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

EMLA-2020-1608-02-001 September 17, 2020

Mr. Kevin Pierard
Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6313

Subject: Submittal of the Interim Facility-Wide Groundwater Monitoring Plan for the 2021 Monitoring Year, October 2020–September 2021, Revision 1

Dear Mr. Pierard:

Enclosed please find two hard copies with electronic files of the "Interim Facility-Wide Groundwater Monitoring Plan for the 2021 Monitoring Year, October 2020–September 2021, Revision 1." Enclosure 1 includes an electronic copy of a redline strikeout version of the plan that incorporates all changes made in response to the New Mexico Environment Department's (NMED's) comments. A meeting was held on July 28, 2020, between NMED and Newport News Nuclear BWXT-Los Alamos, LLC (N3B) to discuss resolutions to NMED's comments, and a copy of the meeting minutes is 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) 257-7943 (hai.shen@em.doe.gov).

Sincerely,

Arturo Duran Digitally signed by Arturo Duran Date: 2020.09.15 06:36:53 -06'00'

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) – Interim Facility-Wide Groundwater Monitoring Plan for the 2021 Monitoring Year, October 2020–September 2021, Revision 1 (EM2020-0404)
2. Meeting to Discuss N3B Responses to NMED Comments Regarding the MY2021 IFGMP, Meeting Minutes, July 28th, 2020

CC (letter with hard-copy enclosure[s]):
Steve Veenis, N3B

CC (letter with CD/DVD enclosure[s]):
Harry Burgess, Los Alamos County, Los Alamos, NM (2 copies)
Michelle Hunter, NMED-GWQB

CC (letter and enclosure[s] emailed):
Laurie King, EPA Region 6, Dallas, TX
Raymond Martinez, San Ildefonso Pueblo, NM
Dino Chavarria, Santa Clara Pueblo, NM
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Jack Richardson, Los Alamos County, NM
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Meeting to Discuss N3B Reponses to NMED Comments Regarding the MY2021 IFGMP

Meeting Minutes
July 28th, 2020

Meeting Purpose and Objectives:
The purpose of this technical team meeting was to discuss N3B responses to NMEDs comments regarding the MY2021 IFGMP as listed below. The meeting minute summaries are intended to document the topics discussed and any agreements and actions that resulted from discussions in an effort to guide future discussions between Newport News Nuclear BWXT – Los Alamos (N3B) and the State of New Mexico Environment Department (NMED).

Specific topics covered in this meeting included:

- Discussion of NMED's draft comments
- Potential changes to MY2021 IFGMP sampling campaigns due to COVID-19/EMCA impacts

Meeting Outcomes:
Note: Technical discussions and information are working group discussions and do not represent final agreements until such time as the Technical Team representatives confirm that (1) the summation accurately and adequately captures the agreements and (2) has management approval. Presentation materials and technical materials are considered working level products unless otherwise noted.

MY2020 IFGMP Comment Response Discussion:

1.) Introductions of participants (see attachment 1)
2.) Discussion regarding N3B responses to comments provided by NMED regarding the MY 2021 IFGMP (see attachment 2 for draft comments and responses)
    a. Comment 1 regarding monitoring of Outfall 051
        i. N3B response in the draft comments is appropriate
        ii. This language will be included in subsequent revisions of the MY 2021 IFGMP and will also name the specific wells being monitored
    b. Comment 2 regarding specific language in Section 3.2 of the MY 2021 IFGMP
        i. Discrepancy with "generally thickened to the west" language
            1. This language was fixed with a replacement page in last year's IFGMP and the language is unchanged this year
        ii. Question regarding the presence of and ability to monitor intermediate zones around R-42 and R-62
            1. NMED agrees and appreciates the response provided in the draft comments
            2. Simplified, but similar language will be included in subsequent revisions of the MY 2021 IFGMP
    c. Comment 3 regarding integration of the Chromium IM with the groundwater sampling program

        i. To better integrate the work performed across programs, monthly sampling and tracer sampling in the Chromium Investigation Group will be included in the MY 2021 IFGMP
        ii. Updated language and tables reflecting this will be included in subsequent revisions of the MY 2021 IFGMP
    d. Comment 4 regarding declining water levels in MCOI-5 and ability to monitor this intermediate zone with well MCOI-6
        i. Due to reduced discharge from Outfall 051, water level in the intermediate zone is no longer sufficient for sampling at MCOI-5
        ii. A number of factors need to be discussed to ensure an appropriate path forward to monitor this zone
        iii. Additional discussions regarding these issues will be incorporated as part of Chromium Technical meetings
    e. Comment 5 regarding omission of low-level 1,4-dioxane and low-level nitrosamines from Appendix C, Table C-1
        i. 1,4-dioxane and nitrosamines will be sampled using low-level methods at the same frequency as SVOCs as part of the MY 2021 IFGMP
        ii. Appendix C will be updated to include these methods in subsequent revisions of the MY 2021 IFGMP
    f. Comment 6 regarding Appendix E, Table E-1.0-1 "Watch List for Deep Monitoring Wells"
        i. Rational for removing MCOI-4 from Table E-1.0-1
            1. N3B response in the draft comments is appropriate
        ii. Rational for including R-25b with reduced purging requirements in Table E-1.0-1
            1. N3B response in the draft comments is appropriate
        iii. Rational for including CdV-R-37-2 S2 with increased purging requirements in Table E-1.0-1
            1. N3B response in the draft comments is appropriate
    g. Comment 7 regarding omission of sampling frequency for general inorganics at R-46
        i. The omission was inadvertent and will be corrected in subsequent revisions of the MY 2021 IFGMP

3.) Discussion regarding Potential changes to MY2021 IFGMP sampling campaigns due to COVID-19/EMCA impacts
    a. N3B states there might be a need to postpone or cancel the White Rock Canyon General Surveillance Monitoring Group sampling campaign due to impacts from the ongoing COVID-19 pandemic
    b. NMED states the MY 2021 IFGMP will be approved with all currently included sampling campaigns. Additionally, any deviations from sampling need to be included in the respective periodic monitoring report and provide ample justification for why samples were not collected
    c. A follow-up meeting between N3B and NMED (HWB and DOE OB) is suggested to help determine a best path forward regarding sampling this monitoring group

4.) Determination of resubmittal of MY 2021 IFGMP
    a. NMED states it is preferable to resubmit document as a revised report as opposed to replacement pages.
    b. NMED also asks that comments with responses be included with the revised report.

Attachment 1: List of Participants

Neelam Dhawan	NMED – HWB
Christopher Krambis	NMED – HWB
Megan Green	NMED – DOE OB
Christian Maupin	N3B – Regulatory Compliance
Steve Veenis	N3B – Monitoring and Compliance
Zoe Duran	N3B – Groundwater Management
David Fellenz	N3B – Groundwater Management

Attachment 2

The New Mexico Environment Department's Draft Comments on the
Interim Facility-Wide Groundwater Monitoring Plan for the 2021 Monitoring Year
October 2020-September 2021, May 2020

June 24, 2020

Specific Comments

1. **Section 3.2, page 15 –** Please include a discussion on how the monitoring plan being proposed in the MY2021 IFGMP will monitor for the potential effects from the two documented discharges from Outfall 051.

   Response: As part of the current NMED Groundwater Quality Bureau authorization for discharge at outfall 051, TRIAD LLC, and NSSA monitor two alluvial wells and one intermediate well quarterly, as well as three regional wells annually to ensure water quality parameters are being achieved. Proposed to provide replacement pages to the MY2021 IFGMP.

2. **Section 3.2, page 16 –** Please resolve the apparent discrepancy between the MY2021 IFGMP, which states that the perched zone in the Puye formation above the basalt "generally thickened to the west", and the MY2020 IFGMP, which states that this zone "generally thinned to the west."

   Response: The language "generally thickened to the west" was updated in response to NMED comments to the MY 2020 IFGMP sent on June 27, 2019 asking for a revision to section 3.2. Upon review of data, it was determined that the statement saying the Puye "thinned" was incorrect and the language was updated. The revised language was included as part of replacement pages to the MY 2020 IFGMP and was not changed in the MY 2021 IFGMP.

   Explain the addition from the previous IFGMP of the statement "*Additionally, some saturation may have been encountered below the Cerros del Rio basalt in the Puye Formation at both wells R-42 (LANL 2009, 105026) and R-62 (LANL 2012, 215008)*", and whether DOE plans to monitor this zone.

   Response: The intent of the statement was to provide consistency with previously published reports related to these wells and the Chromium project. Video logging in the open borehole at R-42 indicated that one gpm or less was entering the hole at a depth interval of 685.9 to 690 ft bgs (LANL 2009, 105026). It is possible that the observed water seeping into the R-42 borehole was potable water used for drilling R-42 returning back into the open borehole. Additional drilling and extensive subsurface investigations in the vicinity of R-42 indicate that significant perched saturation is not present. In 2001, borehole MCOBT-8.5 was advanced to a depth of 740 ft bgs to determine the presence of perched saturation in the Cerros del Rio basalt and Puye Formation sediments underlying the basalts. The MCOBT-8.5 borehole was located about 850 feet west of R-42. The borehole penetrated 30 feet into the Puye Formation beneath the basalts at a depth of 710 ft bgs. The investigation involved the examination of information and data from drill cuttings, open-borehole video, geophysical logging, and water-level monitoring and side-wall coring. Results from this investigation determined "that no intermediate saturated zones had been encountered" (LANL 2002, MCOBT-4.4 and 8.5 completion report LA-13993-MS). In 2014 and 2015, sonic-drilled coreholes CrCH-3 and CrCH-4 were positioned approximately 200 feet and 1,100 feet west of R-42, respectively. A third corehole, CrCH-2, was drilled 1000 feet east of R-42. Each of these coreholes penetrated the Cerros del Rio basalt and Puye Formation, and reached total depth about 100 feet below the regional water table. Borehole cuttings and sonic core were collected at each borehole. No perched saturation in the lower portion of the basalts and underlying Puye Formation was encountered. Results from this investigation provided additional evidence that perched saturation near R-42 is not present.

3. **Section 3.3, page 17 –** This section states "*Beginning in MY 2019, the objective for the Chromium Investigation monitoring group incorporated performance monitoring associated with the IM*." Please clarify if the IM sampling program and the IFGMP have been integrated.

   Response: It is proposed that with a revision to the MY 2021 IFGMP, all sampling within the Chromium Investigation Monitoring Group will incorporate the wells, suite, and monitoring frequency for performance monitoring for the chromium interim measure. Future changes to performance monitoring will be reflected exclusively in the annual IFGMP, as necessary.

4. **Section 3.4, page 18** – Please discuss whether the groundwater quality monitoring currently conducted at MCOI-6 will be sufficient for characterization if MCOI-5 can no longer be sampled due to the decline in the water table at the base of the Cerro del Rio Basalt.

   Response: While the zone of saturation at both wells is within the lower portion of the Cerros del Rio basalt, the sufficiency of characterization and monitoring in the perched-intermediate zones within the Cerros del Rio would be dependent on many factors including reasons that MCOI-5 might be going dry. Additional considerations regarding MCOI-5 can be discussed as part of chromium technical team discussions.

5. **Appendix C, Table C-1** – Provide a justification for not including low-level 1,4-dioxane and low-level nitrosamine analyses in the MY2021 IFGMP. These analyses were included in the MY2020 IFGMP. During the February 24, 2020 pre-submittal meeting, NMED directed DOE continue the use of low-level method for both 1,4-dioxane, and low-level nitrosamine analyses for more accurate results.

   Response: Low-level methods will continue to be used in MY 2021 to analyze 1,4 dioxane and nitrosamines. Collection of these samples will be at the same frequency as SVOCs. These analyses are included in all sampling tables (2.4-1 through 8.3-1). Appendix C, Table C-1 has been updated to reflect use of low-level methods. Propose to provide replacement pages to the MY2021 IFGMP.

6. **Appendix E, Table E-1.0-1** – Provide the rationale regarding the removal of MCOI-4 from the table and include whether water levels can still be monitored during MY2021.

Response: MCOI-4 has been included in both Appendix E, Table E-1.0-1 “Watch List for Deep Monitoring Wells” as “monitor for water levels only” and Table 1.9-1 “Frequencies for Locations Assigned to Water-Level Monitoring Only” since the MY 2014 IFGMP. Furthermore, MCOI-4 continues to have insufficient water to sample (0.7 ft above the bottom of the screen as of March 2020). Therefore, it was removed from Table E-1.0-1 to eliminate the redundancy of continuing to include this well. However, MCOI-4 will continue to be monitored for water levels and therefore is included in Table 1.9-1 of the MY 2021 IFGMP.

Explain why the sample purging method for R-25b was changed from using the N3B-ER-SOP-20032 to purging 1.5 casing volumes regardless of stabilization, especially considering that DOE does not consider samples collected from this well as representative of formation conditions.

Response: R-25b has been sampled at 1.5 casing volumes (CV) regardless of stability since MY 2013 to account for a rapid increase of turbidity when additional purging of the well occurs. This direction was previously captured in Attachment 15 of the Groundwater Sampling Standard Operating Procedure (SOP) (ER-SOP-20032, R0). Attachment 15 has been removed from the recent revision of this SOP (N3P-SOP-ER-3003, R0). The list of purge variations that were included in this table have been moved to Table E-1.0-1, which identifies deep monitoring wells that are purged less than 3 CVs.

Explain why the sample purging method for CdV-R-37-2 S2 was changed from using the N3B-ER-SOP-20032 to purging 12 casing volumes regardless of stabilization, especially considering that DOE does not consider samples collected from this well as representative of formation conditions.

Response: CdV-R-37-2 S2 is a converted Westbay well. Since its conversion in 2013, the well has shown evidence of reducing conditions which would yield non-representative water chemistry for some constituents that are redox sensitive. Evidence of reducing conditions include elevated iron and manganese and abnormally low dissolved oxygen for the formation in which it is completed. CdV-R-37-2 S2 has often been sampled following extended purges, but has not been purged beyond 3 CVs since MY 2015 Q4 following a 36 CV purge. During the MY 2021 IFGMP Second Pre-Submittal Meeting with NMED discussions on Appendix H, it was determined that CdV-R-37-2 S2 should once again undergo an extended purge to determine if extended purging can facilitate collection of representative data from this well. Since Attachment 15 is no longer included in the most recent revision of the Groundwater Sampling SOP (N3B-SOP-ER-3003, R0), the extended purge is included in Table E-1.0-1, which identifies deep monitoring wells on which reliability assessments are conducted.

7. **Appendix H, Table H-3** – For general inorganics sampled from R-46, no sampling frequency is provided for MY2021. Please correct Table H-3 or provide an explanation for this apparent omission.

   Response: This omission was inadvertent. The appropriate frequency of “A” will be provided in replacement pages.

September 2020
EM2020-0404

Interim Facility-Wide Groundwater Monitoring Plan for the 2021 Monitoring Year, October 2020–September 2021, Revision 1

N3B Los Alamos

EM2020-0404

Interim Facility-Wide Groundwater Monitoring Plan for the 2021 Monitoring Year, October 2020–September 2021, Revision 1

September 2020

Responsible program director:

Steve Veenis	[signature]	T2S Program Director	Water Program	9/3/20
Printed Name	Signature	Title	Organization	Date

Responsible N3B representative:

Kim Lebak	[signature]	Program Manager	N3B Environmental Remediation Program	9/3/20
Printed Name	Signature	Title	Organization	Date

Responsible DOE EM-LA representative:

Arturo Q. Duran	Arturo Duran Digitally signed by Arturo Duran Date: 2020.09.15 06:37:20 -06'00'	Compliance and Permitting Manager	Office of Quality and Regulatory Compliance	
Printed Name	Signature	Title	Organization	Date

EXECUTIVE SUMMARY

This Interim Facility-Wide Groundwater Monitoring Plan (IFGMP) fulfills the sampling requirements of the 2016 Compliance Order on Consent (hereafter, the Consent Order) for monitoring locations associated with Los Alamos National Laboratory (LANL or the Laboratory). To satisfy these requirements in accordance with the Consent Order, Newport News Nuclear BWXT-Los Alamos, LLC (N3B) will collect and analyze groundwater and surface water samples at specific locations and for specific constituents. Four types of water are monitored: base flow (persistent surface water), alluvial groundwater, intermediate-perched groundwater, and regional aquifer groundwater. Groundwater-level data will also be collected because this information is critical to understanding the occurrence and movement of groundwater. The IFGMP is updated annually and submitted to the New Mexico Environment Department (NMED) for approval. The 2021 IFGMP applies to the 2021 monitoring year from October 1, 2020, to September 30, 2021.

The monitoring conducted under this plan is used to enhance the understanding of groundwater within and beneath the Laboratory, support ongoing operations, and assist in corrective measures work at numerous sites both inside and outside current Laboratory boundaries. Monitoring occurs within seven major watershed groupings: Los Alamos Canyon/Pueblo Canyon, Sandia Canyon, Mortandad Canyon, Pajarito Canyon, Water Canyon/Cañon de Valle, the combined watersheds of Ancho/Chaquehui/ Frijoles Canyons (typically referred to as Ancho Canyon), and White Rock Canyon.

The majority of the monitoring locations discussed in the IFGMP are assigned to area-specific monitoring groups related to project areas that may be located in one or more watersheds. These include Technical Area 16 (TA-16) 260, TA-21, TA-54, Chromium Investigation, Material Disposal Area (MDA) AB, and MDA C. Locations not included within one of these six area-specific monitoring groups are assigned to the General Surveillance monitoring group.

Monitoring outside the Laboratory boundaries is conducted in areas (1) where Laboratory operations have occurred in the past (e.g., Guaje and Rendija Canyons) or (2) that historically have not been affected by Laboratory operations. To ensure water leaving the Laboratory does not pose an unacceptable risk to human and ecological receptors, this plan also includes monitoring downgradient of and outside Laboratory boundaries (e.g., the Rio Grande and springs in White Rock Canyon).

Although monitoring locations were initially derived from Table XII-5 of the 2005 Consent Order, the current list of monitoring locations presented in this document represents the most recent updates to analytical suites and the required frequency of monitoring and reflects the technical and regulatory status of each area-specific monitoring group.

The monitoring data collected under this plan are published in annual periodic monitoring reports submitted to NMED, and analytical results are made available to the public in the Intellus New Mexico database (available at www.intellusnm.com). Groundwater data collected by N3B are reviewed monthly, and constituents exceeding any of the five screening criteria in Section XXVI of the Consent Order are reported monthly to the NMED Hazardous Waste Bureau.

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1.0 INTRODUCTION

The monitoring year (MY) 2021 Interim Facility-Wide Groundwater Monitoring Plan (IFGMP) fulfills the groundwater monitoring requirement in Section XII of the 2016 Compliance Order on Consent (hereafter, the Consent Order). Section XII requires the IFGMP to be updated annually and anticipates that monitoring plans for specific areas will change as the groundwater investigation objectives in Section XII are met. This IFGMP applies to MY 2021, from October 1, 2020, to September 30, 2021.

Groundwater monitoring has been conducted at Los Alamos National Laboratory (LANL or the Laboratory) for 75 years, starting with U.S. Geological Survey (USGS) water supply studies in 1945 and Laboratory groundwater-quality monitoring in 1949. The first groundwater monitoring network consisted of water supply wells, several observation wells, and springs. The monitoring network continued to evolve through the years as additional wells were installed during various environmental investigations, primarily in the shallow alluvial systems, as potential monitoring points.

Between 1997 and 2005, the Laboratory implemented a site-wide hydrogeologic characterization program, described in the Laboratory's "Hydrogeologic Workplan" (LANL 1998, 059599). The primary objective of this characterization program was to refine the Laboratory's understanding of the area's hydrogeologic systems and to improve its ability to design and implement an integrated site-wide groundwater monitoring plan. Building upon information obtained from this and other programs, the Laboratory subsequently refined the monitoring network design and implementation through a series of monitoring-well network evaluation reports and the delineation of area-specific monitoring groups. The original 2005 Consent Order was modified in April 2012 to provide the option for a site-specific groundwater monitoring plan in place of a watershed-specific monitoring plan, where appropriate. Since the third quarter of fiscal year 2018, the work described in this document is being performed by Newport News Nuclear BWXT-Los Alamos, LLC (N3B) under the U.S. Department of Energy (DOE) Office of Environmental Management Los Alamos Field Office (EM-LA).

This plan consists of nine sections, including this introduction, with supporting appendixes. Sections 2 through 7 describe the monitoring and site activities conducted in six area-specific monitoring groups: Technical Area 21 (TA-21), Chromium Investigation, Material Disposal Area (MDA) C, TA-54, TA-16 260, and MDA AB. Section 8 describes general surveillance monitoring in seven major watersheds or watershed groupings: Los Alamos/Pueblo Canyons, Sandia Canyon, Mortandad Canyon, Pajarito Canyon, Water Canyon/Cañon de Valle, the combined watersheds of Ancho/Chaquehui/Frijoles Canyons (hereafter referred to as Ancho Canyon), and White Rock Canyon. Section 9 includes a list of references cited in this report and the map data sources.

Appendix A is the list of acronyms and abbreviations used in the report, a metric conversion table, and the definitions of data qualifiers. Appendix B summarizes the methods and procedures used to conduct monitoring and the management of investigation-derived waste (IDW). Appendix C summarizes the objectives of the monitoring performed and the sampling frequencies and analytical suites for each monitoring group. Appendix D summarizes how field quality assurance (QA)/quality control (QC) sample results are used and the types of corrective actions that may be taken to address exceedances of target level concentrations in the regular samples associated with QA/QC samples. Appendix E assesses the reliability of water-quality data collected from specific monitoring-network wells. Appendix F presents geologic cross-sections of the watersheds. Appendix G presents a map of the water table for the regional aquifer incorporating water level elevation data updated in November 2019 and a map illustrating the geology at the water table. Appendix H includes sampling and analysis crosswalks by monitoring group for the MY 2020 versus MY 2021 IFGMPs.

Information on radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to the New Mexico Environment Department (NMED) in accordance with DOE policy.

1.1 Purpose

The IFGMP will address monitoring to

- determine the fate and transport of known legacy-waste contaminants,
- detect the arrival of potential contaminants in groundwater from previous releases,
- evaluate efficacies of corrective action remedies,
- support proposed corrective measures, and
- meet monitoring requirements of DOE Orders 436.1 and 458.1, Chg 3.

These objectives collectively assist N3B in identifying any adverse effects to surface water and groundwater resulting from historical Laboratory operations.

In addition, monitoring produces data required to evaluate risk and to assess regulatory compliance. Although the IFGMP does not specifically address how the data collected will be used in those evaluations, the design of the monitoring network is based on conceptual models of potential sources, hydrogeologic pathways, and receptors. The data collected are intended to meet the reporting requirements under the Consent Order.

This IFGMP focuses on monitoring activities at the area-specific monitoring groups for TA-21, Chromium Investigation, MDA C, TA-54, TA-16 260, and MDA AB. Monitoring of alluvial wells and springs that show a history of nondetections, that are located near other springs being monitored, or that are located in outlying areas away from Laboratory operations has been significantly reduced in recent years under the focused monitoring approach introduced in the 2011 IFGMP, Revision 1 (LANL 2011, 208811).

The current monitoring approach includes the following key elements to ensure groundwater protection.

- The spatial coverage of the current monitoring program will be maintained. The monitoring footprint in perched-intermediate and regional wells at all monitoring groups is retained.
- The selection of monitoring frequency and appropriate analytes is tailored to each specific area. The monitoring frequency for each monitoring group is determined based on the contamination status at each site, the rate of change in contaminant concentrations, the historical monitoring data, and the hydrogeological conditions governing contaminant fate and transport for the area.
- The groundwater monitoring program incorporates the use of sentinel wells to identify potential contaminant releases before they reach water supply wells.
- Monitoring of key alluvial monitoring wells and springs will continue. The alluvial wells were selected at locations downgradient of ongoing Laboratory operations. Continued monitoring of these alluvial wells will allow detection of contaminant releases, should any occur.

Section 1.7 addresses key elements of monitoring network design, including sampling frequencies and analytical suites for locations assigned to area-specific and general surveillance monitoring groups.

Updates to monitoring within each watershed or monitoring group, including changes in monitoring frequency, analytical suites, and monitoring locations, are based on the following:

- Conceptual models in watershed investigation reports (IRs)

- Changes to the monitoring-well networks over time, including the addition of newly installed monitoring wells, the rehabilitation and conversion of multiscreen wells, and the removal of wells recently plugged and abandoned or planned for plugging and abandonment in the near term
- Changes in well performance
- Monitoring objectives for the area-specific monitoring groups
- Programmatic data requirements to support decisions regarding corrective actions
- Regulatory direction specified in NMED approval letters related to earlier IFGMPs

1.2 Hydrogeologic Setting

Background information on the hydrology and geohydrology of the Pajarito Plateau is presented below. This information may provide useful context for reviewing the base-flow and groundwater monitoring strategies presented in this IFGMP.

1.2.1 Hydrology of the Pajarito Plateau

Surface water hydrology on the Pajarito Plateau is generally characterized by short-duration storm runoff that predominantly occurs during the summer monsoon season and can sometimes occur during the fall. Storm runoff events typically last only several hours, but larger events or those that occur during wet antecedent conditions may have longer recessional flow that can last for a day or more. Except in very rare conditions, storm runoff is the only surface water that crosses the downgradient Laboratory boundary, with spring seasonal snowmelt having little-to-no contribution.

The conditions that are associated with persistent surface water (i.e., base flow) uniquely occur in the western portion of the Laboratory near the mountain front. The mountain-front setting is where seasonally persistent surface water is present in watersheds that head in the Jemez uplands. Persistent surface water occurs where canyon-bottom alluvium is saturated and limits transmission loss along the stream channel. Suballuvium geology is a major factor in where alluvial saturation can persist and can also affect where infiltration of alluvial groundwater occurs and thus where persistent surface water occurs.

Infiltration into fault-related fractures located along the Jemez Mountain front is known to daylight as springs that discharge along the western portion of the Pajarito Plateau, typically within canyons. Loss of the tree canopy during the 2000 Cerro Grande and 2011 Las Conchas fires and subsequent stripping of much of the mountain-front forest duff layer and soil appears to have resulted in significantly less water-storage capacity along the mountain front and an overall reduction in the occurrences and duration of persistent base-flow conditions. The effect of the fires on spring discharges is less apparent.

The various types of surface water, base flow, and storm water are generally in close hydrologic connection with alluvial groundwater that is present in limited sections of canyons. Alluvial saturation is generally from several feet to tens of feet thick, with water tables ranging from just below the ground surface to tens of feet below ground surface. Surface water and storm water may recharge alluvial aquifers, and alluvial aquifers sometimes surface where alluvium thins or where channels are topographically lower than an upgradient alluvial groundwater table. These recharge/discharge conditions have been observed in Water Canyon, Cañon de Valle, Pajarito Canyon, Mortandad Canyon, Cañada del Buey, Sandia Canyon, and Los Alamos and Pueblo Canyons (including DP and Acid Canyons).

1.2.2 Geohydrology of the Pajarito Plateau

Stratigraphic units of the Pajarito Plateau include thick Quaternary ash-flow tuff sheets erupted from calderas located in the central part of the Jemez Mountain volcanic field, Pliocene alluvial fan deposits shed from the mountain block west of the Pajarito fault system, Pliocene basaltic and dacitic rocks erupted from the Jemez Mountains and Cerros del Rio volcanic fields, and Miocene alluvial fan and basin floor sedimentary deposits. The distribution of rock units is shown in cross-sections in Appendix F of this IFGMP. Major rock units are described in descending stratigraphic order below.

The Quaternary Tshirege Member of the Bandelier Tuff was erupted from the Valles Caldera and dominates the surface geology of the Pajarito Plateau, an east-dipping ignimbrite sheet that overlies the western part of the Española basin. It is a compound cooling unit that resulted from emplacement of successive rhyolite ash-flow tuffs separated by periods of inactivity that allowed for partial cooling before subsequent flows were deposited (Smith and Bailey 1966, 021584; Broxton and Reneau 1995, 049726). Because of the episodic nature of deposition, physical properties such as density, porosity, degree of welding, fracture density, and mineralogy vary as a function of stratigraphic position. Vertical variations in tuff properties were used to subdivide the Tshirege Member into mappable subunits that reflect localized emplacement temperature, thickness, gas content, and composition of the tuff deposits (Broxton and Reneau 1995, 049726; Lewis et al. 2002, 073785). The Tsankawi Pumice Bed forms a thin (~1 m) but widespread fall deposit at the base of the Tshirege Member. The upper Tshirege Member hosts numerous springs in the western part of the Laboratory. Discharge locations and well data suggest these springs are part of ribbon-like groundwater bodies that are associated with geologic contacts between subunits of the Tshirege Member (LANL 2011, 207069).

The Quaternary Cerro Toledo Formation (Gardner et al. 2010, 204421) is a sequence of epiclastic sedimentary rocks and tephras that records deposition of fluvial deposits during the time interval between eruptions of the Tshirege and Otowi Members of the Bandelier Tuff. It consists of tuffaceous gravels, sandstone, and siltstone derived from erosion of Cerro Toledo and Otowi Member tuffs from the east slopes of the Jemez Mountains. It also includes localized dacite-rich fluvial deposits eroded from the Tschicoma Formation in the eastern Jemez Mountains. The Cerro Toledo Formation was deposited by streams eroded into the top of the Otowi Member; consequently, these deposits have variable thicknesses and are absent in some areas. Perched groundwater at least 50 ft thick occurs in the lower part of the Cerro Toledo Formation in the western part of the Laboratory.

The Otowi Member is an ignimbrite sheet made up of nonwelded vitric ash-flow tuffs and thin beds of intercalated ash and pumice falls. The ash-flow tuffs contain abundant pumice supported by a matrix of poorly sorted glass shards, broken pumice fragments, phenocrysts (primarily sanidine and quartz), and volcanic lithics. The unit lacks the welding and crystallization zones that characterize the Tshirege Member. The Guaje Pumice Bed is the basal fall deposit of the Otowi Member and consists of fine-depleted gravel-sized vitric pumice, quartz and sanidine phenocrysts, and subordinate volcanic lithics. Perched groundwater is associated with the Guaje Pumice Bed and lower Otowi ash-flow tuffs in Los Alamos Canyon and Cañon de Valle.

The Pliocene Puye Formation was deposited as broad, coalescing alluvial fans shed eastward from the Jemez Mountain volcanic field into the western Española basin (Griggs and Hem 1964, 092516; Bailey et al. 1969, 021498). It is a heterogeneous assemblage of clast- to matrix-supported dacitic conglomerates, gravels, and lithic sandstones. The deposits are commonly poorly sorted and lack cementation and clay minerals. The Tschicoma Formation, which is exposed in the eastern Jemez Mountains, was the primary source for these deposits. Puye alluvial fan deposits are intercalated with ancestral Rio Grande deposits of the Totavi Lentil beneath the eastern Pajarito Plateau. The Puye Formation is an important component of deep perched groundwater zones beneath Cañon de Valle and is the primary rock unit of the regional aquifer in the western and central part of the Laboratory.

Rocks of the Cerros del Rio volcanic field make up a significant portion of the stratigraphic sequence in the eastern part of the Laboratory where they interfinger with the upper part of the Puye Formation. The Pliocene Cerros del Rio volcanic series is a thick sequence of stacked mafic lava flows that are separated by interflow breccias, cinder or scoria zones, volcaniclastic and riverine sediments, phreatomagmatic deposits, and lake-bed deposits. The lava flows generally have massive interiors made up of dense, variably fractured basalt. These volcanic rocks generally occur in the vadose zone where they play important roles as host rocks for perched groundwater; however, the formation thickens southward where it becomes part of the regional aquifer.

Thick lobes of Pliocene Tschicoma Formation dacite lava flowed eastward into the western part of the Española basin from the Jemez Mountain volcanic field. These lavas were subsequently down-faulted and buried by Puye Formation alluvial fans in the western part of the Laboratory. Additional small-volume dacite lavas were erupted from volcanic vents in the region between the Jemez Mountain volcanic field and the Cerros del Rio volcanic field (Samuels et al. 2007, 204422). These small-volume dacites occur at scattered locations beneath the Pajarito Plateau and are similar in composition to Tschicoma lavas exposed in the Jemez Mountain volcanic field, but they more closely overlap the distribution and ages of mafic lavas of the Cerros del Rio volcanic field. The small-volume dacites are intercalated with alluvial fan deposits of the upper Puye Formation.

A sequence of unnamed Miocene pumiceous sediments underlies the Puye Formation throughout much of the Pajarito Plateau. Deposits are generally dominated by sand with subordinate silt and gravel and typically contain abundant vitric rhyolite pumice admixed with ash and lithic sands. Pumice clasts are similar in age and petrology to the late Miocene Bearhead Rhyolite (Justet and Spell 2001, 093391). These epiclastic sediments are interpreted as alluvial fans shed eastward from the Jemez Mountain volcanic field into the western Española basin (Broxton and Vaniman 2005, 090038). They make up part of the regional aquifer in the north-central part of the Laboratory.

The Miocene Chamita Formation of the Santa Fe Group is made up of axial river deposits consisting of the Hernandez and Vallito Members that were deposited on the floor of the Española basin. The Hernandez Member represents ancestral Rio Chama deposits, and the Vallito Member represents ancestral Rio Grande deposits. These south-flowing river systems merged in the vicinity of Buckman Mesa (Koning et al. 2007, 106122), and the separate members are grouped at the formation level beneath the Laboratory. The Chamita Formation consists of fine- to coarse-grained quartz sands and silty sands with minor microcline and felsic to intermediate volcanics, fine- to coarse-grained volcanic lithic sands; and sandy and silty gravels dominated by well-rounded felsic to intermediate volcanics and 1%–3% Precambrian quartzite. Some gravel deposits also contain subangular to subrounded intermediate volcanic clasts that probably represent input of sediment from tributary streams draining the Jemez Mountain volcanic field. These stratified deposits are variably cemented by calcite with poorly to non-cemented sands and gravels intercalated with cemented sandstones. Most water supply wells on the Pajarito Plateau are completed in this formation. The upper part of the formation overlaps in age with Miocene Jemez Mountain volcanic field alluvial fan deposits, and it is likely that alluvial fan and axial river sediments interfinger along the western margin of the basin floor. Miocene basaltic lava flows are intercalated with Chamita Formation deposits beneath the eastern Pajarito Plateau.

1.3 Scope

The IFGMP describes the objectives for monitoring, the locations of sampling stations, the frequency of sampling, the field measurements taken at each location, and the analytical suites included in the monitoring plan for each watershed or monitoring group.

Four occurrences of water are monitored in this plan:

- *Base flow*—persistent surface water that is maintained by precipitation, effluent, and other sources
- *Alluvial groundwater*—water within the alluvium present in the bottom of the canyons
- *Perched-intermediate groundwater*—localized saturated zones located within the unsaturated zone
- *Regional groundwater*—deep, laterally continuous groundwater located beneath the Pajarito Plateau

Groundwater is monitored routinely by collecting samples at wells and springs and by analyzing them for specific constituents. Groundwater monitoring refers to collecting data not only for water-quality analysis but also for groundwater-level measurements. Groundwater-level data are critical to understanding the occurrence and movement of groundwater and the responses of groundwater levels to recharge and water supply well pumping.

Surface water at the Laboratory is divided into the following three flow types:

- *Base flow*—persistent, but not necessarily perennial, stream flow. This stream flow is present for periods of weeks or longer. The water source may be effluent, springs, or shallow groundwater in canyons.
- *Snowmelt*—flowing water that is present because of melting snow. This type of water often may be present for several weeks or more (persistent) but may not be present at all in some years.
- *Storm runoff*—flowing water that is present in response to rainfall. These flow events are generally short-lived, with flows lasting from less than an hour to several days.

In some cases, depending on weather conditions, each flow type may be collected at a single location within a time span of a few days. At other times, the flow may represent a combination of these types.

Storm runoff and snowmelt monitoring are not addressed in this plan but through the National Pollutant Discharge Elimination System (NPDES) Individual Permit and Multi-Sector General Permit and under DOE Orders 436.1 and 458.1, Chg 3 for surveillance. Base flow (persistent water) and, in some cases, persistent flow derived from snowmelt are monitored under the IFGMP.

Monitoring under the IFGMP will take place in area-specific monitoring groups within seven major watershed groupings: Los Alamos/Pueblo Canyons, Sandia Canyon, Mortandad Canyon, Pajarito Canyon, Water Canyon/Cañon de Valle, Ancho Canyon, and White Rock Canyon. Monitoring outside the Laboratory boundary is conducted to collect baseline data in areas that have been affected by past Laboratory operations (e.g., Guaje and Rendija Canyons) or that have not been affected by Laboratory operations. This plan also includes monitoring in off-site areas that could potentially be impacted by the Laboratory (e.g., the Rio Grande and springs in White Rock Canyon). Figure 1.3-1 shows the areas addressed in this IFGMP.

The IFGMP is updated annually to incorporate new information collected during the previous year. Sampling locations, analytes, and sampling frequencies are evaluated and updated, as appropriate, to ensure adequate monitoring and monitoring objectives for the individual monitoring groups continue to be met. Information gained through characterization efforts, aquifer test results, groundwater-level monitoring, network assessments, and water-quality data may be used to refine the monitoring plan for each monitoring group. In addition, the need to sample for analytes previously eliminated from sampling in various monitoring groups may be reevaluated during the development of the annual updates to the IFGMP. Regulatory input from NMED is also considered.

1.4 Reporting

Analytical results obtained from groundwater, base-flow, and spring samples collected under this IFGMP are provided in periodic monitoring reports (PMRs) prepared in accordance with Appendix E, Part IV, of the 2016 Consent Order. PMRs will be submitted quarterly on November 30, February 28, May 31, and August 31. Eight PMRs are prepared and submitted annually to fulfill reporting requirements under the Consent Order: one for each of the six area-specific monitoring groups, one for the General Surveillance monitoring group, and one comprised solely of base-flow locations. Table 1.4-1 presents the anticipated PMR submittal schedule for MY 2021. The PMR submittal dates presented in Table 1.4-1 are subject to change based on the actual completion dates of the quarterly sampling events that are reported in the PMRs.

N3B reviews analytical data from all groundwater monitoring conducted under the Consent Order that were received during the previous month and notifies NMED monthly of any exceedances of five criteria in accordance with Section XXVI of the 2016 Consent Order.

Analytical results provided in PMRs and monthly notifications are also made available to the public in the Intellus New Mexico database (available at www.intellusnm.com). The results are subject to the Protocol for Protecting Confidential Pueblo Information included in the Memorandum of Agreement dated June 18, 2015, agreed upon by the DOE National Nuclear Security Administration Los Alamos Field Office, DOE EM-LA, and the Pueblo de San Ildefonso regarding the release of analytical data collected from groundwater and base-flow samples at locations within the Pueblo de San Ildefonso boundary.

1.5 Regulatory Context

This IFGMP fulfills groundwater monitoring requirements of the Consent Order as described in section 1.0. In addition to the Consent Order, groundwater monitoring is performed to satisfy other regulatory requirements, as summarized below. N3B has an integrated approach to monitoring groundwater, and many of the other regulatory requirements discussed below are fulfilled through the implementation of the monitoring performed under the IFGMP.

1.5.1 DOE Environmental Protection Programs

Groundwater monitoring has been conducted in compliance with DOE orders related to environmental protection. DOE Order 436.1 requires an environmental management system at DOE facilities that includes surveillance and reporting. Surveillance monitoring has been conducted at the Laboratory since 1949; the Laboratory took over the surveillance monitoring program in 1970. Currently, N3B conducts groundwater-surveillance monitoring at wells located within the Laboratory boundary and also at off-site locations. These wells include alluvial, perched-intermediate, and regional aquifer wells. Some off-site monitoring is performed under cooperative agreements with Los Alamos County, which owns and operates water supply wells within and near the Laboratory, and with the City of Santa Fe. Additional monitoring is performed under the annually updated Appendix A of the Memorandum of Understanding for Environmental Monitoring that is agreed upon by DOE, the Bureau of Indian Affairs, and the Pueblo de San Ildefonso. The results of surveillance monitoring are reported in annual environmental reports and in the Intellus New Mexico database. The environmental reports contain descriptions of the surveillance monitoring network, key results and trends, and the QA/QC program.

1.5.2 Resource Conservation and Recovery Act Hazardous Waste Facility Permit

Section VII of the Consent Order describes the integration of the current and any future Resource Conservation and Recovery Act (RCRA) Hazardous Waste Facility Permits with the Consent Order. Parallel supporting language is contained in Part 11.1 of the current permit. Groundwater monitoring for solid waste management units (SWMUs) and areas of concern (AOCs) and the regulated units at TA-54 are addressed through the monitoring requirements of this IFGMP.

1.6 Integration of Groundwater Monitoring

All groundwater monitoring under the IFGMP is conducted as an integrated activity that uses the same operating procedures, field sampling and analytical contracts, and data-management systems. For chemical analysis of water samples, N3B uses commonly accepted analytical methods called for under federal statutes (such as the Clean Water Act) and approved by the U.S. Environmental Protection Agency (EPA). N3B is responsible for obtaining analytical services that support monitoring activities. Samples for laboratory analysis are submitted to accredited contract laboratories. The analytical laboratory statement of work provides accredited contract laboratories with general QA guidelines and includes specific requirements and guidelines for analyzing water samples. The accredited contract laboratories are required to establish method detection limits (MDLs) and practical quantitation limits (PQLs) for target analytes.

Appendix B includes summaries of the procedures followed to measure water levels and collect water samples (sections B-1.0 and B-2.0) and to measure field parameters (section B-3.0). Field procedures follow guidelines from USGS water sample collection methods and industrial standards common to environmental sample collection and field measurements. The analytical methods, PQLs, and applicable background or screening levels used for each analyte are listed in section B-4.0. The management of IDW is discussed in section B-5.0.

1.7 Approach to Monitoring Network Design

The interim nature of this monitoring plan reflects an evolving monitoring network. The groundwater data collected under this plan are used for subsurface characterization, groundwater monitoring network evaluation, and supporting corrective measures. A Consent Order modification, approved by NMED on April 20, 2012, allows periodic groundwater monitoring to be conducted on an area-specific basis instead of a watershed basis, where appropriate.

Monitoring groups have been established to address monitoring requirements for locations within specific project areas (LANL 2010, 109830). These monitoring groups are shown on Plate 1 and include the following:

- TA-21
- Chromium Investigation
- MDA C

- TA-54
- TA-16 260
- MDA AB

Monitoring locations outside of the six area-specific monitoring groups delineated above are included in the General Surveillance monitoring group.

The analytical suites and frequency of monitoring for each monitoring group reflect the state of knowledge for a given project area, including what contaminants have been released and the nature and extent of the contaminants released. Recommendations for the analytical suites were determined by evaluating past Laboratory operations, past monitoring results, and direction from NMED. New wells are sampled for all analytical suites for at least four sampling rounds.

Table 1.7-1 presents applicable standards for groundwater quality and Table 1.7-2 presents applicable standards for surface water quality. These standards are used as screening levels for evaluating monitoring results. Table 1.7-3 lists analytes and field preparation (filtered or unfiltered samples) for constituents with applicable groundwater screening levels. Table 1.7-4 lists field preparation for analysis of tracers that have no applicable screening levels. Contract laboratories use the most current accredited analytical methods to analyze the samples collected under the IFGMP.

Appendix C summarizes the sampling frequencies and analytical suites for each monitoring group and explains how the monitoring objectives are protective of groundwater.

1.8 Sampling Frequency and Schedule

The IFGMP proposes sampling frequencies for each monitoring group location as described in the sampling tables in sections 2 through 8 (Tables 2.4-1 through 8.3-1). The sampling frequency for the current monitoring year is designated as M for monthly, Q for quarterly, S for semiannually, and A for annually. Some suites may be sampled less frequently than annually based on limited mobility of the contaminants (for example, polychlorinated biphenyls [PCBs] and dioxins/furans) or based on historical data indicating the contaminants are not present in a given monitoring group. In these cases, the sampling frequency may be designated B for biennially (every 2 yr), T for triennially (every 3 yr), or V for quinquennially (every 5 yr). The monitoring year during which the samples will be collected is listed in parenthesis following the B, T, or V sampling frequency designator.

Sampling under this IFGMP will be conducted in MY 2021, from October 1, 2020, to September 30, 2021. Table 1.8-1 presents a proposed sampling schedule. Following submittal of this IFGMP to NMED, a finalized sampling schedule for each monitoring group or watershed will be developed to ensure the monitoring frequency is met during the implementation year of the plan. The Consent Order requires all monitoring wells within a watershed to be sampled within 21 days of the start of the groundwater sampling event. For this IFGMP, monitoring groups for project areas are the primary organizational structure for sampling, and sampling campaigns for project area monitoring groups will be completed within 21 days. Monitoring of White Rock Canyon locations within the General Surveillance monitoring group will be completed within 21 days, while other General Surveillance locations will be sampled throughout the monitoring year during sampling campaigns for nearby monitoring groups.

1.9 Groundwater-Level Monitoring

Water levels are measured in groundwater monitoring wells immediately before each purge and sampling event. As such, all required water-level data for groundwater wells in a sampling event are collected within the 21-day sampling event period.

For most groundwater monitoring wells, water-level measurements are obtained from installed pressure transducers. In wells that are not equipped with pressure transducers, or in instances when the pressure transducer is not functioning properly, portable instrumentation is used to measure the groundwater level (i.e., a "manual" measurement). The configuration of some wells does not permit manual groundwater-level measurements to be taken (e.g., the well does not include an extra tube to accommodate a manual water-level probe). In these cases, historical groundwater-level data are substituted for a measurement before purging and sampling.

Spring discharge and base-flow discharge are measured during sampling using installed or portable flumes. In cases where surface-water flow is below the range of flume equipment, calculated estimates of flow are recorded based on field measurements of flow channel cross-section and flow velocity.

The pressure transducers discussed above allow groundwater-level data to be recorded every 1 to 2 hr. These data are used in conjunction with groundwater-level data collected during the sampling events and from wells and/or well screens not sampled under the IFGMP (Table 1.9-1) to develop and validate the conceptual models.

1.10 Wells That Are Historically Dry

Generally, historically dry wells are no longer monitored for groundwater levels except for a few wells in key locations (Table 1.9-1). Wells that intermittently show water (in response to large snowmelt years or precipitation events) may continue to be monitored for groundwater levels using transducers and may be sampled if sufficient water is present during their respective watershed's sampling campaign and if the wells are included within the sampling tables in the IFGMP. New wells that do not yield sufficient water for sampling may still be retained in the monitoring plan to evaluate potential wetting responses and temporal changes in groundwater levels.

1.11 Deviations to the Sampling Requirements

Occasionally, monitoring locations scheduled for a sampling campaign cannot be sampled for various reasons. In these cases, NMED is notified of deviations from the IFGMP in the PMRs, in accordance with the requirements of Appendix E, Part IV, of the 2016 Consent Order.

The following approach will be implemented when samples cannot be collected per the requirements of the IFGMP.

- Locations that are dry or that do not have adequate water for sampling during the scheduled sampling campaign will be sampled during the next scheduled sampling event for those locations. Locations that are consistently dry from year to year will be removed from the IFGMP.
- Locations that have limited water will be sampled according to a prioritized sampling suite prepared for the monitoring group or sampling location (Table 1.11-1).
- If a location cannot be sampled because of pump or equipment failure, every effort will be made to repair the equipment, and the location will be sampled during the next scheduled sampling event for the location.

- If a location cannot be safely sampled because of changes in field conditions, the situation will be discussed with NMED personnel, and alternative sampling arrangements will be considered to ensure sampling can be conducted safely.
- If a location cannot be sampled within the 21-day sampling window because of access issues (for example, as a result of road damage from flooding or inaccessibility because of snow), N3B will work to reestablish access and to sample the location during the sampling campaign. If access cannot be reestablished during the campaign, the location will be sampled during the next scheduled sampling event for the location.

2.0 TECHNICAL AREA 21 MONITORING GROUP

2.1 Introduction

The TA-21 monitoring group is located in and around TA-21 and is primarily located in upper Los Alamos Canyon (Figure 2.1-1). The group includes monitoring wells completed in perched-intermediate groundwater and in the regional aquifer.

TA-21 is located on the mesa north of Los Alamos Canyon, which is joined by DP Canyon, east of TA-21. TA-21 consists of two historical operating areas, DP West and DP East, both of which produced liquid and solid radioactive wastes. The operations at DP West included plutonium processing, while the operations at DP East included the production of weapon initiators and tritium research. A total of 155 SWMUs and AOCs are located in TA-21. Immediately adjacent to the west end of TA-21, to the south in Los Alamos Canyon, is TA-02, the location of the former Omega West nuclear reactor. A total of 39 SWMUs and AOCs are located in TA-02.

2.2 Background

The occurrence of surface water and alluvial, perched-intermediate, and regional groundwater in Los Alamos Canyon is discussed in detail in section 7.2 of the Los Alamos and Pueblo Canyons IR (LANL 2004, 087390).

In upper Los Alamos Canyon, perennial flow originates from springs and interflow through hillslope soils. The downgradient extent of perennial flow varies but generally terminates in the upper portions of Los Alamos Canyon west of TA-41. The remainder of upper Los Alamos Canyon down to the confluence with Pueblo Canyon is characterized by ephemeral surface-water flow that is storm water–dependent. Within the vicinity of TA-21, surface water occurs predominantly as ephemeral flow in Los Alamos and DP Canyons. Ephemeral surface-water flows generally occur during runoff associated with thunderstorms.

In the vicinity of TA-21, alluvial groundwater occurs in Los Alamos Canyon and in stretches of DP Canyon. DP Canyon is typical of other dry canyons (Birdsell et al. 2005, 092048) based on its small drainage area and low-elevation headwaters; however, it previously received effluent discharges from operations at TA-21 [SWMU 21-011(k)]. It currently receives surface runoff from paved parking lots and roadways from within the Los Alamos townsite. These townsite runoff sources contribute to locally persistent alluvial groundwater beneath parts of the canyon floor, specifically the portion next to TA-21. There, alluvial deposits are thin (approximately 2 m [6 ft]) and are periodically recharged by surface-water flows that reach this part of the canyon. Surface water infiltrates the canyon bottom alluvial sediments until its downward movement is impeded by strata of lower permeability, typically welded tuff at the top of unit Qbt 2 of the Tshirege Member. Despite the episodic nature of surface-water flow and thin nature of the alluvial deposits, transducer readings at alluvial well LAUZ-1 indicate the alluvium in this part of the canyon was continuously saturated from January 2008 to January 2010 (Koch and Schmeer 2010, 108926), suggesting the underlying welded tuffs are an effective perching horizon that inhibits deeper percolation.

Appendix D of "Technical Area 21 Groundwater and Vadose-Zone Monitoring Well Network Evaluation and Recommendations" (LANL 2010, 109947) describes known occurrences of perched-intermediate water beneath Los Alamos and Pueblo Canyons. Perched-intermediate zones nearest TA-21 are shown on the geologic cross-sections presented in Appendix F.

Perched-intermediate groundwater beneath Los Alamos and Pueblo Canyons results from percolation of surface water and alluvial groundwater derived from snowmelt and seasonal rainfall. Surface water in Pueblo Canyon was previously augmented by effluent released from the Pueblo Canyon wastewater treatment plant (WWTP) from 1951 to 1991 and the Central WWTP from 1947 to 1961. Perched-intermediate groundwater beneath lower Pueblo Canyon includes contributions of canyon-floor effluent percolation from the Bayo WWTP that operated from 1963 to 2007 and the Los Alamos WWTP that began to operate in 2007.

The most significant perched-intermediate groundwater in the vicinity of TA-21 occurs within the Guaje Pumice Bed and the underlying Puye Formation beneath Los Alamos Canyon. Near TA-21, saturated thicknesses for these occurrences range from about 9 ft at LADP-3 to more than 31 ft at LAOI-3.2a. The depth to perched-intermediate groundwater ranges from 124 ft to 746 ft below ground surface (bgs). These perched groundwater occurrences are probably part of a larger integrated system that extends over 3.5 mi along the axis of Los Alamos Canyon from H-19 (an historic test hole drilled in 1949) to LAOI-3.2 and LAOI-3.2a and may extend locally to the south (Appendix F).

Based on these observations, it appears an important control of intermediate-zone groundwater flow in the vicinity of TA-21 is the contact between the Guaje Pumice Bed and the underlying Puye Formation. Structure contours indicate the downdip direction for the base of the Guaje Pumice Bed is towards the south, southeast, and southwest in the vicinity of TA-21. The control exerted on groundwater flow by the Guaje Pumice Bed suggests perched water beneath Los Alamos Canyon should move generally southward away from TA-21.

The occurrence of thicker perched-intermediate zones in the eastern part of Los Alamos Canyon may be the result of enhanced percolation where the canyon floor is underlain by Cerros del Rio basalts rather than by the Bandelier Tuff. Because the Cerros del Rio basalt does not extend as far west as the developed portion of TA-21, it is unlikely the eastern perched zones of Los Alamos Canyon extend beneath the TA-21 area. To date, no perched-intermediate groundwater has been encountered during drilling on DP Mesa.

The regional aquifer includes confined and unconfined zones. The shallow portion of the regional aquifer is predominantly unconfined, and the deeper portion of the aquifer is predominantly confined. Groundwater flow in the shallow portion of the regional aquifer generally follows the gradient of the water table. The deep portion of the regional aquifer is predominantly under confined conditions that are affected by water supply pumping on the Pajarito Plateau.

Near TA-21, the upper surface of the regional aquifer is located in the Puye Formation and in the Santa Fe Group. The depths to water range from 707 ft to 1159 ft bgs (Koch and Schmeer 2011, 201566). The regional aquifer beneath the east end of DP Mesa occurs at a depth of 1159 ft bgs, based on groundwater levels measured in well R-6. Shallow regional groundwater in the vicinity of TA-21 generally flows to the east-northeast.

Contaminant Sources and Distributions

The primary sources of contaminants near the TA-21 monitoring group include the SWMU 21-011(k) outfall, the adsorption beds and disposal shafts at MDA T, the adsorption beds at MDA U, the former Omega West Reactor cooling tower (SWMU 02-005) and outfall, DP West, and waste lines and sumps. Other potential sources include DP East and leakage from an underground diesel fuel line as well as past releases from the former Omega West Reactor.

Mobile contaminants such as tritium, nitrate, and perchlorate released at the SWMU 21-011(k) outfall have been dispersed by surface water and alluvial groundwater down DP and Los Alamos Canyons. Contaminants are present in perched-intermediate groundwater near the north boundary of TA-21 and DP Canyon (at well R-6i), near the confluence of DP and Los Alamos Canyons (at wells LAOI-3.2, and LAOI-3.2a), farther down Los Alamos Canyon (at LAOI-7 and R-9i), and beneath Mesita de Los Alamos (at R-53i).

The lower reach of DP Canyon is the likely location of percolation for mobile contaminants such as tritium, nitrate, and perchlorate detected in perched groundwater at wells R-6i, LAOI-3.2, and LAOI-3.2a. Percolation at the confluence with DP Canyon (near wells LAOI-3.2/LAOI-3.2a) may be further enhanced by surface water runoff and alluvial groundwater in Los Alamos Canyon, contributing to the deeper perched-intermediate zones observed beneath the confluence of the two canyons. The zones of perched-intermediate groundwater occur within the Guaje Pumice Bed and the underlying Puye Formation near the confluence of the two canyons.

Contaminant concentrations are at background levels in regional groundwater monitoring wells near TA-21 (e.g., R-6, R-8, and R-64), suggesting that deep percolation through the vadose zone, including migration from perched groundwater, does not reach the regional aquifer near TA-21. This observation is also supported by the absence of tritium activity in the regional screen in R-7, although the absence of nitrate and perchlorate detections at this location is not conclusive because of reducing conditions in the screened interval that may be attributed to residual organic drilling products. The regional aquifer near former Test Well 3 (TW-3) shows levels of contamination above background, but this may be related to leakage around the well casing from the absence of annular seal in this older well. TW-3 was plugged and abandoned in early 2012. Tritium and perchlorate are slightly elevated in the regional aquifer at R-9, located farther down Los Alamos Canyon. These far-field contaminants may have originated at SWMU 21-011(k).

2.3 Monitoring Objectives

The monitoring objectives for the TA-21 monitoring group presented in this IFGMP are based in part on the results and conclusions presented in the Los Alamos and Pueblo Canyons IR (LANL 2004, 087390) as well as on the NMED-approved “Los Alamos and Pueblo Canyons Groundwater Monitoring Well Network Evaluation and Recommendations, Revision 1” (LANL 2008, 101330).

Sampling over the last few years has generated a substantial data set from perched-intermediate and regional groundwater wells located in and next to Los Alamos Canyon. Data from these wells indicate the importance of lateral migration of perched-intermediate groundwater and regional groundwater flow directions. This information can lead to a groundwater monitoring domain that may extend beyond the footprint of a watershed where the initial release occurred.

Monitoring for TA-21 is focused on perched-intermediate and regional wells surrounding TA-21 that monitor for potential releases from mesa-top sites and the fate of mobile constituents historically released into DP Canyon from SWMU 21-011(k). The key constituents detected in nearby perched-intermediate and regional groundwater wells include nitrate, perchlorate, and tritium. Base-flow and alluvial groundwater wells near and downgradient of TA-21 are not part of the TA-21 monitoring group because the source(s) of constituents detected in these wells is terminated or controlled, and residual concentrations are stable, declining, or no longer present.

2.4 Scope of Activities

All active monitoring locations in the TA-21 monitoring group are located in the Los Alamos Canyon/ Pueblo Canyon watershed. Monitoring locations include intermediate-perched groundwater wells and regional groundwater wells, which are shown in Figure 2.1-1.

Table 2.4-1 presents sampling locations, analytical suites, and monitoring frequencies for the TA-21 monitoring group. The analytical suites and frequencies specified are based on the results of applicable IRs, previous reviews of monitoring data, and direction from NMED as stated in its approval with modifications for the 2011 IFGMP, Revision 1 (NMED 2012, 520410).

The majority of the wells in the TA-21 monitoring group are sampled annually. The objectives for the sampling frequencies and analytical suites are presented in Table C-1.

3.0 CHROMIUM INVESTIGATION MONITORING GROUP

3.1 Introduction

The Chromium Investigation monitoring group is located in Sandia and Mortandad Canyons (Figure 3.1-1). Historically, the primary focus of groundwater monitoring in this group has been characterization and fate and transport of chromium and related contaminants in perched-intermediate groundwater and within the regional aquifer. The objective for MY 2021 incorporates performance monitoring for an interim measure (IM) that is underway to control contaminant migration along the periphery of the plume in the regional aquifer, and for plume-center characterization activities (LANL 2015, 600458; LANL 2015, 600615). The monitoring objectives are described in more detail in section 3.3.

Sandia Canyon heads on Laboratory property within TA-03 at an elevation of approximately 7300 ft and trends east-southeast across the Laboratory, Bandelier National Monument, and Pueblo de San Ildefonso. Sandia Canyon empties into the Rio Grande in White Rock Canyon at an elevation of 5450 ft. The area of Sandia Canyon watershed is approximately 5.5 mi^2. The head of the canyon is located on the Pajarito Plateau at TA-03. Effluent supported perennial stream flow and saturated alluvial groundwater conditions occur in the upper and middle portions of the canyon system. A wetland of approximately 7 acres exists as a result of the treated effluent discharge to the canyon. TAs located in the Sandia Canyon watershed include TA-03, TA-53, TA-60, TA-61, TA-72, and former TA-20. A total of 261 SWMUs and AOCs are located within the portions of these TAs in the Sandia Canyon watershed.

Mortandad Canyon is an east-to-southeast trending canyon that heads on the Pajarito Plateau near the main Laboratory complex at TA-03 at an elevation of 7380 ft (Figure 1.3-1). The drainage extends about 9.6 mi from its headwaters to its confluence with the Rio Grande at an elevation of 5440 ft. The canyon crosses Pueblo de San Ildefonso land for several miles before joining the Rio Grande (LANL 1997, 056835). The Mortandad Canyon watershed is located in the central portion of the Laboratory and covers approximately 10 mi^2. The lower portion of Mortandad Canyon is on Pueblo de San Ildefonso land southeast of the Laboratory property boundary. The Mortandad Canyon watershed contains several tributary canyons that have received contaminants released during Laboratory operations. The most prominent tributary canyons include Ten Site Canyon, Pratt Canyon, Effluent Canyon, and 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. Since November of 2010, effluent from Outfall 051 has been released twice, in June 2019 and March 2020. As part of the current NMED Groundwater Quality Bureau authorization for discharge at Outfall 051, the Laboratory monitors two alluvial wells (MCA-RLW-1 and MCA-RLW-2) and one perched-intermediate well (MCOI-6) quarterly. Four regional wells (R-1, R-14 S1, R-46, and R-60) are monitored annually.

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 monitored under the NPDES program. 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 three goals: (1) to reduce PCB levels to meet stricter effluent limits, (2) to increase the number of cooling water circulation loops for cooling towers at the Strategic Computing Complex (SCC), and (3) to help achieve a national DOE initiative for water conservation. 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 been essentially eliminated since 2010. 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 effluent releases from NPDES Outfall 001 and periodically by storm water and minor snowmelt runoff. 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 thin, discontinuous alluvial groundwater saturation. 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 elimination of significant effluent releases from RLWTF beginning in 2010.

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 20 ft thick and generally thickened to the west. This perched zone beneth 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 a perching layer. The top of the Cerros del Rio basalt also acts as a perching horizon at intermediate well MCOI-4 and possibly in regional well R-62, indicating this contact has favorable characteristics for perching groundwater. Additionally, some saturation may have been encountered below the Cerros del Rio basalt in the Puye Formation at both wells R-42 (LANL 2009, 105026) and R-62 (LANL 2012, 215008). However, it is possible that the water observed seeping into the R-42 borehole was potable water used for drilling R-42 returning back into the open borehole. Additional drilling and subsurface investigations in the vicinity of R-42 at boreholes MCOBT-4.4, MCOBT-8.5, and CrCH-2 indicate that if perched water is present in the R-42 area, it’s very limited spatially (Broxton et al. 2002, 076006; LANL 2015, 600457).

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, MCOI-5, and MCOI-6. Wells MCOI-5 and MCOI-6 monitor this perched zone of saturation.

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 have historically exceeded the NMED groundwater standard of 50 ppb 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 interim measure currently underway for the chromium plume has effectively reduced chromium concentrations to below 50 ppb for some wells with historical groundwater exceedances for chromium. The primary source of the chromium plume is blowdown water discharged from the TA-03 power plant cooling tower from 1956 to 1972. Additionally, regional well R-61 screen 1 has historically exceeded the NMED tap-water screening level for perchlorate of 13.8 ppb. Other collocated constituents detected above background, but below applicable groundwater screening levels, include 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] may also have occurred in the vadose zone. These sources and the migration pathways are discussed in the Sandia Canyon IR (LANL 2009, 107453; LANL 2018, 602964).

3.3 Monitoring Objectives

Historically, the key objective of the Chromium Investigation monitoring group was to characterize the fate and transport behavior of chromium and related contaminants originating from various sources principally within Sandia and Mortandad Canyons. Monitoring in and beneath Sandia Canyon and adjacent canyons focused on acquiring a fundamental understanding of the nature and extent of contaminants originating in the Sandia Canyon watershed, with an emphasis on chromium contamination because chromium concentrations exceed groundwater standards in the regional aquifer. Beginning in MY 2019, the objective for the Chromium Investigation monitoring group incorporated performance monitoring associated with the IM. Monthly monitoring of select performance monitoring wells is used to provide high-resolution information to assess performance of the interim measure being conducted under the "Interim Measures Work Plan for Chromium Plume Control" (LANL 2015, 600458) The results of the performance monitoring are presented in the context of the IM objectives in semiannual progress reports on chromium plume control interim measure performance. Changes to the location, suite, or frequency of chromium interim measures performance monitoring will be reflected in annual IFGMPs,

Localized pumping and injection under the IM began in late 2016. The IM involves pumping contaminated groundwater from extraction wells, treating water at the surface using ion exchange, and reinjecting the water through a series of injection wells located along the plume periphery. The IM performance monitoring wells currently include R-50 screens 1 and 2, R-45 screens 1 and 2, R-44 screens 1 and 2, R-35a, R-35b, R-11, R-61 screen 1, R-70 screens 1 and 2, and SIMR-2. These wells will continue to be sampled quarterly as part of the MY 2021 IFGMP; however, additional monthly monitoring of these wells is conducted and reported under the "Semiannual Progress Report on Chromium Plume Control Interim Measure Performance" (see Appendix H, Table H-2) (N3B 2019, 700356). Field pilot tests at R-28 and R-42 using amendments to assess potential in situ remediation strategies are underway as part of the pilot-scale amendments testing work plan and supplemental amendments testing work plan. Sampling of the regional aquifer piezometers in the Chromium Investigation monitoring group area will also be conducted as part of an IM performance monitoring plan.

Base-flow locations and alluvial wells in Sandia Canyon are excluded from the Chromium Investigation monitoring group because the primary contaminants of concern are at low and very stable concentrations in these media (LANL 2009, 107453). In Mortandad Canyon, contaminants in the surface water and alluvial groundwater have shown a marked decrease in concentration as a result of improvements in the treatment processes at the TA-50 RLWTF (see Figures 7.2-17, 7.2-18, and 7.2-25 of the Mortandad Canyon IR [LANL 2006, 094161]). The steadily decreasing trend of the contaminant concentrations in surface water and alluvial groundwater supports the inclusion of base-flow and alluvial well monitoring locations in the General Surveillance monitoring group (section 8). Data from these monitoring locations provide sufficient information to continue verifying decreasing trends in contaminant concentrations in alluvial groundwater.

3.4 Scope of Activities

The Chromium Investigation monitoring group includes monitoring well locations in Sandia and Mortandad Canyons. Active monitoring locations in this group include perched-intermediate groundwater and regional aquifer monitoring wells, which are shown in Figure 3.1-1.

The water level at MCOI-5 has been steadily declining over the past 9 yr, and as of January 2020 is less than 1 ft above the bottom of the screen, which is an insufficient water level to collect samples. Beginning in MY 2021, MCOI-5 will be monitored for water levels and if sufficient recharge occurs allowing the water level to rise to 3.5 ft above the bottom of the screen (6124.2 ft above mean sea level [amsl]), a prioritized suite consisting of perchlorate, per- and polyfluoroalkyl substances (PFAS), metals, and additional general inorganics will be sampled.

Table 3.4-1 specifies sampling frequencies and analytical suites for Chromium Investigation monitoring group monitoring locations. The specified analytical suites and frequencies are based on the results of applicable IRs, previous reviews of monitoring data, and performance monitoring objectives and presented in Table C-1.

4.0 MATERIAL DISPOSAL AREA C MONITORING GROUP

4.1 Introduction

The MDA C monitoring group includes nearby regional monitoring wells on the mesa top and in Mortandad Canyon (Figure 4.1-1). MDA C is located on Mesita del Buey in TA-50, at the head of Ten Site Canyon. TA-50 is bounded on the north by Effluent and Mortandad Canyons, on the east by the upper reaches of Ten Site Canyon, on the south by Twomile Canyon, and on the west by TA-55.

MDA C (SWMU 50-009) is an inactive 11.8-acre landfill consisting of 7 disposal pits and 108 shafts. Between 1948 and 1974, solid low-level radioactive wastes and chemical wastes were disposed of in the landfill. The depths of the 7 pits at MDA C range from 12 ft to 25 ft below the original ground surface. The depths of the 108 shafts range from 10 ft to 25 ft below the original ground surface. The original ground surface is defined as beneath the cover that was placed over the site in 1984. The pits and shafts are constructed in the Tshirege Member of the Bandelier Tuff. The regional aquifer is estimated to be approximately 1332 ft deep in well R-46 based on November 2018 groundwater-level data. The topography of MDA C is relatively flat, although the slope steepens to the north where the northeast corner of MDA C abuts the south wall of Ten Site Canyon.

4.2 Background

MDA C is located on a mesa top, so no shallow alluvial groundwater is present in the immediate vicinity. The nearest surface water is found in Effluent Canyon to the north and in Pajarito Canyon and Twomile Canyon to the south.

No perched groundwater or intermediate-depth saturated horizons were encountered during previous investigations at MDA C (LANL 1998, 059599; LANL 2005, 091493, p. 6) or in any of the boreholes drilled during the Phase III investigation at MDA C (LANL 2011, 204370). No perched groundwater was encountered during the drilling of regional wells R-46 or R-60.

Regional monitoring wells R-46 and R-60 are located downgradient of MDA C (Figure 4.1-1) (LANL 2009, 105592; LANL 2011, 111798). The upper surface of the regional aquifer is located within the lower Puye Formation or the upper pumiceous deposits of the Santa Fe Group, and the depths to water range from approximately 1320 ft to 1330 ft bgs (Koch and Schmeer 2011, 201566). Near MDA C, the direction of shallow groundwater flow in the regional aquifer is to the east-southeast.

Contaminant Sources and Distributions

Vapor-phase volatile organic compounds (VOCs) and tritium are present in the upper 500 ft of the unsaturated zone beneath MDA C (LANL 2011, 204370). The primary vapor-phase contaminants beneath MDA C are trichloroethene (TCE) and tritium. No evidence has been found of groundwater contamination in the regional aquifer. MDA C is located on a mesa top above thick, unsaturated units of the Bandelier Tuff, and therefore, present-day aqueous-phase transport is generally assumed to be minimal.

4.3 Monitoring Objectives

Monitoring objectives for the MDA C monitoring group are to supplement existing vadose zone pore-gas monitoring to refine the nature and extent of contamination and to assess the fate and transport of the current vadose zone contaminant distribution. The monitoring will also support the remedy selection process for MDA C.

4.4 Scope of Activities

The MDA C monitoring group consists of three regional groundwater monitoring wells, R-14, R-46, and R-60, as shown in Figure 4.1-1. Table 4.4-1 presents sampling locations, analytical suites, and monitoring frequencies for the MDA C monitoring group. The specified analytical suites and frequencies are based on the results of applicable IRs, previous reviews of monitoring data, and direction from NMED as stated in its approval with modifications for the 2011 IFGMP, Revision 1 (LANL 2011, 208811; NMED 2012, 520410).

The wells in the MDA C monitoring group are sampled annually. The objectives for the sampling frequencies and analytical suites are presented in Table C-1.

5.0 TECHNICAL AREA 54 MONITORING GROUP

5.1 Introduction

At TA-54, groundwater monitoring is conducted to support both the corrective measures process for SWMUs and AOCs (particularly MDAs G, H, and L) under the Consent Order and in support of the RCRA permit. The TA-54 monitoring group was established to address the monitoring requirements for all portions and aspects of TA-54 (Figure 5.1-1). The TA-54 monitoring group includes both perched-intermediate and regional wells in the near vicinity. Other downgradient wells have general relevance to TA-54 and other upgradient sources but are not considered part of the TA-54 monitoring network and are not discussed in this section.

TA-54 is situated in the east-central portion of the Laboratory on Mesita del Buey. TA-54 includes: four MDAs designated as G, H, J, and L; a waste characterization, container storage, and transfer facility (TA-54 West); active radioactive waste storage and disposal operations at Area G; hazardous and mixed-waste storage operations at Area L; and administrative and support areas. The transfer facility is located at the western end of TA-54. MDAs H and J are located approximately 150 m and 305 m (500 ft and 1000 ft) southeast of the transfer facility, respectively. MDA L is located approximately 1.6 km (1 mi) southeast of the transfer facility. MDA G subsurface units are located within Area G approximately 0.8 km (0.5 mi) southeast of MDA L. A total of 47 SWMUs and AOCs are located within TA-54.

Mesita del Buey is a 100-ft- to 140-ft-high mesa that trends southeast. The elevation of Mesita del Buey ranges from 6750 ft to 6670 ft at Area G. The mesa is approximately 500 ft wide and is bounded on the north by Cañada del Buey and on the south by Pajarito Canyon (Figure 5.1-1).

5.2 Background

The TA-54 monitoring group is located in the Pajarito and Mortandad Canyon watersheds, and the occurrence of surface water, alluvial groundwater, and perched-intermediate and regional groundwater is discussed in detail in section 7.2 of the "Pajarito Canyon Investigation Report, Revision 1" (hereafter, Pajarito Canyon IR) (LANL 2009, 106939). The Mortandad Canyon setting is discussed in section 3.

Sources of surface water in the Pajarito watershed currently include snowmelt, storm water runoff, and discharges at several springs. Ephemeral-intermittent surface-water flow within the TA-54 monitoring group area occurs in Pajarito Canyon.

The primary alluvial groundwater body in Pajarito Canyon extends east from below the confluence with Twomile Canyon to approximately regional well R-23, a distance of 7 km (4.4 mi). Spatially restricted bodies of alluvial groundwater are also present west of the Twomile Canyon confluence and extend upcanyon to springs in the south fork of Pajarito Canyon (Upper Starmer Spring) and Pajarito Canyon above the south fork confluence (Homestead Spring). The alluvial groundwater is recharged by stream flow and some local precipitation. It accumulates in the alluvial deposits that fill the canyon bottom, often perching on shallow bedrock units. The alluvial groundwater extends farther downcanyon than stream flow does because some downcanyon lateral flow occurs within the alluvium. Alluvial groundwater acts as a source of water percolating into the deeper tuff units above the Cerros del Rio basalt, which is very near the surface at well R-23. The extent of this groundwater helps to define deeper percolation zones within the canyon. Overall, lateral flow within the alluvium and deeper percolation of alluvial groundwater into underlying bedrock may provide a driving force for subsurface transport of soluble contaminants along the length of the canyon and into the deeper subsurface.

Perched-intermediate groundwater occurs in a variety of settings beneath the Pajarito watershed. Occurrences are known from deep groundwater investigations and from more localized site investigations. Perched-intermediate horizons are present in the Bandelier Tuff in the upper portion of the watershed and in the Cerro Toledo interval, Puye Formation, dacitic lavas, and Cerros del Rio lavas in the middle and lower portions of Pajarito Canyon. The location and nature of most of these occurrences are consistent with, and indicative of, known or suspected canyon reaches with higher percolation, such as nearby wells R-17 and R-23. No indication was found that the perched-intermediate zones are laterally continuous over large areas.

In the vicinity of TA-54, perched-intermediate groundwater occurs in wells R-55i and R-23i (LANL 2003, 079601; Kleinfelder 2006, 092495; LANL 2011, 111611) at depths ranging from 406 ft to 498 ft bgs. Perched-intermediate groundwater also occurs in wells R-40/R-40 Si and R-37 (LANL 2009, 106432; LANL 2009, 107116) at depths ranging from 639 ft to 909 ft. This water is thought to be localized beneath the canyon floor and to result from localized canyon floor percolation.

The regional aquifer in the vicinity of TA-54 includes confined and unconfined zones. The shallow portion of the regional aquifer is predominantly unconfined, and the deeper portion of the aquifer is predominantly confined. Groundwater flow in the shallow portion of the regional aquifer is generally eastward beneath the western section of Pajarito watershed and southeastward beneath the eastern section of Pajarito watershed. In the vicinity of TA-54, the upper surface of the regional aquifer is located within the

Cerros del Rio basalts and the underlying sediments of the Puye Formation, and the depths to water range from 785 ft to 1020 ft bgs (Koch and Schmeer 2011, 201566).

Groundwater flow in the upper part of the regional aquifer beneath TA-54 appears to be substantially impacted by the Cerros del Rio lavas (LANL 2010, 111362). These lavas are more than 150 ft thick beneath the regional water table. Groundwater flow in the regional aquifer beneath TA-54 is impacted by (1) water supply pumping, (2) the local-scale recharge along Pajarito Canyon, (3) the lateral propagation of large-scale mountain-front aquifer recharge occurring to the west of TA-54, and (4) the discharge of the regional aquifer to the southwest towards the White Rock Canyon springs and the Rio Grande.

Contaminant Sources and Distributions

Pore-gas monitoring data show that vapor-phase transport of contaminants occurs in the upper portion of the unsaturated zone and vapor-phase VOCs are present beneath MDAs G and L. The primary contaminants in the vapor phase at TA-54 are 1,1,1-trichloroethane; TCE; and tritium (LANL 2005, 090513; LANL 2006, 091888; LANL 2007, 096409).

Historical data from the groundwater monitoring network around TA-54 showed sporadic detections of several organic compounds. Data show minimal detections for these constituents and only consistently at two wells, specifically trichloroethene at R-40 screen 1 and R-20 screen 2, and are all below applicable Consent Order groundwater screening levels. Further evaluations of existing groundwater data near TA-54 and detailed descriptions of organic and inorganic contaminants detected in perched-intermediate and regional groundwater at TA-54 are presented in the corrective measures evaluations (CMEs) for MDAs G, H, and L (LANL 2011, 205756; LANL 2011, 206319; LANL 2011, 206324). Although DOE withdrew the three CMEs in 2016 (DOE 2016, 601899), the references are included herein because the data and evaluations they present are useful for understanding groundwater contamination at TA-54.

5.3 Monitoring Objectives

Monitoring at TA-54 focuses on perched-intermediate and regional groundwater zones beneath TA-54 (Figure 5.1-1). The monitoring suite for perched-intermediate and regional groundwater addresses RCRA monitoring requirements and also reflects the data collected to date from wells in the TA-54 network.

The monitoring at TA-54 provides the basis for accurately describing the groundwater conditions beneath TA-54. Base-flow and alluvial groundwater wells near and downgradient of TA-54 are not included in the TA-54 monitoring group because no evidence was found of a hydrologic connection between the subsurface contamination beneath TA-54 and adjacent canyons, as discussed in the Pajarito Canyon and Cañada del Buey IRs (LANL 2009, 106939; LANL 2009, 107497).

The regional monitoring well network downgradient of the MDAs in TA-54 is a system that includes redundancy and is designed to provide reliable detection of contaminants reaching the regional aquifer. The wells are located both near the facility boundary and at more distal locations along the dominant regional flow direction as well as along potential local flow directions to the northeast. The locations of wells also address potential complex pathways for contaminants in the vadose zone. Because of the difficulties associated with monitoring groundwater that occurs in lavas beneath TA-54, the network is made up of dual-screened wells with an upper well screen placed as close to the water table as possible to monitor the first arrival of contaminants in the aquifer and a lower screen placed in permeable aquifer sediments to monitor the primary groundwater pathways downgradient of the facility.

5.4 Scope of Activities

The TA-54 monitoring group consists of intermediate-perched and regional groundwater wells, many of which are dual-screened wells with Baski sampling systems. The TA-54 monitoring wells are shown in Figure 5.1-1.

Table 5.4-1 presents sampling locations, analytical suites, and monitoring frequencies for the TA-54 monitoring group. The specified analytical suites and frequencies are based on the results of previous investigations, CMEs, reviews of monitoring data, and direction from NMED, as stated in its approval with modifications for the 2011 IFGMP, Revision 1 (LANL 2011, 208811; NMED 2012, 520410).

The wells in the TA-54 monitoring group are sampled annually. The objectives for the sampling frequencies and analytical suites are presented in Table C-1.

Well screen R-40 Si shows impacts from drilling foam and is sampled only for metals, general inorganics, and low-level tritium.

Samples from monitoring well R-55i and the well R-54 screen 1 show impacts from residual organic material introduced during drilling; collection of samples from these screens is limited to low-level tritium.

Regional well R-57 screen 1 and screen 2 have additional annual sampling requirements to meet a 1996 EPA authorization/agreement related to the disposal of PCBs at Area G. The 1996 agreement requires sampling for PCBs, pH, specific conductance, and chlorinated organics.

6.0 TECHNICAL AREA 16 260 MONITORING GROUP

6.1 Introduction

The TA-16 260 monitoring group (Figure 6.1-1) was established for the upper Water Canyon/ Cañon de Valle watershed to detect and monitor contaminants released from Consolidated Unit 16-021(c)-99, the TA-16 260 Outfall (hereafter, the 260 Outfall), and other sites at TA-16. The 260 Outfall is a former high explosives– (HE-) machining outfall that discharged HE-bearing water to Cañon de Valle from 1951 to 1996 and is the predominant source of contaminants detected in groundwater in the Water Canyon/Cañon de Valle area. These discharges contaminated the soils, sediments, surface waters, spring waters, perched intermediate, and regional groundwater at TA-16.

The TA-16 260 monitoring group includes springs, alluvial wells, and wells completed in several deep perched-intermediate groundwater zones and in the regional aquifer. Shallow monitoring locations, such as the springs and alluvial wells, are included in this monitoring group because they contain HE, barium, and VOC contamination related to past activities at the 260 Outfall and other sites in the area.

TA-16 is located in the southwest corner of the Laboratory and was established to develop explosive formulations, cast and machine explosive charges, and assemble and test explosive components for the nuclear weapons program. A total of 409 SWMUs and AOCs are located within TA-16. TA-16 is bordered by Bandelier National Monument along NM 4 to the south and by the Santa Fe National Forest along NM 501 to the west. To the north and east, it is bordered by TA-08, TA-09, TA-11, TA-14, TA-15, TA-37, and TA-49. Water Canyon, a 200-ft-deep ravine with steep walls, separates NM 4 from active sites at TA-16. Cañon de Valle forms the northern border of TA-16.

6.2 Background

Surface water in the area is ephemeral, intermittent, and perennial. Perennial water is derived from springs, storm water, and snowmelt runoff that flows in canyon drainages, including Cañon de Valle, Fishladder Canyon, and Martin Spring (S-Site) Canyon. Fishladder Canyon also receives snowmelt and storm water runoff. Alluvial groundwater occasionally discharges at Fishladder Spring. The surface flow in Fishladder Canyon decreased significantly once the TA-16 340 Outfall was deactivated.

The TA-16 260 monitoring group includes alluvial monitoring wells in Cañon de Valle, Fishladder Canyon, and Martin Spring Canyon. Groundwater in these alluvial systems is shallow, and water levels generally show responses to snowmelt runoff.

The vadose zone at TA-16 is approximately 600 ft to 1300 ft thick and is recharged by mountain-front precipitation and subsequent percolation along the Pajarito fault zone west of TA-16 and along canyons (e.g., percolation along upper Cañon de Valle). The vadose zone contains shallow perched-intermediate groundwater water zones (typically less than 200 ft in depth from the mesa top) and two deep perched-intermediate groundwater zones between approximately 650 ft and 1200 ft bgs. The shallow perched-intermediate zones are heterogeneous and controlled by fractures and surge beds near the contact of units 3 and 4 of the Tshirege Member. They manifest as three springs (SWSC [Sanitary Wastewater Systems Consolidation], Burning Ground, and Martin), as intermittently saturated zones in several boreholes in the northern portions of TA-16, and in a continuously saturated zone in a borehole near the 90s Line Pond. The primary, uppermost deep perched-intermediate groundwater zones are believed to extend from west to east for 8600 ft and from north to south for 2700 ft.

Perched-intermediate groundwater was encountered at R-26 screen 1; R-25b, R-25 screens 1, 2, and 4 (plugged and abandoned); CdV-9-1(i); CdV-9-1(i) PZ-1; CdV-9-1(i) PZ-2; CdV-16-1(i); CdV-16-2(i)r; CdV-16-4ip; R-47i; and R-63i as well as in regional well R-68. No perched groundwater was observed at R-18, R-47, R-48, and R-58, limiting its north-south and east-west extent. The low-permeability Tschicoma dacite observed in R-48 (approximately 2000 ft south of Cañon de Valle) may impede the southward flow of water in the deep perched-intermediate system. The perched zones are present both within the Otowi Member of the Bandelier Tuff [R-25 (plugged and abandoned), R-25b, CdV-9-1(i) PZ-1, and CdV-16-1(i)] and within the Puye Formation [CdV-9-1(i) PZ-2, CdV-9-1(i), CdV-16-4ip, CdV-16-2(i)r] and R-63i. In the vicinity of CdV-16-4ip, the two perched zones are separated by 100 ft to 150 ft of Puye sediments under variable saturation (LANL 2011, 203711).

Water-level data indicate groundwater within the perched horizons generally flows from west to east. Groundwater-level data from multiple screens in R-25 (plugged and abandoned), from the two screens of CdV-16-4ip, from CdV-9-1(i), and from R-63 and R-63i indicate water levels within the deep perched-intermediate systems are lower with depth. Cross-borehole aquifer test results (LANL 2017, 602288) showed hydraulic communication between screens relatively proximal to each other and completed in the upper Puye Formation. The primary area of hydraulic communication is a laterally continuous saturated zone within the upper Puye Formation that is at least as large as the triangle formed by CdV-9-1(i), CdV-16-4ip, and R-25 screen 2 (plugged and abandoned). The preferential communication across the upper Puye Formation is likely driven by stratification (i.e., high anisotropy) within Puye strata.

The regional aquifer in the vicinity of northern TA-16 is predominantly unconfined, with the water table located within the Puye Formation at a depth of approximately 1108 ft to 1353 ft bgs. Groundwater flow in the upper portion of the regional aquifer is generally eastward. However, localized recharge beneath Cañon de Valle contributes to water levels that do not conform to this general flow direction. Groundwater levels in regional wells near TA-16 show little influence from transient effects of deeper water supply pumping (LANL 2006, 091450).

Contaminant Sources and Distributions

Discharge from the former 260 Outfall at Consolidated Unit 16-021(c)-99 from 1951 to 1996 served as a primary source of HE and inorganic contamination found throughout the site (LANL 1998, 059891; LANL 2003, 085531; LANL 2011, 207069). The drainage channel below the outfall and the canyon bottom and surface water, alluvial groundwater, and deep perched-intermediate groundwater are contaminated with explosive compounds, including RDX (Royal Demolition Explosive), HMX (Her Majesty's Explosive), TNT (2,4,6-trinitrotoluene), and barium. In addition, the VOCs tetrachloroethene, TCE, methyl tert-butyl ether (MTBE), and toluene have been detected in a number of locations, including perched-intermediate groundwater and regional groundwater. RDX has also been detected in regional groundwater in wells R-18, R-25 screens 5 and 6 (plugged and abandoned), R-63, R-68, and R-69.

The primary migration pathway for these contaminants is thought to consist of (1) discharge as effluent from the 260 Outfall, (2) surface flow to Cañon de Valle via a small tributary drainage, (3) downcanyon transport by surface-water flow and alluvial groundwater, and (4) percolation through the vadose zone as recharge to the deep perched-intermediate groundwater zones and potentially into the regional aquifer.

In addition, there is some evidence of a possible source for HE from historical releases at TA-09. Increasing concentrations of RDX in R-18 may have originated from the 260 Outfall, migrating down from Cañon de Valle through the vadose zone to the regional aquifer, or may have potentially originated from an alternate source, possibly from historical releases at TA-09.

Groundwater in the perched-intermediate horizons contains the largest inventory of HE in the environment on a mass basis, with estimates ranging from hundreds to thousands of kilograms of RDX (LANL 2006, 093798; LANL 2018, 602963).

Recent data for deep groundwater show elevated RDX concentrations in both perched-intermediate and regional groundwater. Monitoring wells CdV-16-4ip screen 1 and CdV-16-2(i)r, completed in perched-intermediate groundwater, show the highest RDX concentrations, at approximately 150 µg/L and approximately 130 µg/L, respectively. RDX has been detected in perched-intermediate groundwater north of Cañon de Valle, with concentrations in CdV-9-1(i) screen 1 on the order of approximately 25 µg/L.

Regional monitoring wells R-68 and R-69 show RDX concentrations in the regional aquifer above the New Mexico tap water screening level of 9.66 µg/L, with RDX at approximately 14 µg/L to 17.1 µg/L for R-68 and 31.7 µg/L to 39.4 µg/L for R-69 screen 1 and screen 2, respectively. RDX concentrations at R-18 have gradually increased from nondetection to around 5 µg/L.

6.3 Monitoring Objectives

The monitoring objectives for the TA-16 260 monitoring group are to assess the nature and extent of contamination, to refine the conceptual site model for the area, to collect data to assess potential corrective action alternatives for RDX in groundwater, and to collect long-term monitoring data. Monitoring activities focus on sampling for HE and VOCs in the upper Cañon de Valle watershed.

Activities in recent years focused on collecting data to refine the site conceptual model for identification of corrective action alternatives and evaluating the nature and extent of contamination. These activities have included the deployment of tracers in 2015 in three monitoring wells and subsequent monitoring of these tracers in the deep perched-intermediate and regional groundwater (LANL 2015, 600535). Monitoring of these tracers is incorporated into the IFGMP. This work will continue to be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."

In September 2017, the Laboratory submitted the remedy completion report for Consolidated Unit 16-021(c)-99 to NMED, which was approved by NMED in February 2018 (LANL 2017, 602597; NMED 2018, 602893). The report recommended long-term monitoring of springs, base flow, and alluvial groundwater to monitor trends in RDX and barium in Cañon de Valle and Martin Spring Canyons. A long-term monitoring and maintenance plan was included as Appendix A to the remedy completion report.

6.4 Scope of Activities

Active monitoring locations in the TA-16 260 monitoring group include base flows, alluvial groundwater wells, perched-intermediate groundwater wells, regional groundwater wells, and springs. These locations are shown in Figure 6.1-1. Sampling locations, analytical suites, and monitoring frequencies for the TA-16 260 monitoring group are presented in Table 6.4-1. The long-term monitoring requirements specified in the remedy completion report have been incorporated into Table 6.4-1, with long-term monitoring locations highlighted in blue.

Monitoring of both deep perched-intermediate and regional groundwater represents a long-term data set that indicates what constituents are present and their trends and variability. Additional samples are collected for some constituents as early-detection samples to assess potential migration of those constituents from secondary sources in the vadose zone.

The sampling frequency for most locations in the TA-16 260 monitoring group is primarily semiannual, although select locations are sampled quarterly. The objectives for the sampling frequencies and analytical suites are presented in Table C-1.

Samples collected from monitoring well R-25b continue to show the influence of tracers introduced in November 2015 (LANL 2017, 602161) and are not representative. For this reason, R-25b has been included in the “watch list” in Appendix E. Well R-25b will continue to be sampled in MY 2021, but the samples will be categorized as screening samples until the geochemistry is more representative. In addition, the frequency of sampling for HEXMOD (high explosives and RDX degradation products) analytes and tracers at R-25b continues to be semiannually.

Long-term monitoring will be conducted in alluvial wells, base flow, and springs in accordance with the requirements of Appendix A to the remedy completion report (LANL 2017, 602597). In addition, the low-permeability cap above the settling pond at the 260 Outfall will be inspected and maintained as necessary. Water levels in the Surge Bed Monitoring Well (location 16-612309) near the settling pond will be monitored to ensure that the low-permeability cap remains protective of the underlying surge bed, which still has residual contamination. The requirements for the inspections of the low-permeability cap and water level monitoring in location 16-612309 are specified in the remedy completion report.

Samples will be collected from the Surge Bed Monitoring Well in accordance with Table 6.4-1 when sufficient water is available. The well is typically dry and was therefore equipped with a water-level transducer to better understand the timing associated with the presence of water in the well. The Surge Bed Monitoring Well was added to the TA-16 260 monitoring group in December 2017 to support the long-term groundwater monitoring program.

7.0 MATERIAL DISPOSAL AREA AB MONITORING GROUP

7.1 Introduction

The MDA AB monitoring group is located in TA-49 and includes one monitoring well completed in perched-intermediate groundwater and three wells completed in the regional aquifer. TA-49, also known as the Frijoles Mesa Site, is located on a mesa in the upper part of the Ancho Canyon drainage, and part of the area drains into Water Canyon. The MDA AB monitoring group is shown in Figure 7.1-1.

TA-49 was used for underground hydronuclear testing in the early 1960s. The testing consisted of criticality, equation-of-state, and calibration experiments involving special nuclear materials and produced large inventories of radioactive and hazardous materials: isotopes of uranium and plutonium, lead, and beryllium; explosives such as TNT, RDX, and HMX; and barium nitrate. Much of this material remains in shafts on the mesa top. Further information about activities and SWMUs and AOCs at TA-49 is presented in Laboratory reports (LANL 2010, 109318; LANL 2010, 109319). A total of 20 SWMUs and AOCs are located within TA-49.

7.2 Background

Both Ancho Canyon and the north fork of Ancho Canyon head on the Pajarito Plateau in the south-central part of the Laboratory. Approximately 2.2 mi^2 (5.6 km^2) is drained by the north fork of Ancho Canyon and approximately 2.3 mi^2 (5.8 km^2) is drained by Ancho Canyon. Surface-water flow is ephemeral and occurs as runoff, primarily following infrequent, intense thunderstorms or during snowmelt. Its source is direct precipitation and runoff from surrounding mesa tops. No perennial sources of surface water exist at TA-49.

In 1960, the USGS drilled three deep test wells (DT-5A, DT-9, and DT-10, which have since been plugged and abandoned) to monitor the water quality in the regional aquifer. No contaminants were found in these wells at concentrations near or above standards. As with other wells installed around the Laboratory during that period using mild carbon steel, samples from these three test wells showed elevated metals concentrations related to corrosion or flaking of well components. In 2010, the total lead concentration in a sample from test well DT-9 of 20.1 µg/L was above the EPA drinking water system action level of 15 µg/L. Another sample collected during the year had a total lead result of less than 2 µg/L. Some results during the 1990s were above 50 µg/L. The source of lead was believed to be galvanized piping used for pump or transducer installation.

Several deep mesa-top boreholes and wells have been drilled to intermediate depths of 300 ft to 700 ft bgs (49-CH-1 through 49-CH-4, 49-2-700-1) and to the regional aquifer (DT-5A, DT-9, DT-10, R-29, and R-30). No perched-intermediate groundwater zones were encountered when these wells were drilled (LANL 2006, 093714; LANL 2010, 110478; LANL 2010, 110518). A moisture profile for the 700-ft-deep mesa-top borehole 49-2-700-1 showed low moisture content (<17% by weight) throughout the profile; the profile is similar to that beneath other dry mesas and indicates percolation along neighboring canyons does not impact moisture beneath the mesa at TA-49. In addition, 49-Gamma was drilled to 54 ft bgs in upper Ancho Canyon, and wells 49-9M-2 through 49-9M-4 were drilled in the drainage of the upper north fork of Ancho Canyon. These boreholes were dry when drilled. These observations show a lack of shallow perched groundwater in the upper portions of the Ancho watershed.

Perched-intermediate groundwater was encountered in Water Canyon, approximately 3500 ft northeast of MDA AB during the drilling of R-27 in 2005. The perched zone was detected at 628 ft bgs in the Puye Formation immediately above the Cerros del Rio basalt. Monitoring well R-27i was subsequently installed in September 2009 with a single screen to evaluate water quality and measure water levels in the perched zone.

Springs and seeps are known to occur in the lower reaches of Water and Ancho Canyons, far downgradient of TA-49 (near the Rio Grande), but none have been identified within the boundaries of TA-49 (LANL 2007, 098492; LANL 2007, 098523).

The top of the regional aquifer occurs at approximately 1154 ft bgs, based on groundwater levels in monitoring wells R-29 and R-30. The potentiometric surface of the regional aquifer beneath TA-49 lies completely within the Puye Formation and the Cerros del Rio basalt. Groundwater flow in the upper portion of the regional aquifer at TA-49 is generally eastward.

Contaminant Sources and Distributions

The primary contaminants at MDA AB and other disposal areas in TA-49 include tritium, radionuclides (plutonium-238, plutonium-239/240, americium-241, and cesium-137), arsenic, chromium, copper, lead, and perchlorate. Radionuclides have been detected in canyon sediments, but no elevated levels of contaminants have been detected in groundwater in the wells that compose the MDA AB monitoring group. Three decades of water-quality records from regional test wells in this area (DT-5A, DT-9, and DT-10) show no substantial changes in water chemistry or the presence of Laboratory contaminants in the regional aquifer. Perchlorate has been detected slightly above background in well R-27i.

7.3 Monitoring Objectives

The monitoring objectives for the MDA AB monitoring group are to characterize the groundwater beneath MDA AB and ultimately to support the MDA AB CME process. Regional aquifer wells R-29 and R-30 have been drilled immediately downgradient of MDA AB at TA-49. The older test wells, DT-5A, DT-9, and DT-10, have been plugged and abandoned because of their potential for producing nonrepresentative data associated with well casing and screen material and their long well screen intervals (617 ft, 681 ft, and 329.6 ft bgs, respectively); these wells have been replaced by wells R-29 and R-30.

7.4 Scope of Activities

Groundwater monitoring for MDA AB had historically been conducted primarily at the DT-series regional aquifer wells. Wells R-29 and R-30 have been incorporated into the monitoring network for MDA AB and are monitored annually to support the corrective action process for MDA AB.

Table 7.4-1 presents the sampling locations, analytical suites, and monitoring frequencies for the MDA AB monitoring group. The objectives for the sampling frequencies and analytical suites are presented in Table C-1. The specified analytical suites and frequencies are based on the results of applicable IRs, previous reviews of monitoring data, and direction from NMED as stated in its approval with modifications for the 2011 IFGMP, Revision 1 (LANL 2011, 208811; NMED 2012, 520410).

8.0 GENERAL SURVEILLANCE MONITORING GROUP

8.1 Overview

Monitoring locations not associated with project-specific monitoring groups are included in the General Surveillance monitoring group. This group includes most base-flow locations, alluvial monitoring wells, and springs, except for those assigned to the TA-16 260 monitoring group. The General Surveillance monitoring group also includes some wells completed in perched-intermediate zones or in the regional aquifer that are not associated with area-specific monitoring groups.

General Surveillance monitoring group locations are sited across the Pajarito Plateau in all the major watersheds. Some are upgradient of project-specific areas or are in areas where contamination was historically present but where concentrations have since decreased and are stable and below standards. General Surveillance monitoring locations for Los Alamos Canyon, Pueblo Canyon, Sandia Canyon, Mortandad Canyon, Pajarito Canyon, Water Canyon, and Ancho Canyon are shown in Figure 8.1-1. The locations for White Rock Canyon within the General Surveillance monitoring group are shown in Figure 8.1-2.

Most general surveillance locations are well characterized and have a long history of sampling data. Some locations show little or no contamination, while others show residual contamination from past operations or effluent releases. The residual contamination may be present in surface water, alluvial groundwater, and occasionally in perched-intermediate groundwater. In many cases, contaminant concentrations at these locations are fairly steady over time or decrease as a result of reductions in sources over the years.

8.2 Monitoring Objectives

The primary monitoring objectives for the General Surveillance monitoring group locations are to

- continue monitoring long-term water-quality trends;
- continue verifying decreasing contaminant trends at general surveillance locations in some watersheds (Los Alamos, Sandia, and Mortandad);
- monitor for potential impacts from ongoing operations under DOE requirements for environmental surveillance; and
- continue surveillance for potential Laboratory impacts to the groundwater, as expressed at the springs in White Rock Canyon.

8.3 Scope of Activities

The objectives can be met at all General Surveillance monitoring group locations through annual or biennial monitoring at the majority of locations, with a few exceptions. Well R-12 screen 1 shows reducing conditions, as indicated by low dissolved oxygen and will be monitored for low-level tritium only annually.

Annual monitoring for mobile contaminants is proposed for all White Rock Canyon springs to improve contaminant detection and monitoring coverage in White Rock Canyon. The exceptions are the biennial or triennial monitoring of HE at Upper La Mesita, Sacred, Lower Sandia, and Spring 2 groundwater springs as stipulated in Appendix A of the memorandum of understanding.

As of MY 2020, La Mesita Spring, Sandia Spring, and Spring 5A have been removed from the White Rock Canyon sampling campaign for various reasons. La Mesita Spring is now replaced with samples collected at Upper La Mesita because of decreasing flows at La Mesita Spring and their similar major ion chemistry. Sandia Spring and Spring 5A have both been dry for a long period of time, with the last sample collected at Sandia Spring in 2010 and the last sample collected at Spring 5A in 2012.

Table 8.3-1 presents sampling locations, analytical suites, and monitoring frequencies for the General Surveillance monitoring group. The objectives for the sampling frequencies and analytical suites are presented in Table C-1.

9.0 REFERENCES AND MAP DATA SOURCES

9.1 References

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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.

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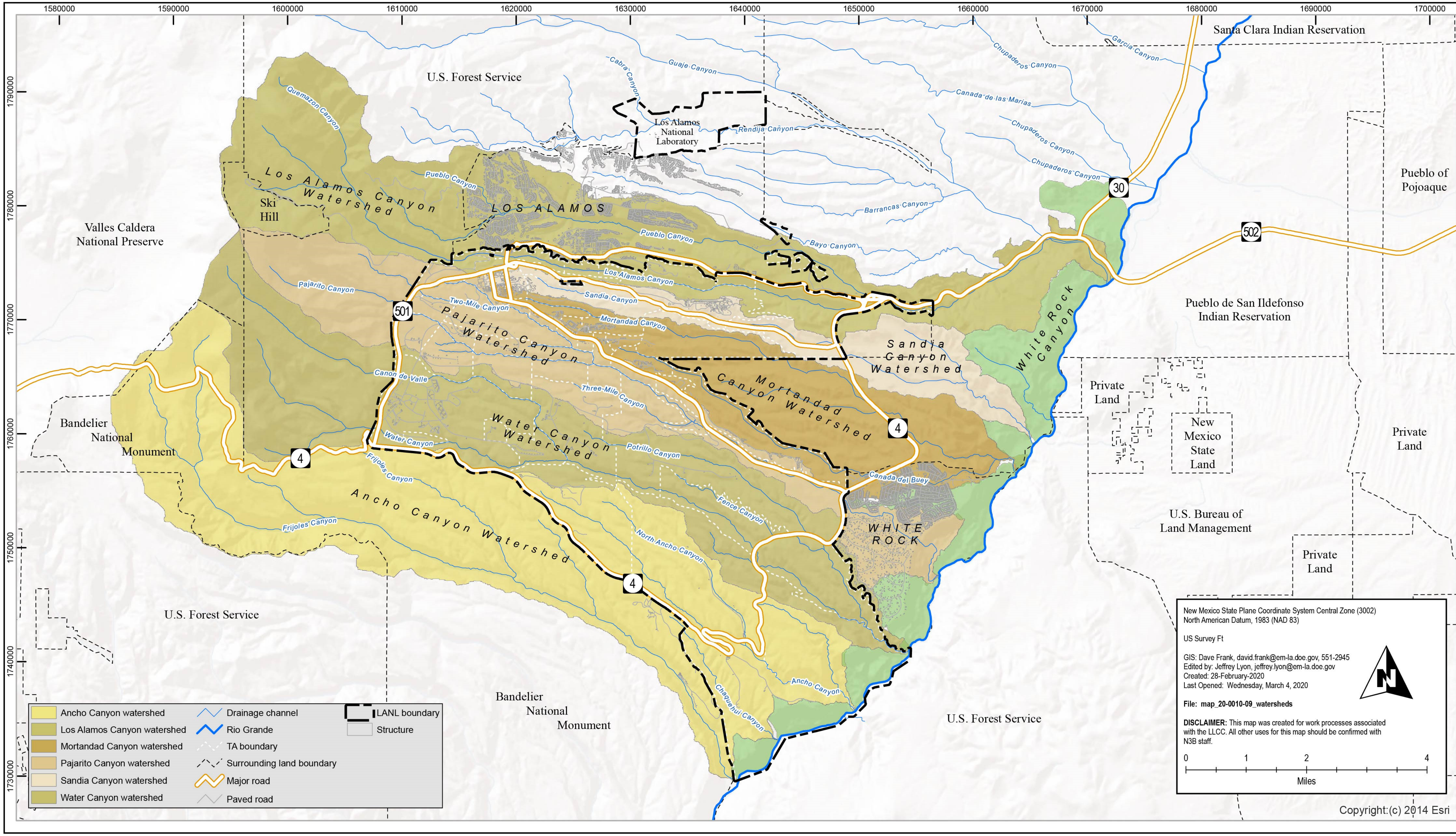

Figure 1.3-1 Watersheds at Los Alamos National Laboratory

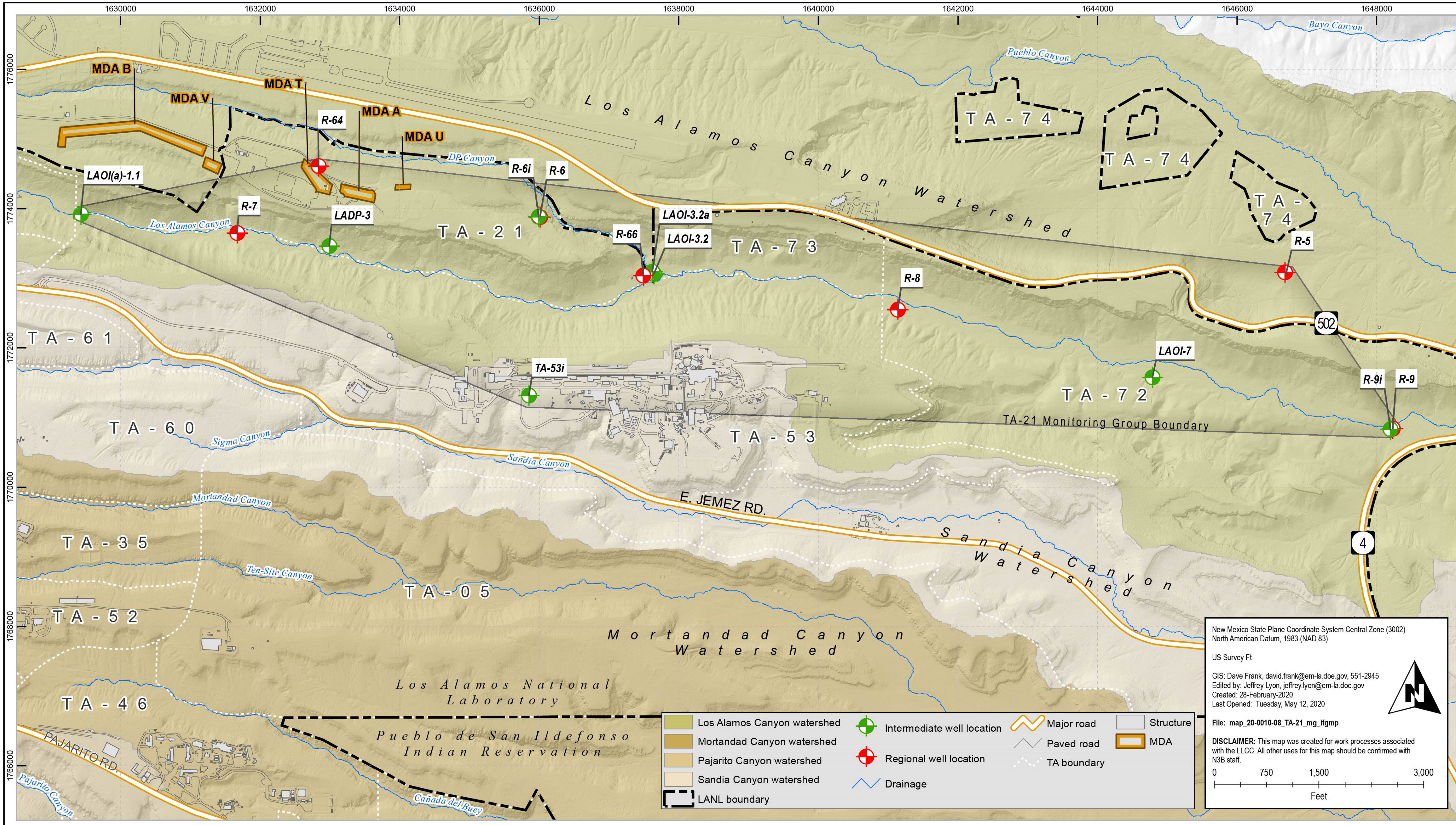

Figure 2.1-1 TA-21 monitoring group

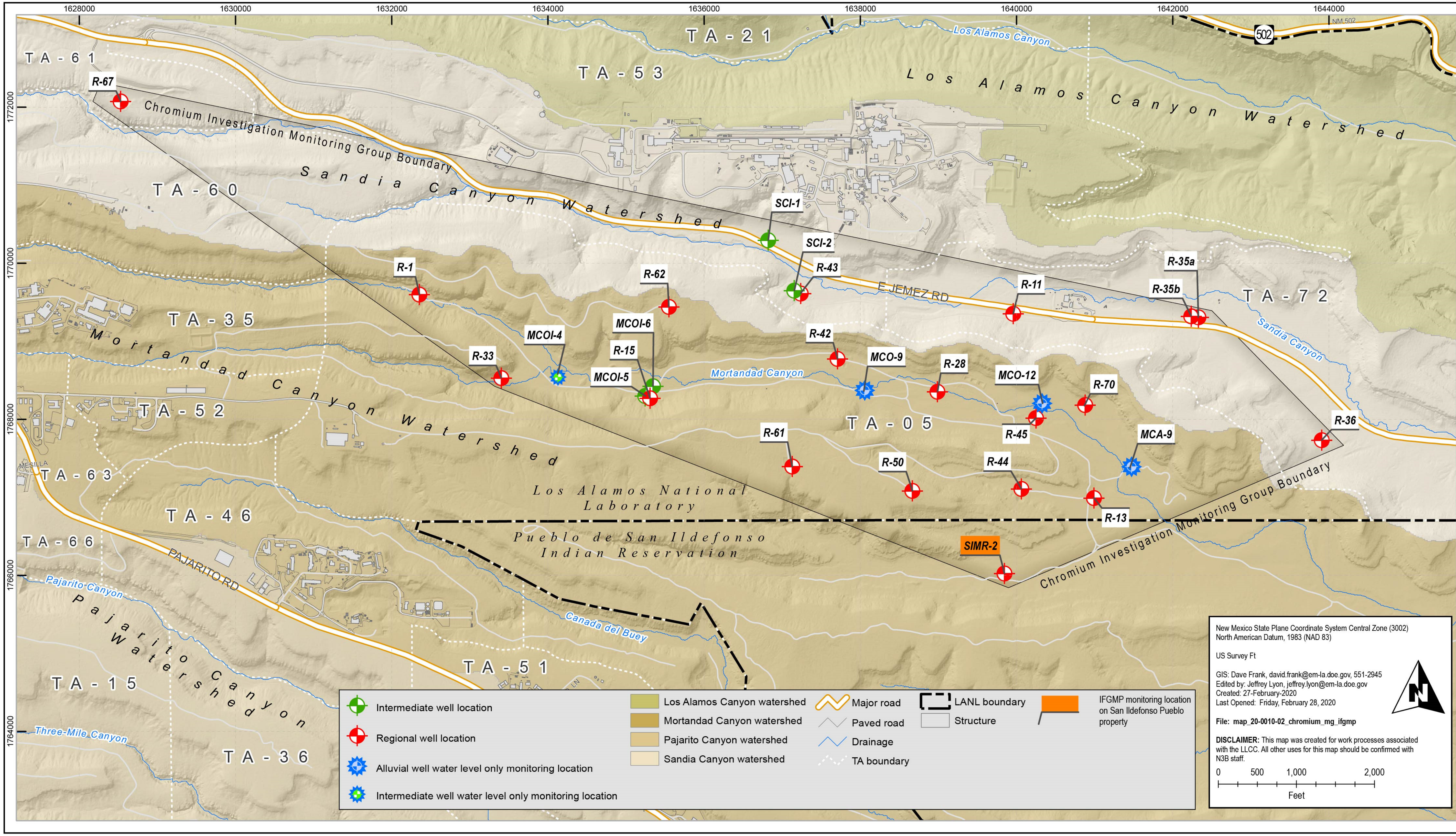

Figure 3.1-1 Chromium Investigation monitoring group

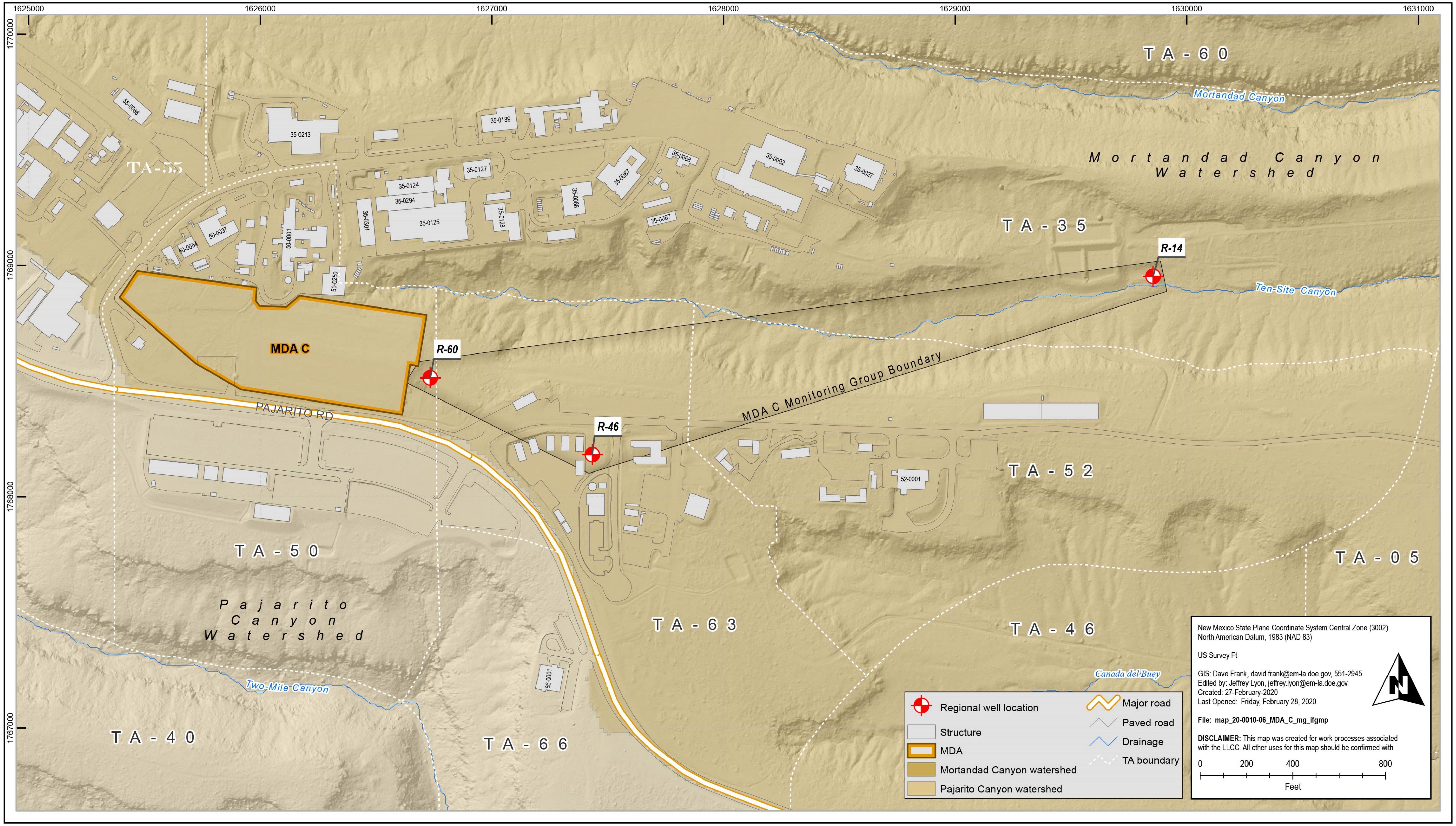

Figure 4.1-1 MDA C monitoring group

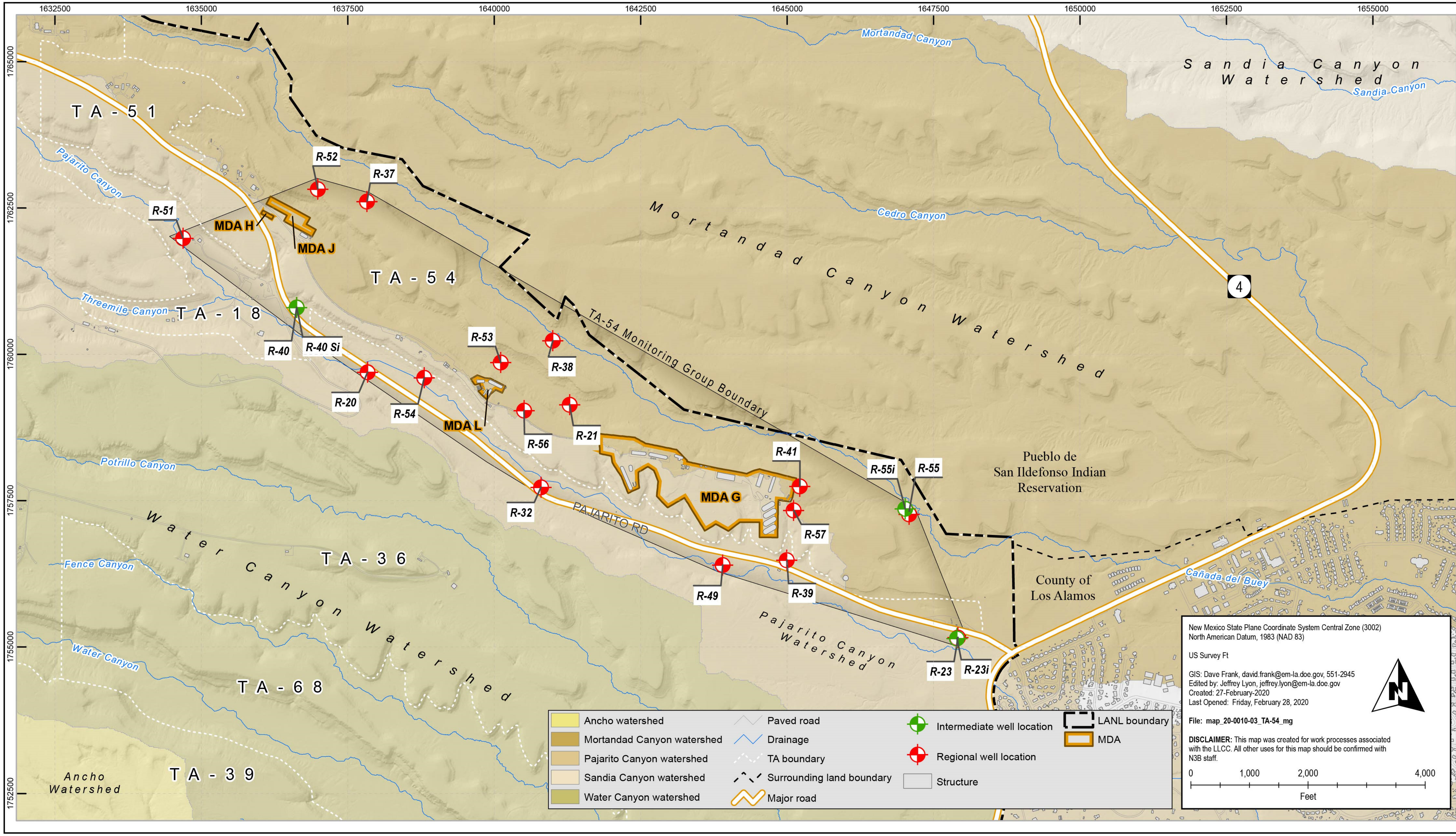

Figure 5.1-1 TA-54 monitoring group

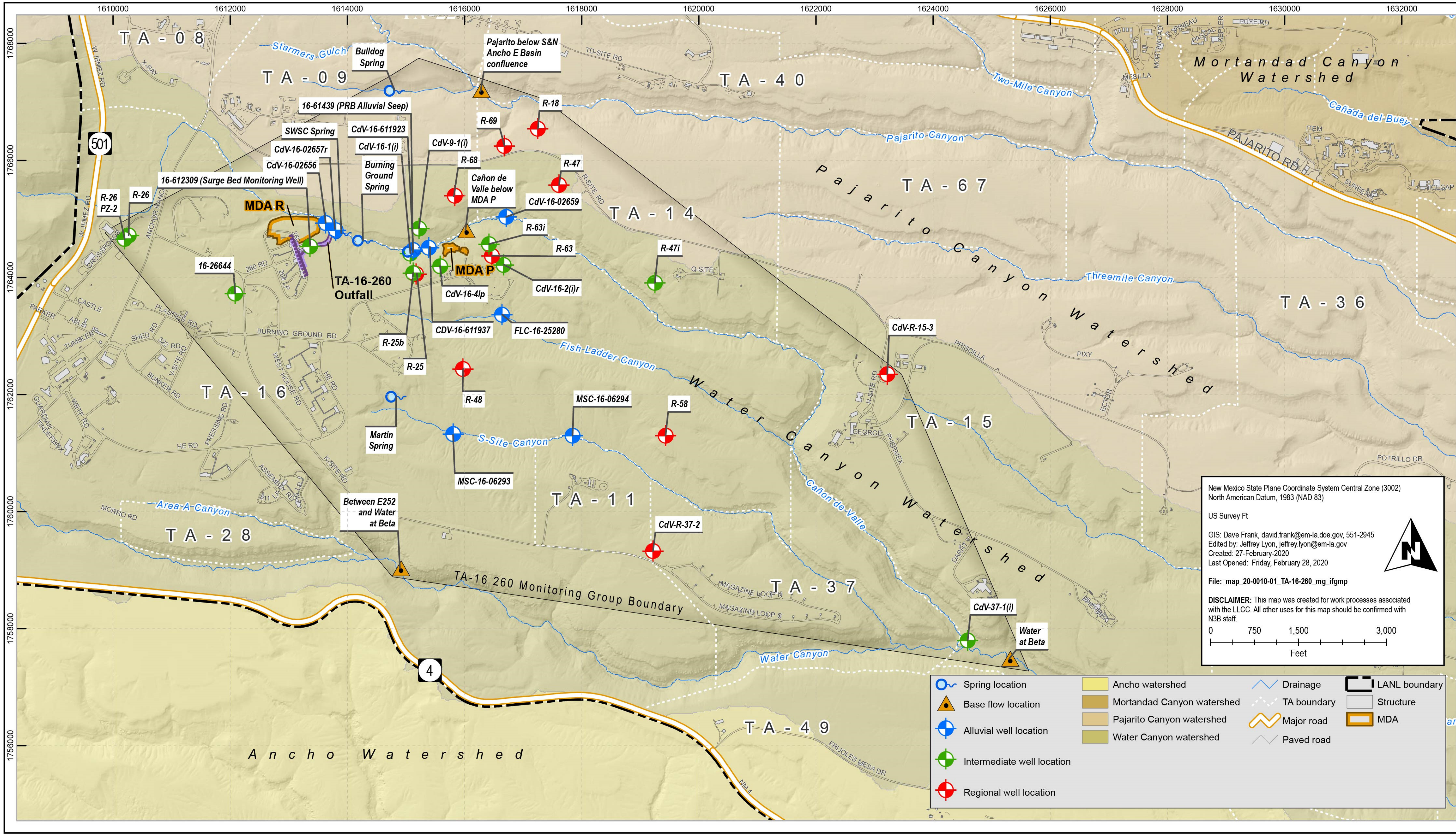

Figure 6.1-1 TA-16 260 monitoring group

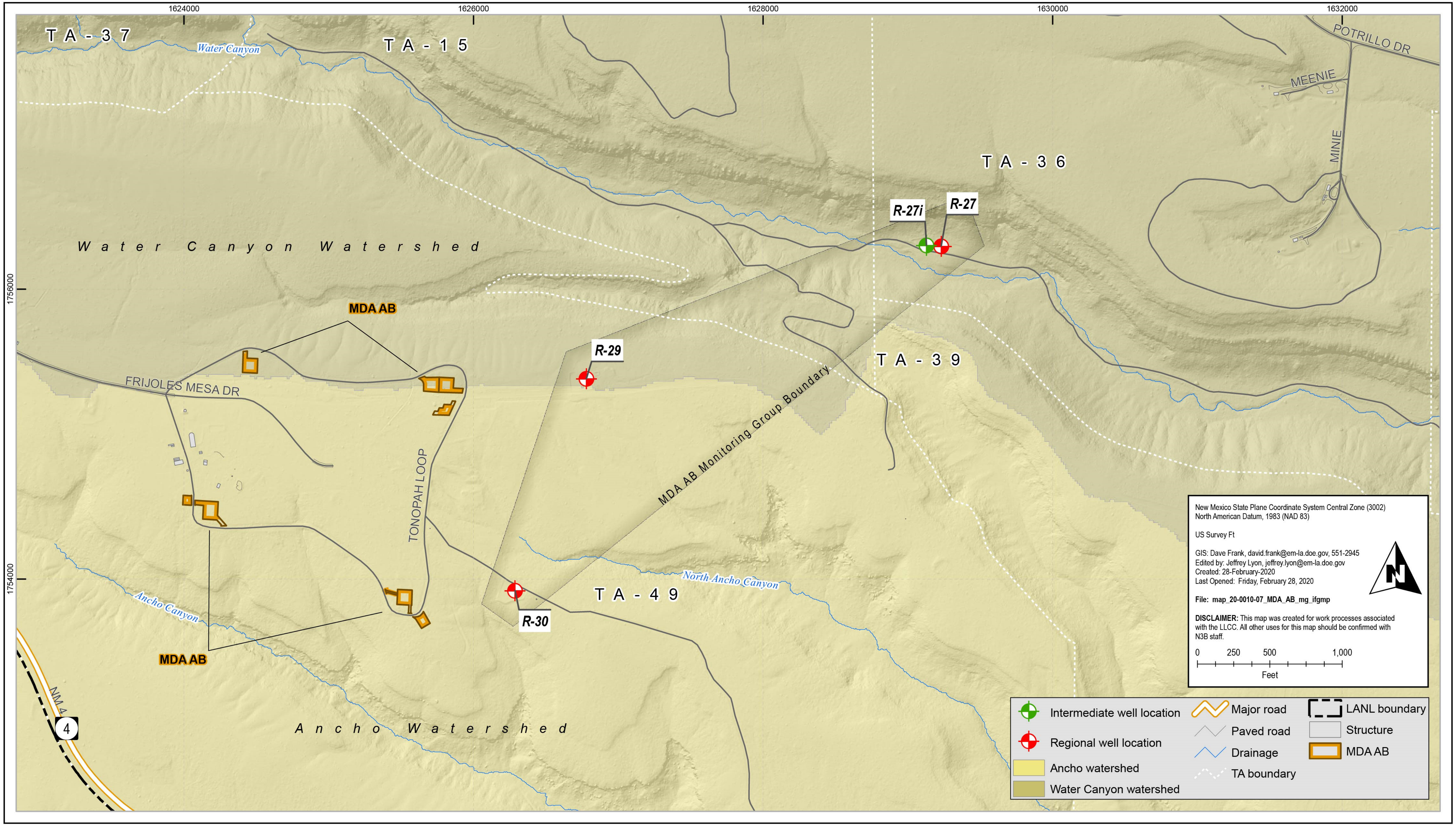

Figure 7.1-1 MDA AB monitoring group

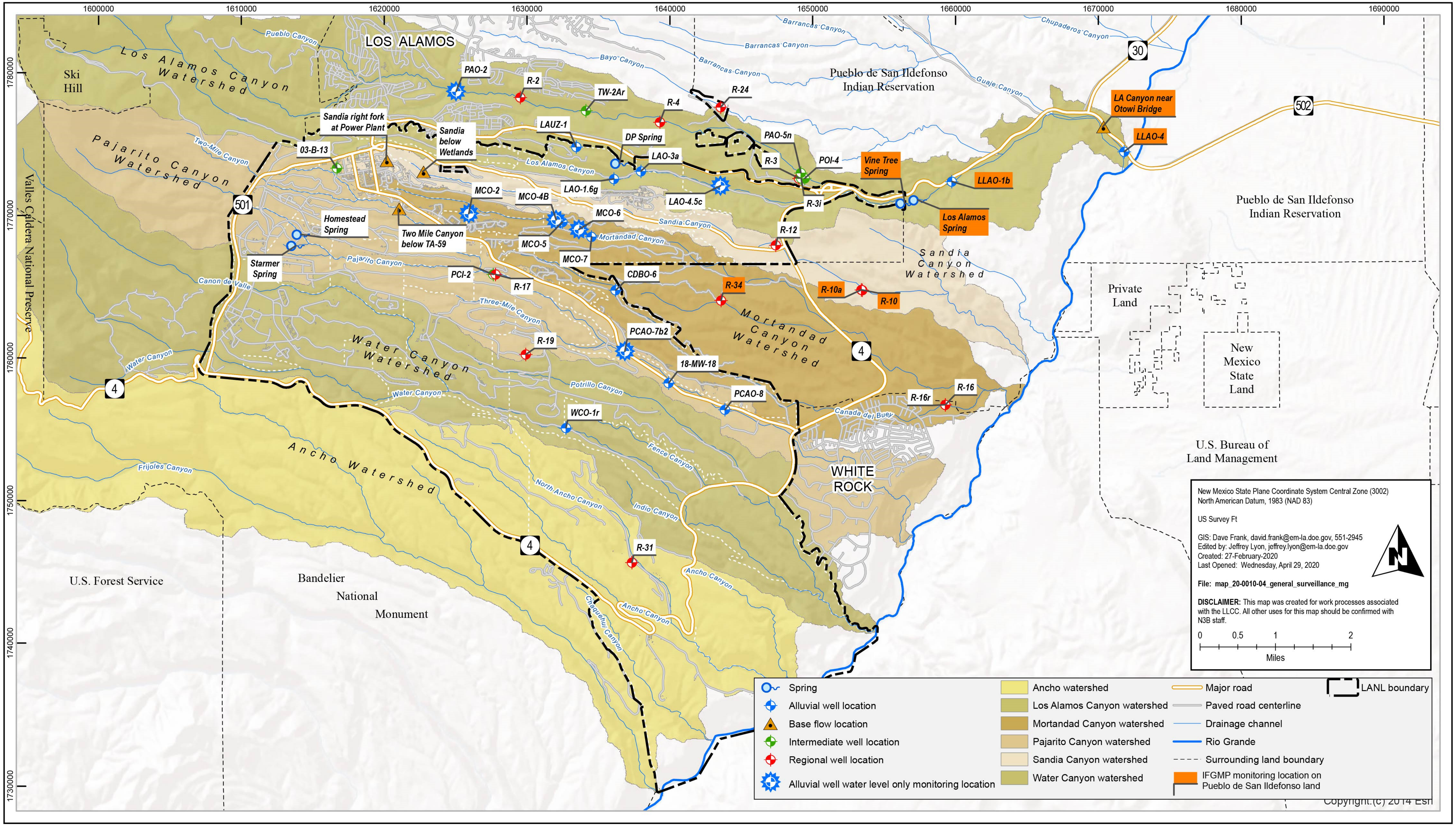

Figure 8.1-1 General Surveillance monitoring group (watersheds within the Laboratory)

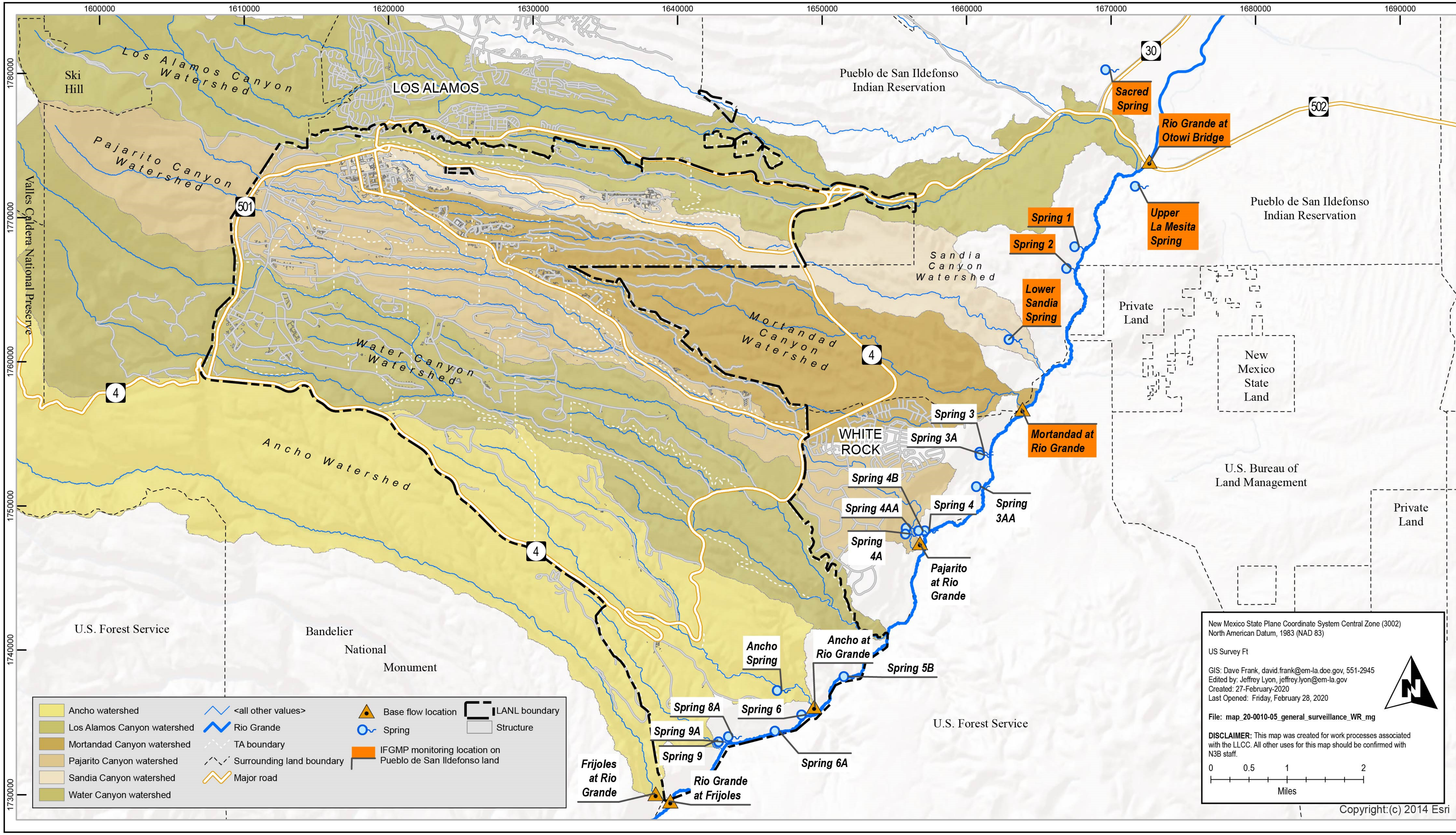

Figure 8.1-2 General Surveillance monitoring group (White Rock Canyon)

Table 1.4-1
Periodic Monitoring Report Submittal Schedule for MY 2021

Monitoring Group PMR	Quarterly Sampling Events Reported in PMR[a]	PMR Submittal Date
Watershed sampling events included in PMR		
General Surveillance		
• Los Alamos/Pueblo	MY 2020: Q1, Q3	November 30, 2020
• Mortandad/Sandia	MY 2019: Q4 MY 2020: Q1, Q3	
• Ancho/Water	MY 2019: Q4 MY 2020: Q2	
• White Rock Canyon	MY 2020: Q1, Q3	
• Pajarito	MY 2020: Q1, Q2, Q3	
• Ancho	MY 2020: Q1, Q2, Q3	
Base Flow[b]	MY 2020 Q1, Q2	November 30, 2020
TA-21	MY 2020:Q1, Q2, Q3, Q4	February 28, 2021
Chromium Investigation[c]	MY 2020: Q2, Q3, Q4 MY 2021: Q1	May 31, 2021
MDA C	MY 2021: Q1	May 31, 2021
TA-54	MY 2020: Q3 MY 2021: Q1	
TA-16 260[d]	MY 2020: Q3, Q4 MY 2021: Q1, Q2	August 30, 2021
MDA AB	MY 2020: Q4	August 30, 2021

Note: Orange shading indicates that the PMR must be sent to the Pueblo de San Ildefonso for review at least 60 days before release to the public.

[a] Q = Quarter.

[b] Includes base-flow locations from White Rock Canyon General Surveillance MY 2020 Q1 and Q4.

[c] Monthly chromium sampling results collected during MY 2020 will be reported in the "Semiannual Progress Report on Chromium Plume Control Interim Measure Performance."

[d] Base-flow data for the TA-16 260 monitoring group will be included in the MY 2022 Base Flow PMR.

Table 1.7-1
Sources for Standards and Screening Levels for Groundwater at Los Alamos National Laboratory

Standard Type	Standard Source	Description	Groundwater
New Mexico			
Standard	20 6.2.3103 NMAC NMWQCC groundwater standard	Groundwater Human Health Standards, other standards for domestic water supply and standards for irrigation use	X
Screening Level	NMED	Tap water screening levels[a]	X
EPA			
Standard	40 Code of Federal Regulations 141	EPA MCLs	X
Risk-Human	EPA Generic Screening Levels	EPA generic screening levels for tap water[b]	X
DOE			
Standard	DOE Order 458.1	DOE 100-mrem[c] public dose derived concentration technical standards	X
Standard	DOE Order 458.1	DOE 4-mrem drinking water derived concentration technical standards	X

[a] Screening levels derived from NMED guidance (NMED 2017, 602274; NMED 2019, 700550).

[b] EPA generic screening levels (http://www.epa.gov/risk/risk-based-screening-table-generic-tables).

[c] mrem = Millirem.

Table 1.7-2
Sources for Standards and Screening Levels for Surface Water at Los Alamos National Laboratory

Standard Type	Standard Source	Los Alamos Canyon near Otowi Bridge	Sandia Right Fork at Power Plant	Sandia below Wetlands	Two Mile Canyon Below TA-59	Ancho at Rio Grande	Frijoles at Rio Grande	Pajarito at Rio Grande	Rio Grande at Frijoles	Rio Grande at Otowi Bridge	Between E252 and Water at Beta	Cañon de Valle below MDA P	Pajarito below S&N Ancho Basin Confluence	Water at Beta
NMAC-NMWQCC														
Irrigation Standard	20 6.4.900.C NMAC	—[a]	—	—	—	—	X[b]	—	X	—	—	—	—	—
Livestock Watering Standard	20 6.4.900.F NMAC	X	X	X	X	X	X	X	X	X	X	X	X	X
Wildlife Habitat Standard	20 6.4.900.G NMAC	X	X	X	X	X	X	X	X	X	X	X	X	X
Aquatic Life Standards Acute	20 6.4.900.H NMAC	X	—	—	X	X	—	X	—	—	X[c, d]	—	X[c, d]	X[c, d]
Aquatic Life Standards Acute (hardness based)	20.6.4.900.I NMAC	X[c,d]	—	—	—	—	—	—	—	—	—	—	—	—
Aquatic Life Standards Chronic	20 6.4.900.H NMAC	—	X	X	—	—	X	—	X	X	—	X[c, d]	—	—
Aquatic Life Standards Chronic (hardness based)	—	—	X[c,d]		—	—	—	—	—	—	—	—	—	—
Aquatic Life Human Health Standard	20 6.4.900.H NMAC	X	X	X	—	—	X	X	X	X	X	X	X	X
Human health-organism only criteria apply only for persistent pollutants	20.6.4.900.J NMAC	—	—	—	X	X	—	—	—	—	—	—	—	—
Domestic Water Supply	20.6.4.900.B NMAC	—	—	—	—	—	X	—	X	—	—	—	—	—

Note: Hardness assignments are site and event specific

[a] — = Not applied to data screen.

[b] X = Applied to data screen.

[c] Hardness-dependent acute and chronic criteria were used for total recoverable aluminum and dissolved cadmium, chromium, copper, lead, manganese, nickel, silver, and zinc.

[d] Standard for dissolved chromium(VI) conservatively compared with results for dissolved chromium https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables.

Table 1.7-3
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-846:7470 series	Mercury
		SW-846:6020 series	Aluminum, selenium
	Filtered	SM:A2340	Hardness
		SW-846:6010 series	Barium, beryllium, boron, calcium, iron, magnesium, manganese, potassium, silicon dioxide, sodium, strontium, tin, vanadium, zinc
		SW-846:6020 series	Aluminum, antimony, arsenic, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, selenium, silver, thallium, uranium
		SW-846:7470 series	Mercury
VOCs[c]	Unfiltered	SW-846:8260 series	See Table B-4.1-1
SVOCs[d]	Unfiltered	SW-846:8270 series	See Table B-4.1-1, includes prometon (pesticide) and sulfolane (solvent)
Low-level 1,4-dioxane	Unfiltered	SW-846-8270E-SIM	1,4-dioxane
Low-level nitrosamines	Unfiltered	Proprietary HRGC/MS	Nitrosodiethylamine[N-], Nitrosodimethylamine[N-], Nitroso-di-n-butylamine[N-], Nitroso-di-n-propylamine[N-], Nitrosopyrrolidine[N-]
PCBs[e]	Unfiltered	SW-846:8082 series	See Table B-4.1-1
HEXP[f]	Unfiltered	SW-846:8330 series	See Table B-4.1-1
HEXMOD[g]	Unfiltered	SW-846:8330 series	See Table B-4.1-1

Table 1.7-3 (continued)

Analytical Suite	Field Preparation	Analytical Method	Analytes
PFAS[h]	Unfiltered	EPA 537.1 Modified	Perfluorohexane sulfonic acid (PFHxS), perfluorooctane sulfate (PFOS), perfluorooctanoic acid (PFOA)
Dioxins/Furans	Unfiltered	SW-846:8290 series	See Table B-4.1-1
Radionuclides	Unfiltered	EPA:900	Gross alpha, gross beta
		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
		EPA:903.1	Radium-226
		EPA:904	Radium-228
		Generic:radium by calculation	Radium-226+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
		SW-846:9056 series	Bromide, chloride, fluoride, sulfate
		EPA:310.1	Alkalinity-CO_3, alkalinity-CO_3+HCO_3
		SW-846:6850 series	Perchlorate
		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 series	Total organic carbon
		SW-846:9012 series	Cyanide (Total)

[a] The following metals suite field preparations apply to groundwater samples (i.e., alluvial, intermediate, regional, and springs): filtered metals and unfiltered mercury.

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

[c] VOCs = Volatile organic compounds.

[d] SVOCs = Semivolatile organic compounds.

[e] PCBs = Polychlorinated biphenyls.

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

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

[h] PFAS = Perfluorohexane sulfonic acid (PFHxS), perfluorooctanoic acid (PFOA), and perfluorooctane sulfate (PFOS)

Table 1.7-4
Analytes, Field Preparation, and Analytical Methods for Tracer Samples Collected under the IFGMP

Analytical Suite	Field Preparation	Analytical Method	Analytes
Naphthalene Sulfonate Tracers	Unfiltered	SW-846:8330 MOD	1-Naphthalene sulfonic acid
			2-Naphthalene sulfonic acid
			1,5-Naphthalene disulfonic acid
			1,6-Naphthalene disulfonic acid
			2,6-Naphthalene disulfonic acid
			2,7-Naphthalene disulfonic acid
			1,3,5-Naphthalene trisulfonic acid
			1,3,5-Naphthalene trisulfonic acid
Sodium Perrhenate Tracer	Unfiltered	EPA:200.8	Sodium Perrhenate ($NaReO_4$) (returned as rhenium)
Deuterated Water Tracer	Unfiltered	Generic: Deuterium Ratio	Deuterium Ratio
$^{15}N/^{18}O$ Isotopes in Nitrate	Unfiltered	Generic: Nitrogen and oxygen isotope ratios	Nitrogen-15/nitrogen-14 ratio and oxygen-18/oxygen-16 ratio from nitrate

Table 1.8-1
Sampling Schedule for MY 2021: October 1, 2020–September 30, 2021

Primary Watershed/ Monitoring Group	Sampling Table	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
		Oct–Dec 2020	Jan–Mar 2021	Apr–Jun 2021	Jul–Sep 2021
Pajarito Watershed					
TA-54	Table 5.4-1	A	—[a]	—	—
General Surveillance[b]	Table 8.3-1	S	—	S, A, B (2021)[c]	—
Mortandad and Sandia Canyons					
Chromium Investigation[b]	Table 3.4-1	M, Q, S, A	M, Q[d]	M, Q, S	M, Q
MDA C	Table 4.4-1	A	—	—	—
General Surveillance	Table 8.3-1	S, A[e], T (2021)	—	S	A, B (2021)
Los Alamos and Pueblo Canyons					
TA-21[b]	Table 2.4-1	—	—	—	A
General Surveillance	Table 8.3-1	S	—	S, A, T(2021)	—
Water/Cañon de Valle Watershed[f]					
TA-16 260	Table 6.4-1	Q	Q, S, A[g]	Q	Q, S
General Surveillance	Table 8.3-1	—	A	—	—
Ancho Watershed					
MDA AB	Table 7.4-1	—	—	—	A
General Surveillance[b]	Table 8.3-1	—	S, A	—	S
White Rock Canyon					
General Surveillance	Table 8.3-1	S, A, B(2021), T(2021)	—	S	—
Characterization					
All Watersheds	Characterization	Q	Q	Q	Q

Notes: Sampling frequencies: M = monthly (12 times/yr); Q = quarterly (4 times/yr); S = semiannual (2 times/yr); A = annual (1 time/yr); B = biennial (1 time/2 yr); T = triennial (1 time/3 yr).

[a] — = No samples are scheduled to be collected from this monitoring group during this period.

[b] Some wells in these monitoring groups are still undergoing characterization sampling. Refer to appropriate monitoring plan tables in this IFGMP for sample collection guidance.

[c] 2021 = Monitoring year that biennial and triennial samples are to be collected.

[d] An extended purge will be conducted at R-62 during the second quarter (January–March) of MY 2021.

[e] R-10 screen 1 (S1), R-10 screen 2 (S2), R-10a, R-34.

[f] Semiannual sampling events in the Water/Cañon de Valle watershed will be conducted in March and August, when possible, to improve the likelihood that water will be sufficient to collect samples from base-flow, springs, and alluvial well locations.

[g] An extended 12 casing volume (CV) purge will be conducted at CdV-R-37-2 S2.

Table 1.9-1
Frequencies for Locations Assigned to Groundwater-Level Monitoring Only

Assigned Monitoring Group	Location	Rationale for Selection of Location	Source Aquifer	Water Levela
Los Alamos/Pueblo Canyons Watershed				
General Surveillance	LAO-4.5c	Monitors location downcanyon below confluence of Los Alamos/DP Canyon.	Alluvial	C
	PAO-2	Monitors location in upper Pueblo Canyon.	Alluvial	C
Mortandad Canyon Watershed				
General Surveillance	MCO-2	Well monitors Effluent Canyon above the TA-50 outfall.	Alluvial	C
	MCO-4B	Well monitors upper part of Mortandad Canyon. Data will be used to assess the influence from reductions in discharge from the TA-50 RLWTF outfall.	Alluvial	C
	MCO-6	Well monitors upper part of Mortandad Canyon. Data will be used to assess the influence from reductions in discharge from the TA-50 RLWTF outfall.	Alluvial	C
Chromium Investigation Monitoring Group	MCA-9 MCO-9 MCO-12	Wells meet Discharge Permit 1793 requirement to monitor historically dry wells for verification that land application of waste water does not result in local saturation.	Alluvial	M
	MCOI-4	Well monitors upper Mortandad and Ten Site Canyons but no longer yields sufficient water for sampling.	Intermediate	C
	R-61 S2[b]	Water levels should be monitored to assess hydraulic responses from pumping at production wells PM-4 and PM-5 and at other Chromium Investigation monitoring group wells during aquifer testing.	Regional	C
TA-54 Monitoring Group	R-41 S1[c]	Well located east of MDA G at TA-54. Screen 1 has been dry since well installation (March 2009). Water level should be checked during sampling of R-41 S2.	Intermediate	Q^{HD}
Pajarito Canyon Watershed				
General Surveillance	PCAO-7b2	Well characterizes potential impacts from TA-18.	Alluvial	C
Water Canyon/Cañon de Valle Watershed				
TA-16 Monitoring Group	CdV-9-1(i) PZ-1 CdV-9-1(i) PZ-2	Intermediate well located north of Cañon de Valle. Completed on January 19, 2015.	Intermediate	C

[a] Sampling frequency: C = continuous; M = monthly (12 times/yr at set time periods); Q = quarterly (4 times/yr); The superscript HD indicates this sampling location is historically dry. Continuous monitoring for groundwater refers to the collection of groundwater-level measurements by a transducer placed in a well and programmed to collect groundwater-level measurements at highly frequent intervals (e.g., every 60 or 120 min daily throughout the year).

[b] S2 = Screen 2.

[c] S1 = Screen 1.

Table 1.11-1
Prioritized Sampling Suites by Monitoring Group

Monitoring Group	Watershed	Sampling Ordera
TA-21	Los Alamos/Pueblo Canyons	1. Tritium or low-level tritium
		2. PFAS
		3. Metals
		4. General Inorganics
		5. SVOCs (R-6i, LAOI-3.2, LAOI-3.2a)
Chromium Investigation	Sandia Canyon	1. Metals
		2. General Inorganics
		3. PFAS
		4. VOCs
		5. SVOCs
	Mortandad Canyon[b, c]	1. Metals
		2. General Inorganics
		3. PFAS
		4. SVOCs
		5. Tritium or low-level tritium
		6. VOCs
MDA C	Mortandad Canyon	1.HEXP
		2. VOCs
		3. PFAS
		4. Low-level tritium
		5. Metals
		6. General Inorganics
TA-54	Mortandad/Pajarito Canyons[d]	1. VOCs
		2. PFAS
		3. Metals
		4. SVOCs
		5. General Inorganics
		6. Radionuclides
		7. PCBs
		8. Dioxins/Furans
TA-16 260	Pajarito/Water Canyons[e]	1. HEXMOD
		2. PFAS
		3. VOCs
		4. Metals
		5. General Inorganics
		6. Low-level tritium

Table 1.11-1 (continued)

Monitoring Group	Watershed	Sampling Order
MDA AB	Ancho Canyon	1. HEXP
		2. PFAS
		3. General Inorganics
		4. Metals
		5. VOCs
		6. SVOCs
	Water Canyon	1. General Inorganics
		2. PFAS
		3. Metals
		4. VOCs
		5. SVOCs
General Surveillance	Los Alamos/Pueblo Canyons	1. Tritium or low-level tritium
		2.PFAS
		3. Metals
		4. General Inorganics
		5. Radionuclides (Alluvial wells)
	Sandia Canyon	1. Metals
		2. General Inorganics
		3. PFAS
		4. VOCs
		5. SVOCs
	Mortandad Canyon	1. Metals
		2. General Inorganics
		3. PFAS
		4. SVOCs
		5. VOCs
		6. Low-level tritium
	Pajarito Canyon	1. HEXP
		2. VOCs
		3. PFAS
		4. Tritium or low-level tritium
		5. Metals
		6. General Inorganics
	Water/Ancho Canyons	1. HEXP
		2. PFAS
		3. General Inorganics
		4. Metals
		5. VOCs
		6. SVOCs

Table 1.11-1 (continued)

Monitoring Group	Watershed	Sampling Order
General Surveillance	White Rock Canyon	1. Metals
		2. General Inorganics
		3. PFAS
		4. VOCs
		5. HEXP
		6. Low-level tritium

Note: If a listed prioritized analyte is not being sampled, proceed to the next sampled analyte.

[a] PFAS = Perfluorohexane sulfonic acid (PFHxS), perfluorooctanoic acid (PFOA), and perfluorooctane sulfate (PFOS); SVOCs= semivolatile organic compounds; VOCs = volatile organic compounds; HEXP = analytical suite for analysis of samples for high explosives by SW-846:8330 series; PCBs = pPolychlorinated biphenyls; HEXMOD = analytical suite for analysis of samples for high explosives and RDX-(hexahydro-1,3,5-trinitro-1,3,5-triazine) degradation products by SW-846:8330 series.

[b] Prioritized Suite for MCOI-5: (1) perchlorate, (2) PFAS, (3) metals, and (4) additional general inorganics.

[c] Prioritized Suite for MCOI-6: (1) metals, (2) PFAS, (3) SVOCs, (4) General Inorganics, and (5) tritium.

[d] Prioritized Suite for R-40 S1: (1) PFAS, (2) low-level tritium, and (3) VOCs.

[e] Prioritized Suite for R-26 PZ-2: (1) VOCs, (2) PFAS, (3) HEXMOD, (4) metals, (5) general inorganics, and (6) low-level tritium.

Table 2.4-1
Interim Monitoring Plan for TA-21 Monitoring Group

Location	Watershed	Monitoring Group	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics
LADP-3	Los Alamos	TA-21	Intermediate	A	B (2022)[f]	B (2022)	B (2022)	B (2022)	A	—[g]	—	—	A	—	B (2022)	A
LAOI(a)-1.1	Los Alamos	TA-21	Intermediate	A	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	B (2022)	A
LAOI-3.2	Los Alamos	TA-21	Intermediate	A	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	A	A	—	A
LAOI-3.2a	Los Alamos	TA-21	Intermediate	A	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	A	A	—	A
LAOI-7	Los Alamos	TA-21	Intermediate	A	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	A	A	—	A
R-6i	Los Alamos	TA-21	Intermediate	A	A	B (2022)	B (2022)	B (2022)	A	—	—	—	A	A	—	A
TA-53i	Los Alamos	TA-21	Intermediate	A	A	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	A	A
R-9i S1[h, i]	Los Alamos	TA-21	Intermediate	A	A	A	A	A	A	A	A	A	A	—	A	A
R-5 S2[h, j]	Pueblo	TA-21	Intermediate	A	A	A	A	A	A	A	A	A	A	—	A	A
R-6**[k]	Los Alamos	TA-21	Regional	A	A	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	A	A
R-7 S3[h, l]	Los Alamos	TA-21	Regional	A	A	A	A	A	A	A	A	A	A	—	A	A
R-8 S1[h]	Los Alamos	TA-21	Regional	A	A	A	A	A	A	A	A	A	A	—	A	A
R-8 S2[h]	Los Alamos	TA-21	Regional	A	A	A	A	A	A	A	A	A	A	—	A	A
R-64	Los Alamos	TA-21	Regional	A	A	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	A	A
R-66	Los Alamos	TA-21	Regional	A	A	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	A	A
R-9	Los Alamos	TA-21	Regional	A	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	A	A

Notes: Sampling suites and frequencies: A = annual (1 time/yr); B = biennial (1 time/2 yr).

[a] VOCs = Volatile organic compounds.

[b] SVOCs = Semivolatile organic compounds. New toxic pollutants prometon (6-methoxy-1,3,5-triazine-2,4-diamine) and sulfolane (thiolane-1,1-dioxide) are sampled as part of this suite.

[c] PFAS = Perfluorohexane sulfonic acid (PFHxS), perfluorooctanoic acid (PFOA), and perfluorooctane sulfate (PFOS). No additional PFAS sampling will be performed after MY 2021 unless a NMWQCC regulatory standard has been exceeded.

[d] PCBs = Polychlorinated biphenyls.

[e] HEXP = Analytical suite for analysis of samples for high explosives by SW-846:8330 series.

[f] 2022 = Samples scheduled to be collected during implementation of MY 2022 IFGMP.

[g] — = This analytical suite is not scheduled to be collected for this type of water at locations assigned to this monitoring group.

[h] Converted Westbay well. Propose reducing sampling frequency to annual at the completion of first four quarterly rounds of sampling pending review of data. See Table H-1 MY 2020 of this IFGMP for sampling suites prior to completion of first four rounds of sampling.

[i] S1 = Screen 1.

[j] S2 = Screen 2.

[k] Double asterisks (**) indicate background monitoring location as specified in the Groundwater Background Investigation Report, Revision 5 (LANL 2016, 601920).

[l] S3 = Screen 3.

Table 3.4-1
Interim Monitoring Plan for Chromium Investigation Monitoring Group

Location	Watershed	Monitoring Group	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Naphthalene Sulfonate Tracers	Sodium Perrhenate Tracer	Deuterated Water Tracer
MCOI-5[f]	Mortandad	Chromium Investigation	Intermediate	Q	—[g]	—	—	—	A	—	—	—	—	—	—	Q	—	—	—
MCOI-6	Mortandad	Chromium Investigation	Intermediate	Q	S	S	S	S	A	B (2022)[h]	—	—	A	A	—	Q	—	—	—
SCI-1	Sandia	Chromium Investigation	Intermediate	S	B (2022)	B (2022)	B (2022)	B (2022)	A	B (2022)	—	—	A	—	A	S	—	—	—
SCI-2	Sandia	Chromium Investigation	Intermediate	Q	B (2022)	B (2022)	B (2022)	B (2022)	A	B (2022)	—	—	A	A	—	Q	—	—	—
R-1	Mortandad	Chromium Investigation	Regional	S	B (2022)	B (2022)	B (2022)	B (2022)	A	B (2022)	—	—	B (2022)	—	A	S	—	—	—
R-11	Sandia	Chromium Investigation	Regional	M	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	S	M	M	M	M
R-13**[i]	Mortandad	Chromium Investigation	Regional	Q	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	A	Q	—	—	—
R-15	Mortandad	Chromium Investigation	Regional	Q	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	B (2022)	Q	—	—	—
R-28[j]	Mortandad	Chromium Investigation	Regional	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
R-33 S1**[k]	Mortandad	Chromium Investigation	Regional	Q	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	A	Q	—	—	—
R-33 S2**[l]	Mortandad	Chromium Investigation	Regional	Q	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	A	Q	—	—	—
R-35a	Sandia	Chromium Investigation	Regional	M	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	S	M	M	M	M
R-35b	Sandia	Chromium Investigation	Regional	M	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	S	M	M	M	M
R-36	Sandia	Chromium Investigation	Regional	Q	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	S	Q	—	—	—
R-42[j]	Mortandad	Chromium Investigation	Regional	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
R-43 S1	Sandia	Chromium Investigation	Regional	Q	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	S	Q	—	—	—
R-43 S2	Sandia	Chromium Investigation	Regional	Q	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	S	Q	—	—	—
R-44 S1	Mortandad	Chromium Investigation	Regional	M	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	Q	M	M	M	—
R-44 S2	Mortandad	Chromium Investigation	Regional	M	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	Q	M	M	M	—
R-45 S1	Mortandad	Chromium Investigation	Regional	M	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	Q	M	M	M	M
R-45 S2	Mortandad	Chromium Investigation	Regional	M	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	Q	M	M	M	M
R-50 S1	Mortandad	Chromium Investigation	Regional	M	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	Q	M	M	—	—
R-50 S2**	Mortandad	Chromium Investigation	Regional	M	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	Q	M	M	—	—
R-61 S1	Mortandad	Chromium Investigation	Regional	M	—	—	—	—	A	—	—	—	—	—	Q	M	—	—	—
R-62[m]	Mortandad	Chromium Investigation	Regional	Q	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	Q	Q	—	—	—
R-67	Sandia	Chromium Investigation	Regional	Q	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	S	Q	—	—	—

Table 3.4-1 (continued)

Location	Watershed	Monitoring Group	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Naphthalene Sulfonate Tracers	Sodium Perrhenate Tracer	Deuterated Water Tracer
R-70 S1[n]	Mortandad	Chromium Investigation	Regional	M	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	Q	M	M	M	M
R-70 S2[n]	Mortandad	Chromium Investigation	Regional	M	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	Q	M	M	M	M
SIMR-2[o]	Mortandad	Chromium Investigation	Regional	M	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	B (2022)	—	S	M	M	—	—

Notes: Sampling suites and frequencies: M = monthly (12 times/yr); Q = quarterly (4 times/yr); S = semiannual (2 times/yr); A = annual (1 time/yr); B = biennial (1 time/2 yr).

[a] VOCs = Volatile organic compounds.

[b] SVOCs = Semivolatile organic compounds. New toxic pollutants prometon (6-methoxy-1,3,5-triazine-2,4-diamine) and sulfolane (thiolane-1,1-dioxide) are sampled as part of this suite.

[c] PFAS = Perfluorohexane sulfonic acid (PFHxS), perfluorooctanoic acid (PFOA), and perfluorooctane sulfate (PFOS). No additional PFAS sampling will be performed after MY 2021 unless a NMWQCC regulatory standard has been exceeded.

[d] PCBs = Polychlorinated biphenyls.

[e] HEXP = Analytical suite for analysis of samples for high explosives by SW-846:8330 series.

[f] MCOI-5 will be monitored for water levels and if sufficient recharge occurs allowing water level to rise to 3.5 ft. above the bottom of the screen (6124.2 ft. amsl) a prioritized suite consisting of perchlorate, PFAs, metals, and additional general inorganics will be collected.

[g] — = This analytical suite is not scheduled to be collected for this type of water at locations assigned to this monitoring group.

[h] 2022 = Samples scheduled to be collected during implementation of MY 2022 IFGMP.

[i] Double asterisks (**) indicate background monitoring location as specified in the Groundwater Background Investigation Report, Revision 5 (LANL 2016, 601920).

[j] Gray shading indicates wells that are included in the pilot amendments test and will be sampled per the NMED-approved work plan.

[k] S1 = Screen 1.

[l] S2 = Screen 2.

[m] Conduct an extended purge at R-62 during the second quarter (January–March) of MY 2021. Collect time-series samples at the following purge volumes: 3 CV, 6 CV, 9 CV, 12 CV, 15 CV, 18 CV and 21 CV. Time-series samples shall be collected for the following analytical suites: Metals and General Inorganics, and coded as "W" and "Test". Regular IFGMP samples are to be collected after a minimum of 3 CVs have been purged and stable field parameters are achieved.

[n] Propose reducing sampling frequency to match R-45 at the completion of first four quarterly rounds of sampling pending review of data. See Table H-2 MY 2020 of this IFGMP for sampling suites prior to completion of first four rounds of sampling.

[o] Orange shading indicates sampling location is on Pueblo de San Ildefonso land.

Table 4.4-1
Interim Monitoring Plan for MDA C Monitoring Group

Location	Watershed	Monitoring Group	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics
R-14 S1**[f, g]	Mortandad	MDA C	Regional	A	A	B (2022)[h]	B (2022)	B (2022)	A	B (2022)	A	—[i]	B (2022)	—	A	A
R-46**	Mortandad	MDA C	Regional	A	A	B (2022)	B (2022)	B (2022)	A	B (2022)	A	—	B (2022)	—	A	A
R-60**	Mortandad	MDA C	Regional	A	A	B (2022)	B (2022)	B (2022)	A	B (2022)	A	—	A	—	A	A

Notes: Sampling suites and frequencies: A = annual (1 time/yr); B = biennial (1 time/2 yr).
[a] VOCs = Volatile organic compounds.
[b] SVOCs = Semivolatile organic compounds. New toxic pollutants prometon (6-methoxy-1,3,5-triazine-2,4-diamine) and sulfolane (thiolane-1,1-dioxide) are sampled as part of this suite.
[c] PFAS = Perfluorohexane sulfonic acid (PFHxS), perfluorooctanoic acid (PFOA), and perfluorooctane sulfate (PFOS). No additional PFAS sampling will be performed after MY 2021 unless a NMWQCC regulatory standard has been exceeded.
[d] PCBs = Polychlorinated biphenyls.
[e] HEXP = Analytical suite for analysis of samples for high explosives by SW-846:8330 series.
[f] Double asterisks (**) indicate background monitoring location as specified in the Groundwater Background Investigation Report, Revision 5 (LANL 2016, 601920).
[g] S1 = Screen 1.
[h] 2022 = Samples scheduled to be collected during implementation of MY 2022 IFGMP.
[i] — = This analytical suite is not scheduled to be collected for this type of water at locations assigned to this monitoring group.

Table 5.4-1
Interim Monitoring Plan for TA-54 Monitoring Group

Location	Watershed	Monitoring Group	Surface Water Body or Source Aquifer	Metals	VOCsa	SVOCsb	Low-Level 1,4-dioxane	Low-Level Nitrosamines	PFASc	PCBsd	HEXPe	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics
R-23i S1[f]	Pajarito	TA-54	Intermediate	A	A	A	A	A	A	V (2025)[g]	V (2025)	—[h]	A	—	A	A
R-23i S2[i]	Pajarito	TA-54	Intermediate	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-23i S3[j]	Pajarito	TA-54	Intermediate	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-37 S1	Mortandad	TA-54	Intermediate	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-40 Si	Pajarito	TA-54	Intermediate	A	—	—	—	—	A	—	—	—	—	—	A	A
R-40 S1	Pajarito	TA-54	Intermediate	A	A	—	—	—	A	—	—	—	—	—	A	A
R-55i	Mortandad	TA-54	Intermediate	—	—	—	—	—	A	—	—	—	—	—	A	—
R-20 S1	Pajarito	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-20 S2	Pajarito	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-21**[k]	Mortandad	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-23	Pajarito	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A

Table 5.4-1 (continued)

Location	Watershed	Monitoring Group	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics
R-32 S1	Pajarito	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-37 S2**	Mortandad	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-38**	Mortandad	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-39**	Pajarito	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-40 S2**	Pajarito	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-41 S2	Pajarito	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-49 S1**	Pajarito	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-49 S2**	Pajarito	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-51 S1**	Pajarito	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-51 S2**	Pajarito	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-52 S1**	Pajarito	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-52 S2**	Pajarito	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-53 S1**	Pajarito	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-53 S2**	Pajarito	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-54 S1	Pajarito	TA-54	Regional	—	—	—	—	—	A	—	—	—	—	—	A	—
R-54 S2**	Pajarito	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-55 S1	Mortandad	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-55 S2	Mortandad	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-56 S1**	Pajarito	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-56 S2**	Pajarito	TA-54	Regional	A	A	A	A	A	A	V (2025)	V (2025)	—	A	—	A	A
R-57 S1**[l]	Pajarito	TA-54	Regional	A	A	A	A	A	A	A	V (2025)	A	A	—	A	A
R-57 S2**[l]	Pajarito	TA-54	Regional	A	A	A	A	A	A	A	V (2025)	A	A	—	A	A

Notes: Sampling suites and frequencies: A = annual (1 time/yr); V = quinquennial (1 time/5 yr).

[a] VOCs = Volatile organic compounds.

[b] SVOCs = Semivolatile organic compounds. New toxic pollutants prometon (6-methoxy-1,3,5-triazine-2,4-diamine) and sulfolane (thiolane-1,1-dioxide) are sampled as part of this suite.

[c] PFAS = Perfluorohexane sulfonic acid (PFHxS), perfluorooctane sulfate (PFOS), and perfluorooctanoic acid (PFOA). No additional PFAS sampling will be performed after MY 2021 unless a NMWQCC regulatory standard has been exceeded.

[d] PCBs = Polychlorinated biphenyls.

[e] HEXP = Analytical suite for analysis of samples for high explosives by SW-846:8330 series.

[f] S1 = Screen 1.

[g] 2025 = Samples scheduled to be collected during implementation of MY 2025 IFGMP.

[h] — = This analytical suite is not scheduled to be collected for this type of water at locations assigned to this monitoring group.

[i] S2 = Screen 2.

[j] S3 = Screen 3.

[k] Double asterisks (**) indicate background monitoring location as specified in the Groundwater Background Investigation Report, Revision 5 (LANL 2016, 601920).

[l] The IFGMP sampling and analysis specified for R-57 S1 and R-57 S2 for analysis of VOCs, SVOCs, and PCBs also satisfies the TA-54 Area G PCB compliance monitoring requirements.

Table 6.4-1
Interim Monitoring Plan for TA-16 260 Monitoring Group

Location	Watershed	Monitoring Group	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXMOD[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Naphthalene Sulfonate Tracers	15N/18O Isotopes in Nitrate
Cañon de Valle below MDA P[f]	Water	TA-16 260	Base flow	S	S	B (2022)[g]	B (2022)	B (2022)	A	V (2025)[h]	S	V (2025)	B (2022)	—[i]	—	S	—	—
Between E252 and Water at Beta	Water	TA-16 260	Base flow	S	S	B (2022)	B (2022)	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—
Water at Beta	Water	TA-16 260	Base flow	S	S	B (2022)	B (2022)	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—
Pajarito below S&N Ancho E Basin Confluence	Pajarito	TA-16 260	Base flow	S	S	B (2022)	B (2022)	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—
Bulldog Spring	Pajarito	TA-16 260	Spring	S	S	B (2022)	B (2022)	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	A
SWSC Spring	Water	TA-16 260	Spring	S	S	B (2022)	B (2022)	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	A
Burning Ground Spring	Water	TA-16 260	Spring	S	S	B (2022)	B (2022)	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	A	S	—	A
Martin Spring	Water	TA-16 260	Spring	S	S	B (2022)	B (2022)	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	A	S	—	A
16-61439 (alias: PRB Alluvial Seep)	Water	TA-16 260	Spring	S	S	B (2022)	B (2022)	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—
FLC-16-25280	Water	TA-16 260	Alluvial	S	S	B (2022)	B (2022)	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—
CdV-16-02656	Water	TA-16 260	Alluvial	S	S	B (2022)	B (2022)	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—
CdV-16-02657r	Water	TA-16 260	Alluvial	S	S	B (2022)	B (2022)	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—
CdV-16-02659	Water	TA-16 260	Alluvial	S	S	B (2022)	B (2022)	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—
CdV-16-611923	Water	TA-16 260	Alluvial	S	S	B (2022)	B (2022)	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—
MSC-16-06293	Water	TA-16 260	Alluvial	S	S	B (2022)	B (2022)	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—
MSC-16-06294	Water	TA-16 260	Alluvial	S	S	B (2022)	B (2022)	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—
CdV-16-611937	Water	TA-16 260	Alluvial	S	S	B (2022)	B (2022)	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—
16-26644	Water	TA-16 260	Intermediate	S	S	B (2022)	B (2022)	B (2022)	A	—	Q	—	B (2022)	—	A	S	—	A
CdV-9-1(i) S1[j]	Water	TA-16 260	Intermediate	S	S	B (2022)	B (2022)	B (2022)	A	V (2025)	Q	A	B (2022)	—	A	S	Q	A
CdV-16-1(i)	Water	TA-16 260	Intermediate	S	S	B (2022)	B (2022)	B (2022)	A	—	Q	—	B (2022)	—	A	S	Q	A
CdV-16-2(i)r	Water	TA-16 260	Intermediate	S	S	B (2022)	B (2022)	B (2022)	A	—	Q	—	B (2022)	—	A	S	Q	A
CdV-16-4ip S1	Water	TA-16 260	Intermediate	S	S	B (2022)	B (2022)	B (2022)	A	V (2025)	Q	V (2025)	B (2022)	—	A	S	Q	A
CdV-37-1(i)**[k]	Water	TA-16 260	Intermediate	S	S	B (2022)	B (2022)	B (2022)	A	—	S	—	B (2022)	—	A	S	—	—
R-25b	Water	TA-16 260	Intermediate	S	S	B (2022)	B (2022)	B (2022)	A	—	S	—	B (2022)	—	A	S	S	—
R-26 PZ-2	Water	TA-16 260	Intermediate	S	S	B (2022)	B (2022)	B (2022)	A	—	S	—	B (2022)	—	A	S	—	—
R-26 S1**	Water	TA-16 260	Intermediate	S	S	B (2022)	B (2022)	B (2022)	A	—	S	—	B (2022)	—	A	S	—	—
R-47i**	Water	TA-16 260	Intermediate	S	S	B (2022)	B (2022)	B (2022)	A	—	Q	—	B (2022)	—	A	S	Q	A
R-63i	Water	TA-16 260	Intermediate	S	S	—	—	—	A	—	S	—	A	—	A	S	S	A

Table 6.4-1 (continued)

Location	Watershed	Monitoring Group	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXMOD[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Naphthalene Sulfonate Tracers	15N/18O Isotopes in Nitrate
16-612309 (alias: Surge Bed Monitoring Well)	Water	TA-16 260	Intermediate	S	S	S	S	S	A	—	S	—	—	—	—	S	—	—
R-47**	Water	TA-16 260	Regional	S	S	B (2022)	B (2022)	B (2022)	A	V (2025)	Q	V (2025)	B (2022)	—	A	S	Q	A
CdV-R-15-3 S4[l]	Water	TA-16 260	Regional	S	S	B (2022)	B (2022)	B (2022)	A	—	S	—	B (2022)	—	A	S	—	—
CdV-R-37-2 S2[m, n]	Water	TA-16 260	Regional	A	—	—	—	—	A	—	A	—	—	—	A	A	—	—
R-18	Pajarito	TA-16 260	Regional	S	S	B (2022)	B (2022)	B (2022)	A	—	Q	—	B (2022)	—	A	S	Q	A
R-48**	Water	TA-16 260	Regional	S	S	B (2022)	B (2022)	B (2022)	A	—	Q	—	B (2022)	—	A	S	Q	A
R-58	Water	TA-16 260	Regional	S	S	B (2022)	B (2022)	B (2022)	A	V (2025)	Q	V (2025)	B (2022)	—	A	S	Q	A
R-63	Water	TA-16 260	Regional	S	S	B (2022)	B (2022)	B (2022)	A	—	Q	—	B (2022)	—	A	S	Q	—
R-68	Water	TA-16 260	Regional	S	S	S	S	S	A	—	Q	—	B (2022)	—	A	S	Q	A
R-69 S1	Water	TA-16 260	Regional	S	S	S	S	S	A	—	Q	—	S	—	S	S	Q	Q
R-69 S2	Water	TA-16 260	Regional	S	S	S	S	S	A	—	Q	—	S	—	S	S	Q	Q

Notes: Sampling suites and frequencies: Q = quarterly (4 times/yr); S = semiannual (2 times/yr); A = annual (1 time/yr); B = biennial (1 time/2 yr); V = quinquennial (1 time/5 yr).

[a] VOCs = Volatile organic compounds.

[b] SVOCs = Semivolatile organic compounds. New toxic pollutants prometon (6-methoxy-1,3,5-triazine-2,4-diamine) and sulfolane (thiolane-1,1-dioxide) are sampled as part of this suite.

[c] PFAS = Perfluorohexane sulfonic acid (PFHxS), perfluorooctane sulfate (PFOS), and perfluorooctanoic acid (PFOA). No additional PFAS sampling will be performed after MY 2021 unless a NMWQCC regulatory standard has been exceeded.

[d] PCBs = Polychlorinated biphenyls.

[e] HEXMOD = Analytical suite for analysis of samples for high explosives and RDX-(hexahydro-1,3,5-trinitro-1,3,5-triazine) degradation products by SW-846:8330 series.

[f] Blue shading indicates a long-term monitoring locations per Appendix A of the Remedy Completion Report for Corrective Measures Implementation at Consolidated Unit 16-021 (c)-99.

[g] 2022 = Samples scheduled to be collected during implementation of MY 2022 IFGMP.

[h] 2025 = Samples scheduled to be collected during implementation of MY 2025 IFGMP.

[i] — = This analytical suite is not scheduled to be collected for this type of water at locations assigned to this monitoring group.

[j] S1 = Screen 1.

[k] Double asterisks (**) indicate background monitoring location as specified in the Groundwater Background Investigation Report, Revision 5 (LANL 2016, 601920).

[l] S4 = Screen 4

[m] CdV-R-37-2 S2 will be sampled following an extended 12 CV purge regardless of stability. This well will be sampled in accordance to Appendix E recommendations that samples are coded as "W" and "Test" for all analytes except for low-level tritium.

[n] S2 = Screen 2.

Table 7.4-1
Interim Monitoring Plan for MDA AB Monitoring Group

Location	Watershed	Monitoring Group	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics
R-27i**[f]	Water	MDA AB	Intermediate	A	A	B (2022)[g]	B (2022)	B (2022)	A	—	—[h]	—	A	—	A	A
R-27**	Water	MDA AB	Regional	A	A	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	A	A
R-29	Ancho	MDA AB	Regional	A	A	B (2022)	B (2022)	B (2022)	A	—	A	—	A	—	A	A
R-30**	Ancho	MDA AB	Regional	A	A	B (2022)	B (2022)	B (2022)	A	—	A	—	A	—	A	A

Notes: Sampling suites and frequencies: A = annual (1 time/yr); B = biennial (1 time/2 yr).

[a] VOCs = Volatile organic compounds.

[b] SVOCs = Semivolatile organic compounds. New toxic pollutants prometon (6-methoxy-1,3,5-triazine-2,4-diamine) and sulfolane (thiolane-1,1-dioxide) are sampled as part of this suite.

[c] PFAS = Perfluorohexane sulfonic acid (PFHxS), perfluorooctane sulfate (PFOS), and perfluorooctanoic acid (PFOA). No additional PFAS sampling will be performed after MY 2021 unless a NMWQCC regulatory standard has been exceeded.

[d] PCBs = Polychlorinated biphenyls.

[e] HEXP = Analytical suite for analysis of samples for high explosives by SW-846:8330 series.

[f] Double asterisks (**) indicate background monitoring location as specified in the Groundwater Background Investigation Report, Revision 5 (LANL 2016, 601920).

[g] 2022 = Samples scheduled to be collected during implementation of MY 2022 IFGMP.

[h] — = This analytical suite is not scheduled to be collected for this type of water at locations assigned to this monitoring group.

Table 8.3-1
Interim Monitoring Plan for General Surveillance Monitoring Group

Location	Watershed	Monitoring Group	Surface Water Body or Source Aquifer	Metals	VOCsa	SVOCsb	Low-Level 1,4-dioxane	Low-Level Nitrosamines	PFASc	PCBsd	HEXPe	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics
LA Canyon near Otowi Bridge[f]	Los Alamos	General Surveillance	Base flow	S	S	S	S	S	A	V (2025)[g]	T (2021)[h]	V (2025)	S	—[i]	S	S
DP Spring	Los Alamos	General Surveillance	Spring	A	A	B (2022)[j]	B (2022)	B (2022)	A	—	A	—	A	—	A	A
Los Alamos Spring	Los Alamos	General Surveillance	Spring	A	A	T (2021)	T (2021)	T (2021)	A	T (2021)	T (2021)	V (2025)	A	—	A	A
Vine Tree Spring	Los Alamos	General Surveillance	Spring	A	A	T (2021)	T (2021)	T (2021)	A	T (2021)	T (2021)	V (2025)	A	—	A	A
LLAO-1b	Los Alamos	General Surveillance	Alluvial	A	A	T (2021)	T (2021)	T (2021)	A	T (2021)	T (2021)	V (2025)	A	—	—	A
LLAO-4	Los Alamos	General Surveillance	Alluvial	A	A	T (2021)	T (2021)	T (2021)	A	T (2021)	T (2021)	V (2025)	A	—	—	A
LAO-1.6g	Los Alamos	General Surveillance	Alluvial	A	A	B (2022)	B (2022)	B (2022)	A	—	A	—	A	—	A	A
LAO-3a	Los Alamos	General Surveillance	Alluvial	A	B (2022)	B (2022)	B (2022)	B (2022)	A	V (2025)	—	V (2025)	A	—	—	A
LAUZ-1	Los Alamos	General Surveillance	Alluvial	A	A	B (2022)	B (2022)	B (2022)	A	—	A	—	A	—	A	A

Table 8.3-1 (continued)

Location	Watershed	Monitoring Group	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics
PAO-5n	Pueblo	General Surveillance	Alluvial	A	B (2022)	B (2022)	B (2022)	B (2022)	A	V (2025)	—	V (2025)	A	—	—	A
POI-4	Pueblo	General Surveillance	Intermediate	A	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	B (2022)	A
R-3i	Pueblo	General Surveillance	Intermediate	A	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	B (2022)	A
TW-2Ar	Pueblo	General Surveillance	Intermediate	A	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	A	B (2022)	—	A
R-2**[k]	Pueblo	General Surveillance	Regional	A	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	A	A
R-24	Pueblo	General Surveillance	Regional	A	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	B (2022)	A
R-3	Pueblo	General Surveillance	Regional	A	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	B (2022)	A
R-4	Pueblo	General Surveillance	Regional	A	A	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	B (2022)	A
Sandia Right Fork at Pwr Plant	Sandia	General Surveillance	Base flow	A	A	B (2022)	B (2022)	B (2022)	A	A	V (2025)	V (2025)	A	—	—	A
Sandia below Wetlands	Sandia	General Surveillance	Base flow	A	A	B (2022)	B (2022)	B (2022)	A	A	V (2025)	V (2025)	A	—	—	A
R-12 S1[l]	Sandia	General Surveillance	Intermediate	—	—	—	—	—	A	—	—	—	—	—	B (2021)	—
R-12 S2[m]	Sandia	General Surveillance	Intermediate	A	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	A	A
R-10 S1	Sandia	General Surveillance	Regional	A	A	B (2022)	B (2022)	B (2022)	A	T (2021)	T (2021)	—	A	—	A	A
R-10 S2	Sandia	General Surveillance	Regional	A	A	B (2022)	B (2022)	B (2022)	A	T (2021)	T (2021)	—	A	—	A	A
R-10a	Sandia	General Surveillance	Regional	S	S	B (2022)	B (2022)	B (2022)	A	T (2021)	T (2021)	—	S	—	S	S
CDBO-6	Mortandad	General Surveillance	Alluvial	B (2022)	B (2022)	B (2022)	B (2022)	B (2022)	A	V (2025)	—	V (2025)	A	—	—	B (2022)
MCO-5	Mortandad	General Surveillance	Alluvial	A	B (2022)	B (2022)	B (2022)	B (2022)	A	V (2025)	—	V (2025)	A	—	A	A
MCO-7	Mortandad	General Surveillance	Alluvial	A	A	B (2022)	B (2022)	B (2022)	A	A	—	V (2025)	A	—	A	A
R-16 S2	Mortandad	General Surveillance	Regional	A	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	A	A
R-16 S4[n]	Mortandad	General Surveillance	Regional	A	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	A	A
R-16r**	Mortandad	General Surveillance	Regional	A	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	A	A
R-34	Mortandad	General Surveillance	Regional	A	A	B (2022)	B (2022)	B (2022)	A	T (2021)	T (2021)	—	A	—	A	A
Two Mile Canyon Below TA-59	Pajarito	General Surveillance	Base flow	A	A	B (2022)	B (2022)	B (2022)	A	V (2025)	A	V (2025)	A	—	—	A
Homestead Spring	Pajarito	General Surveillance	Spring	A	A	B (2022)	B (2022)	B (2022)	A	—	A	—	A	—	A	A
Starmer Spring	Pajarito	General Surveillance	Spring	A	A	B (2022)	B (2022)	B (2022)	A	—	A	—	A	—	A	A
18-MW-18	Pajarito	General Surveillance	Alluvial	A	B (2021)	B (2021)	B (2021)	B (2021)	A	V (2025)	V (2025)	V (2025)	A	—	B (2021)	A
PCAO-8	Pajarito	General Surveillance	Alluvial	A	B (2021)	B (2021)	B (2021)	B (2021)	A	V (2025)	V (2025)	V (2025)	A	—	—	A
03-B-13	Pajarito	General Surveillance	Intermediate	A	A	A	A	A	A	—	V (2025)	—	A	B (2021)	—	A
PCI-2**	Pajarito	General Surveillance	Intermediate	A	A	A	A	A	A	—	A	—	A	—	A	A
R-19 S2[o]	Pajarito	General Surveillance	Intermediate	A	A	A	A	A	A	A	S	A	A	—	A	A
R-17 S1**	Pajarito	General Surveillance	Regional	A	A	B (2022)	B (2022)	B (2022)	A	—	S	—	A	—	A	A
R-17 S2**	Pajarito	General Surveillance	Regional	A	A	B (2022)	B (2022)	B (2022)	A	—	S	—	A	—	A	A
R-19 S3[o, p]	Pajarito	General Surveillance	Regional	A	A	A	A	A	A	A	S	A	A	—	A	A

Table 8.3-1 (continued)

Location	Watershed	Monitoring Group	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics
WCO-1r	Water	General Surveillance	Alluvial	A	B (2022)	B (2022)	B (2022)	B (2022)	A	V (2025)	A	V (2025)	A	—	A	A
R-31 S3[o]	Ancho	General Surveillance	Regional	S	A	A	A	A	A	A	S	A	A	—	A	S
R-31 S4[o]	Ancho	General Surveillance	Regional	S	A	A	A	A	A	A	S	A	A	—	A	S
Ancho at Rio Grande	White Rock Canyon	General Surveillance	Base flow	A	B (2021)	B (2021)	B (2021)	B (2021)	A	B (2021)	B (2021)	B (2021)	B (2021)	—	—	A
Frijoles at Rio Grande	White Rock Canyon	General Surveillance	Base flow	A	B (2021)	B (2021)	B (2021)	B (2021)	A	B (2021)	B (2021)	B (2021)	B (2021)	—	—	A
Mortandad at Rio Grande	White Rock Canyon	General Surveillance	Base flow	A	B (2022)	B (2022)	B (2022)	B (2022)	A	B (2022)	B (2022)	B (2022)	B (2022)	—	—	A
Pajarito at Rio Grande	White Rock Canyon	General Surveillance	Base flow	A	B (2021)	B (2021)	B (2021)	B (2021)	A	B (2021)	B (2021)	B (2021)	B (2021)	—	—	A
Rio Grande at Frijoles	White Rock Canyon	General Surveillance	Base flow	A	B (2021)	B (2021)	B (2021)	B (2021)	A	B (2021)	B (2021)	B (2021)	B (2021)	—	—	A
Rio Grande at Otowi Bridge	White Rock Canyon	General Surveillance	Base flow	S	A	B (2022)	B (2022)	B (2022)	A	A	—	A	A	—	A	S
Ancho Spring**	White Rock Canyon	General Surveillance	Spring	A	A	B (2022)	B (2022)	B (2022)	A	—	A	—	A	—	A	A
Upper La Mesita Spring	White Rock Canyon	General Surveillance	Spring	A	A	B (2022)	B (2022)	B (2022)	A	T (2021)	T (2021)	—	A	—	A	A
Sacred Spring	White Rock Canyon	General Surveillance	Spring	A	A	B (2022)	B (2022)	B (2022)	A	T (2021)	T (2021)	—	A	—	A	A
Lower Sandia Spring	White Rock Canyon	General Surveillance	Spring	A	A	B (2022)	B (2022)	B (2022)	A	B (2022)	B (2022)	—	A	—	A	A
Spring 1	White Rock Canyon	General Surveillance	Spring	A	A	B (2022)	B (2022)	B (2022)	A	A	A	—	A	—	A	A
Spring 2	White Rock Canyon	General Surveillance	Spring	A	A	B (2022)	B (2022)	B (2022)	A	B (2022)	B (2022)	—	A	—	A	A
Spring 3[q]	White Rock Canyon	General Surveillance	Spring	A	A	B (2021)	B (2021)	B (2021)	A	B (2021)	A	B (2021)	A	—	B (2021)	A
Spring 3A	White Rock Canyon	General Surveillance	Spring	A	A	B (2021)	B (2021)	B (2021)	A	—	A	—	A	—	A	A
Spring 3AA**	White Rock Canyon	General Surveillance	Spring	A	A	B (2021)	B (2021)	B (2021)	A	—	A	—	A	—	A	A
Spring 4[q]	White Rock Canyon	General Surveillance	Spring	A	A	B (2021)	B (2021)	B (2021)	A	A	A	A	A	—	B (2021)	A
Spring 4A	White Rock Canyon	General Surveillance	Spring	A	A	B (2021)	B (2021)	B (2021)	A	—	A	—	A	—	A	A
Spring 4AA	White Rock Canyon	General Surveillance	Spring	A	A	B (2021)	B (2021)	B (2021)	A	—	A	—	A	—	A	A
Spring 4B	White Rock Canyon	General Surveillance	Spring	A	A	B (2021)	B (2021)	B (2021)	A	—	A	—	A	—	B (2021)	A
Spring 5	White Rock Canyon	General Surveillance	Spring	A	A	B (2021)	B (2021)	B (2021)	A	—	A	—	A	—	A	A
Spring 5B	White Rock Canyon	General Surveillance	Spring	A	A	B (2021)	B (2021)	B (2021)	A	—	A	—	A	—	A	A
Spring 6**	White Rock Canyon	General Surveillance	Spring	A	A	B (2021)	B (2021)	B (2021)	A	—	A	—	A	—	B (2021)	A

Table 8.3-1 (continued)

Location	Watershed	Monitoring Group	Surface Water Body or Source Aquifer	Metals	VOCsa	SVOCsb	Low-Level 1,4-dioxane	Low-Level Nitrosamines	PFASc	PCBsd	HEXPe	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics
Spring 6A**	White Rock Canyon	General Surveillance	Spring	A	A	B (2021)	B (2021)	B (2021)	A	—	A	—	A	—	A	A
Spring 8A**	White Rock Canyon	General Surveillance	Spring	A	A	B (2021)	B (2021)	B (2021)	A	—	A	—	A	—	A	A
Spring 9**	White Rock Canyon	General Surveillance	Spring	A	A	B (2021)	B (2021)	B (2021)	A	—	A	—	A	—	B (2021)	A
Spring 9A**	White Rock Canyon	General Surveillance	Spring	A	A	B (2021)	B (2021)	B (2021)	A	—	A	—	A	—	A	A

Notes: Sampling suites and frequencies: S = semiannual (2 times/yr); A = annual (1 time/yr); B = biennial (1 time/2 yr); T = triennial (1 time/3 yr); V = quinquennial (1 time/5 yr)

[a] VOCs = Volatile organic compounds.

[b] SVOCs = Semivolatile organic compounds. New toxic pollutants prometon (6-methoxy-1,3,5-triazine-2,4-diamine) and sulfolane (thiolane-1,1-dioxide) are sampled as part of this suite.

[c] PFAS = Perfluorohexane sulfonic acid (PFHxS), perfluorooctane sulfate (PFOS), and perfluorooctanoic acid (PFOA). No additional PFAS sampling will be performed after MY 2021 unless a NMWQCC regulatory standard has been exceeded.

[d] PCBs = Polychlorinated biphenyls.

[e] HEXP = Analytical suite for analysis of samples for high explosives by SW-846:8330 series.

[f] Orange shading indicates a sampling location is on Pueblo de San Ildefonso land.

[g] 2025 = Samples scheduled to be collected during implementation of MY 2025 IFGMP.

[h] 2021 = Samples scheduled to be collected during implementation of MY 2021 IFGMP.

[i] — = This analytical suite is not scheduled to be collected for this type of water at locations assigned to this monitoring group.

[j] 2022 = Samples scheduled to be collected during implementation of MY 2022 IFGMP.

[k] Double asterisks (**) indicate background monitoring location as specified in the Groundwater Background Investigation Report, Revision 5 (LANL 2016, 601920).

[l] S1 = Screen 1.

[m] S2 = Screen 2.

[n] S4 = Screen 4.

[o] Converted Westbay well. Propose reducing sampling frequency at the completion of first four quarterly rounds of sampling pending data review. See Table H-7 MY 2020 of this IFGMP for sampling suites before completion of first four rounds of sampling.

[p] S3 = Screen 3.

[q] Springs 3 and 4 are backup locations for primary TA-54 Area G PCB compliance monitoring locations R-57 S1 and R-57 S2. The VOC, SVOC, and PCB sampling and analysis plan will be modified as necessary for Springs 3 and 4 in the event that all specified samples from R-57 S1 and/or R-57 S2 cannot be collected.

Appendix A

Acronyms and Abbreviations,
Metric Conversion Table, and Data Qualifier Definitions

A-1.0 ACRONYMS AND ABBREVIATIONS

AK	acceptable knowledge
amsl	above mean sea level
AOC	area of concern
bgs	below ground surface
CAS	Chemical Abstract Service
CME	corrective measures evaluation
Consent Order	Compliance Order on Consent
CV	casing volume
D/F	dioxins/furans
DO	dissolved oxygen
DOE	Department of Energy (U.S.)
EM	Office of Environmental Management (DOE)
EPA	Environmental Protection Agency (U.S.)
EQB	equipment rinsate blank
F	filtered
FB	field blank
FD	field duplicate
FTB	field trip blank
FS	field split
GFM	geologic framework model
HE	high explosives
HEXMOD	analytical suite for high explosives and RDX degradation products
HEXP	analytical suite for high explosives
HMX	Her Majesty's Explosive
IDW	investigation-derived waste
IFGMP	Interim Facility-Wide Groundwater Monitoring Plan
IM	interim measure
IR	investigation report
Laboratory	Los Alamos National Laboratory
LANL	Los Alamos National Laboratory
MCL	maximum contaminant level
MDA	material disposal area

MDL	method detection limit
meq	milliequivalent
MTBE	methyl tert-butyl ether
MY	monitoring year
N3B	Newport News Nuclear BWXT-Los Alamos, LLC
NIST	National Institute of Standards and Technology
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMWQCC	New Mexico Water Quality Control Commission
NOI	notice of intent
NPDES	National Pollutant Discharge Elimination System
NTU	nephelometric turbidity unit
ORP	oxidation-reduction potential
PFAS	per- and polyfluoroalkyl substances
PCB	polychlorinated biphenyl
PEB	performance evaluation blank
PMR	periodic monitoring report
PQL	practical quantitation limit
Q	quarter
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RDX	Royal Demolition Explosive
REG	regular investigative sample
RLWTF	Radioactive Liquid Waste Treatment Facility
RPD	relative percent difference
S	screen
SC	specific conductance
SCC	Strategic Computing Complex
SERF	Sanitary Effluent Reclamation Facility
SMO	Sample Management Office
SOP	standard operating procedure
SU	Standard Unit
SVOC	semivolatile organic compound

SWMU	solid waste management unit
SWSC	Sanitary Wastewater Systems Consolidation (Spring)
TA	technical area
TCE	trichloroethene
TDS	total dissolved solids
TKN	total Kjeldahl nitrogen
TNT	trinitrotoluene(2,4,6)
TOC	total organic carbon
TW	test well
UF	unfiltered
USGS	U.S. Geological Survey
VOC	volatile organic compound
WCSF	waste characterization strategy form
WWTP	wastewater treatment plant

A-2.0 METRIC CONVERSION TABLE

Multiply SI (Metric) Unit	by	To Obtain U.S. Customary Unit
kilometers (km)	0.622	miles (mi)
kilometers (km)	3281	feet (ft)
meters (m)	3.281	feet (ft)
meters (m)	39.37	inches (in.)
centimeters (cm)	0.03281	feet (ft)
centimeters (cm)	0.394	inches (in.)
millimeters (mm)	0.0394	inches (in.)
micrometers or microns (µm)	0.0000394	inches (in.)
square kilometers (km^2)	0.3861	square miles (mi^2)
hectares (ha)	2.5	acres
square meters (m^2)	10.764	square feet (ft^2)
cubic meters (m^3)	35.31	cubic feet (ft^3)
kilograms (kg)	2.2046	pounds (lb)
grams (g)	0.0353	ounces (oz)
grams per cubic centimeter (g/cm^3)	62.422	pounds per cubic foot (lb/ft^3)
milligrams per kilogram (mg/kg)	1	parts per million (ppm)
micrograms per gram (µg/g)	1	parts per million (ppm)
liters (L)	0.26	gallons (gal.)
milligrams per liter (mg/L)	1	parts per million (ppm)
degrees Celsius (°C)	9/5 + 32	degrees Fahrenheit (°F)

A-3.0 DATA QUALIFIER DEFINITIONS

Data Qualifier	Definition
U	The analyte is classified as not detected.
J	The analyte is classified as detected but the reported concentration value is expected to be more uncertain than usual.
J+	The analyte is classified as detected but the reported concentration value is expected to be more uncertain than usual with a potential positive bias.
J-	The analyte is classified as detected but the reported concentration value is expected to be more uncertain than usual with a potential negative bias.
UJ	The analyte is classified as not detected, with an expectation that the reported result is more uncertain than usual.
R	The reported sample result is classified as rejected due to serious noncompliances regarding quality control acceptance criteria. The presence or absence of the analyte cannot be verified.
NQ	No validation qualifier flag is associated with this result, and the analyte is classified as detected.

Appendix B

Procedures, Methods, and Investigation-Derived Waste Management

B-1.0 PROCEDURES FOR MEASURING GROUNDWATER LEVELS AND COLLECTING WATER SAMPLES

This section summarizes standard operating procedures (SOPs) used to measure groundwater levels and to collect groundwater, base flow, and spring samples. The procedures are listed in the table below and are summarized in subsequent sections. These procedures (or their equivalents) will be used during sampling activities conducted in accordance with this Interim Facility-Wide Groundwater Monitoring Plan (IFGMP).

Procedure Identifier*	Procedure Title	Applicability
Measurement of Groundwater Levels		
N3B-SOP-ER-3001, R0	Manual Groundwater Level Measurements	Procedure for measuring depth to groundwater and determining groundwater elevation in a monitoring well or an open borehole
N3B-SOP-ER-6001, R0	Pressure Transducer Installation, Removal, and Maintenance	Procedure to install, remove, and maintain pressure transducers to monitor and record water-level data in monitoring wells and piezometers
N3B-SOP-ER-3004, R0	Groundwater Level Data Processing, Review, and Validation	Procedure to review and validate groundwater level data obtained from pressure transducers
N3B-ER-SOP-20006	Monitoring Well Packer System Reinflation	Procedure for monitoring and maintenance of Baski sampling system packers and temporary packers installed in water wells
Collection of Groundwater Samples		
N3B-SOP-ER-3003, R0	Groundwater Sampling	Procedure for sampling groundwater using various types of pumps. Procedure also addresses sampling of water supply wells and domestic wells.
N3B-SOP-ER-2002, R0	Field Decontamination of Equipment	Procedure for field decontamination of equipment
N3B-ER-SOP-20324	Locus Mobile Application for Groundwater Data Collection	Procedure for incorporating field sample data into the Environmental Information System database.
Collection of Surface Water and Spring Samples		
N3B-SOP-ER-3002	Spring and Surface Water Sampling	Procedure for sampling springs and surface water
Sample Preparation, Preservation, and Transportation		
N3B-ER-SOP-20235	Sample Containers, Preservation, and Field Quality Control	Procedure specifying sample containers, collection and preservation techniques, and holding times
N3B-SOP-SDM-1101.	Sample Control and Field Documentation	Procedure for field preparation, packaging, and transport to the sample management office
N3B-SOP-SDM-1102	Sample Receiving and Shipping by the N3B Sample Management Office	Procedure for receiving, packaging, and shipping samples to analytical laboratories

Procedure Identifier*	Procedure Title	Applicability
Field Activities Documentation		
RCRA [Resource Conservation and Recovery Act] Ground-Water Monitoring Draft Technical Guidance (EPA 1992, 600436)	Notebook and logbook documentation will follow the guidance in Section 7.6.3 of the U.S. Environmental Protection Agency's (EPA's) RCRA Ground-Water Monitoring Draft Technical Guidance	Procedure for documenting technical work and field activities in a notebook or logbook
Waste Management		
N3B-EP-DIR-SOP-10021	Characterization and Management of Environmental Programs Waste	Strategy for characterizing and managing generated waste

* Newport News Nuclear BWXT-Los Alamos, LLC (N3B) numbers cited as procedure identifiers are current and valid at time of publication but may be updated over the lifetime of this document.

B-2.0 SUMMARY OF FIELD INVESTIGATION METHODS

Method	Summary
General	The objective of this sampling program is to collect samples from wells, springs, or base flow stations that are representative of physical and geochemical conditions in the targeted hydrogeologic unit. To meet this objective, sampling equipment, sampling methods, monitoring well operation and maintenance, and sample handling procedures are implemented such that the chemistry of the sample is not altered. The procedures summarized below have been developed to meet the above objective and to be consistent with the requirements of the Compliance Order on Consent (the Consent Order).
Groundwater Level Measurements Referenced Procedures: • N3B-SOP-ER-6001, Pressure Transducer Installation, Removal, and Maintenance • N3B-SOP-ER-3001, Manual Groundwater Level Measurements • N3B-SOP-ER-3004, Groundwater Level Data Processing, Review and Validation	This summary applies to the collection of groundwater level data. Groundwater levels are manually measured at predetermined intervals. Additionally, data are downloaded at wells with pressure transducers installed after each sampling event. Two methods are used to collect groundwater level data: • Pressure transducers are used to measure water levels in individual wells or well screens at specified intervals. Most wells sampled under the IFGMP are monitored with pressure transducers. • Manual groundwater level measurements are routinely measured in wells not instrumented with pressure transducers. These measurements are also taken before purging and sampling alluvial wells. Manual groundwater level measurements are also taken periodically to verify transducer readings. Data from pressure transducers are automatically recorded and stored for later retrieval and processing to calculate water levels. Information collected during manual groundwater level measurements is documented on the N3B-Form-6156, Groundwater Level Field Form.

<table>
<tr><th>Method</th><th>Summary</th></tr>
<tr>
<td>
Collection of Groundwater Samples Using Dedicated Submersible or Portable Pumping Systems
Referenced Procedures:

N3B-SOP-ER-3003, Groundwater Sampling
N3B-ER-SOP-20235, Sample Containers and Preservation
N3B-EP-DIR-SOP-10021, Characterization and Management of Environmental Programs Waste
RCRA Ground-Water Monitoring Draft Technical Guidance (EPA 1992, 600436)
N3B-ER-SOP-20324, Locus Mobile Application for Groundwater Data Collection

</td>
<td>
This summary applies to the use of an electric gear-driven submersible pump system, a bladder pump system, a Bennett pump system, a Baski pump system, a hand-bailer system, and portable versions of the bladder pump and Bennett pump to sample wells.

Wells are purged sufficiently before sample collection to ensure samples will be representative of formation water.
The pumping rate should be adjusted, if possible, during purging so excessive drawdown does not occur. Field crews may have limited ability to restrict flow, depending on the pumping system. Turning off the pump while purging regional and intermediate wells should be avoided unless absolutely necessary. Instead, the pumping rate should be slowed to prevent drawdown into the screen, whenever possible.
The discharge rate is calculated either by using an in-line flow meter or by filling a bucket or bottle of known volume and dividing by the fill time. Flow rate is monitored at regular intervals during the purge, preferably once per casing volume (CV) and while the drop pipe is being cleared.
In general, a well may be sampled once the following criteria have been met (see N3B-SOP-ER-3003 for details):

A minimum of 1 CV has been removed for alluvial wells and a minimum of 3 CVs (plus the drop pipe) has been removed for intermediate or regional wells (unless otherwise requested).
The field indicator parameters have stabilized within their allowable ranges (as listed below) for at least three consecutive measurements taken a minimum of 3 or 5 min apart.

<table>
<tr><th>Field Parameter</th><th>Stabilization Criteria
(Yeskis and Zavala 2002, 204429)</th></tr>
<tr><td>Turbidity</td><td><10 nephelometric turbidity units (NTU), or turbidity should vary no more than 10% when turbidity is greater than 10 NTU.</td></tr>
<tr><td>Dissolved Oxygen (DO)</td><td>DO varies no more than 0.3 mg/L.</td></tr>
<tr><td>pH</td><td>pH varies no more than 0.2 Standard Units (SU).</td></tr>
<tr><td>Specific Conductance (SC)</td><td>For SC>100 µS/cm, SC varies no more than 3%, or for SC≤100 µS/cm, SC varies no more than 5%.</td></tr>
</table>

At the start of each sampling campaign, well-specific work plans are developed which provide additional direction where purge volume and/or field parameter stability requirements cannot be met. In these cases, the work plan requirements will supersede the requirements of N3B-SOP-ER-3003.
Purge water is discharged under the Decision Tree for Land Application of Drilling, Development, Rehabilitation, and Sampling Purge Water, 2016, approved by the New Mexico Environment Department (NMED) or containerized pending waste determination.
Sample labels and documentation are completed for each sample following procedures referenced in this IFGMP. All activities are documented in the field logbook and appropriate field forms.
Chain-of-custody seals are applied to each sample container before samples are transported from the site.
All samples are submitted to the Sample Management Office (SMO) and then shipped to the designated off-site analytical laboratory in a timely manner to allow the laboratory to conduct analyses within proper holding times.

</td>
</tr>
</table>

Method	Summary
Collection of Spring and Surface Water Samples Referenced Procedures: • N3B-SOP-ER-3002, Spring and Surface Water Sampling • N3B-ER-SOP-20235, Sample Containers and Preservation • N3B-ER-SOP-20324, Locus Mobile Application for Groundwater Data Collection	This summary applies to collecting water-quality samples from base flow sites and springs. • Spring and base flow sampling sites are usually identified by posts or gaging stations. However, these identifiers may not be present at some sites. • Ideally, samples are collected from flowing water. In some cases, the samples may need to be collected from pooled or ponded water. Samples are collected far enough upstream of a confluence so they are not influenced by water from another stream. If there is any question about whether a representative sample can be collected, field personnel are instructed to contact the requestor before proceeding. • Samples may be collected using either the direct containment method or a peristaltic pump. Filtered samples must be collected using a peristaltic pump. • Where both field conditions and flow conditions allow, a discharge measurement should be taken using one of the methods outlined in N3B-SOP-ER-3002. Discharge may be estimated where quantitative measurements are not possible. • Sample labels and documentation are completed for each sample following procedures referenced in this IFGMP. All activities are documented in the field logbook and appropriate field forms. • Samples are delivered to SMO and shipped to the designated off-site analytical laboratory in a timely manner to allow the samples to be analyzed within proper holding times.
Sample Bottles and Preservation of Samples Referenced Procedure: • N3B-ER-SOP-20235, Sample Containers and Preservation	This summary applies to requirements for sampling containers, sample pretreatment, and sample preservation requirements that are applicable to all water-quality samples. • All samples are collected in containers specifically prepared for that given parameter. • Sample containers are precleaned to a 300 Series (I-Chem, ESS) and are commercially available through a number of vendors. • For filtered samples for the analysis of dissolved constituents, the following systems will be used: ❖ in-line 0.45-µm disposable filter capsules, ❖ in-line filter holders with 0.45-µm filter membranes, or ❖ in-line 0.02-µm disposable filter capsules (for samples requiring microfiltration only). • Samples are preserved in accordance with Attachment 1 to N3B-ER-SOP-20235. • Samples are preserved and pH tested immediately after collection.
Handling, Packaging, and Shipping of Samples Referenced Procedures: • N3B-SOP-SDM-1101, Sample Control and Field Documentation	This summary applies to requirements for handling, packaging, and shipping of samples. • After all samples are collected and preserved, the sample containers are wiped off and custody tape is applied before packaging. • Samples for off-site analysis are transported to the SMO for shipment to off-site analytical laboratories. • The sampling personnel will coordinate with the SMO regarding shipment of all samples.

Method	Summary
Sample Documentation Referenced Procedures: • RCRA Ground-Water Monitoring Draft Technical Guidance (EPA 1992, 600436) • N3B-ER-SOP-20324, Locus Mobile Application for Groundwater Data Collection	This summary applies to requirements for documentation of sample collection. • The requested parameters, preservation and bottle type, chain of custody, required field parameters, and any other additional information are included on the analytical request generated from the database. • All sampling activities are documented in the field logbooks and appropriate field forms. • Chain of custody is documented on the analytical request form and signed to verify that the samples were not left unattended. • All field information, date and time of sample, purging and final field parameters, field conditions, and sampling personnel are included in the specific sampling method field sheets.
Field Quality Assurance/Quality Control Samples Referenced Document: • Current IFGMP	Field quality assurance (QA)/quality control (QC) samples are required by the Consent Order and are discussed in detail in Appendix D. Field QA/QC samples to be collected are summarized below. • Field duplicates are collected at a rate of 10% of all samples collected during a sampling campaign and are distributed proportionately by water type (surface water, alluvial groundwater, and intermediate/regional groundwater). • Field blanks are collected at a minimum frequency of 10% of all samples collected in a sampling campaign. • Equipment rinsate blanks are collected before a well with a nondedicated pump is sampled. • Field trip blanks are included with any coolers containing samples submitted for volatile organic compound analysis. • Performance evaluation blanks are collected once per sampling campaign, and analyzed for all constituents sampled for during the campaign. They are prepared from reagent-grade deionized water. • Field split samples are collected once per sampling campaign, and analyzed for all constituents sampled for during the campaign. They are prepared by splitting a regular sample into two subsamples, which are then analyzed at the project's primary laboratory (the regular sample) and another independent contract laboratory (the field split sample).

B-3.0 METHODS AND INSTRUMENTS USED FOR FIELD MEASUREMENTS

Field Parameter	Method Description	EPA-Approved Methods	Primary Field Instrument(s)	Primary Flow-Through Cell	Description
pH	Hydrogen ion, pH (pH units): electrometric measurement	EPA Method 150.1 Standard Methods,* 4500-H^+ B Editions 18^{th}, 19^{th}, 20^{th}	YSI ProDSS Multiparameter Water Quality Meter with YSI ProDSS 4-Port Cable Assembly with Sensors or Equivalent	YSI ProDSS	Samples will be analyzed for pH in the field using a flow-through cell during well purging and immediately preceding sample collection. The listed instrument is commercially available with a temperature sensor for automatic compensation. A calibration check is performed following the manufacturer's instructions with standard buffers traceable to National Institute of Standards and Technology (NIST). Standards are purchased from commercial vendors.
Temperature	Temperature, thermometric (°C)	EPA Method 170.1 Standard Methods, 2550 B Editions 18^{th}, 19^{th}, 20^{th}	YSI ProDSS Multiparameter Water Quality Meter with YSI ProDSS 4-Port Cable Assembly with Sensors or Equivalent	YSI ProDSS	Samples will be analyzed for temperature concurrently with pH measurement in the field using a flow-through cell during well purging and immediately preceding sample collection. The listed instruments are commercially available with a temperature sensor for automatic compensation.
Specific Conductance	Electrical conductance (micromhos/cm at 25°C): Wheatstone bridge	EPA Method 120.1 Standard Methods, 2510 B Editions 18^{th}, 19^{th}, 20^{th}	YSI ProDSS Multiparameter Water Quality Meter with YSI ProDSS 4-Port Cable Assembly with Sensors or Equivalent	YSI ProDSS	Samples will be analyzed for SC in the field during well purging and immediately preceding sample collection. The listed instruments are commercially available with a temperature sensor for automatic compensation. A calibration check is performed following the manufacturer's instructions with standard buffers traceable to NIST. Standards are purchased from commercial vendors.
Dissolved Oxygen	Oxygen, dissolved (mg/L): electrode	EPA Method 360.1 Standard Methods, 4500-O G Editions 18^{th}, 19^{th}, 20^{th} ASTM D888-09(C)	YSI ProDSS Multiparameter Water Quality Meter with YSI ProDSS 4-Port Cable Assembly with Sensors or Equivalent	YSI ProDSS	Samples will be analyzed for DO in the field using a flow-through cell during well purging immediately preceding sample collection. The listed instruments are commercially available with a temperature sensor for automatic compensation. The instrument is calibrated following the manufacturer's instructions.

Field Parameter	Method Description	EPA-Approved Methods	Primary Field Instrument(s)	Primary Flow-Through Cell	Description
Turbidity	Static determination using white-light turbidimeter	EPA Method 180.1 Standard Methods, 2130 B Editions 18th, 19th, 20th ASTM D7315, ISO 7027	Hach 2100Q YSI ProDSS Multiparameter Water Quality Meter with YSI ProDSS 4-Port Cable Assembly with Sensors or Equivalent	Single sample aliquot application YSI ProDSS	Samples will be analyzed for turbidity in the field using a flow-through cell and/or a single aliquot method during well purging and immediately preceding sample collection. The listed instruments are commercially available, and a calibration check is performed following the manufacturer's instructions.
Oxidation-Reduction Potential (ORP)	Oxidation-reduction potential (mV): electrode method	Standard Methods, 2580 A Editions 18th, 19th, 20th	YSI ProDSS Multiparameter Water Quality Meter with YSI ProDSS 4-Port Cable Assembly with Sensors or Equivalent	YSI ProDSS	Samples will be analyzed for ORP in the field using a flow-through cell during well purging and immediately preceding sample collection. The listed instruments are commercially available with a temperature sensor for automatic compensation. A calibration check is performed following the manufacturer's instructions and is recorded.

* "Standard Methods" refers to editions of the Standard Methods for the Examination of Water and Wastewater, published by the American Public Health Association (Washington, D.C.), American Water Works Association (Denver, Colorado), Water Environment Federation (Alexandria, Virginia).

B-4.0 ANALYTICAL METHODS—GROUNDWATER ANALYTICAL SUITES

B-4.1 Analyses by Accredited Contract Laboratories

Samples for laboratory analysis are submitted to accredited contract laboratories and analyzed using the methods listed in both Tables 1.7-3 and B-4.1-1. The accredited contract laboratories are required to establish method detection limits (MDLs) and practical quantitation limits (PQLs) for target analytes.

The MDL is the minimum concentration of an analyte that can be measured and reported with a 99% confidence that the concentration is greater than 0, as determined by the procedure set forth in Appendix B of 40 Code of Federal Regulations Part 136. The MDL is based on standard calibration samples that undergo the entire sample-preparation process before they are analyzed.

The PQL is the lowest concentration that can be reliably measured within specified limits of precision, accuracy, representativeness, completeness, and comparability during *routine* laboratory operating conditions using approved EPA methods. Generally, the PQL is 3 to 5 times higher than the MDL and should not be more than 10 times the MDL.

Tables B-4.1-2 and B-4.1-3 list analytical suites, analytes, and minimum and maximum MDLs and PQLs for groundwater and base flow samples, respectively, collected in monitoring years (MY) 2018 and 2019. For comparison, screening values are shown for groundwater locations, which are determined by the three-tier screening process specified in Section IX of the 2016 Consent Order. Screening values for base-flow locations are site and sample dependent and therefore not listed in table B-4.1-3. The specific values associated with base-flow screening values are found in their respective periodic monitoring reports (PMRs) (TA-16 260 PMR, General Surveillance PMR, or 2021 Base Flow PMR).

The data set used to develop Tables B-4.1-2 and B-4.1-3 can be created using the data extraction bounds listed below.

- Monitoring locations specified in the "Interim Facility-Wide Groundwater Monitoring Plan for the 2019 Monitoring Year, October 2018–September 2019" (N3B 2018, 700000) (MY 2019 IFGMP)
- Sample dates from October 1, 2017, to September 30, 2019 (i.e., MY 2018 and MY 2019)
- All analytical suites listed in Table 1.7-2 of the MY 2019 IFGMP except for the radionuclide analytical suite
- Data possessing the following attributes:
    - ❖ Sample type of WG (for groundwater data) or WS (for base flow data)
    - ❖ Sample purpose of either regular (REG) or field duplicate (FD)
    - ❖ Best value flag of yes (Y)
    - ❖ Sample usage code of either investigation (INV) or quality control (QC) or a null value
    - ❖ Dilution factor of 1 (except for high explosives where the default dilution factor is 2)

B-5.0 INVESTIGATION-DERIVED WASTE MANAGEMENT

This section describes how investigation-derived waste (IDW) generated during the groundwater monitoring activities conducted under this IFGMP will be managed. IDW is waste generated as a result of field-investigation activities and may include, but is not limited to, purge water, contact waste, decontamination fluids, and all other wastes that have potentially come into contact with contaminants.

IDW generated during implementation of the IFGMP will be managed to protect human health and the environment, comply with applicable regulatory requirements, and adhere to waste minimization goals.

All IDW generated during groundwater monitoring activities will be managed in accordance with applicable SOPs, which incorporate the requirements of all applicable EPA and NMED regulations, U.S. Department of Energy (DOE) orders, and N3B requirements.

The most current version of the Laboratory's "2019 Hazardous Waste Minimization Report" (DOE 2019, 700692) will be implemented during groundwater monitoring to minimize waste generation. This document is updated annually as a requirement of section 2.9 of the Hazardous Waste Facility Permit.

The IDW streams associated with groundwater monitoring are identified in Table B-5.0-1 and are briefly described below. The estimated volumes of these waste streams that may be generated during the implementation of this IFGMP are summarized in Table B-5.0-1.

The document providing detailed waste characterization and management requirements for IDW generated by groundwater monitoring activities is the waste characterization strategy form (WCSF) for the groundwater monitoring program. The WCSF provides detailed information on IDW characterization methods, management, containerization, and potential volumes. IDW characterization is completed through review of sampling data and/or documentation or by direct sampling of the IDW or the media being investigated (e.g., groundwater). Waste characterization may include a review of historical information and process knowledge to identify whether listed hazardous waste may be present (i.e., due diligence reviews). If low levels of hazardous waste from a listed source are identified, a "contained in" determination may be submitted for approval to NMED.

Wastes will be containerized and placed in clearly marked, appropriately constructed waste accumulation areas. Waste accumulation area postings, regulated storage duration, and inspection requirements will be based on the type of IDW and its classification. Container and storage requirements are specified in the WCSF and approved before the waste is generated. Transportation and disposal requirements are also presented in the WCSF and approved before waste is generated.

Waste Determinations

The number of sampling events needed to make RCRA waste determinations will be based on acceptable knowledge (AK) of groundwater conditions within a watershed at the well or surface sample location. AK includes a review of historical information and process knowledge to identify whether hazardous waste, from a listed source, may be present (i.e., due diligence reviews).

The number of sampling events needed to make the waste determination for a given location is summarized as follows:

- For locations where existing AK demonstrates no RCRA hazardous waste or hazardous constituents above RCRA regulatory limits, a minimum of one sampling event will be used annually to confirm the nonhazardous waste determination. This waste determination will be reevaluated with data from subsequent sampling campaigns.
- For new wells with no existing AK, two consecutive sampling events will be conducted to ensure reproducibility and to establish reliable AK. Wastes generated during the first sampling event will be characterized by the data collected during the event. These wastes will be managed in accordance with the regulatory classification.

- For locations where RCRA hazardous constituents are suspected to exhibit a characteristic or sporadic, but not confirmed, detection, the waste will initially be managed as hazardous. Once data from the first sampling event are received, waste will be managed and disposed of according to the analytical results. Waste generated from subsequent sampling events will be managed using AK from previous events until analytical data are available.

For new locations at or near a known listed hazardous waste source that does not have a "contained in" determination, waste will be managed as hazardous until a due diligence can be performed. If a listed hazardous waste source is identified and low levels of listed hazardous waste constituents are detected, a "contained in" determination may be submitted to NMED for approval.

- For locations where IDW has been identified as RCRA hazardous waste, subsequent IDW generated at the location will be managed as hazardous waste until the data from four consecutive sampling events contain no RCRA hazardous waste or hazardous constituents above RCRA regulatory limits. At this point, the waste will be managed as nonhazardous.

Where RCRA constituents are detected, the following steps may be taken to complete the waste determination:

- Where duplicate groundwater samples are collected during the same sampling event and one is a nondetection and the other is detected, the Laboratory assumes the detection is the result of laboratory or field contamination. The detection will not be used for waste determination.
- When an F-, U-, P-, or K-listed contaminant is detected, the sources contributing to the watershed will be evaluated (i.e., due diligence reviews). If there is no documentation that these contaminants are from listed processes, the waste will be managed as nonhazardous.
- Sampling purge water will be managed in accordance with the most current version of N3B-EPC-CP-QP-010, "Land Application of Groundwater," pursuant to the NMED-approved "Decision Tree for Land Application of Drilling, Development, Rehabilitation and Sampling Purge Water," revised November 2016.

Waste Management

Purge water: This waste stream consists of water purged from wells before and during sampling. The management of nonhazardous purge water will comply with N3B-EPC-CP-QP-010, "Land Application of Groundwater." If the purge water is hazardous, it will be managed in accordance with hazardous waste management requirements.

Purge water will be characterized based on the results of the analysis of water samples from the well from which the purge water originated or by direct sampling and analysis of the purge water. Purge water will be land-applied if it meets the criteria in the NMED-approved notice of intent for land application of groundwater.

Contact waste: The contact waste stream consists of potentially contaminated wastes that "contacted" purge water during sampling. This waste stream consists primarily of, but is not limited to, personal protective equipment such as gloves; decontamination wastes such as paper wipes; and disposable sampling supplies. Characterization of this waste stream will be performed through AK from analytical results for the environmental media (i.e., purge water) with which it came into contact or direct sampling of the containerized waste and a review of any potentially RCRA Hazardous Listed Waste sources. N3B expects most of these contact wastes will be nonhazardous waste that will be disposed of at a New Mexico solid waste landfill or low-level waste that will be disposed of at an approved N3B off-site facility.

Decontamination fluids: The decontamination fluids waste stream will consist of liquid wastes from decontamination activities (i.e., decontamination solutions and rinse waters). Consistent with waste minimization practices, the Laboratory employs dry decontamination methods to the extent possible. If dry decontamination cannot be performed, liquid decontamination wastes will be collected in containers at the point of generation. The decontamination fluids will be characterized through AK of the waste materials, the levels of contamination detected in the environmental media (e.g., purge water) and, if necessary, direct sampling of the containerized waste. N3B expects most of these wastes to be nonhazardous liquid waste or radioactive liquid waste that will be sent to an N3B-approved off-site treatment facility.

B-6.0 REFERENCES

The following reference list includes documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ERID, ESHID, or EMID. This information is also included in text citations. ERIDs were assigned by the Laboratory's Associate Directorate for Environmental Management (IDs through 599999); ESHIDs were assigned by the Laboratory's Associate Directorate for Environment, Safety, and Health (IDs 600000 through 699999); and EMIDs are assigned by N3B (IDs 700000 and above). IDs are used to locate documents in N3B's Records Management System and in the Master Reference Set. The NMED Hazardous Waste Bureau and N3B maintain copies of the Master Reference Set. The set ensures that NMED has the references to review documents. The set is updated when new references are cited in documents.

DOE (U.S Department of Energy), November 25, 2019. "Transmittal of 2019 Hazardous Waste Minimization Report, Los Alamos National Laboratory, EPA ID# NM0890010515," U.S Department of Energy letter (LANL letter no. EPC-DO-19-400) with attachments to NMED-HWB Bureau Chief from K.E. Armijo (NA-LA) and A. Duran (EM-LA), Los Alamos, New Mexico. (DOE 2019, 700692)

EPA (U.S. Environmental Protection Agency), November 1992. "RCRA Ground-Water Monitoring: Draft Technical Guidance," Office of Solid Waste, Washington, D.C. (EPA 1992, 600436)

N3B (Newport News Nuclear BWXT-Los Alamos, LLC), May 2018. "Interim Facility-Wide Groundwater Monitoring Plan for the 2019 Monitoring Year, October 2018–September 2019," Newport News Nuclear BWXT-Los Alamos, LLC, document EM2018-0004, Los Alamos, New Mexico. (N3B 2018, 700000)

Yeskis, D., and B. Zavala, May 2002. "Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers," a *Ground Water Forum Issue Paper*, EPA 542-S-02-001, Office of Solid Waste and Emergency Response, Washington, D.C. (Yeskis and Zavala 2002, 204429)

Table B-4.1-1
Analytical Methods Used by
Contract Laboratories for Samples Collected under the IFGMP

Symbol or CAS[a] No.	Analyte
Analytical Suite: VOCs[b] **Analytical Method: SW-846:8260**	
67-64-1	Acetone
75-05-8	Acetonitrile
107-02-8	Acrolein
107-13-1	Acrylonitrile
71-43-2	Benzene
108-86-1	Bromobenzene
74-97-5	Bromochloromethane
75-27-4	Bromodichloromethane
75-25-2	Bromoform
74-83-9	Bromomethane
71-36-3	Butanol[1-]
78-93-3	Butanone[2-]
104-51-8	Butylbenzene[n-]
135-98-8	Butylbenzene[sec-]
98-06-6	Butylbenzene[tert-]
75-15-0	Carbon Disulfide
56-23-5	Carbon Tetrachloride
126-99-8	Chloro-1,3-butadiene[2-]
107-05-1	Chloro-1-propene[3-]
108-90-7	Chlorobenzene
124-48-1	Chlorodibromomethane
75-00-3	Chloroethane
67-66-3	Chloroform
74-87-3	Chloromethane
95-49-8	Chlorotoluene[2-]
106-43-4	Chlorotoluene[4-]
96-12-8	Dibromo-3-Chloropropane[1,2-]
106-93-4	Dibromoethane[1,2-]
74-95-3	Dibromomethane
95-50-1	Dichlorobenzene[1,2-]
541-73-1	Dichlorobenzene[1,3-]
106-46-7	Dichlorobenzene[1,4-]
75-71-8	Dichlorodifluoromethane
75-34-3	Dichloroethane[1,1-]

Table B-4.1-1 (continued)

Symbol or CAS[a] No.	Analyte
107-06-2	Dichloroethane[1,2-]
75-35-4	Dichloroethene[1,1-]
156-59-2	Dichloroethene[cis-1,2-]
156-60-5	Dichloroethene[trans-1,2-]
78-87-5	Dichloropropane[1,2-]
142-28-9	Dichloropropane[1,3-]
594-20-7	Dichloropropane[2,2-]
563-58-6	Dichloropropene[1,1-]
10061-01-5	Dichloropropene[cis-1,3-]
10061-02-6	Dichloropropene[trans-1,3-]
60-29-7	Diethyl Ether
97-63-2	Ethyl Methacrylate
100-41-4	Ethylbenzene
87-68-3	Hexachlorobutadiene
591-78-6	Hexanone[2-]
74-88-4	Iodomethane
78-83-1	Isobutyl Alcohol
98-82-8	Isopropylbenzene
99-87-6	Isopropyltoluene[4-]
126-98-7	Methacrylonitrile
80-62-6	Methyl Methacrylate
1634-04-4	Methyl tert-Butyl Ether
108-10-1	Methyl-2-pentanone[4-]
75-09-2	Methylene Chloride
91-20-3	Naphthalene
107-12-0	Propionitrile
103-65-1	Propylbenzene[1-]
100-42-5	Styrene
630-20-6	Tetrachloroethane[1,1,1,2-]
79-34-5	Tetrachloroethane[1,1,2,2-]
127-18-4	Tetrachloroethene
108-88-3	Toluene
76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]
87-61-6	Trichlorobenzene[1,2,3-]
120-82-1	Trichlorobenzene[1,2,4-]
71-55-6	Trichloroethane[1,1,1-]
79-00-5	Trichloroethane[1,1,2-]
79-01-6	Trichloroethene
75-69-4	Trichlorofluoromethane
96-18-4	Trichloropropane[1,2,3-]

Table B-4.1-1 (continued)

Symbol or CAS[a] No.	Analyte
95-63-6	Trimethylbenzene[1,2,4-]
108-67-8	Trimethylbenzene[1,3,5-]
108-05-4	Vinyl Acetate
75-01-4	Vinyl Chloride
95-47-6	Xylene[1,2-]
Xylene[m+p]	Xylene[1,3-]+Xylene[1,4-]
Analytical Suite: SVOCs[c] **Analytical Method: SW-846:8270**	
83-32-9	Acenaphthene
208-96-8	Acenaphthylene
62-53-3	Aniline
120-12-7	Anthracene
1912-24-9	Atrazine
92-87-5	Benzidine
56-55-3	Benzo(a)anthracene
50-32-8	Benzo(a)pyrene
205-99-2	Benzo(b)fluoranthene
191-24-2	Benzo(g,h,i)perylene
207-08-9	Benzo(k)fluoranthene
65-85-0	Benzoic Acid
100-51-6	Benzyl Alcohol
111-91-1	Bis(2-chloroethoxy)methane
111-44-4	Bis(2-chloroethyl)ether
117-81-7	Bis(2-ethylhexyl)phthalate
101-55-3	Bromophenyl-phenylether[4-]
85-68-7	Butylbenzylphthalate
59-50-7	Chloro-3-methylphenol[4-]
106-47-8	Chloroaniline[4-]
91-58-7	Chloronaphthalene[2-]
95-57-8	Chlorophenol[2-]
7005-72-3	Chlorophenyl-phenyl[4-] Ether
218-01-9	Chrysene
53-70-3	Dibenz(a,h)anthracene
132-64-9	Dibenzofuran
95-50-1	Dichlorobenzene[1,2-]
541-73-1	Dichlorobenzene[1,3-]
106-46-7	Dichlorobenzene[1,4-]
91-94-1	Dichlorobenzidine[3,3'-]
120-83-2	Dichlorophenol[2,4-]
84-66-2	Diethylphthalate

Table B-4.1-1 (continued)

Symbol or CAS[a] No.	Analyte
131-11-3	Dimethyl Phthalate
105-67-9	Dimethylphenol[2,4-]
84-74-2	Di-n-butylphthalate
534-52-1	Dinitro-2-methylphenol[4,6-]
51-28-5	Dinitrophenol[2,4-]
121-14-2	Dinitrotoluene[2,4-]
606-20-2	Dinitrotoluene[2,6-]
117-84-0	Di-n-octylphthalate
88-85-7	Dinoseb
123-91-1	Dioxane[1,4-]
122-39-4	Diphenylamine
122-66-7	Diphenylhydrazine[1,2-]
206-44-0	Fluoranthene
86-73-7	Fluorene
118-74-1	Hexachlorobenzene
87-68-3	Hexachlorobutadiene
77-47-4	Hexachlorocyclopentadiene
67-72-1	Hexachloroethane
193-39-5	Indeno(1,2,3-cd)pyrene
78-59-1	Isophorone
90-12-0	Methylnaphthalene[1-]
91-57-6	Methylnaphthalene[2-]
95-48-7	Methylphenol[2-]
65794-96-9	Methylphenol[3-,4-]
91-20-3	Naphthalene
88-74-4	Nitroaniline[2-]
99-09-2	Nitroaniline[3-]
100-01-6	Nitroaniline[4-]
98-95-3	Nitrobenzene
88-75-5	Nitrophenol[2-]
100-02-7	Nitrophenol[4-]
55-18-5	Nitrosodiethylamine[N-]
62-75-9	Nitrosodimethylamine[N-]
924-16-3	Nitroso-di-n-butylamine[N-]
621-64-7	Nitroso-di-n-propylamine[N-]
930-55-2	Nitrosopyrrolidine[N-]

Table B-4.1-1 (continued)

Symbol or CAS[a] No.	Analyte
108-60-1	Oxybis(1-chloropropane)[2,2'-]
608-93-5	Pentachlorobenzene
87-86-5	Pentachlorophenol
85-01-8	Phenanthrene
108-95-2	Phenol
1610-18-0	Prometon
129-00-0	Pyrene
110-86-1	Pyridine
126-33-0	Sulfolane
95-94-3	Tetrachlorobenzene[1,2,4,5]
58-90-2	Tetrachlorophenol[2,3,4,6-]
120-82-1	Trichlorobenzene[1,2,4-]
95-95-4	Trichlorophenol[2,4,5-]
88-06-2	Trichlorophenol[2,4,6-]
Analytical Suite: PCBs[d] **Analytical Method: SW-846:8082**	
12674-11-2	Aroclor-1016
11104-28-2	Aroclor-1221
11141-16-5	Aroclor-1232
53469-21-9	Aroclor-1242
12672-29-6	Aroclor-1248
11097-69-1	Aroclor-1254
11096-82-5	Aroclor-1260
37324-23-5	Aroclor-1262
Analytical Suite: HEXP[e] **Analytical Method: SW-846:8330B**	
6629-29-4	2,4-Diamino-6-nitrotoluene
59229-75-3	2,6-Diamino-4-nitrotoluene
618-87-1	3,5-Dinitroaniline
19406-51-0	Amino-2,6-dinitrotoluene[4-]
35572-78-2	Amino-4,6-dinitrotoluene[2-]
99-65-0	Dinitrobenzene[1,3-]
121-14-2	Dinitrotoluene[2,4-]
606-20-2	Dinitrotoluene[2,6-]
2691-41-0	HMX[f]
98-95-3	Nitrobenzene
88-72-2	Nitrotoluene[2-]
99-08-1	Nitrotoluene[3-]
99-99-0	Nitrotoluene[4-]
78-11-5	PETN[g]

Table B-4.1-1 (continued)

Symbol or CAS[a] No.	Analyte
121-82-4	RDX[h]
3058-38-6	TATB[i]
479-45-8	Tetryl
99-35-4	Trinitrobenzene[1,3,5-]
118-96-7	Trinitrotoluene[2,4,6-]
78-30-8	Tris (o-cresyl) phosphate
Analytical Suite: HEXMOD[j] **Analytical Method: SW-846:8330B**	
6629-29-4	2,4-Diamino-6-nitrotoluene
59229-75-3	2,6-Diamino-4-nitrotoluene
618-87-1	3,5-Dinitroaniline
19406-51-0	Amino-2,6-dinitrotoluene[4-]
35572-78-2	Amino-4,6-dinitrotoluene[2-]
99-65-0	Dinitrobenzene[1,3-]
121-14-2	Dinitrotoluene[2,4-]
606-20-2	Dinitrotoluene[2,6-]
2691-41-0	HMX
98-95-3	Nitrobenzene
88-72-2	Nitrotoluene[2-]
99-08-1	Nitrotoluene[3-]
99-99-0	Nitrotoluene[4-]
78-11-5	PETN
121-82-4	RDX
3058-38-6	TATB
479-45-8	Tetryl
99-35-4	Trinitrobenzene[1,3,5-]
118-96-7	Trinitrotoluene[2,4,6-]
78-30-8	Tris (o-cresyl) phosphate
80251-29-2	DNX[k]
5755-27-1	MNX[k]
13980-04-6	TNX[k]
Analytical Suite: D/F[l] **Analytical Method SW-846:8290**	
35822-46-9	Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]
37871-00-4	Heptachlorodibenzodioxins (Total)
67562-39-4	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]
55673-89-7	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]
38998-75-3	Heptachlorodibenzofurans (Total)
39227-28-6	Hexachlorodibenzodioxin[1,2,3,4,7,8-]
57653-85-7	Hexachlorodibenzodioxin[1,2,3,6,7,8-]

Table B-4.1-1 (continued)

Symbol or CAS[a] No.	Analyte
19408-74-3	Hexachlorodibenzodioxin[1,2,3,7,8,9-]
34465-46-8	Hexachlorodibenzodioxins (Total)
70648-26-9	Hexachlorodibenzofuran[1,2,3,4,7,8-]
57117-44-9	Hexachlorodibenzofuran[1,2,3,6,7,8-]
72918-21-9	Hexachlorodibenzofuran[1,2,3,7,8,9-]
60851-34-5	Hexachlorodibenzofuran[2,3,4,6,7,8-]
55684-94-1	Hexachlorodibenzofurans (Total)
3268-87-9	Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]
39001-02-0	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]
40321-76-4	Pentachlorodibenzodioxin[1,2,3,7,8-]
36088-22-9	Pentachlorodibenzodioxins (Total)
57117-41-6	Pentachlorodibenzofuran[1,2,3,7,8-]
57117-31-4	Pentachlorodibenzofuran[2,3,4,7,8-]
30402-15-4	Pentachlorodibenzofurans (Totals)
1746-01-6	Tetrachlorodibenzodioxin[2,3,7,8-]
41903-57-5	Tetrachlorodibenzodioxins (Total)
51207-31-9	Tetrachlorodibenzofuran[2,3,7,8-]
55722-27-5	Tetrachlorodibenzofurans (Totals)

Note: Table B-4.1-1 is referenced in Table 1.7-2 and serves to complete the analyte lists in Table 1.7-2.

[a] CAS = Chemical Abstracts Service.

[b] VOC = Volatile organic compounds.

[c] SVOC = Semivolatile organic compounds.

[d] PCB = Polychlorinated biphenyl.

[e] HEXP = High explosives.

[f] HMX = Her Majesty's Explosive.

[g] PETN = Pentaerythritol tetranitrate.

[h] RDX = Royal Demolition Explosive.

[i] TATB = Triaminotrinitrobenzene.

[j] HEXMOD = High explosives and RDX degradation products.

[k] DNX, MNX, and TNX are RDX degradation products.

[l] D/F = Dioxins/Furans.

Table B-4.1-2
Analyte MDLs and PQLs for Groundwater Samples Collected in MY 2018 and MY 2019 and Analyzed by Accredited Contract Laboratories

Suite	Symbol or CAS No.	Analyte	Analytical Method	Field Preparation Code[a]	Unit	Number of Analyses	MDL (Minimum)	MDL (Maximum)	MDL (Average)	PQL (Minimum)	PQL (Maximum)	PQL (Average)	Screening Value	Screening Value Type
Dioxins Furans	35822-46-9	Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	SW-846:8290A	UF	µg/L	11	1.72E-05	1.90E-05	1.79E-05	5.20E-05	5.70E-05	5.37E-05	—[b]	—
Dioxins Furans	67562-39-4	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	SW-846:8290A	UF	µg/L	11	1.72E-05	1.92E-05	1.80E-05	5.20E-05	5.70E-05	5.37E-05	—	—
Dioxins Furans	55673-89-7	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	SW-846:8290A	UF	µg/L	11	1.72E-05	2.01E-05	1.84E-05	5.20E-05	5.70E-05	5.37E-05	—	—
Dioxins Furans	39227-28-6	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	SW-846:8290A	UF	µg/L	11	1.72E-05	3.54E-05	2.50E-05	5.20E-05	5.70E-05	5.37E-05	0.00013	EPA TAP SCRN LVL
Dioxins Furans	57653-85-7	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	SW-846:8290A	UF	µg/L	11	1.72E-05	2.71E-05	2.14E-05	5.20E-05	5.70E-05	5.37E-05	—	—
Dioxins Furans	19408-74-3	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	SW-846:8290A	UF	µg/L	11	1.72E-05	3.04E-05	2.28E-05	5.20E-05	5.70E-05	5.37E-05	0.00013	EPA TAP SCRN LVL
Dioxins Furans	70648-26-9	Hexachlorodibenzofuran[1,2,3,4,7,8-]	SW-846:8290A	UF	µg/L	11	1.72E-05	2.26E-05	1.94E-05	5.20E-05	5.70E-05	5.37E-05	—	—
Dioxins Furans	57117-44-9	Hexachlorodibenzofuran[1,2,3,6,7,8-]	SW-846:8290A	UF	µg/L	11	1.72E-05	2.51E-05	2.05E-05	5.20E-05	5.70E-05	5.37E-05	—	—
Dioxins Furans	72918-21-9	Hexachlorodibenzofuran[1,2,3,7,8,9-]	SW-846:8290A	UF	µg/L	11	1.72E-05	2.89E-05	2.22E-05	5.20E-05	5.70E-05	5.37E-05	—	—
Dioxins Furans	60851-34-5	Hexachlorodibenzofuran[2,3,4,6,7,8-]	SW-846:8290A	UF	µg/L	11	1.72E-05	2.10E-05	1.87E-05	5.20E-05	5.70E-05	5.37E-05	—	—
Dioxins Furans	3268-87-9	Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	SW-846:8290A	UF	µg/L	11	3.45E-05	3.79E-05	3.58E-05	1.00E-04	1.10E-04	1.07E-04	—	—
Dioxins Furans	39001-02-0	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	SW-846:8290A	UF	µg/L	11	3.45E-05	6.61E-05	4.80E-05	1.00E-04	1.10E-04	1.07E-04	—	—
Dioxins Furans	40321-76-4	Pentachlorodibenzodioxin[1,2,3,7,8-]	SW-846:8290A	UF	µg/L	11	1.72E-05	3.13E-05	2.32E-05	5.20E-05	5.70E-05	5.37E-05	—	—
Dioxins Furans	57117-41-6	Pentachlorodibenzofuran[1,2,3,7,8-]	SW-846:8290A	UF	µg/L	11	1.72E-05	2.27E-05	1.95E-05	5.20E-05	5.70E-05	5.37E-05	—	—
Dioxins Furans	57117-31-4	Pentachlorodibenzofuran[2,3,4,7,8-]	SW-846:8290A	UF	µg/L	11	1.72E-05	1.90E-05	1.79E-05	5.20E-05	5.70E-05	5.37E-05	—	—
Dioxins Furans	1746-01-6	Tetrachlorodibenzodioxin[2,3,7,8-]	SW-846:8290A	UF	µg/L	11	3.45E-06	3.79E-06	3.58E-06	1.00E-05	1.10E-05	1.07E-05	3.00E-05	EPA MCL
Dioxins Furans	51207-31-9	Tetrachlorodibenzofuran[2,3,7,8-]	SW-846:8290A	UF	µg/L	11	3.45E-06	3.79E-06	3.58E-06	1.00E-05	1.10E-05	1.07E-05	1.84E-06	NMED A1 TAP SCRN LVL
General Inorganics	pH	Acidity or Alkalinity of a solution	EPA:150.1	F	SU	693	0.01	0.01	0.01	0.1	0.1	0.1	—	—
General Inorganics	ALK-CO3	Alkalinity-CO3	EPA:310.1	F	mg/L	715	1.45	1.45	1.45	4.0	4.0	4.0	—	—
General Inorganics	ALK-CO3+HCO3	Alkalinity-CO3+HCO3	EPA:310.1	F	mg/L	715	1.45	1.45	1.45	4.0	4.0	4.0	—	—
General Inorganics	NH3-N	Ammonia as Nitrogen	EPA:350.1	F	mg/L	714	0.017	0.017	0.017	0.05	0.05	0.05	—	—
General Inorganics	Br(-1)	Bromide	EPA:300.0	F	mg/L	713	0.067	0.067	0.067	0.2	0.2	0.2	—	—
General Inorganics	Cl(-1)	Chloride	EPA:300.0	F	mg/L	548	0.067	0.067	0.067	0.2	0.2	0.2	250	NM GW STD
General Inorganics	F(-1)	Fluoride	EPA:300.0	F	mg/L	714	0.033	0.033	0.033	0.1	0.1	0.1	1.6	NM GW STD
General Inorganics	NO3+NO2-N	Nitrate-Nitrite as Nitrogen	EPA:353.2	F	mg/L	401	0.017	0.017	0.017	0.05	0.05	0.05	10	EPA MCL
General Inorganics	SPEC_CONDC	Specific Conductance	EPA:120.1	F	µS/cm	715	1.0	1.0	1.0	1.0	1.0	1.0	—	—
General Inorganics	SO4(-2)	Sulfate	EPA:300.0	F	mg/L	643	0.133	0.133	0.133	0.4	0.4	0.4	600	NM GW STD
General Inorganics	TDS	Total Dissolved Solids	EPA:160.1	F	mg/L	693	3.4	3.4	3.4	14.3	14.3	14.3	1000	NM GW STD
General Inorganics	TKN	Total Kjeldahl Nitrogen	EPA:351.2	UF	mg/L	716	0.033	0.033	0.033	0.1	0.1	0.1	—	—
General Inorganics	TOC	Total Organic Carbon	SW-846:9060	UF	mg/L	706	0.33	0.33	0.33	1.0	1.0	1.0	—	—
General Inorganics	PO4-P	Total Phosphate as Phosphorus	EPA:365.4	F	mg/L	713	0.02	0.02	0.02	0.05	0.05	0.05	—	—
General Inorganics	CN(TOTAL)	Cyanide (Total)	EPA:335.4	UF	mg/L	714	0.00167	0.00167	0.00167	0.005	0.005	0.005	200	NM GW STD
General Inorganics	ClO4	Perchlorate	SW-846:6850	F	µg/L	626	0.05	0.05	0.05	0.2	0.2	0.2	13.8	NMED A1 TAP SCRN LVL
HEXP[c]	6629-29-4	2,4-Diamino-6-nitrotoluene	SW-846:8330B	UF	µg/L	234	0.515	0.625	0.542	2.58	3.13	2.709	—	—
HEXP	59229-75-3	2,6-Diamino-4-nitrotoluene	SW-846:8330B	UF	µg/L	234	0.515	0.625	0.542	2.58	3.13	2.709	—	—

Table B-4.1-2 (continued)

Suite	Symbol or CAS No.	Analyte	Analytical Method	Field Preparation Code	Unit	Number of Analyses	MDL (Minimum)	MDL (Maximum)	MDL (Average)	PQL (Minimum)	PQL (Maximum)	PQL (Average)	Screening Value	Screening Value Type
HEXP	618-87-1	3,5-Dinitroaniline	SW-846:8330B	UF	µg/L	234	0.309	0.375	0.325	1.03	1.25	1.083	—	—
HEXP	19406-51-0	Amino-2,6-dinitrotoluene[4-]	SW-846:8330B	UF	µg/L	234	0.0825	0.1	0.087	0.258	0.313	0.271	39	EPA TAP SCRN LVL
HEXP	35572-78-2	Amino-4,6-dinitrotoluene[2-]	SW-846:8330B	UF	µg/L	234	0.0825	0.1	0.087	0.258	0.313	0.271	39	EPA TAP SCRN LVL
HEXP	99-65-0	Dinitrobenzene[1,3-]	SW-846:8330B	UF	µg/L	234	0.0825	0.1	0.087	0.258	0.313	0.271	2	EPA TAP SCRN LVL
HEXP	121-14-2	Dinitrotoluene[2,4-]	SW-846:8330B	UF	µg/L	234	0.0825	0.1	0.087	0.258	0.313	0.271	2.37	NMED A1 TAP SCRN LVL
HEXP	606-20-2	Dinitrotoluene[2,6-]	SW-846:8330B	UF	µg/L	234	0.0825	0.1	0.087	0.258	0.313	0.271	0.485	NMED A1 TAP SCRN LVL
HEXP	DNX[d]	DNX	SW-846:8330B	UF	µg/L	169	0.0825	0.0995	0.086	0.258	0.311	0.27	—	—
HEXP	2691-41-0	HMX[e]	SW-846:8330B	UF	µg/L	217	0.0825	0.1	0.087	0.258	0.313	0.271	1000	NMED A1 TAP SCRN LVL
HEXP	MNX[f]	MNX	SW-846:8330B	UF	µg/L	168	0.0825	0.0995	0.086	0.258	0.311	0.27	—	—
HEXP	98-95-3	Nitrobenzene	SW-846:8330B	UF	µg/L	234	0.0825	0.1	0.087	0.258	0.313	0.271	1.4	NMED A1 TAP SCRN LVL
HEXP	88-72-2	Nitrotoluene[2-]	SW-846:8330B	UF	µg/L	234	0.0845	0.103	0.089	0.258	0.313	0.271	3.14	NMED A1 TAP SCRN LVL
HEXP	99-08-1	Nitrotoluene[3-]	SW-846:8330B	UF	µg/L	234	0.0825	0.1	0.087	0.258	0.313	0.271	1.74	NMED A1 TAP SCRN LVL
HEXP	99-99-0	Nitrotoluene[4-]	SW-846:8330B	UF	µg/L	234	0.155	0.188	0.163	0.515	0.625	0.542	42.7	NMED A1 TAP SCRN LVL
HEXP	78-11-5	PETN[g]	SW-846:8330B	UF	µg/L	234	0.103	0.125	0.108	0.515	0.625	0.542	190	EPA TAP SCRN LVL
HEXP	121-82-4	RDX[h]	SW-846:8330B	UF	µg/L	176	0.0825	0.1	0.087	0.258	0.313	0.272	9.66	NMED A1 TAP SCRN LVL
HEXP	3058-38-6	TATB[i]	SW-846:8330B	UF	µg/L	234	0.309	0.375	0.325	1.03	1.25	1.083	—	—
HEXP	479-45-8	Tetryl	SW-846:8330B	UF	µg/L	233	0.0825	0.1	0.087	0.515	0.625	0.542	39.4	NMED A1 TAP SCRN LVL
HEXP	TNX	TNX[j]	SW-846:8330B	UF	µg/L	169	0.0825	0.0995	0.086	0.258	0.311	0.27	—	—
HEXP	99-35-4	Trinitrobenzene[1,3,5-]	SW-846:8330B	UF	µg/L	233	0.0825	0.1	0.087	0.258	0.313	0.271	590	EPA TAP SCRN LVL
HEXP	118-96-7	Trinitrotoluene[2,4,6-]	SW-846:8330B	UF	µg/L	234	0.0825	0.1	0.087	0.258	0.313	0.271	9.8	NMED A1 TAP SCRN LVL
HEXP	78-30-8	Tris (o-cresyl) phosphate	SW-846:8330B	UF	µg/L	234	0.309	0.375	0.325	1.03	1.25	1.083	—	—
Metals	Al	Aluminum	SW-846:6010C	F	µg/L	718	68.0	68.0	68.0	200.0	200.0	200.0	5000	NM GW STD
Metals	Sb	Antimony	SW-846:6020	F	µg/L	718	1.0	1.0	1.0	3.0	3.0	3.0	6	NM GW STD
Metals	As	Arsenic	SW-846:6020	F	µg/L	717	2.0	2.0	2.0	5.0	5.0	5.0	10	NM GW STD
Metals	Ba	Barium	SW-846:6010C	F	µg/L	718	1.0	1.0	1.0	5.0	5.0	5.0	2000	NM GW STD
Metals	Be	Beryllium	SW-846:6010C	F	µg/L	718	1.0	1.0	1.0	5.0	5.0	5.0	4	NM GW STD
Metals	B	Boron	SW-846:6010C	F	µg/L	718	15.0	15.0	15.0	50.0	50.0	50.0	750	NM GW STD
Metals	Cd	Cadmium	SW-846:6020	F	µg/L	718	0.3	0.3	0.3	1.0	1.0	1.0	5	NM GW STD
Metals	Ca	Calcium	SW-846:6010C	F	µg/L	718	0.05	0.05	0.05	0.2	0.2	0.2	—	—
Metals	Cr	Chromium	SW-846:6020	F	µg/L	708	3.0	3.0	3.0	10.0	10.0	10.0	50	NM GW STD
Metals	Co	Cobalt	SW-846:6010C	F	µg/L	718	1.0	1.0	1.0	5.0	5.0	5.0	50	NM GW STD
Metals	Cu	Copper	SW-846:6010C	F	µg/L	718	3.0	3.0	3.0	10.0	20.0	12.3	1000	NM GW STD
Metals	Hardness	Hardness	SM:A2340B	F	mg/L	718	0.453	0.453	0.453	1.24	1.24	1.24	—	—
Metals	Fe	Iron	SW-846:6010C	F	µg/L	718	30.0	30.0	30.0	100.0	100.0	100.0	1000	NM GW STD
Metals	Pb	Lead	SW-846:6020	F	µg/L	718	0.5	0.5	0.5	2.0	2.0	2.0	15	NM GW STD
Metals	Mg	Magnesium	SW-846:6010C	F	mg/L	718	0.11	0.11	0.11	0.3	0.3	0.3	—	—
Metals	Mn	Manganese	SW-846:6010C	F	µg/L	718	2.0	2.0	2.0	10.0	10.0	10.0	200	NM GW STD

Table B-4.1-2 (continued)

Suite	Symbol or CAS No.	Analyte	Analytical Method	Field Preparation Code	Unit	Number of Analyses	MDL (Minimum)	MDL (Maximum)	MDL (Average)	PQL (Minimum)	PQL (Maximum)	PQL (Average)	Screening Value	Screening Value Type
Metals	Hg	Mercury	EPA:245.2	F	µg/L	718	0.067	0.067	0.067	0.2	0.2	0.2	2	NM GW STD
Metals	Hg	Mercury	EPA:245.2	UF	µg/L	716	0.067	0.067	0.067	0.2	0.2	0.2	2	NM GW STD
Metals	Mo	Molybdenum	SW-846:6020	F	µg/L	718	0.2	0.2	0.2	0.5	1.0	0.615	1000	NM GW STD
Metals	Ni	Nickel	SW-846:6020	F	µg/L	712	0.6	0.6	0.6	2.0	2.0	2.0	200	NM GW STD
Metals	K	Potassium	SW-846:6010C	F	mg/L	718	0.05	0.05	0.05	0.15	0.15	0.15	—	—
Metals	Se	Selenium	SW-846:6020	F	µg/L	717	2.0	2.0	2.0	5.0	5.0	5.0	50	NM GW STD
Metals	SiO2	Silicon Dioxide	SW-846:6010C	F	mg/L	712	0.053	0.053	0.053	0.213	0.213	0.213	—	—
Metals	Ag	Silver	SW-846:6020	F	µg/L	718	0.3	0.3	0.3	1.0	1.0	1.0	50	NM GW STD
Metals	Na	Sodium	SW-846:6010C	F	mg/L	718	0.1	0.1	0.1	0.3	0.3	0.3	—	—
Metals	Sr	Strontium	SW-846:6010C	F	µg/L	718	1.0	1.0	1.0	5.0	5.0	5.0	11800	NMED A1 TAP SCRN LVL
Metals	Tl	Thallium	SW-846:6020	F	µg/L	718	0.6	0.6	0.6	2.0	2.0	2.0	2	NM GW STD
Metals	Sn	Tin	SW-846:6010C	F	µg/L	718	2.5	2.5	2.5	10.0	10.0	10.0	12000	EPA TAP SCRN LVL
Metals	U	Uranium	SW-846:6020	F	µg/L	718	0.067	0.067	0.067	0.2	0.2	0.2	30	NM GW STD
Metals	V	Vanadium	SW-846:6010C	F	µg/L	718	1.0	1.0	1.0	5.0	5.0	5.0	63.1	NMED A1 TAP SCRN LVL
Metals	Zn	Zinc	SW-846:6010C	F	µg/L	717	3.3	3.3	3.3	10.0	20.0	12.3	10000	NM GW STD
PCBs[k]	12674-11-2	Aroclor-1016	SW-846:8082	UF	µg/L	37	0.0333	0.0396	0.0352	0.1	0.119	0.106	0.5	NM GW STD
PCBs	11104-28-2	Aroclor-1221	SW-846:8082	UF	µg/L	37	0.0333	0.0396	0.0352	0.1	0.119	0.106	0.5	NM GW STD
PCBs	11141-16-5	Aroclor-1232	SW-846:8082	UF	µg/L	37	0.0333	0.0396	0.0352	0.1	0.119	0.106	0.5	NM GW STD
PCBs	53469-21-9	Aroclor-1242	SW-846:8082	UF	µg/L	37	0.0333	0.0396	0.0352	0.1	0.119	0.106	0.5	NM GW STD
PCBs	12672-29-6	Aroclor-1248	SW-846:8082	UF	µg/L	37	0.0333	0.0396	0.0352	0.1	0.119	0.106	0.5	NM GW STD
PCBs	11097-69-1	Aroclor-1254	SW-846:8082	UF	µg/L	37	0.0333	0.0396	0.0352	0.1	0.119	0.106	0.5	NM GW STD
PCBs	11096-82-5	Aroclor-1260	SW-846:8082	UF	µg/L	37	0.0333	0.0396	0.0352	0.1	0.119	0.106	0.5	NM GW STD
PCBs	37324-23-5	Aroclor-1262	SW-846:8082	UF	µg/L	37	0.0333	0.0396	0.0352	0.1	0.119	0.106	0.5	NM GW STD
SVOCs[l]	83-32-9	Acenaphthene	SW-846:8270D	UF	µg/L	249	0.3	0.417	0.315	1.0	1.39	1.05	535	NMED A1 TAP SCRN LVL
SVOCs	208-96-8	Acenaphthylene	SW-846:8270D	UF	µg/L	249	0.3	0.417	0.315	1.0	1.39	1.05	—	—
SVOCs	62-53-3	Aniline	SW-846:8270D	UF	µg/L	249	4.2	5.83	4.41	10.0	13.9	10.5	130	EPA TAP SCRN LVL
SVOCs	120-12-7	Anthracene	SW-846:8270D	UF	µg/L	249	0.3	0.417	0.315	1.0	1.39	1.05	1720	NMED A1 TAP SCRN LVL
SVOCs	1912-24-9	Atrazine	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	3	NM GW STD
SVOCs	103-33-3	Azobenzene	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	1.2	EPA TAP SCRN LVL
SVOCs	92-87-5	Benzidine	SW-846:8270D	UF	µg/L	249	3.9	5.42	4.10	10.0	13.9	10.5	0.00109	NMED A1 TAP SCRN LVL
SVOCs	56-55-3	Benzo(a)anthracene	SW-846:8270D	UF	µg/L	249	0.3	0.417	0.315	1.0	1.39	1.05	0.12	NMED A1 TAP SCRN LVL
SVOCs	50-32-8	Benzo(a)pyrene	SW-846:8270D	UF	µg/L	249	0.3	0.417	0.315	1.0	1.39	1.05	0.2	NM GW STD
SVOCs	205-99-2	Benzo(b)fluoranthene	SW-846:8270D	UF	µg/L	249	0.3	0.417	0.315	1.0	1.39	1.05	0.343	NMED A1 TAP SCRN LVL
SVOCs	191-24-2	Benzo(g,h,i)perylene	SW-846:8270D	UF	µg/L	249	0.3	0.417	0.315	1.0	1.39	1.05	—	—
SVOCs	207-08-9	Benzo(k)fluoranthene	SW-846:8270D	UF	µg/L	249	0.3	0.417	0.315	1.0	1.39	1.05	3.43	NMED A1 TAP SCRN LVL
SVOCs	65-85-0	Benzoic Acid	SW-846:8270D	UF	µg/L	249	6.0	8.33	6.30	20.0	27.8	21.0	75000	EPA TAP SCRN LVL
SVOCs	100-51-6	Benzyl Alcohol	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	2000	EPA TAP SCRN LVL

Table B-4.1-2 (continued)

Suite	Symbol or CAS No.	Analyte	Analytical Method	Field Preparation Code	Unit	Number of Analyses	MDL (Minimum)	MDL (Maximum)	MDL (Average)	PQL (Minimum)	PQL (Maximum)	PQL (Average)	Screening Value	Screening Value Type
SVOCs	111-91-1	Bis(2-chloroethoxy)methane	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	59	EPA TAP SCRN LVL
SVOCs	111-44-4	Bis(2-chloroethyl)ether	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	0.137	NMED A1 TAP SCRN LVL
SVOCs	117-81-7	Bis(2-ethylhexyl)phthalate	SW-846:8270D	UF	µg/L	249	0.3	4.17	1.77	1.0	13.9	4.7	6	EPA MCL
SVOCs	101-55-3	Bromophenyl-phenylether[4-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	—	—
SVOCs	85-68-7	Butylbenzylphthalate	SW-846:8270D	UF	µg/L	249	0.3	4.17	1.77	10.0	13.9	10.5	160	EPA TAP SCRN LVL
SVOCs	59-50-7	Chloro-3-methylphenol[4-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	1400	EPA TAP SCRN LVL
SVOCs	106-47-8	Chloroaniline[4-]	SW-846:8270D	UF	µg/L	249	3.3	4.58	3.47	10.0	13.9	10.5	3.7	EPA TAP SCRN LVL
SVOCs	91-58-7	Chloronaphthalene[2-]	SW-846:8270D	UF	µg/L	249	0.41	0.569	0.4	1.0	1.39	1.05	733	NMED A1 TAP SCRN LVL
SVOCs	95-57-8	Chlorophenol[2-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.2	10.0	13.9	10.5	91	NMED A1 TAP SCRN LVL
SVOCs	7005-72-3	Chlorophenyl-phenyl[4-] Ether	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.2	10.0	13.9	10.5	—	—
SVOCs	218-01-9	Chrysene	SW-846:8270D	UF	µg/L	249	0.3	0.417	0.32	1.0	1.39	1.05	34.3	NMED A1 TAP SCRN LVL
SVOCs	53-70-3	Dibenz(a,h)anthracene	SW-846:8270D	UF	µg/L	249	0.3	0.417	0.32	1.0	1.39	1.05	0.0343	NMED A1 TAP SCRN LVL
SVOCs	132-64-9	Dibenzofuran	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.2	10.0	13.9	10.5	7.9	EPA TAP SCRN LVL
SVOCs	95-50-1	Dichlorobenzene[1,2-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.2	10.0	13.9	10.5	600	NM GW STD
SVOCs	541-73-1	Dichlorobenzene[1,3-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.2	10.0	13.9	10.5	—	—
SVOCs	106-46-7	Dichlorobenzene[1,4-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.2	10.0	13.9	10.5	75	NM GW STD
SVOCs	91-94-1	Dichlorobenzidine[3,3'-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.2	10.0	13.9	10.5	1.25	NMED A1 TAP SCRN LVL
SVOCs	120-83-2	Dichlorophenol[2,4-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.2	10.0	13.9	10.5	45.3	NMED A1 TAP SCRN LVL
SVOCs	84-66-2	Diethylphthalate	SW-846:8270D	UF	µg/L	249	0.3	4.17	1.8	10.0	13.9	10.5	14800	NMED A1 TAP SCRN LVL
SVOCs	131-11-3	Dimethyl Phthalate	SW-846:8270D	UF	µg/L	249	0.3	4.17	1.8	10.0	13.9	10.5	612	NMED A1 TAP SCRN LVL
SVOCs	105-67-9	Dimethylphenol[2,4-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.2	10.0	13.9	10.5	354	NMED A1 TAP SCRN LVL
SVOCs	84-74-2	Di-n-butylphthalate	SW-846:8270D	UF	µg/L	249	0.3	4.17	1.8	10.0	13.9	10.5	885	NMED A1 TAP SCRN LVL
SVOCs	534-52-1	Dinitro-2-methylphenol[4,6-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.2	10.0	13.9	10.5	1.52	NMED A1 TAP SCRN LVL
SVOCs	51-28-5	Dinitrophenol[2,4-]	SW-846:8270D	UF	µg/L	249	5.0	6.94	5.3	20.0	27.8	21.0	38.7	NMED A1 TAP SCRN LVL
SVOCs	121-14-2	Dinitrotoluene[2,4-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.2	10.0	13.9	10.5	2.37	NMED A1 TAP SCRN LVL
SVOCs	606-20-2	Dinitrotoluene[2,6-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.2	10.0	13.9	10.5	0.485	NMED A1 TAP SCRN LVL
SVOCs	117-84-0	Di-n-octylphthalate	SW-846:8270D	UF	µg/L	249	0.3	4.17	1.8	10.0	13.9	10.5	200	EPA TAP SCRN LVL
SVOCs	88-85-7	Dinoseb	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.2	10.0	13.9	10.5	7	EPA MCL
SVOCs	123-91-1	Dioxane[1,4-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.2	10.0	13.9	10.5	4.59	NMED A1 TAP SCRN LVL
SVOCs	122-39-4	Diphenylamine	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.2	10.0	13.9	10.5	122	NMED A1 TAP SCRN LVL
SVOCs	206-44-0	Fluoranthene	SW-846:8270D	UF	µg/L	249	0.3	0.417	0.32	1.0	1.39	1.05	802	NMED A1 TAP SCRN LVL
SVOCs	86-73-7	Fluorene	SW-846:8270D	UF	µg/L	249	0.3	0.417	0.32	1.0	1.39	1.05	288	NMED A1 TAP SCRN LVL
SVOCs	118-74-1	Hexachlorobenzene	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	1	EPA MCL
SVOCs	87-68-3	Hexachlorobutadiene	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	1.39	NMED A1 TAP SCRN LVL
SVOCs	77-47-4	Hexachlorocyclopentadiene	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	50	EPA MCL
SVOCs	67-72-1	Hexachloroethane	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	3.28	NMED A1 TAP SCRN LVL
SVOCs	193-39-5	Indeno(1,2,3-cd)pyrene	SW-846:8270D	UF	µg/L	249	0.3	0.417	0.315	1.0	1.39	1.05	0.343	NMED A1 TAP SCRN LVL

Table B-4.1-2 (continued)

Suite	Symbol or CAS No.	Analyte	Analytical Method	Field Preparation Code	Unit	Number of Analyses	MDL (Minimum)	MDL (Maximum)	MDL (Average)	PQL (Minimum)	PQL (Maximum)	PQL (Average)	Screening Value	Screening Value Type
SVOCs	78-59-1	Isophorone	SW-846:8270D	UF	µg/L	249	3.5	4.86	3.68	10.0	13.9	10.5	781	NMED A1 TAP SCRN LVL
SVOCs	90-12-0	Methylnaphthalene[1-]	SW-846:8270D	UF	µg/L	249	0.3	0.417	0.315	1.0	1.39	1.05	11.4	NMED A1 TAP SCRN LVL
SVOCs	91-57-6	Methylnaphthalene[2-]	SW-846:8270D	UF	µg/L	249	0.3	0.417	0.315	1.0	1.39	1.05	35.1	NMED A1 TAP SCRN LVL
SVOCs	95-48-7	Methylphenol[2-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	930	EPA TAP SCRN LVL
SVOCs	65794-96-9	Methylphenol[3-,4-]	SW-846:8270D	UF	µg/L	249	3.7	5.14	3.89	10.0	13.9	10.5	1900	EPA TAP SCRN LVL
SVOCs	91-20-3	Naphthalene	SW-846:8270D	UF	µg/L	249	0.3	0.417	0.315	1.0	1.39	1.05	1.65	NMED A1 TAP SCRN LVL
SVOCs	88-74-4	Nitroaniline[2-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	190	EPA TAP SCRN LVL
SVOCs	99-09-2	Nitroaniline[3-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	—	—
SVOCs	100-01-6	Nitroaniline[4-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	38	EPA TAP SCRN LVL
SVOCs	98-95-3	Nitrobenzene	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	1.4	NMED A1 TAP SCRN LVL
SVOCs	88-75-5	Nitrophenol[2-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	—	—
SVOCs	100-02-7	Nitrophenol[4-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	—	—
SVOCs	55-18-5	Nitrosodiethylamine[N-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	0.00167	NMED A1 TAP SCRN LVL
SVOCs	62-75-9	Nitrosodimethylamine[N-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	0.00491	NMED A1 TAP SCRN LVL
SVOCs	924-16-3	Nitroso-di-n-butylamine[N-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	0.0273	NMED A1 TAP SCRN LVL
SVOCs	621-64-7	Nitroso-di-n-propylamine[N-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	0.11	EPA TAP SCRN LVL
SVOCs	930-55-2	Nitrosopyrrolidine[N-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	0.37	NMED A1 TAP SCRN LVL
SVOCs	108-60-1	Oxybis(1-chloropropane)[2,2'-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	9.81	NMED A1 TAP SCRN LVL
SVOCs	608-93-5	Pentachlorobenzene	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	3.07	NMED A1 TAP SCRN LVL
SVOCs	87-86-5	Pentachlorophenol	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	1	NM GW STD
SVOCs	85-01-8	Phenanthrene	SW-846:8270D	UF	µg/L	249	0.3	0.417	0.315	1.0	1.39	1.05	170	NMED A1 TAP SCRN LVL
SVOCs	108-95-2	Phenol	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	5	NM GW STD
SVOCs	129-00-0	Pyrene	SW-846:8270D	UF	µg/L	249	0.3	0.417	0.315	1.0	1.39	1.05	117	NMED A1 TAP SCRN LVL
SVOCs	110-86-1	Pyridine	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	20	EPA TAP SCRN LVL
SVOCs	95-94-3	Tetrachlorobenzene[1,2,4,5]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	1.66	NMED A1 TAP SCRN LVL
SVOCs	58-90-2	Tetrachlorophenol[2,3,4,6-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	240	EPA TAP SCRN LVL
SVOCs	120-82-1	Trichlorobenzene[1,2,4-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	70	NM GW STD
SVOCs	95-95-4	Trichlorophenol[2,4,5-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	1170	NMED A1 TAP SCRN LVL
SVOCs	88-06-2	Trichlorophenol[2,4,6-]	SW-846:8270D	UF	µg/L	249	3.0	4.17	3.15	10.0	13.9	10.5	11.9	NMED A1 TAP SCRN LVL
VOC[m]	67-64-1	Acetone	SW-846:8260B	UF	µg/L	421	1.5	1.5	1.5	10.0	10.0	10.0	14100	NMED A1 TAP SCRN LVL
VOC	75-05-8	Acetonitrile	SW-846:8260B	UF	µg/L	421	8.0	8.0	8.0	25.0	25.0	25.0	130	EPA TAP SCRN LVL
VOC	107-02-8	Acrolein	SW-846:8260B	UF	µg/L	421	1.5	1.5	1.5	5.0	5.0	5.0	0.0415	NMED A1 TAP SCRN LVL
VOC	107-13-1	Acrylonitrile	SW-846:8260B	UF	µg/L	421	1.5	1.5	1.5	5.0	5.0	5.0	0.523	NMED A1 TAP SCRN LVL
VOC	71-43-2	Benzene	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	5	NM GW STD
VOC	108-86-1	Bromobenzene	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	62	EPA TAP SCRN LVL
VOC	74-97-5	Bromochloromethane	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	83	EPA TAP SCRN LVL
VOC	75-27-4	Bromodichloromethane	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	1.34	NMED A1 TAP SCRN LVL

Table B-4.1-2 (continued)

Suite	Symbol or CAS No.	Analyte	Analytical Method	Field Preparation Code	Unit	Number of Analyses	MDL (Minimum)	MDL (Maximum)	MDL (Average)	PQL (Minimum)	PQL (Maximum)	PQL (Average)	Screening Value	Screening Value Type
VOC	75-25-2	Bromoform	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	80	EPA MCL
VOC	74-83-9	Bromomethane	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	7.54	NMED A1 TAP SCRN LVL
VOC	71-36-3	Butanol[1-]	SW-846:8260B	UF	µg/L	421	15.0	15.0	15.0	50.0	50.0	50.0	2000	EPA TAP SCRN LVL
VOC	78-93-3	Butanone[2-]	SW-846:8260B	UF	µg/L	421	1.5	1.5	1.5	5.0	5.0	5.0	5560	NMED A1 TAP SCRN LVL
VOC	104-51-8	Butylbenzene[n-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	1000	EPA TAP SCRN LVL
VOC	135-98-8	Butylbenzene[sec-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	2000	EPA TAP SCRN LVL
VOC	98-06-6	Butylbenzene[tert-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	690	EPA TAP SCRN LVL
VOC	75-15-0	Carbon Disulfide	SW-846:8260B	UF	µg/L	421	1.5	1.5	1.5	5.0	5.0	5.0	810	NMED A1 TAP SCRN LVL
VOC	56-23-5	Carbon Tetrachloride	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	5	NM GW STD
VOC	126-99-8	Chloro-1,3-butadiene[2-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	0.187	NMED A1 TAP SCRN LVL
VOC	107-05-1	Chloro-1-propene[3-]	SW-846:8260B	UF	µg/L	421	1.5	1.5	1.5	5.0	5.0	5.0	7.3	EPA TAP SCRN LVL
VOC	108-90-7	Chlorobenzene	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	100	EPA MCL
VOC	124-48-1	Chlorodibromomethane	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	1.68	NMED A1 TAP SCRN LVL
VOC	75-00-3	Chloroethane	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	20900	NMED A1 TAP SCRN LVL
VOC	67-66-3	Chloroform	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	80	EPA MCL
VOC	74-87-3	Chloromethane	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	20.3	NMED A1 TAP SCRN LVL
VOC	95-49-8	Chlorotoluene[2-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	233	NMED A1 TAP SCRN LVL
VOC	106-43-4	Chlorotoluene[4-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	250	EPA TAP SCRN LVL
VOC	96-12-8	Dibromo-3-Chloropropane[1,2-]	SW-846:8260B	UF	µg/L	421	0.5	0.5	0.5	1.0	1.0	1.0	0.2	EPA MCL
VOC	106-93-4	Dibromoethane[1,2-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	0.05	NM GW STD
VOC	74-95-3	Dibromomethane	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	0.0747	NMED A1 TAP SCRN LVL
VOC	95-50-1	Dichlorobenzene[1,2-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	600	NM GW STD
VOC	541-73-1	Dichlorobenzene[1,3-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	—	—
VOC	106-46-7	Dichlorobenzene[1,4-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	75	NM GW STD
VOC	75-71-8	Dichlorodifluoromethane	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	197	NMED A1 TAP SCRN LVL
VOC	75-34-3	Dichloroethane[1,1-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	25	NM GW STD
VOC	107-06-2	Dichloroethane[1,2-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	5	NM GW STD
VOC	75-35-4	Dichloroethene[1,1-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	7	NM GW STD
VOC	156-59-2	Dichloroethene[cis-1,2-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	70	NM GW STD
VOC	156-60-5	Dichloroethene[trans-1,2-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	100	NM GW STD
VOC	78-87-5	Dichloropropane[1,2-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	5	NM GW STD
VOC	142-28-9	Dichloropropane[1,3-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	370	EPA TAP SCRN LVL
VOC	594-20-7	Dichloropropane[2,2-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	—	—
VOC	563-58-6	Dichloropropene[1,1-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	—	—
VOC	10061-01-5	Dichloropropene[cis-1,3-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	4.71	NMED A1 TAP SCRN LVL
VOC	10061-02-6	Dichloropropene[trans-1,3-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	4.71	NMED A1 TAP SCRN LVL
VOC	60-29-7	Diethyl Ether	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	3930	NMED A1 TAP SCRN LVL

Table B-4.1-2 (continued)

Suite	Symbol or CAS No.	Analyte	Analytical Method	Field Preparation Code	Unit	Number of Analyses	MDL (Minimum)	MDL (Maximum)	MDL (Average)	PQL (Minimum)	PQL (Maximum)	PQL (Average)	Screening Value	Screening Value Type
VOC	97-63-2	Ethyl Methacrylate	SW-846:8260B	UF	µg/L	421	1.5	1.5	1.5	5.0	5.0	5.0	455	NMED A1 TAP SCRN LVL
VOC	100-41-4	Ethylbenzene	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	700	NM GW STD
VOC	87-68-3	Hexachlorobutadiene	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	1.39	NMED A1 TAP SCRN LVL
VOC	591-78-6	Hexanone[2-]	SW-846:8260B	UF	µg/L	421	1.5	1.5	1.5	5.0	5.0	5.0	38	EPA TAP SCRN LVL
VOC	74-88-4	Iodomethane	SW-846:8260B	UF	µg/L	421	1.5	1.5	1.5	5.0	5.0	5.0	—	—
VOC	78-83-1	Isobutyl alcohol	SW-846:8260B	UF	µg/L	421	15.0	15.0	15.0	50.0	50.0	50.0	5910	NMED A1 TAP SCRN LVL
VOC	98-82-8	Isopropylbenzene	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	447	NMED A1 TAP SCRN LVL
VOC	99-87-6	Isopropyltoluene[4-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	—	—
VOC	126-98-7	Methacrylonitrile	SW-846:8260B	UF	µg/L	421	1.5	1.5	1.5	5.0	5.0	5.0	1.91	NMED A1 TAP SCRN LVL
VOC	80-62-6	Methyl Methacrylate	SW-846:8260B	UF	µg/L	421	1.5	1.5	1.5	5.0	5.0	5.0	1390	NMED A1 TAP SCRN LVL
VOC	1634-04-4	Methyl tert-Butyl Ether	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	100	NM GW STD
VOC	108-10-1	Methyl-2-pentanone[4-]	SW-846:8260B	UF	µg/L	421	1.5	1.5	1.5	5.0	5.0	5.0	1240	NMED A1 TAP SCRN LVL
VOC	75-09-2	Methylene Chloride	SW-846:8260B	UF	µg/L	420	1.0	1.0	1.0	10.0	10.0	10.0	5	NM GW STD
VOC	91-20-3	Naphthalene	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	1.65	NMED A1 TAP SCRN LVL
VOC	107-12-0	Propionitrile	SW-846:8260B	UF	µg/L	421	1.5	1.5	1.5	5.0	5.0	5.0	—	—
VOC	103-65-1	Propylbenzene[1-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	660	EPA TAP SCRN LVL
VOC	100-42-5	Styrene	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	100	NM GW STD
VOC	630-20-6	Tetrachloroethane[1,1,1,2-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	5.74	NMED A1 TAP SCRN LVL
VOC	79-34-5	Tetrachloroethane[1,1,2,2-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	10	NM GW STD
VOC	127-18-4	Tetrachloroethene	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	5	NM GW STD
VOC	108-88-3	Toluene	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	1000	NM GW STD
VOC	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	SW-846:8260B	UF	µg/L	421	2.0	2.0	2.0	5.0	5.0	5.0	55000	NMED A1 TAP SCRN LVL
VOC	87-61-6	Trichlorobenzene[1,2,3-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	7	EPA TAP SCRN LVL
VOC	120-82-1	Trichlorobenzene[1,2,4-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	70	NM GW STD
VOC	71-55-6	Trichloroethane[1,1,1-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	200	NM GW STD
VOC	79-00-5	Trichloroethane[1,1,2-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	5	NM GW STD
VOC	79-01-6	Trichloroethene	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	5	NM GW STD
VOC	75-69-4	Trichlorofluoromethane	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	1140	NMED A1 TAP SCRN LVL
VOC	96-18-4	Trichloropropane[1,2,3-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	0.00835	NMED A1 TAP SCRN LVL
VOC	95-63-6	Trimethylbenzene[1,2,4-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	56	EPA TAP SCRN LVL

Table B-4.1-2 (continued)

Suite	Symbol or CAS No.	Analyte	Analytical Method	Field Preparation Code	Unit	Number of Analyses	MDL (Minimum)	MDL (Maximum)	MDL (Average)	PQL (Minimum)	PQL (Maximum)	PQL (Average)	Screening Value	Screening Value Type
VOC	108-67-8	Trimethylbenzene[1,3,5-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	60	EPA TAP SCRN LVL
VOC	108-05-4	Vinyl acetate	SW-846:8260B	UF	µg/L	421	1.5	1.5	1.5	5.0	5.0	5.0	409	NMED A1 TAP SCRN LVL
VOC	75-01-4	Vinyl Chloride	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	2	NM GW STD
VOC	95-47-6	Xylene[1,2-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	1.0	1.0	1.0	193	NMED A1 TAP SCRN LVL
VOC	Xylene[m+p]	Xylene[1,3-]+Xylene[1,4-]	SW-846:8260B	UF	µg/L	421	0.3	0.3	0.3	2.0	2.0	2.0	193	NMED A1 TAP SCRN LVL

Notes: CAS = Chemical Abstracts Service; EPA MCL = EPA maximum contaminant level; NM GW STD = New Mexico groundwater standard; EPA TAP SCRN LVL = EPA tap water screening level; NMED A1 TAP SCRN LVL = NMED screening level for tap water.

[a] UF = Unfiltered, F = filtered.

[b] — = Not available.

[c] HEXP = High explosives.

[d] DNX = Dinitrotoluene.

[e] HMX = Her Majesty's Explosive.

[f] MNX = Hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine.

[g] PETN =Pentaerythritol tetranitrate.

[h] RDX = Royal Demolition Explosive.

[i] TATB = Triaminotrinitrobenzene.

[j] TNX = Trinitroxylene[2,4,6-].

[k] PCB = Polychlorinated biphenyl.

[l] SVOC = Semivolatile organic chemical.

[m] VOC = Volatile organic chemical.

Table B-4.1-3
Analyte MDLs and PQLs for Base Flow Samples Collected in MY 2018 and MY 2019 and Analyzed by Accredited Contract Laboratories

Suite	Symbol or CAS No.	Analyte	Analytical Method	Field Preparation Code[a]	Unit	Number of Analyses	MDL (Minimum)	MDL (Maximum)	MDL (Average)	PQL (Minimum)	PQL (Maximum)	PQL (Average)
Dioxins/Furans	35822-46-9	Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	SW-846:8290A	UF	µg/L	8	1.73E-05	1.82E-05	1.78E-05	5.20E-05	5.50E-05	5.34E-05
Dioxins/Furans	57653-85-7	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	SW-846:8290A	UF	µg/L	8	1.78E-05	2.60E-05	2.25E-05	5.20E-05	5.50E-05	5.34E-05
Dioxins/Furans	39227-28-6	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	SW-846:8290A	UF	µg/L	8	1.78E-05	3.40E-05	2.74E-05	5.20E-05	5.50E-05	5.34E-05
Dioxins/Furans	19408-74-3	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	SW-846:8290A	UF	µg/L	8	1.78E-05	2.92E-05	2.45E-05	5.20E-05	5.50E-05	5.34E-05
Dioxins/Furans	3268-87-9	Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	SW-846:8290A	UF	µg/L	8	3.46E-05	3.65E-05	3.56E-05	1.00E-04	1.10E-04	1.06E-04
Dioxins/Furans	40321-76-4	Pentachlorodibenzodioxin[1,2,3,7,8-]	SW-846:8290A	UF	µg/L	8	1.78E-05	3.00E-05	2.49E-05	5.20E-05	5.50E-05	5.34E-05
Dioxins/Furans	1746-01-6	Tetrachlorodibenzodioxin[2,3,7,8-]	SW-846:8290A	UF	µg/L	8	3.46E-06	3.65E-06	3.56E-06	1.00E-05	1.10E-05	1.06E-05
Dioxins/Furans	55673-89-7	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	SW-846:8290A	UF	µg/L	8	1.78E-05	1.93E-05	1.84E-05	5.20E-05	5.50E-05	5.34E-05
Dioxins/Furans	67562-39-4	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	SW-846:8290A	UF	µg/L	8	1.75E-05	1.84E-05	1.79E-05	5.20E-05	5.50E-05	5.34E-05
Dioxins/Furans	57117-44-9	Hexachlorodibenzofuran[1,2,3,6,7,8-]	SW-846:8290A	UF	µg/L	8	1.78E-05	2.41E-05	2.14E-05	5.20E-05	5.50E-05	5.34E-05
Dioxins/Furans	60851-34-5	Hexachlorodibenzofuran[2,3,4,6,7,8-]	SW-846:8290A	UF	µg/L	8	1.78E-05	2.01E-05	1.90E-05	5.20E-05	5.50E-05	5.34E-05
Dioxins/Furans	70648-26-9	Hexachlorodibenzofuran[1,2,3,4,7,8-]	SW-846:8290A	UF	µg/L	8	1.78E-05	2.17E-05	1.99E-05	5.20E-05	5.50E-05	5.34E-05
Dioxins/Furans	72918-21-9	Hexachlorodibenzofuran[1,2,3,7,8,9-]	SW-846:8290A	UF	µg/L	8	1.78E-05	2.78E-05	2.36E-05	5.20E-05	5.50E-05	5.34E-05
Dioxins/Furans	39001-02-0	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	SW-846:8290A	UF	µg/L	8	3.56E-05	6.34E-05	5.20E-05	1.00E-04	1.10E-04	1.06E-04

Table B-4.1-3 (continued)

Suite	Symbol or CAS No.	Analyte	Analytical Method	Field Preparation Code[a]	Unit	Number of Analyses	MDL (Minimum)	MDL (Maximum)	MDL (Average)	PQL (Minimum)	PQL (Maximum)	PQL (Average)
Dioxins/Furans	57117-31-4	Pentachlorodibenzofuran[2,3,4,7,8-]	SW-846:8290A	UF	µg/L	8	1.73E-05	1.82E-05	1.78E-05	5.20E-05	5.50E-05	5.34E-05
Dioxins/Furans	57117-41-6	Pentachlorodibenzofuran[1,2,3,7,8-]	SW-846:8290A	UF	µg/L	8	1.78E-05	2.18E-05	2.00E-05	5.20E-05	5.50E-05	5.34E-05
Dioxins/Furans	51207-31-9	Tetrachlorodibenzofuran[2,3,7,8-]	SW-846:8290A	UF	µg/L	8	3.46E-06	3.65E-06	3.56E-06	1.00E-05	1.10E-05	1.06E-05
General Inorganics	ALK-CO3	Alkalinity-CO3	EPA:310.1	F	mg/L	23	1.45	1.45	1.45	4.0	4.0	4.0
General Inorganics	ALK-CO3+HCO3	Alkalinity-CO3+HCO3	EPA:310.1	F	mg/L	23	1.45	1.45	1.45	4.0	4.0	4.0
General Inorganics	Br(-1)	Bromide	EPA:300.0	F	mg/L	22	0.067	0.067	0.067	0.2	0.2	0.2
General Inorganics	Cl(-1)	Chloride	EPA:300.0	F	mg/L	7	0.067	0.067	0.067	0.2	0.2	0.2
General Inorganics	F(-1)	Fluoride	EPA:300.0	F	mg/L	23	0.033	0.033	0.033	0.1	0.1	0.1
General Inorganics	NH3-N	Ammonia as Nitrogen	EPA:350.1	F	mg/L	22	0.017	0.017	0.017	0.05	0.05	0.05
General Inorganics	NO3+NO2-N	Nitrate-Nitrite as Nitrogen	EPA:353.2	F	mg/L	21	0.017	0.017	0.017	0.05	0.05	0.05
General Inorganics	pH	Acidity or Alkalinity of a solution	EPA:150.1	F	SU	22	0.01	0.01	0.01	0.1	0.1	0.1
General Inorganics	PO4-P	Total Phosphate as Phosphorus	EPA:365.4	F	mg/L	21	0.02	0.02	0.02	0.05	0.05	0.05
General Inorganics	SO4(-2)	Sulfate	EPA:300.0	F	mg/L	17	0.133	0.133	0.133	0.4	0.4	0.4
General Inorganics	SPEC_CONDC	Specific Conductance	EPA:120.1	F	µS/cm	23	1.0	1.0	1.0	1.0	1.0	1.0
General Inorganics	TDS	Total Dissolved Solids	EPA:160.1	F	mg/L	22	3.4	3.4	3.4	14.3	14.3	14.3
General Inorganics	TKN	Total Kjeldahl Nitrogen	EPA:351.2	UF	mg/L	22	0.033	0.033	0.033	0.1	0.1	0.1
General Inorganics	TOC	Total Organic Carbon	SW-846:9060	UF	mg/L	19	0.33	0.33	0.33	1.0	1.0	1.0
General Inorganics	CN(TOTAL)	Cyanide (Total)	EPA:335.4	UF	mg/L	23	0.00167	0.00167	0.00167	0.005	0.005	0.005
General Inorganics	ClO4	Perchlorate	SW-846:6850	F	µg/L	22	0.05	0.05	0.0500	0.2	0.2	0.200
Metals	Ag	Silver	SW-846:6020	F	µg/L	39	0.3	0.3	0.3	1.0	1.0	1.0
Metals	Al	Aluminum	SW-846:6010C	F	µg/L	39	68.0	68.0	68.0	200.0	200.0	200.0
Metals	Al	Aluminum	SW-846:6010C	UF	µg/L	39	68.0	68.0	68.0	200.0	200.0	200.0
Metals	As	Arsenic	SW-846:6020	F	µg/L	39	2.0	2.0	2.0	5.0	5.0	5.0
Metals	B	Boron	SW-846:6010C	F	µg/L	39	15.0	15.0	15.0	50.0	50.0	50.0
Metals	Ba	Barium	SW-846:6010C	F	µg/L	39	1.0	1.0	1.0	5.0	5.0	5.0
Metals	Be	Beryllium	SW-846:6010C	F	µg/L	39	1.0	1.0	1.0	5.0	5.0	5.0
Metals	Ca	Calcium	SW-846:6010C	F	mg/L	39	0.05	0.05	0.05	0.2	0.2	0.2
Metals	Cd	Cadmium	SW-846:6020	F	µg/L	39	0.3	0.3	0.3	1.0	1.0	1.0
Metals	Co	Cobalt	SW-846:6010C	F	µg/L	39	1.0	1.0	1.0	5.0	5.0	5.0
Metals	Cr	Chromium	SW-846:6020	F	µg/L	39	3.0	3.0	3.0	10.0	10.0	10.0
Metals	Cu	Copper	SW-846:6010C	F	µg/L	39	3.0	3.0	3.0	10.0	20.0	11.3
Metals	Fe	Iron	SW-846:6010C	F	µg/L	39	30.0	30.0	30.0	100.0	100.0	100.0
Metals	Hardness	Hardness	SM:A2340B	F	mg/L	39	0.453	0.453	0.453	1.24	1.24	1.24
Metals	Hg	Mercury	EPA:245.2	F	µg/L	39	0.067	0.067	0.067	0.2	0.2	0.2
Metals	Hg	Mercury	EPA:245.2	UF	µg/L	39	0.067	0.067	0.067	0.2	0.2	0.2
Metals	K	Potassium	SW-846:6010C	F	mg/L	39	0.05	0.05	0.05	0.15	0.15	0.15
Metals	Mg	Magnesium	SW-846:6010C	F	mg/L	39	0.11	0.11	0.11	0.3	0.3	0.3

Table B-4.1-3 (continued)

Suite	Symbol or CAS No.	Analyte	Analytical Method	Field Preparation Code[a]	Unit	Number of Analyses	MDL (Minimum)	MDL (Maximum)	MDL (Average)	PQL (Minimum)	PQL (Maximum)	PQL (Average)
Metals	Mn	Manganese	SW-846:6010C	F	µg/L	39	2.0	2.0	2.0	10.0	10.0	10.0
Metals	Mo	Molybdenum	SW-846:6020	F	µg/L	39	0.2	0.2	0.2	0.5	1.0	0.6
Metals	Na	Sodium	SW-846:6010C	F	mg/L	39	0.1	0.1	0.1	0.3	0.3	0.3
Metals	Ni	Nickel	SW-846:6020	F	µg/L	39	0.6	0.6	0.6	2.0	2.0	2.0
Metals	Pb	Lead	SW-846:6020	F	µg/L	39	0.5	0.5	0.5	2.0	2.0	2.0
Metals	Sb	Antimony	SW-846:6020	F	µg/L	39	1.0	1.0	1.0	3.0	3.0	3.0
Metals	Se	Selenium	SW-846:6020	F	µg/L	39	2.0	2.0	2.0	5.0	5.0	5.0
Metals	Se	Selenium	SW-846:6020	UF	µg/L	39	2.0	2.0	2.0	5.0	5.0	5.0
Metals	SiO2	Silicon Dioxide	SW-846:6010C	F	mg/L	26	0.053	0.053	0.053	0.213	0.213	0.213
Metals	Sn	Tin	SW-846:6010C	F	µg/L	39	2.5	2.5	2.5	10.0	10.0	10.0
Metals	Sr	Strontium	SW-846:6010C	F	µg/L	39	1.0	1.0	1.0	5.0	5.0	5.0
Metals	Tl	Thallium	SW-846:6020	F	µg/L	39	0.6	0.6	0.6	2.0	2.0	2.0
Metals	U	Uranium	SW-846:6020	F	µg/L	39	0.067	0.067	0.067	0.2	0.2	0.2
Metals	V	Vanadium	SW-846:6010C	F	µg/L	39	1.0	1.0	1.0	5.0	5.0	5.0
Metals	Zn	Zinc	SW-846:6010C	F	µg/L	39	3.3	3.3	3.3	10.0	20.0	11.3
PCBs[b]	11096-82-5	Aroclor-1260	SW-846:8082	UF	µg/L	12	0.034	0.037	0.0352	0.102	0.111	0.106
PCBs	11097-69-1	Aroclor-1254	SW-846:8082	UF	µg/L	12	0.034	0.037	0.0352	0.102	0.111	0.106
PCBs	11104-28-2	Aroclor-1221	SW-846:8082	UF	µg/L	12	0.034	0.037	0.0352	0.102	0.111	0.106
PCBs	11141-16-5	Aroclor-1232	SW-846:8082	UF	µg/L	12	0.034	0.037	0.0352	0.102	0.111	0.106
PCBs	12672-29-6	Aroclor-1248	SW-846:8082	UF	µg/L	12	0.034	0.037	0.0352	0.102	0.111	0.106
PCBs	12674-11-2	Aroclor-1016	SW-846:8082	UF	µg/L	12	0.034	0.037	0.0352	0.102	0.111	0.106
PCBs	37324-23-5	Aroclor-1262	SW-846:8082	UF	µg/L	12	0.034	0.037	0.0352	0.102	0.111	0.106
PCBs	53469-21-9	Aroclor-1242	SW-846:8082	UF	µg/L	12	0.034	0.037	0.0352	0.102	0.111	0.106
HEXP[c]	118-96-7	Trinitrotoluene[2,4,6-]	SW-846:8330B	UF	µg/L	14	0.0825	0.0904	0.0862	0.258	0.283	0.270
HEXP	121-14-2	Dinitrotoluene[2,4-]	SW-846:8330B	UF	µg/L	14	0.0825	0.0904	0.0862	0.258	0.283	0.270
HEXP	121-82-4	RDX[d]	SW-846:8330B	UF	µg/L	13	0.0825	0.0904	0.0862	0.258	0.283	0.269
HEXP	19406-51-0	Amino-2,6-dinitrotoluene[4-]	SW-846:8330B	UF	µg/L	14	0.0825	0.0904	0.0862	0.258	0.283	0.270
HEXP	2691-41-0	HMX[e]	SW-846:8330B	UF	µg/L	13	0.0825	0.0904	0.0862	0.258	0.283	0.269
HEXP	3058-38-6	TATB[f]	SW-846:8330B	UF	µg/L	14	0.309	0.339	0.3234	1.03	1.13	1.1
HEXP	35572-78-2	Amino-4,6-dinitrotoluene[2-]	SW-846:8330B	UF	µg/L	14	0.0825	0.0904	0.0862	0.258	0.283	0.270
HEXP	479-45-8	Tetryl	SW-846:8330B	UF	µg/L	14	0.0825	0.0904	0.0862	0.515	0.565	0.539
HEXP	59229-75-3	2,6-Diamino-4-nitrotoluene	SW-846:8330B	UF	µg/L	14	0.515	0.565	0.5387	2.58	2.83	2.7
HEXP	606-20-2	Dinitrotoluene[2,6-]	SW-846:8330B	UF	µg/L	14	0.0825	0.0904	0.0862	0.258	0.283	0.270
HEXP	618-87-1	3,5-Dinitroaniline	SW-846:8330B	UF	µg/L	14	0.309	0.339	0.3234	1.03	1.13	1.1
HEXP	6629-29-4	2,4-Diamino-6-nitrotoluene	SW-846:8330B	UF	µg/L	14	0.515	0.565	0.5387	2.58	2.83	2.7
HEXP	78-11-5	PETN[g]	SW-846:8330B	UF	µg/L	14	0.103	0.113	0.1078	0.515	0.565	0.539
HEXP	78-30-8	Tris (o-cresyl) phosphate	SW-846:8330B	UF	µg/L	14	0.309	0.339	0.3234	1.03	1.13	1.078

Table B-4.1-3 (continued)

Suite	Symbol or CAS No.	Analyte	Analytical Method	Field Preparation Code[a]	Unit	Number of Analyses	MDL (Minimum)	MDL (Maximum)	MDL (Average)	PQL (Minimum)	PQL (Maximum)	PQL (Average)
HEXP	88-72-2	Nitrotoluene[2-]	SW-846:8330B	UF	µg/L	14	0.0845	0.0927	0.0884	0.258	0.283	0.270
HEXP	98-95-3	Nitrobenzene	SW-846:8330B	UF	µg/L	14	0.0825	0.0904	0.0862	0.258	0.283	0.270
HEXP	99-08-1	Nitrotoluene[3-]	SW-846:8330B	UF	µg/L	14	0.0825	0.0904	0.0862	0.258	0.283	0.270
HEXP	99-35-4	Trinitrobenzene[1,3,5-]	SW-846:8330B	UF	µg/L	14	0.0825	0.0904	0.0862	0.258	0.283	0.270
HEXP	99-65-0	Dinitrobenzene[1,3-]	SW-846:8330B	UF	µg/L	14	0.0825	0.0904	0.0862	0.258	0.283	0.270
HEXP	99-99-0	Nitrotoluene[4-]	SW-846:8330B	UF	µg/L	14	0.155	0.17	0.1618	0.515	0.565	0.539
HEXP	DNX	DNX[h]	SW-846:8330B	UF	µg/L	9	0.0833	0.0904	0.0861	0.26	0.283	0.269
HEXP	MNX	MNX[i]	SW-846:8330B	UF	µg/L	9	0.0833	0.0904	0.0861	0.26	0.283	0.269
HEXP	TNX	TNX[j]	SW-846:8330B	UF	µg/L	9	0.0833	0.0904	0.0861	0.26	0.283	0.269
SVOC[k]	100-01-6	Nitroaniline[4-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	100-02-7	Nitrophenol[4-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	100-51-6	Benzyl Alcohol	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	101-55-3	Bromophenyl-phenylether[4-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	103-33-3	Azobenzene	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	105-67-9	Dimethylphenol[2,4-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	106-46-7	Dichlorobenzene[1,4-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	106-47-8	Chloroaniline[4-]	SW-846:8270D	UF	µg/L	13	3.3	3.59	3.4	10.0	10.9	10.4
SVOC	108-60-1	Oxybis(1-chloropropane)[2,2'-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	108-95-2	Phenol	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	110-86-1	Pyridine	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	111-44-4	Bis(2-chloroethyl)ether	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	111-91-1	Bis(2-chloroethoxy)methane	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	117-81-7	Bis(2-ethylhexyl)phthalate	SW-846:8270D	UF	µg/L	13	0.3	3.26	1.6	1.0	10.8	3.2
SVOC	117-84-0	Di-n-octylphthalate	SW-846:8270D	UF	µg/L	13	0.3	3.26	1.6	10.0	10.9	10.4
SVOC	118-74-1	Hexachlorobenzene	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	120-12-7	Anthracene	SW-846:8270D	UF	µg/L	13	0.3	0.326	0.3	1.0	1.09	1.04
SVOC	120-82-1	Trichlorobenzene[1,2,4-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	120-83-2	Dichlorophenol[2,4-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	121-14-2	Dinitrotoluene[2,4-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	122-39-4	Diphenylamine	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	123-91-1	Dioxane[1,4-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	129-00-0	Pyrene	SW-846:8270D	UF	µg/L	13	0.3	0.326	0.3	1.0	1.09	1.04
SVOC	131-11-3	Dimethyl Phthalate	SW-846:8270D	UF	µg/L	13	0.3	3.26	1.6	10.0	10.9	10.4
SVOC	132-64-9	Dibenzofuran	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	191-24-2	Benzo(g,h,i)perylene	SW-846:8270D	UF	µg/L	13	0.3	0.326	0.3	1.0	1.09	1.04
SVOC	1912-24-9	Atrazine	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	193-39-5	Indeno(1,2,3-cd)pyrene	SW-846:8270D	UF	µg/L	13	0.3	0.326	0.3	1.0	1.09	1.04

Table B-4.1-3 (continued)

Suite	Symbol or CAS No.	Analyte	Analytical Method	Field Preparation Code[a]	Unit	Number of Analyses	MDL (Minimum)	MDL (Maximum)	MDL (Average)	PQL (Minimum)	PQL (Maximum)	PQL (Average)
SVOC	205-99-2	Benzo(b)fluoranthene	SW-846:8270D	UF	µg/L	13	0.3	0.326	0.3	1.0	1.09	1.04
SVOC	206-44-0	Fluoranthene	SW-846:8270D	UF	µg/L	13	0.3	0.326	0.3	1.0	1.09	1.04
SVOC	207-08-9	Benzo(k)fluoranthene	SW-846:8270D	UF	µg/L	13	0.3	0.326	0.3	1.0	1.09	1.04
SVOC	208-96-8	Acenaphthylene	SW-846:8270D	UF	µg/L	13	0.3	0.326	0.3	1.0	1.09	1.04
SVOC	218-01-9	Chrysene	SW-846:8270D	UF	µg/L	13	0.3	0.326	0.3	1.0	1.09	1.04
SVOC	50-32-8	Benzo(a)pyrene	SW-846:8270D	UF	µg/L	13	0.3	0.326	0.3	1.0	1.09	1.04
SVOC	51-28-5	Dinitrophenol[2,4-]	SW-846:8270D	UF	µg/L	13	5.0	5.43	5.2	20.0	21.7	20.8
SVOC	53-70-3	Dibenz(a,h)anthracene	SW-846:8270D	UF	µg/L	13	0.3	0.326	0.3	1.0	1.09	1.04
SVOC	534-52-1	Dinitro-2-methylphenol[4,6-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	541-73-1	Dichlorobenzene[1,3-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	55-18-5	Nitrosodiethylamine[N-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	56-55-3	Benzo(a)anthracene	SW-846:8270D	UF	µg/L	13	0.3	0.326	0.3	1.0	1.09	1.04
SVOC	58-90-2	Tetrachlorophenol[2,3,4,6-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	59-50-7	Chloro-3-methylphenol[4-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	606-20-2	Dinitrotoluene[2,6-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	608-93-5	Pentachlorobenzene	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	62-53-3	Aniline	SW-846:8270D	UF	µg/L	13	4.2	4.57	4.4	10.0	10.9	10.4
SVOC	62-75-9	Nitrosodimethylamine[N-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	621-64-7	Nitroso-di-n-propylamine[N-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	65-85-0	Benzoic Acid	SW-846:8270D	UF	µg/L	13	6.0	6.52	6.2	20.0	21.7	20.8
SVOC	65794-96-9	Methylphenol[3-,4-]	SW-846:8270D	UF	µg/L	13	3.7	4.02	3.8	10.0	10.9	10.4
SVOC	67-72-1	Hexachloroethane	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	7005-72-3	Chlorophenyl-phenyl[4-] Ether	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	77-47-4	Hexachlorocyclopentadiene	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	78-59-1	Isophorone	SW-846:8270D	UF	µg/L	13	3.5	3.8	3.6	10.0	10.9	10.4
SVOC	83-32-9	Acenaphthene	SW-846:8270D	UF	µg/L	13	0.3	0.326	0.3	1.0	1.09	1.04
SVOC	84-66-2	Diethylphthalate	SW-846:8270D	UF	µg/L	13	0.3	3.26	1.6	10.0	10.9	10.4
SVOC	84-74-2	Di-n-butylphthalate	SW-846:8270D	UF	µg/L	13	0.3	3.26	1.6	10.0	10.9	10.4
SVOC	85-01-8	Phenanthrene	SW-846:8270D	UF	µg/L	13	0.3	0.326	0.3	1.0	1.09	1.04
SVOC	85-68-7	Butylbenzylphthalate	SW-846:8270D	UF	µg/L	13	0.3	3.26	1.6	10.0	10.9	10.4
SVOC	86-73-7	Fluorene	SW-846:8270D	UF	µg/L	13	0.3	0.326	0.3	1.0	1.09	1.04
SVOC	87-68-3	Hexachlorobutadiene	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	87-86-5	Pentachlorophenol	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	88-06-2	Trichlorophenol[2,4,6-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	88-74-4	Nitroaniline[2-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	88-75-5	Nitrophenol[2-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	88-85-7	Dinoseb	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4

Table B-4.1-3 (continued)

Suite	Symbol or CAS No.	Analyte	Analytical Method	Field Preparation Code[a]	Unit	Number of Analyses	MDL (Minimum)	MDL (Maximum)	MDL (Average)	PQL (Minimum)	PQL (Maximum)	PQL (Average)
SVOC	90-12-0	Methylnaphthalene[1-]	SW-846:8270D	UF	µg/L	13	0.3	0.326	0.3	1.0	1.09	1.04
SVOC	91-20-3	Naphthalene	SW-846:8270D	UF	µg/L	13	0.3	0.326	0.3	1.0	1.09	1.04
SVOC	91-57-6	Methylnaphthalene[2-]	SW-846:8270D	UF	µg/L	13	0.3	0.326	0.3	1.0	1.09	1.04
SVOC	91-58-7	Chloronaphthalene[2-]	SW-846:8270D	UF	µg/L	13	0.41	0.446	0.4	1.0	1.09	1.04
SVOC	91-94-1	Dichlorobenzidine[3,3'-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	92-87-5	Benzidine	SW-846:8270D	UF	µg/L	13	3.9	4.24	4.1	10.0	10.9	10.4
SVOC	924-16-3	Nitroso-di-n-butylamine[N-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	930-55-2	Nitrosopyrrolidine[N-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	95-48-7	Methylphenol[2-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	95-50-1	Dichlorobenzene[1,2-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	95-57-8	Chlorophenol[2-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	95-94-3	Tetrachlorobenzene[1,2,4,5]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	95-95-4	Trichlorophenol[2,4,5-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	98-95-3	Nitrobenzene	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
SVOC	99-09-2	Nitroaniline[3-]	SW-846:8270D	UF	µg/L	13	3.0	3.26	3.1	10.0	10.9	10.4
VOC[l]	100-41-4	Ethylbenzene	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	100-42-5	Styrene	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	10061-01-5	Dichloropropene[cis-1,3-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	10061-02-6	Dichloropropene[trans-1,3-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	103-65-1	Propylbenzene[1-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	104-51-8	Butylbenzene[n-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	106-43-4	Chlorotoluene[4-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	106-46-7	Dichlorobenzene[1,4-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	106-93-4	Dibromoethane[1,2-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	107-02-8	Acrolein	SW-846:8260B	UF	µg/L	23	1.5	1.5	1.5	5.0	5.0	5.0
VOC	107-05-1	Chloro-1-propene[3-]	SW-846:8260B	UF	µg/L	23	1.5	1.5	1.5	5.0	5.0	5.0
VOC	107-06-2	Dichloroethane[1,2-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	107-12-0	Propionitrile	SW-846:8260B	UF	µg/L	23	1.5	1.5	1.5	5.0	5.0	5.0
VOC	107-13-1	Acrylonitrile	SW-846:8260B	UF	µg/L	23	1.5	1.5	1.5	5.0	5.0	5.0
VOC	108-05-4	Vinyl acetate	SW-846:8260B	UF	µg/L	23	1.5	1.5	1.5	5.0	5.0	5.0
VOC	108-10-1	Methyl-2-pentanone[4-]	SW-846:8260B	UF	µg/L	23	1.5	1.5	1.5	5.0	5.0	5.0
VOC	108-67-8	Trimethylbenzene[1,3,5-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	108-86-1	Bromobenzene	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	108-88-3	Toluene	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	108-90-7	Chlorobenzene	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	120-82-1	Trichlorobenzene[1,2,4-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	124-48-1	Chlorodibromomethane	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0

Table B-4.1-3 (continued)

Suite	Symbol or CAS No.	Analyte	Analytical Method	Field Preparation Code[a]	Unit	Number of Analyses	MDL (Minimum)	MDL (Maximum)	MDL (Average)	PQL (Minimum)	PQL (Maximum)	PQL (Average)
VOC	126-98-7	Methacrylonitrile	SW-846:8260B	UF	µg/L	23	1.5	1.5	1.5	5.0	5.0	5.0
VOC	126-99-8	Chloro-1,3-butadiene[2-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	127-18-4	Tetrachloroethene	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	135-98-8	Butylbenzene[sec-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	142-28-9	Dichloropropane[1,3-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	156-59-2	Dichloroethene[cis-1,2-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	156-60-5	Dichloroethene[trans-1,2-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	1634-04-4	Methyl tert-Butyl Ether	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	541-73-1	Dichlorobenzene[1,3-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	56-23-5	Carbon Tetrachloride	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	563-58-6	Dichloropropene[1,1-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	591-78-6	Hexanone[2-]	SW-846:8260B	UF	µg/L	23	1.5	1.5	1.5	5.0	5.0	5.0
VOC	594-20-7	Dichloropropane[2,2-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	60-29-7	Diethyl Ether	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	630-20-6	Tetrachloroethane[1,1,1,2-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	67-64-1	Acetone	SW-846:8260B	UF	µg/L	23	1.5	1.5	1.5	10.0	10.0	10.0
VOC	67-66-3	Chloroform	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	71-36-3	Butanol[1-]	SW-846:8260B	UF	µg/L	23	15.0	15.0	15.0	50.0	50.0	50.0
VOC	71-43-2	Benzene	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	71-55-6	Trichloroethane[1,1,1-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	74-83-9	Bromomethane	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	74-87-3	Chloromethane	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	74-88-4	Iodomethane	SW-846:8260B	UF	µg/L	23	1.5	1.5	1.5	5.0	5.0	5.0
VOC	74-95-3	Dibromomethane	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	74-97-5	Bromochloromethane	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	75-00-3	Chloroethane	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	75-01-4	Vinyl Chloride	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	75-05-8	Acetonitrile	SW-846:8260B	UF	µg/L	23	8.0	8.0	8.0	25.0	25.0	25.0
VOC	75-09-2	Methylene Chloride	SW-846:8260B	UF	µg/L	23	1.0	1.0	1.0	10.0	10.0	10.0
VOC	75-15-0	Carbon Disulfide	SW-846:8260B	UF	µg/L	23	1.5	1.5	1.5	5.0	5.0	5.0
VOC	75-25-2	Bromoform	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	75-27-4	Bromodichloromethane	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	75-34-3	Dichloroethane[1,1-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	75-35-4	Dichloroethene[1,1-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	75-69-4	Trichlorofluoromethane	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	75-71-8	Dichlorodifluoromethane	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	SW-846:8260B	UF	µg/L	23	2.0	2.0	2.0	5.0	5.0	5.0

Table B-4.1-3 (continued)

Suite	Symbol or CAS No.	Analyte	Analytical Method	Field Preparation Code[a]	Unit	Number of Analyses	MDL (Minimum)	MDL (Maximum)	MDL (Average)	PQL (Minimum)	PQL (Maximum)	PQL (Average)
VOC	78-83-1	Isobutyl alcohol	SW-846:8260B	UF	µg/L	23	15.0	15.0	15.0	50.0	50.0	50.0
VOC	78-87-5	Dichloropropane[1,2-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	78-93-3	Butanone[2-]	SW-846:8260B	UF	µg/L	23	1.5	1.5	1.5	5.0	5.0	5.0
VOC	79-00-5	Trichloroethane[1,1,2-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	79-01-6	Trichloroethene	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	79-34-5	Tetrachloroethane[1,1,2,2-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	80-62-6	Methyl Methacrylate	SW-846:8260B	UF	µg/L	23	1.5	1.5	1.5	5.0	5.0	5.0
VOC	87-61-6	Trichlorobenzene[1,2,3-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	87-68-3	Hexachlorobutadiene	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	91-20-3	Naphthalene	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	95-47-6	Xylene[1,2-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	95-49-8	Chlorotoluene[2-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	95-50-1	Dichlorobenzene[1,2-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	95-63-6	Trimethylbenzene[1,2,4-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	96-12-8	Dibromo-3-Chloropropane[1,2-]	SW-846:8260B	UF	µg/L	23	0.5	0.5	0.5	1.0	1.0	1.0
VOC	96-18-4	Trichloropropane[1,2,3-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	97-63-2	Ethyl Methacrylate	SW-846:8260B	UF	µg/L	23	1.5	1.5	1.5	5.0	5.0	5.0
VOC	98-06-6	Butylbenzene[tert-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	98-82-8	Isopropylbenzene	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	99-87-6	Isopropyltoluene[4-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	1.0	1.0	1.0
VOC	Xylene[m+p]	Xylene[1,3-]+Xylene[1,4-]	SW-846:8260B	UF	µg/L	23	0.3	0.3	0.3	2.0	2.0	2.0

Notes: CAS = Chemical Abstracts Service; EPA MCL = EPA maximum contaminant level; NM GW STD = New Mexico groundwater standard; EPA TAP SCRN LVL = EPA tap water screening level; NMED A1 TAP SCRN LVL = NMED screening level for tap water.

[a] UF = Unfiltered, F = filtered.

[b] PCB = Polychlorinated biphenyl.

[c] HEXP = High explosives.

[d] RDX = Royal Demolition Explosive.

[e] HMX = Her Majesty's Explosive.

[f] TATB = Triaminotrinitrobenzene.

[g] PETN =Pentaerythritol tetranitrate.

[h] DNX = Dinitrotoluene.

[i] MNX = Hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine.

[j] TNX = Trinitroxylene[2,4,6-].

[k] SVOC = Semivolatile organic chemical.

[l] VOC = Volatile organic chemical.

Table B-5.0-1
Waste Stream, Estimated Volumes, and Management of IDW

Waste Stream	Estimated Volume	On-Site Management and Final Disposition
Purge water	5 to 3000 gal. per well per sampling event	Land application per N3B-QP-RGC-0002, Land Application of Groundwater
Contact waste	Less than 110 gal. per watershed monitoring campaign	Accumulation in 55-gal. drums with drum liners. Disposal off-site at a New Mexico solid waste landfill or on-site disposal at TA-54, Area G
Decontamination fluids	Less than 55 gal. per watershed monitoring campaign	Treatment at an N3B-approved off-site wastewater treatment facility for which waste meets waste acceptance criteria

Appendix C

Supplemental Information for
Assigned Sampling Suites and Frequencies

This appendix of the Interim Facility-Wide Groundwater Monitoring Plan (IFGMP) provides supplemental information relevant to sampling frequencies and analytical suites assigned to locations in each area-specific monitoring group or watershed within Los Alamos National Laboratory (LANL or the Laboratory). The following are primary considerations used to define sampling frequencies and analytical suites that are protective of groundwater:

- general types of contaminants released from upgradient sources
- degree to which contaminant nature and extent have been defined
- expected transport characteristics of the released contaminants
- frequency of detection of contaminants in the monitoring group
- magnitude of concentrations relative to the lowest applicable standard
- nature and rate of change of contaminant concentrations
- regulatory direction specified in New Mexico Environment Department (NMED) approval letters related to earlier IFGMPs
- programmatic data requirements to support decisions regarding corrective actions

The highest sampling frequencies apply to areas where a mobile contaminant has been detected above a standard but its nature and extent may not be characterized sufficiently to support decisions about potential remedial actions to be taken. Lower sampling frequencies apply to analytes that are not of significance for a given monitoring group, are relatively immobile in the subsurface, and have not been detected or have been detected infrequently.

The following general rules of thumb were used to define the lowest sampling frequencies for specific analytical suites (excluding those locations undergoing characterization sampling).

Field Parameters. Field parameters are measured at all locations during every sampling event. Field parameters include pH, turbidity, specific conductance, dissolved oxygen, and temperature. Oxidation-reduction potential will be measured if a flow-through cell is used and will not be measured in surface water or spring water unless specified otherwise.

Inorganic Constituents. General inorganic chemicals and metals are typically sampled annually if these suites contain one or more significant contaminants for a monitoring group, the nature and extent of those constituents are well characterized, and additional data are not needed to support regulatory decision-making, such as an investigation report or a corrective measures evaluation (CME). To the extent that additional data are needed to meet project objectives or for new wells, the relevant analytical suite is sampled more frequently.

Organic Constituents. The main characteristic used to determine the lowest sampling frequency for an organic analytical suite is the mobility of its constituents. Suites containing organic constituents with moderate to high mobility in the environment (volatile organic compounds [VOCs] and, to a lesser extent, semivolatile organic compounds [SVOCs] including low-level methods for 1,4-dioxane and nitrosamines) are sampled annually (VOCs), biennially (SVOCs), or not sampled in areas for which there is a history of nondetections and where additional data are not needed to support regulatory decision-making, such as an investigation report or a CME. If consistently detected or if additional data are needed to meet project objectives, then the relevant suite is sampled annually or more frequently. Data from across the Laboratory show a history of nondetections for dioxins/furans, pesticides, and polychlorinated biphenyls (PCBs) in deeper groundwater zones, reflecting the tendency for these constituents to sorb to soils and fine-grained materials rather than to migrate to deeper groundwater zones. Therefore, the frequency of sampling for these constituents has been significantly reduced in regional monitoring wells at many locations, and in some cases, these constituents are no longer analyzed. Similarly, high explosives (HE) are not present in the northern watersheds (those north of Pajarito Canyon) and are typically not part of the analytical suite after initial characterization sampling of new wells has been completed. Pesticides are no longer sampled under the groundwater monitoring program because they are not primary contaminants at the Laboratory.

Radionuclides (Excluding Tritium). If there is a history of nondetections or if detections fall within the range of natural background (for naturally occurring radionuclides), then the lowest sampling frequency applies: quarterly or semiannually for new wells, annually if radionuclides are among the significant constituents for an area being monitored, and biennially otherwise.

Tritium. Tritium samples are collected from select springs and deep groundwater on an annual or greater basis. Tritium may not be analyzed at locations where tritium is not a significant contaminant, such as in some General Surveillance locations. Samples are collected for low-level tritium analysis at locations in select monitoring groups where a very low minimum detectable activity is useful to support a conceptual model for fate and transport.

Tritium samples may be submitted for analysis by liquid scintillation if average activities are anticipated to exceed 200 pCi/L. Low-level tritium is analyzed using electrolytic enrichment or direct counting.

Per- and polyfluoroalkyl substances. Per- and polyfluoroalkyl substances (PFAS) are manufactured compounds used for a variety of purposes in various industrial, commercial, and consumer applications. As of December 2018, three PFAS compounds are identified as toxic pollutants under New Mexico Administrative Code 20.6.2: Perfluorohexane sulfonic acid, Perfluorooctanoic acid, and Perfluorooctane sulfate.

In monitoring year (MY) 2020, initial sampling for the three PFAS constituents listed above was performed at all IFGMP locations. In MY 2021, one additional round of sampling will be taken for these three PFAS constituents at each location in order to create a baseline sample data set. No additional PFAS sampling will be performed after MY 2021 unless a New Mexico Water Quality Control Commission (NMWQCC) regulatory standard has been exceeded. If NMWQCC regulatory standards for PFAS constituents change in the future, U.S. Department of Energy (DOE) Environmental Management Los Alamos Field Office/Newport News Nuclear BWXT-Los Alamos, LLC (N3B) will evaluate the change to the PFAS regulatory standard and determine if additional sampling for PFAS constituents may be required.

Because of the potential for cross-contamination when sampling for these compounds, a task group consisting of NMED, N3B, and DOE personnel was established before sampling in MY 2020 to determine best sampling practices for collecting these substances. A standard operating procedure developed by N3B and the NMED DOE Oversight Bureau, which incorporates established PFAS sampling protocol, will be utilized by sampling personnel when collecting PFAS samples.

Table C-1 provides background information and the objectives generally used to define the sampling frequencies and analytical suites for the area-specific monitoring groups. The specific sampling frequencies and analytical suites for individual sampling locations are provided in Tables 2.4-1 through 8.3-1.

REFERENCES

The following reference list includes documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ERID, ESHID, or EMID. This information is also included in text citations. ERIDs were assigned by the Laboratory's Associate Directorate for Environmental Management (IDs through 599999); ESHIDs were assigned by the Laboratory's Associate Directorate for Environment, Safety, and Health (IDs 600000 through 699999); and EMIDs are assigned by N3B (IDs 700000 and above). IDs are used to locate documents in N3B's Records Management System and in the Master Reference Set. The NMED Hazardous Waste Bureau and N3B maintain copies of the Master Reference Set. The set ensures that NMED has the references to review documents. The set is updated when new references are cited in documents.

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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)

LANL (Los Alamos National Laboratory), September 2011. "Corrective Measures Evaluation Report for Material Disposal Area G, Solid Waste Management Unit 54-013(b)-99, at Technical Area 54, Revision 3," Los Alamos National Laboratory document LA-UR-11-4910, Los Alamos, New Mexico. (LANL 2011, 206324)

LANL (Los Alamos National Laboratory), September 2012. "Corrective Measures Evaluation Report for Material Disposal Area C, Solid Waste Management Unit 50-009 at Technical Area 50," Los Alamos National Laboratory document LA-UR-12-24944, Los Alamos, New Mexico. (LANL 2012, 222830)

Table C-1
Background Information and Objectives Used to Determine
Sampling Frequencies and Analytical Suites for Area-Specific Monitoring Groups

Monitoring Group	Background[a]	Proposed Frequency	Proposed Analyte Suites	Objectives
Technical Area 21 (TA-21)	• Nature and extent of groundwater contamination generally understood • No concentrations exceed screening values in regional groundwater	• Annual and biennial sampling of intermediate and regional wells	• Metals, radionuclides, tritium (or low-level tritium), and general inorganics analyses annually for most wells • VOC and SVOCs (including low-level methods for 1,4-dioxane and nitrosamines) sampled annually in select wells and biennially in other wells • Annual PFAS analyses at all locations; no additional PFAS sampling will be performed after MY 2021 unless a NMWQCC regulatory standard has been exceeded	• Focus on mobile constituents and radionuclides
Chromium Investigation	• Nature and extent of groundwater contamination generally understood • Chromium (Cr) concentrations in regional aquifer exceed New Mexico Groundwater Standard (NM GW STD) • Cr concentrations are increasing at two plume-edge wells. Interim measure and plume-center characterization underway in support of pending CME.	• Quarterly sampling of intermediate and regional wells with Cr concentrations exceeding 25 µg/L (half the NM GW STD) • Quarterly sampling of intermediate and regional wells with significant rate of change in Cr concentrations • Quarterly sampling of R-35a, R-35b, R-44 screen 1 (S1), and R-44 S2 to provide "early warning" of possible contamination for supply well PM-3 **Note**: Monthly sampling at select Mortandad Canyon regional wells is conducted and reported under the "Semiannual Progress Report on Chromium Plume Control Interim Measure Performance"	• The focus is on metals (Cr) and related contaminants, tritium, and general inorganics (nitrate, perchlorate, sulfate) for all samples • Semiannual VOC and SVOC (including low-level methods for 1,4-dioxane and nitrosamines) analysis for samples from Mortandad Canyon intermediate wells with consistently detected 1,4-dioxane • Biennial analyses for VOCs and SVOCs (including low-level methods for 1,4-dioxane and nitrosamines) in select regional wells and two Sandia Canyon intermediate wells • Annual analysis for radionuclides at intermediate wells; biennial for regional wells except new wells that undergo full suite for first year • Annual PFAS analyses at all locations; no additional PFAS sampling will be performed after MY 2021 unless a NMWQCC regulatory standard has been exceeded **Note**: Analysis of monthly samples and tracers is conducted and reported under the "Semiannual Progress Report on Chromium Plume Control Interim Measure Performance"	• Quarterly sampling of the wells to monitor potential changes in the plume associated with ambient groundwater flow, and potential effects of Interim Measure and Plume Center Characterization activities
Material Disposal Area (MDA) C	• Current data being collected is sufficient to support remedy selection for MDA C CME submitted to NMED in 2012 (LANL 2012, 222830) • No concentrations of constituents exceed screening values in regional groundwater • Determination that groundwater is protected is supported by vapor-phase VOC sampling conducted to date	• Annual and biennial sampling of all wells	• Annual metals, VOC, low-level tritium, high explosives (HEXP analytical suite), and general inorganics analyses at all locations • Annual PFAS analyses at all locations; no additional PFAS sampling will be performed after MY 2021 unless a NMWQCC regulatory standard has been exceeded • Biennial SVOC (including low-level methods for 1,4-dioxane and nitrosamines), PCB, and radionuclide sampling (except for R-60, which will continue annual radionuclide sampling) at all locations	• Focus highest frequency analysis for mobile constituents known to be present beneath MDA C
TA-54	• CMEs for MDAs G, H, and L submitted to NMED in 2011 (LANL 2011, 205756; LANL 2011, 206319; LANL 2011, 206324) and DOE withdrew the three CMEs in 2016 (DOE 2016, 601899). No constituent concentrations exceed screening values in regional groundwater • Determination that groundwater is protected is supported by vapor-phase VOC sampling conducted to date	• Annual sampling at all intermediate and regional wells for metals, VOCs, SVOCs (including low-level methods for 1,4-dioxane and nitrosamines), radionuclides, low-level tritium, and general inorganics	• Annual metals, VOCs, SVOCs (including low-level methods for 1,4-dioxane and nitrosamines), radionuclides, low-level tritium, and general inorganics for most locations • VOCs and low-level tritium analysis only at R-40 S1 because of low yield • Annual PFAS analyses at all locations; no additional PFAS sampling will be performed after MY 2021 unless a NMWQCC regulatory standard has been exceeded • Quinquennial analysis for PCBs and HEXP at most locations	• Focus highest frequency analysis for mobile constituents known to be present beneath TA-54 MDAs

Table C-1 (continued)

Monitoring Group	Background*	Proposed Frequency	Proposed Analyte Suites	Objectives
TA-16 260	• Nature and extent of groundwater contamination generally understood • RDX (Royal Demolition Explosive) concentrations exceed the NMED tap water screening level in intermediate groundwater • RDX concentrations exceed the NMED tap water screening level in regional groundwater	• Quarterly or semiannual monitoring at most TA-16 260 monitoring group locations to support CME **Note**: Tracer sampling previously collected at select wells is conducted and reported under the "Annual Progress Report for the Corrective Measures Evaluations for the Deep Groundwater Investigation for Consolidated Unit 16-02(c)-99."	• Metals, VOC, HEXMOD, and general inorganics analyses semiannually for most locations • Quarterly analysis for HE and RDX degradation products (i.e., HEXMOD) and tracers (naphthalene sulfonate compounds and bromide) in select wells • Annual PFAS analyses at all locations; no additional PFAS sampling will be performed after MY 2021 unless a NMWQCC regulatory standard has been exceeded • Biennial analysis for radionuclides and SVOCs (including low-level methods for 1,4-dioxane and nitrosamines) for most locations; annual analysis for low-level tritium in springs and in intermediate and regional wells • Quinquennial sampling for PCBs and dioxins/furans at shallow sampling locations (base flow, springs, and alluvial wells) and select intermediate and regional groundwater locations	• Collect data to support TA-16 260 CME and to further refine site conceptual model
MDA AB	• No constituent concentrations exceed screening values in regional groundwater	• Annual and biennial sampling of intermediate and regional wells. Annual and biennial sampling of regional wells R-29 and R-30 to monitor MDA AB	• Annual sampling for metals, VOCs, radionuclides, low-level tritium, and general inorganics analyses for all locations. HE also included for R-29 and R-30 • Annual PFAS analyses at all locations; no additional PFAS sampling will be performed after MY 2021 unless a NMWQCC regulatory standard has been exceeded • Biennial sampling for SVOCs (including low-level methods for 1,4-dioxane and nitrosamines) at all locations	• General analyte suite for constituents that may have been released from MDA AB
General Surveillance, including White Rock Canyon	• Number of outfalls significantly reduced and remaining outfalls have improved water quality • Nature and extent of groundwater contamination generally understood • Canyon investigations are complete and show contribution to risk from surface water is low and within acceptable limits • Constituent concentrations generally below screening values • Decades of annual monitoring at springs in White Rock Canyon show little evidence of Laboratory contaminants. • Focused monitoring around MDAs and areas of known groundwater contamination along with generally low groundwater velocities support proposing a biennial sampling frequency at White Rock Canyon springs.	• Annual monitoring at key alluvial monitoring wells, springs, and base flow locations to capture unexpected near-surface conditions • Annual sampling of all intermediate and regional wells • Semiannual monitoring at R-10a to monitor groundwater at Laboratory boundary • Semiannual sampling at Rio Grande at Otowi Bridge to monitor for arsenic values • Annual sampling at all White Rock Canyon springs and base flow locations to monitor groundwater at Laboratory boundary	• Annual sampling for metals, radionuclides, and general inorganics analyses for most locations • Semiannual or annual sampling for HEXP analysis for southern watersheds • VOC analyses semiannually, annually, or biennially and SVOC (including low-level methods for 1,4-dioxane and nitrosamines) analyses semiannually, annually, biennially, or triennially at most locations • Low-level tritium analysis seminannually, annually or biennially at select base flow, spring, and well locations • Annual PFAS analyses at all locations; no additional PFAS sampling will be performed after MY 2021 unless a NMWQCC regulatory standard has been exceeded • Semiannual, annual, or biennial sampling for metals and general inorganics at all White Rock Canyon springs and base flows; annual or biennial sampling for VOCs, SVOCs (including low-level methods for 1,4-dioxane and nitrosamines), radionuclides, and low-level tritium at all White Rock Canyon springs and base flows; annual, biennial, or triennial sampling for HEXP at most White Rock Canyon springs and base flows; annual, biennial, or triennial sampling for PCBs; and annual or biennial sampling of dioxins and furans at select White Rock Canyon springs and base flows	• Focus highest frequency analysis for mobile constituents known to be present in particular watershed • Limit monitoring in the alluvial groundwater because of limited contamination • Focus on intermediate and regional locations for groundwater protection

* Constituents discussed in this column do not include detections of spurious organic constituents, naturally occurring constituents, or constituents related to well corrosion or to potential drilling effects.

Appendix D

Field Quality Assurance/Quality Control Samples

Sample Type	Summary
General	This appendix summarizes field quality assurance/quality control (QA/QC) samples to be collected during activities conducted under the Interim Facility-Wide Groundwater Monitoring Plan. Field QA/QC samples are collected in accordance with the Compliance Order on Consent, Appendix F, Section I.B.5.f, and include field blanks (FBs), equipment blanks (EQBs), performance evaluation blanks (PEBs), field duplicates (FDs), field trip blanks (FTBs), and field splits (FSs). Field QA/QC samples are used to detect possible contamination from field sample collection, shipping processes, or the analytical laboratory process, and in the case of PEBs, to track analytical laboratory performance. Differences in analytical results between FDs and their paired regular samples, for example, may indicate the samples were not collected uniformly, were contaminated during shipping, or underwent significant variation during analyses. Detection of analytes in deionized water FBs may indicate contamination of the deionized water source, contamination from the shipping process, contamination of sample bottles, or contamination from the analytical laboratory. This appendix also addresses how field QA/QC results are used and the types of corrective actions or data qualifications that may be taken to address exceedances of target measures for each QA/QC sample type. Field QA/QC samples are not required for samples collected for screening-level laboratory analysis.
Field Blanks	FBs are used to monitor for contamination during sampling. They also can identify contamination from transportation and analysis in associated samples. **FBs are collected at a frequency of 10% of all samples collected in a 21-day sampling campaign**. FBs are collected by filling sample containers in the field with deionized water to check for sources of sample contamination in the field. FBs are analyzed for the same analytical suites for which primary samples collected in the same trip are analyzed. FB results are evaluated as part of the secondary data validation process by using FB results to validate the associated sample results. If any analytes are detected in the FB, the result(s) from the associated sample(s) is qualified as undetected if the associated sample's concentration is less than 5 times the analyte concentration found in the associated FB. A validation reason code is also assigned to explain why the data were qualified.
Equipment Rinsate Blanks	EQBs are used to detect any contamination resulting from contaminated equipment or poor decontamination techniques. EQBs can also be used identify contamination from transportation and analysis in associated samples. **EQBs are collected before a well is sampled with nondedicated equipment (pump)**. EQBs are prepared by passing deionized water through unused or decontaminated sampling equipment. EQBs are analyzed for organic constituents and per- and polyfluoroalkyl substances (PFAS) sampled for in the associated well, with the exception of high explosive compounds, which are not analyzed in EQBs. During the secondary data validation process, EQBs are evaluated in the same manner as FBs. If any analytes are detected in the EQB, the result(s) from the associated sample(s) is qualified as undetected if the associated sample's concentration is less than 5 times the analyte concentration found in the associated EQB. A validation reason code is also assigned to explain why the data were qualified.

Sample Type	Summary
Performance Evaluation Blanks	PEBs are deionized water blanks submitted as regular samples, without any indication they are QC samples. PEBs are used to evaluate contamination from the deionized water used to create the FBs or EQBs (if needed), from sample shipment, or from the analytical laboratory. **One PEB is collected per 21-day sampling campaign.** PEBs are prepared by collecting reagent-grade deionized water in a sample bottle at the end of the sampling trip, and then adding the PEB to the samples for shipment to the laboratory. The PEB is analyzed for total organic carbon and for the full suite of constituents analyzed during the 21-day sampling campaign. PEBs are not analyzed for stable isotopes or specialized analytes that may be requested for the sampling campaign. If any analytes are detected in the PEB, the result(s) from the associated sample(s) is qualified as undetected if the associated sample's concentration is less than 5 times the analyte concentration found in the associated PEB. A validation reason code is also assigned to explain why the data were qualified.
Field Duplicates	FDs are split samples that provide information about sample collection uniformity, or contamination from shipping, or significant variation during laboratory analyses. They may reveal sampling techniques with poor reproducibility and provide information on the reproducibility of the sampling process. **FDs are collected at a rate of 10% of all samples collected during a 21-day sampling campaign**. FDs should be distributed proportionally among surface water, alluvial groundwater, and intermediate/regional groundwater to the relative number of samples collected for each type of water. FDs are selected from robust sampling locations requiring full analytical suites and yielding plenty of sample volume. FDs are collected for the same suite of analytes for which the primary samples are analyzed. However, FDs are not analyzed for stable isotopes or specialized analytes that may be requested for the sampling campaign. FD results are compared with its associated sample results, and a relative percent difference (RPD) is calculated. The maximum threshold for RPDs between a FD and its paired regular sample is generally 20% (or within the laboratory's stated RPD) for data greater than 5 times the reporting limit. If the RPD is exceeded, the data will be qualified and a validation reason code is also assigned to explain why the data were qualified.
Field Trip Blanks	FTBs collected for volatile organic compound (VOC) analyses and are used to identify potential VOC contamination that may have occurred during sample collection, shipping, storage, or analysis. FTBs consist of organic-free deionized water prepared by an independent off-site laboratory and are analyzed for VOCs only. **A minimum of one FTB is required for each cooler containing samples for VOC analyses. However, to facilitate data validation and verification, one FTB may be included with each sample submitted for VOC analysis**. During the secondary data validation process, FTBs are evaluated in the same manner as described for FB evaluations. If any analytes are detected in the FTB, the result(s) from the associated sample(s) is qualified as undetected if the associated sample's concentration is less than 5 times the analyte concentration found in the associated FTB. A validation reason code is also assigned to explain why the data were qualified.

Sample Type	Summary
Field Splits	FSs are a sub-sample of a regular sample that are analyzed at two different analytical laboratories to provide an outside assurance of analytical laboratory method performance. **One FS is collected per 21-day sampling campaign.** FSs are prepared by dividing a single sample into two subsamples. FSs are analyzed for the full suite of constituents analyzed during the 21-day sampling campaign. One subsample is analyzed at the primary laboratory (the regular sample) and the other is analyzed at a second independent laboratory (the FS sample). The results are compared to provide an outside assurance of analytical laboratory method performance and provide a known backup laboratory in cases where the project needs to use a different laboratory in place of the primary laboratory. FSs are not used to qualify the regular sample's results.

Exceedances of target level concentrations for each of the QA/QC sections summarized above triggers any of several potential corrective actions. Potential corrective actions are considered on a case-by-case basis and generally follow a graded approach. Corrective actions to be considered include the following.

Corrective Action	Summary
Level 3 Data Validation	A typical first step is to review the entire sample records package associated with a sample. This includes field paperwork (e.g., chains-of-custody forms, sample collection logs) as well as laboratory data information (laboratory QC samples, machine calibration, etc.). The Level 3 data validation may also provide insights into improper use of sample preservatives and other similar errors in sample collection or sample shipping, or during laboratory analyses
Reanalysis	Level 3 data validation results sometimes detect problems that occur with sample analysis. In these instances, reanalysis of an aliquot of the original sample may be requested of the analytical laboratory.
Resampling	If the QA/QC problem is not resolved using the approaches described above, resampling may be necessary. The decision to resample depends largely on the schedule for the subsequent sampling campaign. For instance, if a site is sampled quarterly, the sample collected for that round should suffice in filling the data gap. If the site is sampled annually, it may be necessary to resample after the discovery of a QA/QC concern if it would result in an important data gap. If an unacceptable QA/QC condition persists, then determining the source of the problem and making root-level corrections in a specific portion of the process will be initiated. For example, corrections or modifications may be made to an equipment decontamination process.

Appendix E

Protocols for Assessing the Performance of Deep Groundwater Monitoring Wells

E-1.0 OBJECTIVES AND SCOPE

This appendix establishes a "watch list" that identifies perched-intermediate and regional groundwater monitoring wells (hereafter referred to as the deep monitoring wells) for which water-quality data for certain constituents are nonrepresentative or are of questionable representativeness because of limited water availability, and it describes the approaches used to address potential data-quality issues. These deep monitoring wells are sampled under the Interim Facility-Wide Groundwater Monitoring Plan (IFGMP). Table E-1.0-1 presents the watch list of deep monitoring wells for monitoring year (MY) 2021.

This appendix is organized as follows:

- Section E-1.0 summarizes the objectives of groundwater monitoring in deep wells.
- Section E-2.0 identifies deep monitoring wells that are purged less than 3 casing volumes (CVs).
- Section E-3.0 defines a protocol for assigning deep monitoring wells to watch lists with appropriate follow-up actions when questions arise concerning the reliability and representativeness of water-quality data from those wells.
- Section E-4.0 outlines an approach for conducting reliability assessments of deep monitoring wells to determine their capability for producing representative water-quality samples and to identify any potential effects of well installation, rehabilitation, or sampling protocol on data quality.

One well is also included on the watch list because of possible construction issues. In addition to wells described in Table E-1.0-1, the representativeness of new water-quality samples from other wells is continually reviewed for possible addition to the watch list. The results from newly drilled wells and recently converted Westbay wells are part of this evaluation.

Inclusion of a well on the watch list is intended to be used as a general indicator of data quality and should not be construed as a definitive identification of data usability. The watch list is also dynamic insofar as it is updated as conditions evolve. Changes occur when additional water-quality data justify the removal of wells from or addition of wells to the list.

E-2.0 DEEP WELLS WITH LIMITED PURGE VOLUMES

Water that remains in a monitoring well for a period of time may not be representative of formation water because of physical, chemical, or biological changes that may occur as the water remains in contact with the well casing, dedicated sampling equipment, and the air space in the upper casing. This stagnant water may not represent formation water at the time of sampling. To ensure samples collected from a monitoring well are representative of formation water, stagnant water in the casing is generally removed (i.e., purged) from the sampling zone within the well before it is sampled. As prescribed in Standard Operating Procedure (SOP) N3B-SOP-ER-3003, R0, "Groundwater Sampling," standard practice is to purge perched-intermediate and regional wells a minimum of 3 CVs plus the volume of the drop pipe and to continue purging until water-quality parameters stabilize. Once the parameters stabilize all stagnant water is assumed to have been removed from the well and fresh formation water is available for sampling.

However, purging 3 CVs is not always possible or feasible, particularly in low-producing monitoring wells that purge dry at low pumping rates. N3B-SOP-ER-3003, R0 allows deviation from the 3-CV purge requirement for such conditions. However, data users may want to be aware of deep monitoring wells at which the 3-CV purge requirement generally cannot be met to consider potential impacts for data reliability. Table E-1.0-1 lists deep well screens that cannot meet the 3-CV purge requirement and describes the reason for this condition.

E-3.0 WATCH LIST ASSIGNMENTS

This section discusses additional watch list criteria for deep monitoring wells in this IFGMP for which the representativeness of water-quality data is questionable.

Data examined for the assessment includes field parameters monitored during purging before sample collection, field parameters associated with samples at the time of collection, major-ion concentrations, trace-metal concentrations, and detections of organic constituents. The assessments are based on site-specific geochemical criteria. The assessment may result in recommendations concerning the well's configuration, sampling protocols (such as purging volumes), extension or limitation of the analytical suites to be collected from the well screen, or caveats about data usability.

The specific objective of a reliability assessment is to determine the current reliability of a well (including its sampling system) as it relates to the water-quality data objectives of the specific monitoring network to which it is assigned. In general, reliability assessments may be conducted for a subset of the wells assigned to the watch list described in the preceding section or for deep wells within the context of a specific monitoring network.

The watch list presented in Table E-1.0-1 includes deep well screens for which field parameters monitored during purging consistently fail to meet stability criteria as well as deep well screens that show anomalous chemistry data, suggesting groundwater in the screened interval may not be fully equilibrated following construction or rehabilitation. Table E-1.0-1 also provides the rationale for each listed well screen and lists recommended follow-up actions.

E-4.0 RELIABILITY ASSESSMENT PROTOCOL

The specific objective of a reliability assessment is to determine the current reliability of a well (including its sampling system) as it relates to the water-quality data objectives of the specific monitoring network to which it is assigned. In general, reliability assessments may be conducted for a subset of the wells assigned to the watch lists described in the preceding section or for deep wells within the context of a specific monitoring network.

Data examined for the assessment includes field parameters monitored during purging before sample collection, field parameters associated with samples at the time of collection, major ion concentrations, trace-metal concentrations, and detections of organic constituents. The assessments are based on site-specific geochemical criteria and generally focus on data obtained for the four most recent sampling events. The assessment may result in recommendations concerning the well's configuration, sampling protocols (such as purging volumes), extension or limitation of the analytical suites to be collected from the well screen, or caveats about data usability.

Field parameters. Time-series data for field parameters monitored during purging before sample collection are examined for attainment of stable values by the end of purging. Stabilization criteria are prescribed in N3B-SOP-ER-3003, R0 and are derived from the stabilization criteria recommended by the U.S. Environmental Protection Agency (EPA) (Yeskis and Zavala 2002, 204429) and from the Compliance Order on Consent. The most sensitive indicator parameters are dissolved oxygen (DO) and turbidity. Other parameters such as water temperature, specific conductance, pH, and oxidation-reduction potential are also monitored but are considered less sensitive indicators of formation water.

Field parameters are examined for stability during individual sampling events, and trends are compared for a sequence of events at the same location. Final field-parameter values associated with the sample at the time of collection are compared with the range observed in background locations for perched-intermediate groundwater and regional groundwater.

Inorganic analytes. Analytical data for common inorganic ions and trace metals are examined for stability and for excursions from background concentrations as follows:

- trends in concentrations of key indicators for the presence of the specific materials used in the screened interval, such as sodium, sulfate, and total organic carbon;
- trends in relative concentrations of major ions; and
- comparison of concentrations for major ions and selected trace metals with lower and upper concentration ranges for plateau-scale and site-specific background groundwater, as described below.

Concentration trends may be depicted using time-series plots, standard trilinear diagrams, or modified Schoeller plots.

- Trilinear diagrams, also called Piper plots, show major ions as percentages of milliequivalents (meq) in two base triangles. The total cations and the total anions are set equal to 100%, and the data points in the two triangles are projected onto an adjacent grid. The main purpose of the Piper diagram is to show clustering of data points to indicate samples with similar compositions.
- Schoeller plots are semilogarithmic diagrams originally developed to represent major ion analyses in meq/L and to demonstrate different hydrochemical water types on the same diagram. This type of graphical representation has the advantage that, unlike the trilinear diagrams, actual sample concentrations are displayed and compared. The modified Schoeller plot used for the reliability assessment represents analyses as mg/L or µg/L to avoid the need to make assumptions about ion speciation, which may be particularly problematic for trace metals.

Organic analytes. Detections of volatile organic compounds (VOCs) and semivolatile organic compounds are compiled for examination of temporal trends and comparison against area-specific chemicals of potential concern.

Field documentation. As appropriate, field notes, groundwater sampling logs, and sample collection logs for each sampling event are also examined for observations about unusual odors, colors, or other indications of impacted water samples.

Plateau-scale background values for assessment. For naturally occurring analytes, statistical summaries of water-quality data for background groundwater locations establish a range of concentrations against which data from the assessed wells are compared for a preliminary assessment step. Lower and upper bounds of plateau-scale background ranges used in the reliability assessments are derived primarily from statistical tables in the most recent New Mexico Environment Department– (NMED-) approved “Groundwater Background Investigation Report.”

Site-specific background values for assessment. Representativeness may be assessed with greater specificity by comparing analytical concentrations with those in groundwater from other deep wells in sufficiently similar hydrogeologic settings and at which effects from downhole materials or local contaminants are known to be absent or negligible. The approach allows for the inclusion of wells not hydraulically upgradient of the well being assessed. This is similar to the interwell comparison approach described in sections 5.2.4 and 6.3.2 of the EPA guidance document, “Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities” (“Unified Guidance”) (EPA 2009, 110369). The development and use of site-specific background values is illustrated in the "Reliability Assessment of Well R-47i" (LANL 2011, 201564).

Under some conditions, some or all of the constituents measured in the sample collected at the end of development may also be appropriate to use as the basis of site-specific background values or to augment the background data set compiled for the interwell comparison, similar to the intrawell comparison approach described in sections 5.2.4 and 6.3.2 of EPA's Unified Guidance (EPA 2009, 110369).

E-5.0 REFERENCES

The following reference list includes documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ERID, ESHID, or EMID. This information is also included in text citations. ERIDs were assigned by the Laboratory's Associate Directorate for Environmental Management (IDs through 599999); ESHIDs were assigned by the Laboratory's Associate Directorate for Environment, Safety, and Health (IDs 600000 through 699999); and EMIDs are assigned by Newport News Nuclear BWXT-Los Alamos, LLC (N3B) (IDs 700000 and above). IDs are used to locate documents in N3B's Records Management System and in the Master Reference Set. The NMED Hazardous Waste Bureau and N3B maintain copies of the Master Reference Set. The set ensures that NMED has the references to review documents. The set is updated when new references are cited in documents.

EPA (U.S. Environmental Protection Agency), March 2009. "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance," EPA 530-R-09-007, Office of Resource Conservation and Recovery, Washington, D.C. (EPA 2009, 110369)

LANL (Los Alamos National Laboratory), March 2011. "Reliability Assessment for Well R-47i," Los Alamos National Laboratory document LA-UR-11-0933, Los Alamos, New Mexico. (LANL 2011, 201564)

LANL (Los Alamos National Laboratory), February 2017. "Status Report for the Tracer Tests at Consolidated Unit 16-02l(c)-99, Technical Area 16," Los Alamos National Laboratory document LA-UR-17-20782, Los Alamos, New Mexico. (LANL 2017, 602161)

Yeskis, D., and B. Zavala, May 2002. "Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers," a *Ground Water Forum Issue Paper*, EPA 542-S-02-001, Office of Solid Waste and Emergency Response, Washington, D.C. (Yeskis and Zavala 2002, 204429)

Table E-1.0-1
Watch List for Deep Monitoring Wells

Location	Monitoring Group	Watch List Rationale	Description of Condition	Action
Limited Water Volume				
MCOI-5	Chromium Investigation	Limited water volume	Well no longer yields sufficient water for sampling.	The water level at MCOI-5 has been steadily declining over the past 9 yr and as of January 2020, is less than 1 ft above the bottom of the screen, which is an insufficient volume to collect samples. This well will be monitored for water levels and if sufficient recharge occurs allowing water level to rise to 3.5 ft above the bottom of the screen (6124.2 ft above mean sea level), a prioritized suite consisting of perchlorate, per- and polyfluoroalkyl substances (PFAS), metals, and additional general inorganics will be collected after 1 CV plus drop-pipe volume is purged regardless of field parameter stability.
SCI-1	Chromium Investigation	Limited water volume	Limited volume of water and extremely low recovery rate. Field parameters do not stabilize.	Collect samples in accordance with the prioritized sampling suite list for SCI-1 after 1 CV plus drop-pipe volume is purged regardless of field parameter stability.
R-26 PZ-2	Technical Area 16 (TA-16) 260	Limited water volume	Sampled with bailer. Insufficient water available to bail more than 1 CV. High turbidity.	Purge (by bailing) 1 CV or until dry, allow for recharge, and collect a prioritized analytical suite the same day regardless of field parameter stability.
R-63i	TA-16 260	Limited water volume	Formation has limited yield.	Initiated sampling and analysis in MY 2018. Bail dry at least 1 day before sampling and monitor recharge behavior. Collect a prioritized sample suite as necessary as soon as possible after well recharges. Code analytical results as “screening level” in database. Measure and record one set of field parameter data before sample collection.
R-40 S1[a]	TA-54	Limited water volume	Extremely low yield and recovery rate. Approximately 2 wk required to recover water levels after 1-CV purge.	Sample for VOCs, low-level tritium, metals, and general inorganics. Collect samples after 1 CV plus drop-pipe volume is purged regardless of field parameter stability.

Table E-1.0-1 (continued)

Location	Monitoring Group	Watch List Rationale	Description of Condition	Action
Limited Water Volume				
R-25b	TA-16 260	Tracers persist in monitoring well.	Samples collected from monitoring well R-25b continue to show the presence of the tracers introduced into the well in November 2015 (LANL 2017, 602161), indicating that sampling and analysis data for R-25b are not representative of surrounding groundwater chemistry.	Collect sample at 1.5 CVs + drop pipe regardless of field parameter stability. Code analytical results as “screening level” in database until the geochemistry provides representative samples.
CdV-R-37-2 S2[b]	TA-16 260	Reducing conditions	Water-quality and field parameter data indicate CdV-R-37-2 S2 does not produce representative samples. Elevated iron and manganese are present.	Collect samples following an extended 12-CV purge regardless of stability. Sample for low-level tritium, high explosives, metals, and general inorganics annually. Code analytical results for constituents other than tritium as “screening level” in database. Annual sampling for metals and general inorganics supports continued assessment of well conditions.
R-40 Si (formerly R-40i)	TA-54	Reducing conditions	Samples showed residual drilling foam and reducing conditions. Elevated iron and manganese present. Recent data suggest improving trends, with increasing DO and decreasing iron and manganese concentrations.	Collect samples in accordance with N3B-SOP-ER-3003, R0. Sample only for low-level tritium, general inorganics, and metals. Code analytical results for constituents other than tritium as “screening level” in database.
R-54 S1	TA-54	Reducing conditions	Reducing conditions appear to persist from residual drilling lubricants. Elevated iron and manganese are present.	Sample for low-level tritium only.
R-55i	TA-54	Reducing conditions	Reducing conditions appear to persist from residual drilling lubricants. Elevated iron and manganese are present.	Sample for low-level tritium only.
R-12 S1	General Surveillance (Sandia Watershed)	Reducing conditions	Reducing conditions appear to persist from residual drilling fluids as indicated by low DO and elevated iron and manganese. Reducing conditions yield nonrepresentative data.	Sample for low-level tritium only.

[a] S1 = Screen 1.

[b] S2 = Screen 2.

Appendix F

Geologic Cross-Sections

The transect location map and geologic cross-section maps presented in this appendix show the relationship of sampling locations in this Interim Facility-Wide Groundwater Monitoring Plan to the hydrogeologic setting of the Los Alamos National Laboratory (LANL or the Laboratory) site. The transect location map (Figure F-1) presents an overview of the cross-section locations.

The east-west cross-sections follow the stream channel in the following canyons:

- A–A' Water Canyon/Cañon de Valle (Figure F-2)
- B–B' Pajarito Canyon (Figure F-3)
- C–C' Mortandad Canyon (Figure F-4)
- D–D' Sandia Canyon (Figure F-5)
- E–E' Los Alamos Canyon (Figure F-6)
- F–F' Pueblo Canyon (Figure F-7)

The north-south cross-sections are distributed across the Laboratory site and include the following:

- G–G' in the eastern part of the Laboratory (Figure F-8)
- H–H' in the central part of the Laboratory (Figure F-9)
- I–I' in the western part of the Laboratory (Figure F-10)

The cross-sections are based on a three-dimensional geologic framework model (GFM) for the Laboratory developed from borehole and outcrop stratigraphic data. The GFM used in this report is an updated version of the Laboratory's fiscal year 2009 GFM (Cole et al. 2010, 106101). It was developed in 2010 by Weston Solutions, Inc., and was subsequently updated in 2011 and 2012 using the geospatial modeling software EarthVision by Dynamic Graphics. This GFM version is designated WC12b and incorporates new regional and perched-intermediate wells installed since the previous GFM update (WC11c), reinterpretation of stratigraphic contacts in a few existing well logs, edits to the shape of volcanic flows, and edits to the displacement of various units across the Pajarito fault zone. The WC12b GFM attempts to depict the most current understanding of geology beneath the Laboratory and is the same model used to develop the geologic map intersecting the regional water table discussed in Appendix G.

The cross-sections show sampling locations that fall within a 1500-ft buffer on both sides of the respective transect lines. Perched-intermediate and regional monitoring wells are shown as vertical lines, and the locations of well screens are shown as boxes presented to actual scale. Wells located within 500 ft of transects are indicated by solid lines, and wells offset more than 500 ft are demarcated by a dashed pattern. Because of their offset from the transect, some well screens in the outer portions of the buffer zones may not appear to plot within the proper geologic unit because of dipping geologic contacts. The relative positions of alluvial wells, surface-water sampling stations, and springs located along the transects are arrayed horizontally above the cross-sections to show the spatial relationship between the shallow, intermediate, and deep water-quality monitoring network and the GFM. The cross-sections are based on the WC12b model update described above.

REFERENCE

The following reference list includes documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ERID, ESHID, or EMID. This information is also included in text citations. ERIDs were assigned by the Laboratory's Associate Directorate for Environmental Management (IDs through 599999); ESHIDs were assigned by the Laboratory's Associate Directorate for Environment, Safety, and Health (IDs 600000 through 699999); and EMIDs are assigned by Newport News Nuclear BWXT-Los Alamos, LLC (N3B) (IDs 700000 and above). IDs are used to locate documents in N3B's Records Management System and in the Master Reference Set. The New Mexico Environment Department (NMED) Hazardous Waste Bureau and N3B maintain copies of the Master Reference Set. The set ensures that NMED has the references to review documents. The set is updated when new references are cited in documents.

Cole, G., D. Coblentz, E. Jacobs, D. Koning, D. Broxton, D. Vaniman, F. Goff, and G. WoldeGabriel, April 2010. "The 2009 Three-Dimensional Geologic Models of the Los Alamos National Laboratory Site, Southern Española Basin, and Española Basin," Los Alamos National Laboratory document LA-UR-09-3701, Los Alamos, New Mexico. (Cole et al. 2010, 106101)

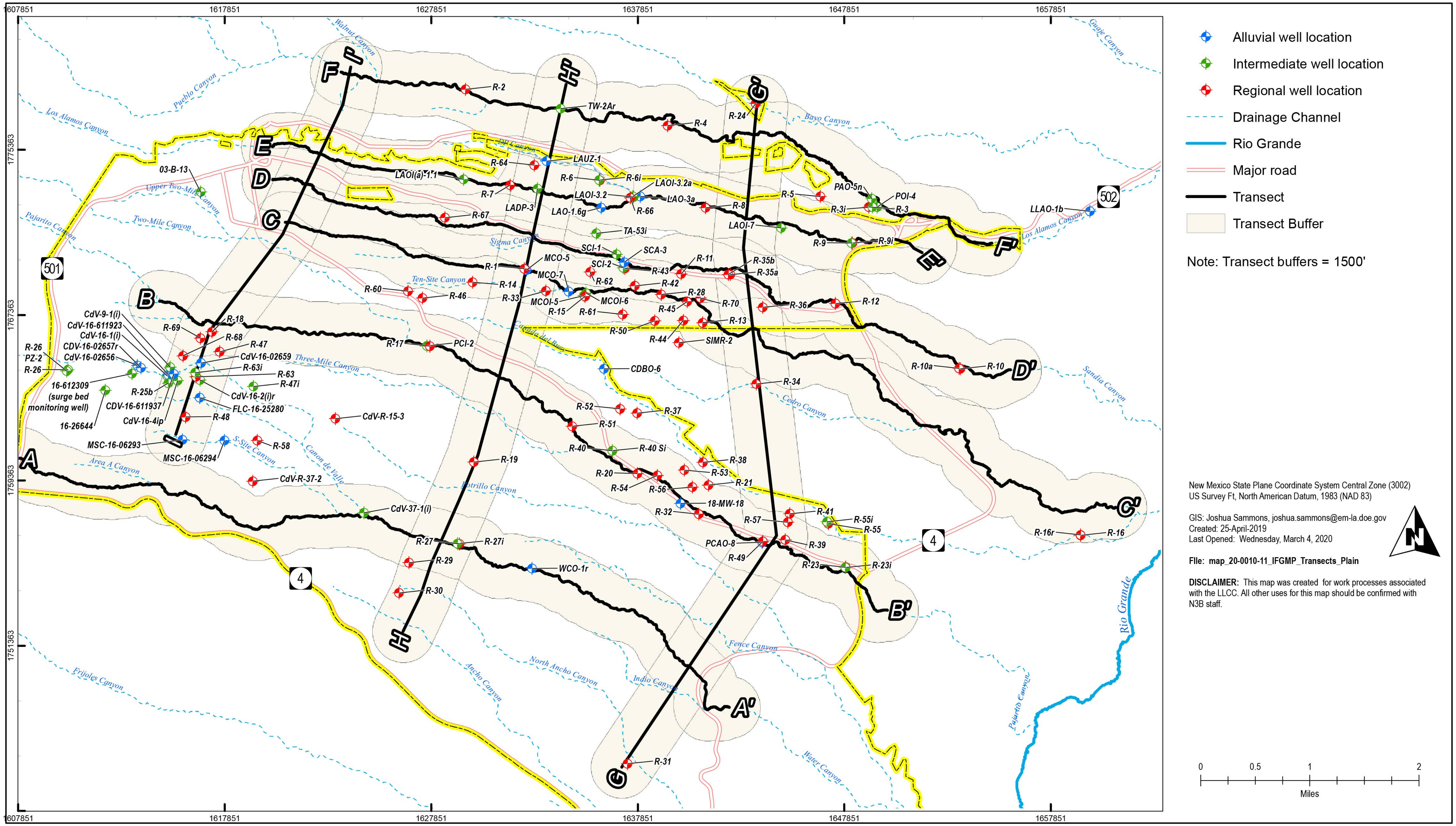
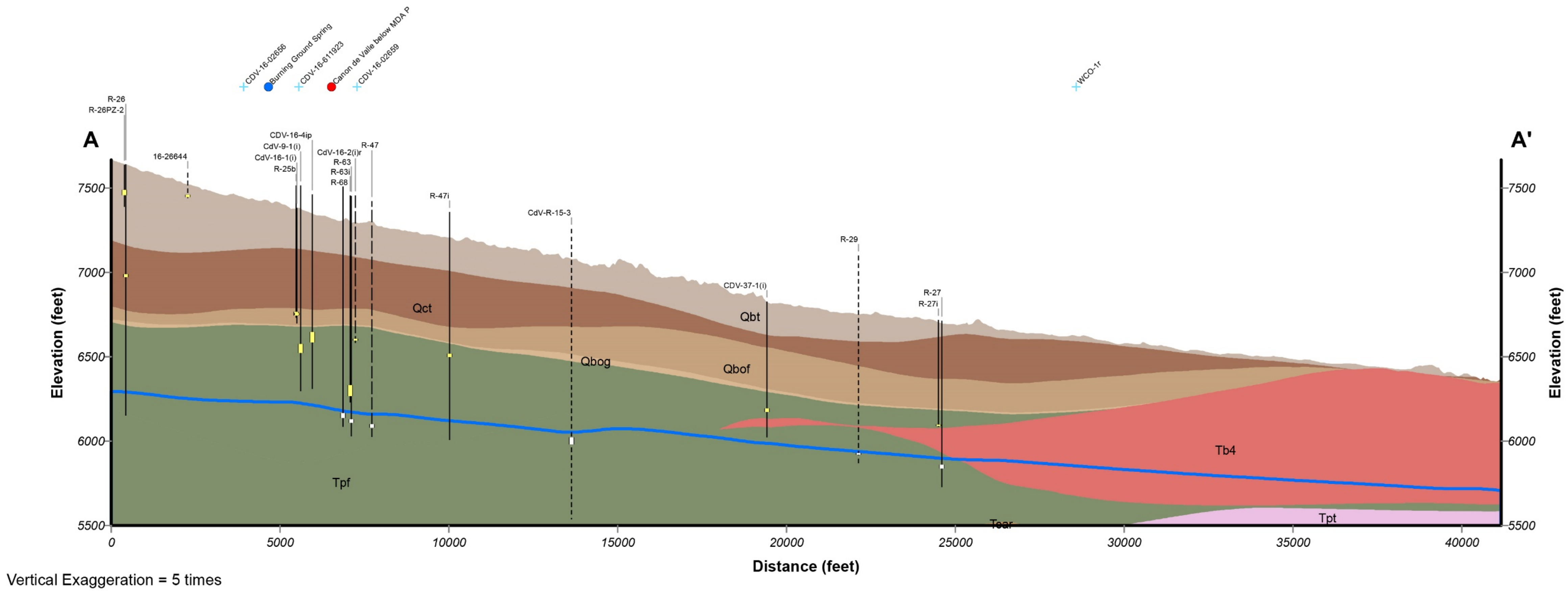


Figure F-1 Transect location map



Legend

Screens
- Well Screen (Intermediate)
- Well Screen (Regional)

Borehole Offset
- —— < 500-ft
- — - < 1000-ft
- - - - > 1000-ft

- Regional Water Table

Alluvial System and Springs
- Well (Alluvial)
- Spring (Alluvial)
- Spring (Intermediate)
- Surface Water Sample

Geologic Unit
- Qbt - Tshirege Member, Bandelier Tuff
- Qct - Cerro Toledo Formation
- Qbof - Otowi Member, Bandelier Tuff
- Qbog - Guaje Pumice Bed
- Tb4 - Cerros del Rio Basalts
- Tvt2 - Younger dacite flows
- Tvt1 - Older Tschicoma dacite flows
- Tpf - Puye Formation, fanglomerate
- Tpt - Puye Fm, Totavi Lentil
- Tjfp - Miocene pumiceous sediments (Bearhead equivalent)
- Tb2 - Miocene Basalt
- Tcar - Chamita Formation

Notes:

1. *This cross-section was extracted from Weston's WC12b update to LANL's FY09 GFM (Cole et al. 2010, 106101). The WC12b model accounts for several new regional borings, revisions to a few existing borehole logs by LANL geologists, and some shallow TA-21 and data that were not incorporated into the FY09 model.*
2. *A 1500-ft transect line buffer was used to filter the data to those points having the largest influence on the geology depicted on the cross-section. Because of the potential 1500-ft offset from the transect however, some layer contacts may not appear to honor the data. The line pattern for the borehole trace is used to quatifiy the offset of the data from the section.*

Figure F-2 Cross-section A–A′ Water Canyon/Cañon de Valle

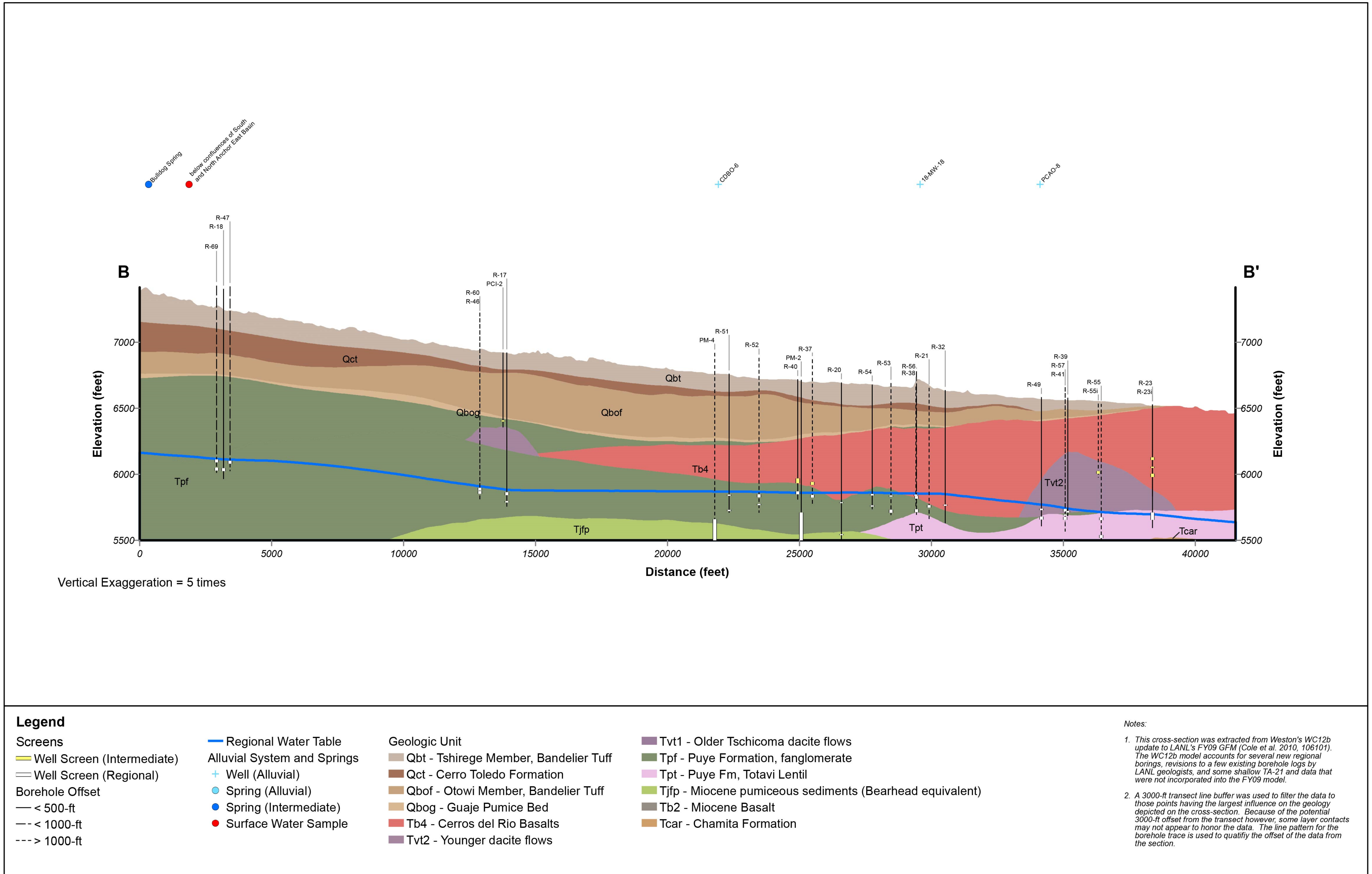


Figure F-3 Cross-section B–B′ Pajarito Canyon

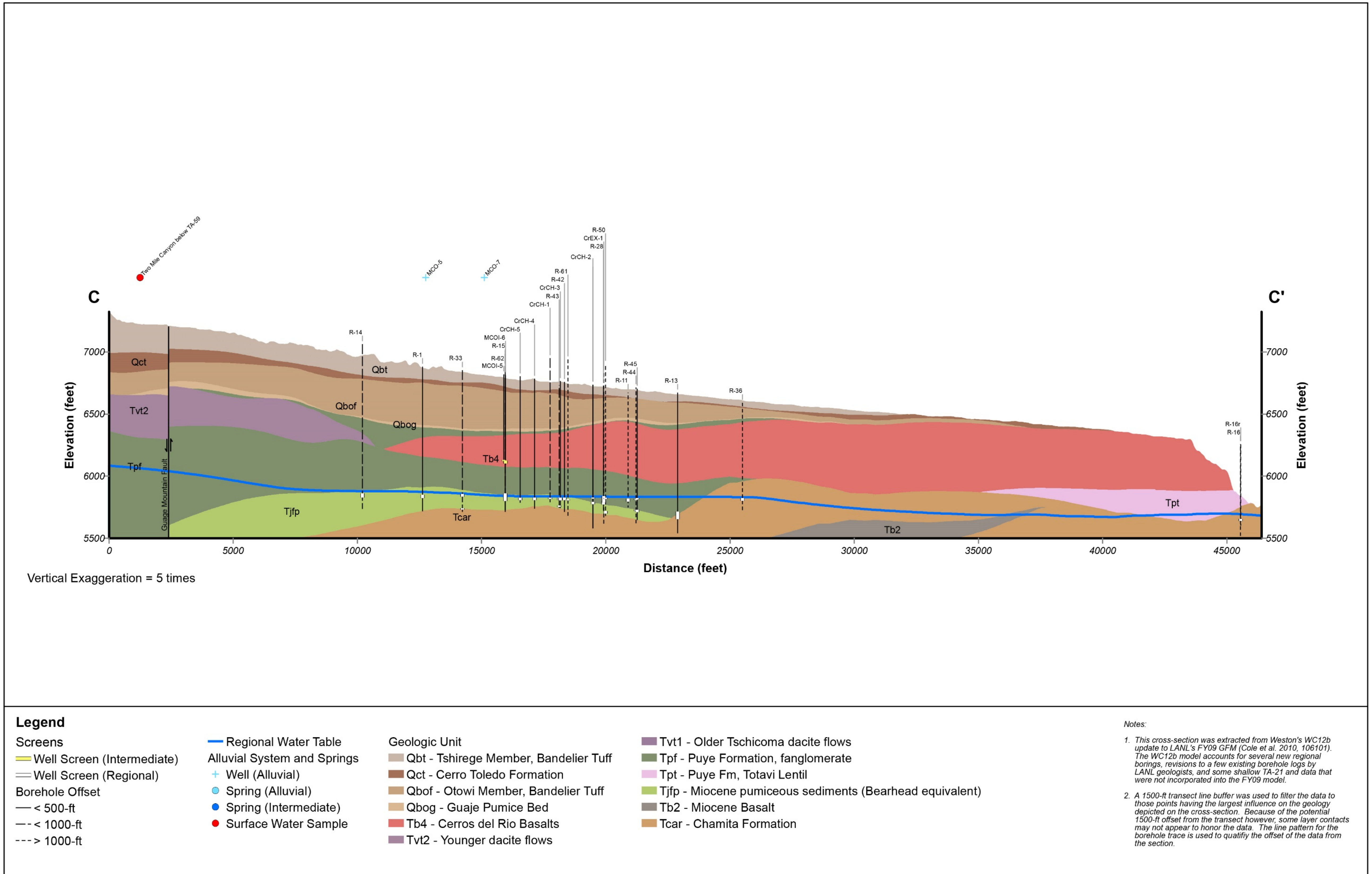
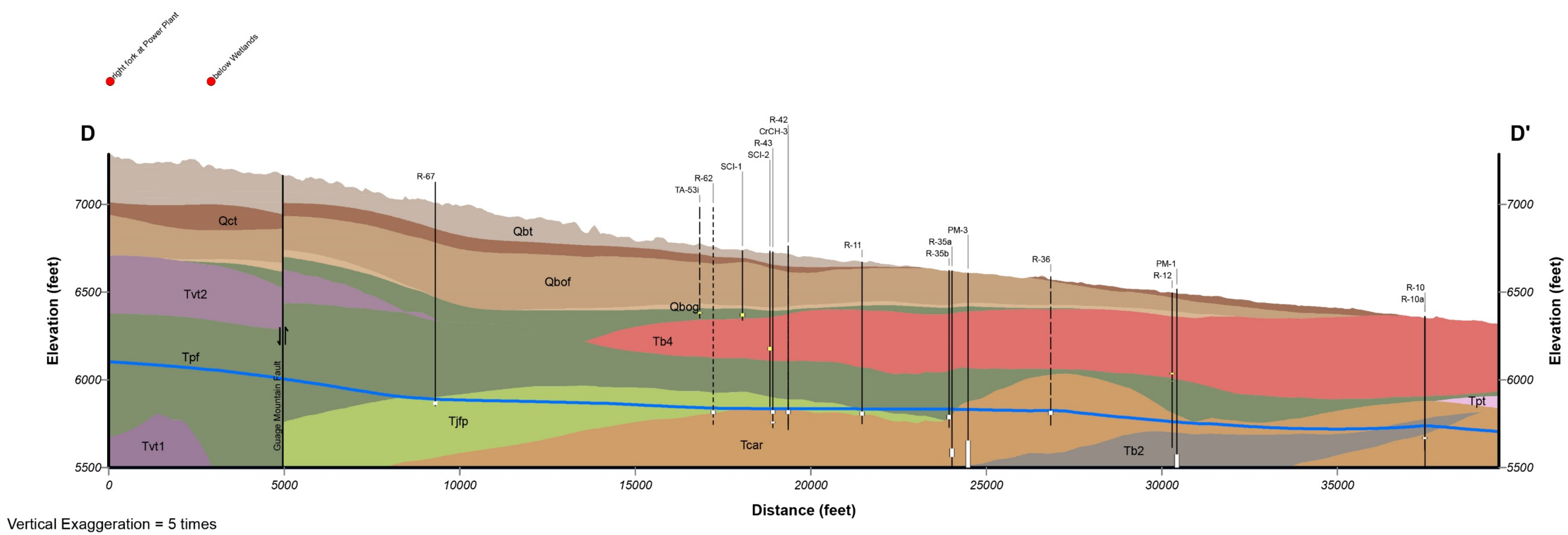


Figure F-4 Cross-section C–C′ Mortandad Canyon



Legend

Screens
- Well Screen (Intermediate)
- Well Screen (Regional)

Borehole Offset
- — < 500-ft
- — - < 1000-ft
- - - - > 1000-ft

- Regional Water Table

Alluvial System and Springs
- Well (Alluvial)
- Spring (Alluvial)
- Spring (Intermediate)
- Surface Water Sample

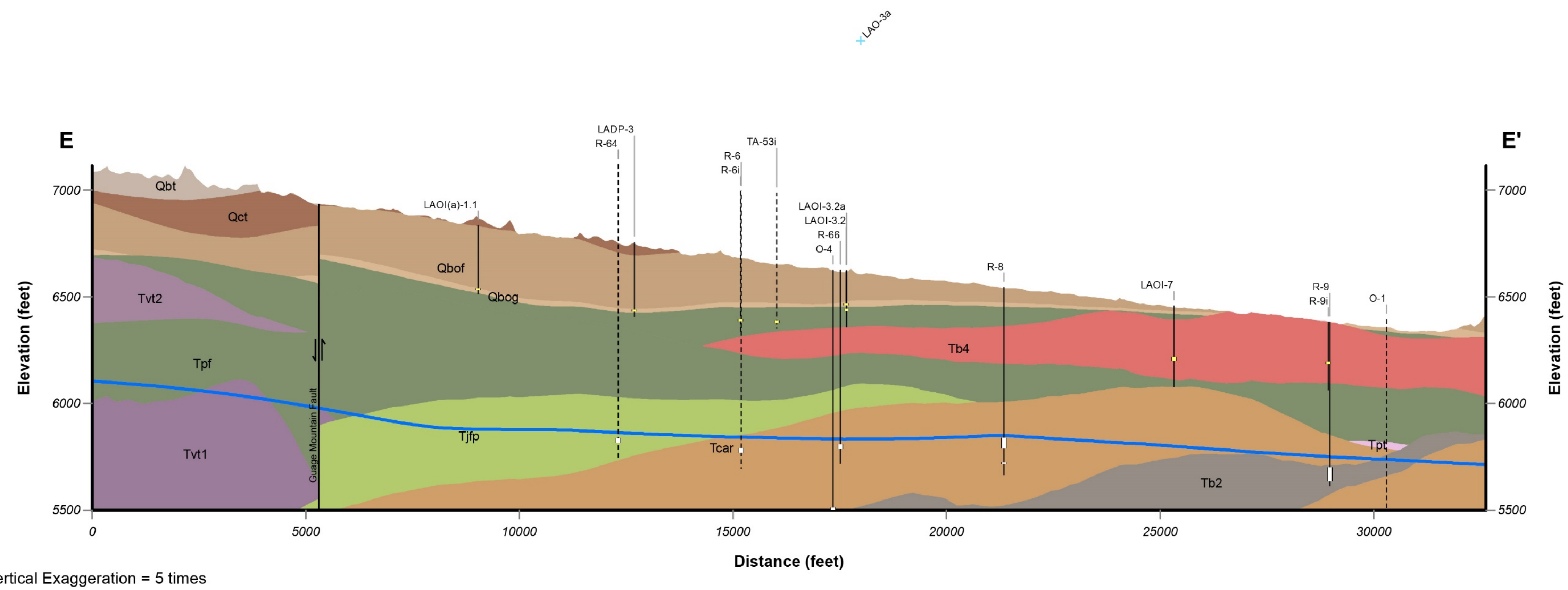
Geologic Unit
- Qbt - Tshirege Member, Bandelier Tuff
- Qct - Cerro Toledo Formation
- Qbof - Otowi Member, Bandelier Tuff
- Qbog - Guaje Pumice Bed
- Tb4 - Cerros del Rio Basalts
- Tvt2 - Younger dacite flows
- Tvt1 - Older Tschicoma dacite flows
- Tpf - Puye Formation, fanglomerate
- Tpt - Puye Fm, Totavi Lentil
- Tjfp - Miocene pumiceous sediments (Bearhead equivalent)
- Tb2 - Miocene Basalt
- Tcar - Chamita Formation

Notes:

1. *This cross-section was extracted from Weston's WC12b update to LANL's FY09 GFM (Cole et al. 2010, 106101). The WC12b model accounts for several new regional borings, revisions to a few existing borehole logs by LANL geologists, and some shallow TA-21 data and data that were not incorporated into the FY09 model.*
2. *A 1100-ft transect line buffer was used to filter the data to those points having the largest influence on the geology depicted on the cross-section. Because of the potential 1100-ft offset from the transect however, some layer contacts may not appear to honor the data. The line pattern for the borehole trace is used to quantify the offset of the data from the section.*

Modified 030816, ptm

Figure F-5 Cross-section D–D′ Sandia Canyon



Legend

Screens
- Well Screen (Intermediate)
- Well Screen (Regional)

Borehole Offset
- < 500-ft
- < 1000-ft
- > 1000-ft

Regional Water Table

Alluvial System and Springs
- Well (Alluvial)
- Spring (Alluvial)
- Spring (Intermediate)
- Surface Water Sample

Geologic Unit
- Qbt - Tshirege Member, Bandelier Tuff
- Qct - Cerro Toledo Formation
- Qbof - Otowi Member, Bandelier Tuff
- Qbog - Guaje Pumice Bed
- Tb4 - Cerros del Rio Basalts
- Tvt2 - Younger dacite flows
- Tvt1 - Older Tschicoma dacite flows
- Tpf - Puye Formation, fanglomerate
- Tpt - Puye Fm, Totavi Lentil
- Tjfp - Miocene pumiceous sediments (Bearhead equivalent)
- Tb2 - Miocene Basalt
- Tcar - Chamita Formation

Notes:

1. *This cross-section was extracted from Weston's WC12b update to LANL's FY09 GFM (Cole et al. 2010, 106101). The WC12b model accounts for several new regional borings, revisions to a few existing borehole logs by LANL geologists, and some shallow TA-21 and data that were not incorporated into the FY09 model.*
2. *A 1500-ft transect line buffer was used to filter the data to those points having the largest influence on the geology depicted on the cross-section. Because of the potential 1500-ft offset from the transect however, some layer contacts may not appear to honor the data. The line pattern for the borehole trace is used to quatifiy the offset of the data from the section.*

Figure F-6 Cross-section E–E′ Los Alamos Canyon

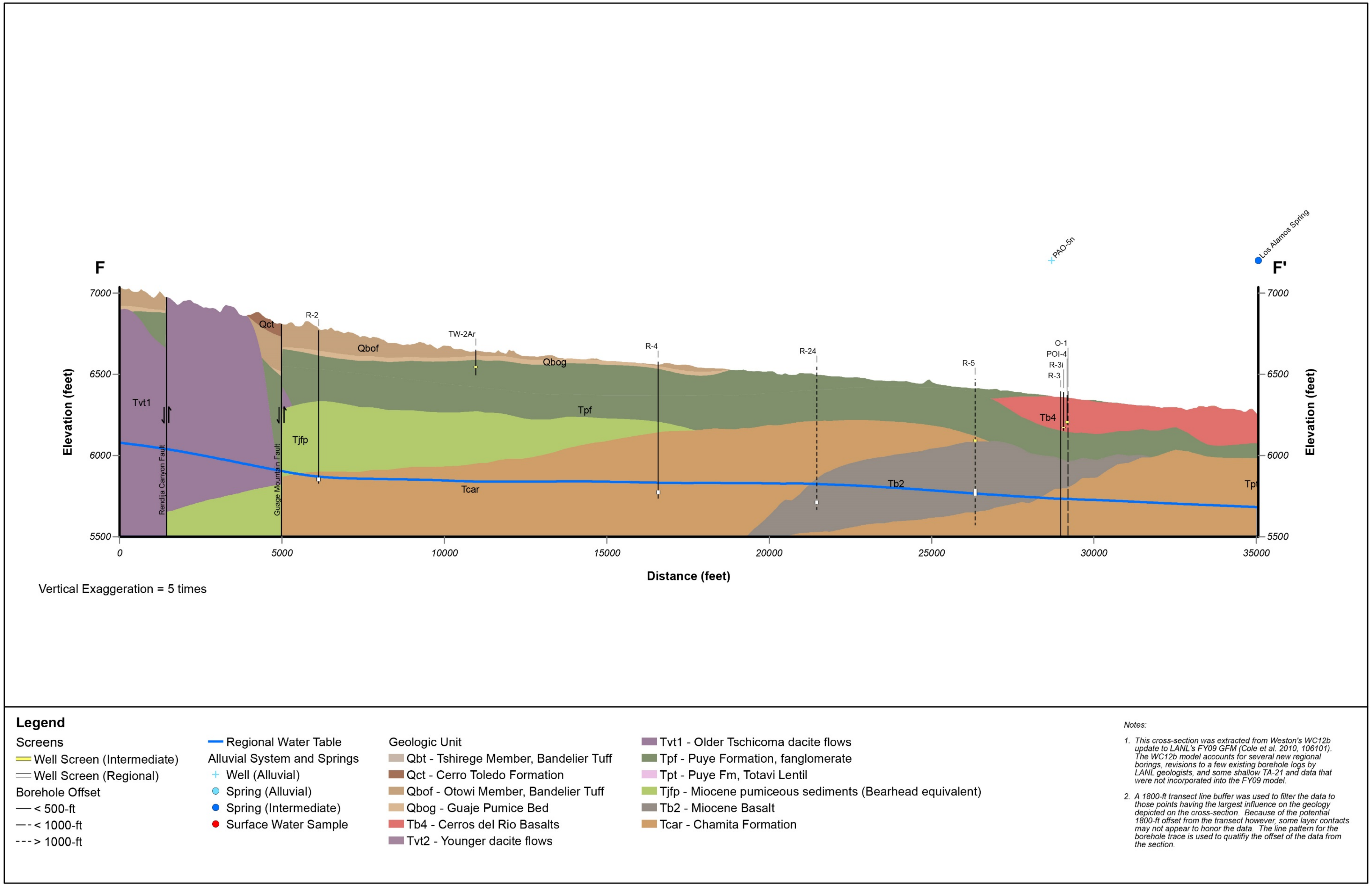


Figure F-7 Cross-section F–F′ Pueblo Canyon

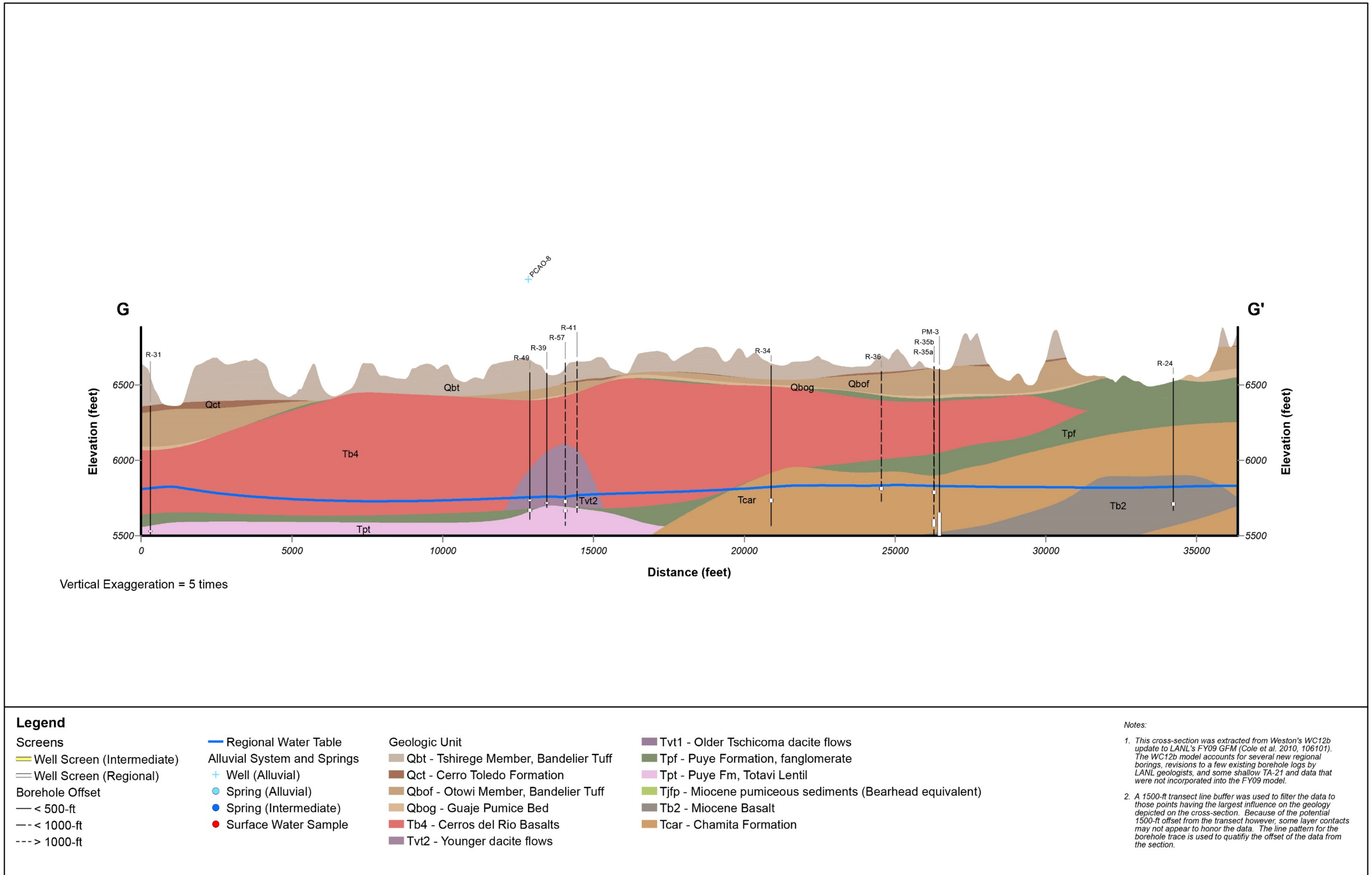


Figure F-8 Cross-section G–G′ in the eastern part of the Laboratory (north-south)

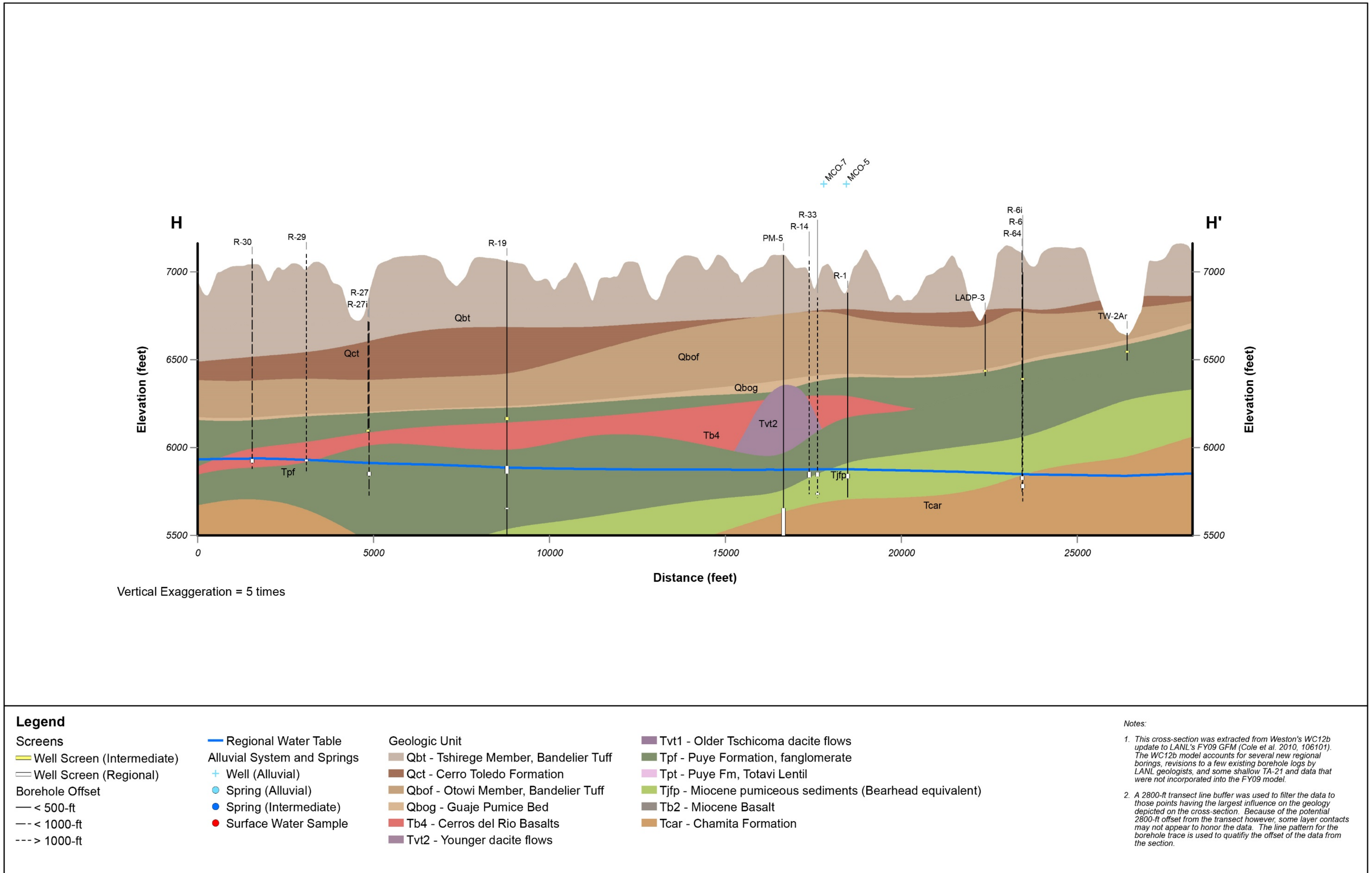
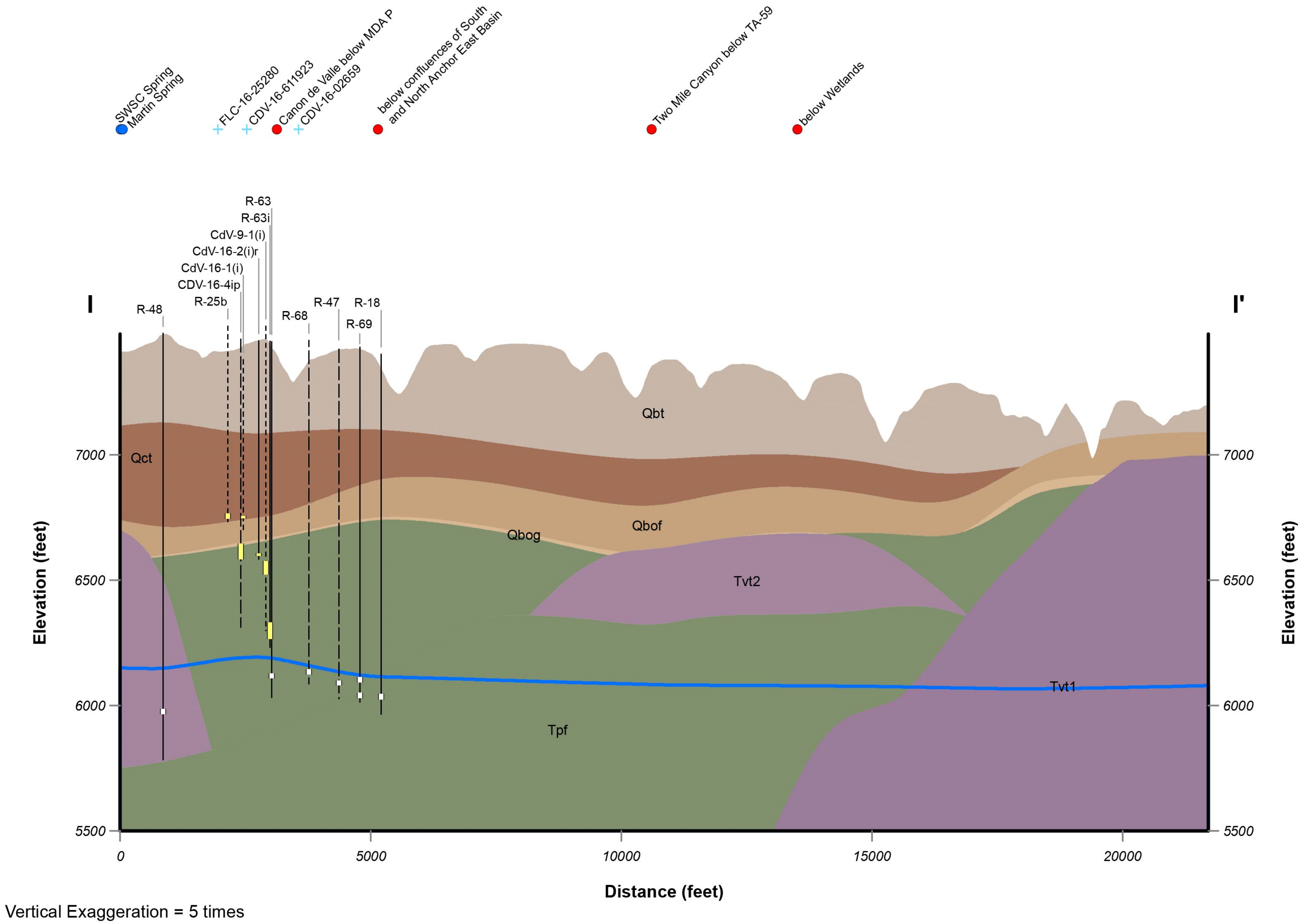


Figure F-9 Cross-section H–H′ in the central part of the Laboratory (north-south)



Legend

Screens
Well Screen (Intermediate)
Well Screen (Regional)

Borehole Offset
< 500-ft
< 1000-ft
> 1000-ft

Regional Water Table

Alluvial System and Springs
Well (Alluvial)
Spring (Alluvial)
Spring (Intermediate)
Surface Water Sample

Geologic Unit
Qbt - Tshirege Member, Bandelier Tuff
Qct - Cerro Toledo Formation
Qbof - Otowi Member, Bandelier Tuff
Qbog - Guaje Pumice Bed
Tb4 - Cerros del Rio Basalts
Tvt2 - Younger dacite flows
Tvt1 - Older Tschicoma dacite flows
Tpf - Puye Formation, fanglomerate
Tpt - Puye Fm, Totavi Lentil
Tjfp - Miocene pumiceous sediments (Bearhead equivalent)
Tb2 - Miocene Basalt
Tcar - Chamita Formation

Notes:

1. *This cross-section was extracted from Weston's WC12b update to LANL's FY09 GFM (Cole et al. 2010, 106101). The WC12b model accounts for several new regional borings, revisions to a few existing borehole logs by LANL geologists, and some shallow TA-21 and data that were not incorporated into the FY09 model.*

2. *A 1500-ft transect line buffer was used to filter the data to those points having the largest influence on the geology depicted on the cross-section. Because of the potential 1500-ft offset from the transect however, some layer contacts may not appear to honor the data. The line pattern for the borehole trace is used to quatifiy the offset of the data from the section.*

Figure F-10 Cross-section I–I′ in the western part of the Laboratory (north-south)

Appendix G

Geology Intersecting the Regional Water Table

This appendix presents a map of the geology intersecting the regional water table beneath the sampling network for the 2021 Interim Facility-Wide Groundwater Monitoring Plan for the Los Alamos National Laboratory (LANL or the Laboratory) site.

The map is based on a three-dimensional geologic framework model (GFM) for the Laboratory developed from borehole and outcrop stratigraphic data. The GFM used in this plan is an updated version of the Laboratory's fiscal year 2009 GFM (Cole et al. 2010, 106101). It was developed in 2010 by Weston Solutions, Inc., and was subsequently updated in 2011 and 2012 using the geospatial modeling software EarthVision by Dynamic Graphics. This GFM version is designated WC12b and incorporates new regional and perched-intermediate wells installed since the previous GFM update (WC11c), reinterpretation of stratigraphic contacts in a few existing well logs, edits to the shape of volcanic flows, and edits to the displacement of various units across the Pajarito fault zone. The WC12b GFM attempts to depict the most current understanding of geology beneath the Laboratory and is the same model used to develop the cross-sections provided in Appendix F.

The water-table surface was modeled numerically based on regional water-level data measured in November 2019 as input for the potentiometric surface. The water table in Figure G-1 is depicted using 50-ft contour intervals superimposed on the underlying geology. The transect lines and regional wells from Appendix F are also provided in this appendix to link the geologic map and the geologic cross-sections.

REFERENCE

The following reference list includes documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ERID, ESHID, or EMID. This information is also included in text citations. ERIDs were assigned by the Laboratory's Associate Directorate for Environmental Management (IDs through 599999); ESHIDs were assigned by the Laboratory's Associate Directorate for Environment, Safety, and Health (IDs 600000 through 699999); and EMIDs are assigned by Newport News Nuclear BWXT-Los Alamos, LLC (N3B) (IDs 700000 and above). IDs are used to locate documents in N3B's Records Management System and in the Master Reference Set. The New Mexico Environment Department (NMED) Hazardous Waste Bureau and N3B maintain copies of the Master Reference Set. The set ensures that NMED has the references to review documents. The set is updated when new references are cited in documents.

Cole, G., D. Coblentz, E. Jacobs, D. Koning, D. Broxton, D. Vaniman, F. Goff, and G. WoldeGabriel, April 2010. "The 2009 Three-Dimensional Geologic Models of the Los Alamos National Laboratory Site, Southern Española Basin, and Española Basin," Los Alamos National Laboratory document LA-UR-09-3701, Los Alamos, New Mexico. (Cole et al. 2010, 106101)

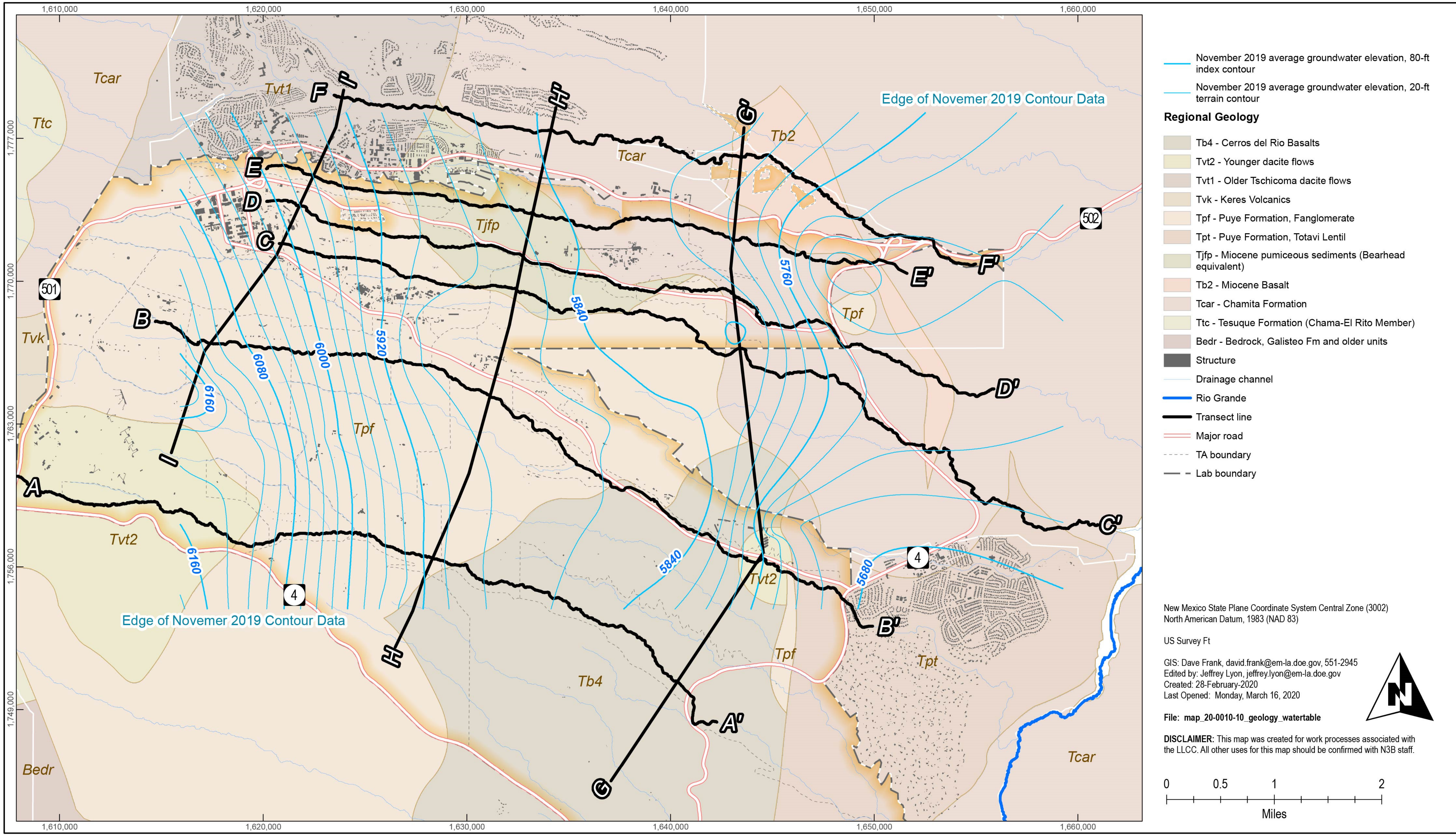


Figure G-1 **Water table superimposed on the underlying geology**

Appendix H

Crosswalks for the
Monitoring Year 2020 versus Monitoring Year 2021
Interim Facility-Wide Groundwater Monitoring Plans

Tables H-1 through H-7 present comparisons of the monitoring year (MY) 2020 and MY 2021 interim monitoring plans for each monitoring group and correspond respectively to Tables 2.4-1, 3.4-1, 4.4-1, 5.4-1, 6.4-1, 7.4-1, and 8.3-1 in the MY 2020 Interim Facility-Wide Groundwater Monitoring Plan (IFGMP) (N3B 2019, 700451) and MY 2021 IFGMP. Changes from the MY 2020 IFGMP to the MY 2021 IFGMP are identified by red text and were based on examination of the most recent 5 yr of monitoring data available at the time the MY 2021 IFGMP was prepared. This data set can be created by bounding the extraction from a sample date of January 1, 2013, to a data validation date of January 11, 2020, and including regular (REG) and field duplicate (FD) data that are coded with the best value flag. The rationale for the changes from the MY 2020 IFGMP to the MY 2021 IFGMP is presented in the last column of each crosswalk table.

Monitoring objectives for each of the monitoring groups are presented in the following sections of the MY 2021 IFGMP:

Monitoring Group	Section Reference for Monitoring Objectives
Technical Area 21 (TA-21)	Section 2.3
Chromium Investigation	Section 3.3
Material Disposal Area (MDA) C	Section 4.3
TA-54	Section 5.3
TA-16 260	Section 6.3
MDA AB	Section 7.3
General Surveillance	Section 8.2

REFERENCES

The following reference list includes documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ERID, ESHID, or EMID. This information is also included in text citations. ERIDs were assigned by the Laboratory's Associate Directorate for Environmental Management (IDs through 599999); ESHIDs were assigned by the Laboratory's Associate Directorate for Environment, Safety, and Health (IDs 600000 through 699999); and EMIDs are assigned by Newport News Nuclear BWXT-Los Alamos, LLC (N3B) (IDs 700000 and above). IDs are used to locate documents in N3B's Records Management System and in the Master Reference Set. The New Mexico Environment Department (NMED) Hazardous Waste Bureau and N3B maintain copies of the Master Reference Set. The set ensures that NMED has the references to review documents. The set is updated when new references are cited in documents.

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), September 2016. "Groundwater Investigation Work Plan for Consolidated Unit 16-021(c)-99, Including Drilling Work Plans for Wells R-68 and R-69," Los Alamos National Laboratory document LA-UR-16-26493, Los Alamos, New Mexico. (LANL 2016, 601779)

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)

N3B (Newport News Nuclear BWXT-Los Alamos, LLC), May 2019. "Interim Facility-Wide Groundwater Monitoring Plan for the 2020 Monitoring Year, October 2019–September 2020," Newport News Nuclear BWXT-Los Alamos, LLC, document EM2019-0156, Los Alamos, New Mexico. (N3B 2019, 700451)

Table H-1
Crosswalk for the MY 2020 versus MY 2021 Interim Monitoring Plans for the TA-21 Monitoring Group

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Rationale for Changes (MY 2020 to MY 2021)
LADP-3	2020	Intermediate	A	B (2020)	B (2020)	A	A	A	—[f]	—	—	A	—	B (2020)	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	B (2022)[g, h]	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	B (2022)	A	
LAOI(a)-1.1	2020	Intermediate	A	B (2020)	B (2020)	A	A	A	—	—	—	A	—	B (2020)	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	B (2022)	A	
LAOI-3.2	2020	Intermediate	A	B (2020)	B (2020)	A	A	A	—	—	—	A	A	—	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	A	A	—	A	
LAOI-3.2a	2020	Intermediate	A	B (2020)	B (2020)	A	A	A	—	—	—	A	A	—	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	A	A	—	A	
LAOI-7	2020	Intermediate	A	B (2020)	B (2020)	A	A	A	—	—	—	A	A	—	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	A	A	—	A	
R-6i	2020	Intermediate	A	A	B (2020)	A	A	A	—	—	—	A	A	—	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	B (2022)	A	—	—	—	A	A	—	A	
TA-53i	2020	Intermediate	A	A	B (2020)	A	A	A	—	—	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	A	A	
R-9i S1[i, j]	2020	Intermediate	Q	Q	Q	Q	A	A	A	A	A	A	---	A	Q	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	A	A	A	A	A	A	---	A	A	
R-5 S2[i, k]	2020	Intermediate	Q	Q	Q	Q	A	A	A	A	A	A	---	A	Q	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	A	A	A	A	A	A	---	A	A	
R-6**[l]	2020	Regional	A	A	B (2020)	A	A	A	—	—	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	A	A	
R-7 S3[i, m]	2020	Regional	Q	Q	Q	Q	A	A	A	A	A	A	---	A	Q	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	A	A	A	A	A	A	---	A	A	
R-8 S1[i]	2020	Regional	Q	Q	Q	Q	A	A	A	A	A	A	---	A	Q	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	A	A	A	A	A	A	---	A	A	
R-8 S2[i]	2020	Regional	Q	Q	Q	Q	A	A	A	A	A	A	---	A	Q	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	A	A	A	A	A	A	---	A	A	

Table H-1 (continued)

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Rationale for Changes (MY 2020 to MY 2021)
R-64	2020	Regional	A	A	B (2020)	A	A	A	—	—	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	A	A	
R-66	2020	Regional	A	A	B (2020)	A	A	A	—	—	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	A	A	
R-9	2020	Regional	A	B (2020)	B (2020)	A	A	A	—	—	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	B (2022)	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	A	A	

Notes: Table H-1 is a crosswalk from Table 2.4-1 in the MY 2020 Interim Facility-Wide Groundwater Monitoring Plan (IFGMP) (N3B 2019, 700451) to Table 2.4-1 in the MY 2021 IFGMP. Sampling suites and frequencies: Q = quarterly (4 times/yr); A = annual (1 time/yr); B = biennial (1 time/2 yr).

[a] VOCs = Volatile organic compounds.

[b] SVOCs = Semivolatile organic compounds; New toxic pollutants prometon (6-methoxy-1,3,5-triazine-2,4-diamine) and sulfolane (thiolane-1,1-dioxide) are sampled as part of this suite.

[c] PFAS = Perfluorohexane Sulfonic Acid (PFHxS), Perfluorooctanoic Acid (PFOA), and Perfluorooctane Sulfate (PFOS).

[d] PCBs = Polychlorinated biphenyls.

[e] HEXP = Analytical suite for analysis of samples for high explosives by SW-846:8330B series.

[f] — = This analytical suite is not scheduled to be collected for this type of water at locations assigned to this monitoring group.

[g] 2022 = Samples scheduled to be collected during implementation of the MY 2022 IFGMP.

[h] Red font indicates change from previous iteration of the IFGMP.

[i] Converted Westbay wells. Propose reducing sampling frequency to annual at the completion of first four quarterly rounds of sampling pending review of data.

[j] S1 = Screen 1.

[k] S2 = Screen 2.

[j] Double asterisks (**) indicate background monitoring location as specified in the "Groundwater Background Investigation Report, Revision 5" (LANL 2016, 601920).

[m] S3 = Screen 3.

Table H-2
Crosswalk for the MY 2020 versus MY 2021 Interim Monitoring Plans for the Chromium Investigation Monitoring Group

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Naphthalene Sulfonate Tracers	Sodium Perrhenate Tracer	Deuterated Water Tracer	Rationale for Changes (MY 2020 to MY 2021)
MCOI-5	2020	Intermediate	Q	S	S	A	—[f]	A	A	—	—	—	A	A	—	Q	—	—	—	The water level at MCOI-5 has been steadily declining over the past 9 yr and as of January 2020 is less than 1 ft above the bottom of the screen, which is an insufficient volume to collect samples. This well will be monitored for water levels and if sufficient recharge occurs allowing water level to rise to 3.5 ft above the bottom of the screen (6124.2 ft amsl) a prioritized suite consisting of perchlorate, PFAS, metals, and additional general inorganics will be collected.
	2021		Q	—[g]	—	—	—	—	A	—	—	—	—	—	—	Q	—	—	—	
MCOI-6	2020	Intermediate	Q	S	S	A	—	A	A	B (2020)	—	—	A	A	—	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		Q	S	S	S	—	S	A	B (2022)[h]	—	—	A	A	—	Q	—	—	—	
SCI-1	2020	Intermediate	S	B (2020)	B (2020)	A	—	A	A	B (2020)	—	—	A	—	A	S	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		S	B (2022)	B (2022)	B (2022)	—	B (2022)	A	B (2022)	—	—	A	—	A	S	—	—	—	
SCI-2	2020	Intermediate	Q	B (2020)	B (2020)	A	—	A	A	B (2020)	—	—	A	A	—	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		Q	B (2022)	B (2022)	B (2022)	—	B (2022)	A	B (2022)	—	—	A	A	—	Q	—	—	—	
R-1	2020	Regional	S	B (2020)	B (2020)	A	—	A	A	B (2020)	—	—	B (2020)	—	A	S	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		S	B (2022)	B (2022)	B (2022)	—	B (2022)	A	B (2022)	—	—	B (2022)	—	A	S	—	—	—	
R-11	2020	Regional	Q	B (2020)	B (2020)	A	—	A	A	—	—	—	B (2020)	—	Q	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Reduction of low-level tritium sampling since there have been no detects for low-level tritium since 11/16/2010. Monthly sampling for metals, general inorganics, and tracers have been added to integrate the wells, suite, and monitoring frequency for performance monitoring as outlined in the "Interim Measures Work Plan for Chromium Plume Control" (LANL 2015, 600458).
	2021		M	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	S	M	M	M	M	
R-13**[i]	2020	Regional	Q	B (2020)	B (2020)	A	—	A	A	—	—	—	B (2020)	—	A	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		Q	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	A	Q	—	—	—	
R-15	2020	Regional	Q	B (2020)	B (2020)	A	—	A	A	—	—	—	B (2020)	—	B (2020)	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		Q	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	B (2022)	Q	—	—	—	
R-28[j]	2020	Regional	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	n/a[k]
	2021		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
R-33 S1**[l]	2020	Regional	Q	B (2020)	B (2020)	A	—	A	A	—	—	—	B (2020)	—	A	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		Q	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	A	Q	—	—	—	
R-33 S2**[m]	2020	Regional	Q	B (2020)	B (2020)	A	—	A	A	—	—	—	B (2020)	—	A	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		Q	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	A	Q	—	—	—	

Table H-2 (continued)

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Naphthalene Sulfonate Tracers	Sodium Perrhenate Tracer	Deuterated Water Tracer	Rationale for Changes (MY 2020 to MY 2021)
R-35a	2020	Regional	Q	B (2020)	B (2020)	A	—	A	A	—	—	—	B (2020)	—	Q	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Reduction of low-level tritium sampling since there have been no detects for low-level tritium since 11/11/2010. Monthly sampling for metals, general inorganics, and tracers have been added to integrate the wells, suite, and monitoring frequency for performance monitoring as outlined in the "Interim Measures Work Plan for Chromium Plume Control" (LANL 2015, 600458).
	2021		M	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	S	M	M	M	M	
R-35b	2020	Regional	Q	B (2020)	B (2020)	A	—	A	A	—	—	—	B (2020)	—	Q	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Reduction of low-level tritium sampling since there have been no detects for low-level tritium since 11/11/2010. Monthly sampling for metals, general inorganics, and tracers have been added to integrate the wells, suite, and monitoring frequency for performance monitoring as outlined in the "Interim Measures Work Plan for Chromium Plume Control" (LANL 2015, 600458).
	2021		M	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	S	M	M	M	M	
R-36	2020	Regional	Q	B (2020)	B (2020)	A	—	A	A	—	—	—	B (2020)	—	S	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		Q	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	S	Q	—	—	—	
R-42	2020	Regional	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	n/a
	2021		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
R-43 S1	2020	Regional	Q	B (2020)	B (2020)	A	—	A	A	—	—	—	B (2020)	—	A	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Tritium concentrations have been increasing at this location, therefore, the sampling frequency of low-level tritium will increase to semiannual.
	2021		Q	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	S	Q	—	—	—	
R-43 S2	2020	Regional	Q	B (2020)	B (2020)	A	—	A	A	—	—	—	B (2020)	—	A	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Tritium concentrations have been increasing at this location, therefore, the sampling frequency of low-level tritium will increase to semiannual.
	2021		Q	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	S	Q	—	—	—	
R-44 S1	2020	Regional	Q	B (2020)	B (2020)	A	—	A	A	—	—	—	B (2020)	—	Q	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Monthly sampling for metals, general inorganics, and tracers have been added to integrate the wells, suite, and monitoring frequency for performance monitoring as outlined in the "Interim Measures Work Plan for Chromium Plume Control" (LANL 2015, 600458).
	2021		M	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	Q	M	M	M	—	

Table H-2 (continued)

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Naphthalene Sulfonate Tracers	Sodium Perrhenate Tracer	Deuterated Water Tracer	Rationale for Changes (MY 2020 to MY 2021)
R-44 S2	2020	Regional	Q	B (2020)	B (2020)	A	—	A	A	—	—	—	B (2020)	—	Q	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Monthly sampling for metals, general inorganics, and tracers have been added to integrate the wells, suite, and monitoring frequency for performance monitoring as outlined in the "Interim Measures Work Plan for Chromium Plume Control" (LANL 2015, 600458).
	2021		M	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	Q	M	M	M	—	
R-45 S1	2020	Regional	Q	B (2020)	B (2020)	A	—	A	A	—	—	—	B (2020)	—	Q	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Monthly sampling for metals, general inorganics, and tracers have been added to integrate the wells, suite, and monitoring frequency for performance monitoring as outlined in the "Interim Measures Work Plan for Chromium Plume Control" (LANL 2015, 600458).
	2021		M	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	Q	M	M	M	M	
R-45 S2	2020	Regional	Q	B (2020)	B (2020)	A	—	A	A	—	—	—	B (2020)	—	Q	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Monthly sampling for metals, general inorganics, and tracers have been added to integrate the wells, suite, and monitoring frequency for performance monitoring as outlined in the "Interim Measures Work Plan for Chromium Plume Control" (LANL 2015, 600458).
	2021		M	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	Q	M	M	M	M	
R-50 S1	2020	Regional	Q	B (2020)	B (2020)	A	—	A	A	—	—	—	B (2020)	—	Q	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Monthly sampling for metals, general inorganics, and tracers have been added to integrate the wells, suite, and monitoring frequency for performance monitoring as outlined in the "Interim Measures Work Plan for Chromium Plume Control" (LANL 2015, 600458).
	2021		M	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	Q	M	M	—	—	
R-50 S2**	2020	Regional	Q	B (2020)	B (2020)	A	—	A	A	—	—	—	B (2020)	—	Q	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Monthly sampling for metals, general inorganics, and tracers have been added to integrate the wells, suite, and monitoring frequency for performance monitoring as outlined in the "Interim Measures Work Plan for Chromium Plume Control" (LANL 2015, 600458).
	2021		M	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	Q	M	M	—	—	
R-61 S1	2020	Regional	Q	—	—	A	A	A	A	—	—	—	—	—	Q	Q	—	—	—	Prometon and sulfolane are sampled as part of the SVOC suite. Additionally, low-level 1,4-dioxane and low-level nitrosamines are analyzed along with the SVOC analytical suite. Since SVOC sampling is not required at this location, these analytes are removed from sampling. Monthly sampling for metals and general inorganics have been added to integrate the wells, suite, and monitoring frequency for performance monitoring as outlined in the "Interim Measures Work Plan for Chromium Plume Control" (LANL 2015, 600458).
	2021		M	—	—	—	—	—	A	—	—	—	—	—	Q	M	—	—	—	
R-62[n]	2020	Regional	Q	B (2020)	B (2020)	A	—	A	A	—	—	—	B (2020)	—	A	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Tritium concentrations have been increasing at this location, therefore, the sampling frequency of low-level tritium will increase to quarterly.
	2021		Q	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	Q	Q	—	—	—	

Table H-2 (continued)

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Naphthalene Sulfonate Tracers	Sodium Perrhenate Tracer	Deuterated Water Tracer	Rationale for Changes (MY 2020 to MY 2021)
R-67	2020	Regional	Q	B (2020)	B (2020)	A	—	A	A	—	—	—	B (2020)	—	S	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		Q	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	S	Q	—	—	—	
R-70 S1[o]	2020	Regional	Q	Q	Q	A	—	A	A	—	—	—	Q	—	Q	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Monthly sampling for metals, general inorganics, and tracers have been added to integrate the wells, suite, and monitoring frequency for performance monitoring as outlined in the “Interim Measures Work Plan for Chromium Plume Control” (LANL 2015, 600458).
	2021		M	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	Q	M	M	M	M	
R-70 S2[o]	2020	Regional	Q	Q	Q	A	—	A	A	—	—	—	Q	—	Q	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Monthly sampling for metals, general inorganics, and tracers have been added to integrate the wells, suite, and monitoring frequency for performance monitoring as outlined in the “Interim Measures Work Plan for Chromium Plume Control” (LANL 2015, 600458).
	2021		M	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	Q	M	M	M	M	
SIMR-2[p]	2020	Regional	Q	B (2020)	B (2020)	A	—	A	A	—	—	—	B (2020)	—	Q	Q	—	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Reduction of low-level tritium since there has been one spurious detect for low-level tritium in a field duplicate in 2016. Monthly sampling for metals, general inorganics, and tracers have been added to integrate the wells, suite, and monitoring frequency for performance monitoring as outlined in the “Interim Measures Work Plan for Chromium Plume Control” (LANL 2015, 600458).
	2021		M	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	B (2022)	—	S	M	M	—	—	

Notes: Table H-2 is a crosswalk from Table 3.4-1 in the MY 2020 IFGMP (N3B 2019, 700451) to Table 3.4-1 in the MY 2021 IFGMP. Sampling suites and frequencies: M = monthly (12 times/yr); Q = quarterly (4 times/yr); S = semiannual (2 times/yr); A = annual (1 time/yr); B = biennial (1 time/2 yr).

[a] VOCs = Volatile organic compounds.

[b] SVOCs = Semivolatile organic compounds; New toxic pollutants prometon (6-methoxy-1,3,5-triazine-2,4-diamine) and sulfolane (thiolane-1,1-dioxide) are sampled as part of this suite.

[c] PFAS = Perfluorohexane Sulfonic Acid (PFHxS), Perfluorooctanoic Acid (PFOA), and Perfluorooctane Sulfate (PFOS).

[d] PCBs = Polychlorinated biphenyls.

[e] HEXP = Analytical suite for analysis of samples for high explosives by SW-846:8330 series.

[f] — = This analytical suite is not scheduled to be collected for this type of water at locations assigned to this monitoring group.

[g] Red font indicates change from previous iteration of the IFGMP.

[h] 2022 = Samples scheduled to be collected during implementation of the MY 2022 IFGMP.

[i] Double asterisks (**) indicate background monitoring location as specified in the “Groundwater Background Investigation Report, Revision 5” (LANL 2016, 601920).

[j] Gray shading indicates wells that are included in the pilot amendments test and will be sampled per the NMED-approved work plan.

[k] n/a = Not applicable.

[l] S1 = Screen 1.

[m] S2 = Screen 2.

[n] Conduct an extended purge at R-62 during the second quarter (January–March) of MY 2021. Collect time-series samples at the following purge volumes: 3 CV, 6 CV, 9 CV, 12 CV, 15 CV, 18 CV and 21 CV. Time-series samples shall be collected for the following analytical suites: Metals and General Inorganics, and coded as "W" and "Test". Regular IFGMP samples are to be collected after a minimum of 3 CVs have been purged and stable field parameters are achieved.

[o] Propose reducing sampling frequency to match R-45 at the completion of first four quarterly rounds of sampling pending data review.

[p] Orange shading indicates sampling location is on Pueblo de San Ildefonso land.

Table H-3
Crosswalk for the MY 2020 versus MY 2021 Interim Monitoring Plans for the MDA C Monitoring Group

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Rationale for Changes (MY 2020 to MY 2021)
R-14 S1**[f, g]	2020	Regional	A	A	B (2020)	A	A	A	B (2020)	V (2020)	—[h]	B (2020)	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Increased sampling frequency for HEXP per recommendation of "Investigation Report for Royal demolition Explosive in Deep Groundwater" N3B 2019, 700561).
	2021		A	A	B (2022)[i, j]	B (2022)	B (2022)	A	B (2022)	A	—	B (2022)	—	A	A	
R-46**	2020	Regional	A	A	B (2020)	A	A	A	B (2020)	V (2020)	—	B (2020)	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Increased sampling frequency for HEXP per recommendation of "Investigation Report for Royal demolition Explosive in Deep Groundwater" N3B 2019, 700561).
	2021		A	A	B (2022)	B (2022)	B (2022)	A	B (2022)	A	—	B (2022)	—	A	A	
R-60**	2020	Regional	A	A	B (2020)	A	A	A	B (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Increased sampling frequency for HEXP per recommendation of the "Investigation Report for Royal demolition Explosive in Deep Groundwater" N3B 2019, 700561).
	2021		A	A	B (2022)	B (2022)	B (2022)	A	B (2022)	A	—	A	—	A	A	

Notes: Table H-3 is a crosswalk from Table 4.4-1 in the MY 2020 IFGMP (N3B 2019, 700451) to Table 4.4-1 in the MY 2021 IFGMP. Sampling suites and frequencies: A = annual (1 time/yr); B = biennial (1 time/2 yr); V = quinquennial (1 time/5 yr).

[a] VOCs = Volatile organic compounds.

[b] SVOCs = Semivolatile organic compounds; New toxic pollutants prometon (6-methoxy-1,3,5-triazine-2,4-diamine) and sulfolane (thiolane-1,1-dioxide) are sampled as part of this suite.

[c] PFAS = Perfluorohexane Sulfonic Acid (PFHxS), Perfluorooctanoic Acid (PFOA), and Perfluorooctane Sulfate (PFOS).

[d] PCBs = Polychlorinated biphenyls.

[e] HEXP = Analytical suite for analysis of samples for high explosives by SW-846:8330B series.

[f] Double asterisks (**) indicate background monitoring location as specified in the "Groundwater Background Investigation Report, Revision 5" (LANL 2016, 601920).

[g] S1 = Screen 1.

[h] — = This analytical suite is not scheduled to be collected for this type of water at locations assigned to this monitoring group.

[i] 2022 = Samples scheduled to be collected during implementation of the MY 2022 IFGMP.

[j] Red font indicates change from previous iteration of the IFGMP.

Table H-4
Crosswalk for the MY 2020 versus MY 2021 Interim Monitoring Plans for the TA-54 Monitoring Group

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Rationale for Changes (MY 2020 to MY 2021)
R-23i S1[f]	2020	Intermediate	A	S	A	A	—[g]	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. All historical detects for VOCs are below applicable screening levels, therefore sampling frequency will be reduced for these analytes.
	2021		A	A[h]	A	A	—	A	A	V (2025)[i]	V (2025)	—	A	—	A	A	
R-23i S2[j]	2020	Intermediate	A	S	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Historical detects for VOCs are below applicable screening levels, except for one spurious naphthalene detect in 2006. Therefore, sampling frequency will be reduced for these analytes.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-23i S3[k]	2020	Intermediate	A	S	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. All historical detects for VOCs are below applicable screening levels, therefore sampling frequency will be reduced for these analytes.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-37 S1	2020	Intermediate	A	S	S	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. All historical detects for SVOCs and VOCs are below applicable screening levels, therefore sampling frequency will be reduced for these analytes.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-40 Si	2020	Intermediate	A	—	—	—	A	—	A	—	—	—	—	—	A	A	Prometon and sulfolane are sampled as part of the SVOC suite. Since SVOC sampling is not required at this location, these analytes are removed from sampling.
	2021		A	—	—	—	—	—	A	—	—	—	—	—	A	A	
R-40 S1	2020	Intermediate	S	S	—	A	A	A	A	—	—	—	—	—	A	S	Prometon and sulfolane are sampled as part of the SVOC suite. Additionally, low-level 1,4-dioxane and low-level nitrosamines are analyzed along with the SVOC analytical suite. Since SVOC sampling is not required at this location, these analytes are removed from sampling. All historical detects for analytes with reduced frequence are below applicable screening levels.
	2021		A	A	—	—	—	—	A	—	—	—	—	—	A	A	
R-55i	2020	Intermediate	—	—	—	—	A	—	A	—	—	—	—	—	A	—	Prometon and sulfolane are sampled as part of the SVOC suite. Since SVOC sampling is not required at this location, these analytes are removed from sampling.
	2021		—	—	—	—	—	—	A	—	—	—	—	—	A	—	
R-20 S1	2020	Regional	A	A	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-20 S2	2020	Regional	A	A	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-21**[l]	2020	Regional	A	A	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-23	2020	Regional	A	S	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Historical detects for VOCs are below applicable screening levels, except for one spurious acetone detect in 2002 and one methylene chloride detect in 2013. Therefore, sampling frequency will be reduced for these analytes.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-32 S1	2020	Regional	A	S	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Historical detects for VOCs are below applicable screening levels, except for one spurious methylene chloride detect in 2013. Therefore, sampling frequency will be reduced for these analytes.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	

Table H-4 (continued)

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Rationale for Changes (MY 2020 to MY 2021)
R-37 S2**	2020	Regional	A	S	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Historical detects for VOCs are below applicable screening levels, except for one spurious methylene chloride detect in 2013. Therefore, sampling frequency will be reduced for these analytes.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-38**	2020	Regional	A	S	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Historical detects for VOCs are below applicable screening levels, except for one spurious benzene detect in 2009. Therefore, sampling frequency will be reduced for these analytes.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-39**	2020	Regional	A	S	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Historical detects for VOCs are below applicable screening levels, except for spurious detects of benzene, 1-butanol, and naphthalene in 2008. Therefore, sampling frequency will be reduced for these analytes.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-40 S2**	2020	Regional	A	S	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. All historical detects for VOCs are below applicable screening levels, therefore sampling frequency will be reduced for these analytes.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-41 S2	2020	Regional	A	S	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Historical detects for VOCs are below applicable screening levels, except for one spurious acrylonitrile detect in 2017. Therefore, sampling frequency will be reduced for these analytes.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-49 S1**	2020	Regional	A	A	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-49 S2**	2020	Regional	A	A	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-51 S1**	2020	Regional	A	A	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-51 S2**	2020	Regional	A	A	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-52 S1**	2020	Regional	A	A	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-52 S2**	2020	Regional	A	A	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-53 S1**	2020	Regional	A	A	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-53 S2**	2020	Regional	A	A	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-54 S1	2020	Regional	—	—	—	—	A	—	A	—	—	—	—	—	A	—	Prometon and sulfolane are sampled as part of the SVOC suite. Since SVOC sampling is not required at this location, these analytes are removed from sampling.
	2021		—	—	—	—	—	—	A	—	—	—	—	—	A	—	

Table H-4 (continued)

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Rationale for Changes (MY 2020 to MY 2021)
R-54 S2**	2020	Regional	A	A	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-55 S1	2020	Regional	A	A	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-55 S2	2020	Regional	A	A	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-56 S1**	2020	Regional	A	A	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-56 S2**	2020	Regional	A	A	A	A	—	A	A	V (2020)	V (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	—	A	A	V (2025)	V (2025)	—	A	—	A	A	
R-57 S1**[m]	2020	Regional	A	A	A	A	—	A	A	A	V (2020)	A	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	—	A	A	A	V (2025)	A	A	—	A	A	
R-57 S2**[m]	2020	Regional	A	A	A	A	—	A	A	A	V (2020)	A	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	A	A	—	A	A	A	V (2025)	A	A	—	A	A	

Notes: Table H-4 is a crosswalk from Table 5.4-1 in the MY 2020 IFGMP (N3B 2019, 700451) to Table 5.4-1 in the MY 2021 IFGMP. Sampling suites and frequencies: S = semiannual (2 times/yr); A = annual (1 time/yr); V = quinquennial (1 time/5 yr).

[a] VOCs = Volatile organic compounds.

[b] SVOCs = Semivolatile organic compounds; New toxic pollutants prometon (6-methoxy-1,3,5-triazine-2,4-diamine) and sulfolane (thiolane-1,1-dioxide) are sampled as part of this suite.

[c] PFAS = Perfluorohexane Sulfonic Acid (PFHxS), Perfluorooctanoic Acid (PFOA), and Perfluorooctane Sulfate (PFOS).

[d] PCBs = Polychlorinated biphenyls.

[e] HEXP = Analytical suite for analysis of samples for high explosives by SW-846:8330 series.

[f] S1 = Screen 1.

[g] — = This analytical suite is not scheduled to be collected for this type of water at locations assigned to this monitoring group.

[h] Red font indicates change from previous iteration of the IFGMP.

[i] 2025 = Samples scheduled to be collected during implementation of the MY 2025 IFGMP.

[j] S2 = Screen 2.

[k] S3 = Screen 3.

[l] Double asterisks (**) indicate background monitoring location as specified in the "Groundwater Background Investigation Report, Revision 5" (LANL 2016, 601920)

[m] The IFGMP sampling and analysis specified for R-57 S1 and R-57 S2 for analysis of VOCs, SVOCs, and PCBs also satisfies the TA-54 Area G PCB compliance monitoring requirements.

Table H-5
Crosswalk for the MY 2020 versus MY 2021 Interim Monitoring Plans for the TA-16 260 Monitoring Group

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXMOD[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Naphthalene Sulfonate Tracers	15N/18O Isotopes in Nitrate	Rationale for Changes (MY 2020 to MY 2021)
Cañon de Valle below MDA P	2020	Base flow	S	S	B (2020)	A	—[f]	A	A	V (2020)	S	V (2020)	B (2020)	—	—	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Beginning in MY 2021, base flow locations will be reported under a base flow specific PMR. Criteria for screening base flow monitoring data is different than the groundwater screening process. Base flow locations have been moved into a separate PMR for clearer criteria requirements.
	2021		S	S	B (2022)[g, h]	B (2022)	—	B (2022)	A	V (2025)[i]	S	V (2025)	B (2022)	—	—	S	—	—	
Between E252 and Water at Beta	2020	Base flow	S	S	B (2020)	A	—	A	A	V (2020)	S	V (2020)	B (2020)	—	—	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Beginning in MY 2021, base flow locations will be reported under a base flow specific PMR. Criteria for screening base flow monitoring data is different than the groundwater screening process. Base flow locations have been moved into a separate PMR for clearer criteria requirements.
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—	
Water at Beta	2020	Base flow	S	S	B (2020)	A	—	A	A	V (2020)	S	V (2020)	B (2020)	—	—	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Beginning in MY 2021, base flow locations will be reported under a base flow specific PMR. Criteria for screening base flow monitoring data is different than the groundwater screening process. Base flow locations have been moved into a separate PMR for clearer criteria requirements.
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—	
Pajarito below S&N Ancho E Basin Confluence	2020	Base flow	S	S	B (2020)	A	—	A	A	V (2020)	S	V (2020)	B (2020)	—	—	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Beginning in MY 2021, base flow locations will be reported under a base flow specific PMR. Criteria for screening base flow monitoring data is different than the groundwater screening process. Base flow locations have been moved into a separate PMR for clearer criteria requirements.
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—	
Bulldog Spring	2020	Spring	S	S	B (2020)	A	—	A	A	V (2020)	S	V (2020)	B (2020)	—	—	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Tracer sampling added to help refine site conceptual models. Data will be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	A	
SWSC Spring	2020	Spring	S	S	B (2020)	A	—	A	A	V (2020)	S	V (2020)	B (2020)	—	—	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Tracer sampling added to help refine site conceptual models. Data will be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	A	

Table H-5 (continued)

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXMOD[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Naphthalene Sulfonate Tracers	15N/18O Isotopes in Nitrate	Rationale for Changes (MY 2020 to MY 2021)
Burning Ground Spring	2020	Spring	S	S	B (2020)	A	—	A	A	V (2020)	S	V (2020)	B (2020)	—	A	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Tracer sampling added to help refine site conceptual models. Data will be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	A	S	—	A	
Martin Spring	2020	Spring	S	S	B (2020)	A	—	A	A	V (2020)	S	V (2020)	B (2020)	—	A	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Tracer sampling added to help refine site conceptual models. Data will be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	A	S	—	A	
16-61439 (alias: PRB Alluvial Seep)	2020	Spring	S	S	B (2020)	A	—	A	A	V (2020)	S	V (2020)	B (2020)	—	—	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—	
FLC-16-25280	2020	Alluvial	S	S	B (2020)	A	—	A	A	V (2020)	S	V (2020)	B (2020)	—	—	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—	
CdV-16-02656	2020	Alluvial	S	S	B (2020)	A	—	A	A	V (2020)	S	V (2020)	B (2020)	—	—	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—	
CdV-16-02657r	2020	Alluvial	S	S	B (2020)	A	—	A	A	V (2020)	S	V (2020)	B (2020)	—	—	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—	
CdV-16-02659	2020	Alluvial	S	S	B (2020)	A	—	A	A	V (2020)	S	V (2020)	B (2020)	—	—	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—	
CdV-16-611923	2020	Alluvial	S	S	B (2020)	A	—	A	A	V (2020)	S	V (2020)	B (2020)	—	—	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—	
MSC-16-06293	2020	Alluvial	S	S	B (2020)	A	—	A	A	V (2020)	S	V (2020)	B (2020)	—	—	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—	
MSC-16-06294	2020	Alluvial	S	S	B (2020)	A	—	A	A	V (2020)	S	V (2020)	B (2020)	—	—	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—	
CdV-16-611937	2020	Alluvial	S	S	B (2020)	A	—	A	A	V (2020)	S	V (2020)	B (2020)	—	—	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	V (2025)	S	V (2025)	B (2022)	—	—	S	—	—	

Table H-5 (continued)

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXMOD[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Naphthalene Sulfonate Tracers	15N/18O Isotopes in Nitrate	Rationale for Changes (MY 2020 to MY 2021)
16-26644	2020	Intermediate	S	S	B (2020)	A	—	A	A	—	Q	—	B (2020)	—	A	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Tracer sampling added to help refine site conceptual models. Data will be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	—	Q	—	B (2022)	—	A	S	—	A	
CdV-9-1(i) S1[j]	2020	Intermediate	S	S	B (2020)	A	—	A	A	V (2020)	Q	A	B (2020)	—	A	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Tracer sampling added to help refine site conceptual models. Data will be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	V (2025)	Q	A	B (2022)	—	A	S	Q	A	
CdV-16-1(i)	2020	Intermediate	S	S	B (2020)	A	—	A	A	—	Q	—	B (2020)	—	A	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Tracer sampling added to help refine site conceptual models. Data will be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	—	Q	—	B (2022)	—	A	S	Q	A	
CdV-16-2(i)r	2020	Intermediate	S	S	B (2020)	A	—	A	A	—	Q	—	B (2020)	—	A	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Tracer sampling added to help refine site conceptual models. Data will be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	—	Q	—	B (2022)	—	A	S	Q	A	
CdV-16-4ip S1	2020	Intermediate	S	S	B (2020)	A	—	A	A	V (2020)	Q	V (2020)	B (2020)	—	A	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Tracer sampling added to help refine site conceptual models. Data will be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	V (2025)	Q	V (2025)	B (2022)	—	A	S	Q	A	
CdV-37-1(i)** [k]	2020	Intermediate	S	S	B (2020)	A	—	A	A	—	S	—	B (2020)	—	A	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	—	S	—	B (2022)	—	A	S	—	—	
R-25b	2020	Intermediate	S	S	B (2020)	A	—	A	A	—	S	—	B (2020)	—	A	S	—	—	As noted in the Appendix E watch list, the presence of tracers in R-25b indicates a nonrepresentative condition. Semiannual sampling for HEXMOD will continue in MY 2021. Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Tracer sampling added to help refine site conceptual models. Data will be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	—	S	—	B (2022)	—	A	S	S	—	

Table H-5 (continued)

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXMOD[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Naphthalene Sulfonate Tracers	15N/18O Isotopes in Nitrate	Rationale for Changes (MY 2020 to MY 2021)
R-26 PZ-2	2020	Intermediate	S	S	B (2020)	A	—	A	A	—	S	—	B (2020)	—	A	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	—	S	—	B (2022)	—	A	S	—	—	
R-26 S1**	2020	Intermediate	S	S	B (2020)	A	—	A	A	—	S	—	B (2020)	—	A	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	—	S	—	B (2022)	—	A	S	—	—	
R-47i**	2020	Intermediate	S	S	B (2020)	A	—	A	A	—	Q	—	B (2020)	—	A	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Tracer sampling added to help refine site conceptual models. Data will be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	—	Q	—	B (2022)	—	A	S	Q	A	
R-63i	2020	Intermediate	S	S	—	A	A	A	A	—	S	—	A	—	A	S	—	—	Prometon and sulfolane are sampled as part of the SVOC suite. Additionally, low-level 1,4-dioxane and low-level nitrosamines are analyzed along with the SVOC analytical suite. Since SVOC sampling is not required at this location, these analytes are removed from sampling. Tracer sampling added to help refine site conceptual models. Data will be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."
	2021		S	S	—	—	—	—	A	—	S	—	A	—	A	S	S	A	
16-612309 (alias: Surge Bed Monitoring Well)	2020	Intermediate	S	S	S	A	—	A	A	—	S	—	—	—	—	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		S	S	S	S	—	S	A	—	S	—	—	—	—	S	—	—	
R-47**	2020	Regional	S	Q	B (2020)	A	—	A	A	V (2020)	Q	V (2020)	B (2020)	—	A	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. All historical detects for VOCs are below applicable screening levels, therefore sampling frequency will be reduced for these analytes. Tracer sampling added to help refine site conceptual models. Data will be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	V (2025)	Q	V (2025)	B (2022)	—	A	S	Q	A	
CdV-R-15-3 S4[l]	2020	Regional	S	S	B (2020)	A	—	A	A	—	S	—	B (2020)	—	A	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	—	S	—	B (2022)	—	A	S	—	—	
CdV-R-37-2 S2[m]	2020	Regional	A	—	—	A	A	A	A	—	A	—	—	—	A	A	—	—	Prometon and sulfolane are sampled as part of the SVOC suite. Additionally, low-level 1,4-dioxane and low-level nitrosamines are analyzed along with the SVOC analytical suite. Since SVOC sampling is not required at this location, these analytes are removed from sampling. CdV-R-37-2 S2 will be sampled following an extended 12 CV purge regardless of stability to determine if extended purging of this well shows improvement in reducing conditions that are typical of this location. This well will be sampled in accordance to Appendix E recommendations that samples are coded as "W" and "Test" for all analytes except for low-level tritium.
	2021		A	—	—	—	—	—	A	—	A	—	—	—	A	A	—	—	

Table H-5 (continued)

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXMOD[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Naphthalene Sulfonate Tracers	15N/18O Isotopes in Nitrate	Rationale for Changes (MY 2020 to MY 2021)
R-18	2020	Regional	S	Q	B (2020)	A	—	A	A	—	Q	—	B (2020)	—	A	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. All historical detects for VOCs are below applicable screening levels, therefore sampling frequency will be reduced for these analytes. Tracer sampling added to help refine site conceptual models. Data will be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	—	Q	—	B (2022)	—	A	S	Q	A	
R-48**	2020	Regional	S	S	B (2020)	A	—	A	A	—	Q	—	B (2020)	—	A	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Tracer sampling added to help refine site conceptual models. Data will be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	—	Q	—	B (2022)	—	A	S	Q	A	
R-58	2020	Regional	S	Q	B (2020)	A	—	A	A	V (2020)	Q	V (2020)	B (2020)	—	A	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. All historical detects for VOCs are below applicable screening levels, therefore sampling frequency will be reduced for these analytes. Tracer sampling added to help refine site conceptual models. Data will be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	V (2025)	Q	V (2025)	B (2022)	—	A	S	Q	A	
R-63	2020	Regional	S	S	B (2020)	A	—	A	A	—	Q	—	B (2020)	—	A	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Tracer sampling added to help refine site conceptual models. Data will be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	—	Q	—	B (2022)	—	A	S	Q	—	
R-68	2020	Regional	S	Q	S	A	—	A	A	—	Q	—	B (2020)	—	A	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. All historical detects for VOCs are below applicable screening levels, therefore sampling frequency will be reduced for these analytes. Tracer sampling added to help refine site conceptual models. Data will be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."
	2021		S	S	S	S	—	S	A	—	Q	—	B (2022)	—	A	S	Q	A	

Table H-5 (continued)

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXMOD[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Naphthalene Sulfonate Tracers	15N/18O Isotopes in Nitrate	Rationale for Changes (MY 2020 to MY 2021)
R-69 S1	2020	Regional	S	Q	S	A	—	A	A	—	Q	—	S	—	S	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. All historical detects for VOCs are below applicable screening levels, therefore sampling frequency will be reduced for these analytes. Tracer sampling added to help refine site conceptual models. Data will be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."
	2021		S	S	S	S	—	S	A	—	Q	—	S	—	S	S	Q	Q	
R-69 S2	2020	Regional	S	Q	S	A	—	A	A	—	Q	—	S	—	S	S	—	—	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. All historical detects for VOCs are below applicable screening levels, therefore sampling frequency will be reduced for these analytes. Tracer sampling added to help refine site conceptual models. Data will be reported in the "Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater."
	2021		S	S	S	S	—	S	A	—	Q	—	S	—	S	S	Q	Q	

Notes: Table H-5 is a crosswalk from Table 6.4-1 in the MY 2020 IFGMP (N3B 2019, 700451) to Table 6.4-1 in the MY 2021 IFGMP. Sampling suites and frequencies: Q = quarterly (4 times/yr); S = semiannual (2 times/yr); A = annual (1 time/yr); B = biennial (1 time/2 yr); V = quinquennial (1 time/5 yr).

[a] VOCs = Volatile organic compounds.

[b] SVOCs = Semivolatile organic compounds; New toxic pollutants prometon (6-methoxy-1,3,5-triazine-2,4-diamine) and sulfolane (thiolane-1,1-dioxide) are sampled as part of this suite.

[c] PFAS = Perfluorohexane Sulfonic Acid (PFHxS), Perfluorooctanoic Acid (PFOA), and Perfluorooctane Sulfate (PFOS).

[d] PCBs = Polychlorinated biphenyls.

[e] HEXMOD = Analytical suite for analysis of samples for high explosives and RDX– (Royal Demolition Explosive-) degradation products by SW-846:8330 series.

[f] 2022 = Samples scheduled to be collected during implementation of the MY 2022 IFGMP.

[g] Red font indicates change from previous iteration of IFGMP.

[h] — = This analytical suite is not scheduled to be collected for this type of water at locations assigned to this monitoring group.

[i] 2025 = Samples scheduled to be collected during implementation of the MY 2025 IFGMP.

[j] S1 = Screen 1.

[k] Double asterisks (**) indicate background monitoring location as specified in the "Groundwater Background Investigation Report, Revision 5" (LANL 2016, 601920).

[l] S4 = Screen 4.

[m] S2 = Screen 2.

Table H-6
Crosswalk for the MY 2020 versus MY 2021 Interim Monitoring Plans for the MDA AB Monitoring Group

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Rationale for Changes (MY 2020 to M Y2021)
R-27i**[f]	2020	Intermediate	A	A	B (2020)	A	A	A	—[g]	—	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)[h, i]	B (2022)	B (2022)	A	—	—	—	A	—	A	A	
R-27**	2020	Regional	A	A	B (2020)	A	A	A	—	—	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	B (2022)	A	—	—	—	A	—	A	A	
R-29	2020	Regional	A	A	B (2020)	A	A	A	—	A	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	B (2022)	A	—	A	—	A	—	A	A	
R-30**	2020	Regional	A	A	B (2020)	A	A	A	—	A	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	B (2022)	A	—	A	—	A	—	A	A	

Notes: Table H-6 is a crosswalk from Table 7.4-1 in the MY 2020 IFGMP (N3B 2019, 700451) to Table 7.4-1 in the MY 2021 IFGMP. Sampling suites and frequencies: A = annual (1 time/yr); B = biennial (1 time/2 yr).

[a] VOCs = Volatile organic compounds.

[b] SVOCs = Semivolatile organic compounds; New toxic pollutants prometon (6-methoxy-1,3,5-triazine-2,4-diamine) and sulfolane (thiolane-1,1-dioxide) are sampled as part of this suite.

[c] PFAS = Perfluorohexane Sulfonic Acid (PFHxS), Perfluorooctanoic Acid (PFOA), and Perfluorooctane Sulfate (PFOS).

[d] PCBs = Polychlorinated biphenyls.

[e] HEXP = Analytical suite for analysis of samples for high explosives by SW-846:8330 series.

[f] Double asterisks (**) indicate background monitoring location as specified in the "Groundwater Background Investigation Report, Revision 5" (LANL 2016, 601920).

[g] — = This analytical suite is not scheduled to be collected for this type of water at locations assigned to this monitoring group.

[h] 2022 = Samples scheduled to be collected during implementation of the MY 2022 IFGMP.

[i] Red font indicates change from previous iteration of the IFGMP.

Table H-7
Crosswalk for the MY 2020 versus MY 2021 Interim Monitoring Plans for the General Surveillance Monitoring Group

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Rationale for Changes (MY 2020 to MY 2021)
LA Canyon near Otowi Bridge[f]	2020	Base flow	S	S	S	A	—[g]	A	A	V (2020)	T (2021)[h]	V (2020)	S	—	S	S	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Beginning in MY 2021, base flow locations will be reported under a base flow specific PMR. Criteria for screening base flow monitoring data is different than the groundwater screening process. Base flow locations have been moved into a separate PMR for clearer criteria requirements.
	2021		S	S	S	S	—	S	A	V (2025)[i,j]	T (2021)	V (2025)	S	—	S	S	
DP Spring	2020	Spring	A	A	B (2020)	A	—	A	A	—	A	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)[k]	B (2022)	—	B (2022)	A	—	A	—	A	—	A	A	
Los Alamos Spring	2020	Spring	A	A	T (2021)	A	A	A	A	T (2021)	T (2021)	V (2020)	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency.
	2021		A	A	T (2021)	T (2021)	—	T (2021)	A	T (2021)	T (2021)	V (2025)	A	—	A	A	
Vine Tree Spring	2020	Spring	S	S	T (2021)	A	A	A	A	T (2021)	T (2021)	V (2020)	S	—	S	S	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency. Sampling frequency will be reduced to match Los Alamos Spring.
	2021		A	A	T (2021)	T (2021)	—	T (2021)	A	T (2021)	T (2021)	V (2025)	A	—	A	A	
LAO-1.6g	2020	Alluvial	A	A	B (2020)	A	—	A	A	—	A	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	—	B (2022)	A	—	A	—	A	—	A	A	
LLAO-1b	2020	Alluvial	A	A	T (2021)	A	A	A	A	T (2021)	T (2021)	V (2020)	A	—	—	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency.
	2021		A	A	T (2021)	T (2021)	—	T (2021)	A	T (2021)	T (2021)	V (2025)	A	—	—	A	
LLAO-4	2020	Alluvial	A	A	T (2021)	A	A	A	A	T (2021)	T (2021)	V (2020)	A	—	—	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency.
	2021		A	A	T (2021)	T (2021)	—	T (2021)	A	T (2021)	T (2021)	V (2025)	A	—	—	A	
LAO-3a	2020	Alluvial	A	B (2020)	B (2020)	A	—	A	A	V (2020)	—	V (2020)	A	—	—	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	B (2022)	B (2022)	B (2022)	—	B (2022)	A	V (2025)	—	V (2025)	A	—	—	A	

Table H-7 (continued)

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Rationale for Changes (MY 2020 to MY 2021)
LAUZ-1	2020	Alluvial	A	A	B (2020)	A	—	A	A	—	A	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	—	B (2022)	A	—	A	—	A	—	A	A	
PAO-5n	2020	Alluvial	A	B (2020)	B (2020)	A	—	A	A	V (2020)	—	V (2020)	A	—	—	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	B (2022)	B (2022)	B (2022)	—	B (2022)	A	V (2025)	—	V (2025)	A	—	—	A	
POI-4	2020	Intermediate	A	B (2020)	B (2020)	A	—	A	A	—	—	—	A	—	B (2020)	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	A	—	B (2022)	A	
R-3i	2020	Intermediate	A	B (2020)	B (2020)	A	—	A	A	—	—	—	A	—	B (2020)	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	A	—	B (2022)	A	
TW-2Ar	2020	Intermediate	A	B (2020)	B (2020)	A	—	A	A	—	—	—	A	B (2020)	—	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	A	B (2022)	—	A	
R-2**[l]	2020	Regional	A	B (2020)	B (2020)	A	—	A	A	—	—	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	A	—	A	A	
R-24	2020	Regional	A	B (2020)	B (2020)	A	—	A	A	—	—	—	A	—	B (2020)	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	A	—	B (2022)	A	
R-3	2020	Regional	A	B (2020)	B (2020)	A	—	A	A	—	—	—	A	—	B (2020)	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	A	—	B (2022)	A	
R-4	2020	Regional	A	A	B (2020)	A	—	A	A	—	—	—	A	—	B (2020)	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	—	B (2022)	A	—	—	—	A	—	B (2022)	A	
Sandia Right Fork at Pwr Plant	2020	Base flow	A	A	B (2020)	A	—	A	A	A	V (2020)	V (2020)	A	—	—	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Beginning in MY 2021, base flow locations will be reported under a base flow specific PMR. Criteria for screening base flow monitoring data is different than the groundwater screening process. Base flow locations have been moved into a separate PMR for clearer criteria requirements.
	2021		A	A	B (2022)	B (2022)	—	B (2022)	A	A	V (2025)	V (2025)	A	—	—	A	
Sandia below Wetlands	2020	Base flow	A	A	B (2020)	A	—	A	A	A	V (2020)	V (2020)	A	—	—	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Beginning in MY 2021, base flow locations will be reported under a base flow specific PMR. Criteria for screening base flow monitoring data is different than the groundwater screening process. Base flow locations have been moved into a separate PMR for clearer criteria requirements.
	2021		A	A	B (2022)	B (2022)	—	B (2022)	A	A	V (2025)	V (2025)	A	—	—	A	

Table H-7 (continued)

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Rationale for Changes (MY 2020 to MY 2021)
R-12 S1[m]	2020	Intermediate	—	—	—	—	A	—	A	—	—	—	—	—	B (2021)	—	Prometon and sulfolane are sampled as part of the SVOC suite. Since SVOC sampling is not required at this location, these analytes are removed from sampling.
	2021		—	—	—	—	—	—	A	—	—	—	—	—	B (2021)	—	
R-12 S2[n]	2020	Intermediate	A	B (2020)	B (2020)	A	—	A	A	—	—	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	A	—	A	A	
R-19 S2[o]	2020	Intermediate	Q	Q	Q	Q	—	A	A	A	A	A	A	—	A	Q	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Increased sampling frequency for HEXP per recommendation of "Investigation Report for Royal demolition Explosive in Deep Groundwater" N3B 2019, 700561).
	2021		A	A	A	A	—	A	A	A	S	A	A	—	A	A	
R-10 S1	2020	Regional	A	A	B (2020)	A	—	A	A	T (2021)	T (2021)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	—	B (2022)	A	T (2021)	T (2021)	—	A	—	A	A	
R-10 S2	2020	Regional	A	A	B (2020)	A	—	A	A	T (2021)	T (2021)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	—	B (2022)	A	T (2021)	T (2021)	—	A	—	A	A	
R-10a	2020	Regional	S	S	B (2020)	A	—	A	A	T (2021)	T (2021)	—	S	—	S	S	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		S	S	B (2022)	B (2022)	—	B (2022)	A	T (2021)	T (2021)	—	S	—	S	S	
R-19 S3[o, p]	2020	Regional	Q	Q	Q	Q	—	A	A	A	A	A	A	—	A	Q	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Increased sampling frequency for HEXP per recommendation of "Investigation Report for Royal demolition Explosive in Deep Groundwater" N3B 2019, 700561).
	2021		A	A	A	A	—	A	A	A	S	A	A	—	A	A	
CDBO-6	2020	Alluvial	B (2020)	B (2020)	B (2020)	A	—	A	A	V (2020)	—	V (2020)	A	—	—	B (2020)	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		B (2022)	B (2022)	B (2022)	B (2022)	—	B (2022)	A	V (2025)	—	V (2025)	A	—	—	B (2022)	
MCO-5	2020	Alluvial	A	B (2020)	B (2020)	A	—	A	A	V (2020)	—	V (2020)	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	B (2022)	B (2022)	B (2022)	—	B (2022)	A	V (2025)	—	V (2025)	A	—	A	A	
MCO-7	2020	Alluvial	A	A	B (2020)	A	—	A	A	A	—	V (2020)	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	—	B (2022)	A	A	—	V (2025)	A	—	A	A	
R-16 S2	2020	Regional	A	B (2020)	B (2020)	A	—	A	A	—	—	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	A	—	A	A	

Table H-7 (continued)

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Rationale for Changes (MY 2020 to MY 2021)
R-16 S4[q]	2020	Regional	A	B (2020)	B (2020)	A	—	A	A	—	—	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	A	—	A	A	
R-16r**	2020	Regional	A	B (2020)	B (2020)	A	—	A	A	—	—	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	B (2022)	B (2022)	B (2022)	—	B (2022)	A	—	—	—	A	—	A	A	
R-34	2020	Regional	A	A	B (2020)	A	—	A	A	T (2021)	T (2021)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	—	B (2022)	A	T (2021)	T (2021)	—	A	—	A	A	
Two Mile Canyon Below TA-59	2020	Base flow	A	A	B (2020)	A	—	A	A	V (2020)	A	V (2020)	A	—	—	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Beginning in MY 2021, base flow locations will be reported under a base flow specific PMR. Criteria for screening base flow monitoring data is different than the groundwater screening process. Base flow locations have been moved into a separate PMR for clearer criteria requirements.
	2021		A	A	B (2022)	B (2022)	—	B (2022)	A	V (2025)	A	V (2025)	A	—	—	A	
Homestead Spring	2020	Spring	A	A	B (2020)	A	—	A	A	—	A	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	—	B (2022)	A	—	A	—	A	—	A	A	
Starmer Spring	2020	Spring	A	A	B (2020)	A	—	A	A	—	A	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	—	B (2022)	A	—	A	—	A	—	A	A	
18-MW-18	2020	Alluvial	S	B (2021)	B (2021)	A	A	A	A	V (2020)	V (2020)	V (2020)	S	—	B (2021)	S	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency. Historical detects for analytes with reduced sampling frequencies are below applicable screening levels except for one spurious aluminum and iron detect in 2009 and one spurious gross alpha detect in 2014.
	2021		A	B (2021)	B (2021)	B (2021)	—	B (2021)	A	V (2025)	V (2025)	V (2025)	A	—	B (2021)	A	
PCAO-8	2020	Alluvial	A	B (2021)	B (2021)	A	A	A	A	V (2020)	V (2020)	V (2020)	A	—	—	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency.
	2021		A	B (2021)	B (2021)	B (2021)	—	B (2021)	A	V (2025)	V (2025)	V (2025)	A	—	—	A	
03-B-13	2020	Intermediate	S	S	S	A	—	A	A	—	V (2020)	—	A	B (2021)	—	S	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Historical detects for analytes with reduced sampling frequencies are below applicable screening levels except for one spurious dichloroethene [1,1] detect in 2011 and one spurious trichloroethane [1,1,1-] detect in 2006.
	2021		A	A	A	A	—	A	A	—	V (2025)	—	A	B (2021)	—	A	

Table H-7 (continued)

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Rationale for Changes (MY 2020 to MY 2021)
PCI-2**	2020	Intermediate	S	S	S	A	—	A	A	—	A	—	A	—	A	S	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Historical detects for analytes with reduced sampling frequencies are below applicable screening levels except for the following spurious detects: arsenic in 2009, methylene chloride in 2015, benzo(a)pyrene in 2010, bis(2- ethylhexyl)phthalate in 2009, di-n-octylphthalate in 2009, pentachlorophenol in 2010, and nitrate-nitrite as nitrogen in 2010.
	2021		A	A	A	A	—	A	A	—	A	—	A	—	A	A	
R-17 S1**	2020	Regional	A	A	B (2020)	A	—	A	A	—	A	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Increased sampling frequency for HEXP per recommendation of "Investigation Report for Royal demolition Explosive in Deep Groundwater" N3B 2019, 700561).
	2021		A	A	B (2022)	B (2022)	—	B (2022)	A	—	S	—	A	—	A	A	
R-17 S2**	2020	Regional	A	A	B (2020)	A	—	A	A	—	A	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Increased sampling frequency for HEXP per recommendation of "Investigation Report for Royal demolition Explosive in Deep Groundwater" N3B 2019, 700561).
	2021		A	A	B (2022)	B (2022)	—	B (2022)	A	—	S	—	A	—	A	A	
WCO-1r	2020	Alluvial	S	B (2020)	B (2020)	A	—	A	A	V (2020)	S	V (2020)	A	—	A	S	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Historical detects for analytes with reduced sampling frequencies are below applicable screening levels except for one spurious beryllium detect in 2010 and one spurious iron detect in 2019.
	2021		A	B (2022)	B (2022)	B (2022)	—	B (2022)	A	V (2025)	A	V (2025)	A	—	A	A	
R 31 S3[o]	2020	Regional	Q	Q	Q	Q	—	A	A	A	A	A	A	—	A	Q	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		S	A	A	A	—	A	A	A	S	A	A	—	A	S	
R 31 S4[o]	2020	Regional	Q	Q	Q	Q	—	A	A	A	A	A	A	—	A	Q	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		S	A	A	A	—	A	A	A	S	A	A	—	A	S	
Ancho at Rio Grande	2020	Base flow	A	B (2021)	B (2021)	A	A	A	A	B (2021)	B (2021)	B (2021)	B (2021)	—	—	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency. Beginning in MY 2021, base flow locations will be reported under a base flow specific PMR. Criteria for screening base flow monitoring data is different than the groundwater screening process. Base flow locations have been moved into a separate PMR for clearer criteria requirements.
	2021		A	B (2021)	B (2021)	B (2021)	—	B (2021)	A	B (2021)	B (2021)	B (2021)	B (2021)	—	—	A	

Table H-7 (continued)

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Rationale for Changes (MY 2020 to MY 2021)
Frijoles at Rio Grande	2020	Base flow	A	B (2021)	B (2021)	A	A	A	A	B (2021)	B (2021)	B (2021)	B (2021)	—	—	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency. Beginning in MY 2021, base flow locations will be reported under a base flow specific PMR. Criteria for screening base flow monitoring data is different than the groundwater screening process. Base flow locations have been moved into a separate PMR for clearer criteria requirements.
	2021		A	B (2021)	B (2021)	B (2021)	—	B (2021)	A	B (2021)	B (2021)	B (2021)	B (2021)	—	—	A	
Mortandad at Rio Grande	2020	Base flow	A	B (2020)	B (2020)	A	—	A	A	B (2020)	B (2020)	B (2020)	B (2020)	—	—	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Beginning in MY 2021, base flow locations will be reported under a base flow specific PMR. Criteria for screening base flow monitoring data is different than the groundwater screening process. Base flow locations have been moved into a separate PMR for clearer criteria requirements.
	2021		A	B (2022)	B (2022)	B (2022)	—	B (2022)	A	B (2022)	B (2022)	B (2022)	B (2022)	—	—	A	
Pajarito at Rio Grande	2020	Base flow	A	B (2021)	B (2021)	A	A	A	A	B (2021)	B (2021)	B (2021)	B (2021)	—	—	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency. Beginning in MY 2021, base flow locations will be reported under a base flow specific PMR. Criteria for screening base flow monitoring data is different than the groundwater screening process. Base flow locations have been moved into a separate PMR for clearer criteria requirements.
	2021		A	B (2021)	B (2021)	B (2021)	—	B (2021)	A	B (2021)	B (2021)	B (2021)	B (2021)	—	—	A	
Rio Grande at Frijoles	2020	Base flow	A	B (2021)	B (2021)	A	A	A	A	B (2021)	B (2021)	B (2021)	B (2021)	—	—	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency. Beginning in MY 2021, base flow locations will be reported under a base flow specific PMR. Criteria for screening base flow monitoring data is different than the groundwater screening process. Base flow locations have been moved into a separate PMR for clearer criteria requirements.
	2021		A	B (2021)	B (2021)	B (2021)	—	B (2021)	A	B (2021)	B (2021)	B (2021)	B (2021)	—	—	A	
Rio Grande at Otowi Bridge	2020	Base flow	S	A	B (2020)	A	—	A	A	A	—	A	A	—	A	S	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Beginning in MY 2021, base flow locations will be reported under a base flow specific PMR. Criteria for screening base flow monitoring data is different than the groundwater screening process. Base flow locations have been moved into a separate PMR for clearer criteria requirements.
	2021		S	A	B (2022)	B (2022)	—	B (2022)	A	A	—	A	A	—	A	S	

Table H-7 (continued)

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Rationale for Changes (MY 2020 to MY 2021)
Ancho Spring**	2020	Spring	A	A	B (2020)	A	—	A	A	—	A	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	—	B (2022)	A	—	A	—	A	—	A	A	
Upper La Mesita Spring	2020	Spring	A	A	B (2020)	A	—	A	A	T (2021)	T (2021)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	—	B (2022)	A	T (2021)	T (2021)	—	A	—	A	A	
Sacred Spring	2020	Spring	A	A	B (2020)	A	—	A	A	T (2021)	T (2021)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	—	B (2022)	A	T (2021)	T (2021)	—	A	—	A	A	
Lower Sandia Spring	2020	Spring	A	A	B (2020)	A	—	A	A	B (2020)	B (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	—	B (2022)	A	B (2022)	B (2022)	—	A	—	A	A	
Spring 1	2020	Spring	A	A	B (2020)	A	—	A	A	A	A	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	—	B (2022)	A	A	A	—	A	—	A	A	
Spring 2	2020	Spring	A	A	B (2020)	A	—	A	A	B (2020)	B (2020)	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite.
	2021		A	A	B (2022)	B (2022)	—	B (2022)	A	B (2022)	B (2022)	—	A	—	A	A	
Spring 3[f]	2020	Spring	A	A	B (2021)	A	A	A	A	B (2021)	A	B (2021)	A	—	B (2021)	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency.
	2021		A	A	B (2021)	B (2021)	—	B (2021)	A	B (2021)	A	B (2021)	A	—	B (2021)	A	
Spring 3A	2020	Spring	A	A	B (2021)	A	A	A	A	—	A	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency.
	2021		A	A	B (2021)	B (2021)	—	B (2021)	A	—	A	—	A	—	A	A	
Spring 3AA**	2020	Spring	A	A	B (2021)	A	A	A	A	—	A	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency.
	2021		A	A	B (2021)	B (2021)	—	B (2021)	A	—	A	—	A	—	A	A	
Spring 4[f]	2020	Spring	A	A	B (2021)	A	A	A	A	A	A	A	A	—	B (2021)	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency.
	2021		A	A	B (2021)	B (2021)	—	B (2021)	A	A	A	A	A	—	B (2021)	A	

Table H-7 (continued)

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Rationale for Changes (MY 2020 to MY 2021)
Spring 4A	2020	Spring	A	A	B (2021)	A	A	A	A	—	A	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency.
	2021		A	A	B (2021)	B (2021)	—	B (2021)	A	—	A	—	A	—	A	A	
Spring 4AA	2020	Spring	A	A	B (2021)	A	A	A	A	—	A	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency.
	2021		A	A	B (2021)	B (2021)	—	B (2021)	A	—	A	—	A	—	A	A	
Spring 4B	2020	Spring	A	A	B (2021)	A	A	A	A	—	A	—	A	—	B (2021)	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency.
	2021		A	A	B (2021)	B (2021)	—	B (2021)	A	—	A	—	A	—	B (2021)	A	
Spring 5	2020	Spring	A	A	B (2021)	A	A	A	A	—	A	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency.
	2021		A	A	B (2021)	B (2021)	—	B (2021)	A	—	A	—	A	—	A	A	
Spring 5B	2020	Spring	A	A	B (2021)	A	A	A	A	—	A	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency.
	2021		A	A	B (2021)	B (2021)	—	B (2021)	A	—	A	—	A	—	A	A	
Spring 6**	2020	Spring	A	A	B (2021)	A	A	A	A	—	A	—	A	—	B (2021)	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency.
	2021		A	A	B (2021)	B (2021)	—	B (2021)	A	—	A	—	A	—	B (2021)	A	
Spring 6A**	2020	Spring	A	A	B (2021)	A	A	A	A	—	A	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency.
	2021		A	A	B (2021)	B (2021)	—	B (2021)	A	—	A	—	A	—	A	A	
Spring 8A**	2020	Spring	A	A	B (2021)	A	A	A	A	—	A	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency.
	2021		A	A	B (2021)	B (2021)	—	B (2021)	A	—	A	—	A	—	A	A	

Table H-7 (continued)

Location	Interim Plan Monitoring Year	Surface Water Body or Source Aquifer	Metals	VOCs[a]	SVOCs[b]	Low-Level 1,4-dioxane	Prometon and Sulfolane	Low-Level Nitrosamines	PFAS[c]	PCBs[d]	HEXP[e]	Dioxins/Furans	Radionuclides	Tritium	Low-Level Tritium	General Inorganics	Rationale for Changes (MY 2020 to MY 2021)
Spring 9**	2020	Spring	A	A	B (2021)	A	A	A	A	—	A	—	A	—	B (2021)	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency.
	2021		A	A	B (2021)	B (2021)	—	B (2021)	A	—	A	—	A	—	B (2021)	A	
Spring 9A**	2020	Spring	A	A	B (2021)	A	A	A	A	—	A	—	A	—	A	A	Previously, 1,4-dioxane and nitrosamines were analyzed as part of the SVOC analytical suite. These analytes will now be analyzed using low-level methods and sampled at the same frequency as the SVOC analytical suite. Prometon and sulfolane are analyzed as part of the SVOC analytical suite and will be sampled at the corresponding frequency.
	2021		A	A	B (2021)	B (2021)	—	B (2021)	A	—	A	—	A	—	A	A	

Notes: Table H-7 is a crosswalk from Table 8.3-1 in the MY 2020 IFGMP (N3B 2019, 700451) to Table 8.3-1 in the MY 2021 IFGMP. Sampling suites and frequencies: Q = quarterly (4 times/yr); S = semiannual (2 times/yr); A = annual (1 time/yr); B = biennial (1 time/2 yr); T = triennial (1 time/3 yr); V = quinquennial (1 time/5 yr).

[a] VOCs = Volatile organic compounds.

[b] SVOCs = Semivolatile organic compounds; New toxic pollutants prometon (6-methoxy-1,3,5-triazine-2,4-diamine) and sulfolane (thiolane-1,1-dioxide) are sampled as part of this suite.

[c] PFAS = Perfluorohexane Sulfonic Acid (PFHxS), Perfluorooctanoic Acid (PFOA), and Perfluorooctane Sulfate (PFOS).

[d] PCBs = Polychlorinated biphenyls.

[e] HEXP = Analytical suite for analysis of samples for high explosives by SW-846:8330 series.

[f] Orange shading (both shades) indicates a sampling location is on Pueblo de San Ildefonso land.

[g] — = This analytical suite is not scheduled to be collected for this type of water at locations assigned to this monitoring group.

[h] 2021 = Samples scheduled to be collected during implementation of the MY 2021 IFGMP.

[i] Red font indicates change from previous iteration of the IFGMP.

[j] 2025 = Samples scheduled to be collected during implementation of the MY 2025 IFGMP.

[k] 2022 = Samples scheduled to be collected during implementation of the MY 2022 IFGMP.

[l] Double asterisks (**) indicate background monitoring location as specified in the "Groundwater Background Investigation Report, Revision 5" (LANL 2016, 601920).

[m] S1 = Screen 1.

[n] S2 = Screen 2.

[o] Propose reducing sampling frequency at the completion of first four quarterly rounds of sampling pending data review.

[p] S3 = Screen 3.

[q] S4 = Screen 4.

[r] Springs 3 and 4 are backup locations for primary TA-54 Area G PCB compliance monitoring locations R-57 S1 and R-57 S2. The VOC, SVOC, and PCB sampling and analysis plan will be modified as necessary for Springs 3 and 4 in the event that all specified samples from R-57 S1 and/or R-57 S2 cannot be collected.