EMID-700547

**DEPARTMENT OF ENERGY**
Environmental Management Los Alamos Field Office (EM-LA)
Los Alamos, New Mexico 87544


AUG 19 2019

Mr. John E. Kieling
Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Dear Mr. Kieling:

Subject: Submittal of Replacement Pages for the Interim Facility-Wide Groundwater Monitoring Plan for the 2020 Monitoring Year, October 2019–September 2020

Enclosed please find two hard copies with electronic files of replacement pages for the "Interim Facility-Wide Groundwater Monitoring Plan for the 2020 Monitoring Year, October 2019–September 2020." Also enclosed is an electronic copy of a redline strikeout version of the pages that were revised. Revisions were made in response to comments received from the New Mexico Environment Department (NMED) in June 2019 (comments and responses are included as Enclosure 2).

If you have any questions, please contact Steve Veenis at (505) 309-1362 (steve.veenis@em-la.doe.gov) or Hai Shen at (505) 665-5046 (hai.shen@em.doe.gov).

Sincerely,

Arturo Q. Duran
Compliance and Permitting Manager
Environmental Management
Los Alamos Field Office

Enclosures:
1. Two hard copies with electronic files (including a redline strikeout version) – Replacement pages for the Interim Facility-Wide Groundwater Monitoring Plan for the 2020 Monitoring Year, October 2019–September 2020 (EM2019-0156)
2. Response to NMED Comments on the Interim Facility-Wide Groundwater Monitoring Plan for the 2020 Monitoring Year, October 2019–September 2020 (EM2019-0291)

cc (letter with hard-copy enclosure[s]):
S. Veenis, N3B

cc (letter with CD enclosure[s]):
H. Burgess, Los Alamos County, Los Alamos, NM (2 copies)

cc (letter and enclosure[s] emailed):
L. King, EPA Region 6, Dallas, TX
R. Martinez, San Ildefonso Pueblo, NM
D. Chavarria, Santa Clara Pueblo, NM
R. Carpenter, City of Santa Fe, NM
J. Richardson, Los Alamos County, NM
N. Dhawan, NMED
S. Pullen, NMED
A.C. Romero, NMED
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W. Mairson, LANL
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EM-LA-40AD-00483

Cañada del Buey. TAs located in the Mortandad Canyon watershed include TA-03, TA-05, TA-35, TA-48, TA-50, TA-52, TA-55, TA-60, TA-63, former TA-04, and former TA-42. A total of 257 SWMUs and AOCs are located within the portions of these TAs in the Mortandad Canyon watershed.

Wells in the monitoring group also address historical releases from Outfall 051, which discharged from the Radioactive Liquid Waste Treatment Facility (RLWTF) in Mortandad Canyon. No effluent has been released at Outfall 051 since November 2010.

### 3.2 Background

Most of the surface water in the Sandia watershed consists of treated effluent. Effluent water releases to Sandia Canyon have occurred since the early 1950s and continue today, with the primary source being treated sanitary wastewater and steam plant discharges at Outfall 001(which is tested frequently to meet regulatory requirements) and lesser sources being cooling tower blowdown. Data from 2007 and 2008 indicate the NPDES outfalls contribute approximately 75% of the total surface water flow in Sandia Canyon, with storm water runoff and snowmelt contributing the remainder (LANL 2008, 102996, Appendix C).

The Sanitary Effluent Reclamation Facility (SERF) began further treating the sanitary wastewater stream in July 2012 to meet two goals: (1) to reduce PCB levels to meet stricter effluent limits and (2) to increase the number of cooling water circulation loops for cooling towers at the Strategic Computing Complex (SCC). These changes were implemented in 2012 and 2013. The long-term discharges and runoff support a wetland near the head of Sandia Canyon. Persistent surface flow occurs through the wetland and into the narrow bedrock portion of the upper canyon.

Surface water in Mortandad Canyon is ephemeral and occurs infrequently in lower Mortandad Canyon. Effluent releases from the RLWTF have historically supported surface water in middle Mortandad Canyon, but those contributions have ceased. The lower canyon is characterized by a broad flat canyon floor with a decreasingly defined channel towards the Laboratory boundary. It contains thick alluvial deposits (up to 30 m [100 ft]) that rapidly accommodate the rare storm water flows that extend into this part of the canyon.

Alluvial groundwater in Sandia Canyon is recharged daily by surface water flow, largely supplied by effluent from NPDES Outfall 001 and periodically by storm water. This groundwater generally accumulates in the lower part of the alluvial deposits that fill the canyon bottom, most often perching on or within underlying bedrock units. Effluent volume has been significantly reduced in recent years because of reuse occurring at the SCC. Alluvial saturation was historically present between alluvial wells SCA-2 and SCA-5, with the most persistent perched alluvial groundwater occurring between alluvial wells SCA-2 and SCA-4. New alluvial piezometers were installed in this area in 2016 (LANL 2017, 602134). Groundwater level data from these piezometers continue to provide insights into the extent of alluvial saturation under the reduced effluent volume currently being released from NPDES Outfall 001.

In Mortandad Canyon, alluvial groundwater storage is limited in the upper reaches but increases downcanyon in wider, thicker alluvial deposits (LANL 2006, 094161). Small outfall and runoff sources in upper Effluent Canyon create localized areas of surface water and possibly minor alluvial groundwater. The extent of alluvial saturation in Mortandad Canyon is historically variable and depends primarily on variations in runoff and effluent volume; the extent has decreased consistently with the decrease of effluent from RLWTF.

A zone of perched-intermediate groundwater occurs within the Puye Formation on top of the Cerros del Rio basalt between well SCI-1 and borehole SCC-4, where the zone ranged from approximately 1 ft to 25 ft thick and generally thickened to the west. This perched zone in Sandia Canyon

is likely recharged by percolation of alluvial groundwater through the underlying bedrock units before perching on top of the Cerros del Rio basalt, which acts as the perching layer. The top of the Cerros del Rio basalt also acts as a perching horizon at intermediate well MCOI-4 and regional well R-62 in Mortandad Canyon, indicating this contact has favorable characteristics for perching groundwater. Additionally, perched water was encountered a short distance below the Cerros del Rio basalt in the Puye Formation at both R-42 (LANL 2009, 105026) and R-62 (LANL 2012, 215008).

A second perched-intermediate zone is penetrated by well SCI-2 within fractured lavas and interflow breccias in the lower part of the Cerros del Rio basalt. The thickness of the perched zone is uncertain but ranges between 45 ft and 100 ft. The lava flows hosting the perched groundwater at well SCI-2 were deposited over a south- to south-southeast-dipping surface that developed on top of the Puye Formation. This zone is also present in Mortandad Canyon and was encountered during the drilling of wells R-15 and R-62 and is highly variable in thickness, ranging from 10 ft at R-62 to 100 ft at R-15 (Longmire et al. 2001, 070103).

Perched-intermediate groundwater was not encountered at regional wells R-11, R-35a, R-35b, R-36, R-28, R-44, R-45, R-61, or R-67, suggesting the perched zones at wells SCI-1 and SCI-2 are connected to the regional aquifer over a limited area beneath Sandia and Mortandad Canyons (N3B 2018, 700000).

The shallow portion of the regional aquifer beneath Sandia and Mortandad Canyons is predominantly unconfined. Groundwater flow in the shallow portion of the regional aquifer generally follows the gradient of the water table. Groundwater flow and water levels within the deeper portion of the regional aquifer are impacted by water supply pumping, with the largest fluctuations in groundwater levels observed at well R-35a, located close to water supply well PM-3.

In the vicinity of the Chromium Investigation monitoring group, the water table is located within the Miocene Pumiceous unit and the Puye Formation.

**Contaminant Sources and Distributions**

Chromium concentrations exceed the NMED groundwater standard in the regional aquifer at monitoring wells R-28, R-42, R-45 screen 1, and R-50 screen 1, located in Mortandad Canyon; R-43, located in Sandia Canyon; and R-62, located on the mesa between Sandia and Mortandad Canyons. The primary source of chromium is blowdown water discharged from the TA-03 power plant cooling tower from 1956 to 1972. Other constituents detected above background in wells in the monitoring group include perchlorate, sulfate, nitrate, and tritium. A conceptual model for the sources and distributions of these contaminants is presented in “Investigation Report for Sandia Canyon” (hereafter, the Sandia Canyon IR) (LANL 2009, 107453) and updated in the “Phase II Investigation Report for Sandia Canyon” (hereafter, the Sandia Canyon Phase II IR) (LANL 2012, 228624). These two IRs present the results of the chromium studies and related studies conducted to date to address the nature and extent and the fate and transport of chromium and other contaminants originating in the Sandia Canyon watershed. A more recent update to the conceptual model is included in multiple appendixes of the “Compendium of Technical Reports Conducted Under the Work Plan for Chromium Plume Center Characterization” (LANL 2018, 602964).

The conceptual model hypothesizes that chromium and other contaminants originate from releases into Sandia Canyon with lateral migration pathways that move contamination to locations beneath Mortandad Canyon. For this reason, perched-intermediate and regional wells beneath Mortandad Canyon are included in the Chromium Investigation monitoring group. Other sources of contamination beneath Sandia and Mortandad Canyons are from Mortandad Canyon sources, particularly historical releases from the RLWTF outfall (LANL 2006, 094161; LANL 2018, 602964). Lateral migration from Los Alamos Canyon sources [including SWMU 21-011(k), which discharged to DP Canyon] appears also to be detected. These sources and the migration pathways are discussed in the Sandia Canyon IR (LANL 2009, 107453; LANL 2018, 602964).

LANL (Los Alamos National Laboratory), October 2006. "Mortandad Canyon Investigation Report," Los Alamos National Laboratory document LA-UR-06-6752, Los Alamos, New Mexico. (LANL 2006, 094161)

LANL (Los Alamos National Laboratory), May 2007. "Addendum to the Investigation Report for Material Disposal Area L, Solid Waste Management Unit 54-006, at Technical Area 54," Los Alamos National Laboratory document LA-UR-07-3214, Los Alamos, New Mexico. (LANL 2007, 096409)

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LANL (Los Alamos National Laboratory), February 2008. "Los Alamos and Pueblo Canyons Groundwater Monitoring Well Network Evaluation and Recommendations, Revision 1," Los Alamos National Laboratory document LA-UR-08-1105, Los Alamos, New Mexico. (LANL 2008, 101330)

LANL (Los Alamos National Laboratory), July 2008. "Fate and Transport Investigations Update for Chromium Contamination from Sandia Canyon," Los Alamos National Laboratory document LA-UR-08-4702, Los Alamos, New Mexico. (LANL 2008, 102996)

LANL (Los Alamos National Laboratory), January 2009. "Completion Report for Regional Aquifer Well R-42," Los Alamos National Laboratory document LA-UR-09-0217, Los Alamos, New Mexico. (LANL 2009, 105026)

LANL (Los Alamos National Laboratory), March 2009. "Completion Report for Regional Aquifer Well R-46," Los Alamos National Laboratory document LA-UR-09-1338, Los Alamos, New Mexico. (LANL 2009, 105592)

LANL (Los Alamos National Laboratory), June 2009. "Completion Report for Regional Aquifer Well R-40," Los Alamos National Laboratory document LA-UR-09-3067, Los Alamos, New Mexico. (LANL 2009, 106432)

LANL (Los Alamos National Laboratory), August 2009. "Pajarito Canyon Investigation Report, Revision 1," Los Alamos National Laboratory document LA-UR-09-4670, Los Alamos, New Mexico. (LANL 2009, 106939)

LANL (Los Alamos National Laboratory), September 2009. "Completion Report for Regional Aquifer Well R-37," Los Alamos National Laboratory document LA-UR-09-5371, Los Alamos, New Mexico. (LANL 2009, 107116)

LANL (Los Alamos National Laboratory), October 2009. "Investigation Report for Sandia Canyon," Los Alamos National Laboratory document LA-UR-09-6450, Los Alamos, New Mexico. (LANL 2009, 107453)

LANL (Los Alamos National Laboratory), November 2009. "Cañada del Buey Investigation Report, Revision 1," Los Alamos National Laboratory document LA-UR-09-7317, Los Alamos, New Mexico. (LANL 2009, 107497)

LANL (Los Alamos National Laboratory), May 2010. "Investigation Report for Sites at Technical Area 49 Inside the Nuclear Environmental Site Boundary," Los Alamos National Laboratory document LA-UR-10-3304, Los Alamos, New Mexico. (LANL 2010, 109319)

LANL (Los Alamos National Laboratory), May 2010. "Investigation Report for Sites at Technical Area 49 Outside the Nuclear Environmental Site Boundary," Los Alamos National Laboratory document LA-UR-10-3095, Los Alamos, New Mexico. (LANL 2010, 109318)

LANL (Los Alamos National Laboratory), June 2010. "2010 Interim Facility-Wide Groundwater Monitoring Plan," Los Alamos National Laboratory document LA-UR-10-1777, Los Alamos, New Mexico. (LANL 2010, 109830)

LANL (Los Alamos National Laboratory), July 2010. "Technical Area 21 Groundwater and Vadose-Zone Monitoring Well Network Evaluation and Recommendations," Los Alamos National Laboratory document LA-UR-10-3960, Los Alamos, New Mexico. (LANL 2010, 109947)

LANL (Los Alamos National Laboratory), August 2010. "Completion Report for Regional Aquifer Well R-30," Los Alamos National Laboratory document LA-UR-10-4929, Los Alamos, New Mexico. (LANL 2010, 110518)

LANL (Los Alamos National Laboratory), August 2010. "Completion Report for Regional Aquifer Well R 29," Los Alamos National Laboratory document LA-UR-10-4505, Los Alamos, New Mexico. (LANL 2010, 110478)

LANL (Los Alamos National Laboratory), November 2010. "Corrective Measures Evaluation Report for Material Disposal Area G, Consolidated Unit 54-013(b)-99, at Technical Area 54, Revision 2," Los Alamos National Laboratory document LA-UR-10-7868, Los Alamos, New Mexico. (LANL 2010, 111362)

LANL (Los Alamos National Laboratory), January 2011. "Completion Report for Regional Aquifer Well R-55," Los Alamos National Laboratory document LA-UR-11-0188, Los Alamos, New Mexico. (LANL 2011, 111611)

LANL (Los Alamos National Laboratory), March 2011. "Completion Report for Regional Aquifer Well R-60," Los Alamos National Laboratory document LA-UR-11-0189, Los Alamos, New Mexico. (LANL 2011, 111798)

LANL (Los Alamos National Laboratory), June 2011. "Phase III Investigation Report for Material Disposal Area C, Solid Waste Management Unit 50-009, at Technical Area 50," Los Alamos National Laboratory document LA-UR-11-3429, Los Alamos, New Mexico. (LANL 2011, 204370)

LANL (Los Alamos National Laboratory), June 2011. "Hydrologic Testing Report for Consolidated Unit 16-021(c)-99," Los Alamos National Laboratory document LA-UR-11-3072, Los Alamos, New Mexico. (LANL 2011, 203711)

LANL (Los Alamos National Laboratory), September 2011. "Investigation Report for Water Canyon/ Cañon de Valle," Los Alamos National Laboratory document LA-UR-11-5478, Los Alamos, New Mexico. (LANL 2011, 207069)

LANL (Los Alamos National Laboratory), September 2011. "Corrective Measures Evaluation Report for Material Disposal Area L, Solid Waste Management Unit 54-006, at Technical Area 54, Revision 2," Los Alamos National Laboratory document LA-UR-11-4798, Los Alamos, New Mexico. (LANL 2011, 205756)

LANL (Los Alamos National Laboratory), September 2011. "Corrective Measures Evaluation Report for Material Disposal Area H, Solid Waste Management Unit 54-004, at Technical Area 54, Revision 1," Los Alamos National Laboratory document LA-UR-11-5079, Los Alamos, New Mexico. (LANL 2011, 206319)

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LANL (Los Alamos National Laboratory), December 2011. "2011 Interim Facility-Wide Groundwater Monitoring Plan, Revision 1," Los Alamos National Laboratory document LA-UR-11-6958, Los Alamos, New Mexico. (LANL 2011, 208811)

LANL (Los Alamos National Laboratory), April 2012. "Completion Report for Regional Aquifer Well R-62," Los Alamos National Laboratory document LA-UR-12-0605, Los Alamos, New Mexico. (LANL 2012, 215008)

LANL (Los Alamos National Laboratory), September 2012. "Phase II Investigation Report for Sandia Canyon," Los Alamos National Laboratory document LA-UR-12-24593, Los Alamos, New Mexico. (LANL 2012, 228624)

LANL (Los Alamos National Laboratory), May 2015. "Interim Measures Work Plan for Chromium Plume Control," Los Alamos National Laboratory document LA-UR-15-23126, Los Alamos, New Mexico. (LANL 2015, 600458)

LANL (Los Alamos National Laboratory), July 2015. "Work Plan for Chromium Plume Center Characterization," Los Alamos National Laboratory document LA-UR-15-24861, Los Alamos, New Mexico. (LANL 2015, 600615)

LANL (Los Alamos National Laboratory), July 2015. "Work Plan for a Tracer Test at Consolidated Unit 16-021(c)-99, Technical Area 16, Revision 1," Los Alamos National Laboratory document LA-UR-15-24089, Los Alamos, New Mexico. (LANL 2015, 600535)

LANL (Los Alamos National Laboratory), October 27, 2016. "Groundwater Background Investigation Report, Revision 5," Los Alamos National Laboratory document LA-UR-16-27907, Los Alamos, New Mexico. (LANL 2016, 601920)

LANL (Los Alamos National Laboratory), January 2017. "Field Summary Report for Alluvial Piezometers in Sandia Canyon," Los Alamos National Laboratory document LA-UR-17-20200, Los Alamos, New Mexico. (LANL 2017, 602134)

LANL (Los Alamos National Laboratory), February 2017. "Status Report for the Tracer Tests at Consolidated Unit 16-021(c)-99, Technical Area 16," Los Alamos National Laboratory document LA-UR-17-20782, Los Alamos, New Mexico. (LANL 2017, 602161)

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LANL (Los Alamos National Laboratory), March 2018. "Compendium of Technical Reports Related to the Deep Groundwater Investigation for the RDX Project at Los Alamos National Laboratory," Los Alamos National Laboratory document LA-UR-18-21326, Los Alamos, New Mexico. (LANL 2018, 602963)

LANL (Los Alamos National Laboratory), March 2018. "Compendium of Technical Reports Conducted Under the Work Plan for Chromium Plume Center Characterization," Los Alamos National Laboratory document LA-UR-18-21450, Los Alamos, New Mexico. (LANL 2018, 602964)

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NMED (New Mexico Environment Department), May 21, 2012. "Approval with Modifications, 2011 Interim Facility-Wide Groundwater Monitoring Plan, Revision 1," New Mexico Environment Department letter to P. Maggiore (DOE-LASO) and M.J. Graham (LANL) from J.E. Kieling (NMED-HWB), Santa Fe, New Mexico. (NMED 2012, 520410)

NMED (New Mexico Environment Department), March 2017. "Risk Assessment Guidance for Site Investigations and Remediation, Volume 1, Soil Screening Guidance for Human Health Risk Assessments," Hazardous Waste Bureau and Ground Water Quality Bureau, Santa Fe, New Mexico. (NMED 2017, 602273)

NMED (New Mexico Environment Department), March 2017. "Risk Assessment Guidance for Site Investigations and Remediation, Volume 2, Soil Screening Guidance for Ecological Risk Assessments," Hazardous Waste Bureau and Ground Water Quality Bureau, Santa Fe, New Mexico. (NMED 2017, 602274)

NMED (New Mexico Environment Department), February 14, 2018. "Approval, Annual Progress Report for Corrective Measures Implementation and Deep Groundwater Investigations for Consolidated Unit 16-021(c)-99," New Mexico Environment Department letter to D. Hintze (DOE-EM-LA) and B. Robinson (LANL) from J.E. Kieling (NMED-HWB), Santa Fe, New Mexico. (NMED 2018, 602893)

Samuels, K.E., D.E. Broxton, D.T. Vaniman, G. WoldeGabriel, J.A. Wolff, D.D. Hickmott, E.C. Kluk, and M.M. Fittipaldo, 2007. "Distribution of Dacite Lavas beneath the Pajarito Plateau, Jemez Mountains, New Mexico," New Mexico Geological Society Guidebook: 58th Field Conference, Geology of the Jemez Mountains Region II, pp. 296–308. (Samuels et al. 2007, 204422)

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### 9.2 Map Data Sources

Note that the disclaimers for the plate and maps in this document still indicate Laboratory ownership. Disclaimers will be updated in the next version of this document.

Wells, Springs, and Baseflow locations; ER-ES, As published, GIS projects folder 16-0033;\\slip\gis\GIS\Projects\16-Projects\16-0033\project_data.gdb; wells_ifgmp; 2017.

Road Centerlines for the County of Los Alamos; County of Los Alamos, Information Services; as published 04 March 2009.

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Monitoring group; As published, GIS projects folder 16-0033;\\slip\gis\GIS\Projects\16-Projects\16-0033\project_data.gdb; convex_hull; 2016.

LANL Areas Used and Occupied; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; as published; 2017.

Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 13 August 2010.

Structures; County of Los Alamos, Information Services; as published 29 October 2007.

World Shaded Relief; ArcGIS Map Service; http://services.arcgisonline.com/ArcGIS/service; 2017.

Watersheds; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; EP2006-0942; 1:2,500 Scale Data; 27 October 2006.

**Table 1.7-2**
**Analytes, Field Preparation, and Analytical Methods Used by**
**Accredited Contract Laboratories for Samples Collected under the IFGMP**

| Analytical Suite | Field Preparation | Analytical Method | Analytes |
|---|---|---|---|
| Metals[a, b] | Unfiltered | SW-846:6010 | Aluminum |
| | | EPA:245.2 | Mercury |
| | | SW-846:6020 | Selenium |
| | Filtered | SM:A2340 | Hardness |
| | | SW-846:6010 | Aluminum, barium, beryllium, boron, calcium, cobalt, copper, iron, magnesium, manganese, potassium, silicon dioxide, sodium, strontium, tin, vanadium, zinc |
| | | SW-846:6020 | Antimony, arsenic, cadmium, chromium, lead, molybdenum, nickel, selenium, silver, thallium, uranium |
| | | EPA:245.2 | Mercury |
| | Unfiltered | EPA:245.2 | Mercury |
| VOCs | Unfiltered | SW-846:8260 | See Table B-4.1-1 |
| SVOCs | Unfiltered | SW-846:8270 | See Table B-4.1-1 |
| Low-level 1,4-dioxane | Unfiltered | SW-846-8270-SIM | 1,4-dioxane |
| Prometon | Unfiltered | SW-846-8085 | Prometon (pesticide) |
| Low-level nitrosamines | Unfiltered | Proprietary HRGC/MS | Nitrosodiethylamine[N-], Nitrosodimethylamine[N-], Nitroso-di-n-butylamine[N-], Nitroso-di-n-propylamine[N-], Nitrosopyrrolidine[N-] |
| PCBs | Unfiltered | SW-846:8082 | See Table B-4.1-1 |
| HEXP[c] | Unfiltered | SW-846:8330B | See Table B-4.1-1 |
| HEXMOD[d] | Unfiltered | SW-846:8330B | See Table B-4.1-1 |
| Per- and polyfluoroalkyl substances (PFAS) | Unfiltered | EPA 537.1 Modified | Perfluorohexane sulfonic acid (PFHxS), perfluorooctane sulfate (PFOS), perfluorooctanoic acid (PFOA) |
| Dioxins/Furans | Unfiltered | SW-846:8290 | See Table B-4.1-1 |

**Table 1.7-2 (continued)**

| Analytical Suite | Field Preparation | Analytical Method | Analytes |
|---|---|---|---|
| Radionuclides | Unfiltered | EPA:900 | Gross alpha, gross beta |
| | Unfiltered | EPA:901.1 | Cesium-137, cobalt-60, neptunium-237, potassium-40, sodium-22 |
| | | EPA:905.0 | Strontium-90 |
| | | HASL-300:AM-241 | Americium-241 |
| | | HASL-300:ISOPU | Plutonium-238, plutonium-239/240 |
| | | HASL-300:ISOU | Uranium-234, uranium-235/236, uranium-238 |
| | Unfiltered | EPA:903.1 | Radium-226 |
| | | EPA:904 | Radium-228 |
| Tritium | Unfiltered | EPA:906.0 | Tritium |
| Low-level tritium | Unfiltered | Generic: Low-Level Tritium | Tritium |
| General inorganics | Filtered | EPA:120.1 | Specific conductance |
| | | EPA:150.1 | Acidity or alkalinity of a solution |
| | | EPA:160.1 | Total dissolved solids |
| | | EPA:300.0 | Bromide, chloride, fluoride, sulfate |
| | | EPA:310.1 | Alkalinity-$CO_3$, alkalinity-$CO_3$+$HCO_3$ |
| | | SW-846:6010 | Silicon dioxide |
| | | SW-846:6850 | Perchlorate |
| | Filtered | EPA:350.1 | Ammonia as nitrogen |
| | | EPA:353.2 | Nitrate-nitrite as nitrogen |
| | | EPA:365.4 | Total phosphate as phosphorus |
| | Unfiltered | EPA:351.2 | Total Kjeldahl nitrogen |
| | | SW-846:9060 | Total organic carbon |
| | Unfiltered | EPA:335.4 | Cyanide (Total) |

[a] The following metals suite analytical groups and field preparations apply to groundwater samples (i.e., alluvial, intermediate, regional, and springs): WSP-All Metals (filtered) and MSGP-HG (unfiltered).

[b] The following metals suite analytical groups and field preparations apply to surface water samples (i.e., base flow): WSP-All Metals (unfiltered) and WSP-All Metals (filtered).

[c] HEXP (analytical suite) = Analysis of samples for HE by SW-846:8330B.

[d] HEXMOD (analytical suite) = Analysis of samples for HE and RDX-degradation products by SW-846:8330B.

**Response to NMED Comments on the Interim Facility-Wide Groundwater Monitoring Plan for the 2020 Monitoring Year, October 2019–September 2020, Dated June 2019**

## INTRODUCTION

To facilitate review of this response, the New Mexico Environment Department's (NMED's) comments are included verbatim. The U.S. Department of Energy (DOE) Environmental Management Los Alamos Field Office responses follow each NMED comment.

## SPECIFIC COMMENTS

### NMED Comment

1. ***Section 3.2, Background, page 16, third paragraph:*** *The Report indicates that perched-intermediate groundwater was not encountered during installation of well R-62. However, as documented in the Completion Report for Regional Aquifer Well R-62 (see LA-UR-12-0605/EP2012-0037), two perched-intermediate groundwater zones were encountered during the R-62 well installation at 628 ft below ground surface (bgs) in the upper Puye Formation above the Cerros del Rio basalts, and at 920 ft bgs in the lower part of the Cerros del Rio basalt and top of the underlying Puye Formation. Please revise this section of the Report and discuss the known extent of perched-intermediate groundwater based on observations made during the installation of R-62 and other regional monitoring wells in the chromium plume area (e.g. R-15, R-42, etc.).*

### DOE Response

1. The inclusion of well R-62 in this paragraph was a typographical error; the intended well was R-67. The corrected paragraph is included in the provided replacement page 16 of section 3.2. A discussion of the perched-intermediate groundwater system as it relates to the Chromium Investigation monitoring group, updated to include wells R-15, R-42, and R-62, is also provided in section 3.2, replacement page 16.

### NMED Comment

2. ***Table 1.7-2, Analytes, Field Preparation, and Analytical Methods Used by Accredited Contract Laboratories for Samples Collected under the IFGMP, page 50:*** *The table does not include Radium-226 and Radium-228 as analytes under the radionuclide analytical suite. Radium-226 and Radium-228 have a combined New Mexico Water Quality Control Commission human health standard of 5 pCi/L (NMAC 20.6.2.3103). As such, the radionuclide analytical suite must include these analytes. Please revise this table to include Radium-226 and Radium-228 as constituents to be analyzed as part of the radionuclide analytical suite.*

### DOE Response

2. Table 1.7-2 has been updated to include radium-226 and radium-228 as analytes under the radionuclide analytical suite in the provided replacement pages. Additionally, Table 1.7-2 has been revised to remove the Analytical Group column, as all the fields in the original table provided with the monitoring year 2020 Interim Facility-Wide Groundwater Monitoring Plan (IFGMP) were blank.