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Periodic Monitoring Report for Mortandad Watershed, August 13–August 31, 2007

Los Alamos
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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 Mortandad Watershed. This PME for Mortandad Watershed was conducted pursuant to the 2007 "Interim Facility-Wide Groundwater Monitoring Plan," prepared under the Compliance Order on Consent.

The PME documented in this report occurred from August 13 to August 31, 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 due to delays caused by data validation and San Ildefonso Pueblo review.

Water samples obtained from various locations during these PMEs 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).

Seven results from surface-water samples reported here from the previous PME from Mortandad Canyon exceeded screening levels.

Two results from surface-water samples collected during the August 13–August 31, 2007, PME from Mortandad Canyon were near or exceeded screening levels. At M-1W, aluminum exceeded the New Mexico aquatic acute standard of 7500 µg/L, while copper was detected at 13.1 µg/L, which approached the New Mexico aquatic acute standard of 13.4 µg/L.

Three results from groundwater samples reported here from past PMEs from Mortandad Canyon exceeded screening levels. Chromium concentration at R-28 and uranium concentration at Pine Rock Spring exceeded the New Mexico Water Quality Control Commission Groundwater Standards. The gross alpha concentration at Pine Rock Spring exceeded the U.S. Environmental Protection Agency maximum contaminant level.

Twenty-four results from groundwater samples collected during the August 13–August 31, 2007, PME from Mortandad Canyon were near or 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.)
ENV	Environmental Protection
EPA	Environmental Protection Agency (U.S.)
F	filtered
HE	high explosives
IFGMP	Interim Facility-Wide Groundwater Monitoring Plan
LANL	Los Alamos National Laboratory
LLW	low-level radioactive waste
MCL	maximum contaminant level (EPA)
MDL	method detection limit
msl	mean sea level
N	noncancer
NMED	New Mexico Environment Department
NMWQCC	New Mexico Water Quality Control Commission
NOI	notice of intent
NTU	nephelometric turbidity unit
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 Recovery Group
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
SVOC	semivolatile organic compound
SWSC	Sanitary Wastewater Systems Consolidation [Plant]
SWMU	solid waste management unit
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 quarterly groundwater and surface-water monitoring conducted by Los Alamos National Laboratory (LANL or the Laboratory) in the Mortandad Watershed, pursuant to the "Interim Facility-Wide Groundwater Monitoring Plan" (IFGMP) (LANL 2006, 094043), prepared under the Compliance Order on Consent (Consent Order). This report includes data collected between August 13 and August 31, 2007. This sample 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 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 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

Mortandad Watershed is an east-to-southeast trending drainage that heads on the Pajarito Plateau near the main Laboratory complex at Technical Area (TA) 03 at an elevation of 7380 ft. The drainage extends about 9.6 mi from its headwaters to its confluence with the Rio Grande at an elevation of 5440 ft. The watershed crosses San Ildefonso Pueblo land for several miles before joining the Rio Grande.

Mortandad Watershed is located in the central portion of the Laboratory and covers approximately 10 mi^2. San Ildefonso Pueblo is directly adjacent to a portion of the Laboratory's eastern boundary and includes the eastern end of Mortandad Watershed. Mortandad Watershed contains several tributary canyons that have received contaminants released during historic Laboratory operations. The most prominent tributary canyons include Ten Site Canyon, Pratt Canyon, Effluent Canyon, and Cañada del Buey. Current and former technical areas located in Mortandad Watershed include TA-03, -04, -05, -18, -35, -42, -46, -48, -50, -51, -52, -54, -55, and -59. The primary sources of contamination in this watershed are attributed to past releases of contaminants from outfalls and spills at TA-35 and -50, including the Radioactive Liquid Waste Treatment Facility (RLWTF) at TA-50. Metals and volatile organic compounds (VOCs) have historically been released into the canyon. Nitrate, perchlorate, fluoride, molybdenum, and radionuclides

are some of the contaminants that have been detected in Mortandad Canyon alluvial groundwater. Contamination from perchlorate and nitrate is present in the vadose zone beneath the portion of Mortandad below the confluence of Ten Site Canyon. Nitrate, perchlorate, chromium, and tritium are detected in intermediate perched groundwater. Chromium, nitrate, perchlorate, and tritium occur in the regional groundwater.

1.2 Conceptual Model

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

2.0 SCOPE OF ACTIVITIES

The PME for the Mortandad 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 August 2007 sampling event.

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 immediately before sampling. The water-level measurements taken during this PME 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 immediately before August 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 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 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, cobalt-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 that 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. Table 4.2-1 indicates the type of screening level and its source.

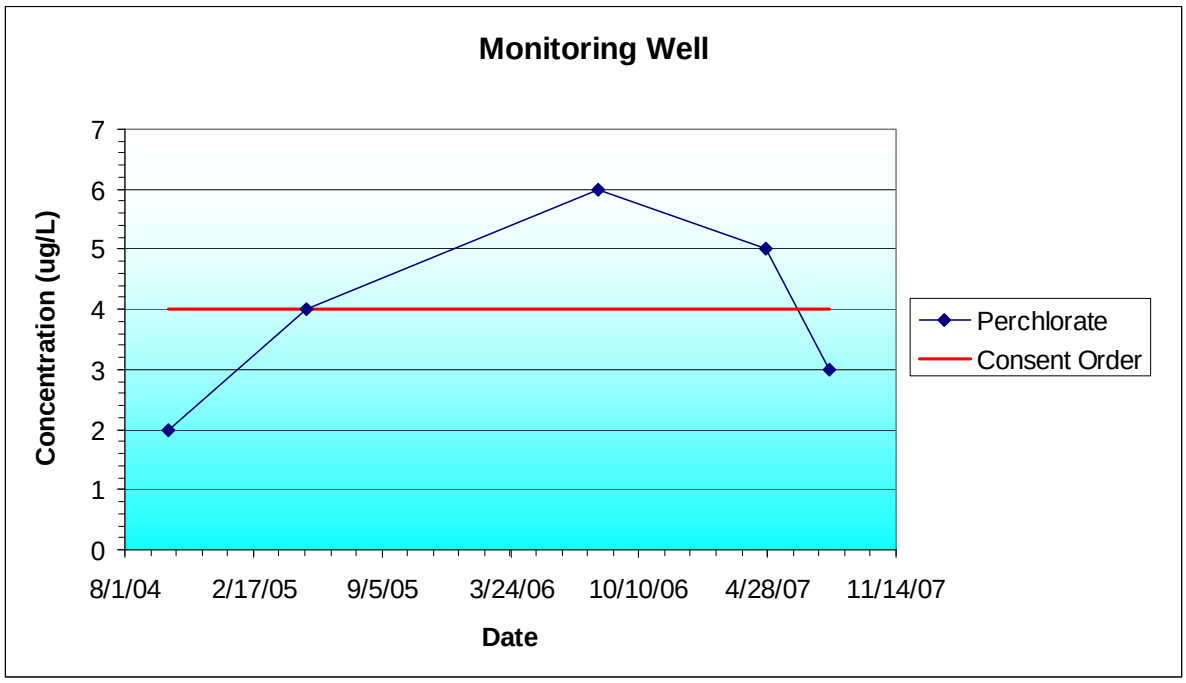
Data for PMRs are evaluated using the following screening process.

- 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, 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 (cancer) or N (noncancer). For the cancer risk type, the risk levels are for 10^{-6} excess cancer risk. The Consent Order specifies screening with these values at a risk level of 10^{-5} (rather than 10^{-6}) excess cancer risk. Therefore, data must exceed the 10^{-6} screening values by a factor of 10 or more to be above a risk level of 10^{-5} excess cancer risk.

- The analytical results for radioactivity are compared with DOE Biota Concentration Guide (BCG) for surface water and Derived Concentration Guidelines (DCG) 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 Figures 4.2-1 and 4.2-2. Figures 4.2-1 and 4.2-2 contain diagrams displaying a series of select analytes. An example of a diagram displaying perchlorate concentration is shown below.



Perchlorate concentration

The analytes displayed in Figures 4.2-1 and 4.2-2 were selected from data acquired during the PME. The analytes shown on the figures were chosen for display because of their historical presence in surface water and 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 may be found 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-3 (Appendix E). Graphical representations of select surface-water analytical results are shown in Figures 4.2-1 through 4.2-3.

A summary of the results comparing the groundwater analytical data with screening levels is shown in Tables E-4 through E-9 (Appendix E). Graphical representations of select groundwater analytical results (section 4.2) are shown in Figures 4.2-1 through 4.2-3.

Tables 4.2-1 through 4.2-3 show 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

All surface-water reaches in this watershed are ephemeral, so the New Mexico aquatic life acute standards apply. The filtered aluminum concentration of 3710 µg/L at location M-1W was above the New Mexico aquatic life acute standard of 750 µg/L. Over the past 2 yr, the aluminum concentration at this location has fluctuated widely with many values above this standard.

Six polycyclic aromatic hydrocarbon (PAH) compounds, including benzo(a)pyrene, were found in a sample at E-1W at concentrations above New Mexico human health standards. All the analytical results were estimated values and near the detection limit, and none of the compounds were found in a field duplicate sample. These are the only PAH detections from six sample events since 2005.

No other surface-water results exceeded screening levels.

4.2.1.2 Results from the August 2007 PME

The filtered aluminum concentration of 7500 µg/L at location M-1W was above the New Mexico aquatic life acute standard of 750 µg/L, which applies in this ephemeral reach. Over the past 2 yr, the aluminum concentration at this location has fluctuated widely with many values above this standard.

The filtered copper concentration of 13.1 µg/L at M-1W was just below the New Mexico aquatic life acute standard (at 100 mg hardness) of 13.4 µg/L, which applies in this ephemeral reach. Copper concentrations at this and nearby surface-water locations have varied widely over the past 2 yr but have mainly been below the standard.

No other surface-water results exceeded screening levels.

4.2.2 Groundwater

4.2.2.1 Previously Unreported Results

The concentration of uranium of 32.3 µg/L at Pine Rock Spring (an intermediate groundwater location on San Ildefonso Pueblo) on July 7, 2006, was just below the NMWQCC groundwater standard of 30 µg/L. Results over the last year have varied from just below to above the standard. The gross alpha result of 29.2 pCi/L on July 7, 2006, was above the EPA MCL of 15 pCi/L. This is the only gross alpha measurement at the spring.

The nitrate (as nitrogen) concentrations of 8.97 mg/L at Pine Rock Spring (on San Ildefonso Pueblo) on July 7, 2006, was just below the 10 mg/L NMWQCC groundwater standards. Results for nitrate (as nitrogen) at this location have ranged from 3.6 to 14.4 mg/L during 2006 and 2007.

In regional well R-28, the unfiltered hexavalent chromium concentration on July 5, 2006, was 423 µg/L, compared with the NMWQCC groundwater standard of 50 µg/L. Over the last 2.5 yr, chromium values have ranged from 310 to 446 µg/L and showed no particular trend with time.

4.2.2.2 Results from the August 2007 PME

Although there is no applicable standard for strontium-90 in alluvial groundwater, for comparison purposes, strontium-90 activities in samples from alluvial wells MCO-4B and MCO-5 of 65.2 pCi/L and 65.4 pCi/L were above the EPA MCL for drinking water of 8 pCi/L. There is also no applicable standard for gross beta; however, activities in these wells of 150 pCi/L and 129 pCi/L were above the EPA drinking water system screening level of 50 pCi/L. These recent strontium-90 and gross beta activities are similar to those measured over the last decade of sampling.

The perchlorate concentrations ranged from 13 to 29 µg/L at four alluvial wells and were above the Consent Order screening level for perchlorate of 4 µg/L. The perchlorate concentrations have declined significantly during the past 5 yr.

Five PAHs were detected at concentrations above screening levels in a sample at MCO-7.5. The results were all near the detection limits, and the compounds were not detected in a field duplicate sample. One compound, benzo(a)pyrene, was at a concentration of 0.825 µg/L, above the EPA MCL of 0.2 µg/L. Four other compounds were detected at concentrations above their EPA tap water screening levels.

The concentration of uranium of 29.6 µg/L at Pine Rock Spring (on San Ildefonso Pueblo) was just below the NMWQCC groundwater standard of 30 µg/L. Results over the last year have varied from just below to above the standard.

The nitrate (as nitrogen) concentrations of 15 mg/L and 20 mg/L in intermediate wells MCOI-4 and MCOI-6 were above the 10 mg/L NMWQCC groundwater standard. During the past 2 yr, results at MCOI-4 have been fairly stable, while concentrations at MCOI-6 have increased.

Perchlorate concentrations at three intermediate groundwater wells ranged from 103 to 164 µg/L, above the Consent Order screening level for perchlorate of 4 µg/L. These values are generally among the lowest measurements made since each well was first sampled in 2005. Earlier values were about 30% higher than recent results.

The filtered chromium concentration in MCOI-6 was 31 µg/L, compared with the NMWQCC groundwater standard of 50 µg/L. These values have fallen by 25% over a year of sampling.

A result in MCOI-4 for dioxane[1,4-] of 61.3 µg/L was just above the EPA tap water screening level of 61.1 µg/L. This result, measured with the volatile organic method, has a method detection limit (MDL) of 20 µg/L. Of nine measurements and seven detections over 2 yr, this is the highest result by the volatile organic method. A separate analysis of the sample by the more precise semivolatile organic method, which has an MDL of 1 µg/L, was below the screening level at 38 µg/L. This was the highest of three measurements by this method.

Bis(2-ethylhexyl)phthalate was detected in MCOI-6 at 5.99 µg/L, just below the EPA MCL of 6 µg/L. This compound has been found in all but one of eight sample events for this well during the past 2 yr, often at higher concentrations, up to 12 µg/L.

The perchlorate concentration in regional well R-15 was 5.9 µg/L, above the Consent Order screening level of 4 µg/L. Values measured by the liquid chromatography/mass spectrometry method during the last 2 yr range from 4.7 to 6.8 µg/L.

In regional well R-28, the filtered chromium concentration was 392 µg/L, compared with the NMWQCC groundwater standard of 50 µg/L. Over the last 2.5 yr, the values have ranged from 310 to 446 µg/ L and showed no particular trend with time.

4.3 Sampling Program Modifications

No modifications to the periodic monitoring sampling for the Mortandad 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 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, seven results from surface-water samples reported here from past PMEs from Mortandad Canyon were near or 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 Mortandad Canyon were near or 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, three results from groundwater samples reported here from past PMEs from Mortandad Canyon were near or exceeded screening levels (Table 4.2-2).

6.2.2.2 Results from the August 2007 PME

Overall, 24 results from groundwater samples collected during this PME from Mortandad Canyon were near or 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 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 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 and regional groundwater-level measurements

11x17

Figure 4.2-1 Alluvial analytical results

11x17

Figure 4.2-2 Intermediate and regional analytical results

Table 2.0-1
Monitoring Locations and General Information

Location	Sample Collection Date	Port Name	Port ID	Port Depth (ft)	Screened Interval (ft)	Top Screen Depth (ft)	Bottom Screen Depth (ft)	Base Flow (ft^3/s)	Water Level (ft above msl)[a]	Water-Level Method
Base Flow										
E-1FW	21-Aug-07	n/a[b]	n/a	n/a	n/a	n/a	n/a	Dry[c]	n/a	n/a
M-1E	20-Aug-07	n/a	n/a	n/a	n/a	n/a	n/a	Dry	n/a	n/a
M-1W	20-Aug-07	n/a	n/a	n/a	n/a	n/a	n/a	0.01	n/a	n/a
TS-1W	17-Aug-07	n/a	n/a	n/a	n/a	n/a	n/a	Dry	n/a	n/a
TS-2E	17-Aug-07	n/a	n/a	n/a	n/a	n/a	n/a	Dry	n/a	n/a
M-2E	17-Aug-07	n/a	n/a	n/a	n/a	n/a	n/a	Dry	n/a	n/a
Mortandad below Effluent Canyon	22-Aug-07	n/a	n/a	n/a	n/a	n/a	n/a	0.36	n/a	n/a
Springs										
Pine Rock Spring	16-Aug-07	n/a	n/a	n/a	n/a	n/a	n/a	Dry	n/a	n/a
Alluvial										
CDBO-1	17-Aug-07	Single Completion	6751	5.1	8	5.1	13.1	n/a	Dry	n/a
CDBO-2	17-Aug-07	Single Completion	6761	5.9	12	5.9	17.9	n/a	Dry	n/a
CDBO-3	17-Aug-07	Single Completion	6771	4.4	8	4.4	12.4	n/a	Dry	n/a
CDBO-4	17-Aug-07	Single Completion	6781	4.1	8	4.1	12.1	n/a	Dry	n/a
CDBO-5	17-Aug-07	Single Completion	6791	7	10	7	17	n/a	Dry	n/a
CDBO-6	27-Aug-07	Single Completion	5281	34	10	34	44	n/a	6781.33	Transducer
CDBO-7	17-Aug-07	Single Completion	5291	29	10	29	39	n/a	Dry	n/a
CDBO-8	17-Aug-07	Single Completion	5671	3	10	3	13	n/a	Dry	n/a
CDBO-9	17-Aug-07	Single Completion	5691	19	10	19	29	n/a	Dry	n/a
MCA-1	21-Aug-07	Single Completion	5601	2.4	3	2.4	5.4	n/a	Dry	n/a
MCA-5	16-Aug-07	Single Completion	5631	1.75	4	1.75	5.75	n/a	Dry	n/a
MCO-0.6	23-Aug-07	Single Completion	5641	1.05	2	1.05	3.05	n/a	Dry	n/a
MCO-2	14-Aug-07	Single Completion	4551	2	7	2	9	n/a	Dry	n/a

Table 2.0-1 (continued)

Location	Sample Collection Date	Port Name	Port ID	Port Depth (ft)	Screened Interval (ft)	Top Screen Depth (ft)	Bottom Screen Depth (ft)	Base Flow (ft^3/s)	Water Level (ft above msl)[a]	Water-Level Method
MCO-4B	13-Aug-07	Single Completion	4581	8.9	20	8.9	28.9	n/a	6858.66	Transducer
MCO-5	21-Aug-07	Single Completion	4591	21	25	21	46	n/a	6848.25	Transducer
MCO-6	14-Aug-07	Single Completion	4601	27	20	27	47	n/a	6813.1	Transducer
MCO-7	28-Aug-07	Single Completion	4631	39	30	39	69	n/a	6791.13	Transducer
MCO-7.5	29-Aug-07	Single Completion	4661	35	25	35	60	n/a	6764.07	Transducer
MT-2	16-Aug-07	Single Completion	5251	44	20	44	64	n/a	6732.9	Transducer
MT-3	-	Single Completion	5261	44	20	44	64	n/a	MT-2 Sampled	n/a
MT-4	-	Single Completion	5271	54	10	54	64	n/a	MT-2 Sampled	n/a
TSCA-6	13-Aug-07	Single Completion	6091	16.2	4.7	16.2	20.9	n/a	Dry	n/a
TSWB-6	13-Aug-07	Single Completion	6101	25	10	25	35	n/a	Dry	n/a
Intermediate										
MCOBT-4.4	27-Aug-07	Single Completion	5401	485.4	38.6	485.4	524	n/a	Dry	n/a
MCOI-4	24-Aug-07	Single Completion	5981	499	23.1	498.9	522	n/a	6316.95	Transducer
MCOI-5	23-Aug-07	Single Completion	5721	689	9.96	689.04	699	n/a	6136.41	Manual
MCOI-6	13-Aug-07	Single Completion	5731	686	22.3	686	708.3	n/a	6153.45	Manual
MCOI-8	27-Aug-07	Single Completion	5991	665	9.96	665	674.96	n/a	Dry	n/a
Regional										
R-1	13-Aug-07	Single Completion	1701	1031.1	26.3	1031.12	1057.42	n/a	5878.21	Manual
R-13	16-Aug-07	Single Completion	1741	958.3	60.39	958.33	1018.72	n/a	5835.69	Manual
R-14	14-Aug-07	MP1A	411	1204.5	32.6	1200.6	1233.2	n/a	5882.79	Transducer
R-14	14-Aug-07	MP2A	471	1288.5	6.6	1286.5	1293.1	n/a	5882.39	Transducer
R-15	16-Aug-07	Single Completion	1751	958.6	61.7	958.6	1020.3	n/a	5849.00	Manual
R-16	28-Aug-07	MP2A	541	866.1	7.5	863.4	870.9	n/a	5642.15	Transducer
R-16	28-Aug-07	MP3A	591	1018.4	7.6	1014.8	1022.4	n/a	5557.24	Transducer
R-16	29-Aug-07	MP4A	641	1238	7.6	1237	1244.6	n/a	5546.38	Transducer
R-16r	20-Aug-07	Single Completion	6341	600	17.6	600	617.6	n/a	5692.56	Manual

Table 2.0-1 (continued)

Location	Sample Collection Date	Port Name	Port ID	Port Depth (ft)	Screened Interval (ft)	Top Screen Depth (ft)	Bottom Screen Depth (ft)	Base Flow (ft^3/s)	Water Level (ft above msl)[a]	Water-Level Method
R-21	20-Aug-07	Single Completion	1761	888.8	18	888.8	906.8	n/a	5853.31	Transducer
R-28	17-Aug-07	Single Completion	1781	934.3	23.8	934.3	958.1	n/a	5837.98	Manual
R-33	22-Aug-07	P1A	5491	995.5	23	995.5	1018.5	n/a	Smaller suite due to insufficient water	n/a
R-33	30-Aug-07	P2A	5501	1112.4	9.9	1112.4	1122.3	n/a	5839.03	Manual
R-34	14-Aug-07	Single Completion	1791	895.15	22.9	883.7	906.6	n/a	5834.45	Manual
Test Well 8	22-Aug-07	Single Completion	4731	953	112	953	1065	n/a	5874.61	Manual

[a] msl = Mean sea level.

[b] n/a = Not applicable.

[c] See Table 3.4-1 for explanation.

Table 3.4-1
Observations and Deviations

Location	Deviation	Cause	Comments
CDBO-1, CDBO-2, CDBO-3, CDBO-4, CDBO-5, CDBO-7, CDBO-8, CDBO-9, M-2E, TS-1W, TS-2E	No data are included in this report for these locations.	The locations were not sampled on 08/17/07 because they were dry.	Locations will be checked again during next scheduled sampling round.
E-1FW, MCA-1	No data are included in this report for these locations.	The locations were not sampled on 08/21/07 because they were dry.	Locations will be checked again during next scheduled sampling round.
M-1E	No data are included in this report for this location.	The location was not sampled on 08/20/07 because it was dry.	Location will be checked again during next scheduled sampling round.
MCA-5, Pine Rock Spring	No data are included in this report for these locations.	The locations were not sampled on 08/16/07 because they were dry.	Locations will be checked again during next scheduled sampling round.
MCO-0.6	No data are included in this report for this location.	The location was not sampled on 08/23/07 because it was dry.	Location will be checked again during next scheduled sampling round.
MCO-2	No data are included in this report for this location.	The location was not sampled on 08/14/07 because it was dry.	Location will be checked again during next scheduled sampling round.
MCOBT-4.4, MCOI-8	No data are included in this report for these locations.	The locations were not sampled on 08/27/07 because they were dry.	Locations will be checked again during next scheduled sampling round.
TSCA-6, TSWB-6	No data are included in this report for these locations.	The locations were not sampled on 08/13/07 because they were dry.	Locations 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
DOE 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 Previously Unreported PME Results

Location	Date	Analyte	Result	Units	Screening Level	Screening Level Type
Surface Water						
M-1W	06/26/06	Al	3710	µg/L	750	NM aquatic acute
E-1W	06/27/06	Benzo(a)pyrene	0.527	µg/L	0.18	NM human health
E-1W	06/27/06	Benzo(b)fluoranthene	0.492	µg/L	0.18	NM human health
E-1W	06/27/06	Benzo(k)fluoranthene	0.579	µg/L	0.18	NM human health
E-1W	06/27/06	Chrysene	0.635	µg/L	0.18	NM human health
E-1W	06/27/06	Dibenz(a,h)anthracene	0.484	µg/L	0.18	NM human health
E-1W	06/27/06	Indeno(1,2,3-cd)pyrene	0.472	µg/L	0.18	NM human health
Intermediate Groundwater						
Pine Rock Spring	07/07/06	GROSSα	29.2	pCi/L	15	EPA MCL
Pine Rock Spring	07/07/06	U	32.3	µg/L	30	NMWQCC
Pine Rock Spring	07/07/06	NO_3+NO_2-N	8.97	mg/L	10	NMWQCC
Regional Groundwater						
R-28	07/05/06	Cr	423	µg/L	50	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 August 2007 PME

Location	Date	Analyte	Result	Units	Screening Level	Screening Level Type
Surface Water						
M-1W	08/20/07	Al	7500	µg/L	750	NM aquatic acute
M-1W	08/20/07	Cu	13.1	µg/L	13.4	NM aquatic acute
Alluvial Groundwater						
MCO-4B	08/13/07	GROSSβ	150	pCi/L	50	EPA drinking water
MCO-4B	08/13/07	Sr-90	65.2	pCi/L	8	EPA MCL
MCO-5	08/21/07	GROSSβ	129	pCi/L	50	EPA drinking water
MCO-5	08/21/07	Sr-90	65.4	pCi/L	8	EPA MCL
MCO-4B	08/13/07	ClO_4	13.3	µg/L	4	Consent Order
MCO-5	08/21/07	ClO_4	19.9	µg/L	4	Consent Order
MCO-7.5	08/29/07	ClO_4	28.9	µg/L	4	Consent Order
MT-3	08/16/07	ClO_4	28	µg/L	4	Consent Order
MCO-7.5	08/29/07	Benzo(a)anthracene	0.74	µg/L	0.295	EPA tap
MCO-7.5	08/29/07	Benzo(a)pyrene	0.825	µg/L	0.2	EPA MCL
MCO-7.5	08/29/07	Benzo(b)fluoranthene	0.641	µg/L	0.295	EPA tap
MCO-7.5	08/29/07	Dibenz(a,h)anthracene	0.52	µg/L	0.03	EPA tap
MCO-7.5	08/29/07	Indeno(1,2,3-cd)pyrene	0.341	µg/L	0.295	EPA tap
Intermediate Groundwater						
Pine Rock Spring	08/16/07	U	29.6	µg/L	30	EPA MCL
MCOI-4	08/24/07	NO_3+NO_2-N	15.1	mg/L	10	NMWQCC
MCOI-6	08/13/07	NO_3+NO_2-N	20	mg/L	10	NMWQCC
MCOI-4	08/24/07	ClO_4	113	µg/L	4	Consent Order
MCOI-5	08/23/07	ClO_4	103	µg/L	4	Consent Order
MCOI-6	08/13/07	ClO_4	164	µg/L	4	Consent Order
MCOI-6	08/13/07	Cr	31.3	µg/L	50	NMWQCC
MCOI-4	08/24/07	Dioxane[1,4-]	61.3	µg/L	61.1	EPA tap
MCOI-6	08/13/07	Bis(2-ethylhexyl)phthalate	5.99	µg/L	6	EPA MCL
Regional Groundwater						
R-15	08/16/07	ClO_4	5.9	µg/L	4	Consent Order
R-28	08/17/07	Cr	392	µg/L	50	NMWQCC

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