LA-UR-10-1777
June 2010
EP2010-0231

2010 Interim Facility-Wide Groundwater Monitoring Plan

Los Alamos
NATIONAL LABORATORY
EST. 1943

Prepared by the Environmental Programs Directorate

LA-UR-10-1777
EP2010-0231

2010 Interim Facility-Wide Groundwater Monitoring Plan

June 2010

Responsible project manager:

Printed Name	Signature	Title	Organization	Date
Steven Paris		Project Manager	Environmental Programs	6/24/10

Responsible LANS representative:

Printed Name	Signature	Title	Organization	Date
Michael J. Graham		Associate Director	Environmental Programs	24 June 10

Responsible DOE representative:

Printed Name	Signature	Title	Organization	Date
George J. Rael		Manager	DOE-LASO	June 28, 2010

EXECUTIVE SUMMARY

This Interim Facility-Wide Groundwater Monitoring Plan (hereafter, the Interim Plan) fulfills a requirement of the March 1, 2005, Compliance Order on Consent (hereafter, the Consent Order). Los Alamos National Laboratory (the Laboratory) will collect and analyze groundwater and surface water samples at specific locations and for specific constituents to fulfill the requirements of the Consent Order. Groundwater-level data will also be collected because they are critical to understanding groundwater occurrence and movement. Four types of water are monitored: base flow (persistent surface water), alluvial groundwater, intermediate-perched groundwater, and regional aquifer groundwater. This Interim Plan is updated annually and submitted to the New Mexico Environment Department (NMED) for its approval. The 2010 Interim Plan applies to the period from July 1, 2010, to June 30, 2011.

The monitoring conducted under this plan is designed to enhance the general understanding of the groundwater within and beneath the Laboratory. These data are used for characterization purposes to support corrective measures work conducted at numerous sites around the Laboratory and to support ongoing operations. The monitoring is conducted both inside and outside of current Laboratory boundaries. Monitoring within current Laboratory boundaries takes place in seven major watershed groupings: Los Alamos Canyon/Pueblo Canyon, Sandia Canyon, Mortandad Canyon, Pajarito Canyon, Water Canyon/Cañon de Valle, Ancho/Chaquehui/Frijoles Canyons, and White Rock Canyon.

This year most of the monitoring wells discussed in the Interim Plan are also assigned to monitoring networks specific to known or potential releases from particular source areas and that generally include locations in more than one watershed. Monitoring networks are defined for Technical Area 54 (TA-54) in Pajarito and Mortandad Canyons; TA-21, primarily in Los Alamos Canyon; Material Disposal Area (MDA) AB, primarily in Water Canyon; MDA C, primarily in Pajarito Canyon; the chromium investigation area in Sandia and Mortandad Canyons; and the TA-16 260 Outfall in Water Canyon/Cañon de Valle.

Monitoring outside the Laboratory boundaries is conducted in areas (1) where Laboratory operations have been conducted in the past (e.g., Guaje and Rendija Canyons) and (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 in areas downgradient of the Laboratory and outside Laboratory boundaries (e.g., the Rio Grande and springs in White Rock Canyon).

Monitoring locations derive from Table XII-5 of the Consent Order and are updated annually in the Interim Plan. The locations, analytical suites, and frequency of monitoring reflect the technical and regulatory status of each watershed and the monitoring networks within the watershed. In some cases, wells that may not have representative data because of the effects of residual drilling fluids may be monitored for a limited suite of "indicator" constituents that allow for tracking of the geochemical conditions over time.

The monitoring data collected under this plan are published in periodic monitoring reports submitted quarterly and semiannually to NMED. In addition, groundwater data collected by the Laboratory are reviewed monthly, and constituents exceeding New Mexico water quality standards or federal maximum contaminant levels or screening levels are reported monthly to the NMED Hazardous Waste Bureau.

CONTENTS

Figures

Tables

Appendixes

1.0 INTRODUCTION

This document is the 2010 Interim Facility-Wide Groundwater Monitoring Plan (hereafter, the Interim Plan) for Los Alamos National Laboratory (LANL or the Laboratory). The Interim Plan fulfills the groundwater monitoring requirement IV.A.3.b of the March 1, 2005, Compliance Order on Consent (hereafter, the Consent Order). Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to the New Mexico Environment Department (NMED) in accordance with U.S. Department of Energy (DOE) policy.

Groundwater monitoring has been conducted at the Laboratory for over 60 yr, 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 various environmental investigations installed additional wells, primarily in the shallow alluvial systems, as potential monitoring points.

Between 1997 and 2005, the Laboratory implemented a sitewide 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 sitewide groundwater monitoring plan. Building upon information obtained from this and other programs, the Laboratory has 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 in this plan.

This plan is organized in 10 sections, including this introduction, with supporting appendixes. Sections 2 through 8 describe the monitoring and site activities conducted in seven major watersheds or 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 and White Rock Canyon. Section 9 provides additional details regarding the monitoring-well network that focuses on Technical Area 54 (TA-54), Material Disposal Area Areas (MDAs) G, H, and L. Section 10 includes a list of references cited in this report.

Appendix A is the list of acronyms and abbreviations used in the report, a metric conversion table, and the definition of data qualifiers. Appendix B presents screening results for data collected in the seven watershed groupings. Appendix C summarizes the methods and procedures used to conduct monitoring and the management of investigation-derived waste (IDW). Appendix D presents tables summarizing changes in sampling frequencies and analytical suites in each watershed. Appendix E summarizes how field quality assurance (QA)/quality control (QC) results are used and the types of corrective actions that may be taken to address exceedances of target measures for each QA/QC sample type. Appendix F evaluates the residual effects of drilling, construction, and development in the monitoring network wells. Appendix G presents geologic cross-sections of the watersheds.

1.1 Purpose

The Interim Plan will address monitoring to

- determine the fate and transport of known legacy-waste contaminants,
- identify new releases,
- determine efficacies of corrective-action remedies, and
- support proposed corrective measures.

These objectives collectively assist the Laboratory in determining any potential adverse impacts to surface water and groundwater resulting from Laboratory operations.

In addition, monitoring produces data required to evaluate risk and to assess regulatory compliance. Although the Interim Plan 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 be useful in meeting reporting requirements under the Consent Order.

The primary changes in this version of the Interim Plan are the delineation of area-specific monitoring groups for Ta-54, TA-21, MDA AB, MDA C, TA-16 260 Outfall, and the chromium investigation, and the increased focus of monitoring activities on these monitoring groups. Section 1.6 summarizes basic sets of analytical suites and frequencies for locations assigned to area-specific monitoring groups or to general surveillance monitoring in each watershed. Updates to monitoring within each watershed or monitoring group, including changes in monitoring frequency, analytical suites, and monitoring locations, are based on the following:

- Summaries of contaminant frequency of detections (FDs) (Attachment B-1 in Appendix B on CD)
- Conceptual models in watershed investigation reports, including updates to these models presented in monitoring-well network evaluations conducted in 2007 and 2008
- Reviews of existing analytical data and trends for individual watersheds
- Reviews of water-level data to identify wells that are consistently dry and candidates for removal from the sampling plan (section 1.11)
- Changes to the monitoring-well networks over time, including the addition of newly installed monitoring wells, the rehabilitation and conversion of multiscreen wells impacted by drilling fluids to single or dual screen wells, the inclusion of several piezometers in the sampling plan, and the removal of wells recently plugged and abandoned or planned for plugging and abandonment in the near term
- Updated evaluations of the reliability of water-quality data from monitoring wells (Appendix F)
- Monitoring objectives for the area-specific monitoring groups

Tables in Appendix D compare the 2009 and 2010 Interim Plans for monitoring groups, general surveillance locations, and for individual sampling locations in each watershed and provide the rationale for any modifications.

1.2 Scope

The Interim Plan 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, snowmelt, effluent, and other sources
- Alluvial groundwater—water within the alluvium in the bottom of the canyons
- Intermediate-perched groundwater—localized saturated zones within the unsaturated zone
- Regional groundwater—deep, laterally continuous groundwater beneath the Pajarito Plateau

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

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 in some years may not be present at all.
- 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 is not addressed in this plan but rather through the National Pollutant Discharge Elimination System (NPDES) Individual Permit and under DOE Order 450.1A for surveillance. Base flow (persistent water) and, in some cases, persistent flow derived from snowmelt are monitored under the Interim Plan.

Monitoring under the Interim Plan will take place in seven major watersheds or 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, and White Rock Canyon. Most of the monitoring wells are also assigned to monitoring networks specific to known or potential releases from particular source areas and that generally include locations in more than one watershed.

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. To ensure that water leaving the Laboratory boundaries does not pose an unacceptable risk, this plan also includes monitoring in areas off-site that have the potential to be impacted by the Laboratory (e.g., the Rio Grande and springs in White Rock Canyon). Figure 1.2-1 shows the areas included in this Interim Plan.

The Interim Plan is updated annually to incorporate new information collected within a watershed. Locations, analytes, and sampling frequencies will be evaluated and updated as appropriate to ensure adequate monitoring and to ensure that monitoring objectives for the individual monitoring groups continue to be met. Information gained through characterization efforts, aquifer test results, water-level monitoring, network assessments, and water-quality data will be used to refine the monitoring plan for each watershed. In addition, the need for sampling of analytes that had previously been eliminated from sampling in various watersheds will be reevaluated during the development of the annual updates to the Interim Plan.

1.3 Reporting

The data collected under this Interim Plan are submitted to NMED in periodic monitoring reports (PMRs) in accordance with Section IV.A.6 of the Consent Order and per subsequent agreements with NMED on the frequency of reporting. The data in reports submitted to NMED are independently maintained and are made available to the public in the Risk Analysis, Communication, Evaluation, and Reduction (RACER) database as the data are received from the analytical laboratory (available at http://www.racernm.com/), subject to the protocol stipulated in the memorandum of understanding (MOU) regarding the release of monitoring data collected from locations on Pueblo of San Ildefonso lands.

The PMRs present groundwater and base-flow data and are submitted quarterly to NMED, in accordance with Consent Order requirements. Each PMR includes all available watershed monitoring data, along with the previous three rounds of data.

1.4 Regulatory Context

This Interim Plan fulfills groundwater monitoring requirements of the Consent Order as described in section 1.0. In addition to the Consent Order, the Laboratory is required to perform groundwater monitoring to satisfy other regulatory requirements, as summarized below. The Laboratory 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 Interim Plan.

1.4.1 New Mexico Water Quality Control Commission Regulations

Currently, the TA-46 Sanitary Wastewater Systems (SWS) Plant operates under a groundwater discharge permit (discharge plan number DP-857) issued by NMED pursuant to 20.6.2. New Mexico Administrative Code (NMAC). Sampling locations, monitoring frequencies, and reporting requirements are specified in the NMED-approved DP-857, under which the Laboratory conducts quarterly sampling at two NPDES outfalls, the SWS Plant reuse wet well, and CDBO-6, an alluvial monitoring well located in Cañada del Buey. Monitoring under DP-857 began when the SWS Plant opened in 1993 and is expected to continue indefinitely, with appropriate modifications made as discharge conditions change over time. The plan was renewed in 1998, and a second request for plan renewal was submitted to the NMED in 2002.

At the request of the NMED Ground Water Quality Bureau, the Laboratory submitted a groundwater discharge plan application (DP-1132) for the TA-50 Radioactive Liquid Waste Treatment facility (RLWTF) in 1996. While NMED's approval of the plan is still pending, since 1999, the Laboratory has conducted voluntary monitoring and quarterly reporting under the pending plan. Sampling locations for monitoring groundwater under DP-1132 are MCO-3, MCO-4B, MCO-6, and MCO-7.

1.4.2 DOE Environmental Protection Programs

Groundwater monitoring has been conducted in compliance with DOE orders related to environmental protection. DOE Order 450.1A requires an environmental management system at DOE facilities to include surveillance groundwater monitoring and reporting. Surveillance monitoring has been conducted at the Laboratory since the 1970s under previous orders, and the results are documented in annual reports. Currently, the Laboratory conducts groundwater-surveillance monitoring from wells located within the Laboratory boundary and at off-site locations. These wells include alluvial, perched-intermediate, and regional aquifer wells. Some of the 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 an MOU among DOE, the Bureau of Indian Affairs, and the Pueblo of San Ildefonso. The results of surveillance monitoring are reported in annual environmental surveillance reports (ESRs) and the RACER database. The ESRs contain descriptions of the surveillance monitoring network, key results and trends, and the QA/QC program.

1.4.3 Hazardous Waste Facility Permit

Several waste management units at the Laboratory are regulated units under the Resource Conservation and Recovery Act (RCRA) and are subject to groundwater monitoring requirements under 40 Code of Federal Regulations (CFR) 264 Subpart F, as administered through the Laboratory's Hazardous Waste Facility Permit. These requirements will be met through implementation of the groundwater-monitoring requirements of the Consent Order, including implementation of the Interim Plan.

1.5 Integration of Groundwater Monitoring at the Laboratory

All groundwater monitoring under the Interim Plan 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, the Laboratory uses commonly accepted analytical methods called for under federal regulations (such as the Clean Water Act) and approved by EPA. The Laboratory 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 (SOW) provides contract laboratories the general QA guidelines and includes specific requirements and guidelines for analyzing water samples. The contract laboratories are required to establish method detection limits (MDLs) and practical quantitation limits (PQLs) for target analytes.

Appendix C includes summaries of the procedures followed to measure water levels and collect water samples (sections C-1.0 and C-2.0) and to measure field parameters (section C-3.0). All the procedures are available on the Laboratory's website (http://www.lanl.gov/environment/all/qa.shtml). Field procedures follow guidelines from USGS water sample collection methods and industrial standards common to environmental sample collection and field measurements. The analytical methods, practical quantitation limits, and applicable background or screening levels used for each analyte are listed in section C-4.0. The management of IDW is discussed in section C-5.0.

1.6 Approach to Monitoring Network Design

The interim nature of this monitoring plan reflects an evolving monitoring network at the Laboratory. The groundwater data collected under this plan are used for subsurface characterization, groundwater monitoring network evaluation, and support of corrective measures. The expected evolution of the process is the eventual decrease in sampling frequencies, analytical suites, and locations. Eventually, the watershed-based interim monitoring plan will be superseded by a cross-watershed facility-wide network monitoring plan or plans.

Under this Interim Plan, groundwater monitoring in each watershed on the Pajarito Plateau has been conducted in four stages.

- Interim monitoring in watersheds that have not undergone investigation activities under the Canyons investigation process, as described in Section IV.B of the Consent Order. The objectives of monitoring are to collect data to identify and track contaminants and to develop a preliminary conceptual model for the watershed.
- Watersheds currently being investigated under the Canyons investigation process. The objectives of monitoring are to determine the extent of contamination and to develop a detailed conceptual model of the watershed.

- Watersheds for which the Canyons investigations process has been completed and that are undergoing postinvestigation interim monitoring. The objectives of monitoring include tracking contaminant fate and transport and refining the conceptual model of the watershed in support of pending corrective measures evaluation (CME) decision points.
- Long-term monitoring to evaluate the performance of corrective measures implemented and the long-term trends of contaminants and their movement in groundwater.

The monitoring-well networks and associated sampling plans also reflect the outcome of area-specific evaluations conducted by the Laboratory pursuant to requirements included in an April 5, 2007, letter from NMED (2007, 095999) that directed the evaluations. The network evaluations and groundwater investigations conducted for the watersheds, as described in Section IV of the Consent Order, recognize that intermediate-depth groundwater perching horizons and groundwater flow directions within the regional aquifer create investigation domains that are larger than surface expression of watersheds. Area-specific geologic information and data from monitoring wells inform the spatial extent of specific investigations that are often larger than or different from the footprint of the watersheds. For example, the investigation area for chromium contamination includes perched-intermediate and regional groundwater wells beneath both Sandia and Mortandad Canyons.

For the 2010 Interim Plan, monitoring groups are established that address monitoring requirements for locations within specific project areas. These monitoring groups are shown in Figure 1.6-1 and include the following (the watersheds in which the project area is located are given in parentheses):

- TA-21 (Los Alamos and Sandia Canyons)
- TA-54 (Pajarito and Mortandad Canyons)
- MDA C (Pajarito and Mortandad Canyons)
- Chromium investigation (Sandia and Mortandad Canyons)
- TA-16 260 Outfall alluvial and deep groundwater (Pajarito and Water Canyons and Cañon de Valle)
- MDA AB (Ancho and Water Canyons)

The locations, analytical suites, and frequency for monitoring in each watershed and for individual monitoring groups 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. Much of the information underlying the design of the monitoring plan is presented in investigation reports and is supported by the FD tables in Appendix B of this plan. Recommendations for the analytical suites for each watershed and locations within the watershed were determined by evaluating past Laboratory operations, investigation-derived information, and monitoring results. For this Interim Plan, updates to monitoring are made for all watersheds based on the adequacy of data to support the modifications to suite and the frequency. Data from 2004 to 2009 were screened to compare with one-half the lowest applicable standard (see Table 1.6-1). This period of record was selected for this version of the plan to provide a sufficiently robust data set to evaluate FD and time-series trends, if applicable. The analytical data screening results are summarized in tables in Attachment B-1 of Appendix B (on CD).

Table 1.6-2 summarizes analytical suites, and sampling frequencies for each type of sampling location (e.g., base flow, alluvial, intermediate, regional, or springs) within each monitoring group. Table 1.6-3 summarizes the analytical suites and sampling frequencies for general surveillance monitoring locations (locations excluded from monitoring groups) within each watershed. The analytical suites and frequencies are tailored to each watershed and sampling location based on the adequacy of the data record, the status of investigations and maturity of the conceptual model, the nature of watershed contaminant sources and the history of detections, as documented in more detail in Appendix D. Analytical suites assigned to existing (pre-2009) wells within watersheds and investigation areas are based on the results of applicable investigation reports and a review of ongoing monitoring data, as presented in the statistical summaries of detections in Attachment B-1 of Appendix B (on CD). The assignment of specific analytical suites to a well also reflects data needs for pending CMEs.

Tables 1.6-2 and 1.6-3 also list characterization suites and sampling frequencies for newly installed wells (wells installed on or after July 1, 2009). New wells will be sampled for four quarters for the characterization suite for new wells presented in Tables 1.6-2 and 1.6-3. Once four characterization samples have been collected, the wells will transition to the default analytical suite and frequency for the monitoring group or watershed to which the well is assigned.

Exceptions to the analytical suites and sampling frequencies presented in Tables 1.6-2 and 1.6-3 occur in some cases. These exceptions may be the result of a number of factors such as additional regulatory or permit requirements and sampling commitments outlined in the MOU with the Pueblo of San Ildefonso.

Exceptions to the default analytical suites and sampling frequencies may also be made for wells affected by residual drilling fluids and for recently rehabilitated wells. These cases are assigned analytical suites based on the results of the geochemical trending presented in Appendix F. These results are used to guide the selection of monitoring suites with respect to well performance for the specific monitoring objectives within the relevant network. For example, if a well shows indications that some or all data may not be adequately representative of actual conditions within the aquifer from the effects of drilling fluids, the well may be sampled for the “indicator” monitoring suite. The indicator suite is a limited-screening suite of key constituents that can be used to assess the geochemical performance of a well with respect to meeting its network monitoring objectives (see section 1.9).

Appendix D documents changes in sampling frequencies and analytical suites for each location in each watershed and provides rationales for changes in the 2010 Interim Plan compared with the 2009 Interim Plan (LANL 2009, 106115).

1.7 Data-Screening Process

This section describes the process for screening the monitoring data. The purpose of the screening is to identify analytical parameters that guide the assignment of analytical suites and monitoring frequencies in each watershed.

The results of the screening for all locations in each watershed are used to update the monitoring for that watershed. The results of the data-screening process and statistical summaries are presented in Appendix B. The data-screening process consists of compiling the water-quality data set, determining detection status, screening the data against applicable standards, and producing summary statistics to identify constituents of potential concern in each watershed. Table B-1 (groundwater) and Table B-2 (surface water) of Appendix B present summary statistics for each water type and analytical suites, based on data compiled for individual locations in Table B-3 (groundwater) and Table B-4 (surface water).

Table 1.6-1 presents the regulatory standards for the various water sample types by screening category. The data results were screened against the lowest applicable regulatory standard or risk-based value in the tables in Attachment B-1 of Appendix B. The standards that apply depend on the type of field preparation conducted during collection (filtered or unfiltered) and the type of the water (i.e., groundwater or persistent surface water). Each combination of water type/field preparation is referred to as a screening category. The standards for filtered samples are those applicable to the dissolved fraction, and standards for unfiltered samples are those applicable to the total concentration in nonfiltered samples. The terms "nonfiltered" and "unfiltered" are used interchangeably in this document.

For screening purposes, laboratory and field QC samples were removed from the statistical analysis. The detection status for an analytical result was established using the combined set of laboratory-assigned validation qualifiers and reason codes assigned during data validation (Appendix E).

The screening tables presented in Attachment B-1 of Appendix B (on CD) were used to identify constituents of potential concern and to optimize the monitoring strategy for each watershed. Groundwater and base-flow data from 2004 to 2009 are screened against one-half the lowest applicable regulatory standards (presented in Table 1.6-1) and against regional background values, if available. The screening tables are organized by contaminant type in each water type (e.g., spring, perennial base flow, regional aquifer) within each watershed.

The screening tables in Attachment B-1 include summary information such as the total number of samples collected for each analyte; the numbers of detections and nondetects; the minimum, mean, and maximum values for detections of each analyte; and comparisons to background values (if available) and to regulatory standards. The tables also list sampling locations where the lowest applicable regulatory standards are exceeded in each watershed. Additional details regarding the screening tables are presented in the introduction to Appendix B.

1.8 Sampling Frequency and Schedule

The Interim Plan proposes monitoring frequencies for each watershed or monitoring group as described in the sampling table for each watershed. For newly installed wells (i.e., those installed on or after July 1, 2009), the monitoring frequency and characterization suite are quarterly for target analyte (TAL) metals, volatile organic compounds (VOCs), radionuclides, tritium, general inorganic chemicals, perchlorate, and field parameters to characterize potential variability in constituent concentrations. Less mobile constituents such as semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and dioxins/furans may be sampled semiannually in new wells. High explosive (HE) compounds may be sampled quarterly if known or suspected to be present and semiannually if the watershed has a history of nondetects.

For wells that are no longer considered "new wells" (i.e., those wells installed before July 1, 2009) sampling frequencies are based on several factors, including the maturity of the characterization within a watershed, the presence of key contaminants, the temporal trends of those contaminants, and the rate of change. Following submittal of this Interim Plan to NMED, a sampling schedule for each watershed will be established to ensure the monitoring frequency is met during the implementation year of the plan. This Interim Plan is implemented from July 2010 to June 2011.

The Consent Order requires all monitoring wells within a watershed be sampled within 21 d of the start of the groundwater sampling event. However, the number of sampling locations in two of the five watershed groups (the Sandia/Mortandad Canyons watershed group and Pajarito Canyon watershed) have increased over the last 5 yr as a result of the monitoring locations added for the chromium investigation as well as the addition of new wells in the TA-54 monitoring network. Consequently, it has become difficult to sample these two watersheds during the 21-d monitoring period.

The Laboratory proposes that the sampling period for the Sandia/Mortandad Canyons watershed group and the Pajarito Canyon watershed be extended from 21 to 24 d beginning with the implementation of the 2010 Interim Plan in July 2010. The sampling windows for the remaining watersheds (Los Alamos Canyon/Pueblo Canyon, White Rock Canyon, Water Canyon [including Cañon de Valle, Potrillo Canyon, and Fence Canyon], and Ancho Canyon) will remain 21 d.

1.9 Indicator Monitoring

Some perched-intermediate and regional groundwater monitoring wells in the monitoring network have screened intervals within aquifer zones that were affected by residual products used during drilling or construction operations. As a result, these screens may produce nonrepresentative water-quality data for certain constituents and therefore have varying utility in the monitoring network. Individual locations and screens were evaluated in the “Well Screen Analysis Report, Revision 2” (LANL 2007, 096330) and subsequently were assessed as part of a series of area-specific monitoring-well network evaluations pursuant to requirements in NMED’s letter dated April 5, 2007 (NMED 2007, 095999). These network evaluations provide a framework for guiding specific analytical suites that are, in part, tailored to the objectives for monitoring in a specific area. These suites consist of indicator constituents (e.g., major anions and cations, trace metals, total organic carbon, and [as appropriate] sulfide, ammonia, total Kjeldahl nitrogen, and perchlorate). The indicator suites are applied to well-screen intervals that continue to show residual effects that compromise the representativeness of some constituents. The constituents in the indicator suite provide the data necessary for continuing to track trends in the well screen’s performance (Appendix F) to support updating the assignment of analytical suites to sampling locations in the Interim Plan. Indicator suites are modified in some cases if additional constituents are deemed appropriate for monitoring.

1.10 Water-Level Monitoring

The majority of monitoring wells sampled are equipped with pressure transducers to measure and record water levels to aid in understanding the hydrologic system. Pressure transducers are typically set to record on an hourly basis. Manual water-level measurements are also collected on a regular basis to verify the pressure transducer data.

The water-level data collected using the automated pressure transducers address the requirement of Section IX.B.2.h.i of the Consent Order to measure groundwater levels in all wells in a given watershed within 24 h. These data are available for any 24-h period and, therefore, meet the requirement for these measurements to be completed across all watersheds within 14 d of the commencement of the specified water-level measuring event as required by the Consent Order. The Laboratory’s Standard Operating Procedure (SOP) 5227, Pressure Transducer Installation, Removal, and Maintenance, requires field verification of the transducer data with periodic manual measurements (see Appendix C for details). The field verification will be conducted in accordance with this SOP.

Water levels are monitored in a number of wells and/or well screens that are not sampled under the Interim Plan. In some cases, these locations have historically been dry, but a technical basis may exist for continued monitoring of potential water at the location to develop or confirm conceptual models. In other cases, the wells may have water but no technical rationale exists to collect samples from the wells (for example other nearby or collocated wells are already being sampled). Groundwater levels are also monitored in Los Alamos County water-supply wells in cooperation with Los Alamos County utilities personnel.

Groundwater-level monitoring data for Laboratory wells and for Los Alamos County water-supply wells are published in an annual groundwater-level status report (e.g., Koch and Schmeer 2010, 108926). This report presents time-series hydrographs of groundwater-level data along with pertinent construction and location information for each well.

1.11 Wells That Are Historically Dry

Wells that are historically dry are either checked manually or are monitored with pressure transducers, depending on project requirements. Wells that have been dry for 4 yr or more are removed from the list of wells to be monitored, except for a few wells in key locations (Table 1.11-1). Wells that intermittently show water (in response to large snowmelt years or precipitation events) will continue to be monitored for water levels using transducers and will be sampled if sufficient water is present during their respective watershed's sampling campaign. New wells that are dry will be retained in the monitoring plan to evaluate potential temporal changes in water levels. These wells will be sampled if water is present. If the wells continue to remain dry during subsequent years of monitoring with transducers, they may be removed from the Interim Plan.

1.12 Stable Isotope Sampling

Samples for analysis of stable isotopes of nitrogen, deuterium, and oxygen have been collected in recent years at many of the locations monitored under the Interim Plan. The data are used to refine conceptual models for groundwater flow and transport.

For the 2010 Interim Plan, stable isotope data for nitrogen, deuterium, and oxygen will be collected for three monitoring groups:

- TA-54 (Pajarito and Mortandad Canyons)
- Chromium investigation (Sandia and Mortandad Canyons)
- TA-16 260 Outfall (Pajarito and Water Canyons and Cañon de Valle)

Stable isotope data will be collected for all intermediate and regional monitoring wells in these monitoring groups to complement ongoing investigations at these sites. In addition, supplemental stable isotope data will be collected from select intermediate and regional wells outside these monitoring groups to continue developing a data set to refine the conceptual model in other watersheds.

2.0 LOS ALAMOS WATERSHED

2.1 Introduction

The Los Alamos Canyon/Pueblo Canyon watershed is located in the northern area of the Laboratory (Figure 1.2-1). The watershed heads on U.S. Forest Service (USFS) land in the Sierra de los Valles to the west and northwest of the Laboratory. The highest point in the watershed is at the summit of Pajarito Mountain at an elevation of 3182 m (10,441 ft). The watershed extends eastward from the headwaters across the Pajarito Plateau for about 30.4 km (18.9 mi) to its confluence with the Rio Grande at an elevation of 1678 m (5504 ft).

2.2 Background

The Los Alamos Canyon/Pueblo Canyon watershed encompasses approximately 57 mi^2. It includes Los Alamos, Pueblo, Delta Prime (DP), and Acid Canyons. Bayo, Guaje, Rendija, and Barrancas Canyons (collectively known as the North Canyons) are smaller tributary canyons in the watershed. The watershed contains numerous springs, perennial and ephemeral stream segments, and alluvial groundwater. Portions of Los Alamos townsite, Los Alamos County, Santa Fe County, and San Ildefonso Pueblo tribal lands are located within the Los Alamos Canyon/Pueblo Canyon watershed. Laboratory operations have been associated with the release of treated and untreated effluent into the watershed since the Laboratory was established in the 1940s to the present. Runoff from solid waste management units (SWMUs) and areas of concern (AOCs) at former and current TA-00, TA-01, TA-02, TA-03, TA-19, TA-21, TA-31, TA-41, TA-43, TA-53, TA-72, and TA-73 have contributed to contaminant releases within the watershed. Metals, perchlorate, nitrates, hydrocarbons, and radionuclides have been detected in groundwater within the watershed. DP Canyon joins Los Alamos Canyon east of TA-21. TA-02, TA-41, and TA-43 are located within Los Alamos Canyon south of the Los Alamos townsite. TA-21, TA-73, and former TA-01 are located on the mesa north of Los Alamos Canyon. TA-62, TA-61, TA-53, and TA-72 are located south of Los Alamos Canyon.

Pueblo Canyon is located on the north side of the Los Alamos townsite and extends from the Jemez Mountains to its confluence with Los Alamos Canyon, approximately 4.5 mi east of the Los Alamos townsite at the intersection of NM 502 and NM 4. TA-72 and TA-73 and former TA-01 and TA-45 are located from west to east along the mesa south of Pueblo Canyon. Acid Canyon joins Pueblo Canyon from the south, opposite former TA-45. Documented discharges and releases into the watershed were primarily in the form of contaminated wastewater generated during research and manufacturing operations on the surrounding mesas in the vicinity of the Los Alamos townsite. In addition, discharges and releases of contaminants were documented in Los Alamos Canyon resulting from operations conducted at TA-02 and TA-41. Releases also originate from debris generated during TA-01 demolition activities and deposited on hillsides located above Los Alamos Canyon, opposite the townsite. Laboratory operations that have affected Pueblo Canyon include the release of contaminants to Pueblo Canyon through Acid Canyon from former TA-01 and TA-45. Contaminants were released into Los Alamos Canyon and its tributary side canyons (DP Canyon and the undesignated canyon located east of TA-53) during activities conducted at TA-02, TA-21, TA-41, TA-53, and former TA-01. Both hazardous constituents and radionuclides were released during past Laboratory operations.

Bayo, Guaje, Rendija, and Barrancas Canyons are located north of Laboratory land. The only active TA in the canyons is TA-74, a portion of which is located in Bayo and Barrancas Canyons. The approximately 18 SWMUs and AOCs in these drainages are related primarily to mortar-impact areas, firing ranges, and releases of treated effluent. Surface-water flow in upper Guaje Canyon is perennial and extends for about 3 mi. In 1996, two shallow test holes were drilled approximately 3 mi east of the perennial flow between the Los Alamos and Guaje faults. Each borehole penetrated saturation from near ground surface to total depth (23 ft and 103 ft below ground surface [bgs], respectively). Regional aquifer water-supply wells in Guaje Canyon were first installed in the early 1950s. In recent years, additional replacement wells were drilled. The depths to water at these wells vary depending on their location. Depth to water in the lower portion of the canyon tends to be shallow (100 to 200 ft bgs), while water-table levels in the upper portion near the Rendija Canyon confluence range from 400 to 500 ft bgs. Surface water flow in Rendija and Barrancas Canyons is ephemeral and normally flows only during the summer monsoon season. Contaminant sources are primarily associated with upper Rendija Canyon. Surface-water sampling conducted in these canyons has periodically shown detections of metals, organics, and radionuclides.

The primary Laboratory activities in these canyons have involved water supply: the Guaje reservoir no longer operates, and the Guaje well field (now operated by Los Alamos County) currently includes five water-supply wells. The wells in this field also extend to lower Rendija Canyon. Rendija Canyon contained a small-arms firing range and several sites used as mortar-impact areas. Past Laboratory activities are described in more detail in the “Work Plan for the North Canyons” (LANL 2001, 071060) and the “RFI Work Plan for Operable Unit 1071” (LANL 1992, 007667). TA-10 was used as a firing site from 1943 to 1961 for tests with explosive compounds and radioactive materials. The site included a radiochemistry laboratory. While in operation, the TA-10 sites in Bayo Canyon were investigated for environmental impacts. The site was decontaminated and decommissioned in 1960. TA-10 was the site of an extensive Formerly Utilized Sites Remedial Action Program investigation in 1976 (Mayfield et al. 1979, 011717). In the mid-1990s, the site was studied under the “RFI Work Plan for Operable Unit 1079”

(LANL 1992, 007668). RCRA facility investigation (RFI) activities included shrapnel removal and investigation, remediation, or deferred action for several SWMUs and AOCs. A second RFI work plan was written in 2001 (LANL 2001, 071060). The "Investigation Report for Bayo Canyon Aggregate Area, Revision 1," dated May 2008, reports on the most recent investigations of SWMUs and AOCs in Bayo Canyon (LANL 2008, 102424). The "Investigation Report for North Canyons, Revision 1" reports on the most recent investigations of SWMUs and AOCs in the North Canyons (LANL 2009, 107416).

In 1997, NMED approved a work plan for the investigation of Los Alamos and Pueblo Canyons (NMED 1997, 056362). An addendum to the Los Alamos Canyon and Pueblo Canyon investigation work plan (LANL 2002, 070235) was submitted to, and approved by, NMED in 2002 (NMED 2002, 073203). In accordance with the NMED-approved investigation work plan and addendum, the Laboratory has conducted investigations of contamination in Los Alamos and Pueblo Canyons. In 2002, the Laboratory conducted an interim action in the South Fork of Acid Canyon (a tributary of Pueblo Canyon) in accordance with an interim action plan approved by NMED in 2002 (LANL 2001, 070188; NMED 2002, 073277). The April 2004 "Los Alamos and Pueblo Canyons Investigation Report" (LANL 2004, 087390) and the February 2008 "Los Alamos and Pueblo Canyons Groundwater Monitoring Well Network Evaluation and Recommendations, Revision 1" (LANL 2008, 101330) provide significant integration of characterization and investigation activities conducted to date within and beneath the watershed.

2.3 Monitoring Objectives

The monitoring for Los Alamos Canyon/Pueblo Canyon watershed presented in this Interim Plan is based in part on results and conclusions presented in the "Los Alamos and Pueblo Canyons Investigation Report" (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). The investigation report addressed only surface water and alluvial groundwater; thus, the information in the report mainly supports recommendations for those zones.

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 investigation domain that may be larger than extent of wells located within the watershed where the initial source exists. An example of that situation in the Los Alamos Canyon/Pueblo Canyon watershed is the discovery of perched-intermediate groundwater encountered by well TA-53i beneath the mesa south of Los Alamos Canyon. The water encountered in that well is believed to represent southward diversion of perched-intermediate water present directly beneath Los Alamos Canyon.

The TA-21 monitoring group has been established from wells situated hydrologically downgradient of TA-21 to monitor for contaminants related to historical releases from TA-21. These wells are located in the vicinity of TA-21 and farther down Los Alamos Canyon. Key contaminants present in the subsurface beneath TA-21 include tritium and other radionuclides and low levels of VOCs. Wells farther downcanyon and to the south of Los Alamos Canyon monitor residual contaminants associated with historical releases from SWMU 21-011(k) in DP Canyon and the Omega West Reactor (decommissioned) in upper Los Alamos Canyon. Contaminants associated with these releases include tritium, perchlorate, and nitrate.

2.4 Scope of Activities

Active monitoring locations in the Los Alamos Canyon/Pueblo Canyon watershed include base-flow stations, alluvial groundwater wells, intermediate-perched groundwater wells, regional groundwater wells, and springs, which are shown in Figure 2.4-1. The TA-21 monitoring group, shown in Figure 2.4-2, consists of a subset of monitoring locations at Los Alamos Canyon/Pueblo Canyon watershed. This monitoring group also includes well R-12 in Sandia Canyon (section 3) to monitor potential southward diversion of perched-intermediate water beneath lower Los Alamos Canyon toward lower Sandia Canyon.

Table 2.4-1 presents sampling locations, the rationale for these locations, analytical suites, and frequencies for the Los Alamos Canyon watershed. Analytical suites and frequencies assigned to individual locations listed in Table 2.4-1 generally follow the high-level monitoring design presented in Table 1.6-2 for the TA-21 monitoring group and in Table 1.6-3 for other locations in the Los Alamos Canyon/Pueblo Canyon watershed. These analytical suites and frequencies are based on the results of applicable investigation reports and a review of ongoing monitoring data, such as the statistical summaries for locations in the Los Alamos Canyon/Pueblo Canyon watershed provided in the FD screening tables in Attachment B-1 of Appendix B (on CD).

Monitoring for TA-21 is focused on intermediate-perched and regional wells surrounding the TA-21 area. Perched-intermediate and regional groundwater monitoring focuses on mobile constituents, including VOCs, nitrate, perchlorate, and tritium, known to be present in the subsurface beneath TA-21. Perched-intermediate monitoring locations are divided into near-field and far-field locations, with more frequent sampling for VOCs and SVOCs in wells closer to TA-21. Base-flow and alluvial groundwater wells near and downgradient of TA-21 are included as general surveillance monitoring locations (Table 1.6-3). These locations are excluded from the TA-21 monitoring group because they are well characterized and show no significant impacts from SWMUs and AOCs at TA-21.

Exceptions to the analytical suites and sampling frequencies presented in Tables 1.6-2 and 1.6-3 may occur for some locations listed in Table 2.4-1. The rationale for any exceptions is documented in Table D-2.0-1.

2.5 Modifications to the 2009 Interim Plan

Changes to monitoring locations in the 2010 Interim Plan for the Los Alamos Canyon/Pueblo Canyon watershed include the following:

- Test Well (TW) 2A was plugged and abandoned and was replaced by regional monitoring well TW-2Ar, completed in March 2010 in perched-intermediate groundwater.
- New regional monitoring well R-3 was added to the monitoring plan. This well is scheduled to be completed in July 2010.
- Screen 1 of monitoring well R-5, completed in perched-intermediate groundwater, has been dry since the well was installed and has been removed from the sampling plan. Water levels will continue to be monitored at this well screen.
- Screen 1 of monitoring well R-7, completed in perched-intermediate groundwater, went dry during sampling on December 18, 2003, and subsequently never recovered. Screen 1 of R-7 has been removed from the sampling plan but will be monitored for water levels.
- Screen 2 of monitoring well R-7, completed in perched-intermediate groundwater, has been dry since the well was installed. Screen 2 of R-7 has been removed from the sampling plan but will be monitored for water levels.

- Campsite Spring, located in upper Guaje Canyon, was added to the sampling campaign to facilitate collection of additional background data.

Appendix D documents the rationale for site-specific changes to analytical suites and frequencies, relative to those assigned in the 2009 Interim Plan (LANL 2009, 106115).

3.0 SANDIA WATERSHED

3.1 Introduction

Sandia Canyon is located within the central part of the Laboratory (Figure 1.2-1) The 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 San Ildefonso Pueblo. Sandia Canyon empties into the Rio Grande in White Rock Canyon at an elevation of 5450 ft. An additional monitoring objective is to provide data to support CME decisions for TA-21 (LANL 2008, 103425).

3.2 Background

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. Perennial stream flow and saturated alluvial aquifer conditions occur in the upper and middle portions of the canyon system because sanitary wastewater and cooling tower effluent discharge to the canyon from operating facilities. A wetland of approximately 7 acres has developed as a result of the wastewater and cooling tower effluent discharge. The only known perennial spring in the watershed (Sandia Spring) is located in lower Sandia Canyon near the Rio Grande. 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 264 SWMUs and AOCs are located within these TAs.

Chromium is a constituent of concern because its concentration exceeds NMED and EPA maximum contaminant levels (MCLs) in the regional aquifer at wells R-28 and R-42. A conceptual model for chromium contamination associated with cooling-tower discharges into Sandia Canyon is presented in the “Investigation Report for Sandia Canyon” (hereafter, the Sandia Canyon IR) (LANL 2009, 107453). The Sandia Canyon IR presents the results of all of the chromium 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.

3.3 Monitoring Objectives

For the past 4 yr, the monitoring in and beneath Sandia Canyon and adjacent canyons has focused on acquiring a fundamental understanding of the nature and extent of contaminants originating in the Sandia Canyon watershed. This work has been coupled with sediment and biota investigations to refine the conceptual model for the fate and transport of contaminants. Several new wells have also been installed and have been undergoing initial characterization monitoring on a quarterly basis.

A monitoring group, called the chromium investigation monitoring group, has been established to understand the water types and locations in and beneath Sandia and Mortandad Canyons and to monitor constituents to assess the fate and transport of key contaminants originating in Sandia Canyon. Perched-intermediate and regional wells in Mortandad Canyon are included in this monitoring group because they are located along the contaminant-transport pathway that includes the southerly diversion of groundwater within the vadose zone beneath Sandia and Mortandad Canyons. The predominant contaminants monitored in this group of wells include chromium and other metals and nitrate. Ongoing monitoring of base-flow and alluvial groundwater is important as a baseline in the event that the volume or quality of effluent releases into Sandia Canyon changes significantly. Because of PCB contamination in the Sandia Canyon watershed, PCBs will continue to be monitored in base-flow stations.

3.4 Scope of Activities

Active monitoring locations in the Sandia Canyon watershed include base-flow stations, alluvial groundwater wells, intermediate-perched groundwater wells, and regional groundwater wells, which are shown in Figure 3.4-1. Sandia Spring, the only spring located in the Sandia Canyon watershed, is monitored as part of the group of springs in White Rock Canyon, described in section 8 of this plan. The chromium investigation monitoring group, shown in Figure 3.4-2, includes locations in Sandia Canyon as well as in Mortandad Canyon to monitor the southward diversion of perched-intermediate and regional groundwater.

Table 3.4-1 presents sampling locations, the rationale for these locations, analytical suites, and monitoring frequencies. Analytical suites and frequencies assigned to individual locations in Table 3.4-1 generally follow the high-level monitoring design presented in Table 1.6-2 for the chromium investigation monitoring group and in Table 1.6-3 for other locations in the Sandia Canyon watershed. These analytical suites and frequencies are based on the results of applicable investigation reports and a review of ongoing monitoring data, such as the statistical summaries for locations in the Sandia Canyon watershed provided in the FD screening tables in Attachment B-1 of Appendix B (on CD).

Base flow and alluvial groundwater monitoring in Sandia Canyon will continue to provide baseline data for water-quality changes associated with variations in effluent volume and quality. Following the Sandia Canyon IR (LANL 2009, 107453), more intensive monitoring is now focused on the perched-intermediate and regional groundwater, with an emphasis on chromium and general inorganic chemicals (particularly nitrate). These constituents have been detected at low concentrations, below standards, in base-flow and alluvial groundwater. For this reason, base-flow and alluvial groundwater will be sampled less frequently than intermediate-perched groundwater or regional groundwater, where concentrations are elevated. Exceptions to the analytical suites and sampling frequencies presented in Tables 1.6-2 and 1.6-3 may occur for some locations listed in Table 3.4-1. The rationale for any exceptions is documented in Table D-3.0-1.

3.5 Modifications to the 2009 Interim Plan

Changes to monitoring locations in the 2010 Interim Plan for Sandia Canyon watershed include the following:

- Alluvial monitoring well SCA-1 has silted up and has been removed from the monitoring plan. It has been replaced by the nearby drive point, SCA-1-DP. Water levels in SCA-1 will continue to be monitored.

Appendix D documents the rationale for site-specific changes to analytical suites and frequencies, relative to those assigned in the 2009 Interim Plan (LANL 2009, 106115).

4.0 MORTANDAD WATERSHED

4.1 Introduction

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 1.2-1). 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 of San Ildefonso land for several miles before joining the Rio Grande (LANL 1997, 056835).

4.2 Background

The Mortandad Canyon watershed is located in the central portion of the Laboratory and covers approximately 10 mi^2. Pueblo of San Ildefonso lies immediately next to a portion of the Laboratory's eastern boundary and includes the eastern end of Mortandad Canyon. 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.

Current and former TAs located in the Mortandad Canyon watershed include TA-03, TA-04, TA-05, TA-18, TA-35, TA-42, TA-46, TA-48, TA-50, TA-51, TA-52, TA-54, TA-55, and TA-59. The primary sources of contamination in this watershed are attributed to past releases of contaminants from outfalls and spills at TA-35 and TA-50, including the RLWTF at TA-50. Metals and VOCs have historically been released into the canyon. Radionuclides, which are not addressed under the Consent Order, nitrates, perchlorate, and molybdenum are some of the contaminants that have been detected in Mortandad Canyon alluvial groundwater. Perchlorate and nitrate contamination is present in the vadose zone beneath the portion of Mortandad Canyon below the confluence of Ten Site Canyon (LANL 2006, 094161).

The conceptual model for the Mortandad Canyon watershed is discussed in the Mortandad Canyon investigation report (MCIR) (LANL 2006, 094161). Surface water and alluvial groundwater in Mortandad Canyon are derived from three sources: the RLWTF outfall at TA-50, other outfalls, and runoff from precipitation. Persistent surface water generally occurs from the TA-50 outfall downcanyon to a location above the sediment traps (LANL 2006, 094161). Alluvial groundwater storage is limited in the upper reaches but increases downcanyon in wider, thicker alluvial deposits. Lesser sources in upper Effluent Canyon create localized areas of surface water and likely minor alluvial groundwater. The extent of alluvial saturation in Mortandad Canyon depends on variations in the runoff sources and varies during the year. The underlying vadose zone and saturated zones have the same mobile constituents, indicating a hydrologic connection with the alluvial groundwater.

Contaminant concentrations in surface and alluvial waters have decreased over time as a result of improvements in the treatment processes at the RLWTF. For example, tritium, nitrate, and perchlorate (primary contaminants in the surface water and alluvial groundwater) show rapid and steady overall decline in concentration at the monitoring locations in the upper canyon where the aquifer volume is small, indicating rapid flushing of the alluvium. Farther downcanyon, the contaminant concentrations in the alluvial groundwater are also declining but at a slower rate.

Nitrate, perchlorate, chromium, and tritium are detected above background concentrations in intermediate-perched groundwater and regional groundwater. A conceptual model for chromium contamination detected beneath Mortandad Canyon is presented in the Sandia Canyon IR (LANL 2009, 107453). This 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, some Mortandad Canyon wells are included in the chromium investigation monitoring group. Other sources of contamination beneath Mortandad Canyon are from Mortandad Canyon sources. These sources and the migration pathways are described in the MCIR (LANL 2006, 094161).

4.3 Monitoring Objectives

The monitoring for Mortandad Canyon reflects the current understanding of the nature and extent and conceptual model for contamination in and beneath the watershed as described in the MCIR (LANL 2006, 094161) and in the Sandia Canyon IR (LANL 2009, 107453). The conceptual model indicates 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 in the MCIR [LANL 2006, 094161]). The steadily decreasing trend of the contaminant concentrations in the surface water and alluvial groundwater supports the continuation of monitoring in base-flow and alluvial groundwater for TAL metals, general inorganics, perchlorate, VOCs at a semiannual or annual frequency and for SVOCs and radionuclides an annual frequency. These data should provide sufficient information to continue verifying the decreasing trends in contaminant concentrations in surface water and alluvial groundwater (Appendix D).

The data from vadose zone characterization core holes and monitoring-well drilling in Mortandad Canyon, presented in the MCIR (LANL 2006, 094161) indicate that migration of contaminants into the vadose zone beneath the alluvium is limited primarily to mobile constituents such as nitrate, perchlorate, tritium, chromium, and possibly a few organic compounds. This finding is also supported by the groundwater-data screening results and FD tables for the intermediate-perched and regional groundwater presented in Appendix B of the MCIR (LANL 2006, 094161). Mobile constituents such as perchlorate, nitrate, chromium, and potentially the SVOC 1,4-dioxane, known to be predominantly located in the vadose zone and in the intermediate-perched and regional groundwater, will continue to be monitored to support the assessment and refinement of the conceptual model for migration in the vadose zone.

The monitoring recommendations for perched-intermediate and regional groundwater beneath Mortandad Canyon also reflect the updated conceptual model for these zones as presented in the Sandia Canyon IR (LANL 2009, 107453). These wells are also part of the chromium investigation monitoring group (see section 3.3) and monitoring at the wells is consistent with the monitoring for the other wells in that group. Additional rounds of samples will be collected for specific constituents (specifically SVOCs) to address potential sources from within Mortandad Canyon. Base-flow locations and alluvial wells in Mortandad Canyon are not considered part of the chromium investigation monitoring group but are part of ongoing surveillance monitoring in Mortandad Canyon.

4.4 Scope of Activities

Active monitoring locations in the Mortandad Canyon watershed include base-flow stations, alluvial groundwater wells, intermediate-perched groundwater wells, and regional groundwater wells, which are shown in Figure 4.4-1. Mortandad Canyon includes wells assigned to three monitoring groups. The chromium investigation monitoring group is described in the section for Sandia Canyon (section 3.4). Base flow in Mortandad Canyon is not related to the Sandia Canyon chromium investigation and will retain a monitoring approach consistent with recent trends observed in the Mortandad Canyon watershed. The TA-54 monitoring group includes deep-groundwater wells in Cañada del Buey in Mortandad Canyon and is described in the sections for Pajarito Canyon (section 5.3) and for TA-54 (section 9). The MDA C monitoring group includes one well in Mortandad Canyon and is described in the section for Pajarito Canyon (section 5.3).

Sampling locations, frequencies, analytical suites, and the rationale for these locations are presented in Table 4.4-1. The FD screening tables for Mortandad Canyon are presented in Attachment B-1 of Appendix B (on CD). Exceptions to the analytical suites and sampling frequencies presented in Tables 1.6-2 and 1.6-3 may occur for some locations listed in Table 4.4-1. The rationale for any exceptions is documented in Table D-4.0-1.

4.5 Modifications to the 2009 Interim Plan

Changes to monitoring locations in the 2010 Interim Plan for Mortandad Canyon watershed include the following:

- New monitoring well R-50, completed in the regional aquifer, was added to the monitoring plan as part of the chromium investigation monitoring group.
- Monitoring wells located in Cañada del Buey (CDBO-4, CDBO-5, CDBO-6, CDBO-7, CDBO-8, and CDBO-9) were administratively transferred to the Pajarito Canyon watershed to ensure all wells related to TA-54 monitoring activities are sampled during the same watershed-sampling event.
- Monitoring well MCOI-8, completed in perched-intermediate groundwater, was removed from the sampling plan because water is present only in the sump in this well. Water levels in this well will continue to be monitored (Table 1.11-1).
- The Westbay sampling system in monitoring well R-16 was removed, and the well was rehabilitated and converted to a two-screened well, monitoring screens 2 and 4. Screen 3 of R-16 was removed from the monitoring plan.
- Monitoring wells in Mortandad Canyon watershed and in the TA-54 monitoring group (R-21, R-37, and R-38) were administratively transferred to the Pajarito Canyon watershed to ensure all wells related to TA-54 monitoring activities are sampled during the same watershed sampling event.

Appendix D documents the rationale for site-specific changes to analytical suites and frequencies, relative to those assigned in the 2009 Interim Plan (LANL 2009, 106115).

5.0 PAJARITO CANYON WATERSHED

5.1 Introduction

Pajarito Canyon is located on the Pajarito Plateau in the central part of the Laboratory (Figure 1.2-1). The canyon heads in the Santa Fe National Forest, approximately 4.6 km (2.9 mi) west of the Laboratory boundary at an elevation of approximately 10,434 ft (3180 m) and trends east-southeast across the Laboratory and Los Alamos County. It empties into the Rio Grande in White Rock Canyon at an elevation of 5422 ft (1653 m). The primary Laboratory use of the Pajarito Canyon watershed has been as the canyon-bottom location for the former Los Alamos Critical Experiments Laboratory at TA-18 and for mesa-top surface and subsurface MDAs F and Q at TA-06; M at TA-09; and G, H, J, and L at TA-54. A detailed description and data summary for Pajarito Canyon contaminants are contained in the “Pajarito Canyon Investigation Report, Revision 1” (LANL 2009, 106939).

5.2 Background

The area of Pajarito Canyon watershed is approximately 13 mi^2. The TAs located within this watershed include TA-03, TA-06, TA-07, TA-08, TA-09, TA-14, TA-15, TA-18, TA-22, TA-23, TA-27, TA-36, TA-40, TA-46, TA-50, TA-54, TA-55, TA-58, TA-59, TA-64, TA-65, TA-66, TA-67, and TA-69. The contaminant release history from 379 SWMUs and AOCs includes releases from outfalls, septic systems, spills, open detonations from firing sites, and MDAs. Laboratory-related contamination has been detected in Pajarito Canyon water samples collected from perennial and ephemeral streams, alluvial groundwater, and springs supplied by intermediate-perched groundwater from the Bandelier Tuff.

5.3 Monitoring Objectives

The Pajarito Canyon watershed includes several perched-intermediate and regional wells that are part of the overall TA-54 monitoring-well network. These wells and wells that lie within the Mortandad Canyon watershed are part of the TA-54 monitoring group. The basis upon which sampling frequencies and analytical suites are assigned to these wells differs from that used to assign frequencies and suites to other wells in the Pajarito Canyon watershed. The monitoring objectives the TA-54 monitoring group are described in section 9 of this Interim Plan.

The remainder of the monitoring for Pajarito Canyon in the 2010 Interim Plan reflects the information presented in the “Pajarito Canyon Investigation Report, Revision 1” (LANL 2009, 106939). The investigation report discussed the watershed-scale characterization of surface-water base flow, springs, alluvial groundwater, intermediate-perched groundwater, and regional groundwater. Monitoring objectives for wells outside of the TA-54 monitoring group and other monitoring groups that fall partially within Pajarito Canyon are included in the monitoring activities described below.

5.4 Scope of Activities

Active monitoring locations in the Pajarito Canyon watershed include base-flow stations, alluvial groundwater wells, intermediate-perched groundwater wells, regional groundwater wells, and springs, which are shown in Figure 5.4-1. The TA-54 monitoring group includes locations in both Mortandad and Pajarito Canyons and is discussed in section 9. The MDA C monitoring group primarily consists of locations in Pajarito Canyon and is shown in Figure 5.4-2.

Sampling locations, frequencies, analytical suites, and the rationale for these locations are presented in Table 5.4-1. The FD screening tables for Pajarito Canyon are presented in Attachment B-1 of Appendix B (on CD). The rationale for assignment of analytical suites and frequencies is summarized in Table 1.6-2 for the monitoring groups and in Table 1.6-3 for other sampling locations in the watershed.

Table 5.4-1 presents sampling locations, the rationale for these locations, analytical suites, and frequencies. Analytical suites and frequencies assigned to individual locations in Table 5.4-1 generally follow the high-level monitoring design presented in Table 1.6-2 for the TA-54 monitoring group and in Table 1.6-3 for other locations in the Pajarito Canyon watershed. These analytical suites and frequencies are based on the results of applicable investigation reports and a review of ongoing monitoring data such as the statistical summaries for locations in the Pajarito Canyon watershed provided in the FD screening tables in Attachment B-1 of Appendix B (on CD).

Base-flow and alluvial groundwater wells near and downgradient of TA-54 are included in this Interim Plan as general surveillance monitoring locations (Table 1.6-3). These locations are not included in the TA-54 monitoring group because they are well characterized as presented in the Pajarito Canyon and Cañada del Buey investigation reports (LANL 2009, 106939; LANL 2009, 107497). Monitoring at TA-54 focuses on perched-intermediate and regional groundwater zones beneath TA-54. 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.

Monitoring at MDA C is focused on nearby perched-intermediate and regional groundwater wells for constituents known to be present in the subsurface beneath MDA C.

Exceptions to the analytical suites and sampling frequencies presented in Tables 1.6-2 and 1.6-3 may occur for some locations listed in Table 5.4-1. The rationale for any exceptions is documented in Table D-5.0-1.

5.5 Modifications to the 2009 Interim Plan

Changes to monitoring locations in the 2010 Interim Plan for Pajarito Canyon Watershed include the following:

- Monitoring wells CDBO-4, CDBO-5, CDBO-6, CDBO-7, CDBO-8, and CDBO-9, R-21, R-37, and R-38 were administratively transferred from the Mortandad Canyon watershed to the Pajarito Canyon watershed (see section 4.5).
- New regional aquifer monitoring wells R-51, R-52, R-53, R-54, R-55, R-56, and R-57 were added to the TA-54 monitoring group in Pajarito Canyon watershed. These wells either have been completed or are scheduled to be completed during the 2010 monitoring year.
- New regional aquifer monitoring wells R-59 and R-60 were added to the MDA C monitoring group in the Pajarito Canyon watershed. These wells are scheduled to be completed during the 2010 monitoring year.

Appendix D documents the rationale for site-specific changes to analytical suites and frequencies, relative to those assigned in the 2009 Interim Plan (LANL 2009, 106115).

6.0 WATER CANYON/CAÑON DE VALLE WATERSHED

6.1 Introduction

The headwaters of the Water Canyon/Cañon de Valle watershed occur along the eastern flank of the Jemez Mountains, near the western margin of the Pajarito Plateau (Figure 1.2-1). The discharge point of the watershed is at the Rio Grande on the eastern edge of the plateau. The major canyons in the watershed include Water Canyon, Cañon de Valle, Potrillo Canyon, and Fence Canyon. The watershed also includes numerous smaller canyons and arroyos.

6.2 Background

The Water Canyon/Cañon de Valle watershed is located in the southern portion of the Laboratory and encompasses an area of approximately 19 mi^2. Cañon de Valle, located in the western portion of the Pajarito Plateau, is the main tributary to Water Canyon. The heads of both canyons are located in the Sierra de los Valles. The watershed includes numerous springs, ephemeral and perennial surface water flow, and alluvial groundwater systems. Tributaries that may contribute contamination to Water Canyon include Indio, Fence, and Potrillo Canyons, which join Water Canyon on the eastern side of the Laboratory. The TAs located within this watershed include TA-09, TA-11, TA-14, TA-15, TA-16, TA-28, TA-36, TA-37, TA-39, TA-49, TA-67, TA-68, TA-70, and TA-71.

This portion of the Laboratory has been used for weapons testing, explosives testing, and explosives production and has received effluent from outfalls containing explosive compounds, metals, and VOCs. Stormwater runoff from firing sites, open burn/open detonation units, surface-disposal sites, and other SWMUs and AOCs may have contributed to the contamination detected within the watershed. The contaminants detected in soil, rock, and sediment samples obtained from various locations within the watershed during previous investigations include barium and other RCRA metals, explosive compounds, VOCs, and radionuclides, which are not addressed under the Consent Order. Results of the TA-16 260 Outfall corrective measures study (CMS) (LANL 2007, 098734) show the drainage channel below the outfall and the canyon bottom, as well as surface water, alluvial groundwater, and deep-perched groundwater, are contaminated with explosive compounds, including RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine); HMX (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine); TNT (2,4,6 trinitrotoluene); and barium (LANL 2003, 085531). The barium contamination results from an explosive compound, Baratol, which is a mixture of $Ba(NO_3)_2$ and TNT. Barium and RDX are chemicals of interest in this watershed because releases of these chemicals are documented, and the spatial and temporal distributions provide information to evaluate the site conceptual model.

6.3 Monitoring Objectives

Monitoring within the Water Canyon/Cañon de Valle watershed is organized into three general categories:

- Monitoring conducted to meet the requirements of the “Long-Term Monitoring and Maintenance Plan for Corrective Measures Implementation at Consolidated Unit 16-021(c)-99” (LANL 2010, 109252)
- Monitoring conducted in support of the performance of CME for perched-intermediate and regional groundwater at Consolidated Unit 16-021(c)-99
- General surveillance monitoring of surface water, springs, and alluvial groundwater

Two monitoring groups have been established for the Water Canyon/Cañon de Valle watershed. Shallow monitoring locations focused on select springs and select alluvial wells addressed in the monitoring and maintenance plan for the CMI at Consolidated Unit 16-021(c)-99 have been assigned to the TA-16-260 alluvial monitoring group. These locations are monitored to assess the performance of the CMI treatment systems at Consolidated Unit 16-021(c)-99. The monitoring requirements are discussed in the long-term monitoring plan (LANL 2010, 109252).

For the ongoing CME for perched-intermediate and regional groundwater, a TA-16-260 deep-groundwater monitoring group has been established (Figure 1.6-1). Monitoring of this group focuses on known HE and barium contamination in the upper Cañon de Valle watershed (Table 1.6-2) and is conducted to support the ongoing deep perched-intermediate groundwater-related CME activities (LANL 2007, 098734; LANL 2008, 103165).

The monitoring locations and objectives for deep groundwater reflect current knowledge about nature and extent of contamination associated with Consolidated Unit 16-021(c)-99 and the current conceptual model for contaminant releases and fate and transport. The current status of this knowledge is presented in the following reports:

- “Corrective Measures Evaluation Report, Intermediate and Regional Groundwater, Consolidated Unit 16-021(c)-99” (LANL 2007, 098734)
- “Evaluation of the Suitability of Wells Near Technical Area 16 for Monitoring Contaminant Releases from Consolidated Unit 16-021(c)-99, Revision 1” (LANL 2007, 100113), together with the addendum (LANL 2008, 101875.5)

- "Long-Term Monitoring and Maintenance Plan for Corrective Measures Implementation at Consolidated Unit 16-021(c)-99" (LANL 2010, 109252)

Characterization sampling for a wide range of potential contaminants in groundwater from TA-16 (e.g., fission-product radionuclides, SVOCs, pesticides, PCBs, dioxins/furans) has been completed. These constituents have not been detected beyond sporadic, low-level detections that can be attributed to infrequent but normal analytical issues, as summarized in the FD tables in Attachment B-1 of Appendix B (on CD).

The third monitoring category within the Water Canyon/Cañon de Valle watershed is the surface water, springs, and alluvial groundwater locations that will continue to be monitored for general surveillance purposes and to track well-documented trends. Historical base-flow and groundwater data show no evidence of pesticides, PCBs, or dioxin/furans in the watershed; therefore, these constituents are not analyzed in the watershed, except during the characterization of new wells.

6.4 Scope of Activities

Active monitoring locations in the Water Canyon/Cañon de Valle watershed include base-flow stations, alluvial groundwater wells, intermediate-perched groundwater wells, regional groundwater wells, and springs. These locations are shown in Figure 6.4-1. The TA-16-260 deep-groundwater monitoring group is shown in Figure 6.4-2.

Sampling locations, frequencies, analytical suites, and the rationale for these locations are presented in Table 6.4-1. The FD screening tables for Water Canyon/Cañon de Valle are presented in Attachment B-1 of Appendix B (on CD).

Monitoring of select springs and alluvial groundwater wells is described in the long-term monitoring plan for the Consolidated Unit 16-021(c)-99 CMI. Sampling locations, frequencies, and analytical suites for the monitoring described in this plan are summarized in Table 6.4-2.

Additional base-flow, spring, and alluvial groundwater monitoring is conducted as general surveillance in the watershed (Table 1.6-3). Monitoring of deep groundwater from the perched-intermediate and regional aquifers reflects a long-term data set that indicates what constituents are present and their trends and variability. Additional rounds are maintained for some constituents in the perched-intermediate groundwater as an early-detection location for potential migration of those constituents from secondary sources in the vadose zone.

Exceptions to the analytical suites and sampling frequencies presented in Tables 1.6-2 and 1.6-3 may occur for some locations listed in Table 6.4-1. The rationale for any exceptions is documented in Table D-6.0-1.

6.5 Modifications to the 2009 Interim Plan

Changes to monitoring locations in the 2010 Interim Plan for Water Canyon/Cañon de Valle watershed include the following:

- WA-6.25 Spring has been removed from the monitoring plan. The spring is typically dry when there is no base flow and is under water when there is base flow; hence, it is rarely sampled.
- Alluvial monitoring well WCO-1 has been plugged and abandoned and has been replaced by monitoring well WCO-1r.

- Alluvial monitoring well WCO-3 has been plugged and abandoned and has been replaced by monitoring well WCO-3r.
- Alluvial monitoring well FCO-1 has been historically dry since it was completed in June 1997. FCO-1 has been removed from the monitoring plan.
- Screen 1 of R-25, completed in perched-intermediate groundwater, was again added to the monitoring plan to allow additional data to be collected in support of CME activities for TA-16 260 Outfall. Although nearby monitoring well R-25b was installed in November 2008 as a replacement for this screen, concentrations of contaminants vary considerably between the two screens, reflecting the significant heterogeneity of the perched-intermediate system.
- Piezometer R-26 PZ-1 has been dry since it was installed in October 2003 and was removed from the monitoring plan. Water levels in R-26 PZ-1 will be checked manually during spring runoff.
- New well R-47i, completed in perched-intermediate groundwater, was added to the Water Canyon/Cañon de Valle watershed as part of the TA-16-260 deep-groundwater monitoring group.

Appendix D documents the rationale for site-specific changes to analytical suites and frequencies, relative to those assigned in the 2009 Interim Plan (LANL 2009, 106115).

7.0 ANCHO/CHAQUEHUI/FRIJOLES CANYONS WATERSHEDS

7.1 Introduction

Ancho Canyon

Ancho Canyon is located in the southeastern part of the Laboratory (Figure 1.2-1). TA-33, located south of Ancho Canyon on a mesa near the Rio Grande, was used as a firing site and for tritium operations. SWMUs and AOCs include landfills and septic systems. TA-39 is located on the floor of middle Ancho Canyon, and it was used for open-air testing of explosive compounds. SWMUs and AOCs in this TA include five firing sites, a number of landfills, and septic systems. More detailed information about the operational history and the SWMUs and AOCs can be found in the “RFI Work Plan for Operable Unit 1122” (LANL 1992, 007671) and the “RFI Work Plan for Operable Unit 1132” (LANL 1993, 015316).

TA-49 is located on a mesa in the upper part of the Ancho Canyon drainage, and part of the area drains into Water Canyon. 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. The testing produced large inventories of radioactive and hazardous materials: isotopes of uranium and plutonium, lead, and beryllium; explosives such as TNT, RDX, 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 can be found in recent Laboratory reports (LANL 2010, 109318; LANL 2010, 109319). The RFI work plan also describes the planned investigations that focus on identifying and quantifying migration of contaminants from the shafts.

Chaquehui Canyon

Chaquehui Canyon is situated south of the mesa occupied by TA-33. Chaquehui Canyon heads on the Pajarito Plateau and contains an ephemeral stream in its upper portion. Farther down the drainage, Doe Spring, Spring 9, and Spring 9A maintain perennial flow that extends 0.25 mi to the Rio Grande. Sampling at Spring 9 is discussed in section 8, White Rock Canyon. No base-flow or groundwater sampling locations are sited in Chaquehui Canyon.

Frijoles Canyon

Frijoles Canyon lies on USFS and National Park Service lands south of the Laboratory. The canyon lies next to the Laboratory boundary near the Rio Grande but is separated from TA-33 by Chaquehui Canyon.

7.2 Background

Ancho Canyon is located in the southeastern part of the Laboratory, and its area is approximately 7 mi^2. The Ancho Canyon watershed is located primarily within TA-33, TA-39, TA-49, and TA-70 and contains 33 SWMUs and AOCs. Contaminants detected in sediments, surface water, or shallow groundwater during previous investigations conducted in the watershed include mercury and other metals, explosive compounds, organic constituents, and radionuclides.

The Chaquehui Canyon watershed is located in the southeast past of the Laboratory at TA-33. A total of 61 SWMUs and AOCs in the watershed vary from inactive industrial outfalls to MDAs. Surface water flow is ephemeral; however, two springs are present along the south-facing wall of the main drainage. Contaminants above background levels have been detected in samples of sediments and surface water obtained in the canyon.

Indio Canyon, a south-entering subbasin to Water Canyon, originates on Laboratory property and extends for about 3 mi to its confluence with Water Canyon. The drainage basin is located in TA-39. Contaminants above background levels have been detected in sediments and surface-water samples obtained from the canyon.

7.3 Monitoring Objectives

The primary monitoring objective of 2010 monitoring in Ancho/Chaquehui/Frijoles Canyon is to maintain general surveillance of base flow, springs, and regional groundwater. Applicable results will be reported in the Ancho, Chaquehui, and Indio Canyons investigation report, due in 2011 under the Consent Order.

7.4 Scope of Activities

7.4.1 Ancho Canyon

Monitoring locations in Ancho Canyon are situated near or downstream from areas of past Laboratory weapons-testing activities. Most monitoring locations in Ancho Canyon access the regional aquifer. Three decades of water-quality records from regional wells in this area (test wells DT-5A, DT-9, and DT-10) and recent data from R-31 show no substantial changes in water chemistry or the presence of Laboratory contaminants in the regional aquifer. New regional aquifer wells R-29 and R-30 have been drilled immediately downgradient of MDA AB at TA-49. Monitoring data from these wells will support the corrective action process for MDA AB and will also be used to corroborate historical monitoring data from the nearby DT-series wells.

Active monitoring locations in the Ancho Canyon watershed include one base-flow station, four regional groundwater wells, and one spring, which are shown in Figure 7.4-1. The MDA AB monitoring group is shown in Figure 7.4-2.

Frequency, analytical suites, and the rationale for monitoring at each location are presented in Table 7.4-1. Groundwater monitoring for MDA AB has historically been conducted primarily at the DT-series regional aquifer wells. New wells R-29 and R-30 are now online and will be incorporated into the monitoring network for MDA AB. These new wells will initially be sampled quarterly for full analytical suites to characterize the groundwater beneath MDA AB and to support an evaluation of historical data from the DT wells.

Monitoring at the single base-flow monitoring point in Ancho Canyon, Ancho at Rio Grande, is conducted during the fall White Rock Canyon sampling campaign. Ancho Spring is also monitored annually during the fall White Rock Canyon sampling campaign (section 8.4).

Exceptions to the analytical suites and sampling frequencies presented in Tables 1.6-2 and 1.6-3 may occur for some locations listed in Table 7.4-1. The rationale for any exceptions is documented in Table D-7.0-1.

7.4.2 Chaquehui Canyon

No base-flow or groundwater sampling locations are sited in Chaquehui Canyon. As noted in section 7.1, Spring 9 in lower Chaquehui Canyon is sampled during the fall White Rock Canyon sampling campaign (section 8.4).

7.4.3 Frijoles Canyon

Locations in Frijoles Canyon are for the most part remote from potential contaminant sources and serve as boundary monitoring points. Sampling locations in Frijoles Canyon are for base flow only, with no groundwater locations included in this Interim Plan. The three-decade water-quality record for base flow in this area shows no substantial changes in water chemistry or the presence of Laboratory contaminants. Water-quality monitoring over several decades in the Frijoles Canyon watershed shows no impact to groundwater exceeding screening criteria.

Base Flow

Flow in Frijoles Canyon is perennial. Base-flow stations include the gaging station Rio de los Frijoles at Bandelier (E350) and Frijoles at Rio Grande. Both stations are sampled annually but under different watershed-sampling campaigns. The station Rio de los Frijoles at Bandelier (E350) is shown in Figure 7.4-1 and is sampled during the Ancho/Chaquehui/Frijoles Canyons sampling campaign (Table 7.4-1), while base flow at Frijoles at Rio Grande is sampled during the fall White Rock Canyon sampling campaign (section 8.4).

7.5 Modifications to the 2009 Interim Plan

Changes to monitoring locations in the 2010 Interim Plan for Ancho/Chaquehui/Frijoles Canyons watersheds include the following:

- New regional aquifer monitoring wells R-29 and R-30 were added to the Ancho Canyon watershed as part of the MDA AB monitoring group.
- Barbara Spring was added to the sampling campaign to facilitate collection of additional background data.

8.0 WHITE ROCK CANYON

8.1 Introduction

The White Rock Canyon springs and base-flow stations are located along the Rio Grande at the eastern border of the Laboratory and on Los Alamos County and San Ildefonso Pueblo lands (Figure 1.2-1). The springs serve as monitoring points to detect possible discharge of contaminated groundwater from into the Rio Grande and represent discharge points for the regional aquifer and perched-intermediate aquifers. The base-flow stations serve as monitoring points to detect possible discharge of contaminated surface water from tributaries that enter the Rio Grande after crossing Laboratory property.

8.2 Background

In the southern portion of White Rock Canyon, tritium operations took place at TA-33, which borders the Rio Grande to the east. The "RFI Work Plan for Operable Unit 1122" (LANL 1992, 007671) describes environmental concerns at TA-33. To the north of TA-33 lies TA-70, a buffer area where no Laboratory activities have occurred. Adjoining TA-70 to the north are low- to moderate-density residential areas in White Rock, a mix of private property and Los Alamos County land. A municipal sanitary treatment plant discharges effluent into Mortandad Canyon just above the river at the northern county boundary. San Ildefonso Pueblo property borders Los Alamos County on the north; this land is undeveloped. San Ildefonso Pueblo operates numerous water-supply wells on both sides of the Rio Grande, and the City of Santa Fe operates the Buckman well field on the east side of the Rio Grande across from White Rock.

8.3 Monitoring Objectives

The monitoring objective for the White Rock Canyon watershed is to continue surveillance for potential Laboratory impacts to the groundwater, as expressed at the spring discharge points in White Rock Canyon. Most springs in White Rock Canyon originate from either the regional aquifer or perched-intermediate aquifers where flow rates are low and little variation in geochemistry occurs beyond cyclical annual changes. In addition, a 25-yr record of water-quality data for the springs shows little or no change. The long period of record, the nondetections or few detections of Laboratory-derived contaminants in the springs, and the expected slow rate of change for arrival concentrations for potential contaminants warrants the annual monitoring frequency for the White Rock Canyon springs included in the Interim Plan.

The monitoring objective for the base-flow stations is to serve as monitoring points to detect possible discharge of contaminated surface water from tributaries that enter the Rio Grande after crossing Laboratory property.

8.4 Scope of Activities

Water-quality monitoring over several decades in the White Rock Canyon watershed shows little or no impact from Laboratory sources. The analytes selected for monitoring are chosen based on data screening against applicable standards, on possible source-terms from Laboratory activities, and on the need to conduct annual monitoring for a broad range of analytes to determine trends. The need for sampling of analytes that have been eliminated from specific locations will be reevaluated on an annual basis during development of the annual update to the Interim Plan.

Sampling locations, frequencies, analytical suites, and the rationale for monitoring base-flow stations and springs are presented in Table 8.4-1, and the locations are shown in Figure 8.4-1. Base-flow and spring locations within White Rock Canyon are sampled during the fall White Rock campaign. Base-flow locations provide a perspective on water quality of the Rio Grande at the confluence of several tributaries that enter the Rio Grande after crossing Laboratory property (Mortandad at Rio Grande, Ancho at Rio Grande, and Frijoles at Rio Grande, and Pajarito at Rio Grande).

Exceptions to the analytical suites and sampling frequencies presented in Table 1.6-3 may occur for some locations listed in Table 8.4-1. The rationale for any exceptions is documented in Table D-8.0-1.

8.5 Modifications to the 2009 Interim Plan

Changes to monitoring locations in the 2010 Interim Plan for the White Rock Canyon watershed include the following:

- Spring 2B has been removed from the monitoring plan because flow from this spring is often mixed with river water.
- Spring 4C has been removed from the monitoring plan because it is closely located to Spring 4 and Spring 4B, and samples from Spring 4C are geochemically similar to samples from Spring 4.
- Spring 5B has been removed from the monitoring plan because flow from this spring is often mixed with river water. Spring 6AAA has been removed from the monitoring plan because flow from this spring is often mixed with river water.
- Because Springs 7 and 8 are closely located and are on the east side of the Rio Grande, only one of these two springs will be sampled; Spring 7 is preferred sampling location. These springs are frequently dry, or flow from the springs are mixed with river water.
- Spring 10 has been removed from the monitoring plan because it frequently has insufficient water for sampling, and discharge from this spring has no potential to be impacted from Laboratory activities, given its location.
- Base-flow location Buckman Diversion SW has been removed from the monitoring plan per a cooperative agreement with the City of Santa Fe.

9.0 TA-54 MONITORING-WELL NETWORK

At TA-54 groundwater monitoring is being conducted to support both the corrective measures process for SWMUs and AOCs (particularly the MDAs G, H, and L) under the Consent Order and in support of the RCRA permit. A TA-54 monitoring group has been established to address the monitoring requirements for all portions and aspects of TA-54 (Table 1.6-2 and Figure 9.0-1). 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.

The number and location of wells that comprise the principal network have been significantly increased over the last 2 yr based on recommendations presented in the revised TA-54 well evaluation and network recommendations report (LANL 2007, 098548) and subsequently approved by NMED (2007, 098283). Additional wells have been drilled in 2010 and are underway as of the writing of this report and will be incorporated into the TA-54 monitoring group as they come online.

Characterization of groundwater under MDAs G, H, and L is underway as data are collected from the completed network of new and existing wells. The groundwater data beneath TA-54 will be coupled with vadose zone data beneath Mesita del Buey and groundwater data from upgradient wells to evaluate whether evidence can be found of contamination from sources within TA-54 or other upgradient locations.

The sampling plan for each of the wells within the TA-54 monitoring group is presented in Table 5.4-1 for the Pajarito Canyon watershed.

10.0 REFERENCES

The following list includes all documents cited in this plan. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Record Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

EPA (U.S. Environmental Protection Agency), 2009. "National Recommended Water Quality Criteria," available online at http://www.epa.gov/ost/criteria/wqctable/, Office of Water, Office of Science and Technology, Washington, D.C. (EPA 2009, 109328)

EPA (U.S. Environmental Protection Agency), 2009. "Regional Screening Level (RSL) Master Table December 2009," Regional Screening Levels for Chemical Contaminants at Superfund Sites screening level/preliminary remediation goal website, tables available online at http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm, Washington, D.C. (EPA 2009, 109613)

Koch, R.J., and S. Schmeer, March 2010. "Groundwater Level Status Report for 2009, Los Alamos National Laboratory," Los Alamos National Laboratory report LA-14416-PR, Los Alamos, New Mexico. (Koch and Schmeer 2010, 108926)

LANL (Los Alamos National Laboratory), May 1992. "RFI Work Plan for Operable Unit 1079," Los Alamos National Laboratory document LA-UR-92-850, Los Alamos, New Mexico. (LANL 1992, 007668)

LANL (Los Alamos National Laboratory), May 1992. "RFI Work Plan for Operable Unit 1122," Los Alamos National Laboratory document LA-UR-92-925, Los Alamos, New Mexico. (LANL 1992, 007671)

LANL (Los Alamos National Laboratory), May 1992. "RFI Work Plan for Operable Unit 1071," Los Alamos National Laboratory document LA-UR-92-810, Los Alamos, New Mexico. (LANL 1992, 007667)

LANL (Los Alamos National Laboratory), June 1993. "RFI Work Plan for Operable Unit 1132," Los Alamos National Laboratory document LA-UR-93-768, Los Alamos, New Mexico. (LANL 1993, 015316)

LANL (Los Alamos National Laboratory), September 1997. "Work Plan for Mortandad Canyon," Los Alamos National Laboratory document LA-UR-97-3291, Los Alamos, New Mexico. (LANL 1997, 056835)

LANL (Los Alamos National Laboratory), May 22, 1998. "Hydrogeologic Workplan," Los Alamos National Laboratory document LA-UR-01-6511, Los Alamos, New Mexico. (LANL 1998, 059599)

LANL (Los Alamos National Laboratory), August 2001. "Interim Action Completion Plan for the South Fork of Acid Canyon," Los Alamos National Laboratory document LA-UR-01-4538, Los Alamos, New Mexico. (LANL 2001, 070188)

LANL (Los Alamos National Laboratory), September 2001. "Work Plan for the North Canyons," Los Alamos National Laboratory document LA-UR-01-1316, Los Alamos, New Mexico. (LANL 2001, 071060)

LANL (Los Alamos National Laboratory), February 2002. "Los Alamos and Pueblo Canyons Work Plan Addendum, Surface Water and Alluvial Groundwater Sampling and Analysis Plan," Los Alamos National Laboratory document LA-UR-02-759, Los Alamos, New Mexico. (LANL 2002, 070235)

LANL (Los Alamos National Laboratory), November 2003. "Corrective Measures Study Report for Solid Waste Management Unit 16-021(c)-99," Los Alamos National Laboratory document LA-UR-03-7627, Los Alamos, New Mexico. (LANL 2003, 085531)

LANL (Los Alamos National Laboratory), April 2004. "Los Alamos and Pueblo Canyons Investigation Report," Los Alamos National Laboratory document LA-UR-04-2714, Los Alamos, New Mexico. (LANL 2004, 087390)

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

LANL (Los Alamos National Laboratory), May 2007. "Well Screen Analysis Report, Revision 2," Los Alamos National Laboratory document LA-UR-07-2852, Los Alamos, New Mexico. (LANL 2007, 096330)

LANL (Los Alamos National Laboratory), August 2007. "Corrective Measures Evaluation Report, Intermediate and Regional Groundwater, Consolidated Unit 16-021(c)-99," Los Alamos National Laboratory document LA-UR-07-5426, Los Alamos, New Mexico. (LANL 2007, 098734)

LANL (Los Alamos National Laboratory), September 2007. "Evaluation of the Suitability of Wells Near Technical Area 16 for Monitoring Contaminant Releases from Consolidated Unit 16-021(c)-99, Revision 1," Los Alamos National Laboratory document LA-UR-07-6433, Los Alamos, New Mexico. (LANL 2007, 100113)

LANL (Los Alamos National Laboratory), October 2007. "Technical Area 54 Well Evaluation and Network Recommendations, Revision 1," Los Alamos National Laboratory document LA-UR-07-6436, Los Alamos, New Mexico. (LANL 2007, 098548)

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

LANL (Los Alamos National Laboratory), March 2008. "Addendum to the 'Evaluation of the Suitability of Wells Near Technical Area 16 for Monitoring Contaminant Releases from Consolidated Unit 16-021(c)-99, Revision 1'," Los Alamos National Laboratory document LA-UR-08-1536, Los Alamos, New Mexico. (LANL 2008, 101875.5)

LANL (Los Alamos National Laboratory), May 2008. "Investigation Report for Bayo Canyon Aggregate Area, Revision 1," Los Alamos National Laboratory document LA-UR-08-3202, Los Alamos, New Mexico. (LANL 2008, 102424)

LANL (Los Alamos National Laboratory), June 2008. "Supplemental Investigation Work Plan for Intermediate and Regional Groundwater at Consolidated Unit 16-021(c)-99," Los Alamos National Laboratory document LA-UR-08-3991, Los Alamos, New Mexico. (LANL 2008, 103165)

LANL (Los Alamos National Laboratory), September 2008. "Corrective Measures Evaluation Report for Material Disposal Area A, Solid Waste Management Unit 21-014, at Technical Area 21," Los Alamos National Laboratory document LA-UR-08-5520, Los Alamos, New Mexico. (LANL 2008, 103425)

LANL (Los Alamos National Laboratory), May 2009. "2009 Interim Facility-Wide Groundwater Monitoring Plan," Los Alamos National Laboratory document LA-UR-09-1340, Los Alamos, New Mexico. (LANL 2009, 106115)

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

LANL (Los Alamos National Laboratory), October 2009. "North Canyons Investigation Report, Revision 1," Los Alamos National Laboratory document LA-UR-09-6794, Los Alamos, New Mexico. (LANL 2009, 107416)

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

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

LANL (Los Alamos National Laboratory), April 2010. "Long-Term Monitoring and Maintenance Plan for the Corrective Measures Implementation at Consolidated Unit 16-021(c)-99," Los Alamos National Laboratory document LA-UR-10-2196, Los Alamos, New Mexico. (LANL 2010, 109252)

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

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

Mayfield, D.L., A.K. Stoker, and A.J. Ahlquist, June 1979. "Formerly Utilized MED/AEC Sites, Remedial Action Program: Radiological Survey of the Bayo Canyon, Los Alamos, New Mexico," U.S. Department of Energy Report No. DOE/EV-0005/15, Los Alamos, New Mexico. (Mayfield et al. 1979, 011717)

NMED (New Mexico Environment Department), June 3, 1997. "Approval of Los Alamos and Pueblo Canyon RFI Workplan (Operable Unit 1049)," New Mexico Environment Department memorandum to T. Taylor (DOE-LAAO) and J. Jansen (ER Project) from R.S. Dinwiddie (NMED-HRMB), Santa Fe, New Mexico. (NMED 1997, 056362)

NMED (New Mexico Environment Department), May 28, 2002. "Approval of the Addendum to the Los Alamos and Pueblo Canyons Workplan, Surface Water and Alluvial Groundwater Sampling and Analysis Plan," New Mexico Environment Department letter to E. Trollinger (DOE-OLASO) and J.C. Browne (LANL Director) from J.E. Young (NMED-HWB), Santa Fe, New Mexico. (NMED 2002, 073203)

NMED (New Mexico Environment Department), June 25, 2002. "Approval of Interim Action Plan for South Fork Acid Canyon," New Mexico Environment Department letter to E. Trollinger (DOE-OLASO) and J.C. Browne (LANL Director) from J.E. Young (NMED-HWB), Santa Fe, New Mexico. (NMED 2002, 073277)

NMED (New Mexico Environment Department), April 5, 2007. "Well Evaluations for Intermediate and Regional Wells," New Mexico Environment Department letter to D. Gregory (DOE LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED HWB), Santa Fe, New Mexico. (NMED 2007, 095999)

NMED (New Mexico Environment Department), August 31, 2007. "Approval with Direction, Technical Area 54 Well Evaluation and Network Recommendations," New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2007, 098283)

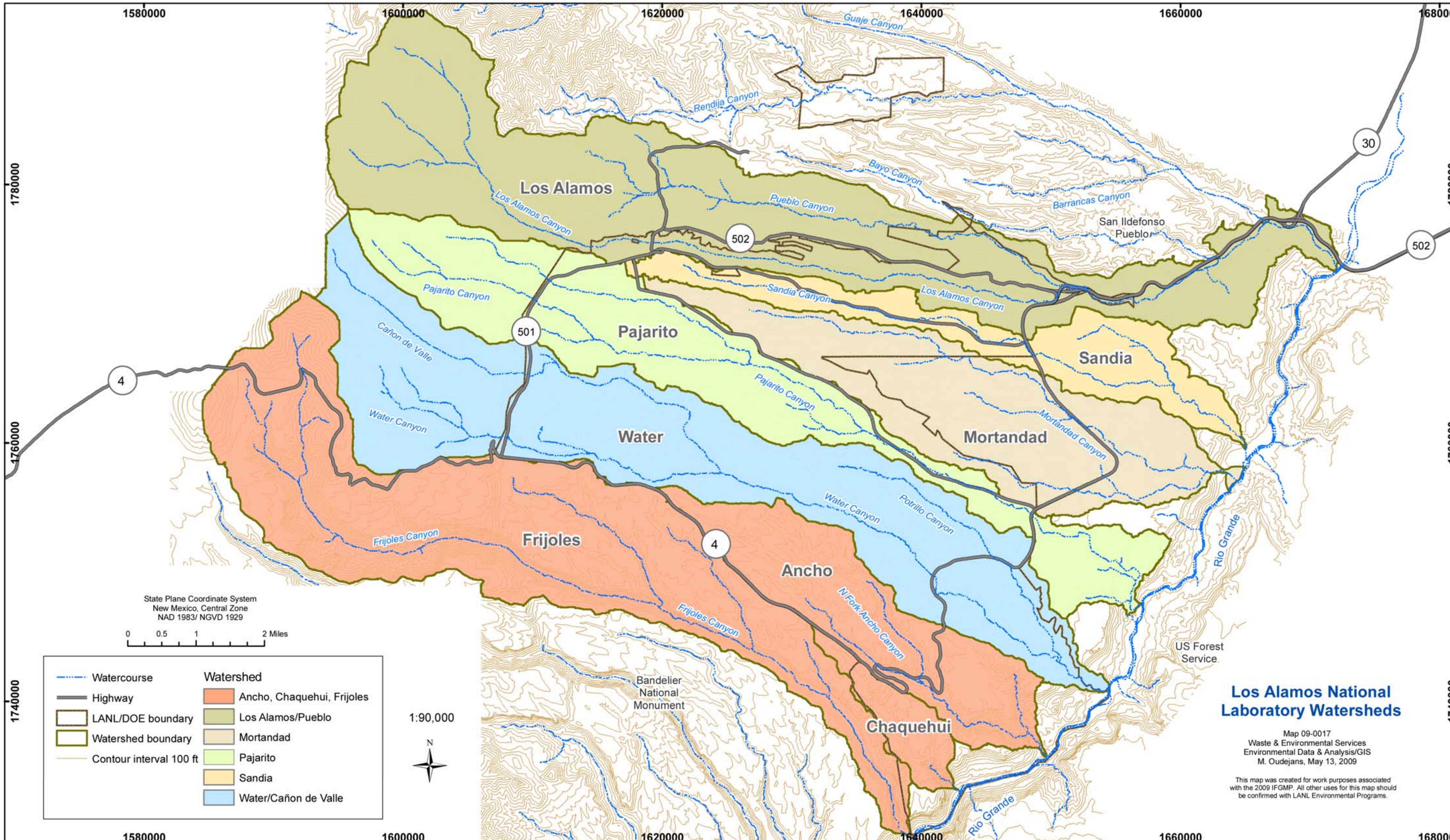

Figure 1.2-1 Watersheds at Los Alamos National Laboratory

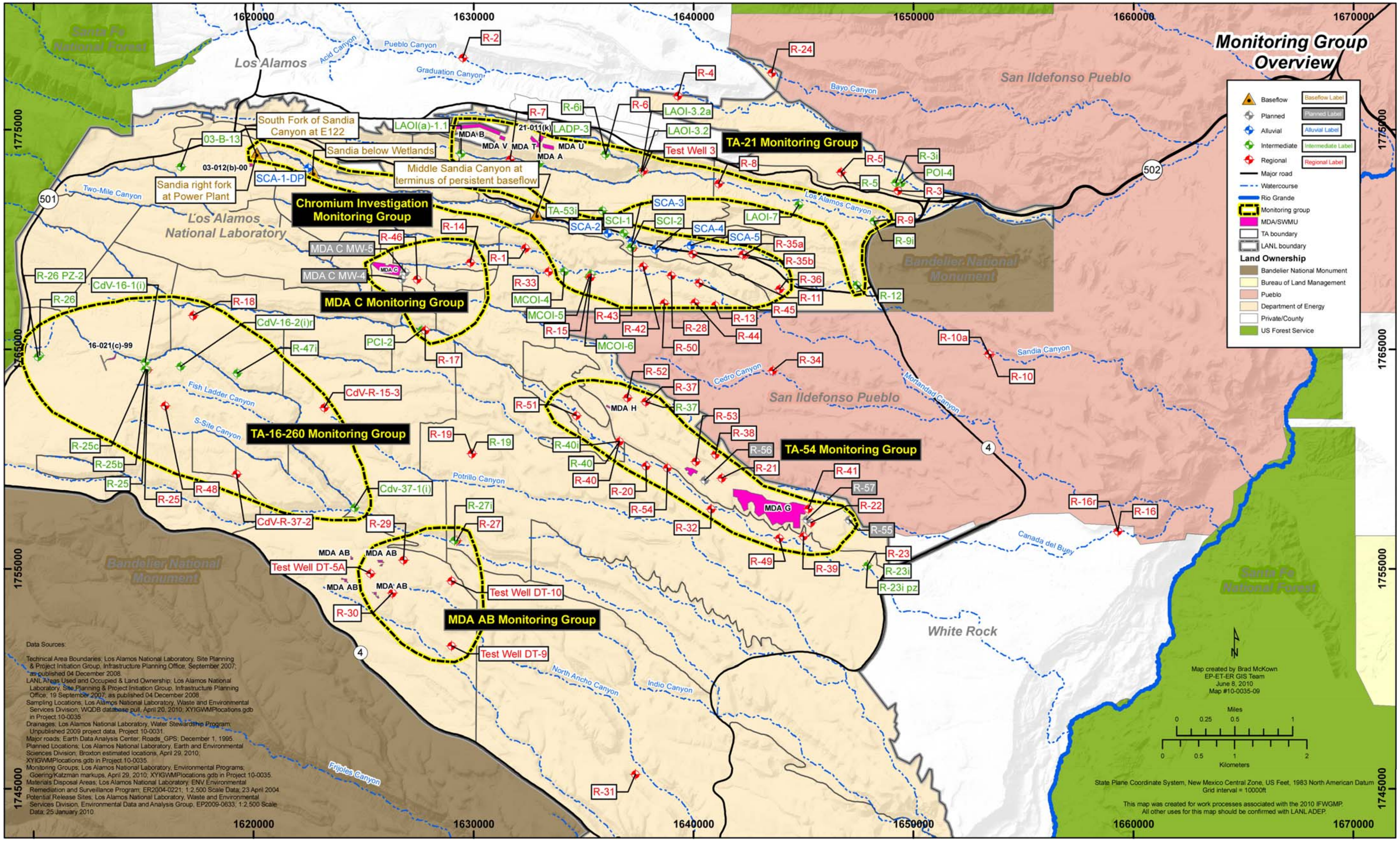

Figure 1.6-1 Overview of monitoring groups

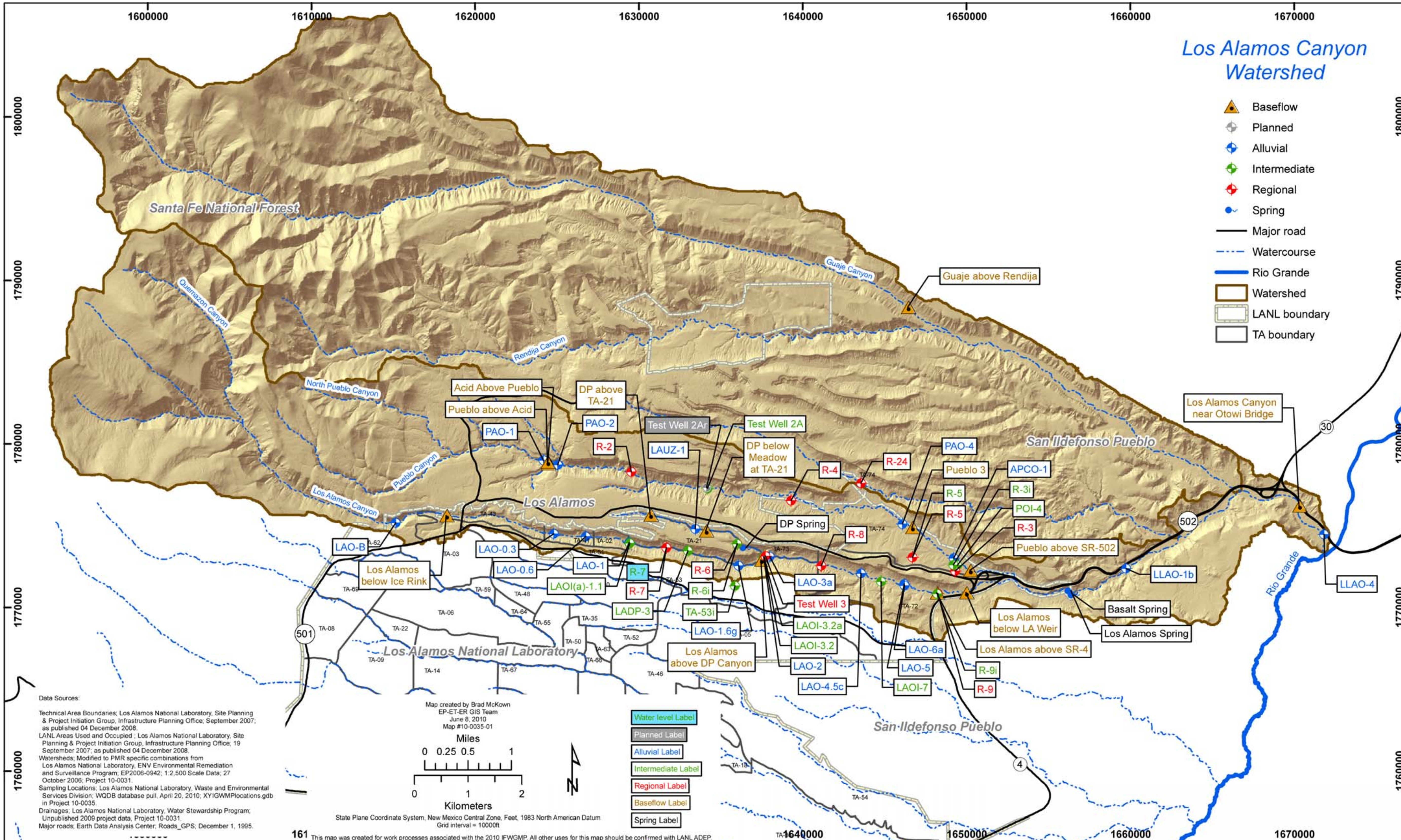

Figure 2.4-1 Los Alamos Canyon/Pueblo Canyon watershed

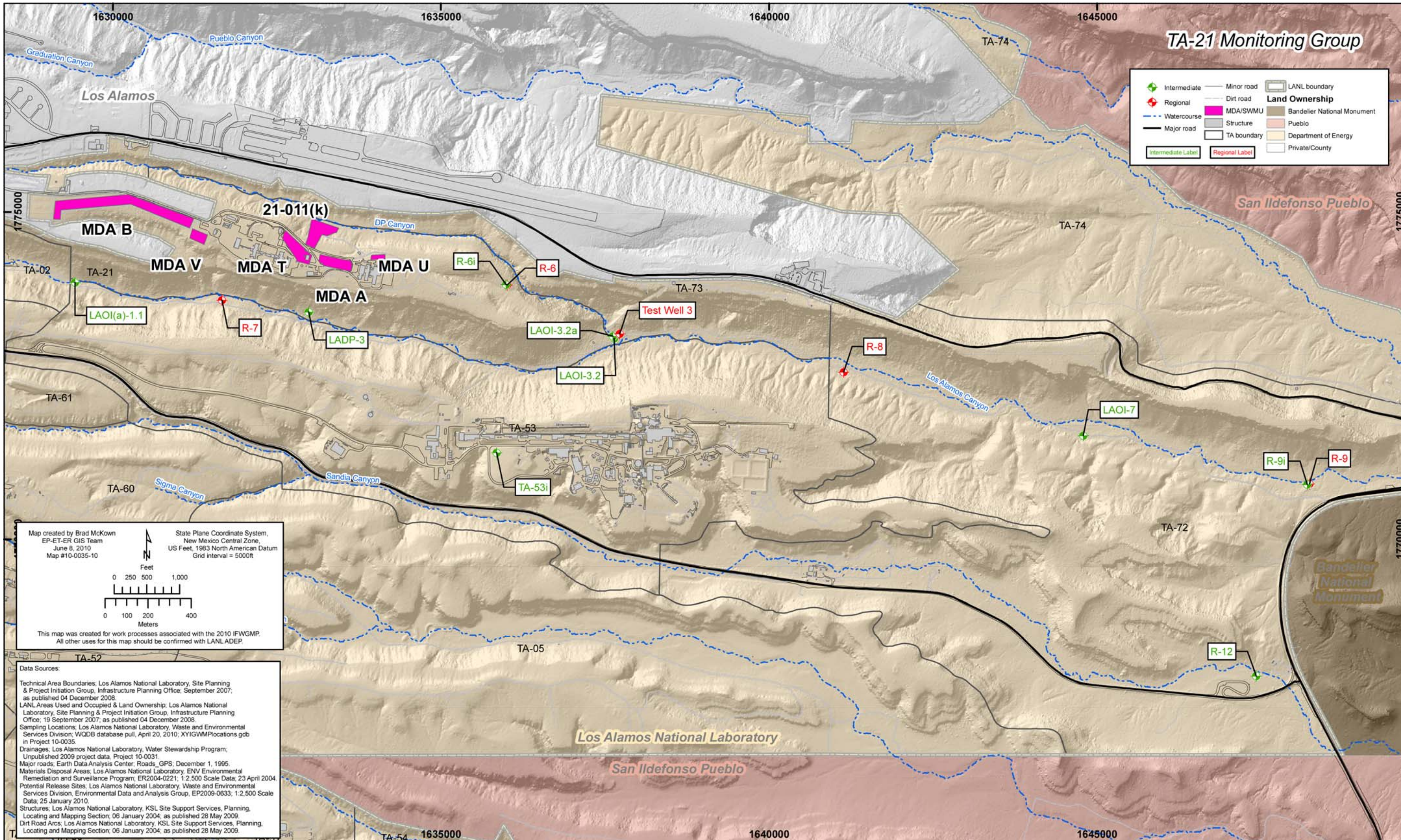

Figure 2.4-2 TA-21 monitoring group

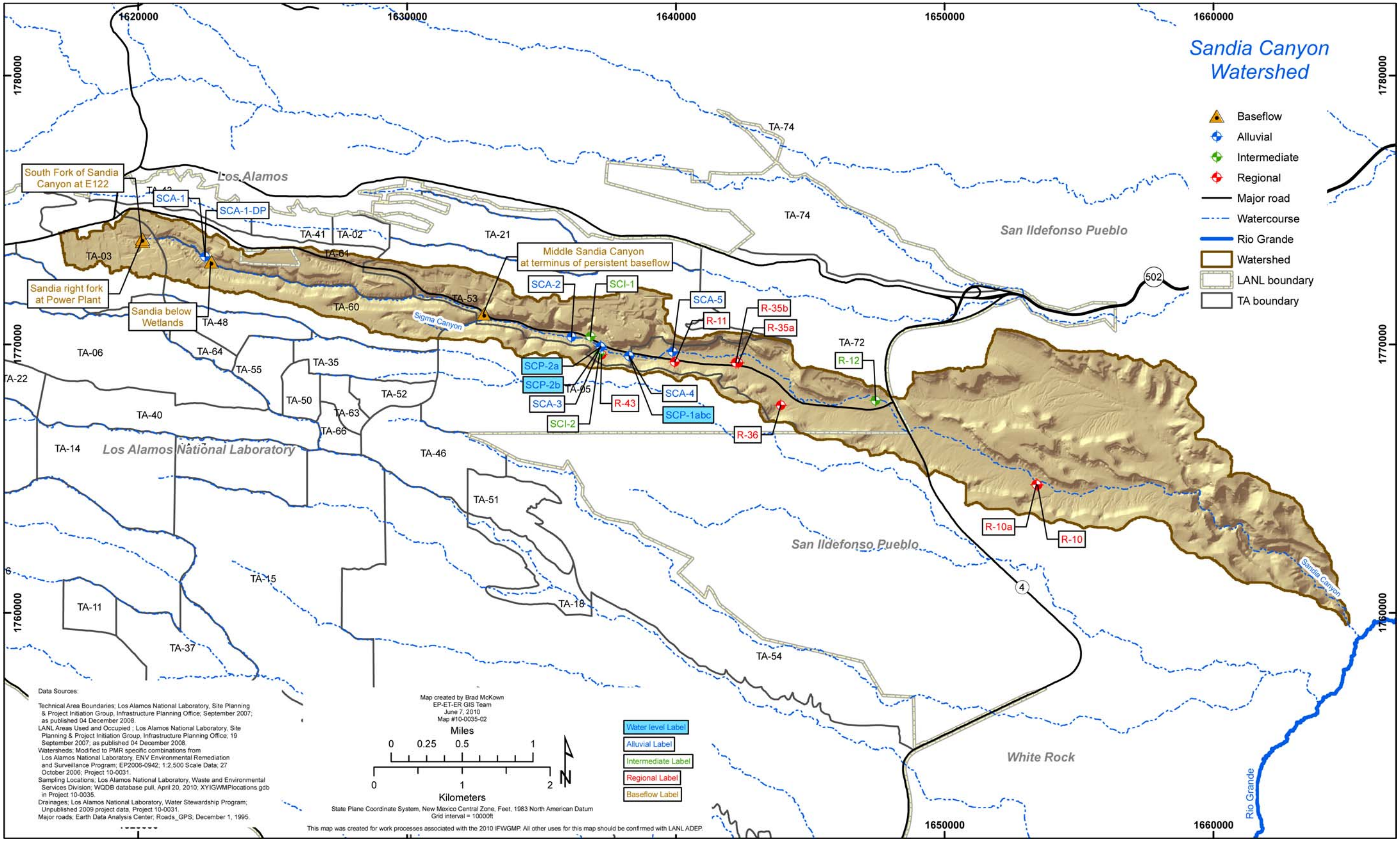

Figure 3.4-1 Sandia Canyon watershed

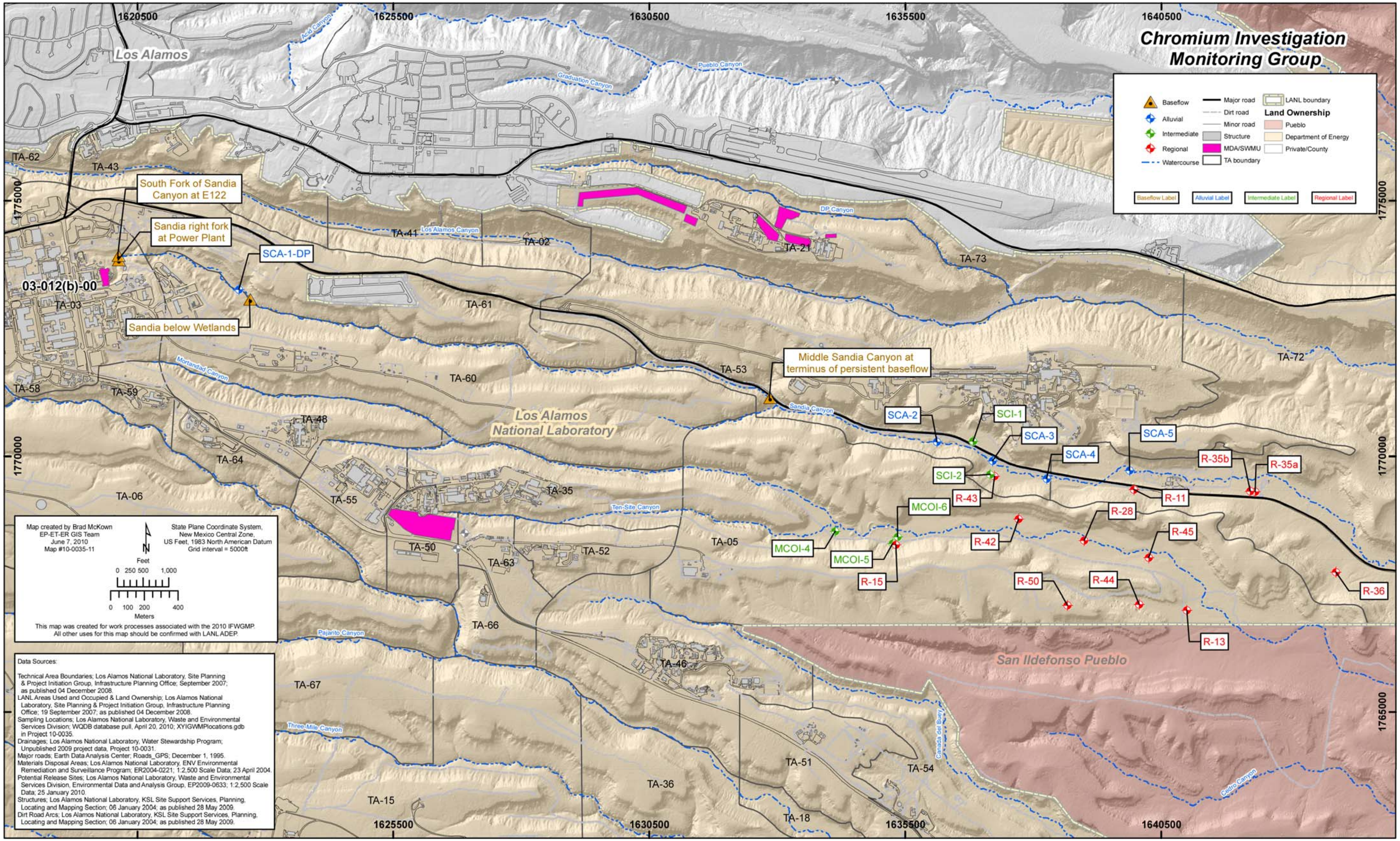

Figure 3.4-2 Chromium investigation monitoring group

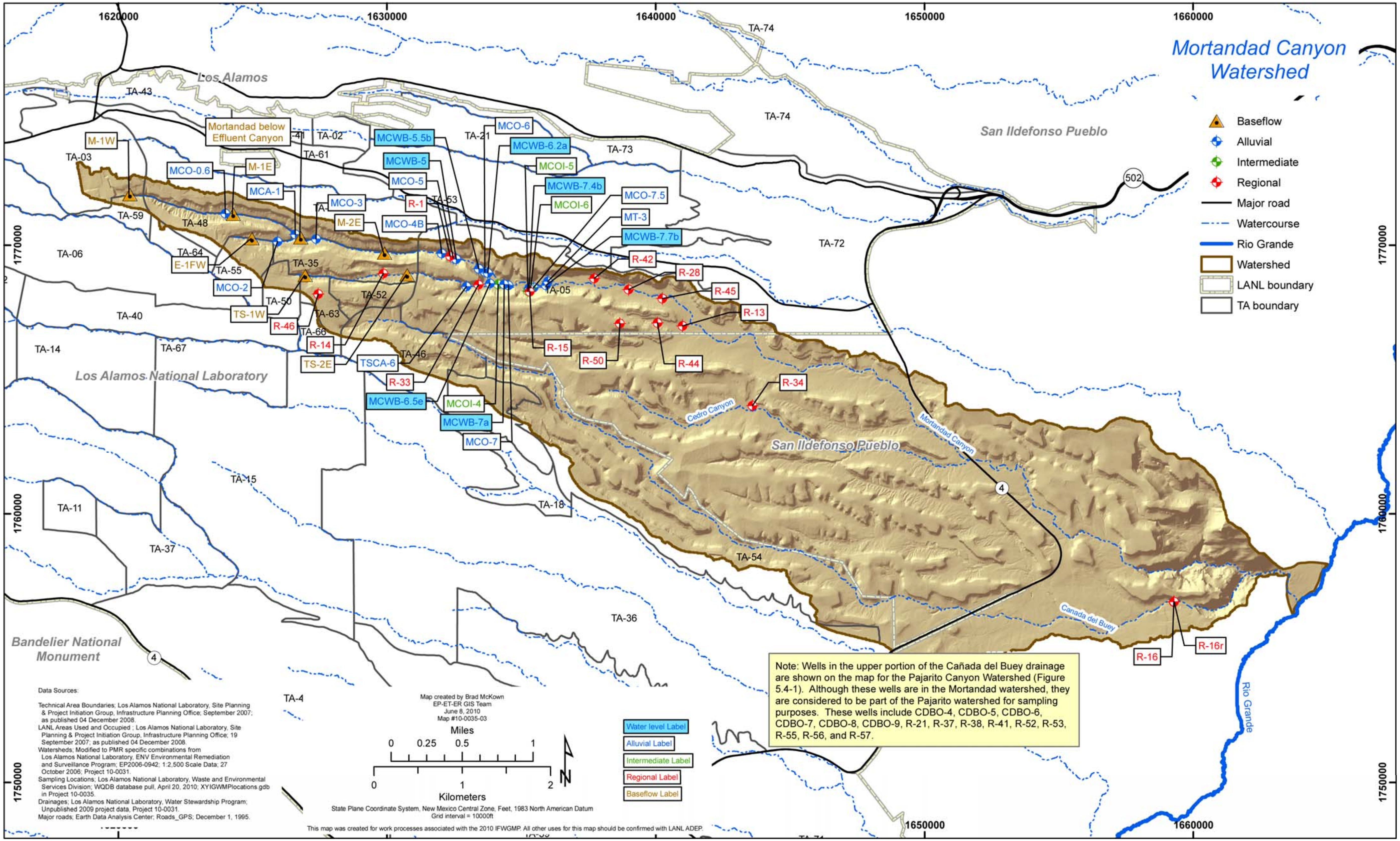

Figure 4.4-1 Mortandad Canyon watershed

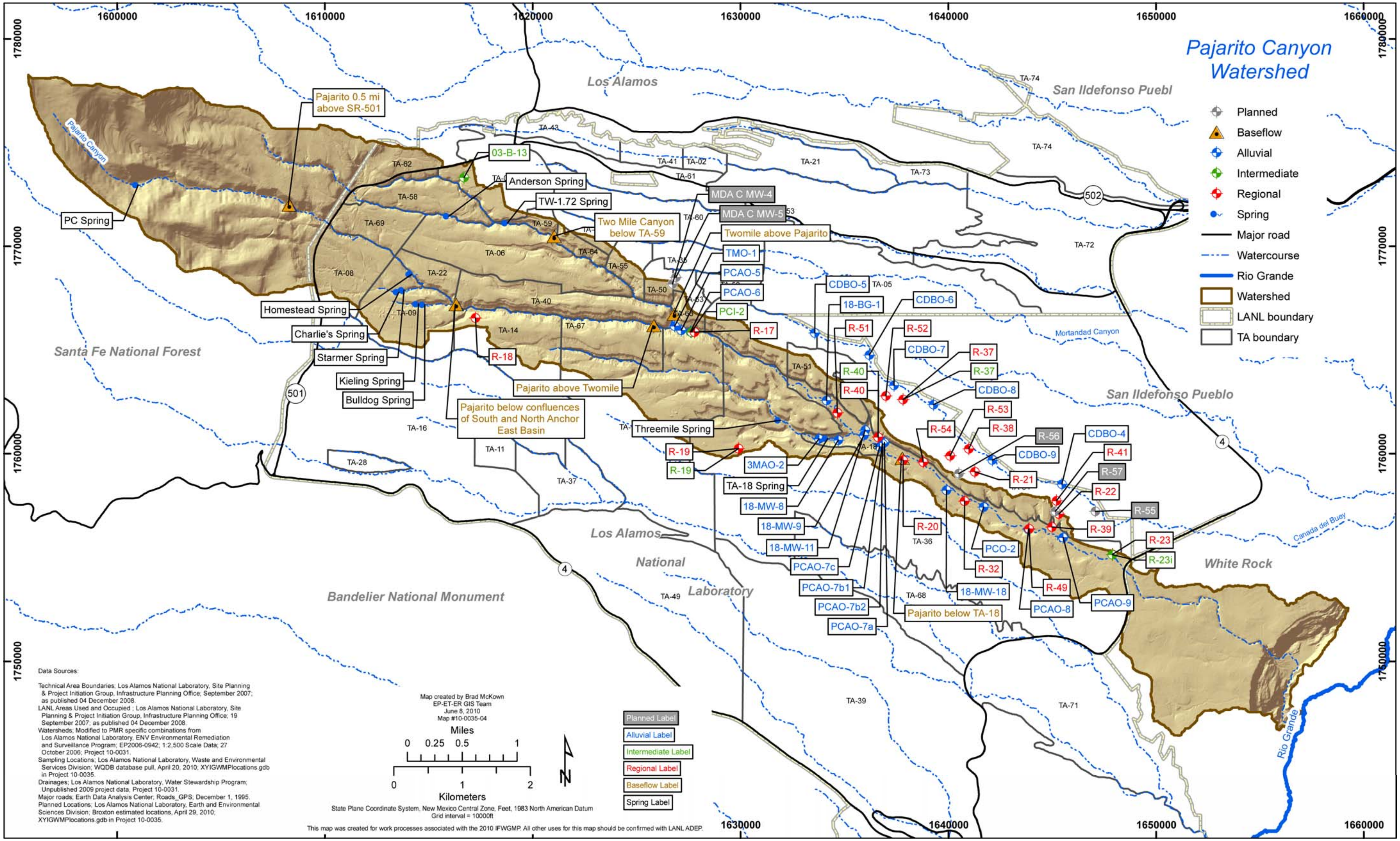

Figure 5.4-1 Pajarito Canyon watershed

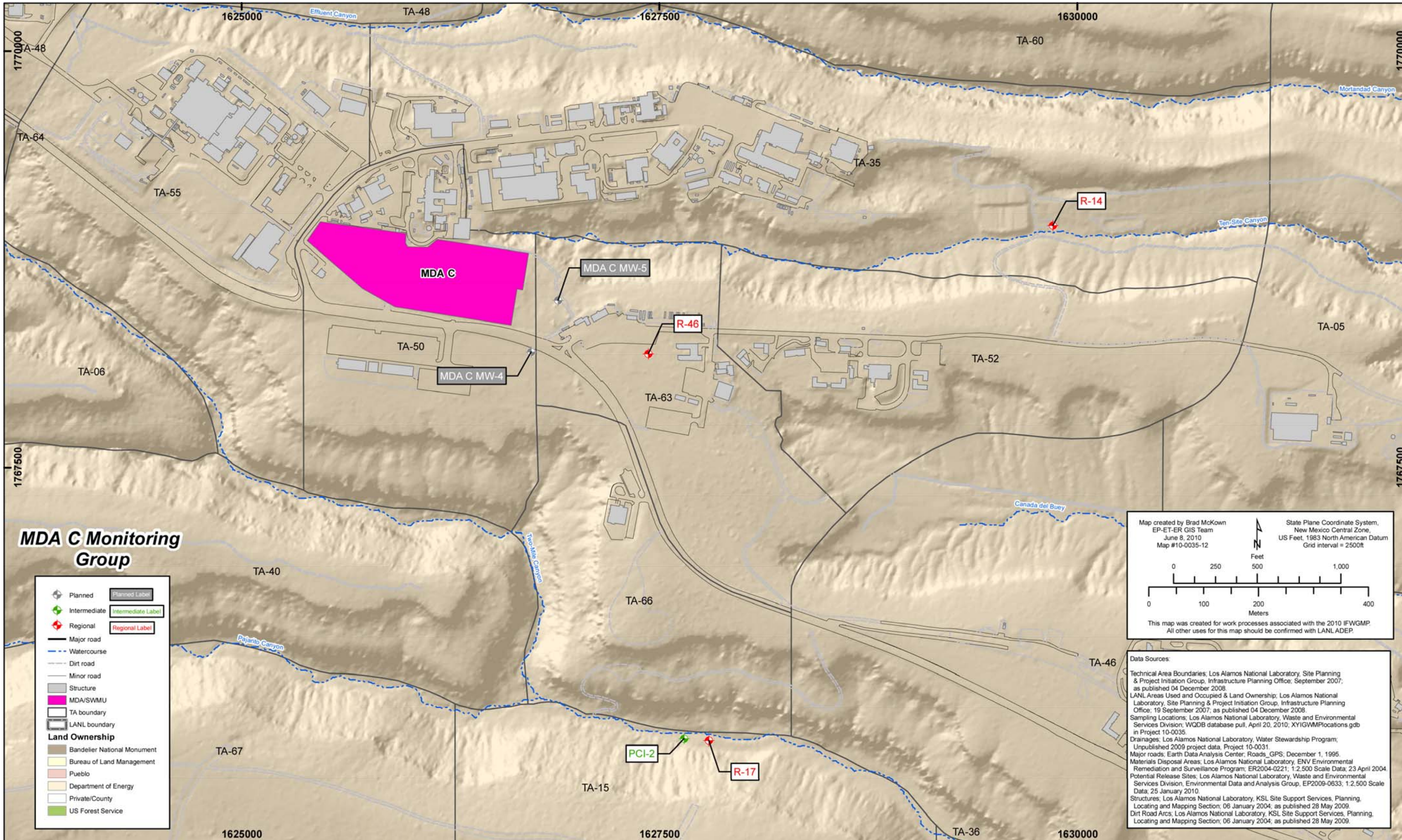

Figure 5.4-2 MDA C monitoring group

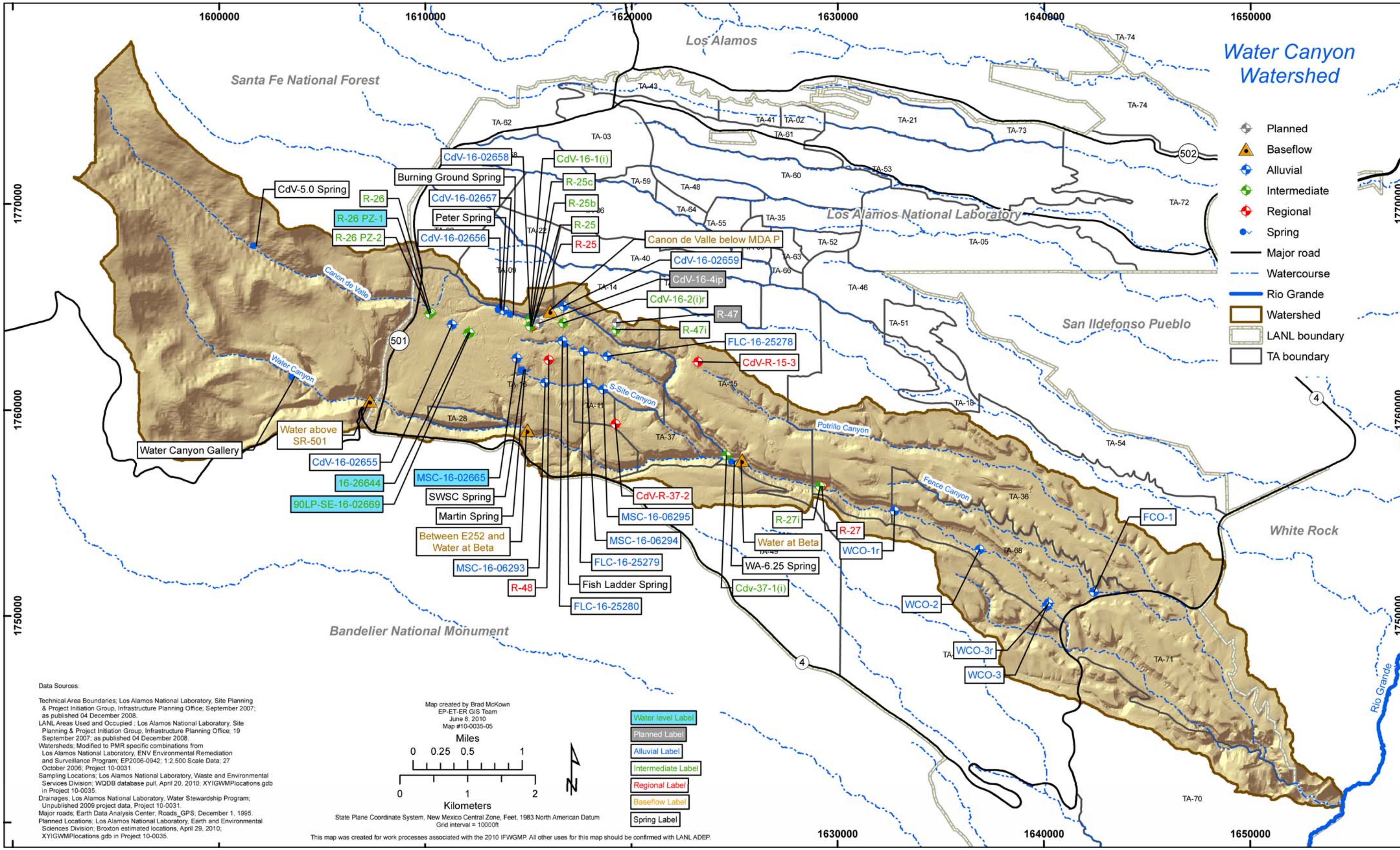

Figure 6.4-1 Water Canyon/Cañon de Valle watershed

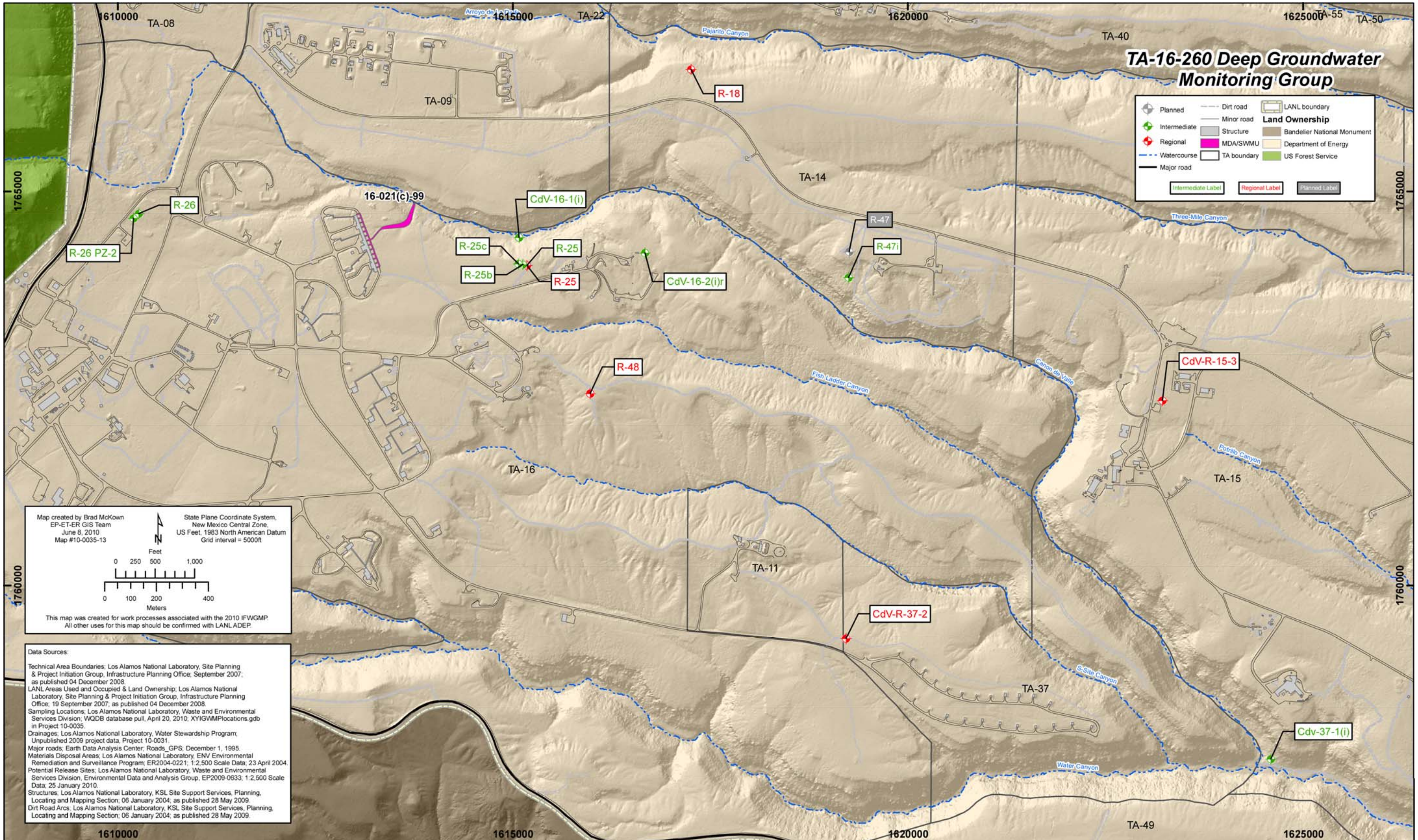

Figure 6.4-2 TA-16 260 Outfall deep-groundwater monitoring group

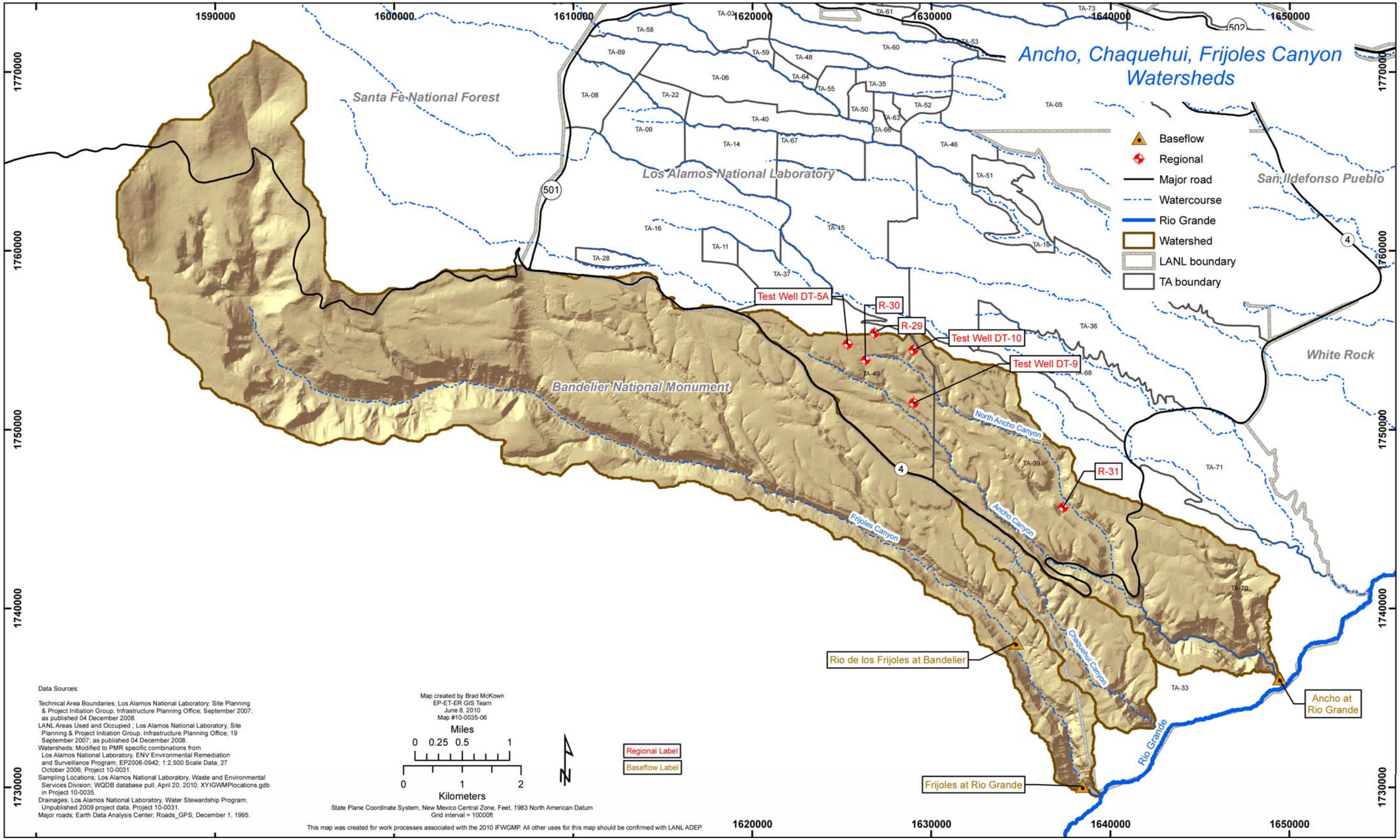

Figure 7.4-1 Frijoles, Ancho, and Chaquehui Canyons watersheds

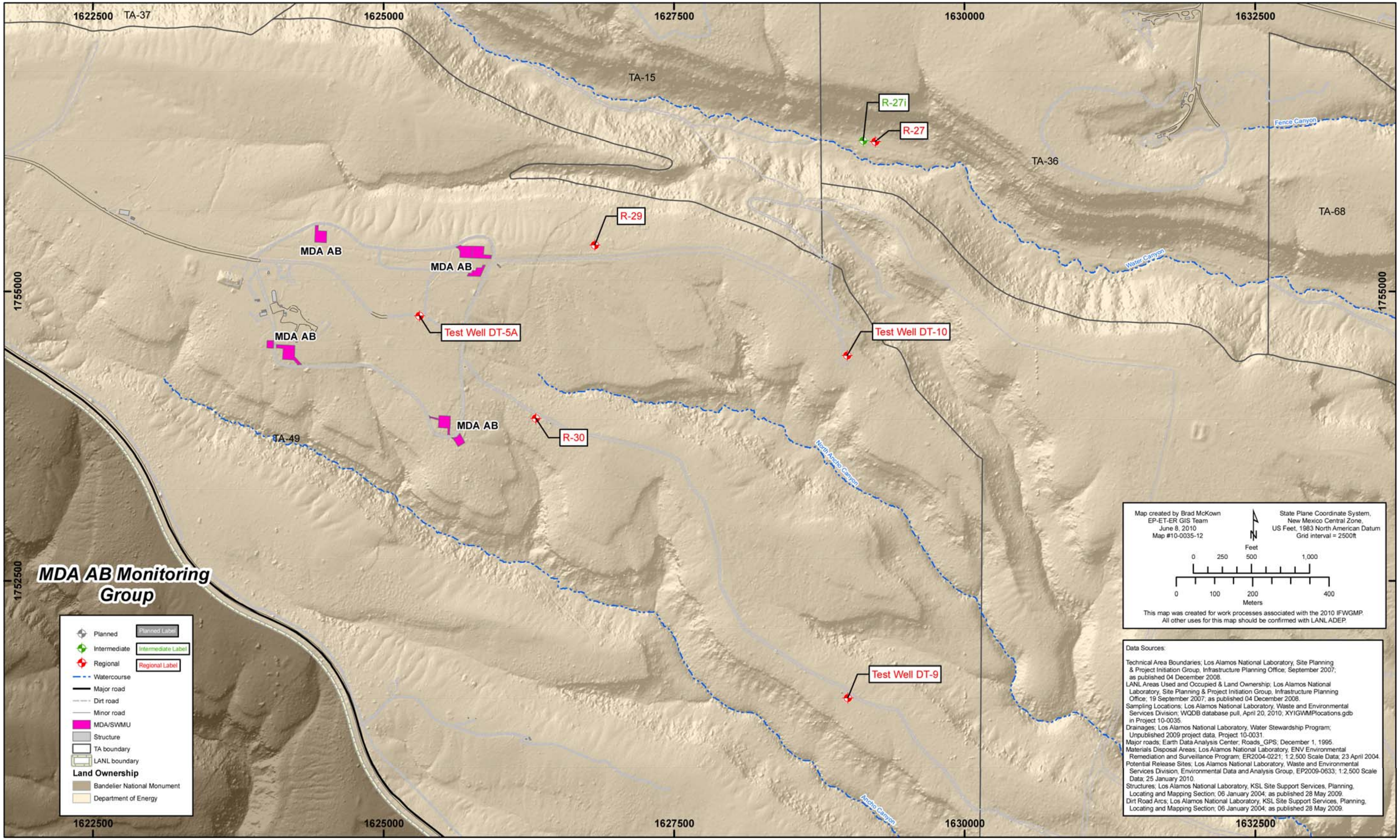

Figure 7.4-2 MDA AB monitoring group

Figure 8.4-1 White Rock Canyon

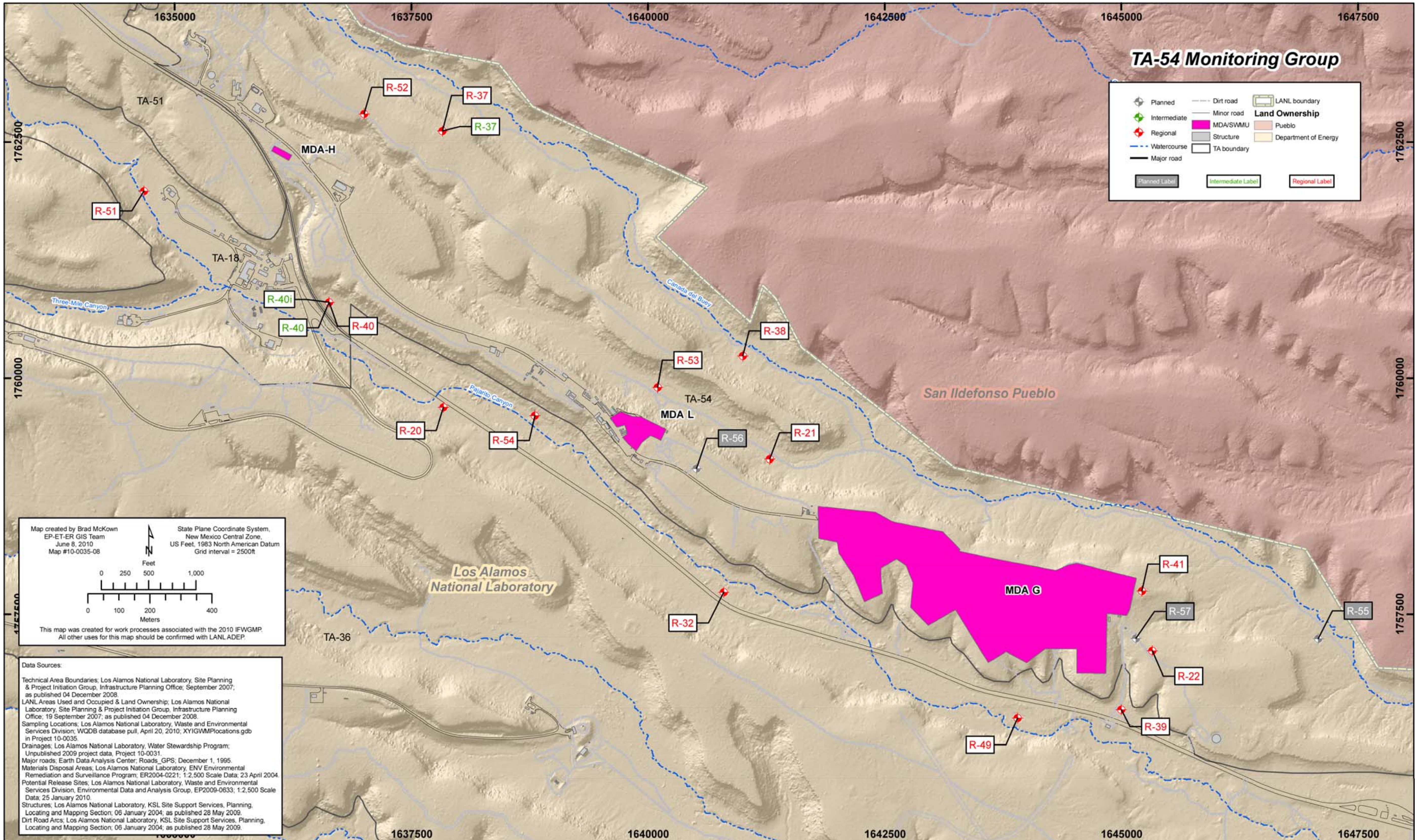

Figure 9.0-1 Monitoring well network for TA-54 MDAs H, L, and G

Table 1.6-1
Potentially Applicable Standards Used to Select Watershed Screening Levels

Type	Source	Description	Abbreviation[a]	Potential Applicability[b]					
				Perennial Surface Water		Ephemeral Surface Water		Groundwater (Includes Springs)	
				F	UF	F	UF	F	UF
State of New Mexico Water Quality Control Commission (WQCC)									
Standard	NMAC 20.6.4	Livestock Watering (Filtered)	LWF	X		X			
Standard	NMAC 20.6.4	Livestock Watering (Unfiltered)	LWU		X		X		
Standard	NMAC 20.6.4	Wildlife Habitat (Unfiltered)	WHU		X		X		
Standard	NMAC 20.6.4	Irrigation Standard (Filtered)	IrF	X		X			
Standard	NMAC 20.6.4	Aquatic Life Acute (Filtered)	AqAcF	X		X			
Standard	NMAC 20.6.4	Aquatic Life Acute (Unfiltered)	AqAcU		X		X		
Standard	NMAC 20.6.4	Total Ammonia Aquatic Life Acute (Unfiltered)	AqAcNH3U		X		X		
Standard	NMAC 20.6.4	Aquatic Life Chronic (Filtered)	AqChrF	X		X			
Standard	NMAC 20.6.4	Aquatic Life Chronic (Unfiltered)	AqChrU		X				
Standard	NMAC 20.6.4	Total Ammonia Aquatic Life Chronic (Unfiltered)	AqChrNH3U		X				
Standard	NMAC 20.6.4	Human Health Standard: Persistent (Filtered)	HHPF	X		X			
Standard	NMAC 20.6.4	Human Health Standard: Persistent (Unfiltered)	HHPU		X		X		
Standard	NMAC 20.6.4	Human Health Standard: Other than Persistent (Filtered)	HHF	X		X			
Standard	NMAC 20.6.4	Human Health Standard: Other than Persistent (Unfiltered)	HHU		X		X		
Standard	NMAC 20.6.2	Groundwater Human Health Standards, Other Standards for Domestic Water Supply and Standards for Irrigation Use (Filtered)	NMGSF					X	
Standard	NMAC 20.6.2	Groundwater Human Health Standards, Other Standards for Domestic Water Supply and Standards for Irrigation Use (Unfiltered)	NMGSU						X
Consent Order									
Screening Level	Consent Order	Screening Level for Perchlorate in Groundwater	NM GW CONS	X	X	X	X	X	X

Table 1.6-1 (continued)

Type	Source	Description	Abbreviation[a]	Potential Applicability[b]					
				Perennial Surface Water		Ephemeral Surface Water		Groundwater (Includes Springs)	
				F	UF	F	UF	F	UF
EPA									
Standard	40 CFR 141	EPA maximum contaminant levels	MCL					X	X
Risk—human	EPA Regional Screening Levels[c]	EPA Regional Screening Levels for Tapwater	EPA RSL	X	X	X	X	X	X
Risk—human	EPA NWQC[d]	Human Health for the Consumption of Organism Only	EPA HHOO	X		X			
Risk—ecological	EPA NWQC	Aquatic Life Acute (Filtered)	EPA AqAcF	X		X			
Risk—ecological	EPA NWQC	Aquatic Life Acute (Unfiltered)	EPA AqAcU		X		X		
Risk—ecological	EPA NWQC	Aquatic Life Chronic (Filtered)	EPA AqChrF	X	X	X	X		
Risk—ecological	EPA NWQC	Aquatic Life Chronic (Unfiltered)	EPA AqChrU	X	X	X	X		
DOE									
Risk—ecological	DOE Order 5400.5	DOE Biota Concentration Guides	DOE BCG	X	X	X	X		
Risk—human	DOE Order 5400.5	DOE 4-mrem Drinking Water Derived Concentration Guidelines	DOE DW DCG	X	X	X	X	X	X

[a] Abbreviations used in the screening tables are defined in Appendix B.

[b] The protocol for selecting the lowest applicable screening levels for groundwater and surface water is described in Appendix B. The description includes assumptions and rationale for hardness-dependent metals. Blank cells indicate the screening level is not applicable to the water type.

[c] EPA Regional screening levels (EPA 2009, 109613).

[d] EPA-recommended National Water Quality Criteria (NWQC) (EPA 2009, 109328).

Table 1.6-2
Analytical Suites and Frequencies for Locations Assigned to Area-Specific Monitoring Groups

	Metals[a]	Organics						Radionuclides			General Inorganics				
Surface-Water Body or Source Aquifer	TAL Metals	VOC +TICs[b]	SVOC +TICs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/ Furans	RAD[e]	Tritium[f]	Low-Level Tritium[f]	General Inorganics[g]	Perchlorate	Stable Isotopes[h]	Suspended Sediment Concentration	Field Data[i]
TA-21 Monitoring Group (Upper Los Alamos and Sandia Canyons)															
Intermediate (near-field locations)	A	S	S	—[j]	—	—	—	A	S	S	S	S	(A)	—	S
Intermediate (far-field locations and locations upgradient of TA-21)	A	A	A	—	—	—	—	A	—	S	S	S	(A)	—	S
Regional	A	A	—	—	—	—	—	A	—	A	A	A	(A)	—	A
Characterization of new deep groundwater wells[k]	Q	Q	S	S	S	S	S	Q	—	Q	Q	Q	S	—	Q
Chromium Investigation Monitoring Group (Sandia and Mortandad Canyons)															
Base flow (Sandia)	S	A	A	—	S[CNGR]	—	—	A	—	—	S	S	—	S	S
Alluvial (Sandia)	S	A	A	—	—	—	—	A	—	A	S	S	—	—	S
Intermediate (Sandia)	Q	A	A	—	—	—	—	A	—	S	Q	S	A	—	Q
Intermediate (Mortandad)	Q	A	S	—	—	—	—	A	—	S	Q	S	A	—	Q
Regional	Q	A	A	—	—	—	—	A	—	S	Q	S	A	—	Q
Characterization of new deep groundwater wells	Q	Q	S	S	S	S	S	Q	—	Q	Q	Q	S	—	Q
TA-54 Monitoring Group (Mortandad Canyon/Cañada del Buey and Pajarito Canyons)															
Intermediate	Q	Q	Q	A	A	A	A	A	—	Q	Q	Q	S	—	Q
Regional	Q	Q	Q	A	A	A	A	A	—	Q	Q	Q	S	—	Q
Characterization of new deep groundwater wells	Q	Q	Q	Q	Q	Q	Q	Q	—	Q	Q	Q	S	—	Q
MDA C Monitoring Group (Mortandad and Pajarito Canyons)															
Intermediate	S	Q	A	—	—	T	—	A	—	S	Q	A	(A)	—	Q
Regional	S	Q	A	—	—	T	—	A	—	S	Q	A	(A)	—	Q
Characterization for new deep groundwater wells	Q	Q	S	S	S	S	S	Q	—	Q	Q	Q	S	—	Q

Table 1.6-2 (continued)

Surface-Water Body or Source Aquifer	Metals[a]	Organics						Radionuclides			General Inorganics				Field Data[i]
	TAL Metals	VOC +TICs[b]	SVOC +TICs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/ Furans	RAD[e]	Tritium[f]	Low-Level Tritium[f]	General Inorganics[g]	Perchlorate	Stable Isotopes[h]	Suspended Sediment Concentration	
TA-16-260 Alluvial CMI Monitoring Group (Water Canyon/Cañon de Valle)															
Alluvial A: surge bed monitoring well	—	—	—	—	—	Q[RDX-DP]	—	—	—	—	—	—	—	—	Q
Alluvial B: pilot permeable reaction barrier (PRB) vessel ports	M/Q	—	—	—	—	M/Q[HRDX-DP]	—	—	—	—	M/Q	—	M/Q[l]	—	M/Q
Alluvial C: above and below pilot PRB	M/Q	—	—	—	—	M/Q[RDX-DP]	—	—	—	—	M/Q	—	—	—	M/Q
Alluvial D: PRB cutoff wall (water levels only)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Springs: carbon-filter systems	—	—	—	—	—	W/M/Q[RDX-DP]	—	—	—	—	W/M/Q	—	—	—	W/M/Q
TA-16-260 Deep Groundwater Monitoring Group (Water Canyon/Cañon de Valle and Pajarito Canyon)															
Intermediate	S	S	A	—	—	S[RDX-DP]	—	A	—	A	S	A	A	—	S
Regional	S	S	A	—	—	S[RDX-DP]	—	A	—	A	S	S	A	—	S
Characterization of new deep groundwater wells	Q	Q	S	S	S	S[RDX-DP]	S	Q	—	Q	Q	Q	S	—	Q
MDA-AB Monitoring Group (Ancho and Water Canyons)															
Regional	S	A	—	—	—	S	—	A	—	A	S	S	(A)	—	S
Characterization of new deep groundwater wells	Q	Q	Q	S	S	Q	S	Q	—	Q	Q	Q	S	—	Q

Table 1.6-2 (continued)

Notes: Sampling suites and frequencies: W = weekly (applies only to first month of sampling); M = monthly (applies only to first quarter of sampling); Q = quarterly (4 times/yr); S = semiannual (2 times/yr); A = annual (1 time/yr); T= triennial (1 time every 3 yr, with the next sample scheduled for collection in 2011). Some locations assigned to an area-specific monitoring group may be assigned analytical suites or frequencies that differ from those shown in this table for site-specific reasons summarized in Tables D-2.0-1 through D-8.0-1.

[a] Metals analysis includes the 23 target analyte list (TAL) metals, plus boron, molybdenum, silicon dioxide, strontium, tin, and uranium.

[b] VOC = Volatile organic compounds; SVOC = semivolatile organic compounds; TICs = tentatively identified compounds.

[c] PCB = Polychlorinated biphenyl (compound). The superscript CNGR indicates the analysis of PCB congeners using U.S. Environmental Protection Agency (EPA) Method 1668A.

[d] The analytical suite of explosive compounds (HEXP) includes the Consent Order list of the normal SW-846:8330 analytes plus pentaerythritol tetranitrate (PETN); triaminotrinitrobenzene (TATB); 3,5-dinitroaniline, tri(o-cresyl)phosphate (TOCP); 2,4-diamino-6-nitrotoluene; and 2,6-diamino-4-nitrotoluene. The superscript RDX-DP indicates the analysis of RDX-degradation products: hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine (MNX); hexahydro-1,3-nitro-1,3,5-triazine (DNX); and hexahydro-1,3,5-trinitroso-1,3,5-triazine (TNX).

[e] The radionuclide suite includes gross alpha, gross beta, alpha spectroscopy, gamma spectroscopy, and strontium-90.

[f] Tritium samples may be submitted for analysis by liquid scintillation if anticipated activities are greater than 300 pCi/L. Low-level tritium is analyzed using electrolytic enrichment or direct counting.

[g] General inorganic analysis includes major anions (bromide, chloride, fluoride, sulfate); major cations (calcium, magnesium, sodium, potassium); nitrate plus nitrite (as N); total Kjeldahl nitrogen (TKN); ammonia; total phosphorus; total organic carbon (TOC); total dissolved solids (TDS); alkalinity; specific conductivity; pH; and hardness.

[h] Analysis for stable nitrogen, deuterium, and oxygen isotopes. The collection of samples for stable isotopic analysis is considered a special sampling campaign that is outside the scope of the regulatory process. In general, samples for isotopic analysis are collected semiannually from "new" wells (those which completed construction, rehabilitation, or conversion on or after July 1, 2009) and annually from other locations. For intermediate and regional wells, "(A)" signifies samples will be collected annually until four sets of stable nitrogen isotope data have been collected. Any subsequent sampling for stable isotope analysis will be decided on the basis of site-specific conditions.

[i] Field parameters include pH, turbidity, specific conductance, dissolved oxygen, and temperature at all locations. Oxidation-reduction potential (ORP) will be measured if a flow-through cell is used and will not be measured in surface water, spring water, or water collected from Westbay sampling systems unless specified. Alkalinity (ALK) will be measured for all samples either in the field or at the on-site EES-14 laboratory.

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

[k] Characterization suites and frequencies apply to new intermediate perched or regional groundwater wells assigned to this monitoring group. "New" wells are defined as those completed, rehabilitated, or converted after July 1, 2009. After completion of four rounds of characterization sampling, a new well is reassigned automatically to the routine analytical suites and frequencies of the appropriate area-specific monitoring group. Any planned exceptions to this general protocol are documented in Tables D-2.0-1 through D-8.0-1.

[l] PRB vessel ports will be sampled for stable isotopes of carbon and nitrogen (LANL 2010, 109252, Table 5.1-3).

Table 1.6-3
Analytical Suites and Frequencies for General Surveillance Monitoring (Grouped by Watershed)

Surface-Water Body or Source Aquifer	Metals[a]	Organics						Radionuclides			General Inorganics				Field Data[i]
	TAL Metals	VOC +TICs[b]	SVOC +TICs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/ Furans	RAD[e]	Tritium[f]	Low-Level Tritium[f]	General Inorganics[g]	Perchlorate	Stable Isotopes[h]	Suspended Sediment Concentration	
Los Alamos/Pueblo Canyon (Table 2.4-1)															
Upper Los Alamos Canyon															
Base flow	A	A	A	—[j]	A[CNGR]	—	—	A	—	—	A	A	—	A	A
Springs	A	A	A	—	A	—	—	A	—	A	A	A	(A)	A	A
Alluvial	A	A	A	—	—	—	—	A	—	A	A	A	—	—	A
Intermediate (n/a[k])	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Regional (n/a)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Pueblo Canyon															
Base flow	A	A	A	—	A[CNGR]	—	—	A	—	—	A	A	—	A	A
Alluvial	A	A	A	—	—	—	—	A	—	A	A	A	—	—	A
Intermediate	A	A	—	—	—	—	—	A	—	A	A	A	(A)	—	A
Regional	A	A	—	—	—	—	—	A	—	A	A	A	(A)	—	A
Lower Los Alamos Canyon															
Base flow	S	A	A	—	—	—	—	A	—	A	S	S	—	S	S
Springs	A	A	T	—	—	—	—	A	—	A	A	A	(A)	A	A
Alluvial	A	A	T	—	—	—	—	A	—	A	A	A	—	—	A
Sandia Canyon (Table 3.4-1)															
Base flow (n/a)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Alluvial (n/a)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Intermediate (n/a)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Regional	Q	A	A	—	—	—	—	A	—	S	Q	S	(A)	—	Q

Table 1.6-3 (continued)

Surface-Water Body or Source Aquifer	Metals[a]	Organics						Radionuclides			General Inorganics				Field Data[i]
	TAL Metals	VOC +TICs[b]	SVOC +TICs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/ Furans	RAD[e]	Tritium[f]	Low-Level Tritium[f]	General Inorganics[g]	Perchlorate	Stable Isotopes[h]	Suspended Sediment Concentration	
Mortandad Canyon (Table 4.4-1)															
Base flow	A	A	A	—	—	—	A	A	—	—	A	A	—	A	A
Alluvial (excluding Cañada del Buey)	A	A	A	—	—	—	—	A	A	—	A	A	—	—	A
Intermediate (n/a)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Regional	Q	A	A	—	—	—	—	A	—	S	Q	S	(A)	—	Q
Pajarito Canyon (Table 5.4-1)															
Base flow	A	A	A	—	—	A	—	A	—	—	A	A	—	A	A
Springs	A	A	A	—	—	A	—	A	—	A	A	A	(A)	A	A
Alluvial (including Cañada del Buey)	A	A	A	—	—	A	—	A	—	A	A	A	—	—	A
Intermediate	S	S	—	—	—	S	—	A	—	S	S	S	(A)	—	S
Regional	S	S	—	—	—	S	—	A	—	A	S	S	(A)	—	S
Water Canyon/Cañon de Valle (Table 6.4-1)															
Base flow	S	S	A	—	—	S[RDX-DP]	—	A	—	—	A	A	—	S	S
Springs	S	S	A	—	—	S[RDX-DP]	—	A	—	A	A	A	A	S	S
Alluvial	S	S	A	—	—	S[RDX-DP]	—	A	—	A	A	A	—	—	S
Intermediate (n/a)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Regional (n/a)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ancho/Frijoles Canyon (Table 7.4-1)															
Regional (Ancho)	A	A	—	—	—	A	—	A	—	A	A	A	(A)	—	A
Base flow (Frijoles)	A	—	—	—	—	—	—	A	—	—	A	A	—	A	A

Table 1.6-3 (continued)

Surface-Water Body or Source Aquifer	Metals[a]	Organics						Radionuclides			General Inorganics				Field Data[i]
	TAL Metals	VOC +TICs[b]	SVOC +TICs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/ Furans	RAD[e]	Tritium[f]	Low-Level Tritium[f]	General Inorganics[g]	Perchlorate	Stable Isotopes[h]	Suspended Sediment Concentration	
White Rock Canyon/Rio Grande (Table 8.4-1)															
Base flow	A	A	—	—	—	—	—	A	—	—	A	A	—	A	A
Spring Subgroup A (upgradient of Area G, TA-54)	A	A	T	—	—	T	—	A	—	A	A	A	(A)	A	A
Spring Subgroup B (downgradient of Area G, TA-54)	A	A	A	—	—	—	—	A	—	A	A	A	(A)	A	A
Spring Subgroup C (downgradient of Pajarito Canyon)	A	A	A	—	—	T	—	A	—	A	A	A	(A)	A	A
Characterization (All Watersheds)															
Characterization of new deep groundwater wells[l]	Q	Q	S	S	S	S	S	Q	—	Q	Q	Q	S	—	Q

Table 1.6-3 (continued)

Notes: Sampling suites and frequencies: Q = quarterly (4 times/yr); S = semiannual (2 times/yr); A = annual (1 time/yr); T= triennial (1 time every 3 years, with the next sample scheduled for collection in 2011); — = this analytical suite is not scheduled to be collected for this type of water at locations assigned to general surveillance monitoring. Some locations assigned to general surveillance may be assigned analytical suites or frequencies that differ from those shown in this table, for site-specific reasons described in the text (sections 2.0 through 8.0) for the major watersheds, and as summarized in Tables D-2.0-1 through D-8.0-1.

[a] Metals analysis includes the 23 target analyte list (TAL) metals, plus boron, molybdenum, silica, strontium, tin, and uranium.

[b] VOC = Volatile organic compounds; SVOC = semivolatile organic compounds; TICs = tentatively identified compounds.

[c] PCB = Polychlorinated biphenyl [compound]. The superscript CNGR indicates the analysis of PCB congeners using U.S. Environmental Protection Agency (EPA) Method 1668A.

[d] The analytical suite of explosive compounds (HEXP) includes the Consent Order list of the normal SW-846:8330 analytes plus pentaerythritol tetranitrate (PETN); triaminotrinitrobenzene (TATB); 3,5-dinitroaniline; tri(o-cresyl)phosphate (TOCP); 2,4-diamino-6-nitrotoluene; and 2,6-diamino-4-nitrotoluene. The superscript RDX-DP indicates the analysis of RDX-degradation products: hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine (MNX); hexahydro-1,3-nitro-1,3,5-triazine (DNX); and hexahydro-1,3,5-trinitroso-1,3,5-triazine (TNX).

[e] The radionuclide suite includes gross alpha, gross beta, alpha spectroscopy, gamma spectroscopy, and strontium-90.

[f] Tritium samples may be submitted for analysis by liquid scintillation if anticipated activities are greater than 300 pCi/L. Low-level tritium is analyzed using electrolytic enrichment or direct counting.

[g] General inorganic analysis includes major anions (bromide, chloride, fluoride, sulfate); major cations (calcium, magnesium, sodium, potassium); nitrate plus nitrite (as N); total Kjeldahl nitrogen (TKN); ammonia; phosphate; total organic carbon (TOC); total dissolved solids (TDS); alkalinity; specific conductivity; pH; and hardness.

[h] Analysis for stable nitrogen, deuterium, and oxygen isotopes. The collection of samples for stable isotopic analysis is considered a special sampling campaign that is outside the scope of the regulatory process. In general, samples for isotopic analysis are collected semiannually from “new” wells (those which completed construction, rehabilitation, or conversion on or after July 1, 2009) and annually from other locations. For intermediate and regional wells, “(A)” signifies samples will be collected annually until four sets of stable nitrogen isotope data have been collected. Any subsequent sampling for stable isotope analysis will be decided on the basis of site-specific conditions.

[i] Field parameters include pH, turbidity, specific conductance, dissolved oxygen, and temperature at all locations. Oxidation-reduction potential (ORP) will be measured if a flow-through cell is used and will not be measured in surface water, spring water, or water collected from Westbay sampling systems unless specified. Alkalinity (ALK) will be measured for all samples either in the field or at the on-site EES-14 laboratory.

[j] — = This analytical suite is not scheduled to be collected for this type of water for general surveillance monitoring in this watershed.

[k] n/a = Not applicable because all locations in this category are currently assigned to an area-specific monitoring group (Table 1.6-2).

[l] Applies to new intermediate perched or regional groundwater wells not assigned to an area-specific monitoring group (Table 1.6-2). “New” wells are defined as those completed, rehabilitated, or converted after July 1, 2009. After completion of four rounds of sampling, a new well is reassigned automatically to the routine analytical suites and frequencies of the appropriate watershed-specific general surveillance group. Any planned exceptions to this general protocol are documented in Tables D-2.0-1 through D-8.0-1.

Table 1.11-1
Frequencies for Locations Assigned to Water-Level Monitoring Only

Assigned Watershed or Monitoring Group	Location	Rationale for Selection of Location	Source Aquifer	Water Level[a]
Los Alamos/Pueblo Canyons Watershed				
General Surveillance	R-5 screen 1	Well located downgradient of upper Pueblo and Acid Canyons. Screen has been dry since well installation (2001) although water was observed in the sump below the screen (Koch and Schmeer 2010, 108926). Water level checked annually during sampling of R-5.	Intermediate	A[HD]
TA-21 Monitoring Group	R-7 screen 1	Well located in middle Los Alamos Canyon. Screen 1 went dry during sampling in December 2003 (Koch and Schmeer 2010, 108926). The zone produced water during drilling, and the screen produced small amounts of water for a short period following installation. Water was detected in the sump below the screen since 2005. Maintain automated monitoring of water levels to see if either zone recovers.	Intermediate	C[HD]
	R-7 screen 2	Well located in middle Los Alamos Canyon. Screen 2 has been dry since well installation in 2001 although water has been observed in the sump since mid 2008 (Koch and Schmeer 2010, 108926). Maintain automated monitoring of water levels to see if either zone recovers.	Intermediate	C[HD]
Sandia Canyon Watershed				
Chromium Investigation Monitoring Group	SCA-1	Well located in wetland in upper Sandia Canyon. Recent sampling events have moved to nearby drive point well SCA-1-DP because of silting in of the screen in SCA-1. Continuous water levels are monitored in SCA-1, and manual measurements are taken at SCA-1 in conjunction with monitoring at SCA-1-DP (Koch and Schmeer 2010, 108926).	Alluvial	C
General Surveillance	SCP-1abc SCP-2a SCP-2b	Piezometers located in middle Sandia Canyon. SCA-1abc is a triple-nested piezometer approximately 5 ft west of SCA-4; SCP-2a and SCP-2b are 10 ft and 5 ft east of SCA-3, respectively (Koch and Schmeer 2010, 108926).	Alluvial	C

Table 1.11-1 (continued)

Assigned Watershed or Monitoring Group	Location	Rationale for Selection of Location	Source Aquifer	Water Level[a]
Mortandad Canyon Watershed				
General Surveillance	MCWB-5 MCWB-5.5b MCWB-6.2a MCWB-6.5e MCWB-7a MCWB-7.4b MCWB-7.7b	The group of "MCWB" wells monitor alluvial saturation in a portion of middle Mortandad Canyon where infiltration to deeper strata occurs. Water-level data from these wells support a long period of record (1995 to present) that may be beneficial for documenting long-term changes associated with variations in effluent volume and release regime from the RLWTF in Effluent Canyon.	Alluvial	C
General Surveillance	MT-4	Well located in Middle Mortandad Canyon, downcanyon of sediment traps and about 525 ft mi east of MT-3.	Alluvial	C
	MCOI-8	Well located in lower Mortandad Canyon above confluence with Ten Site Canyon. Water has been measured in sump of well since well completion in January 2005 (Koch and Schmeer 2010, 108926).	Intermediate	C[HD]
Pajarito Canyon Watershed				
General Surveillance	PCAO-7b1	Well located in lower Pajarito Canyon, in TA-18, on the north side of Pajarito Rd directly across from the TA-18 entrance. Approximately 10 ft from PCAO-7b2. Well was bailed dry during drilling (May 2008), and water has not been seen above the sump since (Koch and Schmeer 2010, 108926).	Alluvial	C[HD]
	PCO-3	Well located in lower Pajarito Canyon, approximately 1 mi east of R-32, in wetlands on south side of Pajarito Road. Water level was below the bottom of the screen from July 2, 2007, to September 3, 2007, and since July 2008 (Koch and Schmeer 2010, 108926).	Alluvial	C
	R-19 Screen 1	Well located on a mesa south of Threemile Canyon. Screen 1 has been dry since installation of the Westbay sampling system in September 2000 (Koch and Schmeer 2010, 108926). Water level checked during sampling.	Intermediate	Q[HD]

Table 1.11-1 (continued)

Assigned Watershed or Monitoring Group	Location	Rationale for Selection of Location	Source Aquifer	Water Level[a]
Water Canyon/Cañon de Valle Watershed				
TA-16-260 Alluvial CMI Monitoring Group	CDV-16-611919 (MW-2) CDV-16-611922 (MW-3) CDV-16-611920 (MW-4) CDV-16-611921 (MW-5) CDV-16-611923 (MW-12)	Two-inch polyvinyl chloride (PVC) alluvial wells above the PRB cutoff wall. Identifiers shown in parentheses are the temporary IDs assigned to these locations in the CMI monitoring plan (LANL 2010, 109252). Wells CDV-16-611921 (MW-5) and CDV-16-611923 (MW-12) will be instrumented with transducers for continuous monitoring.	Alluvial	W/M/Q
	CDV-16-611924 (PZ-13) CDV-16-611925 (PZ-14) CDV-16-611926 (PZ-15) CDV-16-611927 (PZ-16)	Two-inch PVC piezometers above the PRB cutoff wall. Identifiers shown in parentheses are the temporary IDs assigned to these locations in the CMI monitoring plan (LANL 2010, 109252).	Alluvial	W/M/Q
	CDV-16-611938 (MW-1) CDV-16-611928 (MW-6) CDV-16-611929 (MW-7) CDV-16-611930 (MW-8) CDV-16-611931 (MW-9) CDV-16-611932 (MW-10) CDV-16-611935 (MW-11) CDV-16-611933 (MW-17) CDV-16-611934 (MW-18)	Two-inch PVC alluvial wells below the PRB cutoff wall. Identifiers shown in parentheses are the temporary IDs assigned to these locations in the CMI monitoring plan (LANL 2010, 109252). Wells CDV-16-611938 (MW-1), CDV-16-611929 (MW-7), CDV-16-611930 (MW-8), and CDV-16-611931 (MW-9) will be instrumented with transducers for continuous monitoring.	Alluvial	W/M/Q
General Surveillance	90LP-SE-16-02669	Located at TA-16 southeast and downgradient of the 90LP Pond. An annual manual measurement is taken during each spring to enhance conceptual model of potential changes associated with snowmelt runoff.	Intermediate	A[HD]
	16-26644	Located at TA-16 southeast and downgradient of the 90LP Pond. Installed with a transducer to collect data of potential relation of recharge associated with precipitation and snowmelt runoff.	Intermediate	C
	MSC-16-02665	Located at TA-16 at the head of Martin Spring Canyon (S-Site Canyon). Well is usually dry, but water has been observed in well after heavy precipitation and snowmelt (Koch and Schmeer 2010, 108926). Monitor water levels manually annually to enhance conceptual model of the relation to recharge associated with spring runoff.	Intermediate	A[HD]

Table 1.11-1 (continued)

Assigned Watershed or Monitoring Group	Location	Rationale for Selection of Location	Source Aquifer	Water Level[a]
TA-16-260 Deep Groundwater Monitoring Group	CdV-R-15-3 screen 1 CdV-R-15-3 screen 2 CdV-R-15-3 screen 3	The three intermediate screens in this well have been dry since well installation in 2000 (Koch and Schmeer 2010, 108926). Water appeared in the screen 3 sump in October 2006; sump water still present in October 2009. Check for water during groundwater sampling events.	Intermediate	S^{HD}
	CdV-R-37-2 screen 1	The intermediate screen in this well has been dry since well installation in 2000 (Koch and Schmeer 2010, 108926). Check for water during groundwater sampling events.	Intermediate	S^{HD}
	R-25 screen 3	Screen 3 was damaged during installation and is not reliable for water-level monitoring. Sump water at screen 3 responded to drilling and installation of adjacent well R-25c (replacement for R-25 screen 3) in August 2008 (Koch and Schmeer 2010, 108926).	Intermediate	C
	R-26 PZ-1	Piezometer installed near R-26. This screen has historically been dry. Maintain annual manual measurements to evaluate whether zone wets due to infiltration associated with snowmelt runoff.	Intermediate	A^{HD}
	R-26 screen 2	Well located at western Laboratory boundary near Cañon de Valle. Screen 2 is in a tight zone and/or improperly completed zone. Sampling port is plugged with bentonite. Water levels appear valid but the data are being reviewed (Koch and Schmeer 2010, 108926).	Regional	C
Ancho Canyon Watershed				
General Surveillance	R-31 Screen 1	Zone initially showed water during drilling, but has been dry since installation of the Westbay system in 2000. Water level checked during quarterly sampling event.	Intermediate	Q^{HD}
Water-Level Data from Water-Supply Wells (Koch and Schmeer 2010, 108926)				
Cooperative agreement	G-1A, G-2A, G-3A, G-5A	Water-supply wells located in Guaje Canyon	Regional	C
	G-4A	Water-supply well located in lower Rendija Canyon near its confluence with Guaje Canyon	Regional	C
	G-3	Former water-supply well located in Guaje Canyon; converted to monitoring well in 1998.	Regional	C
	O-1	Water-supply well located in lower Pueblo Canyon	Regional	C
	O-4	Water-supply well located in Los Alamos Canyon above confluence with DP Canyon	Regional	C
	PM-1 and PM-3	Water-supply wells located in Sandia Canyon	Regional	C
	PM-2	Water-supply well located in Pajarito Canyon	Regional	C
	PM-4	Water-supply well located on Mesita del Buey south of Mortandad Canyon	Regional	C
	PM-5	Water-supply well located on a mesa south of Ten Site and Mortandad Canyons	Regional	C

Notes: Sampling frequency: W = weekly (applies only to first month of measurements for locations assigned to the TA-16-260 Alluvial CMI Monitoring Group); M = monthly (applies only to first quarter of sampling for locations assigned to the TA-16-260 Alluvial CMI Monitoring Group); C = continuous; Q = quarterly (4 times/yr at set time periods); A = annual (1 time/yr). The superscript HD indicates this sampling location is historically dry. Continuous monitoring for groundwater refers to the measurement 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 min daily throughout the year).

Table 2.4-1
Los Alamos/Pueblo Watershed Interim Monitoring Plan

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
TA-21 Monitoring Group (Upper Los Alamos Canyon)																			
LADP-3	Monitors downgradient location for potential contaminants from upper Los Alamos and DP Canyons and TA-21.	Intermediate	C	A	S	S	—[m]	—	—	—	A	—	S	S	—	S	A	—	S
LAOI(a)-1.1	Monitors for potential contaminants from upper Los Alamos and DP Canyons and TA-21.	Intermediate	C	A	A	A	—	—	—	—	A	—	S	S	—	S	—	—	S
LAOI-3.2	Monitors for potential contaminants from upper Los Alamos and DP Canyons and TA-21.	Intermediate	C	A	S	S	—	—	—	—	A	S	—	S	—	S	—	—	S
LAOI-3.2a	Monitors for potential contaminants from upper Los Alamos and DP Canyons and TA-21.	Intermediate	C	A	S	S	—	—	—	—	A	S	—	S	—	S	—	—	S
LAOI-7	Monitors downgradient location for potential contaminants from upper Los Alamos and DP Canyons and TA-21.	Intermediate	C	A	A	A	—	—	—	—	A	S	—	S	—	S	—	—	S
R-6i	Monitors for potential contaminants from upper Los Alamos and DP Canyons and TA-21.	Intermediate	C	A	S	S	—	—	—	—	A	S	—	S	—	S	—	—	S
R-9i screen 1	Monitors downgradient location for potential contaminants from upper Los Alamos and DP Canyons and TA-21 and possible southward perched-zone migration from Pueblo Canyon.	Intermediate	C	A	A	A	—	—	—	—	A	—	S	S	—	S	A	—	S
R-9i screen 2	Monitors downgradient location for potential contaminants from upper Los Alamos and DP Canyons and TA-21 and possible southward perched-zone migration from Pueblo Canyon.	Intermediate	C	A	A	A	—	—	—	—	A	—	S	S	—	S	A	—	S

Table 2.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
TA-53i	Monitors for potential southward migration of contaminants from sources in Los Alamos Canyon. Recently completed well located south of Los Alamos Canyon within TA-53. Well lies on the mesa between Sandia and Los Alamos Canyons. Completed March 10, 2009.	Intermediate	C	A	S	S	—	—	—	—	A	—	S	S	—	S	A	—	S
R-6	Monitors for potential contaminants from upper Los Alamos Canyon, DP Canyon, and TA-21.	Regional	C	A	A	—	—	—	—	—	A	—	A	A	—	A	—	—	A
R-7 screen 3	Monitors for key potential mobile contaminants from upgradient sources in upper Los Alamos Canyon, DP Canyon, and TA-21. Shows impacts from drilling fluids. Sample for indicator suite augmented by selected suites.	Regional	C	—	A	—	—	—	—	—	—	—	A	—	A +NH_3	A	—	—	A
R-8 screen 1	Monitors downgradient location for potential contaminants from upper Los Alamos and DP Canyons and TA-21.	Regional	C	A	A	—	—	—	—	—	A	—	A	A	—	A	A	—	A
R-8 screen 2	Monitors downgradient location for potential contaminants from upper Los Alamos and DP Canyons and TA-21.	Regional	C	A	A	—	—	—	—	—	A	—	A	A	—	A	A	—	A
R-9	Monitors downgradient location for potential contaminants from upper Los Alamos and DP Canyons and TA-21 and or possible southward perched-zone migration from Pueblo Canyon.	Regional	C	A	A	—	—	—	—	—	A	—	A	A	—	A	—	—	A

Table 2.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites: Metals: Metals[b]	Organics: VOC + TICs[c]	Organics: SVOC + TICs[c]	Organics: Pesticides	Organics: PCB[d]	Organics: HEXP[e]	Organics: Dioxins/Furans	Radionuclides: RAD[f]	Radionuclides: Tritium[g]	Radionuclides: Low-Level Tritium[g]	General Inorganics: Gen Inorganics[h]	General Inorganics: Indicator Suite[i]	General Inorganics: Perchlorate	General Inorganics: Stable Isotopes[j]	General Inorganics: Suspended Sed[k]	Field Data[l]: DO, ORP, pH, SC, T, Trb, ALK
TW-3	Monitors downgradient location for potential contaminants from upper Los Alamos and DP Canyons and TA-21. Well shows evidence of casing corrosion.	Regional	—	—	A	—	—	—	—	—	—	—	A	—	—	—	A	—	A
General Surveillance Monitoring in Upper Los Alamos Canyon (includes DP Canyon)																			
DP below Meadow at TA-21 (E039)	Monitors water quality associated with contaminants in reach DP-2 associated with SWMU 21-011(k).	Base flow	C	A	A	A	—	A[CNGR]	—	—	A	—	—	A	—	A	—	A	A
DP Canyon above TA-21 (E038)	Monitors baseline water quality in DP Canyon associated with Los Alamos townsite runoff. Monitors water quality upgradient of potential effects from SWMU 21-011(k) in reach DP-2.	Base flow	C	A	A	A	—	A[CNGR]	—	—	A	—	—	A	—	A	—	A	A
Los Alamos above DP Canyon (E030)	Monitors water quality from runoff from SWMUs and AOCs in TA-01, TA-02, and TA-41. Typically persistent flow.	Base flow	C	A	A	A	—	A[CNGR]	—	—	A	—	—	A	—	A	—	A	A
Los Alamos above SR-4 (E042)	Monitors flow from DP and upper Los Alamos Canyons and water quality above the low-head weir. Flows primarily during spring runoff in March and April. Data used as baseline for water-quality evaluation of the weir.	Base flow	C	A	A	A	—	A[CNGR]	—	—	A	—	—	A	—	A	—	A	A
Los Alamos below LA Weir (E050)	Monitors water quality at Laboratory boundary and influence of low-head weir on surface-water quality. Flows primarily during spring runoff in March and April.	Base flow	C	A	A	A	—	A[CNGR]	—	—	A	—	—	A	—	A	—	A	A
Los Alamos below the Ice Rink (E026)	Monitors background water quality. Typically persistent flow.	Base flow	C	A	A	A	—	A[CNGR]	—	—	A	—	—	A	—	A	—	A	A

Table 2.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites: Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
DP Spring	Monitors water quality from secondary contaminant sources in DP Canyon sediments.	Spring	A	A	A	A	—	A	—	—	A	—	A	A	—	A	A	A	
LAO-0.3	Monitors baseline runoff water quality downcanyon of the townsite. Provides baseline for assessing potential effects of runoff from SWMUs and AOCs in TA-01, TA-02, and TA-41.	Alluvial	C	A	A	A	—	—	—	—	A	—	A	A	—	A	—	—	A
LAO-0.6	Monitors for potential effects from SWMUs and AOCs in TA-41 and TA-02.	Alluvial	C	A	A	A	—	—	—	—	A	—	A	A	—	A	—	—	A
LAO-1	Monitors potential impact of SWMUs and AOCs in TA-01, TA-02, and TA-04 and sediment contamination in upcanyon reaches.	Alluvial	C	A	A	A	—	—	—	—	A	—	A	A	—	A	—	—	A
LAO-1.6g	Monitors molybdenum contamination historically associated with TA-53 outfall into Los Alamos Canyon.	Alluvial	C	A	A	A	—	—	—	—	A	—	A	A	—	A	—	—	A
LAO-2	Monitors cumulative effects of contaminants in DP Canyon. Most downcanyon alluvial groundwater monitoring point in DP Canyon. Shows some mixing of alluvial groundwater from upper portions of Los Alamos Canyon.	Alluvial	C	A	A	A	—	—	—	—	A	—	A	A	—	A	—	—	A
LAO-3a	Monitors net effect of mixing of alluvial groundwater from Los Alamos and DP Canyons. Located just downcanyon of the confluence of Los Alamos and DP Canyons.	Alluvial	C	A	A	A	—	—	—	—	A	—	A	A	—	A	—	—	A
LAO-4.5c	Monitors for indications of downcanyon migration of contamination below Los Alamos/DP Canyon confluence.	Alluvial	C	A	A	A	—	—	—	—	A	—	A	A	—	A	—	—	A

Table 2.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites																
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
LAO-6a/ LAO-5	Monitors potential contaminant migration from upper canyon and serves as facility boundary monitoring location. Typically dry but sometimes wet up during spring. Well with sufficient saturation will be sampled.	Alluvial	C	A	A	A	—	—	—	—	A	—	A	A	—	A	—	—	A
LAO-B	Monitors background alluvial groundwater quality.	Alluvial	C	A	A	A	—	—	—	—	A	—	A	A	—	A	—	—	A
LAUZ-1	Monitors groundwater contamination associated with contaminated sediments in Reach DP 2.	Alluvial	C[MP]	A	A	A	—	—	—	—	A	—	A	A	—	A	—	—	A
General Surveillance Monitoring in Pueblo Canyon																			
Acid Above Pueblo (E056)	Monitors water quality in lower Acid Canyon to assess cumulative effects of residual contaminants in the Acid Canyon watershed.	Base flow	C	A	A	A	—	A[CNGR]	—	—	A	—	—	A	—	A	—	A	A
Guaje above Rendija Canyon (E089)	Monitors lower extent of flow in Guaje Canyon. Background base-flow location. Responds to snowmelt in high snowpack years, typically in March and April, as well as from summer thunderstorms.	Base flow	A	A	A	A	—	A[CNGR]	—	—	A	—	—	A	—	A	—	A	A
Pueblo 3	Provides baseline data for water quality below the new Los Alamos County WWTP in Pueblo Canyon and above the wetland. Effluent-supported flow.	Base flow	A	A	A	A	—	A[CNGR]	—	A	A	—	—	A	—	A	—	A	A
Pueblo above Acid (E055)	Monitors water quality associated with townsite runoff and provides a baseline relative to Acid Canyon influence. Flows primarily during spring runoff in March and April but can occur much earlier.	Base flow	C	A	A	A	—	A[CNGR]	—	—	A	—	—	A	—	A	—	A	A

Table 2.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites																
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
Pueblo above SR 502 (E060)	Monitors lower boundary location to evaluate potential water-quality changes through the Pueblo Canyon wetland. Effluent-supported flow.	Base flow	C	A	A	A	—	A[CNGR]	—	A	A	—	—	A	—	A	—	A	A
APCO-1	Monitors within the wetland below new Pueblo WWTP. Most downcanyon monitoring point in Pueblo Canyon.	Alluvial	C	A	A	A	—	A	—	A	A	—	A	A	—	A	—	—	A
PAO-1	Monitors groundwater quality in Pueblo Canyon immediately above confluence with Acid Canyon.	Alluvial	C	A	A	A	—	A	—	—	A	—	A	A	—	A	—	—	A
PAO-2	Monitors groundwater quality in Pueblo Canyon immediately below confluence with Acid Canyon.	Alluvial	C[MP]	A	A	A	—	A	—	—	A	—	A	A	—	A	—	—	A
PAO-4	Monitors below the new Los Alamos County WWTP in Pueblo Canyon.	Alluvial	C	A	A	A	—	A	—	A	A	—	A	A	—	A	—	—	A
POI-4	Monitors for potential contaminants from upper Pueblo and Acid Canyons sources.	Intermediate	C	A	A	—	—	—	—	—	A	—	A	A	—	A	A	—	A
R-3i	Monitors along the potential infiltration pathway originating in lower Pueblo Canyon.	Intermediate	C	A	A	A	—	—	—	—	A	—	A	A	—	A	A	—	A
TW-2Ar	Monitors perched-intermediate groundwater in lower Pueblo Canyon. New well completed March 4, 2010, to replace TW-2A. Assigned to characterization suites and frequencies.[n]	Intermediate	C	Q	Q	S	S	S	S	S	Q	—	Q	Q	—	Q	S	—	Q
R-5 screen 2	Monitors for potential contaminants from upper Pueblo and Acid Canyons.	Intermediate	C	A	A	—	—	—	—	—	A	—	A	A	—	A	A	—	A
R-2	Monitors for potential contaminants from upper Pueblo and Acid Canyons.	Regional	C	A	A	—	—	—	—	—	A	—	A	A	—	A	A	—	A

Table 2.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
R-24	Monitors for potential contaminants from upper Pueblo and Acid Canyons and Guaje Canyon.	Regional	C	A	A	—	—	—	—	—	A	—	A	A	—	A	A	—	A
R-3	Serves as key monitoring location for Los Alamos County water-supply well Otowi-1. New well planned for completion by July 2010 in lower Pueblo Canyon. Assigned to characterization suites and frequencies.[n]	Regional	C	Q	Q	S	S	S	S	S	Q	—	Q	Q	—	Q	S	—	Q
R-4	Monitors for potential contaminants from upper Pueblo and Acid Canyons.	Regional	C	A	A	—	—	—	—	—	A	—	A	A	—	A	A	—	A
R-5 screen 3	Monitors for potential contaminants from upper Pueblo and Acid Canyons.	Regional	C	A	A	—	—	—	—	—	A	—	A	A	—	A	A	—	A
R-5 screen 4	Monitors for potential contaminants from upper Pueblo and Acid Canyons.	Regional	C	A	A	—	—	—	—	—	A	—	A	A	—	A	A	—	
General Surveillance Monitoring in Lower Los Alamos Canyon																			
Los Alamos Canyon near Otowi Bridge (E110)	Measures quality of persistent surface water in Los Alamos Canyon above the confluence of Los Alamos Canyon and Rio Grande. Located on San Ildefonso land and sampled under the MOU.	Base flow	S	S	A	A	—	—	—	—	A	—	A	S	—	S	—	S	S
Basalt Spring	Basalt Spring water quality indicates a relation to perched-intermediate groundwater in lower Pueblo Canyon. Located on San Ildefonso land immediately downgradient of the Laboratory boundary and sampled under the MOU.	Spring	A	A	A	T 2011	—	T 2011	T 2011	—	A	—	A	A	—	A	A	A	A

Table 2.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites: Metals — Metals[b]	Organics — VOC + TICs[c]	Organics — SVOC + TICs[c]	Organics — Pesticides	Organics — PCB[d]	Organics — HEXP[e]	Organics — Dioxins/Furans	Radionuclides — RAD[f]	Radionuclides — Tritium[g]	Radionuclides — Low-Level Tritium[g]	General Inorganics — Gen Inorganics[h]	General Inorganics — Indicator Suite[i]	General Inorganics — Perchlorate	General Inorganics — Stable Isotopes[j]	General Inorganics — Suspended Sed[k]	Field Data[l] — DO, ORP, pH, SC, T, Trb, ALK
Los Alamos Spring	Los Alamos Spring water quality indicates a relation to perched-intermediate groundwater, possibly originating beneath Los Alamos Canyon. Located on San Ildefonso land and sampled under the MOU.	Spring	A	A	A	T 2011	—	T 2011	T 2011	—	A	—	A	A	—	A	A	A	A
LLAO-1b	Monitors upper portion of San Ildefonso Pueblo reach in lower Los Alamos Canyon. Water quality is consistent with recharge of water that emerges at Basalt Spring. Located on San Ildefonso land and sampled under the MOU.	Alluvial	C	A	A	T 2011	—	T 2011	T 2011	—	A	—	A	A	—	A	—	—	A
LLAO-4	Monitors lower San Ildefonso Pueblo reach in lower Los Alamos Canyon near the confluence with Rio Grande. Water quality appears to reflect mixing with regional groundwater near the Rio Grande. Located on San Ildefonso land and sampled under the MOU.	Alluvial	C	A	A	T 2011	—	T 2011	T 2011	—	A	—	A	A	—	A	—	—	A
General Surveillance Monitoring (Offsite Background Location)																			
Campsite Spring	Off-site background location in Guaje Canyon. Sample annually in spring.	Spring	A	A	—	—	—	—	—	—	A	—	A	A	—	A	A	A	A

Table 2.4-1 (continued)

Notes: Sampling suites and frequencies: C = continuous; Q = quarterly (4 times/yr); S = semiannual (2 times/yr); A = annual (1 time/yr); T= triennial (1 time every 3 years, with the next sample scheduled for collection in 2011). Some locations assigned to an area-specific monitoring group or designated for general surveillance monitoring may be assigned analytical suites or frequencies that differ from those indicated in Tables 1.6-2 and 1.6-3 for site-specific reasons summarized in Table D-2.0-1.

Nonfiltered and filtered samples will be collected for general inorganics (excluding anions) and metals. Anions and perchlorate samples will be filtered. Samples collected for radionuclide analysis will be nonfiltered only for all water media. Organic and HEXP constituents are nonfiltered for all water media. Stable isotope samples for nitrogen isotopes are filtered; stable isotope samples for deuterium and oxygen isotopes are not filtered.

[a] Continuous monitoring for groundwater refers to the measurement of groundwater levels by a transducer placed in a well and programmed to collect groundwater-level measurements at highly frequent intervals (e.g., every 60 min daily throughout the year). Continuous stream-flow monitoring refers to the measurement of stream flow by a base-flow stream gage that is programmed to collect stream-flow measurements at highly frequent intervals. The superscript MP indicates water levels will be monitored at highly frequent intervals using a multiparameter probe that measures specific conductance, water level, and temperature. The superscript HD indicates that this sampling location is historically dry.

[b] Metals analysis includes the 23 target analyte list (TAL) metals, plus boron, molybdenum, silicon dioxide, strontium, tin, and uranium.

[c] VOC = Volatile organic compounds; SVOC = semivolatile organic compounds; TICs = tentatively identified compounds.

[d] PCB = Polychlorinated biphenyl (compound). The superscript CNGR indicates the analysis of PCB congeners using U.S. Environmental Protection Agency (EPA) Method 1668A.

[e] HEXP = High explosive (compounds). The HEXP analytical suite includes the Consent Order list of the normal SW-846:8330 analytes plus pentaerythritol tetranitrate (PETN); triaminotrinitrobenzene (TATB); 3,5-dinitroaniline, tri(o-cresyl)phosphate (TOCP); 2,4-diamino-6-nitrotoluene; and 2,6-diamino-4-nitrotoluene. These additional analytes are analyzed by SW-846:8321A. The superscript RDX-DP designates samples to be submitted for analysis of RDX degradation products: hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine (MNX); hexahydro-1,3-nitro-1,3,5-triazine (DNX); and hexahydro-1,3,5-trinitroso-1,3,5-triazine (TNX). The RDX-degradation products are analyzed by SW-846:8330.

[f] The radionuclide (RAD) suite includes gross alpha, gross beta, alpha spectroscopy, gamma spectroscopy, and strontium-90.

[g] Tritium samples may be submitted for analysis by liquid scintillation if anticipated activities are greater than 300 pCi/L. Low-level tritium is analyzed using electrolytic enrichment or direct counting.

[h] General inorganic analysis includes major anions (bromide, chloride, fluoride, sulfate); major cations (calcium, magnesium, sodium, potassium); nitrate plus nitrite (as N); total Kjeldahl nitrogen (TKN); ammonia; total phosphorus, total organic carbon (TOC); total dissolved solids (TDS); alkalinity; specific conductivity; pH; and hardness.

[i] Indicator suite includes major anions and cations, nitrate (as N), nitrite (as N), metals, alkalinity, pH, TOC, and, as needed, sulfide, ammonia, TKN, and perchlorate. Indicator-suite samples are submitted to the on-site EES-14 laboratory, with the exception of samples for TKN and perchlorate analysis, which are submitted to an off-site analytical facility.

[j] Analysis for stable nitrogen, deuterium, and oxygen isotopes. The collection of samples for stable isotopic analysis is considered a special sampling campaign that is outside the scope of the regulatory process. In general, samples for isotopic analysis are collected semiannually from “new” wells (those which completed construction, rehabilitation, or conversion on or after July 1, 2009) and annually from other locations. For intermediate and regional wells, “(A)” signifies samples will be collected annually until four sets of stable nitrogen isotope data have been collected. Any subsequent sampling for stable isotope analysis will be decided on the basis of site-specific conditions.

[k] Suspended sed = Suspended sediment concentration.

[l] Field parameters include pH, turbidity, specific conductance, dissolved oxygen, and temperature at all locations. Oxidation-reduction potential (ORP) will be measured if a flow-through cell is used and will not be measured in surface water, spring water, or water collected from Westbay sampling systems unless specified otherwise. Alkalinity (ALK) will be measured for all samples either in the field or at the on-site EES-14 laboratory.

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

[n] Characterization suites and frequencies apply to new intermediate perched or regional groundwater wells. “New” wells are defined as those which are completed, rehabilitated, or converted after July 1, 2009. After completion of four rounds of characterization sampling, a new well is reassigned automatically to the routine analytical suites and frequencies of the appropriate area-specific monitoring group or general surveillance monitoring plan unless specified otherwise.

Table 3.4-1
Sandia Watershed Interim Monitoring Plan

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites: Metals: TAL Metals[b]	Organics: VOC + TICs[c]	Organics: SVOC + TICs[c]	Organics: Pesticides	Organics: PCB[d]	Organics: HEXP[e]	Organics: Dioxins/Furans	Radionuclides: RAD[f]	Radionuclides: Tritium[g]	Radionuclides: Low-Level Tritium[g]	General Inorganics: Gen Inorganics[h]	General Inorganics: Indicator Suite[i]	General Inorganics: Perchlorate	General Inorganics: Stable Isotopes[j]	General Inorganics: Suspended Sed[k]	Field Data[l]: DO, ORP, pH, SC, T, Trb, ALK
Chromium Investigation Monitoring Group																			
Middle Sandia Canyon at terminus of persistent base flow	Most downcanyon location of effluent-supported flow from upcanyon. The surface water expression typically infiltrates alluvium upstream of E124.	Base flow	S	S	A	A	—[m]	S[CNGR]	—	—	A	—	—	S	—	S	—	S	S
Sandia below Wetlands (E123)	Monitors water quality of flow from wetland. Persistent effluent-support flow from NPDES Outfall 01A-001.	Base flow	S	S	A	A	—	S[CNGR]	—	—	A	—	—	S	—	S	—	S	S
Sandia right fork at Power Plant (E121)	Persistent effluent-supported flow predominantly from NPDES Outfall 01A-001. Serves as baseline for comparison to downcanyon changes in water quality, especially related to the downcanyon wetland.	Base flow	S	S	A	A	—	S[CNGR]	—	—	A	—	—	S	—	S	—	S	S
South fork at Sandia Canyon at E122	Monitors TA-03 runoff. Serves as baseline for comparison to downcanyon changes in water quality, especially related to the downcanyon wetland.	Base flow	S	S	A	A	—	S[CNGR]	—	—	A	—	—	S	—	S	—	S	S
SCA-1-DP	Drivepoint installed near SCA-1 to characterize wetland as a replacement for SCA-1. Installed February 18, 2009.	Alluvial	S	S	A	A	—	—	—	—	A	—	A	S	—	S	—	—	S
SCA-2	Located at the upper portion of the lower canyon where the valley floor first opens up and the first significant alluvial storage is present along the canyon.	Alluvial	C[MP]	S	A	A	—	—	—	—	A	—	A	S	—	S	—	—	S

Table 3.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
SCA-3	Monitors water quality associated with ongoing effluent releases and secondary source term in canyon sediments. Located in the canyon within a thick (~20–30 ft) alluvial deposit in the lower canyon.	Alluvial	C	S	A	A	—	—	—	—	A	—	A	S	—	S	—	—	S
SCA-4	Monitors water quality associated with ongoing effluent releases and secondary source term in canyon sediments. Located approximately mid-way between SCA-3 and the easternmost drainage from the TA-53 complex.	Alluvial	C	S	A	A	—	—	—	—	A	—	A	S	—	S	—	—	S
SCA-5	Monitors water quality associated with ongoing effluent releases and secondary source term in canyon sediments. Located just downcanyon of the easternmost drainage from the TA-53 complex. Well is typically dry but responds to runoff periods.	Alluvial	C	S	A	A	—	—	—	—	A	—	A	S	—	S	—	—	S
SCI-1	Monitors the first perched-intermediate groundwater encountered along the key infiltration pathway in Sandia Canyon.	Intermediate	C	Q	A	A	—	—	—	—	A	—	S	Q	—	S	A	—	Q
SCI-2	Monitors key infiltration pathway in Sandia Canyon.	Intermediate	C	Q	A	A	—	—	—	—	A	—	S	Q	—	S	A	—	Q
SCI-2	Monitors key infiltration pathway in Sandia Canyon.	Intermediate	C	Q	A	A	—	—	—	—	A	—	S	Q	—	S	A	—	Q
R-11	Monitors for potential contaminants from Sandia Canyon and possibly Los Alamos Canyon.	Regional	C	Q	A	A	—	—	—	—	A	—	S	Q	—	S	A	—	Q

Table 3.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
R-35a	Sentinel monitoring location for chromium contamination in regional groundwater. Located within the same stratigraphic zone as the upper louvered section of water-supply well PM-3.	Regional	C	Q	A	A	—	—	—	—	A	—	S	Q	—	S	A	—	Q
R-35b	Sentinel monitoring location for chromium contamination in the regional groundwater. Located near the water table above the louvered section of water-supply well PM-3.	Regional	C	Q	A	A	—	—	—	—	A		S	Q	—	S	A	—	Q
R-36	Key well for nature and extent of contamination from the Sandia Canyon source and other potential sources from canyons to the north. Also serves as a sentinel well for water-supply well PM-1.	Regional	C	Q	A	A	—	—	—	—	A		S	Q	—	S	A	—	Q
R-43 screen 2	Monitors downgradient extent of contamination originating in Sandia Canyon and possibly canyons to the north. Well completed in October 2008 as part of the chromium investigation.	Regional	C	Q	A	A	—	—	—	—	A		S	Q	—	S	A	—	Q
R-43 screen 1	Monitors downgradient extent of contamination originating in Sandia Canyon and possibly canyons to the north. Well completed in October 2008 as part of the chromium investigation.	Regional	C	Q	A	A	—	—	—	—	A		S	Q	—	S	A	—	Q

Table 3.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites																	
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
TA-21 Monitoring Group																					
R-12 screen 1	Monitors for potential contaminants from Sandia Canyon or possibly Los Alamos or Pueblo Canyons. Shows minor impacts from drilling fluids.	Intermediate	C	S	A	A	—	—	—	—	A	—	S	S	—	S	—	—	S
R-12 screen 2	Monitors for potential contaminants from Sandia Canyon or possibly Los Alamos or Pueblo Canyons. Shows minor impacts from drilling fluids.	Intermediate	C	S	A	A	—	—	—	—	A	—	S	S	—	S	—	—	S
General Surveillance Monitoring Locations																					
R-10 screen 1	Monitors for potential contaminants from Sandia Canyon and possibly Los Alamos or Pueblo Canyons. Located on San Ildefonso land and sampled under the MOU.	Regional	C	Q	A	A	—	T (2011)	T (2011)	—	A	—	S	Q	—	S	A	—	Q
R-10 screen 2	Monitors for potential contaminants from Sandia Canyon and possibly Los Alamos or Pueblo Canyons. Located on San Ildefonso land and sampled under the MOU.	Regional	C	Q	A	A	—	T (2011)	T (2011)	—	A	—	S	Q	—	S	A	—	Q
R-10a	Monitors for potential contaminants from Sandia Canyon and possibly Los Alamos or Pueblo Canyons. Located on San Ildefonso land and sampled under the MOU.	Regional	C	Q	A	A	—	T (2011)	T (2011)	—	A	—	S	Q	—	S	A	—	Q

Table 3.4-1 (continued)

Notes: Sampling suites and frequencies: C = continuous; Q = quarterly (4 times/yr); S = semiannual (2 times/yr); A = annual (1 time/yr); T= triennial (1 time every 3 years, with the next sample scheduled for collection in 2011). Some locations assigned to an area-specific monitoring group or designated for general surveillance monitoring may be assigned analytical suites or frequencies that differ from those indicated in Tables 1.6-2 and 1.6-3 for site-specific reasons summarized in Table D-3.0-1.

Nonfiltered and filtered samples will be collected for general inorganics (excluding anions) and metals. Anions and perchlorate samples will be filtered. Samples collected for radionuclide analysis will be nonfiltered only for all water media. Organic and HEXP constituents are nonfiltered for all water media. Stable isotope samples for nitrogen isotopes are filtered; stable isotope samples for deuterium and oxygen isotopes are not filtered.

[a] Continuous monitoring for groundwater refers to the measurement of groundwater levels by a transducer placed in a well and programmed to collect groundwater-level measurements at highly frequent intervals (e.g., every 60 min daily throughout the year). Continuous stream-flow monitoring refers to the measurement of stream flow by a base-flow stream gage that is programmed to collect stream-flow measurements at highly frequent intervals. The superscript MP indicates water levels will be monitored at highly frequent intervals using a multiparameter probe that measures specific conductance, water level, and temperature. The superscript HD indicates that this sampling location is historically dry.

[b] Metals analysis includes the 23 target analyte list (TAL) metals, plus boron, molybdenum, silicon dioxide, strontium, tin, and uranium.

[c] VOC = Volatile organic compounds; SVOC = semivolatile organic compounds; TICs = tentatively identified compounds.

[d] PCB = Polychlorinated biphenyl (compound). The superscript CNGR indicates the analysis of PCB congeners using U.S. Environmental Protection Agency (EPA) Method 1668A.

[e] HEXP = High explosive (compounds). The HEXP analytical suite includes the Consent Order list of the normal SW-846:8330 analytes plus pentaerythritol tetranitrate (PETN); triaminotrinitrobenzene (TATB); 3,5-dinitroaniline, tri(o-cresyl)phosphate (TOCP); 2,4-diamino-6-nitrotoluene; and 2,6-diamino-4-nitrotoluene. These additional analytes are analyzed by SW-846:8321A. The superscript RDX-DP designates samples to be submitted for analysis of RDX degradation products: hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine (MNX); hexahydro-1,3-nitro-1,3,5-triazine (DNX); and hexahydro-1,3,5-trinitroso-1,3,5-triazine (TNX). The RDX-degradation products are analyzed by SW-846:8330.

[f] The radionuclide (RAD) suite includes gross alpha, gross beta, alpha spectroscopy, gamma spectroscopy, and strontium-90.

[g] Tritium samples may be submitted for analysis by liquid scintillation if anticipated activities are greater than 300 pCi/L. Low-level tritium is analyzed using electrolytic enrichment or direct counting.

[h] General inorganic analysis includes major anions (bromide, chloride, fluoride, sulfate); major cations (calcium, magnesium, sodium, potassium); nitrate plus nitrite (as N); total Kjeldahl nitrogen (TKN); ammonia; total phosphorus, total organic carbon (TOC); total dissolved solids (TDS); alkalinity; specific conductivity; pH; and hardness.

[i] Indicator suite includes major anions and cations, nitrate (as N), nitrite (as N), metals, alkalinity, pH, TOC, and, as needed, sulfide, ammonia, TKN, and perchlorate. Indicator-suite samples are submitted to the on-site EES-14 laboratory, with the exception of samples for TKN and perchlorate analysis, which are submitted to an off-site analytical facility.

[j] Analysis for stable nitrogen, deuterium, and oxygen isotopes. The collection of samples for stable isotopic analysis is considered a special sampling campaign that is outside the scope of the regulatory process. In general, samples for isotopic analysis are collected semiannually from “new” wells (those which completed construction, rehabilitation, or conversion on or after July 1, 2009) and annually from other locations. For intermediate and regional wells, “(A)” signifies samples will be collected annually until four sets of stable nitrogen isotope data have been collected. Any subsequent sampling for stable isotope analysis will be decided on the basis of site-specific conditions.

[k] Suspended sed = Suspended sediment concentration.

[l] Field parameters include pH, turbidity, specific conductance, dissolved oxygen, and temperature at all locations. Oxidation-reduction potential (ORP) will be measured if a flow-through cell is used and will not be measured in surface water, spring water, or water collected from Westbay sampling systems unless specified otherwise. Alkalinity (ALK) will be measured for all samples either in the field or at the on-site EES-14 laboratory.

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

Table 4.4-1
Mortandad Canyon Watershed Interim Monitoring Plan

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
Chromium Investigation Monitoring Group																			
MCOI-4	Monitors for potential contaminants from upper Mortandad and Ten Site Canyons or possibly Sandia Canyon. Water levels are typically only 1 to 2 ft above the bottom of the well screen. Samples will be collected if sufficient water is available.	Intermediate	C	Q	A	S	—[m]	—	—	—	A	S	—	Q	—	S	A	—	Q
MCOI-5	Monitors for potential contaminants from upper Mortandad and Ten Site Canyons or possibly Sandia Canyon.	Intermediate	C	Q	A	S	—	—	—	—	A	S	—	Q	—	S	A	—	Q
MCOI-6	Monitors for potential contaminants from upper Mortandad and Ten Site Canyons or possibly Sandia Canyon.	Intermediate	C	Q	A	S	—	—	—	—	A	S	—	Q	—	S	A	—	Q
R-13	Monitors for nature and extent of contaminants originating in Mortandad and Sandia Canyons. Key lower boundary well.	Regional	C	Q	A	A	—	—	—	—	A	—	S	Q	—	S	A	—	Q
R-15	Monitors for potential contaminants from upper Ten Site or Mortandad Canyons.	Regional	C	Q	A	S	—	—	—	—	A	—	S	Q	—	S	A	—	Q
R-28	Monitors for potential contaminants from upper Sandia, Mortandad, or Ten Site Canyons or possibly sources in canyons to the north.	Regional	C	Q	A	A	—	—	—	—	A	—	S	Q	—	S	A	—	Q
R-42	Well completed in August 2008 as part of the chromium investigation. Key characterization and monitoring point located upgradient of R-28.	Regional	C	Q	A	S	—	—	—	—	A	—	S	Q	—	S	A	—	Q

Table 4.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
R-44 screen 1	Monitors near the water table for nature and extent of contaminants from sources in Sandia Canyon and possibly sources in canyons to the north. Recently completed well under the chromium investigation. Completed January 15, 2009.	Regional	C	Q	A	A	—	—	—	—	A	—	S	Q	—	S	A	—	Q
R-44 screen 2	Monitors near the water table for nature and extent of contaminants from sources in Sandia Canyon and possibly sources in canyons to the north. Recently completed well under the chromium investigation. Completed January 15, 2009.	Regional	C	Q	A	A	—	—	—	—	A	—	S	Q	—	S	A	—	Q
R-45 screen 1	Monitors near the water table for nature and extent of contaminants from sources in Sandia Canyon and possibly sources in canyons to the north. Recently completed well for the chromium investigation. Completed January 24, 2009.	Regional	C	Q	A	A	—	—	—	—	A	—	S	Q	—	S	A	—	Q
R-45 screen 2	Monitors near the water table for nature and extent of contaminants from sources in Sandia Canyon and possibly sources in canyons to the north. Recently completed well for the chromium investigation. Completed January 24, 2009.	Regional	C	Q	A	A	—	—	—	—	A	—	S	Q	—	S	A	—	Q
R-50 screen 1	New well completed February 1, 2010 to define the southern extent of chromium contamination in the regional aquifer. Located on the mesa south of Mortandad Canyon. Chromium subgroup.[n]	Regional	C	Q	Q	S	S	S	S	S	Q	—	Q	Q	—	Q	S	—	Q

Table 4.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites																
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
R-50 screen 2	New well completed February 1, 2010, to define the southern extent of chromium contamination in the regional aquifer. Located on the mesa south of Mortandad Canyon. Chromium subgroup.[n]	Regional	C	Q	Q	S	S	S	S	S	Q	—	Q	Q	—	Q	S	—	Q
MDA C Monitoring Group																			
R-14	Monitors for potential contaminants from upper Ten Site or Mortandad Canyons, including MDA C.	Regional	C	S	Q	A	—	—	A	—	A	—	S	Q	—	A	A	—	Q
R-46	Recently completed well to monitor groundwater quality downgradient of MDA C. Completed February 26, 2009.	Regional	C	S	Q	A	—	—	A	—	A	—	S	Q	—	A	A	—	Q
General Surveillance Monitoring Locations																			
E-1FW	Effluent-supported reach in upper Effluent Canyon, primarily from TA-50 RLWTF.	Base flow	S	S	S	A	—	—	—	S	S	—	—	S	—	S	—	S	S
M-1E	Measures cumulative upper Mortandad potential impacts just above confluence of Effluent Canyon.	Base flow	A	A	A	A	—	—	—	A	A	—	—	A	—	A	—	A	A
M-1W	Upper Mortandad Canyon. Surface water baseline for Mortandad Canyon.	Base flow	A	A	A	A	—	—	—	A	A	—	—	A	—	A	—	A	A
M-2E	Addresses distal end of persistent surface water in watershed.	Base flow	A	A	A	A	—	—	—	A	A	—	—	A	—	A	—	A	A
Mortandad below Effluent Canyon (E200)	First surface water monitoring location in Mortandad below Effluent Canyon confluence.	Base flow	A	A	A	A	—	—	—	A	A	A	—	A	—	A	—	A	A
TS-1W	Monitors head of Ten Site drainage and potential impacts from MDA C.	Base flow	A	A	A	A	—	—	—	A	A	—	—	A	—	A	—	A	A

Table 4.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites: Metals: TAL Metals[b]	Organics: VOC + TICs[c]	Organics: SVOC + TICs[c]	Organics: Pesticides	Organics: PCB[d]	Organics: HEXP[e]	Organics: Dioxins/Furans	Radionuclides: RAD[f]	Radionuclides: Tritium[g]	Radionuclides: Low-Level Tritium[g]	General Inorganics: Gen Inorganics[h]	General Inorganics: Indicator Suite[i]	General Inorganics: Perchlorate	General Inorganics: Stable Isotopes[j]	General Inorganics: Suspended Sed[k]	Field Data[l]: DO, ORP, pH, SC, T, Trb, ALK
TS-2E	Monitors cumulative impacts from TA-35, including contamination in Pratt Canyon.	Base flow	A	A	A	A	—	—	—	A	A	—	—	A	—	A	—	A	A
MCA-1	Most downcanyon monitoring point in Mortandad Canyon before confluence of Effluent Canyon.	Alluvial	C	A	A	A	—	—	—	A	A	A	—	A	—	A	—	—	A
MCO-0.6	Provides alluvial groundwater quality baseline for upper Mortandad Canyon.	Alluvial	C^{MP}	A	A	A	—	—	—	—	A	—	A	A	—	A	—	—	A
MCO-2	Monitors potential contaminants in Effluent Canyon above the TA-50 outfall.	Alluvial	C^{MP}	A	A	A	—	—	—	—	A	A	—	A	—	A	—	—	A
MCO-3	Monitors trends in alluvial groundwater quality following upgrades to the SWS plant. Monitoring required for SWS Groundwater Discharge Permit.	Alluvial	C	A	A	A	—	—	—	—	A	A	—	Q	—	Q	—	—	Q
MCO-4B	Monitors trends in alluvial groundwater quality following upgrades to the wastewater treatment facility. Monitoring required for SWS Discharge Permit.	Alluvial	C	A	A	A	—	—	—	—	A	A	—	Q	—	Q	—	—	Q
MCO-5	Monitors trends in alluvial groundwater quality following upgrades to the wastewater treatment facility.	Alluvial	C	A	A	A	—	—	—	—	A	A	—	A	—	A	—	—	A
MCO-6	MCO-6 is a better screen placement/configuration than MCO-6B. Monitoring required for SWS Discharge Permit.	Alluvial	C	A	A	A	—	—	—	—	A	A	—	Q	—	Q	—	—	Q
MCO-7	Near recent downcanyon extent of alluvial saturation. Monitors trends in alluvial groundwater quality following upgrades to the wastewater treatment facility. Monitoring required in SWS Discharge Permit.	Alluvial	C	A	A	A	—	—	—	—	A	A	—	Q	—	Q	—	—	Q

Table 4.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites: Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
MCO-7.5	Monitors distal portion of alluvial groundwater saturation. Monitors trends in alluvial groundwater quality following upgrades to the wastewater treatment facility.	Alluvial	C	A	A	A	—	—	—	—	A	A	—	A	—	A	—	—	A
MT-3	Monitors distal portion of alluvial groundwater saturation. Replacement well for MT-2, which is usually dry.	Alluvial	C	A	A	A	—	—	—	—	A	A	—	A	—	A	—	—	A
TSCA-6	Well in lower Ten Site Canyon. Integrates potential alluvial groundwater impacts from Ten Site Canyon. Well is typically dry but wets up during runoff periods.	Alluvial	C	A	A	A	—	—	—	—	A	A	—	A	—	A	—	—	A
R-1	Monitors for potential contaminants from upper Mortandad Canyon or possibly Sandia Canyon.	Regional	C	Q	Q	A	—	—	—	—	A	—	S	Q	—	S	A	—	Q
R-16 screen 2	Downgradient monitoring location for TA-54 or other possible sources in Pajarito Canyon or canyons to the north. Well converted from a Westbay well in CY2009.	Regional	C	Q	Q	S	—	—	—	—	A	—	S	Q	—	Q	S	—	Q
R-16 screen 4	Downgradient monitoring location for TA-54 or other possible sources in Pajarito Canyon or canyons to the north. Well converted from a Westbay well in CY2009.	Regional	C	Q	Q	S	—	—	—	—	A	—	S	Q	—	Q	S	—	Q
R-16r	Downgradient monitoring location for TA-54 or other possible sources in Pajarito Canyon or canyons to the north. Replaces screen 1 in R-16.	Regional	C	Q	Q	A	—	—	—	—	A	—	S	Q	—	S	A	—	Q
R-33 screen 1	Monitors for potential contaminants from upper Ten Site or Mortandad Canyons.	Regional	C	Q	Q	S	—	—	—	—	A	—	S	Q	—	S	A	—	Q

Table 4.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites																	
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
R-33 screen 2	Monitors for potential contaminants from upper Ten Site or Mortandad Canyons.	Regional	C	Q	Q	S	—	—	—	—	A	—	S	Q	—	S	A	—	Q
R-34	Monitors regional groundwater for potential contaminants originating beneath Los Alamos, Sandia, or Mortandad Canyons. Key monitoring location for San Ildefonso and Buckman well field. Located on San Ildefonso land and sampled under the MOU.	Regional	C	Q	A	A	—	T (2011)	T (2011)	—	A	—	S	Q	—	S	A	—	Q

Table 4.4-1 (continued)

Notes: Sampling suites and frequencies: C = continuous; Q = quarterly (4 times/yr); S = semiannual (2 times/yr); A = annual (1 time/yr); T= triennial (1 time every 3 years, with the next sample scheduled for collection in 2011). Some locations assigned to an area-specific monitoring group or designated for general surveillance monitoring may be assigned analytical suites or frequencies that differ from those indicated in Tables 1.6-2 and 1.6-3 for site-specific reasons summarized in Table D-4.0-1.

Nonfiltered and filtered samples will be collected for general inorganics (excluding anions) and metals. Anions and perchlorate samples will be filtered. Samples collected for radionuclide analysis will be nonfiltered only for all water media. Organic and HEXP constituents are nonfiltered for all water media. Stable isotope samples for nitrogen isotopes are filtered; stable isotope samples for deuterium and oxygen isotopes are not filtered.

[a] Continuous monitoring for groundwater refers to the measurement of groundwater levels by a transducer placed in a well and programmed to collect groundwater-level measurements at highly frequent intervals (e.g., every 60 min daily throughout the year). Continuous stream-flow monitoring refers to the measurement of stream flow by a base-flow stream gage that is programmed to collect stream-flow measurements at highly frequent intervals. The superscript MP indicates water levels will be monitored at highly frequent intervals using a multiparameter probe that measures specific conductance, water level, and temperature. The superscript HD indicates that this sampling location is historically dry.

[b] Metals analysis includes the 23 target analyte list (TAL) metals, plus boron, molybdenum, silicon dioxide, strontium, tin, and uranium.

[c] VOC = Volatile organic compounds; SVOC = semivolatile organic compounds; TICs = tentatively identified compounds.

[d] PCB = Polychlorinated biphenyl (compound). The superscript CNGR indicates the analysis of PCB congeners using U.S. Environmental Protection Agency (EPA) Method 1668A.

[e] HEXP = High explosive (compounds). The HEXP analytical suite includes the Consent Order list of the normal SW-846:8330 analytes plus pentaerythritol tetranitrate (PETN); triaminotrinitrobenzene (TATB); 3,5-dinitroaniline, tri(o-cresyl)phosphate (TOCP); 2,4-diamino-6-nitrotoluene; and 2,6-diamino-4-nitrotoluene. These additional analytes are analyzed by SW-846:8321A. The superscript RDX-DP designates samples to be submitted for analysis of RDX degradation products: hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine (MNX); hexahydro-1,3-nitro-1,3,5-triazine (DNX); and hexahydro-1,3,5-trinitroso-1,3,5-triazine (TNX). The RDX-degradation products are analyzed by SW-846:8330.

[f] The radionuclide (RAD) suite includes gross alpha, gross beta, alpha spectroscopy, gamma spectroscopy, and strontium-90.

[g] Tritium samples may be submitted for analysis by liquid scintillation if anticipated activities are greater than 300 pCi/L. Low-level tritium is analyzed using electrolytic enrichment or direct counting.

[h] General inorganic analysis includes major anions (bromide, chloride, fluoride, sulfate); major cations (calcium, magnesium, sodium, potassium); nitrate plus nitrite (as N); total Kjeldahl nitrogen (TKN); ammonia; total phosphorus, total organic carbon (TOC); total dissolved solids (TDS); alkalinity; specific conductivity; pH; and hardness.

[i] Indicator suite includes major anions and cations, nitrate (as N), nitrite (as N), metals, alkalinity, pH, TOC, and, as needed, sulfide, ammonia, TKN, and perchlorate. Indicator-suite samples are submitted to the on-site EES-14 laboratory, with the exception of samples for TKN and perchlorate analysis, which are submitted to an off-site analytical facility.

[j] Analysis for stable nitrogen, deuterium, and oxygen isotopes. The collection of samples for stable isotopic analysis is considered a special sampling campaign that is outside the scope of the regulatory process. In general, samples for isotopic analysis are collected semiannually from “new” wells (those which completed construction, rehabilitation, or conversion on or after July 1, 2009) and annually from other locations. For intermediate and regional wells, “(A)” signifies samples will be collected annually until four sets of stable nitrogen isotope data have been collected. Any subsequent sampling for stable isotope analysis will be decided on the basis of site-specific conditions.

[k] Suspended sed = Suspended sediment concentration.

[l] Field parameters include pH, turbidity, specific conductance, dissolved oxygen, and temperature at all locations. Oxidation-reduction potential (ORP) will be measured if a flow-through cell is used and will not be measured in surface water, spring water, or water collected from Westbay sampling systems unless specified otherwise. Alkalinity (ALK) will be measured for all samples either in the field or at the on-site EES-14 laboratory.

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

[n] Characterization suites and frequencies apply to new intermediate perched or regional groundwater wells. “New” wells are defined as those which are completed, rehabilitated, or converted after July 1, 2009. After completion of four rounds of characterization sampling, a new well is reassigned automatically to the routine analytical suites and frequencies of the appropriate area-specific monitoring group or general surveillance monitoring plan unless specified otherwise.

Table 5.4-1
Pajarito Canyon (Includes Twomile and Threemile Canyons) Watershed Interim Monitoring Plan

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites: Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
MDA C Monitoring Group																			
PCI-2	Monitors perched-intermediate groundwater at the confluence of Twomile and Pajarito Canyons. Provides baseline characterization data for areas upgradient of TA-54.	Intermediate	C	S	Q	A	—[m]	—	T (2011)	—	A	—	S	Q	—	A	A	—	Q
R-17 screen 1	Monitors MDA C, TA-16, and potential sources in upper Pajarito watershed.	Regional	C	S	Q	A	—	—	T (2011)	—	A	—	S	Q	—	A	A	—	Q
R-17 screen 2	Monitors MDA C, TA-16, and potential sources in upper Pajarito watershed.	Regional	C	S	Q	A	—	—	T (2011)	—	A	—	S	Q	—	A	A	—	Q
R-59	Placeholder for new regional well downgradient of MDA C.	Regional	C	Q	Q	S	S	S	S	S	Q	—	Q	Q	—	Q	S	—	Q
R-60	Placeholder for new regional well downgradient of MDA C.	Regional	C	Q	Q	S	S	S	S	S	Q	—	Q	Q	—	Q	S	—	Q
TA-16-260 Monitoring Group																			
R-18	Monitors for potential contaminants from sources in TA-16.	Regional	C	S	S	A	—	—	S[RDX-DP]	—	A	—	A	S	—	S	A	—	S
TA-54 Monitoring Group																			
R-37 screen 1	Monitors perched-intermediate groundwater downgradient of MDA H.	Intermediate	C	Q	Q	Q	A	A	A	A	A	—	Q	Q	—	Q	S	—	Q
R-40i	Monitors TA-54 and potential sources in Pajarito watershed. Screen impacted by drilling fluids.	Intermediate	C	Q	Q	Q	A	A	A	A	A	—	Q	Q	—	Q	S	—	Q
R-40 screen 1	Monitors TA-54 and monitors potential sources in Pajarito watershed.	Intermediate	C	Q	Q	Q	A	A	A	A	A	—	Q	Q	—	Q	S	—	Q

Table 5.4-1 (continued)

				Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
R-41 screen 1	Monitors perched intermediate groundwater near northeast corner of MDA G. Screen has been dry since installation.	Intermediate	Q[HD]	Q	Q	Q	A	A	A	A	A	—	Q	Q	—	Q	S	—	Q
R-20 screen 1	Monitors TA-54 and potential sources in Pajarito watershed.	Regional	C	Q	Q	Q	A	A	A	A	A	—	Q	Q	—	Q	S	—	Q
R-20 screen 2	Monitors TA-54 and potential sources in Pajarito watershed.	Regional	C	Q	Q	Q	A	A	A	A	A	—	Q	Q	—	Q	S	—	Q
R-21	Monitors regional groundwater in Mortandad Canyon.	Regional	C	Q	Q	Q	A	A	A	A	A	—	Q	Q	—	Q	S	—	Q
R-22 screens 1 through 5	Monitors TA-54 and potential sources in Pajarito watershed. Rehabilitated Westbay well; final configuration to be determined.	Regional	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	—	TBD	TBD	—	TBD	TBD	—	TBD
R-32	Monitors TA-54 and potential sources in Pajarito watershed.	Regional	C	Q	Q	Q	A	A	A	A	A	—	Q	Q	—	Q	S	—	Q
R-37 Screen 2	Monitors regional groundwater downgradient of MDA H.	Regional	C	Q	Q	Q	A	A	A	A	A	—	Q	Q	—	Q	S	—	Q
R-38	Monitors groundwater downgradient of MDA L in the north fork of Cañada del Buey, in the Mortandad watershed.	Regional	C	Q	Q	Q	A	A	A	A	A	—	Q	Q	—	Q	S	—	Q
R-39	Monitors TA-54 and potential sources in Pajarito watershed.	Regional	C	Q	Q	Q	A	A	A	A	A	—	Q	Q	—	Q	S	—	Q
R-40 screen 2	Monitors TA-54 and potential sources in Pajarito watershed.	Regional	C	Q	Q	Q	A	A	A	A	A	—	Q	Q	—	Q	S	—	Q
R-41 screen 2	Monitors groundwater near northeast corner of MDA G.	Regional	C	Q	Q	Q	A	A	A	A	A	—	Q	Q	—	Q	S	—	Q

Table 5.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
R-49 Screen 2	Monitors groundwater south of Area G in Pajarito Canyon.	Regional	C	Q	Q	Q	Q	Q	Q	Q	Q	—	Q	Q	—	Q	S	—	Q
R-51 screen 1	New well west of MDAs H and J, and northwest of TA-18. Monitors other potential contaminant sources in Pajarito Canyon. Completed February 8, 2010.[n]	Regional	C	Q	Q	Q	Q	Q	Q	Q	Q	—	Q	Q	—	Q	S	—	Q
R-51 screen 2	New well west of MDAs H and J, and northwest of TA-18. Monitors other potential contaminant sources in Pajarito Canyon. Completed February 8, 2010.[n]	Regional	C	Q	Q	Q	Q	Q	Q	Q	Q	—	Q	Q	—	Q	S	—	Q
R-52 screen 1	New well north-northeast of MDAs H and J, on mesa south of Cañada del Buey. Monitors for potential releases of contaminants from MDAs H and J. Completed March 31, 2010.[n]	Regional	C	Q	Q	Q	Q	Q	Q	Q	Q	—	Q	Q	—	Q	S	—	Q
R-52 screen 2	New well north-northeast of MDAs H and J, on mesa south of Cañada del Buey. Monitors for potential releases of contaminants from MDAs H and J. Completed March 31, 2010.[n]	Regional	C	Q	Q	Q	Q	Q	Q	Q	Q	—	Q	Q	—	Q	S	—	Q
R-53 screen 1	New well located north of MDA L in Cañada del Buey; monitors for potential releases from MDA L. Completed March 1, 2010.[n]	Regional	C	Q	Q	Q	Q	Q	Q	Q	Q	—	Q	Q	—	Q	S	—	Q
R-53 screen 2	New well located north of MDA L in Cañada del Buey; monitors for potential releases from MDA L. Completed March 1, 2010.[n]	Regional	C	Q	Q	Q	Q	Q	Q	Q	Q	—	Q	Q	—	Q	S	—	Q

Table 5.4-1 (continued)

				Analytical Suites																	
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]		
Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK		
R-54 screen 1	New well located immediately west of MDA L in Pajarito Canyon; monitors for potential releases from MDA L. Completed January 29, 2010.[n]	Regional	C	Q	Q	Q	Q	Q	Q	Q	Q	—	Q	Q	—	Q	S	—	Q		
R-54 screen 2	New well located immediately west of MDA L in Pajarito Canyon; monitors for potential releases from MDA L. Completed January 29, 2010.[n]	Regional	C	Q	Q	Q	Q	Q	Q	Q	Q	—	Q	Q	—	Q	S	—	Q		
R-55 screen 1	Regional monitoring well planned downgradient of MDA G. Will monitor for potential contaminant releases from MDA G and other sources in Pajarito Canyon. Expected to be completed by September 28, 2010.	Regional	C	Q	Q	Q	Q	Q	Q	Q	Q	—	Q	Q	—	Q	S	—	Q		
R-55 screen 2	New well downgradient of MDA G to monitor for potential contaminant releases from MDA G and other sources in Pajarito Canyon. Expected to be completed by September 28, 2010.	Regional	C	Q	Q	Q	Q	Q	Q	Q	Q	—	Q	Q	—	Q	S	—	Q		
R-56 screen 1	Located on Mesita del Buey between MDA G and MDA L. Monitors for potential contaminant releases from MDAs G and L, and other sources in Pajarito Canyon. Expected to be completed by September 28, 2010.	Regional	C	Q	Q	Q	Q	Q	Q	Q	Q	—	Q	Q	—	Q	S	—	Q		

Table 5.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites																
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
R-56 screen 2	Located on Mesita del Buey between MDA G and MDA L. Monitors for potential contaminant releases from MDAs G and L, and other sources in Pajarito Canyon. Expected to be completed by September 28, 2010.	Regional	C	Q	Q	Q	Q	Q	Q	Q	Q	—	Q	Q	—	Q	S	—	Q
R-57 screen 1	New well downgradient of MDA G at eastern end of TA-54; monitors for potential releases from MDA G. Expected to be completed by June 30, 2010.	Regional	C	Q	Q	Q	Q	Q	Q	Q	Q	—	Q	Q	—	Q	S	—	Q
R-57 screen 2	New well downgradient of MDA G at eastern end of TA-54; monitors for potential releases from MDA G. Expected to be completed by June 30, 2010.	Regional	C	Q	Q	Q	Q	Q	Q	Q	Q	—	Q	Q	—	Q	S	—	Q
General Surveillance Monitoring Locations																			
Pajarito 0.5 mi above SR-501 (PBF-B)	Background location located 0.5 mi above NM 502. Provides basis for comparison with data from downstream locations.	Base flow	A	A	A	A	—	—	A	—	A	—	—	A	—	A	—	A	A
Pajarito above Two Mile (E243)	Monitors potential cumulative impacts from upper Twomile basin. Collected at gage station E243.	Base flow	S	A	A	A	—	—	S	—	A	—	—	S	—	A	—	A	S
Pajarito below confluence of South and North Anchor East Basin (PBF-1)	Located below the confluences of South and North Anchor East Basin (below E242.5). Monitors potential cumulative impacts of SWMUs and AOCs in Anchor East basin.	Base flow	S	A	A	A	—	—	S	—	A	—	—	S	—	A	—	A	S

Table 5.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites																	
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
Pajarito Below TA-18 (PBF-5)	Monitors base flow below TA-18 at TA boundary. Location moved from road to TA-18 boundary near PCAO-7c.	Base flow	S	A	A	A	—	—	S	—	A	—	—	S	—	A	—	S	S
Two Mile above Pajarito (E244)	Monitors potential cumulative impacts from upper Pajarito basin. Collected at gage station E244. Flows primarily from July to October.	Base flow	A	A	A	A	—	—	A	—	A	—	—	A	—	A	—	A	A
Two Mile Canyon below TA-59 (PBF-2)	Located in Twomile Canyon below TA-59. Monitors potential cumulative impacts of SWMUs and AOCs in upper Twomile basin.	Base flow	A	A	A	A	—	—	A	—	A	—	—	A	—	A	—	A	A
Anderson Spring	Monitors Twomile Canyon downgradient of TA-58, above potential sources of contamination in TA-03.	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	A
Bulldog Spring	Monitors HE contamination downgradient of TA-09.	Spring	S	A	A	A	—	—	S	—	A	—	A	S	—	A	A	A	S
Charlie's Spring	Monitors potential contamination from TA-08 area and MDA M.	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	A
Homestead Spring	Spring with one of the most significant discharge rates in this part of the canyon. Downgradient of TA-09 (MDA M).	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	A
Kieling Spring	Spring with history of HE contamination. Downgradient of TA-09.	Spring	S	A	A	A	—	—	S	—	A	—	A	S	—	A	A	A	S
PC Spring	Provides background water quality from the regional aquifer.	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	A

Table 5.4-1 (continued)

				Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
Starmer Spring	Spring believed to originate from intermediate perched groundwater in Bandelier Tuff. Provides baseline water quality at a location that is not downgradient of discharges from HE facilities.	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	A
TA-18 Spring	In Threemile Canyon, upgradient of TA-18 and downgradient of TA-16 firing site facilities.	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	A
Threemile Spring	In Threemile Canyon, upgradient of TA-18 and downgradient of TA-15 firing site facilities.	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	A
TW-1.72 Spring	Located In Twomile Canyon, downgradient of TA-03 facilities.	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	A
18-BG-1	Monitors baseline water quality relative to the TA-18 complex.	Alluvial	C	A	A	A	—	—	A	—	A	—	A	A	—	A	—	—	A
18-MW-11	Part of a group of alluvial wells within the former TA-18 complex. Well 18-MW-11 included to monitor for potential contaminants associated with buildings 18-147, 18-001, and 18-256.	Alluvial	C	A	A	A	—	—	A	—	A	—	A	A	—	A	—	—	A
18-MW-18	Part of a group of alluvial wells within the former TA-18 complex. Monitoring point for potential releases associated with historical sewage lagoons on lower Pajarito Canyon.	Alluvial	C[MP]	A	A	A	—	—	A	—	A	—	A	A	—	A	—	—	A

Table 5.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
18-MW-8	Part of a group of alluvial wells within the former TA-18 complex. Located in Threemile Canyon downgradient of former Critical Assembly Building at TA-18.	Alluvial	C	A	A	A	—	—	A	—	A	—	A	A	—	A	—	—	A
18-MW-9	Part of a group of alluvial wells within the former TA-18 complex. Well 18-MW-9 included to monitor for potential contaminants associated with buildings 18 31, 18-189, 18 29, and 18-37.	Alluvial	C	A	A	A	—	—	A	—	A	—	A	A	—	A	—	—	A
3MAO-2	Replacement well for 18-BG-4; located immediately east of confluence with South Fork Threemile Canyon. Characterizes potential impacts of TA-18 SWMUs within Threemile Canyon.	Alluvial	C	S	S	A	—	—	A	—	A	—	A	S	—	A	—	—	S
CDBO-4	Located in Cañada del Buey. Well has historically been dry. Transducer installed in early CY2009 as part of an agreement with NMED to characterize potential transients in recharge in this portion of Cañada del Buey. If well wets up, a plan will be implemented to sample the suite described here during a wetted phase.	Alluvial	C[HD]	A	A	A	—	—	—	—	A	—	A	A	—	A	—	—	A

Table 5.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites: Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
CDBO-5	Located in Cañada del Buey. Well has historically been dry. Transducer installed in early CY2009 as part of an agreement with NMED to characterize potential transients in recharge in this portion of Cañada del Buey. If well wets up, a plan will be implemented to sample the suite described here during a wetted phase.	Alluvial	C[HD]	A	A	A	—	—	—	—	A	—	A	A	—	A	—	—	A
CDBO-6	Monitoring required for SWS Discharge Permit.[o,p]	Alluvial	C	A	A	A	—	—	—	A	A	—	A	Q	—	A	—	—	Q
CDBO-7	Saturation usually not sufficient to sample but will be sampled if water is present.	Alluvial	C	A	A	A	—	—	—	—	A	—	A	A	—	A	—	—	A
CDBO-8	Monitors Cañada del Buey, approximately 0.4 mi southeast of CDBO-7. Well has historically been dry. Transducer installed in early CY2009 as part of an agreement with NMED to characterize potential transients in recharge in this portion of Cañada del Buey. If well wets up, a plan will be implemented to sample the suite described here during a wetted phase.	Alluvial	C[HD]	A	A	A	—	—	—	—	A	—	A	A	—	A	—	—	A

Table 5.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites: Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
CDBO-9	Located in Cañada del Buey, approximately 0.4 mi downgradient of CDBO-7. Well has historically been dry. Transducer installed in early CY2009 as part of an agreement with NMED to characterize potential transients in recharge in this portion of Cañada del Buey. If well wets up, a plan will be implemented to sample the suite described here during a wetted phase.	Alluvial	C[HD]	A	A	A	—	—	—	—	A	—	A	A	—	A	—	—	A
PCAO-5	Located above the flood retention structure in Pajarito Canyon, immediately downcanyon of the confluence of Twomile Canyon.	Alluvial	C	S	A	A	—	—	A	—	A	—	A	S	—	A	—	—	S
PCAO-6	Located just downcanyon of the flood retention structure in Pajarito Canyon. Well has been dry since installation.	Alluvial	C[HD]	S	A	A	—	—	A	—	A	—	A	S	—	A	—	—	S
PCAO-7a	Part of a transect of wells in Pajarito Canyon installed to characterize potential impacts from TA-18.	Alluvial	C	S	A	A	—	—	A	—	A	—	A	S	—	A	—	—	S
PCAO-7b2	Part of a transect of wells in Pajarito Canyon installed to characterize potential impacts from TA-18.	Alluvial	C[MP]	S	A	A	—	—	A	—	A	—	A	S	—	A	—	—	
PCAO-7c	Part of a transect of wells in Pajarito Canyon installed to characterize potential impacts from TA-18.	Alluvial	C	S	A	A	—	—	A	—	A	—	A	S	—	A	—	—	S
PCAO-8	Characterizes potential impacts from runoff associated with TA-54 near PCTH-5 (between PCO 2 and PCO-3).	Alluvial	C	S	A	A	—	—	A	—	A	—	A	S	—	A	—	—	S

Table 5.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites: Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
PCAO-9	Historical monitoring location at distal extent of alluvial groundwater saturation in lower Pajarito watershed.	Alluvial	C	S	A	A	—	—	A	—	A	—	A	S	—	A	—	—	S
PCO-2	Historical monitoring location at distal extent of alluvial groundwater saturation in lower Pajarito watershed.	Alluvial	C	S	A	A	—	—	A	—	A	—	A	S	—	A	—	—	S
TMO-1	Monitors alluvial groundwater at the mouth of Twomile Canyon. Characterizes cumulative potential impacts of SWMUs and AOCs throughout Twomile basin.	Alluvial	C	S	A	A	—	—	A	—	A	—	A	S	—	A	—	—	S
03-B-13	Near TA-03, building SM-30. Monitored in support of project at SWMU 03-010(a).	Intermediate	C	Q	Q	Q	—	—	Q	—	A	Q	—	Q	—	Q	A	—	Q
R-19 screen 2	Monitors for potential contaminants from TA-16. Also provides baseline characterization data for downgradient areas including TA-54.	Intermediate	C	S	S	—	—	—	S	—	A	—	S	S	—	S	A	—	S
R-23i piezometer (port 1)	Downgradient monitoring location for TA-54. Monitors potential sources in Pajarito watershed and potential sources in canyons to the north.	Intermediate	Q	Q	Q	S	—	—	S	—	A	—	S	Q	—	S	A	—	Q
R-23i screen 1 (port 2)	Downgradient monitoring location for TA-54. Also monitors potential sources in Pajarito watershed and potential sources in canyons to the north.	Intermediate	C	Q	Q	S	—	—	S	—	A	—	S	Q	—	S	A	—	Q

Table 5.4-1 (continued)

				Analytical Suites																	
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
R-23i screen 2 (port 3)	Downgradient monitoring location for TA-54. Monitors potential sources in Pajarito watershed and potential sources in canyons to the north.	Intermediate	C	Q	Q	S	—	—	S	—	A	—	S	Q	—	S	A	—	Q
R-19 screen 3	Monitors for potential contaminants from TA-16. Also provides baseline characterization data for downgradient areas including TA-54.	Regional	C	Q	Q	—	—	—	S	—	A	—	A	S	—	S	A	—	S
R-19 screen 4	Monitors for potential contaminants from TA-16. Also provides baseline characterization data for downgradient areas including TA-54.	Regional	C	Q	Q	—	—	—	S	—	A	—	A	S	—	S	A	—	S
R-19 screen 5	Well screen continues to show effects from drilling fluids; therefore, sample to be collected only for indicator suite.	Regional	C	—	—	—	—	—	—	—	—	—	—	—	A	—	—	—	A
R-19 screen 6	Well screen continues to show effects from drilling fluids; therefore, sample to be collected only for indicator suite.	Regional	C	—	—	—	—	—	—	—	—	—	—	—	A	—	—	—	A
R-19 screen 7	Well screen continues to show effects from drilling fluids; therefore, samples to be collected only for indicator suite.	Regional	C	—	—	—	—	—	—	—	—	—	—	—	A	—	—	—	A
R-23	Downgradient monitoring location for TA-54. Also monitors potential sources in Pajarito watershed and possible sources from canyons to the north.	Regional	C	Q	Q	Q	A	A	A	A	A	—	Q	Q	—	Q	A	—	Q

Table 5.4-1 (continued)

Notes: Sampling suites and frequencies: C = continuous; Q = quarterly (4 times/yr); S = semiannual (2 times/yr); A = annual (1 time/yr); T= triennial (1 time every 3 years, with the next sample scheduled for collection in 2011). Some locations assigned to an area-specific monitoring group or designated for general surveillance monitoring may be assigned analytical suites or frequencies that differ from those indicated in Tables 1.6-2 and 1.6-3 for site-specific reasons summarized in Table D-5.0-1.

Nonfiltered and filtered samples will be collected for general inorganics (excluding anions) and metals. Anions and perchlorate samples will be filtered. Samples collected for radionuclide analysis will be nonfiltered only for all water media. Organic and HEXP constituents are nonfiltered for all water media. Stable isotope samples for nitrogen isotopes are filtered; stable isotope samples for deuterium and oxygen isotopes are not filtered.

[a] Continuous monitoring for groundwater refers to the measurement of groundwater levels by a transducer placed in a well and programmed to collect groundwater-level measurements at highly frequent intervals (e.g., every 60 min daily throughout the year). Continuous stream-flow monitoring refers to the measurement of stream flow by a base-flow stream gage that is programmed to collect stream-flow measurements at highly frequent intervals. The superscript MP indicates water levels will be monitored at highly frequent intervals using a multiparameter probe that measures specific conductance, water level, and temperature. The superscript HD indicates that this sampling location is historically dry.

[b] Metals analysis includes the 23 target analyte list (TAL) metals, plus boron, molybdenum, silicon dioxide, strontium, tin, and uranium.

[c] VOC = Volatile organic compounds; SVOC = semivolatile organic compounds; TICs = tentatively identified compounds.

[d] PCB = Polychlorinated biphenyl (compound). The superscript CNGR indicates the analysis of PCB congeners using U.S. Environmental Protection Agency (EPA) Method 1668A.

[e] HEXP = High explosive (compounds). The HEXP analytical suite includes the Consent Order list of the normal SW-846:8330 analytes plus pentaerythritol tetranitrate (PETN); triaminotrinitrobenzene (TATB); 3,5-dinitroaniline, tri(o-cresyl)phosphate (TOCP); 2,4-diamino-6-nitrotoluene; and 2,6-diamino-4-nitrotoluene. These additional analytes are analyzed by SW-846:8321A. The superscript RDX-DP designates samples to be submitted for analysis of RDX degradation products: hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine (MNX); hexahydro-1,3-nitro-1,3,5-triazine (DNX); and hexahydro-1,3,5-trinitroso-1,3,5-triazine (TNX). The RDX-degradation products are analyzed by SW-846:8330.

[f] The radionuclide (RAD) suite includes gross alpha, gross beta, alpha spectroscopy, gamma spectroscopy, and strontium-90.

[g] Tritium samples may be submitted for analysis by liquid scintillation if anticipated activities are greater than 300 pCi/L. Low-level tritium is analyzed using electrolytic enrichment or direct counting.

[h] General inorganic analysis includes major anions (bromide, chloride, fluoride, sulfate); major cations (calcium, magnesium, sodium, potassium); nitrate plus nitrite (as N); total Kjeldahl nitrogen (TKN); ammonia; total phosphorus, total organic carbon (TOC); total dissolved solids (TDS); alkalinity; specific conductivity; pH; and hardness.

[i] Indicator suite includes major anions and cations, nitrate (as N), nitrite (as N), metals, alkalinity, pH, TOC, and, as needed, sulfide, ammonia, TKN, and perchlorate. Indicator-suite samples are submitted to the on-site EES-14 laboratory, with the exception of samples for TKN and perchlorate analysis, which are submitted to an off-site analytical facility.

[j] Analysis for stable nitrogen, deuterium, and oxygen isotopes. The collection of samples for stable isotopic analysis is considered a special sampling campaign that is outside the scope of the regulatory process. In general, samples for isotopic analysis are collected semiannually from "new" wells (those which completed construction, rehabilitation, or conversion on or after July 1, 2009) and annually from other locations. For intermediate and regional wells, "(A)" signifies samples will be collected annually until four sets of stable nitrogen isotope data have been collected. Any subsequent sampling for stable isotope analysis will be decided on the basis of site-specific conditions.

[k] Suspended sed = Suspended sediment concentration.

[l] Field parameters include pH, turbidity, specific conductance, dissolved oxygen, and temperature at all locations. Oxidation-reduction potential (ORP) will be measured if a flow-through cell is used and will not be measured in surface water, spring water, or water collected from Westbay sampling systems unless specified otherwise. Alkalinity (ALK) will be measured for all samples either in the field or at the on-site EES-14 laboratory.

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

[n] Characterization suites and frequencies apply to new intermediate perched or regional groundwater wells. "New" wells are defined as those which are completed, rehabilitated, or converted after July 1, 2009. After completion of four rounds of characterization sampling, a new well is reassigned automatically to the routine analytical suites and frequencies of the appropriate area-specific monitoring group or general surveillance monitoring plan unless specified otherwise.

[o] Quarterly SWS discharge permit sampling required for perchlorate by liquid chromatography–mass spectroscopy/mass spectroscopy, nitrate plus nitrite as N, TKN, ammonia (as N), TDS, and chloride. Quarterly samples must be collected before the end of the second month in each quarter.

[p] Annual SWS Discharge Permit sampling required for full suite-water analysis, which includes the following: (1) filtered metals: As, Ba, Cd, Cr, CN, Pb, Se, Ag, U, Cu, Fe, Mn, Zn, Al, B, Co, Mo, Ni; (2) unfiltered metals: Hg; (3) general inorganics: SO_4, F; (4) organics: VOA, SVOA; and (5) radionuclides: gross alpha, radium-226, and radium-228.

Table 6.4-1
Water (Includes Cañon de Valle, Potrillo Canyon, and Fence Canyon) Watershed Interim Monitoring Plan

				Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
MDA AB Monitoring Group																			
R-27i	New well completed October 17, 2009. Monitor potential contamination associated with the perched-intermediate zone downgradient of historical TA-16 sources.[n]	Intermediate	C	Q	Q	Q	S	S	Q[RDX-DP]	S	Q	—[m]	Q	Q	—	Q	S	—	Q
R-27	Monitors TA-16 in support of the TA-16 260 Outfall CME.	Regional	C	S	S	A	—	—	S[RDX-DP]	—	A	—	A	S	—	S	A	—	S
TA-16-260 Deep Groundwater Monitoring Group																			
CdV-16-1(i)	Well is located at TA-16, downgradient of the 260 Outfall.	Intermediate	C	S	S	A	—	—	S[RDX-DP]	—	A	—	A	S	—	A	A	—	S
CdV-16-2(i)r	Well is located at TA-16, downgradient of the 260 Outfall.	Intermediate	C	S	S	A	—	—	S[RDX-DP]	—	A	—	A	S	—	A	A	—	S
Cdv-37-1(i)	New well completed December 2, 2009, near the confluence of Water Canyon and Cañon de Valle Canyon. Monitors groundwater contamination in the perched-intermediate zone downgradient of TA-16.[n]	Intermediate	C	Q	Q	S	S	S	Q[RDX-DP]	S	Q	—	Q	Q	—	Q	S	—	Q
R-25 screen 1	Downgradient monitoring location for the 260 Outfall.	Intermediate	C	S	S	A	—	—	S[RDX-DP]	—	A	—	A	S	—	S	A	—	S
R-25 screen 2	Downgradient monitoring location for the 260 Outfall.	Intermediate	C	—	S	A	—	—	S[RDX-DP]	—	A	—	A	—	S	S	A	—	S
R-25 screen 4	Downgradient monitoring location for the 260 Outfall.	Intermediate	C	S	S	A	—	—	S[RDX-DP]	—	A	—	A	S	—	S	A	—	S
R-25b	Well completed in November 2008 immediately west of R-25 on the mesa top in TA-16. Monitors potential contamination associated with effluent from the 260 Outfall. Replaces screen 1 in R-25.	Intermediate	C	S	S	A	—	—	S[RDX-DP]	—	A	—	A	S	—	S	A	—	S

Table 6.4-1 (continued)

				Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
R-25c	Well completed in September 2008 as a replacement for screen 3 in R-25. Water present only in sump. Monitoring for water levels will continue, and screen will be sampled if water is present.	Intermediate	C[HD]	S	S	A	—	—	S[RDX-DP]	—	A	—	A	S	—	S	A	—	S
R-26 PZ-2	Piezometer installed near R-26. Provides data for perched intermediate groundwater upgradient of TA-16.	Intermediate	C	S	S	A	—	—	S[RDX-DP]	—	A	—	A	S	—	A	A	—	S
R-26 screen 1	Provides background data for perched intermediate groundwater upgradient of TA-16. Well will be converted from Westbay to single-screen well in accordance with the Westbay reliability assessment work plan.	Intermediate	C	S	S	A	—	—	S[RDX-DP]	—	A	—	A	S	—	A	A	—	S
R-47i	New well completed November 15, 2009, northeast of the 260 Outfall. Provides data in support of the 260 Outfall CME.	Intermediate	C	Q	Q	S	S	S	Q[RDX-DP]	S	Q	—	Q	Q	—	Q	S	—	Q
CdV-R-15-3 screen 4	Well will be converted from Westbay to single-screen well, with samples collected before and after conversion for analytes specified in the Westbay reliability assessment work plan.	Regional	C	S	S	A	—	—	S[RDX-DP]	—	A	—	A	S	—	S	A	—	S
CdV-R-15-3 screen 5	Well will be converted from Westbay to single-screen well, with samples collected before and after conversion for analytes specified in the Westbay reliability assessment work plan.	Regional	C	—	—	—	—	—	A[RDX-DP]	—	—	—	—	—	A	—	—	—	A
CdV-R-15-3 screen 6	Well will be converted from Westbay to single-screen well, with samples collected before and after conversion for analytes specified in the Westbay reliability assessment work plan.	Regional	C	—	—	—	—	—	A[RDX-DP]	—	—	—	—	—	A	—	—	—	A

Table 6.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
CdV-R-37-2 screen 2	Well will be converted from Westbay to single-screen well, with samples collected before and after conversion for analytes specified in the Westbay reliability assessment work plan.	Regional	C	—	—	—	—	—	A[RDX-DP]	—	—	—	—	—	A	—	—	—	A
CdV-R-37-2 screen 3	Well will be converted from Westbay to single-screen well, with samples collected before and after conversion for analytes specified in the Westbay reliability assessment work plan.	Regional	C	S	S	A	—	—	S[RDX-DP]	—	A	—	A	S	—	S	A	—	S
CdV-R-37-2 screen 4	Well will be converted from Westbay to single-screen well, with samples collected before and after conversion for analytes specified in the Westbay reliability assessment work plan.	Regional	C	S	S	A	—	—	S[RDX-DP]	—	A	—	A	S	—	S	A	—	S
R-25 screen 5	Downgradient monitoring location for the 260 Outfall.	Regional	C	S	S	A	—	—	S[RDX-DP]	—	A	—	A	S	—	S	A	—	S
R-25 screen 6	Downgradient monitoring location for the 260 Outfall.	Regional	C	S	S	A	—	—	S[RDX-DP]	—	A	—	A	S	—	S	A	—	S
R-25 screen 7	Downgradient monitoring location for the 260 Outfall.	Regional	C	S	S	A	—	—	S[RDX-DP]	—	A	—	A	S	—	S	A	—	S
R-25 screen 8	Downgradient monitoring location for the 260 Outfall.	Regional	C	S	S	A	—	—	S[RDX-DP]	—	A	—	A	S	—	S	A	—	S
R-47	New well planned for CY2010 at Q Site in TA-14. Well will be located along the rim of Canon de Valle within TA-14, and will provide data in support of the 260 Outfall CME.	Regional	C	Q	Q	S	S	S	Q[RDX-DP]	S	Q	—	Q	Q	—	Q	S	—	Q
R-48	New well completed December 26, 2009, by deepening open borehole CdV-16-3(i). Monitors historical TA-16 sources.	Regional	C	Q	Q	S	S	S	Q[RDX-DP]	S	Q	—	Q	Q	—	Q	S	—	Q

Table 6.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
General Surveillance Monitoring Locations																			
Base flow station between E252 and Water at Beta	Downgradient surface water location for 260 Outfall. Monitors HE and other contaminants in support of surface CME.	Base flow	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	—	A	—	A	—	S	S
Cañon de Valle below MDA P (E256).	Downgradient surface water location for 260 Outfall. Monitors HE and other contaminants in support of surface CME.	Base flow	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	—	A	—	A	—	S	S
Water Above SR-501 (E252)	Upgradient location for 260 Outfall CME.	Base flow	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	—	A	—	A	—	S	S
Water at Beta	Downgradient surface water location for 260 Outfall.	Base flow	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	—	A	—	A	—	S	S
Burning Ground Spring	Spring downgradient from TA-16-260 outfall. Monitors HE and other contaminants in support of surface CME.	Spring	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	A	A	—	A	A	S	S
CdV-5.0 Spring	Upgradient location for 260 Outfall CME.	Spring	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	A	A	—	A	A	S	S
Fish Ladder Spring	Spring/seep located in Fishladder Canyon downgradient from the Fishladder and Burning Ground. Shows HE when wet. Monitoring location for these sites.	Spring	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	A	A	—	A	A	S	S
Martin Spring	Spring located in upper Martin/S-Site Canyon. Shows HE w/ dynamics. Sources may include both the 260 Outfall and other TA-16 sources. Traditionally sampled as part of 260 Outfall CME efforts.	Spring	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	A	A	—	A	A	S	S
Peter Spring	Canyon discharge near TA-16-260 Outfall confluence with canyon. Monitors HE and other contaminants in support of surface CME.	Spring	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	A	A	—	A	A	S	S

Table 6.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites: Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
SWSC Spring	Spring downgradient from TA-16-260 outfall. HE contaminated w/dynamics. Supports surface CME.	Spring	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	A	A	—	A	A	S	S
Water Canyon Gallery	Upgradient location for TA-16-260 CME.	Spring	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	A	A	—	A	A	S	S
CdV-16-02655	Upgradient alluvial well location for TA-16-260 CME. Occasionally shows contamination.	Alluvial	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	A	A	—	A	—	—	
CdV-16-02656	Alluvial well location nearest to 260 Outfall drainage/Cañon de Valle confluence. Downgradient from MDA R. Monitors HE and other contaminants in support of surface CME.	Alluvial	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	A	A	—	A	—	—	S
CdV-16-02657	Alluvial well location nearest to 260 Outfall drainage/Cañon de Valle confluence. Shows HE w/dynamics. Supports CME.	Alluvial	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	A	A	—	A	A	—	S
CdV-16-02658	Downgradeint alluvial well from 260 Outfall drainage confluence. Monitors HE and other contaminants in support of surface CME.	Alluvial	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	A	A	—	A	—	—	S
CdV-16-02659	Downgradeint alluvial well from 260 Outfall drainage confluence. Monitors HE and other contaminants in support of surface CME.	Alluvial	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	A	A	—	A	—	—	S
FLC-16-25278	Alluvial well downgradient from Fishladder and Burning Ground. Shows HE and is an excellent downgradient monitoring point for Fishladder and Burning Ground.	Alluvial	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	A	A	—	A	—	—	S
FLC-16-25279	Alluvial well downgradient from Fishladder and Burning Ground. Shows HE and is an excellent downgradient monitoring point for Fishladder and Burning Ground.	Alluvial	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	A	A	—	A	—	—	S

Table 6.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites																	
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
FLC-16-25280	Alluvial well downgradient from Fishladder and Burning Ground. Shows HE and i =s an excellent downgradient monitoring point for Fishladder and Burning Ground.	Alluvial	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	A	A	—	A	—	—	S
MSC-16-06293	Alluvial well in S-Site/Martin canyon downgradient from Martin Spring and several TA-16 SWMU sites. Shows HE when wet. Traditionally included in 260 Outfall CME because of possible connections of Martin Spring with 260 Outfall discharges.	Alluvial	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	A	A	—	A	—	—	S
MSC-16-06294	Alluvial well in S-Site/Martin Canyon downgradient from Martin Spring and several TA-16 SWMU sites. Shows HE when wet. Traditionally included in 260 Outfall CME because of possible connections of Martin Spring with 260 Outfall discharges.	Alluvial	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	A	A	—	A	—	—	S
MSC-16-06295	Alluvial well in S-Site/Martin Canyon downgradient from Martin Spring and several TA-16 SWMU sites. Shows HE when wet. Traditionally included in 260 Outfall CME because of = possible connections of Martin Spring with 260 Outfall discharges.	Alluvial	C	S	S	A	—	—	S^{RDX-DP}	—	A	—	A	A	—	A	—	—	S
WCO-1r	New well completed December 22, 2009, to replace WCO-1. Well was initially dry.	Alluvial	C	Q	Q	Q	Q	Q	Q^{RDX-DP}	—	Q	—	Q	Q	—	Q	S	—	Q
WCO-2	Well occasionally shows water level responses during spring runoff in March/April. Sample annually in spring.	Alluvial	C	A	A	A	—	—	A^{RDX-DP}	—	A	—	A	A	—	A	—	—	A
WCO-3r	New well completed December 22, 2009, to replace WCO-3. Well was initially dry.	Alluvial	C	Q	Q	Q	Q	Q	Q^{RDX-DP}	—	Q	—	Q	Q	—	Q	S	—	Q

Table 6.4-1 (continued)

Notes: Sampling suites and frequencies: C = continuous; Q = quarterly (4 times/yr); S = semiannual (2 times/yr); A = annual (1 time/yr); T= triennial (1 time every 3 years, with the next sample scheduled for collection in 2011). Some locations assigned to an area-specific monitoring group or designated for general surveillance monitoring may be assigned analytical suites or frequencies that differ from those indicated in Tables 1.6-2 and 1.6-3 for site-specific reasons summarized in Table D-6.0-1.

Nonfiltered and filtered samples will be collected for general inorganics (excluding anions) and metals. Anions and perchlorate samples will be filtered. Samples collected for radionuclide analysis will be nonfiltered only for all water media. Organic and HEXP constituents are nonfiltered for all water media. Stable isotope samples for nitrogen isotopes are filtered; stable isotope samples for deuterium and oxygen isotopes are not filtered.

[a] Continuous monitoring for groundwater refers to the measurement of groundwater levels by a transducer placed in a well and programmed to collect groundwater-level measurements at highly frequent intervals (e.g., every 60 min daily throughout the year). Continuous stream-flow monitoring refers to the measurement of stream flow by a base-flow stream gage that is programmed to collect stream-flow measurements at highly frequent intervals. The superscript MP indicates water levels will be monitored at highly frequent intervals using a multiparameter probe that measures specific conductance, water level, and temperature. The superscript HD indicates that this sampling location is historically dry.

[b] Metals analysis includes the 23 target analyte list (TAL) metals, plus boron, molybdenum, silicon dioxide, strontium, tin, and uranium.

[c] VOC = Volatile organic compounds; SVOC = semivolatile organic compounds; TICs = tentatively identified compounds.

[d] PCB = Polychlorinated biphenyl (compound). The superscript CNGR indicates the analysis of PCB congeners using U.S. Environmental Protection Agency (EPA) Method 1668A.

[e] HEXP = High explosive (compounds). The HEXP analytical suite includes the Consent Order list of the normal SW-846:8330 analytes plus pentaerythritol tetranitrate (PETN); triaminotrinitrobenzene (TATB); 3,5-dinitroaniline, tri(o-cresyl)phosphate (TOCP); 2,4-diamino-6-nitrotoluene; and 2,6-diamino-4-nitrotoluene. These additional analytes are analyzed by SW-846:8321A. The superscript RDX-DP designates samples to be submitted for analysis of RDX degradation products: hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine (MNX); hexahydro-1,3-nitro-1,3,5-triazine (DNX); and hexahydro-1,3,5-trinitroso-1,3,5-triazine (TNX). The RDX-degradation products are analyzed by SW-846:8330.

[f] The radionuclide (RAD) suite includes gross alpha, gross beta, alpha spectroscopy, gamma spectroscopy, and strontium-90.

[g] Tritium samples may be submitted for analysis by liquid scintillation if anticipated activities are greater than 300 pCi/L. Low-level tritium is analyzed using electrolytic enrichment or direct counting.

[h] General inorganic analysis includes major anions (bromide, chloride, fluoride, sulfate); major cations (calcium, magnesium, sodium, potassium); nitrate plus nitrite (as N); total Kjeldahl nitrogen (TKN); ammonia; total phosphorus, total organic carbon (TOC); total dissolved solids (TDS); alkalinity; specific conductivity; pH; and hardness.

[i] Indicator suite includes major anions and cations, nitrate (as N), nitrite (as N), metals, alkalinity, pH, TOC, and, as needed, sulfide, ammonia, TKN, and perchlorate. Indicator-suite samples are submitted to the on-site EES-14 laboratory, with the exception of samples for TKN and perchlorate analysis, which are submitted to an off-site analytical facility.

[j] Analysis for stable nitrogen, deuterium, and oxygen isotopes. The collection of samples for stable isotopic analysis is considered a special sampling campaign that is outside the scope of the regulatory process. In general, samples for isotopic analysis are collected semiannually from “new” wells (those which completed construction, rehabilitation, or conversion on or after July 1, 2009) and annually from other locations. For intermediate and regional wells, “(A)” signifies samples will be collected annually until four sets of stable nitrogen isotope data have been collected. Any subsequent sampling for stable isotope analysis will be decided on the basis of site-specific conditions.

[k] Suspended sed = Suspended sediment concentration.

[l] Field parameters include pH, turbidity, specific conductance, dissolved oxygen, and temperature at all locations. Oxidation-reduction potential (ORP) will be measured if a flow-through cell is used and will not be measured in surface water, spring water, or water collected from Westbay sampling systems unless specified otherwise. Alkalinity (ALK) will be measured for all samples either in the field or at the on-site EES-14 laboratory.

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

[n] Characterization suites and frequencies apply to new intermediate perched or regional groundwater wells. “New” wells are defined as those which are completed, rehabilitated, or converted after July 1, 2009. After completion of four rounds of characterization sampling, a new well is reassigned automatically to the routine analytical suites and frequencies of the appropriate area-specific monitoring group or general surveillance monitoring plan unless specified otherwise.

Table 6.4-2
Performance Monitoring Plan for TA-16-260 Alluvial CMI

Location	Rationale for Selection of Location	Source Aquifer	Water Level or Flow	Analytical Suites: Metals	Organics						Radionuclides			General Inorganics					Field Data[g]
				Metals[a]	VOC + TICs[b]	SVOC + TICs[b]	Pesticides	PCB[b]	HEXP + RDX-DP[c]	Dioxins/Furans	RAD[b]	Tritium	Low-Level Tritium	Gen Inorganics[d]	Indicator Suite	Perchlorate	Stable C and N Isotopes[e]	Suspended Sed[f]	DO, ORP, pH, SC, T, Trb, ALK
Alluvial A subgroup (surge bed)																			
Surge bed monitoring well	Alluvial well installed next to the former settling pond in the upper portion of the drainage channel that was fed by the TA-16 260 Outfall. Monitors performance of in situ injection grouting of the surge bed underlying the former settling pond. If the grouting successfully filled the fractures and interstitial pore spaces of the surge bed, then no water is anticipated to be present in the well.	Alluvial	Q	—[h]	—	—	—	—	Q	—	—	—	—	—	—	—	—	—	Q
Alluvial B subgroup (pilot PRB ports)																			
16-612215 (MP1)	Upgradient pilot PRB sampling tube. Monitors pretreatment water chemistry.	Alluvial	M/Q	M/Q	—	—	—	—	M/Q	—	—	—	—	M/Q	—	—	M/Q	—	M/Q
16-612216 (MP-2)	Influent flow rate for pilot PRB. Monitor flow only.	Alluvial	M/Q	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
16-612217 MP3	Pilot PRB zero-valent iron (ZVI) media port. Monitors ZVI media performance.	Alluvial	M/Q	M/Q	—	—	—	—	M/Q	—	—	—	—	M/Q	—	—	M/Q	—	M/Q
16-612218 MP4	Pilot PRB gravel port. Monitors prezeolite/post-ZVI performance.	Alluvial	M/Q	M/Q	—	—	—	—	M/Q	—	—	—	—	M/Q	—	—	M/Q	—	M/Q
16-612219 MP5	Pilot PRB zeolite port. Monitors zeolite perfomance.	Alluvial	M/Q	M/Q	—	—	—	—	M/Q	—	—	—	—	M/Q	—	—	M/Q	—	M/Q
16-612220 (MP-6)	Effluent flow rate for pilot PRB. Monitor flow only.	Alluvial	M/Q	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.4-2 (continued)

Location	Rationale for Selection of Location	Source Aquifer	Water Level or Flow	Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[g]
				Metals[a]	VOC + TICs[b]	SVOC + TICs[b]	Pesticides	PCB[b]	HEXP + RDX-DP[c]	Dioxins/Furans	RAD[b]	Tritium	Low-Level Tritium	Gen Inorganics[d]	Indicator Suite	Perchlorate	Stable C and N Isotopes[e]	Suspended Sed[f]	DO, ORP, pH, SC, T, Trb, ALK
16-612221 MP7	Downgradient PRB sampling tube. Monitors posttreatment water chemistry and pilot PRB performance.	Alluvial	M/Q	M/Q	—	—	—	—	M/Q	—	—	—	—	M/Q	—	—	M/Q	—	M/Q
Alluvial C subgroup (above and below pilot PRB)																			
CDV-16-611938 MW-1	Downgradient of pilot PRB. Monitors influence of PRB effluent on downgradient groundwater chemistry.	Alluvial	M/Q	M/Q	—	—	—	—	M/Q	—	—	—	—	M/Q	—	—	—	—	M/Q
CDV-16-611921 MW-5	Upgradient of pilot PRB. Monitors pretreatment water chemistry.	Alluvial	M/Q	M/Q	—	—	—	—	M/Q	—	—	—	—	M/Q	—	—	—	—	M/Q
CDV-16-611923 MW-12	Upgradient of pilot PRB vessel. Monitors pretreatment water chemistry.	Alluvial	M/Q	M/Q	—	—	—	—	M/Q	—	—	—	—	M/Q	—	—	—	—	M/Q
CDV-16-611934 MW-18	Upgradient of pilot PRB. Monitors pretreatment water chemistry.	Alluvial	M/Q	M/Q	—	—	—	—	M/Q	—	—	—	—	M/Q	—	—	—	—	M/Q
CDV-16-611936 MW-19	Downgradient of pilot PRB. Monitors influence of PRB effluent on downgradient groundwater chemistry.	Alluvial	M/Q	M/Q	—	—	—	—	M/Q	—	—	—	—	M/Q	—	—	—	—	M/Q
CDV-16-611937 MW-20	Downgradient of pilot PRB. Monitors influence of PRB effluent on downgradient groundwater chemistry.	Alluvial	M/Q	M/Q	—	—	—	—	M/Q	—	—	—	—	M/Q	—	—	—	—	M/Q
Alluvial D subgroup (PRB cutoff wall)																			
CDV-16-611924 (PZ-13)	Piezometer above PRB cutoff wall.	Alluvial	W/B/M[i]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CDV-16-611925 (PZ-14)	Piezometer above PRB cutoff wall.	Alluvial	W/B/M[i]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.4-2 (continued)

Location	Rationale for Selection of Location	Source Aquifer	Water Level or Flow	Analytical Suites																	
				Metals	Organics						Radionuclides			General Inorganics					Field Data[g]		
				Metals[a]	VOC + TICs[b]	SVOC + TICs[b]	Pesticides	PCB[b]	HEXP + RDX-DP[c]	Dioxins/Furans	RAD[b]	Tritium	Low-Level Tritium	Gen Inorganics[d]	Indicator Suite	Perchlorate	Stable C and N Isotopes[e]	Suspended Sed[f]	DO, ORP, pH, SC, T, Trb, ALK		
CDV-16-611926 (PZ-15)	Piezometer above PRB cutoff wall.	Alluvial	W/B/M[i]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
CDV-16-611927 (PZ-16)	Piezometer above PRB cutoff wall.	Alluvial	W/B/M[i]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
CDV-16-611919 (MW-2)	Alluvial well above PRB cutoff wall.	Alluvial	W/B/M[i]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
CDV-16-611922 (MW-3)	Alluvial well above PRB cutoff wall.	Alluvial	W/B/M[i]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
CDV-16-611920 (MW-4)	Alluvial well above PRB cutoff wall.	Alluvial	W/B/M[i]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
CDV-16-611921 (MW-5)	Alluvial well above PRB cutoff wall.	Alluvial	W/B/M[i]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
CDV-16-611923 (MW-12)	Alluvial well above PRB cutoff wall.	Alluvial	W/B/M[i]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
CDV-16-611928 (MW-6)	Alluvial well below PRB cutoff wall.	Alluvial	W/B/M[i]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
CDV-16-611929 (MW-7)	Alluvial well below PRB cutoff wall.	Alluvial	W/B/M[i]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
CDV-16-611930 (MW-8)	Alluvial well below PRB cutoff wall.	Alluvial	W/B/M[i]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		

Table 6.4-2 (continued)

Location	Rationale for Selection of Location	Source Aquifer	Water Level or Flow	Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[g]
				Metals[a]	VOC + TICs[b]	SVOC + TICs[b]	Pesticides	PCB[b]	HEXP + RDX-DP[c]	Dioxins/Furans	RAD[b]	Tritium	Low-Level Tritium	Gen Inorganics[d]	Indicator Suite	Perchlorate	Stable C and N Isotopes[e]	Suspended Sed[f]	DO, ORP, pH, SC, T, Trb, ALK
CDV-16-611931 (MW-9)	Alluvial well below PRB cutoff wall.	Alluvial	W/B/M[i]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CDV-16-611932 (MW-10)	Alluvial well below PRB cutoff wall.	Alluvial	W/B/M[i]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CDV-16-611935 (MW-11)	Alluvial well below PRB cutoff wall.	Alluvial	W/B/M[i]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CDV-16-611933 (MW-17)	Alluvial well below PRB cutoff wall.	Alluvial	W/B/M[i]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CDV-16-611934 (MW-18)	Alluvial well below PRB cutoff wall.	Alluvial	W/B/M[i]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Springs (carbon filter treatment systems)																			
Burning Ground Spring	Spring outlet/influent for carbon-filter system. Monitors posttreatment water chemistry and carbon-filter system performance.	Spring	C W/M/Q[j]	—	—	—	—	—	W/M/Q	—	—	—	—	W/M/Q	—	—	—	—	W/M/Q
	Effluent from carbon-filter system installed in 2009. Monitors posttreatment water chemistry and carbon-filter system performance.	Spring	W/M/Q	—	—	—	—	—	W/M/Q	—	—	—	—	W/M/Q	—	—	—	—	W/M/Q

Table 6.4-2 (continued)

Location	Rationale for Selection of Location	Source Aquifer	Water Level or Flow	Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[g]
				Metals[a]	VOC + TICs[b]	SVOC + TICs[b]	Pesticides	PCB[b]	HEXP + RDX-DP[c]	Dioxins/Furans	RAD[b]	Tritium	Low-Level Tritium	Gen Inorganics[d]	Indicator Suite	Perchlorate	Stable C and N Isotopes[e]	Suspended Sed[f]	DO, ORP, pH, SC, T, Trb, ALK
Martin Spring	Spring outlet. Monitors pretreatment water chemistry.	Spring	C W/M/Q[j]	—	—	—	—	—	W/M/Q	—	—	—	—	W/M/Q	—	—	—	—	W/M/Q
	Effluent from carbon-filter system installed in 2001 and upgraded during the CMI. Monitors posttreatment water chemistry and carbon-filter system performance.	Spring	W/M/Q	—	—	—	—	—	W/M/Q	—	—	—	—	W/M/Q	—	—	—	—	W/M/Q
SWSC Spring	Spring outlet. Monitors pretreatment water chemistry.	Spring	C W/M/Q[j]	—	—	—	—	—	W/M/Q	—	—	—	—	W/M/Q	—	—	—	—	W/M/Q
	Effluent from carbon-filter system installed in 2009. Monitors posttreatment water chemistry and carbon-filter system performance.	Spring	W/M/Q	—	—	—	—	—	W/M/Q	—	—	—	—	W/M/Q	—	—	—	—	W/M/Q

Table 6.4-2 (continued)

Notes: Sampling suites and frequencies: W = weekly (applies only to first month of sampling unless specified otherwise); B = biweekly; M = monthly (applies only to first quarter of sampling unless specified otherwise); C = continuous; Q = quarterly (4 times/yr).

Nonfiltered and filtered samples will be collected for general inorganics (excluding anions) and metals. Anion samples will be filtered. HEXP samples are nonfiltered. Stable isotope samples for carbon and nitrogen isotopes are filtered.

[a] Metals analysis includes the 23 target analyte list (TAL) metals, plus boron, molybdenum, silicon dioxide, strontium, tin, and uranium.

[b] VOC = Volatile organic compounds; SVOC = semivolatile organic compounds; TICs = tentatively identified compounds; PCB = polychlorinated biphenyl (compound); RAD = radionuclide suite.

[c] HEXP = High explosive (compounds). The HEXP analytical suite includes the Consent Order list of the normal SW-846:8330 analytes plus pentaerythritol tetranitrate (PETN); triaminotrinitrobenzene (TATB); 3,5-dinitroaniline, tri(o-cresyl)phosphate (TOCP); 2,4-diamino-6-nitrotoluene; and 2,6-diamino-4-nitrotoluene. These additional analytes are analyzed by SW-846:8321A. The superscript RDX-DP designates samples to be submitted for analysis of RDX degradation products: hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine (MNX); hexahydro-1,3-nitro-1,3,5-triazine (DNX); and hexahydro-1,3,5-trinitroso-1,3,5-triazine (TNX). The RDX-degradation products are analyzed by SW-846:8330.

[d] General inorganic analysis includes major anions (bromide, chloride, fluoride, sulfate); major cations (calcium, magnesium, sodium, potassium); nitrate plus nitrite (as N); total Kjeldahl nitrogen (TKN); ammonia; total phosphorus; total organic carbon (TOC); total dissolved solids (TDS); alkalinity; specific conductivity; pH; and hardness.

[e] Analysis for stable carbon and nitrogen isotopes.

[f] Suspended sed = Suspended sediment concentration.

[g] Field parameters include pH, turbidity (TRB), specific conductance (SC), dissolved oxygen (DO), oxidation-reduction potential (ORP), and temperature (T) at all locations and will be measured using a flow-through cell. Alkalinity (ALK) will be measured for all samples either in the field or at the on-site EES-14 laboratory.

[h] — = This analytical suite is not requested for this location as part of the CMI performance monitoring.

[i] Monitor water levels weekly during the first quarter, biweekly during the second quarter, and once each during third and fourth quarters.

[j] The Laboratory continuously measures spring flow rates at SWSC, Burning Ground, and Martin Springs with ultrasonic flow detectors. These data are available once they are downloaded and quality assured. Manual measurements will be made at each spring outlet and filter unit outlet each time a sample is collected. Flow rates will be measured using a graduated measuring device and stopwatch in accordance with SOP 5224, Spring and Surface Water Sampling.

Table 7.4-1
Frijoles, Ancho and Chaquehui Watersheds Interim Monitoring Plan

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites: Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
MDA AB Monitoring Group																			
R-29	New monitoring well located near the southeast corner of MDA AB on mesa between Water and Ancho Canyons. Completed March 31, 2010.[n]	Regional	C	Q	Q	Q	S	S	Q	S	Q	—[m]	Q	Q	—[m]	Q	S	—	Q
R-30	New monitoring well located near the northeast corner of MDA AB on mesa between Water and Ancho Canyons. Completed April 3, 2010.[n]	Regional	C	Q	Q	Q	S	S	Q	S	Q	—	Q	Q	—	Q	S	—	Q
Test Well DT-10	Part of interim monitoring network pending well network assessment for MDA AB.	Regional	C	S	A	—	—	—	S	—	A	—	A	S	—	S	A	—	A
Test Well DT-5A	Part of interim monitoring network pending well network assessment for MDA AB.	Regional	C	S	A	—	—	—	S	—	A	—	A	S	—	S	A	—	A
Test Well DT-9	Part of interim monitoring network pending well network assessment for MDA AB.	Regional	C	S	A	—	—	—	S	—	A	—	A	S	—	S	A	—	A
General Surveillance Monitoring Locations																			
Ancho at Rio Grande	Historical annual sampling site. Sampled in fall during White Rock and Rio Grande watershed sampling event. See Table 8.4-1.	Base flow	—	—	—	—	—	—	—	—	--	—	—	—	—	—	—	--	--
Frijoles at Rio Grande	Perimeter station for the Laboratory. Sampled in fall during White Rock and Rio Grande watershed sampling event. See Table 8.4-1.	Base flow	—	—	—	—	—	—	—	—	--	—	—	—	—	—	—	--	--
Rio de los Frijoles at Bandelier (E350)	Historical sampling location near Bandelier National Monument headquarters.	Base flow	A	A	—	—	—	—	—	—	A	—	—	A	—	A	—	A	A
R-31 screen 1	Dry screen. Water level checked during quarterly sampling event.	Intermediate	Q	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
R-31 screen 2	Well screen impacted by drilling fluids. Sample for watershed-specific indicator suite.	Regional	C	—	—	—	—	—	A	—	--	—	A	—	A	—	A	—	A

Table 7.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
R-31 screen 3	Well screen impacted by drilling fluids. Sample for watershed-specific indicator suite.	Regional	C	—	—	—	—	—	A	—		—	A	—	A	—	A	—	A
R-31 screen 4	Part of interim monitoring network pending well network assessment for MDA AB.	Regional	C	A	A	—	—	—	A	—	A	—	A	A	—	A	A	—	A
R-31 screen 5	Part of interim monitoring network pending well network assessment for MDA AB.	Regional	C	A	A	—	—	—	A	—	A	—	A	A	—	A	A	—	A
General Surveillance Monitoring (Off-site Background Location)																			
Barbara Spring	Off-site background location in upper Frijoles Canyon.	Spring	A	A	—	—	—	—	—	—	A	—	A	A	—	A	A	A	A

Table 7.4-1 (continued)

Notes: Sampling suites and frequencies: C = continuous; Q = quarterly (4 times/yr); S = semiannual (2 times/yr); A = annual (1 time/yr); T= triennial (1 time every 3 years, with the next sample scheduled for collection in 2011). Some locations assigned to an area-specific monitoring group or designated for general surveillance monitoring may be assigned analytical suites or frequencies that differ from those indicated in Tables 1.6-2 and 1.6-3 for site-specific reasons summarized in Table D-7.0-1.

Nonfiltered and filtered samples will be collected for general inorganics (excluding anions) and metals. Anions and perchlorate samples will be filtered. Samples collected for radionuclide analysis will be nonfiltered only for all water media. Organic and HEXP constituents are nonfiltered for all water media. Stable isotope samples for nitrogen isotopes are filtered; stable isotope samples for deuterium and oxygen isotopes are not filtered.

[a] Continuous monitoring for groundwater refers to the measurement of groundwater levels by a transducer placed in a well and programmed to collect groundwater-level measurements at highly frequent intervals (e.g., every 60 min daily throughout the year). Continuous stream-flow monitoring refers to the measurement of stream flow by a base-flow stream gage that is programmed to collect stream-flow measurements at highly frequent intervals. The superscript MP indicates water levels will be monitored at highly frequent intervals using a multiparameter probe that measures specific conductance, water level, and temperature. The superscript HD indicates that this sampling location is historically dry.

[b] Metals analysis includes the 23 target analyte list (TAL) metals, plus boron, molybdenum, silicon dioxide, strontium, tin, and uranium.

[c] VOC = Volatile organic compounds; SVOC = semivolatile organic compounds; TICs = tentatively identified compounds.

[d] PCB = Polychlorinated biphenyl (compound). The superscript CNGR indicates the analysis of PCB congeners using U.S. Environmental Protection Agency (EPA) Method 1668A.

[e] HEXP = High explosive (compounds). The HEXP analytical suite includes the Consent Order list of the normal SW-846:8330 analytes plus pentaerythritol tetranitrate (PETN); triaminotrinitrobenzene (TATB); 3,5-dinitroaniline, tri(o-cresyl)phosphate (TOCP); 2,4-diamino-6-nitrotoluene; and 2,6-diamino-4-nitrotoluene. These additional analytes are analyzed by SW-846:8321A. The superscript RDX-DP designates samples to be submitted for analysis of RDX degradation products: hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine (MNX); hexahydro-1,3-nitro-1,3,5-triazine (DNX); and hexahydro-1,3,5-trinitroso-1,3,5-triazine (TNX). The RDX-degradation products are analyzed by SW-846:8330.

[f] The radionuclide (RAD) suite includes gross alpha, gross beta, alpha spectroscopy, gamma spectroscopy, and strontium-90.

[g] Tritium samples may be submitted for analysis by liquid scintillation if anticipated activities are greater than 300 pCi/L. Low-level tritium is analyzed using electrolytic enrichment or direct counting.

[h] General inorganic analysis includes major anions (bromide, chloride, fluoride, sulfate); major cations (calcium, magnesium, sodium, potassium); nitrate plus nitrite (as N); total Kjeldahl nitrogen (TKN); ammonia; total phosphorus, total organic carbon (TOC); total dissolved solids (TDS); alkalinity; specific conductivity; pH; and hardness.

[i] Indicator suite includes major anions and cations, nitrate (as N), nitrite (as N), metals, alkalinity, pH, TOC, and, as needed, sulfide, ammonia, TKN, and perchlorate. Indicator-suite samples are submitted to the on-site EES-14 laboratory, with the exception of samples for TKN and perchlorate analysis, which are submitted to an off-site analytical facility.

[j] Analysis for stable nitrogen, deuterium, and oxygen isotopes. The collection of samples for stable isotopic analysis is considered a special sampling campaign that is outside the scope of the regulatory process. In general, samples for isotopic analysis are collected semiannually from "new" wells (those which completed construction, rehabilitation, or conversion on or after July 1, 2009) and annually from other locations. For intermediate and regional wells, "(A)" signifies samples will be collected annually until four sets of stable nitrogen isotope data have been collected. Any subsequent sampling for stable isotope analysis will be decided on the basis of site-specific conditions.

[k] Suspended sed = Suspended sediment concentration.

[l] Field parameters include pH, turbidity, specific conductance, dissolved oxygen, and temperature at all locations. Oxidation-reduction potential (ORP) will be measured if a flow-through cell is used and will not be measured in surface water, spring water, or water collected from Westbay sampling systems unless specified otherwise. Alkalinity (ALK) will be measured for all samples either in the field or at the on-site EES-14 laboratory.

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

[n] Characterization suites and frequencies apply to new intermediate perched or regional groundwater wells. "New" wells are defined as those which are completed, rehabilitated, or converted after July 1, 2009. After completion of four rounds of characterization sampling, a new well is reassigned automatically to the routine analytical suites and frequencies of the appropriate area-specific monitoring group or general surveillance monitoring plan unless specified otherwise.

Table 8.4-1
White Rock Canyon and Rio Grande Watershed Interim Monitoring Plan

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites																
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]	
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK	
General Surveillance Monitoring Locations																				
Ancho Spring	Monitors regional aquifer downgradient of the Laboratory.	Spring	A	A	A	A	—[m]	—	A	—	A	—	A	A	—	A	A	A	A	
La Mesita Spring	Monitors regional aquifer downgradient of the Laboratory. Located on San Ildefonso land and sampled under the MOU.	Spring	A	A	A	T (2011)	—	T (2011)	T (2011)	—	A	—	A	A	—	A	A	A	A	
Sacred Spring	Off-site spring that monitors regional aquifer downgradient of the Laboratory. Background location. Located on San Ildefonso land and sampled under the MOU.	Spring	A	A	A	T (2011)	—	T (2011)	T (2011)	—	A	—	A	A	—	A	A	A	A	
Sandia Spring	Monitors regional aquifer downgradient of the Laboratory. Located on San Ildefonso land and sampled under the MOU.	Spring	A	A	A	T (2011)	—	T (2011)	T (2011)	—	A	—	A	A	—	A	A	A	A	
Spring 1	Monitors regional aquifer downgradient of the Laboratory. Background location. Located on San Ildefonso land and sampled under the MOU.	Spring	A	A	A	T (2011)	—	T (2011)	T (2011)	—	A	—	A	A	—	A	A	A	A	
Spring 2	Monitors regional aquifer downgradient of the Laboratory. Located on San Ildefonso land and sampled under the MOU.	Spring	A	A	A	T (2011)	—	T (2011)	T (2011)	—	A	—	A	A	—	A	A	A	A	
Spring 3	Monitors regional aquifer downgradient of the Laboratory.	Spring	A	A	A	A	—	—	—	—	A	—	A	A	—	A	A	A	A	
Spring 3A	Monitors regional aquifer downgradient of the Laboratory.	Spring	A	A	A	A	—	—	—	—	A	—	A	A	—	A	A	A	A	
Spring 3AA	Monitors regional aquifer downgradient of the Laboratory.	Spring	A	A	A	A	—	—	—	—	A	—	A	A	—	A	A	A	A	

Table 8.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
Spring 4	Monitors regional aquifer downgradient of the Laboratory.	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	A
Spring 4A	Monitors regional aquifer downgradient of the Laboratory.	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	A
Spring 4AA	Monitors regional aquifer downgradient of the Laboratory.	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	A
Spring 4B	Monitors regional aquifer downgradient of the Laboratory.	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	A
Spring 5	Monitors regional aquifer downgradient of the Laboratory.	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	A
Spring 5A	Monitors regional aquifer downgradient of the Laboratory.	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	A
Spring 6	Monitors regional aquifer downgradient of the Laboratory. Background location.	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	A
Spring 6A	Monitors regional aquifer downgradient of the Laboratory. Background location.	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	A
Spring 7/ Spring 8	Springs monitor regional aquifer downgradient of the Laboratory. Sample Spring 7; if not possible, sample Spring 8.	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	A
Spring 8A	Monitors regional aquifer downgradient of the Laboratory. Background location.	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	A
Spring 9	Monitors regional aquifer downgradient of the Laboratory. Background location.	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	A
Spring 9A	Monitors regional aquifer downgradient of the Laboratory. Background location.	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	
Spring 9B	Monitors regional aquifer downgradient of the Laboratory. Background location.	Spring	A	A	A	A	—	—	A	—	A	—	A	A	—	A	A	A	A

Table 8.4-1 (continued)

Location	Rationale for Selection of Location	Surface Water Body or Source Aquifer	Water Level or Flow[a]	Analytical Suites															
				Metals	Organics						Radionuclides			General Inorganics					Field Data[l]
				TAL Metals[b]	VOC + TICs[c]	SVOC + TICs[c]	Pesticides	PCB[d]	HEXP[e]	Dioxins/Furans	RAD[f]	Tritium[g]	Low-Level Tritium[g]	Gen Inorganics[h]	Indicator Suite[i]	Perchlorate	Stable Isotopes[j]	Suspended Sed[k]	DO, ORP, pH, SC, T, Trb, ALK
Rio Grande at Otowi Upper	Monitors base flow in the Rio Grande at Otowi Bridge. Located on San Ildefonso land and sampled under the MOU.	Base flow	A	A	A	A	—	A	A	—	A	—	A	A	—	A	—	A	A
Ancho at Rio Grande	Historical annual sampling site. Monitors base flow from Ancho at Rio Grande.	Base flow	A	A	A	—	—	—	—	—	A	—	—	A	—	A	—	A	A
Frijoles at Rio Grande	Perimeter station for the Laboratory. Sampled in fall, during White Rock and Rio Grande watershed sampling event.	Base flow	A	A	A	—	—	—	—	—	A	—	—	A	—	A	—	A	A
Mortandad at Rio Grande	Located on San Ildefonso land and sampled under the MOU.	Base flow	A	A	A	A	—	A	A	—	A	—	A	A	—	A	—	A	A
Pajarito at Rio Grande	Monitors base flow from Pajarito at the Rio Grande.	Base flow	A	A	A	—	—	—	—	—	A	—	—	A	—	A	—	A	A
Rio Grande at Frijoles	Monitors base flow in the Rio Grande at Frijoles Canyon.	Base flow	A	A	A	—	—	—	—	—	A	—	—	A	—	A	—	A	A

Table 8.4-1 (continued)

Notes: Sampling suites and frequencies: C = continuous; Q = quarterly (4 times/yr); S = semiannual (2 times/yr); A = annual (1 time/yr); T= triennial (1 time every 3 years, with the next sample scheduled for collection in 2011). Some locations assigned to an area-specific monitoring group or designated for general surveillance monitoring may be assigned analytical suites or frequencies that differ from those indicated in Tables 1.6-2 and 1.6-3 for site-specific reasons summarized in Table D-8.0-1.

Nonfiltered and filtered samples will be collected for general inorganics (excluding anions) and metals. Anions and perchlorate samples will be filtered. Samples collected for radionuclide analysis will be nonfiltered only for all water media. Organic and HEXP constituents are nonfiltered for all water media. Stable isotope samples for nitrogen isotopes are filtered; stable isotope samples for deuterium and oxygen isotopes are not filtered.

[a] Continuous monitoring for groundwater refers to the measurement of groundwater levels by a transducer placed in a well and programmed to collect groundwater-level measurements at highly frequent intervals (e.g., every 60 min daily throughout the year). Continuous stream-flow monitoring refers to the measurement of stream flow by a base-flow stream gage that is programmed to collect stream-flow measurements at highly frequent intervals. The superscript MP indicates water levels will be monitored at highly frequent intervals using a multiparameter probe that measures specific conductance, water level, and temperature. The superscript HD indicates that this sampling location is historically dry.

[b] Metals analysis includes the 23 target analyte list (TAL) metals, plus boron, molybdenum, silicon dioxide, strontium, tin, and uranium.

[c] VOC = Volatile organic compounds; SVOC = semivolatile organic compounds; TICs = tentatively identified compounds.

[d] PCB = Polychlorinated biphenyl (compound). The superscript CNGR indicates the analysis of PCB congeners using U.S. Environmental Protection Agency (EPA) Method 1668A.

[e] HEXP = High explosive (compounds). The HEXP analytical suite includes the Consent Order list of the normal SW-846:8330 analytes plus pentaerythritol tetranitrate (PETN); triaminotrinitrobenzene (TATB); 3,5-dinitroaniline, tri(o-cresyl)phosphate (TOCP); 2,4-diamino-6-nitrotoluene; and 2,6-diamino-4-nitrotoluene. These additional analytes are analyzed by SW-846:8321A. The superscript RDX-DP designates samples to be submitted for analysis of RDX degradation products: hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine (MNX); hexahydro-1,3-nitro-1,3,5-triazine (DNX); and hexahydro-1,3,5-trinitroso-1,3,5-triazine (TNX). The RDX-degradation products are analyzed by SW-846:8330.

[f] The radionuclide (RAD) suite includes gross alpha, gross beta, alpha spectroscopy, gamma spectroscopy, and strontium-90.

[g] Tritium samples may be submitted for analysis by liquid scintillation if anticipated activities are greater than 300 pCi/L. Low-level tritium is analyzed using electrolytic enrichment or direct counting.

[h] General inorganic analysis includes major anions (bromide, chloride, fluoride, sulfate); major cations (calcium, magnesium, sodium, potassium); nitrate plus nitrite (as N); total Kjeldahl nitrogen (TKN); ammonia; total phosphorus, total organic carbon (TOC); total dissolved solids (TDS); alkalinity; specific conductivity; pH; and hardness.

[i] Indicator suite includes major anions and cations, nitrate (as N), nitrite (as N), metals, alkalinity, pH, TOC, and, as needed, sulfide, ammonia, TKN, and perchlorate. Indicator-suite samples are submitted to the on-site EES-14 laboratory, with the exception of samples for TKN and perchlorate analysis, which are submitted to an off-site analytical facility.

[j] Analysis for stable nitrogen, deuterium, and oxygen isotopes. The collection of samples for stable isotopic analysis is considered a special sampling campaign that is outside the scope of the regulatory process. In general, samples for isotopic analysis are collected semiannually from “new” wells (those which completed construction, rehabilitation, or conversion on or after July 1, 2009) and annually from other locations. For intermediate and regional wells, “(A)” signifies samples will be collected annually until four sets of stable nitrogen isotope data have been collected. Any subsequent sampling for stable isotope analysis will be decided on the basis of site-specific conditions.

[k] Suspended sed = Suspended sediment concentration.

[l] Field parameters include pH, turbidity, specific conductance, dissolved oxygen, and temperature at all locations. Oxidation-reduction potential (ORP) will be measured if a flow-through cell is used and will not be measured in surface water, spring water, or water collected from Westbay sampling systems unless specified otherwise. Alkalinity (ALK) will be measured for all samples either in the field or at the on-site EES-14 laboratory.

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

[n] Characterization suites and frequencies apply to new intermediate perched or regional groundwater wells. “New” wells are defined as those which are completed, rehabilitated, or converted after July 1, 2009. After completion of four rounds of characterization sampling, a new well is reassigned automatically to the routine analytical suites and frequencies of the appropriate area-specific monitoring group or general surveillance monitoring plan unless specified otherwise.

Appendix A

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

A-1.0 ACRONYMS AND ABBREVIATIONS

AK	acceptable knowledge
AOC	area of concern
AS	alpha spectroscopy
BCG	Biota Concentration Guides (DOE)
bgs	below ground surface
CCC	criterion continuous concentration
cfs	cubic feet per second
CFR	Code of Federal Regulations
CH	core hole
CMC	criterion maximum concentration
CME	corrective measures evaluation
CMI	corrective measures implementation
CMS	corrective measures study
Consent Order	Compliance Order on Consent
COPC	chemical of potential concern
CRQL	contract-required quantitation limit
CA	carbonaceous analyzer
CVAA	cold vapor atomic absorption
CY	calendar year
DCG	Derived Concentration Guidelines (DOE)
DDT	dichlorodiphenyltrichloroethane
DO	dissolved oxygen
DOE	Department of Energy (U.S.)
DOT	Department of Transportation (U.S.)
DP	Delta Prime
DNX	hexahydro-1,3-dinitroso-1,3,5-triazine
DQM	Data Qualification Module
DQO	data-quality objective
DRO	diesel range organic
EC	electroconductivity
EES-6	Hydrology, Geochemistry and Geology Group (former name of present Group EES-14)
EES-14	Earth Systems Observations (current name for former Group EES-6)
EP	Environmental Programs (Directorate)

EPA	Environmental Protection Agency (U.S.)
ESR	Environmental Surveillance Report
EV	EarthVision (software)
F	filtered
FFCA	Federal Facility Corrective Action
FD	frequency of detection
FY	fiscal year
GBIR	Groundwater Background Investigation Report
GC	gas chromatography
GC-ECD	GC with electron-capture detection
GCMS	gas chromatography mass spectrometry
GFM	geologic framework model
GFPC	gas flow proportional counting
GGRL	Geochemistry and Geomaterials Research Laboratories (EES-14 analytical laboratory)
GRO	gasoline range organic
GW	groundwater
HE	high explosives
HPLC	high performance liquid chromatography
HPLC/MS/MS	HPLC coupled with tandem mass spectrometry
HMX	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
HRMS	high resolution mass spectrometry
IC	ion chromatography
ICPES	inductively coupled emission spectrometry
ICPMS	inductively coupled mass spectrometry
IDL	instrument detection limit
IDW	investigation-derived waste
Interim Plan	Interim Facility-Wide Groundwater Monitoring Plan
IR	investigation report
K_{OC}	organic-carbon partition coefficient
LANL	Los Alamos National Laboratory
LANSCE	Los Alamos Neutron Science Center
LASO	Los Alamos Site Office
LLEE	low-level electrolytic enrichment
LSC	liquid scintillation counting
MCIR	Mortandad Canyon investigation report

MCL	maximum contaminant level
MDA	material disposal area
MDL	method detection limit
MNA	monitored natural attenuation
MNX	hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine
MOU	memorandum of understanding
MP	Multiport System (Westbay)
MSGP	Multi-Sector General Permit
NIST	National Institute of Standards and Technology
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMWQCC	New Mexico Water Quality Control Commission
NNSA	National Nuclear Security Administration
NOI	notice of intent
NPDES	National Pollutant Discharge Elimination System
NTU	nephelometric turbidity unit
ORP	oxygen-reduction potential
OU	operable unit
PCB	polychlorinated biphenyl
PEB	performance evaluation blank
PETN	pentaerythritol tetranitrate
PMR	periodic monitoring report
PPE	personal protective equipment
PQL	practical quantitation limit
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
QP	quality procedure
R&R	reliable and representative
RACER	Risk Analysis, Communication, Evaluation, and Reduction (database)
RCRA	Resource Conservation and Recovery Act
RDX	hexahydro-1,3,5,trinitro-1,3,5-triazine
redox	oxidation reduction
RET	radon emission technique
RFI	RCRA facility investigation

RLWTF	Radioactive Liquid Waste Treatment Facility
RPF	Records Processing Facility
RSL	Regional Screening Level (EPA)
SC	specific conductance
SMO	Sample Management Office
SOP	standard operating procedure
SOW	statement of work
SR	sampling round
SVOC	semivolatile organic compound
SWMU	solid waste management unit
SWRC	Solid Waste Regulatory Compliance
SWS	Sanitary Wastewater Systems
SWSC	Sanitary Wastewater Systems Consolidation
TA	technical area
TAL	target analyte list (EPA)
TATB	triaminotrinitrobenzene
TBD	to be determined
TDS	total dissolved solids
TIC	tentatively identified compound
TKN	total Kjeldahl nitrogen
TNT	trinitrotoluene(2,4,6) (dynamite)
TNX	hexahydro-1,3,5-trinitroso-1,3,5-triazine
TOC	total organic carbon
TOCP	tri(o-cresyl)phosphate
TSS	total suspended solids
TW	Test Well
UF	unfiltered
USGS	U.S. Geological Survey
USFS	U.S. Forest Service
VOC	volatile organic compound
WCSF	waste characterization strategy form
WQDB	Water Quality Database
WQH	Water Quality and Hydrology Group
WSAR	Well Screen Analysis Report
WWTP	waste water 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 was analyzed for but not detected.
J	The analyte was positively identified, and the associated numerical value is estimated to be more uncertain than would normally be expected for that analysis.
J+	The analyte was positively identified, and the result is likely to be biased high.
J-	The analyte was positively identified, and the result is likely to be biased low.
UJ	The analyte was not positively identified in the sample, and the associated value is an estimate of the sample-specific detection or quantitation limit.
R	The data are rejected as a result of major problems with quality assurance/quality control (QA/QC) parameters.

Appendix B

Screening Information

B-1.0 OVERVIEW

The Interim Facility-Wide Groundwater Monitoring Plan (hereafter, the Interim Plan), including its base-flow monitoring component, supports Los Alamos National Laboratory's (the Laboratory's) Environmental Programs (EP) Directorate and the Corrective Actions Program in efforts to

- determine the presence and fate and transport of known legacy-waste contaminants,
- determine the efficacy of remedies,
- validate proposed corrective measures,
- manage the disposition of purge water generated during routine sampling,
- meet other regulatory requirements of the Compliance Order on Consent (the Consent Order), and
- meet federal (including U.S. Department of Energy [DOE]) and state standards for protecting drinking water, groundwater, and surface water.

Attachment B-1 to this appendix presents screening tables for groundwater and base-flow water-quality data used to optimize monitoring strategies for watersheds and area-specific monitoring groups and ensuring all the above needs are met. Selection of the most appropriate screening values for groundwater data generally follows the conservative approach prescribed for the development of groundwater cleanup levels in the Consent Order (Section VIII). For convenience and transparency, an analogous protocol is used to select screening values for nonstorm-related surface-water data. Groundwater and base-flow data from 2004 to 2009 are screened against one-half of the lowest applicable regulatory standard or screening level, as well as against the New Mexico Environment Department- (NMED-) approved background values for groundwater, where available. A stepwise process is used to select the lowest-applicable standard or screening level (Table B-1.0-1) for the comparison in the screening tables:

- Concentrations of chemicals and radionuclides are compared with the lowest appropriate or relevant water-quality standard.
- If no standard exists for an analyte, then the lowest risk-based screening level for that analyte is selected.
- This process is performed for groups of data defined by field preparation (filtered or nonfiltered samples) and analyte type (e.g., general inorganic chemicals, metals, and semivolatile and volatile organic compounds).

Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to NMED in accordance with DOE policy.

The conservative protocol outlined in this appendix and implemented in the screening tables (Attachment B-1 on CD) is intended to serve as an initial high-level screening tool consistent with U.S. Environmental Protection Agency (EPA) regulatory guidance (EPA 1996, 065402). These screening levels alone do not trigger the need for response actions or define "unacceptable" levels of contaminants in water. In this appendix, "screening" refers to the process of identifying and defining areas, contaminants, and conditions at particular locations in a watershed that do not require additional attention. Generally, at locations where contaminant concentrations consistently fall below screening levels, no further action or study is warranted. On the other hand, at locations where contaminant concentrations exceed a screening level, an important caveat is that the generic screening levels used in this appendix may not apply to a particular situation based on the circumstances. Default assumptions that underlie generic screening levels—such as residential land-use scenarios—are chosen to be protective of human health for a wide range of possible site conditions but are generally more stringent than site-specific levels.

The sections in this appendix provide additional details on the screening protocol implemented in this appendix for groundwater (section B-2.0) and persistent base flow (section B-3.0).

Attachment B-1 (on CD) presents screening tables organized by the seven major watershed groupings: Los Alamos, Sandia, Mortandad, Pajarito, Water, Ancho/Frijoles/Chaquehui, and White Rock Canyon. Within each watershed, these screening tables are organized by analytical suite for each water type sampled in the watershed. Groundwater types include springs, alluvial groundwater, intermediate-perched groundwater, and regional groundwater; surface water types are ephemeral and perennial base flow. Four screening tables are included in Attachment B-1:

- Table B-1, Analytical Data Screening for Frequency of Detection in Each Watershed: Groundwater (including Springs)
- Table B-2, Analytical Data Screening for Frequency of Detection in Each Watershed: Base Flow
- Table B-3, Analytical Data Screening for Frequency of Detection at Locations in Each Watershed: Groundwater (Including Springs)
- Table B-4, Analytical Data Screening for Frequency of Detection at Locations in Each Watershed: Base Flow

For each water type in each watershed, the screening tables report statistics for analytes categorized by analytical suite, with statistics tabulated separately for filtered (F) and unfiltered (UF) samples:

- dioxin/furans (DIOX/FUR)
- general inorganics (GENINORG)
- herbicides (HERB)
- high explosives (HEXP)
- metals (METALS)
- polychlorinated biphenyls (PCB)
- pesticides (PEST)
- radioactivity (RAD)
- semivolatile organic analytes (SVOA)
- volatile organic analytes (VOA)

The list of analytical suites and water types compiled for individual watersheds varies according to the availability of sampling locations and analytical data in that watershed for 2004 to 2009, the period of time covered by these tables. From left to right, table columns in Tables B-1 and B-2 summarize the following types of information:

- Analyte—the name of the analyte screened
- Method—analytical method(s)
- Units—unit of measurement

- Number of analyses—number of analyses available for screening, preceded by the less-than symbol (<) if all of the available analyses are classified as not detected
- Number of Detects—number of values classified as detected
- Number of Nondetects—number of values classified as not detected
- Min, Mean, and Max—minimum, mean, and maximum of detected values (or if in italics, minimum, mean, and maximum of the minimum detection levels)
- BV—applicable numerical background value, if available, used for screening
- Number >BV—number of detections greater than the background value
- Std—numerical value for the lowest applicable standard used for screening, if available
- Number>Std—number of detected values greater than the lowest applicable standard
- 1/2 Std—one-half of the numerical value for the lowest applicable standard used for screening
- Number >1/2 Std—number of detected values greater than one-half the lowest applicable standard
- Std Source—a reference for the lowest applicable standard
- Number of Locations with Data—number of sampling locations with data
- Number of Locations >Std—number of sampling locations with detected concentrations greater than the standard
- Number of Locations > 1/2 Std—number of sampling locations with detected concentrations greater than one-half the standard
- Locations ID >Std—a list of the sampling locations with a detected concentration greater than the standard
- Sort Order—list of numbers corresponding to the list of sampling locations in the preceding column that indicates the relative positions of those locations within the watershed (numbers increase with distance away from the top of the watershed)

Abbreviations used for standards and screening levels in the table column “Std Source” are provided in Table B-1.0-1.

B-2.0 PROTOCOL FOR SELECTING SCREENING LEVELS FOR GROUNDWATER DATA

Chemical data for groundwater (including springs) are compared to the lowest of the following federal (including DOE) or State of New Mexico standards and regulatory requirements.

- New Mexico Water Quality Control Commission (NMWQCC) Standards for Ground Water of 10,000 mg/L TDS Concentration or Less (20.6.2.3103 New Mexico Administrative Code [NMAC])
    - ❖ Human Health Standards (20.6.2.3103[A] NMAC)
    - ❖ Other Standards for Domestic Water Supply (20.6.2.3103[B] NMAC)
    - ❖ Standards for Irrigation Use (20.6.2.3103[C] NMAC)

- EPA National Primary Drinking Water Regulations: maximum contaminant levels (MCLs) for chemicals (40 Code of Federal Regulations [CFR] Part 141 through July 1, 2007)
  - ❖ MCLs for inorganics (40 CFR 141.51)
  - ❖ MCLs for organics (40 CFR 141.61)
  - ❖ MCLs for disinfection products (40 CFR 141.64[b])
  - ❖ MCLs for radionuclides (40 CRF 141.66)
  - ❖ MCLs for lead and copper (40 CFR 141.80)
- Groundwater screening level specified for perchlorate in the Consent Order (Section VIII.A.1)
- DOE Derived Concentration Guidelines (DCGs) for radionuclides (ingested-water DCG based on a target limit of 4 mrem/yr) (DOE 5400.5, Figure III-1)

For those analytes for which the NMWQCC groundwater standard is equal to the MCL, the NMWQCC groundwater regulation is listed as the source of the screening level used in the screening tables. Similarly, for those radionuclides for which the DCG is identical to the MCL, the MCL is listed as the source of the screening level in the screening tables.

If no standard exists for a chemical analyte, groundwater data are compared against the EPA's Regional screening levels (RSLs) for chemical contaminants at Superfund sites (screening levels for tap water) (EPA 2009, 109613). This set of screening levels updates and supersedes the EPA Region 6 Human-Health Media-Specific Screening Levels (EPA 2007, 099314) used in the 2009 Interim Plan. The EPA's human health criteria in the RSL tables are based on a cancer risk of 10^{-6}. These risk levels are adjusted to a cancer risk of 10^{-5}, consistent with requirements in the Consent Order for selecting screening levels and cleanup goals, by moving the decimal point one place to the right.

The screening process for groundwater also compares each analyte against background values for naturally occurring metals and general chemical parameters in intermediate and regional groundwater at or near the Laboratory. The background values selected for this comparison are either the upper tolerance levels, if one exists, or the maximum detected value, as reported in statistical summary tables for each type of groundwater in the most recent NMED-approved groundwater background investigation report (LANL 2007, 095817).

B-3.0 PROTOCOL FOR SCREENING NONSTORM-RELATED SURFACE WATER DATA

The NMWQCC establishes surface water standards in the State of New Mexico Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC). Certain watercourses may be "classified" and have segment-specific designated uses. A designated use may be an attainable or an existing use (e.g., livestock watering) for surface water. Nonclassified surface waters are described as ephemeral, intermittent, or perennial, each of which also has corresponding designated uses described in 20.6.4.97-99 NMAC. The designated uses for surface water are associated with use-specific water quality criteria, including numeric criteria.

The classification of a specific water course as perennial, intermittent, or ephemeral is complex. Once this classification process has been completed, the designated use must be determined. The conservative protocol outlined below is an initial high-level screening tool, not a tool for defining "unacceptable" levels of contaminants in water. For example, screening a surface-water sample against the acute aquatic life criteria for ephemeral surface water does not mean the criteria will be the applicable regulatory standard for any future investigation or remediation activities. In addition, generic screening levels may not take into account the diverse effects of physicochemical factors on chemical toxicity, such as the effect of chemical speciation on bioavailability or the low bioavailability of contaminants present as particulates or adsorbed to suspended particles.

The Laboratory's sitewide monitoring program includes base-flow stations that are assigned to different watercourse classifications in 20.6.4 NMAC, each of which has its own set of regulatory requirements. In addition, the Laboratory collects samples from surface waters under tribal regulatory jurisdiction. Although these waters are specifically excluded from state regulation (20.6.4.7[DD] NMAC), they are nonetheless included in the screening protocol implemented for this interim plan.

To ensure the screening process provides information useful for optimizing monitoring strategies while ensuring that the needs of all potential users are met, surface water locations are assigned to one of two generic screening categories—perennial or ephemeral—in the screening level tables. The protocol used to select the lowest applicable screening levels for these two generic screening categories is described in the following sections.

Screening levels in the 2010 Interim Plan are based on the hardness value of 100 mg/L CaCO3 calculated for the nearest perennial receiving water, the Rio Grande. The statistical analysis of hardness data for the waters of the Rio Grande is documented in a Laboratory report (LANL 2009, 109685), submitted to EPA Region 6 in 2009 for the MSGP (NPDES tracking number NMR05GB21, available at http://cfpub.epa.gov/npdes/stormwater/noi/noidetail_new.cfm?ApplId=NMR05GB21).

To ensure compliance with water-quality standards, watershed-specific hardness standards will be used to analyze surface water data in subsequent reports. Acute and chronic criteria for dissolved cadmium, chromium, copper, lead, nickel, and zinc will be calculated in accordance with the requirements of 20.6.4 NMAC and will be based on hardness analytical results from samples collected at base-flow locations within each watershed. The watershed-specific standards will be based on the geometric mean of hardness data collected since 2006.

B-3.1 Perennial Base-Flow Locations

Locations classified as "perennial" for screening purposes in Tables B-2 and B-4 of Attachment B-1 include those in several watercourse classifications:

- Intermittent waters not included in a classified water of the state (20.2.4.98 NMAC)
- Perennial waters not included in a classified water of the state (20.2.4.99 NMAC)
- Perennial tributaries to the Rio Grande in Bandelier and other tributaries in Sandoval and Santa Fe counties (20.2.4.121 NMAC)
- Perennial portions of watercourses within lands managed by DOE within Laboratory property (20.2.4.126 NMAC)

Water-quality data from these perennial locations are compared with the lowest numeric standard among the following designated uses:

- Livestock watering (20.6.4.900[F] and 20.4.6.900[J] NMAC)
- Wildlife habitat (20.4.6.900[G] and 20.4.6.900[J] NMAC)
- Irrigation (20.4.6.900[C] and 20.4.6.900[J] NMAC)
- Acute aquatic life (20.6.4.900[H(6)], 20.4.6.900[I(1)], 20.4.6.900[J] NMAC)

- Acute criteria for total ammonia (salmonids absent) (20.6.4.128[B(3)] and 20.6.4.900[K] NMAC)
- Chronic aquatic life (20.6.4.900[H], 20.4.6.900[I], and 20.4.6.900[J] NMAC)
- Chronic criteria for total ammonia (20.6.4.900[K] NMAC)
- Human health (20.6.4.11[G] and 20.6.4.900[J] NMAC)

If no standard exists for an analyte, water-quality data from perennial locations are compared with the lowest potentially applicable risk-based screening level for that analyte listed in the most recent version of the EPA-recommended National Water Quality Criteria (NWQC) (EPA 2009, 109328). This screening level table is published by the EPA pursuant to Section 304(a) of the federal Clean Water Act and is referenced in 20.6.4.13[F] NMAC. Potentially applicable screening levels in the EPA NMWC table include the following:

- Aquatic life freshwater criterion continuous concentration (CCC) (chronic)
- Aquatic life freshwater criterion maximum concentration (CMC) (acute)
- Human health for consumption of organisms only, for persistent contaminants (adjusted to a cancer risk level of 10^{-5})
- Human health for consumption of organisms only (for contaminants other than persistent)

B-3.2 Ephemeral Base-Flow Locations

Locations classified as “ephemeral” for screening purposes in Attachment B-1 include those in two watercourse classifications:

- Ephemeral waters not included in a classified water of the state (20.2.4.97 NMAC)
- Ephemeral and intermittent portions of watercourses within lands managed by DOE within Laboratory property (20.2.4.128 NMAC)

Water-quality data from ephemeral locations are compared with the lowest numeric standard among the following designated uses:

- Livestock watering (20.6.4.900[F] and 20.4.6.900[J] NMAC)
- Wildlife habitat (20.4.6.900[G] and 20.4.6.900[J] NMAC)
- Acute aquatic life (20.6.4.900[H(6)], 20.4.6.900[I(1)], 20.4.6.900[J] NMAC)
- Acute criteria for total ammonia (salmonids absent) (20.6.4.128[B(3)] and 20.6.4.900[K] NMAC)
- Human health (persistent contaminants) (20.6.4.11[G] and 20.6.4.900[J] NMAC)

If no standard exists for an analyte, water-quality data for ephemeral locations are compared with the lowest potentially applicable risk-based screening level for that analyte listed in the most recent version of the EPA-recommended NWQC (EPA 2009, 109328). This screening-level table is published by the EPA pursuant to Section 304(a) of the federal Clean Water Act and is referenced in 20.6.4.13[F] NMAC. Potentially applicable screening levels in the EPA NMWC table include the following:

- Aquatic life freshwater CMC (acute)
- Human health for consumption of organisms only, for persistent contaminants, adjusted to a cancer risk level of 10^{-5}

For both ephemeral and perennial locations, applicable screening values for hardness-dependent metals and for total ammonia are sample-specific. Screening levels used for hardness-dependent metals in Tables B-2 and B-4 are calculated using a hardness of 100 mg/L $CaCO_3$ (see rationale presented above in section B-3.0). The screening level used for total ammonia in Tables B-2 and B-4 is based on pH 8.0.

No standard or screening value exists for perchlorate in persistent surface water. In Tables B-2 and B-4, the value of 4 µg/L specified as a screening level for perchlorate in groundwater in the Consent Order has also been used to screen for perchlorate in surface water. Similarly, no standards or screening level are available for RDX (hexahydro-1,3,5,trinitro-1,3,5-triazine) or TNT (2,4,6-trinitrotoluene) in surface water. For these constituents, the EPA RSLs for tap water are used as screening levels for surface-water data in Tables B-2 and B-4 presented in Attachment B-1. This approach is consistent with the use of the EPA RSL screening level for RDX as a performance measure for the Technical Area 16 260 Outfall corrective measures implementation (LANL 2010, 109252).

Radionuclide data for ephemeral and perennial surface-water locations are compared with the lowest value from the following standards and guidelines:

- EPA MCLs for radionuclides [40 CFR 141.66(b) to (e)]
- DOE Biota Concentration Guides (BCGs) (DOE 2002, 085637), as modified by site-specific BCGs for selected radionuclides (McNaughton et al. 2008, 106501)
- DOE DCGs for radionuclides in drinking water, based on a target risk limit of 4 mrem/yr, per DOE Order 5400.5, Figure III-1, Ingested Water DCG.

B-4.0 REFERENCES

The following list includes all documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate’s Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

DOE (U.S. Department of Energy), July 2002. “A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota,” DOE Standard DOE/STD-1153-2002, U.S. Department of Energy, Washington, D.C. (DOE 2002, 085637)

EPA (U.S. Environmental Protection Agency), April 1996. “Soil Screening Guidance: User's Guide,” EPA/540/R-96/018, Office of Solid Waste and Emergency Response, Washington, D.C. (EPA 1996, 065402)

EPA (U.S. Environmental Protection Agency), December 2007. “EPA Region 6 Human Health Medium-Specific Screening Levels,” U.S. EPA Region 6, Dallas, Texas. (EPA 2007, 099314)

EPA (U.S. Environmental Protection Agency), 2009. “National Recommended Water Quality Criteria,” available online at http://www.epa.gov/ost/criteria/wqctable/, Office of Water, Office of Science and Technology, Washington, D.C. (EPA 2009, 109328)

EPA (U.S. Environmental Protection Agency), 2009. "Regional Screening Level (RSL) Master Table December 2009," Regional Screening Levels for Chemical Contaminants at Superfund Sites screening level/preliminary remediation goal website, tables available online at http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm, Washington, D.C. (EPA 2009, 109613)

LANL (Los Alamos National Laboratory), May 2007. "Groundwater Background Investigation Report, Revision 3," Los Alamos National Laboratory document LA-UR-07-2853, Los Alamos, New Mexico. (LANL 2007, 095817)

LANL (Los Alamos National Laboratory), July 14, 2009. "NPDES Permit Tracking No. NMR05GB21, Multi-Sector General Permit Industrial Discharge Monitoring Reports for April 2009 [and enclosures]," Los Alamos National Laboratory letter (ENV-RCRA-09-132, LA-UR-09-04398) to U.S. Environmental Protection Agency from A.R. Grieggs (ENV-RCRA), Los Alamos, New Mexico. (LANL 2009, 109685)

LANL (Los Alamos National Laboratory), April 2010. "Long-Term Monitoring and Maintenance Plan for the Corrective Measures Implementation at Consolidated Unit 16-021(c)-99," Los Alamos National Laboratory document LA-UR-10-2196, Los Alamos, New Mexico. (LANL 2010, 109252)

McNaughton, M., P. Fresquez, and W. Eisele, May 2008. "Site-Representative Biota Concentration Guides at Los Alamos," Los Alamos National Laboratory document LA-UR-08-2783, Los Alamos, New Mexico. (McNaughton et al. 2008, 106501)

Table B-1.0-1
Potentially Applicable Standards Used to Select Watershed Screening Levels

Type	Source	Description	Abbreviation[a]	Potential Applicability[b]					
				Perennial Surface Water		Ephemeral Surface Water		Groundwater (Includes Springs)	
				F	UF	F	UF	F	UF
State of New Mexico Water Quality Control Commission (WQCC)									
Standard	NMAC 20.6.4	Livestock Watering (Filtered)	LWF	X		X			
Standard	NMAC 20.6.4	Livestock Watering (Unfiltered)	LWU		X		X		
Standard	NMAC 20.6.4	Wildlife Habitat (Unfiltered)	WHU		X		X		
Standard	NMAC 20.6.4	Irrigation Standard (Filtered)	IrF	X		X			
Standard	NMAC 20.6.4	Aquatic Life Acute (Filtered)	AqAcF	X		X			
Standard	NMAC 20.6.4	Aquatic Life Acute (Unfiltered)	AqAcU		X		X		
Standard	NMAC 20.6.4	Total Ammonia Aquatic Life Acute (Unfiltered)	AqAcNH3U		X		X		
Standard	NMAC 20.6.4	Aquatic Life Chronic (Filtered)	AqChrF	X		X			
Standard	NMAC 20.6.4	Aquatic Life Chronic (Unfiltered)	AqChrU		X				
Standard	NMAC 20.6.4	Total Ammonia Aquatic Life Chronic (Unfiltered)	AqChrNH3U		X				
Standard	NMAC 20.6.4	Human Health Standard: Persistent (Filtered)	HHPF	X		X			
Standard	NMAC 20.6.4	Human Health Standard: Persistent (Unfiltered)	HHPU		X		X		
Standard	NMAC 20.6.4	Human Health Standard: Other than Persistent (Filtered)	HHF	X		X			
Standard	NMAC 20.6.4	Human Health Standard: Other than Persistent (Unfiltered)	HHU		X		X		
Standard	NMAC 20.6.2	Groundwater Human Health Standards, Other Standards for Domestic Water Supply and Standards for Irrigation Use (Filtered)	NMGSF					X	
Standard	NMAC 20.6.2	Groundwater Human Health Standards, Other Standards for Domestic Water Supply and Standards for Irrigation Use (Unfiltered)	NMGSU						X
Consent Order									
Screening Level	Consent Order	Screening Level for Perchlorate in Groundwater	NM GW CONS	X	X	X	X	X	X

Table B-1.0-1 (continued)

Type	Source	Description	Abbreviation[b]	Potential Applicability[c]					
				Perennial Surface Water		Ephemeral Surface Water		Groundwater (Includes Springs)	
				F	UF	F	UF	F	UF
EPA									
Standard	40 CFR 141	EPA maximum contaminant levels	MCL					X	X
Risk—human	EPA RSLs[c]	EPA Regional Screening Levels for Tapwater	EPA RSL	X	X	X	X	X	X
Risk—human	EPA NWQC[d]	Human Health for the Consumption of Organism Only	EPA HHOO	X		X			
Risk—ecological	EPA NWQC	Aquatic Life Acute (Filtered)	EPA AqAcF	X		X			
Risk—ecological	EPA NWQC	Aquatic Life Acute (Unfiltered)	EPA AqAcU		X		X		
Risk—ecological	EPA NWQC	Aquatic Life Chronic (Filtered)	EPA AqChrF	X					
Risk—ecological	EPA NWQC	Aquatic Life Chronic (Unfiltered)	EPA AqChrU		X				
DOE									
Risk—ecological	DOE Order 5400.5	DOE BCG	DOE BCG	X	X	X	X		
Risk—human	DOE Order 5400.5	DOE 4-mrem Drinking Water DCG	DOE DW DCG	X	X	X	X	X	X

[a] Abbreviations used in Attachment B-1 tables.

[b] See text for a description of the protocol used to select the lowest applicable screening levels for groundwater and surface water. The description includes assumptions and rationale for hardness-dependent metals. Blank cells indicate the screening level is not applicable to the water type.

[c] EPA Regional Screening Levels (EPA 2009, 109613).

[d] EPA National Recommended Water Quality Criteria (EPA 2009, 109328).

Attachment B-1

Analytical Data Screening Tables
(on CD included with this document)

Appendix C

Procedures, Methods, and
Investigation-Derived Waste Management

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

This section summarizes Los Alamos National Laboratory (LANL or the Laboratory) standard operating procedures (SOPs) used to measure groundwater levels and to collect groundwater, base-flow, and spring samples. These procedures are listed in the table below and are summarized in subsequent sections. These procedures (or equivalent procedures) will be used during sampling activities conducted in accordance with the 2010 Interim Facility-Wide Groundwater Monitoring Plan (the Interim Plan).

Procedure Identifier	Procedure Title	Applicability
Measurement of Groundwater Levels		
SOP-5223	Manual Groundwater Level Measurements	Procedure for measuring depth to groundwater and determining groundwater elevation in a monitoring well or an open borehole
SOP-5227	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
SOP-5226	Westbay Pressure Transducer Installation, Removal, and Maintenance	Procedure to install, remove, and maintain pressure transducers to monitor and record water-level data in Westbay monitoring wells
SOP-5260	Pressure Monitoring of Packer Systems in Monitoring Wells	Procedure for monitoring and maintenance of Baski sampling system packers and temporary packers installed in water wells
Collection of Groundwater Samples		
SOP-5232	Groundwater Sampling	Procedure for sampling groundwater using a dedicated submersible pump, Baski sampling system, or a portable pump
SOP-5225	Groundwater Sampling Using Westbay MP System	Procedure for sampling groundwater using the Westbay Multiport (MP) System
EP-ERSS-SOP-5061	Field Decontamination of Equipment	Procedure for field decontamination of equipment
SOP-06.03	Sampling for Volatile Organic Compounds in Groundwater	Procedure for collecting groundwater samples for volatile organic compound (VOC) analysis
Collection of Surface Water and Spring Samples		
SOP-5224	Spring and Surface Water Sampling	Procedure for sampling springs and surface water
Measuring Field Parameters		
ENV-DO-203	Field Water Quality Analyses	Procedure for measuring field analytical water-quality parameters
Sample Preparation, Preservation, and Transportation		
EP-ERSS-SOP-5059	Field Quality Control Samples	Procedure for collection of field quality control (QC) samples, including field duplicates, equipment rinsate blanks, and trip blanks

Procedure Identifier	Procedure Title	Applicability
EP-ERSS-SOP-5058	Sample Control and Field Documentation	Procedure for establishing and maintaining sample traceability using sample control and field documentation
EP-ERSS-SOP-5056	Sample Containers and Preservation	Procedure specifying sample containers, collection and preservation techniques, and holding times
EP-ERSS-SOP-5057	Handling, Packaging, and Transporting Field Samples	Procedure for sample packaging and shipping
ENV-WQH-QP-029	Creating and Maintaining Chain of Custody	Procedure for generating an analytical request and maintaining chain of custody in the collection, management, and processing of water-quality samples
SOP-5255	Shipping of Environmental Samples by the WES SMO	Procedure for receiving, packaging, and shipping samples to analytical laboratories.

C-2.0 SUMMARY OF FIELD INVESTIGATION METHODS

Method	Summary
General	The objective is to collect a “representative” sample of formation water from a well or spring or of surface water from base-flow stations. 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.
Groundwater-Level Measurements Referenced Procedures: • SOP-5227, Pressure Transducer Installation, Removal, and Maintenance • SOP-5226, Westbay Pressure Transducer Installation, Removal and Maintenance • SOP-5223, Manual Groundwater Level Measurements	This summary applies to the collection of groundwater-level data. Groundwater levels are measured at predetermined intervals as well as before the wells are purged and sampled. Two methods are used to collect water-level data: • In situ pressure transducers are used to measure water levels in individual wells or well screens at specified intervals. Most wells sampled under the Interim Plan are monitored with pressure transducers. • Manual water-level measurements are routinely measured in wells not instrumented with pressure transducers. These measurements are also taken before purging alluvial wells and sampling. Manual water-level measurements are also taken periodically to verify transducer readings. Data from in situ pressure transducers are automatically recorded in a data logger for later retrieval and processing to calculate water levels. Information collected during manual water-level measurements is documented on the Groundwater Level Measurement Form.

Method	Summary
Collection of Groundwater Samples Using Dedicated Submersible or Portable Pumping Systems Referenced Procedures: • SOP-5232, Groundwater Sampling • ENV-DO-203, Field Water Quality Analyses • EP-ERSS-SOP-5056, Sample Containers and Preservation	This summary applies to the use of a dedicated electrical submersible pump, bladder pump, Bennett or Baski pumping system, or QED bladder pumping system to sample wells. • The pumps are set at a depth sufficiently below the top of the water surface such that drawdown during pumping does not allow air to enter the pump. • Wells are purged sufficiently before sample collection to ensure samples will be representative of formation water. ❖ Where possible, alluvial wells are purged a minimum of one casing volume plus the volume of the drop pipe. ❖ Where possible, intermediate and regional wells are purged a minimum of three casing volumes plus the volume of the drop pipe. • The pump rate during purging is adjusted so excessive drawdown does not occur. ❖ Drawdown in intermediate and regional wells screened across the water table should be limited to less than 2 ft where possible and preferably to less than 0.5 ft. ❖ Drawdown in regional wells screened below the water table should be limited where possible so water levels are not drawn below the top of the screened interval. • The discharge rate is measured using either the bucket and stopwatch method or an in-line flow meter. • Stable field parameters over three consecutive readings are a goal once the minimum purge volume is met (see section C-3.0). During purging, field parameters are typically measured every 5 min for the first half-hour and every 15–20 min thereafter. • Purge water is discharged under the notice of intent (NOI) with the New Mexico Environment Department (NMED) or containerized pending waste determination. • Samples are collected directly from the pump discharge line as soon as practical after purging is complete. The pump rate during sampling is adjusted to produce a smooth, constant flow rate so turbulent flow is not allowed during the filling of sample bottles. • Sample labels and documentation are completed for each sample following procedures referenced in this Interim Plan. • Signed and dated 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.
Collection of Groundwater Samples Using Westbay System Referenced Procedures: • SOP-5225, Groundwater Sampling Using Westbay Sampling System • SOP-5226, Westbay Pressure Transducer Installation, Removal and Maintenance • ENV-DO-203, Field Water Quality Analyses	This summary applies to the sampling of wells equipped with the Westbay MP System, a multilevel groundwater monitoring system. Samples are collected using a dedicated closed-access tube with valved ports that provide access to multiple levels of a borehole through a single well casing. The Westbay system is designed to allow for sampling without purging under normal aquifer conditions and takes samples at an in situ pressure. • The Westbay MP System consists of casing components that are permanently installed in the final casing, portable pressure measurement and sampling probes, and specialized tools. • The sampling probes are lowered to a precise port depth from which the sample is collected. This sampling system is a nonpurge system so no purge water is generated. • Water-quality parameters are measured during each run as described in section C-3.0.

Method	Summary
Collection of Groundwater Samples Using Westbay System (cont.) • EP-ERSS-SOP-5056, Sample Containers and Preservation	• Samples are collected directly into the sampling probe's sample containers, and as soon as they reach the surface, they are transferred directly into the sample containers. • Data collected during sampling, including port pressures and field parameters, are documented on the appropriate forms in SOP-5225. • The sample probe and sample containers are the only equipment or materials that are reused and are decontaminated between each port using Liquinox as described in SOP-5225. • Sample labels and documentation are completed for each sample following procedures referenced in this Interim Plan. 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.
Collection of Spring and Surface Water Samples Referenced Procedures: • ENV-DO-203, Field Water Quality Analyses • SOP-5224, Spring and Surface Water Sampling • EP-ERSS-SOP-5056, Sample Containers and Preservation • ENV-WQH-SOP-009, Operation and Maintenance of Stream Gauge Stations	This summary applies to collecting water-quality samples from surface water locations and springs. • Permanent surface water sampling sites are usually identified by posts or gaging stations. However, this may not be possible at some sites because of possible public access, vandalism, or physical location (e.g., near a road). • Ideally, samples are collected from running 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 the sample is not influenced by water from another stream. • Where conditions allow, spring discharge is measured using a 1-L polyethylene bottle to capture water discharging from the spring. • For surface water samples collected near established gauging stations, the gauge height is measured and subsequently correlated to discharge. For surface water samples collected away from gauging stations, discharge should be measured using a current meter or Parshall flume. Discharge may be estimated where quantitative measurements are not possible. • Spring sampling sites are similar to surface water locations. However, because of fluctuating spring discharge, field personnel must choose where (or even whether) to sample springs to obtain a representative water sample. • If there is any question about whether a representative sample can be collected, field person are instructed to contact the requestor before proceeding. • Field notes document the rationale deciding to sample not to sample a location. Two distinct spring discharge types have been observed and are sampled as follows. • Some springs discharge over a large area from a large grassy hillside with no one substantial source of flow and no significant depth of water. Samples from these springs should be collected at a point where a relatively stronger flow occurs and where the sample is not influenced by channel soils. • Other springs discharge over some length in a gully or stream channel. Samples from these springs should be collected from a pool in the drainage near the discharge zone. • During sampling, a peristaltic pump should be used to collect the sample, or samples may be collected directly into a container that has been prepared for that given parameter. Alternatively, a sample bottle (glass or plastic depending on the type of sample being collected) may be used to transfer water into the sample container. • 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.

Method	Summary
Sample Bottles and Preservation of Samples Referenced Procedure: • EP-ERSS-SOP-5056, 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. • During sampling of monitor wells, discharge to the sample bottles should be adjusted to produce a smooth, laminar flow during sampling. • 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 U.S. Environmental Protection Agency (EPA): guidance in SW-846 and/or 40 Code of Federal Regulation (CFR) 136 (see preservation table in procedure EP-ERSS-SOP-5056). Immediately upon collection and, where applicable, the pH should be checked approximately 15 min later to assess preservation.
Handling, Packaging, and Shipping of Samples Referenced Procedures: • EP-ERSS-SOP-5057, Handling, Packaging, and Transporting Field Samples • SOP-5255, Shipping of Environmental Samples by the WES SMO	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.
Sample Documentation Referenced Procedures: • SOP-5224, Spring and Surface Water Sampling • ENV-WQH-QP-028, Creating and Maintaining Chain-of-Custody • ENV-WQH-SOP-009, Operation and Maintenance of Stream Gauge Stations • SOP-5232, Groundwater Sampling • SOP-5225, Groundwater Sampling Using Westbay Sampling System	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. • 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.

Method	Summary
Field Quality Assurance/Quality Control Samples Referenced Procedure: • ENV-WQH-QP-028, Creating and Maintaining Chain-of-Custody	Field quality assurance (QA)/QC samples are required by the Consent Order, and are discussed in detail in Appendix E. Field QA/QC samples to be collected are summarized below. • Field blanks are collected at a frequency of 10% of all samples collected. • Equipment rinsate blanks are collected at a minimum frequency of 1 per day when nondedicated sampling equipment is used. • Field duplicates are collected at a rate of 10% of all samples by media type, with a minimum of one duplicate collected per sample batch. • Trip blanks are included with any coolers containing samples submitted for VOC analysis. • Performance evaluation blanks will be submitted on an as-needed basis to evaluate the reagent-grade water used for decontamination and preparation of blanks.

C-3.0 METHODS AND INSTRUMENTS USED FOR FIELD MEASUREMENTS

Field Parameter	Method Description	EPA-Approved Methods	Primary Field Instrument(s)	Primary Flow-Through Cell Used/Type	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 556 Handheld Multiparameter Instrument	YSI 556 cell	Samples will be analyzed for pH and temperature in the field using a flow-through cell during well purging and at the time of sample collection. The listed instrument is commercially available with a temperature sensor for automatic compensation. A calibration check is performed on the meter using the manufacturer's instructions with standard buffers traceable to National Institute of Standards and Technology (NIST) and recorded. 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 556 Handheld Multiparameter Instrument	YSI 556 cell	Samples will be analyzed for temperature concurrently with pH measurement in the field using a flow-through cell during well purging and at the time of sample collection. The listed instruments are commercially available with a temperature sensor for automatic compensation.
Specific Conductance	Electrical conductance (micromho/cm at 25°C): Wheatstone bridge	EPA: Method 120.1 Standard Methods, 2510 B Editions 18^{th}, 19^{th}, 20^{th}	YSI 556 Handheld Multiparameter Instrument	YSI 556 cell	Samples will be analyzed for specific conductance in the field using a flow-through cell during well purging and at the time of sample collection. The listed instruments are commercially available with a temperature sensor for automatic compensation. A calibration check is performed on the meter using the manufacturer's instructions with standard buffers traceable to NIST and is recorded. 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}	WTW Oxi 330i or YSI 85/10ft or YSI 556 Handheld Multiparameter Instrument	YSI 556 cell	Samples will be analyzed for dissolved oxygen in the field using a flow-through cell during well purging and at the time of sample collection. The listed instruments are commercially available with a temperature sensor for automatic compensation. The meter is calibrated using the manufacturer's instructions and is recorded.

Field Parameter	Method Description	EPA-Approved Methods	Primary Field Instrument(s)	Primary Flow-Through Cell Used/Type	Description
Turbidity	Turbidity (NTU): nephelometric	EPA: Method 180.1 Standard Methods, 2130 B Editions 18th, 19th, 20th	Hach 2100P	Single sample aliquot application	Samples will be analyzed for turbidity in the field using a single aliquot during well purging and at the time of sample collection. The listed instrument is commercially available, and a calibration check is performed on the meter using the manufacturer's instructions.
Oxidation Reduction Potential	Reduction-oxidation potential (mV): electrode method	Standard Methods, 2580 A Editions 18th, 19th, 20th	YSI 556 Handheld Multiparameter Instrument	YSI 556 cell	Samples will be analyzed for oxidation-reduction potential (ORP) in the field using a flow-through cell during well purging and at the time of sample collection. The listed instruments are commercially available with a temperature sensor for automatic compensation. A calibration check is performed on the meter using 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.).

C-4.0 ANALYTICAL METHODS—GROUNDWATER ANALYTICAL SUITES

C-4.1 Analyses by Accredited Contract Laboratories

Samples for laboratory analysis are submitted to accredited contract laboratories. The 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 analyte concentration is greater than zero, as determined by the procedure set forth at Appendix B of 40 CFR Part 136. The MDL is based on prepared spiked samples that go through the entire sample preparation scheme before they are analyzed. Most often, the MDL samples are analyzed by the contract laboratories under ideal conditions when the analytical instrumentation has been recently serviced, cleaned, and calibrated.

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 methods (EPA methods). In most cases the contract laboratories define the low spike on their initial calibration curve as the PQL. Generally, the PQL is 3 to 5 times higher than the MDL and should not be more than 10 times the MDL.

The following table provides the contract laboratory MDL and PQLs for the Compliance Order on Consent (the Consent Order) target analytes by analytical suite and method. The table includes information on applicable background and/or screening levels for each analyte listed. The comparison is based on the lowest applicable screening level; if a screening level is not available, the comparison is based on the most recent NMED-approved statistical summary of background values for regional groundwater (LANL 2009, 106115, Table 4.2-3; NMED 2010, 109327). Each analyte with a target PQL above the applicable background or screening level is highlighted, along with an explanation for each such occurrence.

CAS	Analyte	Number of Analyses	Number of Detects	EPA Method	Method Description[a]	MDL	PQL[b]	Screening Level	Unit	Screening-Level Type	Comment
Dioxin Furans											
35822-46-9	Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	351	37	1613/8290	HRMS	0.000005	0.00005	—[c]	µg/L		
67562-39-4	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	352	26	1613/8290	HRMS	0.000005	0.00005	—	µg/L	—	
55673-89-7	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	362	0	1613/8290	HRMS	0.000005	0.00005	—	µg/L	—	
39227-28-6	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	363	1	1613/8290	HRMS	0.000005	0.00005	—	µg/L	—	
57653-85-7	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	362	2	1613/8290	HRMS	0.000005	0.00005	—	µg/L	—	
19408-74-3	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	362	2	1613/8290	HRMS	0.000005	0.00005	—	µg/L	—	
70648-26-9	Hexachlorodibenzofuran[1,2,3,4,7,8-]	359	11	1613/8290	HRMS	0.000005	0.00005	—	µg/L	—	
57117-44-9	Hexachlorodibenzofuran[1,2,3,6,7,8-]	359	4	1613/8290	HRMS	0.000005	0.00005	—	µg/L	—	
72918-21-9	Hexachlorodibenzofuran[1,2,3,7,8,9-]	362	0	1613/8290	HRMS	0.000005	0.00005	—	µg/L	—	
60851-34-5	Hexachlorodibenzofuran[2,3,4,6,7,8-]	357	2	1613/8290	HRMS	0.000005	0.00005	—	µg/L	—	
3268-87-9	Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	347	73	1613/8290	HRMS	0.00001	0.0001	—	µg/L	—	
39001-02-0	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	357	34	1613/8290	HRMS	0.00001	0.0001	—	µg/L	—	
40321-76-4	Pentachlorodibenzodioxin[1,2,3,7,8-]	357	2	1613/8290	HRMS	0.000005	0.00005	—	µg/L	—	
57117-41-6	Pentachlorodibenzofuran[1,2,3,7,8-]	352	3	1613/8290	HRMS	0.000005	0.00005	—	µg/L	—	
57117-31-4	Pentachlorodibenzofuran[2,3,4,7,8-]	348	5	1613/8290	HRMS	0.000005	0.00005	—	µg/L	—	
1746-01-6	Tetrachlorodibenzodioxin[2,3,7,8-]	356	0	1613/8290	HRMS	0.000001	0.00001	0.00003	µg/L	EPA MCL	
51207-31-9	Tetrachlorodibenzofuran[2,3,7,8-]	354	1	1613/8290	HRMS	0.000001	0.00001	—	µg/L	—	
Total Petroleum Hydrocarbons Diesel Range Organics											
TPH-DRO	Total petroleum hydrocarbons diesel range organics	49	24	8015	GC	65	200	—	µg/L	—	
General Inorganic Analytes											
ALK-CO_3	Alkalinity-CO_3	2352	286	310	Titrimetric	0.73	1	—	mg/L	—	
ALK-CO_3+HCO_3	Alkalinity-CO_3+HCO_3	2443	2439	310	Titrimetric	0.73	1	156.6	mg/L	LANL BG	
ALK-HCO3	Alkalinity-HCO_3	199	197	310	Titrimetric	—	1	132.3	mg/L	LANL BG	
NH3-N	Ammonia as nitrogen	2242	403	350	Colorimetry	0.02	0.05	0.05	mg/L	LANL BG	
Br(-1)	Bromide	2389	610	300	IC	0.07	0.2	0.1	mg/L	LANL BG	Alternate promulgated method to meet screening level is not available.
Ca	Calcium	4242	4242	6010/200.7	ICPES	0.05	0.2	24.88	mg/L	LANL BG	
Cl(-1)	Chloride	2465	2461	300	IC	0.05	0.2	250	mg/L	GW STD	
CN(TOTAL)	Cyanide (total)	1818	239	9012/335	Colorimetry	0.0025	0.005	0.2	mg/L	EPA MCL	
F(-1)	Fluoride	2526	2414	300	IC	0.03	0.1	1.6	mg/L	GW STD	
HARDNESS	Hardness	3900	3900	6010/200.7	Calculation	1	2	—	mg/L	—	
Mg	Magnesium	4236	4234	6010/200.7	ICPES	0.085	0.3	4.15	mg/L	LANL BG	
NO3+NO2-N	Nitrate-nitrite as nitrogen	2503	2157	353	Colorimetry	0.05	0.25		mg/L	GW STD	
ClO4	Perchlorate	2387	2101	6850	HPLC/MS/MS	0.05	0.2	4	µg/L	GW CONS	
K	Potassium	4242	4236	6010/200.7	ICPES	0.05	0.15	2.63	mg/L	LANL BG	
SiO2	Silicon dioxide	1548	1518	6010/200.7	ICPES	0.015	0.1	88.5	mg/L	LANL BG	
Na	Sodium	4242	4242	6010/200.7	ICPES	0.1	0.2	24.5	mg/L	LANL BG	

CAS	Analyte	Number of Analyses	Number of Detects	EPA Method	Method Description[a]	MDL	PQL[b]	Screening Level	Unit	Screening-Level Type	Comment
SO4(-2)	Sulfate	2463	2430	300	IC	0.1	0.4	600	mg/L	GW STD	
TKN	Total Kjeldahl Nitrogen	2792	1236	351	Colorimetry	0.01	0.1	0.1	mg/L	LANL BG	
TOC	Total Organic Carbon	1915	1565	9060	CA	0.33	1	1.08	mg/L	LANL BG	
PO4-P	Total Phosphate as Phosphorus	2354	891	365	Colorimetry	0.02	0.05	0.16	mg/L	LANL BG	
High Explosives											
6629-29-4	2,4-Diamino-6-nitrotoluene	1308	9	8321	HPLC/MS/MS	0.39	1.3	—	µg/L	—	
59229-75-3	2,6-Diamino-4-nitrotoluene	1300	3	8321	HPLC/MS/MS	0.39	1.3	—	µg/L	—	
618-87-1	3,5-Dinitroaniline	1314	11	8321	HPLC/MS/MS	1.3	2.6	—	µg/L	—	
19406-51-0	Amino-2,6-dinitrotoluene[4-]	1560	131	8321	HPLC/MS/MS	0.065	0.325	73	µg/L	EPA TAP	
35572-78-2	Amino-4,6-dinitrotoluene[2-]	1562	110	8321	HPLC/MS/MS	0.065	0.325	73	µg/L	EPA TAP	
99-65-0	Dinitrobenzene[1,3-]	1562	1	8321	HPLC/MS/MS	0.065	0.325	3.6	µg/L	EPA TAP	
121-14-2	Dinitrotoluene[2,4-]	1562	7	8321	HPLC/MS/MS	0.078	0.325	2.2	µg/L	EPA TAP	
606-20-2	Dinitrotoluene[2,6-]	1562	2	8321	HPLC/MS/MS	0.065	0.325	37	µg/L	EPA TAP	
DNX	DNX	789	30	8330	HPLC	0.034	0.5	—	µg/L	—	
2691-41-0	HMX	1567	249	8321	HPLC/MS/MS	0.0845	0.325	1800	µg/L	EPA TAP	
MNX	MNX	766	60	8330	HPLC	0.07	0.5	—	µg/L	—	
98-95-3	Nitrobenzene	1561	1	8321	HPLC/MS/MS	0.065	0.325	1.2	µg/L	EPA TAP	
88-72-2	Nitrotoluene[2-]	1561	6	8321	HPLC/MS/MS	0.13	0.325	3.1	µg/L	EPA TAP	
99-08-1	Nitrotoluene[3-]	1561	1	8321	HPLC/MS/MS	0.13	0.325	3.6	µg/L	EPA TAP	
99-99-0	Nitrotoluene[4-]	1559	0	8321	HPLC/MS/MS	0.169	0.65	42	µg/L	EPA TAP	
78-11-5	PETN	1361	0	8321	HPLC/MS/MS	0.52	1.3	—	µg/L	—	
121-82-4	RDX	1561	258	8321	HPLC/MS/MS	0.065	0.325	6.1	µg/L	EPA TAP	
3058-38-6	TATB	1313	2	8321	HPLC/MS/MS	0.819	1.3	—	µg/L	—	
479-45-8	Tetryl	1490	0	8321	HPLC/MS/MS	0.1625	0.65	150	µg/L	EPA TAP	
TNX	TNX	792	32	8330	HPLC	0.041	0.5	—	µg/L		
99-35-4	Trinitrobenzene[1,3,5-]	1562	51	8321	HPLC/MS/MS	0.078	0.325	1100	µg/L	EPA TAP	
118-96-7	Trinitrotoluene[2,4,6-]	1562	50	8321	HPLC/MS/MS	0.065	0.325	22	µg/L	EPA TAP	
78-30-8	Tri(o-cresyl)phosphate	1223	0	8321	HPLC/MS/MS	0.13	1.3	—	µg/L	—	
Metals											
Al	Aluminum	4175	1597	6010/200.7	ICPES	68	200	5000	µg/L	GW STD	
Sb	Antimony	4236	141	6020/200.8	ICPMS	0.5	2	6	µg/L	EPA MCL	
As	Arsenic	4234	861	6020/200.8	ICPMS	2	5	10	µg/L	EPA MCL	
Ba	Barium	4238	4233	6010/200.7	ICPES	1	5	1000	µg/L	GW STD	
Be	Beryllium	4233	133	6020/200.8	ICPMS	0.1	0.5	4	µg/L	EPA MCL	
B	Boron	4134	3101	6010/200.7	ICPES	10	50	750	µg/L	GW STD	
Cd	Cadmium	4234	310	6020/200.8	ICPMS	0.1	1	5	µg/L	EPA MCL	
Cr	Chromium	4313	2727	6020/200.8	ICPMS	1	5	50	µg/L	GW STD	
Cr(VI)	Chromium hexavalent ion	61	54	7196	Colorimetry	2	10	50	µg/L	GW STD	
Co	Cobalt	4238	527	6010/200.7	ICPES	1	5	50	µg/L	GW STD	

CAS	Analyte	Number of Analyses	Number of Detects	EPA Method	Method Description[a]	MDL	PQL[b]	Screening Level	Unit	Screening-Level Type	Comment
Cu	Copper	3750	718	6010/200.7	ICPES	3	10	1000	µg/L	GW STD	
Fe	Iron	4243	2594	6010/200.7	ICPES	18	100	1000	µg/L	GW STD	
Pb	Lead	4238	926	6020/200.8	ICPMS	0.5	2	15	µg/L	EPA MCL	
Mn	Manganese	4236	2553	6010/200.7	ICPES	2	10	200	µg/L	GW STD	
Hg	Mercury	4171	117	7470/245	CVAA	0.05	0.2	2	µg/L	EPA MCL	
Mo	Molybdenum	4129	2364	6020/200.8	ICPMS	0.1	0.5	1000	µg/L	GW STD	
Ni	Nickel	4237	3258	6020/200.8	ICPMS	0.5	2	200	µg/L	GW STD	
Se	Selenium	4188	242	6020/200.8	ICPMS	2.5	5	50	µg/L	EPA MCL	
Ag	Silver	4238	159	6020/200.8	ICPMS	0.2	1	50	µg/L	GW STD	
Sr	Strontium	4134	4134	6010/200.7	ICPES	1	5	22000	µg/L	EPA TAP	
Tl	Thallium	4238	515	6020/200.8	ICPMS	0.4	1	2	µg/L	EPA MCL	
Sn	Tin	3896	52	6010/200.7	ICPES	2.5	10	22000	µg/L	EPA TAP	
U	Uranium	4085	3441	6020/200.8	ICPMS	0.05	0.2	30	µg/L	EPA MCL	
V	Vanadium	4237	3249	6010/200.7	ICPES	1	5	184	µg/L	EPA TAP	
Zn	Zinc	4213	2519	6010/200.7	ICPES	2	10	10000	µg/L	GW STD	
PCBs											
12674-11-2	Aroclor-1016	1078	1	8082/608	GC-ECD	0.0875	0.5	0.5	µg/L	EPA MCL	
11104-28-2	Aroclor-1221	1079	0	8082/608	GC-ECD	0.4165	0.5	0.5	µg/L	EPA MCL	
11141-16-5	Aroclor-1232	1079	0	8082/608	GC-ECD	0.19	0.5	0.5	µg/L	EPA MCL	
53469-21-9	Aroclor-1242	1079	2	8082/608	GC-ECD	0.222	0.5	0.5	µg/L	EPA MCL	
12672-29-6	Aroclor-1248	1079	0	8082/608	GC-ECD	0.135	0.5	0.5	µg/L	EPA MCL	
11097-69-1	Aroclor-1254	1079	7	8082/608	GC-ECD	0.127	0.5	0.5	µg/L	EPA MCL	
11096-82-5	Aroclor-1260	1078	7	8082/608	GC-ECD	0.067	0.5	0.5	µg/L	EPA MCL	
37324-23-5	Aroclor-1262	968	1	8082/608	GC-ECD	0.0935	0.5	0.5	µg/L	EPA MCL	
Pesticides											
309-00-2	Aldrin	1212	4	8081	GC-ECD	0.005	0.02	0.04	µg/L	EPA TAP	
319-84-6	BHC[alpha-]	1214	1	8081	GC-ECD	0.005	0.02	0.11	µg/L	EPA TAP	
319-85-7	BHC[beta-]	1215	1	8081	GC-ECD	0.005	0.02	0.37	µg/L	EPA TAP	
319-86-8	BHC[delta-]	1215	4	8081	GC-ECD	0.005	0.02	—	µg/L	—	
58-89-9	BHC[gamma-]	1215	4	8081	GC-ECD	0.005	0.02	0.2	µg/L	EPA MCL	
5103-71-9	Chlordane[alpha-]	1215	0	8081	GC-ECD	0.005	0.02	—	µg/L	—	
5103-74-2	Chlordane[gamma-]	1215	4	8081	GC-ECD	0.005	0.02	—	µg/L	—	
72-54-8	DDD[4,4'-]	1211	16	8081	GC-ECD	0.01	0.04	2.8	µg/L	EPA TAP	
72-55-9	DDE[4,4'-]	1208	22	8081	GC-ECD	0.01	0.04	2	µg/L	EPA TAP	
50-29-3	DDT[4,4'-]	1202	14	8081	GC-ECD	0.015	0.04	2	µg/L	EPA TAP	
60-57-1	Dieldrin	1213	9	8081	GC-ECD	0.015	0.04	0.042	µg/L	EPA TAP	
959-98-8	Endosulfan I	1214	4	8081	GC-ECD	0.005	0.02	—	µg/L	—	
33213-65-9	Endosulfan II	1206	5	8081	GC-ECD	0.01	0.04	—	µg/L	—	
1031-07-8	Endosulfan Sulfate	1213	9	8081	GC-ECD	0.00625	0.04	—	µg/L	—	

CAS	Analyte	Number of Analyses	Number of Detects	EPA Method	Method Description[a]	MDL	PQL[b]	Screening Level	Unit	Screening-Level Type	Comment
72-20-8	Endrin	1213	6	8081	GC-ECD	0.005	0.04	2	µg/L	EPA MCL	
7421-93-4	Endrin aldehyde	1205	3	8081	GC-ECD	0.01	0.04	—	µg/L	—	
53494-70-5	Endrin ketone	1213	2	8081	GC-ECD	0.01	0.04	—	µg/L	—	
76-44-8	Heptachlor	1214	11	8081	GC-ECD	0.005	0.02	0.4	µg/L	EPA MCL	
1024-57-3	Heptachlor epoxide	1213	3	8081	GC-ECD	0.0075	0.02	0.2	µg/L	EPA MCL	
72-43-5	Methoxychlor[4,4'-]	1198	1	8081	GC-ECD	0.05	0.2	40	µg/L	EPA MCL	
Radionuclides											
Am-241	Americium-241	2456	105	HASL-300	AS	—	0.05	1.2	pCi/L	DW DCG	
Cs-137	Cesium-137	2420	7	901.1	Gamma Spec	—	8	120	pCi/L	DW DCG	
Co-60	Cobalt-60	2418	1	901.1	Gamma Spec	—	8	200	pCi/L	DW DCG	
GROSSA	Gross alpha	1244	312	900	GFPC	—	3	15	pCi/L	EPA MCL	
GROSSB	Gross beta	1667	1081	900	GFPC	—	3	4	pCi/L	LANL BG	
GROSSG	Gross gamma	2385	75	901.1	Gamma Spec	—	120	648	pCi/L	LANL BG	
Np-237	Neptunium-237	2339	2	901.1	Gamma Spec	—	10	1.2	pCi/L	DW DCG	Alpha spectroscopy provides a detection limit below 10 pCi/L. Gamma spectroscopy is the default analytical method; alpha spectroscopy will be used on a limited basis where potential sources may exist.
Pu-238	Plutonium-238	2456	32	HASL-300	AS	—	0.05	1.6	pCi/L	DW DCG	
Pu-239/240	Plutonium-239/240	2438	73	HASL-300	AS	—	0.05	1.2	pCi/L	DW DCG	
K-40	Potassium-40	2276	35	901.1	Gamma Spec	—	10	280	pCi/L	DW DCG	
Ra-226	Radium-226	640	223	903.1	RET	—	1	4	pCi/L	DW DCG	
Ra-228	Radium-228	506	195	904	Radiochemical	—	1	4	pCi/L	DW DCG	
Na-22	Sodium-22	2437	0	901.1	Gamma Spec	—	10	400	pCi/L	DW DCG	
Sr-90	Strontium-90	2461	222	905	GFPC	—	0.5	8	pCi/L	EPA MCL	
H-3	Tritium	2267	1146	906.0	LSC	—	200	20000	pCi/L	EPA MCL	
U-234	Uranium-234	2465	2064	HASL-300	AS	—	1	20	pCi/L	DW DCG	
U-235/236	Uranium-235/236	2462	362	HASL-300	AS	—	1	24	pCi/L	DW DCG	
U-238	Uranium-238	2465	2013	HASL-300	AS	—	0.5	24	pCi/L	DW DCG	
Semivolatile Organic Analytes											
83-32-9	Acenaphthene	1769	2	8270	GCMS	0.31	1	2200	µg/L	EPA TAP	
208-96-8	Acenaphthylene	1767	4	8270	GCMS	0.2	1	—	µg/L	—	
62-53-3	Aniline	1729	0	8270	GCMS	2.5	10	120	µg/L	EPA TAP	
120-12-7	Anthracene	1754	4	8270	GCMS	0.2	1	11000	µg/L	EPA TAP	
1912-24-9	Atrazine	1002	0	8270	GCMS	2	10	3	µg/L	EPA MCL	Alternate promulgated method to meet screening level is not available.
103-33-3	Azobenzene	1740	0	8270	GCMS	2	10	1.3	µg/L	EPA TAP	Alternate promulgated method to meet screening level is not available.
92-87-5	Benzidine	1337	0	8270	GCMS	2	50	0.00094	µg/L	EPA TAP	EPA Method 605 can be used to achieve an MDL of 0.08 µg/L (est. PQL would be ~3 times higher), but the method is not routinely used at analytical laboratories.

CAS	Analyte	Number of Analyses	Number of Detects	EPA Method	Method Description[a]	MDL	PQL[b]	Screening Level	Unit	Screening-Level Type	Comment
56-55-3	Benzo(a)anthracene	1767	3	8270	GCMS	0.2	1	0.29	µg/L	EPA TAP	EPA Method 8310 (HPLC) can be used to achieve an MDL of 0.013 µg/L (est PQL would be ~3 times higher). EPA Method 8310 is used to analyze polycyclic aromatic hydrocarbons (PAHs). As stated in EPA Method 8310, "Use of Method 8310 presupposes a high expectation of finding the specific compounds of interest. If the user is attempting to screen samples for any or all of the compounds listed above (PAHs), he must develop independent protocol for the verification of identity." Method 8270 is retained because of the high adsorption of benzo(a)anthracene and because it is generally not considered a legacy LANL contaminant.
50-32-8	Benzo(a)pyrene	1763	4	8270	GCMS	0.2	1	0.2	µg/L	EPA MCL	EPA Method 8310 can be used to achieve an MDL of 0.023 µg/L (est. PQL would be ~3 times higher). EPA Method 8310 is used to analyze PAHs. As stated in EPA Method 8310, "Use of Method 8310 presupposes a high expectation of finding the specific compounds of interest. If the user is attempting to screen samples for any or all of the compounds listed above (PAHs), he must develop independent protocol for the verification of identity." Method 8270 is retained because of the high adsorption of benzo(a)anthracene and because it is generally not considered a legacy LANL contaminant.
205-99-2	Benzo(b)fluoranthene	1773	5	8270	GCMS	0.2	1	0.29	µg/L	EPA TAP	EPA Method 8310 can be used to achieve an MDL of 0.018 µg/L (est. PQL would be ~3 times higher). EPA Method 8310 is used to analyze PAHs. As stated in EPA Method 8310, "Use of Method 8310 presupposes a high expectation of finding the specific compounds of interest. If the user is attempting to screen samples for any or all of the compounds listed above (PAHs), he must develop independent protocol for the verification of identity." Method 8270 is retained because of the high adsorption of benzo(a)anthracene and because it is generally not considered a legacy LANL contaminant.
191-24-2	Benzo(g,h,i)perylene	1749	3	8270	GCMS	0.2	1	—	µg/L	—	
207-08-9	Benzo(k)fluoranthene	1771	5	8270	GCMS	0.2	1	2.9	µg/L	EPA TAP	
65-85-0	Benzoic acid	1564	24	8270	GCMS	6	20	150000	µg/L	EPA TAP	
100-51-6	Benzyl alcohol	1767	0	8270	GCMS	2	10	3700	µg/L	EPA TAP	
111-91-1	Bis(2-chloroethoxy)methane	1730	0	8270	GCMS	3	10	110	µg/L	EPA TAP	
111-44-4	Bis(2-chloroethyl)ether	1773	0	8270	GCMS	2	10	0.12	µg/L	EPA TAP	EPA Method 611 can be used to achieve an MDL of 0.3 µg/L (est. PQL ~3 times higher), but it is not routinely used at analytical laboratories.
117-81-7	Bis(2-ethylhexyl)phthalate	1773	136	8270	GCMS	2	10	6	µg/L	EPA MCL	Alternate promulgated method to meet screening level is not available.
101-55-3	Bromophenyl-phenylether[4-]	1772	0	8270	GCMS	2	10	—	µg/L	—	
85-68-7	Butylbenzylphthalate	1773	0	8270	GCMS	2	10	350	µg/L	EPA TAP	
59-50-7	Chloro-3-methylphenol[4-]	1703	0	8270	GCMS	2	10	3700	µg/L	EPA TAP	

CAS	Analyte	Number of Analyses	Number of Detects	EPA Method	Method Description[a]	MDL	PQL[b]	Screening Level	Unit	Screening-Level Type	Comment
106-47-8	Chloroaniline[4-]	1772	0	8270	GCMS	2	10	3.4	µg/L	EPA TAP	EPA Method 8311 (GC) can be used to achieve an MDL of 0.66 µg/L (est. PQL would be ~3 times higher), but it is not routinely used at analytical laboratories.
91-58-7	Chloronaphthalene[2-]	1763	2	8270	GCMS	0.35	1	2900	µg/L	EPA TAP	
95-57-8	Chlorophenol[2-]	1703	1	8270	GCMS	2	10	180	µg/L	EPA TAP	
7005-72-3	Chlorophenyl-phenyl[4-] ether	1773	0	8270	GCMS	2	10	—	µg/L	—	
218-01-9	Chrysene	1767	5	8270	GCMS	0.2	1	30	µg/L	EPA TAP	
53-70-3	Dibenz(a,h)anthracene	1772	3	8270	GCMS	0.2	1	0.029	µg/L	EPA TAP	EPA Method 8310 can be used to achieve MDL of 0.03 µg/L (est. PQL would be ~3 times higher). EPA Method 8310 is used to analyze PAHs. As stated in EPA Method 8310, "Use of Method 8310 presupposes a high expectation of finding the specific compounds of interest. If the user is attempting to screen samples for any or all of the compounds listed above (PAHs), he must develop independent protocol for the verification of identity." Method 8270 is retained because of the high adsorption of benzo(a)anthracene and because it is generally not considered a legacy LANL contaminant.
132-64-9	Dibenzofuran	1754	0	8270	GCMS	2	10	37	µg/L	EPA TAP	
95-50-1	Dichlorobenzene[1,2-]	1773	0	8270	GCMS	2	10	600	µg/L	EPA MCL	
541-73-1	Dichlorobenzene[1,3-]	1773	0	8270	GCMS	2	10	—	µg/L	—	
106-46-7	Dichlorobenzene[1,4-]	1773	1	8270	GCMS	2	10	75	µg/L	EPA MCL	
91-94-1	Dichlorobenzidine[3,3'-]	1754	1	8270	GCMS	1	10	1.5	µg/L	EPA TAP	EPA Method 605 can be used to achieve an MDL of 0.13 µg/L (est. PQL would be ~3 times higher), but it is not routinely used at analytical laboratories.
120-83-2	Dichlorophenol[2,4-]	1688	2	8270	GCMS	2	10	110	µg/L	EPA TAP	
84-66-2	Diethylphthalate	1773	5	8270	GCMS	2	10	29000	µg/L	EPA TAP	
105-67-9	Dimethylphenol[2,4-]	1657	1	8270	GCMS	2	10	730	µg/L	EPA TAP	
84-74-2	Di-n-butylphthalate	1751	4	8270	GCMS	2	10	3700	µg/L	EPA TAP	
534-52-1	Dinitro-2-methylphenol[4,6-]	1702	0	8270	GCMS	3	10	3.6	µg/L	EPA TAP	The existing method provides the lowest available MDL and PQL.
51-28-5	Dinitrophenol[2,4-]	1693	0	8270	GCMS	10	20	73	µg/L	EPA TAP	
121-14-2	Dinitrotoluene[2,4-]	1773	0	8270	GCMS	2	10	2.2	µg/L	EPA TAP	Screening level is met by EPA Method 8321, which is used for analysis of high explosives in the 2010 Interim Plan.
606-20-2	Dinitrotoluene[2,6-]	1773	0	8270	GCMS	2	10	37	µg/L	EPA TAP	
117-84-0	Di-n-octylphthalate	1773	7	8270	GCMS	3	10	—	µg/L	—	
123-91-1	Dioxane[1,4-]	1409	97	8270	GCMS	1	10	61	µg/L	EPA TAP	
122-39-4	Diphenylamine	1761	0	8270	GCMS	3	10	910	µg/L	EPA TAP	
206-44-0	Fluoranthene	1765	4	8270	GCMS	0.2	1	1500	µg/L	EPA TAP	
86-73-7	Fluorene	1758	3	8270	GCMS	0.2	1	1500	µg/L	EPA TAP	
118-74-1	Hexachlorobenzene	1773	0	8270	GCMS	2	10	1	µg/L	EPA MCL	EPA Method 8121 (GC) can be used to achieve MDL of 0.0056 µg/L (est. PQL ~3 times higher), but it is not routinely used at analytical laboratories.

CAS	Analyte	Number of Analyses	Number of Detects	EPA Method	Method Description[a]	MDL	PQL[b]	Screening Level	Unit	Screening-Level Type	Comment
87-68-3	Hexachlorobutadiene	1773	0	8270	GCMS	2	10	8.6	µg/L	EPA TAP	EPA Method 8121 (GC) can be used to achieve MDL of 0.0014 µg/L (est. PQL ~3 times higher), but it is not routinely used at analytical laboratories.
77-47-4	Hexachlorocyclopentadiene	1773	0	8270	GCMS	2	10	50	µg/L	EPA MCL	
67-72-1	Hexachloroethane	1773	0	8270	GCMS	2	10	48	µg/L	EPA TAP	
193-39-5	Indeno(1,2,3-cd)pyrene	1769	3	8270	GCMS	0.2	1	0.29	µg/L	EPA TAP	EPA Method 8310 can be used to achieve MDL of 0.043 µg/L (est. PQL ~3 times higher). EPA Method 8310 is used to analyze PAHs. As stated in EPA Method 8310, "Use of Method 8310 presupposes a high expectation of finding the specific compounds of interest. If the user is attempting to screen samples for any or all of the compounds listed above (PAHs), he must develop independent protocol for the verification of identity." Method 8270 is retained because of the high adsorption of benzo(a)anthracene and because it is generally not considered a legacy LANL contaminant.
78-59-1	Isophorone	1773	0	8270	GCMS	2	10	710	µg/L	EPA TAP	
90-12-0	Methylnaphthalene[1-]	1523	2	8270	GCMS	0.3	1	23	µg/L	EPA TAP	
91-57-6	Methylnaphthalene[2-]	1748	2	8270	GCMS	0.3	1	150	µg/L	EPA TAP	
95-48-7	Methylphenol[2-]	1705	3	8270	GCMS	2	10	1800	µg/L	EPA TAP	
65794-96-9	Methylphenol[3-,4-]	719	0	8270	GCMS	3	10	—	µg/L	—	
91-20-3	Naphthalene	1710	10	8270	GCMS	0.3	1	30	µg/L	GW STD	
88-74-4	Nitroaniline[2-]	1771	1	8270	GCMS	2	10	370	µg/L	EPA TAP	
99-09-2	Nitroaniline[3-]	1771	2	8270	GCMS	2	10	—	µg/L	—	
100-01-6	Nitroaniline[4-]	1767	1	8270	GCMS	2	10	34	µg/L	EPA TAP	
98-95-3	Nitrobenzene	1772	0	8270	GCMS	3	10	1.2	µg/L	EPA TAP	Screening level is met by EPA Method 8321, which is used for analysis of high explosives in the 2010 Interim Plan.
88-75-5	Nitrophenol[2-]	1640	0	8270	GCMS	2	10	—	µg/L	—	
100-02-7	Nitrophenol[4-]	1701	0	8270	GCMS	2	10	—	µg/L	—	
55-18-5	Nitrosodiethylamine[N-]	1545	0	8270	GCMS	2	10	0.0014	µg/L	EPA TAP	EPA Method 521 (GC/MS/MS) can be used to obtain detection limit of 0.0021 µg/L (est. PQL ~3 times higher), but it is not routinely used at analytical laboratories.
62-75-9	Nitrosodimethylamine[N-]	1733	0	8270	GCMS	2	10	0.0042	µg/L	EPA TAP	EPA Method 521 (GC/MS/MS) can be used to obtain detection limit of 0.0016 µg/L (est. PQL ~3 times higher), but it is not routinely used at analytical laboratories.
924-16-3	Nitroso-di-n-butylamine[N-]	1534	0	8270	GCMS	2	10	0.024	µg/L	EPA TAP	EPA Method 521 (GC/MS/MS) can be used to obtain detection limit of 0.0014 µg/L (est. PQL ~3 times higher), but it is not routinely used at analytical laboratories.
621-64-7	Nitroso-di-n-propylamine[N-]	1766	0	8270	GCMS	2	10	0.096	µg/L	EPA TAP	EPA Method 521 (GC/MS/MS) can be used to obtain detection limit of 0.0012 µg/L (est. PQL ~3 times higher), but it is not routinely used at analytical laboratories.
930-55-2	Nitrosopyrrolidine[N-]	1538	0	8270	GCMS	2	10	0.32	µg/L	EPA TAP	EPA Method 521 (GC/MS/MS) can be used to obtain detection limit of 0.0014 µg/L (est. PQL ~3 times higher), but it is not routinely used at analytical laboratories.

CAS	Analyte	Number of Analyses	Number of Detects	EPA Method	Method Description[a]	MDL	PQL[b]	Screening Level	Unit	Screening-Level Type	Comment
108-60-1	Oxybis(1-chloropropane)[2,2'-]	1744	0	8270	GCMS	2	10	3.2	µg/L	EPA TAP	EPA Method 611 can be used to achieve MDL of 0.3 µg/L (est. PQL ~3 times higher), but it is not routinely used at analytical laboratories.
608-93-5	Pentachlorobenzene	1538	0	8270	GCMS	2	10	29	µg/L	EPA TAP	
87-86-5	Pentachlorophenol	1698	3	8270	GCMS	2	10	1	µg/L	EPA MCL	Current method provides lowest available MDL/PQL.
85-01-8	Phenanthrene	1688	6	8270	GCMS	0.2	1	—	µg/L	—	
108-95-2	Phenol	1703	4	8270	GCMS	1	10	5	µg/L	GW STD	EPA Method 604 (GC flame ionization detector) can be used to obtain method detection limit of 0.14 µg/L (est. PQL ~3 times higher), but it is not routinely used at analytical laboratories.
129-00-0	Pyrene	1766	3	8270	GCMS	0.3	1	1100	µg/L	EPA TAP	
110-86-1	Pyridine	1074	0	8270	GCMS	3	10	37	µg/L	EPA TAP	
95-94-3	Tetrachlorobenzene[1,2,4,5]	1542	0	8270	GCMS	2	10	11	µg/L	EPA TAP	
58-90-2	Tetrachlorophenol[2,3,4,6-]	1484	0	8270	GCMS	2	10	1100	µg/L	EPA TAP	
120-82-1	Trichlorobenzene[1,2,4-]	1773	1	8270	GCMS	2	10	70	µg/L	EPA MCL	
95-95-4	Trichlorophenol[2,4,5-]	1688	1	8270	GCMS	1	10	3700	µg/L	EPA TAP	
88-06-2	Trichlorophenol[2,4,6-]	1688	1	8270	GCMS	2	10	61	µg/L	EPA TAP	
Volatile Organic Analytes											
67-64-1	Acetone	2098	284	8260	GCMS	1.25	5	22000	µg/L	EPA TAP	
75-05-8	Acetonitrile	1114	9	8260	GCMS	6.25	25	130	µg/L	EPA TAP	
107-02-8	Acrolein	1354	2	8260	GCMS	3	5	0.042	µg/L	EPA TAP	Alternate promulgated method to meet screening level is not available. EPA Method 603 (GC) can be used to obtain method detection limit of 0.7 µg/L (est. PQL ~3 times higher), but it is not routinely used at analytical laboratories.
107-13-1	Acrylonitrile	1987	0	8260	GCMS	1	5	0.45	µg/L	EPA TAP	Alternate promulgated method to meet screening level is not available. EPA Method 603 (GC) can be used to obtain method detection limit of 0.5 µg/L (est. PQL ~3 times higher), but it is not routinely used at analytical laboratories.
71-43-2	Benzene	2149	11	8260	GCMS	0.3	1	5	µg/L	EPA MCL	
108-86-1	Bromobenzene	2163	0	8260	GCMS	0.25	1	88	µg/L	EPA TAP	
74-97-5	Bromochloromethane	2177	0	8260	GCMS	0.3	1	—	µg/L	—	
75-27-4	Bromodichloromethane	2177	0	8260	GCMS	0.25	1	80	µg/L	EPA MCL	
75-25-2	Bromoform	2177	1	8260	GCMS	0.25	1	80	µg/L	EPA MCL	
74-83-9	Bromomethane	2164	2	8260	GCMS	0.5	1	8.7	µg/L	EPA TAP	
71-36-3	Butanol[1-]	504	4	8260	GCMS	12	50	3700	µg/L	EPA TAP	
78-93-3	Butanone[2-]	2170	73	8260	GCMS	1.25	5	7100	µg/L	EPA TAP	
104-51-8	Butylbenzene[n-]	2176	0	8260	GCMS	0.25	1	—	µg/L	—	
135-98-8	Butylbenzene[sec-]	2176	0	8260	GCMS	0.25	1	—	µg/L	—	
98-06-6	Butylbenzene[tert-]	2176	0	8260	GCMS	0.25	1	—	µg/L	—	
75-15-0	Carbon disulfide	2148	19	8260	GCMS	1.25	5	1000	µg/L	EPA TAP	
56-23-5	Carbon tetrachloride	2177	0	8260	GCMS	0.25	1	5	µg/L	EPA MCL	

CAS	Analyte	Number of Analyses	Number of Detects	EPA Method	Method Description[a]	MDL	PQL[b]	Screening Level	Unit	Screening-Level Type	Comment
126-99-8	Chloro-1,3-butadiene[2-]	1934	0	8260	GCMS	0.3	1	14	µg/L	EPA TAP	
107-05-1	Chloro-1-propene[3-]	1936	0	8260	GCMS	3.7	5	6.5	µg/L	EPA TAP	
108-90-7	Chlorobenzene	2177	0	8260	GCMS	0.25	1	100	µg/L	EPA MCL	
124-48-1	Chlorodibromomethane	2177	0	8260	GCMS	0.25	1	80	µg/L	EPA MCL	
75-00-3	Chloroethane	2158	0	8260	GCMS	0.5	1	21000	µg/L	EPA TAP	
110-75-8	Chloroethyl vinyl ether[2-]	269	0	8260	GCMS	3	5	—	µg/L	—	
67-66-3	Chloroform	2177	85	8260	GCMS	0.25	1	80	µg/L	EPA MCL	
74-87-3	Chloromethane	2151	68	8260	GCMS	0.5	1	190	µg/L	EPA TAP	
95-49-8	Chlorotoluene[2-]	2143	0	8260	GCMS	0.25	1	730	µg/L	EPA TAP	
106-43-4	Chlorotoluene[4-]	2175	0	8260	GCMS	0.25	1	2600	µg/L	EPA TAP	
96-12-8	Dibromo-3-chloropropane[1,2-]	2176	0	8260	GCMS	0.5	1	0.2	µg/L	EPA MCL	EPA Method 8011/504 (GC) can be used to achieve an MDL of 0.01 µg/L (est. PQL ~3 times higher), but it is not routinely used at analytical laboratories.
106-93-4	Dibromoethane[1,2-]	2176	0	8260	GCMS	0.25	1	0.05	µg/L	EPA MCL	EPA Method 8011/504 (GC) can be used to achieve an MDL of 0.01 µg/L (est. PQL ~3 times higher), but it is not routinely used at analytical laboratories.
74-95-3	Dibromomethane	2177	0	8260	GCMS	0.3	1	8.2	µg/L	EPA TAP	
95-50-1	Dichlorobenzene[1,2-]	2156	2	8260	GCMS	0.25	1	600	µg/L	EPA MCL	
541-73-1	Dichlorobenzene[1,3-]	2155	18	8260	GCMS	0.25	1	—	µg/L	—	
106-46-7	Dichlorobenzene[1,4-]	2155	0	8260	GCMS	0.25	1	75	µg/L	EPA MCL	
75-71-8	Dichlorodifluoromethane	2174	0	8260	GCMS	0.5	1	400	µg/L	EPA TAP	
75-34-3	Dichloroethane[1,1-]	2177	40	8260	GCMS	0.3	1	25	µg/L	GW STD	
107-06-2	Dichloroethane[1,2-]	2177	5	8260	GCMS	0.25	1	5	µg/L	EPA MCL	
75-35-4	Dichloroethene[1,1-]	2177	41	8260	GCMS	0.3	1	5	µg/L	GW STD	
156-59-2	Dichloroethene[cis-1,2-]	2122	3	8260	GCMS	0.3	1	70	µg/L	EPA MCL	
156-60-5	Dichloroethene[trans-1,2-]	2177	0	8260	GCMS	0.3	1	100	µg/L	EPA MCL	
78-87-5	Dichloropropane[1,2-]	2177	0	8260	GCMS	0.25	1	5	µg/L	EPA MCL	
142-28-9	Dichloropropane[1,3-]	2177	0	8260	GCMS	0.25	1	730	µg/L	EPA TAP	
594-20-7	Dichloropropane[2,2-]	2177	0	8260	GCMS	0.3	1	—	µg/L	—	
563-58-6	Dichloropropene[1,1-]	2177	0	8260	GCMS	0.25	1	—	µg/L	—	
60-29-7	Diethyl ether	1318	4	8260	GCMS	0.25	1	7300	µg/L	EPA TAP	
97-63-2	Ethyl methacrylate	1936	0	8260	GCMS	1	5	3300	µg/L	EPA TAP	
100-41-4	Ethylbenzene	2156	3	8260	GCMS	0.25	1	700	µg/L	EPA MCL	
87-68-3	Hexachlorobutadiene	1967	0	8260	GCMS	0.25	1	8.6	µg/L	EPA TAP	
591-78-6	Hexanone[2-]	2171	1	8260	GCMS	1.25	5	47	µg/L	EPA TAP	
74-88-4	Iodomethane	2175	0	8260	GCMS	1.25	5	—	µg/L	—	
78-83-1	Isobutyl alcohol	784	1	8260	GCMS	20	50	11000	µg/L	EPA TAP	
98-82-8	Isopropylbenzene	2177	20	8260	GCMS	0.25	1	680	µg/L	EPA TAP	
99-87-6	Isopropyltoluene[4-]	2176	4	8260	GCMS	0.25	1	—	µg/L	—	

CAS	Analyte	Number of Analyses	Number of Detects	EPA Method	Method Description[a]	MDL	PQL[b]	Screening Level	Unit	Screening-Level Type	Comment
126-98-7	Methacrylonitrile	1931	0	8260	GCMS	1	5	1	µg/L	EPA TAP	Alternate promulgated method to meet screening level is not available.
80-62-6	Methyl methacrylate	1936	1	8260	GCMS	1	5	1400	µg/L	EPA TAP	
1634-04-4	Methyl tert-butyl ether	1317	20	8260	GCMS	0.25	1	130	µg/L	EPA TAP	
108-10-1	Methyl-2-pentanone[4-]	2175	10	8260	GCMS	1.25	5	2000	µg/L	EPA TAP	
75-09-2	Methylene chloride	2162	11	8260	GCMS	2	5	5	µg/L	EPA MCL	Current method is adequate. Elevated PQL is the result of unavoidable analytical contamination associated with extraction process in the analytical laboratory.
91-20-3	Naphthalene	1965	7	8260	GCMS	0.25	1	30	µg/L	GW STD	
107-12-0	Propionitrile	1118	0	8260	GCMS	1.5	5	—	µg/L	—	
103-65-1	Propylbenzene[1-]	2166	0	8260	GCMS	0.25	1	1300	µg/L	EPA TAP	
100-42-5	Styrene	2163	6	8260	GCMS	0.25	1	100	µg/L	EPA MCL	
630-20-6	Tetrachloroethane[1,1,1,2-]	2169	0	8260	GCMS	0.25	1	5.2	µg/L	EPA TAP	
79-34-5	Tetrachloroethane[1,1,2,2-]	2177	0	8260	GCMS	0.25	1	10	µg/L	GW STD	
127-18-4	Tetrachloroethene	2148	87	8260	GCMS	0.25	1	5	µg/L	EPA MCL	
108-88-3	Toluene	2171	226	8260	GCMS	0.25	1	750	µg/L	GW STD	
76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	2081	2	8260	GCMS	1	5	59000	µg/L	EPA TAP	
87-61-6	Trichlorobenzene[1,2,3-]	1903	2	8260	GCMS	0.3	1	29	µg/L	EPA TAP	
120-82-1	Trichlorobenzene[1,2,4-]	1930	1	8260	GCMS	0.3	1	70	µg/L	EPA MCL	
71-55-6	Trichloroethane[1,1,1-]	2175	40	8260	GCMS	0.3	1	60	µg/L	GW STD	
79-00-5	Trichloroethane[1,1,2-]	2177	6	8260	GCMS	0.25	1	5	µg/L	EPA MCL	
79-01-6	Trichloroethene	2177	115	8260	GCMS	0.25	1	5	µg/L	EPA MCL	
75-69-4	Trichlorofluoromethane	2171	0	8260	GCMS	0.31	1	1300	µg/L	EPA TAP	
96-18-4	Trichloropropane[1,2,3-]	2177	0	8260	GCMS	0.3	1	0.0072	µg/L	EPA TAP	EPA Method 504 (GC) can be used to achieve an MDL of 0.02 µg/L (est. PQL ~3 times higher), but it is not routinely used at analytical laboratories.
95-63-6	Trimethylbenzene[1,2,4-]	2176	5	8260	GCMS	0.25	1	15	µg/L	EPA TAP	
108-67-8	Trimethylbenzene[1,3,5-]	2176	0	8260	GCMS	0.25	1	370	µg/L	EPA TAP	
108-05-4	Vinyl acetate	1916	0	8260	GCMS	1.5	5	410	µg/L	EPA TAP	
75-01-4	Vinyl chloride	2177	0	8260	GCMS	0.5	1	1	µg/L	GW STD	
95-47-6	Xylene[1,2-]	2034	4	8260	GCMS	0.25	1	1200	µg/L	EPA TAP	
Xylene[1,3 and 1,4]	Xylene[1,3-]+xylene[1,4-]	2018	13	8260	GCMS	0.25	2	—	µg/L	—	

Note: Shaded cells indicate analytes for which the target PQL exceeds the screening level.

[a] HRMS = high resolution mass spectrometry; GC = gas chromatography; IC = ion chromatography; HPLC = high performance liquid chromatography; ICPES = inductively coupled emission spectrometry; HPLC/MS/MS = high-performance liquid chromatography coupled with tandem mass spectrometry; CA = carbonaceous analyzer; ICPMS = inductively coupled plasma mass spectrometry; CVAA = Cold vapor atomic absorption spectroscopy; GC-ECD = gas chromatography–electron-capture detector; AS = Alpha spectroscopy; GFPC = gas flow proportional counting; RET = radon emission technique; LSC = liquid scintillation counting; GCMS = gas chromatography mass spectrometry.

[b] In the case of analytical methods for radionuclides that are based on counting statistics, the equivalent of the PQL is expressed as the minimum detectable activity.

[c] — = Not applicable.

C-4.2 Analyses by On-Site Laboratories

Regulatory analyses that support Laboratory's characterization, cleanup, and monitoring programs are always provided by external contract analytical laboratories. However, in some specific situations, samples are most appropriately submitted for on-site analysis by the Geochemistry and Geomaterials Research Laboratories (GGRL) in the Laboratory's Earth Systems Observations Group (EES-14). In-house analyses are often used in the following cases:

- When rapid turnaround data (e.g., <24 h) are required to support activities such as drilling, well development, or well rehabilitation. Such rapid turnaround analyses are unavailable (at reasonable cost) from external laboratories.
- When special studies are undertaken to develop and refine conceptual models for contaminant transport in the environment. Examples of such studies are stable isotope analyses and filtration studies.
- When a well screen is impacted by residual effects of drilling and construction and is not producing reliable or representative water-quality data that fully meet monitoring objectives.

The following table lists the analytical methods and MDLs for analytes reported by GGRL in recent data packages submitted to the Laboratory. The analytical methods used by GGRL are the most recent EPA and industry-accepted extraction and analytical methods for chemical analyses of these analytes.

Analyte	Analytical Method	Method Description	MDL	Unit
General Inorganics				
Alkalinity-CO_3	EPA:310.1	Titrimetric	0.8	mg/L
Alkalinity-CO_3+HCO_3	EPA:310.1	Titrimetric	0.8	mg/L
Ammonia as Nitrogen	EPA:350.3	Ion selective electrode	0.1	mg/L
Bromide	EPA:300.0	Ion chromatography	0.01	mg/L
Calcium	EPA:200.7	ICP-AES	0.01	mg/L
Chloride	EPA:300.0	Ion chromatography	0.01	mg/L
Fluoride	EPA:300.0	Ion chromatography	0.01	mg/L
Magnesium	EPA:200.7	ICP-AES	0.01	mg/L
Nitrite as Nitrogen	EPA:300.0	Ion chromatography	0.003	mg/L
Nitrate as Nitrogen	EPA:300.0	Ion chromatography	0.002	mg/L
Oxalate	EPA:300.0	Ion chromatography	0.01	mg/L
Perchlorate	EPA:314.0	Ion chromatography	2	µg/L
pH	EPA:150.1	pH meter	—*	SU
Phosphorus, Orthophosphate (Expressed as PO_4)	EPA:300.0	Ion chromatography	0.01	mg/L
Potassium	EPA:200.7	ICP-AES	0.01	mg/L
Sodium	EPA:200.7	ICP-AES	0.01	mg/L
Sulfate	EPA:300.0	Ion chromatography	0.01	mg/L
Total Organic Carbon	SW-846:9060	Carbonaceous analyzer	0.2	mg/L
Sulfide, Total	EPA:376.2	Colorimetric	0.01	mg/L

Analyte	Analytical Method	Method Description	MDL	Unit
Metals				
Aluminum	EPA:200.7	ICP-AES	1	µg/L
Antimony	EPA:200.8	ICP-MS	1	µg/L
Arsenic	EPA:200.8	ICP-MS	0.2	µg/L
Barium	EPA:200.7	ICP-AES	1	µg/L
Beryllium	EPA:200.8	ICP-MS	1	µg/L
Boron	EPA:200.7	ICP-AES	2	µg/L
Cadmium	EPA:200.8	ICP-MS	1	µg/L
Cesium	EPA:200.8	ICP-MS	1	µg/L
Chromium	EPA:200.8	ICP-MS	1	µg/L
Chromium Hexavalent Ion	SW-846:7196A	Ultraviolet–Visible Spectrophotometry	0.05	µg/L
Cobalt	EPA:200.8	ICP-MS	1	µg/L
Copper	EPA:200.8	ICP-MS	1	µg/L
Iron	EPA:200.7	ICP-AES	10	µg/L
Lithium	EPA:200.7	ICP-AES	1	µg/L
Lead	EPA:200.8	ICP-MS	0.2	µg/L
Manganese	EPA:200.7	ICP-AES	1	µg/L
Mercury	EPA:200.8	ICP-MS	0.05	µg/L
Molybdenum	EPA:200.8	ICP-MS	1	µg/L
Nickel	EPA:200.8	ICP-MS	1	µg/L
Selenium	EPA:200.8	ICP-MS	1	µg/L
Silicon Dioxide	EPA:200.7	ICP-AES	0.0214	mg/L
Silver	EPA:200.8	ICP-MS	1	µg/L
Strontium	EPA:200.7	ICP-AES	1	µg/L
Thallium	EPA:200.8	ICP-MS	1	µg/L
Tin	EPA:200.8	ICP-MS	1	µg/L
Titanium	EPA:200.7	ICP-AES	2	µg/L
Uranium	EPA:200.8	ICP-MS	0.2	µg/L
Vanadium	EPA:200.8	ICP-MS	1	µg/L
Zinc	EPA:200.7	ICP-AES	1	µg/L
Isotope				
Deuterium Ratio	Generic:Deuterium Ratio	Isotope ratio mass spectrometry	—	permil
Oxygen-18/Oxygen-16 Ratio	Generic:Oxygen Isotope Ratio	Isotope ratio mass spectrometry	—	permil
Nitrogen-15/Nitrogen-14 Ratio	Generic:Nitrogen Isotope Ratio	Isotope ratio mass spectrometry	—	permil

* — = Not applicable.

C-5.0 INVESTIGATION-DERIVED WASTE MANAGEMENT

This section describes how investigation-derived waste (IDW) generated during the groundwater monitoring activities conducted under this Interim Plan will be managed. IDW is waste generated as a result of field-investigation activities and may include, but is not limited to, drill cuttings, purge water, contact waste, decontamination fluids, and all other wastes that has potentially come into contact with contaminants. IDW generated during implementation of the Interim Plan will be managed to protect human health and the environment, comply with applicable regulatory requirements, and adhere to Laboratory waste minimization goals.

All IDW generated during groundwater-monitoring activities will be managed in accordance with applicable Environmental Programs Directorate SOPs, which incorporate the requirements of all applicable EPA and NMED regulations, DOE orders, and Laboratory requirements. The SOP applicable to the characterization and management of IDW is

- SOP-5238, Characterization and Management of Environmental Program Waste, available at http://www.lanl.gov/environment/all/qa/adep.shtml.

The Los Alamos National Security, LLC Hazardous Waste Minimization Plan (LANL 2009, 109324) will be implemented during groundwater monitoring to minimize waste generation. This document is updated annually as a requirement of Module VIII of the Laboratory's Hazardous Waste Facility Permit.

The IDW waste streams associated with groundwater monitoring are identified in the table below and are briefly described below. The following table summarizes the estimated volumes of these waste streams that may be generated during the implementation of this Interim Plan.

Waste Stream	Estimated Volume	On-Site Management and Final Disposition
Purge water	5 to 3000 gal. per well per sampling event	Land application per ENV-RCRA-SOP-010, 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 on-site wastewater treatment facility for which waste meets waste acceptance criteria

A waste characterization strategy form (WCSF) will be prepared and approved per requirements of SOP-5238. The WCSF will provide 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, surface soil, subsurface soil). 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 listed hazardous waste 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 will be detailed in the

WCSF and approved before the waste is generated. Transportation and disposal requirements will also be detailed in the WCSF and approved before waste is generated. .

Waste Determinations

The number of sampling events needed to make Resource Conservation and Recovery Act (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 listed hazardous waste 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 or sporadic, but not confirmed, the waste will initially be managed as hazardous. A minimum of data from two consecutive sampling events will be used to establish reliable AK and to ensure that detection of RCRA-regulated constituents is consistent. Where data results are inconsistent or new RCRA-regulated constituents are detected, up to four sampling events will be used to establish reliable AK.
- 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 nondetect 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 ENV-RCRA-SOP-010, Land Application of Groundwater, as amended by the NMED-approved “LANL Drilling, Development, Rehabilitation and Sampling Purge Water Decision Tree—Revised 03/12/2010” (NMED 2010, 109025).

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 ENV-RCRA-SOP-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 NOI 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. The Laboratory 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 Area G at Technical Area 54.

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 observed in the environmental media (e.g., purge water) and, if necessary, direct sampling of the containerized waste. The Laboratory expects most of these wastes to be nonhazardous liquid waste or radioactive liquid waste that will be sent to one of its wastewater treatment facilities.

C-6.0 REFERENCES

The following list includes all documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate’s Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

LANL (Los Alamos National Laboratory), May 2009. “2009 Interim Facility-Wide Groundwater Monitoring Plan,” Los Alamos National Laboratory document LA-UR-09-1340, Los Alamos, New Mexico. (LANL 2009, 106115)

LANL (Los Alamos National Laboratory), November 2009. “Los Alamos National Security, LLC, Hazardous Waste Minimization Plan,” Los Alamos National Laboratory document LA-UR-09-07682, Los Alamos, New Mexico. (LANL 2009, 109324)

NMED (New Mexico Environment Department), March 12, 2010. “LANL Drilling, Development, Rehabilitation and Sampling Purge Water Decision Tree Revision,” New Mexico Environment Department letter to G. Turner (DOE-LASO) and T. George (LANL) from J.P. Bearzi (NMED-HWB) and W.C. Olsen (NMED-GWQB), Santa Fe, New Mexico. (NMED 2010, 109025)

NMED (New Mexico Environment Department), May 4, 2010. “Approval with Direction, 2009 Interim Facility-Wide Groundwater Monitoring Plan,” New Mexico Environment Department letter to G.J. Rael (DOE-LASO) and M.J. Graham (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2010, 109327)

Appendix D

Supplemental Information

D-1.0 INTRODUCTION

Appendix D provides supplemental information relevant to this annual update of sampling frequencies and analytical suites assigned to locations in each watershed. Locations monitored for water-level only are included in this appendix.

First, default analytical suites and frequencies in the current Interim Facility-Wide Groundwater Monitoring Plan (hereafter, the Interim Plan) are defined in three tables. These aspects are tailored for each type of sampling location (e.g. base flow, alluvial, intermediate, regional, or springs) and are established based on consideration of the adequacy of the data record, the status of investigations and maturity of conceptual models, the nature of watershed contaminant sources and the history of detections as summarized in Attachment B-1 of Appendix B. The tables also document the rationale for changes to default suites and frequencies in those cases for which these aspects differ between the current Interim Plan and the previous version.

- Table D-1.0-1 defines default analytical suites and frequencies for area-specific monitoring groups. For newly defined monitoring groups, Tables D-1.0-1 uses watershed-specific suites and frequencies from last year's Interim Plan as the basis for comparison with and documentation of changes.
- Table D-1.0-2 defines default analytical suites and frequencies for general surveillance monitoring locations in each watershed. These suites and frequencies are applicable to locations not assigned to an area-specific monitoring group.
- Table D-1.0-3 defines analytical suites and frequencies for characterization of new wells.

Second, individual monitoring locations in each watershed are listed in the detailed sampling tables referenced in the following sections, along with rationales for those locations for which assigned analytical suites or frequencies differ from default conditions established in Tables D-1.0-1 or D-1.0-2. For example, exceptions to default suites and frequencies may be appropriate if the data are required to support permit requirements or sampling commitments with the Pueblo of San Ildefonso. Exceptions to the assignment of default suites and frequencies may also include new wells, recently rehabilitated wells, and wells affected by residual drilling fluids. To document the evaluation process used to update the current Interim Plan, the detailed sampling tables also list the analytical suites and frequencies assigned to each location in the 2009 Interim Plan (LANL 2009, 106115).

Each detailed sampling table lists monitoring locations in alphabetical order for each hydrologic zone: base-flow stations, springs, alluvial wells, perched-intermediate wells or well screens, and lastly regional groundwater wells or well screens.

D-2.0 MONITORING PLANS FOR LOS ALAMOS CANYON/PUEBLO CANYON

Table D-2.0-1 lists monitoring locations in Los Alamos Canyon/Pueblo Canyon watershed. Many wells in upper Los Alamos Canyon are assigned to the new TA-21 Monitoring Group.

Dispersed contaminants currently distributed within and beneath the Los Alamos Canyon/Pueblo Canyon watershed predominantly result from the limited number of effluent sources or leaks that discharged to the watershed over the history of the Laboratory. Contaminant sources and conceptual models for these two canyons are described in the "Los Alamos and Pueblo Canyons Investigation Report" (LANL 2004, 087390), and in the New Mexico Environment Department- (NMED-) approved "Los Alamos and Pueblo

Canyons Groundwater Monitoring Well Network Evaluation and Recommendations, Revision 1" (LANL 2008, 101330). Surface water and alluvial groundwater concentrations for mobile contaminants (e.g., nitrate, perchlorate, and tritium) have dropped dramatically since releases and leaks to the canyons have ceased. The contaminants have, however, migrated into the vadose zone and are found in perched-intermediate and regional groundwater beneath the canyons.

D-3.0 MONITORING PLANS FOR SANDIA CANYON

Table D-3.0-1 lists monitoring locations in Sandia Canyon. Many locations in Sandia Canyon are assigned to the new chromium investigation monitoring group or to the new Technical Area (TA-21) monitoring group.

Perennial stream flow and saturated alluvial aquifer conditions occur in the upper and middle portions of Sandia Canyon because sanitary wastewater and cooling tower effluent discharge to the canyon from operating facilities. A wetland has developed as a result of these effluent discharges. A current conceptual model for chromium contamination associated with discharges into Sandia Canyon is presented in the "Fate and Transport Modeling Report for Chromium Contamination from Sandia Canyon" (the Fate and Transport Report) (LANL 2007, 098938).

D-4.0 MONITORING PLANS FOR MORTANDAD CANYON

Table D-4.0-1 lists monitoring locations in Mortandad Canyon. Many perched-intermediate and regional wells in Mortandad Canyon are assigned to the new chromium investigation monitoring group or the new Material Disposal Area (MDA) C monitoring group. Wells in Cañada del Buey that are assigned to the TA-54 monitoring group have been reassigned to the Pajarito Canyon watershed for logistical sampling purposes.

Elevated levels of nitrate, perchlorate, chromium, and tritium are detected in intermediate-perched groundwater and also occur in the regional groundwater. Within the Mortandad Canyon watershed, primary sources of contamination are attributed to past releases from outfalls and spills at TA-35 and TA-50, particularly the radioactive liquid waste treatment facility at TA-50. These sources and migration pathways are described in the "Mortandad Canyon Investigation Report" (LANL 2006, 094161) as well as in other reports referenced in the "Mortandad Canyon Groundwater Monitoring Well Network Evaluation, Revision 1" (LANL 2007, 099128). A current conceptual model for chromium contamination detected beneath Mortandad Canyon is presented in the Fate and Transport Report (LANL 2007, 098938). This conceptual model hypothesizes that chromium and other contaminants originate from releases into Sandia Canyon with complex migration pathways that move contamination to locations beneath Mortandad Canyon.

Contaminant data trends reflect the effects of improvements made at the TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF) in 2000 and 2001, which lowered concentrations of these two constituents in the effluent as well as in surface water and alluvial groundwater. Contaminant concentrations in the intermediate groundwater at MCOI-4, MCOI-5, and MCOI-6 are higher than in the near-surface environment because these wells are measuring past releases that have traveled through the unsaturated zone. However, concentrations in these intermediate wells are also decreasing with time. Concentrations at regional well R-15 are increasing for both constituents, indicating these contaminants are arriving at the regional aquifer and the area bounded approximately by MCOI-4 and MCOI-6 is a zone with enhanced unsaturated-zone transport.

D-5.0 MONITORING PLANS FOR PAJARITO CANYON

Table D-5.0-1 lists monitoring locations in Pajarito Canyon. Many perched-intermediate and regional wells in this watershed are assigned to the TA-54 monitoring group or to the new MDA C or TA-16-260 deep groundwater monitoring groups. Wells in Cañada del Buey that are assigned to the TA-54 monitoring group have been reassigned to the Pajarito Canyon watershed for logistical sampling purposes.

The contaminant release history from solid waste management units (SWMUs) and areas of concern (AOCs) in Pajarito Canyon includes releases from outfalls, septic systems, spills, open detonations from firing sites, and MDAs, including mesa-top MDAs G, H, J, and L at TA-54. Current conceptual models for contamination associated with discharges into Pajarito Canyon are described in the “Pajarito Canyon Investigation Report” (LANL 2008, 104909) and the “Technical Area 54 Well Evaluation and Network Recommendations, Revision 1” (LANL 2007, 098548).

D-6.0 MONITORING PLAN FOR WATER CANYON

Tables D-6.0-1 and D-6.0-2 list monitoring locations in Water Canyon/Cañon de Valle. Many perched-intermediate and regional wells in Water Canyon/Cañon de Valle are assigned to the new MDA AB or TA-16-260 deep groundwater monitoring groups. Table D-6.0-2 lists alluvial wells and springs scheduled to be monitored in support of alluvial corrective measures implementation (CMI) activities.

Water Canyon and its main tributary, Cañon de Valle, have been used for weapons testing, explosives testing, and explosives production and has received effluent from outfalls containing explosive compounds, metals, and volatile organic compounds (VOCs). The current status of this knowledge is presented in the following reports:

- “Corrective Measures Evaluation Report, Intermediate and Regional Groundwater, Consolidated Unit 16-021(c)-99” (LANL 2007, 098734)
- “Evaluation of the Suitability of Wells Near Technical Area 16 for Monitoring Contaminant Releases from Consolidated Unit 16-021-99, Revision 1” (LANL 2007, 100113) and addendum (LANL 2008, 101875.5)
- “Long-Term Monitoring and Maintenance Plan for the Corrective Measures Implementation at Consolidated Unit 16-021(c)-99” (LANL 2010, 109252)

D-7.0 MONITORING PLAN FOR ANCHO/CHAQUIHUI CANYON

Table D-7.0-1 lists monitoring locations in Ancho Canyon. Some regional wells in Ancho Canyon are assigned to the new MDA AB monitoring group.

D-8.0 MONITORING PLAN FOR WHITE ROCK CANYON

Table D-8.0-1 lists base-flow and spring monitoring locations in White Rock Canyon/Rio Grande.

D-9.0 REFERENCES

The following list includes all documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

Koch, R.J., and S. Schmeer, March 2009. "Groundwater Level Status Report for 2008, Los Alamos National Laboratory," Los Alamos National Laboratory report LA-14397-PR, Los Alamos, New Mexico. (Koch and Schmeer 2009, 105181)

Koch, R.J., and S. Schmeer, March 2010. "Groundwater Level Status Report for 2009, Los Alamos National Laboratory," Los Alamos National Laboratory report LA-14416-PR, Los Alamos, New Mexico. (Koch and Schmeer 2010, 108926)

LANL (Los Alamos National Laboratory), April 2004. "Los Alamos and Pueblo Canyons Investigation Report," Los Alamos National Laboratory document LA-UR-04-2714, Los Alamos, New Mexico. (LANL 2004, 087390)

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

LANL (Los Alamos National Laboratory), August 2007. "Corrective Measures Evaluation Report, Intermediate and Regional Groundwater, Consolidated Unit 16-021(c)-99," Los Alamos National Laboratory document LA-UR-07-5426, Los Alamos, New Mexico. (LANL 2007, 098734)

LANL (Los Alamos National Laboratory), September 2007. "Fate and Transport Modeling Report for Chromium Contamination from Sandia Canyon," Los Alamos National Laboratory document LA-UR-07-6018, Los Alamos, New Mexico. (LANL 2007, 098938)

LANL (Los Alamos National Laboratory), September 2007. "Mortandad Canyon Groundwater Monitoring Well Network Evaluation, Revision 1," Los Alamos National Laboratory document LA-UR-07-6435, Los Alamos, New Mexico. (LANL 2007, 099128)

LANL (Los Alamos National Laboratory), September 2007. "Evaluation of the Suitability of Wells Near Technical Area 16 for Monitoring Contaminant Releases from Consolidated Unit 16-021(c)-99, Revision 1," Los Alamos National Laboratory document LA-UR-07-6433, Los Alamos, New Mexico. (LANL 2007, 100113)

LANL (Los Alamos National Laboratory), October 2007. "Technical Area 54 Well Evaluation and Network Recommendations, Revision 1," Los Alamos National Laboratory document LA-UR-07-6436, Los Alamos, New Mexico. (LANL 2007, 098548)

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

LANL (Los Alamos National Laboratory), March 2008. “Addendum to the 'Evaluation of the Suitability of Wells Near Technical Area 16 for Monitoring Contaminant Releases from Consolidated Unit 16-021(c)-99, Revision 1',” Los Alamos National Laboratory document LA-UR-08-1536, Los Alamos, New Mexico. (LANL 2008, 101875.5)

LANL (Los Alamos National Laboratory), September 2008. “Pajarito Canyon Investigation Report,” Los Alamos National Laboratory document LA-UR-08-5852, Los Alamos, New Mexico. (LANL 2008, 104909)

LANL (Los Alamos National Laboratory), May 2009. “2009 Interim Facility-Wide Groundwater Monitoring Plan,” Los Alamos National Laboratory document LA-UR-09-1340, Los Alamos, New Mexico. (LANL 2009, 106115)

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

LANL (Los Alamos National Laboratory), April 2010. “Long-Term Monitoring and Maintenance Plan for the Corrective Measures Implementation at Consolidated Unit 16-021(c)-99,” Los Alamos National Laboratory document LA-UR-10-2196, Los Alamos, New Mexico. (LANL 2010, 109252)

NMED (New Mexico Environment Department), November 12, 2008. “Notice of Approval with Modifications for 2008 Interim Facility-Wide Groundwater Monitoring Plan,” New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2008, 103642)

NMED (New Mexico Environment Department), March 26, 2009. “Approval to Waive Requirements to Install Additional Alluvial Wells in Cañada del Buey,” New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2009, 105600)

Table D-1.0-1
Analytical Suites and Frequencies for Locations Assigned to Area-Specific Monitoring Groups

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics						Radionuclides[e]	Tritium[f]	General Inorganics[g]	Perchlorate	Stable Isotopes[h]	Rationale for Monitoring Group Suite and Frequency
			VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/ Furans						
TA-21 Monitoring Group (Upper Los Alamos and Sandia Canyons)—New monitoring group discussed in section 2.4														
Intermediate (Near-field)	2010	A	S	S	—[i]	—	—	—	A	S	S	S	(A)[h]	New monitoring group. Sampling plan for this new group is based on suites and frequencies specified for general surveillance of this hydrologic zone in the 2009 Interim Plan. Added SVOC suite to complement VOC data and to provide additional data in support of CME decisions.
	2009	A	S	—	—	—	—	—	A	S	S	S	A	This monitoring group did not exist in the 2009 Interim Plan. The information shown in this row is the watershed-specific analytical suite and frequencies for this hydrological zone in Upper Los Alamos Canyon in the 2009 Interim Plan.
Intermediate (Far-field or upgradient)	2010	A	A	A	—	—	—	—	A	S	S	S	(A)	New monitoring group. Sampling plan for this new group is based on suites and frequencies specified for general surveillance of this hydrologic zone in the 2009 Interim Plan. Reduced VOC frequency to annual because of the greater distance of these locations from TA-21 sources. Added SVOC suite to complement VOC data and to provide additional data in support of CME decisions.
	2009	A	S	—	—	—	—	—	A	S	S	S	A	This monitoring group did not exist in the 2009 Interim Plan. The information shown in this row is the watershed-specific analytical suite and frequencies for this hydrological zone in Upper Los Alamos Canyon in the 2009 Interim Plan.
Regional	2010	A	A	—	—	—	—	—	A	A	A	A	(A)	New monitoring group. Sampling plan for this new group is based on suites and frequencies specified for general surveillance of this hydrologic zone in the 2009 Interim Plan. No change.
	2009	A	A	—	—	—	—	—	A	A	A	A	A	This monitoring group did not exist in the 2009 Interim Plan. The information shown in this row is the watershed-specific analytical suite and frequencies for this hydrological zone in Upper Los Alamos Canyon in the 2009 Interim Plan.

Table D-1.0-1 (continued)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics: VOCs[b]	Organics: SVOCs[b]	Organics: Pesticides	Organics: PCB[c]	Organics: HEXP[d]	Organics: Dioxins/ Furans	Radionuclides[e]	Tritium[f]	General Inorganics[g]	Perchlorate	Stable Isotopes[h]	Rationale for Monitoring Group Suite and Frequency
Chromium Investigation Monitoring Group (portions of Sandia and Mortandad Canyons)—New monitoring group discussed in section 3.4														
Base Flow (Sandia)	2010	S	A	A	—	S[CNGR]	—	—	A	—	S	S	—	Provide baseline data for water-quality changes associated with variations in effluent volume and quality. Reduction in sampling frequencies (relative to frequencies specified for general surveillance of this hydrologic zone in the 2009 Interim Plan) reflects adequacy of data record to demonstrate reduction of contaminants in base flow and the maturation of the site conceptual model as documented in the Investigation Report for Sandia Canyon (LANL 2009, 107453). PCB congener method is specified to obtain more accurate data with lower detection levels.
	2009	Q	Q	A	—	Q	—	—	A	—	Q	A	Q	This monitoring group did not exist in the 2009 Interim Plan. The information shown in this row is the watershed-specific analytical suite and frequencies for this hydrological zone in Sandia Canyon in the 2009 Interim Plan.
Alluvial (Sandia)	2010	S	A	A	—	—	—	—	A	A	S	S	—	Provide baseline data for water-quality changes associated with variations in effluent volume and quality. Reduction in sampling frequencies (relative to frequencies specified for general surveillance of this hydrologic zone in the 2009 Interim Plan) reflects adequacy of data record to demonstrate reduction of contaminants in alluvial groundwater, maturation of the site conceptual model, and shift in focus to contaminants in deep groundwater, as documented in the Investigation Report for Sandia Canyon (LANL 2009, 107453). Removed PCB suite because of the predominance of nondetects (Table B-1).
	2009	Q	Q	A	—	A	—	—	A	A	Q	A	—	This monitoring group did not exist in the 2009 Interim Plan. The information shown in this row is the watershed-specific analytical suite and frequencies for this hydrological zone in Sandia Canyon in the 2009 Interim Plan.

Table D-1.0-1 (continued)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics						Radionuclides[e]	Tritium[f]	General Inorganics[g]	Perchlorate	Stable Isotopes[h]	Rationale for Monitoring Group Suite and Frequency
			VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/ Furans						
Intermediate (Sandia)	2010	Q	A	A	—	—	—	—	A	S	Q	S	A	New monitoring group. Sampling plan for this new group is based on suites and frequencies specified for general surveillance of this hydrologic zone in the 2009 Interim Plan, focusing on chromium and general inorganics (particularly nitrate) in deep groundwater. Reduction in sampling frequencies for VOCs, tritium, and perchlorate (relative to 2009 sampling plan) reflects adequacy of data record to demonstrate nature and extent of contaminants in groundwater (Table B-1) and the maturation of the site conceptual model (LANL 2009, 107453). Removed PCB suite because of the history of nondetects in this hydrologic zone and limited mobility of PCBs in groundwater.
	2009	Q	Q	A	—	A	—	—	A	Q	Q	Q	A	This monitoring group did not exist in the 2009 Interim Plan. The information shown in this row is the watershed-specific analytical suite and frequencies for this hydrological zone in Sandia Canyon in the 2009 Interim Plan.
Intermediate (Mortandad)	2010	Q	A	S	—	—	—	—	A	S	Q	S	A	New monitoring group. Sampling plan for this new group is based on suites and frequencies specified for general surveillance of this hydrologic zone in the 2009 Interim Plan, focusing on chromium and general inorganics (particularly nitrate) in deep groundwater. Reduction in sampling frequencies for VOCs, tritium, and perchlorate (relative to 2009 sampling plan) reflects adequacy of data record to demonstrate nature and extent of contaminants in groundwater (Table B-1) and the maturation of the site conceptual model (LANL 2009, 107453). Increased frequency for SVOC suite to monitor 1,4-dioxane trends in this hydrologic zone.
	2009	Q	S	Q	—	—	—	—	A	Q	Q	Q	S	This monitoring group did not exist in the 2009 Interim Plan. The information shown in this row is the watershed-specific analytical suite and frequencies for this hydrological zone in Mortandad Canyon in the 2009 Interim Plan.

Table D-1.0-1 (continued)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics						Radionuclides[e]	Tritium[f]	General Inorganics[g]	Perchlorate	Stable Isotopes[h]	Rationale for Monitoring Group Suite and Frequency
			VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/ Furans						
Regional	2010	Q	A	A	—	—	—	—	A	S	Q	S	A	New monitoring group. Sampling plan for this new group is based on suites and frequencies specified for general surveillance of this hydrologic zone in the 2009 Interim Plan, focusing on chromium and general inorganics (particularly nitrate) in deep groundwater. Reduction in sampling frequencies for VOCs, tritium, and perchlorate (relative to 2009 sampling plan) reflects the adequacy of data record to demonstrate nature and extent of contaminants in groundwater (Table B-1) and the maturation of the site conceptual model (LANL 2009, 107453). Removed PCB suite because of the history of nondetects in this hydrologic zone and the limited mobility of PCBs in groundwater.
	2009	Q	Q	A	—	A	—	—	A	Q	Q	Q	A	This monitoring group did not exist in the 2009 Interim Plan. The information shown in this row is the watershed-specific analytical suite and frequencies for this hydrological zone in Sandia Canyon in the 2009 Interim Plan.
TA-54 Monitoring Group (Mortandad Canyon/Cañada del Buey and Pajarito Canyon)—Monitoring group established in 2009 Interim Plan and discussed in section 5.4														
Intermediate	2010	Q	Q	Q	A	A	A	A	A	Q	Q	Q	S	Newly assigned hydrologic zone for this monitoring group. The sampling plan is identical to that defined for regional groundwater wells in this monitoring group. This plan addresses Resource Conservation and Recovery Act (RCRA) monitoring requirements and also reflects data collected to date from wells in the TA-54 network (Table B-1).
	2009	Q	Q	—	—	—	S	—	A	Q	Q	Q	Q	No intermediate wells were assigned to this monitoring group in the 2009 Interim Plan. The information shown in this row is the watershed-specific analytical suite and frequencies for this hydrological zone in Pajarito Canyon in the 2009 Interim Plan.

Table D-1.0-1 (continued)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics						Radionuclides[e]	Tritium[f]	General Inorganics[g]	Perchlorate	Stable Isotopes[h]	Rationale for Monitoring Group Suite and Frequency
			VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/ Furans						
Regional	2010	Q	Q	Q	A	A	A	A	A	Q	Q	Q	S	No change (other than reduced sampling frequency for stable isotopes).
	2009	Q	Q	Q	A	A	A	A	A	Q	Q	Q	Q	Existing wells sampled quarterly for suites containing constituents detected in these wells, and annually (rather than quarterly) for pesticides, PCB, HEXP, dioxins/furans, and radionuclides because of the predominance of nondetects for these constituents in these monitoring network wells.
MDA C Monitoring Group (Mortandad and Pajarito Canyons)—New monitoring group discussed in section 6.4														
Intermediate	2010	S	Q	A	—	—	T	—	A	S	Q	A	(A)	New monitoring group. Sampling plan is based on suites and frequencies specified for general surveillance of this hydrologic zone in the 2009 Interim Plan, modified to focus on those suites most relevant to potential releases from MDA C. Modified suites and frequencies are the same for intermediate and regional groundwater locations in this monitoring group. Reduced frequencies (relative to 2009 Interim Plan) for metals, tritium, and perchlorate reflect adequacy of data record to demonstrate nature and extent of these contaminants in groundwater in this part of the watershed (Table B-1). Added SVOC suite to complement VOC data. Retained HEXP suite at reduced frequency to address the limited migration potential for these constituents from TA-16 sources.
	2009	Q	Q	—	—	—	S	—	A	Q	Q	Q	Q	This monitoring group did not exist in the 2009 Interim Plan. The information shown in this row is the watershed-specific analytical suite and frequencies for this hydrological zone in Pajarito Canyon in the 2009 Interim Plan.

Table D-1.0-1 (continued)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics: VOCs[b]	Organics: SVOCs[b]	Organics: Pesticides	Organics: PCB[c]	Organics: HEXP[d]	Organics: Dioxins/ Furans	Radionuclides[e]	Tritium[f]	General Inorganics[g]	Perchlorate	Stable Isotopes[h]	Rationale for Monitoring Group Suite and Frequency
Regional	2010	S	Q	A	—	—	T	—	A	S	Q	A	(A)	New monitoring group. Sampling plan is based on suites and frequencies specified for general surveillance of this hydrologic zone in the 2009 Interim Plan, modified to focus on those suites most relevant to potential releases from MDA C. Modified suites and frequencies are the same for intermediate and regional groundwater locations in this monitoring group. Reduced frequencies (relative to 2009 Interim Plan) for metals, tritium, and perchlorate reflect adequacy of data record to demonstrate nature and extent of these contaminants in groundwater in this part of the watershed (Table B-1). Added SVOC suite to complement VOC data. Retained HEXP suite at reduced frequency to address the limited migration potential for these constituents from TA-16 sources.
	2009	Q	Q	—	—	—	S	—	A	A	Q	Q	A	This monitoring group did not exist in the 2009 Interim Plan. The information shown in this row is the watershed-specific analytical suite and frequencies for this hydrological zone in Pajarito Canyon in the 2009 Interim Plan.
TA-16-260 Alluvial Corrective Measures Implementation (CMI) Monitoring Group (Water Canyon/Cañon de Valle)—New monitoring group discussed in section 6.4														
Alluvial A	2010	—	—	—	—	—	Q[RDX-DP]	—	—	—	—	—	—	New monitoring group. Monitors the performance of injection grouting of the surge bed underlying the former settling pond. Water-level monitoring only (Table 1.11-1 of the Interim Plan); no water is anticipated to be present. A sample will be collected if water is present (LANL 2010, 109252, section 3.2 and Table 3.1-1). Specified RDX-degradation product suite in support of CMI performance evaluation.

Table D-1.0-1 (continued)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics						Radionuclides[e]	Tritium[f]	General Inorganics[g]	Perchlorate	Stable Isotopes[h]	Rationale for Monitoring Group Suite and Frequency
			VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/ Furans						
Alluvial B	2010	M/Q	—	—	—	—	M/Q[RDX-DP]	—	—	—	M/Q	—	M/Q[j]	New monitoring group. Monitors the performance of the pilot permeable reaction barrier (PRB) alluvial groundwater treatment system in Cañon de Valle. Upgradient, interior, and downgradient PRB vessel test ports (LANL 2010, 109252, section 5.1 and Tables 5.1-2, 5.1-3, and 5.1-4). Specified RDX-degradation product suite in support of CMI performance evaluation.
Alluvial C	2010	M/Q	—	—	—	—	M/Q[RDX-DP]	—	—	—	M/Q	—	—	New monitoring group. Monitors the effectiveness of the pilot PRB system on the alluvial water in Cañon de Valle. Upgradient and downgradient alluvial wells (LANL 2010, 109252, section 5.3 and Tables 5.3-1, 5.3-2, and 5.1-6). Specified RDX-degradation product suite in support of CMI performance evaluation.
Alluvial D	2010	—	—	—	—	—	—	—	—	—	—	—	—	New monitoring group. Monitors the performance of the cutoff wall for the pilot PRB treatment system in Cañon de Valle. Water-level monitoring only at alluvial wells and piezometers, Monitor water levels weekly during the first quarter, biweekly during the second quarter, and once each during third and fourth quarters (Table 1.11-1) (LANL 2010, 109252, section 5.2 and Table 5.1-6).
Springs	2010	—	—	—	—	—	W/M/Q RDX-DP	—	—	—	W/M/Q	—	—	New monitoring group. Monitors the performance of carbon filter treatment systems installed at selected springs in Cañon de Valle and Martin Spring Canyon. Samples collected from spring outlet and filter unit sampling ports (LANL 2010, 109252, section 4.0 and Tables 4.2-1, 4.2-2, and 4.3-1). Specified RDX-degradation product suite in support of CMI performance evaluation.

Table D-1.0-1 (continued)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics: VOCs[b]	Organics: SVOCs[b]	Organics: Pesticides	Organics: PCB[c]	Organics: HEXP[d]	Organics: Dioxins/ Furans	Radionuclides[e]	Tritium[f]	General Inorganics[g]	Perchlorate	Stable Isotopes[h]	Rationale for Monitoring Group Suite and Frequency
TA-16-260 Deep Groundwater Monitoring Group (Water Canyon/Cañon de Valle and Pajarito Canyon)—New monitoring group discussed in section 6.4														
Intermediate	2010	S	S	A	—	—	S[RDX-DP]	—	A	A	S	A	A	New monitoring group. Sampling plan is based on suites and frequencies specified for general surveillance of this hydrologic zone in the 2009 Interim Plan. Specified RDX-degradation product suite in support of CME. No change.
	2009	S	S	A	—	—	S	—	A	A	S	A	A	This monitoring group did not exist in the 2009 Interim Plan. The information shown in this row is the watershed-specific analytical suite and frequencies for this hydrological zone in Water Canyon/Cañon de Valle in the 2009 Interim Plan.
Regional	2010	S	S	A	—	—	S[RDX-DP]	—	A	A	S	S	A	New monitoring group. Sampling plan is based on suites and frequencies specified for general surveillance of this hydrologic zone in the 2009 Interim Plan. Specified RDX-degradation product suite in support of CME. No change.
	2009	S	S	A	—	—	S	—	A	A	S	S	A	This monitoring group did not exist in the 2009 Interim Plan. The information shown in this row is the watershed-specific analytical suite and frequencies for this hydrological zone in Water Canyon/Cañon de Valle in the 2009 Interim Plan.
MDA AB Monitoring Group (Ancho and Water Canyons)—New monitoring group discussed in section 7.4														
Regional	2010	S	A	—	—	—	S	—	A	A	S	S	(A)	Groundwater monitoring for MDA AB has historically been conducted predominantly at the DT-series regional aquifer wells. The focused suite for the DT wells will be maintained. Reduced frequency from semiannual to annual for tritium due to history of nondetects (Table B-1).
	2009	S	A	—	—	—	S	—	A	S	S	S	A	This monitoring group did not exist in the 2009 Interim Plan. The information shown in this row is the watershed-specific analytical suite and frequencies for this hydrological zone in Ancho Canyon in the 2009 Interim Plan.

Table D-1.0-1 (continued)

Notes: Sampling suites and frequencies for last year's Interim Plan are shown in gray text in order to set this information apart from that for the current Interim Plan. Sampling frequency: W = weekly (applies only to first month of sampling); M = monthly (applies only to first quarter of sampling); Q = quarterly (4 times/yr); S = semiannual (2 times/yr); A = annual (1 time/yr); T= triennial (once every 3 yr, with the next sample scheduled for collection in 2011). For simplicity, sample collection frequencies for analysis of suspended sediment concentrations and field parameters are not listed in this table. Field parameters are routinely collected for every sampling event at every type of location, and samples for suspended sediment concentrations are collected for every sampling event at base-flow stations and springs.

[a] Metals analysis includes the 23 target analyte list (TAL) metals, plus boron, molybdenum, silicon dioxide, strontium, tin, and uranium.

[b] VOC = volatile organic compounds; SVOC = semivolatile organic compounds.

[c] PCB = polychlorinated biphenyl [compound]. The superscript CNGR indicates the analysis of PCB congeners using U.S. Environmental Protection Agency (EPA) Method 1668A.

[d] The analytical suite of explosive compounds (HEXP) includes the Consent Order list of the normal SW-846:8330 analytes plus pentaerythritol tetranitrate (PETN); triaminotrinitrobenzene (TATB); 3,5-dinitroaniline; tri(o-cresyl)phosphate (TOCP); 2,4-diamino-6-nitrotoluene; and 2,6-diamino-4-nitrotoluene. The superscript RDX-DP indicates the analysis of RDX-degradation products hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine (MNX); hexahydro-1,3-nitro-1,3,5-triazine (DNX); and hexahydro-1,3,5-trinitroso-1,3,5-triazine (TNX).

[e] The radionuclide suite includes gross alpha, gross beta, alpha spectroscopy, gamma spectroscopy, and strontium-90.

[f] Tritium samples may be submitted for analysis by liquid scintillation if anticipated activities are greater than 300 pCi/L. Low-level tritium is analyzed using electrolytic enrichment or direct counting.

[g] General inorganic analysis includes major anions (bromide, chloride, fluoride, sulfate), major cations (calcium, magnesium, sodium, potassium), nitrate plus nitrite (as N), total Kjeldahl nitrogen (TKN), ammonia, total phosphorus, total organic carbon (TOC), total dissolved solids (TDS), alkalinity, specific conductivity, pH, and hardness. The superscript IND is specified for individual locations assigned to the indicator suite due to residual geochemical effects of drilling or other well activities.

[h] Analysis for stable isotopes of nitrogen, hydrogen, and oxygen. The collection of samples for stable isotope analysis is considered a special sampling campaign that is outside the scope of the regulatory process. In general, these samples are collected semiannually from “new” wells (those which completed construction, rehabilitation, or conversion on or after July 1, 2009), and annually from other locations. For intermediate and regional wells, “(A)” signifies samples will be collected annually until four sets of nitrogen isotope data have been collected. Any subsequent sampling for stable isotope analysis will be decided on the basis of site-specific conditions.

[i] — = This analytical suite is not scheduled to be collected for this type of water at locations assigned to this area-specific monitoring group. Some locations are assigned analytical suites or frequencies that differ from those shown in this table, for site-specific reasons as described in the text (sections 2.0 through 8.0) for the major watersheds, and as summarized in Tables D-2.0-1 through D-8.0-1.

[h] PRB vessel ports will be sampled for stable isotopes of carbon and nitrogen (LANL 2010 109252, Table 5.1-3).

Table D-1.0-2
Analytical Suites and Frequencies for General Surveillance Monitoring (Grouped by Watershed)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics						Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
			VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/ Furans						
Los Alamos Canyon/Pueblo Canyon														
Upper Los Alamos Canyon														
Base flow	2010	A	A	A	—[i]	A^{CNGR}	—	—	A	—	A	A	—	No change
	2009	A	A	A	—	ACNGR	—	—	A	—	A	A	—	Sampling frequency for PCBs is reduced to annual, consistent with frequencies for other suites from base-flow stations in this portion of the watershed. Data collected to date for these stations show nondetects for PCBs using EPA Method 608 or 8082 (Table B-1). PCB congener method is specified to obtain more accurate data with lower detection levels.
Springs	2010	A	A	A	—	A	—	—	A	A	A	A	(A)[h]	Added VOC and SVOC suites for consistency with monitoring plans for base-flow and alluvial surveillance locations in this subwatershed.
	2009	A	—	—	—	A	—	—	A	A	A	A	A	No change
Alluvial	2010	A	A	A	—	—	—	—	A	A	A	A	—	No change
	2009	A	A	A	—	—	—	—	A	A	A	A	—	No change
Intermediate	2010	—	—	—	—	—	—	—	—	—	—	—	—	Not applicable. All intermediate wells in this subwatershed are presently assigned to the TA-21 monitoring group.
	2009	A	S	—	—	—	—	—	A	S	S	S	A	Sampling frequency for VOCs is increased from annual to semiannual for wells downgradient of TA-21 to provide additional data in support of CME decisions.

Table D-1.0-2 (continued)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics: VOCs[b]	Organics: SVOCs[b]	Organics: Pesticides	Organics: PCB[c]	Organics: HEXP[d]	Organics: Dioxins/ Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Regional	2010	—	—	—	—	—	—	—	—	—	—	—	—	Not applicable. All regional wells in this subwatershed are presently assigned to the TA-21 monitoring Group.
	2009	A	A	—	—	—	—	—	A	A	A	A	A	Sampling frequencies for tritium, general inorganics, and perchlorate are reduced to annual, consistent with frequencies for other suites from regional wells in this portion of the watershed. Frequencies are reduced because the conceptual model is mature for this portion of the watershed, sufficient data have been collected for these analytical suites to justify monitoring on an annual basis (Table B-1), and contaminant concentrations within these suites are generally stable or decreasing with time (e.g., see tritium trends in Figure D-2.1-1).
Pueblo Canyon														
Base flow	2010	A	A	A	—	A^{CNGR}	—	—	A	—	A	A	—	No change. Retained PCB congener method to continue to establish baseline of data with lower practical quantitation levels.
	2009	A	A	A	—	ACNGR	—	—	A	—	A	A	—	No changes to sampling frequencies. PCB congener method is specified to obtain more accurate data with lower detection levels.
Alluvial	2010	A	A	A	—	—	—	—	A	A	A	A	—	No change
	2009	A	A	A	—	—	—	—	A	A	A	A	—	No change

Table D-1.0-2 (continued)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics: VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/ Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Intermediate	2010	A	A	—	—	—	—	—	A	A	A	A	(A)	No change
	2009	A	A	—	—	—	—	—	A	A	A	A	A	Sampling frequencies for tritium, general inorganics, and perchlorate are reduced to annual, consistent with sampling frequencies for other suites from intermediate wells in this portion of the watershed. Frequencies are reduced because the conceptual model is mature for this portion of the watershed, and sufficient data have been collected for these analytical suites to justify monitoring on an annual basis (Table B-1).
Regional	2010	A	A	—	—	—	—	—	A	A	A	A	(A)	No change
	2009	A	A	—	—	—	—	—	A	A	A	A	A	Sampling frequencies for tritium, general inorganics, and perchlorate are reduced to annual, consistent with sampling frequencies for other suites from regional wells in this portion of the watershed. Frequencies are reduced because the conceptual model is mature for this portion of the watershed, and sufficient data have been collected for these analytical suites to justify monitoring on an annual basis (Table B-1).
Lower Los Alamos Canyon														
Base flow	2010	S	A	A	—	—	—	—	A	A	S	S	—	No change
	2009	S	A	A	—	—	—	—	A	A	S	S	—	No change

Table D-1.0-2 (continued)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics: VOCs[b]	Organics: SVOCs[b]	Organics: Pesticides	Organics: PCB[c]	Organics: HEXP[d]	Organics: Dioxins/ Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Springs	2010	A	A	T	—	—	—	—	A	A	A	A	(A)	Reduced frequency for SVOC suite and dropped PCBs and HEXP suites due to predominance of nondetects and generally low mobility of these constituents in groundwater (Table B-1). Additional suites or increased frequencies are assigned on a site-specific basis as needed to meet requirements specified in the 2010 memorandum of understanding (MOU) with the Pueblo of San Ildefonso.
	2009	A	A	A	—	T	T	—	A	A	A	A	A	Sampling added for VOC, SVOC, PCB and HEXP suites for consistency with requirements of the 2009 memorandum of understanding (MOU) with the Pueblo of San Ildefonso. Triennial requirements for PCB and HEXP suites are based on the 2009 MOU with the Pueblo of San Ildefonso.
Alluvial	2010	A	A	T	—	—	—	—	A	A	A	A	—	Reduced frequency for SVOC suite and dropped PCBs and HEXP suites because of predominance of nondetects and generally low mobility of these constituents in groundwater (Table B-1). Additional suites or increased frequencies are assigned on a site-specific basis as needed to meet requirements specified in the 2010 MOU with the Pueblo of San Ildefonso.
	2009	A	A	A	—	T	T	—	A	A	A	A	—	Sampling frequencies for tritium, general inorganics, and perchlorate are reduced to annual, consistent with sampling frequencies for other suites in this portion of the watershed. Frequencies are reduced because the conceptual model is mature for this portion of the watershed, and sufficient data have been collected for these analytical suites to justify monitoring on an annual basis (Table B-1). Triennial requirements for PCB and HEXP suites are based on the 2009 MOU with the Pueblo of San Ildefonso.

Table D-1.0-2 (continued)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics: VOCs[b]	Organics: SVOCs[b]	Organics: Pesticides	Organics: PCB[c]	Organics: HEXP[d]	Organics: Dioxins/ Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Sandia Canyon														
Base flow	2010	—	—	—	—	—	—	—	—	—	—	—	—	Not applicable. All base-flow locations in this watershed are presently assigned to the chromium investigation monitoring group.
	2009	Q	Q	A	—	Q	—	—	A	—	Q	A	Q	Sampling frequency for VOCs is increased to quarterly because additional data are needed to characterize the presence of VOC analytes detected in the upper part of the watershed (Table B-1). Added PCBs because PCBs Aroclor-1254 and Aroclor-1260 have been detected in the past at Station E123 (Sandia below wetlands).
Alluvial	2010	—	—	—	—	—	—	—	—	—	—	—	—	Not applicable. All alluvial wells in this watershed are presently assigned to the new chromium investigation monitoring group.
	2009	Q	Q	A	—	A	—	—	A	A	Q	A	—	Sampling frequency for VOCs is increased to quarterly because additional data are needed to characterize the presence of VOC analytes detected in the upper part of the watershed (Table B-1). Retained PCBs to evaluate their potential for migration from base flow into alluvial groundwater; reduced frequency of sampling for PCBs to annual because they have not been detected within the watershed (with the exception of detections at SCA-1) (Table B-1).

Table D-1.0-2 (continued)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics						Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
			VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/ Furans						
Intermediate	2010	—	—	—	—	—	—	—	—	—	—	—	—	Not applicable. All intermediate wells in this watershed are presently assigned to the new chromium investigation or TA-21 monitoring groups.
	2009	Q	Q	A	—	A	—	—	A	Q	Q	Q	A	Sampling frequency for VOCs is increased to quarterly because additional data are needed to characterize the sporadic detection of VOC analytes detected in the upper part of the watershed (Table B-1). Sampling has been added for SVOC analytes to complement the collection and interpretation of VOC data. PCBs monitored in wells completed within perched intermediate groundwater within Sandia Canyon to evaluate the potential for migration of PCBs to deeper groundwater.
Regional	2010	Q	A	A	—	—	—	—	A	S	Q	S	(A)	Reduced frequency of VOC suite to annual because of the predominance of nondetects at general surveillance locations (Table B-1). Reduced frequencies to semiannual for tritium and perchlorate because of the adequacy of data set to characterize baseline conditions in regional groundwater in this part of the watershed.
	2009	Q	Q	A	—	A	—	—	A	Q	Q	Q	A	Sampling frequency for VOCs is increased to quarterly because additional data are needed to characterize the sporadic detection of VOC analytes detected in the upper part of the watershed (Table B-1). Added SVOC suite to complement collection and interpretation of VOC data. PCBs monitored in wells completed within the regional aquifer to evaluate the potential for migration of PCBs to deeper groundwater.

Table D-1.0-2 (continued)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics: VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/ Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Mortandad Canyon														
Base flow	2010	A	A	A	—	—	—	A	A	—	A	A	—	No change
	2009	A	A	A	—	—	—	A	A	—	A	A	—	Sampling frequencies for metals, general inorganics, and perchlorate are reduced to annual—consistent with sampling frequencies for other suites collected from these base-flow locations—because the conceptual model is mature for this portion of the watershed, and sufficient data have been collected for these analytical suites to justify monitoring on an annual basis (Table B-1). Sampling added for dioxins/furans in response to sporadic detections of low concentrations of dioxins/furans at base-flow stations in the past (Table B-1).
Alluvial (Excluding Cañada del Buey)	2010	A	A	A	—	—	—	—	A	A	A	A	—	Combined alluvial groups A and B (defined in 2009 Interim Plan) after Cañada del Buey locations were reassigned to the monitoring plan for Pajarito Canyon watershed for logistical sampling purposes. Specified annual frequencies for all alluvial locations. Reduction in sampling frequencies for VOCs, tritium, and perchlorate (relative to 2009 sampling plan) reflects adequacy of data record to demonstrate nature and extent of contaminants in groundwater (Table B-1) and the maturation of the site conceptual model (LANL 2009, 107453).
Alluvial Subgroup A	2009	A	A	A	—	—	—	—	A	A	A	A	—	Applicable to locations in Cañada del Buey and upper Mortandad above Effluent Canyon and Ten Site Canyon. Sampling frequencies for metals, general inorganics, and perchlorate are reduced to annual—consistent with sampling frequencies for other suites collected from these alluvial wells—because the conceptual model is mature for this portion of the watershed, and sufficient data have been collected for these analytical suites to justify monitoring this part of the watershed on an annual basis (Table B-1).

Table D-1.0-2 (continued)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics: VOCs[b]	Organics: SVOCs[b]	Organics: Pesticides	Organics: PCB[c]	Organics: HEXP[d]	Organics: Dioxins/ Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Alluvial Subgroup B	2009	S	S	A	—	—	—	—	A	A	S	S	—	Applicable to locations in or below Effluent Canyon or Ten-Site Canyon. Sampling frequencies for general inorganics and perchlorate are reduced to annual—consistent with sampling frequencies for other suites collected from these alluvial wells—because the conceptual model is mature for this portion of the watershed, and sufficient data have been collected for these analytical suites to justify monitoring this part of the watershed on an annual basis (Table B-1).
Intermediate	2010	—	—	—	—	—	—	—	—	—	—	—	—	Not applicable. All intermediate wells in this watershed are presently assigned to the new chromium investigation monitoring group.
	2009	Q	S	Q	—	—	—	—	A	Q	Q	Q	S	Quarterly frequencies (no change) are specified for most suites. Sampling frequency for tritium increased to quarterly to assess temporal trends, while sampling frequency for VOCs reduced to semiannual because of their history of nondetects (Table B-1). Semiannual (rather than annual) frequency for stable isotopes is specified to collect additional data needed to characterize spatial variability in contaminant and geochemical trends in this hydrologic zone (e.g., see Figures D 4.0-1 through D-4.0-5).

Table D-1.0-2 (continued)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics						Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
			VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/ Furans						
Regional	2010	Q	A	A	—	—	—	—	A	S	Q	S	(A)	Most regional wells in this watershed have been reassigned to one of the area-specific monitoring groups for which suites and frequencies have been tailored to meet each group's monitoring objectives. For regional wells that remain in the general surveillance category, quarterly frequencies are specified for metals and general inorganics and semiannual frequencies for tritium and perchlorate because these contaminants have been detected above background values or screening levels at other regional wells.
	2009	Q	Q	A	—	—	—	—	A	S	Q	Q	A	Sampling frequency for VOCs is increased to quarterly because additional data are needed to characterize the sporadic detection of VOC analytes in regional wells in this watershed (Table B-1).
Pajarito Canyon														
Base flow	2010	A	A	A	—	—	A	—	A	—	A	A	—	No change
	2009	A	A	A	—	—	A	—	A	—	A	A	—	Sampling frequencies for metals, HEXP, general inorganics, and perchlorate are reduced to annual—consistent with sampling frequencies for other suites collected from these base-flow stations—because the conceptual model is mature for this watershed, and sufficient data have been collected for these analytical suites to justify monitoring the watershed on an annual basis (Table B-1).

Table D-1.0-2 (continued)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics: VOCs[b]	Organics: SVOCs[b]	Organics: Pesticides	Organics: PCB[c]	Organics: HEXP[d]	Organics: Dioxins/ Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Springs	2010	A	A	A	—	—	A	—	A	A	A	A	(A)	No change
	2009	A	A	A	—	—	A	—	A	A	A	A	A	Sampling frequencies for metals, HEXP, general inorganics, and perchlorate are reduced to annual—consistent with sampling frequencies for other suites collected from these base-flow stations—because the conceptual model is mature for this watershed, and sufficient data have been collected for these analytical suites to justify monitoring the watershed on an annual basis (Table B-1). Replaced "intermediate spring" with more generic descriptor "spring" in the column for source aquifer in Table 5.4-1 to address NMED comments (NMED 2008, 103642).
Alluvial (including Cañada del Buey)	2010	A	A	A	—	—	A	—	A	A	A	A	—	No change. Alluvial wells in Cañada del Buey reassigned to Pajarito Canyon sampling for logistical sampling purposes
	2009	A	A	A	—	—	A	—	A	A	A	A	—	Pajaritio Alluvial Subgroup B in 2009 Interim Plan. Sampling frequencies for most Pajarito alluvial wells have been reduced from quarterly to annual, with the exception of the new wells. The conceptual model is mature for this portion of the watershed, and sufficient data have been collected to justify monitoring on an annual basis (Table B-1).
	2009	A	A	A	—	—	—	—	A	A	A	A	—	Mortandad Alluvial Subgroup A (including Cañada del Buey) in 2009 Interim Plan. Sampling frequencies for metals, general inorganics, and perchlorate are reduced to annual—consistent with sampling frequencies for other suites collected from these alluvial wells—because the conceptual model is mature for this portion of the watershed, and sufficient data have been collected for these analytical suites to justify monitoring this part of the watershed on an annual basis (Table B-1).

Table D-1.0-2 (continued)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics: VOCs[b]	Organics: SVOCs[b]	Organics: Pesticides	Organics: PCB[c]	Organics: HEXP[d]	Organics: Dioxins/ Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Intermediate	2010	S	S	—	—	—	S	—	A	S	S	S	(A)	Several intermediate wells in this watershed have been reassigned to one of the area-specific monitoring groups for which suites and frequencies have been tailored to meet each group's monitoring objectives. For intermediate wells that remain in the general surveillance category, annual frequency is retained for the radionuclide and stable isotope suites, and semiannual frequencies are specified for the remaining suites. Additional suites or increased frequencies are assigned on a site-specific basis as appropriate (Appendix D-5.0-1).
	2009	Q	Q	—	—	—	S	—	A	Q	Q	Q	Q	Intermediate wells will continue to be monitored on a quarterly basis for most constituents to support CME decisions and TA-54 monitoring requirements.
Regional	2010	S	S	—	—	—	S	—	A	A	S	S	(A)	All but two regional wells in this watershed have been reassigned to one of the area-specific monitoring groups for which suites and frequencies have been tailored to meet each group's monitoring objectives. For the two regional wells that remain in the general surveillance category, annual frequencies are specified for tritium and radionuclides because of the history of nondetects and background levels for these analytes are these locations. Semiannual frequencies are specified for the remaining suites because these contaminants have been detected above background values or screening levels at other regional wells.
	2009	Q	Q	—	—	—	S	—	A	A	Q	Q	A	Monitored quarterly for metals, VOCs, general inorganics, and perchlorate in support of CME decisions and TA-54 monitoring requirements.

Table D-1.0-2 (continued)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics						Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
			VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/ Furans						
Water Canyon/Cañon de Valle														
Base flow	2010	S	S	A	—	—	$\text{S}^{\text{HEXP-DP}}$	—	A	—	A	A	—	No change
	2009	S	S	A	—	—	S	—	A	—	A	A	—	Sampling frequencies for general inorganics and perchlorate are reduced to annual—consistent with sampling frequencies for other suites collected from these base-flow stations—because the conceptual model is mature for this watershed, and sufficient data have been collected for these analytical suites to justify monitoring the watershed on an annual basis (Table B-1).
Springs	2010	S	S	A	—	—	$\text{S}^{\text{HEXP-DP}}$	—	A	A	A	A	A	No change
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Sampling frequencies for general inorganics and perchlorate are reduced to annual—consistent with sampling frequencies for other suites collected from these springs—because the conceptual model is mature for this watershed, and sufficient data have been collected for these analytical suites to justify monitoring the watershed on an annual basis (Table B-1).
Alluvial	2010	S	S	A	—	—	$\text{S}^{\text{HEXP-DP}}$	—	A	A	A	A	—	No change
	2009	S	S	A	—	—	S	—	A	A	A	A	—	Sampling frequencies for general inorganics and perchlorate are reduced to annual—consistent with sampling frequencies for other suites collected from these alluvial wells—because the conceptual model is mature for this watershed, and sufficient data have been collected for these analytical suites to justify monitoring the watershed on an annual basis (Table B-1).

Table D-1.0-2 (continued)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics						Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
			VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/ Furans						
Intermediate	2010	—	—	—	—	—	—	—	—	—	—	—	—	Not applicable. All intermediate wells in this watershed are presently assigned to the TA-16-260 deep groundwater (GW) or MDA AB monitoring groups.
	2009	S	S	A	—	—	S	—	A	A	S	A	A	Sampling frequency for perchlorate reduced to annual because concentrations detected are relatively low.
Regional	2010	—	—	—	—	—	—	—	—	—	—	—	—	Not applicable. All regional wells in this watershed are presently assigned to the TA-16-260 deep GW or MDA AB monitoring groups.
	2009	S	S	A	—	—	S	—	A	A	S	S	A	Sampling frequency continued on a semiannual basis for metals, VOCs, HEXP, general inorganics, and perchlorate to support CME decisions for TA-16.
Ancho/Frijoles Canyons														
Base flow (Ancho)	2010	—	—	—	—	—	—	—	—	—	—	—	—	Reassigned to White Rock Canyon/Rio Grande sampling plan.
	2009	A	—	—	—	—	A	—	A	—	A	A	—	Monitoring for VOCs and SVOCs eliminated from 2009 Interim Plan because of a history of nondetects for these constituents.
Regional (Ancho	2010	A	A	—	—	—	A	—	A	A	A	A	(A)	Separate monitoring group created for wells supporting MDA AB investigation. Frequency reduced to annual for remaining multiscreen well used for general surveillance because of the predominance of nondetects for contaminants.
	2009	S	A	—	—	—	S	—	A	S	S	S	A	Frequency increased to semiannual for metals, HEXP, tritium, perchlorate to support MDA AB investigation.
Base flow (Frijoles)	2010	A	—	—	—	—	—	—	A	—	A	A	—	Monitoring for VOCs and tritium eliminated from 2010 Interim Plan because of a history of nondetects for these constituents.
	2009	A	A	—	—	—	—	—	A	A	A	A	—	Monitoring for SVOCs eliminated from 2009 Interim Plan because of a history of nondetects for these constituents.

Table D-1.0-2 (continued)

Surface-Water Body or Source Aquifer	Interim Plan	Metals[a]	Organics						Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
			VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/ Furans						
White Rock Canyon/Rio Grande														
Base flow	2010	A	A	—	—	—	—	—	A	—	A	A	—	No change
	2009	A	A	—	—	—	—	—	A	—	A	A	—	No change
Spring Subgroup A	2010	A	A	T	—	—	T	—	A	A	A	A	(A)	Applies to springs upgradient of TA-54 Area G, above the confluence of Mortandad Canyon with the Rio Grande. Reduced frequency for SVOC suite annual to triennial and dropped PCB suites because of the predominance of nondetects and generally low mobility of these constituents in groundwater (Table B-1). Additional suites or increased frequencies are assigned on a site-specific basis as needed to meet requirements specified in the 2010 MOU with the Pueblo of San Ildefonso
	2009	A	A	A	—	T	T	—	A	A	A	A	A	Added HEXP and PCB suites for triennial sampling for consistency with requirements of the 2009 MOU with Pueblo of San Ildefonso.
Spring Subgroup B	2010	A	A	A	—	—	—	—	A	A	A	A	(A)	Applies to springs downgradient of TA-54 Area G, between the confluences of Mortandad and Water Canyons with the Rio Grande. No change
	2009	A	A	A	—	—	—	—	A	A	A	A	A	No change
Spring Subgroup C	2010	A	A	A	—	—	T	—	A	A	A	A	(A)	Applies to springs in or downgradient of Pajarito and Ancho Canyons. Added annual sampling for SVOCs in support of VOC data. HEXP reduced from annual to triennial because of the predominance of nondetects (Table B-1).
	2009	A	A	—	—	—	A	—	A	A	A	A	A	VOCs added to all springs along White Rock Canyon, per NMED request.

Footnotes are defined at the end of Table D-1.0-1.

Table D-1.0-3
Analytical Suites and Frequencies for Characterization of New Wells

Source Aquifer	Interim Plan	Metals[a]	Organics						Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
			VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/ Furans						
Characterization of new perched-intermediate and regional groundwater wells														
General Surveillance	2010	Q	Q	S	S	S	S	S	Q	Q	Q	Q	S	No change from characterization suites and frequencies specified in 2009 Interim Plan for new deep groundwater wells in Los Alamos/Pueblo, Sandia, and Mortandad Canyons (other than reduction in sampling frequency from quarterly to semiannual for stable isotopes).
TA-21, MDA C, and chromium investigation monitoring groups	2010	Q	Q	S	S	S	S	S	Q	Q	Q	Q	S	New monitoring groups. Same characterization suites and frequencies as for new general surveillance wells.
TA-54 monitoring group	2010	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	S	No change from characterization suites and frequencies specified for this monitoring group in the 2009 Interim Plan (other than reduction in sampling frequency from quarterly to semiannual for stable isotopes).
TA-16-260 deep GW monitoring group	2010	Q	Q	S	S	S	$Q^{\text{RDX-DP}}$	S	Q	Q	Q	Q	S	New monitoring group. Same characterization suites and frequencies as for new general surveillance wells. Extended HEXP suite includes RDX-degradation products.
MDA AB monitoring group	2010	Q	Q	Q	S	S	Q	S	Q	Q	Q	Q	S	New wells will initially be sampled for large suites quarterly to characterize the groundwater beneath MDA AB and to support an evaluation of historical data from the DT wells.
Characterization of new alluvial groundwater wells														
Water Canyon/Cañon de Valle watershed	2010	Q	Q	Q	Q	Q	$Q^{\text{RDX-DP}}$	Q	Q	Q	Q	Q	S	No change from characterization suites and frequencies specified in 2009 Interim Plan for alluvial groundwater wells.

Note: "New" wells are defined as those which are completed, rehabilitated, or converted after July 1, 2009. After completion of four rounds of characterization sampling, a new well is reassigned automatically to the routine analytical suites and frequencies of the appropriate area-specific monitoring group. Any planned exceptions to this general protocol are documented in Tables D-2.0-1 through D-8.0-1.

Table D-2.0-1
Sampling Frequencies and Analytical Suites Assigned to Locations in Los Alamos/Pueblo Canyons

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Upper Los Alamos Canyon—Base-Flow Stations														
Base flow (General Surveillance)	*2010*	*A*	*A*	*A*	*—[i]*	A^{CNGR}	*—*	*—*	*A*	*—*	*A*	*A*	*—*	*No change (Table D-1.0-2)*
	2009	*A*	*A*	*A*	*—*	A^{CNGR}	*—*	*—*	*A*	*—*	*A*	*A*	*—*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
DP below Meadow at TA-21 (E039)	2010	A	A	A	—	A^{CNGR}	—	—	A	—	A	A	—	No change
	2009	A	A	A	—	A^{CNGR}	—	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
DP Canyon above TA-21 (E038)	2010	A	A	A	—	A^{CNGR}	—	—	A	—	A	A	—	Remains assigned to suites and frequencies for general surveillance of base-flow locations in this subwatershed. Discontinued diesel range organics (DRO) suite because data do not show evidence of off-site effects from past diesel spill (Table B-2).
	2009	A	A	A + DRO	—	A^{CNGR}	—	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies. DRO added to SVOC suite to monitor past diesel spill near this location.
Los Alamos above DP Canyon (E030)	2010	A	A	A	—	A^{CNGR}	—	—	A	—	A	A	—	No change
	2009	A	A	A	—	A^{CNGR}	—	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
Los Alamos above SR-4 (E042)	2010	A	A	A	—	A^{CNGR}	—	—	A	—	A	A	—	No change
	2009	A	A	A	—	A^{CNGR}	—	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
Los Alamos below the Ice Rink (E026)	2010	A	A	A	—	A^{CNGR}	—	—	A	—	A	A	—	No change
	2009	A	A	A	—	A^{CNGR}	—	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
Los Alamos below LA Weir (E050)	2010	A	A	A	—	A^{CNGR}	—	—	A	—	A	A	—	No change
	2009	A	A	A	—	A^{CNGR}	—	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.

Table D-2.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Upper Los Alamos Canyon—Springs														
Springs (General Surveillance)	*2010*	*A*	*A*	*A*	—	*A*	—	—	*A*	*A*	*A*	*A*	*(A)*	*Rationale for changes to suites and frequencies for general surveillance locations in this subwatershed is provided in Table D-1.0-2.*
	2009	*A*	—	—	—	*A*	—	—	*A*	*A*	*A*	*A*	*A*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
DP Spring	2010	A	A	A	—	A	—	—	A	A	A	A	A	Changes reflect updated suites and frequencies for general surveillance at springs in this subwatershed.
	2009	A	—	—	—	A	—	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Upper Los Alamos Canyon—Alluvial Wells														
Alluvial (General Surveillance)	*2010*	*A*	*A*	*A*	—	—	—	—	*A*	*A*	*A*	*A*	—	*No change (Table D-1.0-2).*
	2009	*A*	*A*	*A*	—	—	—	—	*A*	*A*	*A*	*A*	—	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
LAO-B	2010	A	A	A	—	—	—	—	A	A	A	A	—	No change
	2009	A	A	A	—	—	—	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies.
LAO-0.3	2010	A	A	A	—	—	—	—	A	A	A	A	—	Remains assigned to suites and frequencies for general surveillance at alluvial wells in this subwatershed. Discontinued PCB suite; cumulative data for alluvial groundwater in this subwatershed show history of nondetects (Table B-1).
	2009	A	A	A	—	A	—	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies. Added PCBs to evaluate their potential for migration to alluvial groundwater.
LAO-0.6	2010	A	A	A	—	—	—	—	A	A	A	A	—	No change
	2009	A	A	A	—	—	—	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies.
LAO-1	2010	A	A	A	—	—	—	—	A	A	A	A	—	No change
	2009	A	A	A	—	—	—	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies.

Table D-2.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
LAO-1.6g	2010	A	A	A	—	—	—	—	A	A	A	A	—	No change
	2009	A	A	A	—	—	—	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies.
LAO-1.8	2010	—	—	—	—	—	—	—	—	—	—	—	—	Removed from water-level monitoring plan. Well frequently runs dry. Total depth has changed over the years as the well silts in. Water-level monitoring in this well ceased on January 10, 2010 (Koch and Schmeer 2010, 108926).
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Well removed from sampling under the Interim Plan because it is historically dry (Koch and Schmeer 2009, 105181) and inadequately protected from the surface environment. Water-level monitoring only.
LAO-2	2010	A	A	A	—	—	—	—	A	A	A	A	—	No change
	2009	A	A	A	—	—	—	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies.
LAO-3a	2010	A	A	A	—	—	—	—	A	A	A	A	—	Remains assigned to suites and frequencies for general surveillance at alluvial wells in this subwatershed. Discontinued PCB suite; cumulative data for alluvial groundwater in this subwatershed show history of nondetects (Table B-1).
	2009	A	A	A	—	A	—	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies. Added PCBs to evaluate their potential for migration to alluvial groundwater.
LAO-4.5c	2010	A	A	A	—	—	—	—	A	A	A	A	—	No change
	2009	A	A	A	—	—	—	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies.

Table D-2.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
LAO-6	2010	—	—	—	—	—	—	—	—	—	—	—	—	Removed from water-level monitoring plan. Regular monitoring of this well was discontinued on January 3, 2008, and manual water levels were obtained for sampling events only. All monitoring of this well was discontinued as of December 2009 (Koch and Schmeer 2010, 108926).
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Removed LAO-6 from sampling plan because it is historically dry (Koch and Schmeer 2009, 105181); nearby wells LAO-6a and LAO-5 are adequate for providing water-quality samples.
LAO-6a, LAO-5	2010	A	A	A	—	—	—	—	A	A	A	A	—	Remains assigned to suites and frequencies for general surveillance at alluvial wells in this subwatershed. Discontinued PCB suite; cumulative data for alluvial groundwater in this subwatershed show history of nondetects (Table B-1).
	2009	A	A	A	—	A	—	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies. Added PCBs to evaluate their potential for migration to alluvial groundwater. Removed LAO-6 from this grouping because it is historically dry (Koch and Schmeer 2009, 105181); the other two locations are adequate for providing water-quality samples.
LAUZ-1	2010	A	A	A	—	—	—	—	A	A	A	A	—	No change
	2009	A	A	A	—	—	—	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies.
Upper Los Alamos Canyon—Intermediate Wells														
Intermediate (General Surveillance)	*2010*	—	—	—	—	—	—	—	—	—	—	—	—	*Not applicable. All intermediate wells in this subwatershed are presently assigned to the TA-21 monitoring group.*
	2009	*A*	*S*	—	—	—	—	—	*A*	*S*	*S*	*S*	*A*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
Intermediate (TA-21 monitoring group, near-field)	*2010*	*A*	*S*	*S*	—	—	—	—	*A*	*S*	*S*	*S*	*(A)*	*New monitoring group. Rationale for suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.*

Table D-2.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Intermediate (TA-21 monitoring group, far-field and upgradient)	*2010*	*A*	*A*	*A*	—	—	—	—	*A*	*S*	*S*	*S*	*(A)*	*New monitoring group. Rationale for suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.*
LADP-3	2010	A	S	S	—	—	—	—	A	S	S	S	A	Reassigned to suites and frequencies for new TA-21 monitoring group (near-field).
	2009	S	S	—	—	—	—	—	A	S	S	S	A	Assigned to watershed-specific suites and frequencies, with the sampling frequency for metals increased to semiannual because additional data are needed to characterize metals at this location. Only two to three samples have been collected so far for analysis of metals and VOCs.
LAOI(a)-1.1	2010	A	A	A	—	—	—	—	A	S	S	S	—	Reassigned to suites and frequencies for new TA-21 monitoring group (upgradient). Background location approved for inclusion in the Groundwater Background Investigation Report, Revision 4 (GBIR, R4, in preparation).
	2009	A	S	—	—	—	—	—	A	S	S	S	A	Assigned to watershed-specific suites and frequencies.
LAOI-3.2	2010	A	S	S	—	—	—	—	A	S	S	S	—	Reassigned to suites and frequencies for new TA-21 monitoring group (near-field).
	2009	A	S	—	—	—	—	—	A	S	S	S	A	Assigned to watershed-specific suites and frequencies.
LAOI-3.2a	2010	A	S	S	—	—	—	—	A	S	S	S	—	Reassigned to suites and frequencies for new TA-21 monitoring group (near-field).
	2009	A	S	—	—	—	—	—	A	S	S	S	A	Assigned to watershed-specific suites and frequencies.
LAOI-7	2010	A	A	A	—	—	—	—	A	S	S	S	—	Reassigned to suites and frequencies for new TA-21 monitoring group (far-field).
	2009	A	S	—	—	—	—	—	A	S	S	S	A	Assigned to watershed-specific suites and frequencies.

Table D-2.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-6i	2010	A	S	S	—	—	—	—	A	S	S	S	A	Reassigned to suites and frequencies for new TA-21 monitoring group (near-field).
	2009	A	S	S	—	—	—	—	A	S	S	S	A	Assigned to watershed-specific suites and frequencies. Added SVOC suite because of persistent detections of 1,4-dioxane.
R-7 screen 1	2010	—	—	—	—	—	—	—	—	—	—	—	—	Reassigned to TA-21 monitoring group. Generally, no water is present in the screen. Monitor water levels only (Table1.11-1).
	2009	A	S	—	—	—	—	—	A	S	S	S	A	Assigned to watershed-specific suites and frequencies.
R-7 screen 2	2010	—	—	—	—	—	—	—	—	—	—	—	—	Reassigned to TA-21 monitoring group. Generally, no water is present in the screen. Monitor water levels only (Table1.11-1).
	2009	A	S	—	—	—	—	—	A	S	S	S	A	Assigned to watershed-specific suites and frequencies.
R-9i screen 1	2010	A	A	A	—	—	—	—	A	S	S	S	A	Reassigned to suites and frequencies for new TA-21 monitoring group (far-field).
	2009	A	S	—	—	—	—	—	A	S	S	S	A	Assigned to watershed-specific suites and frequencies.
R-9i screen 2	2010	A	A	A	—	—	—	—	A	S	S	S	A	Reassigned to suites and frequencies for new TA-21 monitoring group (far-field).
	2009	A	S	—	—	—	—	—	A	S	S	S	A	Assigned to watershed-specific suites and frequencies.
TA-53i	2010	A	S	S	—	—	—	—	A	S	S	S	A	Completed characterization sampling. Reassigned to suites and frequencies for new TA-21 monitoring group (near-field).
	2009	Q	Q	S	S	S	S	S	Q	Q	Q	Q	Q	New well assigned to watershed-specific characterization suites and frequencies.

Table D-2.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Upper Los Alamos Canyon—Regional Wells														
Regional (General Surveillance)	*2010*	—	—	—	—	—	—	—	—	—	—	—	—	*Not applicable. All regional wells in this subwatershed are presently assigned to the TA-21 monitoring group.*
	2009	*A*	*A*	—	—	—	—	—	*A*	*A*	*A*	*A*	*A*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
Regional (TA-21 monitoring group)	*2010*	*A*	*A*	—	—	—	—	—	*A*	*A*	*A*	*A*	*(A)*	*New monitoring group. Rationale for suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.*
R-6	2010	A	A	—	—	—	—	—	A	A	A	A	—	Reassigned to suites and frequencies for new TA-21 monitoring group. Background location approved for inclusion in GBIR, R4.
	2009	A	S	—	—	—	—	—	A	S	S	S	A	Assigned to watershed-specific suites, with increased frequencies for VOC, tritium, general inorganics, and perchlorate in support of TA-21 monitoring activities.
R-7 screen 3	2010	—	A	—	—	—	—	—	—	A	A[IND] + NH_3	A	—	Reassigned to suites and frequencies for new TA-21 monitoring group. Well screen continues to show residual effects from drilling (Appendix F) and remains assigned to indicator suite. VOCs included, recognizing that analytical results for a few constituents could be biased low by the presence of iron corrosion products (Table F-4.0-1).Tritium is included as a key analyte that is unaffected by residual effects of drilling. Perchlorate is included to support the evaluation of redox conditions at this screen.
	2009	—	S	—	—	—	—	—	—	S	—	S	A	Well screen continues to show residual effects from drilling and remains assigned to indicator suite. Tritium is included as a key analyte that is unaffected by residual effects of drilling. Perchlorate is included to support the evaluation of redox conditions at this screen. Added VOCs, recognizing that analytical results for a few constituents could be biased low by the presence of iron corrosion products.

Table D-2.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-8 screen 1	2010	A	A	—	—	—	—	—	A	A	A	A	A	Reassigned to suites and frequencies for new TA-21 monitoring group.
	2009	A	A	—	—	—	—	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
R-8 screen 2	2010	A	A	—	—	—	—	—	A	A	A	A	A	Reassigned to suites and frequencies for new TA-21 monitoring group.
	2009	A	A	—	—	—	—	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
R-9	2010	A	A	—	—	—	—	—	A	A	A	A	—	Reassigned to suites and frequencies for new TA-21 monitoring group.
	2009	A	A	—	—	—	—	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
TW-3	2010	—	A	—	—	—	—	—	—	A	—	—	A	Reassigned to suites and frequencies for new TA-21 monitoring group. Assigned restricted list of suites and frequencies because well is affected by casing corrosion (see Appendix F). Transducer removed February 9, 2006, in preparation for plugging and abandoning this well (Koch and Schmeer 2010, 108926).
	2009	—	S	—	—	—	—	—	—	S	—	—	A	Well is affected by casing corrosion (see Appendix F). Tritium is included as a key analyte that is unaffected by corrosion products. Added VOCs, recognizing that analytical results for a few constituents could be biased low by the presence of iron corrosion products.
Pueblo Canyon—Base-Flow Stations														
Base flow (General Surveillance)	*2010*	*A*	*A*	*A*	—	*A*[CNGR]	—	—	*A*	—	*A*	*A*	—	*No change (Table D-1.0-2)*
	2009	*A*	*A*	*A*	—	*A*[CNGR]	—	—	*A*	—	*A*	*A*	—	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
Acid Above Pueblo (E056)	2010	A	A	A	—	A[CNGR]	—	—	A	—	A	A	—	No change
	2009	A	A	A	—	A[CNGR]	—	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.

Table D-2.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Guaje above Rendija Canyon (E089)	2010	A	A	A	—	A[CNGR]	—	—	A	—	A	A	—	No change
	2009	A	A	A	—	A[CNGR]	—	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
Pueblo 3	2010	A	A	A	—	A[CNGR]	—	A	A	—	A	A	—	No change. Retained annual monitoring for dioxins/furans because of sporadic detections of these analytes (Table B-2).
	2009	A	A	A	—	A[CNGR]	—	A	A	—	A	A	—	Assigned to watershed-specific suites and frequencies, with the addition of annual monitoring for dioxins/furans because of sporadic detections of these analytes.
Pueblo above Acid (E055)	2010	A	A	A	—	A[CNGR]	—	—	A	—	A	A	—	No change
	2009	A	A	A	—	A[CNGR]	—	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
Pueblo above SR-502 (E060)	2010	A	A	A	—	A[CNGR]	—	A	A	—	A	A	—	No change. Retained annual monitoring for dioxins/furans because of sporadic detections of these analytes (Table B-2).
	2009	A	A	A	—	A[CNGR]	—	A	A	—	A	A	—	Assigned to watershed-specific suites and frequencies, with the addition of annual monitoring for dioxins/furans because of sporadic detections of these analytes.
Pueblo Canyon—Alluvial Wells														
Alluvial (General Surveillance)	*2010*	*A*	*A*	*A*	—	—	—	—	*A*	*A*	*A*	*A*	—	*No change (Table D-1.0-2).*
	2009	*A*	*A*	*A*	—	—	—	—	*A*	*A*	*A*	*A*	—	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
APCO-1	2010	A	A	A	—	A	—	A	A	A	A	A	—	No change. Retained PCB suite to continue to build baseline data for this location.
	2009	A	A	A	—	A	—	A	A	A	A	A	—	Assigned to watershed-specific suites and frequencies, with the addition of annual monitoring for PCBs because additional data are needed to characterize PCBs at this location. Only one sample has been collected so far for analysis of PCBs. Annual monitoring for dioxins/furans is included because of persistent detections of these analytes at this location.

Table D-2.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
PAO-1	2010	A	A	A	—	A	—	—	A	A	A	A	—	Remains assigned to suites and frequencies for general surveillance at alluvial wells in this subwatershed. Added PCB suite to establish baseline data for this location.
	2009	A	A	A	—	—	—	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies.
PAO-2	2010	A	A	A	—	A	—	—	A	A	A	A	—	No change. Retained PCB suite to continue to build baseline data for this location.
	2009	A	A	A	—	A	—	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies, with the addition of annual monitoring for PCBs because additional data are needed to characterize PCBs at this location. Only one sample has been collected so far for analysis of PCBs.
PAO-4	2010	A	A	A	—	A	—	A	A	A	A	A	—	Remains assigned to suites and frequencies for general surveillance at alluvial wells in this subwatershed. Added PCB suite to establish baseline data for this location.
	2009	A	A	A	—	—	—	A	A	A	A	A	—	Assigned to watershed-specific suites and frequencies, with the addition of annual monitoring for dioxins/furans because of persistent detections of these analytes at this location.
Pueblo Canyon—Intermediate Wells														
Intermediate (General Surveillance)	*2010*	*A*	*A*	—	—	—	—	—	*A*	*A*	*A*	*A*	*(A)*	*No change (Table D-1.0-2).*
	2009	*A*	*A*	—	—	—	—	—	*A*	*A*	*A*	*A*	*A*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
POI-4	2010	A	A	—	—	—	—	—	A	A	A	A	A	No change
	2009	A	A	—	—	—	—	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
R-3i	2010	A	A	A	—	—	—	—	A	A	A	A	A	No change
	2009	A	A	A	—	—	—	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies, with the addition of annual monitoring of SVOCs because of sporadic detections of 1,4-dioxane at this location (2 detections out of 7 samples).

Table D-2.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-5 screen 1	2010	—	—	—	—	—	—	—	—	—	—	—	—	Historically dry (Koch and Schmeer 2010, 108926). Monitor water levels only in accordance with frequency shown in Table1.11-1.
	2009	A	A	—	—	—	—	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
R-5 screen 2	2010	A	A	—	—	—	—	—	A	A	A	A	A	No change
	2009	A	A	—	—	—	—	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
TW-2A	2010	—	—	—	—	—	—	—	—	—	—	—	—	Removed from Interim Plan. Well was plugged and abandoned in February 2010. Replaced by TW-2Ar.
	2009	A	—	—	—	—	—	—	A	A	A	A	A	Added to the current Interim Plan because NMED requested continued sampling of TW-2A until a replacement well has been installed (NMED 2008, 103642). Assignment of analytical suites is limited because data reliability and representativeness are affected by the presence of casing corrosion.
TW-2Ar	2010	Q	Q	S	S	S	S	S	Q	Q	Q	Q	S	New well assigned to characterization suites and frequencies for general surveillance wells (Table D-1.0-3). Replaces TW-2A.
	2009	Q	Q	S	S	S	S	S	Q	Q	Q	Q	Q	Planned well to be assigned to watershed-specific characterization suite.
Pueblo Canyon—Regional Wells														
Regional (General Surveillance)	*2010*	*A*	*A*	—	—	—	—	—	*A*	*A*	*A*	*A*	*(A)*	*No change (Table D-1.0-2).*
	2009	*A*	*A*	—	—	—	—	—	*A*	*A*	*A*	*A*	*A*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
R-2	2010	A	A	—	—	—	—	—	A	A	A	A	A	No change. Background location approved for inclusion in GBIR, R4.
	2009	A	A	—	—	—	—	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.

Table D-2.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-3	2010	Q	Q	S	S	S	S	S	Q	Q	Q	Q	S	New well assigned to characterization suites and frequencies for general surveillance at deep groundwater wells (Table D-1.0-3).
	2009	Q	Q	S	S	S	S	S	Q	Q	Q	Q	Q	Planned well to be assigned to watershed-specific characterization suite.
R-4	2010	A	A	—	—	—	—	—	A	A	A	A	A	No change
	2009	A	A	—	—	—	—	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
R-5 screen 3	2010	A	A	—	—	—	—	—	A	A	A	A	A	No change
	2009	A	A	—	—	—	—	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
R-5 screen 4	2010	A	A	—	—	—	—	—	A	A	A	A	A	No change
	2009	A	A	—	—	—	—	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
R-24	2010	A	A	—	—	—	—	—	A	A	A	A	A	No change. Background location approved for inclusion in GBIR, R4.
	2009	A	A	—	—	—	—	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Lower Los Alamos Canyon—Base-Flow Stations														
Base flow (General Surveillance)	*2010*	*S*	*A*	*A*	—	—	—	—	*A*	*A*	*S*	*S*	—	*No change (Table D-1.0-2).*
	2009	*S*	*A*	*A*	—	—	—	—	*A*	*A*	*S*	*S*	—	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
Los Alamos Canyon near Otowi Bridge (E110)	2010	S	A	A	—	—	—	—	A	A	S	S	—	No change
	2009	S	A	A	—	—	—	—	A	A	S	S	—	Assigned to watershed-specific suites and frequencies.

Table D-2.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Lower Los Alamos Canyon—Springs														
Springs (General Surveillance)	*2010*	*A*	*A*	*T*	—	—	—	—	*A*	*A*	*A*	*A*	*(A)*	*Rationale for changes to suites and frequencies for general surveillance locations in this subwatershed is provided in Table D-1.0-2.*
	2009	*A*	*A*	*A*	—	*T*	*T*	—	*A*	*A*	*A*	*A*	*A*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
Basalt Spring	2010	A	A	T	—	T	T	—	A	A	A	A	A	Reduced SVOC frequency reflects updated suites and frequencies for general surveillance at springs in this part of the watershed. Retained triennial sampling for PCB and HEXP suites consistent with requirements for this location in the 2010 MOU with the Pueblo of San Ildefonso.
	2009	S	S	S	—	T	T	—	A	S	S	S	A	Assigned to watershed-specific suites but retained semiannual frequencies to monitor variably elevated perchlorate concentrations and for consistency with requirements for this spring in the 2009 MOU with the Pueblo of San Ildefonso.
Los Alamos Spring	2010	A	A	T	—	T	T	—	A	A	A	A	A	Reduced SVOC frequency reflects updated suites and frequencies for general surveillance at springs in this part of the watershed. Retained triennial sampling for PCB and HEXP suites consistent with requirements for this location in the 2010 MOU with the Pueblo of San Ildefonso.
	2009	A	A	A	—	T	T	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.

Table D-2.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Lower Los Alamos Canyon—Alluvial Wells														
Alluvial (General Surveillance)	*2010*	*A*	*A*	*T*	—	—	—	—	*A*	*A*	*A*	*A*	—	*Rationale for changes to suites and frequencies for general surveillance locations in this subwatershed is provided in Table D-1.0-2.*
	2009	*A*	*A*	*A*	—	*T*	*T*	—	*A*	*A*	*A*	*A*	—	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
LLAO-1b	2010	A	A	T	—	T	T	—	A	A	A	A	—	Reduced SVOC frequency reflects updated suites and frequencies for general surveillance at alluvial wells in this part of the watershed. Retained triennial sampling for PCB and HEXP suites consistent with requirements for this well in the 2010 MOU with the Pueblo of San Ildefonso.
	2009	A	A	A	—	T	T	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies.
LLAO-4	2010	A	A	T	—	T	T	—	A	A	A	A	—	Reduced SVOC frequency reflects updated suites and frequencies for general surveillance at alluvial wells in this part of the watershed. Retained triennial sampling for PCB and HEXP suites consistent with requirements for this well in the 2010 MOU with the Pueblo of San Ildefonso.
	2009	A	A	A	—	T	T	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies.
General Surveillance Monitoring (Off-site Background Location)														
Campsite Spring	2010	A	—	—	—	—	—	—	A	A	A	A	(A)	Background location approved for inclusion in the GBIR, R4. Assigned analytical suites for naturally occurring constituents.

Table D-3.0-1
Sampling Frequencies and Analytical Suites Assigned to Locations in Sandia Canyon

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Base-Flow Stations														
Base flow (General Surveillance)	*2010*	*—*[i]	*—*	*—*	*—*	*—*	*—*	*—*	*—*	*—*	*—*	*—*	*—*	*Not applicable. All base-flow locations in this watershed are currently assigned to the chromium investigation monitoring group.*
	2009	*Q*	*Q*	*A*	*—*	*Q*	*—*	*—*	*A*	*—*	*Q*	*A*	*Q*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
Base flow (chromium investigation monitoring group)	*2010*	*S*	*A*	*A*	*—*	*S*[CNGR]	*—*	*—*	*A*	*—*	*S*	*S*	*—*	*New monitoring group. Rationale for suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.*
Middle Sandia Canyon at terminus of persistent base flow	2010	S	A	A	—	S[CNGR]	—	—	A	—	S	A	—	Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	A	—	Q	—	—	A	—	Q	A	Q	Assigned to watershed-specific suites and frequencies.
Sandia below Wetlands (E123)	2010	S	A	A	—	S[CNGR]	—	—	A	—	S	S	—	Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	A	—	Q	—	—	A	—	Q	A	Q	Assigned to watershed-specific suites and frequencies.
Sandia right fork at Power Plant (E121)	2010	S	A	A	—	S[CNGR]	—	—	A	—	S	S	—	Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	A	—	Q	—	—	A	—	Q	A	Q	Added to 2009 Interim Plan to support Cr investigation work plan. Assigned to watershed-specific suites and frequencies.
South fork of Sandia Canyon at E122	2010	S	A	A	—	S[CNGR]	—	—	A	—	S	S	—	Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	A	A	Q	—	—	A	—	Q	A	Q	Assigned to watershed-specific frequencies and suite. Added pesticides for annual monitoring as requested by the NMED to address pesticides detected above standards at this location (NMED 2008, 103642). This location is not the same as gage station E122, called "Sandia Left Fork at Asphalt Plant" in the Water-Quality Database; these two locations are about 5 ft apart and are summarized separately in the detailed frequency of detection table for this watershed.

Table D-3.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Alluvial Wells														
Alluvial (General Surveillance)	*2010*	—	—	—	—	—	—	—	—	—	—	—	—	*Not applicable. All alluvial wells in this watershed are currently assigned to the chromium investigation monitoring group.*
	2009	*Q*	*Q*	*A*	—	*A*	—	—	*A*	*A*	*Q*	*A*	—	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
Alluvial (chromium investigation monitoring group)	*2010*	*S*	*A*	*A*	—	—	—	—	*A*	—	*S*	*A*	—	*New monitoring group. Rationale for suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.*
SCA-1 SCA-1- DP	2010	S	A	A	—	—	—	—	A	A	S	S	—	Reassigned SCA-1-DP to suites and frequencies for new chromium investigation monitoring group. SCA-1 continues to be retained for water-level monitoring only at frequency shown in Table 1.11-1.
	2009	Q	Q	A	—	Q	—	—	A	A	Q	A	—	Assigned to watershed-specific suites and frequencies. Retained quarterly monitoring for PCBs because of detection of Aroclor and to obtain additional data from the drive point installed in the vicinity of SCA-1. Installed drive point for collecting water samples because SCA-1 screen is clogged. SCA-1 is still instrumented with a transducer and is used for continuous monitoring of water levels at this location.
SCA-2	2010	S	A	A	—	—	—	—	A	A	S	S	—	Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	A	—	A	—	—	A	A	Q	A	—	Assigned to watershed-specific suites and frequencies.
SCA-3	2010	S	A	A	—	—	—	—	A	A	S	S	—	Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	A	—	A	—	—	A	A	Q	A	—	Assigned to watershed-specific suites and frequencies.
SCA-4	2010	S	A	A	—	—	—	—	A	A	S	S	—	Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	A	—	A	—	—	A	A	Q	A	—	Assigned to watershed-specific suites and frequencies.

Table D-3.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
SCA-5	2010	S	A	A	—	—	—	—	A	A	S	S	—	Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	A	—	A	—	—	A	A	Q	A	—	Assigned to watershed-specific suites and frequencies.
SCO-1	2010	—	—	—	—	—	—	—	—	—	—	—	—	Removed from water-level monitoring plan. Historically dry. Water-level monitoring ceased in August 2009 (Koch and Schmeer 2010, 108926).
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Water-level monitoring only. Well has been dry for every measurement event since its installation in 1997. There is no transducer installed in this well.
SCO-2	2010	—	—	—	—	—	—	—	—	—	—	—	—	Removed from water-level monitoring plan. Historically dry. Water-level monitoring ceased in August 2009 (Koch and Schmeer 2010, 108926).
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Water-level monitoring only. Well has been dry for every measurement event since its installation in 1997. There is no transducer installed in this well.
SCP-1abc	2010	—	—	—	—	—	—	—	—	—	—	—	—	No change. Continue monitoring this triple-nested piezometer for water levels only in accordance with frequency shown in Table 1.11-1.
SCP-2a	2010	—	—	—	—	—	—	—	—	—	—	—	—	No change. Continue monitoring this piezometer for water levels only in accordance with frequency shown in Table 1.11-1.
SCP-2b	2010	—	—	—	—	—	—	—	—	—	—	—	—	No change. Continue monitoring this piezometer for water levels only in accordance with frequency shown in Table 1.11-1.
Intermediate Wells														
Intermediate (General Surveillance)	*2010*	—	—	—	—	—	—	—	—	—	—	—	—	*Not applicable. All intermediate wells in this watershed are currently assigned to the chromium investigation monitoring group or to the TA-21 monitoring group.*
	2009	*Q*	*Q*	*A*	—	*A*	—	—	*A*	*Q*	*Q*	*Q*	*A*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
Intermediate (Chromium investigation monitoring group)	*2010*	*Q*	*A*	*A*	—	—	—	—	*A*	*S*	*Q*	*S*	*A*	*New monitoring group. Rationale for suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.*

Table D-3.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Intermediate (TA-21 monitoring group)	*2010*	*A*	*A*	*A*	—	—	—	—	*A*	*S*	*S*	*S*	*(A)*	*New monitoring group. Rationale for suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.*
R-12 screen 1	2010	S	A	A	—	—	—	—	A	S	S	S	—	Completed postconversion characterization sampling. Reassigned to suites and frequencies for new TA-21 monitoring group, augmented by semiannual frequency for metals because of the proximity of this well to the new chromium investigation monitoring group.
	2009	Q	Q	A	—	A	—	—	A	Q	Q	Q	A	Assigned to watershed-specific suites and frequencies. This rehabilitated screen completed several rounds of sampling following installation of a new sampling system in December 2007. Screen still shows minor geochemical effects from drilling and rehabilitation activities but is upgraded and removed from the indicator suite because it can provide reliable data for nearly all constituents of concern at this location.
R-12 screen 2	2010	S	A	A	—	—	—	—	A	S	S	S	—	Completed postconversion characterization sampling. Reassigned to suites and frequencies for new TA-21 monitoring group, augmented by semiannual frequency for metals because of the proximity of this well to the new chromium investigation monitoring group.
	2009	Q	Q	A	—	A	—	—	A	Q	Q	Q	A	Assigned to watershed-specific suites and frequencies. This rehabilitated screen completed several rounds of sampling following installation of a new sampling system in December 2007 and shows no residual effects from drilling and rehabilitation activities.
SCI-1	2010	Q	A	A	—	—	—	—	A	S	Q	S	A	Reassigned to suites and frequencies for new chromium investigation monitoring group (near-field).
	2009	Q	Q	A	—	A	—	—	A	Q	Q	Q	Q	Assigned to watershed-specific suites and frequencies.
SCI-2	2010	Q	A	A	—	—	—	—	A	S	Q	S	A	Completed characterization sampling. Reassigned to suites and frequencies for new chromium investigation monitoring group (near-field).
	2009	Q	Q	S	S	S	S	S	Q	Q	Q	Q	Q	New well assigned to watershed-specific characterization suite.

Table D-3.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Regional Wells														
Regional (General Surveillance)	*2010*	*Q*	*A*	*A*	—	*T*	*T*	—	*A*	*S*	*Q*	*S*	*(A)*	*Rationale for changes to suites and frequencies for general surveillance locations in this subwatershed is provided in Table D-1.0-2.*
	2009	*Q*	*Q*	*A*	—	*A*	—	—	*A*	*Q*	*Q*	*Q*	*A*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
Regional (Chromium investigation monitoring group)	*2010*	*Q*	*A*	*A*	—	—	—	—	*A*	*S*	*Q*	*S*	*A*	*New monitoring group. Rationale for suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.*
R-10 screen 1	2010	Q	A	A	—	T	T	—	A	S	Q	S	A	Reduced frequencies for VOCs, tritium and perchlorate suites reflect updated suites and frequencies for general surveillance locations in this part of the watershed and are consistent with requirements of the 2010 MOU with Pueblo of San Ildefonso. Background location approved for inclusion in GBIR, R4.
	2009	Q	Q	A	—	T	T	—	A	Q	Q	Q	A	Assigned to watershed-specific suites and frequencies. Added HEXP suite for consistency with requirements of the 2009 MOU with Pueblo of San Ildefonso. Triennial requirements for PCB and HEXP suites are based on the 2009 MOU with the Pueblo of San Ildefonso.
R-10 screen 2	2010	Q	A	A	—	T	T	—	A	S	Q	S	A	Reduced frequencies for VOCs, tritium and perchlorate suites reflect updated suites and frequencies for general surveillance locations in this part of the watershed and are consistent with requirements of the 2010 MOU with Pueblo of San Ildefonso. Background location approved for inclusion in GBIR, R4.
	2009	Q	Q	A	—	T	T	—	A	Q	Q	Q	A	Assigned to watershed-specific suites and frequencies. Added HEXP suite for consistency with requirements of the 2009 MOU with Pueblo of San Ildefonso. Triennial requirements for PCB and HEXP suites are based on the 2009 MOU with the Pueblo of San Ildefonso.

Table D-3.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-10a	2010	Q	A	A	—	T	T	—	A	S	Q	S	A	Reduced frequencies for VOCs, tritium, and perchlorate suites reflect updated suites and frequencies for general surveillance locations in this part of the watershed and are consistent with requirements of the 2010 MOU with Pueblo of San Ildefonso.
	2009	Q	Q	A	—	T	T	—	A	Q	Q	Q	A	Assigned to watershed-specific suites and frequencies. Added HEXP suite for consistency with requirements of the 2009 MOU with Pueblo of San Ildefonso. Triennial requirements for PCB and HEXP suites are based on the 2009 MOU with the Pueblo of San Ildefonso.
R-11	2010	Q	A	A	—	—	—	—	A	S	Q	S	A	Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	A	—	A	—	—	A	Q	Q	Q	A	Assigned to watershed-specific suites and frequencies.
R-35a	2010	Q	A	A	—	—	—	—	A	S	Q	S	A	Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	A	—	A	—	—	A	Q	Q	Q	A	Assigned to watershed-specific suites and frequencies based on a review of detection frequencies for more than four sampling events and an evaluation of these samples for residual effects from drilling and construction.
R-35b	2010	Q	A	A	—	—	—	—	A	S	Q	S	A	Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	A	—	A	—	—	A	Q	Q	Q	A	Assigned to watershed-specific suites and frequencies based on a review of detection frequencies for more than four sampling events and an evaluation of these samples for residual effects from drilling and construction.
R-36	2010	Q	A	A	—	—	—	—	A	S	Q	S	A	Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	S	S	S	S	S	Q	Q	Q	Q	Q	Assigned to the watershed-specific characterization suite until at least four sampling events have been completed, after which this well will be evaluated for assignment to watershed-specific analytical suites and frequencies.

Table D-3.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-43 screen 1	2010	Q	A	A	—	—	—	—	A	S	Q	S	A	Characterization sampling completed. Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	S	S	S	S	S	Q	Q	Q	Q	Q	New well assigned to watershed-specific characterization.
R-43 screen 2	2010	Q	A	A	—	—	—	—	A	S	Q	S	A	Characterization sampling completed. Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	S	S	S	S	S	Q	Q	Q	Q	Q	New well assigned to watershed-specific characterization.

Notes: Watershed-specific and monitoring group-specific sampling suites and frequencies for individual water types are shown in shaded rows in order to set this information apart from that for the individual sampling locations that follow these rows. Other table notes for this table are defined in the notes for Table D-1.0-1.

Table D-4.0-1
Sampling Frequencies and Analytical Suites Assigned to Locations in Mortandad Canyon

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Base-Flow Stations														
Base flow (General Surveillance)	*2010*	*A*	*A*	*A*	*—[i]*	*—*	*—*	*A*	*A*	*—*	*A*	*A*	*—*	*No change (Table D-1.0-2).*
	2009	*A*	*A*	*A*	*—*	*—*	*—*	*A*	*A*	*—*	*A*	*A*	*—*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
E-1FW	2010	S	S	A	—	—	—	S	S	—	S	S	—	Remains assigned to suites for general surveillance at base-flow stations in this watershed. Retained semiannual frequency for most suites because of the importance of this location for monitoring effluent discharged from the RLWTF. Reduced frequency for SVOC suite to annual because of history of nondetects (Table B-4).
	2009	S	S	S	—	—	—	S	S	—	S	S	—	Assigned to watershed-specific suites, retaining semiannual sampling frequencies because of the importance of this location for monitoring effluent discharged from the RLWTF.
M-1W	2010	A	A	A	—	—	—	A	A	—	A	A	—	No change
	2009	A	A	A	—	—	—	A	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
M-1E	2010	A	A	A	—	—	—	A	A	—	A	A	—	No change
	2009	A	A	A	—	—	—	A	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
M-2E	2010	A	A	A	—	—	—	A	A	—	A	A	—	No change
	2009	A	A	A	—	—	—	A	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
Mortandad below Effluent Canyon (E200)	2010	A	A	A	—	—	—	A	A	A	A	A	—	Remains assigned to suites for general surveillance at base-flow stations in this watershed, augmented by tritium because of historically elevated tritium activities at this location (Table B-4).
	2009	A	A	A	—	—	—	A	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
TS-1W	2010	A	A	A	—	—	—	A	A	—	A	A	—	No change
	2009	A	A	A	—	—	—	A	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.

Table D-4.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
TS-2E	2010	A	A	A	—	—	—	A	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
	2009	A	A	A	—	—	—	A	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
Alluvial Wells in Cañada del Buey and Upper Mortandad Canyon (above confluence with Effluent Canyon)														
Alluvial (General Surveillance)	*2010*	*A*	*A*	*A*	—	—	—	—	*A*	*A*	*A*	*A*	—	*Combined Subgroups A and B after moving Cañada del Buey locations to Pajarito watershed monitoring plan for logistical sampling purposes. Rationale for changes to suites and frequencies for general surveillance locations in this watershed is provided in Table D-1.0-2.*
Alluvial Subgroup A	*2009*	*A*	*A*	*A*	—	—	—	—	*A*	*A*	*A*	*A*	—	*Includes locations in Cañada del Buey and above Effluent Canyon. Watershed-specific suites and frequencies for 2009 Interim Plan.*
Alluvial Subgroup B	*2009*	*S*	*S*	*A*	—	—	—	—	*A*	*A*	*S*	*S*	—	*Includes locations in or below Effluent Canyon or Ten-Site Canyon). Watershed-specific suites and frequencies for 2009 Interim Plan.*
CDBO-4, CDBO-5, CDBO-6, CDBO-7, CDBO-8, CDBO-9	2010	—	—	—	—	—	—	—	—	—	—	—	—	Documentation moved to sampling table for Pajarito Canyon watershed (Table D-5.0-1). Although located in the Mortandad Canyon watershed, this well in the Cañada del Buey subwatershed is treated as part of the Pajarito Canyon watershed for logistical sampling purposes.
MCA-1	2010	A	A	A	—	—	—	A	A	A	A	A	—	Changes reflect revised suites and frequencies for general surveillance at alluvial wells in this part of the watershed. Retained sampling for dioxins/furans to continue to establish baseline for alluvial groundwater in response to sporadic detections of dioxins/furans at base-flow stations in the past.
	2009	A	A	A	—	—	—	A	A	—	A	A	—	Assigned to watershed-specific suites and frequencies. Added annual sampling for dioxins/furans in response to sporadic detections of low concentrations of dioxins/furans at base flow stations in the past.

Table D-4.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
MCA-5	2010	—	—	—	—	—	—	—	—	—	—	—	—	Removed from water-level monitoring plan. Intermittently dry (Koch and Schmeer 2010, 108926). Replaced by MCO-3.
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Removed from sampling under the Interim Plan because this well is typically dry (Koch and Schmeer 2009, 105181), and rarely contains sufficient water for sampling. Water-level monitoring only.
MCA-8	2010	—	—	—	—	—	—	—	—	—	—	—	—	Removed from water-level monitoring plan. Water only in sump since well completed in September 2004 (Koch and Schmeer 2010, 108926).
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Water-level monitoring only. Water only in sump since well completion in September 2004.
MCO-0.6	2010	A	A	A	—	—	—	—	A	A	A	A	—	No change
	2009	A	A	A	—	—	—	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies.
MCO-2	2010	A	A	A	—	—	—	—	A	A	A	A	—	Changes reflect revised suites and frequencies for general surveillance at alluvial wells in this part of the watershed.
	2009	S	S	A	—	—	—	—	A	A	S	S	—	Assigned to watershed-specific suites and frequencies.
MCO-3	2010	A	A	A	—	—	—	—	A	A	Q	Q	—	Changes reflect revised suites and frequencies for general surveillance at alluvial wells in this part of the watershed, with quarterly sampling of general inorganics and perchlorate as required by Sanitary Wastewater Systems (SWS) discharge permit.
	2009	S	S	A	—	—	—	—	A	A	Q	Q	—	Added back to Interim Plan to replace MCA-5, which is typically dry. Assigned to watershed-specific suites, with quarterly sampling of general inorganics and perchlorate as required by SWS discharge permit.

Table D-4.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
MCO-4B	2010	A	A	A	—	—	—	—	A	A	Q	Q	—	Changes reflect revised suites and frequencies for general surveillance at alluvial wells in this part of the watershed, with quarterly sampling of general inorganics and perchlorate as required by SWS discharge permit.
	2009	S	S	A	—	—	—	—	A	A	Q	Q	—	Assigned to watershed-specific suites, with quarterly sampling of general inorganics and perchlorate as required by SWS discharge permit.
MCO-5	2010	A	A	A	—	—	—	—	A	A	A	A	—	Changes reflect revised suites and frequencies for general surveillance at alluvial wells in this part of the watershed.
	2009	S	S	A	—	—	—	—	A	A	S	S	—	Assigned to watershed-specific suites and frequencies.
MCO-6	2010	A	A	A	—	—	—	—	A	A	Q	Q	—	Changes reflect revised suites and frequencies for general surveillance at alluvial wells in this part of the watershed, with quarterly sampling of general inorganics and perchlorate as required by SWS discharge permit.
	2009	S	S	A	—	—	—	—	A	A	Q	Q	—	Assigned to watershed-specific suites, with quarterly sampling of general inorganics and perchlorate as required by SWS discharge permit.
MCO-7	2010	A	A	A	—	—	—	—	A	A	Q	Q	—	Changes reflect revised suites and frequencies for general surveillance at alluvial wells in this part of the watershed, with quarterly sampling of general inorganics and perchlorate as required by SWS discharge permit.
	2009	S	S	A	—	—	—	—	A	A	Q	Q	—	Assigned to watershed-specific suites, with quarterly sampling of general inorganics and perchlorate as required by SWS discharge permit.
MCO-7.5	2010	A	A	A	—	—	—	—	A	A	A	A	—	Changes reflect revised suites and frequencies for general surveillance at alluvial wells in this part of the watershed.
	2009	S	S	A	—	—	—	—	A	A	S	S	—	Assigned to watershed-specific suites and frequencies.

Table D-4.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
MCWB-5, MCWB-5.5b, MCWB-6.2a, MCWB-6.5e, MCWB-7a, MCWB-7.4b, MCWB-7.7b	2010	—	—	—	—	—	—	—	—	—	—	—	—	No change. Continue to monitor water levels only in accordance with frequency shown in Table 1.11-1.
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Water-level monitoring only.
MT-2	2010	—	—	—	—	—	—	—	—	—	—	—	—	Removed from water-level monitoring plan. This well is often dry and has been replaced by MT-3 (Koch and Schmeer 2010, 108926).
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Removed from Interim Plan because this well is historically dry (Koch and Schmeer 2009, 105181). Replaced by MT-3.
MT-3	2010	A	A	A	—	—	—	—	A	A	A	A	—	Changes reflect revised suites and frequencies for general surveillance at alluvial wells in this part of the watershed.
	2009	S	S	A	—	—	—	—	A	A	S	S	—	Assigned to watershed-specific suites and frequencies. Removed from 2007 Interim Plan and replaced by MT-2 but added back to 2009 Interim Plan because MT-2 is always dry.
MT-4	2010	—	—	—	—	—	—	—	—	—	—	—	—	No change. Continue to monitor water levels only in accordance with frequency shown in Table 1.11-1.
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Water-level monitoring only.
TSCA-6	2009	A	A	A	—	—	—	—	A	A	A	A	—	No change
	2009	A	A	A	—	—	—	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies.
Intermediate Wells														
Intermediate (General Surveillance)	*2010*	—	—	—	—	—	—	—	—	—	—	—	—	*Not applicable. All intermediate locations in this watershed are assigned to a monitoring group.*
	2009	*Q*	*S*	*Q*	—	—	—	—	*A*	*Q*	*Q*	*Q*	*S*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*

Table D-4.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Intermediate (Chromium investigation monitoring group)	*2010*	*Q*	*A*	*S*	—	—	—	—	*A*	*S*	*Q*	*S*	*A*	*New monitoring group. Rationale for suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.*
MCOBT-4.4	2010	—	—	—	—	—	—	—	—	—	—	—	—	Removed from water-level monitoring plan. Well was plugged and abandoned in July 2009 (Koch and Schmeer 2010, 108926).
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Water-level monitoring only.
MCOI-4	2010	Q	A	S	—	—	—	—	A	S	Q	S	A	Reassigned to suites and frequencies for new chromium investigation monitoring group (Mortandad Canyon wells).
	2009	Q	S	Q	—	—	—	—	A	Q	Q	Q	S	Assigned to watershed-specific suites and frequencies.
MCOI-5	2010	Q	A	S	—	—	—	—	A	S	Q	S	A	Reassigned to suites and frequencies for new chromium investigation monitoring group (Mortandad Canyon wells).
	2009	Q	S	Q	—	—	—	—	A	Q	Q	Q	S	Assigned to watershed-specific suites and frequencies.
MCOI-6	2010	Q	A	S	—	—	—	—	A	S	Q	S	A	Reassigned to suites and frequencies for new chromium investigation monitoring group (Mortandad Canyon wells).
	2009	Q	S	Q	—	—	—	—	A	Q	Q	Q	S	Assigned to watershed-specific suites and frequencies.
MCOI-8	2010	—	—	—	—	—	—	—	—	—	—	—	—	No change. Water has been measured in sump of well since well completion in January 2005 (Koch and Schmeer 2010, 108926). Continue to monitor water levels only in accordance with frequency shown in Table1.11-1.
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Removed from sampling under the Interim Plan because water is limited to the sump and well does not meet monitoring network objectives. Retained for water-level monitoring only.

Table D-4.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Regional Wells														
Regional (General Surveillance)	*2010*	*Q*	*A*	*A*	—	—	—	—	*A*	*S*	*Q*	*S*	*(A)*	*Rationale for changes to suites and frequencies for general surveillance locations in this subwatershed is provided in Table D-1.0-2.*
	2009	*Q*	*Q*	*A*	—	—	—	—	*A*	*S*	*Q*	*Q*	*A*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
Regional (Chromium investigation monitoring group)	*2010*	*Q*	*A*	*A*	—	—	—	—	*A*	*S*	*Q*	*S*	*A*	*New monitoring group. Rationale for suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.*
Regional (MDA C monitoring group)	*2010*	*S*	*Q*	*A*	—	—	*A*	—	*A*	*S*	*Q*	*A*	*(A)*	*New monitoring group. Rationale for suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.*
R-1	2010	Q	Q	A	—	—	—	—	A	S	Q	S	A	Changes reflect updated suites and frequencies for general surveillance at regional wells in this watershed. Retained quarterly sampling for VOCs because of proximity to new MDA C monitoring group.
	2009	Q	Q	A	—	—	—	—	A	S	Q	Q	A	Assigned to watershed-specific suites and frequencies.
R-13	2010	Q	A	A	—	—	—	—	A	S	Q	S	A	Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	A	—	—	—	—	A	S	Q	Q	A	Assigned to watershed-specific suites and frequencies.
R-14	2010	S	Q	A	—	—	A	—	A	S	Q	A	A	Completed post-conversion characterization sampling. Reassigned to suites and frequencies for new MDA C monitoring group. Background location approved for inclusion in GBIR, R4.
	2009	Q	Q	A	—	—	—	—	A	S	Q	Q	A	Assigned to watershed-specific suites and frequencies.
R-15	2010	Q	A	S	—	—	—	—	A	S	Q	S	A	Reassigned to suites and frequencies for new chromium investigation monitoring group, augmented by semiannual frequency for SVOCs because of 1,4-dioxane detections in perched-intermediate groundwater in this watershed.
	2009	Q	Q	A	—	—	—	—	A	S	Q	Q	A	Assigned to watershed-specific suites and frequencies.

Table D-4.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-16 screen 2	2010	Q	Q	S	—	—	—	—	A	S	Q	Q	S	Post-conversion sampling completed. Upgraded to suites and frequencies for general surveillance at regional wells in this watershed, augmented by quarterly sampling for VOCs because of the location of this well downgradient from TA-54. Retained higher sampling frequencies for SVOCs and perchlorate to continue to evaluate reestablishment of representative water chemistry in this screen.
	2009	—	—	—	—	—	—	—	—	Q	—	Q	A	Assigned to indicator suite because of residual effects of drilling. To be reevaluated following completion of rehabilitation and conversion activities scheduled for this well in Calendar year (CY) 2009.
R-16 screen 3	2010	—	—	—	—	—	—	—	—	—	—	—	—	Removed from monitoring plan. This screen was packed off when well R-16 was converted to a dual-screen well.
	2009	Q	Q	A	—	—	—	—	A	S	Q	Q	A	Assigned to watershed-specific suites and frequencies pending implementation of rehabilitation and conversion activities scheduled for this well in CY2009.
R-16 screen 4	2010	Q	Q	S	—	—	—	—	A	S	Q	Q	S	Postconversion sampling completed. Upgraded to suites and frequencies for general surveillance at regional wells in this watershed, augmented by quarterly sampling for VOCs because of the location of this well downgradient of TA-54. Retained higher sampling frequencies for SVOCs and perchlorate to continue to evaluate reestablishment of representative water chemistry in this screen.
	2009	—	—	—	—	—	—	—	—	Q	—	Q	A	Assigned to indicator suite because of residual effects of drilling. To be reevaluated following completion of rehabilitation and conversion activities scheduled for this well in CY2009.
R-16r	2010	Q	Q	A	—	—	—	—	A	S	Q	Q	A	No change. Remains assigned to suites and frequencies for general surveillance at regional wells in this watershed, augmented by quarterly sampling for VOCs because of its location downgradient of TA-54. Background location approved for inclusion in GBIR, R4.
	2009	Q	Q	A	—	—	—	—	A	S	Q	Q	A	Assigned to watershed-specific suites and frequencies.

Table D-4.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-21	2010	—	—	—	—	—	—	—	—	—	—	—	—	Documentation moved to sampling table for Pajarito Watershed (Table D-5.0-1). Although located in Mortandad Canyon watershed, this well in the Cañada del Buey subwatershed is treated as part of the Pajarito Canyon watershed for logistical sampling purposes.
R-28	2010	Q	A	A	—	—	—	—	A	S	Q	S	A	Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	A	—	—	—	—	A	S	Q	Q	A	Assigned to watershed-specific suites and frequencies.
R-33 screen 1	2010	Q	Q	S	—	—	—	—	A	S	Q	S	A	Completed postconversion characterization sampling. Changes reflect updated suites and frequencies for general surveillance at regional wells in this watershed. Retained quarterly sampling for VOC suite because of the proximity of this well to MDA C monitoring group. Retained semiannual sampling for SVOC suite because of the proximity of this well to locations where 1,4-dioxane is detected in perched-intermediate groundwater. Background location approved for inclusion in GBIR, R4.
	2009	Q	Q	S	S	S	S	S	Q	Q	Q	Q	Q	Well rehabilitated in early 2008; new sampling system installed in June 2008. Assigned to watershed-specific characterization suites and frequencies at the request of the NMED (NMED 2008, 103642). After at least four sampling events have been completed, this screen will be evaluated for assignment to watershed-specific analytical suites and frequencies.

Table D-4.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-33 screen 2	2010	Q	Q	S	—	—	—	—	A	S	Q	S	A	Completed postconversion characterization sampling. Changes reflect updated suites and frequencies for general surveillance at regional wells in this watershed. Retained quarterly sampling for VOC suite because of the proximity of this well to MDA C monitoring group. Retained semiannual sampling for SVOC suite because of the proximity of this well to locations where 1,4-dioxane is detected in perched-intermediate groundwater. Background location approved for inclusion in GBIR, R4.
	2009	Q	Q	S	S	S	S	S	Q	Q	Q	Q	Q	Well rehabilitated in early 2008; new sampling system installed in June 2008. Assigned to watershed-specific characterization suites and frequencies at the request of the NMED (2008, 103642). After at least four sampling events have been completed, this screen will be evaluated for assignment to watershed-specific analytical suites and frequencies.
R-34	2010	Q	A	A	—	T	T	—	A	S	Q	S	A	Changes reflect updated suites and frequencies for general surveillance at regional wells in this watershed. Retained triennial sampling for PCB and HEXP suites consistent with requirements for this location in the 2010 MOU with the Pueblo of San Ildefonso.
	2009	Q	Q	A	—	T	T	—	A	Q	Q	Q	A	Assigned to watershed-specific suites and frequencies. Quarterly frequency for tritium and the addition of triennial sampling for PCB and HEXP suites are based on the 2009 MOU with the Pueblo of San Ildefonso.
R-37 screens 1 and 2	2010	—	—	—	—	—	—	—	—	—	—	—	—	Documentation moved to sampling table for Pajarito Canyon watershed (Table D-5.0-1). Although located in Mortandad Watershed, this well in the Cañada del Buey subwatershed is treated as part of the Pajarito Watershed for logistical sampling purposes.

Table D-4.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-38	2010	—	—	—	—	—	—	—	—	—	—	—	—	Documentation moved to sampling table for Pajarito Canyon watershed (Table D-5.0-1). Although located in Mortandad Canyon watershed, this well in the Cañada del Buey subwatershed is treated as part of the Pajarito Canyon watershed for logistical sampling purposes.
R-42	2010	Q	A	S	—	—	—	—	A	S	Q	S	A	Characterization sampling completed. Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	S	S	S	S	S	Q	Q	Q	Q	Q	New well assigned to watershed-specific characterization suites and frequencies.
R-44 screen 1	2010	Q	A	A	—	—	—	—	A	S	Q	S	A	Characterization sampling completed. Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	S	S	S	S	S	Q	Q	Q	Q	Q	New well assigned to watershed-specific characterization suites and frequencies.
R-44 screen 2	2010	Q	A	A	—	—	—	—	A	S	Q	S	A	Characterization sampling completed. Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	S	S	S	S	S	Q	Q	Q	Q	Q	New well assigned to watershed-specific characterization suites and frequencies.
R-45 screen 1	2010	Q	A	A	—	—	—	—	A	S	Q	S	A	Characterization sampling completed. Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	S	S	S	S	S	Q	Q	Q	Q	Q	New well assigned to watershed-specific characterization suites and frequencies.
R-45 screen 2	2010	Q	A	A	—	—	—	—	A	S	Q	S	A	Characterization sampling completed. Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	S	S	S	S	S	Q	Q	Q	Q	Q	New well assigned to watershed-specific characterization suites and frequencies.
R-46	2010	S	Q	A	—	—	S	—	A	S	Q	A	A	Characterization sampling completed. Reassigned to suites and frequencies for new chromium investigation monitoring group.
	2009	Q	Q	S	S	S	S	S	Q	Q	Q	Q	Q	New well assigned to watershed-specific characterization suites and frequencies.

Table D-4.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-50 screen 1	2010	Q	Q	S	S	S	S	S	Q	Q	Q	Q	S	Newly completed well assigned to characterization suites and frequencies applicable to new regional wells that are part of the new chromium investigation monitoring group.
R-50 screen 2	2010	Q	Q	S	S	S	S	S	Q	Q	Q	Q	S	Newly completed well assigned to characterization suites and frequencies applicable to new regional wells that are part of the new chromium investigation monitoring group.
Test Well (TW) 8	2010	—	—	—	—	—	—	—	—	—	—	—	—	Removed from water-level monitoring plan. Well was plugged and abandoned on August 13, 2009 (Koch and Schmeer 2010, 108926).
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Removed from 2008 Interim Plan because TW-8 is scheduled to be plugged and abandoned as recommended by the network evaluation (LANL 2007, 099128). Well annulus is a potential pathway for alluvial and intermediate groundwater to reach regional groundwater. The well will be sampled one more time following the 24-h pump test scheduled to occur prior to plugging and abandonment.

Table D-5.0-1
Sampling Frequencies and Analytical Suites Assigned to Locations in Pajarito Canyon

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Base-Flow Stations														
Base flow V	*2010*	*A*	*A*	*A*	*—*[i]	*—*	*A*	*—*	*A*	*—*	*A*	*A*	*—*	*No change (Table D-1.0-2).*
	2009	*A*	*A*	*A*	*—*	*—*	*A*	*—*	*A*	*—*	*A*	*A*	*—*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
Pajarito 0.5 mi above SR-501 (PBF-B)	2010	A	A	A	—	—	A	—	A	—	A	A	—	No change
	2009	A	A	A	—	—	A	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
Pajarito above Two Mile (E243)	2010	A	A	A	—	—	S	—	A	—	S	A	—	Remains assigned to suites and frequencies for general surveillance at base-flow locations in this watershed, augmented by semiannual sampling for HEXP. Increased frequency for general inorganics suite to the same as that for the HEXP suite to support interpretation of trends.
	2009	A	A	A	—	—	S	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies, with continued semiannual sampling for HEXP to monitor trends for detected explosive compounds.
Pajarito below confluence of South and North Anchor East Basin (PBF-1)	2010	A	A	A	—	—	S	—	A	—	S	A	—	Remains assigned to suites and frequencies for general surveillance at base-flow locations in this watershed, augmented by semiannual sampling for HEXP. Increased frequency for general inorganics suite to the same as that for the HEXP suite to support interpretation of trends.
	2009	A	A	A	—	—	S	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies, with continued semiannual sampling for HEXP to monitor trends for detected explosive compounds.

Table D-5.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Pajarito below TA-18 (PBF-5)	2010	A	A	A	—	—	S	—	A	—	S	A	—	Remains assigned to suites and frequencies for general surveillance at base-flow locations in this watershed, augmented by semiannual sampling for HEXP. Increased frequency for general inorganics suite to the same as that for the HEXP suite to support interpretation of trends.
	2009	A	A	A	—	—	S	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies, with continued semiannual sampling for HEXP to monitor trends for detected explosive compounds.
Two Mile above Pajarito (E244)	2010	A	A	A	—	—	A	—	A	—	A	A	—	No change
	2009	A	A	A	—	—	A	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
Two Mile Canyon below TA-59 (PBF-2)	2010	A	A	A	—	—	A	—	A	—	A	A	—	No change
	2009	A	A	A	—	—	A	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
Springs														
Springs (General Surveillance)	*2010*	*A*	*A*	*A*	—	—	*A*	—	*A*	*A*	*A*	*A*	*A*	*No change (Table D-1.0-2).*
	2009	*A*	*A*	*A*	—	—	*A*	—	*A*	*A*	*A*	*A*	*A*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
Anderson Spring	2010	A	A	A	—	—	A	—	A	A	A	A	A	No change
	2009	A	A	A	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Bulldog Spring	2010	A	A	A	—	—	S	—	A	A	S	A	A	Remains assigned to for general surveillance at springs in this watershed, augmented by semiannual sampling for HEXP. Increased frequency for general inorganics suite to the same as that for the HEXP suite to support interpretation of trends.
	2009	A	A	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies, with semiannual sampling for HEXP to monitor trends for detected explosive compounds.

Table D-5.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Charlie's Spring	2010	A	A	A	—	—	A	—	A	A	A	A	A	No change
	2009	A	A	A	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Homestead Spring	2010	A	A	A	—	—	A	—	A	A	A	A	A	No change
	2009	A	A	A	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Kieling Spring	2010	A	A	A	—	—	S	—	A	A	S	A	A	Remains assigned to suites and frequencies for general surveillance at springs in this watershed, augmented by semiannual sampling for HEXP. Increased frequency for general inorganics suite to the same as that for the HEXP suite to support interpretation of trends.
	2009	A	A	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies, with semiannual sampling for HEXP to monitor trends for detected explosive compounds.
PC Spring	2010	A	A	A	—	—	A	—	A	A	A	A	A	No change. Background location approved for inclusion in GBIR, R4.
	2009	A	A	A	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Starmer Spring	2010	A	A	A	—	—	A	—	A	A	A	A	A	No change
	2009	A	A	A	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
TA-18 Spring	2010	A	A	A	—	—	A	—	A	A	A	A	A	No change
	2009	A	A	A	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Threemile Spring	2010	A	A	A	—	—	A	—	A	A	A	A	A	No change
	2009	A	A	A	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
TW-1.72 Spring	2010	A	A	A	—	—	A	—	A	A	A	A	A	No change
	2009	A	A	A	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.

Table D-5.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Alluvial Wells														
Alluvial (General Surveillance)	*2010*	*A*	*A*	*A*	—	—	*A*	—	*A*	*A*	*A*	*A*	—	*No change (Table D-1.0-2).*
	2009	*A*	*A*	*A*	—	—	*A*	—	*A*	*A*	*A*	*A*	—	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
3MAO-2	2010	S	S	A	—	—	A	—	A	A	S	A	—	Remains assigned to suites and frequencies for general surveillance at alluvial wells in this watershed, augmented by semiannual frequencies for metals, VOCs, and general inorganics because this location monitors baseline water quality relative to the TA-18 complex.
	2009	S	S	S	S	S	S	S	S	S	S	S	S	New well completed in June 2008. Assigned to watershed-specific characterization suites and frequencies for new alluvial wells.
18-BG-1	2010	A	A	A	—	—	A	—	A	A	A	A	—	Remains assigned to suites for general surveillance at alluvial wells in this watershed. Reduced frequencies to annual for all suites, consistent with frequencies for general surveillance at other alluvial wells, to reflect maturity of conceptual model for this part of the watershed and the adequacy of the cumulative data set.
	2009	S	S	S	—	—	S	—	S	A	S	S	—	Assigned to watershed-specific suites with semiannual frequencies for metals, VOCs, SVOCs, HEXP, and general inorganics because this location monitors baseline water quality relative to the TA-18 complex.
18-MW-8	2010	A	A	A	—	—	A	—	A	A	A	A	—	No change
	2009	A	A	A	—	—	A	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies.
18-MW-9	2010	A	A	A	—	—	A	—	A	A	A	A	—	No change
	2009	A	A	A	—	—	A	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies.
18-MW-11	2010	A	A	A	—	—	A	—	A	A	A	A	—	No change
	2009	A	A	A	—	—	A	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies.

Table D-5.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
18-MW-18	2010	A	A	A	—	—	A	—	A	A	A	A	—	No change
	2009	A	A	A	—	—	A	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies.
CDBO-4	2010	A	A	A	—	—	—	—	A	A	A	A	—	No change. Remains assigned to suites and frequencies for general surveillance at alluvial wells in Cañada del Buey. Although technically in Mortandad Canyon watershed, this well is considered to be in the Pajarito Canyon watershed for logistical sampling purposes.
	2009	A	A	A	—	—	—	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies. Although this well is historically dry (Koch and Schmeer 2009, 105181), it is retained in the current Interim Plan because a transducer was installed in early CY2009 as part of an agreement with NMED to build upon the conceptual model for the surface water and alluvial system of Cañada del Buey (NMED 2009, 105600).
CDBO-5	2010	A	A	A	—	—	—	—	A	A	A	A	—	No change. Remains assigned to suites and frequencies for general surveillance at alluvial wells in Cañada del Buey. Although technically in Mortandad Canyon watershed, this well is considered to be in the Pajarito Canyon watershed for logistical sampling purposes.
	2009	A	A	A	—	—	—	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies. Although this well is historically dry (Koch and Schmeer 2009, 105181), it is retained in the current Interim Plan because a transducer was installed in early CY2009 as part of an agreement with NMED to build upon the conceptual model for the surface water and alluvial system of Cañada del Buey (NMED 2009, 105600).

Table D-5.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
CDBO-6	2010	A	A	A	—	—	—	A	A	A	Q	Q	—	Remains assigned to suites and frequencies for general surveillance at alluvial wells in Cañada del Buey. Retained quarterly sampling for general inorganics and perchlorate as required by SWS discharge permit. Retained annual sampling for dioxins/furans in response to sporadic detections of low concentrations of dioxins/furans at base-flow stations in the past. Although technically in Mortandad Canyon watershed, this well is considered to be in the Pajarito Canyon watershed for logistical sampling purposes.
	2009	S	S	A	—	—	—	A	A	A	Q	Q	Q	Assigned to watershed-specific suites, but sampled at higher frequencies because of the importance of this location for monitoring effluent discharged from the SWS. Discharge permit requires quarterly sampling for general inorganics and perchlorate, and annual sampling for metals, VOCs, SVOCs, and radioactivity. However, metals and VOCs will be sampled semiannually to provide additional data in support of conceptual model development. Added annual sampling for dioxins/furans in response to sporadic detections of low concentrations of dioxins/furans at base-flow stations in the past.
CDBO-7	2010	A	A	A	—	—	—	—	A	A	A	A	—	No change. Remains assigned to suites and frequencies for general surveillance at alluvial wells in Cañada del Buey. Although technically in Mortandad Canyon watershed, this well is considered to be in the Pajarito Canyon watershed for logistical sampling purposes.
	2009	A	A	A	—	—	—	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies. Does not usually have sufficient saturation to permit sampling.

Table D-5.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
CDBO-8	2010	A	A	A	—	—	—	—	A	A	A	A	—	No change. Remains assigned to suites and frequencies for general surveillance at alluvial wells in Cañada del Buey. Although technically in Mortandad Canyon watershed, this well is considered to be in the Mortandad Canyon watershed for logistical sampling purposes.
	2009	A	A	A	—	—	—	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies. Although this well is historically dry (Koch and Schmeer 2009, 105181), it is retained in the current Interim Plan because a transducer was installed in early CY2009 as part of an agreement with NMED to build upon the conceptual model for the surface water and alluvial system of Cañada del Buey (NMED 2009, 105600).
CDBO-9	2010	A	A	A	—	—	—	—	A	A	A	A	—	No change. Remains assigned to suites and frequencies for general surveillance at alluvial wells in Cañada del Buey. Although technically in Mortandad Canyon watershed, this well is considered to be in the Pajarito Canyon watershed for logistical sampling purposes.
	2009	A	A	A	—	—	—	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies. Although this well is historically dry (Koch and Schmeer 2009, 105181), it is retained in the current Interim Plan because a transducer was installed in early CY2009 as part of an agreement with NMED to build upon the conceptual model for the surface water and alluvial system of Cañada del Buey (NMED 2009, 105600).

Table D-5.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
PCAO-5	2010	S	A	A	—	—	A	—	A	A	S	A	A	Characterization sampling completed. Changes reflect assignment to suites and frequencies for general surveillance at alluvial wells in this watershed. Retained semiannual frequencies for metals and general inorganics to collect additional baseline data for these suites.
	2009	S	S	S	S	S	S	S	S	S	S	S	S	New well completed in June 2008. Assigned to watershed-specific characterization suites and frequencies for new alluvial wells.
PCAO-6	2010	S	A	A	—	—	A	—	A	A	S	A	A	Characterization sampling completed. Changes reflect assignment to suites and frequencies for general surveillance at alluvial wells in this watershed. Retained semiannual frequencies for metals and general inorganics to collect additional baseline data for these suites.
	2009	S	S	S	S	S	S	S	S	S	S	S	S	New well completed in May 2008. Assigned to watershed-specific characterization suites and frequencies for new alluvial wells.
PCAO-7a	2010	S	A	A	—	—	A	—	A	A	S	A	A	Characterization sampling completed. Changes reflect assignment to suites and frequencies for general surveillance at alluvial wells in this watershed. Retained semiannual frequencies for metals and general inorganics to collect additional baseline data for these suites.
	2009	S	S	S	S	S	S	S	S	S	S	S	S	New well completed in May 2008. Assigned to watershed-specific characterization suites and frequencies for new alluvial wells.
PCAO-7b1	2010	—	—	—	—	—	—	—	—	—	—	—	—	No change. Water-level monitoring only. Well bailed dry during drilling, and water has not risen above sump since then. Continue to monitor water levels only in accordance with frequency shown in Table1.11-1.
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Water-level monitoring only.

Table D-5.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
PCAO-7b2	2010	S	A	A	—	—	A	—	A	A	S	A	A	Characterization sampling completed. Changes reflect assignment to suites and frequencies for general surveillance at alluvial wells in this watershed. Retained semiannual frequencies for metals and general inorganics to collect additional baseline data for these suites.
	2009	S	S	S	S	S	S	S	S	S	S	S	S	New well completed in May 2008. Assigned to watershed-specific characterization suites and frequencies for new alluvial wells.
PCAO-7c	2010	S	A	A	—	—	A	—	A	A	S	A	A	Characterization sampling completed. Changes reflect assignment to suites and frequencies for general surveillance at alluvial wells in this watershed. Retained semiannual frequencies for metals and general inorganics to collect additional baseline data for these suites.
	2009	S	S	S	S	S	S	S	S	S	S	S	S	New well completed in May 2008. Assigned to watershed-specific characterization suites and frequencies for new alluvial wells.
PCAO-8	2010	S	A	A	—	—	A	—	A	A	S	A	A	Characterization sampling completed. Changes reflect assignment to suites and frequencies for general surveillance at alluvial wells in this watershed. Retained semiannual frequencies for metals and general inorganics to collect additional baseline data for these suites.
	2009	S	S	S	S	S	S	S	S	S	S	S	S	New well completed in June 2008. Assigned to watershed-specific characterization suites and frequencies for new alluvial wells.

Table D-5.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
PCAO-9	2010	S	A	A	—	—	A	—	A	A	S	A	A	Characterization sampling completed. Changes reflect assignment to suites and frequencies for general surveillance at alluvial wells in this watershed. Retained semiannual frequencies for metals and general inorganics to collect additional baseline data for these suites.
	2009	S	S	S	S	S	S	S	S	S	S	S	S	New well completed in June 2008 as replacement for PCO-3. Assigned to watershed-specific characterization suites and frequencies for new alluvial wells.
PCO-2	2010	S	A	A	—	—	A	—	A	A	S	A	A	Characterization sampling completed. Changes reflect assignment to suites and frequencies for general surveillance at alluvial wells in this watershed. Retained semiannual frequencies for metals and general inorganics to collect additional baseline data for these suites.
	2009	A	A	A	—	—	A	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies.
PCO-3	2010	—	—	—	—	—	—	—	—	—	—	—	—	No change. Water-level monitoring only in accordance with frequency shown in Table 1.11-1.
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Water-level monitoring only.
TMO-1	2010	S	A	A	—	—	A	—	A	A	S	A	A	Characterization sampling completed. Changes reflect assignment to suites and frequencies for general surveillance at alluvial wells in this watershed. Retained semiannual frequencies for metals and general inorganics to collect additional baseline data for these suites.
	2009	S	S	S	S	S	S	S	S	S	S	S	S	New well completed in fiscal year (FY) 2007. Assigned to watershed-specific characterization suites and frequencies for new alluvial wells.

Table D-5.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Intermediate Wells														
Intermediate (General Surveillance)	*2010*	*S*	*S*	—	—	—	*S*	—	*A*	*S*	*S*	*S*	*(A)*	*Rationale for changes to suites and frequencies for general surveillance locations in this subwatershed is provided in Table D-1.0-2.*
	2009	*Q*	*Q*	—	—	—	*Q*	—	*Q*	*Q*	*Q*	*Q*	*Q*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
Intermediate (MDA C monitoring group)	*2010*	*S*	*Q*	*A*	—	—	*T*	—	*A*	*S*	*Q*	*A*	*A*	*New monitoring group. Rationale for suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.*
Intermediate (TA-54 monitoring group)	*2010*	*Q*	*Q*	*Q*	*A*	*A*	*A*	*A*	*A*	*Q*	*Q*	*Q*	*S*	*New hydrologic zone for this monitoring group. Rationale for suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.*
03-B-9	2010	—	—	—	—	—	—	—	—	—	—	—	—	Well was plugged and abandoned September 25, 2009 (Koch and Schmeer 2010, 108926).
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Removed from Interim Plan because well is noncompliant. Request to NMED to plug and abandon this well is pending.
03-B-10	2010	—	—	—	—	—	—	—	—	—	—	—	—	Well was plugged and abandoned September 25, 2009 (Koch and Schmeer 2010, 108926).
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Removed from Interim Plan because well is noncompliant and is redundant with nearby well 03-B-13. Request to NMED to plug and abandon this well is pending.
03-B-13	2010	Q	Q	Q	—	—	Q	—	—	Q	Q	Q	A	No change (other than addition of stable isotope suite).
	2009	Q	Q	Q	—	—	Q	—	—	Q	Q	Q	—	Continued quarterly monitoring of assigned analytical suites as requested by NMED to provide data in support of investigation at SWMU 03-010(a).

Table D-5.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
PCI-2	2010	S	Q	A	—	—	T	—	A	S	Q	A	A	Completed characterization sampling. Assigned to suites and frequencies for new MDA C monitoring group. Background location approved for inclusion in GBIR, R4.
	2009	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	New well completed in April 2009. Assigned to characterization suites and frequencies applicable to new intermediate and regional wells that are part of TA-54 monitoring well network (Table D-1.0-1) to provide baseline characterization data for areas upgradient of TA-54.
R-19 screen 1	2010	—	—	—	—	—	—	—	—	—	—	—	—	No change. Water-level monitoring only in accordance with frequency shown in Table 1.11-1.
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Water-level monitoring only.
R-19 screen 2	2010	S	S	—	—	—	S	—	A	S	S	S	A	Changes reflect updated suites and frequencies for general surveillance at regional wells in this watershed.
	2009	Q	Q	—	—	—	Q	—	Q	Q	Q	Q	Q	Assigned to watershed-specific suites and frequencies.
R-23i screen 1 (port 2)	2010	Q	Q	S	—	—	S	—	A	S	Q	S	A	Remains assigned to suites and frequencies for general surveillance at intermediate wells in this watershed, augmented by quarterly sampling for metals, VOCs, and general inorganics because of the location of this well downgradient of TA-54. Removed sampling for pesticides, PCBs, and dioxins/furans because of history of nondetects (Table B-3).
	2009	Q	Q	S	S	S	Q	S	Q	Q	Q	Q	Q	Assigned to watershed-specific suites and frequencies, extended to include semiannual sampling for SVOCs, pesticides, PCBs, and dioxins/furans to provide baseline characterization data for this area downgradient of TA-54.

Table D-5.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-23i screen 2 (port 3)	2010	Q	Q	S	—	—	S	—	A	S	Q	S	A	Remains assigned to suites and frequencies for general surveillance at intermediate wells in this watershed, augmented by quarterly sampling for metals, VOCs, and general inorganics because of the location of this well downgradient of TA-54. Removed sampling for pesticides, PCBs, and dioxins/furans because of history of nondetects (Table B-3).
	2009	Q	Q	S	S	S	Q	S	Q	Q	Q	Q	Q	Assigned to watershed-specific suites and frequencies, extended to include semiannual sampling for SVOCs, pesticides, PCBs, and dioxins/furans to provide baseline characterization data for this area downgradient of TA-54.
R-23i piezometer (port 1)	2010	Q	Q	S	—	—	S	—	A	S	Q	S	A	Remains assigned to suites and frequencies for general surveillance at intermediate wells in this watershed, augmented by quarterly sampling for metals, VOCs, and general inorganics because of the location of this well downgradient of TA-54. Removed sampling for pesticides, PCBs, and dioxins/furans because of history of nondetects (Table B-3).
	2009	Q	Q	S	S	S	Q	S	Q	Q	Q	Q	Q	Assigned to watershed-specific suites and frequencies, extended to include semiannual sampling for SVOCs, pesticides, PCBs, and dioxins/furans to provide baseline characterization data for this area downgradient of TA-54.
R-37 screen 1	2010	Q	Q	Q	A	A	A	A	A	Q	Q	Q	S	Completed characterization sampling. Assigned to routine suites and frequencies for TA-54 monitoring group.
	2009	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	New well assigned to characterization suites and frequencies applicable to wells that are part of TA-54 monitoring well network.

Table D-5.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-40i	2010	Q	Q	Q	A	A	A	A	A	Q	Q	Q	S	Completed characterization sampling. Assigned to routine suites and frequencies for TA-54 monitoring group.
	2009	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	New well completed in January 2009. Assigned to characterization suites and frequencies applicable to new intermediate and regional wells that are part of TA-54 monitoring well network (Table D-1.0-1).
R-40 screen 1	2010	Q	Q	Q	A	A	A	A	A	Q	Q	Q	S	Completed characterization sampling. Assigned to routine suites and frequencies for TA-54 monitoring group.
	2009	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	New well completed in January 2009. Assigned to characterization suites and frequencies applicable to new intermediate and regional wells that are part of TA-54 monitoring well network.
R-41 screen 1	2010	Q	Q	Q	A	A	A	A	A	Q	Q	Q	S	Completed characterization sampling. Assigned to routine suites and frequencies for TA-54 monitoring group.
	2009	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	New well completed in March 2009. Assigned to characterization suites and frequencies applicable to new intermediate and regional wells that are part of TA-54 monitoring well network.
Regional Wells														
Regional (General Surveillance)	*2010*	*Q*	*Q*	*—*	*—*	*—*	*S*	*—*	*A*	*A*	*Q*	*Q*	*A*	*Rationale for changes to suites and frequencies for general surveillance locations in this subwatershed is provided in Table D-1.0-2.*
	2009	*Q*	*Q*	*—*	*—*	*—*	*S*	*—*	*A*	*A*	*Q*	*Q*	*A*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
Regional (MDA C monitoring group)	*2010*	*S*	*Q*	*A*	*—*	*—*	*T*	*—*	*A*	*S*	*Q*	*A*	*A*	*New monitoring group. Rationale for suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.*

Table D-5.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Regional (TA-16-260 deep GW monitoring group)	*2010*	*S*	*S*	*—*	*—*	*—*	*S[RDX-DP]*	*—*	*A*	*A*	*S*	*S*	*A*	*New monitoring group. Rationale for suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.*
Regional (TA-54 monitoring group)	*2010*	*Q*	*Q*	*Q*	*A*	*A*	*A*	*A*	*A*	*Q*	*Q*	*Q*	*S*	*No change (other than reduction in sampling frequency for stable isotopes) (Table D-1.0-1).*
	2009	*Q*	*Q*	*Q*	*A*	*A*	*A*	*A*	*A*	*Q*	*Q*	*Q*	*Q*	*Suites and frequencies for TA-54 monitoring group in 2009 Interim Plan.*
R-17 screen 1	2010	S	Q	A	—	—	S	—	A	S	Q	A	A	Reassigned to suites and frequencies for new MDA C monitoring group. Background location approved for inclusion in GBIR, R4.
	2009	Q	Q	—	—	—	Q	—	A	A	Q	Q	A	Assigned to watershed-specific suites and frequencies but with quarterly frequency for HEXP suite to support revised CME for TA-16 planned for 2010.
R-17 screen 2	2010	S	Q	A	—	—	S	—	A	S	Q	A	A	Reassigned to suites and frequencies for new MDA C monitoring group. Background location approved for inclusion in GBIR, R4.
	2009	Q	Q	—	—	—	Q	—	A	A	Q	Q	A	Assigned to watershed-specific suites and frequencies but with quarterly frequency for HEXP suite to support revised CME for TA-16 planned for 2010.
R-18	2010	S	S	—	—	—	S[RDX-DP]	—	A	A	S	S	A	Reassigned to suites and frequencies for new TA-16-260 deep GW monitoring group. No change.
	2009	S	S	—	—	—	S	—	A	A	S	S	A	Assigned to watershed-specific suites but with frequencies reduced from quarterly to semiannual because the conceptual model is mature for this portion of the watershed and sufficient data have been collected for these analytical suites to justify monitoring on a semiannual basis.

Table D-5.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-19 screen 3	2009	Q	Q	—	—	—	S	—	A	A	Q	Q	A	No change
	2009	Q	Q	—	—	—	S	—	A	A	Q	Q	A	Assigned to watershed-specific suites and frequencies.
R-19 screen 4	2009	Q	Q	—	—	—	S	—	A	A	Q	Q	A	No change
	2009	Q	Q	—	—	—	S	—	A	A	Q	Q	A	Assigned to watershed-specific suites and frequencies.
R-19 screen 5	2010	—	—	—	—	—	—	—	—	—	A[IND]	—	—	Well screen continues to show residual effects from drilling and remains assigned to indicator suite (Table F-4.0-1).
	2009	—	—	—	—	—	—	—	—	—	—	—	A	Well screen continues to show residual effects from drilling and remains assigned to indicator suite.
R-19 screen 6	2010	—	—	—	—	—	—	—	—	—	A[IND]	—	—	Well screen continues to show residual effects from drilling and remains assigned to indicator suite (Table F-4.0-1).
	2009	—	—	—	—	—	—	—	—	—	—	—	A	Well screen continues to show residual effects from drilling and remains assigned to indicator suite.
R-19 screen 7	2010	—	—	—	—	—	—	—	—	—	A[IND]	—	—	Well screen continues to show residual effects from drilling and remains assigned to indicator suite (Table F-4.0-1).
	2009	—	—	—	—	—	—	—	—	—	—	—	A	Well screen continues to show residual effects from drilling and remains assigned to indicator suite.
R-20 screen 1	2010	Q	Q	Q	A	A	A	A	A	Q	Q	Q	S	No change (other than reduced frequency for stable isotopes).
	2009	Q	Q	Q	A	A	A	A	A	Q	Q	Q	Q	Assigned to analytical suites and frequencies applicable to regional wells that are part of TA-54 monitoring well network. This rehabilitated screen completed several rounds of sampling following installation of a new sampling system in May 2008. Screen still shows minor geochemical effects from drilling and rehabilitation activities but provides reliable and representative data for nearly all constituents of concern at this location.

Table D-5.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-20 screen 2	2010	Q	Q	Q	A	A	A	A	A	Q	Q	Q	S	No change (other than reduced frequency for stable isotopes).
	2009	Q	Q	Q	A	A	A	A	A	Q	Q	Q	Q	Assigned to analytical suites and frequencies applicable to regional wells that are part of TA-54 monitoring well network. This rehabilitated screen completed several rounds of sampling following installation of a new sampling system in May 2008. Screen still shows minor geochemical effects from drilling and rehabilitation activities but provides reliable and representative data for nearly all constituents of concern at this location.
R-21	2010	Q	Q	Q	A	A	A	A	A	Q	Q	Q	S	No change (other than reduced frequency for stable isotopes). Background location approved for inclusion in GBIR, R4.
	2009	Q	Q	Q	A	A	A	A	A	Q	Q	Q	Q	Assigned to analytical suites and frequencies applicable to wells that are part of TA-54 monitoring well network (Table D-1.0-1).
R-22 screens 1 to 5	2010	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Assigned to TA-54 monitoring group. Assignment of analytical suites and frequencies to be determined following completion of rehabilitation and conversion activities in progress at this well.
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Assignment of analytical suites and frequencies to be determined following completion of rehabilitation and conversion activities in progress at this well as of May 2009.
R-23	2010	Q	Q	Q	A	A	A	A	A	Q	Q	Q	A	No change (other than reduced frequency for stable isotopes).
	2009	Q	Q	Q	A	A	A	A	A	Q	Q	Q	Q	Assigned to analytical suites and frequencies applicable to wells that are part of TA-54 monitoring well network in order to provide baseline characterization data for this area downgradient of TA-54.

Table D-5.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-32	2010	Q	Q	Q	A	A	A	A	A	Q	Q	Q	S	No change (other than reduced frequency for stable isotopes).
	2009	Q	Q	Q	A	A	A	A	A	Q	Q	Q	Q	Assigned to analytical suites and frequencies applicable to wells that are part of TA-54 monitoring well network.
R-37 screen 2	2010	Q	Q	Q	A	A	A	A	A	Q	Q	Q	S	Completed characterization sampling. Assigned to routine suites and frequencies for TA-54 monitoring group.
	2009	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	New well assigned to characterization suites and frequencies applicable to wells that are part of TA-54 monitoring well network.
R-38	2010	Q	Q	Q	A	A	A	A	A	Q	Q	Q	S	Completed characterization sampling. Assigned to routine suites and frequencies for TA-54 monitoring group.
	2009	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	New well assigned to characterization suites and frequencies applicable to wells that are part of TA-54 monitoring well network.
R-39	2010	Q	Q	Q	A	A	A	A	A	Q	Q	Q	S	Completed characterization sampling. Assigned to routine suites and frequencies for TA-54 monitoring group.
	2009	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	New well completed in December 2008. Assigned to characterization suites and frequencies applicable to new intermediate and regional wells that are part of TA-54 monitoring well network.
R-40 screen 2	2010	Q	Q	Q	A	A	A	A	A	Q	Q	Q	S	Completed characterization sampling. Assigned to routine suites and frequencies for TA-54 monitoring group.
	2009	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	New well completed in January 2009. Assigned to characterization suites and frequencies applicable to new intermediate and regional wells that are part of TA-54 monitoring well network.

Table D-5.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-41 screen 2	2010	Q	Q	Q	A	A	A	A	A	Q	Q	Q	S	Completed characterization sampling. Assigned to routine suites and frequencies for TA-54 monitoring group.
	2009	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	New well completed in March 2009. Assigned to characterization suites and frequencies applicable to new intermediate and regional wells that are part of TA-54 monitoring well network.
R-49 screen 1	2010	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	S	Newly completed well. Assigned to characterization suites and frequencies for new regional wells in the TA-54 monitoring group (Table D-1.0-3).
R-49 screen 2	2010	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	S	Newly completed well. Assigned to characterization suites and frequencies for new regional wells in the TA-54 monitoring group (Table D-1.0-3). Background location approved for inclusion in GBIR, R4.
R-51 screen 1	2010	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	S	Newly completed well. Assigned to characterization suites and frequencies for new regional wells in the TA-54 monitoring group (Table D-1.0-3).
R-51 screen 2	2010	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	S	Newly completed well. Assigned to characterization suites and frequencies for new regional wells in the TA-54 monitoring group (Table D-1.0-3).
R-52 screen 1	2010	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	S	Newly completed well. Assigned to characterization suites and frequencies for new regional wells in the TA-54 monitoring group (Table D-1.0-3).
R-52 screen 2	2010	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	S	Newly completed well. Assigned to characterization suites and frequencies for new regional wells in the TA-54 monitoring group (Table D-1.0-3).
R-53 screen 1	2010	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	S	Newly completed well. Assigned to characterization suites and frequencies for new regional wells in the TA-54 monitoring group (Table D-1.0-3).

Table D-5.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-53 screen 2	2010	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	S	Newly completed well. Assigned to characterization suites and frequencies for new regional wells in the TA-54 monitoring group (Table D-1.0-3).
R-54 screen 1	2010	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	S	Newly completed well. Assigned to characterization suites and frequencies for new regional wells in the TA-54 monitoring group (Table D-1.0-3).
R-54 screen 2	2010	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	S	Newly completed well. Assigned to characterization suites and frequencies for new regional wells in the TA-54 monitoring group (Table D-1.0-3).
R-55 screen 1	2010	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	S	Placeholder for planned new well. Assigned to characterization suites and frequencies for new regional wells in the TA-54 monitoring group (Table D-1.0-3).
R-55 screen 2	2010	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	S	Placeholder for planned new well. Assigned to characterization suites and frequencies for new regional wells in the TA-54 monitoring group (Table D-1.0-3).
R-56 screen 1	2010	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	S	Placeholder for planned new well. Assigned to characterization suites and frequencies for new regional wells in the TA-54 monitoring group (Table D-1.0-3).
R-56 screen 2	2010	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	S	Placeholder for planned new well. Assigned to characterization suites and frequencies for new regional wells in the TA-54 monitoring group (Table D-1.0-3).
R-57 screen 1	2010	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	S	Placeholder for planned new well. Assigned to characterization suites and frequencies for new regional wells in the TA-54 monitoring group (Table D-1.0-3).

Table D-5.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-57 screen 2	2010	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	S	Placeholder for planned new well. Assigned to characterization suites and frequencies for new regional wells in the TA-54 monitoring group (Table D-1.0-3).
R-59	2010	Q	Q	S	S	S	S	—	Q	Q	Q	Q	S	Placeholder for planned new well. Assigned to characterization suites and frequencies for new regional wells in the MDA C monitoring group (Table D-1.0-3).
R-60	2010	Q	Q	S	S	S	S	—	Q	Q	Q	Q	S	Placeholder for planned new well. Assigned to characterization suites and frequencies for new regional wells in the MDA C monitoring group (Table D-1.0-3).

Notes: Watershed-specific and monitoring group-specific sampling suites and frequencies for individual water types are shown in shaded rows in order to set this information apart from that for the individual sampling locations that follow these rows. Other table notes for this table are defined in the notes for Table D-1.0-1.

Table D-6.0-1
Sampling Frequencies and Analytical Suites Assigned to Locations in Water Canyon/Cañon de Valle

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Base-Flow Stations														
Base flow (General Surveillance)	*2009*	*S*	*S*	*A*	*—[i]*	*—*	*S[RDX-DP]*	*—*	*A*	*—*	*A*	*A*	*—*	*No change (Table D-1.0-2)*
	2009	*S*	*S*	*A*	*—*	*—*	*S*	*—*	*A*	*—*	*A*	*A*	*—*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
Between E252 and Water at Beta	2010	S	S	A	—	—	S[RDX-DP]	—	A	—	A	A	—	No change
	2009	S	S	A	—	—	S	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
Cañon de Valle below MDA P (E256)	2010	S	S	A	—	—	S[RDX-DP]	—	A	—	A	A	—	No change
	2009	S	S	A	—	—	S	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
Water above SR-501 (E252)	2010	S	S	A	—	—	S[RDX-DP]	—	A	—	A	A	—	No change
	2009	S	S	A	—	—	S	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
Water at Beta	2010	S	S	A	—	—	S[RDX-DP]	—	A	—	A	A	—	No change
	2009	S	S	A	—	—	S	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
Springs														
Springs (General Surveillance)	*2010*	*S*	*S*	*A*	*—*	*—*	*S[RDX-DP]*	*—*	*A*	*A*	*A*	*A*	*A*	*No change (Table D-1.0-2)*
	2009	*S*	*S*	*A*	*—*	*—*	*S*	*—*	*A*	*A*	*A*	*A*	*A*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*

Table D-6.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Burning Ground Spring	2010	S	S	A	—	—	$S^{RDX\text{-}DP}$	—	A	A	A	A	A	No change. Note that additional monitoring at this spring is conducted as part of the TA-16-260 Alluvial CMI monitoring group (Table D-6.0-2).
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
CdV-5.0 Spring	2010	S	S	A	—	—	$S^{RDX\text{-}DP}$	—	A	A	A	A	A	No change. Background location approved for inclusion in GBIR, R4.
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Fish Ladder Spring	2010	S	S	A	—	—	$S^{RDX\text{-}DP}$	—	A	A	A	A	A	No change
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Martin Spring	2010	S	S	A	—	—	$S^{RDX\text{-}DP}$	—	A	A	A	A	A	No change. Additional monitoring at this spring is conducted as part of the TA-16-260 Alluvial CMI monitoring group (Table D-6.0-2).
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Peter Spring	2010	S	S	A	—	—	$S^{RDX\text{-}DP}$	—	A	A	A	A	A	No change
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
SWSC Spring	2010	S	S	A	—	—	$S^{RDX\text{-}DP}$	—	A	A	A	A	A	No change. Additional monitoring at this spring is conducted as part of the TA-16-260 Alluvial CMI monitoring group (Table D-6.0-2).
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.

Table D-6.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
WA-6.25 Spring	2010	—	—	—	—	—	—	—	—	—	—	—	—	Removed from Interim Plan. This spring is rarely sampled because it is typically dry when there is no base flow and is underwater when there is base flow.
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Water Canyon Gallery	2010	S	S	A	—	—	S^{RDX-DP}	—	A	A	A	A	A	No change. Background location approved for inclusion in GBIR, R4.
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Alluvial Wells														
Alluvial (General Surveillance)	2010	S	S	A	—	—	S^{RDX-DP}	—	A	A	A	A	—	No change (Table D-1.0-2)
	2009	S	S	A	—	—	S	—	A	A	A	A	—	Watershed-specific suites and frequencies for 2009 Interim Plan.
Alluvial (TA-16-260 Alluvial CMI monitoring group)	2010	Sampling plans for this new monitoring group are summarized in Table D-6.0-2.												New monitoring group established to monitor performance of CMI activities.
CdV-16-02655	2010	S	S	A	—	—	S^{RDX-DP}	—	A	A	A	A	—	No change (other than removal of stable isotopes).
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
CdV-16-02656	2010	S	S	A	—	—	S^{RDX-DP}	—	A	A	A	A	—	No change (other than removal of stable isotopes).
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.

Table D-6.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
CdV-16-02657	2010	S	S	A	—	—	$S^{\text{RDX-DP}}$	—	A	A	A	A	—	No change (other than removal of stable isotopes).
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
CdV-16-02658	2010	S	S	A	—	—	$S^{\text{RDX-DP}}$	—	A	A	A	A	—	No change (other than removal of stable isotopes).
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
CdV-16-02659	2010	S	S	A	—	—	$S^{\text{RDX-DP}}$	—	A	A	A	A	—	No change (other than removal of stable isotopes).
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
FCO-1	2010	—	—	—	—	—	—	—	—	—	—	—	—	Removed from Interim Plan. Well has been historically dry since it was completed in June 1997 (Koch and Schmeer 2010, 108926).
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies. Well has been dry since completion (Koch and Schmeer 2009, 105181). A transducer was installed in January 2008, and the well is retained for sampling should sufficient water be present.
FLC-16-25278	2010	S	S	A	—	—	$S^{\text{RDX-DP}}$	—	A	A	A	A	—	No change (other than removal of stable isotopes).
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
FLC-16-25279	2010	S	S	A	—	—	$S^{\text{RDX-DP}}$	—	A	A	A	A	—	No change (other than removal of stable isotopes).
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.

Table D-6.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
FLC-16-25280	2010	S	S	A	—	—	S[RDX-DP]	—	A	A	A	A	—	No change (other than removal of stable isotopes).
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
MSC-16-06293	2010	S	S	A	—	—	S[RDX-DP]	—	A	A	A	A	—	No change (other than removal of stable isotopes).
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
MSC-16-06294	2010	S	S	A	—	—	S[RDX-DP]	—	A	A	A	A	—	No change (other than removal of stable isotopes).
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Added back to 2009 Interim Plan until spatial variability in alluvial wells in this area can be further evaluated. Assigned to watershed-specific suites and frequencies.
MSC-16-06295	2010	S	S	A	—	—	S[RDX-DP]	—	A	A	A	A	—	No change (other than removal of stable isotopes).
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
WCO-1	2010	—	—	—	—	—	—	—	—	—	—	—	—	Well has been plugged and abandoned. Replaced by WCO-1r.
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Well removed from Interim Plan because it is historically dry (Koch and Schmeer 2009, 105181).
WCO-1r	2010	Q	Q	Q	Q	Q	Q[RDX-DP]	—	Q	Q	Q	Q	S	Assigned to characterization suites and frequencies applicable to new alluvial wells assigned to general surveillance in this watershed.
WCO-2	2010	A	A	A	—	—	A[RDX-DP]	—	A	A	A	A	—	Reduced frequencies to annual for all suites because this well is only sampled in the spring; it is dry the rest of the year.
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.

Table D-6.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
WCO-3	2010	—	—	—	—	—	—	—	—	—	—	—	—	Well has been plugged and abandoned. Replaced by WCO-3r.
	2009	S	S	A	—	—	S	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies. Well has historically been dry, with the single exception of an event in June 1997 (Koch and Schmeer 2009, 105181). A transducer was installed in January 2008, and the well is retained for sampling should sufficient water be present.
WCO-3r	2010	Q	Q	Q	Q	Q	$Q^{\text{RDX-DP}}$	—	Q	Q	Q	Q	S	Assigned to characterization suites and frequencies applicable to new alluvial wells assigned to general surveillance in this watershed (Table D-1.0-3).
Intermediate Wells														
Intermediate (General Surveillance)	2010	S	S	A	—	—	$S^{\text{RDX-DP}}$	—	A	A	S	A	A	No change (Table D-1.0-2)
	2009	S	S	A	—	—	S	—	A	A	S	A	A	Watershed-specific suites and frequencies for 2009 Interim Plan.
Intermediate (TA-16-260 Deep GW monitoring group)	2010	S	S	A	—	—	$S^{\text{RDX-DP}}$	—	A	A	S	A	A	New monitoring group. Rationale for suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.
16-26644	2010	—	—	—	—	—	—	—	—	—	—	—	—	No change. Water-level monitoring only in accordance with frequency shown in Table 1.11-1.
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Water-level monitoring only.
90LP-SE-16-02669	2010	—	—	—	—	—	—	—	—	—	—	—	—	No change. Water-level monitoring only in accordance with frequency shown in Table 1.11-1.
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Water-level monitoring only.

Table D-6.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
CdV-16-1(i)	2010	S	S	A	—	—	S^{RDX-DP}	—	A	A	S	A	A	Reassigned to suites and frequencies for new TA-16-260 deep GW monitoring group. No changes.
	2009	S	S	A	—	—	S	—	A	A	S	A	A	Assigned to watershed-specific suites and frequencies.
CdV-16-2(i)r	2010	S	S	A	—	—	S^{RDX-DP}	—	A	A	S	A	A	Reassigned to suites and frequencies for new TA-16-260 deep GW monitoring group. No changes.
	2009	S	S	A	—	—	S	—	A	A	S	A	A	Assigned to watershed-specific suites and frequencies.
CdV-37-1(i)	2010	Q	Q	S	S	S	Q^{RDX-DP}	S	Q	Q	Q	Q	S	Newly completed well. Reassigned to characterization suites and frequencies applicable to new intermediate wells assigned to TA-16-260 deep GW monitoring group. No changes (other than frequency for stable isotopes).
	2009	Q	Q	S	S	S	Q	S	Q	Q	Q	Q	Q	Placeholder for planned new well.
CdV-R-15-3 screens 1, 2, and 3	2010	—	—	—	—	—	—	—	—	—	—	—	—	No change. Water-level monitoring only in accordance with frequency shown in Table 1.11-1.
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Well screens removed from Interim Plan because they are historically dry (Koch and Schmeer 2009, 105181).
CdV-R-37-2 screen 1	2010	—	—	—	—	—	—	—	—	—	—	—	—	No change. Water-level monitoring only in accordance with frequency shown in Table 1.11-1.
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Well screen removed from Interim Plan because it is historically dry (Koch and Schmeer 2009, 105181).
MSC-16-02665	2010	—	—	—	—	—	—	—	—	—	—	—	—	No change. Water-level monitoring only in accordance with frequency shown in Table 1.11-1.
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Water-level monitoring only.

Table D-6.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-25 screen 1	2010	S	S	A	—	—	S[RDX-DP]	—	A	A	SIND	S	A	Reassigned to TA-16-260 deep GW monitoring group indicator suite augmented with group-specific analytical suites. Impacted by casing corrosion and residual drilling products (Table F-4.0-1). VOC and HEXP suites are included as analytes of potential concern known to be present at this location, recognizing that analytical results for a few constituents could be biased low by the presence of iron-corrosion products. Perchlorate included because of its usefulness for evaluating redox conditions at this screen. This screen is added back to the Interim Plan to acquire additional water-quality data in support of CME activities for TA-16 260 Outfall. Although nearby well R-25b was installed in November 2008 as a replacement for this screen, contaminant concentrations are significantly different in the two screens, reflecting the heterogeneity of the perched-intermediate system in this area.
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Removed from Interim Plan because of casing corrosion. Replaced by R-25b.

Table D-6.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-25 screen 2	2010	—	S	A	—	—	$S^{\text{RDX-DP}}$	—	A	A	S	S	A	Reassigned to TA-16-260 deep GW monitoring group indicator suite, augmented with group-specific analytical suites. VOC and HEXP suites are included as analytes of potential concern known to be present at this location, recognizing that analytical results for a few constituents could be biased low by the presence of iron corrosion products (Table F-4.0-1). Perchlorate included because of its usefulness for evaluating redox conditions at this screen.
	2009	—	S	—	—	—	S	—	A	A	—	S	A	Assigned to watershed-specific indicator suite (Table F-4.0-1). VOC and HEXP suites are included as chemicals of potential concern known to be present at this location, recognizing that analytical results for a few constituents could be biased low by the presence of iron corrosion products. Perchlorate included because of its usefulness for evaluating redox conditions at this screen.
R-25 screen 4	2010	S	S	A	—	—	$S^{\text{RDX-DP}}$	—	A	A	S	S	A	Reassigned to suites and frequencies for new TA-16-260 deep GW monitoring group. No changes.
	2009	S	S	A	—	—	S	—	A	A	S	S	A	Assigned to watershed-specific suites and frequencies.
R-25b	2010	S	S	A	—	—	$S^{\text{RDX-DP}}$	—	A	A	S	S	A	Characterization sampling completed. Reassigned to TA-16-260 deep GW monitoring group. Intended to replace R-25 screen 1.
	2009	Q	Q	S	S	S	Q	S	Q	Q	Q	Q	Q	New well completed in November 2008. Assigned to characterization suites and frequencies. Replaces R-25 screen 1.

Table D-6.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-25c	2010	S	S	A	—	—	S[RDX-DP]	—	A	A	S	S	A	Characterization sampling completed. Reassigned to TA-16-260 deep GW monitoring group. Intended to replace R-25 screen 3. Water present only in sump. Monitoring for water levels will continue and screen will be sampled if water is present.
	2009	Q	Q	S	S	S	Q	S	Q	Q	Q	Q	Q	New well completed in September 2008. Assigned to characterization suites and frequencies. Intended to replace R-25 screen 3.
R-26 screen 1	2010	S	S	A	—	—	S[RDX-DP]	—	A	A	S	A	A	Reassigned to suites and frequencies for new TA-16-260 deep GW monitoring group. No changes.
	2009	S	S	—	—	—	S	—	A	A	S	S	A	Assigned to watershed-specific suites and frequencies, but removed SVOC suite because of history of nondetects in regional groundwater in this watershed.
R-26 PZ-1	2010	—	—	—	—	—	—	—	—	—	—	—	—	Historically dry since its installation in October 2003 (Koch and Schmeer 2010, 108926). Monitor water levels only in accordance with frequency shown in Table1.11-1.
	2009	Q	Q	S	S	S	Q	S	Q	Q	Q	Q	Q	Existing location newly added to Interim Plan at the request of the NMED (2008, 103642). Assigned to watershed-specific characterization suites and frequencies to acquire additional data for characterizing spatial variability in contaminant and other geochemical trends in this hydrologic zone.

Table D-6.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-26 PZ-2	2010	S	S	A	—	—	S[RDX-DP]	—	A	A	S	A	A	Reassigned to suites and frequencies for new TA-16-260 deep GW monitoring group. No changes.
	2009	Q	Q	S	S	S	Q	S	Q	Q	Q	Q	Q	Existing location newly added to Interim Plan at the request of the NMED (2008, 103642). Assigned to watershed-specific characterization suites and frequencies to acquire additional data for characterizing spatial variability in contaminant and other geochemical trends in this hydrologic zone.
R-27i	2010	Q	Q	Q	S	S	Q[RDX-DP]	S	Q	Q	Q	Q	S	Newly completed well. Reassigned to characterization suites and frequencies applicable to new intermediate wells assigned to MDA AB monitoring group.
	2009	Q	Q	Q	S	S	Q	S	Q	Q	Q	Q	Q	Placeholder for planned new well.
R-47i	2010	Q	Q	S	S	S	Q[RDX-DP]	S	Q	Q	Q	Q	S	Newly completed well. Reassigned to characterization suites and frequencies applicable to new intermediate wells assigned to TA-16-260 deep GW monitoring group.
	2009	Q	Q	S	S	S	Q	S	Q	Q	Q	Q	Q	Placeholder for planned new well (listed as R-47).
Regional Wells														
Regional (General Surveillance)	2010	S	S	A	—	—	*S[RDX-DP]*	—	A	A	S	S	(A)	No change (Table D-1.0-2).
	2009	S	S	A	—	—	S	—	A	A	S	S	A	Watershed-specific suites and frequencies for 2009 Interim Plan.
Regional (MDA AB monitoring group)	2010	S	S	A	—	—	*S[RDX-DP]*	—	A	A	S	S	(A)	New monitoring group. Rationale for suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.

Table D-6.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Regional (TA-16-260 Deep GW monitoring group)	2010	S	S	A	—	—	S^{RDX-DP}	—	A	A	S	A	A	New monitoring group. Rationale for suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.
CdV-R-15-3 screen 4	2010	S	S	A	—	—	S^{RDX-DP}	—	A	A	S	S	A	Reassigned to suites and frequencies for new TA-16-260 deep GW monitoring group. No change.
	2009	S	S	A	—	—	S	—	A	A	S	S	A	Assigned to watershed-specific suites and frequencies.
CdV-R-15-3 screen 5	2010	—	—	—	—	—	A^{RDX-DP}	—	—	—	AIND	—	—	Part of TA-16-260 deep GW monitoring group. Assigned to indicator suite because of residual effects of drilling.
	2009	—	—	—	—	—	—	—	—	A	—	—	A	Assigned to indicator suite because of residual effects of drilling.
CdV-R-15-3 screen 6	2010	—	A	—	—	—	A^{RDX-DP}	—	—	—	AIND	—	—	Part of TA-16-260 deep GW monitoring group. Assigned to indicator suite because of residual effects of drilling.
	2009	—	S	—	—	—	S	—	—	A	—	—	A	Assigned to indicator suite because of residual effects of drilling.
CdV-R-37-2 screen 2	2010	—	—	—	—	—	A^{RDX-DP}	—	—	—	AIND	—	—	Part of TA-16-260 deep GW monitoring group. Assigned to indicator suite because of residual effects of drilling.
	2009	—	—	—	—	—	S	—	—	A	—	—	A	Assigned to indicator suite because of residual effects of drilling.

Table D-6.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
CdV-R-37-2 screen 3	2010	S	S	A	—	—	S^{RDX-DP}	—	A	A	S	S	A	Reassigned to suites and frequencies for new TA-16-260 deep GW monitoring group. No changes.
	2009	S	S	A	—	—	S	—	A	A	S	S	A	Assigned to watershed-specific suites and frequencies but removed SVOC suite because of history of nondetects.
CdV-R-37-2 screen 4	2010	S	S	A	—	—	S^{RDX-DP}	—	A	A	S	S	A	Assigned to suites and frequencies for new TA-16-260 deep GW monitoring group. Reduced sampling frequency to annual for SVOC suite, consistent with that for other intermediate wells assigned to this monitoring group.
	2009	S	S	S	—	—	S	—	A	A	S	S	A	Removed from indicator suite and assigned to watershed-specific suites and frequencies, but with increased frequency for SVOC suite in order to acquire additional baseline SVOC data for this location.
R-25 screen 5	2010	S	S	A	—	—	S^{RDX-DP}	—	A	A	S	S	A	Reassigned to suites and frequencies for new TA-16-260 deep GW monitoring group.
	2009	S	S	—	—	—	S	—	A	A	S	S	A	Assigned to watershed-specific suites and frequencies but removed SVOC suite because of history of nondetects.
R-25 screen 6	2010	S	S	A	—	—	S^{RDX-DP}	—	A	A	S	S	A	Reassigned to suites and frequencies for new TA-16-260 deep GW monitoring group.
	2009	S	S	—	—	—	S	—	A	A	S	S	A	Assigned to watershed-specific suites and frequencies but removed SVOC suite because of history of nondetects.

Table D-6.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-25 screen 7	2010	S	S	A	—	—	S[RDX-DP]	—	A	A	S	S	A	Reassigned to suites and frequencies for new TA-16-260 deep GW monitoring group.
	2009	S	S	—	—	—	S	—	A	A	S	S	A	Assigned to watershed-specific suites and frequencies but removed SVOC suite because of history of nondetects.
R-25 screen 8	2010	S	S	A	—	—	S[RDX-DP]	—	A	A	S	S	A	Reassigned to suites and frequencies for new TA-16-260 deep GW monitoring group.
	2009	S	S	—	—	—	S	—	A	A	S	S	A	Assigned to watershed-specific suites and frequencies but removed SVOC suite because of history of nondetects.
R-26 screen 2	2010	—	—	—	—	—	—	—	—	—	—	—	—	No change. Water-level monitoring only in accordance with frequency shown in Table 1.11-1.
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Water-level monitoring only.
R-27	2010	S	S	A	—	—	S[RDX-DP]	—	A	A	S	S	A	Reassigned to suites and frequencies for new MDA AB monitoring group. No change. Background location approved for inclusion in GBIR, R4.
	2009	S	S	A	—	—	S	—	A	A	S	S	A	Assigned to watershed-specific suites and frequencies.
R-47	2010	Q	Q	S	S	S	Q[RDX-DP]	S	Q	Q	Q	Q	S	Newly completed well. Assigned to characterization suites and frequencies applicable to new regional wells assigned to TA-16-260 deep GW monitoring group.
	2009	Q	Q	Q	S	S	Q	S	Q	Q	Q	Q	Q	Placeholder for planned new well.

Table D-6.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-48	2010	Q	Q	S	S	S	Q[RDX-DP]	S	Q	Q	Q	Q	S	Newly completed well. Assigned to characterization suites and frequencies applicable to new regional wells assigned to TA-16-260 deep GW monitoring group.
	2009	Q	Q	S	S	S	Q	S	Q	Q	Q	Q	Q	Placeholder for planned new well. Open borehole CdV-16-3(i) to be deepened to access the regional aquifer.

Notes: Watershed-specific and monitoring group-specific sampling suites and frequencies for individual water types are shown in shaded rows in order to set this information apart from that for the individual sampling locations that follow these rows. Other table notes for this table are defined in the notes for Table D-1.0-1.

Table D-6.0-2
Sampling Frequencies and Analytical Suites Assigned to Locations in TA-16-260 Alluvial CMI Monitoring Group

Location	Interim Plan	Water Levels	Metals[a]	HEXP + RDX-DP[b]	General Inorganics[c]	Stable C and N Isotopes[d]	Field Parameters[e]	Rationale for Changes Relative to Previous Interim Plan
Springs (Carbon-filter systems)	*2010*	*W/M/Q*[f]	—[g]	*W/M/Q*	*W/M/Q*	—	*W/M/Q*	*New monitoring group established to monitor performance of surge bed injection grouting. Documentation regarding the suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.*
Burning Ground Spring	2010	*C*[h] *W/M/Q*	—	*W/M/Q*	*W/M/Q*	—	*W/M/Q*	Spring outlet/influent for carbon-filter treatment system.
	2010	*W/M/Q*	—	*W/M/Q*	*W/M/Q*	—	*W/M/Q*	Effluent from carbon-filter treatment system.
Martin Spring	2010	*C* *W/M/Q*	—	*W/M/Q*	*W/M/Q*	—	*W/M/Q*	Spring outlet/influent for carbon-filter treatment system.
	2010	*W/M/Q*	—	*W/M/Q*	*W/M/Q*	—	*W/M/Q*	Effluent from carbon-filter treatment system.
SWSC Spring	2010	*C* *W/M/Q*	—	*W/M/Q*	*W/M/Q*	—	*W/M/Q*	Spring outlet/influent for carbon-filter treatment system.
	2010	*W/M/Q*	—	*W/M/Q*	*W/M/Q*	—	*W/M/Q*	Effluent from carbon-filter treatment system.
Alluvial Subgroup A	*2010*	*Q*	—	*Q*	—	—	—	*New monitoring group established to monitor performance of surge bed injection grouting. Documentation regarding the suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.*
Surge bed monitoring well	2010	Q	—	*Q*	—	—	—	Water-level monitoring only (Table 1.11-1); no water is anticipated to be present. A sample will be collected if water is present (LANL 2010, 109252, section 3.2 and Table 3.1-1).
Alluvial Subgroup B	*2010*	*M/Q*	*M/Q*	M/Q	*M/Q*	*M/Q*	*M/Q*	*New monitoring group established to monitor performance of pilot PRB vessel. Documentation regarding the suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.*
16-612215 (MP-1)	2010	—	M/Q	M/Q	M/Q	M/Q	M/Q	Pretreatment sample port for pilot PRB vessel. Monitors pretreatment water chemistry.
16-612216 (MP-2)	2010	M/Q	—	—	—	—	—	Pretreatment discharge valve for pilot PRB vessel. Measurement point for influent flow rate.
16-612217 (MP-3)	2010	—	M/Q	M/Q	M/Q	M/Q	M/Q	Zero-valent iron (ZVI) sample port for pilot PRB vessel.

Table D-6.0-2 (continued)

Location	Interim Plan	Water Levels	Metals[a]	HEXP + RDX-DP[b]	General Inorganics[c]	Stable C and N Isotopes[d]	Field Parameters[e]	Rationale for Changes Relative to Previous Interim Plan
16-612218 (MP-4)	2010	—	M/Q	M/Q	M/Q	M/Q	M/Q	Gravel sample port for pilot PRB vessel.
16-612219 (MP-5)	2010	—	M/Q	M/Q	M/Q	M/Q	M/Q	Zeolite sample port for pilot PRB vessel.
16-612220 (MP-6)	2010	M/Q	—	—	—	—	—	Posttreatment discharge valve for pilot PRB vessel. Measurement point for effluent flow rate.
16-612221 (MP-7)	2010	—	M/Q	M/Q	M/Q	M/Q	M/Q	Posttreatment sample port for pilot PRB vessel. Monitors posttreatment water chemistry.
Alluvial Subgroup C	2010	W/M/Q	M/Q	M/Q	M/Q	—	M/Q	New monitoring group established to monitor performance of alluvial groundwater upgradient and downgradient of pilot PRB vessel. Documentation regarding the suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.
Alluvial Subgroup D	2010	W/M/Q	—	—	—	—	—	New monitoring group established to monitor performance of PRB cutoff wall. Water level monitoring only (Table 1.11-1). Frequencies specific to this monitoring group are provided in Table D-1.0-1. Monitor water levels weekly during the first quarter, biweekly during the second quarter, and once each during third and fourth quarters (Table 1.11-1) (LANL 2010, 109252, section 5.2 and Table 5.1-6).
CDV-16-611919 (MW-2)	2010	W/M/Q	—	—	—	—	—	Assigned to Alluvial Subgroup D (water levels).
CDV-16-611920 (MW-4)	2010	W/M/Q	—	—	—	—	—	Assigned to Alluvial Subgroup D (water levels).
CDV-16-611921 (MW-5)	2010	W/M/Q	M/Q	Q	M/Q	—	M/Q	Assigned to Alluvial Subgroups C (sampling) and D (water levels). Will be instrumented with a transducer for continuous monitoring.
CDV-16-611922 (MW-3)	2010	W/M/Q	—	—	—	—	—	Assigned to Alluvial Subgroup D (water levels).
CDV-16-611923 (MW-12)	2010	W/M/Q	M/Q	Q[RDX-DP]	M/Q	—	M/Q	Assigned to Alluvial Subgroups C (sampling) and D (water levels). Will be instrumented with a transducer for continuous monitoring.
CDV-16-611924 (PZ-13)	2010	W/M/Q	—	—	—	—	—	Assigned to Alluvial Subgroup D (water levels).
CDV-16-611925 (PZ-14)	2010	W/M/Q	—	—	—	—	—	Assigned to Alluvial Subgroup D (water levels).
CDV-16-611926 (PZ-15)	2010	W/M/Q	—	—	—	—	—	Assigned to Alluvial Subgroup D (water levels).

Table D-6.0-2 (continued)

Location	Interim Plan	Water Levels	Metals[a]	HEXP + RDX-DP[b]	General Inorganics[c]	Stable C and N Isotopes[d]	Field Parameters[e]	Rationale for Changes Relative to Previous Interim Plan
CDV-16-611927 (PZ-16)	2010	W/M/Q	—	—	—	—	—	Assigned to Alluvial Subgroup D (water levels).
CDV-16-611928 (MW-6)	2010	W/M/Q	—	—	—	—	—	Assigned to Alluvial Subgroup D (water levels).
CDV-16-611929 (MW-7)	2010	W/M/Q	—	—	—	—	—	Assigned to Alluvial Subgroup D (water levels). Will be instrumented with a transducer for continuous monitoring.
CDV-16-611930 (MW-8)	2010	W/M/Q	—	—	—	—	—	Assigned to Alluvial Subgroup D (water levels). Will be instrumented with a transducer for continuous monitoring.
CDV-16-611931 (MW-9)	2010	W/M/Q	—	—	—	—	—	Assigned to Alluvial Subgroup D (water levels). Will be instrumented with a transducer for continuous monitoring.
CDV-16-611932 (MW-10)	2010	W/M/Q	—	—	—	—	—	Assigned to Alluvial Subgroup D (water levels).
CDV-16-611933 (MW-17)	2010	W/M/Q	—	—	—	—	—	Assigned to Alluvial Subgroup D (water levels).
CDV-16-611934 (MW-18)	2010	W/M/Q	M/Q	Q^{RDX-DP}	M/Q	—		Assigned to Alluvial Subgroups C (sampling) and D (water levels).
CDV-16-611935 (MW-11)	2010	W/M/Q	—	—	—	—	—	Assigned to Alluvial Subgroup D (water levels).
CDV-16-611936 (MW-19)	2010	W/M/Q	M/Q	Q^{RDX-DP}	M/Q	—	M/Q	Assigned to Alluvial Subgroup C (sampling).
CDV-16-611937 (MW-20)	2010	W/M/Q	M/Q	Q^{RDX-DP}	M/Q	—	M/Q	Assigned to Alluvial Subgroup C (sampling).
CDV-16-611938 (MW-1)	2010	W/M/Q	M/Q	Q^{RDX-DP}	M/Q	—	M/Q	Assigned to Alluvial Subgroup C (sampling). Will be instrumented with a transducer for continuous monitoring.

Table D-6.0-2 (continued)

Notes: Identifier shown in parentheses is the field ID assigned to this port in the CMI monitoring plan (LANL 2010, 109252). Notes: Sampling suites and frequencies: W = weekly (applies only to first month of sampling unless specified otherwise); B = biweekly; M = monthly (applies only to first quarter of sampling unless specified otherwise); C = continuous; Q = quarterly (4 times/yr).

Nonfiltered and filtered samples will be collected for general inorganics (excluding anions) and metals. Anion samples will be filtered. HEXP samples are nonfiltered. Stable isotope samples for carbon and nitrogen isotopes are filtered.

[a] Metals analysis includes the 23 target analyte list (TAL) metals, plus boron, molybdenum, silicon dioxide, strontium, tin, and uranium.

[b] HEXP = High explosive (compounds). RDX-DP = RDX-degradation products. The HEXP analytical suite includes the Consent Order list of the normal SW-846:8330 analytes plus pentaerythritol tetranitrate (PETN); triaminotrinitrobenzene (TATB); 3,5-dinitroaniline; tri(o-cresyl)phosphate (TOCP); 2,4-diamino-6-nitrotoluene; and 2,6-diamino-4-nitrotoluene. The RDX-degradation products include hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine (MNX); hexahydro-1,3-nitro-1,3,5-triazine (DNX); and hexahydro-1,3,5-trinitroso-1,3,5-triazine (TNX).

[c] General inorganic analysis includes major anions (bromide, chloride, fluoride, sulfate); major cations (calcium, magnesium, sodium, potassium); nitrate plus nitrite (as N); total Kjeldahl nitrogen (TKN); ammonia; total phosphorus; total organic carbon (TOC); total dissolved solids (TDS); alkalinity; specific conductivity; pH; and hardness.

[d] Analysis for stable carbon and nitrogen isotopes.

[e] Field parameters include pH, turbidity (TRB), specific conductance (SC), dissolved oxygen (DO), oxidation-reduction potential (ORP), and temperature (T) at all locations and will be measured using a flow-through cell. Alkalinity (ALK) will be measured for all samples either in the field or at the on-site EES-14 laboratory.

[f] Monitor water levels weekly during the first quarter, biweekly during the second quarter, and once each during third and fourth quarters.

[g] — = This analytical suite is not requested for this location as part of the CMI performance monitoring.

[h] The Laboratory continuously measures spring flow rates at SWSC, Burning Ground, and Martin Springs with ultrasonic flow detectors. These data are available once they are downloaded and quality assured. Manual measurements will be made at each spring outlet and filter unit outlet each time a sample is collected. Flow rates will be measured using a graduated measuring device and stopwatch in accordance with SOP 5224, Spring and Surface Water Sampling.

Table D-7.0-1
Sampling Frequencies and Analytical Suites Assigned to Locations in Ancho, Frijoles, and Chaquihui Canyons

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Base-Flow Stations (Ancho)														
Ancho at Rio Grande	—	—	—	—	—	—	—	—	—	—	—	—	—	Documentation provided in table D-8.0-1 (White Rock Canyon). Although located in Ancho Canyon, this station is treated as being in White Rock Canyon for logistical sampling purposes.
Frijoles at Rio Grande	—	—	—	—	—	—	—	—	—	—	—	—	—	Documentation provided in table D-8.0-1 (White Rock Canyon). Although located in Ancho Canyon, this station is treated as being in White Rock Canyon for logistical sampling purposes.
Regional Wells (Ancho)														
Regional (General Surveillance)	*2010*	*A*	*A*	—	—	—	*A*	—	*A*	*A*	*A*	*A*	*(A)*	*Rationale for changes to suites and frequencies for general surveillance locations in this subwatershed is provided in Table D-1.0-2.*
	2009	*S*	*A*	—	—	—	*S*	—	*A*	*S*	*S*	*S*	*A*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
Regional (MDA AB monitoring group)	*2010*	*S*	*A*	—	—	—	*S*	—	*A*	*A*	*S*	*S*	*(A)*	*New monitoring group. Rationale for suites and frequencies assigned to this monitoring group is provided in Table D-1.0-1.*
R-29	2010	Q	Q	Q	S	S	Q	S	Q	Q	Q	Q	S	Newly completed well. Assigned to characterization suites and frequencies applicable to new regional wells assigned to MDA AB monitoring group.
R-30	2010	Q	Q	Q	S	S	Q	S	Q	Q	Q	Q	S	Newly completed well. Assigned to characterization suites and frequencies applicable to new regional wells assigned to MDA AB monitoring group.
	2009	Q	Q	Q	S	S	Q	S	Q	Q	Q	Q	Q	Placeholder for planned new well scheduled for CY2010. Assigned to watershed-specific characterization suite for new regional wells.
Test Well DT-5A	2010	S	A	—	—	—	S	—	A	A	S	S	A	Reassigned to suites and frequencies for new MDA AB monitoring group.
	2009	S	A	—	—	—	S	—	A	S	S	S	A	Assigned to watershed-specific suites and frequencies.

Table D-7.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Test Well DT-9	2010	S	A	—	—	—	S	—	A	A	S	S	A	Reassigned to suites and frequencies for new MDA AB monitoring group.
	2009	S	A	—	—	—	S	—	A	S	S	S	A	Assigned to watershed-specific suites and frequencies.
Test Well DT-10	2010	S	A	—	—	—	S	—	A	A	S	S	A	Reassigned to suites and frequencies for new MDA AB monitoring group.
	2009	S	A	—	—	—	S	—	A	S	S	S	A	Assigned to watershed-specific suites and frequencies.
R-31 screen 1	2010	—	—	—	—	—	—	—	—	—	—	—	—	Historically dry (Koch and Schmeer 2010, 108926). Monitor water levels only in accordance with frequency shown in Table1.11-1.
	2009	—	—	—	—	—	—	—	—	—	—	—	—	Well screen removed from Interim Plan because it is historically dry (Koch and Schmeer 2009, 105181).
R-31 screen 2	2010	—	—	—	—	—	A	—	—	A	A[IND]	—	A	Assigned to indicator suite because of residual effects of drilling. Retained sampling for HEXP and tritium as watershed-specific analytes.
	2009	—	—	—	—	—	A	—	—	S	—	—	A	Assigned to watershed-specific indicator suite (includes annual sampling for HEXP, semiannual sampling for tritium) because of residual effects of drilling.
R-31 screen 3	2010	—	—	—	—	—	A	—	—	A	A[IND]	—	A	Assigned to indicator suite because of residual effects of drilling. Retained sampling for HEXP and tritium as watershed-specific analytes.
	2009	—	—	—	—	—	A	—	—	S	—	—	A	Assigned to watershed-specific indicator suite (includes annual sampling for HEXP, semiannual sampling for tritium) because of residual effects of drilling.
R-31 screen 4	2010	A	A	—	—	—	A	—	A	A	A	A	A	Changes reflects updated suites and frequenices for general surveillance at regional wells in this part of the watershed.
	2009	S	A	—	—	—	S	—	A	S	S	S	A	Assigned to watershed-specific suites and frequencies.

Table D-7.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
R-31 screen 5	2010	A	A	—	—	—	A	—	A	A	A	A	A	Changes reflects updated suites and frequenices for general surveillance at regional wells in this part of the watershed.
	2009	S	A	—	—	—	S	—	A	S	S	S	A	Assigned to watershed-specific suites and frequencies.
Base-Flow Stations (Frijoles)														
Base flow (General Surveillance)	*2010*	*A*	—	—	—	—	—	—	*A*	—	*A*	*A*	—	*Rationale for changes to suites and frequencies for general surveillance locations in this subwatershed is provided in Table D-1.0-2.*
	2009	*A*	*A*	—	—	—	—	—	*A*	*A*	*A*	*A*	—	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
Rio de los Frijoles (E350)	2010	A	—	—	—	—	—	—	A	—	A	A	—	Changes reflects updated suites and frequenices for general surveillance at base-flow locations in this watershed.
	2009	A	A	—	—	—	—	—	A	A	A	A	—	Assigned to watershed-specific suites and frequencies.
General Surveillance Monitoring (Off-site Background Location)														
Barbara Spring	2010	A	—	—	—	—	—	—	A	A	A	A	(A)	Background location approved for inclusion in the GBIR, R4. Assigned analytical suites for naturally occurring constituents.

Notes: Watershed-specific and monitoring group-specific sampling suites and frequencies for individual water types are shown in shaded rows in order to set this information apart from that for the individual sampling locations that follow these rows. Other table notes for this table are defined in the notes for Table D-1.0-1.

Table D-8.0-1
Sampling Frequencies and Analytical Suites Assigned to Locations in White Rock Canyon

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Base-Flow Stations														
Base flow (General Surveillance)	*2010*	*A*	*A*	*—[i]*	*—*	*—*	*—*	*—*	*A*	*—*	*A*	*A*	*—*	*Rationale for changes to suites and frequencies for general surveillance locations in this subwatershed is provided in Table D-1.0-2.*
	2009	*A*	*A*	*A*	*—*	*—*	*—*	*—*	*A*	*—*	*A*	*A*	*—*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
Ancho at Rio Grande	2010	A	A	—	—	—	—	—	A	—	A	A	—	Changes reflect updated suites and frequencies for general surveillance at base-flow stations in this watershed.
	2008	A	A	A	—	—	A	—	A	—	A	A	—	Listed in table for Frijoles, Ancho and Chaquehui Canyon.
Buckman Diversion SW	2010	—	—	—	—	—	—	—	—	—	—	—	—	Removed from Interim Plan. No requirement for further sampling.
	2009	S	B	B	—	B[CNGR]	—	—	B	B	B	B	—	Added new location to Interim Plan. Assigned metal suite at semiannual frequency, and other suites at bimonthly frequencies, based on agreement with City of Santa Fe and consistent with requirements of the 2009 MOU with Pueblo of San Ildefonso.
Frijoles at Rio Grande	2010	A	A	—	—	—	—	—	A	—	A	A	—	Changes reflect updated suites and frequencies for general surveillance at base-flow stations in this watershed.
	2008	A	A	A	—	—	—	—	A	A	A	A	A	Listed in table for Frijoles, Ancho and Chaquehui Canyons.

Table D-8.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Mortandad at Rio Grande	2010	A	A	A	—	A	A	—	A	A	A	A	—	No change. Retained annual sampling for PCB and HEXP suites as required by 2010 MOU with Pueblo of San Ildefonso.
	2009	A	A	A	—	A	A	—	A	A	A	A	—	Added new location to Interim Plan. Assigned to watershed-specific suites and frequencies. Added annual sampling for HEXP and PCB suites for consistency with requirements of the 2009 MOU with Pueblo of San Ildefonso.
Pajarito at Rio Grande	2010	A	A	—	—	—	—	—	A	—	A	A	—	No change
	2009	A	A	—	—	—	—	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
Rio Grande at Frijoles	2010	A	A	—	—	—	—	—	A	—	A	A	—	No change
	2009	A	A	—	—	—	—	—	A	—	A	A	—	Assigned to watershed-specific suites and frequencies.
Rio Grande at Otowi	2010	A	A	A	—	A	A	—	A	A	A	A	—	Assigned to suites and frequencies for general surveillance at base-flow stations in this watershed. Added annual sampling for HEXP and PCB suites as required by 2010 MOU with Pueblo of San Ildefonso.
	2009	B	B	B	—	B[CNGR]	—	—	B	B	B	B	—	Added new location to Interim Plan. Assigned suites at bimonthly frequencies based on agreement with City of Santa Fe and consistent with requirements of the 2009 MOU with Pueblo of San Ildefonso.

Table D-8.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Spring Subgroup A: Springs Upgradient of TA-54 Area G														
Spring Subgroup A (General Surveillance)	*2010*	*A*	*A*	*T*	—	—	*T*	—	*A*	*A*	*A*	*A*	*(A)*	*Rationale for changes to suites and frequencies for general surveillance locations in this subwatershed is provided in Table D-1.0-2.*
	2009	*A*	*A*	*A*	—	*T*	*T*	—	*A*	*A*	*A*	*A*	—	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
La Mesita Spring	2010	A	A	T	—	T	T	—	A	A	A	A	A	Reduction in frequency from annual to triennial for SVOC suite reflects updated frequency for general surveillance spring locations in this part of the watershed. Retained triennial sampling for PCBs as required by 2010 MOU with Pueblo of San Ildefonso.
	2009	A	A	A	—	T	T	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Sacred Spring	2010	A	A	T	—	T	T	—	A	A	A	A	A	Reduction in frequency from annual to triennial for SVOC suite reflects updated frequency for general surveillance spring locations in this part of the watershed. Retained triennial sampling for PCBs as required by 2010 MOU with Pueblo of San Ildefonso. Background location approved for inclusion in GBIR, R4.
	2009	A	A	A	—	T	T	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Sandia Spring	2010	A	A	T	—	T	T	—	A	A	A	A	A	Reduction in frequency from annual to triennial for SVOC suite reflects updated frequency for general surveillance spring locations in this part of the watershed. Retained triennial sampling for PCBs as required by 2010 MOU with Pueblo of San Ildefonso. Background location approved for inclusion in GBIR, R4.
	2009	S	S	S	—	T	T	—	S	S	S	S	A	Assigned to watershed-specific suites but sampled semiannually because of its proximity to the Buckman well field.

Table D-8.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Spring 1	2010	A	A	T	—	T	T	—	A	A	A	A	A	Reduction in frequency from annual to triennial for SVOC suite reflects updated frequency for general surveillance spring locations in this part of the watershed. Retained triennial sampling for PCBs as required by 2010 MOU with Pueblo of San Ildefonso. Background location approved for inclusion in GBIR, R4.
	2009	A	A	A	—	T	T	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Spring 2	2010	A	A	T	—	T	T	—	A	A	A	A	A	Reduction in frequency from annual to triennial for SVOC suite reflects updated frequency for general surveillance spring locations in this part of the watershed. Retained triennial sampling for PCBs as required by 2010 MOU with Pueblo of San Ildefonso.
	2009	A	A	A	—	T	T	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Spring Subgroup B: Springs Downgradient of TA-54 Area G														
Spring Subgroup B (General Surveillance)	*2010*	*A*	*A*	*A*	—	—	—	—	*A*	*A*	*A*	*A*	*(A)*	*Rationale for changes to suites and frequencies for general surveillance locations in this subwatershed is provided in Table D-1.0-2.*
	2009	*A*	*A*	*A*	—	—	—	—	*A*	*A*	*A*	*A*	*A*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
Spring 2B	2010	—	—	—	—	—	—	—	—	—	—	—	—	Removed from Interim Plan because flow from this spring is often mixed with river water.
	2009	A	A	A	—	—	—	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Spring 3	2010	A	A	A	—	—	—	—	A	A	A	A	A	No change
	2009	A	A	A	—	—	—	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.

Table D-8.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Spring 3A	2010	A	A	A	—	—	—	—	A	A	A	A	A	No change
	2009	A	A	A	—	—	—	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Spring 3AA	2010	A	A	A	—	—	—	—	A	A	A	A	A	No change
	2009	A	A	A	—	—	—	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Spring Subgroup C: Springs in or downgradient of Pajarito Canyon and Ancho Canyon														
Spring Subgroup C (General Surveillance)	*2010*	*A*	*A*	*A*	—	—	*A*	—	*A*	*A*	*A*	*A*	*(A)*	*Rationale for changes to suites and frequencies for general surveillance locations in this subwatershed is provided in Table D-1.0-2.*
	2009	*A*	*A*	—	—	—	*A*	—	*A*	*A*	*A*	*A*	*A*	*Watershed-specific suites and frequencies for 2009 Interim Plan.*
Ancho Spring	2010	A	A	A	—	—	A	—	A	A	A	A	A	Addition of SVOC suite reflects updated suites for general surveillance spring locations in this part of the watershed. Background location approved for inclusion in GBIR, R4.
	2009	A	A	—	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Spring 4	2010	A	A	A	—	—	A	—	A	A	A	A	A	Assigned to revised general surveillance suites and frequencies for spring subgroup C. Frequencies for all assigned suites are reduced to annual because the conceptual model is mature for this portion of the watershed, and sufficient data have been collected for these analytical suites to justify monitoring on an annual basis (Table B-1).
	2009	S	S	S	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites defined for spring subgroups A and B. Metals, VOCs and SVOCs sampled semiannually because of ongoing concerns regarding detections of low levels of contaminants in this spring.

Table D-8.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Spring 4A	2010	A	A	A	—	—	A	—	A	A	A	A	A	Assigned to revised general surveillance suites and frequencies for spring subgroup C. Frequencies for all assigned suites are reduced to annual because the conceptual model is mature for this portion of the watershed, and sufficient data have been collected for these analytical suites to justify monitoring on an annual basis (Table B-1).
	2009	A	A	A	—	—	S	—	A	A	S	S	S	Assigned to watershed-specific suites defined for two subgroups: springs downgradient of Area G and springs downgradient of Pajarito Canyon.
Spring 4 AA	2010	A	A	A	—	—	A	—	A	A	A	A	A	Assigned to revised general surveillance suites and frequencies for spring subgroup C. Frequencies for all assigned suites are reduced to annual because the conceptual model is mature for this portion of the watershed, and sufficient data have been collected for these analytical suites to justify monitoring on an annual basis (Table B-1).
	2009	A	A	A	—	—	S	—	A	A	S	S	A	Assigned to watershed-specific suites defined for spring subgroups A and B.
Spring 4B	2010	A	A	A	—	—	A	—	A	A	A	A	A	Assigned to revised general surveillance suites and frequencies for spring subgroup C. Frequencies for all assigned suites are reduced to annual because the conceptual model is mature for this portion of the watershed, and sufficient data have been collected for these analytical suites to justify monitoring on an annual basis (Table B-1).
	2009	S	S	S	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites defined for spring subgroups A and B. Metals, VOCs and SVOCs sampled semiannually because of ongoing concerns regarding detections of low levels of contaminants in this spring.

Table D-8.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Spring 4C	2010	—	—	—	—	—	—	—	—	—	—	—	—	Removed from Interim Plan. Geochemically similar to nearby Spring 4, which will continue to be sampled.
	2009	S	S	S	—	—	S	—	A	S	S	S	S	Assigned to watershed-specific suites defined for spring subgroups A and B. Sampled semiannually because of ongoing concerns regarding detections of low levels of contaminants in this spring.
Spring 5	2010	A	A	A	—	—	A	—	A	A	A	A	A	No change
	2009	A	A	A	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites defined for spring subgroups A and B.
Spring 5A	2010	A	A	A	—	—	A	—	A	A	A	A	A	No change
	2009	A	A	A	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites defined for spring subgroups A and B.
Spring 5B	2010	—	—	—	—	—	—	—	—	—	—	—	—	Removed from Interim Plan because flow from this spring is often mixed with river water.
	2009	A	A	—	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Spring 6	2010	A	A	A	—	—	A	—	A	A	A	A	A	Addition of SVOC suite reflects updated suites for general surveillance spring locations in this part of the watershed. Background location approved for inclusion in GBIR, R4.
	2009	A	A	—	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Spring 6A	2010	A	A	A	—	—	A	—	A	A	A	A	A	Addition of SVOC suite reflects updated suites for general surveillance spring locations in this part of the watershed. Background location approved for inclusion in GBIR R4.
	2009	A	A	—	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Spring 6AAA	2010	—	—	—	—	—	—	—	—	—	—	—	—	Removed from Interim Plan because flow from this spring is often mixed with river water.
	2009	A	A	—	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.

Table D-8.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Spring 7	2010	A	A	A	—	—	A	—	A	A	A	A	A	Addition of SVOC suite reflects updated suites for general surveillance spring locations in this part of the watershed. Because Springs 7 and 8 are located close to one another on the east side of the Rio Grande, only one will be sampled. Spring 7 is the preferred sampling location, with Spring 8 as an alternative. These springs are frequently dry, or flow from the springs is mixed with river water.
	2009	A	A	—	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Spring 8	2010	—	—	—	—	—	—	—	—	—	—	—	—	Alternative sampling location for Spring 7 if it cannot be sampled.
	2009	A	A	—	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Spring 8A	2010	A	A	A	—	—	A	—	A	A	A	A	A	Addition of SVOC suite reflects updated suites for general surveillance spring locations in this part of the watershed.
	2009	A	A	—	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Spring 9	2010	A	A	A	—	—	A	—	A	A	A	A	A	Addition of SVOC suite reflects updated suites for general surveillance spring locations in this part of the watershed. Background location approved for inclusion in GBIR, R4.
	2009	A	A	—	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Spring 9A	2010	A	A	A	—	—	A	—	A	A	A	A	A	Addition of SVOC suite reflects updated suites for general surveillance spring locations in this part of the watershed. Background location approved for inclusion in GBIR, R4.
	2009	A	A	—	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.

Table D-8.0-1 (continued)

Location	Interim Plan	Metals[a]	VOCs[b]	SVOCs[b]	Pesticides	PCB[c]	HEXP[d]	Dioxins/Furans	Radionuclides[e]	Tritium[f]	General Inorganics[f,g]	Perchlorate	Stable Isotopes[h]	Rationale for Changes Relative to Previous Interim Plan
Spring 9B	2010	A	A	A	—	—	A	—	A	A	A	A	A	Addition of SVOC suite reflects updated suites for general surveillance spring locations in this part of the watershed. Background location approved for inclusion in GBIR, R4.
	2009	A	A	—	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.
Spring 10	2010	—	—	—	—	—	—	—	—	—	—	—	—	Removed from Interim Plan because this spring frequently has insufficient water for sampling, and this location has no potential to be impacted by Laboratory activities.
	2009	A	A	—	—	—	A	—	A	A	A	A	A	Assigned to watershed-specific suites and frequencies.

Notes: Watershed-specific and monitoring group-specific sampling suites and frequencies for individual water types are shown in shaded rows in order to set this information apart from that for the individual sampling locations that follow these rows. Other table notes for this table are defined in the notes for Table D-1.0-1.

Appendix E

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 interim facility-wide groundwater monitoring activities. Field QA/QC samples are collected in accordance with the Compliance Order on Consent, Section IX.B and include field blanks, equipment rinsate blanks, performance evaluation blanks, field duplicates, and field trip blanks. Field QA/QC samples are used to detect possible field or analytical laboratory contamination and to track analytical laboratory performance. Differences in analytical results between field-duplicate samples, for example, may indicate the samples were not uniform or significant variation occurred during analyses. Detection of analytes in deionized water field blanks may indicate contamination of the deionized water source or sample bottles or contamination from the analytical laboratory. This summary also addresses how field QA/QC results are used and the types of corrective actions that may be taken to address exceedances of target measures for each QA/QC sample type.
Field Blanks	Field blanks are used to monitor for contamination during sampling and are collected at a minimum frequency of 10% of all samples collected in a 21-d watershed sampling campaign. Field blanks are collected by filling sample containers in the field with deionized water to check for sources of sample contamination in the field. Field blanks are analyzed only for the organic constituents sampled for in the watershed. Field-blank results are evaluated as part of the secondary data validation process by using the results to validate the associated sample results. If any analytes are detected in the field blank, the result from the associated sample is qualified as undetected if the result is less than 5 times the amount for the analyte found in the associated field blank. A validation reason code is also assigned to describe why the data were qualified.
Equipment Rinsate Blanks	Equipment rinsate blanks are used to detect any contamination resulting from contaminated equipment or poor decontamination techniques. The equipment rinsate blank is prepared by passing deionized water through unused or decontaminated sampling equipment, including Westbay sample bottles. Equipment rinsate blanks are collected before a well is sampled with a nondedicated pump. An equipment rinsate blank is also collected before sampling each Westbay well for which samples are being collected for off-site analysis. Equipment rinsate blanks are not required for Westbay wells from which samples are being collected only for on-site analysis of indicator suites. Equipment rinsate blanks are analyzed for the organic constituents sampled for in the associated well. During the secondary data validation process, equipment rinsate blanks are evaluated in the same manner as field blanks, and any detected analytes are qualified in the samples associated with the equipment rinsate blank.
Performance Evaluation Blanks	Performance evaluation blanks (PEBs) are deionized water blanks submitted as regular samples, without any indication that they are QC samples. PEBs are used to evaluate the reagent-grade deionized water used to decontaminate sampling equipment and to prepare the blank samples discussed above. One PEB is collected per watershed sampling campaign and analyzed for total organic carbon and for the full suite of constituents analyzed during the watershed sampling campaign, including metals, organic chemicals, general inorganics, and radionuclides. PEBs are not analyzed for stable isotopes or specialized analytes that may be requested for a watershed.

Sample Type	Summary
Field Duplicates	Field duplicates are split samples that provide information about field variation of sampling results as well as analytical laboratory variation. They may reveal sampling techniques with poor reproducibility and provide information on the reproducibility of the sampling process. Field duplicates are collected at a rate of 10% of all samples collected in a 21-d watershed sampling campaign. Field-duplicate samples should be distributed proportionally among surface water, alluvial groundwater, and intermediate/regional groundwater to the relative number of samples collected for each type of media. Field-duplicate samples are selected from robust sampling locations requiring full analytical suites and yielding plenty of sample volume. Field-duplicate samples should be analyzed for the same suite of analytes for which the primary samples are analyzed. However, field-duplicate samples need not be analyzed for specialized nonroutine analytes that may be requested for a watershed, unless directed by the project leader. These analytes include stable isotopes and parameters for which microfiltration is requested. Field-duplicate results are compared with the associated sample results, and a relative percent difference is calculated. The acceptable threshold for relative percent differences is 20% for data greater than 5 times the reporting limit.
Field Trip Blanks	Field trip blanks accompany samples collected for volatile organic compound (VOC) analyses and are used to identify potential VOC contamination that may occur during sample handling, shipping, and storage or at the analytical laboratory. Field trip blanks consist of organic-free deionized water prepared by an independent off-site laboratory and are analyzed only for VOCs. A minimum of one trip blank is required for each cooler containing samples for VOC analyses. However, to facilitate data validation and verification, one trip blank may be included with each sample submitted for VOC analysis. During the secondary data validation process, field trip blanks are evaluated the same as field blanks, and any detected analytes are qualified in the samples associated with the trip blank. If any analytes are detected in the field trip blank, the result from the associated sample is qualified as undetected if the result is less than 5 times the amount of the concentration of the analyte found in the associated field blank. These results are given a validation reason code to describe why the data were qualified.
QA/QC Corrective Actions	Exceedances of target measures for each of the QA/QC sections summarized above triggers any number of potential corrective actions. The selection of one or more corrective actions is dependent on project data quality objectives (DQOs) and a variety of other factors. 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. **Data review/focused validation:** A typical first step is to review field paperwork (e.g., chains-of-custody, sample collection logs) to ensure sample identifiers align with analytical results. Detailed data review and focused validation may also provide insights into improper use of sample preservatives and other similar errors in sample collection. **Reanalysis:** Review of QA/QC results sometimes detects problems that occur with sample analysis. In these instances, reanalysis of an aliquot of the original sample may be requested of the analytical laboratory, assuming no holding-time issues are associated with the sample aliquot. **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 round. 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 based on project DQOs. 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 F

Geochemical Evaluation of
Monitoring Network Wells for Residual Effects of Drilling

F-1.0 OBJECTIVES AND SCOPE

This appendix summarizes the evaluation of water-quality data for residual effects of drilling products in samples collected from candidate monitoring network wells in 2009. The evaluation protocol is applied to water-quality data that reside in the Water Quality Database (WQDB) and that were collected from deep characterization wells that access perched-intermediate zones or the regional aquifer. The evaluations follow the general protocol presented in the Well Screen Analysis Report (WSAR), Revision 2 (LANL 2007, 096330), implemented using the Data Qualification Module (DQM) in accordance with the Standard Operating Procedure 5204, "Analytical Data Qualification for Residual Effects of Drilling Products." This evaluation protocol was previously applied to all sampling events beginning with the first groundwater sample collected after completion of well development activities and extending to those events for which data were available in the WQDB as of December 2007. Appendix F of the 2009 Interim Facility-Wide Groundwater Monitoring Plan (the Interim Plan) extended the evaluation results for this set of wells to include data in the WQDB through December 2008 (LANL 2009, 106115) and also applied the evaluation to newly completed intermediate and regional wells.

This appendix evaluates water-quality data in the WQDB for intermediate and regional groundwater wells included in the 2010 Interim Plan that meet at least one of the following criteria (Table F-1.0-1):

- wells assigned to restricted analytical suites or indicator suites in the 2009 Interim Plan
- wells assigned to characterization suites in the 2009 Interim Plan or other newly completed wells undergoing characterization in 2009 for which results are available for at least three sampling events
- wells that were rehabilitated, redeveloped, or converted to single-screen or dual-screen wells in 2008 or 2009
- wells potentially affected by cross-flow between screened intervals
- wells otherwise noted in Table F-4.0-1 of the 2009 Interim Plan as not completely equilibrated or for which reevaluation over a longer period of record was recommended

Because the test conditions used for this evaluation are not based on site-specific criteria, the results of this evaluation are intended to be used as general indicators of data quality and should not be construed as a definitive identification of data usability. The guiding philosophy for the evaluation protocol is to assume that water-quality data from a well screen are reliable and representative (R&R) of predrilling conditions unless clear and consistent evidence to the contrary is found. The approach is based on simple conceptual models of drilling-related impacts that exclude consideration of effects that are not likely to be significant.

This appendix documents the data-quality evaluation for the well screens as follows:

- Section F-2.0.1 provides a general overview of the evaluation protocol, lists evaluation outcomes for groundwater samples collected in 2009 from the wells listed in Table F-1.0-1, and identifies those samples that show clear evidence for residual effects from drilling, rehabilitation, or conversion activities.
- Section F-3.0.1 identifies the most recent revisions of groundwater monitoring well network evaluation reports and well rehabilitation and conversion reports which have evaluated the capability of individual well screens to provide R&R water-quality data for watershed-specific chemicals of potential concern (COPCs). Included in those reports are recommendations concerning the use of those screens for water-quality monitoring.

- Based on consideration of geochemical and other information from the preceding two sections, Section F-4.0.1 summarizes the basis on which analytical suites to be collected from each well screen in the 2010 Interim Plan have been maintained, extended, or limited—as compared with the 2009 Interim Plan (LANL 2009, 106115)—based upon the type and degree of residual impacts from drilling, rehabilitation, or conversion activities.

F-2.0 RESIDUAL DRILLING-RELATED EFFECTS PRESENT IN WATER-QUALITY SAMPLES COLLECTED IN 2009

In Table F-2.0-1, geochemical data in the WQDB for samples collected from screens in 2009 are evaluated by comparing the data for each sample with threshold levels for about 35 geochemical indicator species. The threshold levels are established based on concentrations measured in background samples that are representative of water quality in perched-intermediate groundwater or in the regional aquifer beneath the Pajarito Plateau, as reported in the "Groundwater Background Investigation Report, Revision 2" (LANL 2007, 094856). As appropriate, upper threshold levels for the evaluation are set at the upper tolerance limit, the 90^{th} percentile of the background distribution, or the maximum concentration measured in the background data set. Similarly, lower threshold levels are set at the 5^{th} or 10^{th} percentiles.

The test criteria identify water-quality data that appear to be unreliable or are not representative of predrilling groundwater chemistry because of residual effects of drilling, rehabilitation, or conversion activities. Because some of the test indicators are sometimes also present as groundwater contaminants (e.g., chloride, perchlorate, sodium, sulfate, and total organic carbon), site-specific groundwater contamination that may be present in the well screen must also be considered when the applicability of a particular test is assessed.

Residual effects from drilling, rehabilitation or conversion activities are classified into seven categories (LANL 2007, 096330), shown in the column headings in Table F-2.0-1:

- Category A—Residual inorganic constituents from drilling, construction, and development products
- Category B—Residual organic components from drilling or well construction products
- Category C—Modification of in situ oxidation-reduction (redox) conditions
- Category D—Modification of surface-active mineral surfaces with the effect of enhancing adsorption, such as onto clay minerals present in drilling mud
- Category E—Shift in carbonate system
- Category F—Corrosion of stainless steel
- General Indicator Category—General water-quality indicators such as field parameters, common groundwater contaminants not included in Category A, and zinc. Anomalous values for the field parameters and zinc commonly accompany other indicators of residual effects from drilling, rehabilitation, or conversion activities, but these excursions generally cannot be attributed with confidence to any single cause.

Table F-2.0-1 summarizes the test outcomes for water-quality samples collected in 2009. Wells are listed alphabetically by watershed. For each of the seven categories of possible effects, a sampling event is given an overall outcome of Pass, Fail, No Data, or Indeterminate in Table F-2.0-1. Additional details are provided in the outcomes listed for Category C; if the overall test outcome for reducing conditions is not "Pass," then the indicated redox condition is noted in this column (i.e., sulfate-reducing, iron/manganese-reducing, or nitrate-reducing). In assigning an overall outcome to a well screen for each category, the identification of consistent geochemical trends within that category is a critical factor for determining what residual drilling effects are present. Generally, it is assumed that an outcome that changes from "Pass" to "Fail" for a particular category, or vice versa, reflects changing geochemical conditions at the well screen. However, a "Fail" condition for a given category in Table F-2.0-1 does not necessarily mean that the well screen is not capable of providing R&R water-quality data. Examples of reasons that a given category may be listed as "Fail" but nonetheless be judged capable of providing R&R water-quality data are as follows:

- the geochemical conceptual model on which the test is based may be inappropriate for a site-specific location or condition within the aquifer;
- there may have been problems with the sampling equipment, such as the presence of metal corrosion products; or
- local contamination may affect the applicability of the test criteria.

F-3.0 WELL SCREEN CAPABILITY FOR MEETING GEOCHEMICAL MONITORING OBJECTIVES

Most of the well screens evaluated in Table F-2.0-1 were previously addressed in one of the monitoring network evaluation reports issued starting in 2007:

- "Evaluation of the Suitability of Wells Near Technical Area 16 for Monitoring Contaminant Releases from Consolidated Unit 16-021(c)-99, Revision 1" (LANL 2007, 100113)
- "Addendum to the Evaluation of the Suitability of Wells Near Technical Area 16 for Monitoring Contaminant Releases from Consolidated Unit 16-021(c)-99, Revision 1" (LANL 2008, 101875.5)
- "Mortandad Canyon Groundwater Monitoring Well Network Evaluation, Revision 1" (LANL 2007, 099128)
- "Los Alamos and Pueblo Canyons Groundwater Monitoring Well Network Evaluation and Recommendations, Revision 1" (LANL 2008, 101330)
- "Technical Area 54 Well Evaluation and Network Recommendations, Revision 1" (LANL 2007, 098548)

In contrast with the evaluation of individual water-quality samples summarized in Section F-2.0.1, these network evaluation reports focused more on the present-day capability of each screen (including its sampling system) to meet monitoring objectives that were based on watershed-specific COPCs and site-characterization data. The network well evaluations culminated in recommended actions regarding the continued use of each well screen for monitoring water quality. Geochemical evaluation criteria included not only an assessment of samples for the presence of any drilling-related conditions but also the extent to which any such condition that may be present could impair the capability of the screen to provide water-quality samples that meet monitoring objectives, focusing on key contaminants of concern for groundwater. Each screen's current ability to meet geochemical monitoring objectives was expressed by assigning the screen to one of three categories based on an evaluation of the most recent sampling events available at the time the monitoring network evaluation report was written:

- Meets monitoring objectives—the evaluation does not reveal compelling evidence for any residual drilling effects, and the screen provides R&R samples for all COPCs;
- Conditionally meets objectives—the evaluation indicates the presence of a residual drilling effect, but the screen currently provides R&R samples for some COPCs; or

- Does not meet monitoring objectives—the evaluation shows obvious geochemical effects related to drilling, such that the screen cannot provide R&R samples for many COPCs, and conditions do not show clear signs of improving within a reasonable time frame.

This appendix extends the period of evaluation to 2009 for the monitoring network wells and also evaluates new intermediate and regional wells that were installed to implement New Mexico Environment Department– (NMED-) approved recommendations in these monitoring network reports.

F-4.0 UPDATE OF INTERIM PLAN BASED ON SCREEN EVALUATIONS

Table F-4.0-1 summarizes how the 2010 Interim Plan updates the 2009 Interim Plan by taking into consideration the geochemical evaluations summarized in this appendix. For each perched-intermediate and regional groundwater well screen included in the 2010 Interim Plan, Table F-4.0-1 classifies the assigned analytical suites as characterization, unrestricted, or indicator suite. The last table column summarizes the rationale for the assignments and the reasons for changes relative to those in the 2009 Interim Plan.

F-5.0 REFERENCES

The following list includes all documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

LANL (Los Alamos National Laboratory), February 2007. "Groundwater Background Investigation Report, Revision 2," Los Alamos National Laboratory document LA-UR-07-0755, Los Alamos, New Mexico. (LANL 2007, 094856)

LANL (Los Alamos National Laboratory), May 2007. "Well Screen Analysis Report, Revision 2," Los Alamos National Laboratory document LA-UR-07-2852, Los Alamos, New Mexico. (LANL 2007, 096330)

LANL (Los Alamos National Laboratory), September 2007. "Evaluation of the Suitability of Wells Near Technical Area 16 for Monitoring Contaminant Releases from Consolidated Unit 16-021(c)-99, Revision 1," Los Alamos National Laboratory document LA-UR-07-6433, Los Alamos, New Mexico. (LANL 2007, 100113)

LANL (Los Alamos National Laboratory), September 2007. "Mortandad Canyon Groundwater Monitoring Well Network Evaluation, Revision 1," Los Alamos National Laboratory document LA-UR-07-6435, Los Alamos, New Mexico. (LANL 2007, 099128)

LANL (Los Alamos National Laboratory), October 2007. "Technical Area 54 Well Evaluation and Network Recommendations, Revision 1," Los Alamos National Laboratory document LA-UR-07-6436, Los Alamos, New Mexico. (LANL 2007, 098548)

LANL (Los Alamos National Laboratory), December 2007. “Well R-32 Rehabilitation and Conversion Summary Report, Revision 1,” Los Alamos National Laboratory document LA-UR-07-8074, Los Alamos, New Mexico. (LANL 2007, 100572)

LANL (Los Alamos National Laboratory), January 2008. “Well R-12 Rehabilitation and Conversion Summary Report, Revision 1,” Los Alamos National Laboratory document LA-UR-08-0260, Los Alamos, New Mexico. (LANL 2008, 100352)

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

LANL (Los Alamos National Laboratory), March 2008. “Addendum to the 'Evaluation of the Suitability of Wells Near Technical Area 16 for Monitoring Contaminant Releases from Consolidated Unit 16-021(c)-99, Revision 1',” Los Alamos National Laboratory document LA-UR-08-1536, Los Alamos, New Mexico. (LANL 2008, 101875.5)

LANL (Los Alamos National Laboratory), May 2008. “2008 Interim Facility-Wide Groundwater Monitoring Plan,” Los Alamos National Laboratory document LA-UR-08-3273, Los Alamos, New Mexico. (LANL 2008, 101897)

LANL (Los Alamos National Laboratory), June 2008. “Well R-14 Rehabilitation and Conversion Summary Report, Revision 1,” Los Alamos National Laboratory document LA-UR-08-3829, Los Alamos, New Mexico. (LANL 2008, 102415)

LANL (Los Alamos National Laboratory), July 2008. “Well R-20 Rehabilitation and Conversion Summary Report, Revision 1,” Los Alamos National Laboratory document LA-UR-08-3828, Los Alamos, New Mexico. (LANL 2008, 103100)

LANL (Los Alamos National Laboratory), August 2008. “R-33 Well Conversion and Rehabilitation Summary Report,” Los Alamos National Laboratory document LA-UR-08-4696, Los Alamos, New Mexico. (LANL 2008, 103171)

LANL (Los Alamos National Laboratory), May 2009. “2009 Interim Facility-Wide Groundwater Monitoring Plan,” Los Alamos National Laboratory document LA-UR-09-1340, Los Alamos, New Mexico. (LANL 2009, 106115)

LANL (Los Alamos National Laboratory), August 2009. “R-22 Well Redevelopment Phase I Summary Report,” Los Alamos National Laboratory document LA-UR-09-4936, Los Alamos, New Mexico. (LANL 2009, 106796)

LANL (Los Alamos National Laboratory), February 2010. “Status of Inflatable Packer Systems and Assessment of Cross Flow in Monitoring Wells at Los Alamos National Laboratory,” Los Alamos National Laboratory document LA-UR-10-1111, Los Alamos, New Mexico. (LANL 2010, 108783)

Table F-1.0-1
Wells Evaluated for Residual Effects of Drilling, Construction, and Rehabilitation Activities

Location	Screen	Hydrologic Zone	Rationale for Updated Geochemical Evaluation in This Appendix
Los Alamos/Pueblo Watershed			
R-5	Screen 4	Regional	Indicator suite in 2008 Interim Plan (LANL 2008, 101897). Upgraded suite assignment in 2009 Interim Plan with recommendation to continue to monitor water-quality trends.
R-7	Screen 3	Regional	Indicator suite in 2009 Interim Plan
TA-53i	Single	Intermediate	Characterization suite in 2009 Interim Plan. New well completed March 2009.
Sandia Watershed			
R-12	Screen 1	Intermediate	Postconversion characterization suite in 2009 Interim Plan
R-12	Screen 2	Intermediate	Postconversion characterization suite in 2009 Interim Plan
R-36	Single	Regional	Characterization suite in 2009 Interim Plan
R-43	Screen 1	Regional	Characterization suite in 2009 Interim Plan. New well completed October 2008.
R-43	Screen 2	Regional	Characterization suite in 2009 Interim Plan. New well completed October 2008.
SCI-2	Single	Intermediate	Characterization suite in 2009 Interim Plan. New well completed October 2008.
Mortandad			
R-14	Single	Regional	Postconversion characterization suite in 2009 Interim Plan
R-16	Screen 2	Regional	Postconversion characterization suite in 2009 Interim Plan. Potential cross-flow between screened intervals in 2009 because of underinflated packer (LANL 2010, 108783).
R-16	Screen 4	Regional	Postconversion characterization suite in 2009 Interim Plan. Potential cross-flow between screened intervals in 2009 because of underinflated packer (LANL 2010, 108783).
R-33	Screen 1	Regional	Postconversion characterization suite in 2009 Interim Plan
R-33	Screen 2	Regional	Postconversion characterization suite in 2009 Interim Plan
R-42	Single	Regional	Characterization suite in 2009 Interim Plan. New well completed August 2008.
R-44	Screen 1	Regional	Characterization suite in 2009 Interim Plan. New well completed January 2009.
R-44	Screen 2	Regional	Characterization suite in 2009 Interim Plan. New well completed January 2009.
R-45	Screen 1	Regional	Characterization suite in 2009 Interim Plan. New well completed January 2009.
R-45	Screen 2	Regional	Characterization suite in 2009 Interim Plan. New well completed January 2009.
R-46	Single	Regional	Characterization suite in 2009 Interim Plan. New well completed February 2009.

Table F-1.0-1 (continued)

Location	Screen	Hydrologic Zone	Rationale for Updated Geochemical Evaluation in This Appendix
Pajarito			
PCI-2	Single	Intermediate	Characterization suite in 2009 Interim Plan. New well completed April 2009.
R-19	Screen 5	Regional	Indicator suite in 2009 Interim Plan
R-19	Screen 6	Regional	Indicator suite in 2009 Interim Plan
R-19	Screen 7	Regional	Indicator suite in 2009 Interim Plan
R-20	Screen 1	Regional	Postconversion sampling in 2009 Interim Plan. Potential cross-flow between screened intervals in 2009 because of underinflated packer (LANL 2010, 108783).
R-20	Screen 2	Regional	Postconversion sampling in 2009 Interim Plan. Potential cross-flow between screened intervals in 2009 because of underinflated packer (LANL 2010, 108783).
R-22	Screens 1-5	Regional	Not applicable. Undergoing redevelopment and conversion (LANL 2009, 106796).
R-23i	Port 2	Intermediate	Potential cross-flow between screened intervals in 2009 because of underinflated packer (LANL 2010, 108783).
R-23i	Port 3	Intermediate	Potential cross-flow between screened intervals in 2009 because of underinflated packer (LANL 2010, 108783).
R-32	Single	Regional	Rehabilitated multiscreen well, converted to single screen. Installed packer and submersible pump in November 2007 (LANL 2007, 100572).
R-37	Screen 1	Intermediate	Characterization suite in 2009 Interim Plan. New well completed June 2009.
R-37	Screen 2	Regional	Characterization suite in 2009 Interim Plan. New well completed June 2009.
R-38	Single	Regional	Characterization suite in 2009 Interim Plan. New well completed December 2008.
R-39	Single	Regional	Characterization suite in 2009 Interim Plan. New well completed December 2008.
R-40	Screen 1	Intermediate	Characterization suite in 2009 Interim Plan. New well completed January 2009.
R-40	Screen 2	Regional	Characterization suite in 2009 Interim Plan. New well completed January 2009.
R-40i	Single	Intermediate	Characterization suite in 2009 Interim Plan. New well completed January 2009.
R-41	Screen 2	Regional	Characterization suite in 2009 Interim Plan. New well completed March 2009.
R-49	Screen 1	Intermediate	Characterization suite in 2009 Interim Plan. New well completed 2009.
R-49	Screen 2	Regional	Characterization suite in 2009 Interim Plan. New well completed 2009.
Water			
CdV-R-15-3	Screen 5	Regional	Indicator suite in 2009 Interim Plan
CdV-R-15-3	Screen 6	Regional	Indicator suite in 2009 Interim Plan
CdV-R-37-2	Screen 2	Regional	Indicator suite in 2009 Interim Plan

Table F-1.0-1 (continued)

Location	Screen	Hydrologic Zone	Rationale for Updated Geochemical Evaluation in This Appendix
CdV-R-37-2	Screen 4	Regional	Indicator suite in 2008 Interim Plan (LANL 2008, 101897). Upgraded in 2009 Interim Plan with recommendation to continue to monitor water-quality trends.
R-25	Screen 1	Intermediate	Indicator suite in 2008 Interim Plan (LANL 2008, 101897), removed from 2009 Interim Plan, added back to 2010 Interim Plan. Continue to monitor water-quality trends.
R-25	Screen 2	Intermediate	Indicator suite in 2009 Interim Plan
R-25	Screen 4	Intermediate	Impacted screen. Continue to monitor water-quality trends.
R-25	Screen 5	Regional	Impacted screen. Continue to monitor water-quality trends.
R-25	Screen 8	Regional	Impacted screen. Continue to monitor water-quality trends.
R-25b	Single	Intermediate	Characterization suite in 2009 Interim Plan. New well completed November 2008.
Ancho			
R-31	Screen 2	Regional	Indicator suite in 2009 Interim Plan.
R-31	Screen 3	Regional	Indicator suite in 2009 Interim Plan.

Table F-2.0-1
Summary of Data Quality Evaluation Test Outcomes for Groundwater Sampling Events in 2009

Well Screen	Start Date	Limited Analytical Suite[a]	Number of DQM Test Outcomes[b]		% Pass	Categories of Residual Effects of Drilling (see text for descriptions)						General Indicator Category	Conditions Present[d]	Applicable Notes[e]
			Pass	Fail		Category A Residual Inorganics	Category B Residual Organics	Category C Redox[c]	Category D Enhanced Sorption	Category E Carbonate System	Category F Steel Corrosion			
Los Alamos Watershed (includes Pueblo Canyon)														
R-5 Scr 4	12-Jan-09	—	32	1	97	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	A2, E2, G1
R-5 Scr 4	23-Jul-09	—	29	2	94	Pass	Pass	NO3	Pass	Pass	Pass	Fail	C	A2, E2, G1
R-7 Scr 3	13-Jan-09	Indicator	23	10	70	Pass	Fail	Fe-Mn	Pass	Fail	Pass	Fail	B, C, E	G1
R-7 Scr 3	20-Jul-09	Indicator	19	10	66	Pass	Fail	SO4	Pass	Fail	Pass	Pass	B, C, E	—
TA-53i	21-May-09	—	23	6	79	Pass	Fail	Pass	Pass	Pass	Pass	Fail	B	A1, A2, E2, G1, G2
TA-53i	20-Jul-09	—	26	5	84	Pass	Fail	Pass	Pass	Pass	Pass	Fail	B	A1, A2, E2, G1, G2
TA-53i	30-Nov-09	—	26	4	87	Pass	Fail	Pass	Pass	Pass	Pass	Fail	B	A1, A2, E2, G1, G2
Sandia Watershed														
R-12 Scr 1	20-Feb-09	—	20	7	74	Pass	Fail	Fe-Mn	Pass	Pass	Pass	Fail	B, C	A1, A2, E2, G1
R-12 Scr 1	5-Aug-09	—	20	5	80	Pass	Fail	Fe-Mn	Pass	Pass	Pass	Fail	B, C	A1, A2, E2, G1
R-12 Scr 1	12-Nov-09	—	22	5	81	Pass	Fail	Fe-Mn	Pass	Pass	Pass	Fail	B, C	A1, A2, E2, G1
R-12 Scr 2	11-Feb-09	—	25	2	93	Pass	Pass	Fe-Mn	Pass	Pass	Pass	Fail	C	A1, A2, C1, G1
R-12 Scr 2	29-Apr-09	—	26	2	93	Pass	Pass	Fe-Mn	Pass	Pass	Pass	Fail	C	A1, A2, C1, G1
R-12 Scr 2	5-Aug-09	—	26	2	93	Pass	Pass	Fe-Mn	Pass	Pass	Pass	Fail	C	A1, A2, C1, G1
R-12 Scr 2	12-Nov-09	—	26	2	93	Pass	Pass	Fe-Mn	Pass	Pass	Pass	Fail	C	A1, A2, C1, G1
R-36	5-Feb-09	—	33	1	97	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	A1, A2, G3
R-36	28-Apr-09	—	31	2	94	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	A1, A2, G2, G3
R-36	5-Aug-09	—	32	1	97	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	A1, A2, G3
R-36	4-Nov-09	—	30	2	94	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	A1, A2, G2, G3
R-43 Scr 1	19-Jun-09	—	28	2	93	Pass	Fail	Pass	Pass	Pass	Pass	Pass	B	A1
R-43 Scr 1	18-Aug-09	—	29	1	97	Pass	Fail	Pass	Pass	Pass	Pass	Pass	B	A1, A2
R-43 Scr 1	19-Nov-09	—	31	1	97	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	A1, G2
R-43 Scr 2	18-Jun-09	—	33	4	89	Fail	Pass	Pass	Pass	Pass	Pass	Fail	A, Mix[f]	G2
R-43 Scr 2	18-Aug-09	—	33	4	89	Fail	Pass	Pass	Pass	Pass	Pass	Fail	A, Mix	G2
R-43 Scr 2	19-Nov-09	—	36	2	95	Fail	Pass	Pass	Pass	Pass	Pass	Fail	A, Mix	G2

Table F-2.0-1 (continued)

Well Screen	Start Date	Limited Analytical Suite[a]	Number of DQM Test Outcomes[b]		% Pass	Categories of Residual Effects of Drilling (see text for descriptions)							Conditions Present[d]	Applicable Notes[e]
			Pass	Fail		Category A Residual Inorganics	Category B Residual Organics	Category C Redox[c]	Category D Enhanced Sorption	Category E Carbonate System	Category F Steel Corrosion	General Indicator Category		
SCI-2	13-Feb-09	—	20	3	87	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	A1,A2,B1,E1,G1,G4,G5
SCI-2	6-May-09	—	23	1	96	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	A1, B1, E1, G1
SCI-2	4-Aug-09	—	20	1	95	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	A1, A2, E1, G1
SCI-2	17-Nov-09	—	23	1	96	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	A1, A2, B1, E1, G1
Mortandad Canyon Watershed														
R-14	18-Feb-09	—	36	1	97	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	G1
R-14	7-May-09	—	34	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-14	7-Aug-09	—	36	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-14	4-Nov-09	—	38	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-16 Scr 2	3-Feb-09	Indicator	26	8	76	Fail	*Indeter*[g]	Fe-Mn	Pass	Pass	Pass	Fail	A, C	G1
R-16 Scr 2	18-Jul-09	Indicator	34	0	100	Pass	*Indeter*	Pass	Pass	Pass	Pass	Pass	—	—
R-16 Scr 2	23-Oct-09	Indicator	33	0	100	Pass	*Indeter*	Pass	Pass	Pass	Pass	Pass	—	—
R-16 Scr 2	19-Nov-09	—	38	1	97	Pass	Fail	Pass	Pass	Pass	Pass	Pass	B	E2
R-16 Scr 4	3-Feb-09	Indicator	23	10	70	Fail	Fail	SO4	Pass	Fail	Pass	Fail	A, B, C, E	G1
R-16 Scr 4	17-Jul-09	Indicator	33	2	94	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	G1, G3
R-16 Scr 4	23-Oct-09	Indicator	33	1	97	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Mix	E2, G1
R-33 Scr 1	19-Feb-09	—	36	1	97	Pass	Fail	Pass	Pass	Pass	Pass	Pass	B	—
R-33 Scr 1	6-May-09	—	37	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-33 Scr 1	14-Aug-09	—	38	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-33 Scr 1	9-Nov-09	—	38	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-33 Scr 2	3-Feb-09	—	37	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-33 Scr 2	5-May-09	—	39	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-33 Scr 2	14-Aug-09	—	36	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-33 Scr 2	6-Nov-09	—	34	1	97	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	G2

Table F-2.0-1 (continued)

Well Screen	Start Date	Limited Analytical Suite[a]	Number of DQM Test Outcomes[b]		% Pass	Categories of Residual Effects of Drilling (see text for descriptions)							Conditions Present[d]	Applicable Notes[e]
			Pass	Fail		Category A Residual Inorganics	Category B Residual Organics	Category C Redox[c]	Category D Enhanced Sorption	Category E Carbonate System	Category F Steel Corrosion	General Indicator Category		
R-42	20-Feb-09	—	27	2	93	Pass	Fail	Pass	Pass	Pass	Pass	Pass	B	A1, E1, E2
R-42	11-May-09	—	27	1	96	Pass	Fail	Pass	Pass	Pass	Pass	Pass	B	A1, E1, E2
R-42	14-Aug-09	—	28	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	A1, E1, E2
R-42	5-Nov-09	—	26	1	96	Pass	Fail	Pass	Pass	Pass	Pass	Pass	B	A1, E1, E2
R-44 Scr 1	17-Feb-09	—	35	2	95	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	G2
R-44 Scr 1	14-Jul-09	—	35	5	88	Pass	Fail	Pass	Pass	Pass	Pass	Fail	B	C2, G2, G3, G4
R-44 Scr 1	17-Aug-09	—	35	2	95	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	G2
R-44 Scr 1	13-Nov-09	—	32	3	91	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	G2
R-44 Scr 2	22-Feb-09	—	38	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-44 Scr 2	14-Jul-09	—	39	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-44 Scr 2	17-Aug-09	—	36	3	92	Pass	Fail	Pass	Pass	Pass	Pass	Fail	B	G2
R-44 Scr 2	13-Nov-09	—	35	2	95	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	G2
R-45 Scr 1	28-Feb-09	—	37	2	95	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	G2
R-45 Scr 1	16-Jul-09	—	35	4	90	Pass	Fail	Pass	Pass	Pass	Pass	Fail	B	G2, G3
R-45 Scr 1	19-Aug-09	—	33	5	87	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	G2, G3
R-45 Scr 1	16-Nov-09	—	33	4	89	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	G2
R-45 Scr 2	5-Mar-09	—	38	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-45 Scr 2	16-Jul-09	—	38	1	97	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	C2, G2
R-45 Scr 2	19-Aug-09	—	37	1	97	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	G2
R-45 Scr 2	16-Nov-09	—	35	1	97	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	G2
R-46	11-Mar-09	—	34	1	97	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	C2, G4
R-46	13-May-09	—	36	3	92	Pass	Fail	Pass	Pass	Pass	Pass	Fail	B	G4
R-46	17-Jun-09	—	35	3	92	Pass	Fail	NO3	Pass	Pass	Pass	Pass	B, C	—
R-46	10-Aug-09	—	36	3	92	Pass	Fail	NO3	Pass	Pass	Pass	Pass	B, C	—
R-46	13-Nov-09	—	35	2	95	Pass	Fail	Pass	Pass	Pass	Pass	Pass	B	—

Table F-2.0-1 (continued)

Well Screen	Start Date	Limited Analytical Suite[a]	Number of DQM Test Outcomes[b]		% Pass	Categories of Residual Effects of Drilling (see text for descriptions)							Conditions Present[d]	Applicable Notes[e]
						Category A	Category B	Category C	Category D	Category E	Category F			
			Pass	Fail		Residual Inorganics	Residual Organics	Redox[c]	Enhanced Sorption	Carbonate System	Steel Corrosion	General Indicator Category		
Pajarito Canyon Watershed														
PCI-2	11-Jun-09	—	31	2	94	Pass	Pass	NO3	Pass	Pass	Pass	Fail	C	C1, G4
PCI-2	4-Sep-09	—	30	1	97	Pass	Pass	NO3	Pass	Pass	Pass	Pass	C	C1
PCI-2	14-Dec-09	—	31	1	97	Pass	Pass	NO3	Pass	Pass	Pass	Pass	C	C1
R-19 Scr 5	5-Mar-09	Indicator	24	10	71	Pass	Fail	Fe-Mn	Pass	Fail	Pass	Fail	B, C, E	G1
R-19 Scr 5	28-May-09	Indicator	20	15	57	Pass	Fail	SO4	Pass	Fail	Pass	Fail	B, C, E	G1, G3, G4
R-19 Scr 5	18-Sep-09	Indicator	23	12	66	Fail	Fail	Fe-Mn	Pass	Fail	Pass	Fail	A, B, C, E	G1
R-19 Scr 6	9-Mar-09	Indicator	28	6	82	Pass	Fail	Fe-Mn	Pass	Fail	Pass	Pass	B, C, E	—
R-19 Scr 6	28-May-09	Indicator	26	7	79	Pass	Fail	Fe-Mn	Pass	Fail	Pass	Fail	B, C, E	G1
R-19 Scr 6	18-Sep-09	Indicator	20	6	77	Pass	Fail	Fe-Mn	Pass	Fail	Pass	Fail	B, C, E	G1
R-19 Scr 7	11-Mar-09	Indicator	21	16	57	Fail	Fail	SO4	Pass	Fail	Fail	Fail	A,B,C,E,F	G1, G3, G4
R-19 Scr 7	28-May-09	Indicator	22	13	63	Fail	Fail	Fe-Mn	Pass	Fail	Pass	Fail	A, B, C, E	G1, G4, G5
R-19 Scr 7	18-Sep-09	Indicator	22	11	67	Pass	Fail	SO4	Pass	Fail	Pass	Fail	B, C, E	G1
R-20 Scr 1	10-Mar-09	—	28	6	82	Pass	Fail	Fe-Mn	Pass	Pass	Pass	Pass	B, C	—
R-20 Scr 1	2-Jun-09	—	31	5	86	Pass	Pass	Fe-Mn	Pass	Fail	Pass	Pass	C, E	—
R-20 Scr 1	2-Sep-09	—	31	1	97	Pass	Pass	Pass	Pass	Fail	Pass	Pass	E	—
R-20 Scr 1	1-Dec-09	—	30	3	91	Pass	Fail	Fe-Mn	Pass	Fail	Pass	Pass	B, C, E	—
R-20 Scr 2	9-Mar-09	—	32	7	82	Pass	Fail	Fe-Mn	Pass	Fail	Pass	Pass	B, C, E	—
R-20 Scr 2	29-May-09	—	30	6	83	Pass	Fail	Fe-Mn	Pass	Fail	Pass	Pass	B, C, E	—
R-20 Scr 2	3-Sep-09	—	23	9	72	Pass	Fail	SO4	Pass	Fail	Pass	Pass	B, C, E	—
R-20 Scr 2	2-Dec-09	—	26	7	79	Pass	Fail	Fe-Mn	Pass	Fail	Pass	Pass	B, C, E	—
R-23i Port 2	24-Feb-09	—	26	1	96	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	A1, A2, E2, G1
R-23i Port 2	4-Jun-09	—	28	1	97	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	A1, A2, E2, G1
R-23i Port 2	8-Sep-09	—	25	1	96	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	A1, E2, G1
R-23i Port 2	2-Dec-09	—	28	1	82	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	A1, A2, E2, G1

Table F-2.0-1 (continued)

Well Screen	Start Date	Limited Analytical Suite[a]	Number of DQM Test Outcomes[b]		% Pass	Categories of Residual Effects of Drilling (see text for descriptions)							Conditions Present[d]	Applicable Notes[e]
			Pass	Fail		Category A Residual Inorganics	Category B Residual Organics	Category C Redox[c]	Category D Enhanced Sorption	Category E Carbonate System	Category F Steel Corrosion	General Indicator Category		
R-23i Port 3	25-Feb-09	—	28	1	97	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	A1, A2, E2, G1
R-23i Port 3	10-Jun-09	—	26	2	93	Pass	Pass	NO3	Pass	Pass	Pass	Fail	C, Mix	A1, A2, E2, G1
R-23i Port 3	9-Sep-09	—	27	1	96	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	A1, A2, E2, G1
R-23i Port 3	1-Dec-09	—	27	1	96	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	A1, A2, E2, G1
R-32	26-Feb-09	—	35	2	95	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	G2, G3
R-32	8-Jun-09	—	34	2	94	Pass	Fail	Pass	Pass	Pass	Pass	Pass	B	G2, G3
R-32	31-Aug-09	—	37	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-32	7-Dec-09	—	33	2	94	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	G2
R-37 Scr 1	13-Jul-09	—	23	6	79	Fail	Pass	NO3	Pass	Pass	Pass	Fail	A, C	A2, E2, G1, G2, G4
R-37 Scr 1	20-Aug-09	—	27	9	75	Fail	Pass	Pass	Pass	Fail	Pass	Fail	A, E	G1, G2
R-37 Scr 1	18-Nov-09	—	25	10	71	Fail	Fail	Pass	Pass	Fail	Pass	Fail	A, B, E	G1, G2
R-37 Scr 1	18-Dec-09	—	25	12	68	Fail	Fail	Pass	Pass	Fail	Pass	Fail	A, B, E	G1, G2
R-37 Scr 2	22-Jun-09	—	37	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-37 Scr 2	18-Nov-09	—	32	4	89	Fail	Pass	Pass	Pass	Pass	Pass	Fail	A	G2, G4
R-37 Scr 2	18-Dec-09	—	31	5	86	Fail	Pass	Pass	Pass	Fail	Pass	Fail	A, E	G2
R-38	6-Feb-09	—	32	6	84	Pass	Fail	Fe-Mn	Pass	Pass	Fail	Fail	B, C, F	G3, G4
R-38	1-May-09	—	36	2	95	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	G1, G2
R-38	21-Aug-09	—	36	1	97	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	G2
R-38	17-Dec-09	—	38	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-39	19-Feb-09	—	35	1	97	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	G4
R-39	12-Mar-09	—	35	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-39	9-Jun-09	—	37	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-39	2-Sep-09	—	37	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-39	9-Dec-09	—	37	1	97	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	G4

Table F-2.0-1 (continued)

Well Screen	Start Date	Limited Analytical Suite[a]	Number of DQM Test Outcomes[b]		% Pass	Categories of Residual Effects of Drilling (see text for descriptions)							Conditions Present[d]	Applicable Notes[e]
			Pass	Fail		Category A Residual Inorganics	Category B Residual Organics	Category C Redox[c]	Category D Enhanced Sorption	Category E Carbonate System	Category F Steel Corrosion	General Indicator Category		
R-40i	28-Jan-09	—	23	16	59	Fail	Fail	Fe-Mn	Pass	Fail	Pass	Fail	A, B, C, E	G1, G3, G4
R-40i	10-Jun-09	—	21	14	60	Fail	Fail	SO4	Pass	Fail	Pass	Fail	A, B, C, E	G1, G5
R-40i	31-Aug-09	—	21	13	62	Fail	Fail	SO4	Pass	Fail	Pass	Fail	A, B, C, E	G1, G5
R-40i	4-Dec-09	—	19	13	59	Fail	Fail	SO4	Pass	Fail	Pass	Fail	A, B, C, E	G1, G5
R-40 Scr 1	21-Apr-09	—	22	13	63	Fail	Fail	SO4	Pass	Fail	Pass	Fail	A, B, C, E	G1, G4, G5
R-40 Scr 1	4-Sep-09	—	20	9	69	Fail	*Indeter*	Fe-Mn	Pass	Fail	Pass	Fail	A, C, E	G1
R-40 Scr 1	4-Dec-09	—	22	14	61	Fail	Fail	Fe-Mn	Pass	Fail	Fail	Fail	A,B,C,E,F	G1
R-40 Scr 2	15-Jan-09	—	31	6	84	Pass	Fail	Fe-Mn	Pass	Pass	Pass	Fail	B, C	G3, G4, G5
R-40 Scr 2	3-Sep-09	—	34	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-40 Scr 2	3-Dec-09	—	33	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-41 Scr 2	1-Apr-09	—	36	1	97	Pass	Pass	Pass	Pass	Pass	Pass	Fail	—	G3
R-41 Scr 2	1-Sep-09	—	34	1	97	Pass	Pass	NO3	Pass	Pass	Pass	Pass	C	—
R-41 Scr 2	15-Dec-09	—	35	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
Water Canyon Watershed (includes Canon De Valle)														
CdV-R-15-3 Scr 5	31-Mar-09	Indicator	24	6	80	Pass	Pass	Fe-Mn	Pass	Fail	Pass	Pass	C, E	—
CdV-R-15-3 Scr 6	31-Mar-09	Indicator	30	1	97	Pass	Pass	NO3	Pass	Pass	Pass	Pass	C	—
CdV-R-37-2 Scr 2	24-Mar-09	Indicator	20	10	67	Pass	Fail	SO4	Pass	Fail	Pass	Fail	B, C, E	G1, G5
CdV-R-37-2 Scr 2	15-Oct-09	Indicator	21	10	68	Pass	Fail	SO4	Pass	Fail	Pass	Fail	B, C, E	G1, G5
CdV-R-37-2 Scr 4	24-Mar-09	Indicator	29	3	91	Pass	Pass	Fe-Mn	Pass	Pass	Pass	Pass	C	—
CdV-R-37-2 Scr 4	14-Oct-09	—	29	1	97	Pass	Pass	NO3	Pass	Pass	Pass	Pass	C	—
R-25 Scr 1	31-Mar-09	—	23	8	74	Pass	Pass	Pass	Pass	Pass	Fail	Fail	F	G1, G2, G3
R-25 Scr 2	1-Apr-09	Indicator	13	11	54	Fail	Pass	Fe-Mn	Pass	Fail	Fail	Fail	A, C, E, F	A3, G1, G3
R-25 Scr 2	16-Oct-09	Indicator	17	10	63	Pass	Pass	Fe-Mn	Pass	Pass	Fail	Fail	C, F	G1, G3, G4
R-25 Scr 4	31-Mar-09	—	23	5	82	Pass	Pass	Fe-Mn	Pass	Fail	Pass	Fail	C, E	A1, G1
R-25 Scr 4	19-Oct-09	—	22	5	81	Pass	Pass	Fe-Mn	Pass	Fail	Pass	Fail	C, E	A1, G1
R-25 Scr 5	7-Apr-09	—	26	2	92	Fail	Pass	NO3	Pass	Pass	Pass	Pass	A, C	A1, A3

Table F-2.0-1 (continued)

Well Screen	Start Date	Limited Analytical Suite[a]	Number of DQM Test Outcomes[b]		% Pass	Categories of Residual Effects of Drilling (see text for descriptions)							Conditions Present[d]	Applicable Notes[e]
						Category A	Category B	Category C	Category D	Category E	Category F	General Indicator Category		
			Pass	Fail		Residual Inorganics	Residual Organics	Redox[c]	Enhanced Sorption	Carbonate System	Steel Corrosion			
R-25 Scr 8	1-Apr-09	—	36	0	100	Pass	Pass	Pass	Pass	Pass	Pass	Pass	—	—
R-25 Scr 8	20-Oct-09	—	31	1	97	Fail	Pass	Pass	Pass	Pass	Pass	Pass	A	A3
R-25b	5-Jan-09	—	24	11	69	Fail	Fail	Fe-Mn	Pass	Fail	Pass	Fail	A, B, C, E	G1, G3, G4
R-25b	8-Jun-09	—	27	13	68	Fail	Pass	Fe-Mn	Pass	Fail	Pass	Fail	A, C, E	G1, G3, G4, G5
R-25b	9-Oct-09	—	24	12	67	Fail	Pass	Fe-Mn	Pass	Fail	Fail	Fail	A, C, E, F	G1, G3
Ancho Watershed														
R-31 Scr 2	7-Apr-09	Indicator	20	13	61	Fail	Fail	SO4	Pass	Fail	Pass	Fail	A ,B, C, E	G1, G3, G5
R-31 Scr 2	26-Oct-09	Indicator	20	12	63	Fail	Fail	SO4	Pass	Fail	Pass	Fail	A ,B, C, E	G1, G3, G5
R-31 Scr 3	8-Apr-09	Indicator	22	10	69	Pass	Fail	SO4	Pass	Fail	Pass	Fail	B, C, E	G1, G5
R-31 Scr 3	26-Oct-09	Indicator	25	6	81	Pass	Pass	Fe-Mn	Pass	Pass	Pass	Fail	C	G1, G5

Table F-2.0-1 (continued)

Data source: Water Quality Database.

[a] Definition of entries in the column "Limited analytical suite"

- "Indicator" means that the sample was analyzed by the Laboratory's Earth and Environmental Sciences (EES) 14 laboratory because the well screen was assigned to the indicator constituent suite in accordance with the 2009 Interim Plan or because the sample was collected as part of a special study, including samples collected as part of rehabilitation and conversion activities.
- "—" means the sample was analyzed by an outside analytical laboratory.

[b] Number of DQM test outcomes includes all pass/fail test outcomes (including those in the general indicator category).

[c] Redox test outcomes are labeled and color-coded as follows: Pass (blue) = oxidizing; Fe/Mn (orange) = iron- or manganese-reducing; NO_3 (yellow) = nitrate-reducing; SO_4 (pink) = sulfate-reducing.

[d] Residual effects of drilling, construction or rehabilitation activities present: letters A through F indicate categories of effects that may be present in the water-quality sample; "—" indicates that no residual effect appears to be present and that any failed test outcomes for the water-quality sample appear to be attributable to some cause other than drilling, as documented by applicable notes in the adjacent column.

[e] Applicable notes. Each identifier for a note consists of a test category letter (A through G) followed by a sequential number.

A1 Based upon geochemical trends at this location, the elevated analyte concentration causing a Fail outcome in this category is associated with contamination at this location and is considered to be representative of local groundwater and is not a residual artifact of well drilling, construction, or rehabilitation activities.

A2 Based upon geochemical trends at this location, the elevated analyte concentration causing a Fail outcome in this category is not considered to be a residual artifact of well drilling, construction, or rehabilitation activities but rather arises from some other source (e.g., local background, local contaminant, statistical outlier).

A3 The only residual inorganic drilling products present in this sample are phosphate and/or sodium, which derive from the use of sodium polyphosphate to clean the screen before development.

B1 Based upon geochemical trends at this location, the elevated analyte concentration causing a Fail outcome in this category is not considered to be a residual artifact of well drilling, construction, or rehabilitation activities but rather arises from some other source (e.g., local background, local contaminant, statistical outlier).

B2 Although the available analytical data are inconclusive regarding the presence or absence of residual organic drilling products, this condition is probably absent—corresponding to a test outcome of Pass—based on data for samples that precede or follow this one.

B3 Although the available analytical data are inconclusive regarding the presence or absence of residual organic drilling products, this condition is probably present—corresponding to a test outcome of Fail—based on data for samples that precede or follow this one.

C1 Based upon geochemical trends at this location, analyte concentrations causing a Fail outcome in this category, inferring the presence of reducing conditions, may be representative of local groundwater.

C2 Based upon geochemical trends at this location, the elevated metal concentration causing a Fail outcome in this category is not considered to be an indicator of reducing conditions in the screen interval, but rather arises from some other source (e.g., sampling system, statistical outlier).

E1 Based upon geochemical trends at this location, the elevated analyte concentration causing a Fail outcome in this category is probably associated with contamination at this location, in which case it is considered to be representative of local groundwater and not a residual artifact of well drilling, construction, or rehabilitation activities.

E2 Based upon geochemical trends at this location, the analyte concentration causing a Fail outcome in this category is not considered to be a residual artifact of well drilling, construction, or rehabilitation activities but rather arises from some other source (e.g., local background, local contaminant, statistical outlier).

F1 The elevated metal concentration causing a Fail outcome in this category is probably associated with the sampling system and is not a residual artifact of well drilling, construction, or rehabilitation activities.

G1 Fail outcome because either pH or carbonate alkalinity is outside its background range.

G2 Fail outcome because the concentration of one or more constituents included in the general indicator category (e.g., tritium, chromium, nitrate, perchlorate) is detected above its background range but has not been identified as a contaminant at this location.

G3 Fail outcome because zinc (a surrogate indicator for strongly adsorbing metals) is elevated above its background range.

G4 Fail outcome because sample turbidity is high.

G5 Fail outcome because total iron concentration is elevated, but there is no other indicator of metal corrosion.

[f] Mix—water chemistry potentially affected by cross-flow between screened intervals.

[g] *Indeter*—test outcome is indeterminate because the data available were insufficient for evaluation.

Table F-4.0-1
Sampling Suite Assignment in 2010 Interim Plan Based on Geochemical Considerations

Well Screen	Assignment in 2009 Interim Plan	Assignment in 2010 Interim Plan	Geochemical Rationale for Implementation Action
Los Alamos/Pueblo Canyon Watershed			
Upper Los Alamos Canyon (Intermediate)			
LADP-3	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1.
LAOI(a)1.1	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
LAOI-3.2	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
LAOI-3.2a	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
LAOI-7	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-6i	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-7 screen 1	Unrestricted	Unrestricted	Usually dry; reevaluate if water is present. No basis for change (LANL 2009, 106115, Table F-4.0-1).
R-7 screen 2	Unrestricted	Unrestricted	Usually dry; reevaluate if water is present. No basis for change (LANL 2009, 106115, Table F-4.0-1).
R-9i screen 1	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-9i screen 2	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
TA-53i	Characterization	Unrestricted; monitor trends	Residual organic drilling products nearly completed cleared up by end of 2009 (Table F-2.0-1). Characterization completed in early 2010.
Upper Los Alamos Canyon (Regional)			
R-6	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1).
R-7 screen 3	Indicator suite	Indicator suite	Continues to show significant residual effects from drilling (Table F-2.0-1). No basis for change.
R-8 screen 1	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-8 screen 2	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-9	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
TW-3	Limited	Limited	Reducing conditions and elevated zinc concentrations (Table F-2.0-1) attributed to casing corrosion. Limited assignment of analytical suites is consistent with direction from NMED (LANL 2009, 106115, Table F-4.0-1).

Table F-4.0-1 (continued)

Well Screen	Assignment in 2009 Interim Plan	Assignment in 2010 Interim Plan	Geochemical Rationale for Implementation Action
Pueblo Canyon (Intermediate)			
POI-4	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-3i	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-5 screen 1	Unrestricted	Unrestricted	Usually dry; reevaluate if water is present. No basis for change (LANL 2009, 106115, Table F-4.0-1).
R-5 screen 2	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
TW-2Ar	—	Characterization	Not applicable. New well undergoing characterization in 2009 and 2010.
Pueblo Canyon (Regional)			
R-2	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-4	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-5 screen 3	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1).
R-5 screen 4	Unrestricted; monitor trends	Unrestricted; monitor trends	Nearly completely equilibrated based on trends observed in 2008 and 2009. Conditions may be slightly nitrate-reducing (Table F-2.0-1). No basis for change; continue to monitor trends.
R-24	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
Sandia Canyon Watershed			
Sandia Canyon Watershed (Intermediate)			
R-12 screen 1	Unrestricted; monitor trends	Unrestricted; monitor trends	Rehabilitated well converted to dual screen (LANL 2008, 100352). Minor drilling effects possibly still present from degradation of residual organic drilling products (Table F-2.0-1). However, screen interval has recovered almost completely; The majority of analytes of concern at this location would not be affected by the conditions that may be present. No basis for change; continue to monitor trends.
R-12 screen 2	Unrestricted	Unrestricted; monitor trends	Rehabilitated well converted to dual screen (LANL 2008, 100352). Residual effects of drilling and rehabilitation appear to have cleared up. The observed manganese-reducing conditions may be representative of local groundwater (Table F-2.0-1). No basis for change; continue to monitor trends.
SCI-1	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
SCI-2	Characterization	Unrestricted	Characterization completed. No drilling effects are apparent (Table F-2.0-1).

Table F-4.0-1 (continued)

Well Screen	Assignment in 2009 Interim Plan	Assignment in 2010 Interim Plan	Geochemical Rationale for Implementation Action
Sandia Canyon Watershed (Regional)			
R-10a	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-10 screen 1	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-10 screen 2	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-11	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-35a	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-35b	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-36	Characterization	Unrestricted	Extended period of characterization completed. Residual organic drilling products cleared up by end of 2009; equilibrated, with stable trends (Table F-2.0-1).
R-43 screen 1	Characterization	Unrestricted; monitor trends	Characterization completed. Mostly reequilibrated, no persistent residual effects of drilling observed (Table F-2.0-1).
R-43 screen 2	Characterization	Unrestricted; monitor trends	Characterization completed. Some samples potentially affected by cross-flow after installation of the sampling system (Table F-2.0-1).
Mortandad Canyon Watershed			
Mortandad Canyon Watershed (Intermediate)			
MCOI-4	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
MCOI-5	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
MCOI-6	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1).
Mortandad Canyon Watershed (Regional)			
R-1	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-13	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-14	Unrestricted	Unrestricted	Rehabilitated well converted to single screen (LANL 2008, 102415). Equilibrated, with stable trends (Table F-2.0-1). No basis for change.
R-15	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-16 screen 2	Indicator suite	Unrestricted; monitor trends	Rehabilitated well converted to dual screen. Mostly reequilibrated, no persistent residual effects of rehabilitation observed (Table F-2.0-1).
R-16 screen 4	Indicator suite	Unrestricted; monitor trends	Rehabilitated well converted to dual screen. Possibly still reequilibrating from residual effects of rehabilitation activities (Table F-2.0-1). Some samples in 2009 potentially affected by cross-flow. No basis for change; continue to monitor trends.

Table F-4.0-1 (continued)

Well Screen	Assignment in 2009 Interim Plan	Assignment in 2010 Interim Plan	Geochemical Rationale for Implementation Action
R-16r	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-21	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-28	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-33 screen 1	Unrestricted	Unrestricted	Rehabilitated well converted to dual screen (LANL 2008, 103171). Reequilibrated, with stable trends (Table F-2.0-1).
R-33 screen 2	Unrestricted	Unrestricted	Rehabilitated well converted to dual screen (LANL 2008, 103171). Reequilibrated, with stable trends (Table F-2.0-1).
R-34	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1).
R-42	Characterization	Unrestricted	Characterization completed. No drilling effects are apparent (Table F-2.0-1).
R-44 screen 1	Characterization	Unrestricted	Characterization completed. No drilling effects are apparent (Table F-2.0-1).
R-44 screen 2	Characterization	Unrestricted; monitor trends	Characterization completed. No drilling effects are apparent, although some samples potentially may be affected by cross-flow (Table F-2.0-1).
R-45 screen 1	Characterization	Unrestricted	Characterization completed. No drilling effects are apparent (Table F-2.0-1).
R-45 screen 2	Characterization	Unrestricted	Characterization completed. No drilling effects are apparent (Table F-2.0-1).
R-46	Characterization	Unrestricted; monitor trends	Characterization completed. Possibly still reequilibrating from residual effects of drilling or construction activities (Table F-2.0-1).
R-50 screen 1	—	Characterization	Not applicable. New well undergoing characterization in 2010.
R-50 screen 2	—	Characterization	Not applicable. New well undergoing characterization in 2010.
Pajarito Canyon Watershed			
Pajarito Canyon Watershed (Intermediate)			
03-B-13	Unrestricted	Unrestricted	Reducing conditions and variable geochemical trends are assumed to be a consequence of the entry of contaminated surface runoff into this well and are not an indication of drilling effects. No basis for change (LANL 2009, 106115, Table F-4.0-1).
PCI-2	Characterization	Unrestricted	Characterization completed. No drilling effects are apparent and geochemical conditions are stable; the observed low nitrate concentrations may be representative of local groundwater (Table F-2.0-1).
R-19 screen 2	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-23i port 2	Unrestricted	Unrestricted; monitor trends	Equilibrated, with stable trends (Table F-2.0-1). Sampling system removed for repairs in December 2009. Well was redeveloped in January 2010 before reinstallation of the sampling system. No basis for change; continue to monitor trends.

Table F-4.0-1 (continued)

Well Screen	Assignment in 2009 Interim Plan	Assignment in 2010 Interim Plan	Geochemical Rationale for Implementation Action
R-23i port 3	Unrestricted	Unrestricted; monitor trends	Mostly equilibrated (Table F-2.0-1). Some samples in 2009 potentially affected by cross-flow. Sampling system removed for repairs in December 2009. Well was redeveloped in January 2010 before reinstallation of the sampling system. No basis for change; continue to monitor trends.
R-23i piezometer	Unrestricted	Unrestricted	Geochemistry appears to be affected by seasonal water-level changes, resulting in variable geochemical trends. No basis for change (LANL 2009, 106115, Table F-4.0-1).
R-37 screen 1	Characterization	Unrestricted; monitor trends	Characterization completed. Residual effects of drilling and construction observed (Table F-2.0-1).
R-40i	Characterization	Unrestricted; monitor trends	Characterization completed. Shows significant residual effects of drilling (Table F-2.0-1).
R-40 screen 1	Characterization	Unrestricted; monitor trends	Characterization completed. Residual effects of drilling and construction observed (Table F-2.0-1).
R-41 screen 1	Characterization	Unrestricted	Not applicable. Screen has been dry since installation.
Pajarito Canyon Watershed (Regional)			
R-17 screen 1	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1).
R-17 screen 2	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-18	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-19 screen 3	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-19 screen 4	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-19 screen 5	Indicator suite	Indicator suite	Continues to show significant residual effects from drilling (Table F-2.0-1). No basis for change.
R-19 screen 6	Indicator suite	Indicator suite	Continues to show residual effects from drilling (Table F-2.0-1). No basis for change.
R-19 screen 7	Indicator suite	Indicator suite	Continues to show significant residual effects from drilling (Table F-2.0-1). No basis for change.
R-20 screen 1	Unrestricted; monitor trends	Unrestricted; monitor trends	Rehabilitated well converted to dual screen (LANL 2008, 103100). Minor drilling effects still evident as residual organic drilling products degrade under the restored oxic conditions, as evidenced by slightly elevated organic carbon concentrations and the presence of manganese-reducing conditions (Table F-2.0-1). No basis for change; continue to reevaluate as new data are obtained.
R-20 screen 2	Unrestricted; monitor trends	Unrestricted; monitor trends	Rehabilitated well converted to dual screen (LANL 2008, 103100). Mostly reequilibrated, stability of trends to continue to be evaluated as new data are obtained (Table F-2.0-1). No basis for change.
R-22 screens 1–5	—	—	Not applicable. Rehabilitated Westbay well; final configuration to be determined.
R-23	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1).

Table F-4.0-1 (continued)

Well Screen	Assignment in 2009 Interim Plan	Assignment in 2010 Interim Plan	Geochemical Rationale for Implementation Action
R-32	Unrestricted	Unrestricted	Rehabilitated well converted to single screen (LANL 2007, 100572). Equilibrated, with stable trends (Table F-2.0-1). No basis for change.
R-37 screen 2	Characterization	Unrestricted; monitor trends	Characterization completed. Still reequilibrating following installation of sampling system in late 2009 (Table F-2.0-1). Continue to monitor trends.
R-38	Characterization	Unrestricted	Characterization completed. No drilling effects are apparent (Table F-2.0-1).
R-39	Characterization	Unrestricted	Characterization completed. No drilling effects are apparent (Table F-2.0-1).
R-40 screen 2	Characterization	Unrestricted; monitor trends	Characterization completed. Mostly reequilibrated, no persistent residual effects of drilling observed (Table F-2.0-1). Continue to monitor trends.
R-41 screen 2	Characterization	Unrestricted	Characterization completed. No drilling effects are apparent (Table F-2.0-1).
R-49 screen 1	—	Characterization	Not applicable. New well undergoing characterization in 2010.
R-49 screen 2	—	Characterization	Not applicable. New well undergoing characterization in 2010.
R-51 screen 1	—	Characterization	Not applicable. New well undergoing characterization in 2010.
R-51 screen 2	—	Characterization	Not applicable. New well undergoing characterization in 2010.
R-52 screen 1	—	Characterization	Not applicable. New well undergoing characterization in 2010.
R-52 screen 2	—	Characterization	Not applicable. New well undergoing characterization in 2010.
R-53 screen 1	—	Characterization	Not applicable. New well undergoing characterization in 2010.
R-53 screen 2	—	Characterization	Not applicable. New well undergoing characterization in 2010.
R-54 screen 1	—	Characterization	Not applicable. New well undergoing characterization in 2010.
R-54 screen 2	—	Characterization	Not applicable. New well undergoing characterization in 2010.
Water Canyon (includes Cañon de Valle)			
Water Canyon (Intermediate)			
CdV-16-1(i)	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1).
CdV-16-2(i)r	Unrestricted	Unrestricted	Geochemistry is affected by water-level changes following sampling events, resulting in variable geochemical trends. No basis for change (LANL 2009, 106115, Table F-4.0-1).
CdV-37-1(i)	—	Characterization	Not applicable. New well undergoing characterization in 2010.
R-25 screen 1	—	Indicator suite	Slightly impacted by well corrosion (Table F-2.0-1). This screen is added back to the Interim Plan to acquire additional water-quality data in support of corrective measures evaluation activities for TA-16 260 Outfall (Table D-6.0-1).

Table F-4.0-1 (continued)

Well Screen	Assignment in 2009 Interim Plan	Assignment in 2010 Interim Plan	Geochemical Rationale for Implementation Action
R-25 screen 2	Indicator suite	Unrestricted; monitor trends	Moderately impacted by well corrosion, with slowly improving trends (Table F-2.0-1). No basis for change.
R-25 screen 4	Unrestricted	Unrestricted; monitor trends	Slightly impacted (Table F-2.0-1). No basis for change.
R-25b	Characterization	Unrestricted; monitor trends	Characterization completed. Residual effects of drilling mostly cleared up by end of 2009 (Table F-2.0-1). Continue to monitor trends.
R-25c	Characterization	Unrestricted	Not applicable; water only in sump.
R-26 PZ-2	Characterization	Unrestricted; monitor trends	Insufficient data for evaluation. Continue to monitor trends.
R-26 screen 1	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1).
R-27i	—	Characterization	Not applicable. New well undergoing characterization in 2010.
R-47i	—	Characterization	Not applicable. New well undergoing characterization in 2010.
Water Canyon (Regional)			
CdV-R-15-3 screen 4	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
CdV-R-15-3 screen 5	Indicator suite	Indicator suite	Still shows effects from drilling (Table F-2.0-1). No basis for change.
CdV-R-15-3 screen 6	Indicator suite	Indicator suite	Mostly reequilibrated (Table F-2.0-1).
CdV-R-37-2 screen 2	Indicator suite	Indicator suite	Continues to show significant effects from drilling (Table F-2.0-1). No basis for change.
CdV-R-37-2 screen 3	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
CdV-R-37-2 screen 4	Unrestricted	Unrestricted; monitor trends	Mostly reequilibrated (Table F-2.0-1). No basis for change; continue to monitor trends.
R-25 screen 5	Unrestricted	Unrestricted; monitor trends	Continues to show minor residual effects (Table F-2.0-1). No basis for change; continue to monitor trends.
R-25 screen 6	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-25 screen 7	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)

Table F-4.0-1 (continued)

Well Screen	Assignment in 2009 Interim Plan	Assignment in 2010 Interim Plan	Geochemical Rationale for Implementation Action
R-25 screen 8	Unrestricted; monitor trends	Unrestricted; monitor trends	Nearly completely reequilibrated (Table F-2.0-1). No basis for change; continue to monitor trends.
R-27	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-47	—	Characterization	Not applicable. New well undergoing characterization in 2010.
R-48	—	Characterization	Not applicable. New well undergoing characterization in 2010.
Ancho Canyon Watershed			
R-29	—	Characterization	Not applicable. New well undergoing characterization in 2010.
R-30	—	Characterization	Not applicable. New well undergoing characterization in 2010.
R-31 screen 2	Indicator suite	Indicator suite	Continues to show significant effects from drilling (Table F-2.0-1). No basis for change.
R-31 screen 3	Indicator suite	Indicator suite	Continues to show effects from drilling, with slowly improving trends (Table F-2.0-1). No basis for change.
R-31 screen 4	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
R-31 screen 5	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
Test Well DT-5A	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
Test Well DT-9	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1)
Test Well DT-10	Unrestricted	Unrestricted	No basis for change (LANL 2009, 106115, Table F-4.0-1).

"—" indicates that the well screen was not included in the 2009 Interim Plan (LANL 2009, 106115).

Appendix G

Geologic Cross-Sections

This appendix presents six east-west and three north-south geologic cross-sections that show the relationship of sampling locations in this Interim Facility-Wide Groundwater Monitoring Plan (the Interim Plan) to the hydrogeologic setting of the Los Alamos National Laboratory (the Laboratory) site. Figure G-1 is 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 G-2)
- B–B' Pajarito Canyon (Figure G-3)
- C–C' Mortandad Canyon (Figure G-4)
- D–D' Sandia Canyon (Figure G-5)
- E–E' Los Alamos Canyon (Figure G-6)
- F–F' Pueblo Canyon (Figure G-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 G-8)
- H–H' in the central part of the Laboratory (Figure G-9)
- I–I' in the western part of the Laboratory (Figure G-10)

The cross-sections are based on two-dimensional geologic surfaces that were developed using borehole and outcrop mapping data. These surfaces were integrated to form the geologic units presented in the Laboratory's fiscal year (FY) 2009 three-dimensional geologic framework model (Cole et al. 2010, 106101). The geologic framework model (GFM) was developed using the geospatial modeling software EarthVision (EV), developed by Dynamic Graphics, Inc., in 2008. The GFM was recently updated to incorporate new monitoring well and vadose-zone borehole data collected since the Laboratory's FY2009 GFM was finalized and is designated as EV model WC09c. The cross-sections were generated using the updated WC09c model to best represent the current conceptual understanding of the Laboratory's GFM.

To produce more realistic illustrations of the geologic contacts shown in the cross-sections, refinements to some of the geologic surfaces in the GFM were completed using graphic editing techniques. The geologic surfaces representing younger Tschicoma dacite flows (unit Tvt 2) were modified to isolate individual lava flows known to be independent based on chemical and geochronology data. In addition, the unit Bearhead rhyolite and fanglomerates (unit Tjfp) was modified to better reflect the lateral pinchout that occurs within this sedimentary deposit. No faults are presented on the cross-sections because no known or mapped faults lie within the GFM domain used to develop these geologic cross-sections. Buried, inferred, and possible faults have not yet been incorporated into the WC09c model.

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. Only sampling locations proposed to be sampled as part of the 2010 Interim Plan are shown on the cross-sections.

REFERENCE

The following list includes all documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the New Mexico Environment Department Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

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)

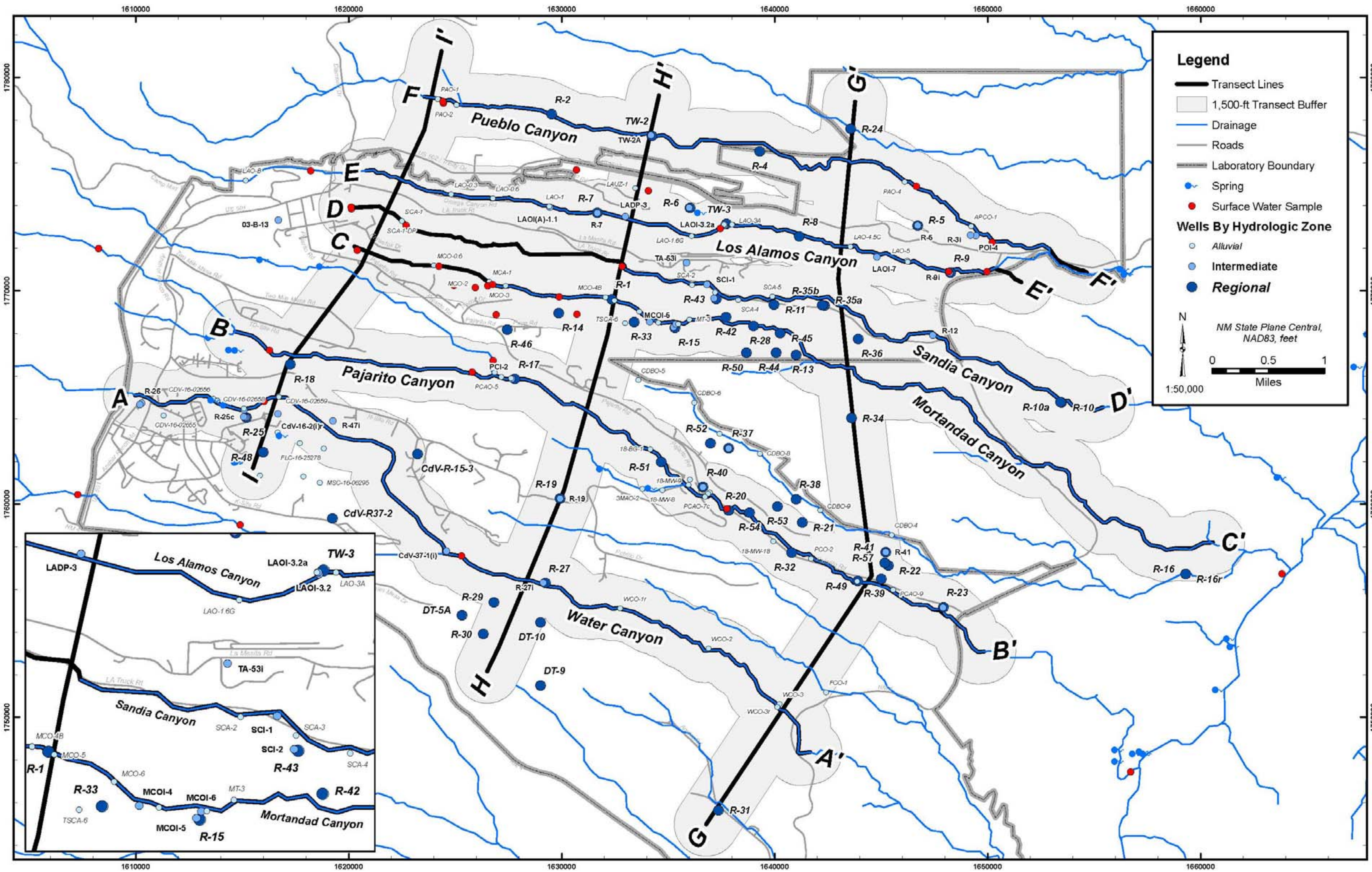

Figure G-1 Overview of transect locations

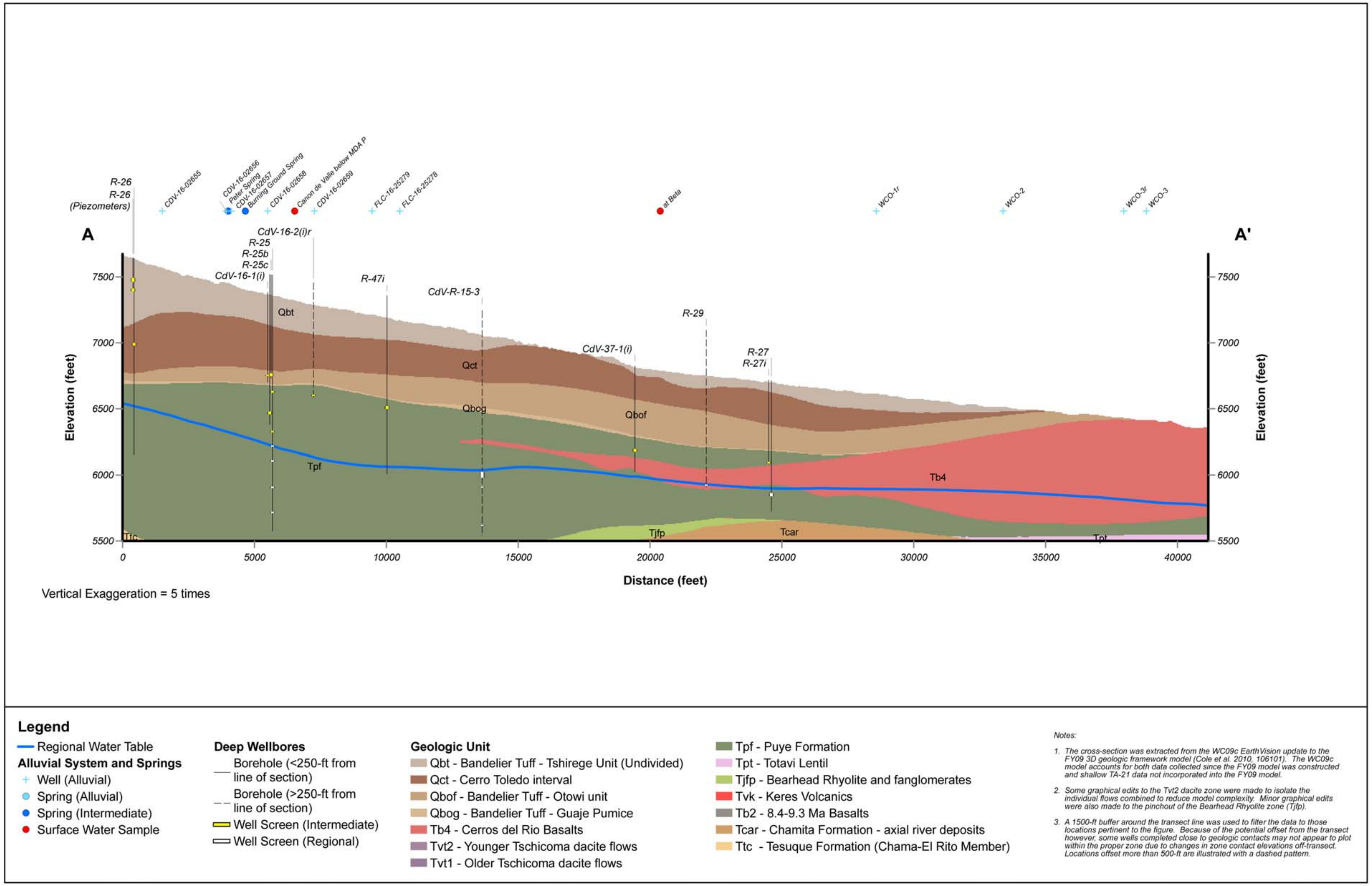

Figure G-2 Cross-section A–A' Water Canyon/Cañon de Valle

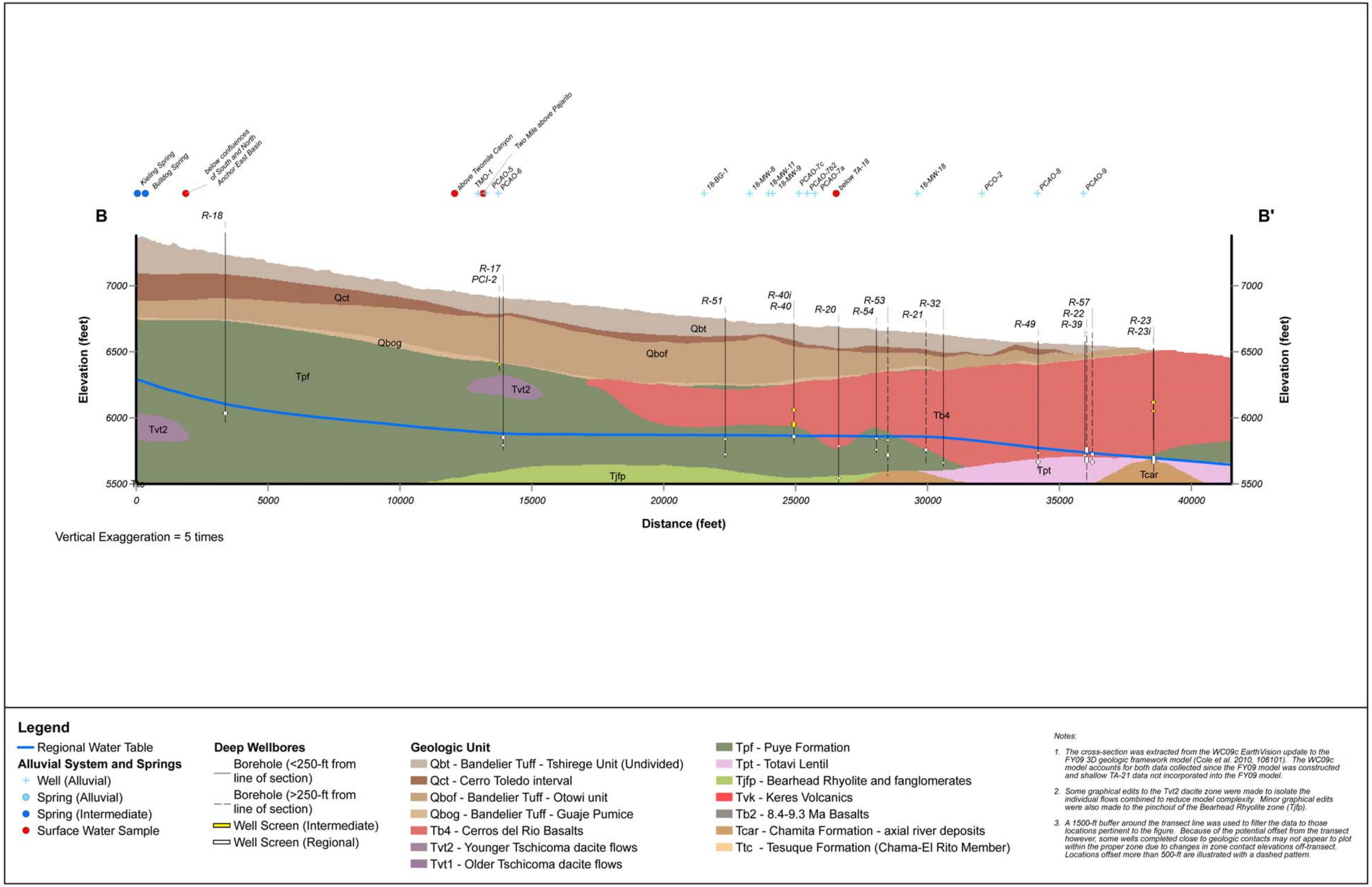

Figure G-3 Cross-section B–B' Pajarito Canyon

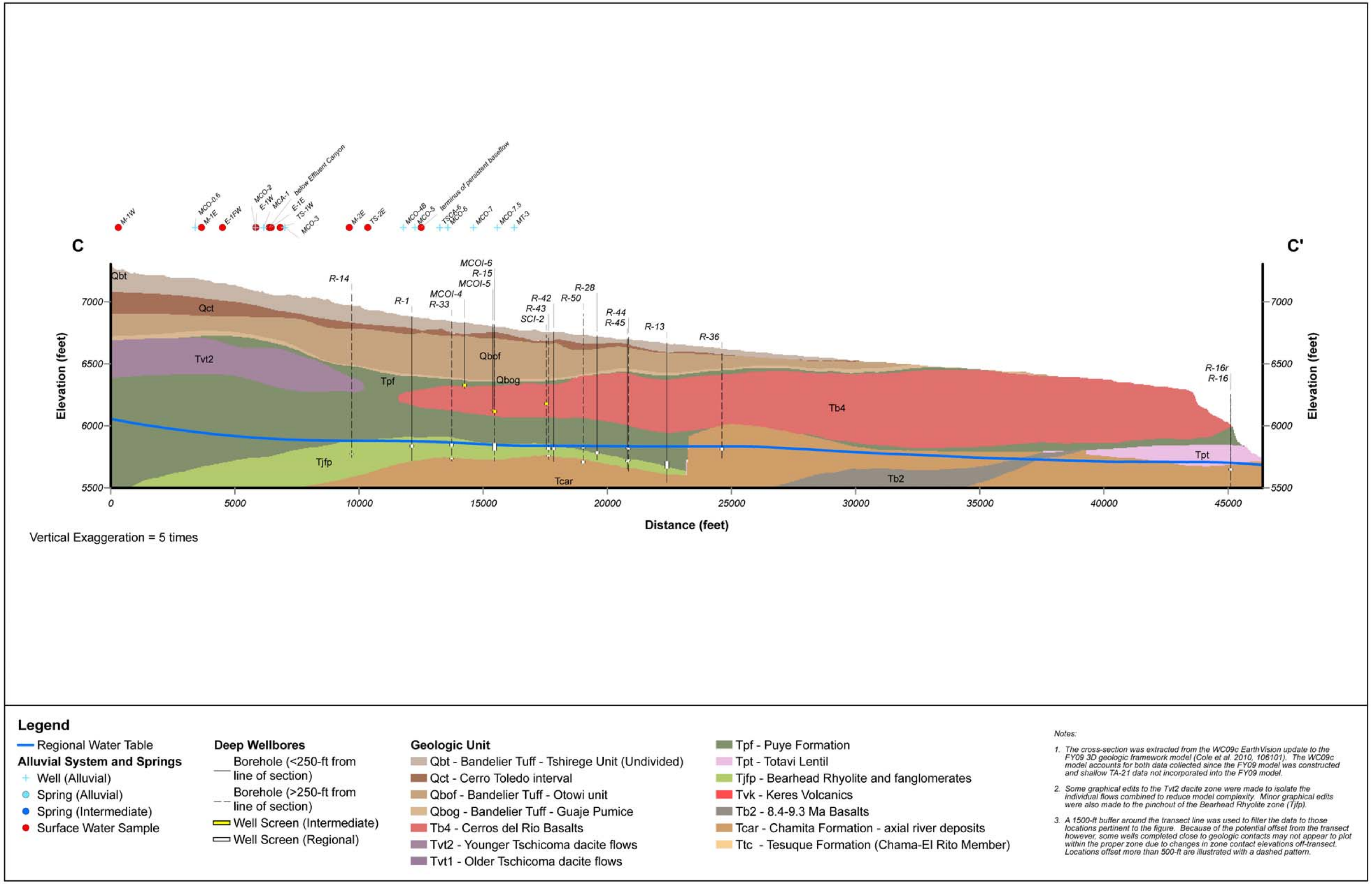

Figure G-4 Cross-section C–C' Mortandad Canyon

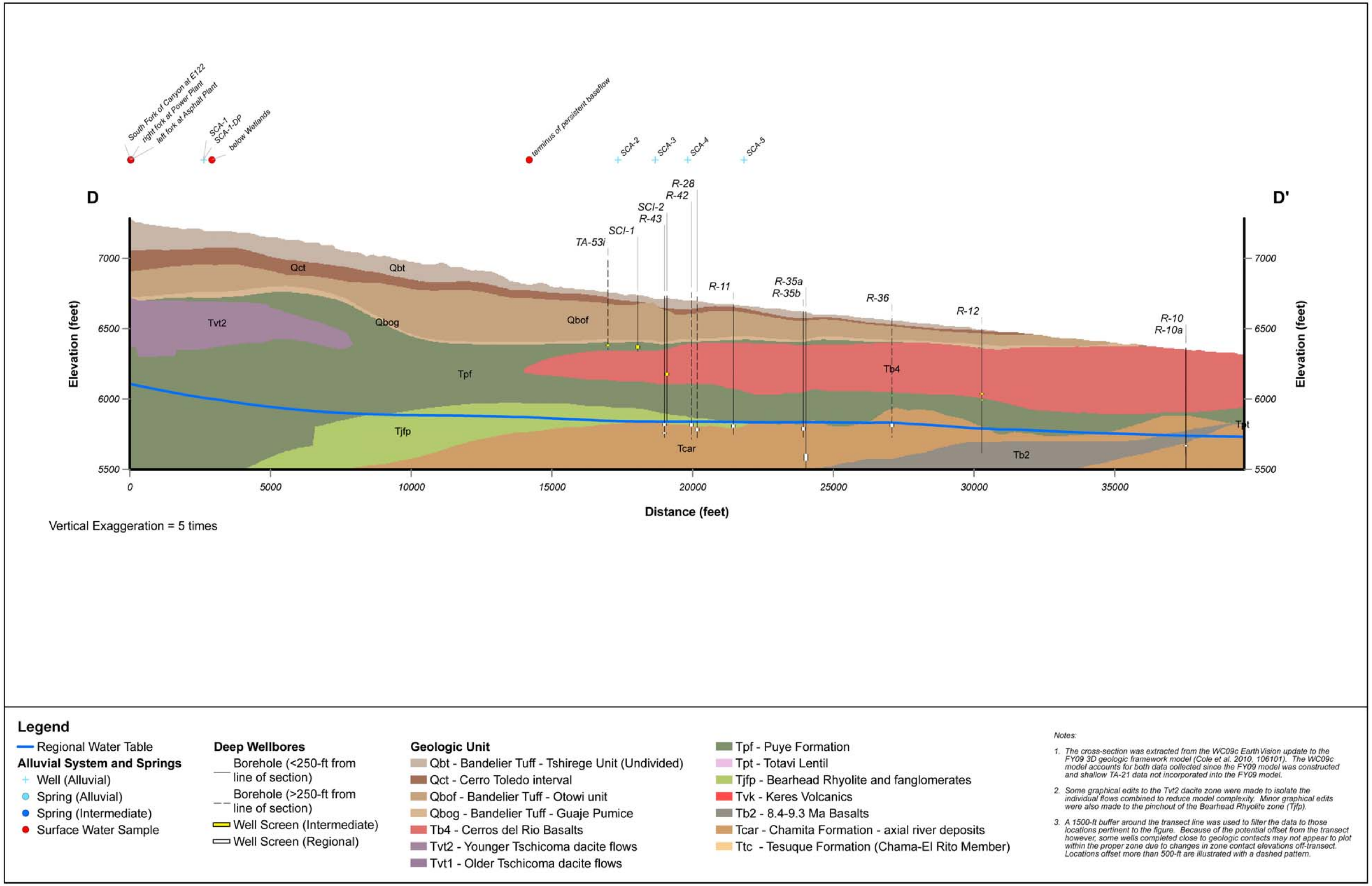

Figure G-5 Cross-section D–D' Sandia Canyon

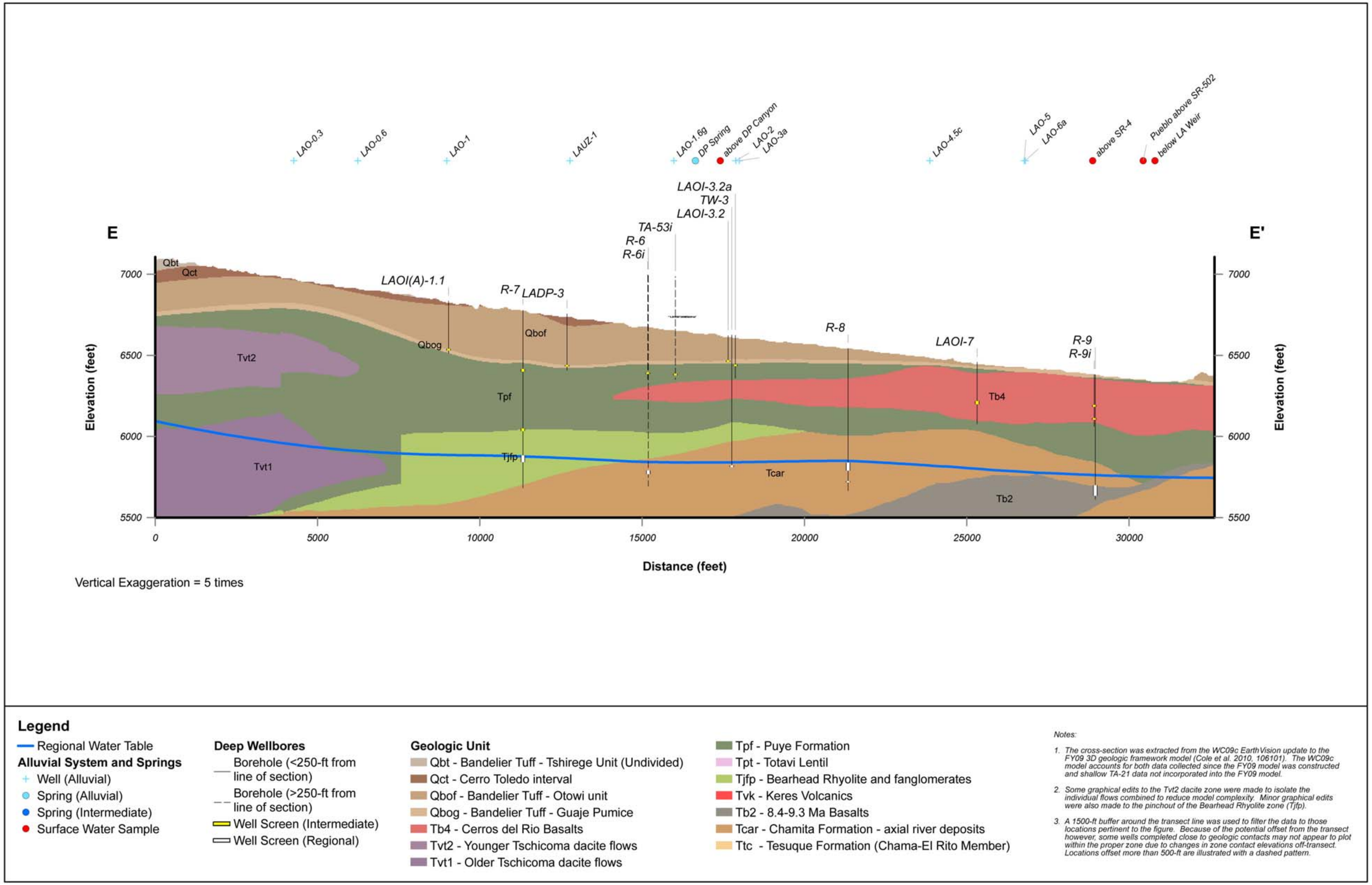

Figure G-6 Cross-section E–E' Los Alamos Canyon

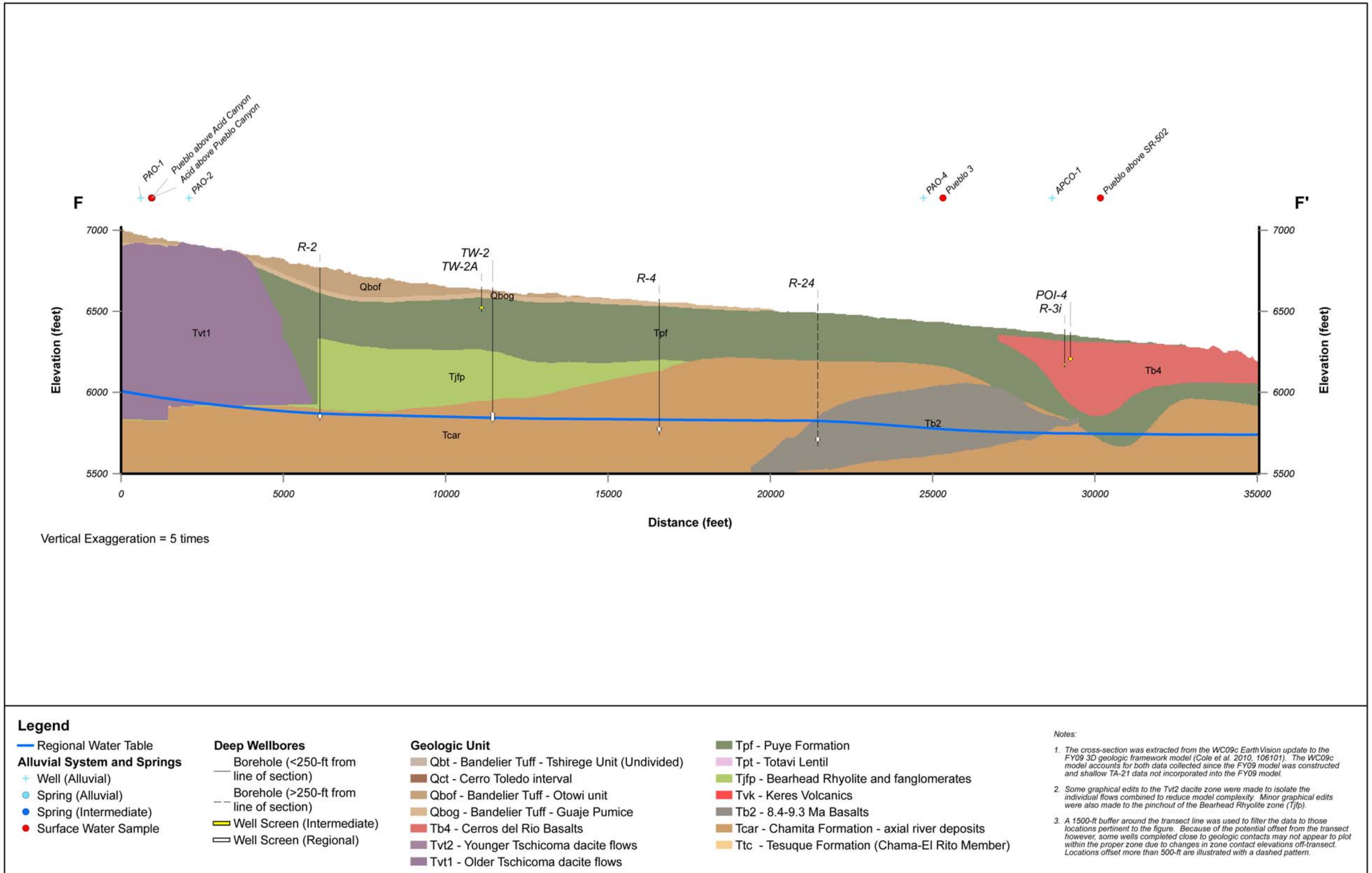

Figure G-7 Cross-section F–F' Pueblo Canyon

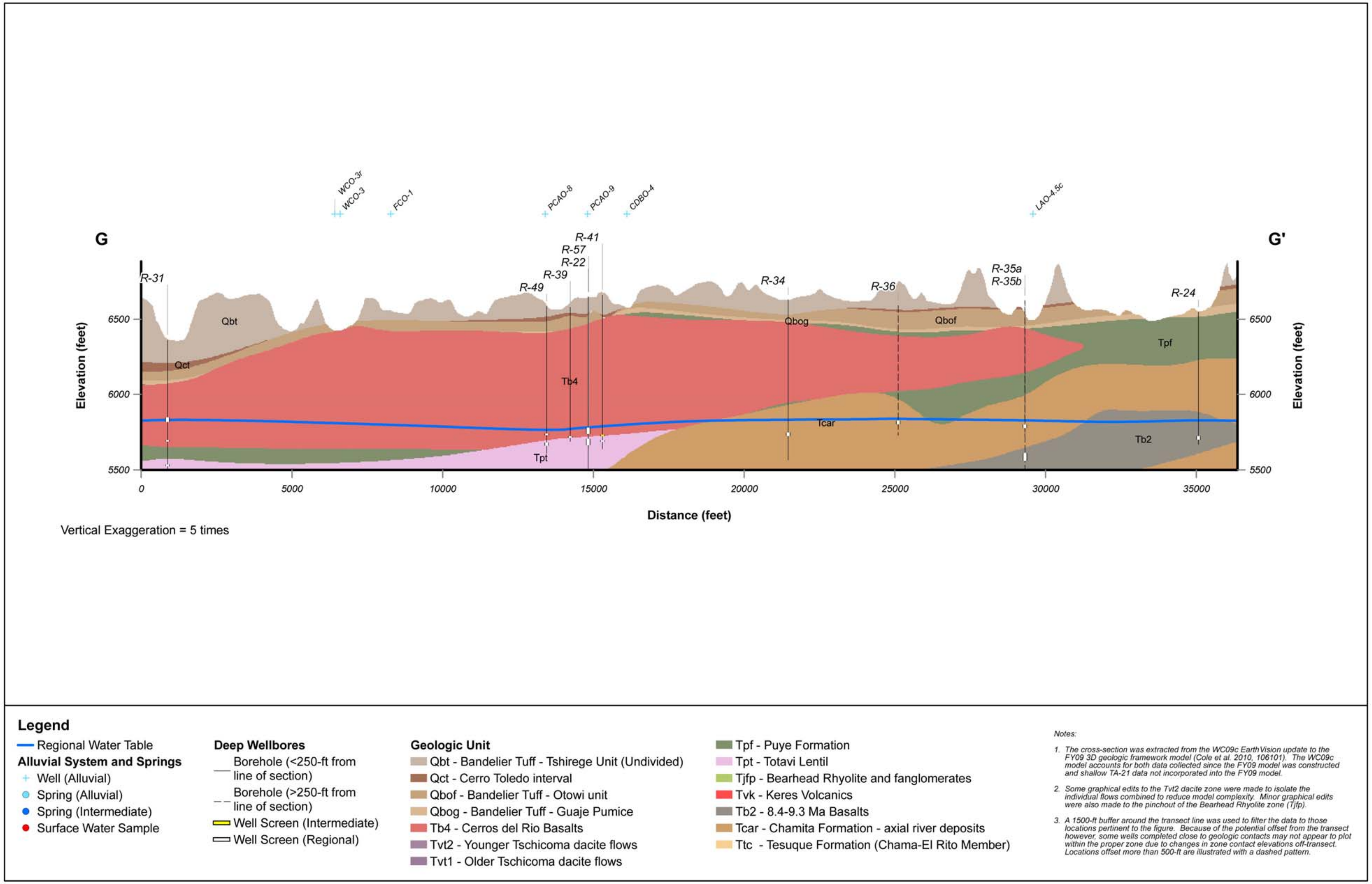

Figure G-8 **Cross-section G–G' lower canyon (north-south)**

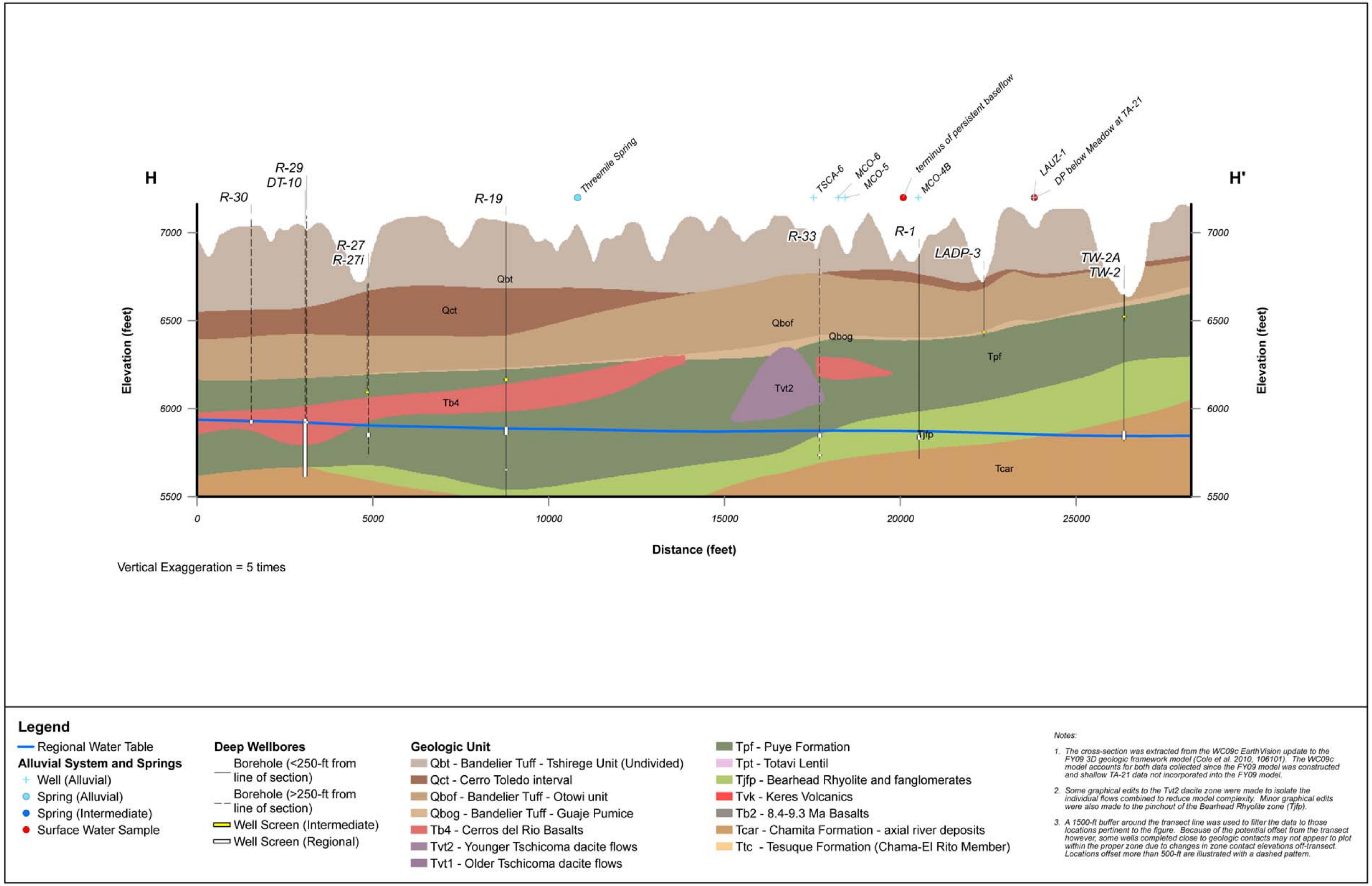

Figure G-9 Cross-section H–H' middle canyon (north-south)

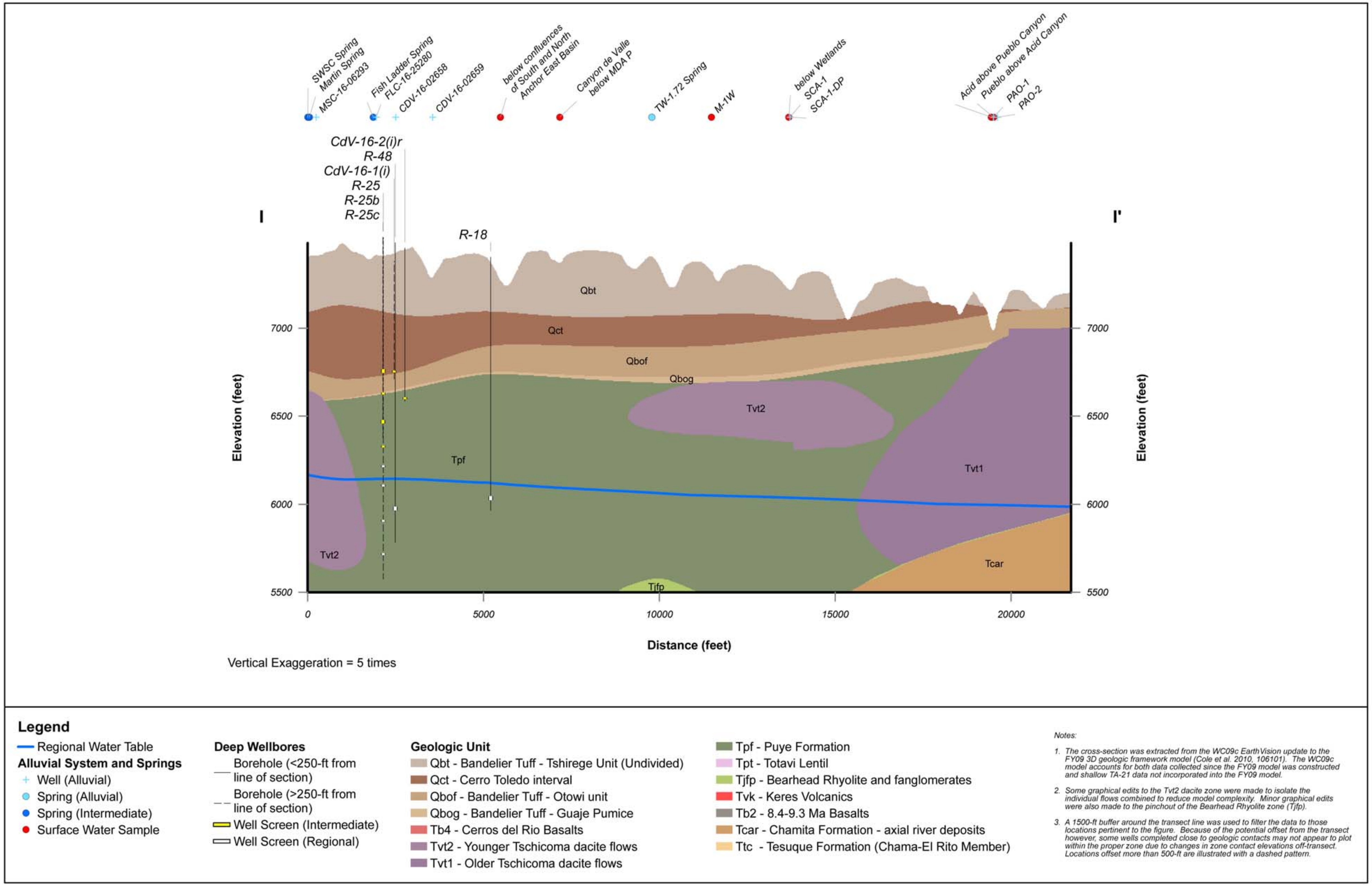

Figure G-10 Cross-section I–I' upper canyon (north-south)