul-07	Single	11.32	10	11.32	21.32	n/a	5836.15	Transducer
LLAO-4	24-Jul-07	Single	5.24	10	5.24	15.24	n/a	5508.33	Transducer
PAO-1	24-Jul-07	Single	5.89	5	5.89	10.89	n/a	6949.29	Transducer
PAO-2	25-Jul-07	Single	6.06	5	6.06	11.06	n/a	6920.82	Transducer
PAO-3	2-Aug-07	Single	5.62	5	5.62	10.62	n/a	Destroyed Summer 2006.	na
PAO-4	2-Aug-07	Single	1.97	5	1.97	6.97	n/a	6434.32	Transducer
Intermediate									
LAOI(a)-1.1	31-Jul-07	Single	295.2	9.8	295.2	305	n/a	6543.37	Manual
LAOI-3.2	26-Jul-07	Single	153.3	9.5	153.3	162.8	n/a	6491.29	Manual
LAOI-3.2a	31-Jul-07	Single	181.4	9.6	181.4	191	n/a	6439.27	Manual
LAOI-7	19-Jul-07	Single	240	19.6	240	259.6	n/a	6244.34	Manual
POI-4	2-Aug-07	Single	159	15	159	174	n/a	6213.01	Manual
R-3i	20-Jul-07	Single	215.2	6.8	215.2	222	n/a	6195.87	Manual
R-5	17-Jul-07	MP1A	329.5	5.1	326.4	331.5	n/a	Dry	na

Table 2.0-1 (continued)

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
R-5	16-Jul-07	MP2A	383.9	16	372.8	388.8	n/a	6135.23	Transducer
R-6i	17-Jul-07	Single	602	10	602	612	n/a	6403.31	Manual
R-7	31-Jul-07	MP1A	378	16	363.2	379.2	n/a	Dry	na
R-7	31-Jul-07	MP2A	744.8	16	730.4	746.4	n/a	Dry	na
R-9i	27-Jul-07	MP1A	198.8	10.4	189.1	199.5	n/a	6246.42	Transducer
R-9i	27-Jul-07	MP2A	278.8	10.7	269.6	280.3	n/a	6129.94	Transducer
Regional									
R-2	16-Jul-07	Single	918	23.12	906.45	929.57	n/a	5870.99	Manual
R-24	18-Jul-07	Single	825	23	825	848	n/a	5829.45	Manual
R-4	18-Jul-07	Single	792.9	23.1	792.9	816	n/a	5832.13	Manual
R-5	17-Jul-07	MP3B	695.1	43.4	676.9	720.3	n/a	5766.87	Transducer
R-5	16-Jul-07	MP4A	860.9	5	858.7	863.7	n/a	5749.06	Transducer
R-6	17-Jul-07	Single	1205	23	1205	1228	n/a	5838.47	Manual
R-7	31-Jul-07	MP3A	915.1	41.9	895.5	937.4	n/a	5877.81	Transducer
R-8	23-Jul-07	MP1A	711.1	50.39	705.31	755.7	n/a	5853.74	Transducer
R-8	25-Jul-07	MP2A	825	7	821	828	n/a	5834.76	Transducer
R-9	19-Jul-07	Single	684	65.5	683	748.5	n/a	5692.29	Manual

[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

Samples Not Collected			
Location	Deviation	Cause	Comment
Basalt Spring, R-7 Screen 1, R-7 Screen 2	No data are included in this report for these locations.	The locations were not sampled on 07/31/07 because they were dry.	Locations will be checked again during next scheduled sampling round.
DP above TA-21, Guaje above Rendija, Los Alamos above DP Canyon, Los Alamos above SR-4, Los Alamos below Ice Rink, Los Alamos below LA Weir, Pueblo above SR-502	No data are included in this report for these locations.	The locations were not sampled on 07/24/07 because they were dry.	Locations will be checked again during next scheduled sampling round.
LADP-3	No data are included in this report for this location.	The location was not sampled on 07/30/07 because it was dry.	Location will be checked again during next scheduled sampling round.
LAO-1.8	No data are included in this report for this location.	The location was not sampled on 07/23/07 because it was dry.	Location will be checked again during next scheduled sampling round.
LAO-6, LAO-6a	No data are included in this report for these locations.	The locations were not sampled on 08/3/07 because they were dry.	Locations will be checked again during next scheduled sampling round.
R-5 Screen 1	No data are included in this report for this location.	The location was not sampled on 07/17/07 because it was dry.	Location will be checked again during next scheduled sampling round.

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
Department of Energy (DOE) Biota Concentration Guidelines (BCG)	n/a[a]	x[b]
DOE 100 mrem Public Dose Derived Concentration Guidelines (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 Previously Unreported PME Results

Location	Date	Analyte	Result	Units	Screening Level	Screening Level Type
Surface Water						
Pueblo above SR-502	07/28/06	Tetrachlorodibenzo-dioxin[2,3,7,8-]	0.00000285	µg/L	0.000000051	NM human health
Alluvial Groundwater						
LLAO-1b	08/09/06	NO_3+NO_2-N	9.73	mg/L	10	NMWQCC
LAUZ-1	08/02/06	GROSSβ	206	pCi/L	50	EPA tap
LAUZ-1	08/02/06	Sr-90	66.7	pCi/L	8	EPA MCL
LAO-3a	08/01/06	GROSSβ	61.2	pCi/L	50	EPA tap
LAO-3a	08/01/06	Sr-90	19.7	pCi/L	8	EPA MCL
Intermediate Groundwater						
Basalt Spring	08/08/06	NO_3+NO_2-N	9.12	mg/L	10	NMWQCC

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

Table 4.2-3
Results above Screening Levels for Groundwater and Surface Water July–August PME Results

Location	Date	Analyte	Result	Units	Screening Level	Screening Level Type
Surface Water						
Pueblo 3	07/26/07	ClO_4	17	µg/L	4	Consent Order
Pueblo 3	07/26/07	Heptachlor	0.0295	µg/L	$7.9E^{-4}$	NM human health criteria
Alluvial Groundwater						
PAO-4	08/02/07	Fe	4500	µg/L	1000	NMWQCC
PAO-4	08/02/07	Mn	2240	µg/L	200	NMWQCC
APCO-1	08/01/07	Fe	1180	µg/L	1000	NMWQCC
APCO-1	08/01/07	Mn	3440	µg/L	200	NMWQCC
LAUZ-1	08/01/07	Mn	727	µg/L	200	NMWQCC
LLAO-1b	07/24/07	NO_3+NO_2-N	2634	mg/L	10	NMWQCC
PAO-4	08/02/07	ClO_4	15.7	µg/L	4	Consent Order
DP Spring	07/23/07	GROSSβ	143	pCi/L	50	EPA tap
DP Spring	07/23/07	Sr-90	62	pCi/L	8	EPA MCL
LAO-1	08/01/07	Sr-90	10.9	pCi/L	8	EPA MCL
LAUZ-1	08/01/07	GROSSβ	106	pCi/L	50	EPA tap
LAUZ-1	08/01/07	Sr-90	44.5	pCi/L	8	EPA MCL
LAO-2	07/23/07	Sr-90	11.7	pCi/L	8	EPA MCL
LAO-3a	07/19/07	GROSSβ	52.8	pCi/L	50	EPA tap
LAO-3a	07/19/07	Sr-90	17.6	pCi/L	8	EPA MCL
Intermediate Groundwater						
R-6i	07/17/07	ClO_4	7.07	µg/L	4	Consent Order
LAOI-3.2	07/26/07	ClO_4	9	µg/L	4	Consent Order
Regional Groundwater						
R-4	7/18/2007	ClO_4	4.3	µg/L	4	Consent Order

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